

DENALI NATIONAL PARK AND PRESERVE

CENTRAL ALASKA NETWORK

Vegetation Monitoring Program

Summary Trip Report: Upper Stony Creek Mini-grid

14 July to 22 July, 2008



Photo 1. A view from a slope west of Stony Creek, looking northeast.

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Photos by Peter Nelson unless otherwise notes

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PURPOSE:

The intention of this initial visit to the Upper Stony Creek Mini-grid was to install permanent plot markers at each of the 25 points of the mini-grid. Additionally, our crew collected vascular and non-vascular plant, soils, and general plot data in accordance with the protocols established by the Long-Term Ecological Monitoring Project (LTEM). The crew succeeded in placing the monuments and collecting data from each of the 25 points of the mini-grid. The sampling period took place between the dates of July 14 and July 22, 2008.

PERSONNEL:

Carl Roland -- Crew lead, metaplot data collection, transects, vascular plant species composition and collections, vascular plant cover estimates

Peter Nelson -- Navigation, plot setup, photography, transects, non-vascular plant species composition and collections, non-vascular plant cover estimates, aided with soil depths

Richard Tate -- Plot setup, soils collections, soil depths, weather and trip notes, aided with transects and vascular plant species composition and cover estimates

ACCESS TO MINI-GRID AND CAMPING POSSIBILITIES:

As the frontier of the Upper Stony grid lies within 6 km off the park road, it was decided that this would be a hike-in grid. Thus, we packed light, eschewing all unnecessary gear in favor of lighter, more manageable backpacks. The number of bear barrels was kept to a minimum, with each team member getting an individual barrel and another three barrels being shared between the team members. Only two of these were filled and taken into the field, however, making for a total of five barrels of food supplies carried into the field on the initial trip in. Additionally, each crew member received another individual bear barrel during a resupply drop that was hiked in halfway through the duration of the sampling.

On the morning of Monday, July 14th, we loaded up into a suburban to drive through the rain to Stony Creek. Accompanying the members of the vegetation crew were three exuberantly willing sherpas (Heather Wetherbee, Mark Paulson, and Alonzo Mandanna), who tooted a large portion of the sampling and camping gear necessary for the trip. We parked at the bridge crossing Stony Creek, just east of Stony Dome, at about 1100 and prepared for the walk into the minigrid. Our course took us due north, following Stony Creek through a canyon that eventually opened into the wider valley of the study area. Some of the walking through this canyon is arduous, and at least one crossing of the creek is necessary, so be sure to wear waterproof rubber boots or all-terrain sandals! Coming into the valley, we followed a dry channel from the confluence of Big Stony and Little Stony Creek north to the minigrid. The hike from the road to the campsite took about an hour and a half to complete. We were fortunate to find a prime campsite almost directly in the middle of the grid. We placed our tents on a high, vegetated "island" sand bar sandwiched between Stony Creek proper and one of its side channels. Our kitchen and bear barrel cache were respectively about 75m southeast and northeast of our tents, on the peripheries of a large rocky wash that originates in the mountains to the east.



Photo 2. Arrow indicates large wash where we placed our kitchen and food cache. Our tent sites are obscured by a ridge, but they are across a small channel from the west end of the wash. View is roughly northeast.

Water is easily accessible and of good quality in this grid. Stony Creek itself would provide good water, but might be a bit silty due to some glacial influence. To circumvent the possibility of clogging a filter, we got our water from the small, clear side channel that separated our camping area from the rocky wash to the east. Pumping water was largely eliminated due to the use of a Katadyn camp filter, which is essentially a large bag full of water that is automatically filtered as it is released from the bag. Although it fills bottles somewhat slowly, the flow rate is probably equivalent to filtering water using a hand pump. Unfortunately, use of this apparatus removes an important portion of the field botanist's physical training regimen- the pumping of water- and thus should be used with caution.

The Upper Stony grid, straddling Stony Creek, is comprised of a variety of different habitat types. The eastern edge of the grid (especially points 1, 6, and 11) falls on the first foothills of a mountain range that rises to the east. The hillsides are largely open and meadow, displaying diverse forbs and mats of dwarf shrubs such as *Dryas alaskensis* and *Cassiope tetragona*.

Between these hills and Stony Creek is an impressive alluvial fan originating in the mountains mentioned above. The large, east-west running rocky wash we camped near is a

major landmark of this area. In addition, the alluvial fan's surface is gullied by other smaller, vegetated watercourses, thick with stands of *Salix*, some of which have running water. There are some small puddles and ponds marking the surface of the fan, but for the most part it appears well-drained. *Betula nana* covers much of this area in extensive low-growing thickets, and scattered stands of willow and *Populus balsamifera* stand like windrows above the level of the shrubs. Despite the thick cover of dwarf birch, many of the plots showed a surprisingly high diversity of forbs beneath the shrubs, including species such as *Androsace chamaejasme*, more commonly associated with high open tundra.

