CHUGACH STATE PARK AVALANCHE INFORMATION CENTER FEASIBILITY STUDY

Jon Gellings *
Alaska Pacific University, Anchorage, Alaska; United States Forest Service, Girdwood, Alaska
Eeva Latosuo
Alaska Pacific University, Anchorage, Alaska
Blaine Smith
Alaska Avalanche School, Anchorage, Alaska; Alaska State Parks, Anchorage, Alaska
Ian Thomas
Alaska State Parks, Anchorage, Alaska

ABSTRACT: This feasibility study aimed at determining what it would take to provide avalanche information advisories with the state agency of Alaska State Parks. This study included determining visitor use, public support, and what infrastructure would be needed to start and continue operations. Out of 272 people who took a survey through this study, an overwhelming majority thought that there is a need for an avalanche information advisory program, and would use the service if it was provided. The four areas of highest use according to the survey include the Rabbit Creek Valley and Powerline Pass area (Flattop Peak), South Fork Eagle River area (S.F.E.R.), and Arctic Valley area (Rendezvous Peak area). The majority (72%) of people would be willing to pay between $1-50 per year. Respondents felt that the program should be funded by both the state and a non-profit group. If a qualified Specialist currently working for the park was to start avalanche forecasting for the area, 1 ridge top weather station would be needed for wind measurements, and an additional budget of $2000 would be needed to fund it for the first year to pay for high-speed internet and a new computer. The program would start with 1 full-time employee writing advisories 2-3 days a week. This program is currently feasible as a Type 3 Avalanche Center with room to expand in the future, and would be a great resource for public safety information.

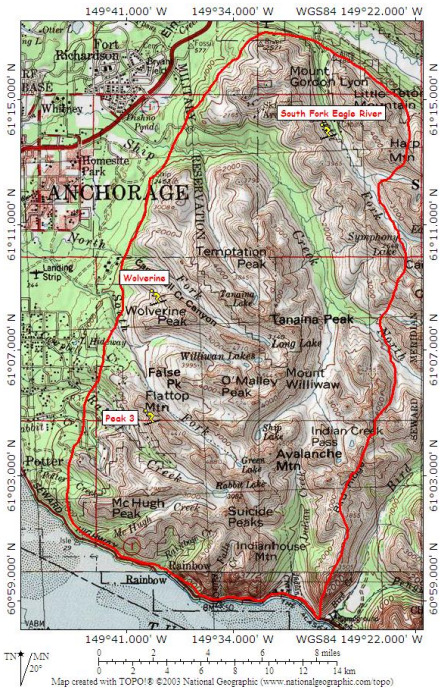

Figure 1: Suggested Avalanche Advisory Area

* *Corresponding author address:*
Jon Gellings, United States Forest Service, Girdwood, AK, USA 99587; tel: 920-960-6982; email: jgellings@gmail.com

1. INTRODUCTION

After being up here in South Central Alaska for over 4 years, and becoming an avid backcountry snowboarder who enjoys riding in terrain suitable for avalanches, I find that there should be an avalanche information center posting bulletins about the current avalanche danger for the Front Range Mountains next to Anchorage. Many people do not realize they support avalanche forecasting any time they drive from Anchorage to Girdwood, or that there is no forecasting for the avalanche-prone slopes hanging to the East of the city lights. There used to be a program set up from 1981 (AKDOT, 2005) to 1986 (Ryan, 2003) for the Front Range mountains as well as the Turnagain Pass Area, but funding went dry and it collapsed. Doug Fesler, the pioneer of this disbanded program, is still regarded as one of the foremost avalanche experts in the United States, and has had many high profile students come out from under his wing. Yet, the avalanche hazard for these mountains next to Anchorage is not currently forecasted. Turnagain Pass (not Turnagain Arm) has had an avalanche information program started up again in 2000 as an Avalanche Information Center (AIC) core advisory area by Carl Skustad of the USDA Forest Service, and has been a growing success over the years. A core

