

WRANGELL-ST. ELIAS NATIONAL PARK AND PRESERVE

CENTRAL ALASKA NETWORK

Vegetation Monitoring Program

Summary Trip Report: Rufus Mini-grid

9 July to 19 July



Lead Author: Cedar Drake
Contributors: Kim Smith and Ken Lindsay

September, 2007

PURPOSE:

The purpose of this trip was to install permanent vegetation monitoring plots and to collect vegetation data at the Rufus mini-grid study area according to the protocols established for the Central Alaska Network (CAKN) vegetation monitoring program. We completed sampling protocols at each of the 25 sample points at this mini-grid, though for point 5 we only completed the metaplot data.

PERSONNEL:

Cedar Drake— non-vascular plant data collection, transects data, gridpoint data, metaplot data

Kimberly Smith— vascular plant, transect and soils data collection

Ken Lindsay— plot photography, tree and sapling measurements, transect data

ACCESS TO MINI-GRID AND CAMPING POSSIBILITIES:

During our sampling visit to the Rufus Creek mini-grid, we used the Betty Freed cabin, approximately 6 miles down the Nabesna road from the Slana ranger station, as our base camp. A large, locked, and relatively secure storage shed was made available to house our personal and sampling gear during our field trips. Two small weatherports and several smaller cabins were available on the site for overnight accommodations. The main cabin was used for cooking, washing, and as an office space. The cabin was well equipped with non-potable running hot water, hot shower, three refrigerators, a large chest freezer, gas range, and a washer/dryer unit. Fresh water was transported in 5 gallon containers from an outdoor spigot behind the Slana ranger station. Three new mountain bikes were made available to us for transportation between the Freed cabin and the Slana ranger station.

As we did not have a government vehicle of our own, we made arrangements to be picked up daily at the Freed cabin at 800 AM by a member of the maintenance or fisheries crew and shuttled to a point on the Nabesna road in closest proximity to our daily plots. At the end of the day we contacted the fisheries crew via handheld radio for a pickup and shuttle back to the Freed cabin. This situation worked optimally for us. Our warmest appreciation goes out to WRST NPS employees: Lucas Stumpf, Julie Barnes, Lonnie Boutte, and Max Holston for their daily assistance.



Photo 1. NPS Freed cabin near Slana

HIKING:

Navigation and access was straightforward in the Rufus mini-grid as the entire area is flat and posed no major obstacles. The main concern for hiking is standing water and shallow streams. Knee-high boots are recommended.

WEATHER AND ENVIRONMENTAL CONDITIONS:

It was generally sunny and warm with temperatures mostly ranging from the 60s to the 80s. We only had one day of thunderstorms and drizzle.

PHENOLOGY OBSERVATIONS:

Vegetation was beyond peak phenology during the sampling period.

GENERAL NOTES ON PLOT-WORK AND PLOT OBSERVATIONS:

In early July 2007 the CAKN WRST crew completed a 10 day sampling visit to the Rufus Creek mini-grid. All 25 plots were sampled. The data for one plot (Rufus 5) needed to be estimated due to its location on the opposite shore of the Copper River. Plots with data entered primarily on Tablet PC: 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 19, 20, 24, and 25. Plots with data entered solely on data sheets: 4, 16, 17, 18, 21, and 23.

The Rufus mini-grid is characterized by a gentle sloping plain interrupted by successively descending stream terraces as the land approaches the Copper River. Succession is clearly evident in the mini-grid along a southwest to northeast transect. Stream terraces along the Copper River indicate late primary succession and forest stands northeast of Rufus Creek typify mature boreal forests. The mini-grid is intersected by numerous shallow streams draining in a northwesterly direction. Some small wetland areas are also present. The elevational relief of the mini-grid is approximately 50 feet with a range between 2,200 and 2,250 feet. Vegetation was slightly past peak phenology during the sampling period. Vaccinium uliginosum fruits were beginning to ripen by the end of the sampling period. Soils at the Rufus mini-grid were predominantly loamy sands overlying pure orange sand. Permafrost was rarely encountered in the mini-grid; its presence was recorded for all four sampling points in plots 2 and 19 and patchily in plots 7, 16, 24, and 25.

Table 1. Collection series for the Rufus mini-grid.

