HATCHER PASS RECREATIONAL AREA ACCESS, TRAILS, AND TRANSIT FACILITIES

Wetlands Reconnaissance Report

October 2009

FTA United States Department of Transportation Federal Transit Administration

DOWL HKM

WETLANDS RECONNAISSANCE REPORT
AND
FUNCTIONS AND VALUES ASSESSMENT, VEGETATION CLASSIFICATION, AND HABITAT ASSESSMENT

HATCHER PASS RECREATIONAL AREA ACCESS, TRAILS, AND TRANSIT FACILITIES

Prepared on behalf of:

Matanuska-Susitna Borough
350 East Dahlia Avenue
Palmer, Alaska 99645

Prepared by:

DOWL HKM
4041 B Street
Anchorage, Alaska 99503
(907) 562-2000

W.O. D59609A

October 2009

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (cont'd)

TABLES **Page**

APPENDICES

LIST OF ACRONYMS

ADF&G....Alaska Department of Fish and Game
bgs....below ground surface
FTA....Federal Transit Administration
GIS....Geographic Information Systems
MSB....Matanuska-Susitna Borough
NWI....National Wetlands Inventory
Project Area....Hatcher Pass Recreational Area Access, Trails, and Transit Facilities
PWD....Preliminary Wetlands Delineation
U.S....United States
USACE....United States Army Corps of Engineers
USFWS....United States Fish and Wildlife Service
USGS....United States Geological Survey
WDOT....State of Washington Department of Transportation

EXECUTIVE SUMMARY

DOWL HKM has been contracted by the Matanuska-Susitna Borough to perform a wetlands reconnaissance of the proposed Hatcher Pass Recreational Area Access, Trails, and Transit Facilities. In addition to a wetlands reconnaissance, this report describes the classification and mapping of each wetlands habitat and an evaluation of the functions and values of each wetlands habitat. This report serves as a planning-level assessment. Hereafter, this document is referred to as the Wetlands Reconnaissance Report.

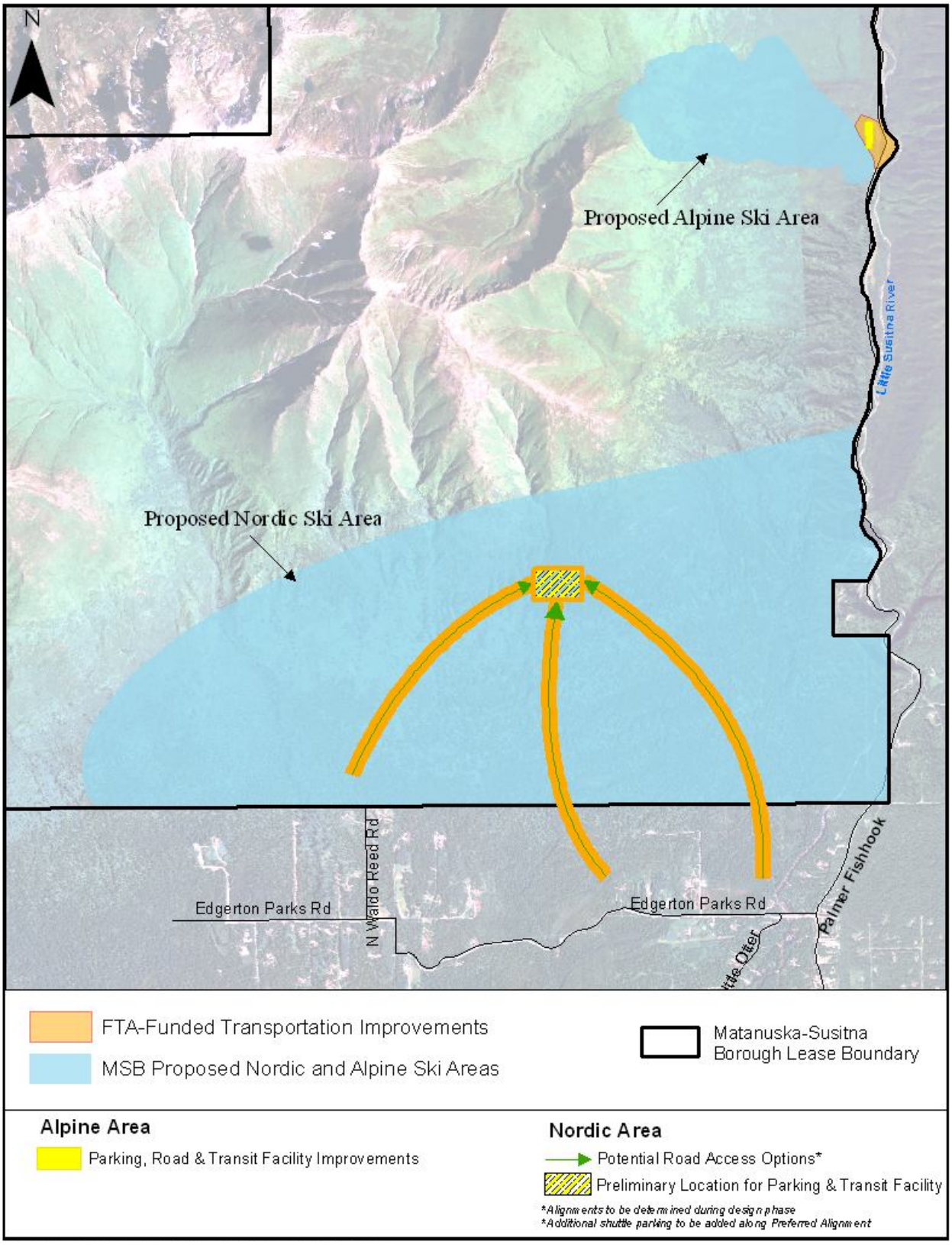
A Preliminary Wetland Delineation has been prepared based on the information in the Wetland Reconnaissance Report and additional fieldwork. The Preliminary Wetland Delineation has been submitted to the United States Army Corps of Engineers for a Jurisdictional Determination. The Wetlands Reconnaissance Report in conjunction with the Preliminary Wetland Delineation can be used to understand the overall proposed Hatcher Pass Recreational Area Access, Trails, and Transit Facilities project area.

