

YUKON-CHARLEY RIVERS NATIONAL PRESERVE

CENTRAL ALASKA NETWORK

Vegetation Monitoring Program

Summary Trip Report: Twin Mountain Mini-grid

18 June – 26 June, 2008



Lead Author: Meg Perdue
Contributors: Rory Nichols, Heather Stewart

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PURPOSE:

The purpose of this trip was to establish permanent plots for vegetation sampling at the Twin Mountain mini-grid according to the Central Alaska Network (CAKN) vegetation monitoring protocols. Twenty of the twenty-five points were sampled. Five points were not sampled due to lack of sufficient time.

PERSONNEL:

Meg Perdue - crew leader, plot/quadrat variable estimates, transect data, sapling data

Rory Nichols - non-vascular collections/id, plot photographs, tree core (1)

Heather Stewart - vascular plant collections/id, quadrat variable estimates, soil data, transect data

Dr. Bruce Bennett (VIP and botanist in the Yukon Territory) – quadrat variable estimates, identification expertise

ACCESS TO MINI-GRID AND CAMPING POSSIBILITIES:

The Twin Mountain mini-grid is located in a remote portion of the preserve that is only accessible by helicopter. In order to minimize the amount of helicopter flight time required to access this area, personnel and gear were first transported via fixed-wing aircraft from Fairbanks to the airstrip at Coal Creek Camp (approximately 1 hour flight time). A Hughes 500-D helicopter contracted by the Fire Management Program and based out of Coal Creek Camp was utilized for the approximately 20-minute flight to the Twin Mountain site. This was the first trip of the field season and to move all the field gear and four people necessitated two flights in a Cessna 185 from Fairbanks to Coal Creek Camp. It required two helicopter flights to move all four people to the site plus an additional flight to bring in a small amount of remaining gear. This third flight would be unnecessary with a standard sampling crew of three people. Initially, it was unknown whether we would be able to camp near water and so water jugs were flown from Fairbanks into Coal Creek Camp. After the first helicopter flight to the Twin Mountain site it was determined that water was available and so the jugs were left at Coal Creek Camp. While the jugs did add to the gear load for the fixed wing flights from Fairbanks, I am uncertain that it would be possible to get a regular sampling crew of three plus all gear in one fixed wing flight in a Cessna 185.

After a brief aerial reconnaissance, a camp location was picked on the edge of the grid northeast of point 6. This site provided good access to water and the flattest terrain with no obstructing vegetation, thus making it a helicopter landing area. Our camp spot was located on a terrace approximately 50 meters above the confluence of two small stream drainages where only the southern fork is shown as a blue line. (Photo 1, Topographic Map 1). The southern fork provided excellent drinking water and appeared to be a significant enough source to be available throughout the summer. The northern fork of the stream was dry above the confluence. We placed our tents on the bench above the stream terrace and set up our cooking shelter on the stream terrace itself. This stream was small enough in width and volume to allow us to cross over it easily to access the grid points to the south. Camping between and slightly south of points 11 and 12 might also be a possibility (seen in the

background of Photo1). This area has thick low brush and wet areas but would be closer to the grid center. Minimizing hiking distances by camping more centrally might facilitate completion of the grid on future sampling trips



Photo 1. Looking west into the grid and at our camp spot, the south fork of the stream is in the left of the photo and the north fork is at the edge on the right.

HIKING:

Hiking within the Twin Mountain mini-grid is for the most part not very difficult. The vegetation is generally easy to negotiate with minimal bush-whacking required. The grid contains many large areas of rock and boulder fields of various levels of stability. Most of these rocks are covered by large black foliose lichens that can become very slick in wet, rainy conditions. The stream in the southeast corner of the grid was small and could be crossed easily from camp to access points on the south side and could be avoided entirely when travelling to points to the north. None of the terrain is too steep to negotiate, however, sticking to less steep terrain, even when the route is slightly longer, in order to avoid boulder areas is more efficient and minimizes the chance of injury from twisting an ankle or knee on the rocks.

