

6-15-2013

Into the West: A Journey to Big Sky Country for Ski Mountaineering

Chris Makowicki

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Into The West: A Journey to the Big Sky

Southwestern Montana Ski Mountaineering



Submitted in partial completion of the assignments for EXP 436:
Senior Expedition

By Chris Makowicki, Bobby O'connor and Dan Nesel

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Abstract

The Madison range is nestled in the south west corner of Montana right between Yellowstone and Bozeman. Surrounding southwest Montana are the Bridger, Madison, Hyalite, Greater Gallatins, Absaroka and Beartooth range. This unsupported expedition will take place over a 14 day period. My team which includes Bobby O'Connor and Dan Nesel picked the Madison range for its amount of snow; in the northern range the mountains annually get 300 to 400 inches while the southern range gets 400 to 500 inches¹. This range I think is our best option not only because of snow but also because it is known for its low traffic of skiers, good spring skiing, some technical routes and some easy approaches. It holds the opportunity for us as expeditionary leaders to put our skills to practice, finding out what works and what doesn't. What follows is sample of peaks that we would like to mountaineer/ski mountaineer. These areas have little to no restrictions regarding permits for skinning and skiing which make it easier to camp in the backcountry. Following the end of the spring

¹ Werner, Ben. *The Bozeman and Big Sky Backcountry Ski Guide*. 1st ed. Werner software publishing, 2011. Print.

semester my team will be driving out to Montana which we plan on taking 4 to 5 days to get out to Bozeman. The fuel coast according to AAA (split between 3 people) for my Subaru forester will be 137 \$. With gas prices fluctuating from region to region my team will throw an extra 45\$ each. As far as food goes will we each allow ourselves a budget of 7\$ per person per day. This 7\$ budget includes the drive out and amount per day on the expedition as to not go over our purposed budget. In the event the weather does not cooperate we will follow out our contingency plan, heading further to the Pacific Northwest in the north cascades in Washington. If snow is still unsuitable we will follow out on mountaineering in or around Bozeman Montana in one of the many mountainous ranges to complete our requirements for 436 Senior Expedition.

Expedition Goals (Personal and Professional/Objectives)

Our team goals (personal and professional) are established so that as expeditionary students we can advance our knowledge and skills in our particular field. Advancing skills means more than just a simple list of tasks which we hope to be complete. It means establishing goals before the trip and reaching them during the trip. Professional goals are important to establish and reach because they can open opportunities to obtain jobs as professional ski guides, ski patrol or anything else in this particular field. Personal goals are focused on what we as individuals want to accomplish that might not be taught during a guide course or classroom setting. Personal goals require personal motivation. With that in mind this backcountry ski trip to Montana is something

we have dreamed about for a long time. To be able to drive out west where the snow and culture are much different than in the east coast is truly something we are looking forward to.

Professional Goal:

→ There are three professional goals we have established and want to reach by the end of this backcountry ski trip. Manage technical descents, leadership decisions, and assessment for terrain. Skiing in the backcountry especially out west will be much different than skiing the snow in the east. Managing the technical descents of myself and my team will be a challenge but a goal we plan to work toward. Before a line is skied, we will dig several snow pits (if necessary) at the bottom, middle and top of the ski line for snow stability. we will scope the line making sure our team knows to watch our partners on the descent down. Once one of us is down we can get to a safe spot and call another partner down to ski their line. Part of reaching this goal is to keep in mind factors on the trip that may seem fun but could cause potential hazards including avalanches or skiing falls that could end the trip for me or my teammates. Assessing terrain is our next professional goal. Assessing terrain in the backcountry could mean life or death and when the call is mine to make (as a guide) it's important that I make the appropriate call. Knowing the weeks forecast will help so I plan to have a weaver band receiver for the

backcountry area in Montana. If the conditions for the day range from high to extreme as a guide I would NOT take clients out therefore as a professional goal my team and I will NOT ski on days where the risk is that high. The final goal we hope to achieve is proper assessing of terrain. Part of this is understanding how avalanches can start. Before lines are skied we will check the snowpack at the bottom and the top of the peak. Slab avalanches occur when there's a heavy layer on top of a weak layer causing the slab to fracture and slide. Digging snow pits and assessing the layering system of the snow will help us determine what is safe to ski and what is not. This will also familiarize my team with the rutschblock and shear quality test. "These tests relate to how easy it is for a fracture to propagate through a given weak layer. The more energy, the more likely a fracture is going to propagate and set off an avalanche"².

Personal Goals

➔ Personal goals are objectives that we feel are not suitable for a professional goal. Working through this class so far has made us think of how much we want to focus on physical fitness during the duration of the trip. With this in mind the team has devoted (as seen on my Gantt chart) a

² O'Bannon, Allen, and Mike Clelland. *Allen & Mike's Really Cool Backcountry Ski Book*. 2nd. Helena: Morris Book Publishing, LLC, 2007. Print.

substantial amount of time to training aerobic and anaerobically. This is to prepare for the amount of skinning and skiing my group has prepared to do for the 12 days (weather permitting). Our goal, so far is to ski 8 peaks including Lone Mountain, Beehive Peak and Gallatin peak to name a few in the Madison Range. Then ski 4 peaks in the Bridger Range. We want to be able to push ourselves to the challenging level where there is a chance of failure where we may not be able to ski the amount of peaks listed. The reason behind this goal is we feel we have not pushed ourselves to difficult physical levels in a long time. This personal goal will continue long after were done with this trip. We want to push ourselves not only to expand our journals in the amount of peaks we've skied. Or maintain a healthy lifestyle but to one day ski up challenging peaks such as Denali where top physical fitness is a key aspect.

Senior Expedition Guidelines

1) Following Leave No Trace: As a backcountry skier, we will make LNT a part of our expedition. There are 7 principles to LNT, all applying to any expedition, though we have explained them in relation to our own.

1. Plan ahead and Prepare: If we need to gain permits to ski in Madison Range, Absaroka Range, the Bear tooth Mountains and the Greater Gallitans we will do so. These areas do have private property. For instance Beehive Basin's first mile has private property

along the sides of skin tracks and skiers have been issued citations for crossing over. My team and I will stay in bounds on legal terrain at all times. Our team will also plan ahead by calculating a budget that is reasonable for the team to afford. This means for example, keeping the entire budget of the expedition under 1,000 \$ including gas for driving out, food for the expedition, group equipment that needs purchasing including maps of the local area and personal clothing or equipment.

- 2. Travel and camp on durable surfaces:** Camping in the backcountry during the winter season requires camping on top of snow. Snow is a surface which is transitory and thus not affected by camping, the impact of boots, skis, tents mountaineering axes and crampons. My team will pack down snow and not dig pits to the ground to sleep on as this "will cause the ground to freeze and the detriment of subnivean and subterranean life"³. When travelling by skinning our group will try and use the same skin track as to establish a single track instead of spreading out.

³ Tilton, Buck, and John Gookin. *NOLS Winter Camping*. 1st. Mechanincsburg: STACKPOLE, 2005.

- 3. Dispose of waste properly:** As all outdoor trips go we will abide by the “pack in, pack out” method for all garbage, including toilet paper, food wrappers, and both food and human waste. This includes packing out feces; wag bags are an easy option because they can be light while traveling. Using a designated camp bathroom sites so as to not distribute urine all around camp and keep food garbage contained where animals can’t rip through bear canisters. The bathroom should be at least 200 yards away from base camp.
- 4. Leave what you find:** This is simple enough; any natural artifacts or structures are protected by the National Historic Preservation Act. They are therefore not to be stolen. This includes interesting rocks or pieces of wood. We will take a photograph instead to avoid fines and remain professional in outdoor etiquette.
- 5. Minimize Campfire Impact:** During our backcountry ski tour, fires will be extremely hard to make because finding dry wood in deep snowfields or snowy areas is hard to find. With that said, a clean way would be committing to no fires throughout the trip. The MSR XGK stoves will be in a contained area, most likely in the vestibule of the tent if the weather isn’t cooperating. If the weather is cooperating we will cook on snow screen pads outside the tent.

6. Respect Wildlife: This includes avoiding feeding animals, giving them space and understanding harmful situations that can arise in the backcountry. In the area surrounding Big Sky there are occasional sightings of Moose, Lynx, red tail squirrel and other small creatures. Keeping food safe and secure to will avoid contributing to animal dependency on the food we use on our trip. We will give these animals space because we do not want to scare animals away from their own land or disrupt hibernation cycles. This will reduce the impact we have on animals during a season where food is scarcer than summer.

7. Be considerate of other visitors: Our group will keep our campsite clean, keep the noise level of our voices at an appropriate volume and offer courteous greetings to other skiers in the area.

Following minimalist equipment ethics: Our packs will carry necessary equipment only. All the equipment I will use will be functional to the expedition. By functional I mean, skis will be used to ascend and descend mountains while ice axes and crampons will be used for self arrest for mountaineering skills. Other functional items include a beacon, shovel and probe to increase my safety net during the expedition.

Be Unsupported: This trip will be unsupported because I, Dan and Bobby will be without supervision during the expedition. It requires us

to use our own judgment and assess our risk. We will have all the food, equipment and clothing into the backcountry to ski different ranges near Bozeman, Montana. We will not be under the supervision of our professors. Being unsupported also means not stashing extra food in cars or taking day trips through the ranges. The expectation of the expedition is to carry in the necessary amount of food, and equipment to support the 2 weeks we spend out in the backcountry.

