STATEMENT OF FINDINGS FOR PROTECTION OF WETLANDS (EXECUTIVE ORDER 11990) DENA POLYCHROME AREA IMPROVEMENTS DENALI NATIONAL PARK AND PRESERVE

Recommended

BROOKE MERRELL Digitally signed by BROOKE MERRELL Date: 2022.02.17 13:23:26 -09'00'

Brooke Merrell, Deputy Superintendent, Denali National Park and Preserve Date

Certified for Technical Accuracy and Servicewide Consistency

FORREST HARVEY Digitally signed by FORREST HARVEY Date: 2022.02.22 15:30:33 -07'00'

Forrest Harvey, Chief, National Park Service Water Resources Division Date

Approved

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M. Sarah Creachbaum, Regional Director Date

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1 INTRODUCTION

The National Park Service (NPS) proposes to implement a series of engineered solutions to address landslide and geohazard concerns along the Denali Park Road by constructing an approximately 400-foot steel bridge spanning the Pretty Rocks Landslide at Mile 45.4 in Denali National Park and Preserve (DENA) and undertaking additional geohazard risk reduction measures. Action is needed because the Pretty Rocks Landslide and other geohazards from Mile 44 through Mile 46 are threatening the integrity, safety, and continued viability of the Park Road as well as threatening access to 47 miles of the road beyond the Pretty Rocks Landslide. The project would be broken into two phases and with the first phase of construction occurring over an approximately 2-year period. The road would be temporarily closed at Mile 43 and traffic would not be allowed through the Polychrome area during Phase I of construction, although access would be restored during Phase II. The existing roadway alignment spanned by the bridge through the Pretty Rocks Landslide would be abandoned after bridge construction, allowing landslide processes to continue naturally. The project area includes the road corridor and the immediately adjacent wilderness in the vicinity of Mile 44 through Mile 46 of the Park Road. The majority of the Park Road—including the project area—is listed on the National Register of Historic Places (National Register).

Because the proposed action would include work in wetlands (Figure 1), 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

2 PROPOSED ACTION

Alternative 2 is the NPS's preferred action and environmentally preferred alternative. Alternative 2 would consist of two implementation phases. The project was broken into two phases for budgetary and scheduling reasons, with Phase I focusing on the highest priority sites. Phase I would restore access through the Polychrome area by constructing a bridge over the Pretty Rocks Landslide (approximately Mile 45.4) and undertaking risk reduction measures for the Perlite Landslide (approximately Mile 45.3) and rockfall hazards near the proposed bridge. The old road alignment through the Pretty Rocks Landslide would be abandoned after bridge construction, allowing landslide processes to continue and the road to degrade naturally.

Phase II would address several additional geologic hazards in the Polychrome area, including constructing a retaining wall at the Bear Cave Landslide and undertaking risk reduction measures in rockfall areas. For both phases, workers would be housed in existing areas in the park that have been previously disturbed, including the possible use of campgrounds. The Park Road would be used to transport materials and workers to work sites.

Phase I would include the following:

- Excavation of uphill slopes at the western and eastern ends of the proposed bridge location and excavation of the "rock knob" on the eastern end
- Placement of excavated material on the slope below the road

- Slight road realignment near the west side of the bridge
- Construction of retaining walls, including possible earthwork and horizontal drains, on the east side of the bridge
- Rockfall risk reduction including rockfall ditches, cut benches, rock scaling, and/or installation of rock bolts and dowels
- Construction of an approximately 400-foot steel bridge spanning the Pretty Rocks Landslide (including a temporary platform for bridge assembly on the eastern side and steel and concrete bridge abutments on both sides)
- Restriction of traffic through the project area (i.e., no visitor traffic would be allowed)

2.1.1 Excavation

Approximately 125,000 to 150,000 cubic yards of material would be excavated. Excavation of the rock would be accomplished with heavy equipment and blasting. Areas east of the landslide, including the "rock knob" on the south side of the road and the slope on the north side of the road, would be excavated to provide space for bridge construction and equipment.

The slope above the west abutment would be excavated to provide space for construction of the bridge and to accommodate a slight road realignment for vehicles turning on and off the bridge. A portion of this excavation area (less than 1 acre) would be in designated wilderness. The excavation could include a bench cut into the rock partway down the rock face to serve as a rockfall catchment area. The excavation could also include a road-level rockfall ditch. Periodic maintenance of the bench using heavy machinery would be needed, a small portion of which would be in wilderness. Excavation may also require heavy equipment to drive up the vegetated slope from the western edge of the project area, which would require temporary access of motorized vehicles through designated wilderness. Measures would be implemented to protect the vegetation from damage by heavy machinery and tracked vehicles. If feasible, equipment may be placed for excavation by helicopter, eliminating the need to drive over vegetation in wilderness. Actions are intended to produce rough irregular rock faces that resemble the surrounding natural rock outcrops while maintaining the integrity of the finished rock cut face to minimize rockfall and rock instability.

2.1.2 Material Placement

After swell is accounted for, the volume of material that would need to be disposed of would be slightly larger than the volume that was excavated. Excavated material that is of sufficient quality for maintenance use would be trucked off site and stored in existing DENA material storage locations (such as the Toklat pit) for use on future projects. The majority of the excavated material would be disposed of on site on the slope below the road. Approximately 10 acres of that area would be in wilderness and 0.6 acre in streams or wetlands. Some vegetation toward the toe of the landslide would be covered by excavated material. Excavated material would consist of rock and soil similar to what currently exists at the site and would be expected to look similar to existing rock/soil at the landslide. Motorized equipment would be used to move material off the roadway and into the material placement area, which would require temporary use in wilderness.

2.1.3 Road Realignment

On the west side of the bridge, a short section of the road would be realigned slightly to create space for an appropriate turning radius for vehicles entering and exiting the bridge. The realignment would also include shifting an additional section of road away from the eroding road edge. The realigned road corridor would be entirely outside of designated wilderness; the wilderness boundary would not shift with this realignment.

2.1.4 Retaining Walls

A retaining wall near the east abutment of the Pretty Rocks Bridge would be installed on the slope above the road to reduce the risk of rockfall from the excavated slope. A combination of earthwork, horizontal drains, and possibly a retaining wall would also be required to address the Perlite Landslide on the east side of the Pretty Rocks Landslide. These structures would be outside of wilderness.

2.1.5 Rockfall Risk Reduction

Rockfall areas above the road to the east and west of the Pretty Rocks Landslide would be addressed using a combination of rock scaling (i.e., the removal of loose or potentially unstable rocks), installation of rock bolts or dowels, and/or the creation of rockfall ditches. Rock scaling would be designed to match existing surroundings and would be conducted by workers on ropes and performed by hand using prybars; no blasting would be necessary. Installation of rock bolts would include 1-inch diameter bolts or dowels drilled into the surface and subsurface rock of the cliff face to secure hazardous rocks and would be designed to match surroundings by either staining the bolts or cutting them flush with the rock and grouting over them. Rock scaling and installation of rock bolts would occur in wilderness and would be repeated every 5 to 10 years, or as needed to reduce additional rockfall hazards.

