Draft Statement of Findings for Protection of Wetlands
(Executive Order 11990)
Rehabilitation and Re-route of the Copper Lake Trail
Wrangell-St. Elias National Park and Preserve

Recommended

Rick Obernesser, Superintendent, Wrangell St. Elias National Park and Preserve Date

Certified for Technical Accuracy and Servicewide Consistency

Chief, National Park Service Water Resources Division Date

Approved

Alaska Regional Director Date

INTRODUCTION

In December, 2011, the Alaska Regional Director signed the Record of Decision for the Nabesna Off Road Vehicle Management Plan/Environmental Impact Statement. One element of the decision was to improve six trails in the area to a maintainable condition. These trails have been degraded to severely degraded by Off Road Vehicle (ORV) use, resulting in impacts to vegetation, soils, and wetlands. One of the trails proposed for improvement is the Copper Lake trail, which traverses 19.4 miles to the wilderness boundary, where it accesses subsistence Dall sheep and moose hunting opportunities. The EIS considered a range of trail improvement and ORV management options for all motorized trails in the area.

The Record of Decision states: "Implementation of trail improvements or new trail construction may require additional NEPA compliance to address cultural resource clearance, proposed trail construction in wetlands, or the need for development of gravel sources. Subsequent NEPA compliance will be tiered off the FEIS."

Because the prescription for improvement of the Copper Lake trails includes work in wetlands, this Wetlands Statement of Findings is required to comply with NPS Director's Order #77-1: Wetland Protection, which establishes the policies, requirements, and standards for implementing Executive Order 11990 (Protection of Wetlands). This Statement of Findings:

- Presents the rationale for implementation of the project with regards to wetlands, and documents the anticipated effects on wetland resources.
- Describes the effects on wetland values associated with the proposed action.
- Provides a description of mitigation measures.
- Ensures "no net loss" of wetland functions or values.

PROPOSED ACTION

For the Copper Lake trail, the Record of Decision states:

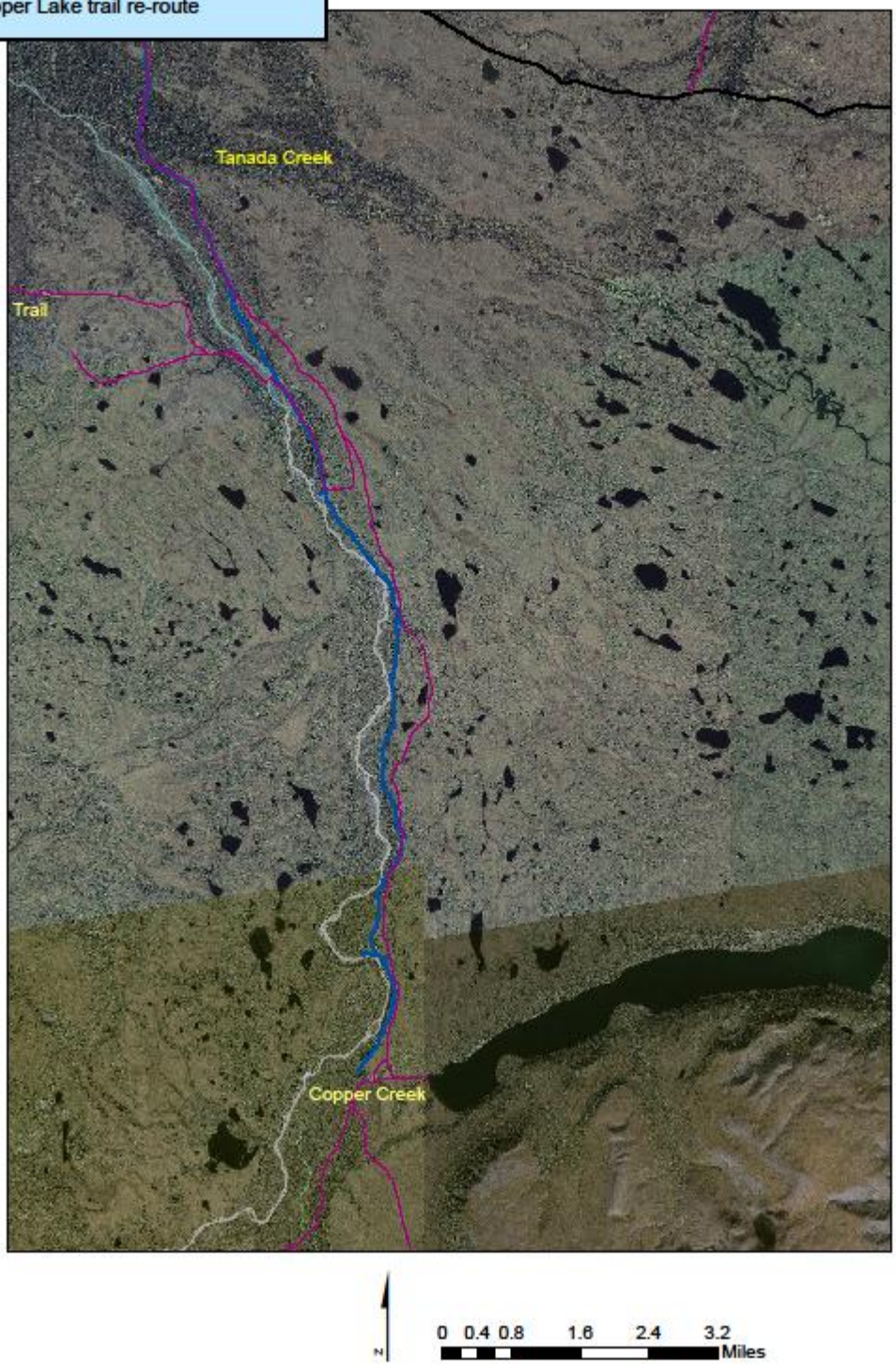
"Past the Tanada Creek crossing, additional ditch and cap work will be done for approximately 1.5 miles at which point a descending bench cut would be constructed to access the Copper River floodplain. This second segment will be a trail re-route along the Copper River floodplain to the cutoff trail to Boomerang and then continuing south utilizing well-drained alluvial gravel soils on elevated terraces along the river floodplain, side-slope bench cuts, some well-drained soils near the top edge of the bluff, and some sections of hardened trail to access Copper Creek."