Stony Creek erodes the base of the alluvial fan, bisecting the minigrid from south to north. Only a couple of points (8, 18) actually land in the creek bottom. The flood plain of the creek exhibits thickets of large *Salix alaxensis* shrubs and forby undergrowth including *Equisetum variegatum*, *Pedicularis interior* and *P. verticillata*, and the interesting Alaskan endemic *Astragalus nutzotinesis* (look for this species' peculiar sickle-shaped legumes).

West of Stony Creek the landscape inclines sharply to a long ridge that fairly well demarcates the western edge of the Upper Stony mini-grid. East-running draws drain to Stony Creek from the ridge top, with exposed scree slopes on the south-facing hillsides of these gullies. The vegetation varies from very shrubby at the base of the hills to grassy/forbaceous tundra at the ridge top, with a gradation of dominant plant types between. A sole point, #25, lies to the west of this ridge in the bottom of a smaller creek, and is characterized by well-shaded, willow dominated vegetation.

HIKING:

The walking in this minigrid varies depending on what section of it one happens to be in (this may come as no great revelation). Navigation throughout the grid is superior, a hassle-free affair. A distinct scarcity of trees and an abundance of good vantage points make choosing routes between points easy as pie.

The majority of points fall on the large alluvial fan that takes up the eastern portion of the grid. The knee-high dwarf birch and low shrubs that make up most of the vegetative cover in this section do not provide too much of an impediment to movement, and taller shrubs are generally relegated to the drainages and watercourses that carve their way across the surface of the fan. Tussock fields and other such difficult terrain is largely absent, although we did run into some *Eriophorum* patches in the vicinity of point 16. The toe slopes of the mountains to the east must be climbed to access points on the southeastern edge of the grid, but routes that avoid snarled vegetation are easy to come by.



Photo 3. A view of point 20 (looking west) exhibiting the looseness of the substrate and the steep incline of the slope.

Access to the western points, located in more varied terrain and plant cover, is somewhat more challenging. The two westernmost rows of points require strapping on the Chacos (or other all-terrain sandal) and crossing Stony Creek, a substantial stream. Care must be taken not to lose balance on the slick stones in the rushing water. The stream crossing is an admittedly refreshing way to start your day, especially on cool mornings. The floodplain of the creek itself sports thickets of *Salix alaxensis* which can require some schwhacking, and the lower slopes of the tall western ridge are covered in more dense, albeit lower, stands of *Salix pulchra* and alder. The vegetation thins out and becomes more graminaceous and forby as one ascends the slope, and the main difficulty in hiking comes from the incline of the ridge itself. Many of the inclines boast scree slopes and other erosional areas that make for treacherous footing.

WEATHER AND ENVIRONMENTAL CONDITIONS:

The weather during our time at Upper Stony was, with a couple of exceptions, wet and chilly. The exceptions, when the sun shone and the temperatures rose, were the first couple days, an afternoon or two in the middle of the sample bout, and the last day on the grid. Fortunately the rain was not continuous, and sun breaks gave us an opportunity to reacquaint ourselves with dry skin and clothes. The combination of cool temperatures and precipitation kept the presence of mosquitoes and other biting insects to a minimum, and the bug shirts only came out on a couple of occasions. Also, despite it being July, snow levels on the surrounding mountains came down very low on a couple of days, to perhaps less than 1500 meters, and a couple of the mornings it felt as though snow could start falling at any minute. The lesson learned is that one must be prepared for any variety of inclement or fair conditions.

SAFETY CONSIDERATIONS:

Being “bear aware” is always a good idea, and while we saw only one bear from a distance while staying in the grid, there was a substantial amount of sign. Maintaining vigilance and calling even while on the open tundra could prevent surprising a bear in one of the many small drainages in the grid.

ACTIVITIES:

Monday, July 14

As described above in the “Access to Mini-grid...” section, Green Team and the attendant sherpas loaded up into a late-model Chevy Suburban and departed Denali headquarters at approximately 0830, due west on the Park Road through the rain for Stony Creek and environs. The expedition arrived at the bridge that crosses Stony Creek (just east of Stony Hill) around 1100, and followed the course of the creek north away from the road. After a decent hike tracing the route of Stony Creek through the exposed geology of its’ canyon and shrubby floodplain, we arrived at our spectacular camp site at about 1230, pitched our tents and ate lunch.

Following this bout of prandial repose, the team of sherpas bade us farewell, promising to return on Saturday the 19th to resupply our food stocks. The members of Green Team turned our attentions to the task at hand- sampling the Upper Stony grid. It was decided that starting at a relatively accessible corner point would be a good idea, as there was plenty of daylight remaining. Point 21, at the northeastern corner of the grid, was chosen to be the first plot to fall under the scalpel of our sampling scrutiny. We set out over the knee-high dwarf birch of the alluvial fan towards this point

The vegetation of point 21 appeared superficially to be very similar to that covering much of the large alluvial fan that comprised the eastern half of this mini-grid: void of trees, bearing a thick brushy layer of *Betula nana* and *Salix* species (in this instance, *S. pulchra*, *S. barrattiana* and a possible cross between *S. barrattiana* and *S. glauca*), and a sparse understory of forbs interspersed in a carpet of ‘feather moss’. Upon closer inspection, however, this point proved to be relatively diverse, encompassing nearly 50 species of vascular plant. Much of this diversity can be attributed to the influence of water within the plot, as it was dotted with some open puddles of standing water. Interesting forbs grew around these pondlets, including blooming *Claytonia sarmentosa* and *Saxifraga hirculus*.

