Appendix E: Vegetation and Wetlands

PART 1 of 3

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KATLIAN BAY ROAD

Plant Biological Evaluation Report

11 September 2015

Prepared for:
Alaska Department of Transportation
& Public Facilities
6860 Glacier Highway
Juneau, AK 99801-7999

Agreement No. 02543017
AKSAS No. 67672

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BIOLOGICAL EVALUATION FOR SENSITIVE PLANTS

Katlian Bay Road Project

Sitka Ranger District
Tongass National Forest

SIGNATURES

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BIOLOGICAL EVALUATION FOR SENSITIVE PLANTS

Katlian Bay Road Project
Alaska State Project No. 67672

Sitka Ranger District
Tongass National Forest

INTRODUCTION

This biological evaluation (BE) is written in support of an environmental assessment for the Katlian Bay Road (Proposed Action). United States Forest Service (USFS) policy requires that a review of programs and activities, through an effects analysis, be conducted to determine their potential impact on threatened and endangered species, species proposed for listing, and USFS Regional Forester–designated sensitive species. The purpose of this document is to present the analysis and determination of effects of the Proposed Action on federally listed species (endangered, threatened, and proposed) and USFS sensitive plant species (FSM 2670.31-2670.32). The Proposed Action is an Alaska State Department of Transportation funded project No. 67672. Part of the Proposed Action would traverse USFS-managed lands (Tongass National Forest) as described below.

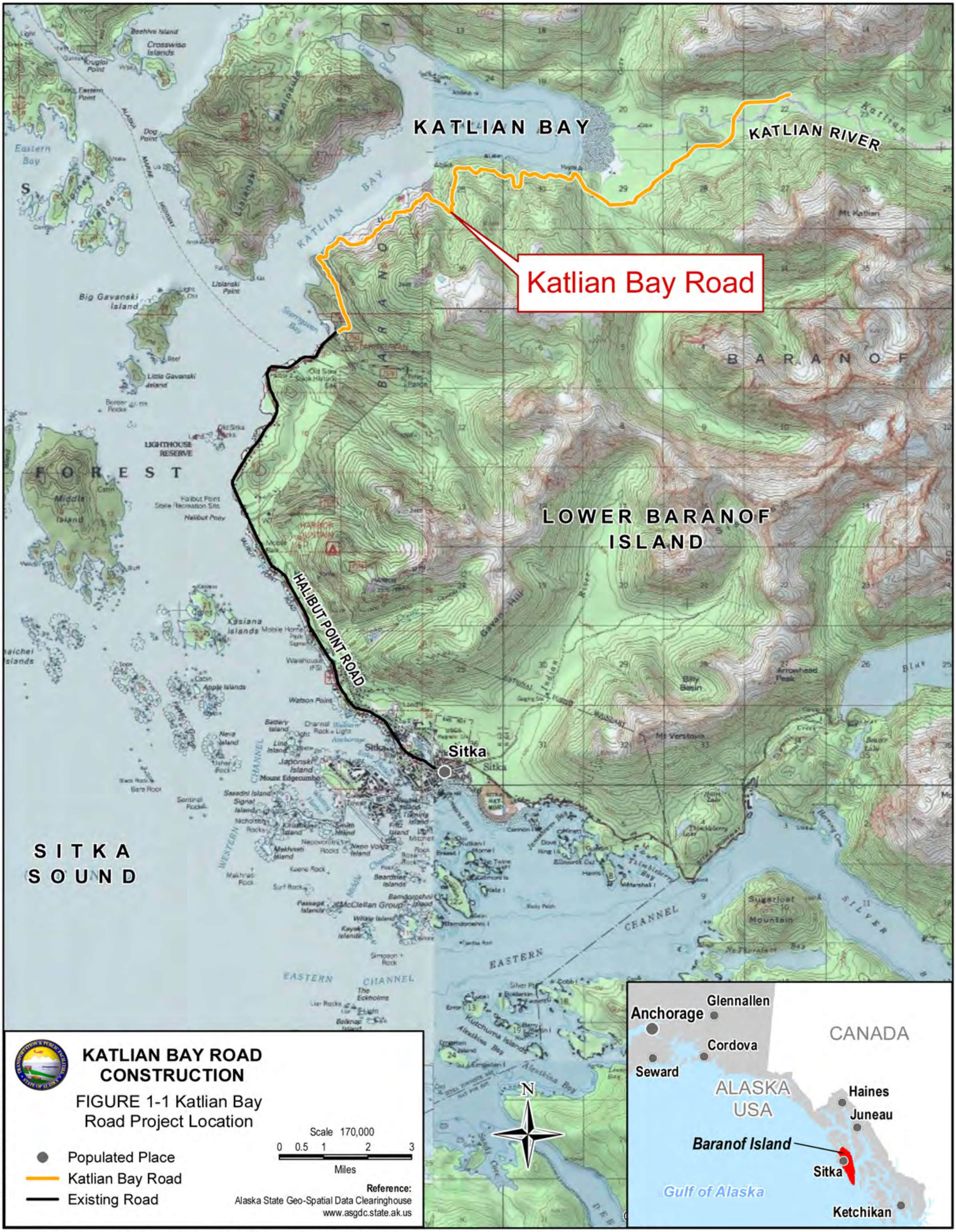
The analysis and document for threatened and endangered species and species proposed for listing are referred to as a biological assessment. No federally listed or proposed plant species are known or suspected to occur in the Alaska Region; therefore, there will be no further discussion of federally listed or proposed plants in this document.