Collector	Identifier	Series
Smith	Vascular plants	KS-07-105 to KS-07-154; KS-07-174
Lindsay	Digital Photos	100-0235 to 100-0639
Drake	Nonvascular collections	CD-07- 022 to CD-07-44
Smith	Soils	24 samples taken: one from each plot 1A,1B,1C,1D,2B,2C,2D,3A,3D,6A, 6B,6Ca,6Cb,7B,7D,8A,8B,8D,9A, 9B,9C,9D,11A,11B,11C,12A,12B, 12D,13A,13C,13D,14A,14C,14D,16D, 17A,17B,17C,17D,18C,19A,19B,19C, 19D,20C,21A,21B,21C,21D,22A, 22B,22D,23A,23B,23C,23D,24A, 24B,24C,24D,25A,25B,25C,25D
Lindsay	Tree Cores	

Auxiliary Photo Points:

Several photos were taken in the Rufus mini-grid without the creation of Auxiliary points in the field database. The table below links these photos with their respective plots. These photos have been archived with the standard plot and panorama photos in their corresponding plots. The associated GPS files should be referred to in the field during the next sampling event in order for photo retakes to be performed in the same location.

Table 2. Photo points and their associated plots that are not in database.

<u>Mini Grid</u>	<u>Photo_pts</u>	<u>Associated Plot</u>	<u>Corr_Type</u>	<u>GPS Rcvr</u>	<u>Datum</u>
RUFUS	pp 100-0504 to 0516, rufus 16	Rufus 16	Postprocessed Code	GeoXM	WGS 84
RUFUS	pp 100-0380 to 0382, sw to rufus 05	Rufus 5	Postprocessed Code	GeoXM	WGS 84
RUFUS	pp 100-0396, 0397; deep tundra crack	Rufus 2	Postprocessed Code	GeoXM	WGS 84
RUFUS	pp 100-0398,0399; sunken tundra	Rufus 2	Postprocessed Code	GeoXM	WGS 84

Table 3. Location information about photo points not in database.

<u>Mini Grid</u>	<u>Photo_pts</u>	<u>Associated Plot</u>	<u>GPS elev (m.)</u>	<u>Latitude</u>	<u>Longitude</u>
RUFUS	pp 100-0504 to 0516, rufus 16	Rufus 16	686.546	62.670153964	-143.845659537
RUFUS	pp 100-0380 to 0382, sw to rufus 05	Rufus 5	681.554	62.657957634	-143.881953068
RUFUS	pp 100-0396, 0397; deep tundra crack	Rufus 2	691.100	62.656890585	-143.855093807
RUFUS	pp 100-0398,0399; sunken tundra	Rufus 2	691.793	62.657464900	-143.855145457

Additional Notes:

1. No liverwort species were tallied in the quadrats or along transects.
2. Extensive E. nigrum browning was evident on hummock tops and under tree clumps. We were not sure if this was normal for this time of year or due to a particularly dry early summer and spring.
3. The plot points marked on the attached aerial photos and maps (see below) are not situated correctly. The plot center locations are actually approximately 200 meters to the south.

4. Due to a malfunctioning soil thermometer, soil temperature data was not collected for the Rufus Creek mini-grid.

ACTIVITIES:

Monday, July 9

On Monday we completed points 24 and 25. The Rufus 24 plot center was located approximately 9 meters to the south of the Nabesna road. The north end of the transect extends 1.5 meters into the mowed road corridor. At its northern end, the metaplot extends into the center of the Nabesna road. The vegetation is characterized by open Picea glauca forest with a relatively open understory of Vaccinium uliginosum/E. nigrum. Abundant Stereocaulon tomentosum is present on the site. This is a flat plot with standing water occurring in a natural ditch in quadrant D. Rufus 24 marks the outer edge of the Rufus Creek mini-grid as it intersects the Nabesna road from the west. It is approximately 3.5 miles from Rufus 24 to the Freed cabin. Permafrost was detected in the plot.



Photo 2. Rufus 24 Quadrat C. Nabesna Road in background



Photo 3. Rufus 24 looking to the east

It is a 20 minute walk from the Nabesna road to Rufus 25. The vegetation was characterized by a forest clearing of smaller diameter Picea glauca saplings with an open understory of Vaccinium uliginosum/E. nigrum/L. groenlandicum/Arctostaphylos rubra. Scattered Sphagnum pollsters and permafrost are present. There are many signs of logging and old fire scars in the plot.