2.1.6 Pretty Rocks Bridge Construction

A bridge spanning the Pretty Rocks Landslide site would be installed. The bridge would be approximately 400 feet long and have an overall width of approximately 24 feet and would be supported by two abutments, one on either end. Abutments would be steel pilings with ground anchors, which would be drilled or driven into the bedrock and fortified with concrete. The bridge would be one lane and traffic would stop at existing pullouts at either end, yielding to vehicles on the bridge.

A temporary platform would be constructed near the east abutment for use as a bridge assembly location. The platform would extend 150 feet from the south side of the road. The bridge components would be trucked to the site and stored at the temporary platform until assembly. A large crane would be used to assemble the bridge on site. Temporary platform construction would require some pile driving and concrete placement, with several dozen piles needed. Equipment for bridge construction could include an impact hammer and/or vibratory hammer, generator, drill rig, large mobile crane, excavators, and forklifts.

After bridge construction, the temporary platform would be removed, the staging areas would be recontoured, and the road would be restored to its historic road width where possible. Space would be preserved at both abutments for future maintenance needs.

2.1.7 Traffic

Road access through Polychrome is not anticipated during Phase I. For safety reasons, only construction traffic would be allowed in the Pretty Rocks area during most construction activities. Incidental traffic may be facilitated as conditions permit. Visitor transportation would continue to be limited to Mile 43 of the Park Road and buses would turn around at the East Fork Bridge or the East Fork cabin site. Access to Kantishna inholdings would be primarily via air until the bridge is completed.

2.2 PHASE II

Phase II would include the following:

- Construction of a partially buried retaining wall along approximately 1,000 feet of road above the Bear Cave Landslide, including excavation of materials, installation of drainage improvements, and temporary widening of the road
- Rockfall risk reduction (rock bolts or dowels, rock scaling, and/or rockfall ditches)
- Visitor traffic allowed through the project area, with delays and temporary closures possible

2.2.1 Retaining Wall

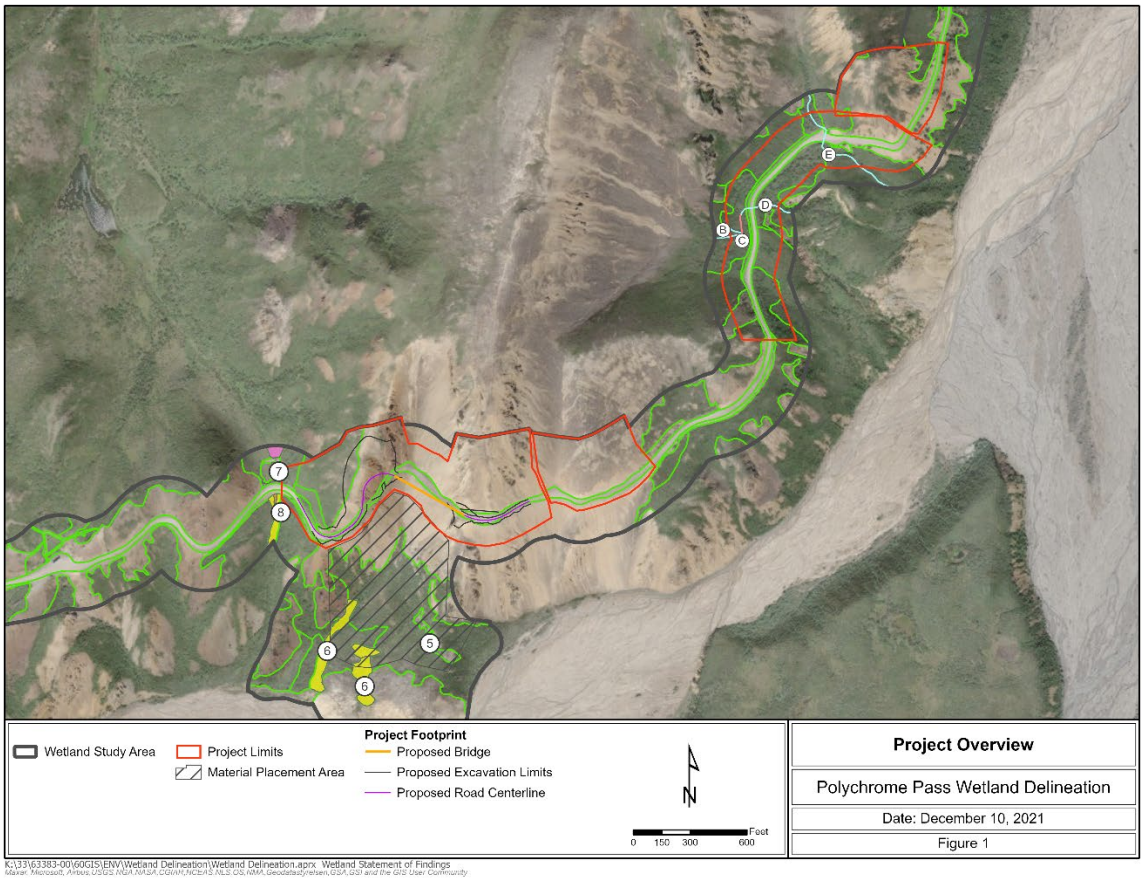
At the Bear Cave Landslide area, Phase II would include excavation of materials and construction of a retaining wall on the south side of the Park Road. The retaining wall would be buried approximately 30- to 60-feet deep and run approximately 1,000 feet along the road edge to stabilize the road, and would potentially require several hundred piles. The north side of the Park Road would be temporarily widened to allow traffic to pass around the construction site. Road work would also include subsurface and surface drainage improvements. The retaining wall and road widening/improvements would not be in the wilderness area. After construction of the wall, the area on the north side of the road would be recovered and the road would be returned to the existing roadway centerline and width. Disturbed areas would be revegetated to match the surrounding area. The retaining wall would be minimally visible from the surrounding area, including from backcountry areas south of the road. Construction equipment necessary for wall construction and road widening would include excavators; graders; front-end loaders; dump trucks; a vibratory hammer; generator; drill rig for wall and anchor installation; and large mobile cranes. Equipment and materials for Bear Cave work would be stored at existing staging areas in DENA.

2.2.2 Rockfall Risk Reduction

Rockfall areas above the road to the east and west of Bear Cave Landslide would be addressed during Phase II using a combination of rock scaling (i.e., the removal of loose or potentially unstable rocks), installation of rock bolts or dowels, and/or the creation of rockfall ditches. Rock scaling would be designed to match existing surroundings and would be conducted by workers on ropes and performed by hand using prybars; no blasting would be necessary. Installation of rock bolts would include 1-inch diameter bolts or dowels drilled into the surface and subsurface rock of the cliff face to secure hazardous rocks and would be designed to match surroundings by either staining the bolts or cutting them flush with the rock and grouting over them. Rock scaling and installation of rock bolts would occur in wilderness and would be repeated every 5 to 10 years, or as needed to reduce additional rockfall hazards.

