

WRANGELL-ST. ELIAS NATIONAL PARK AND PRESERVE

CENTRAL ALASKA NETWORK

Vegetation Monitoring Program

Summary Trip Report: Lower Tanada Creek Mini-grid

23 July to 1 August 2007



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September, 2007

PURPOSE:

The purpose of this trip was to establish permanent vegetation plots and collect vegetation data at the Lower Tanada Creek mini-grid study area according to the protocols established for the Central Alaska Network (CAKN) vegetation monitoring program. We completed all sampling protocols at 24 of 25 plots.

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

At 0900 the CAKN crew met with Slana District Ranger Mark Thompson, Slana seasonal LE Ranger Mark Giddons, and WRST GIS Specialist Joshua Scott at the Betty Freed cabin on the Nabesna road. The group drove approximately 25 minutes along the Nabesna road to the Copper Lake trailhead. Three 4-wheelers and one ORV trailer were then employed to transport crew and gear to the Tanada Creek crossing of the Copper Lake trail. This distance of 3 miles took approximately 45 minutes to travel due to the rough and muddy conditions of the trail. 4-wheelers often needed to be manually assisted through extensive muck holes and water levels which at times reached close to seated level. According to the rangers, the trail was at that time in average condition. They informed us that in the case of heavy rains during our ten day sampling period it might not be possible to shuttle us back to the Nabesna road via ORV on the last day of our sampling trip. Luckily, this was not the case, but should be taken into consideration for future sampling visits.

We began our hike in towards our base camp at a point along the Copper Lake trail approximately 300 m north of the Tanada Creek crossing where an abandoned creek channel crosses the Copper Lake trail. GPS coordinates: 62.58350962° N, -143.6929082° W. From this point we angled towards Plot 14 using our Garmin GPS unit. Hiking in with heavy packs was relatively difficult due to thick brush and tall Calamagrostis canadensis/Equisetum meadows which obscured a plethora of fallen logs. It is advisable when packing into the base camp to angle farther north rather than staying too close to Tanada Creek in order to avoid thick riparian vegetation and the incessant meandering of Tanada creek. One-way travel from the trail to the campsite required 45 minutes of strenuous hiking with heavy packs. Two pack-in trips of three people were required in order to bring all equipment from the trail to our base camp (3 hours total). A large grizzly bear print was observed in a fresh mud flat along the creek bank. Two piles of wolf scat were also seen.

During our sampling trip, Tanada Creek was moderately clear without suspended glacial silt. Sockeye salmon were observed swimming upstream. The creek water was palatable and good for drinking. Maximum creek depths ranged up to 1m during our stay. Evidence of recent and early season flooding indicated that creek depths may reach 1.5 m or more during

early season and periods of heavy precipitation. Creek width ranged from 5 to 7 meters, often with steep-walled banks on both sides. Chest waders were used for creek crossings as all crossings were well above the height of our rubber boots. Many large diameter logs spanning the Tanada Creek channel were present within the mini-grid. These might be employed in crossing the creek during higher water. Extensive low-lying areas adjacent to Tanada creek flood during higher water levels. This would complicate navigation among plots and most likely require use of a different base camp.

The base camp used during this sampling trip was optimal for the completion of the mini-grid. Located approximately 125 meters northwest of plot 14, it occupied a central location within the mini-grid. Tents were erected on flat ground adjacent to the creek under the canopy of large diameter spruce and poplar trees. A kitchen area was established 60 meters upstream near a small gravel bar/ beach. The base camp was surrounded by copious blooming monkshood (*Aconitum delphinfolium*) which created a cheerful atmosphere. The GPS coordinates of our campsite were: 62.57763634° N, -143.6794448° W.

HIKING:

Avoid walking in tall *Calamagrostis canadensis* meadows adjacent to Tanada Creek due to the difficulties of navigating over fallen logs and deep holes hidden in the grass.

WEATHER AND ENVIRONMENTAL CONDITIONS:

We experienced mild temperatures ranging from the 60s to the 80s. We had little rain, with mostly sunny or overcast skies.

SAFETY CONSIDERATIONS:

Frequent and significant bear sign (scat, diggings, tracks) was encountered in the mini-grid. Although we never encountered a bear, they were present; thus travel with caution!

PHENOLOGY OBSERVATIONS:

Vegetation was beyond peak phenology during sampling period. Flowering plants were rarely encountered other than plots occurring in riparian areas adjacent to Tanada Creek.

GENERAL NOTES ON PLOT-WORK AND PLOT OBSERVATIONS:

In late July 2007 the CAKN vegetation monitoring crew completed a 10 day sampling trip to the Lower Tanada Creek mini-grid and sampled 24 of 25 plots. The Copper Lake ORV trail provided good access to the study area. The Tanada Creek mini-grid study area was characterized by an undulating plain occupied by open low shrub/sedge scrub with patchy mixed *Picea glauca* / *Picea mariana* forest and moist to wet tussock meadows. Tanada Creek dissected the mini-grid along its southern and western borders. Evidence of periodic flooding and backwater sloughs were encountered along Tanada Creek within the study area. Approximately ½ km north of Tanada Creek, a sizable vegetated stream channel paralleled the active channel for the entire length of the mini-grid. To the north of this inactive channel,

tussock tundra meadows increases in frequency. A well developed riparian community extended on either side of Tanada Creek. Riparian vegetation was dominated by tall Picea glauca / Populus balsamifera stands with a lush herbaceous understory. Equisetum was abundant in the understory of some areas. Dense meadows of tall Calamagrostis canadensis occurred sporadically along the creek in periodically flooded areas and backwater sloughs. A 50 meter high plateau extended southeasterly along the southern portion of the mini-grid separating Tanada creek from the Copper River. The vegetation along this plateau was mesic and there was a small lake along the southern border of the mini-grid. The elevational relief of the mini-grid was approximately 33 meters feet with a range between 2,550 and 2,650 feet. During the sampling period vegetation was past peak phenology. Soils in forested areas were sandy loams overlying pure sand. The tussock meadows often had a deep organic layer and the saturated areas contained a clay-like, gleyed mineral soil. Permafrost was present in the study area and was encountered in plots 6, 7, 16, 20, 21, and 23.