advisory area is a mountainous location that has avalanche forecasts or advisories produced for winter recreationist consumption. This area is located within the boundaries of the Chugach National Forest, which is managed differently from Chugach State Park; the Forest is governed by the federal government, while the Park is managed by the State of Alaska. The goal of this study was to determine what it would take to get an AIC started for an area of Chugach State Park, and if the needed resources are available. The project objectives following allowed me to examine if the mountains close to Anchorage have enough visitor use and public support to get a program of avalanche forecasting for the suggested core advisory area (Fig. 1) started, and they are as follows:

1. Determine the visitor use of Peak 3, Wolverine Mountain, and South Fork Eagle River during avalanche season using a trail counter at each location.
2. Determine areas of use, and public support for an AIC via a survey in both the field and online.
3. Determine if people would be willing to pay money to fund the AIC.
4. Determine what amount of staff would be necessary for the suggested area.

Everybody living in the Municipality of Anchorage (282,813 in 2006, or 42.2% of Alaska's Population (Fison, 2007) actually lives within 15 miles of avalanche terrain. Consequently, it has the possibility of attracting many non-avalanche educated people into the avalanche prone area. Wouldn't it be nice for backcountry recreationists to have a resource that alerts you to hidden instabilities, so a person could plan accordingly to not trigger avalanches in these areas?

People are getting killed in snow avalanches more often now than in the past throughout the United States and Canada (CAIC, 2007). This is mostly due to an increase in recreation and ease of access to avalanche terrain. Alaska is no exception, and is currently in second in amounts of avalanche fatalities. Between 1998 and 2008/09, Colorado lead the way in shear amounts of avalanche fatalities at 57, but Alaska was right on it's heels with 50, followed by Montana at 44 (CAIC, 2009). This is actually more frightening for Alaska however, because when you bring to mind the differences in state population, you find that Alaska has many more deaths per capita than any of the other states. Chugach State Park has experienced 12 different fatal avalanche accidents between 1952 and 2008, while there have been 11 different fatal avalanche accidents within the Chugach National Forest Glacier Ranger District (Friends of CNFAIC, 2008). This is excluding another fatal incident in Chugach State Park in 2010, and in the Chugach National Forest in 2009 and 2010. The difference is that the Chugach National Forest has an avalanche information center, while the Chugach State Park does not. Although fatalities are on the rise nationally (UAC, 2009), so are advancements in technology. With more people accessing the backcountry with ease, more potential avalanche triggers will happen. It is important for the growing avalanche community to have another resource along with educational classes for obtaining current and pertinent avalanche information.

Alaska is the second deadliest state for the amount of people killed in avalanches during the past 59 years (CAIC, 2009). The people getting killed are both trained and seasoned outdoors people, as well as teenagers on their first backcountry outing. Plus, the Anchorage Front Range holds Flattop Mountain, which is considered Alaska's most popular climb (ADN, 2009). People come from all over the world to hike to the top of this mountain, because it has scenic views of the Chugach Mountains, Cook Inlet, Turnagain Arm, Denali, and the Tordrillo Mountains. Even though it seems like a fairly benign peak to some locals, the trail leads directly into avalanche terrain. People don't stop hiking it during winter either, and many use the same route as in the summer. A person is able to cross this area when the snow is stable, but many people hiking it do not know anything about avalanche dangers. Some people have taken educational avalanche classes and have learned how to interpret stability test observations, meaning that they have the knowledge to perform and assess these tests. However, it is impractical for those seeking recreation to spend a lot of time on stability tests or snowpack observations that require digging a pit (Campbell, 2006).