Advancing skills:

- After two weeks of skiing I hope to improve my form in ascents and descents of a mountain on skis.
- I plan to advance in navigation, specifically route selection and hazard assessments. I know that slopes are most likely to slide between 30 and 45 degrees which are usually the angles backcountry skiers enjoy. I plan to assess the wind direction, where cornice's develop, is there a good run out zone and doing snow stability test at the bottom and top of the ski line.
- As part of evolving leadership roles I will identify: Individual leadership vs. collective decision making. I will demonstrate a positive mental attitude during days when people might feel sick or lazy is a good part as an individual leader. During collective decision making I will be planning out a day of skiing and what

as a group it is that we want to accomplish. Maybe taking five laps on moderate terrain or going for a big ascent and descent if the entire group puts forth feedback.

→ Travel skills: when skinning it is important for the group to travel using one path. When using my ski poles in the backcountry I will also avoid using the “touring grip” as this could be hazardous in avalanche situations.

→ Avalanche awareness and rescue procedures: a big part of being in avalanches is understanding what to do in them. It’s hard to describe the situation if you are not in it but I will fight to stay on top and swim if I can. Rescue procedures will involve one of the teammates sending out a GPS 911 emergency call if the damage is extreme.

Cover required span of time: This expedition will cover a time span of 2 full weeks.

Be planned and executed by students, with a minimum of guidance from other parties: In the planning stages Dan, Bobby and I will use Casey as guidance of what terrain is best to ski in during mid-May. While on the trip we will avoid asking other parties where the best local places to ski are or ask others for weather reports. All of that is up to us.

Be of sufficient difficulty to make failure a possibility but also sufficiently flexible to allow dangers to be avoided when

possible: Some of the ski lines on Mount Blackmore can be technical, requiring mountaineering skills to reach the summit for a ski descent. This will be something of a challenge since if we cannot summit; we will have to forego skiing from the summit. Luckily, there are many ski descent options if we fail to summit or if skinning gets too difficult. We can always opt to descend from a lower elevation. The Madison range offers some forgiving terrain (like beehive meadows) easy access from the road or a camp and is great for spring skiing.

Take place at a time and in a place when seasonal weather patterns are conducive to a successful expedition:

The plan is for the expedition to happen right when school ends in mid-May. Spring skiing in Montana is very popular especially for the backcountry area around Bozeman. Temperatures are moderate and average 40 to 60 degrees and the snow does not fully recede until mid July.

Not take place in areas with which we are already familiar with:

We have never been to Bozeman Montana and have never skied in any part of Montana.

Take place outside a 100 mile exclusion zone around Plattsburgh and family residence: Check.

Be justified based on the nature and explanation of identified

outcomes: My expedition will fulfill my goals of backcountry skiing in Montana. I plan to evolve as a leader by making decisions increasing the safety net of my unsupported expedition. My expedition will also fulfill my improvement of ski ascents and descents. If we ski for two weeks my technique can improve from practice and repetition.

Exceed 300 level EXP course expeditions in level of challenge

and duration: This expedition will exceed ski mountaineering 388 in duration by a week, and challenge because of the terrain that can be covered in the allotted time. The level of challenge also goes beyond miles. Making leadership decision cut off time when it is safe and unsafe to ski our last line of the day. The challenges will also consist of assessing terrain without the supervision of Casey. If there is a wet snowfall on top of light snowpack its shear quality can fracture. The challenges of paying attention are entirely up to my group alone. I find this to be an extreme challenge.

Add value to our profile as members of the adventure industry:

Skiing in the backcountry in Bozeman Montana is an excellent resume builder and can help to obtain a job in the industry.

Show evidence of additional training to cover areas which EXP

does in limited fashion: Additional training can include shake down trips. One, for example we plan on skiing Tuckermans ravine for a 3 day trip. This is to see if we can bring proper equipment, correct amount of food and useful mountaineering and skiing skills in the backcountry setting.

Include a minimum of six hours of daily skiing from at least seven

backcountry camps. We will be skiing in different ranges that border each other. Though we do not have specific camps yet, we will be camping in the Madison, Gallatin, Absaroka and Beartooth mountain range. For example in the Madison range we could potentially cover 6 mountains covering over 25 miles from mountain to mountain.

Can't be resort based: Will only be skiing the backcountry in southwest Montana

Science

The Madison Range is a magnificent Range that runs in Montana and Idaho. This range is home to a number of different peaks topping out at over 9,000 and 10,000ft. The tallest mountain in the Madison Range is Hilgard peak which summits at 11,316ft. The Madison Range is only one of the huge breath taking Ranges in the southern Montana region.

Neighboring the Madison range to the east are the Greater Gallitains, the Bridger range, Hyalite Canyon, Absaroka Range, and the Beartooth Mountains. All these beautiful ranges have sky scraping peaks and abyssal canyons that were formed by glacier movement millions of years ago. Like most western States Montana stayed undeveloped for some time. It was not until the production of the railroad in the 19th century to the west till settlers started coming from the east. Before the Railroad much of Montana's population was ether ranchers, farmers, gold seekers, or traders. Through the definition of what "developed" means today Montana still remains relatively natural.

Montana is not only blooming with sublime mountain tops and divine canyons. It's also flourishing with plant and animal life. Montana is home to some of the largest mammals in the United States. For example mammals like the grizzly bear, black bear, bison, mountain lion, bobcat, the gray wolf, and on some occasions even a Canadian lynx has been seen. These big animals make Montana a very unique and desirable place. But when it comes to living in the backcountry it makes for greater perpetration and awareness for camp security

and cleanliness. For example bear kegs are a most have. Some of the smaller mammals living in Montana are you're average squirrels and raccoons and the more unique pronghorn which is a small deer like animal. Montana is also known for the unique culture of birds they home. The list is quite extravagant so I will only list a number of rare uncommon birds found in Montana. First off there is the Western Meadowlark which is the state bird of Montana. The Loons of Montana consist of the Red-throated loon, Pacific Loon, Common Loon, and the Yellow Billed Loon. Some of the more popular birds I am likely to see in the mountains are the red tailed hawk, bald eagle, Golden eagle, white tailed kite, northern harrier, Coopers hawk, and the broad winged hawk. A couple birds I really hope to see during the trip are the American kestrel, Prairie Falcon, and Gyrfalcon. This list is not even one fourth of the amount of different birds Montana has to offer these are just the ones I would enjoy to see. But there are a ton more native unique birds like owls, cranes, pigeons, and hummingbirds to spot while out in the beautiful landscape of Montana.

Montana Flora is just as unique as its wild life. They offer a wide variety of different plants like *Juniperus scopulorum* which is known as the rocky mountain juniper. Many of the plants in the mountains are deciduous and evergreen shrubby plants, like the *Alnus incana*, *Rosa woodsii*, *Symphoricarpos oreophilus* (known as the mountain snowberry), and *Phyllodoce empetrifomis* (known as pink mountain heather).

In conclusion Montana is still known as one of the last frontiers in the United States. Its history, flora, fauna, and wild life are some of the best you will find anywhere. Also it's skiing is not half bad as well! And a large part of this is due to the seasonal weather.

Works Cited

Harris, David. "Plants & Animals in Montana." *EHow*. Demand Media, 21 June 2010. Web. 28 Nov. 2012. <http://www.ehow.com/list_6648107_plants-animals-montana.html>.

"Madison Range." *Wikipedia*. Wikimedia Foundation, 23 Nov. 2012. Web. 28 Nov. 2012. <http://en.wikipedia.org/wiki/Madison_Range>.

"State Plant Listings." *Ecosystem and Vegetation System Mgmt*. N.p., n.d. Web. 28 Nov. 2012. <http://www.environment.fhwa.dot.gov/ecosystems/vegmgmt_rd_mt.asp>.

"Gallatin Range." *Wikipedia*. Wikimedia Foundation, 23 Nov. 2012. Web. 28 Nov. 2012. <http://en.wikipedia.org/wiki/Gallatin_Range>.

Budget Plan

For our Expedition we will need an effective and efficient plan of spending and an overall budget, both individually and for our team as a whole. Several aspects will come into consideration and to organize these elements of spending and budgeting we have decided to make a table to make things flow a little more simply. The main costs of this expedition will be travel, food, camping and personal cash to supply for personal purchases, spare gear or repairs for example. We believe budgeting is extremely important for the success of an expedition because without the funding, an expedition cannot continue. If we were to go without a budget there is a risk factor for incompleteness of the Expedition and failure to return home. The following is a table which shows my individual costs and the estimated cost as a team.