This prescription has been refined based on site-specific layout and engineering. The basic concept is to reconstruct and re-route the Copper Lake trail to a maintainable standard. This will allow motorized trail users to stay on one trail alignment and thus eliminate off-trail impacts to soils, wetlands, and vegetation. The first portion of the Copper Lake trail (trailhead to Tanada Creek crossing) was improved in 2012 utilizing trail hardening and improvement techniques on the existing trail. This proposed action will improve the trail from the Tanada Creek crossing south to the Copper Creek crossing. Figure 1 shows satellite imagery of the area and the existing trail alignment vs. the proposed re-route.

Figure 1: Proposed trail re-route

Existing Copper Lake trail

Copper Lake trail re-route



For trail improvement and construction, mechanized equipment will be used to the extent possible. Trail construction equipment will include narrow gauge trail dozers, mini excavators, forestry/rock grinders, and tracked carriers. Tree removal will be done by hand crew with chainsaws. Where necessary, vegetation removal is done to a 12' width. Actual construction disturbance within that width varies based on the following construction types. Trail construction results in a trail tread that is 4 – 6' wide.

The prescription for the Copper Lake trail improvement and re-route consists of several different methods of trail treatment which are described in detail in this document under **THE PROPOSAL'S IMPACT ON WETLANDS.** Trail improvements would replace 12.1 miles of highly degraded and unmaintainable existing trail, most of which occurs in wetlands. After completion and opening of the improved trail and re-route, the old degraded portion of the trail will be closed to all ORV use.

THE PURPOSE AND NEED FOR ACTION

Improvement of the Copper Lake trail is necessary in order to provide continued opportunities for appropriate and reasonable access to wilderness and backcountry recreational activities, which also accommodates subsistence and access to inholdings; while protecting scenic quality, fish and wildlife habitat, and other park resource values.

Studies conducted at WRST have demonstrated that ORV use over wet areas leads to trail braiding and widening. Vegetation does not recover quickly, soils erode, permafrost depth changes, and impacts to surface hydrology occur. The Copper Lake trail improvements are needed to provide one sustainable trail alignment that trail users can stay on. This will eliminate off-trail braiding and impacts to wetlands, vegetation, and soils. On-trail impacts will be minimized by providing a durable trail tread and appropriate drainage.

OTHER ALTERNATIVES CONSIDERED

No Action

Under the No Action alternative, no trail improvements would occur on the Copper Lake trail. The trail would continue to be closed to recreational ORV use, but would be open for ORV use in support of subsistence activities. Even with limited use (estimated at 125 round trips per year), resource impacts associated with the trail would be expected to get worse. Trail braiding would continue as users would avoid bad spots in the trail and continue to drive around these areas, thus widening the trail footprint over time and increasing the impacts to soils, vegetation, and wetlands. Total disturbed wetlands associated with the existing trail have been estimated at 133 acres. This acreage would increase under the No Action alternative.

WETLANDS IN THE COPPER LAKE TRAIL AREA

Knowledge of existing wetland resources in the project area is based on the National Wetland Inventory (NWI) Database of Alaska, inventories of vascular flora conducted by the NPS (Cook

et al. 2007), and a remote sensing effort that utilized aerial photography and photo interpolation (SMU 2008). The wetland types found within the existing Copper Lake trail project area include the following:

Palustrine Emergent Wetlands (emergent)—Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes that are typically present for most of the growing season.

Palustrine Scrub-Shrub Wetlands (scrub-shrub)—Scrub-shrub wetlands are dominated by shrubs, young trees, or mature trees that have been stunted due to environmental conditions. Vegetation is typically less than 6 meters tall.

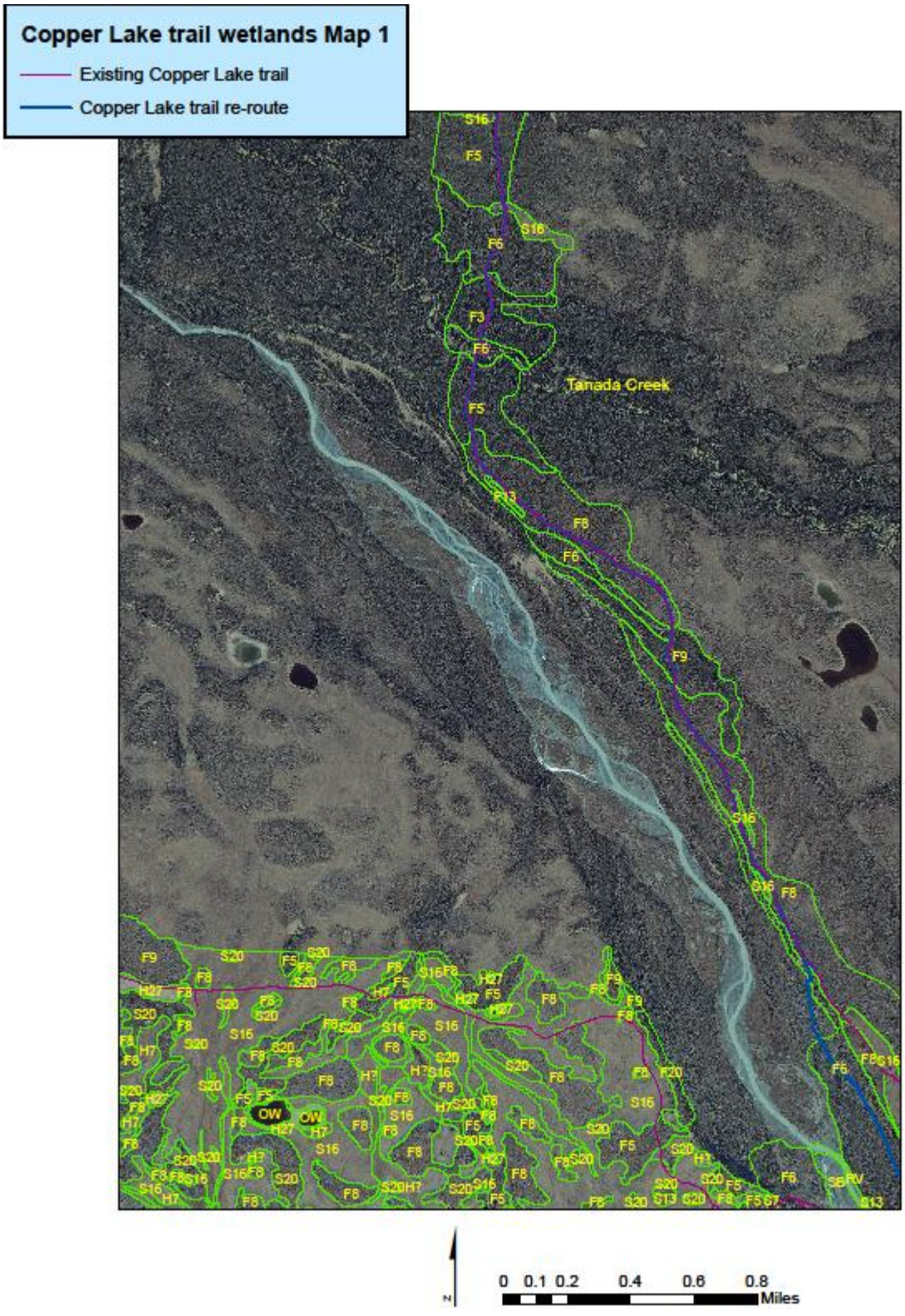
Palustrine Forested Wetlands (forested)—Forested wetlands contain woody vegetation that is 6 meters tall or taller.