Weather: AM: Rainy, overcast. PM: Rain continuing, clearing towards evening.

Tuesday, July 15

On this fine day in July we crossed west across Stony Creek and sampled points 9, 10 and 15. Point 9 laid part way up the ridge slope, located on a steep, open, meadowy hillside

dotted with *Betula nana* and *Salix* shrubs. In addition to commons members of grassy communities such as *Festuca altaica* and *Arctigrostis latifolia*, novel graminoids included the high tundra-loving *Hierochloe alpinum* and a full three species of *Luzula* (*L. rufescens*, *L. parvifolia*, and *L. multiflora*). The small caryophyllaceous forbs *Moeringia latifolia* and *Stellaria longipes* were found in the undergrowth of every quadrat. Other common forbs numbered among the considerable diversity of this site included blooming *Rhodiola integrifolia*, *Pedicularis capitata*, and *Arnica lessingii*.



Photo 4. A view of the subsided hillside south of point 10.

Continuing westward upslope to point 10, we can upon plot center near the edge of a considerable subsidence area. The area described by the plot comprised a steep open slope with southeastern exposure, dominated by mats of dwarf shrubs, low *Vaccinium uliginosum*, and diffuse bunches of *Festuca altaica*. Approximately the final two meters of the southern transect line occurred over the precipitous edge of the subsidence zone. The low vegetation failed to cover entirely the gravel and rocks in small bare patches. Diversity was high at this site as well, numbering upwards of 50 vascular plants species, and owed much to caespitose forbs such as *Diapensia lapponica*, *Minuartia macrocarpa*, and *Saxifraga tricuspidata*. We sighted a golden eagle from this high clear vantage, soaring on updrafts to the south of us.

We decided to travel upslope to the ridge top rather than take the straight route to point 15, avoiding a scree- and shrub-filled jaunt up and down a steep canyon to the north of us. Point 15 sat at the top of east-running valley that exited into Stony Creek, a very diverse meadow of lush forbs, the ground cover dominated by swaths of *Salix reticulata*. The area was polka-

dotted with vivid pink by the blossoms of *Dodecatheon frigidum* and *Pedicularis verticillata*. *Sanguisorba stipulata* was very prominent within the plot as well. Heretofore undocumented forbs from the grid found at this site included the Alaskan state flower, *Myosotis alpestris*; what possibly *should be* Alaska's state flower, the endemic bear flower, *Boykinia richardsonii*; bright yellow *Viola biflora*, and the scroph *Veronica wormsoldjii*.

Coming down the hillslope towards camp, we sighted 2 hikers walking through our cook tent area. They departed before we reached camp to talk to them, hiking up the large rocky drainage to the east of our camp and setting up their camp some distance away.

Weather: AM: Immaculate, sunny, good view of Denali. PM: Clouds gathering, overcast with rain later.

Wednesday, July 16

Again we crossed Stony Creek and headed towards the ridgetop, our goal being to take care of the plots along the western edge of the mini-grid. Our route took us to the vicinity of plot 14. From this vantage we could observe a repeater tower on a mountain to the south of our location, most likely the Thoroughfare repeater. This was another plot on the open, east-facing slope, and featured quite a bit of shrubbery in thickets of dwarf birch, *Salix pulchra*, and *V. uliginosum*. The blue flowers of *Mertensia paniculata* and the pink of *Rosa acicularis* were found throughout. The juniperesque lycopod *Diphasiastrum alpinum* was found in two quadrats, A and B. *Epilobium angustifolium* was another common forb. A duo of cawing magpies flew to the south of us, calling loudly.

We crested the ridge and dropped part way down its' western flank en route to point 20, found on an extremely steep southwestern-facing incline composed of loose dirt soil and scree (photo 4). This was one of the most speciose plots of the grid for us, with total vascular plant species found tallied at 68. Fascinating high alpine tundra species such as *Syntherisma borealis*, *Antennaria monocephala*, and *Campanula lasiocarpa* studded the largely exposed soil. Also found was a relative of the sedges, the inconspicuous *Kobresia mysuroides*. Especially exciting was encountering the uncommon amphiberingian crucifer *Erysimum pallasii*. For a time, we watched a large grizzly bear forage in the creek bottom to the west of us, maintaining vigilance until it worked its way out of sight. It was some distance away and did not appear to be aware of our presence. Other signs of animal life came in the form of arctic ground squirrel burrows and caribou tracks and scat in the plot.