There is a lot of avalanche terrain in the park, and the skiing history here dates back to the early 1940's (ALSAP, 2009). There was a site called Rabbit Creek Rope Tow, but was abandoned before a great historical record was established. This was close to the area known today as Peak 3, and skiing is still one of the main winter activities in this area. There was a resort proposed in Eagle River Valley during 1987 that was supposed to be infrastructure for the Anchorage Olympics bid in 1994. Ultimately, this endeavor was determined unfeasible and was scrapped, but the overall message is that people come to this

area to go skiing anyway. The proposed site of the resort is located within the valley known as South Fork Eagle River, which is a current popular backcountry area. In this project, these two popular backcountry areas, along with another at Wolverine Peak, were used to determine visitor use. All of these sites are located within the proposed AIC core advisory area.
The CSPAIC (Chugach State Park Avalanche Information Center) would employ Avalanche Specialists hired by Chugach State Park, unless it was a fully-functioning non-profit group, to assess the snow for avalanche danger over the course of a winter season for a large area of Chugach State Park. These Avalanche Specialists would collect information from various instability tests, observations, and meteorological data. They would then interpret the information gained for the public to listen to via the telephone, and view on the internet for additional information about the snowpack. The proposed outcome of this project will benefit Alaska Pacific University (APU) by opening up future opportunities to students, Chugach State Park and the State of Alaska by implementing a public avalanche information resource to possibly reduce avalanche incidents and cut down on the amount of costly organized avalanche rescues, and the community of backcountry enthusiasts in and around Anchorage by enabling them to have the option of using a professional Avalanche Specialist's advice on pertinent avalanche concerns while travelling around the park.

2. METHODS

2.1 Trail Counters

Trail counters were used to monitor visitor use and determine if people go out more often during different times of the winter season, as well as to determine which location gets more actual use. A Diamond Traffic Products 2-part trail counter was used, of which 1 part transmits and receives an IR beam, which is reflected off the 2nd part (circle reflector). Repeat visits are accounted for during this study, and any person/animal going through the trail counter beam would be counted every time the IR beam was broken. It was assumed that every person going up the trail came right back down the same path, so the total count every week on Monday was divided by 2 to give an overall weekly use amount at each location. Monitoring visitor use in Turnagain Pass is done every weekend day by Forest Service employees, in which they count vehicles parked at designated pullouts throughout the pass. An unpublished average vehicle ridership study by a Forest Service employee in this area showed that 2.5 people per vehicle recreate here during this time, so this information was used to determine how many people are recreating each weekend. Ridges and troughs of use were compared between Turnagain Pass and Chugach State Park to determine a relationship between how people use the areas.

2.2 Public Support Survey

A survey with 7 qualitative questions was used to understand how people feel about necessities required to starting an avalanche center. Descriptive statistics were used to interpret answers to the survey questions. The questions were unbiased and offered options for favorable or unfavorable answers relative to starting operations. Participants who accessed CNFAIC avalanche advisories and CSP snow reports were used to give an idea of how often the demographic looks at current avalanche conditions in the Chugach National Forest. The same method was used to determine how often participants recreated in the Park more than once a week, how many felt there was a need for the program, how many wanted and would use the program, and how they felt about funding options for the center. Yearly possible funding contributions from the public were interpreted by taking the smallest and largest possible amounts from each group and giving an amount of funding possible between the two to help provide for funding estimations from year to year. Locations of highest visitor use were determined to help narrow down the areas of most avalanche hazard concern to allow for greater attention while the operation is small. These areas can expand throughout time as the program gains support and more resources.

2.3 Program Infrastructure and Funding Needs

Interviews were conducted with professionals in the field, including Carl Skustad of the Chugach National Forest and Tom Harrison of Chugach State Park, to determine the necessary components of running a center. This was also conducted to find out if any of these components are currently available for exclusive use if the program was determined feasible and was implemented. To determine what amount of funds were needed to start and carry the program through the years, a suitable type of avalanche center for this program was needed to be suggested. A Type 3 avalanche center is suggested, so the budget would be based off

recommendations from the National Avalanche Center.