For sensitive plant species, the analysis and document are referred to as a biological evaluation (BE) (FSM 2670.3). Preparation of a BE as part of the National Environmental Protection Act (NEPA) process ensures that sensitive plant species receive full consideration in the decision-making process.

Several sensitive plant species are known to occur on this National Forest, but none were recorded during the survey for sensitive plant species in late-June of 2015.

PROJECT DESCRIPTION

The Proposed Action is to construct a new 8.8-mile-long, unpaved, single-lane road located north of Sitka, Alaska (Figure 1), which would connect Halibut Point Road to USFS Road No. 75797. There would be 3 bridge crossings and 0.6 miles of off-highway vehicle (OHV) trail. A parking lot would be constructed at the termination of the Proposed Action about 2 miles northeast of the eastern end of Katlian Bay. The road would cross Alaska State, Tongass National Forest, and Shee Atiká, Incorporated (Shee Atika)-owned lands. Construction access would include use of an existing log transfer facility, two existing roads (USFS Road No. 7579 and No. 75797) (Figure 1), and construction of a bridge over Coxe River. The log transfer facility and existing roads are located on Shee Atika property. Construction of the Proposed Action would begin in 2018 over 2 construction seasons.



KATLIAN BAY ROAD CONSTRUCTION

FIGURE 1-1 Katlian Bay Road Project Location

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The Proposed Action would provide direct road access to USFS trails from the existing Halibut Point Road. This would provide users with additional recreational and subsistence opportunities in the Sitka Ranger District of Tongass National Forest. The new road would also provide access to Shee Atika's Native Corporation lands and Mental Health Trust lands that could be developed in the future.

Action Area

This survey for sensitive plant species was conducted within the portion of Tongass National Forest that would be crossed by the right of way easement for the Proposed Action. This area has a USFS land use designation of Semi-Remote Recreation, which is to provide predominantly natural or natural-appearing settings for semi-primitive types of recreation and tourism and/or occasional enclaves of concentrated recreation and tourism facilities (USFS 1997). The area is also within a watershed designated by U.S. Geological Survey (USGS 2004) as Katlian Bay–Frontal Sitka Sound. The Proposed Action would enter Tongass National Forest at milepost (MP) 1.27 and end at MP 3.64 for a total of 2.37 miles.

The 2.37-mile-long action area comprises the geographic extent of the direct and indirect environmental changes that would result from construction and operation of the Proposed Action. The action area should not be confused with the project itself, which is delineated by the right of way easement along the entire 8.8 miles of proposed new road. Direct environmental changes would occur within the right of way easement because it would lead to loss of native habitat and associated plants. Indirect changes would result from the creation and maintenance of anthropogenic edges in the forest alongside the project footprint. Edges created by road construction indirectly affect the environment because edges can alter light and dust levels, air and soil moisture and temperature, hydrology, wind speed, and disturbance regimes. This ultimately leads to changes in plant community composition. While there is no absolute rule of thumb regarding precisely how far an edge effect penetrates into a forest, edge effect on cool north-facing slopes adjacent to trees is less severe and penetrates a shorter distance than those edges with a hot south-facing slope adjacent to an open habitat (Chen et al. 1995; Gehlahausen et al. 2000; Gignac and Dale 2007). Chen et al. (1995) found that the maximum depth of an edge's influence was about five tree heights. The dominate tree in the action area is western hemlock (*Tsuga heterophylla*), which grows to a maximum height of 164 feet (Farrar 1999). This results in a maximum depth of an edge's influence at 820 feet. The action area is defined as the right of way easement within Tongass National Forest MP 1.27 and MP 3.64 plus an 820-foot buffer on either side.