Photo 5. Looking south from plot center of point 25, near large *Salix sp.*

As we were traversing the ridge between points 20 and 25, a live caribou was spotted on a ridge to the north of us. We dropped down to the west off the ridge top and into a creek bottom to reach point 25, which laid in a thicket of *Salix alaxensis* on the active floodplain of the stream (photo 5). The creek cut through the western portion of the plot. Nonvascular diversity was especially low at this plot, being mostly mosses, and soils proved somewhat difficult to collect, as most of the fine grained material had washed downstream. Most of the plot was shaded by the thick willows and thus was not very diverse, but an open area on the east side of the plot hosted some interesting plants, such as the moonwort *Botrychium lunaria*, a handful of graminoids, and the umbel *Angelica lucida*.

Our path back to camp took us through plot 19, which we decided to knock out while we were in the neighborhood. Its' location was on the east slope of the large ridge, lying just south of a small flowing drainage. The northeastern third of the plot had subsided into the small creek below and was a sparsely vegetated scree slope. The remainder was a *Boykinia* /*Salix reticulata*/ *Calamagrostis canadensis* meadow, with diverse forbs and grasses (67 vascular species in total). A thicket of *Salix pulchra* took up a good portion of the surface of quadrant A. We were barked at by ground squirrels at this plot, a golden eagle was on the wing above us, and, at some point in the weeks before our arrival, a thankfully now-absent bear had dug some roots near the western terminus of the transect line.

Weather: AM: Overcast, clearing to partial sun. PM: Skies clearing, nice sun.

Thursday, July 17

On this day we set out to complete the points remaining on the northern edge of the mini-grid, namely 22, 23, and 24. We began on the large alluvial fan at point 22, a dwarf birch-

dominated site. A small open drainage, running from ENE to SSW through the plot towards Stony Creek, upped the vascular plant diversity of the site. Blooming *Potentilla fruticosa* was scattered in the drainage and amongst the birch. The inconspicuous lycopod *Selaginella selaginoides* grew amongst the forbs and grasses in the drainage. Plants more commonly encountered in open, rocky tundra, such as *Lloydia serotina* and *Silene acaulis*, seemed very content to grow in the drainage of the shrubby bench.

Completing point 22, we proceeded west towards 23, crossing Stony Creek and ascending partway up the large ridge. Point 23 was largely enclosed by *Salix pulchra*/*Salix richardsonii* thickets and *Betula nana* shrubs, which shaded out much of the vascular plant diversity. Thick moss made for shallow, cold soil. Forbs found beneath the shrubbery included *Equisetum arvense*, *Mertensia paniculata*, and *Valeriana capitata*. Roots from the shrubs made collect of soils somewhat difficult. The ubiquitous sedge *Carex bigelowii* made an appearance in every quadrat of the plot.

The last point of the day, #24, resided on a steep (30°+ slope) southeast-facing valley side farther up the ridge, nearly at the top (photo 6). The vegetation was characteristic low-growing alpine tundra- extensive coverage by diverse lichens, mats of dwarf shrubs, and many forbs- covering the loose rock and gravel of a scree slope. *Saxifraga reflexa* and Death Camas, *Zygadenus elegans*, were found in quadrat B, and bunches of *Festuca altaica* showed up in every quadrat. As clouds began to thicken, rain began to fall and the wind began to blow, we gladly called it a day and came down off the ridgetop, heading for camp.



Photo 6. Looking west down transect of plot 24, evidencing steep slope and inclement weather.

Weather: AM: Overcast, windy and a bit chilly. Sun broke ~1030. PM: Clouds ceiling descended around noon. Overcast. Rain started ~1300.

Friday, July 18

This day started out cold and rainy. Point 18 fell in an active floodplain just east of Stony Creek. Nearly the entire plot was covered in a tall thicket of *Salix alaxensis*, standing over a relatively open gravel bar. Ground cover included hummocks of moss, straggly *Equisetum variegatum*, and flowering *Parnassia palustris* and *Aster sibiricus*. The pink inflorescences of *Hedysarum alpinum* were also in evidence. The willow *Salix arbusculoides* grew in quadrant C, and *Sherperdia canadensis* was widespread within the confines of the plot. A small rivulet side channel of Stony Creek flowed through the plot from south to north. The feathers and wing of a ptarmigan were in the plot, remains of a predator's lunch.

We headed east out of the stream channel, up onto the alluvial fan, and came to plot 17. Extensive shrub cover, common on this section of the grid, was definitely the case for this point. Much of the surface area of this point was covered in *Betula nana*, *Vaccinium uliginosum*, and almost luminous *Salix barrettiana*. Small forbs like *Androsace chaemejasme* and *Antennaria monocephala* were less conspicuous members of the diversity of this plot, with plants such as *Lupinus arcticus* and *Potentilla fruticosa* being more readily apparent to the casual eye.

Plot 16 occupied a section of a north-facing hillslope at the eastern limit of the large alluvial fan, in the foothills of the mountains to the east of the grid. There was much influence of water in the form of seeps and standing puddles, creating a home for water-loving species like *Saxifraga hirculus*. Hummocks formed by *Carex bigelowii* and *Sphagnum* moss were interspersed with mats of tundra dwarf scrub, including *Cassiope tetragona* and *Dryas alaskensis*. Large emerald foliage and vibrant greenery seemed to indicate the influx of a nitrogen source somewhere in the plot. Caribou scat in the plot indicated the presence of the animals in the plot.