Weather: overcast/thunderstorms/ light drizzle 60's



Photo 4. Rufus 25 Quadrat

Tuesday, July 10

Point 19 was an open Picea glauca forest with abundant wildlife sign. Permafrost was detected at all four sampling points in the plot.

Rufus 20 occurs on an early to mid-successional stream terrace with numerous Vaccinium uliginosum clumps, downed woody debris, and scattered standing water.



Photo 5. Rufus 20 looking south towards plot center



Photo 6. Rufus 20 Quadrat A

Rufus 15 is a shrub dominated site with areas of scattered standing water present within the plot. A large P. balsamifera stand is adjacent to the plot. Our fieldwork was supervised by three raucous ravens.

Weather: partly cloudy/ cool 50's



Photo 7. Rufus 15 Quadrat B

Wednesday, July 11

On Wednesday we sampled points 13, 8, and 14. Rufus 13 is approximately a 10 minute walk from Nabesna road. The vegetation is characterized by tall open Betula nana. Liverworts were abundant in the plot.



Photo 8. Rufus 13 Quadrat D

Rufus 8 is a mature, open park-like stands of Picea glauca characterize the vegetation between Rufus 13 and 8. In this area we encountered two fledgling red-tail hawks on the ground (photographed) and abundant bear sign including fresh moose calf bones, Hedysarum alpinum diggings, and scat. This is an area to be especially alert for bears. Rufus 8 is characterized by large diameter open Picea glauca stands with relatively open low Vaccinium uliginosum understory.



Photo 9. Rufus 8 looking south towards center



Photo 10. Fledgling red-tailed hawk adjacent plot 8

Rufus 14 occurs on a flat fully-vegetated mid-successional stream terrace. The vegetation was a spruce (*Picea glauca*) woodland with trees less than 10 meters tall and a total canopy cover of approximately 20%. The understory cover is approximately 60% and dominated by *Vaccinium uliginosum*.

Weather: warm and sunny 70's



Photo 11. Rufus 14 Quadrat B

Thursday, July 12

On 12 July we sampled points 9, 10, and 5. Rufus 9 was open tall scrub vegetation for purposes of Viereck vegetation classification. The greater surrounding area, however, would be better described as *Picea glauca* woodland due to denser canopy coverage. The plot is situated on a mid-successional, fully revegetated and inactive flood plain. Some scattered standing water was present in kettle holes. The entire metaplot is mostly mesic with sandy soils but without any sign of fire. Abundant bear scat and *Hedysarum alpinum* diggings were present in the plot. Scattered large diameter *P. balsamifera*, most of which are dying and may serve as habitat for cavity nesters, offer clues into the site's riparian past. *Picea glauca* at the site are young and

exceptionally healthy; mostly less than 10 meters tall. Tree cores indicate their age to be approximately 40-50 years. Abundant mature Vaccinium uliginosum berries were present. This plot is approximately a 25 minute walk from the Nabesna road.



Photo 12. Rufus 9 Quadrat B

Rufus 10 is situated in a riparian corridor with approximately 65% total canopy cover; most of which is comprised of *Aln*vir and *Salix* species. A small flowing creek in the plot feeds a 125 m² pond at the south end of the transect. Soils near the creek were saturated and *Vioepi* is abundant in the plot. 3 small bird nests were found in and adjacent to the metaplot assembled from moose hair, *Salix* fluff, and dried grass. 15% of the plot is located on a grassy plain dominated by 2 to 4 meter tall *Alnten* and *Salgla*. Bear sign was abundant in the plot and surrounding area.



Photo 13. Rufus 10 Quadrat B



Photo 14. Looking across the Copper River towards the approximate location of Rufus 5 on the opposite shore

We were unable to sample Rufus 5 due to its position on the opposite shore of the Copper River. The above picture was taken at the closest accessible location to Rufus 5; approximately 200 meters away. Metaplot data was estimated for this plot as though it would lie along the primary stream terrace/ revegetating cobble field on the opposite side of the river.

Weather: partly cloudy 70's

Friday, July 13

On Friday we completed plots 2 and 3. Rufus 2 is an open Picea glauca forest with approximately 85% moss cover. Vaccinium uliginosum is the dominant understory species. A 2.5 m² seasonal pond was present. This plot is adjacent to an open "peat meadow" with low Salix (up to 0.5 meter tall) separated by a 0.5 m high stream terrace bank. A small open Alnten thicket (< 200m²) is situated to the east between the plot and the "peat meadow". Permafrost was detected in the plot.