The tree canopy in the action area is dominated by Sitka spruce (*Picea sitchensis*) and western hemlock with the occasional Alaska-cedar (*Callitropsis nootkatensis*). Much of the action area is old-growth forest, although second growth forest is also present. The shrub layer is dominated by false azalea (*Menziesia ferruginea*), oval-leaf blueberry (*Vaccinium ovalifolium*), Alaska blueberry (*Vaccinium alaskanse*), thimbleberry (*Rubus parviflorus*), and salmonberry (*Rubus spectabilis*), while the herb layer generally comprises spreading woodfern (*Dryopteris expansa*), twisted-stalk (*Streptopus amplexifolius* and *S. roseus*.), and threeleaf foamflower (*Tiarella trifoliata*). The bryophyte layer is dominated by gooseneck moss (*Rhytidiadelphus loreus*), splendid feather moss (*Hylocomium splendens*), and yellow-ladle liverwort (*Scapania bolanderi*). Primary forests are open with widely spaced mature trees and a sparse shrub layer. The second-growth forests have a dense shrub layer comprising western hemlock and ericaceous shrubs. Compared with wetlands and riparian ecosystems, species diversity in upland forested ecosystems is relatively low.

SENSITIVE PLANTS

As of November 2013, 19 vascular plants and 1 lichen have sensitive species designation in the Alaska Region (M. Stensvold pers. comm., USFS regional biologist; Appendix A). Table 1 provides sensitive plant species known or suspected to occur within the Sitka Ranger District of Tongass National Forest.

Table 1: Sensitive Plant Species Known or Suspected to Occur on the Sitka Ranger District of Tongass National Forest.

Scientific Name	Common Name	Known or Expected to Occur within the Sitka Ranger District
Botrychium spathulatum	Spatulate moonwort	known
Botrychium tunux	Moosewort fern	known
Botrychium yaaxudakeit	Yakutat moonwort	suspected
Ligusticum calderi	Calder's loveage	suspected
Lobaria amplissima	Large lungwort lichen	known
Piperia unalascensis	Alaska rein orchid	known
Polystichum kruckebergii	Kruckeberg's swordfern	known
Romanzoffia unalaschcensis	Unalaska mist-maiden	known
Sidalcea hendersonii	Henderson's checkermallow	suspected
Tanacetum bipinnatum ssp. *huronense*	Dune tansy	known

PRE-FIELD REVIEW OF EXISTING INFORMATION

A pre-field review of the potential sensitive plants that may occur in the action area was conducted prior to the field survey. The phytogeography and habitat requirements for the 10 sensitive plant species known or suspected to occur in the Sitka Ranger District of Tongass National Forest (Table 1) was determined by synthesizing information from the following sources:

- Consortium of Pacific Northwest Herbaria (CPWNH), label data available at http://www.pnwherbaria.org/index.php
- Consortium of North American Lichen Herbaria (CNALN), label data available at http://lichenportal.org/portal/index.php
- Global Biodiversity Information Facility (GBif), label data available at http://www.gbif.org/
- University of Alaska Herbarium (ALA), label data available at http://arctos.database.museum/SpecimenSearch.cfm
- University of British Columbia Herbarium (UBC), label data available at http://www.biodiversity.ubc.ca/museum/herbarium/database.html

- Flora of North America (Flora of North America, eds., 1993+)
- Illustrated Flora of British Columbia (Flora of British Columbia, eds., 1998+)
- Hultén (1968)
- Calder and Taylor (1968)
- Carlson and Cortes-Burns (2013)
- Farrar (2005)
- Nawrocki et al. (2013)
- Ogilvie and Roemer (1984)
- Wagner (1993)
- Consultation with the USFS regional botanist Dr. Mary Stensvold.

No sensitive plant species are known to occur within the action area. However, Unalaska mist-maiden was collected nearby, about 6 miles east of Sitka in an open area of an old spruce/hemlock forest in 1982 (*Stensvold s.n.*).

Habitat within the action area was assessed using aerial imagery, geological maps, and vegetation cover maps in ArcGis v.10.2. The action area occurs on undivided Cretaceous sedimentary and volcanic rocks. Habitats include coniferous forest, coastal fringe forest edges, rocky outcrops, intertidal rock outcrops, cliffs, rocky areas, gravel, seeps, riparian areas, and stream banks. Based on the geology, available habitat, and phytogeography, three sensitive plant species have the potential to occur in the action area (Table 1). However, only two of these species are likely to occur in the right of way easement.

Digital aerial maps and electronic versions of USFS Region 10 Threatened, Endangered, and Sensitive Species Plant Survey and Element Occurrence forms were prepared in advance of the field survey. A guide to the sensitive and rare plants that could be potentially present in the action area was prepared prior to field work.

The sensitive plant species listed below are suspected to occur in the action area since it contains appropriate habitat and is within the known or suspected range of these species.