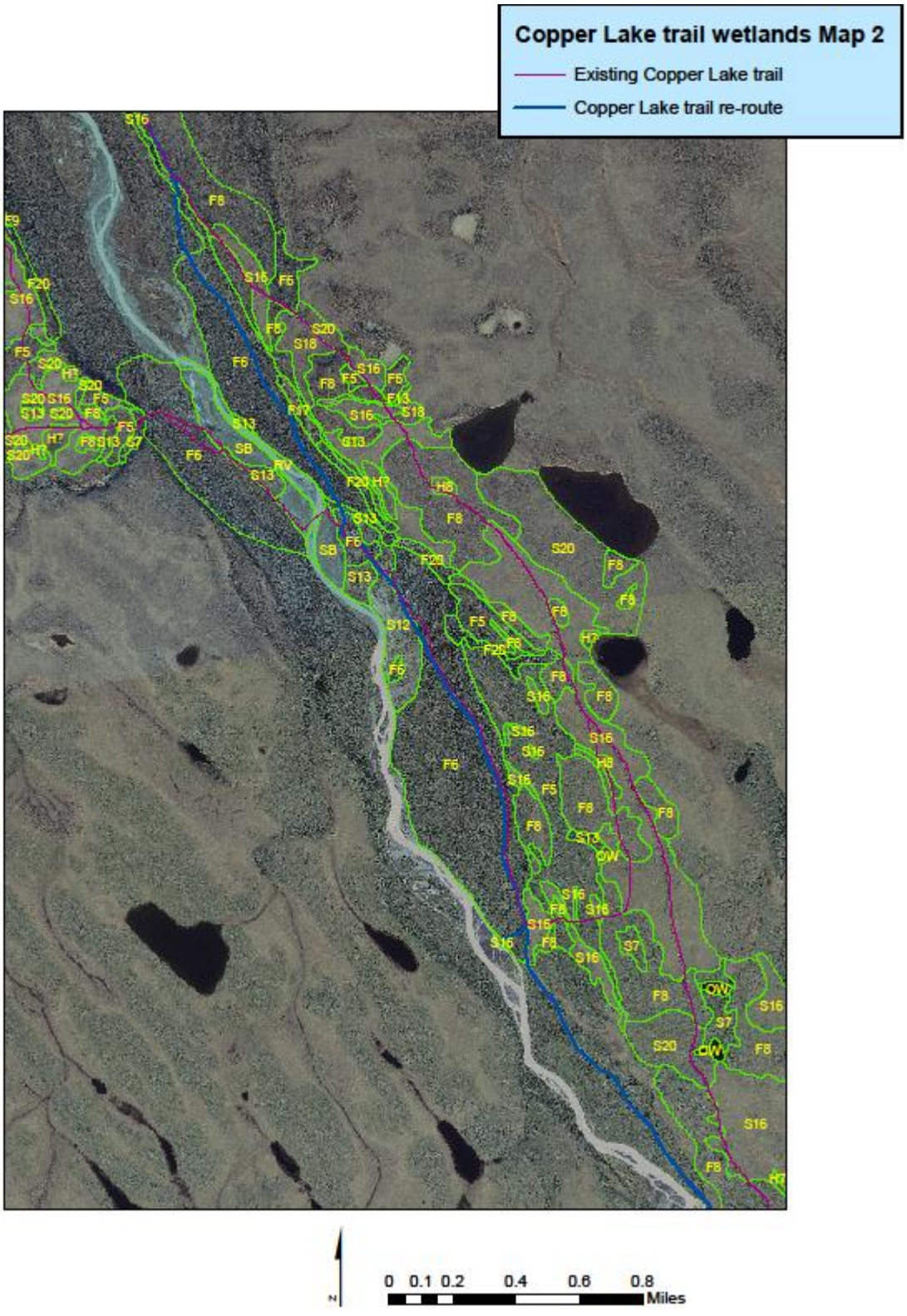
Palustrine Unconsolidated Bottom and Aquatic Bed Wetlands (ponds)—Two types of ponded wetlands occur within the project area. Ponded palustrine wetlands that have at least 25 percent bottom cover of particles smaller than stones (less than 3 inches in size) and a vegetation cover of less than 30 percent are considered to have unconsolidated bottoms. Ponded wetlands that tend to have deeper water and are dominated by plants that grow principally on or below the surface of the water for most of the growing season are considered to have aquatic beds.