Weather: AM: Rainy. Snow level on mountains to E and S down to approximately 1000 m. Chilly morning (2.5°C @ 0845). PM: Persistent rain, warming a couple of degrees.



Photo 7. Looking west from point 1.

Saturday, July 19

On this Saturday, the day of our appointed food resupply, we decided to do the southeastern corner of the plot in order to stage a rendezvous with our group of sherpas. We began with plot 3, closest to Stony Creek but still on the extensive alluvial fan. The major vascular plant players were in full effect here: *Betula nana*, *Vaccinium uliginosum*, *Vaccinium vitis-idaea*, *Calamagrostis canadensis*. The flowerless basal rosettes of *Parrya nudicaulis* and *Taraxacum alaskanum* were found in the quadrat B. Depressed drainages running SE to NW on either side of the plot necessitated offsetting the soil sample point inwards towards plot center in order to garner soil indicative of the plot area itself.

Plot 2 was very similar to plot 3, but bore perhaps more exposed area free of shrub cover. In these areas, open tundra-associated forbs (*Campanula lasiocarpa*, *Antennaria monocephala*) and grasses (*Hierochloa alpinum*) were found growing. Carl Roland departed for a time at this plot, seeking to meet up with the crew hauling our replacement bear barrels in. He successfully met up with them and returned to our location as Peter and Rich were finishing up the plot.

Plot 1 lay upon the slope of the foothills above the alluvial plain to the east of Stony Creek. It was an open, forb-rich, west-facing hillside meadow largely void of tall shrubs. Caespitose tundra forbs like *Diapensia lapponica* and *Silene acaulis* grew between dwarfed *Vaccinium uliginosum*, *Betula nana* and *Festuca* bunches. *Papaver macounii* and *Boykinia richardsonii* were also present.

Weather: AM: Overcast, misting rain. PM: Overcast with sun breaks, periodic showers.

Sunday, July 20

Plot 12 kicked this day off, sitting a few meters north of the large rocky drainage running east of our camp. It was a fairly open site with thickets of large *Salix alaxensis*, a few *Populus balsamifera* saplings, and a shorter understory of *Shepherdia canadensis*. Feather moss, *Dryas* mats, and graminoids (*Festuca altaica*, *Trisetum spicatum*, *Poa* spp.) bestowed a thin veneer of greenery to the alluvial rocks that, in much of the plot area, were fully exposed. Fine mineral soil had to be scraped from crevices between the larger rocks composing the substrate of the site.

Plot 11 was located on a small, south-facing hillside north of the rocky drainage. The southeastern third of the plot, including much of quadrant A, was located in a dense thicket of *Salix pulchra* that reached over 2 meters tall. The remainder was open tundra covered with *Betula nana*, *Vaccinium uliginosum*, and *Festuca altaica*. Despite the high degree of shrub coverage, nearly 60 species of vascular plant called the plot home, including the inconspicuous *Adoxa moschetelliana* and *Corydalis pauciflora*, as well as the broad vegetative leaves of *Petasites frigidus*. A red fox (who was actually predominantly black and dark brown) curiously checked us out for a time, ducking in and out of the bushes to the east

of us. A herd of caribou, four adults and two juveniles, drew our attention as they made their way up the large drainage to the south.

We ended the day by traversing the drainage to the south and climbing up the slope to the vicinity of plot 6. This was a low-growing, west-facing forby meadow similar to the environment found in plot 5. Dwarf shrubs like *Dryas alakensis*, *Cassiope tetragona*, and *Salix reticulata*. Tundra forbs like *Thalictrum alpinum*, *Minuartia macrocarpa*, and *Gentiana algida* were found in the matrix of plants. The brassicaceous *Eutrema edwardsii* (which shares a genus with the plant that gives us the popular horseradish-like condiment wasabi) was found in quadrant B. The plot also hosted four (and perhaps more) species of *Carex*. The sun shone for a time at this site, giving us a reprieve from what had been incessant precipitation for much of the previous few days.

Weather: AM: Persistent light drizzle. Rained all the night previous. PM: Sun breaks, quit raining about 1500. Sunny from 1600 on.

Monday, July 21

We made our last foray to the west side of Stony Creek on this day, seeking to knock out plots 4 and 5. We traveled upstream on the east bank where it more open before crossing over Stony. We proceeded up a smaller tributary of the mainstream and climbed a little rise to point 4. This was a somewhat unusual site: diverse, forby, covered in *Equisetum arvense*, but on a northwest-facing slope. The presence of water must have driven much of this diversity, as some water-loving forbs such as *Claytonia sarmentosa* and *Chrysopenium tetandrum* were found. We were careful not to walk around unnecessarily within the plot in order to reduce the effect of trampling. *Petasites frigidus* and *Myosotis alpestris* were widespread in the site, along with low-lying thickets of *S. pulcra* and *B. nana*. On the graminoid side of things, *Arctogrostis latifolia* was plentiful.