Photo 15. Rufus 2 Quadrat C



Photo 16. Rufus 2 looking north towards plot center

We discovered two strange land features approximately 150 m north of Rufus 2. One was a large (150 m²) roughly elliptical depression in a peat meadow approximately 6 meters wide along its broad dimension. The depression continued down to the permafrost layer (0.7 m deep). This

depression was photographed and marked with GPS; the coordinates of the site are: **62.56745760° N, -143.85517356° W**. Most of the mosses in and adjacent to the depression were dead and dying. A large side profile of permafrost was visible. This disturbance looked relatively recent. No sign of water flow or any other geomorphic disturbance was observed. The second feature was a deep crack in the peat which extended approximately 70 cm. down to the permafrost layer. The peat crack, though not continuous with the hole, was situated nearby and extended nearly 6 m southwards towards Rufus 2. The GPS coordinates of the site are: **62.65689162° N, -143.85509286° W**.



Photo 17. Peat “crack” approximately 70 cm deep and 6 meters long near Rufus 2



Photo 18. Close-up of peat crack



Photo 19. Sunken peat depression with exposed permafrost near Rufus 2



Photo 20. Close-up of sunken peat depression

Rufus 3 is located within a broad (50 m) ecotone between mature open *Picea glauca* forest and a mid to early-successional *Picea glauca* woodland with *Vaccinium uliginosum*/Alnten/Salpul understory. There is a small inactive stream channel at the edge of the plot.



Photo 21. Rufus 3 Quadrat D



Photo 22. Rufus 3 looking north towards plot center

Weather: sunny/clear/warm/ 80's

Saturday, July 14

On Saturday we sampled plots 7 and 1. Rufus 7 was a very complex plot with 3 distinct vegetation types: tussocked *Carex* meadow, moist *Picea mariana*/shrub/*Carex* woodland, and mesic open *Picea mariana* forest. Standing water was present in the *Carex* meadow and moist *Picea mariana* woodland. Permafrost was detected patchily at the site.



Photo 23. Rufus 7 Quadrat D



Photo 24. Rufus 7 looking north towards plot center

Rufus 1 is situated in an abandoned vegetated stream channel. The vegetation may be characterized as an open pure *Picea mariana* forest with 35% canopy cover and abundant 1.0 meter tall *Betula nana*. Stream terrace banks exist on either end of the north/south transect; 0.5 meter tall to the north and 0.3 tall to the south. Three *Carex* species are present in abundance in the “creek bottom” of the plot. In the metaplot portion beyond the stream banks, the vegetation is more mesic with very little *Carex* and reduced *Betula nana*. Evidence of fire was present in plot (charred snags) but appears to be greater than 50 years old.

Weather: sunny/hot 80's



Photo 25. Rufus 1 Quadrat C



Photo 26. Rufus 1 looking east towards plot center

Sunday, July 15

Sunday we sampled plots 12, 11, and 6. Rufus 12 may be characterized as an open mixed Picea mariana/Picea glauca forest with an understory of abundant Betula nana.



Photo 27. Rufus 12 looking west towards plot center

Rufus 11 may be characterized as an open mixed Picea mariana/Picea glauca forest with an understory of abundant Betula nana.



Photo 28. Rufus 11 Quadrat D

Rufus 6 (or at least a portion of its metaplot) may exist on private land. To access this plot, travel up the Nabesna road (approximately 6 miles from the intersection with the Richardson highway) to an abandoned lodge on the north side of the road. Walk behind the lodge, cross Rufus Creek (abundant Dolly Varden in the creek here), and continue east in the forest at least 10 meters. From here, walk upstream approximately 100 meters to reach the plot. At this point the plot is approximately 16 meters into the forest southeast of a visible cabin that may be occupied. A DOI bearing tree (yellow sign) was located approximately 10 meters to the north of the plot. A second DOI bearing tree was not located. Wood cutting and garbage were observed within and adjacent to the plot. This area may be strongly influenced by human presence in the future.