The 4,260-acre Wetland Reconnaissance Report study area is located within Hatcher Pass, northwest of Palmer, Alaska. For the purposes of this analysis, the project area was divided into two separate areas: the 2,917-acre Southern Area comprises Study Area A, and the 1,343-acre Northern Area comprises Study Area B. For both the Northern and Southern Areas, jurisdictional wetlands comprise approximately 22.6 acres, and Other Waters of the United States comprise approximately 20.4 acres. In both the Northern and Southern Areas, non-jurisdictional uplands comprise approximately 4,217 acres.

The Southern Area is a highly complex landscape of forested uplands crossed by dozens of streams and interspersed with many different types of wetlands. After collecting an initial round of 63 data points, it was determined that to accurately locate and delineate wetland areas would require a much more focused assessment. This is due primarily to the surficial geology of the area, which is characterized by glacial tills of varying permeability resulting in a highly unpredictable water table. This mix of permeable and non-permeable soils produces seep areas that are not easily denoted by vegetative changes or topography, and therefore must be thoroughly ground-truthed. Additionally, complex topography and soils made the identification of watercourse presence and location extremely difficult.

Alternately, the Northern Area consists of a landscape in which the vegetation communities and topography reflects a distinct change between wetlands and uplands. Additionally, the presence and location of watercourses is consistent with local topography.

For these reasons, all data collected in the Southern Area is presented in this reconnaissance report as planning-level assessment to aid in the development of a preferred alternative for the alignment of the access road and other development within the area. The Northern Area is also included in this report, although resulting maps are to the standard of a Preliminary Wetlands Delineation. This standard was achievable for the Northern Area because an accurate delineation of the area could be achieved by the representative sample points which could be extrapolated using the vegetation communities and topography.



Proposed Ski Areas

1.0 INTRODUCTION

DOWL HKM has been contracted by the Matanuska-Susitna Borough to perform a wetlands reconnaissance of the proposed Hatcher Pass Recreational Area Access, Trails, and Transit Facilities (Project Area). In addition to a wetlands reconnaissance, this report describes the classification and mapping of each wetlands habitat and an evaluation of the functions and values of each wetlands habitat. Hereafter, this document is referred to as the Wetlands Reconnaissance Report (WRR).

Wetlands are defined by the United States Army Corps of Engineers (USACE) as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (USACE, 1987)."

This WRR serves to support the Preliminary Wetlands Delineation (PWD) in which a jurisdictional determination by the USACE, under authority granted by the Clean Water Act Section 404, will be sought. In addition, this WRR is serving dual purposes to cover both Federal Transit Administration (FTA)-funded portions of the project that will be covered in the Environmental Impact Statement as well as the Matanuska-Susitna Borough (MSB)-funded portions of the project.

1.1 Project Description

The FTA and the MSB are proposing a project to construct transit facilities, access roads, parking lots, and trail connections for two day-use areas that would provide an opportunity for skiing and other non-motorized recreational opportunities for local and regional residents in the Hatcher Pass area. The MSB's goal is a moderate sized development that would include Alpine and Nordic skiing, snowboarding, biathlon, mountain biking, hiking, sledding, and equestrian access in Hatcher Pass, Alaska. The project proposes the following development of access to the Northern and Southern Areas to support existing use:

Northern Area:

- Reconstruction of an existing gravel access road, not more than 2,000 feet.
- Reconstruction of an existing gravel parking area.

- Construction of a covered 20- to 30-passenger transit shelter at the south end of the parking lot.

Southern Area:

- Construction of a new access road off of Edgerton Park Road, approximately 5,500-feet in length.
- Construction of a parking lot, overflow parking, and trailhead connections.
- Construction of a covered 20- to 30-passenger transit shelter.

The following components are not part of the FTA-funded project. The MSB plans to construct two Alpine ski lifts, Alpine trails, and a small day lodge providing food and ski concessions as part of the overall Northern Area development; Nordic and other non-motorized multiple-use trails and a small chalet and conference facility as part of the overall recreational area development.

The Southern Area, referred to as Study Area A in this report, is a highly complex landscape of forested uplands crossed by dozens of streams and interspersed with many different types of wetlands. After collecting an initial round of 63 data points, it was determined that to accurately locate and delineate wetland areas would require a much more focused assessment. This is due primarily to the surficial geology of the area, which is characterized by glacial tills of varying permeability resulting in a highly unpredictable water table. This mix of permeable and non-permeable soils produces seep areas that are not easily denoted by vegetative changes or topography and therefore must be thoroughly ground-truthed. Additionally, complex topography and soils made the identification of surface flow extremely difficult.

Alternatively, the Northern Area, referred to as Study Area B, consists of a landscape in which the vegetation communities and topography reflects the change between wetlands and uplands. Additionally, the presence and location of watercourses is consistent with local topography.

For these reasons, all data collected in the Southern Area is presented in this reconnaissance report as a planning-level assessment to aid in the development of a preferred transit alternative or other development activities within the area. The Northern Area is included in this report, although resulting maps are to the standard of a PWD. The reason the Northern Area mapping

could be completed to the PWD standard is because it lacked the complex nature that is characteristic of the Southern Area, therefore the representative field sample points along with vegetation changes visible on aerial photographs and topography changes present on Geographical Information Systems (GIS) data enabled accurate mapping.