Table 1. Collection series for the Lower Tanada Creek mini-grid.

Collector	Identifier	Series
Smith	Vascular plants	KS-07-155 to KS-07-173;
Lindsay	Digital Photos	KS-07-175 to KS-07-192
Drake	Nonvascular collections	100-0640 to 100-1064
		CD-07-45 to CD-07-65
Smith	Soils	25 samples taken; one from each plot and two from point 16
		2D,3C,3D,5A,5B,5C,5D,6A,6B,6C,6D,7A,7B,7C,7D,8A,8B,8C,8D,9B,9C,9D,10A,10B,10C,10D,11A,11B,11C,11D,12A,12B,12C,12D,13C,13D,14A,14B,14C,14D,15A,15B,15C,15D,16B,18A,18C,18D,19B,19C,19D,20A,20B,20C,20D,21A,21B,21C,21D,23A,23B,23C,23D,24A,24C,24D
Lindsay	Tree Cores	

Auxiliary photo points:

Unfortunately, several photos were taken in the Lower Tanada 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 not in database.

Mini Grid	Photo_pts	Associated Plot	Corr_Type	Revr_Type
TANDADA_L	100-0999	Tanada 3	Uncorrected	Garmin
TANDADA_L	100-1039	Tanada 14	Uncorrected	Garmin
TANDADA_L	100-1038	Tanada 14	Uncorrected	Garmin
TANDADA_L	100-0981-0982	Tanada 9	Uncorrected	Garmin
TANDADA_L	100-0983 to 0984	Tanada 9	Uncorrected	Garmin
TANDADA_L	100-0985	Tanada 9	Uncorrected	Garmin

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

Mini Grid	Photo_pts	Associated Plot	GPS_elev (m.)	Latitude	Longitude
TANDADA_L	100-0999	Tanada 3	2679	62.568273670	-143.666888500
TANDADA_L	100-1039	Tanada 14	2640	62.577133250	-143.677587600
TANDADA_L	100-1038	Tanada 14	2631	62.577191680	-143.677638400
TANDADA_L	100-0981 to 0982	Tanada 9	2611	62.572694450	-143.677215100
TANDADA_L	100-0983 to 0984	Tanada 9	2626	62.572658490	-143.677424700
TANDADA_L	100-0985	Tanada 9	2638	62.572595880	-143.677498400

Additional Notes:

1. Total number plots sampled in study area = 24; Point #1 was not completed due to lack of time
2. All Lower Tanada Creek Mini-grid field data were entered onto data sheets. The Tablet PC was not used during this trip because it was inoperable.
3. Picea mariana and Picea glauca were at times relatively difficult to distinguish from one another in this mini-grid. Extreme care was taken in tree species determination.
4. An abundance of fresh mushrooms were observed in the mini-grid. We often encountered small mushrooms in the spruce branches. Most likely these were being dried by squirrels.
5. Cladina lichen species were present in most plots but not often recorded because by species their cover was most often less than 5% of the 1 m² quadrat.
6. Be prepared for significant tussock walking when sampling this mini-grid.
7. We observed several red salmon in Tanada creek during the 10 day period.
8. Due to a malfunctioning soil thermometer, soil temperature data was not collected for the Tanada mini-grid.
9. The lake at the southern central border of the mini-grid appeared to be at only 80% of its maximum volume.

ACTIVITIES:

Monday, July 23

We spent the majority of the day getting to our camp spot (see “access to mini-grid and camping possibilities” for detail). After setting up camp, we attempted to complete Tanada 14 which was only 30 meters away from our kitchen site. Unfortunately, we encountered difficulties obtaining satellites with our Trimble unit and had to abandon our sampling plans for the day after waiting 1½ hours for satellite reception.

Weather: rain/clearing 50’s



Photo 1. Slana district ranger Mark Thompson transporting CAKN field gear along a flooded section of the Copper lake trail



Photo 2. Mark Thompson and LE Ranger Mark Giddens navigating a muddy section of the Copper Lake trail



Photo 3. Looking towards Tanada Creek Base camp from cooking area



Photo 4. Looking towards cooking area from trail to base camp

Tuesday, July 24

On Tuesday we sampled points 21, 16, and 11. Upon arrival at Tanada 21, we again began to wait for satellites, without any success. We “reset” the GPS receiver and satellites were immediately detected. Tanada 21 was an open mixed Picea glauca/Picea mariana forest with 35% total canopy cover. Approximately 65% of the canopy cover was comprised of Picea glauca and 35% of Picea mariana. The plot had an open V. uliginosum/B. nana/L. groenlandicum understory with scattered Carex tussocks and Salix clumps less than 1.5 meters tall. Heavy moose browse was evident in the plot. Tanada 21 featured high non-vascular diversity, but few species occupied greater than 5% of the 1m² grid. Scattered permafrost was present. No evidence of wildfire was encountered. Scattered dry kettle ponds (approximately 4 m²) containing exposed rounded river stones were present in the metaplot. These have been colonized heavily by lichen species. The plot marker was located at the base of a group of spruce trees and may be difficult to relocate. Tanada 21 was situated approximately 150 meters north of a large tussock meadow.



Photo 5. Tanada 21 Quadrat C

Tanada 16 was occupied by open, mixed low shrub: sedge tussock tundra scrub. The total tree canopy cover of the plot was 9%. The south end of the plot had a higher density of trees and saplings but there was no distinct ecotone. The metaplot was situated within a broad ecotone that gradually transitions from open Picea glauca woodland to an area of E. vaginatum-dominated, low scrub with scattered Picea glauca. Some standing water was evident among the tussocks to the north end of the metaplot but the area was predominantly moist, not wet. Tanada 16 was increasingly drier at its southern end where more Picea glauca were present. E. vaginatum and C. bigelowii tussocks up to 50 cm high were present with 30 cm spacing. Loamy clay soils and permafrost were encountered. No evidence of fire was observed in this plot. This plot had abundant Picea glauca seedlings. Tanada 16 lies within an arm of a large pure tussock meadow to the northwest and was gradually being colonized by trees.