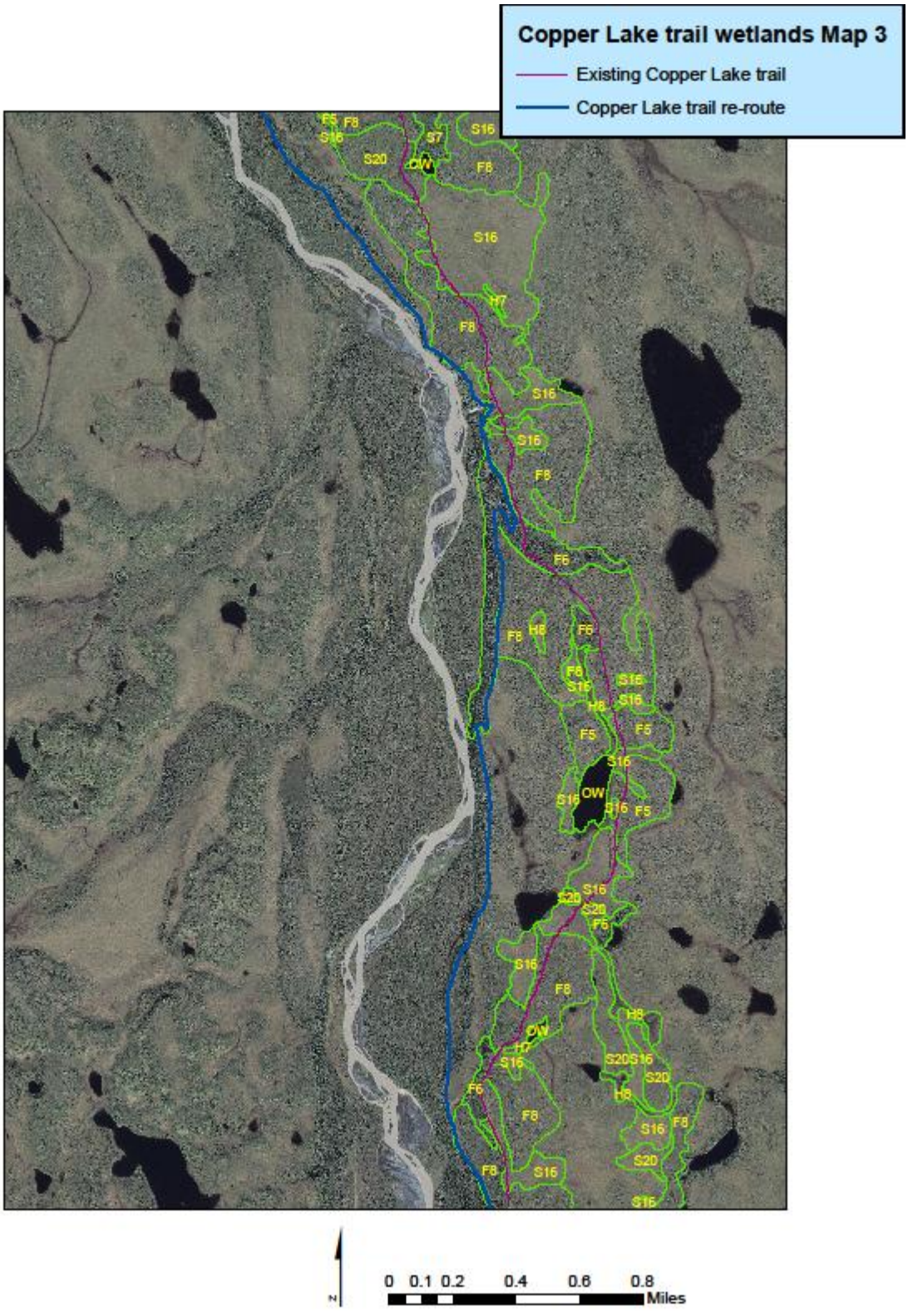
Lacustrine Wetlands—Lacustrine wetlands are essentially lakes, and are defined as wetlands situated in a topographic depression or dammed river channel, that lacks vegetation and has a total area that exceeds 20 acres in size.

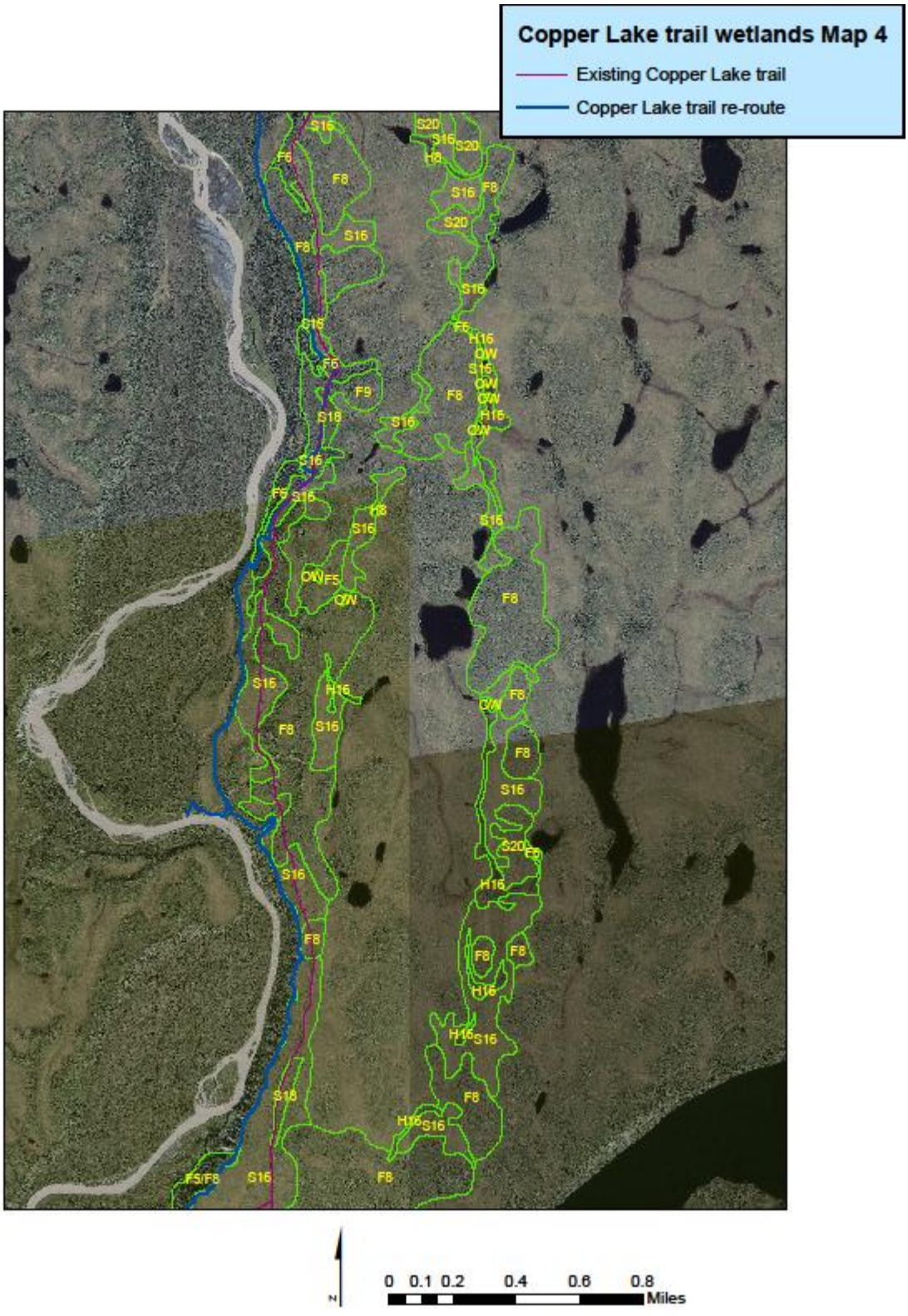
Riverine Wetlands—Riverine wetlands are freshwater wetland habitats contained within a channel, which are not dominated by trees, shrubs, emergent, moss, or lichens; and do not contain ocean-derived salts in excess of 0.5 percent.