Item	Quantity	Category	Individual Cost	Team Cost	Where to Buy
Gasoline	228.96 gallons	Travel	\$309.67	\$929.01	Various Mobile

Engine Oil	4 quarts	Travel	\$9.33	\$28.00	Walmart
Food	All	Nutrition	\$250.00	\$750.00	Walmart
Campsite Fees	1-2 nights	Camping	\$20.00	\$60.00	N/A
Advil	3 bottles, 80 soft gels per.	Medical	\$7.97	23.91	Walmart
Jet Boil fuel 100grams	5 canisters	Camping	\$8.25	\$24.75	EMS
Adventure Med Kit	1	Medical	\$19.99	\$59.99	Gander Mtn.
SPOT GPS UNIT	1	Safety	\$33.33	\$99.99	OGE
Guide Book/Maps	1	Navigation	\$50.00	\$150.00	Mytopo.com
Misc. Spending			\$100.00	\$300.00	
Total		All	\$808.54	\$2325.65	

In order to determine the cost of gasoline I visited the AAA fuel cost calculator at <http://fuelcostcalculator.aaa.com/> and filled in the requested information to calculate

the exact amount of miles and gasoline needed between Albany, NY and Glacier National Park, Montana. One way from Albany, NY to Glacier National Park Montana is 2,404 miles using 114.48 gallons of gasoline, and costing \$419.51 to make it this distance. When it is doubled for the round trip calculation it amounts to 4,808 miles, 228.96 gallons at a cost of \$839.02. So with the round trip cost calculated, once divided by three (the number of men in team), the individual cost of fuel is approximately \$279.67 each. Considering the fluctuation of gasoline prices from now until May 2013, I would estimate at least an additional thirty dollars for safe measure. This makes the individual fuel costs amounting to \$309.67.

The car will also need engine oil during the 4,808 miles of travel. This is not a large cost but should be factored in, if the car were to burn a quart of oil every 1,000 miles, we would need to purchase four quarts of oil. With a cost of about \$7.00 a quart this would be \$28.00 for the team and \$9.33 for each individual. On this table I have included an approximate cost of food, which will be in more detail within the explanation of my Meal and nutrition plan with each item of food included with costs. Since going on several cross country trips, it is important to budget the gas money effectively. The way we do this is each member of the team will have their gas money up front where we will put it in an envelope. Each time we need gas it is taken out of the gas money stash to avoid any uneven payments. The driving shifts will be evenly timed as well.

Equipment Lists

The equipment list is an important aspect for planning out an expedition. It allows the team to go through gear, clothing, food and miscellaneous items that we might otherwise have forgotten if we didn't have this check list. Gear lists can also help us stay within a budget. If we need to buy items this equipment list can be used as a point of reference. It will revolve around where and what we're planning to do on our expedition. Some things to think about when making an

equipment list are geographical location (mountains), range of temperature and season, distribution of group gear, duration of trip and required specialized tools. With a checklist we can minimize the failing efforts of packing all the gear and clothes we will need to bring on our trip.

** See Appendix A for equipment list and budget of list.

The Team

In our essay regarding goals and aspirations, there are long term goals as well as short term, and I am confident that both my team members have as much passion and determination as I. To assess the abilities and experience of my team is easy because they have been next to me during this four year journey.

We feel extremely fortunate to have experienced the Rockies, Cascades and the Adirondacks with close friends, and it is imperative for the success of the expedition to have a complex and dynamic team. My relationship with both Bobby and Chris has grown exponentially. Chris and I go back to high school lacrosse rivals, but also great friends from a neighboring town. After an extremely competitive battle on the lacrosse field, we would have a barbeque with both teams, Makowicki and I seemed to be very similar guys, with the competitive attitude and joy of the sport. It was carried over to extreme outdoor sports here at SUNY Plattsburgh. Chris transferred to Plattsburgh for the sole reason of pursuing Expeditionary Studies after hearing of how much fun I had been having here.

I believe the roots of our passion for the outdoors began in the location in which we live, the beautiful Hudson Valley. I was from Red Hook, and Makowicki from Hyde Park, both beautiful towns in the Hudson valley on the Banks of the Hudson River, where you can see the Catskill Mountains, our playground of hiking, skiing and paddling for many years. Since then we have only progressed and moved up in size to the Adirondack Mountains, our new playground and thankfully our classroom. Now as members of a team about to embark upon an epic journey and senior expedition, Chris is an easy and obvious choice in which I have total confidence, trust and faith in.

The third member to this outstanding team is Bobby O'Connor, one of my best friends here at Plattsburgh State, and partner in crime. Though we did not go back to high school we made up for it in the last three years as classmates through day one as Expeditionary Studies majors. We have always been go-getter kind of guys with an energy and incredible motivation to be in the outdoors. I would like to use the analogy of Lacrosse once again, In high School my friend Dan and I would stay after practice and shoot on goal for hours, and do one on ones to improve our skills. This relates directly to bobby and I with skiing and climbing, in that we have always had the urge to improve our selves. Since freshmen year if there was a day off from classes we would wake up and contact each other saying "let's do something epic today bro". It was easy for either end of the phone to say "hell yes", and that would lead us to countless trips to Mckenzie Pond to boulder, Whiteface Mountain to get in fresh turns or the Keene valley to get that climb in that we had our eyes on for a while.

Bobby and I have had a bond in the class room and outside the class room, which both happen to be the Adirondack Mountains and the Champlain Valley. We have been on all ski courses available here at Plattsburgh, from digging avy pits in Utah, to skiing tree lines in Oregon, and having that experience in technical skills and ability has lead to our choice to pursue a backcountry ski trip in a state that we have never set foot in. I believe this adds greatly to the integrity of our expedition, I have always been about being

spontaneous and trying the unknown and so have Chris and Bobby. Traveling to a new state to ski new terrain is the obvious motivation for this team and I have great expectations from all of us. The fact that we drool over movies by Warren Miller with scenes of slow motion powder turns is proof that we have had enough of the icy east coast and thrive for that moment of slow motion powder for ourselves.

It is no doubt that Chris, Bobby and I are ready for the Madison range in Montana. Our preparations did not just start this year, but in our youths as outdoor enthusiasts. What did refine our discipline of Ski and rock climbing focus was the Expeditionary Studies Program at SUNY Plattsburgh and the highly qualified Staff who have jobs of a dream. Casey Henley, Larry Soroka, Steve Maynard and many more are the ones to thank for the guidance to hopefully become guides ourselves. As we eventually set off on this trip in May of 2013 we will have even more confidence in ourselves and our team to successfully navigate and ski the terrain of the Madison Range of the Big Sky state. We don't even think the team was chosen, but actually fell into place, and the leadership of this team is a not a dictatorship. Each of us brings charismatic, positive attitudes, and attributes that will benefit us as a whole. This is why we believe decision making will not be a difficult task. Each of us is capable of making decisions in stressful situations, and that applies to each aspect of the risk management plan, and Go/No-Go standards. Decisions will be made as a

group, being friends for so many years we have fought at least a few times, but the fact that no grudges are held and we are able to bring it back is another reason why this team has great odds for success.

Risk Management

With the understanding that risk in any expedition cannot be completely mitigated, it is important that we think of possible outcomes that could go wrong during this trip. As part of the approval process for our Senior Expedition in the academic department of Expeditionary Studies, it is imperative that this plan be sufficient in detail. This risk management plan represents our thinking of how I will be able to keep myself and my team safe and to manage unnecessary risk. One of the most important aspects of risk management identifies and risk before it occurs. From a physical perspective, risk can range from minor problems such as small cuts to deadly avalanches that can be triggered by my team. Risk is not limited only to physical injuries but also from a financial perspective, legal obligations and responsibilities and even a social perspective. If funds are not calculated correctly it could mean cutting short on food or simply not being able to go on the trip. A legal obligation means abiding by laws or public versus private property to avoid being arrested. Keeping this in mind it is not only vital

but professionally responsible to follow out protocols and be able to comprehend and execute a safety plan should something occur.

Emergency Contacts:

✚ Big Sky Search and Rescue: Emergency- 911.

- Office: (406) 995-3911

✚ Gallatin National Forecast Avalanche Center

- Advisory: (406) 587-6981
- Office: (406) 587-6984

✚ Gallatin County Sheriff's Office:

- (406) 582-2100

✚ Casey Henley:

- Cell phone: (206) 851-2689
- Office phone: (518) 564-5292

✚ Larry Soroka:

- Cell phone: (518) 570-9159
- Office phone: (518) 564-5292

✚ Michele Makowicki (Chris's Mom):

- Cell Phone: (845)392-8512

Personal Emergency contact information:

- a) Dan Nesel's Mother- 845-489-8379
- b) Dan Nesel's Father- 845-489-3450

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Risk Management Chart

Hazard	Likelihood/ frequency	Risk prior to controls (H/M/L)	Controls	Risk with Control
Weather				
Cold weather/Snow	Medium	Medium	Avalanche awareness, proper layers, sleep system, hydration	Low
High heat/lightening Wind	Medium	Medium	Hydration, sunscreen, sunglasses, sunhat, avoid exposure if storm rolls in, snowpack stability and awareness for cornice's	Medium
Hazard	Likelihood/Frequency	Risk prior to controls (H/M/L)	Controls	Risk with control
Physical Health				
Sun Burn	High	Medium	SPF 50 apply every 2 hours, proper layers, sun hat, sun	Low

			glasses avoid sun contact with skin	
Poison Ivy	Medium			
Dehydration	High	Medium	1 liter per person per hour general guideline, carry enough/spare	Medium
Abrasions/ cuts	Medium	Medium	Always carry first aid kit, all necessary band aids etc. scope lines before descents	Medium
Hypothermia	High	Medium	Proper layer system , proper sleep system, hot drinks	Low
Lack of Training	Low	Low	Work out routines, gantt chart, shake down trips	Lower
Broken Bones	Medium	Medium	Proper ski turns, controlled slides, avoiding debris,	Low
Scrapes, Abrasions, cuts	Medium	Medium	Avoid poor run out zones, knee pads, helmets, four essentials	Low
Mental Health				
Low Morale	Medium	Medium	Balance ski/down time,	Low