Photo 6. Tanada 16 Quadrat A

Tanada 11 was a mixed Picea glauca/Picea mariana woodland with 24% canopy cover. It has an open B. nana/V. uliginosum/L. groenlandicum/L. decumbens/V. vitis-idaea understory. Moss cover was approximately 70%. Cladina and Peltigera lichens were abundant in the area. Soils were deep, sandy loams. No permafrost was encountered. Charred stumps were identified in the plot and aged as greater than 20 years old. Lots of animal scat was present in the plot.

Weather: clear/sunny 70s



Photo 7. Tanada 11 Quadrat C

Wednesday, July 25

We completed plots 22, 17, and 12 on 25 July. Plot center for plot 22 lies approximately 50 meters north from a forest edge in a large tussock meadow. Tanada 22 lies along an ecotone between a more mesic tussock meadow with greater than 25% low shrub cover (mostly B. nana/V. uliginosum/L. groenlandicum) and a lower “channel” Carex tussock meadow/bog with standing water (up to 30 cm deep) dominated by E. vaginatum, Eriang, and a diversity of other Carex species. This ecotone (to the north of the plot) was blurry and indistinct. Metaplot ecotone mapping was determined by presence/absence of scattered standing water and density of B. nana (decreasing in wetter areas). The metaplot encompasses an entire portion of the wet channel and portions of the drier tussock tundra on both sides. No permafrost was encountered, but it should most likely exist in the area; especially on higher ground. Very little wildlife sign was encountered. No evidence of wildfire was identified. Soils were saturated with a high organic content.



Photo 8. Tanada 22 panorama.

Tanada 17 was located in a wide (200m) ecotone between tussock tundra meadow and open mixed Picea glauca/Picea mariana forest. Some small, wet depressions occur within the plot. Tree canopy cover was approximately 8%, but the plot was Viereck Class coded to woodland because it better described the plot in the context with the surrounding continuous vegetation. The proportion of Picea glauca to Picea mariana in the plot was nearly 50:50. The understory was dominated by E. vaginatum/C. bigelowii tussocks up to 45 cm with 30 cm spacing. B. nana and V. uliginosum were also scattered uniformly throughout the plot with approximately 10% cover each. Burnt snags were evident in the metaplot and were most likely greater than 50 years old. No permafrost was encountered. Clay-like, gleyed mineral soils were present. This was one of the most diverse plots for vascular species that we encountered throughout the entire field season.



Photo 9. Tanada 17.

Tanada 12 was a mesic mixed Picea glauca/Picea mariana woodland with 24% canopy cover and equal proportions of white and black spruce. It had an open understory of B. nana/V. uliginosum/S. pulchra. E. vaginatum/C. bigelowii tussocks were present to 40 cm tall and there features increased in dominance towards the south of the metaplot. Tanada 12 had 35% graminoid cover. Few herbaceous species were encountered in the plot/metaplot. Deep loamy soils were encountered. No evidence of previous fires was identified. Numerous small, dry kettle ponds with rounded river stones on the bottom were scattered throughout the area.

Weather: partly cloudy 60s



Photo 10. Tanada 12 Quadrat C

Thursday, July 26

Thursday we sampled Tanada 23, 18, and 13. Tanada 23 was a Picea mariana woodland with 20% canopy cover. 90% of the tree cover originates from Picea mariana. Picea glauca trees taller than 10 meters create an emergent tree layer. A moderately open understory was comprised of 1.5 meter B. nana and V. uliginosum/L. groenlandicum/L. decumbens/V. vitis-idaea/Empnig. Very little grass and forb cover was present in the plot. A well developed and continuous moss/lichen layer was present. Scattered permafrost was encountered. No signs of wildfire were identified. Loamy soils were present in the plot.



Photo 11. Tanada 23 Quadrat A

Tanada 18 was a mixed Picea mariana/Picea glauca woodland with 18% canopy cover. The understory was dominated by E. vaginatum/C. bigelowii tussocks. Scattered V. uliginosum/B. nana shrubs were present with approximately 25% cover. Moist soils were encountered and it is likely that abundant standing water was present in the plot earlier in the season or during wetter periods. Clay-like, gleyed soils were encountered. No permafrost was observed. Evidence of a recent fire less than 10 years ago was evident due to the presence of burnt snags adjacent to the metaplot. Very little wildlife sign was encountered. Numerous dried out kettle tarns were encountered in the surrounding area.

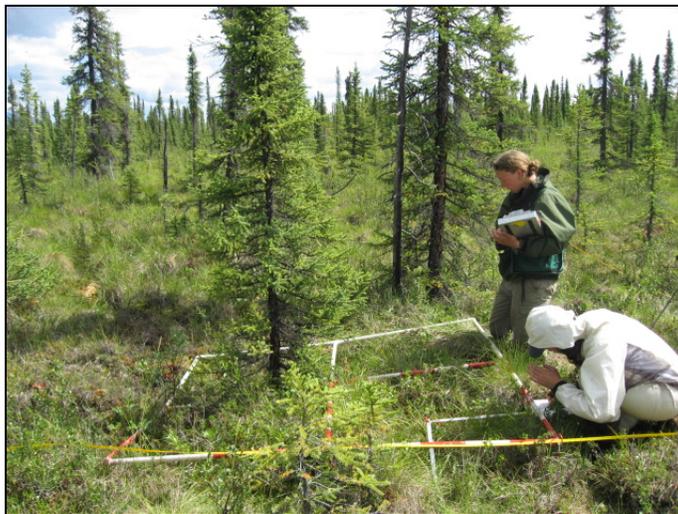


Photo 12. Tanada 8 Quadrat D

Tanada 13 occurs within the ecotone between Picea mariana/E. vaginatum tussocked woodland (no standing water and 11% canopy cover) and mixed Picea mariana/Picea glauca open mesic forest (on a slight 4° slope with 19% canopy cover). The ecotone exists at a slope break resulting in a gradual change in soil moisture. A blurry ecotonal edge exists between the vegetation types. The presence/absence of E. vaginatum tussocks was used to delineate ecotonal boundaries.