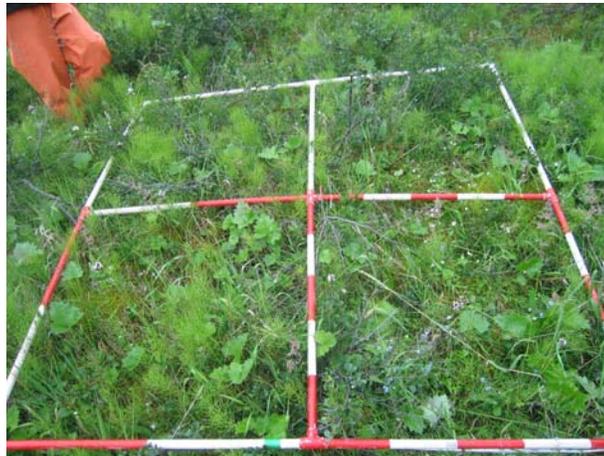


Photo 8. Quadrat A of point 4. Note diverse forbs and dominance of *Equisetum arvense*.

We were initially dreading the westward hike to point 5, which from our vantage appeared brushy, steep and damp. Luckily, as were climbing the slope from the small tributary north of

point 4, we happened upon a veritable freeway of a moose trail that appeared to head in the direction of point 5. We decided to follow it for a time, and as luck would have it, it took us up the drainage to within a quick 75 meter uphill walk to point 5.

Point 5 stood on a southeast-facing open slope, north of the tributary to Stony Creek. Ground cover consisted mostly of *Salix pulchra*, *S. glauca*, *Ledum decumbens*, *V. uliginosum* and *V. vitus-idaea*. Scattered under this brush were a few forbs and graminoids, including *Stellaria borealis* and *Aconitum delphinifolium*. While we were working, the park helicopter 191 thumped out of the low-lying clouds and flew over several times, and once circled multiple times over a basin to the west. This activity was unclear and unusual, but it has since come to light that the whirlybird was flying a group of paleontologists on a foray looking for new fossil sites.

Completing the sampling of point 5, we returned down the moose trail to the east and came out near our morning's crossing point on Stony Creek. We crossed back over to the eastern bank headed for plot 7, lying on the southern periphery of the large rock drainage east of our camp. Scattered BETNAN and SALGLA shrubs dotted the barely covered rocks of the drainage, which bore a thin layer of diverse lichens and mosses. *Populus balsamifera* seedlings grew up from the rock, and bunches of FESALT and *Lupinus arcticus* could be found around the plot. There is no stamped number on the cap, but a crew member did attempt to scratch in a crude "7" into the aluminum.

Weather: AM: Overcast, LOW clouds. PM: Rain began ~1400. COLD.

Tuesday, July 22

On this, the last day of our sampling, we found ourselves with a scant two plots remaining. Point 13 was only a couple hundred meters from camp, on the edge of the alluvial fan above Stony Creek's eastern banks. The western four meters of the E-W transect line fell over the steep eroding edge of the cliff face, so it was decided that we should not collect soils from this point or do a quadrat on this arm of the transects. In addition to the common members of the alluvial fan plots, *Empetrum nigrum* showed up in 3 of the quadrats, and a selection of forbs rounded out the plant diversity.

Our last point of the grid, #8, landed in the stream bottom on an older, grown-over stream terrace. In terms of vascular plants, it turned out to one of our most diverse plots, totaling 62 species. Tall *Salix* thickets (*S. pulchra*, *S. glauca*, and *S. alaxensis*) formed walls on the eastern and northern edges of the plot, and these species of willow, along with *S. pseudomyrsinoides*, were interspersed in a mosaic with forb- and graminoid-rich meadow in the rest of the plot. *Cerastium beeringanum*, *Astragalus umbellatus*, *Selaginella selaginoides*, *Delphinium glaucum*, and *Saxifraga hieracifolia* are just some of the many diverse forbs found at this site.

While engrossed in our sampling task, we were joined by Brian Dysktra and James Walton, the crew assigned to help extract us and our gear from the minigrid. They helped us finish up plot 8, at which point we all returned to our base camp to tear it down and divvy the gear up

amongst ourselves. We retraced our steps from nine days before out to the park road where a vehicle waited for us, and drove the park road back to headquarters, arriving at approximately 1800.



Photo 9. A view from the western edge of point 13, showing the steep descent from the alluvial fan (at right) to Stony Creek bottom.

Weather: AM: Early low clouds, lifting. Sun & partial clouds by 0830. Low snow level (<1500m) on mountains. PM: Partially cloudy.

CONCLUSION AND FUTURE CONSIDERATIONS:

All in all, the Upper Stony mini-grid makes for relatively straightforward camping and sampling. We were able to complete all 25 of the vegetation plots successfully. Much of our success was attributable to our campsite, which was close to ideal: centrally located within the grid, adjacent to flowing filterable water, in the path of easy transit routes across the terrain. Future crews should heavily consider camping at our location or nearby.