Weather: sunny/warm 80's



Photo 29. Rufus 6 Quadrat A



Photo 30. Rufus 6 looking west towards plot center

Monday, July 16

On 16 July we completed plots 16, 17, and 18. Plot center for Rufus 16 is situated approximately 17 meters south of a small (3.5 m. wide) creek. An ecotone is present within the

metaplot between an open mixed coniferous forest and a mesic graminoid meadow. The first vegetation type is an open mixed Picea mariana/Picea glauca forest with an understory of tall Betula nana to 1.5 meters high. Vaccinium uliginosum and Calcan are abundant in this area. The 2nd vegetation type is a nearly pure mesic Calcan meadow with scattered forbs and Salix. Overall Rufus 16 is a mesic site with sandy/loamy soils and no evidence of fire. An old eroded stream terrace bank (0.4 meter high) corresponds with the ecotone.



Photo 31. Rufus 16 Panorama

Rufus 17 was keyed out to “woodland” in the Viereck vegetation classification even though tree canopy cover was slightly less than 10%, because it seemed to more accurately describe the plot in context with the surrounding vegetation. Rufus 17 lies in a lightly forested “gap” surrounded by large diameter Picea glauca. This “gap” is approximately the same size as the plot. The vegetation is characterized by large diameter Picea glauca up to 18 meters tall with some sub-dominant Picea mariana. The understory is dominated by 30-50 cm Vaccinium uliginosum with abundant L. groenlandicum/E. nigrum/Vacvit. This is a mesic site with loamy soils and no evidence of fire. One unique feature of Rufus 17 is its open, park-like nature. It is possible to look through the forest up to 80 meters distance.



Photo 32. Rufus 17 Panorama

Rufus 18 is a purely open Picea mariana forest with 35% canopy cover. The dominant tree canopy is approximately 5 meters tall. This is a mesic plot with loamy soils and no evidence of fire or permafrost. Lichen and moss covers are about equal. The 40% understory cover is dominated by Betula nana (approx 1 meter tall) Vaccinium uliginosum/E. nigrum/Vacvit. Moose scat was abundant in the plot.

Weather: sunny/warm/windy 70's



Photo 33. Rufus 13 looking south towards plot center

Tuesday, July 17

We sampled points 23, 22, and 21. Rufus 23 is a pure *Picea glauca* woodland with 24% canopy coverage and an understory dominated by *Vaccinium uliginosum*/*E. nigrum*. This is a mesic site with loamy soils. No evidence of fire was encountered. The northern portion of Quadrants D and C (approximately 30% of metaplot area) keys out to *Picea glauca* woodland, but the understory is dominated by *Salpula*/*Vaccinium uliginosum*/*Equarv*/Moss. We decided not to divide the metaplot into two vegetation classes, because they both keyed out to the same Viereck Level 4. A 4 meter wide creek is located approximately 25 meters north of plot center. Abundant wildlife sign was encountered in the plot.



Photo 34. Rufus 23 Panorama

Rufus 22 is an open *Picea mariana* woodland with scattered *Picea glauca*. Quadrants A, C, and D have high *Betula nana* cover (50%). Quadrant B has a complete absence of *Betula nana* but the same tree and understory composition as the rest of the plot/metaplot. A fairly clear ecotone is evident, but we did not split the vegetation into two classes because both keyed out to the same Level 4 Viereck class. It is unclear what the reason is for the *Betula nana* presence/absence. It may be due to a slight elevation gradient. Photos were taken at the end of the west transect looking west (no *Betula nana*) and east (into *Betula nana*) illustrating this difference. No evidence of fire was encountered. This is a mesic site with loamy soils.



Photo 35. Rufus 22 looking west towards plot center

Rufus 21 was a very complicated plot with numerous ecotones and 3 vegetation classes. The plot is situated in a forest “gap” at the edge of a large terrace promontory (approximately 4 meter drop over 10 meter distance). To the north and east of the gap lay undulating plains of open Picea mariana forest. A dry drainage channel and a moderately steep terrace slope (20 degrees) with open Picea glauca forest occur to the west and southwest. The forest “gap” keyed out to mesic open low shrub dominated by Poptre seedlings (<1 meter tall) and Vaccinium uliginosum/L. groenlandicum/Lichen/Moss. Calamagrostis purpurescens dominated the forested understory. This is a mesic site with loamy soils and evidence of fire within the plot is approximately 20 years old. Vascular and non-vascular diversity is quite high. An ORV trail lies 12 meters to the north of plot center. Garbage was found in the plot as well as abundant animal sign. Panorama photos were taken from plot center.