3. RESULTS

3.1 Trail Counters

Results indicate that Wolverine Peak had the highest average visitor use per week (mean=242.3, n=18), Peak 3 was second (mean=179.6, n=18), and S.F.E.R. had the lowest average visitor use per week (mean=92.52, n=18). Peak 3 had the highest growth between 2 weeks (586% difference), S.F.E.R. was second (330%), and Wolverine had the lowest growth between 2 weeks (177%). These were all during the first storm during the recorded period in which 12+ inches of snow fell in the area. All areas had the lowest use during the week after a local resident was killed on February 13th due to a hard slab avalanche.

When compared to visitor use in Turnagain Pass, there is almost an inverse relationship between the two places. When use increases in Chugach State Park, use decreases for Turnagain Pass, and vice versa. Two notable discrepancies to this rule occurred during a stretch of clear weather at the end of January, and during Spring Break. During both those times, use increased at both areas. All areas received a decrease in use the week after 3 fatalities occurred on February 13, 2010. When looked at next to the counted weekly winter recreationists by area graph below, it becomes apparent that winter use increases from week to week most often when more than 1" new snow falls.

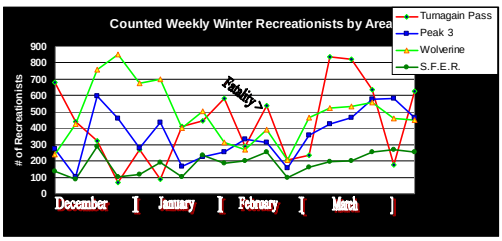

Figure 2: Counted Weekly Winter Recreationists by Area

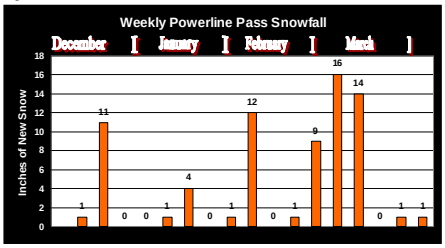

Figure 3: Weekly Powerline Pass Snowfall

3.2 Public Support Survey

Surveys were solicited in person at Glen Alps Parking Lot, Peak 3 trail, Prospect Heights trail, and S.F.E.R. trail, as well as at BLM Winter Trails Day and the Alaska Avalanche School Fundraiser Movie Night at Grant Hall on the Alaska Pacific University campus. Online versions of the same survey were solicited for dispersal to Alpenglow Ski Area, Alaska Mountaineering Club, American Mountaineering Club- AK chapter, Alaska Avalanche School, Ascending Path, North American Outdoor Institute, Friends of Eagle River Nature Center, Chugach State Park Advisory Board, Alaska Search and Rescue, and Alaska Mountain Rescue Group. It was also available online at Chugach State Park's Snow Report webpage, and the Chugach National Forest Avalanche Information Center's Turnagain Pass and Summit Lake Area advisory pages. This target-market of backcountry recreationists garnered a large amount of users (n=272) from different groups that recreate in the area during the winter months, and covers over 1% of the total estimated target population in the area for the year 2010 (23,674.2 backcountry skiers). Here is how they answered the questions:

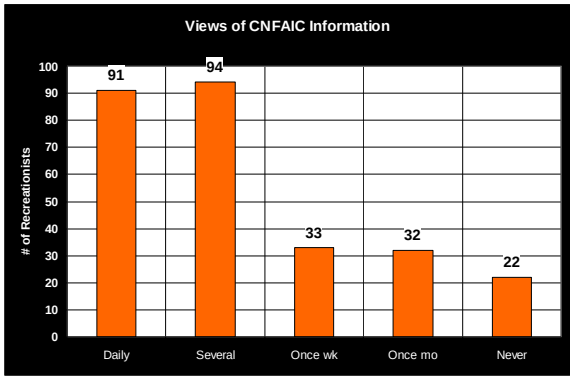

Figure 4: Views of CNFAIC info (n=272)

68% of participants view current avalanche information for a different area either daily or several days per week. This shows that a majority of recreationists would likely use a similar product for a close proximity recreation area.