1.2 Project Location

The Project Area is located northwest of Palmer, Alaska, within the Hatcher Pass area. The proposed Northern Area lies south of Willow-Fishhook Road and west of Palmer-Fishhook (Hatcher Pass) Road, and the proposed Southern Area lies north of East Edgerton Parks Road and west of Palmer-Fishhook (Hatcher Pass) Road (Figure 1, Appendix A). The Project Area includes portions of Sections 2-5, 8-11, 14-22, and 26-30 of T19N, R1E, Seward Meridian (United States Geological Survey [USGS] Quadrangle Anchorage C6, C7, and D7 1:63,360 Scale).

1.3 Study Area

The 4,260-acre study area is located in the Talkeetna Mountain foothills and is divided into two distinct areas: the 2,917-acre Southern Area comprises Study Area A, and the 1,343-acre Northern Area comprises Study Area B. Both study areas are west of the public use area located along the Little Susitna River. The Southern Area is south of Government Peak and the Northern Area is located east of Bald Mountain Ridge and north of the Southern Area and Government Peak.

- Study Area A is moderately sloped, although sample points covered areas with a maximum of 10% slope. The general surficial geology within Study Area A consists of sections of loess mantle on glacial till plains and hills, ash-influenced loess overlying gravelly outwash, loamy and sandy alluvium overlying sand and gravel alluvium. Surface drainage in Study Area A flows from the north to the southeast toward the Little Susitna River.

- Study Area B is moderately sloped with average grades between 10 to 15% and some steep mountain slopes. The upper portion of the alpine area is dominated by hummocks. The general surficial geology within Study Area B consists of sections of rocky outcroppings, cold spodosols, ash-influenced loess overlying glacial till, loess and

stratified loamy alluvium over sand, and gravel perched on low stream terraces. Surface drainage in Study Area B consists of steep, fast-flowing streams that flow southeast toward the Little Susitna River.

2.0 METHODS

DOWL HKM conducted a WRR in accordance with Part IV, Section D, Subsection 3, of the *Corps of Engineers Wetlands Delineation Manual* (USACE, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region* (Version 2.0) (USACE, September 2007). This effort included preliminary data gathering and analysis, a field investigation, post-field data review, and mapping utilizing GIS tools. This WRR was completed entirely by DOWL HKM personnel who have completed USACE wetlands delineation training course(s).

2.1 Existing Data for Project Area

Preliminary data gathering referenced the following as potential information sources and provided a basis for synthesizing of data for this report.

- Aerial Photography: High-resolution color aerial photographs of the Project Area (2007)
- Natural Resources Conservation Service Matanuska-Susitna Soil Survey (2000)
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Maps: Anchorage C-7 and D-7
- USGS Quadrangle Maps: Anchorage C-7 and D-7
- Alaska Department of Fish and Game (ADF&G) Fish Distribution Database (ADF&G, 2008)
- The MSB's hydrologic GIS layer (MSB, 2001)
- USFWS Inventory of Fish Distribution (USFWS, 2007)
- McClintock Land Associates, Inc: 2007 Two-foot Contour Elevation Data

2.2 Wetlands Assessment

2.2.1 Preliminary Mapping and Classification

Information gathered from the preliminary data review and synthesis was used to develop an initial sampling plan for the field investigation. An aerial photograph contact print (2007) was studied to classify and map potential habitat types within the study area.

2.2.2 Field Methods

On July 29 and 31, August 4 and 12, and October 3, 2008, teams of two wetlands scientists from DOWL HKM conducted a field investigation of Study Areas A and B The preliminary maps were reviewed to assess the accuracy of mapping and to identify changes that needed to be made in wetlands and plant community boundary delineations. The wetlands area was divided into sampling areas based on the vegetation communities observed on the aerial photographs. For each vegetation community observed, sampling points were chosen based on the total area of that community in relation to other communities. Larger tracts of a particular plant community received more data points than smaller communities, ensuring accurate mapping information. Photographs were taken at each sampling site to document the vegetation (Appendix B). A full sampling site list with sampling type, study area location, and all the classifications is provided at the beginning of Appendix B.

Field delineation of wetlands were performed according to the three-parameter approach using vegetative, pedologic, and hydrologic characteristics, as described in the USACE Wetlands Delineation Manuals (USACE, 1987; USACE, 2007). For the wetlands delineation, a USACE routine wetlands delineation data sheet was completed to document observed vegetation, soil, and hydrology characteristics at each sample site (Appendix B). Percent aerial cover for each species was estimated, and the type of vegetation stratum (tree, shrub, and herb layers) for each species was recorded.

Hydrophytic vegetation was identified through a Prevalence Index and/or the Dominance Test, as defined by the 2007 *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Alaska Region*. The Prevalence Index was applied in communities with moderate aerial cover for several species, or where one stratum contains much less plant cover than another stratum. The Dominance Test was applied in communities where a few plant species were more abundant than the other species in the community.

The taxonomic nomenclature for each recorded plant species followed Hultén (1968). The indicator status of each recorded plant species was noted from the *National List of Plant Species That Occur in Wetlands: Alaska (Region A)* (Reed, 1988).

The following references were used to assist with the field identification of dominant plant species:

- *Alaskan Wildflowers* (Pratt, 1989)
- *Flora of Alaska and Neighboring Territories: A Manual of the Vascular Plants* (Hultén, 1968)
- *Plants of the Pacific Northwest Cost* (Pojar and MacKinnon, 1994)
- *Wetland Sedges of Alaska* (Tande and Lipkin, 2003)
- *Willows of Southcentral Alaska* (Collet, 2004)

At each sampling site where standing water or complete saturation of the ground was not observed, a soil pit was excavated to a depth of at least 20 inches to determine soil saturation and to describe soil characteristics. Soil color was determined using Munsell Soil Color Charts (2000). Photographs were taken at each sampling site to document vegetation and soil profiles (where applicable).