Vegetation and wetland mapping is shown on Maps 1 through 5. The maps also show the locations of the existing Copper Lake trail and the proposed re-route. Table 1 displays the vegetation and wetland types that correspond to the mapping codes shown on Maps 1 through 5. The table also displays the linear feet of each vegetation/wetland type that is crossed by the existing Copper Lake trail and the proposed re-route.


Copper Lake trail wetlands Map 1
Existing Copper Lake trail
Copper Lake trail re-route
Tanada Creek
N
0 0.1 0.2 0.4 0.6 0.8
Miles


Copper Lake trail wetlands Map 2
Existing Copper Lake trail
Copper Lake trail re-route
0 0.1 0.2 0.4 0.6 0.8
Miles


Copper Lake trail wetlands Map 3
Existing Copper Lake trail
Copper Lake trail re-route
F5
F8
S16
S7
S20
OW
H7
F6
H8
S20
0 0.1 0.2 0.4 0.6 0.8
Miles


Copper Lake trail wetlands Map 4
Existing Copper Lake trail
Copper Lake trail re-route
0 0.1 0.2 0.4 0.6 0.8
Miles

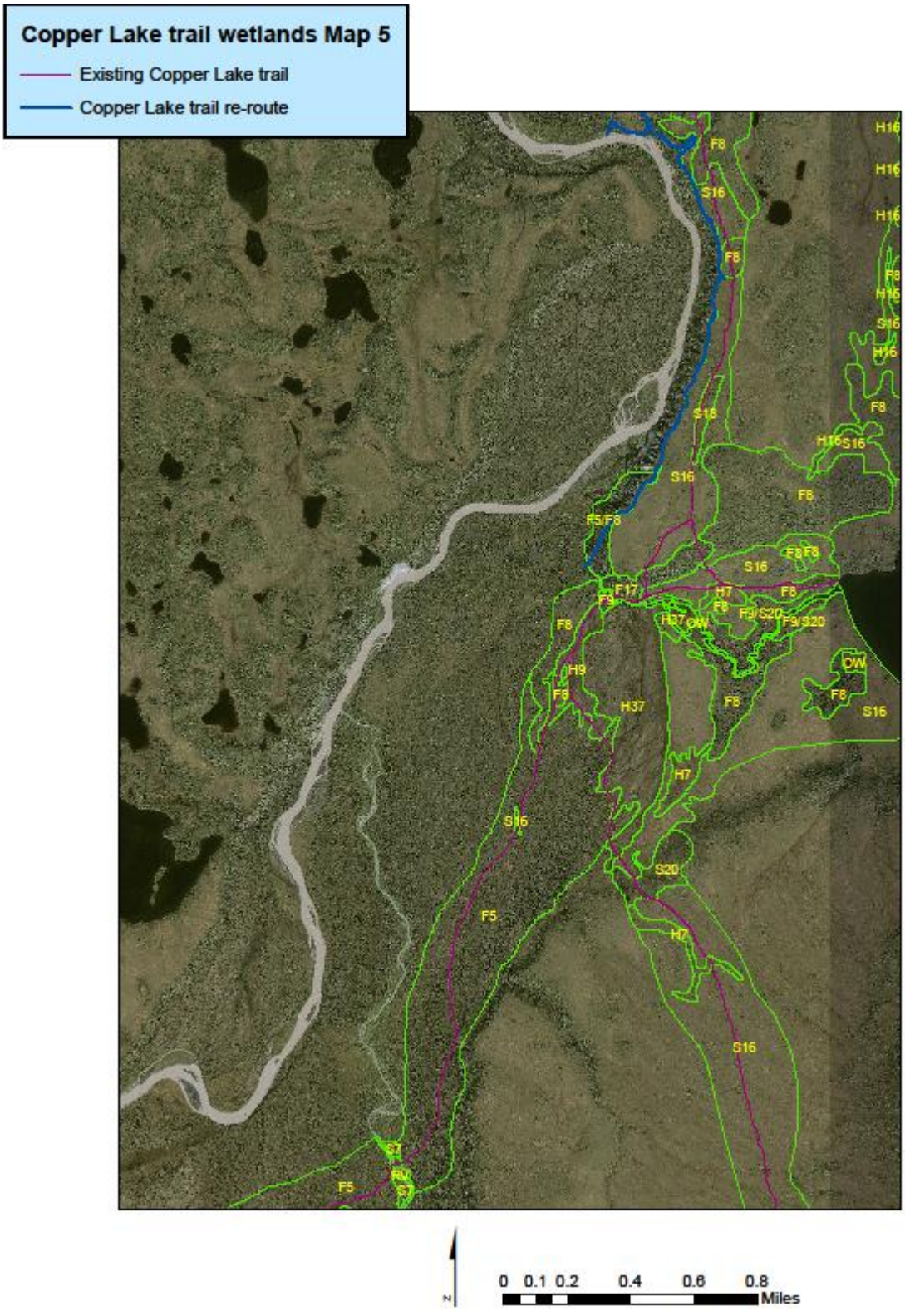

Copper Lake trail wetlands Map 5
Existing Copper Lake trail
Copper Lake trail re-route
H16
F8
S16
H16
H16
F8
H16
S16
H16
F8
S16
H16
S16
F8
S16
F5/F8
F8
F8
S16
F17
H7
F8
F8
F9/S20
F9/S20
H37
OW
F8
H9
F8
H37
F8
OW
F8
S16
H7
S16
S20
F5
H7
S16
S7
F5
OW
S7
N
0 0.1 0.2 0.4 0.6 0.8
Miles