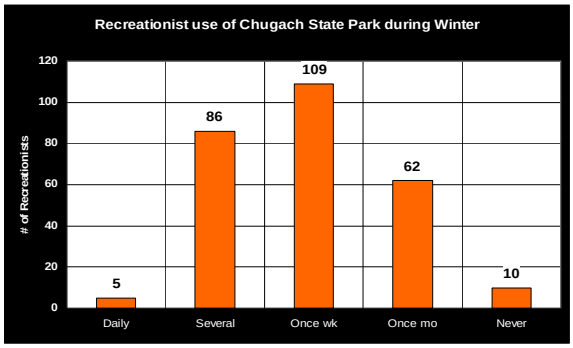

Figure 5: Recreationist use of CSP (n=272)

Only 37% of participants recreate in Chugach State Park more than once a week, with only 1.8% of participants recreating here daily. Everybody that does not recreate here daily needs some help gaining information about the current avalanche hazard.

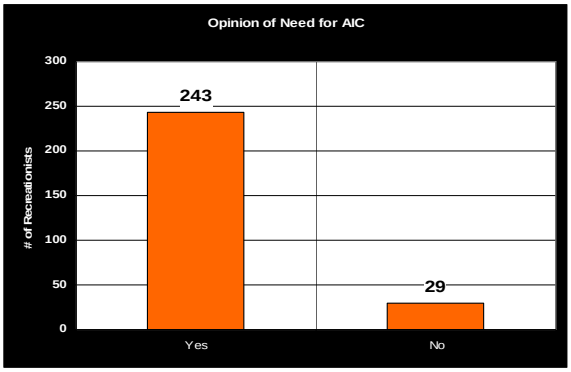

Figure 6: Opinion of need (n=272)

89% of participants feel there is a need for current avalanche information in the area. This is underwritten by the large amount of avalanche terrain that is easily accessible from trails permeating the park.

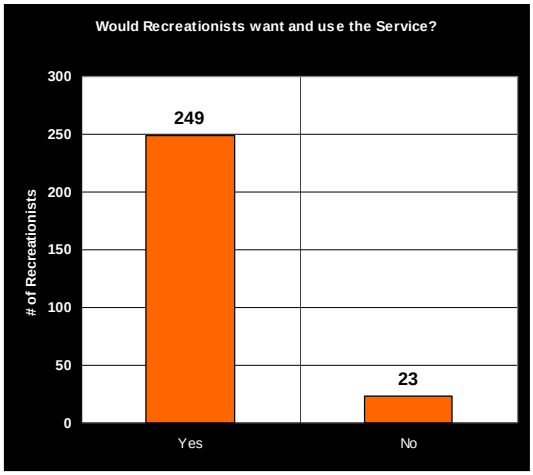

Figure 7: Would they want and use it? (n=272)

92% of participants want and would use the program's avalanche information advisories. The past two graphs show that more people would use the information than think it is needed.

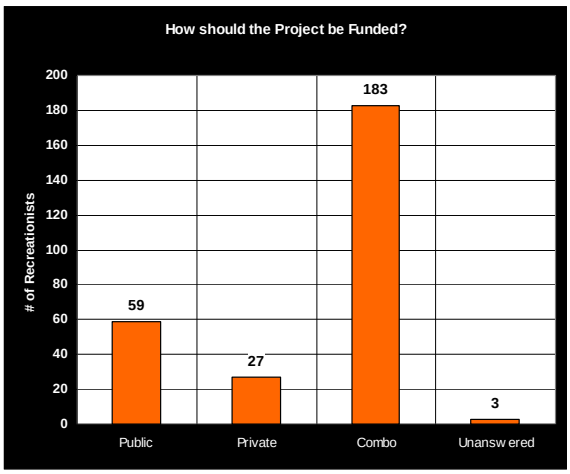

Figure 8: How should it be funded? (n=272)

67% of participants thought that the program should be supported by a combination of funds from the state government and a non-profit group. This combination of government and non-profit organizations is how most of the avalanche centers in the United States are funded.