Photographic sample points were taken to document site conditions and confirm the dominant plant species as well as to extrapolate data to similar habitat areas.

At the end of each field day, the data sheets were reviewed for completeness, collected plant samples were identified and noted, and boundaries were preliminarily mapped.

2.2.2.1 Wetlands Classification

Wetland areas were classified to the class level, according to the system guidelines outlined in the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979). Hydrologic modifiers were added to each wetlands class.

Wetland habitats were determined by evaluating landscape position, (e.g., upland, lowland, riparian), plant community structure cohesion, and characteristics that form habitat functional units.

All flowing Waters of the United States (U.S.) were classified according to the same guidelines.

2.2.2.2 Stream Mapping - Study Area A

Because Study Area A contained a large amount of drainages and streams that required mapping and evaluation from multiple sources of information (as listed in Section 2.1), a specialized method using GIS tools and two-foot contour lines was employed.

Using the two-foot contour lines as the base data, Spatial Analyst (a GIS tool that provides spatial modeling and analysis features) was used to interpolate probable stream routes. A series of maps were created using a range of factors to weigh the analysis. The model chosen was based on its calibration with what was observed in the field. Next, Study Area A was traversed from east to west, and when a stream was encountered, a Global Positioning System point, notes, and pictures were taken. The traverse was not a true transect, as the route varied in the north/south movement. A stream was defined as a drainage feature with water flowing for at least part of the year and a defined bed, bank, and channel.

The streams that were modeled using Spatial Analyst were then compared with streams mapped in the field. Using the 2-foot contour line, the modeled data was corrected. The modeling showed many streams that began and ended within a 100-foot length; so, although it showed the relative position of the streams in terms of the larger study area, the actual location of the branches was manually corrected by the wetland scientists who did the field delineation. The final stream mapping was therefore a result of the Spatial Analyst modeling, the use of contour lines with aerial maps, and ground-truthing.

Next, to determine stream type (intermittent versus perennial), a cross-sectional surface area was calculated for each observed water body. Intermittent streams contain water for only part of the year, and perennial streams contain water year-round (Cowardin et al., 1979). Using pictures/contour data and notes, a width/depth was approximated for each stream. For purposes of this report, and based on our field delineation, an area of 1 square foot or more represents a perennial stream, while an area of less than 1 square foot represents an intermittent stream.

Comparison with existing mapping is described further in Sections 3.2.2 and 4.1.

2.2.3 Functions and Values Assessment

Wetland functions are self-sustaining properties of a wetlands ecosystem that exist in the absence of society. Functions result from both biotic and abiotic components of specific wetlands and include all processes necessary for the self-maintenance of the wetlands ecosystem, such as primary production and nutrient cycling. Functions relate to the ecological significance of wetland properties without regard to subjective human values. Wetland values are benefits to society that derive from one or more wetland functions. The value of a particular wetlands function is based on human use or human judgment of the worth, merit, quality, or importance attributed to those functions (USACE, 1999).

The functional importance of wetlands at each site was recorded on data sheets using criteria outlined in the State of Washington Department of Transportation's (WDOT) *Wetland Functions Characterization Tool for Linear Projects* (WDOT, 2000). The relative importance of 10 processes or attributes that encompass hydrological, water quality, ecological, and social functions was evaluated for each wetlands type. Wetland habitats were then ranked into categories of low, medium, and high importance. The rankings were based on comparisons among assessment areas within the overall study area. Additionally, any evidence of animal activity (i.e., animal dens, birds' nest, animal tracks, droppings/scat) was recorded.

Riverine habitats were not assessed under this method, as streams perform vastly different functions than wetlands.

For a more thorough explanation of the criteria used to evaluate wetlands for their functions and values, see Appendix C.

2.3 Vegetation Classification

Plant communities were mapped and classified using Level III of the Alaska Vegetation Classification System (Viereck et al., 1972), which is a hierarchical system based on dominant growth forms (tree, shrub, or herb), canopy height and closure, general soil moisture and salinity, and dominant plants.

2.4 Habitat Assessment

Classification to Level III of the Viereck system provides the detail necessary to characterize the plant communities for the purpose of assessing the wildlife habitat in the study area. Determination and classification of habitat types were made based on vegetation classifications, landscape position (e.g., upland, lowland, riparian), plant community structure cohesion, and characteristics that form habitat functional units.

During the field investigation, evidence of animal activity (e.g., animal dens, bird nests, animal tracks, and droppings/scat) and species observed in the field was correlated with the information from the office-based research. Wildlife values that were considered in this assessment include foraging habitats, nesting or denning areas, escape cover from predators, and seasonal food sources.

2.5 Final Mapping

Using ArcMap GIS, a georeferenced aerial photograph from 2007 was used as a base map to digitally map wetlands and vegetation community boundaries and to calculate areas.

It should be noted that since the mapping of streams and drainages was based on a relatively small number of observations along their length within the study area, Cowardin classifications for the Riverine system were inferred for those parts of the streams not directly observed in the field. Changes in flow regime and bottom type do occur as streams flow through varying soil types and slope; however it would be impossible to delineate such changes without a full survey of each stream from one end of the study area to the other.

Final mapping was performed at DOWL HKM's Anchorage office based on aerial photograph interpretation, site photographs, and field observations. Three maps were produced and are appended to this report:

- Wetlands and Other Waters of the U.S. by Cowardin classification,
- Vegetation types described by the Alaska Vegetation Classification System, and
- Wetlands and Uplands by habitat type.