Weather: overcast/cooler/breezy 70’s



Photo 36. Rufus 21 Quadrat C



Photo 37. Rufus 21 looking north towards plot center

Wednesday, July 18

Rufus 4 is comprised of 3 vegetation types: mesic open low ericaceous shrub, tall open alder-willow scrub, and open Picea glauca woodland. The mesic open low ericaceous shrub community is dominated by Salarb /Potfru/Vaccinium uliginosum/E. nigrum and Stereocaulon tomentosum. The open Picea glauca woodland has 40% canopy cover with 90% of the trees < 4.5 meters tall. The dominant understory is Potfru/Vaccinium uliginosum/E. nigrum/Carmed. The tall, open alder-willow scrub has approximately 55% cover and is dominated by E. nigrum/Vaccinium uliginosum/Calamagrostis canadensis/Carcon/Rubus arcticus/Vioepi.

Weather: partly sunny/ warm 60's

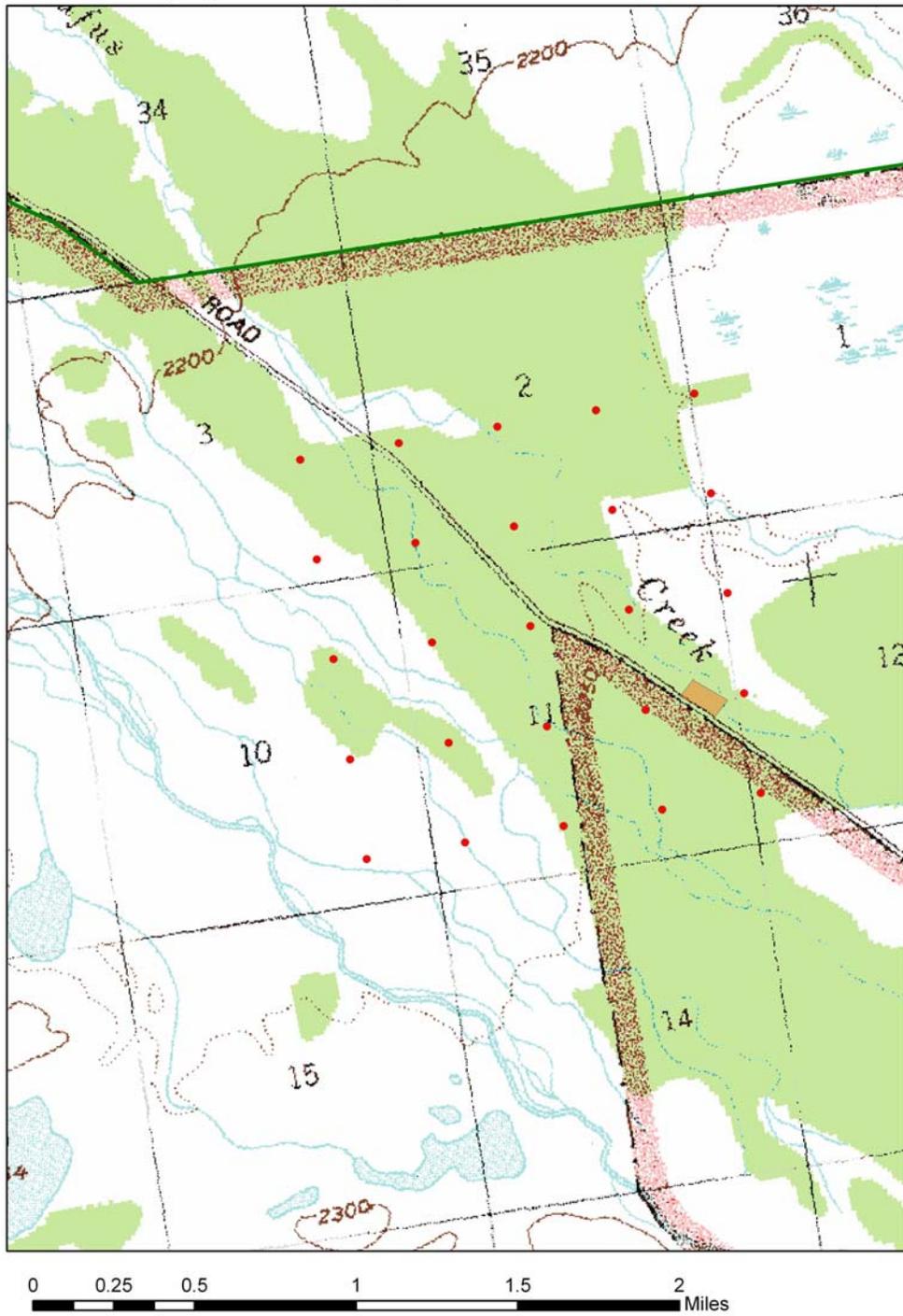


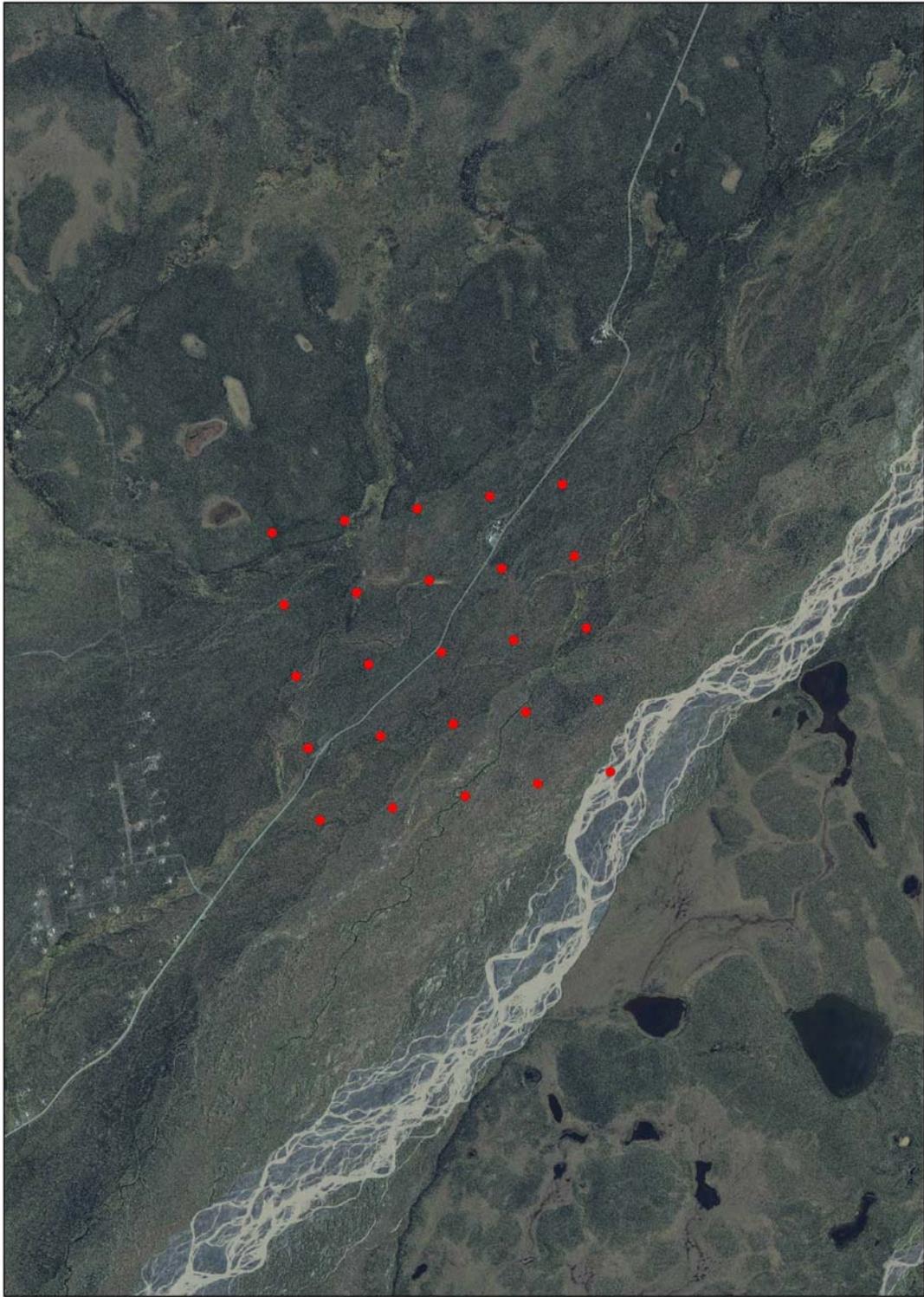
Photo 38. Rufus 4 Panorama

CONCLUSION AND FUTURE CONSIDERATIONS:

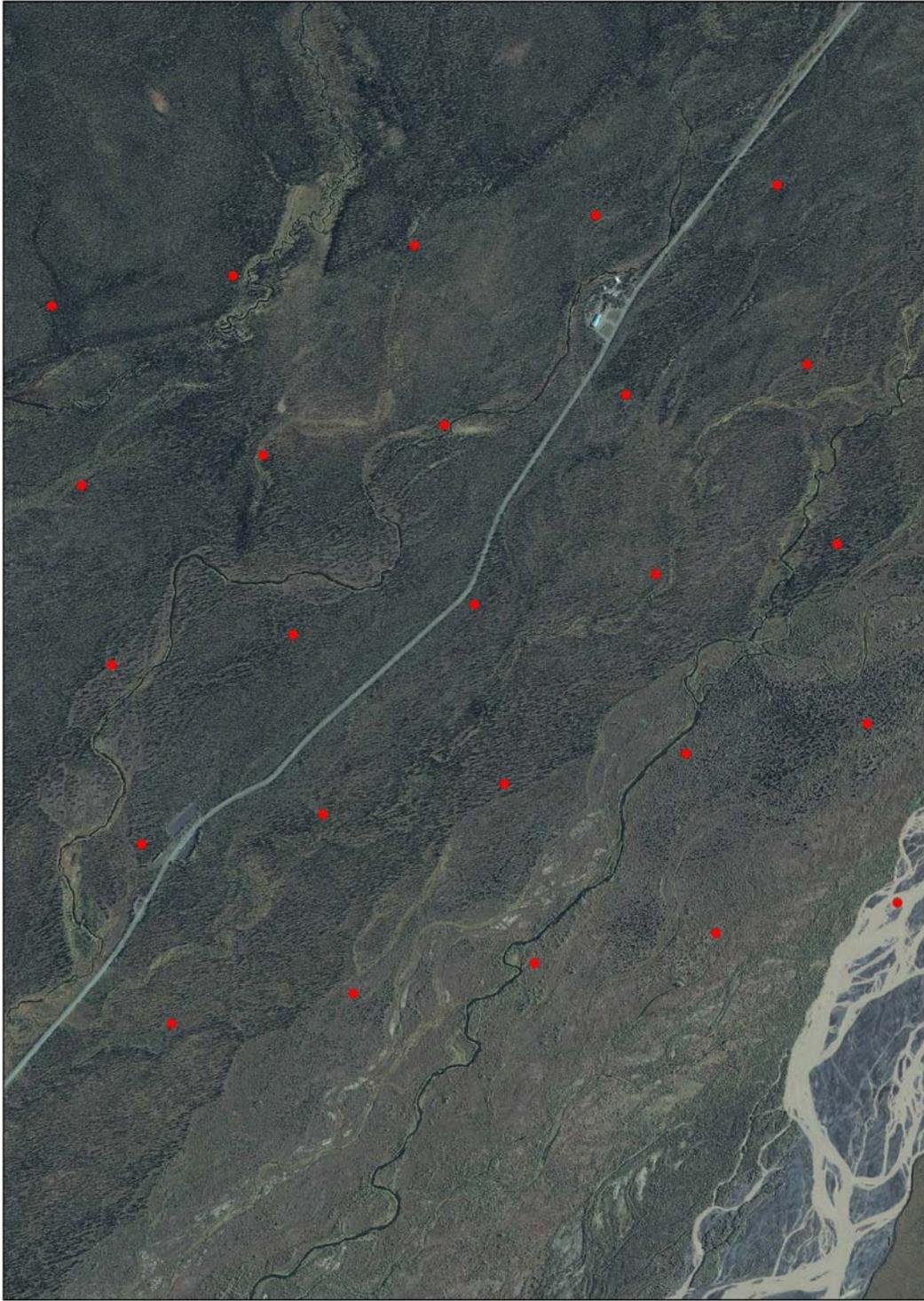
1. Knee high rubber boots are highly encouraged for this mini-grid as standing water and small creeks were frequently encountered throughout the entire area.
2. Use Garmin GPS unit while driving along the Nabesna road through the mini-grid to determine the entry point on the road nearest to the plot.
3. Mount camera on to the top of Hagloff pole in order to rotate camera from a stable platform when making panorama photos.

Rufus Creek Mini-grid (private land in orange)





Rufus Creek Mini-grid



Rufus Creek Mini-grid - Close