WEATHER AND ENVIRONMENTAL CONDITIONS:

We experienced a mix of weather while at the Twin Mountain mini-grid. Weather often moved through the area quickly and could change from nasty squalls to a nice breeze and sun in as little as an hour. We experienced rain on 7 of the 9 field days but also had breaks from the rain and various degrees of sun on those days as well (Photo 2). There was a light to moderate wind most of the time which helped greatly with controlling the mosquitoes. There

was somewhat of a trend of afternoon build-up but it was not completely consistent. Two prevailing weather directions were observed, on the first several days of the trip weather seemed to be coming from the northwest and then shifted later in the trip to come from the southeast. Temperatures ranged from the mid 40's to the low 80's during the day, with the median temperatures falling in the 50's to 60's (Fahrenheit). The overnight temperatures fell into the low 30's (Fahrenheit). The last two days of the trip were the nicest with only partly cloudy skies and no rain.



Photo 2. Typical 'Wait five minutes, it'll change' weather experienced at Twin Mountain

SAFETY CONSIDERATIONS:

As mentioned in the 'Hiking' section, the major safety concern is the potential for injury while hiking or working in the boulder and rock fields that cover large portions of the terrain in this mini-grid (Photo 3 & 4). The potential for twisting an ankle or knee while hiking in these areas seems quite high. This is an especial risk during wet conditions, as the large, black foliose lichens that cover most of the rocks can become very slick. Points 20 and 2 were a particular challenge, due to many large and fairly unstable boulders. While the potential for one of these to move may not be exceptionally large, the consequences could be very serious. If at all possible, the boulders should be avoided or the crew should be prepared to proceed at a slower, more careful pace to avoid falls and injury. Additionally, bears are always a safety concern, however, we did not see much in the way of bear sign, though there was one old dig area fairly close to where we camped. The five points that were not sampled do not seem like they would pose any additional concerns than those already outlined.



Photo 3. Boulder fields dominate the terrain, particularly at the higher elevations.



Photo 4. Point 20, the most extreme example of very large and potentially unstable boulders.

PHENOLOGY OBSERVATIONS:

There were a number of vegetation types at Twin Mountain: tundra, herbaceous meadow, medium to tall scrub, open black spruce forest and barren rocky areas. We found an average of 36 plant species per plot. Plots with a mix of herbaceous meadow and tundra ecotones had the highest vascular diversity. However, no clear patterns in terms of flowering or fruiting were noticed in relation to habitat type, slope aspect, or any other factor. In general, many plants were in flower: *Vaccinium uliginosum*, *Cassiope tetragona*, *Hierochloë alpina*, *Anemone narcissiflora*, *Carex* spp., *Dryas* spp., and *Ledum decumbens*. Some of the later flowering species that were in bud were *Linnaea borealis* and *Spiraea stevenii*. Due to sampling early in the season, few species were in seed (*Empetrum nigrum*, *Vaccinium vitis-idaea*, and *Salix* spp.). In addition, this created instances where identification was made difficult with very small, new plants that lacked flowering parts or seed heads.

GENERAL NOTES ON PLOT-WORK AND PLOT OBSERVATIONS:

Due to the identification expertise provided by Dr. Bruce Bennett a minimal number of vascular collections were required on this sampling trip. Heather collected 8 vascular plant specimens from the Twin Mountain mini-grid; she began on collection number HS-08-001 and ended on HS-08-008 (Table 1). Rory collected 103 nonvascular plants (RN-0074 to RN-0176) (Table 1). The number of the first photo taken at Twin Mountain was 100-0005 and the last number was 100-0284 (Table 1). Heather collected soil samples from every plot visited. At points 2, 5, 6, 17, 18, 20 and 22 – 24 soil was taken in the vicinity of the plot, but not at the standard locations due to the presence of rocks. Points 3, 5, 11 and 12 had sapling data however none of the plots had tree data and only one tree core was done at Twin Mountain (point 3) due to a lack of suitable specimens.

Table 1. Collection series for the Twin Mountain mini-grid.

Collector	Identifier	Series
Stewart	Vascular plants	HS-08-001 - HS-08-008
Nichols	Photos	100-0005 - 100-0284
Nichols	Nonvascular collections	RN-0074 to RN-0176

Some additional notes provided by Bruce Bennett include observations of a high abundance of *Podistera macounii* and *Luzula rufescens*. Several ‘pertinent negatives’ also struck Bennett; plants in the genera Selaginella, Minuartia, Silene, Draba, Equisetum, Potentilla (other than fruticosa), Lilies and Orchids were not observed. Additionally, there were very few *Saxifraga* spp., or smaller *Poa* spp. and *Festuca* spp. *Oxytropis mertensiana* was found on the bench where camp was located. Also of interest, a number of dead alder patches were observed, predominantly at elevations above 3500 feet (1066 meters). Other observations include snow patches present in the stream bottom and on north facing slopes and not seeing or hearing any ground squirrels.