3.0 RESULTS

3.1 Study Area Results

The study area encompasses approximately 4,260 acres. For both study areas, wetlands comprise approximately 22.6 acres (0.5%), and uplands comprise 4,217 acres (99%). In both study areas, Waters of the U.S. comprised approximately 20.4 acres (0.5%). Table 1 presents all habitats and their associated acreage and sampling points, with the exception of developed/disturbed areas and trails.

Due to the large extent of the mapping effort, the study area was divided into 16 sections. Figure 2 serves as a reference map for the entire study area. Figures 3a through 3p show wetland types, 4a through 4p show habitat types, and 5a through 5p show vegetation types (Appendix A).

Table 1: Wetlands, Other Waters of the United States, and Non-Jurisdictional Uplands by Acreage

Habitat Acres		Associated Sample Points	Associated Photo Points
Wetlands			
Forest	6.46	69	
Sphagnum Bog	6.09	13, 14, 68	
Willow Thicket	3.69	56, 81	
Pond	1.32		
Herb Meadow	5.08	52, 55, 57, 59, 80	
Other Waters of the U.S.			
Intermittent Streams	4.57		2, 9, 11, 12, 16-19, 22-24, 32, 33, 36, 40, 41, 43, 44, 46, 47, 49, 58, 60-62, 64, 67, 78, 79, 90, 92, 93, 96, 97
Perennial Streams	6.33		1, 5, 8, 25-27, 29, 31, 34, 39, 48, 50, 63, 65, 66, 91, 94
Perennial Stream-Anadromous	9.47		42, 45, 95, 98
Non-Jurisdictional Uplands			
Forest	1,815.33	10, 15, 20, 21, 35, 70, 73	30, 37, 38,71
Thicket	72.13	3, 7	74
Willow Thicket	241.81	82, 83	88
*Forest Herb Meadow**	908.57		
Alder Thicket	362.30	72	
Dry Tundra	49.61		
*Herb Meadow**	699.12	6, 7, 28, 51, 53, 54, 76, 77, 86, 89	4, 84, 85, 87
Developed/Trails	67.87		

**Italicized habitat types are mosaics.*

The study area has dominant communities of thickets, herb meadows, and forests. The interspersion between these three is very high and is difficult to distinguish from the aerial, resulting in many mapping classifications as a mosaic of two or more habitat and vegetation types. Because the mapping from fieldwork resulted in mosaic communities, individual sample points' habitat and vegetation types will not necessarily match the mapping. For instance, Point 21 is a forest habitat with a Viereck classification of "Fmo." It is mapped as "forest herb meadow" and Fmo/Hfm.

Study Area A - General Description

Study Area A is dominated by forested areas with incised watercourses in the lower elevation areas. In the higher elevation areas where the slopes are steeper, the vegetation is dominated by highly interspersed areas of herb meadows and shrub thickets. The herb meadows are primarily composed of cow parsnip and various wildflowers, whereas the shrub thickets are a combination of thin-leaf alder (*Alnus tenuifolia*), red elderberry (*Sambucus racemosa*), and devilsclub (*Oplopanax horridus*). Vegetation in the entire study area is incredibly dense. Only the forested areas with "closed mixed canopy" designations had a relatively clear understory. For the most part, the streams and drainages that flow through Study Area A are deeply incised and are not associated with wetlands. Bear scat and moose droppings were frequently observed in every habitat in Study Area A, and bedding areas and game trails were common.

Study Area B - General Description

Study Area B is dominated by two distinct areas: upper elevation herb meadows and lower elevation slopes dominated by alder. Shrub thickets in the alpine areas are composed of dwarf ericaceous shrubs and low willows and are highly interspersed with forbs. The alder areas have some open patches dominated by forbs; but for the most part, the alders dominated and are tall with a lower percentage of herb understory species. A moose was observed in the alder thickets and numerous game trails and droppings from mountain goats, bear, and moose were encountered.

3.2 Habitat Types

For a full description of all Cowardin and Viereck classifications used, reference Table 2. All wetlands and their respective Cowardin and Viereck codes, and overall rating for functions and values have been cross-referenced in Table 3.

Table 2: Vegetation and Wetland Types Found Within the Study Area

Wetlands Classification (Cowardin)	Description
POW	Palustrine, open water
PFO4B	Palustrine, forested, needle-leaved evergreen, saturated
PEM1C	Palustrine, emergent, persistent, seasonally flooded
PSS1B	Palustrine, scrub-shrub, broad-leaved deciduous, saturated
PSS1C	Palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded
R2UB3	Riverine, lower perennial, unconsolidated bottom, mud
R3UB1	Riverine, upper perennial, unconsolidated bottom, cobble-gravel
R3UB2	Riverine, upper perennial, unconsolidated bottom, sand
R3RB2	Riverine, upper perennial, rock bottom, rubble
R4RB1	Riverine, intermittent, rock bottom, bedrock
R4RB2	Riverine, intermittent, rock bottom, rubble
R4UB1	Riverine, intermittent, unconsolidated bottom, cobble-gravel
R4UB2	Riverine, intermittent, unconsolidated bottom, sand
R4UB3	Riverine, intermittent, unconsolidated bottom, mud
R5UB1	Riverine, unknown perennial, unconsolidated bottom, cobble-gravel
R5UB2	Riverine, unknown perennial, unconsolidated bottom, sand
R5UB3	Riverine, unknown perennial, unconsolidated bottom, mud
Vegetation Classification (Viereck Code)	**Description**
Fbo	Forested, broadleaf, open
Fbc	Forested, broadleaf, closed
Fmo	Forested, mixed, open
Fmc	Forested, mixed, closed
Fnw	Forested, needleleaf, woodland
Slo	Shrub, low, open
Slc	Shrub, low, closed
Sto	Shrub, tall, open
Stc	Shrub, tall, closed
Sdw	Shrub, dwarf, willow
Hfw	Herb, forb
Hfm	Herb, forb
Hgm	Herb, graminoid, mesic
Hgw	Herb, graminoid, wet
W	Water

The evaluation of each habitat's function and values are described in Appendix C.