2.2.3 Traffic

Road access through the Polychrome area is anticipated during Phase II. Visitor transportation to destination points west of Pretty Rocks and regular traffic to Kantishna inholdings would be allowed. There may be some traffic delays due to single-lane use or temporary restrictions at the project sites. There could also be scheduled nighttime road restrictions for work to occur. Because rock scaling and bolting cannot occur in the dark due to safety concerns, road restrictions would be needed during some daylight hours as well.



3 THE PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is to restore reliable access west of Polychrome for users of the Park Road, including visitors, staff, concessioners, and Kantishna property owners. Action is needed because the Pretty Rocks Landslide and other geohazards from Mile 44 through Mile 46 are threatening the integrity, safety, and continued viability of the Park Road as well as threatening access to 47 miles of the road west of the Pretty Rocks Landslide. As of September 2021, the NPS is no longer able to safely repair the road at Pretty Rocks and without action, that section of road would remain closed indefinitely. In addition, it is necessary to make other long-term improvements in the Polychrome area, including addressing Bear Cave Landslide, Perlite Landslide, and several rockfall areas because the safety of the road and reliable access to the 47 miles of the road west of the Pretty Rocks Landslide cannot be maintained without addressing all of these geohazards.

Landslide movement at Pretty Rocks has accelerated in recent years. The rate of road movement within the landslide evolved from a couple of inches per year prior to 2014, to inches per month in 2017, inches per week in 2018, and a few inches per day in 2019. Monitoring equipment used by DENA staff indicated that by the end of August 2021, the movement of the landslide had reached 13 to 15.5 inches per day and further acceleration is likely in the near future. The increasing movement of the landslide results in an increased risk of rockfall hazard as the loose material holding large rocks in place erodes away and the slope above the road becomes steeper. The current conditions

require enhanced safety protocols, including the need for additional staff to serve as rockfall spotters during most maintenance activities in the area.

In recent years, the increased rate of movement has also required extraordinary maintenance efforts from the NPS in order to safely maintain access across the landslide. For example, over a 5 month period from fall 2020 to spring 2021, the Pretty Rocks Landslide section of the road slumped approximately 18 feet below the surrounding road grade, which required an emergency repair, the addition of about 6,000 cubic yards of material, and a delayed spring road opening. The slump required an additional 10,000 cubic yards of material and daily maintenance throughout the summer 2021 season. This limited the maintenance that the NPS could conduct on other parts of the Park Road and concerns grew about the rapid depletion of aggregate reserves. While these repairs were challenging, they were manageable until the acceleration of the slide in August 2021 proved that previous maintenance efforts would no longer be sustainable and the NPS was forced to close the Park Road at Mile 43 for the remainder of the season, 20 days earlier than scheduled. Without daily maintenance, the condition of the road quickly deteriorated and the landslide has displaced the road more than 30 feet below the surrounding road grade since September 2021.

The Park Road—including the section through the Pretty Rocks Landslide and the Bear Cave Landslide—is the primary means by which most visitors experience DENA and inholders access their inholdings. The majority of park visitors use the Park Road, and most of those road users traverse the Pretty Rocks Landslide area. If left unaddressed, the Pretty Rocks Landslide and the Bear Cave Landslide would continue displacing the road, eliminating vehicular access to the western half of the Park Road and popular visitor destinations and NPS facilities including the Toklat Road Camp, Eielson Visitor Center, Wonder Lake, Kantishna, and the most iconic views of the Alaska Range and the Denali massif, as well as the easy wilderness access this section of road provides. As a result, the majority of visitors would lose the opportunity to experience the iconic views and recreational opportunities offered along the western half of the Park Road, NPS facilities would be abandoned, and concessioners and Kantishna businesses would suffer financial loss. Providing safe access through the Polychrome area would ensure access along the only overland route in DENA and allow visitors to continue experiencing and enjoying the entirety of the Park Road and the access it provides to other areas of the park.

4 OTHER ALTERNATIVES CONSIDERED

4.1 NO ACTION

Under Alternative 1, the Park Road at Pretty Rocks would not be repaired and no bridge would be constructed; the Bear Cave Landslide, Perlite Landslide, and rockfall areas would not be addressed. The NPS would not improve the Polychrome section of road and there would be no vehicle access through the Polychrome area to the 47 miles of road west of the landslide (Mile 45.4). Access to the Kantishna inholdings would be primarily via air, and visitor transportation would continue to be limited to Mile 43 of the Park Road, indefinitely. If no action is taken to restore road access to the west district of the park, further planning would be needed to determine if NPS roads and facilities west of Polychrome would be maintained, abandoned, or restored to a natural state.

5 WETLANDS IN THE POLYCHROME IMPROVEMENTS STUDY AREA

Field work was conducted in August 26, 2021 and September 1, 2021 in a 190.3-acre study area that largely extended beyond the project footprint to accommodate any unforeseen design shifts (NPS 2021).

Knowledge of existing wetland resources in the study area is based on the National Wetland Inventory (NWI) Database of Alaska and a wetland delineation conducted by qualified individuals at DOWL with professional wetland scientist certifications, Society of Wetland Scientists Professional Membership, and extensive wetland delineation experience in Alaska.

A total of eight palustrine scrub shrub and emergent wetlands encompassing 9.5 acres, and 11 riverine (stream segments) totaling 3.8 acres or 5,128 linear feet (0.97 miles) were identified and delineated. The wetland types found in the Polychrome Improvements study 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. Wetlands characterized by herbaceous vegetation (PEM1) consist of Lapland reedgrass (*Calamagrostis lapponica*), Bigelow's sedge (*Carex bigelowii*), arctic hare-foot sedge (*Carex lachenalia*), alpine-tundra sedge (*Carex macrochaeta*), tufted hair grass (*Deschampsia caespitosa*), rough fescue (*Festuca altaica*), pygmy gentian (*Gentiana prostrata*), two-flower rush (*Juncus biglumis*), tall bluebells (*Mertensia paniculata*), arctic sweet colt's foot (*Petasites frigida*), fowl blue grass (*Poa palustris*), tall Jacob's ladder (*Polemonium acutiflorum*), and arctic yellow violet (*Viola biflora*)

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 20 feet tall. Wetlands characterized by shrubs (PSS1/EM1) consist of black torpedoberry (*Arctous alpinus*), swamp birch (*Betula nana*), leatherleaf (*Chamaedaphne calyculata*), golden-hardhack (*Dasiphora fruticosa*), marsh Labrador tea (*Rhododendron tomentosum*), cloudberry (*Rubus chamaemorus*), diamond leaf willow (*Salix pulchra*), net-vein willow (*Salix reticulata*), diamond leaf willow (*Salix pulchra*), alpine blueberry (*Vaccinium uliginosum*), and northern mountain cranberry (*Vaccinium vitis-idaea*).

Palustrine Unconsolidated Bottom and Aquatic Bed Wetlands (ponds)—One type of ponded wetland occurs within the study area. Ponded palustrine wetlands that have at least 25 percent bottom cover of particles smaller than stones (less than 3 inches) and a vegetation cover of less than 30 percent are considered to have unconsolidated bottoms.