ACTIVITES:

Wednesday, June 18

We travelled from Fairbanks to the Twin Mountain mini-grid via Coal Creek Camp (CCC) and sampled point 6. Rory and I left Fairbanks for CCC at 08:00 with Brad Shults in a government-owned Cessna 185. We arrived at CCC at 09:05 and began the process of weighing and organizing gear for the helicopter flight with the helicopter manager, Peg Ainsle. During this time Brad returned to Fairbanks to bring in Heather and Bruce. There was some time between when we arrived and the helicopter's arrival and so we were given an orientation to CCC. Prior to Heather and Bruce's arrival by fixed-wing, Rory and I departed in the helicopter with pilot Gary Hall at 11:20 and were dropped off at Twin Mountain at 11:40. The helicopter did not return with Heather and Bruce until 14:30, they had been delayed in Fairbanks and did not take off from there until 12:30. During the intervening period Rory and I set up camp and organized gear. The four of us set up the remainder of the camp while the helicopter brought in the remaining gear by 15:30. We departed camp at 16:10 to sample our first point. Due to the late hour we chose to sample the point closest to camp, point 6. We began sampling at 16:50 and completed the point at 20:40. It was necessary to offset the monument due to a boulder present at plot center. This point was characterized by dry tundra vegetation interspersed with *Salix* spp. and wet tundra vegetation found in depressions created by the rocks scattered throughout the plot. It appeared that pika had been feeding on the vegetation. We hiked back to camp by 21:00.

Weather: The morning was mostly cloudy to overcast with intermittent showers requiring Brad to take a slightly more circuitous route to reach CCC. The first helicopter flight to Twin Mountain occurred in overcast conditions with a ceiling of approximately 5000 feet, showers and light wind. Weather improved somewhat by the second flight and for sampling with showers ending but remaining mostly cloudy. Temperatures were in the low 50's F.

Thursday, June 19

Thursday we sampled points 25 and 24. We left camp at 08:00 headed towards point 25; the furthest corner of the grid from our camp, the hike took until 9:40. We began work on point 25 at 09:50 and completed it by 12:40. This plot was predominantly low shrubs with an area of drier tundra vegetation in Quadrant D due to the presence of a boulder patch. Animal trails, likely created by moose and/or caribou were visible in the plot with small patches of standing water present as puddles in these trails. We had lunch and then hiked to point 24 arriving there at 13:40. We started work on this point at 13:50 and completed it by 16:50. The vegetation was similar to that found at point 25 though shrubs were less dominant with more *Dryas* spp. present. This plot also contained a boulder patch and animal tracks that are parallel and about the width apart of tire tracks. As we hiked back to camp we passed the locations of points 18 and 12 and so marked each as the satellite coverage was good at that time and to expedite sampling work in future days. We were back at camp by 18:30.

Weather: Weather in the morning was mostly cloudy becoming overcast with rain showers with continuing intermittent rain all day, light winds and temperatures in the 50's F.

Friday, June 20

Friday we sampled plots 21, 22, and 23. We left camp at 08:00 for point 21, arriving there by 09:00. While hiking to this point we encountered several marmots making warning calls from their boulder perches. Point 21 was started at 09:10 and completed by 12:15. This point required the monument to be offset due to the presence of a boulder at plot center. This plot is located close to the top of a saddle with boulders and rocks scattered throughout the plot, some of these boulders were lichen covered, while others were visible through a mat of vascular vegetation. Dry tundra vegetation was predominant, however, depressions amongst the boulders contained wetter vegetation types along with a few small pools of standing water. We then hiked to point 22 and set the monument marker, which again required an offset; this time the offset was very large at over 8 meters. We had lunch and began work on the plot at 13:00 completing it by 15:30. This plot is encompassed by a large lichen covered boulder field with only a few small islands of vascular vegetation. We then hiked to point 23 (20 minute hike) where I realized that I had used the randomization values intended for point 23 at point 22, I decided to also use these values for point 23. Another monument offset was necessary due to the presence of boulders and rocky terrain where the stake could not be driven into the ground. Point 23 was started at 16:00 and completed by 18:50. This point is located approximately 30 meters vertically below the high point of the ridge on a flat bench. There are a large number of boulders in the plot with small pockets of standing water down among some of these. The vegetation was characterized by dry tundra dominated by *Dryas* spp. and graminoids. Heather and I completed work and headed back to camp to start dinner arriving there at 19:00. Rory and Bruce stayed to complete the non-vascular work and arrived at camp at 19:30.