Table 3: Wetlands, Other Waters of the United States, and Non-Jurisdictional Uplands with Cowardin and Viereck Classifications and Functions/Value

Habitat Cowardin		Viereck	Functions/Value
Wetlands			
Forested Wetlands	PFO4B	Fnw, Fmc	Low
Pond	POW	W	High
Sphagnum Bog	PSS1B, PSS1C, PEM1C	Hgw, Sto	High
Willow Thicket	PSS/EM1C	Sdw	Moderate
Herb Meadow	PEM1C, PSS1C	Hfw, Hgm, Hfm	Moderate
Other Waters of the U.S.			
Intermittent Streams	R4RB2, R4UB(1,2,3)	W	High
Perennial Streams	R3RB2, R3UB(1,2,3) R5UB(1,2)	W	High
Perennial Stream-Anadromous	R3RB2, R3UB1, R5UB2	W	High
Non-Jurisdictional Uplands			
Forest	Upland	Fbo, Fbc, Fmo, Fmc, Fnw, Hfm	N/A
Thicket	Upland	Stc	N/A
Willow Thicket	Upland	Sto, Slc	N/A
Herb Meadow	Upland	Hfm/Slc; Hfm/Slo; Hfd	N/A
Alder Thicket	Upland	Stc	N/A
Dry Tundra	Upland	Bb	N/A

3.2.1 Wetlands

Although a total of five wetland habitats, representing six Cowardin classifications, were documented in the study area, the overall percentage of wetlands was small, comprising just 0.5% of the total study area. Forested wetlands are the most common type of wetlands, comprising approximately 29% of the wetlands in the study area.

3.2.1.1 Herb Meadow Wetlands

The herb meadow habitat type is dominated by bluejoint (*Calamagrostis canadensis*), Canadian burnet (*Sanguisorba canadensis*), arctic sweet coltsfoot (*Petasites frigidus*), Enander's sedge (*Carex enanderi*), American false hellebore (*Veratrum viride*), and star false Solomon's-seal *(Smilacina stellata*).

Several sample sites within the herb meadow habitat were classified by Viereck as being dominated by shrubs, although the shrub layers had a smaller total percentage of cover than the herb layers. Viereck classifications are limiting in describing these herb meadows as they are

biased toward shrub layers because the key only allows a description of the area as herb if shrub cover is 25% or less. In many cases, the total cover for shrubs was greater than 30%, yet the overall structure of the community was herb.

The herb meadow habitat type had saturated soils ranging from 0 to 10 inches below ground surface (bgs) and silt, silty loam, silty gravelly sand, or gravelly sand with Munsell colors of 10 YR 3/2 or 7.5 2.5/1 from 6 to 20 inches bgs. Soil could not be sampled below 9 to 12 inches in some sample areas because of hard packed rock, gravel, or cobbles. At Site 57 there was a hydrogen sulfide smell while sampling the soils. Wetlands hydrology indicators included surface water and saturation.

3.2.1.2 Forested Wetlands

Forested wetlands were observed in just one area in Study Area A (Point 69). This area was mapped as forested wetlands by the NWI maps; however, the extent of wetlands mapped by NWI is larger than what was found during the ground-truthing. Forested wetlands area was dominated by black spruce (*Picea mariana*) and bluejoint. Soils were characterized by a histic epipedon and saturation was observed at the surface. Water seeped into the soil pit 10 inches below the surface.

3.2.1.3 Willow Thicket

The willow thicket wetland areas are dominated by diamondleaf willow (*Salix planifolia*), Enander's sedge, bluejoint, and Canadian burnet. The soils encountered in Sample Location 81 consisted of saturated organic material from 0 to 8 inches bgs and gravelly sand with a Munsell color of 2.5Y 5/2 from 8 to 10 inches bgs; at 10 inches bgs, hard-packed rock was encountered that could not be excavated. Flowing surface water and soil saturation were encountered at Site 56, so soils were not taken; a hydric situation is assumed. Wetland indicators, such as saturation, were present in both sample locations.

Both locations of this type of wetlands were small and sloped. Point 81 was taken in an area between a seepage, from a break in the slope, and a watercourse. Point 56 was taken at the base of a small bench, where water perches and flows near the surface before branching into two distinct watercourses.

3.2.1.4 Sphagnum Bog

Sphagnum bog is dominated by thinleaf alder, marsh cinquefoil (*Potentilla palustris*), bluejoint, water sedge (*Carex aquatilis*), and northern grass of Parnassus (*Parnassia palustris*). The soils encountered in Sample Location 13 consisted of saturated organics from 0 to 10 inches bgs; below 10 inches could not be excavated because the pit was collapsing and filling with water. Hydric soil is assumed to be present due to the surface water and soil saturation. Wetlands hydrology indicators observed at both sites were surface water, high water table, and saturation.

3.2.1.5 Pond

Pond Habitat is an area consisting of open water with dense vegetation surrounding it. It appears that some of the ponded areas along the stream may have been made by beavers. The ponded areas are not contained in a channel and are less than 20 acres and have a depth of less than 2 meters at low water, therefore are considered to be wetlands.

3.2.2 Other Waters of the United States

Habitats identified in this report as Other Waters of the U.S. are flowing water bodies per Code of Federal Regulations 33 CFR Part 328 Definition of Waters of the U.S. Habitats within this section have a Cowardin classification of a riverine system which includes all wetlands and deepwater habitats contained within a channel with two exceptions: wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and habitats with water containing ocean derived salts in excess of 0.5% (Cowardin, et al., 1979). In the Viereck classification system, all streams are considered to be open water.