/Poor snow conditions			have fun!, Monitor each other's moods, Positive mental attitude, games	
Travel	Medium	Medium	Keep busy, take breaks, site see	Low
Car Trouble	High	Medium	Triple A, Spare tire, jack, motor oil	Low
Car Accident	High	Medium	Mandatory breaks (not driving more than 3 hours at one time) no all night driving	Medium
Fog/White out, Unplanned descent route	Medium	Low	Atlas, maps GPS, Guidebook, smart phones, Communication carry all necessary items for an overnight trip even if planned to ski during the day	Lower
Gear				
Broken Gear	Medium/High	Medium	Carry proper tools to fix, check gear before using,	Low

			spare parts	
Lost Gear	Medium	Low	Keep gear organized, know what you brought, double check, don't keep unattended	Low
Missing Gear	Medium	Low	Check gear list before depart, organization	Low
Too Much Gear	Low	Low	Research type of gear specific to area, extra weight can slow day down, find out what works/what doesn't on shakedown trip	Low
Route Finding	High	Medium	Map/compass, assess terrain for unstable snow, plan out routes before the day, knowing our bearings on the map, as result of planning	Low
High Altitude	Medium	Low	Shake down trips have proper meds if necessary, hydration and	Low

			food	
Team traveling techniques	Medium	Medium	Stay as a group, ski lines one at a time, pay attention while leading skin tracks, reducing the likeliness of triggering avalanche	Low
Avalanche	This will depend of winter snow conditions and depths during the duration of the senior expedition	Medium	Listen to local weather forecasts, Check beacons before days trip, scope lines, ski lines one at time, dig snow pits, bring all equipment	Low
Deprived (Food)				
Nutrient Deficiency	Medium	Low	Well balanced diet, fruits, vegetables, carb to protein ratio	Low
Low Calorie Intake	Medium	Low	Eat throughout the day, high calories	Low
Wild life eats food	Low	Low	Bear canisters, keep food secure out of tent but out of reach of animals too	Low



Contingency Planning

While emergency plans are extremely important we cannot overlook also having a contingency plan. Contingency planning is a part of all expedition planning. It is both short and long term. Short term could mean changing a plan right before it is about to happen. If there were a massive amount of snow that dropped on a peak we wanted to ski that day and the snow pack was unstable, we would have to pick another peak. This short term change could affect the goals for the whole expedition. In my teams case for the months leading up to the expedition we will have to keep a close eye on weather and how much snow southwest Montana is receiving. All of this takes time for preparation and planning. To avoid a complete melt down a long contingency plan needs to serve as a backup. The north cascades in Washington state are within a reasonable driving period and receive more snow annually then southwest Montana. After speaking on the phone with North Cascade Mountain Guides, they gave me some helpful hints on finding routes of peaks that would supplement the curriculum of a contingency plan or my senior expedition. The Washington pass highway is closed in the winter and re-opened (weather depending) in early May before our senior expedition would take place. The

west ridge of "Silver Star"⁴ would be a particularly fun ski descent. Though the eastern mountains of the cascade don't get as much snow as the western mountains, they do have something to offer. The eastern mountains stay colder than the western mountains. With the colder temperatures comes colder, drier snow allowing the snow to remain fluffy many days after it falls.

Seasonal weather

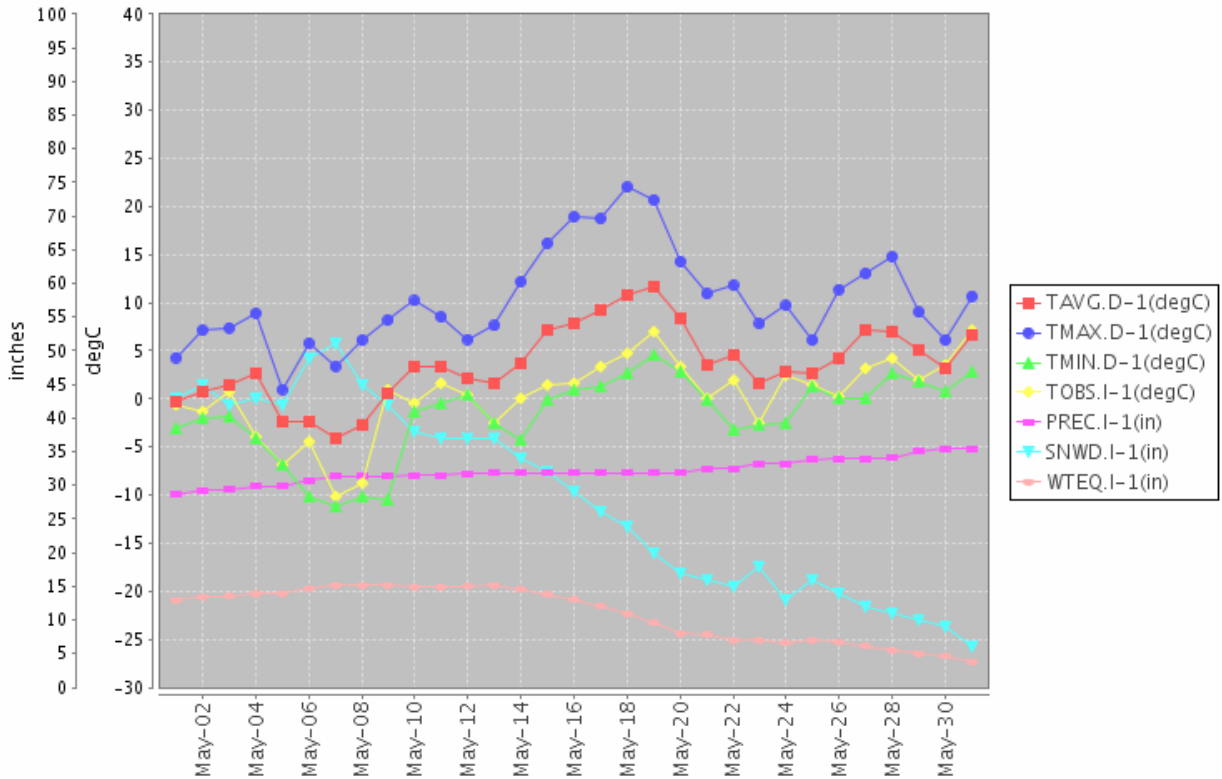
Sometimes contingency plans are executed because of seasonal weather, this is particularly important for skiers. With Montana's state the fourth largest state of the union⁵. As a result, its climate variation is large. The continental divide traverses the western section of the state, which also dictates its weather. For instance, areas adjacent to mountain ranges generally are the wettest and nearly half the annual long-term average total in Montana falls from May through July. In parts of the western end of the state where the mountains are, annual snowfall can reach 300 inches. Other conditions that do occur are hail storms. Because we will be in mountainous environment weather can change quickly and depending on what range we are in some weather might be worse than another's. The following chart and table is taken from the site

⁴ <http://www.ncmountainguides.com/> web.

⁵ "Climate of Montana." *Climate of Montana*. National Climatic Data Center, Web. 19 Sep 2012. <<http://www.wrcc.dri.edu/narratives/MONTANA.htm>>.

SNOTEL.

Station (929) MONTH=2010-05-01 (Daily) NRCS National Water and Climate Center - Provisional Data - subject to revision
Wed Sep 19 14:30:22 PDT 2012



Conditions for the Madison Range in Montana:

Considering the Expedition will occur in the Spring months here is some detailed climate data for the area in May.

TAPS table gives a month by month summary and probability analysis of temperature and precipitation.