Lichen cover increases with elevation. Clay-like, gleyed soils were present in the tussock meadow. No permafrost was encountered in the plot. Little wildlife sign was observed. No sign of wildfire was identified.

Weather: partly sunny/warm/thunderstorms/light rain 80s



Photo 13. Tanada 13 Panorama overview

Friday, July 27

We sampled Tanada 25, 24, and 19 on 27 July. Tanada 25 was situated in an *E. vaginatum* tussock meadow with moist soils and scattered standing water. Tussocks were generally 50 cm high with 20 cm spacing. Shrub cover was 20% and dominated by *B. nana*/*V. uliginosum*/*L. decumbens*. Scattered *Picea mariana* and *Picea glauca* saplings occur in the plot up to 2 meters tall, but most average 1 meter tall. Total tree canopy cover was 2%. The metaplot lies directly in a tussock meadow approximately 45 meters wide and 300 meters long. Plot center was located on a tussock top. Moist organic peat soils were present. No sign of wildfire, permafrost, or wildlife were encountered.

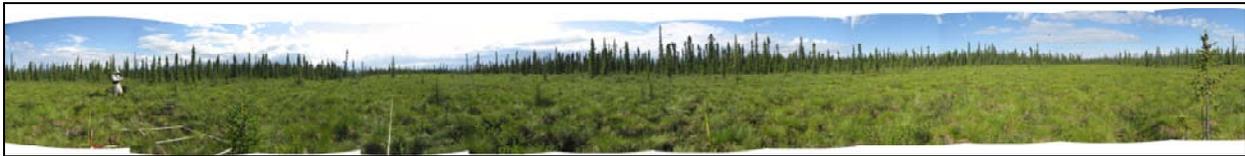


Photo 14. Tanada 25 Panorama Overview

The Tanada 24 metaplot lies within a broad ecotone between *Picea mariana* woodland and tussock tundra meadow. The ecotonal edge between the two communities was 1 meter south of the southern metaplot edge. The vegetation of this plot was characterized by 23% canopy coverage of which 80% was *Picea mariana*. The understory was comprised of *B. nana*/*V. uliginosum*/*Salmyr* and common dwarf shrubs. The south of the metaplot tends towards tussocking and *Calamagrostis canadensis*. To the north, the metaplot becomes more woodland and forest-like. Scattered kettle depressions up to 50 cm deep were present in the plot. Most were dry with moist soil but approximately 30% of the depressions still have standing water up to 30 cm deep. Deep loamy soils were present. Soils were gleyed at the end of the north transect. No permafrost or evidence of wildfire was encountered in plot. Tanada 24 also features a high diversity of non-vascular species and abundant wildlife sign.



Photo 15. Tanada 24Quadrat B

Tanada 19 was a mixed Picea mariana/Picea glauca forest with 17% canopy cover comprised of 60% Picea mariana and 40% Picea glauca. This plot has an open understory of V. uliginosum/B. nana/Salmyr/V. vitis-idaea/Empnig/Calcan/C. bigelowii. The moss/lichen substrate was well developed. Small kettle ponds were present with moist soils. One kettle along the south transect was completely dry and starting to revegetate with mesic vegetation. Soils were clay-like and gleyed. A burnt snag in the plot indicates wildfire in the plot 20-50 years ago. No permafrost was encountered.

Weather: partly sunny/ cooler/ 70s

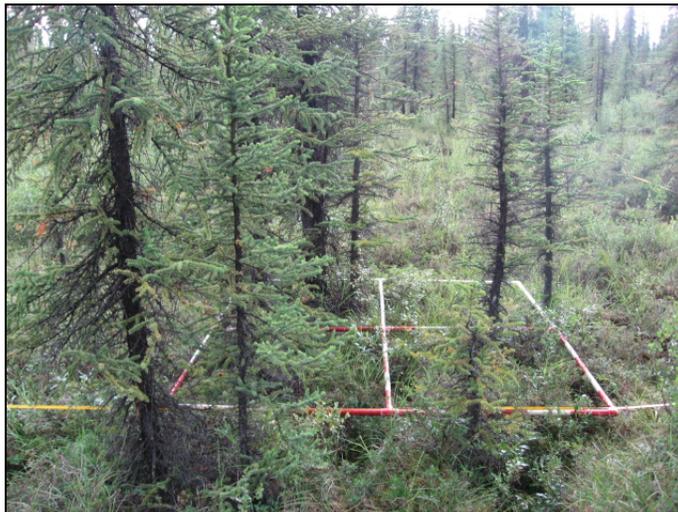


Photo 16. Tanada 19: Quadrat A

Saturday, July 28

On Saturday we sampled plots 6, 7, and 8. Tanada 6 was a Picea mariana woodland with 22% canopy cover comprised of 95% Picea mariana. Trees taller than 10 meters high tend to be Picea

glauca. The understory was characterized by scattered V. uliginosum/S. pulchra clumps. Widely scattered C. bigelowii tussocks were present to the south of the plot and E. vaginatum tussocks up to 40 cm tall to the north. The 5% forb understory was dominated by Petfri and Rubcha. Permafrost was observed at each soil point. The plot has 30% graminoid cover. No evidence of fire was encountered. Tanada 6 seems to be riparian influenced. Few lichens were present.