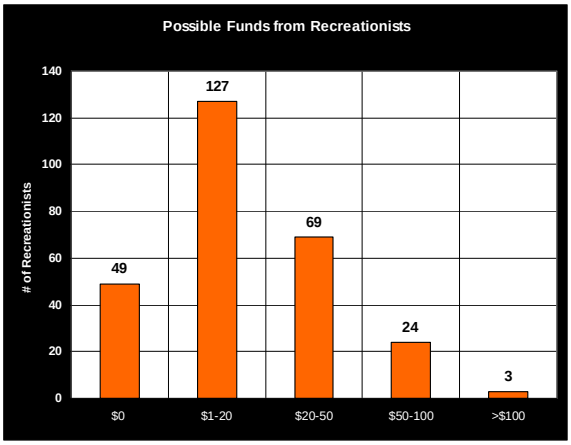

Figure 9: Possible funds from recreationists (n=272)

65% of participants would spend between $0-20 on the program every year. The participants that answered >$100 were assumed to donate $100 dollars/year for the purpose of this study. With this in mind, the survey participants would theoretically fund the center with between $2407 and $8090 every year.

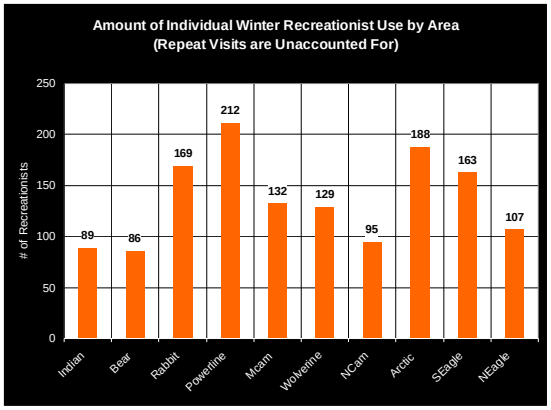

Figure 10: Individual use per area (n=272)

78% of participants recreate in Powerline Pass, while 69% recreate in Arctic Valley. On the other side of the ridge from these valleys, 62% recreate in Rabbit Creek Valley, and 60% recreate in South Fork Eagle River. Since the majority of winter recreationists use these areas, avalanche information advisories should be concentrated to these two areas at first; a possible expansion in the proposed core advisory area could be introduced in the future as the program itself expands, but should be limited to areas within the proposed core advisory area mentioned in the introduction.

3.3 Program Infrastructure and Funding Needs

It was determined that many aspects of infrastructure are currently lacking for implementation, including 2 snow machines and a snow machine trailer, 1 ridge-top weather station, high-speed internet and a computer, and trailhead signs used to educate people on how to access current avalanche information. If a Chugach State Park Specialist directed the program in the future, several things would be available for use. These necessities include office space at the Eagle River Parks Maintenance Shop, website to relay information on the Friends of CNFAIC.org website, an avalanche hotline on a CSP cell phone, a 4x4 truck, temporary use of a snow machine and snow machine trailer, and 1 snow-pillow weather station at Powerline Pass. Then the needed infrastructure includes 2 ridge-top weather stations on the Flattop and Rendezvous Peak ridge lines, high-speed internet with a computer, and signs. Eventually, snow machines with a trailer should be purchased, but is currently unnecessary. Cost of upkeep for these resources would need to be figured in to future budget allocations.

4. DISCUSSION

There is a perceived need for avalanche forecasts in the Chugach State Park Front Range, and people want and would use the service if it was made available. Almost ¾ of the targeted people use current avalanche information for a nearby location. About 2% of the people use Chugach State Park enough to continually assess the avalanche hazard throughout the week, while the other 98% need help keeping an eye on changing conditions.