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

Uplands typically are characterized by open or closed cover of tall or low shrubs. Dominant upland shrub species included swamp birch (*Betula nana*), golden-hardhack (*Dasiphora fruticosa*), white mountain-avens (*Dryas integrifolia*), black crowberry (*Empetrum nigrum*), Barratt's willow (*Salix barrattiana*), gray-leaf willow (*Salix glauca*), diamond leaf willow (*Salix pulchra*), net-vein willow (*Salix reticulata*), and alpine blueberry (*Vaccinium uliginosum*). The upland understory was composed of dominant herbaceous vegetation including bluejoint (*Calamagrostis canadensis*), Lapland reedgrass (*Calamagrostis lapponica*), alpine-tundra Sedge (*Carex macrochaeta*), narrow-leaf fireweed (*Chamaererion angustifolium*), rough fescue (*Festuca altaica*), and arctic sweet-Colt's-Foot (*Petasites frigida*).

Wetland mapping is shown in Figure 2.1 through Figure 2.6. Wetlands identified in the project vicinity include:

Wetland #1 (6.5 acres): This wetland ecosystem occurs on a sloped hillside above the East Fork of the Toklat River. Wetland 1 soils were histosols. The plant community consisted of dwarf willow shrub and low closed shrub that generally conforms to the Boggs et al. (2001) vegetation classifications of low shrub-sedge and low shrub-birch Landcover Classes. In the Cowardin et al. (1979) classification scheme, this wetland is a scrub-shrub, deciduous, broad leaved/emergent, persistent deciduous, saturated (PSS1/EM1B) habitat. Groundwater was observed within the upper 12 inches of the surface. Wetland 1 does not have a surface hydrologic connection with the East Fork of the Toklat River and is separated by an upland hillslope.

Wetland #2 (0.05 acre): This wetland is a drainage swale that potentially connects to a wetland complex outside of the study area, and mapped NWI wetland high above the East Fork of the Toklat River. Wetland 2 soils had a histic epipedon. The plant community generally conforms to the Boggs et al. (2001) vegetation classification of the low shrub birch-ericaceous-willow Landcover Class. In the Cowardin et al. (1979) classification scheme, this wetland is a scrub-shrub, deciduous, broad leaved/emergent, persistent deciduous, saturated (PSS1/EM1B) habitat. Saturation was within the upper 12 inches with a water table at 18 inches. Wetland 2 does not have a surface hydrologic connection with the East Fork of the Toklat River and is separated by a steep upland hillslope.

Wetland #3 (0.6 acre): This wetland ecosystem occupies a topographic depression that connects to a wetland complex mapped by the NWI on a terrace above the East Fork of the Toklat River. Wetland 3 soils had a histic epipedon. The plant communities generally conforms to the Boggs et al. (2001) vegetation classification of the low shrub birch-ericaceous-willow, closed low shrub birch, and low shrub-sedge Landcover Classes. In the Cowardin et al. (1979) classification scheme, this wetland is a scrub-shrub, deciduous, broad leaved/emergent, persistent deciduous, saturated (PSS1/EM1B) habitat. Saturation was observed within 12 inches of the surface and the water table was observed at 18 inches below the surface. Wetland 3 does not have a surface hydrologic connection with the East Fork Toklat River and is separated by a steep upland hillslope.

Wetland #4 (0.01 acre): This small wetland occurs on a steep hillside and is supported by a groundwater seep. The plant community generally conforms to the Boggs et al. (2001) vegetation classification of the low shrub birch-ericaceous-willow Landcover Class. In the Cowardin et al. (1979) classification scheme, this wetland is a scrub-shrub, deciduous, broad leaved/emergent, persistent deciduous, saturated (PSS1/EM1B) habitat. Water was observed seeping from the ground in a small drainage area. Wetland 4 does not have a surface hydrologic connection with the East Fork of the Toklat River and is separated by an upland hillslope.

Wetland #5 (0.1 acre): This wetland ecosystem occupies a topographic depression at the toe of slope of the Pretty Rocks Landslide. Site soils were Alaska gleyed and Alaska redox. The plant community generally conforms to the Boggs et al. (2001) vegetation classification of the low shrub-sedge Landcover Class. In the Cowardin et al. (1979) classification scheme, this wetland is considered characteristic of a scrub-shrub, deciduous, broad leaved/emergent, persistent deciduous, seasonally flooded (PSS1/EM1C) habitat. The wetland exhibited signs of water-stained leaves, geomorphic position, shallow aquitard, and positive FAC-neutral test. Wetland 5 is a closed depression high above the East Fork of the Toklat River.

Wetland #6 (1.1 acres): This wetland ecosystem occurs in a drainage swale and depressional area at the base of the Pretty Rocks Landslide. Wetland 6 soils were problematic, meeting the depth requirement for a histic epipedon but with low organic material below from landslide activity. The wetland complex includes a small pond, and depressional and slope hydrogeomorphic (HGM) wetlands. The plant community generally conforms to the Boggs et al. (2001) vegetation classification of the low shrub-sedge Landcover Class. In the Cowardin et al. (1979) classification

scheme, this wetland is a scrub-shrub, deciduous, broad leaved/emergent, persistent deciduous, saturated (PSS1/EM1B) and unconsolidated bottom, permanently flooded (PUBH) habitat. Groundwater and saturation were observed within 12 inches of the surface. This wetland lacks a surface hydrologic connection with the East Fork of the Toklat River from an upland hillslope.

Wetland #7 (0.2 acre): This wetland ecosystem lies on a sloped hillside and begins above the Denali Park Road. Wetland 7 soils had a histic epipedon and hydrogen sulfide odor. The plant community generally conforms to the Boggs et al. (2001) vegetation classification of the low shrub birch--ericaceous--willow Landcover Class. In the Cowardin et al. (1979) classification scheme, this wetland is considered characteristic of emergent, persistent, saturated, and seasonally flooded (PEM1B and PEM1C) habitat. Groundwater was observed within the upper 12 inches of the wetland test pit. Wetland 7 does not connect to Wetland 8.