Photo 17. Tanada 6 Quadrat C

Tanada 7 was an open mixed woodland with 60% Picea glauca and 40% Picea mariana. The total canopy cover of the plot was 16%. Plot understory was characterized by tall B. nana to 1.3 meters tall with V. uliginosum/L. groenlandicum/R. acicularis/V. vitis-idaea/Empnig. The abundant interspersed graminoid cover at 26% was dominated by Calamagrostis canadensis but was not found flowering. Deep Sphagnum mats to 30 cm deep were present. Permafrost was encountered at all four soil points. Loamy soils were present. Two well-used animal paths cross through the plot. Tanada 7 was approximately 30 meters north of an abandoned Tanada creek stream channel. The metaplot was coded as a Picea glauca woodland Viereck class rather than the mixed Picea mariana/Picea glauca woodland, because it better described the site in context with the surrounding vegetation.



Photo 18. Tanada 7 Quadrat C

Tanada 8 was an open Picea glauca forest with 30% cover comprised of 90% Picea glauca. Most trees in the plot were taller than 10 meters. A closed, thick understory was dominated by

Equarv/Calamagrostis canadensis/V. vitis-idaea. Deep moss substrate covers the forest floor. A 1.3 m high stream terrace passes through the southwest and southeast quadrants of the plot. Abundant downed woody debris and snags were present. No evidence of fire or permafrost was encountered. Plot center was approximately 30 meters away from the bank edge of Tanada creek. A wildlife trail traverses the plot to a low water crossing in the creek. Recent moose calf predation at the site was indicated by bones, fur, and a 3 m² radius circle of disturbed soil in the metaplot. A large squirrel midden was present in the plot.

Weather: partly cloudy/ 70s



Photo 19. Tanada 8 Quadrat C

Sunday, July 29

On Sunday we completed plots 10, 5, and 4. We crossed Tanada Creek approximately 15 meters upstream from our cooking site. Water depth was slightly above knee level.

Tanada 10 was located near the crest of a gently sloping ridge between Tanada Creek and the Copper River. This was a mesic site. The total canopy cover was 15% comprised of 70% Picea glauca and 30% Picea mariana. All trees in the metaplot were 10 meters tall or shorter. The understory was characterized by tall B. nana to 1.9 m high with a dense understory of V. vitis-idaea/Empnig/L. decumbens. Some graminoids were interspersed throughout the site. The moss/lichen layer was non-continuous. There was abundant natural litter in the plot. Burnt snags older than 20 years were present. No permafrost was encountered. Soils were loamy. A dry and revegetating kettle pond was present in metaplot. Many Boletus mushrooms were encountered. This plot has great views of Mt. Sanford.



Photo 20. Tanada 10 Quadrat D

Tanada 5 was an open, mesic Picea glauca woodland with 12% canopy cover. It was a pure Picea glauca stand. The understory was composed of tall and densely spaced B. nana to 1.9 m tall with nearly continuous dwarf shrub understory. V. vitis-idaea and L. groenlandicum were abundant in the plot. A thick moss carpet comprised primarily of Plesch and Hylspl was present. Peltigera apthosa was abundant in the plot. Loamy soils were encountered. No permafrost was identified in the plot. Abundant evidence of fire greater than 20 years ago was identified. Plot center was located approximately 80 meters southeast from the base of a steep embankment (15 m high). An abandoned river channel of the Copper River was located along the base of this embankment. It was completely revegetated without any sign of recent flooding. At some point in time (perhaps > 200 years ago?) this plot was possibly situated in the main river channel of the Copper River. Unfortunately, while locating this plot we lost power to our Trimble GPS unit (including the external camcorder battery). As a result, this plot and the following 7 plots were installed with a Garmin unit. In the future crews should acquire GPS coordinates using a Trimble device at the following plots: Tanada Lake mini-grid plots 5, 4, 9, 3, 2, 14, 15, 20.



Photo 21. Tanada 5 Quadrat C

Tanada 4 was located on a small scenic plateau between Tanada Creek and the Copper River. Total tree cover in the plot was 2%. The metaplot lies within an ecotone between a tussock tundra meadow dominated by E. vaginatum/B. nana with scattered small Picea glauca and a B. nana/ericaceous open low shrub community characterized by a more mesic tundra-like composition. The ecotone was mosaiced. The ecotone was delineated using E. vaginatum tussock concentration versus mesic tundra-like surfaces. No standing water was encountered in

the plot. This may be quite different earlier in the season or during wetter periods. No indication of wildfire was encountered. Little wildlife sign was evident. No permafrost was encountered. Loamy soils were present. An upland Cowardian classification for both Viereck classes was assigned due to the lack of standing water on the site. This plot offers splendid views of the Mentastas, Boyden Hills, and the Wrangell Mountains.

Weather: partly sunny, 70s



Photo 22. Tanada 4 Panorama overview

Monday, July 30

We sampled plots 9, 3, and 2. Tanada 9 was a very complex metaplot with three ecotones present. The dominant Viereck class was low scrub dominated by C. bigelowii and E. vaginatum tussocks up to 30 cm tall with abundant B. nana/V. uliginosum/L. groenlandicum. Along the north side of the plot is a thin riparian strip of tall Picea glauca with Populus balsamifera and tall Salix bebbiana. This vegetation community was approximately 10 meters wide and lies in a vegetated stream channel. This stream channel has most likely been dry for a long time as evidenced by the abundant needle cast litter present. The eroded stream bank along the north end of metaplot was approximately 1 m high. North of this stream bank was a small (25m²) inclusion of Picea glauca woodland with 1.3 m high B. nana and lower L. groenlandicum. To the south of the metaplot the slope breaks abruptly from 1° to 13°. The slope change coincides with a change to mesic mixed Picea glauca/Picea mariana woodland with abundant B. nana/V. uliginosum and a considerable increase in the density of surface macrolichens; especially Cladina spp. Tussock formation was the primary measure used in determining ecotone between the middle and more southerly



Photo 23. Tanada 9 Quadrat C

vegetation communities within the metaplot. Permafrost was observed in the plot. Abundant fire sign was seen in the area. Photographs documenting the ecotones were recorded at the site.