Weather: In the morning the weather was fairly nice, partly cloudy with a light breeze and temperatures in the 60's F. By early afternoon clouds had increased and light rain showers began with more wind and cooler temperatures and remained that way for the rest of the day.

Saturday, June 21

On this day, the summer solstice, we completed points 5 and 10. At 08:00 we left camp headed for point 10. We decided the best route would be to avoid the brush and gain some elevation following the terrain we knew had worked to reach point 25. After hiking almost directly west from camp across the grid, we dropped down into the brush. We reached point 5 by 09:40 and began work by 09:55 after setting the monument which again required an offset and is located in fairly thick brush. This plot was very brushy; it is dominated by tall *Betula* spp. shrubs. While *Picea* spp. are present in the surrounding area only one seedling sized individual was present in the plot. Point 5 was completed by 13:15. We then hiked to point 10 and set the monument by 13:50. We had lunch and worked on the plot from 14:20 to 17:30. This point was characterized by low shrub vegetation around a meter in height on a gentle slope just below a bench. The only tree present in the plot had been broken off at the top, possibly by a moose. Bruce and I hiked over to point 15 (10 minutes) to set the monument (16:50) while Rory and Heather completed point 10. We then all hiked back to camp, arriving at 18:30.

Weather: The day started out sunny and mostly clear with a light breeze and temperatures in the 60's and low 70's F. The afternoon brought increasing clouds, cooler temperatures and scattered showers that persisted into the evening.

Sunday, June 22

Sunday we sampled points 3 and 2. We traveled down the drainage utilizing animal trails and arrived at point 3 at 08:50. After establishing the monument plot work began at 09:00 and was completed at 12:15. This was the only plot containing a significant number of saplings, all *Picea Mariana*, and the only point where a tree core was possible. This area was characterized by low brush with fairly dense but small stands of *Picea mariana* and a few solitary larger *Picea glauca* scattered about the slope. We traveled to point 2 by 12:55 had lunch and started work on the plot by 13:20. A monument offset was required due to the presence of rocks at plot center. This plot was one of the two of greatest concern, due to the potential instability of some of the rocks and the very slick footing due to rain. The plot encompasses a boulder field and contains only a few 'islands' of vascular vegetation. The area surrounding the plot is characterized by other boulder fields interspersed with relatively tall *Salix* spp. and *Ulnus* spp. dominated brush (1 -2 meters). Bruce and I headed to point 1 to set the monument while Heather and Rory completed point 2. We were all back in camp at 18:00.

Weather: Mostly clear in the morning with a minimal breeze and temperatures in the 60's F; by afternoon the sky had become overcast with rain showers, light winds and temperatures in the 50's F.

Monday, June 23

This day we sampled points 15, 20 and 14. We hike from camp at 08:00 and arrived at point 15 at 09:15. Having already set the monument plot work began immediately and was completed by 11:30. This plot is located on a very gently sloping bench on a somewhat steeper hill slope and contains almost no rocks. There is a range of moisture regimes, from patches of standing water through saturated soil to dry conditions. The vegetation can be characterized as tundra meadow with graminoids, herbaceous and ericaceous species all present. There was only one small tree and a few *Salix* shrubs present in the plot. We hiked to point 20 by 11:50 and set the monument, which again required an offset. We had lunch and then worked on the plot from 12:15 to 15:30. This plot constituted the greatest safety concern due to the large size of the boulders, the steepness of the slope and the potential instability caused by this combination. The slope of the plot was quite steep (38 plus degrees) that then leveled off to a bench below (west) of the plot. The lichen-covered rocks were the dominant cover but a few small patches of vascular vegetation, some under rock overhangs exhibited high species diversity. Due to the vertical and overhanging orientation of some of the boulders some of the transect measurements were difficult to determine with precision. We then hiked to point 14 (20 minutes) and worked on this grid from 16:00 to 18:15. This plot was similar to point 15 and can be described as a gently sloping bench on a larger hill slope. The vegetation can be characterized as tundra meadow with wet and dry conditions interspersed throughout the plot. We returned to camp at 19:30.

Weather: Partly cloudy with moderate winds and temperatures in the 50's and low 60's F in the morning and early afternoon. By late afternoon and evening the sky was overcast with intermittent heavy rain showers.