TAPS Station : DECORAH, 192110

Start yr. - 1971 End yr. - 2000

Temperature: 30 years available out of 30 requested in this analysis

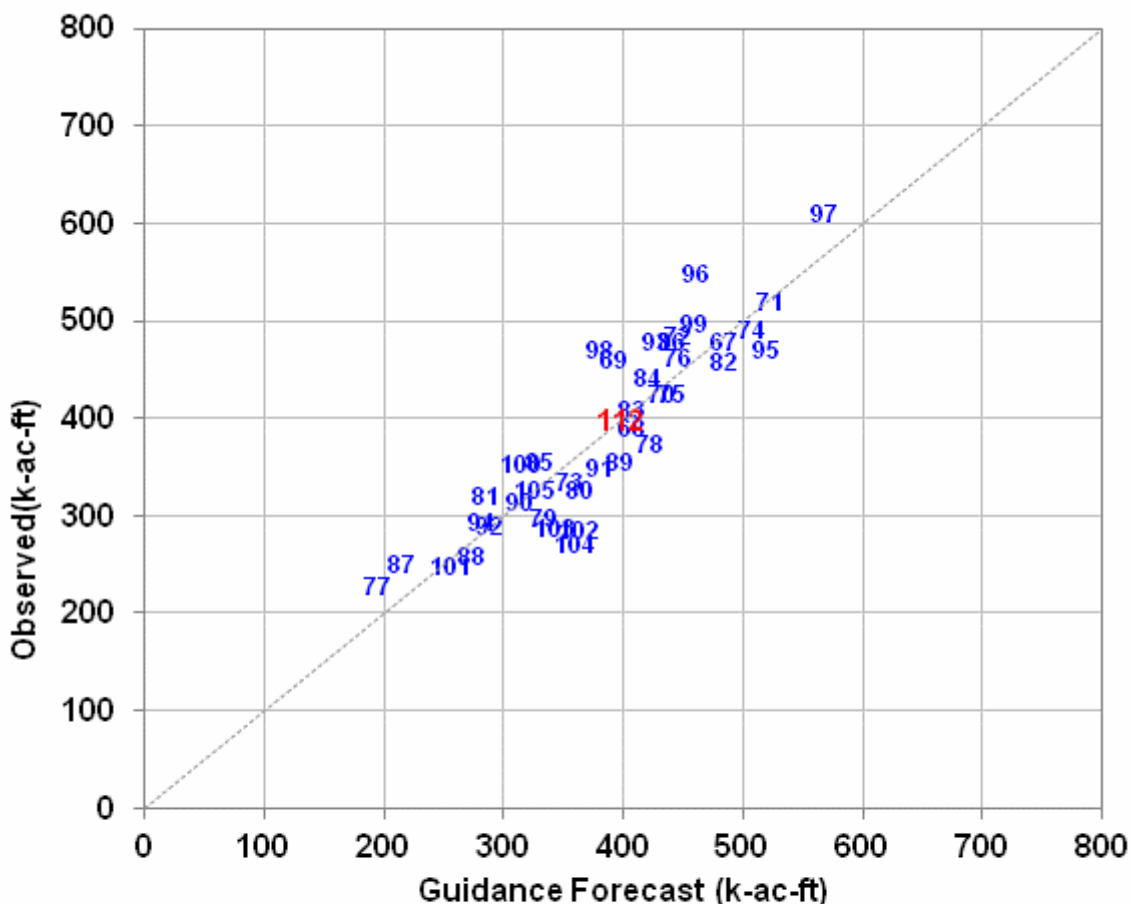
Precipitation: 30 years available out of 30 requested in this analysis

Month	Temperature						Precipitation			
	avg	avg	avg	max	min	grow	avg	less	more	w/
0.10/snow-	daily	daily		temp.	temp.	deg		than	than	inch or/fall
	max	min		>than	<than	days*	(in.)	(in.)	(in.)	more

January	23.7	5.3	14.5	49	-29	1	0.74	0.27	1.14	2	
7.0											
February	29.6	10.7	20.1	54	-22	3	0.82	0.32	1.29	2	
7.2											
March	42.0	23.6	32.8	73	-10	55	1.89	1.05	2.64	4	
7.5											
April	58.2	36.3	47.2	84	14	256	3.42	1.96	4.71	6	
1.6											
May	70.8	47.7	59.2	89	27	597	3.82	2.60	4.94	7	
0.0											
June	79.7	56.7	68.2	95	39	846	4.20	2.29	5.89	6	
0.0											
July	83.7	61.4	72.6	97	46	1010	3.99	2.28	5.51	6	
0.0											
August	81.5	59.0	70.3	95	42	937	4.03	2.04	5.76	6	
0.0											
September	72.7	50.7	61.7	91	29	651	3.93	1.53	5.95	6	
0.0											
October	61.0	39.9	50.5	84	18	339	2.27	1.07	3.31	4	
0.2											
November	43.8	27.0	35.4	67	1	65	1.68	0.65	2.64	4	
3.4											
December	28.3	12.1	20.2	56	-21	5	1.21	0.63	1.73	3	
9.7											
Yearly :											
Average	56.3	35.9	46.1	---	---	---	---	---	---	---	---
Extreme	101	-39	---	98	-31	---	---	---	---	---	---
Total	---	---	---	---	---	4764	32.01	26.89	36.67	56	36.5

*A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (Threshold : 40.0 deg. F)

Madison R Nr Grayling (MT): Apr-Jul Volume



This is an automated product based solely on SNOTEL data, provisional data are subject to change. Each number (e.g. "99", "104") represents an individual year (e.g. "1999", "2004") from the calibration set of the guidance forecast equation for today's date. The most recent guidance forecast is shown in red. This product is not meant to replace or supercede the official forecasts produced in coordination with the National Weather Service and should only be used for planning purposes.



Science Contact: Jim.Marron@por.usda.gov
http://www.wcc.nrcs.usda.gov/ws/daily_forecasts.html

Generated 6:41 Sep 19 2012

Expedition Itinerary

We will begin by explaining the start of our trip. First off my wild team of cliff hucking bandits will consists of Dan Nesel, Chris Makowicki, and I. We will be driving across country to Bozeman Montana in Makowicki's Subaru forester precisely after each of us finishes our last final in early May. From there we will make stops at each other's houses to drop of gear that is not needed. Kiss our families goodbye and head for the west. We will take route I-90W all the way across the United States, and if all goes according to plan arrive in Bozeman Montana 39 hours later.

Once in Montana we will be spending most of our time mountaineering and backcountry skiing in the Madison Range. We picked this area because of the southerly facing slope aspects. Due to their south facing slopes the Madison range makes for great spring skiing. And since we are arriving there in late May this makes it the perfect mountain range for us. After researching the camping options we found that we should have no trouble at all finding areas to stay. The website Parkcamper.com mentions that "The camping choices in the Gallatin allow you to pitch a tent or park your camper in a wide variety of environments. You also won't have to worry about not getting a site as there is almost always another campground not too far down the road. On top of that, dispersed camping is allowed on the forest. I can tell you from personal experience that

the Gallatin is one of the best camping locations in the United States. It offers a spectacular, yet cozy feeling. The scenery, hiking, fishing and just "hanging out around camp" are at their best in this Montana national forest." I look forward to spending time in these cultivating campgrounds and really grasping a feel for Montana's backcountry society.

With travel plans and camping plans set up I will now go into what we will be doing in the Madison Range and Gallatin national forest. We will be working our way through the Madison Range and part of the Bridger Range bagging and skiing as many peaks as we possibly can. With limited time in this vast beautiful area we must take advantage of every second. With the idea of skiing as many peaks possible in mind, here are just handful of "must do's" I have written on my bucket list. **Beehive to Bear basin-** this ski area is a backcountry classic in Montana. It offers amazing scenery with a fairly easy approach and deep snow with open bowls. Next is **The Sphinx-** which in the **Bozeman and Big sky Backcountry Ski Guide** book is labeled as an Epic Winter Adventure! This huge epic looking mountain summits at 10878ft and rarely sees a lot of traffic throughout the ski season. With its extreme rating for avalanche danger we need to be especially on top of our game with checking avy reports and digging and assessing the snow pack. Other options are if we feel it is too dangerous to ski is to climbing mountaineer style and descend on foot or to skin up and follow our skin trail down. Either way I want to summit this peak. The third

must do peak is **Buttcrack Chute**- this high alpine bowl delivers what sounds and looks like amazing back country skiing! Again the avalanche danger on these slopes can be high so we must take proper precautions. Finally the fourth and last must do peak I have planned is **beartooth pass**- this ski area is a spring classic and from former research I have heard that the Beartooth mountain range is spectacular and is a must see. There high vertical peaks make for amazing alpine climbing and skiing. Here is a TENTATIVE itinerary.

DAY ONE – TELEMAR MEADOWS

DAY TWO – BEEHIVE TO BEAR BASIN

DAY THREE – DEER CREEK

DAY FOUR – YELLOW MOUNTAIN

DAY FIVE – REST DAY

DAY SIX – MR BUTTCRACK CHUTE

DAY SEVEN – BACON RIND SKILLET

DAY EIGHT - BRIDGER BOWL (BRIDGER RANGE)

DAY NINE – TEXAS MEADOWS

DAY TEN – REST DAY

DAY ELEVEN – THE SPHINX

DAY TWELVE – TRUMAN GULCH

DAY THIRTEEN – HYALITE PEAK

DAY FOUTEEN – LICK CREEK MEADOWS

With these routes and mountains in our cross hairs we as a team have to be extremely safe and aware of our surroundings. This brings me to my next topic Risk management.

Works Cited

"Gallatin National Forest Camping." Gallatin National Forest Camping. N.p., n.d.

Web. 06 Nov. 2012. <<http://www.parkcamper.com/Gallatin-National-Forest/gallatin-national-forest-camping.htm>>.

Werner, Ben. The Bozeman and Big Sky Backcountry Ski Guide. (S.I.); Werner Software (WS) Pub., 2011. Print.