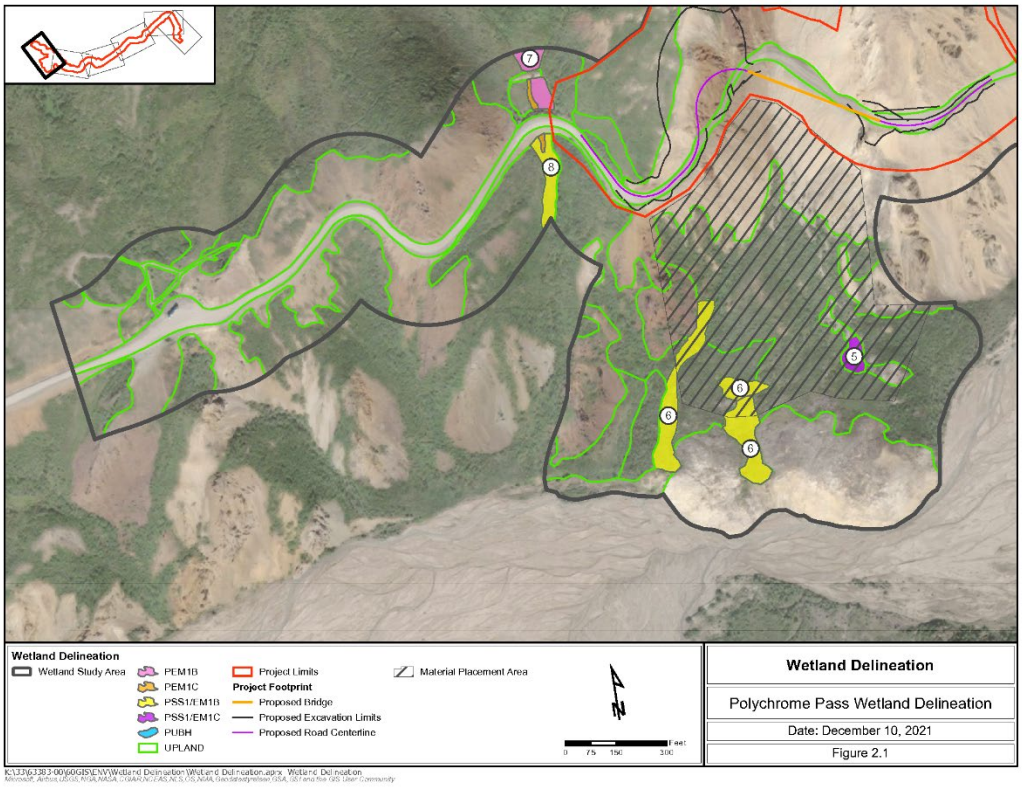
Wetland #8 (0.3 acre): This wetland ecosystem occupies a sloped hillside below the Park Road. No culvert connects Wetland 7 and 8, though shallow subsurface hydrology is evident from similar wetland development. Wetland 8 soils had a histic epipedon and a hydrogen sulfide odor. The plant community generally conforms to the Boggs et al. (2001) vegetation classification of the low shrub birch-ericaceous-willow Landcover Class. In the Cowardin et al. (1979) classification scheme, this wetland is a scrub-shrub, deciduous, broad leaved/emergent, persistent deciduous, saturated (PSS1/EM1B) and emergent, persistent, seasonally flooded (PEM1C) habitat. Groundwater was observed within 12 inches of the surface. Wetland 8 does not have a surface hydrologic connection with the East Fork of the Toklat River and is separated by an upland hillslope.

Streams identified within the proposed vicinity include the following:

Small Perennial Streams (Streams A-H) (3,022 linear feet): These eight streams are less than 1 -foot wide and 1 -foot deep with a gravel and silt substrate. Two of these small perennial streams connect to the excavated trench in the Bear Cave Landslide. These streams begin upslope of the Denali Park road and continue through culverts. They are presumed to connect to the East Fork of the Toklat River outside of the study area. These features exhibited characteristics of a riverine, upper perennial, unconsolidated bottom system (R3UBH), with one stream the result of excavation (R3UBHx).

Tributary to the East Fork of the Toklat River, Perennial Stream (Stream I) (1,162 linear feet): This stream collects streamflow from several streams along the bluff and connects to the East Fork of the Toklat River. The stream consists of a channel 5 to 10 -feet wide and less than 1 -foot deep with a gravel and silt substrate. Under Cowardin et al. (1979) this tributary stream is classified as a riverine, upper perennial, unconsolidated bottom system (R3UBH).