Tuesday, June 24

On Tuesday we sampled points 1, 7 and 12. At 08:00 we began hiking up the ridge south of camp to point 1 arriving there at 08:40. Since the monument had been set on 6/22 (again with an offset) work began immediately and was completed by 11:45. This plot is located on a broad ridge and is exposed so it would be prudent to avoid in thunderstorms. The plot itself is centered over a depression containing pools of standing water in amongst the boulders with dry tundra interspersed. Only one small *Picea glauca* is visible in the view shed and this is located just outside the plot. Bruce and I then got a head start to point 7 to place the monument while Rory and Heather completed point 1. The monument at point 7 was set by 11:50 with Heather and Rory arriving by 12:15. We had lunch and began work at 12:45, completing the point by 15:00. This plot had no rocks and was dominated by low shrubs, a meter or less in height. The surrounding slope was dotted with small groupings of sapling-size *Picea* spp. (likely *Picea mariana*) but none were present in the plot itself. A few indistinct and non-continuous animal trails are contained in the plot creating muddy patches and puddles of standing water. We then hiked to point 12 (30 minutes) via the stream bed in order for Bruce to assess if new and different species could be found in this riparian zone, nothing unusual was found. We began work at point 12 at 15:45 and completed this plot at 17:50. This plot also had no rocks and was dominated by low *Betula* spp. and *Salix* spp. shrubs just over a meter in height. The vicinity also is dotted with dense stands of small *Picea* spp. with one of these falling just at the edge of the plot so that only one sapling sized tree was present in the plot. We hiked back to camp by 18:30.

NOTE: Once we reached point 7 we realized we left a pin marker at point 1, likely it is located near the monument cap at plot center.

Weather: Overcast in the morning with light to moderate winds and temperatures in the 50's F and low 60's F; continued cloudy conditions but with some clearing, no rain.

Wednesday, June 25

On this, our last plot day, we completed four points, 18, 17, 16, and 11. We started from camp and hiked to point 18 by 08:45. Since the monument was set on 6/19 work began immediately and was completed by 11:45. Point 18 is located near the top of a broad ridge; the ground cover was evenly split between boulders and dry tundra vegetation. While Rory and Heather completed the first point Bruce and I hiked to point 17 and set the monument. Heather and Rory arrived at noon and we had lunch. We started point 17 at 12:30 and completed it by 15:20. This plot was equal parts boulders, *Betula nana* shrubs, and dwarf shrub cover. Bruce and I again hiked ahead to set the monument and the transect tapes at point 16 while Rory and Heather finished up the previous plot. Point 16 was begun at 15:30 and completed by 18:00. This plot contained about 10% boulders and could be characterized

as a tundra meadow with wet and dry conditions present. We decided to get in one last plot and so hiked to point 11 (10 minutes) where we started the plot at 18:20 and completed it by 20:30. This point had only a few visible rocks and was dominated by *Betula nana* shrubs about half a meter in height. There was one tree present in the plot as well as a few *Salix* spp. shrubs. Several animal trails cross the plot and its periphery. We hiked back to camp arriving there at 21:00.

Weather: Mostly cloudy all day with no wind and temperatures in the 50's F.