Crux Points, Go/No-go Standards

Before we entered this major we had no idea what a “crux point” was. It was only when we were on a personal or class trips that we learned what crux points were. A crux point can be the hardest part of my expedition in which it can require more from me physically and mentally. Being in this situation is not supposed to be comfortable in fact; it will push our limit that’s why it’s important that we familiarize ourselves with potential crux points. No matter how good our plan or how good our research is for our expedition, weather is always a crux point. Weather is not only unpredictable in the mountains but can cause dangerous conditions that might be unsuitable to ski. To make matters worse the guidebook that we have says that “Weather forecasting is notoriously bad for southwest Montana in general”⁶. We still plan on paying close attention to the

⁶ Werner, Ben. *The Bozeman and Big Sky Backcountry Ski Guide*. 1st ed. Werner software publishing, 2011. Print.

weather patterns for the weeks leading up to the expedition with temperatures and snow depth. Another crux point will be route finding. Most of the Madison Range is dense with trees making route finding that much more difficult. It will take more concentration than to skin up a bowl and descend, it can be very easy to get off track, and ski a wrong line making it harder to get back to our original trail. With route finding it is also important to recognize mountaineering skills on an ascent. If our team decides to mountaineer up a peak using technical ice tools, crampons and rope that will make that part of the expedition that much harder to complete. Aside from knowing what the crux points are for our trip having go and no-go standards are equally as important. Go and no go standards can help us decide whether or not we need to initiate our contingency plan for the duration of the trip. It can also simply mean deciding to ski another peak or the day. We will enforce strict rules on ourselves and team members on the go and no go standards. A big standard is avalanche danger. In the backcountry avalanches are a reality and can happen often. The scale for avalanche terrain danger varies from low, moderate, considerable, high and extreme. Our personal commitment to safety is not skiing in high and extreme avalanche conditions possible not considerable if we are uncomfortable with snow stability. With all other descents my team will perform snowpack stability tests at the bottom and top of peaks. While skinning up we will pay attention to obvious warning signs like the "Whumph" noise. If we hear that noise or our snowpack tests fail, then we will **not** ski that particular day.

Another commitment we will enforce is picking a time of day to turn around and end skiing for the day. Even in May when the sun begins to stay out longer it will be important to know when it's time to pack up for the day. If we haven't descended by **3 pm** we will need to start heading back to the original trail and get back to camp for the night. If the weather produces white-out conditions to the point where my group cannot safely route find for the day as tempting as it may be we will also not ski for the day. These standards are put in place so that my team and I can execute our senior expedition as safely as possible. There will be risk involved in the expedition no matter what and injuries can occur that had nothing to do with go and no go standards. But, these standards are here to remind us that these standards can protect us from temptation that could lead to injury or fatality.

Training

Paul Petzoldt once stated "Prior preparation prevents piss-poor performance"⁷. The two categories that can be broken down into training are

⁷ Anderson, Dave, and Molly Absolon. *NOLS Expedition Planning*. 1st. Mechanicsburg: STACKPOLE, 2011. Print.

mental and physical. Without a balanced focus on both categories failure, in the expedition is a probable outcome. Part of going on an unsupported expedition is the understanding of coping with failure, even if we have trained physically and mentally to the best of our ability. Part of mental preparation begins with mental toughness. This has to do with finding our internal motivators. What are we willing to fight for to succeed? How will this expedition fulfill our dreams and desires? Another part of this mental preparation means going out on trips and finding out my response to stress, fear and discomfort. We believe the answers to these questions will tell us what drives us emotionally and help understand how this expedition fits our larger dreams. Mental preparation is hard to explain in writing, it is when we are in the moment with competence in a stressful situation that will show how our mental preparation pans out. The other part of training is just as necessary as mental, that is physical. Without physical training our bodies will not be able to take on the physical exertion required for skinning and skiing. Physical training for us is understanding what muscles are used during ski mountaineering and how to optimize them. Cardiovascular training optimizes the body's ability to transport oxygen to the muscles and to transport waste products (lactic acid) away from muscles which makes us less sore³⁴. When it comes to physical training I can get into very scientific formulas including V02 max and anaerobic threshold. For the purpose of this expedition we would like to focus on a training cycle, recovery workouts and tapering and rest. Mark Twight, author of Extreme Alpinism has some great insight on a training

cycle I plan on using⁸. It includes a six step program including foundation building, power training, cardiovascular power endurance, extensive endurance and muscular endurance, tapering and rest and finally, peaking. Training physically for skiing also means saving my knees and keeping healthy which incorporates my nutrition plan. As we continue to update our gantt chart we will progress in our physical ability while making sure that we understand what limits we can push our bodies to.

** See appendix B for training chart

Nutrition

I remember, as a kid hearing the comment, "You are what you eat". It was everywhere, in health class, on and off the sports field and in my house

⁸ Twight, Mark. *Extreme Alpinism*. 1st ed. Seattle: 1999. Print.

hold. Nutrition for me, was not important growing up; this isn't to say I drank soda and ate junk food all the time. For the most part, I was just always and still am active in outdoor recreation and sports. When I was younger I would constantly be running around which kept me in shape even though that wasn't a goal; it was just something I loved doing. As I got older; staying fit meant incorporating nutrition. Today I realize it is equally important on expeditions to get nutrients while my body is undergoing physical excursion. Developing a thorough meal plan for my expedition ensures I will get enough calories, vitamins and minerals, calcium and protein throughout our expedition.

Besides the nutritional aspects of our menu, it is imperative that we also ask myself some basic questions. How much do we eat in a day on trips? Do we need to share food? What is our budget? Are we going to back ultra light, normal weight or heavy weight for this unsupported expedition? The food must keep; will this limit the amount of nutrients we will get for the duration of the trip? After going on several IWLS trips that ranged from 12 to 24 days in the backcountry, backpacking and expeditionary studies trips we have developed a style of what foods we enjoy, fit our budget and what perishable and non perishable foods do well in certain environments. Food also plays a big part in personal and overall group moral. It's a part of risk management and having some comfort snacks and candy bars, although they might not have much nutritional value, does have an impact on the general mood of the team and its

members. Since there are no vegetarians or vegans on our trip there isn't any meat restrictions. Food that is on our meal plan menu has a functional purpose. That is to provide our bodies with the necessary nutrients to keep our bodies at work. The foods that are listed on our food menu consist of protein, carbohydrates, fat, and assorted vitamins.

Protein is necessary for building lean muscles and for muscle recovery, the crucial consideration for an extended expedition. It is therefore important to have a substantial amount of protein in our meals. Complete proteins have all essential amino acids including ones our bodies can't produce on their own²⁴. According to the Center for Disease Control and Prevention, males ages 19-70 should receive 56 grams of protein each day²⁴. Skiing is a sport where we are constantly using our legs which could become sore after 2 weeks of skiing. Having a daily intake of protein will help guard against muscle fatigue as well as possible rest days.

Carbohydrates are what fuel athletes. We can find carbohydrates in fruits, vegetables, breads, and almost everything we will be eating. There are 2 types of carbohydrates, simple and complex. Simple carbohydrates refer to sugars found naturally in foods such as fruits, vegetables and milk. These simple carbohydrates can also include sugar added during food processing and refining²⁵. Complex carbohydrates consist of two different nutrients, starch and dietary fiber. Starch, which is found in beans, potatoes, cereals and grains are a

glucose source. When our bodies ingest these carbohydrates it makes glucose which gives us the energy we need to stay active in the backcountry. Glucose is unique because it can be used immediately or stored in our livers or muscles until it's needed. Glucose is a simple sugar and it uses many compounds including water, carbon dioxide and nitrogen providing energy for our cells²⁷. Dietary fiber is also part of complex carbohydrates. Dietary fiber is split into 2 groups, soluble and insoluble fiber. The main distinction between the 2 fibers is that soluble fibers dissolve in water and insoluble fibers do not. Soluble fibers provide 2 main health benefits. When this fiber dissolves it forms a gel. This delays the emptying of our stomachs causing us to feel fuller and control weight. The 2nd health benefit is lowering LDL or so-called bad cholesterol. It can do this by interfering with the absorption of dietary cholesterol²⁶. Insoluble fibers do not dissolve in water but are still important for nutrition. This is the fiber that has the laxative effect and helps prevent constipation²⁶. Insoluble fibers pass through our gastrointestinal tract speeding up the passage of food and waste through our gut²⁶. This is important so that during the trip we are going to the bathroom regularly.

Although fat gets a bad representation in the health world, it provides nutritious benefits necessary for athletes. It is another source that gives us energy. Fats are split into categories of saturated and unsaturated fats. Saturated fats are high in calories and can be important if we are getting a limited supply when skinning

and skiing. Adding saturated fats like butter or any oil that solidifies at room temperature will increase the amount of calories we get per day²⁸. Unsaturated fats are much healthier than saturated. Unsaturated can also help lower cholesterol levels. These fats include monounsaturated and polyunsaturated fats. Canola and olive oils supply monounsaturated fats, these can lower my LDL and could reduce the risk of heart disease in the future²⁸. Polyunsaturated fats are vegetable oils (sunflower, corn and soybean) consisting of omega 3 and omega 6 fatty acids. Flax seeds, which we plan to bring on this trip, are an excellent source of omega 3. Omega 6 is found in vegetable oils so if there's a choice of buying butter or soybean oil we will choose the soybean.

In addition to considering the facts of nutrition, it is also important to know when and what to eat at certain times of the day. In the morning we will want a hearty meal consisting of simple and complex carbohydrates and a caffeinated drink to get our bodies up and awake. We like simple carbohydrates because they give us immediate energy and food with some fat can last longer into the day when we will be burning up the carbohydrates. Green tea is a healthier and cheaper alternative than coffee. With a little raw honey our hot drinks will be sweet and add more calories. For lunch we will continue with simple and complex carbohydrates as well as protein. Again, the simple carbohydrates will give me a fast energy and the complex carbohydrates will give me the energy reserve we need to ski throughout the day. Protein will be a good source for

lunch because it avoids some of the negative attributes fat has and is good for the breakdown of muscle repair. For dinner we plan to incorporate fat, protein and simple and complex carbohydrates adding a tasty drink too. We like the complex carbohydrates because they give us the “full feeling” before bed and it keeps some on reserve for the next morning (Pasta is always a good source for this.) The protein will help with muscle recovery and the fat can also give us the full feeling effect.