Riverine habitats were not assessed by a method designed for wetlands and are assumed to have an inherently high value within the study area. Although the location of streams described in this section were mapped based on field data and GIS data interpolation (explained in Section 2.2.2.2), the ADF&G anadromous streams dataset was consulted to classify streams for an accurate assessment of streams for their habitat type. A more thorough discussion of this comparison is in Section 4.1.

3.2.2.1 Intermittent Streams

Intermittent streams are channels which contain flowing water for only part of the year. When the water is not flowing it may remain in isolated pools or surface water may be absent (Cowardin, et al., 1979). Approximately 25 intermittent stream segments were mapped within Study Area A and 12 stream segments within Study Area B.

3.2.2.2 Perennial Streams

Perennial streams are channels with water flowing throughout the year with a low to high gradient and a slow to fast flow velocity. The substrate varies but consists of sand, mud, gravel, cobbles, or rock. Approximately 15 perennial stream segments were mapped within Study Area A and 4 stream segments within Study Area B.

3.2.2.3 Perennial Streams - Anadromous

Perennial streams-anadromous have been identified by ADF&G as being anadromous because they contain anadromous fish that use the stream for spawning and/or rearing. These streams flow throughout the year with a low to high gradient and a slow to fast flow velocity. The substrate varies, but includes sand, mud, gravel, cobbles, or rock. Their only difference from perennial streams is that they are used for anadromous fish spawning and/or rearing. Five perennial streams-anadromous were mapped within Study Area A and none within Study Area B.

3.2.3 Uplands

Upland areas comprise 99% of the study area. Seven upland habitat types were documented in the study area. Forest is the most common upland type, comprising 43% of the uplands in the study area.

Additionally, developed/disturbed areas and trails were classified as uplands, but do not provide true habitat. Areas identified as “trails” in Study Area A were approximately 15 feet wide and were created and maintained primarily for Nordic skiing. Although soils are undisturbed, all vegetation has been cleared and is bare with the exception of small forbs and non-native grasses. For this reason, these two developed/disturbed areas are not discussed.

3.2.3.1 Herb Meadow

Herb meadow is dominated by fireweed (*Epilobium angustifolium*), spreading woodfern (*Dryopteris dilatata*), oakfern (*Gymnocarpium dryopteris*), Sitka valerian (*Valeriana sitchensis*), field horsetail (*Equisetum arvense*), subarctic ladyfern (*Athyrium felix-femina*), Canadian burnet, Alaska bellheather (*Harrimanella stelleriana*), bluejoint, and least willow (*Salix rotundifolia*).

Soils encountered at sample sites within this habitat consisted of rootwad or organic material ranging from 0 to 5 inches bgs and sandy loam or gravelly sand with a Munsell color of 10 YR 3/3, 10 YR 3/4, 10 YR 3/2, or 7.5 YR 2.5/1 from 4 to 18 inches bgs. Site 76 was a silty loam with a color of 2.5Y 3/2 from 6 to 20 inches bgs. The rest of the sites hit cobbles or hard packed rock ranging from 8 to 12 inches bgs. Soil was not sampled at Site 21 (in Figure 4I labeled FHM and Forest on Appendix B) because of inundation. However, soils were not saturated organics, but rather unconsolidated mineral material, and no evidence of long-term inundation was present. No hydrogen sulfide small was detected. Based additionally on two-foot contour data, it appears this is a small, localized, concave area that retains excess precipitation, but not on a yearly basis. Except for Sites 21 and 28, no wetlands hydrology was observed.

3.2.3.2 Forest

Forest is dominated by paper birch (*Betula papyrifera*), European red alder (*Sambucus racemosa*), thin leaf alder, black spruce, white spruce (*Picea glauca*), woodland horsetail, oakfern, mountain woodfern, Canada bunchberry (*Cornus canadensis*), bluejoint, fireweed, and devilsclub. Soils encountered at sample sites within this habitat consisted of rootwad or organic material ranging from 0 to 6 inches bgs and a silty loam, sandy clay loam, or sandy silt loam with a Munsell color of 10 YR 3/4, 10 YR 3/3, 5Y 4/2, 10 YR 3/2, or 10 YR 3/6. No wetlands hydrology indicators were observed within the forest habitat.

3.2.3.3 Forest Herb Meadow

The interspersion of forest and herb meadow is so high in some areas that they are mapped as a joint habitat. This is an artifact of mapping at a scale which prevents the distinction of areas which are largely dominated by herb meadow, but with a mosaic of forested areas interspersed throughout.

3.2.3.4 Willow Thicket

Willow thicket is dominated by diamond-leaf willow or grayleaf willow (*Salix glauca*), Canada bunchberry, Canada burnet, black crowberry (*Empetrum nigrum*), bog blueberry (*Vaccinium uliginosum*), American false hellebore, bluejoint, and fireweed. Willow thickets were found in Study Area B and are dominant in the transition area between alpine tundra and alder thicket.

Soils encountered at sites consisted of rootwad ranging from 0 to 4 inches bgs with a silty loam from 2 to 20 inches bgs with a Munsell color of 2.5 YR 5/1 or 10 YR 3/2. No wetlands hydrology indicators were observed in the willow thicket habitat. In Site 30 some surface water was observed but area vegetation was upland.

3.2.3.5 Alder Thicket

A large portion of Study Area B was composed of alder thicket that occurred mostly on moderately sloped, non-forested areas. It was sampled at Site 72, and aside from alder, the understory was devilsclub and subarctic ladyfern. Alder thicket soils were underlain by cobbles at a relatively shallow depth.