East Fork of the Toklat River, Perennial Stream (Stream J) (943 linear feet): This stream is the East Fork of the Toklat River that is part of the study area in two locations. The stream is approximately 150 -feet wide and 5 to 15 -feet deep beneath the East Fork Bridge. This feature exhibited characteristics of a riverine, upper perennial, unconsolidated bottom system (R3UBH). The East Fork of the Toklat River is mapped by the Alaska Department of Fish and Game Anadromous Waters Catalog as having spawning coho salmon and chum salmon presence approximately 25 air miles from the study area (ADF&G 2021).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8
5
6
6
6
Wetland Delineation
Wetland Study Area
PEM1B
PEM1C
PSS1/EM1B
PSS1/EM1C
PUBH
UPLAND
Project Limits
Project Footprint
Proposed Bridge
Proposed Excavation Limits
Proposed Road Centerline
Material Placement Area
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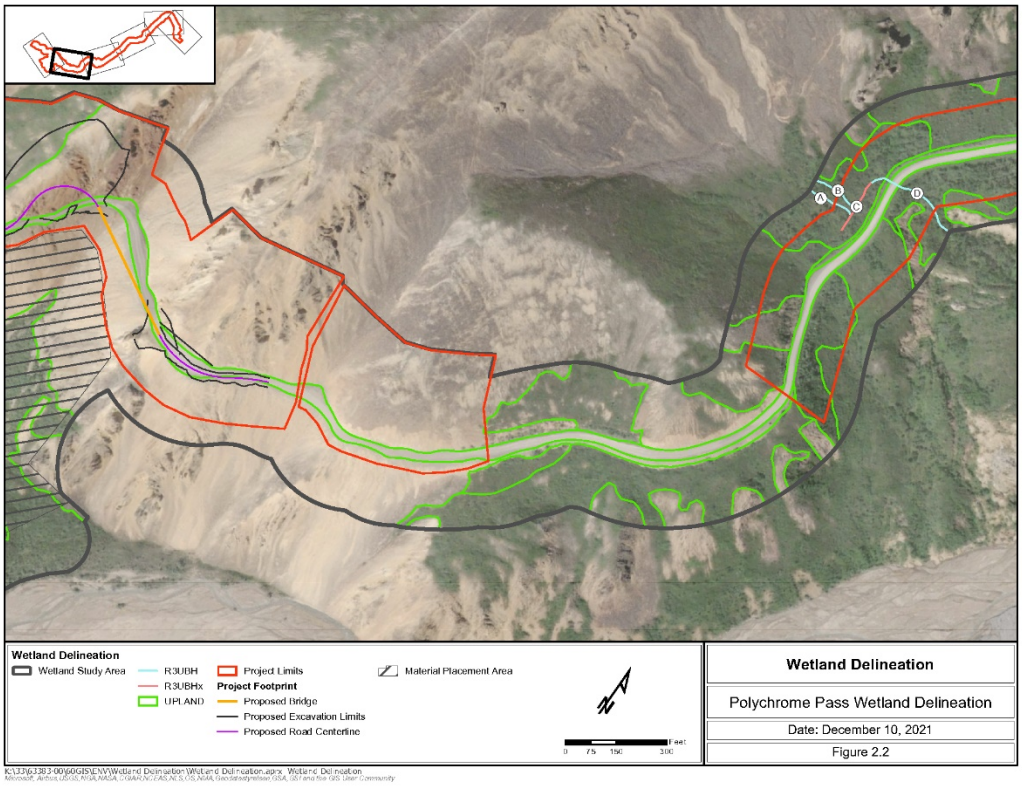
Feet
Wetland Delineation
Polychrome Pass Wetland Delineation
Date: December 10, 2021
Figure 2.1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Wetland Delineation
Wetland Study Area
R3UBH
R3UBHx
UPLAND
Project Limits
Project Footprint
Proposed Bridge
Proposed Excavation Limits
Proposed Road Centerline
Material Placement Area
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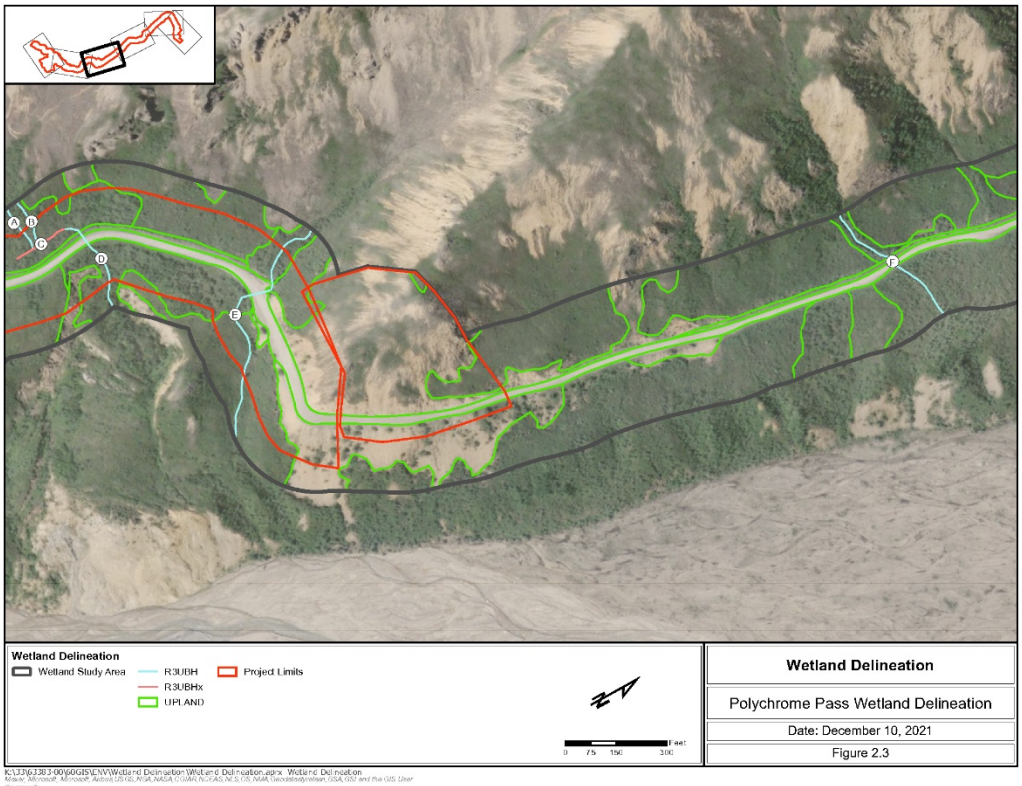
Polychrome Pass Wetland Delineation
Date: December 10, 2021
Figure 2.2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Wetland Study Area
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R3UBHx
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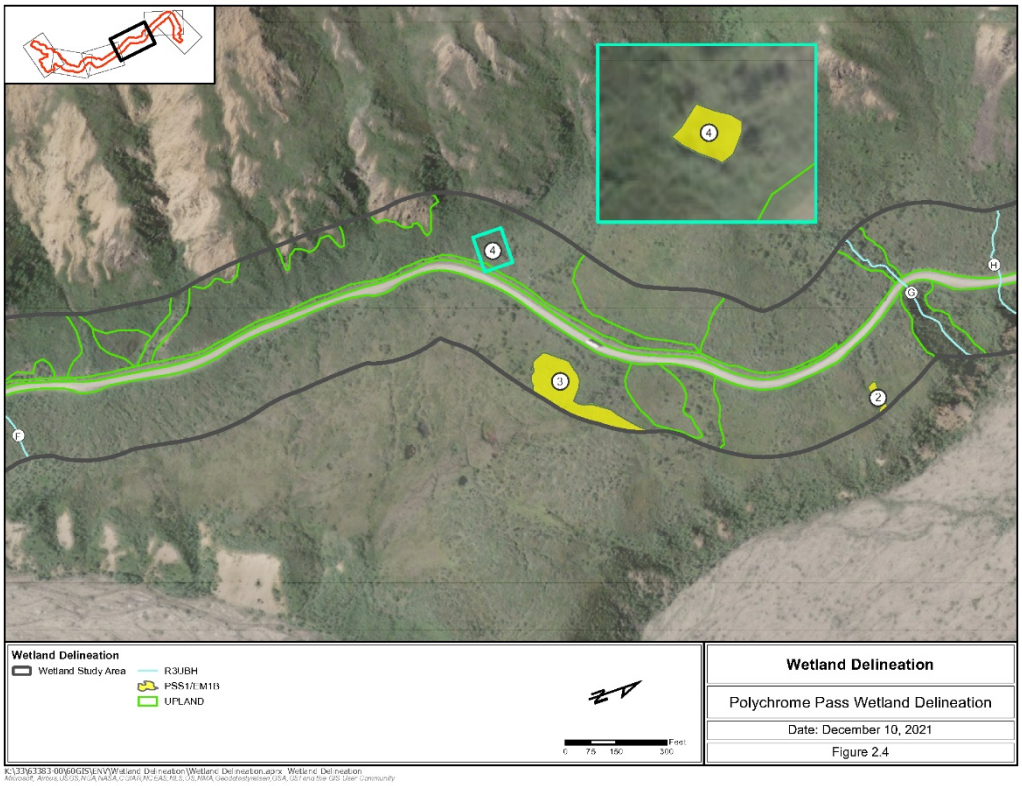
Polychrome Pass Wetland Delineation
Date: December 10, 2021
Figure 2.3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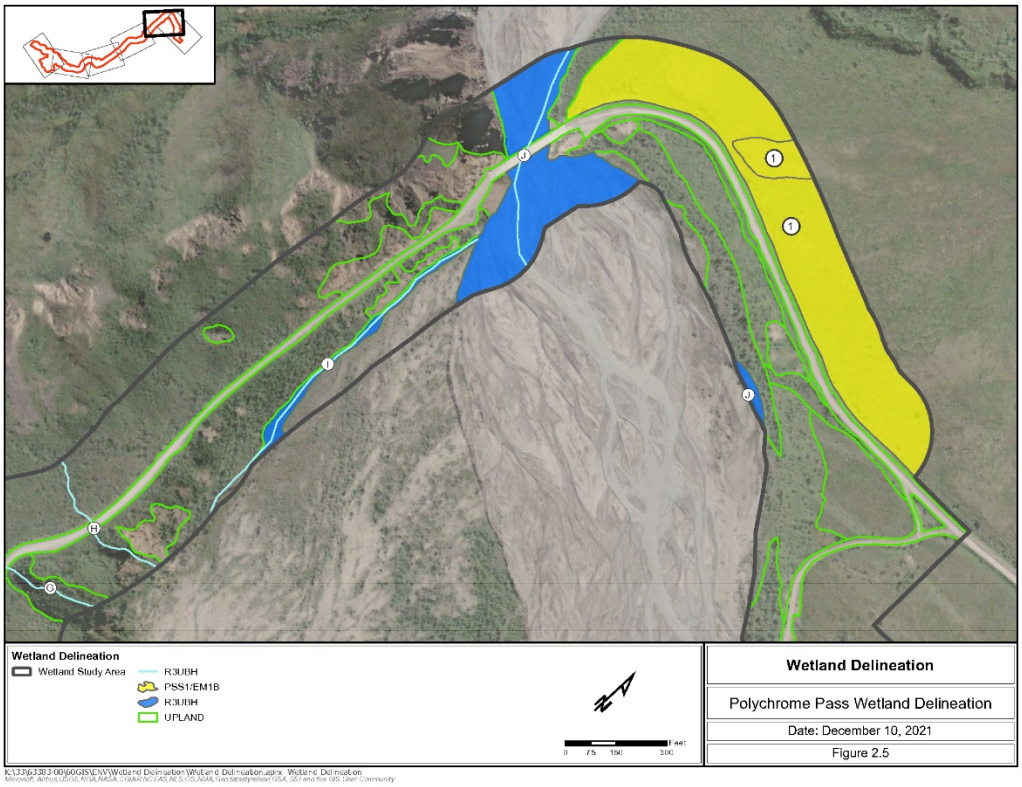
Wetland Delineation
Wetland Study Area
R3UBH
PSS1/EM1B
UPLAND
Feet
0 75 150 300
Wetland Delineation
Polychrome Pass Wetland Delineation
Date: December 10, 2021
Figure 2.4