Table 1: Vegetation/Wetland Types

Code	Level 1	Level 2	Level 3	Level 4	NWI Attributes	Linear Feet crossed by trail re-route	Linear Feet crossed by existing trail
F5	Forest	Needleleaf 75%	Open 25-60%	Black Spruce	PFO4/SS1B, PSS1/FO4B	1,189	2,689
F6	Forest	Needleleaf 75%	Open 25-60%	White / Black Spruce	PFO4/SS1B, PSS1/FO4B	37,724	1,570
F7	Forest	Needleleaf 75%	Woodland 25-60%	White Spruce			
F8	Forest	Needleleaf 75%	Woodland 25-60%	Black Spruce	PSS4B	14,225	28,259
F9	Forest	Needleleaf 75%	Woodland 25-60%	White / Black Spruce	PSS4B	999	2,353
F17	Forest	Mixed Forest	Closed 60-100%	Aspen / Spruce uplands			1,470
S7	Scrub	Tall 5-10ft	Open 25-75%	Willow	PSS1C (B)		
S8	Scrub	Tall 5-10ft	Open 25-75%	Alder	PSS1C (B)		
S12	Scrub	Low 20cm-5ft	Closed 75-100%	Willow	PSS1C (B)	558	
S13	Scrub	Low 20cm-5ft	Closed 75-100%	Birch / Willow	PSS1C (B)	200	
S16	Scrub	Low 20cm-5ft	Open 25-75%	Mixed shrub - sedge tussock bog	PSS1/EM1B, PEM1/SS1B	2,053	29,846
S18	Scrub	Low 20cm-5ft	Open 25-75%	Shrub birch - ericaceous shrub bog	PSS1/EM1B, PEM1/SS1B		1,938
S20	Scrub	Low 20cm-5ft	Open 25-75%	Birch / Willow	PSS1/EM1B, PEM1/SS1B		2,176
H7	Herbaceous	Graminoid	Mesic	Tussock tundra	PEM1B (C,F,H)		559
H8	Herbaceous	Graminoid	Mesic	Mesic sedge - grass meadow			361
H16	Herbaceous	Graminoid	Wet	Subarctic lowland sedge wet meadow	PEM1H		
H37	Herbaceous	Graminoid	Wet	Subarctic lowland sedge - herb wet meadow	PEM1H		
TOTAL						56,948	71,221

Current Condition of Wetlands in the Project Area

Due to the remoteness of the area and the lack of human activity, most of the wetlands within the project area have been undisturbed. Within the project area, the Nabesna road and associated trails are the primary source of impact to wetlands.

Wetlands are particularly susceptible to impacts from ORVs using the system of trails found within the project area (Ahlstrand and Racine 1990, Happe et al. 1998). Root systems in wetlands are typically shallow (often within the top 25 centimeters of soil) and easily impacted by even limited ORV use (Loomis and Liebermann 2006). In addition, ORV use within wetlands has resulted in the creation of large muck-holes, which can become impassable by ORV. When this occurs, ORV users have moved onto adjacent lands in order to bypass these muck-holes, resulting in the expansion of trail widths. This has created a braided pattern of trails through these wetlands, which has increased the acreage of impact per trail mile beyond what would be necessary for a single-track trail. At an 8' width, the single tracked portions of the existing trail impact 0.96 acres per mile. In braided portions of the existing trail that occur in scrub-shrub wetland types, average width is 149', or 18 acres per mile.

Most of the wetlands found within the project area are high quality wetlands in regards to their function within the landscape and their support of the hydrologic, geochemical, and biological processes that occur within the area. The primary functions and processes provided by wetlands in the project area include: flood-flow alteration and storage, which in turn are related to erosion control and sediment stabilization; groundwater recharge and discharge; nutrient cycling; carbon/detrital export; and fish and wildlife habitat.

The wetlands that provide flood-flow alteration/storage include those located in the lower portion of a watershed, which are large in size (relative to the watershed), and contain dense herbaceous vegetation and flat slopes (Corps 2000). Wetlands that contribute to groundwater recharge and discharge include those with gravel soils (allowing water movement in and out of the wetland) and located near perennial or intermittent watercourses (Corps 2000). Those that contribute to erosion control and sediment stabilization include wetlands with deep and dense root systems located on steep slopes (greater than 7 percent) above water courses or other sediment sensitive resources (Corps 2000). Wetlands that support nutrient cycling and carbon/detrital export include any large wetlands (relative to the watershed, with slow moving deep waters and abundant vegetation (Corps 2000). All wetlands within the project area could serve as wildlife habitat for avian species. Riverine and lacustrine wetlands could serve as habitat for fish species, particularly for small fry, while large forested and scrub-shrub wetlands serve as high quality habitat for moose, as well as many other species such as aquatic insects.

Existing ORV trails have impacted some of the function of wetlands within the project area. The ability of vegetated wetlands to control erosion and stabilize sediments has been reduced at the locations where existing trails cross these wetlands. Functional loss occurs as ORV use removes vegetation, alters hydrology, and creates soil conditions that are unsuitable for vegetation. Such damage results in an increase in local sediment loading and erosion to adjacent lands, and has

increased the sediment loads within adjacent watercourses to some degree. The ability of wetlands to provide wildlife habitat has also been impacted by existing ORV trails. ORV use in watercourses has impacted fish habitat. As noted previously, moose utilize large forested and scrub-shrub habitats and ORV trails have allowed hunters increased access to hunt while reducing the plant cover in some of these areas resulting in a decline in the habitat quality of these wetlands types for moose (NPS 2011).