PLANTS SUSPECTED

-Large lungwort lichen (*Lobaria amplissima* [Scope.] Forss.)
No common name for this lichen is generally recognized, but the species epithet "*amplissima*" is Latin for "large" and members of the genus *Lobaria* are widely called lungworts. Large lungwort lichen occurs in Europe and North America and is uncommon throughout its range. It has a global ranking of Globally Not Rare and has an Alaskan S-Rank of S1S3 (S1=critically imperiled; S3=special concern, vulnerable to extirpation or extinction). In Alaska, it occurs on the trunks of dead or living Sitka spruce, red alder (*Alnus rubra*), and willows (*Salix* sp.) on the edges of coastal forests. Although this habitat does occur in the action area, this lichen was not observed during the survey.

Recent phylogenetic analysis has revealed that the lungworts form six well-supported groups, and each group corresponds to a diagnostic suite of morpho-chemical and ecological features. This means that recognizing six genera instead of one better represents the phylogenetic, morphological, and ecological diversity of the group. Large lungwort lichen resolves to a group whose members have a plane lobe surface and a uniform lower tomentum not forming veins or holes. Members of this group correspond to the previously well-delimited but not widely recognized genus *Ricasolia*. As a result, *L. amplissima* was recognized as *Ricasolia amplissima* (Scop.) De Not. in the most recent treatment of the group (Moncada et al. 2013).

Lichens have a “double nature” because they normally comprise two partners, a fungus and a photosynthetic symbiont (Schwendener 1869; Jørgensen 1998). However, a particular fungus may form an exclusive relationship with one photosynthetic partner or another. As a result, the same fungus can develop into morphologically dissimilar organisms depending on the photosynthetic symbiont it forms a partnership with. Such is the case for large lungwort lichen. Depending on what photosynthetic algae the fungus forms an association with, the same fungus can become *Lobaria amplissima* or *Dendriscocaulon umhausense* (Dughi 1936; Jørgensen 1998).

- Alaska rein orchid (*Piperia unalascensis* [Sprengel] Rydbert)

This orchid (Orchidaceae) is the only member of its genus in the Alaskan flora. It is morphologically similar to members of the genus *Platanthera*, in which this species was placed by Hultén (1968). *Piperia* spp. have 1-veined sepals and basal leaves that are withering at flowering while *Platanthera* spp. have 3-veined sepals and stem and basal leaves remaining green at flowering.

Alaska rein orchid is widely distributed from the Aleutian Islands down the western North American cordillera to the border of Mexico. In Alaska, this orchid is known from dry to moist open sites, alder/willow thickets, and sometimes ultramafic or calcareous outcrops. It has a global ranking of G5 (demonstrably widespread, abundant, and secure) and an Alaskan S-Rank of S3 (special concern, vulnerable to extirpation or extinction). Marginal habitat for this orchid occurs in the action area. This plant was not observed during the survey for sensitive plant species.

The orchid life cycle is inseparably tied to mycorrhizal fungi. Orchid seeds are among the smallest produced by flowering plants (Stoutamire 1964) and cannot germinate and develop in the wild without the appropriate mycorrhizal fungi (Rasmussen 1995). Most seeds are shed within a few yards of the maternal plant and large deposits of seeds accumulate on the soil surface over time. After the seed is inoculated by mycorrhizae, it develops into a seedling (technically called a protocorm). The protocorm may live for several years underground, and during this time it usually obtains all of its nourishment from mycorrhizal fungi. A mycorrhizal associate of *P. unalascensis* is *Ceratorhiza* sp. (Zelmer et al. 1996). Under proper conditions, the seedling sends up photosynthetic shoots and leaves, which thereafter produce most of the nourishment for the plant. However, the mycorrhizal relationship may or may not persist after this time. As long as conditions are favorable for both seed germination and the mycorrhizal associate, new orchid seedlings should become established (Burgeff 1954). However, the survivorship rates of these seedlings and their ability to mature into photosynthesizing adult plants that set viable seed are dependent upon multiple variables, including the health of the pollinator’s population.

- Unalaska mist-maiden (*Romanzoffia unalaschcensis* Cham.)
This perennial herbaceous member of the Waterleaf family (Hydrophyllaceae) can easily be mistaken for a saxifrage because the two taxa share a similar overall habit. However, upon closer inspection, the flowers are not saxifrage-like but have an inferior ovary and a campanulate corolla. It is an Alaskan endemic, with a global range confined to the eastern Aleutians, the Alaska Peninsula, and Kodiak. This species occurs near steam sides, waterfalls, moist rocky outcrops, and open forests. A nearby collection was made about 6 miles east of Sitka in an open area of an old spruce/hemlock forest in 1982 (*Stensvold s.n*.). It has a global ranking of G3 (vulnerable to extirpation or extinction) and an Alaskan S-Rank of S3S4 (S3= special concern, vulnerable to extirpation or extinction; S4=apparently secure). Habitat for this plant occurs in the action area but the species was not observed during the sensitive plant survey.