The program should be funded by both the state as well as a non-profit Friends group, and the center could estimate between $2407 and $8090 from public donations every year, both of which are more than the projected first year's funding needs of $2000; the program could be sustained at this level for several years with these projected donations.

Several weeks show similar trends between locations in the park, meaning that people generally either stay at home or go out more often during similar times at all locations. The majority of observations should be taken from the Flattop area, as well as the Rendezvous Peak area, since these areas are the most recreated during the winter. People stayed at home after reports of fatalities either due to fear of misinterpreting the snowpack stability, or due to obvious signs of instability; however, anecdotal data shows that fear was the contributing factor. Hatchers Pass has a large contingency of winter recreationists as well, so it would be beneficial if a study similar to this one was conducted for that area.

Monitoring winter visitor use should be studied more in-depth to find out just how many people are actually backcountry skiers by monitoring trailheads every weekend for both days in entirety. The trail counting sensors were placed high enough that dogs were unable to trip the sensor and be included in the count. However, moose in the area were definitely able to set it off as well. Only one moose track crossed the beam at S.F.E.R. during the time the trail counters were in position; no others were noticed.

After obtaining all information, a Type 3 avalanche center is currently recommended for Chugach State Park, with room to grow in the future. Whenever avalanche information advisories are produced for Chugach State Park, the product will be well received by the public, and will attempt to save lives that could otherwise be unnecessarily taken by avalanches.

5. REFERENCES

AKDOT (2005). Addendum to Appendix J: Snow Avalanche Report. *Juneau: AES.* Retrieved 1-13-2010 from http://www.dot.state.ak.us/stwdplng/projectinfo/ser/juneau_access/assets/FEIS_06/Appendix_J_add.pdf.

Alaskasnow (2009). Valdez Avalanche Bulletin. *Alaska Avalanche Information Center.* Retrieved on 10-18-2009 from http://alaskasnow.org.googlepages.com/avalanchebulletin.

ALSAP (2009). Chugach State Park Proposed Ski Areas. *Alaska Lost Ski Area Project.* Retrieved on 10-10-2009 from http://www.alsap.org/ChugachStatePark/ChugachStatePark.htm

Avalanche (2009). Definition. *Merriam-Webster Online Dictionary*. Retrieved 10-17-2009, from http://www.merriam-webster.com/dictionary/avalanche.

Avalanche.org (2009). Avalanche Centers. *American Avalanche Association.* Retrieved 10-18-2009 from http://www.avalanche.org.

Birkeland, K.W., & Chabot, D. (2006). Minimizing "False-Stable" Stability Test Results: Why Digging More Snowpits is a Good Idea. *International Snow Science Workshop, 2006,* 498-503.

Bowker, J.M. (2001). Outdoor Recreation by Alaskans: Projections for 2000 Through 2020. *USDA Forest Service Pacific Northwest Research Station.* Retrieved on 1-14-2010 from http://www.fs.fed.us/pnw/pubs/gtr527.pdf.

CAIC (2009). Avalanche Fatalities by Winter. *Colorado Avalanche Information Center.* Retrieved on 1-13-2010 from http://avalanche.state.co.us/acc/acc_images/Slide9.JPG.

CAIC (2009). Avalanche Fatalities by State. *Colorado Avalanche Information Center.* Retrieved on 1-13-2010 from http://avalanche.state.co.us/acc/acc_images/Slide6.JPG.

Campbell, C., Jamieson, B., Haegeli, P., Schweizer, J. (2006). Can Stability Tests Help Recreationists Assess the Local Avalanche Danger? *International Snow Science Workshop, 2004,* 468-477.

Campbell, M. (2009). Hike into the Sky. *Anchorage Daily News, 8-31-09.*

CBJ (2009). Urban Avalanche Advisory. *City/Borough of Juneau.* Retrieved on 10-18-2009 from http://www.juneau.org/avalanche.

CNFAIC (2009). Current Advisory. *Chugach National Forest Avalanche Information Center.* Retrieved on 10-18-2009 from http://www.cnfaic.org.