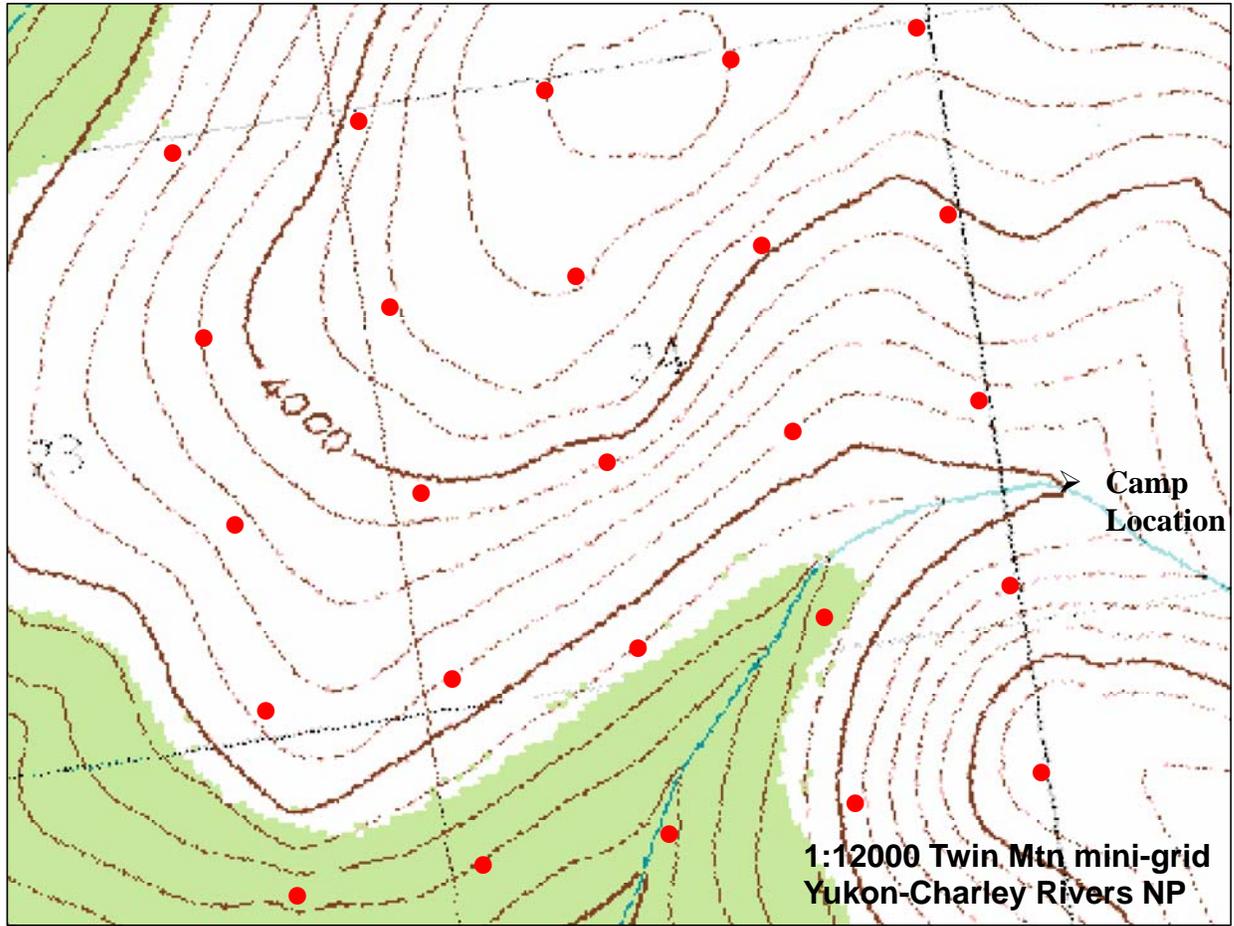
Thursday, June 26

This was our fly-out day and we expected the helicopter around 10:00 – 10:30 so we began breaking camp and preparing loads at 08:00. The camp location was taken with the Trimble unit at that time. We were ready when the helicopter arrived at 10:00 with the pilot, Gary Hall, and helicopter manager, Andrew Ruth. The gear was re-weighed and the ship packed; Heather and Bruce left on the first flight at 10:35. The second flight back to CCC with Rory and I occurred around 11:30. Andrew Ruth returned with the remaining gear on a third trip. Brad Shults arrived in the fixed wing and took Bruce and Heather back to Fairbanks departing at 12:25. Brad returned around 15:00 the second load was packed and Rory and I departed for Fairbanks at 15:30. We arrived there around 16:30 and were picked up by Heather.

Weather: Mostly clear and sunny with light winds and temperatures in the upper 60's F.

CONCLUSIONS AND FUTURE CONSIDERATIONS:

Given that all three crew members were new to the project and two were new to Alaska this was a very successful sampling trip. Having the assistance of someone as familiar with the vegetation as Bruce Bennett aided greatly in this outcome. While five points were not sampled, the twenty points that were represent all aspects, elevations and vegetation types seen in the mini-grid. The use of the Fire Management helicopter for access worked smoothly on this trip, but was problematic on the second sampling trip and contributed to the cancellation of the last field trip. This was extremely unfortunate and thus researching other aircraft options or contingency plans might help to avoid this situation in future. Also be aware that while the twin mountain radio repeater is relatively close by to the grid, it is on the opposite side of twin mountain, so we had no radio reception whatsoever. We used the satellite phone to check in once a day with the Eagle office.



Map 1. Topographic map of Twin Mountain Mini-Grid