THE PROPOSAL'S IMPACT ON WETLANDS

As shown in Table 1, the proposed trail re-route minimizes trail crossing through the scrub-shrub wetland types, specifically the mixed shrub-sedge tussock bog type (S16). This is accomplished through re-routing the trail through forested wetland types, specifically white/black spruce (F6) and open black spruce (F8) wetland types. The trail re-route utilizes gravel-at-depth along alluvial terraces in the Copper River floodplain (predominantly F6, white/black spruce wetland type) and sidehill construction through the open black spruce wetland type (F8), utilizing sideslope to improve drainage away from the trail.

The following describes in detail the prescribed trail improvement methods and estimated acres of wetland disturbance associated with each:

1. Do Nothing: Utilized in areas where very little will be done to the existing or proposed trail locations. At minimum little to no brushing would be necessary, some minor drainage structures would be installed and route assurance markers would be placed. This prescription traverses 15,442 feet of open black spruce (F5), open white/black spruce (F6), woodland black spruce (F8), and woodland black/white spruce (F9) wetland types. Doing nothing implies a durable trail tread and a trail that allows adequate drainage. Wetland impacts consist of vegetation removal to maintain a trail tread. At an estimated disturbance width of 8', this prescription area will impact a total of 2.8 acres of wetlands but will have minimal impact on wetland function.

2. Ditch and Elevate: Vegetation would be removed. An excavator would be utilized to excavate native soil on either side of the trail tread and place on the existing tread area thereby elevating the tread to allow for drainage. Utilize a trail dozer or excavator to spread excavated material. Once native soil has drained sufficiently it would be compacted to support vehicles. This prescription will be utilized in a flat portion on the "border" between open white/black spruce (F6) and mixed shrub sedge-tussock bog (S16) and traverses 1,764 feet. Impacts to wetlands include vegetation removal over a 20' disturbance width, soil compaction over the 8' tread width, and an elevated and compacted surface, preventing any cross drainage. Drainage is provided off the trail tread by the parallel ditches. This prescription will impact a total of 0.8 acres of wetlands.

3. Sidehill, sidecast, and compact: Utilized in locations where sidehill conditions exist, where drainage (breaks in grade) can be located while being constructed. Heavy brushing and tree removal will required before construction can commence. Cuts will consist of full bench cuts with fill being sidecast and compacted on outside of trail sub-base. Outside compacted vegetated edge will provide for runoff filtering of exposed tread and cutslopes greatly reducing erosion. Exposed tread will be compacted with sheep's foot roller attached to trail dozer. This

prescription is utilized on sideslopes, mostly within the open white/black spruce wetland type (F6), and traverses 17,064 feet. Disturbance consists of full bench construction consisting of sidehill excavation and deposition of material on the outside edge of the trail tread. This results in vegetation clearing and ground disturbance over a 10 – 20' width, depending on the degree of sideslope. Cross drainage is provided through rolling grade dips and outslope on the constructed trail tread. This prescription will impact a total of 5.8 acres of wetlands.

4. Geo-trak installation: Utilized in areas where wet/soft soil conditions exist. Vegetation is only removed where cross braces will be imbedded to keep the trail tread dry. The geo-track consists of two sections of geo-block grids screwed together with a synthetic wood brace located at junctions. The grids are laid length-wise with 24" between the grids (see Photo 1). This prescription is generally used to cross wetter scrub-shrub wetland types such as open mixed shrub sedge-tussock bogs (S16), and traverses 3,361 feet. Disturbance is minimal, with removal of surface vegetation only to accommodate the cross braces. The open nature of the geo-block grid allows vegetation to grow through and cross drainage is provided by the geo-block grids being slightly elevated above ground level on the cross braces. Estimated impact would be 0.46 acres.

Photo 1: Geo-track installation

5. Geo-block with gravel: Same as described for geo-track, except the installation consists of solid geo-block (three grids laid sideways for additional flotation). This prescription includes overcapping with gravel to reduce degradation of the Geo-block. Approximately 4 to 6" of gravel will be placed on the geo-block and compacted. This prescription is only utilized for crossing short sections of open mixed shrub sedge-tussock bog (S16) and is prescribed for 323 feet. Because of the gravel capping, cross-drainage is limited. This prescription would result in an impact to 0.06 acres of wetland.

6. Trail tread grinding: To be utilized in areas where ground conditions warrant minimal ground disturbance by grinding and blending existing vegetation, mineral soil and gravels to establish a very distinct trail tread without removing ground cover and creating an incised tread. This method is only used where underlying soils contain enough gravel to create a durable trail tread. This method is mostly used in open white/black spruce wetlands (F6) and traverses 14,498 feet. Impact consists of vegetation clearing and mulching for an 8' width. Because of the gravel-at-depth, trail tread will remain durable, with no subsidence or incision. Cross drainage is maintained and impacts to wetland function are minimal. Total impact is estimated at 2.7 acres.

7. Combination of sidehill (see #3) and trail tread grinding (see #6). This prescription is called for on 4,496 feet of trail through open white/black spruce (F6) and woodland black spruce (F8) wetland types. Impacts to wetlands are the same as described under above under #3. Total estimated impact is 1.5 acres.

8. Drainage structure: This is used in either a spot or lateral application. This method is used where mud/muck holes exist because water is held in an incised trail location. This generally occurs in flat areas where no opportunity for drainage exists. The addition of catchments adjacent to the trail tread has been very successful in reducing the impact to the trail tread. The catchment is sized accordingly to remove/store the water from most rain events away from the trail tread. Average size varies from 6'W x 16'L x 4'D on either side of the trail. Material from the excavation will be utilized as borrow to raise the trail tread to direct water flow. These drainage structures are planned at five different locations in woodland black spruce (F8) and open white/black spruce wetland types. Impacts to wetlands include vegetation removal, excavation and displacement of soils, and alteration of drainage patterns. Total impact is estimated at 0.02 acres.

9. Arched culverts: Utilized in areas where water is flowing and drainage is required. Arched culverts replace conventional corrugated metal pipe culverts that are traditionally used. Arched culverts are not affected by freeze-thaw conditions. Arched culverts are made of light weight polymers in segmented sections of 7.5 feet so they can be of any length. They are light weight, easy to install and they require no disturbance of the water course. A 6" cap of native surface would be covered with a tensor grid for added strength and an overcap of gravel (4 – 6" in depth). Arched culverts are prescribed where the trail re-route crosses side drainages at four different locations. Disturbance is limited to excavation of material needed to cover the culverts,

some of which may be taken from the drainage structures described above. Arched culverts allow cross drainage. Impact to wetlands from installation is estimated at less than 0.02 acres.