COC (2009). Local Avalanche Conditions. *City of Cordova.* Retrieved on 10-18-2009 from http://www.cityofcordova.net/AvalancheConditionsPage.htm.

DeLorme (2001). Alaska Atlas and Gazetteer. *Delorme, 2001,* 5.

Diamond Traffic Products (2008). Trail Counter Field Manual-TTC-4420.

F-CNFAIC (2008). Avalanche Accidents with Fatalities: South Central AK 1952-2008. Retrieved 10-7-2009, from http://www.cnfaic.org/maps.php#accidents

Fison, S. (2007). Anchorage Indicators: General Demographic Indicators. *Anchorage Sourcebook*. Retrieved on 1-13-2010 from http://www.muni.org/Departments/OCPD/Sourcebook/PopulationTrends.pdf.

Friends (2009). *Friends of the CNFAIC Newsletter*. Volume 1, Issue 2. 10-8-09

Glude, B. (2004). The AK Block, a Sized-Block Snow Test. *International Snow Science Workshop, 2004,* 153-160.

Greene, E.M., Birkeland, K.W., Elder, K., Johnson, G., Landry, C., McCammon, I., et al. (2009). New Observation Guidelines for Avalanche Programs in the United States. *International Snow Science Workshop, 2004,* 161-164.

Harrison, T. (2009) Necessary Infrastructure Availability Interview. November 16, 2009

Hill, M., Wiesinger, T., & Abromeit, D. (2004). Avalanche Forecaster Exchange Program U.S. –

Switzerland. *International Snow Science Workshop, 2004,* 172-176.

Jamieson, B., Haegeli, P. (2008). Can Field Observations be Combined Systematically with the Regional Danger Rating to Estimate the Local Avalanche Danger? *International Snow Science Workshop, 2008,* 228-237.

LaChappelle, E. (1965). Avalanche Forecasting: A Modern Synthesis. United States Forest Service, 1965.

McClung, D., Schaerer, P. (2006). The Avalanche Handbook. Seattle: *The Mountaineers Books.*

NAC (2001). Forest Service Backcountry Avalanche Program Business Plan. *USDA Forest Service National Avalanche Center,* (2001).

Rossman, J. Robert., Schlatter, B. (2003). Recreation Programming: Designing Leisure Experiences. Champaign: *Sagamore Publishing.*

Ryan, M. (2003). Ice Capades. Washington: *Smithsonian Magazine.* Retrieved on 1-13-2010 from http://www.smithsonianmag.com/science-nature/ice.html.

Savage, S. (2006). Deep Slab Avalanche Hazard Forecasting and Mitigation: The South Face at Big Sky Ski Area. *International Snow Science Workshop, 2006,* 483-490.

SEAAC (2007). State Forecast Center Budget. *Southeast Alaska Avalanche Center.* Retrieved on 3-16-2010 from http://www.avalanche.org/~seaac/PDFs/20071024StateForecastCenterBudget.pdf.

Skustad, C. (2009). Avalanche Center Necessities Interview. February, 13, 2009

Tremper, B. (1993). Life and Death in Snow Country. *Earth.* Mar. 1993, Vol 2, Iss 2, p34.

Tremper, B. (2008). Staying Alive in Avalanche Terrain. Seattle: *The Mountaineers Books.*

UAC (2009). U.S. Avalanche Fatalities by Year. *Utah Avalanche Center.* Retrieved on 1-13-2010 from http://utahavalanchecenter.org/resources/stats.

WWA (2006). Winter Recreation on Western National Forest Lands. Boise: *Winter Wildlands Alliance.* Retrieved on 1-14-2010 from http://www.winterwildlands.org/resources/reports/WWA_WinterRecreation.pdf.

Zimmerman, J. (1994). A Naturalist's Guide to Chugach State Park. Anchorage: *A.T. Publishing and Printing.*