FIELD SURVEY FOR SENSITIVE PLANTS

A modified intuitive controlled survey was conducted within the right of way easement of the project (see Appendix B for definitions of plant survey types). Figure 1 indicates the exact route that the botanist travelled on the ground and will be incorporated into the USFS Natural Resource Manager Threatened, Endangered, and Sensitive Plants survey layer by the end of November 2015. Due to steep terrain, however, the GPS lost satellite reception between MP 1.29 and MP 1.50. The approximated route over this portion of the project is depicted in Figure 2. The survey was floristic in nature and documented all vascular plants using an electronic version of the USFS Region 10 Threatened, Endangered, and Sensitive Plant Survey form.

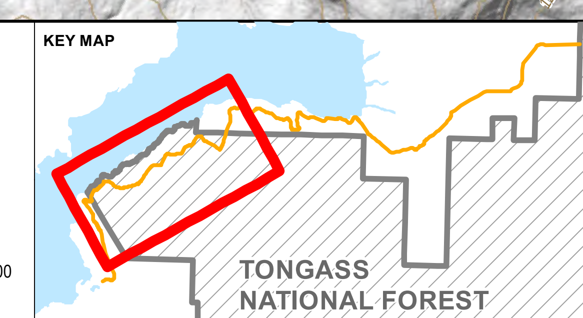
Dates of survey: 16 June to 18 June 2015
Project surveyed by: Dr. Christopher Sears, Vegetation Ecologist at Amec Foster Wheeler

All potentially occurring sensitive plant species can be identified during this time of year and Dr. Sears is qualified to conduct such surveys.

FIGURE 2
KATLIAN BAY ROAD CONSTRUCTION
Biological Assessment - Sensitive Plant Transect

- Watercourse
- Land Status
- Quarter Mile Marker
- Preferred Route
- Right of Way
- GPS Tracks (Field visit June 2015)
- Approximated Tracks (Field visit June 2015)
- Sensitive Plant Action Area (820ft buffer off of ROW)

Scale: 1:9,000 — 0 250 500 1000 Feet



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DETERMINATION OF EFFECTS

No sensitive plant species were located within areas likely to be affected by project activities. However, a risk assessment (as described below) is warranted because an undetected population of a sensitive plant species may be directly or indirectly affected by the Proposed Action.

Direct/Indirect Effects

This section determines if the Proposed Action is expected to directly or indirectly affect or threaten the three sensitive plant species evaluated in this BE. Direct effects would occur immediately or soon after implementation of a project (Dillman et al. 2009). Since only Alaska rein orchid and Unalaska mist-maiden have the potential to occur in the right of way easement, only those species would be directly affected by the Proposed Action. Large lungwort lichen does not potentially occur in the right of way easement. Populations of undetected Alaska rein orchid and Unalaska mist-maiden in the right of way easement would be lost in part or in whole by mechanical removal or burial during construction. This would also lead to habitat loss.

Indirect effects are defined as those effects that are likely to occur at a point of time after a project has been implemented (Dillman et al. 2009). In this case, indirect effects would largely result from edge effects, which were described above in the Project Description section. Because the action area is defined as the maximum extent to which an edge effect can reasonably be expected to penetrate into the surrounding landscape, edge effect would ultimately result in changes to the composition of plant communities within the action area. These effects include an increase in cover in the shrub layer near the edges of the project and the possible introduction of invasive plant species. The project would result in increased recreational access, and other new activities, which could lead to in the destruction of sensitive plant species populations and their habitat through trampling.

Cumulative Effects

Under NEPA, a cumulative effect is defined as an impact on the environment that results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (50 CFR 1508.7).

From an anthropogenic standpoint, historic logging has had the most significant impact on the current distribution, number, and density of plant populations in the action area. There is no current active logging in the action area and its land use designation of Semi-Remote Recreation does not allow for future timber harvest. Because the action area occurs on steep, rugged terrain, current anthropogenic environmental impacts are negligible. In 2014, a trail was blazed along the centerline of the project, which mechanically removed plants from the herb, shrub, and tree layers. Direct effects of road, culvert, and bridge construction would result in habitat loss, and edge effect may alter plant community composition up to 820 feet from the edge of the Proposed Action.

Risk Assessment for Sensitive Plants

Determination of risks to populations of sensitive plant species takes into account size, density, vigor, habitat requirements, potential location of populations, and consequence of adverse effects on the species as a whole within its range and within the National Forest (USFS 2011). A risk assessment considers two factors:

- Factor 1: The consequence of adverse (or beneficial) effects on the population
- Factor 2: The likelihood or probability that these effects would occur (USFS 2011).

The consequences of adverse impacts to each of the three sensitive plant species addressed in this BE are summarized below. The ratings for the risk assessment are defined in Appendix C (USFS 2011).