A paucity of trees within the confines of the grid makes for easy navigation. Outside of the drainages and watercourses, tall shrubbery was largely absent as well, meaning one could see for long distances and choose the best route between plots. The large ridge to the west of Stony Creek could be cut down to size by doing plots halfway up its face, thus forsaking the need to scale its' entirety in a single sustained bout. One of our most productive days, in which we accomplished four plots, occurred on a day in which we climbed the ridge, went down its' far side, and crossed back over it en route to camp, showing that its topography does not necessarily impede progress too much. Cold, rainy conditions were the rule for much of our time at Upper Stony, making long workdays largely out of the question, but if not for these inclement conditions, more four-point days could have followed on the open alluvial plain. Diversity was much lower here and hiking conditions much less demanding than on the ridgetop.

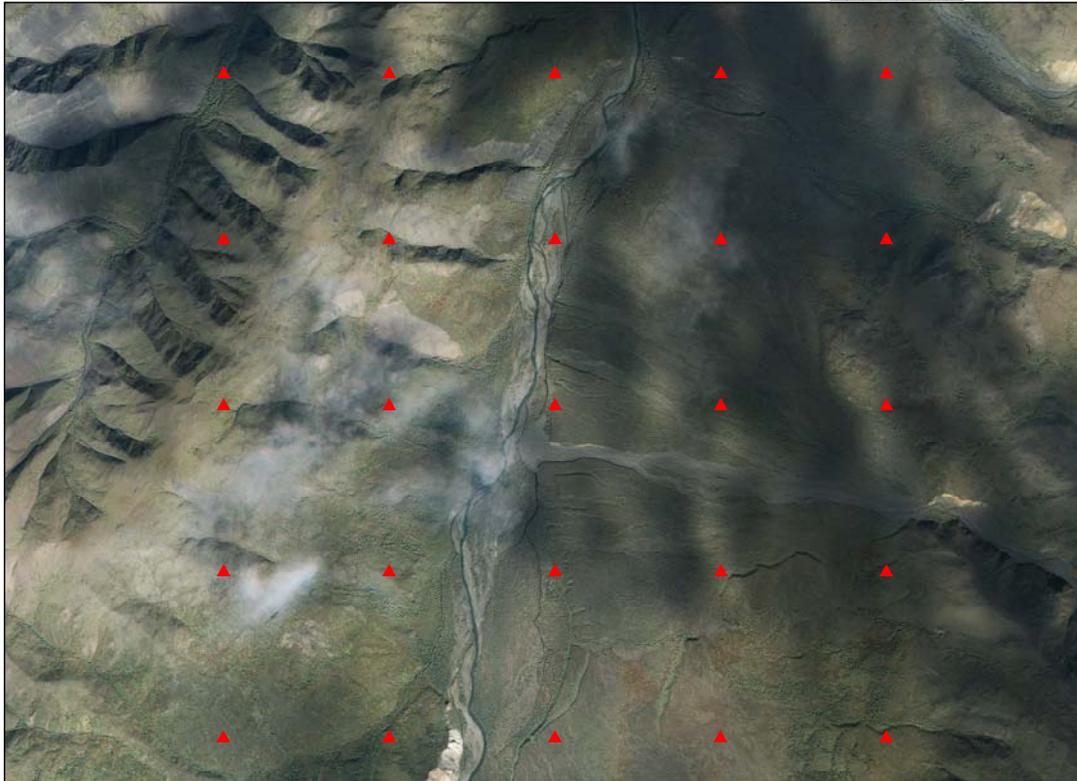
The open tundra conditions that prevailed over much of this grid occurred in very high vascular plant diversity, with many sites harboring upwards of 50 species. A careful botanical eye is needed to tease apart the distinct species from the chlorophyllic morass. Surprising numbers of small forbs hid amongst the feather mosses and dwarf birch that characterized the alluvial fan area.

Taking advantage of natural routes across the terrain can also be of great advantage to a botany crew looking to minimize their transit time. At the end of the workday, we would often beeline for the large rocky drainage on the east side of the grid, knowing that at its' western terminus lay our camp. Walking along the Stony Creek floodplain saved us time traveling north or south from camp. The moose trail that saved us a bushwhack between points 4 and 5 is a lifesaver; look for it on the north side of the small tributary stream that dumps into Stony in the vicinity of point 4. Finally, the ridgetop to the west of Stony makes for quick walking, and using it to traverse between points on the grid's western edge is a smart tactical move.

Weather conditions at the Upper Stony mini-grid in 2008 were, for the large part, abysmal. Just because it is the middle of July does not mean the surrounding hills won't get a dusting of snow in the night- which they did in our case. Twice. The first few days of sampling were pleasant, but soon rain and cold set in that would last, with few breaks, until the day we hiked out. Making sure you have adequate gear to withstand the conditions is necessary for mental health and good data collection, and should not be skimmed on simply because this is a hike-in grid. It weighs little and one will be happy they brought the spare clothing. A pair of neoprene gloves, an extra rain jacket, rubber boots, and plenty of socks are a few suggested items that can improve comfort, and bringing a mindless game to play in the cook tent (Pocket Farkel, anyone?) can maintain morale when the bad weather precludes an evening hike.