Tanada 3 was situated on a plateau between Tanada creek and the Copper River. Plot center was located approximately 100 meters northwest of a medium-sized shallow lake. Recent wolf tracks were observed at the lake. Plot center was placed in a B. nana clump and may be difficult to relocate. The plot/metaplot located in tall B. nana (up to 2.0 m tall) with scattered trees (mostly Picea mariana) to 13 m tall. Canopy cover in the plot/metaplot was slightly below 10%. No permafrost was encountered. Abundant standing dead snags with charcoal scarring indicate a substantial fire in the area twenty or more years ago (possibly a 1970 fire recorded in the GIS). Loamy soils were present in the plot. This plot has a beautiful view!



Photo 24. Tanada 3 Quadrat D

Tanada 2 was characterized by tussock tundra with scattered Picea glauca mostly less than 4 meters in height. Tree canopy cover was approximately 7% and total shrub cover was just below 25%. The dominant understory was B. nana up to 0.5 m tall and V. uliginosum. Tussocks were present in the plot up to 35 cm tall with 25 cm spacing. No standing water was observed between the tussocks. A different vegetation type exists on the north end of the metaplot (mixed spruce woodland), but this only extended 4 m into the metaplot and was thus not recognized as a separate Viereck class. Permafrost was present in the plot. Clay-like, gleyed soils were encountered throughout the plot. Evidence of fire was greater than 20 years old. Very little wildlife sign was encountered.

Weather: mostly cloudy



Photo 25. Tanada 2 Panorama overview

Tuesday, July 31

On Tuesday we sampled plots 14, 15, and 20. The vegetation of Tanada 14 was characterized by mature Picea glauca (> 20 meters tall) with an open understory of Equisetum and forbs (e.g. Pyrola/Mertensia/Aconitum/Valerian). Canopy cover was approximately 40% in the plot. Many standing dead trees with peeling bark were present as well as abundant downed woody debris. The entire metaplot appeared to be situated in an active floodplain area. Evidence of flooding

throughout the site was present from either current or previous years. Sandy loamy soils were present. No permafrost was encountered. Plot center was approximately 20 m north of Tanada Creek. The metaplot includes an abandoned but intermittent (active within the last few months as evidenced by matted vegetation and dried river scum) backwater slough that flows around the plot site. This slough area was dominated by dense swards of Calamagrostis canadensis to 1.5 meters tall with clumps of S. pulchra, R. acicularis, and various forbs and patches of Equisetum. Although there were a few tall Picea glauca in the Calamagrostis canadensis meadow and the tree cover was slightly greater than 10%, this area was coded as an herbaceous Viereck class because it better described the actual vegetation rather than a Picea glauca woodland classification. Calamagrostis canadensis cover in this area was approximately 70%. No evidence of fire was encountered. This plot was only a 3 minute walk from the camp cooking area.



Photo 26. Tanada 14 Quadrat D

Tanada 15 was an open Picea glauca forest with 35% canopy closure comprised of nearly 100% Picea glauca (in contrast to many plots in this study area with mixed spruce). The tall understory of the plot was relatively open and dominated by moose-browsed S. pulchra. R. acicularis and B. nana were also present to 1 meter tall. The low understory was dominated by a thick moss carpet (mostly Hylspl) with Equisetum/V. vitis-idaea/L. borealis and various forbs (M. paniculata/V. capitata). Peltigera apthosa was abundant in the plot but mostly dried to brown. No evidence of fire was encountered. Considerable downed woody debris was present. Permafrost was not encountered. Just beyond the north and east ends of the plot (at 8 m) lie the eroded, vegetated remnants of an old stream bank, most likely a previous channel of Tanada Creek. We heard bald eagle vocalizations while completing this plot. Towards the south end of the metaplot the vegetation became more mesic but not enough to warrant a separate vegetation type.



Photo 27. Tanada 15 Quadrat D

Tanada 20 was a complex plot situated in an abandoned stream channel. The channel bank was approximately 3 m east of plot center. Numerous intersecting mosaic patterns exist in the metaplot. To the north, the metaplot was more mesic with an open understory of Festuca altaica/V. vitis-idaea/Moss. To the east and south (on top of a revegetated stream terrace) the vegetation was shrubbier and dominated by B. nana/L. groenlandicum/S. pulchra to a height of 0.5 m. The west of the metaplot was characterized by a denser Picea glauca stand with an open understory of R. acicularis/Equisetum/moss and forbs. The entire metaplot was a complex interpenetrating mosaic of vegetation lacking clear ecotones. Tall Picea glauca (up to 20 meters tall) dominate the site with abundant Picea mariana recruitment in the understory. To the east and south of the metaplot, the vegetation tends towards mixed Picea mariana/Picea glauca woodland. Evidence of fire in the plot (charred stumps and logs) was identified. Permafrost was encountered in the plot, although it appeared to be patchy. Dry loamy soils were present. There was high vascular plant diversity in the plot, at least in part because of the variety of different vegetation types present there.

Weather: overcast 60s F.



Photo 28. Tanada 20 Quadrat D

CONCLUSION AND FUTURE CONSIDERATIONS:

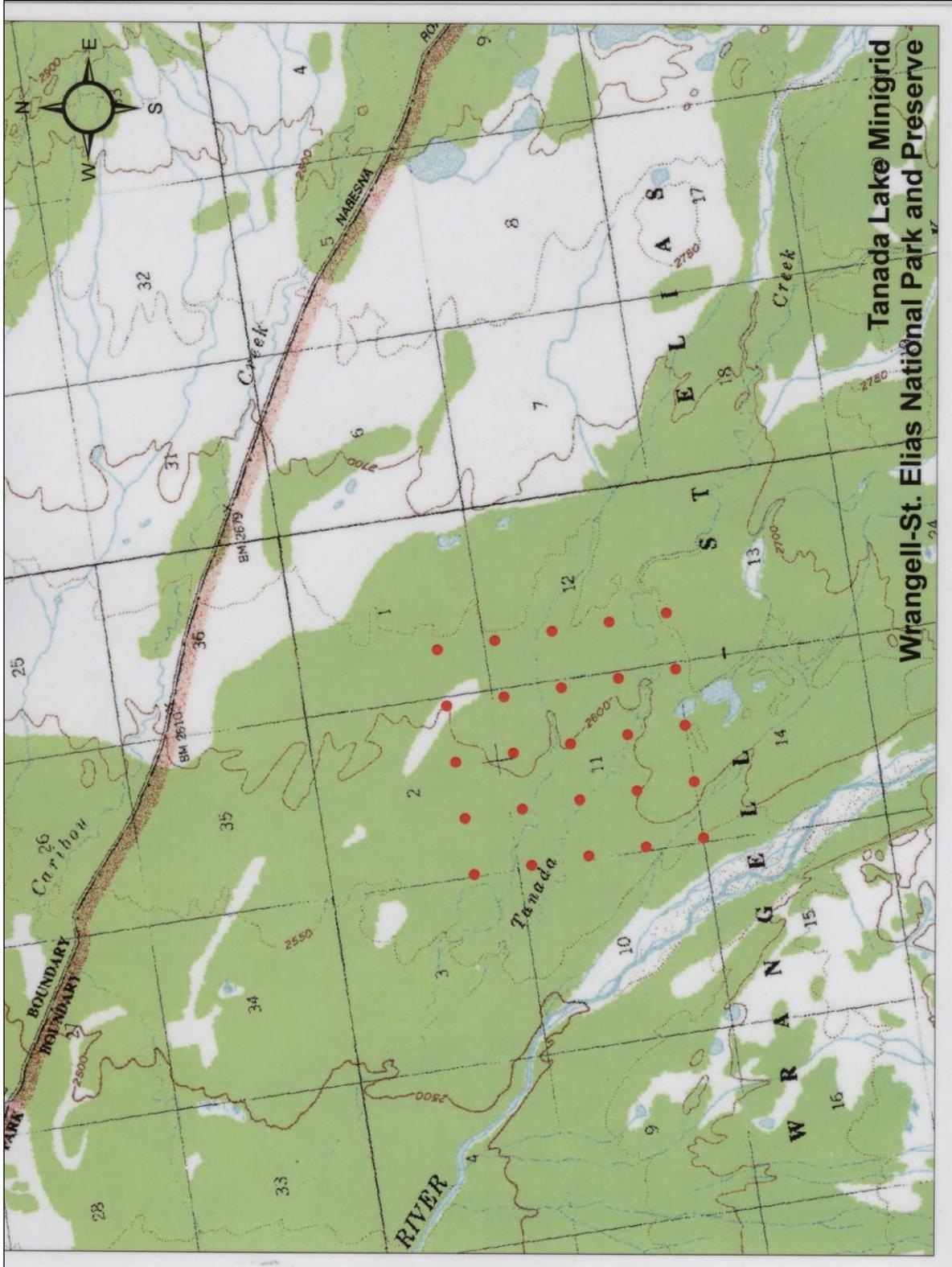
Due to internal and external battery failures of our Trimble GPS device on 7/29/2007, we were obligated to obtain 8 plot center coordinates using a Garmin GPSMap76CSX unit. Upon re-sampling Lower Tanada Creek mini-grid, these 8 Garmin generated points should be re-obtained using a Trimble device to improve the precision of the Garmin generated coordinates. Prior to the complete battery failures, the Trimble GPS unit (GEO XM), repeatedly lost power and a soft reset was necessary a number of times. The battery was fully charged at the beginning of the mini-grid, and it was unclear why this problem occurred. Consultation with the WRST GIS specialist resulted in an update to the firmware, which he felt may resolve the problem.

Table 4. Plot center locations recorded with Trimble or Garmin.

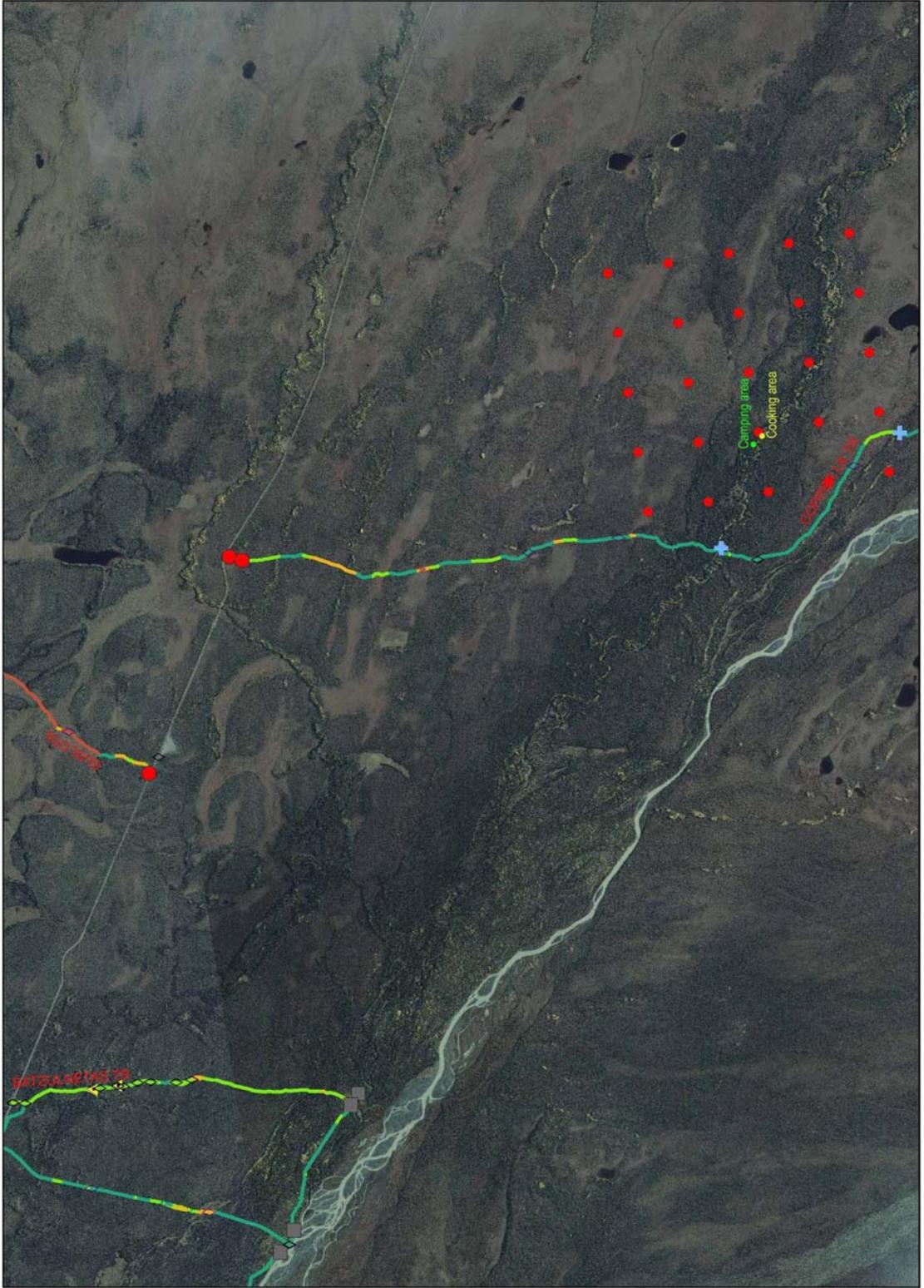
Trimble plots	Garmin plots
6,7,8,10,11,12,13,16,17,18,19,21,22,23,24,25	2,3,4,5,9,14,15,20