-Large lungwort lichen

The consequences of adverse impacts to large lungwort lichen due to project activities are low because the potential habitat for this lichen—ocean fringe forests—occurs at the very edge of the action area. There would be no direct effects to this lichen due to project activities because its habitat does not occur in the right of way easement. The severity of edge effect on a population of this lichen would be low. The likelihood of an adverse effect is low because the suitable habitat for this lichen is at the edge of the limits of a potential edge effect. Even if a population was being adversely impacted by the Proposed Action, Gilbert (1991) demonstrated that populations of this species can be effectively transplanted from one tree to another.

-Alaska rein orchid

The consequences of adverse impacts to a population of Alaska rein orchid is moderate because its habitat occurs within the right of way easement and construction activities could directly remove undetected populations. The Proposed Action would indirectly affect the short- and long-term viability of populations (if present) outside of the right of way easement because of potential negative impacts to their mycorrhizal associates and pollinators. The likelihood of adverse effects from project activities to an Alaska rein orchid population is moderate because the indirect detrimental effects to the orchid's pollinators and mycorrhizal associate may not be possible to quantify.

-Unalaska mist-maiden

The consequences of adverse impacts to an undetected population of Unalaska mist-maiden is moderate because the Proposed Action would directly remove habitat that may support undetected populations from the right of way easement (if present), and changes to downstream hydrology may affect the short- and long-term viability of populations outside of the right of way easement, if present. The likelihood of adverse effects from project activities is low because maintaining good water flow from the upstream to the downstream side of the project is required for geotechnical and erosion control reasons.

Determination

Based on the rationale described above, the Proposed Action would likely result in the following impacts on the three sensitive plant species evaluated in this BE.

-Large lungwort lichen: no impact
-Alaska rein orchid: may adversely impact individuals, but not likely to result in a loss of viability in the watershed, nor cause a trend toward federal listing.
-Unalaska mist-maiden: may adversely impact individuals, but not likely to result in a loss of viability in the watershed, nor cause a trend toward federal listing.

Additional Management Recommendations

A guide to the sensitive plant species addressed in this BE should be prepared and issued to all construction workers. If any populations of sensitive plants are encountered at any time prior to or during implementation of the Proposed Action, the populations should be protected and avoided. The district or forest botanist/ecologist should be notified immediately to evaluate the population and recommend avoidance or mitigation measures.

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Appendix A. Alaska Region Sensitive Plants as of November 2013 (Stensvold pers. comm. 2015)

Common Name	**Scientific Name**	**Occurrence[1]**	
		Chugach National Forest	**Tongass National Forest**
Vascular Plant			
Alaska rein orchid	*Piperia unalascensis*	S	K
Calder's loveage	*Ligusticum calderi*	S	K
Dune tansy	*Tanacetum bipinnatum* subsp. *huronense*	S	K
Edible thistle	*Cirsium edule* var. *macounii*		K
Eschscholtz's little nightmare	*Aphragmus eschscholtzianus*	K	S
Henderson's checkermallow	*Sidalcea hendersonii*		K
Kruckeberg's swordfern	*Polystichum kruckebergii*		K
Large yellow lady's slipper	*Cypripedium parviflorum* var. *pubescens*	S	K
Lesser round-leaved orchid	*Platanthera orbiculata*		K
Moosewort fern	*Botrychium tunux*	S	K
Mountain lady's slipper	*Cypripedium montanum*	S	K
Pale poppy	*Papaver alboroseum*	K	S
Sessileleaf scurvygrass	*Cochlearia sessilifolia*	S	
Spatulate moonwort fern	*Botrychium spathulatum*	S	K
Spotted lady's slipper	*Cypripedium guttatum*	K	
Unalaska mist-maiden	*Romanzoffia unalaschcensis*	K	K
Yakutat moonwort	*Botrychium yaaxudakeit*	S	K
Lichen			
Large lungwort lichen	*Lobaria amplissima*	S	k

[1] K=document occurrence; S=suspected; blank = not known or suspected to occur

Appendix B. Survey Types (USFS 2011).