3.2.3.6 Thicket

Thicket is unique to Study Area A and is characterized by one or more of devilsclub, elderberry, and/or alder. Few herb species other than bluejoint and horsetail were observed. This habitat occurred under the forest habitat where drainages occurred as well as on the upper unforested slopes. It was sampled at Site 74 and was observed at many photo locations documenting intermittent streams.

3.2.3.7 Dry Tundra

Dry Tundra is unique to Study Area B and is characterized by steep mountain slope areas within the alpine bowl at higher elevations. These areas are bare of any vegetation, with the exception of small patches, which are assumed to be Dryas species.

4.0 DISCUSSION

4.1 Comparisons with Previous Mapping

NWI Mapping

Areas mapped as wetlands by NWI are generally consistent with mapping and observations contained in this report. The small wetlands identified by Sites 13 and 14 is mapped by NWI as PSS1/4B and is mapped in this report as two separate polygons (PSS1C and PEM1C). Additionally, NWI mapped this wetlands area to be somewhat larger than the wetland boundaries contained in this report.

Other areas mapped as wetlands by NWI are in the very south of Study Area A and are identified at Sites 68 and 69. These were mapped as "freshwater forested/shrub wetlands" by the NWI maps; however, the extent of wetlands mapped by NWI is larger than what fieldwork supported. The area described by Site 68 was mapped by NWI as PSS1B, and it is mapped in this report as PSS1C. The area described by Site 69 was mapped by NWI and this report as PFO4B.

The only area mapped as wetlands by NWI in Study Area B is located near Site 85, which suggests that this pond is permanent and not beaver-caused. Although Site 85 is showing the thick herb meadow common to the area, the pond can be seen in the picture.

Previous Stream Mapping

The final mapping in this report differs from stream locations identified by ADF&G, as shown in Figure 5. It should be noted that neither this report nor the ADF&G identify anadromous streams within Study Area B, so this discussion relates only to Study Area A.

Since both the ADF&G and MSB data is generated at a small scale, the purpose of both datasets is to give general visual reference to the attributes of particular water bodies and not to precisely map the locations of these streams. Therefore, the precision of these stream locations is coarser than streams mapped in this report. However, the larger streams identified in this report can be inferred to be anadromous based on proximity to ADF&G-mapped streams.

Although the ADF&G and USFWS maps describe the general extent of fish usage, a study is being prepared concurrently to the development of this report to ground-truth such extents. In the absence of this data, any stream in this report identified as anadromous was considered to be

anadromous throughout its entire reach within the study area. This was done not to assume fish extents, but rather to aid in a conservative analysis of stream habitat type.

4.2 Effects of Precipitation

Hatcher Pass was more saturated than usual according to precipitation records that were reviewed for each date of fieldwork performed. Data collected from a weather station located approximately 6 miles southeast of Hatcher Pass on Amberwood off Farm Loop Road reported 3.38 inches fell in July, and as of August 12 an additional 1.10 inches has fallen. The average rainfall in July is 2.06 inches.

Additionally, heavy rainfall occurred during every field day; this affected the characteristics of the area's drainage system, including the appearance of active intermittent streams that would have otherwise not been flowing, areas of standing water, and inundated trail segments from adjacent streams. Trail segments that conducted water were marked as Waters of the U.S., as channelization appeared to be the result of water and not from single-track bicycles or foot traffic (see Site 11). While this distinction is hard to produce, other evidence from the surrounding area was used to make this decision.

4.3 Hydrologic Analysis

All wetlands identified in this report have a clear and direct surface-water connection to the Little Susitna River, which is a "traditionally navigable water" as defined by the USACE. Therefore, DOWL HKM expects that no "significant nexus analysis" is necessary.

5.0 REFERENCES

ADF&G. 2008. Fish Distribution Database. Reviewed on August 13, 2008. Available at http://gis.sf.adfg.state.ak.us/AWC_IMS/viewer.htm.

Aerial Photographs. 2007. High-resolution color aerial photographs of Hatcher Pass, Alaska.

Collet, D.M. 2004. *Willows of Southcentral Alaska*. Kenai Watershed Forum.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* FWS/OBS-79/31. U.S. Department of Interior, Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

Hultén, E. 1968. *Flora of Alaska and Neighboring Territories: A Manual of the Vascular Plants*. Stanford University Press, Stanford, CA.

MSB. 2001. *DNR Hydrological Features* (as lines). January 2001. Available from MSB GIS website: ww1.matsugov.us.

Munsell Soil Color Charts. 2000. *Revised Edition*. Kollmorgen Instruments Corporation, Baltimore, MD.

Pojar, J. and A. MacKinnon (eds.). 1994. *Plants of the Pacific Northwest Coast.* Lone Pine Publishing. Vancouver, BC.

Pratt, V.E. 1989. *Alaskan Wildflowers.* Alaskakrafts Publishing, Anchorage, AK.

Reed, P.B. 1988. *National List of Plant Species That Occur In Wetlands: Alaska (Region A).* U.S. Department of Interior, Fish and Wildlife Service, Washington D.C.

Tande, G., and R. Lipkin. 2003. *Wetland Sedges of Alaska*. University of Alaska Anchorage, Environment and Natural Resources Institute, Alaska Natural Heritage Program, Anchorage AK.

USACE. 1987. Environmental Laboratory. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, USACE, Waterways Experiment Station, Vicksburg, MS.

USACE. 1999. *The Highway Methodology Workbook Supplement: Wetland Functions and Values; A Descriptive Approach*. NAEEP-360-1-30a. USACE, New England District.

USACE. 2007. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0).*

USFWS. 2007. *Inventory of Fish Distribution in Matanuska-Susitna Basin Streams, Southcentral Alaska, 2007*. Alaska Fisheries Data Series Number 2008-15.

WDOT. 2000. *Wetland Functions Characterization Tool for Linear Projects*.