Wetland Delineation
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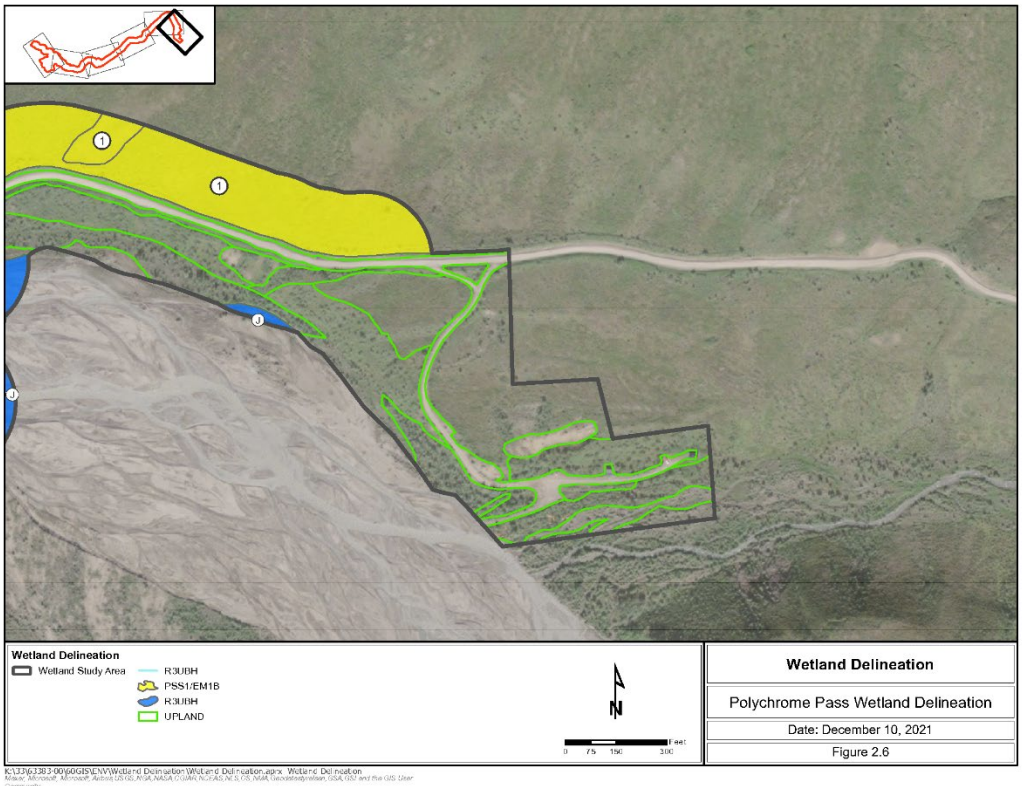
Wetland Delineation
Polychrome Pass Wetland Delineation
Date: December 10, 2021
Figure 2.5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Wetland Delineation
Polychrome Pass Wetland Delineation
Date: December 10, 2021
Figure 2.6

5.1 CURRENT CONDITION OF WETLANDS IN THE STUDY AREA

Wetlands in the study area have been hydrologically disturbed from the Park Road or from natural landslide activity. The area is remote and no other human activities exist in the study area.

Wetlands were evaluated during the delineation in three Assessment Areas (Slope, Flat, and Depressional) based on the HGM classification system which groups wetlands with similar ecosystem functions based on abiotic features such as the chemical characteristics of water, habitat maintenance, and water storage and transport (Brinson 1993). Wetlands and streams were assessed for functions and their overall value using the Alaska Wetland Assessment Methodology developed by the State of Alaska Department of Transportation and Public Facilities (ADOT&PF 2011).

No wetlands were identified as Category 1 based on low to moderate scoring for threatened or endangered species, uniqueness, water storage, no general fish support, and less than 50 percent of possible score. No waterbodies were identified as Category 1.

No wetlands were identified as Category 2 wetlands based on low to moderate scoring for threatened or endangered species, uniqueness, water storage, general wildlife support, no general fish support, and less than 50 percent of possible score. Waterbodies—including the East Fork of the Toklat River and tributary—are Category 2 based on perennial flow, a natural stream channel, and potential to support resident fish.

All wetlands are ranked as Category 3, which are moderate- to low -functioning wetlands. They can be important for a variety of wildlife species and can provide watershed protection functions depending on where they are situated. Generally, these wetlands will be smaller and/or less diverse in the landscape than Category 2 wetlands. These wetlands usually have experienced some form of degradation, but to a lesser degree than Category 4 wetlands. Category 3 waterbodies include perennial natural stream channels that are not known or thought to support fish species.

Slope wetlands scored 49 percent, Flat wetlands scored 38 percent, and Depressional wetlands scored 47 percent of possible points. Wetlands identified in the study area are adjacent to steep slopes and are not connected to streams through a surface inlet or outlet, which is relatively common in the watershed. The hydrologic regime of identified wetlands mostly consists of saturated soils, and are either bisected by the Park Road or on the toe of the Pretty Rocks Landslide. There is minor disturbance adjacent to Slope and Flat assessment areas. The small perennial streams on steep slopes in the study area near the Park Road are Category 3 based on perennial flow, a natural stream channel, and because they are not known or thought to support fish.

No wetlands were identified as Category 4, which are low functioning. The trench that was excavated in the Bear Cave Landslide to divert water away from the Park Road is a Category 4 waterbody (culverted streams and nonnaturalized ditches) because it is a ditch that does not support fish.

6 THE PROPOSED PROJECT'S IMPACT ON WETLANDS

The proposed action would impact 0.6 acres of low- to moderate -functioning wetlands and 999.01 linear feet of low- to moderate -functioning streams in the impact area. Most wetlands would be avoided due to their location outside of project road improvement areas in uplands. A list of wetlands and their associated vegetation types in the project impact area is provided in Table 1.