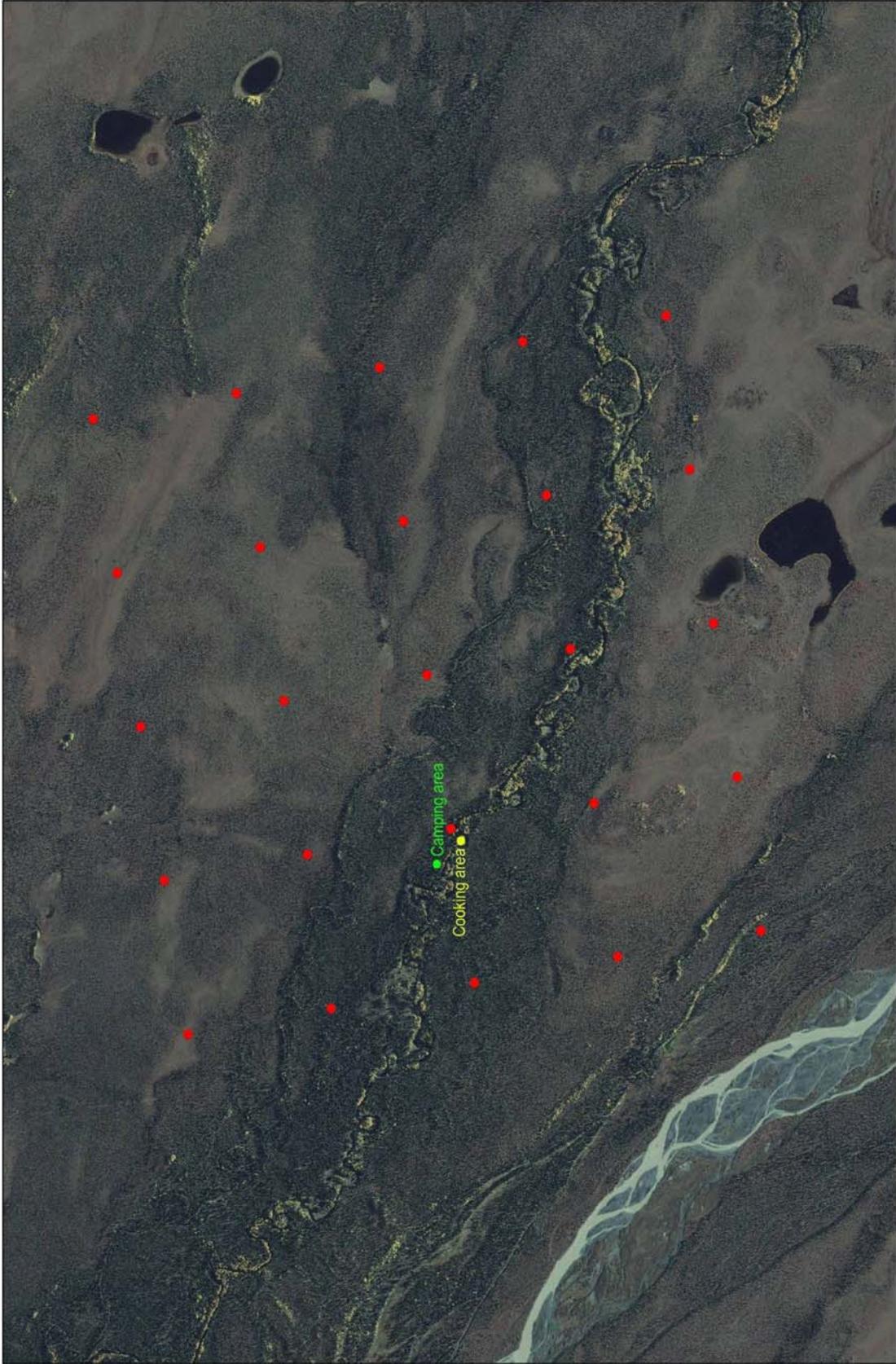
Photo 29. Boreal pond situated along southern border of Tanada mini-grid.



Map 1: Tanada Lake Mini-grid Topo



Lower Tanada Creek Mini-grid adjacent trails



Lower Tanada Creek Mini-grid - close