In addition to 3 meals a day, it is equally important to be snacking throughout the day as well. This will help keep our metabolism up and prevent myself from stuffing our faces with food at one of the 3 main meals. We enjoy snacking on Clif bars, dried fruits and assorted nuts. These will offer some carbohydrate, protein and fat needs without eating a full meal. It may be beneficial to have snacks before and after skinning and skiing so to keep up with the amount of calories we need in a day. Typically skiers burn 4,000 to 6,000 calories a day, maybe even more if there is a big descent for the day. We plan snacking between each meal.

Water makes up approximately 60 to 70% of the human body weight²⁹. Our bodies can survive much longer without food than without water. Staying hydrated throughout this expedition is paramount to keeping our bodies and minds safe. Poor hydration will lead to a variety of illness and injuries which will reduce the speed and clarity of my judgment and decision making abilities. It is

a general rule of thumb in the outdoors to drink at least 2 liters (if not more) of water a day. We plan on drinking a gallon to keep my body running smoothly. We will watch my hydration by monitoring the color of my urine, how much or little sweat I produce, and the physical symptoms including headaches, dizziness, and dry mouth.

We enjoy eating good food and drinking plenty of water in our daily life. We plan to continue this on our expedition because at best, the lack of food and hydration can lower the overall fun of the trip and personal moral. At worst, it can lead to death. Our meal plan is to ensure that we are getting enough calories, nutrition and hydration needed to keep our body safe and physically active. The meal plan is as follows.

**See appendix C for menu

Appendix A

Appendix A

Equipment List			
Need:	Type	\$\$	Total: 1147

Have (technical equipment)

Skis	BD Havoc	299	Ski Poles
Skins		Borrow	Mountaineering Axe
Boots	Garmot helix AT	299	Pots, Spork,bowl, food stuff sack
Snow Shovel	Volie XML	35	Sleeping Bag
Transceiver		Borrow	Sleeping Pad
Avalanche Probe		Borrow	Sun Screen
Full Size Backpack	75L Mercury BD	225	Matches,lighter, flint/steel
Stove	MSR XGK	Borrow	Head Lamp, Extra Batteries
Fuel	White Gas		Toilet Paper,Ziplock Bags
Fuel Canisters	2X Aluminium bottles	Borrow	Notebook,pens,pencils
Tent		Borrow	Tooth brush/Toothpaste
Sled			First Aid Kit
Slope Meter		borrow	Pee Bottle
Stove			
pad/windscreen		borrow	Gaiters
Snow Saw			Bandana
Booties			Sun Glasses
Bindings	Fritschi Diamir AT	249	Day Pack
Bozeman/Big Sky Backcountry Ski guide		40	Multi-tool
GPS			Goggles
SPOT sat			Compass
Crampons			Water Bottles
Mountaineering boots			Clothing Uppers/Lowers
Snow Shoes			Heavy Parka (Down)
			Shell Jacket
			Fleece Hat
			Mid insulate layers Non Cotton
			Top Base Wicking Layer
			Insulating Base Gloves
			Shell Gloves (Gore-tex)
			Long Johns
			Synthetic Thermal Spandex
			Hardshell Snowpants
			Socks heavy wool&liners
			Synthetic Boxers
			Sun Hat

Appendix B

Month: November-January

Day	Time	Exercise 1	Exercise 2	Category	Reps	Distance
Monday	1 Hr	Run	Rock Gym	Endurance	N/A	6 Miles
Tuesday	1.5 Hrs	1)Supine bike 2) pull-ups	3)Lunges 4)leg lifts	Strength	1) 10 0 2) 40 3) 10 0 4) 10 0	N/A
Wednesday	6 Hrs	Whiteface Telemark skiing	N/A	Strength	12-15 runs	41,000 Vertical ft.
Thursday	1.5 Hrs	Free Swim	Rock Gym/Slack line	Endurance/Balance	20 Laps	1000 yards
Friday	3 Hrs	Cross-country skiing	Stretching	Endurance/Flexibility		5 miles

Saturday	6 Hrs	Skinning	Skiing	Endurance	Laps	4-8 Miles
Sunday	2 Hrs	Run	1)Squats 2)Calf raises 3) box jumps	Speed/Power	1) 50 2) 50 3) 50	8 Miles

Appendix C

Week 1:

Day	Date	Breakfast	Cal.	Lunch	Cal.	Dinner (Freeze Dried)	Cal.	Total	Cost
1	May 29	Oatmeal Granola/Tea, soy protein	628.046	Trail mix Dried Fruit gatorade	854.69	Chicken a la king with noodles	800	2282	\$11.50
2	May 30	Cream of wheat/Coffee, soy protein	604.61	PB&J Tortilla Hot tea, beef jerky	795.25	Beef Terryaki with rice	800	2199	\$12.50
3	May 31	Instant Grits Honey packets/tea, orange slices	605.11	Granola bars Gatorade mix Beef jerky	715.67	Maccoroni and cheese	930	2250	\$11.50
4	June 1	Muesli/coffee, granola	589	Energy gels/almonds, Gatorade, tuna packet	902.05	Rice and chicken breast	840	2331	\$13.00
5	June 2	Cream of wheat/coffee, mango slices	604.61	PB&J Torilla Pistachios, gatorade	825.43	Sweet and sour pork with rice	840	2269	\$14.50

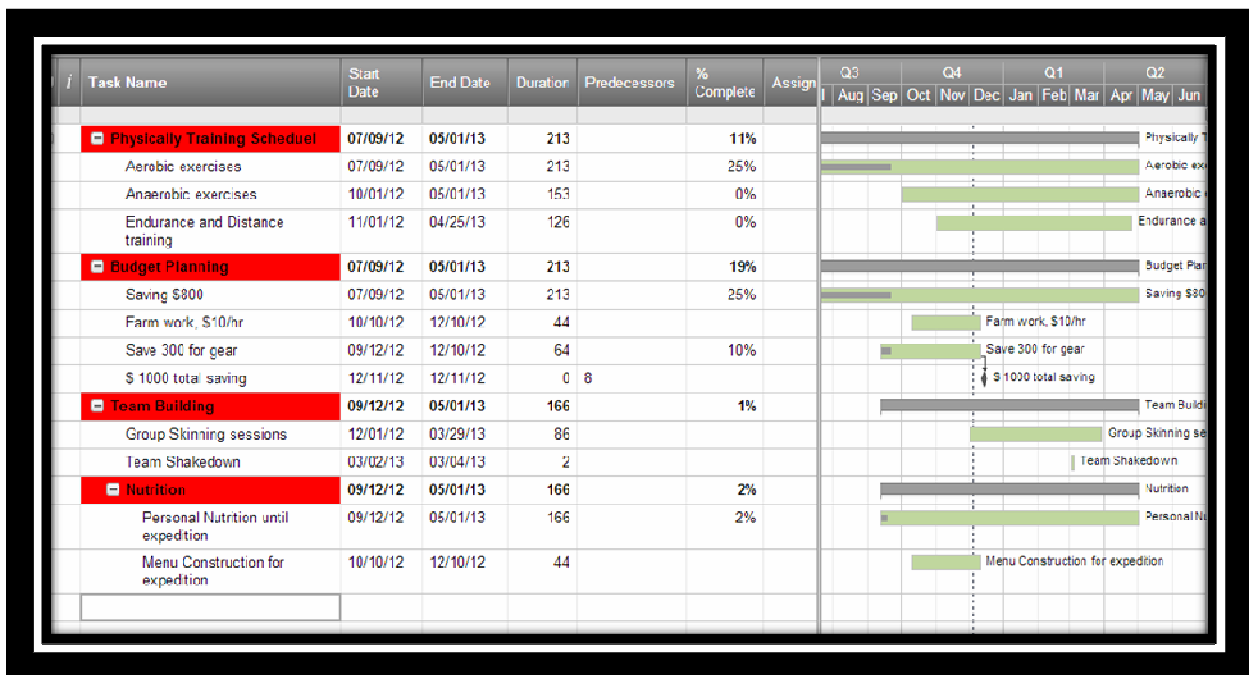
6	June 3	Grits/tea, honey, banana chips, powdered milk	605.11	Packaged chicken Summer Sausage/wheat crackers, Hot tea	935.96	Beef Stroganoff with noodles	750	2290	\$15.00
7	June 4	granola/instant cider, powder milk, dried apples.	604.82	Tuna packet/tortilla gu energy gel, hot cocoa	700.50	Chili Mac with beef.	720	2020	\$14.50
									\$92.50

Week 2:

Day	Date	Breakfast	Cal.	Lunch	Cal.	Dinner (Freeze dried)	Cal.	Total	Cost
1	June 5	Oatmeal Granola/Tea, soy protein	628.046	Raman Noodles crackers, jerky. gatorade	854.69	Chicken terryaki with Mashed potatoes	800	2282	\$9.50
2	June 6	Cream of wheat/Coffee, soy protein	604.61	PB&J Tortilla Hot tea, Venison jerky	795.25	Beef stew with garlic herb potatoes	800	2199	\$12.50
3	June 7	Instant Grits Honey packets/tea, orange slices	605.11	Strawberry yogurt Granola Gatorade mix Venison heart jerky	715.67	Maccoroni and cheese	930	2250	\$10.50
4	June 8	Muesli/coffee, granola	589	Gatorade, tuna packet, Tortillas, mayo packets.	902.05	Wild Rice and pork	840	2331	\$13.00

				Chocolate bar		chops			
5	June 9	Cream of wheat/coffee, mango slices	604.61	PB&J Torilla Pistachios, gatorade	825.43	Meat lasagna with sauce	840	2269	\$13.50
6	June 10	Grits/tea, honey, banana chips, powdered milk	605.11	Packaged chicken Summer Sausage/wheat crackers, Hot tea	935.96	Whole grain pasta with sauce	850	2390	\$14.00
7	June 11	granola/instant cider, powder milk, dried apples.	604.82	Turkey packet/tortilla gu energy gel, hot cocoa	700.50	Ramen Noodles, Instant Mashed potatoes, corn.	740	2040	\$11.50
									\$84.50

Appendix D



Gant Chart:

The above chart was created in order to set apart each section of our expedition planning. These sections each have sub-sections which allow us to budget correctly as well as stay fit and healthy in order to execute the expedition to the Madison Range of Montana in May. Each section has a percentage of completion and obvious the percentage goes up as we come closer to May. On the right side of the chart it is broken up into sections of three months each, and shows when the training will commence and when it will

finish. Each section is different and takes a different amount of time towards its completion. The purpose of this chart is to ensure proper preparation for our senior expedition and to keep up with this chart is important for the success of it.

Preliminary Bibliography (MLA Format)

- 1) Cox, Steven, and Kris Fulscaas. *Mountaineering The Freedom of the Hills*. 7th. Seattle: The Mountaineers Books, 2003. Print.
- 2) Anderson, Dave, and Molly Absolon. *NOLS Expedition Planning*. 1st. Mechanicsburg: STACKPOLE, 2011. Print.
- 3) Watts, Alan. *Instant Weather Forecasting*. 2nd. Dobbs Ferry: Sheridan House Inc., 2001. Print.
- 4) Tilton, Buck, and John Gookin. *NOLS Winter Camping*. 1st. Mechaninicsburg: STACKPOLE, 2005. Print.
- 5) O'Bannon, Allen, and Mike Clelland. *Allen & Mike's Really Cool Backcountry Ski Book*. 2nd. Helena: Morris Book Publishing, LLC, 2007. Print.
- 6) Dawson, Lou. *Wildsnow.com*. 2012. Web.
<<http://www.wildsnow.com/2012/backcountry-skier-code-ethics/>>.

- 7) Eisfeldt, Ryan. "A Day In The Field." *Wild Things Unlimited*. Wild Things Unlimited, 10 Jan 2001. Web. 5 Sep 2012. <<http://wildthingsultd.org/a-day-in-the-field/>>.
- 8) "Ski Mountaineering and Technical Leadership." *American Alpine Institute*. American Alpine Institute, 10/ 5/ 2010. Web. 6 Sep 2012. <http://www.aai.cc/pdf_download/AMTL3c_Itinerary.pdf>.
- 9) Werner, Ben. *The Bozeman and Big Sky Backcountry Ski Guide*. 1st ed. Werner software publishing, 2011. Print.
- 10) Morley, Sean. "Risk Assessment." *Circumnavigation of the British Isles by sea kayak*. Word Press, 2004. Web. Web. 13 Sep. 2012. <<http://www.expeditionkayak.com/resources/risk-assessment/>>.
- 11) Zhang, Hong-Wei. "The analysis and construction of physical activities in Universities." *Journal of Physical Education Institute of Shanx Normal University*. 24.2 n. page. Print. <<http://search.proquest.com/physicaleducation/docview/746128238/139259D45FB2B40483E/11?accountid=13215>>.
- 12) Caprio, J.M., and P Farnes. "Climate of Montana." *Montana Interagency Materials Handbook*. Animal & Range Sciences, Extension Service, Web. 19 Sep 2012. <<http://animalrangeextension.montana.edu/articles/forage/MIPMH-chptr-1.htm>>.
- 13). "Climate of Montana." *Climate of Montana*. National Climatic Data Center, Web. 19 Sep 2012. <<http://www.wrcc.dri.edu/narratives/MONTANA.htm>>.
- 14) Hansen, Katherine, and Harry Fritz. "A Brief History of Montana." *Montana Historical Society*. Montana Historical Society, 2000. Web. 21 Sep 2012.
- 15) Sihler, Bob. "Madison Range Overview." *Summit Post*. summitpost.org, 15 Aug 2010. Web. 21 Sep 2012. <<http://www.summitpost.org/madison-range/321090>>.

- 16)Web. 21 Sep 2012. <http://en.wikipedia.org/wiki/History_of_Montana>.
- 17)Topinka, Lyn. "CVU Menu-America's Volcanic Past." *America's Volcanic Past Montana*. USGS, 11/06/2003. Web. 24 Sep 2012.
<http://vulcan.wr.usgs.gov/LivingWith/VolcanicPast/Places/volcanic_past_montana.html>.
- 18). "AMGA Ski Mountaineering Programs." *American Mountain Guides Association*. Marmor, Web. 24 Sep 2012.
<amga.com/programs/ski_SMGE.php>.
- 19)John, E, and B Allen. *The Culture and sport of Skiing*. Umass press: Thomson-Shore, Inc., 2007. Print.
- 20)Fry, John. *The Story of Modern Skiing*. Lebanon, NH: University Press of New England, 2006. Print.
- 21)Tejada-Flores, Lito. *Backcountry Skiing*. United States of America: Sierra Club, 1981. Print.
- 22). "List of Flora and Fauna of Montana." *Wikipedia*. Wikimedia Foundation, Inc., 10/May/2012. Web. 26 Sep 2012.
<en.wikipedia.org/wiki/List_of_flora_and_fauna_of_montana>.
- 23)"Montana." 2012. *The History Channel website*. Sep 26 2012, 1:35
<http://www.history.com/topics/montana>.
- 24). "Protein." *Center for Disease Control and Prevention*. Center for Disease Control and Prevention, 31 Oct 2011. Web. 2 Oct 2012.
<<http://www.cdc.gov/nutrition/everyone/basics/protein.html>>.
- 25)"Carbohydrates." *Center for Disease Control and Prevention*. Center for Disease Control and Prevention, 4 Oct 2011. Web. 2 Oct 2012.
<<http://www.cdc.gov/nutrition/everyone/basics/carbs.html>>.
- 26)Zelman, Kathleen. "The benefits of Fiber. For Your Heart, Weight and Energy." *Web MD*. WebMD LLC, Web. 2 Oct 2012.
<<http://www.webmd.com/diet/fiber-health-benefits-11/insoluble-soluble-fiber>>.

- 27). "Glucose." Web. 3 Oct 2012. <<http://hyperphysics.phy-astr.gsu.edu/hbase/organic/sugar.html>>.
- 28)"Types of Fat Topic Overview." *WebMD*. WebMD LLC, 3 May 2011. Web. 3 Oct 2012. <<http://www.webmd.com/food-recipes/tc/types-of-fats-topic-overview>>.
- 29)Zelman, Kathleen. "Sports and Hydration." *WebMD*. WebMD LLC, Web. 4 Oct 2012. <<http://www.webmd.com/fitness-exercise/features/drink-up-sports-fitness>>.
- 30)Volken, Martin, Scott Schell, and Margaret Wheeler. *BACKCOUNTRY SKIING Skills for Ski Touring and Ski Mountaineering*. Seattle: The Mountaineers Books, 2007. Print.
- 31)Dawson, Louis. *Wild Snow*. 1st ed. Golden: The American Alpine Club, 1998. Print.
- 32)Griffin, Lindsay. "French climb Kamet new route apline-style." *BMC working for climbers, hill walkers and mountaineers*. British Mountaineering Council, 10/JULY/2012. Web. 10 Oct 2012. <<http://www.thebmc.co.uk/>>.
- 33)Krakauer, Jon. *Into Thin Air*. New York: Anchor Books, 1998.
- 34)Twight, Mark. *Extreme Alpinism*. 1st ed. Seattle: 1999. Print.
- 35)Moran, Gary, and George Mcglynn. *Cross-Training for sports*. Champaign: Human Kinetics, 1997. Print.
- 36)<http://www.legendsofamerica.com/na-quotes.html>. Web
- 37). "AAA Fuel Cost Calculator." AAA. N.p.. Web. 13 Nov 2012. <<http://fuelcostcalculator.aaa.com/>>.
- 38). "Indian Nations." *Montana Official state travel site*. N.p.. Web. 15 Nov 2012. <http://visitmt.com/places_to_go/indian_nations/>.
- 39)"Montana Department of Environment." *Montana Official state travel site*. N.p.. Web. 15 Nov 2012. <<http://deq.mt.gov/ClimateChange/NaturalResources/Forestry/treeSpecies.mcp&xgt;>>.