IKONOS True Color - 1:12000 Upper Stony mini-grid Denali NP&P

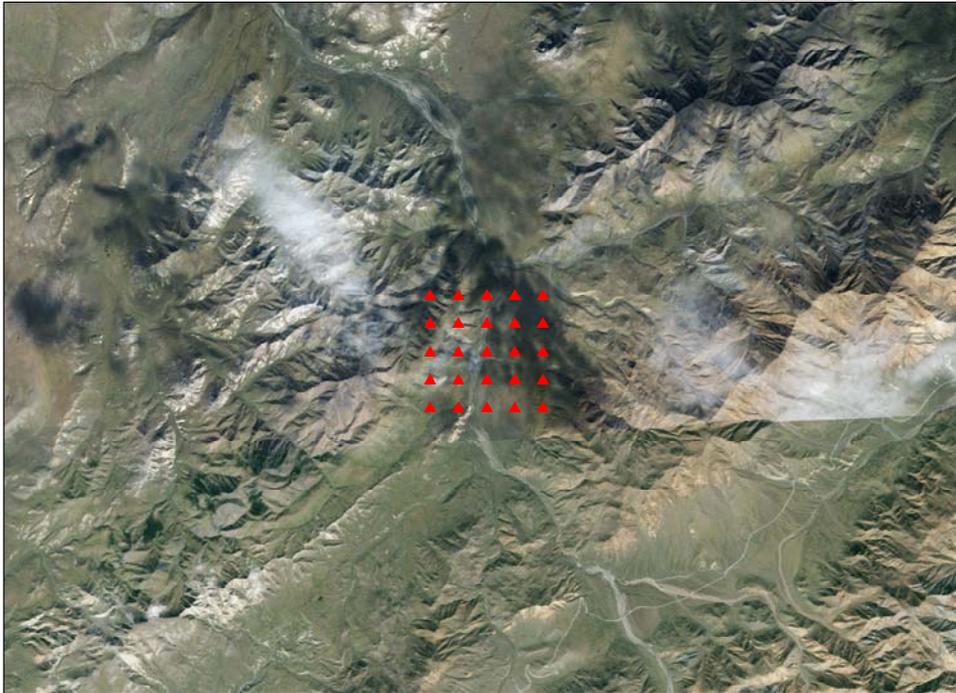
0 0.1 0.2 0.4 Kilometers



Map 1. IKONOS image True Color 1:12K of Upper Stony Creek mini-grid.

IKONOS True Color - 1:63000 Upper Stony mini-grid Denali NP&P

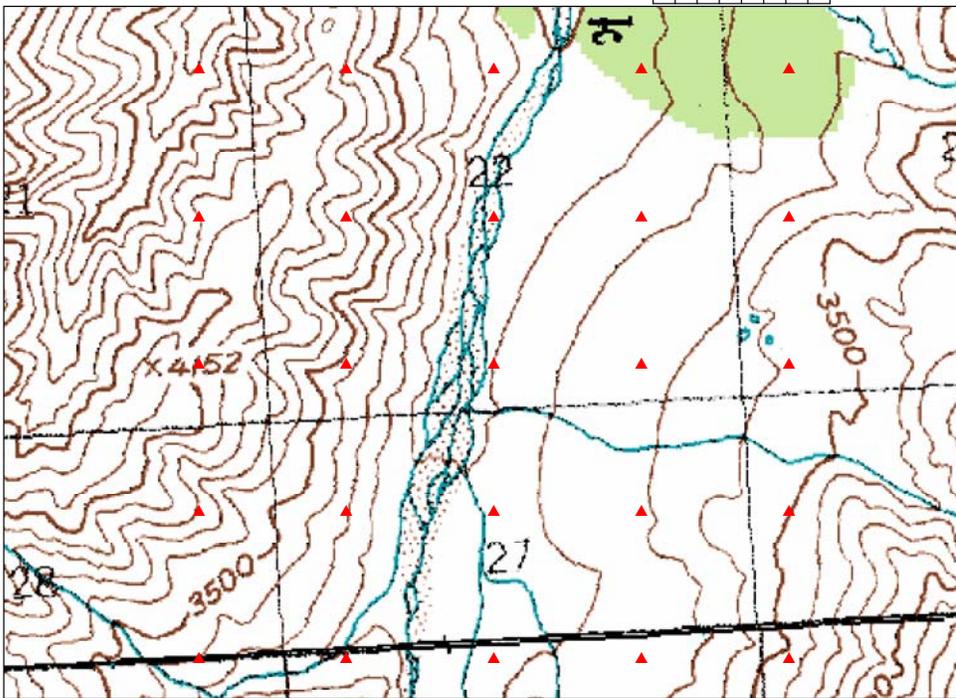
0 0.5 1 2 Kilometers



Map 2. IKONOS image True Color 1:63K of Upper Stony Creek mini-grid

Topo - 1:12000 Upper Stony mini-grid Denali NP&P

0 0.15 0.3 0.6 Kilometers



Map 3. Topo map 1:12K of Upper Stony Creek mini-grid.