10. Rock crossings: These are utilized in areas where ephemeral water courses exist. A hardened crossing can be established where the bottom of the crossing has a base of rock or gravels able to support sustained use. A suitable site will first be cleared of organic material and a row of large rock will be placed downstream to define the route. Then a layer of rock (10" to 12" diameter) will be placed first with successive layers of smaller diameter rock. Three of these crossings are prescribed. Impacts include potential excavation of suitable material from the adjacent area and some alteration of the existing stream course. Impact to wetlands from installation is estimated at less than 0.01 acres.

Total impact to wetlands from the improvement of the Copper Lake trail would be 14.2 acres. Because the impacted area would be maintained as part of the trail tread or associated drainage control, this constitutes a permanent loss of wetlands and wetland function including erosion control and sediment stabilization; nutrient cycling and carbon/detrital export; and wildlife habitat.

WETLAND IMPACT MITIGATION MEASURES

Avoidance Efforts

There are no practicable alternative that would avoid wetland impacts entirely. Most of the project area has been delineated as wetlands. Not taking any action to improve the trail and still allowing motorized access for subsistence hunting purposes would result in an increase in trail degradation and expanding footprint of wetland impacts. A closure to all motorized access would result in a serious restriction in opportunities for subsistence harvest.

The proposed re-route of the Copper Lake trail avoids wetlands to the extent possible, particularly mixed shrub sedge-tussock bogs (see Table 1). Where the existing trail crosses this wetland type, average trail width is approximately 149 feet. The improved trail will allow for a durable tread, either through use of gravel-at-depth, geo-block, or incorporation of drainage features. This will enable trail users to stay on one tread and contain all impacts to the established tread.

Design Measures to Minimize Impacts

Best Management practices. Best management practices for watershed protection, sediment and erosion control will include the following:

- Trail layout and design reflects and incorporates current standards and features common to sustainable trail features. Trails are designed to incorporate best management practices into the layout of the trail. During and after construction the trail layout and design will function as both temporary and permanent best

management practices. Examples include utilizing features such as grade reversals, rolling grade dips, outsloping, drainage dips, surface hardening, geo-trak, geo-block, and hardened water crossings. Such features by design will remove water from tread surfaces prior to any destabilization of tread surface, thereby reducing the potential for erosion and/or sediment release. These features also allow for cross-flow so that the trail does not transport water.

- Trail construction activities will occur during dry weather periods, generally between July 1st and September 15th of each year. Any construction activities in or around streams or other water features will be accomplished during low flow. All materials will be on site prior to ground disturbance to allow quick project completion (1-2 days) and minimize exposure times.
- Construction activities will be phased to minimize the areas disturbed at one time. This will also allow completed areas to be stabilized before disturbing adjacent sites. Most individual trail construction activities are accomplished within a 1 day to 1 week timeframe, thereby limiting the exposure of disturbance to potential weather events.
- Maintain existing vegetation whenever possible and minimize the area of disturbance. Retain and protect trees and other vegetation to enhance forest health, protect habitat and to reduce raindrop impact.
- Install sediment control practices prior to any soil disturbing activities (as needed).
- Maintain and protect all natural waterways. Retain natural vegetation along all waterways to filter out sediment and other pollutants.
- Use rock rip-rap at both the inlet and outlet ends of culverts to prevent scour erosion and use energy dissipaters at the outlet ends (e.g. plunge pools).
- When using heavy equipment, limit construction equipment operation to designated areas to control soil compaction. Keep equipment away from existing trees and infiltration basins.
- In areas of concentrated flow install earth mound swales, rock check dams, triangular dikes, riprap or apply duff to slow runoff and trap sediment.

Closure of old existing trail

Once work is completed on the Copper Lake re-route, the old portions of the trail will be closed to all motorized use. This will allow recovery of these degraded trail portions.

WETLAND COMPENSATION

A typical minimum compensation ratio for replacing a loss of wetland functions with restoration of degraded wetlands is 1:1 (NPS 1998). Wetland loss as a result of the proposed Copper Lake trail improvement totals 14.2 acres.

As noted above, upon completion of the Copper Lake trail improvement, the old existing portion of the trail will be closed to all motorized use. Average width of the existing Copper Lake trail

was calculated utilizing satellite imagery overlaid by wetlands mapping. Where this highly degraded trail passes through scrub-shrub (S16, S18, and S20 wetland types), the average disturbance width was calculated at 149 feet and results in 118 acres of wetland disturbance. In forested wetland types (F5, F6, F8, and F9) trail disturbance width varied. Wetland disturbance within these wetland types was calculated at 15 acres. By closing this highly degraded trail to all motorized uses, it will allow 133 acres of impacted wetlands to recover.

Natural recovery is assumed to occur as described in Happe et al. 1998. In particular, graminoid cover (particularly *Carex* and *Eriophorum vaginatum)* increases, dwarf shrub species show a slight increase, and little to no recovery is observable for soil subsidence and depth of permafrost thaw. Impacted sites typically stabilize on flat-lying terrain when disturbance ends (Happe, 1998).

Natural recovery would not restore the wetland to a pristine condition. However, an increase in vegetation cover, decrease in bare ground, and gradual build-up of litter and organic matter would allow the wetland to fully function in providing erosion control and sediment stabilization; nutrient cycling and carbon/detrital export; and wildlife habitat.

CONCLUSIONS

The National Park Service has identified a proposed action for improving the Copper Lake trail. The proposed action is a trail prescription that was developed based on the December 2011 Record of Decision for the Nabesna Off Road Vehicle Management Plan FEIS. Wetland impact has been minimized to the practicable extent allowed by utilizing sustainable trail layout and construction techniques. The natural recovery of 120 acres of wetlands through closure to all motorized use will adequately compensate for wetland loss caused by the proposed improvements. Therefore, this project is consistent with E.O. 11990 and NPS Director's Order #77-1, including the NPS no-net-loss of wetlands policy.

LITERATURE CITED

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