TABLE 1. VEGETATION/WETLAND TYPES

Identifier	Viereck Level III	Cowardin Classification	Boggs et al. Vegetation Classification	Project Component	Area (ac)	Linear Ft
Wetland #5	Open Low Shrub	PSS1/EM1C	Low Shrub-Sedge	Phase I: Material Placement	0.14	0.00
Wetland #6	Closed Tall Shrub (canopy 75-100%)	PSS1/EM1B	Low Shrub-Sedge	Phase I: Material Placement	0.45	0.00
Wetland # 7	Moist Graminoid Herbaceous	PEM1B	Low Shrub Birch-Ericaceous-Willow	Phase I: Pretty Rocks & Retaining Walls	0.01	0.00
Stream A	Water	R3UBH	N/A	Bear Cave	0.003	62.0
Stream B	Water	R3UBH	N/A	Bear Cave	0.003	74.27
Stream C	Water	R3UBHx	N/A	Bear Cave	0.008	165.07
Stream D	Water	R3UBH	N/A	Bear Cave	0.010	226.0
Stream E	Water	R3UBH	N/A	Bear Cave	0.043	471.67
				Total	**0.667**	**999.01**

Notes:
ac = acres
ft = foot/feet

The following estimates wetland and stream disturbance associated with each project component of the proposed action:

1. Excavation, Road Realignment, Pretty Rocks Bridge, and Retaining Walls: No impacts to streams or wetlands would occur as none are in and around the proposed Pretty Rocks bridge or excavation areas. Approximately 0.01 acres of wetland impacts would occur west of the proposed Pretty Rocks Bridge that would be avoided.
2. Rockfall Risk Reduction (Phase I and Phase II): No impacts to wetlands or streams would occur as none are in and around these proposed rock scaling and rock bolting areas.
3. Bear Cave Landslide Retaining Wall: No impacts to wetlands would occur because none are in and around the proposed clearing and retaining wall; however, five stream segments totaling 999.01 linear feet (0.189 miles or approximately 0.067 acres) of small, perennial streams would be impacted by fill material for the retaining wall construction. These streams are already hydrologically disconnected from downstream areas by the park road so the incremental impact of the project would be minor.
4. Material Placement: No impacts to streams would occur as none are in and around the proposed Pretty Rocks bridge or excavation area; however, approximately 0.59 acre of wetland impacts would occur south in the toe of slope of the proposed Pretty Rocks Bridge. Fill material that is excavated from the hillside above the proposed bridge would be placed at the toe of slope.

7 WETLAND IMPACT MITIGATION MEASURES

7.1 AVOIDANCE EFFORTS

There is no practicable alternative that would avoid wetland and stream impacts entirely. The proposed action avoids wetlands and streams to the extent practicable. The existing Park Road was predominantly routed on steep slopes high above the East Fork of the Toklat River, avoiding additional impacts that would occur with working in the floodplain or areas with higher wetland concentrations.

Not taking any action would result in continued erosion and collapse of the road, which could potentially result in large amounts of rock entering the wetlands downslope.

Avoiding impacts to wetlands is not practicable as wetlands are in present in areas where improvements are needed. The wetland area at the toe of the landslide is currently being buried and moved by mass wasting caused by a combination of natural and human--induced processes. This process is likely to continue under any alternative as it is driven by changing ground conditions. While the proposed action does directly affect this area, it does not alter the eventual outcome of permanent wetland disturbance.

Wetlands were largely avoided through the following:

- The Park Road is not being widened throughout the project area (Mile 44 to 46) and is only being widened through realignment of a small section of road. Widening of the entire project area could have impacted more wetlands, particularly east of the East Fork of the Toklat River bridge.
- Material placement in the toe of slope has been limited through best management practices to minimize incidental fill in wetlands from blasting.
- All staging and driving surfaces will be limited to uplands and materials would be stockpiled or staged in developed or upland areas, to avoid impacting additional wetlands.

7.2 MEASURES TO MINIMIZE IMPACTS

Minimization measures from design and during construction include the following:

1. Fill material will be extracted from an existing material site with no expansion in wetland areas.
2. Stormwater and erosion control best management practices including vegetation buffers to wetlands and waters, erosion control fencing, and constructing a retaining wall would be implemented during construction.
3. Approximately 0.01 acre of wetland #7 is in an area that has been included in the project for the purpose of accessing the excavation slope and this wetland would be flagged and avoided.
4. Even though minor stream impacts will occur with clearing and grading for construction of the Bear Cave Landslide retaining wall, the wall will minimize further impacts to wetlands downslope of the Bear Cave Landslide, where regular erosion and sedimentation events occur as a result of landslide activity. These natural landslides have the potential to fill wetlands downslope.
5. General roadwork has been minimized to maintain the Park Road in the project corridor.
6. The majority of improvements are proposed for upland areas, as the area is steep, high above the East Fork of the Toklat River floodplain, and well drained.
7. In order to prevent unintended impacts, wetland, and streams within 100 feet of the project's limits of clearing will be flagged prior to construction activities.

8 WETLAND COMPENSATION

Because it is likely that 0.59 acre of wetland loss at the toe of the slope of the proposed Pretty Rocks Bridge will continue regardless of these actions, any additional wetland loss resulting from the proposed action (0.077 acre in total) would be less than 0.1 acre; therefore, no compensation is expected to occur.

9 CONCLUSIONS

The NPS identified a proposed action for the Polychrome Area Improvements Project. Wetland impacts have been avoided and minimized to the extent practicable by using the existing Park Road corridor, minimizing expansion to 20 to 30 feet from the existing embankment for the project corridor and proposing improvements mostly in uplands. 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.

10 REFERENCES

ADF&G. 2021. Anadromous Waters Catalog. 2021 Regulatory Atlas Maps, Interior Region.

ADOT&PF. 2011. ADOT&PF Alaska Wetland Assessment Method. Version 1. Adapted with permission from: Montana Department of Transportation Montana Wetland Assessment Method. Alaska Department of Transportation and Public Facilities Research and Technology Transfer Division and Statewide Environmental Office. With assistance from U.S. Army Corps of Engineers, Regulatory Branch, Fairbanks Field Office Fairbanks, Alaska and HDR Alaska, Inc. Anchorage, Alaska. July 2010

Boggs, K., A. Garibaldi, J.L. Stevens, J. Grunblatt, and T. Helt. 2001. Denali National Park and Preserve landcover mapping project Volume 2: Landcover classes and plant associations. Natural Resource Technical Report NPS/DENA/NRTR—2001/002. National Park Service, Fort Collins, Colorado.

Brinson, M. M. 1993. A hydrogeomorphic classification for wetlands. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS, USA. Wetlands Research Program Technical Report WRP-DE-4.Cowardin, L.M.; V. Carter, F. C. Golet, E. T. La Roe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Wetland Classification System, Jamestown: U.S. Department of the Interior.

NPS. 2021. DENA Polychrome Area Improvements Wetland Delineation Report. Prepared for National Park Service, Denver Service Center, Denver, CO. Prepared by DOWL, Anchorage, AK. 119 pages.

NPS. 2016. Procedural Manual 77-1: Wetland Protection. U.S. Department of the Interior, Washington D.C.