Survey type	Description
Field Check	The survey area is given a quick “once over” but the surveyor does not walk completely through the action area. The entire area is not examined.
Cursory	A cursory survey is appropriately used to confirm the presence of species of interest identified in previous surveys or in the pre-field analysis. By its nature, the cursory survey is rapid and does not provide in-depth environmental information. The entire area is traversed at least once. For example, stand condition as seen in aerial photography can be verified by a cursory survey. Also, a cursory survey can be used to determine if a plant population that had been previously documented at a site remains present or intact.
General	The survey area is given a closer review by walking through the area and its perimeter or by walking more than once through the area. Most of the area is examined
Focused (Intuitive Controlled)	The focused, or intuitive controlled, survey is the most commonly used and most efficient method of surveying for threatened, endangered, and sensitive (TES) plants. During pre-field analysis, potential suitable habitat is identified for each species of interest and the survey effort is focused in those areas. This method requires adequate knowledge of suitable habitat to accurately select the areas of focused searching. When conducting intuitive controlled surveys, an area somewhat larger than the identified suitable habitat should be searched to validate current suitable habitat definitions.
Random	Random surveys employ an undirected, typically non-linear, traverse through an action area. These surveys are employed either when there is inadequate natural history information about a species to discern its suitable habitat and the surveyor is simply searching for occurrences or when a target species is very abundant within a search area and the surveyor is attempting to make estimates of population parameters such as intra-patch variations in density or the occurrence of predation or herbivory. However, a stratified random survey may be more effective in these latter cases.
Stratified Random	This survey is most often used within known population areas of target species or when an area to be surveyed is of unknown habitat suitability and is relatively large. Stratified random surveys employ a series of randomly selected plots of equal size within an action area that are each thoroughly searched for target species. When conducting a stratified random survey, it is important to sample an adequate number of plots that are of sufficient size if statistical inference regarding the survey area is desired. (For a discussion of sample designs, see Elzinga *et al.* 1998.)
Systematic	Typically used in limited areas where the likelihood of occurrence of a target species may be evenly distributed throughout the survey area. Systematic surveys are often employed either within focused search areas (e.g., stratified random and intuitive controlled methods) or when a proposed project is likely to produce significant habitat alterations for species that are especially sensitive to the proposed activities.

References:

Elzinga, C.L., D. W. Salzer, J. W. Willoughby. 1998. Measuring and Monitoring Plant Populations, Bureau of Land Management. BLM Technical Reference 1730-1, Denver, Colorado.

Appendix C. Criteria for Risk Assessment (USFS 2011).

Factor 1. Consequence of Adverse Effect from a Particular Activity

LOW:	None, or questionable adverse effect on habitat or population. No cumulative effects expected.
MODERATE:	Possible adverse effects to habitat or to population. Cumulative effects possible.
HIGH:	Obvious adverse effects on habitat or population. Cumulative effects probable.

Factor 2. Likelihood of Adverse Effect from a Particular Activity

NONE:	Activity would not affect habitat or population (no further risk assessment needed).
LOW:	Activity controllable by seasonal or spatial restrictions and not likely to affect habitat or populations.
MODERATE:	Activity not completely controllable or intense administration of project needed to prevent adverse effects on habitat or population. Adverse effects may occur.
HIGH:	Activity not controllable and adverse effects on habitat or populations likely to occur

KATLIAN BAY ROAD PROJECT

Wetlands and Streams Delineation Report

23 January 2017

Prepared for:

Alaska Department of Transportation
& Public Facilities Southcoast Region
6860 Glacier Highway
Juneau, AK 99801-7999

Agreement No. 02543017
AKSAS No. Z676720000

Prepared by:

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11810 North Creek Parkway N.
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Under Contract to:

LEI Engineering & Surveying, LLC
310 K Street, Suite 200
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Katlian Bay Road Wetland Gravina Mill Road Reconstruction

Addendum 1 – January 23, 2017

Addendum 1 (its entirety provided as Appendix E) has been added to this report to include wetland surveys conducted by Bosworth Botanical Consulting (August 2016) within the Katlian Bay Road project area to determine if staging and waste areas and the temporary construction road at the Coxe River crossing may occur within or adjacent to wetlands. As a result of these surveys, some components of the project were moved so that wetlands could be avoided. Please see the mapbook (Appendix A) for the most recent road, waste, and staging area locations determined after August 2016. Wetland survey results from the Bosworth Technical Consulting wetland report have been added to this Wetland Delineation Report and associated figures.

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Executive Summary

The Alaska Department of Transportation and Public Facilities Southcoast Region proposes to construct a state-funded new road on Baranof Island in the vicinity of Katlian Bay in the City and Borough of Sitka, Alaska. The Katlian Bay Road Project would consist of approximately 8.8 miles of new single-lane road with turnouts, an aggregate-surface, and three bridge crossings. The road would begin at the northern terminus of Halibut Point Road, extending east along the south shoreline of Katlian Bay, across the Katlian River, and terminating approximately 2 miles east of the Katlian Bay estuary. An additional 0.6 miles of an existing logging road is planned for resurfacing as an off-highway vehicle trail. Amec Foster Wheeler Environment & Infrastructure, Inc. was subcontracted to delineate wetland and stream boundaries along for the proposed project.

This report describes the wetland and stream delineation methods used, documents data collected in the field, and provides an assessment of the value and functions of the delineated wetlands and streams. Field reconnaissance of wetland areas in the study area was conducted in September 2014 to aid in selecting the proposed alignment of the new road that avoided and minimized impacts to wetlands and streams. After the final alignment was selected, a complete wetlands delineation and functional assessment was completed in June 2015 to document wetland boundaries and functions in the study area. This report includes the results of the delineation and assessment process.

The proposed road is located within evergreen forest habitat above the shorelines of Starrigavan Bay and Katlian Bay, and it terminates at the north side of the Katlian River valley at an existing U.S. Forest Service National Forest System (NFS) Road No. 75797. The Katlian River valley includes three major river systems—South Katlian River, Sukka Héen, and Katlian River—and has extensive secondary growth red alder (*Alnus rubra*) stands as a result of previous logging in the early 1960s (USFS and Sitka Tribe 2003).

A total of 136 freshwater watercourses were identified in the study area. Most occur as shallow concentrated flows on steep slopes (i.e., draws, drainages, and washes) along the south side of Katlian Bay. Watercourses in the lowlands of Katlian valley include several large rivers and associated floodplains, side channels, and smaller tributaries.

Over 45 acres of wetlands were mapped within the vicinity of the road alignment. Twenty-five wetlands (identified in this report as W-1 through W-25) were delineated within the study area, totaling 8.71 acres, and additional wetlands were observed near staging and waste areas (Appendix E). Cowardin habitat classes mapped include PFO4A/B, PFO1A/B, PFO4/PEM1B, PFO4/PSS1B, and PUB3x. Wetlands in the study area abut perennial and seasonal Relatively Permanent Waters that drain to either Starrigavan Bay or Katlian Bay, both of which are part of Sitka Sound, a Traditional Navigable Water.

The majority of delineated wetlands in the study area provide a high to moderate level of hydrologic, biogeochemical, and wildlife habitat functions and are therefore considered Category I (high value) and Category II (moderate value) wetlands (USACE 2014). One Category III (low value) wetland was delineated. All wetlands and streams delineated in the study area are considered Waters of the United States and thus regulated by the U.S. Army Corps of Engineers under the Clean Water Act.

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Appendix A Wetlands and Streams Delineation Mapbook

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Appendix C Summary of Stream Characteristics and USACE Classifications

Appendix D Wetland Determination Data Forms

Appendix E Addendum Katlian Bay Road Bosworth Botanical Consulting

List of Acronyms

ADF&G	Alaska Department of Fish and Game
Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
CWA	Clean Water Act
DEC	Alaska Department of Environmental Conservation
DOT&PF	Alaska Department of Transportation and Public Facilities
EPA	United States Environmental Protection Agency
FAC	facultative
FACU	facultative upland
FACQ	facultative wetland
GIS	Geographical Information System
HGM	hydrogeomorphic
HTL	high tide line
HUC	Hydrologic Unit Code
LEI	LEI Engineering and Surveying, LLC
LTF	log transfer facility
MHW	mean high water
MP	milepost
MSL	mean sea level
NFS	National Forest System
NRCS	Natural Resources Conservation Service
OBL	obligate
OHV	off-highway vehicle
OHWM	ordinary high water mark
PEM	palustrine emergent
PEM1B	palustrine emergent persistent, saturated
PFO	palustrine forested
PFO1A	palustrine forested broad-leaved deciduous, temporarily flooded
PFO1B	palustrine forested broad-leaved deciduous, saturated
PFO4	palustrine forested needle-leaved evergreen
PFO4A	palustrine forested needle-leaved evergreen, temporarily flooded
PFO4B	palustrine, forested, needle-leaved evergreen, saturated
PSS	palustrine scrub-shrub
PSS1B	palustrine scrub-shrub broad leaved-deciduous, saturated
PUB3X	palustrine unconsolidated bottom, mud, excavated
RPW	Relatively Permanent Water
Shee Atiká	Shee Atiká Urban Corporation
TNW	Traditional Navigable Water

List of Acronyms (Continued)

UAS	University of Alaska Southeast
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WESPAK-SE	Wetland Ecosystems Services Protocol for Southeast Alaska

1 INTRODUCTION

The Alaska Department of Transportation and Public Facilities (DOT&PF) Southcoast Region proposes to construct a state-funded new road on Baranof Island in the vicinity of Katlian Bay and the Borough of Sitka, both of which are in the Borough of Sitka, Alaska (Figure 1-1). The Katlian Bay Road Project would consist of approximately 8.8 miles of new single-lane with turnouts, aggregate-surface road with three bridge crossings, beginning at the northern terminus of Halibut Point Road, extending east along the south shoreline of Katlian Bay, across the Katlian River, and terminating approximately 2 miles east of the Katlian Bay estuary at the boundary between Shee Atiká, Incorporated (Shee Atiká) and United States Forest Service (USFS) lands along an existing USFS National Forest System (NFS) Road No. 75797 (Figure 1-2). Approximately 0.6 miles of NFS Road No. 75797 is planned for resurfacing as an off-highway vehicle (OHV) trail from the terminus of the new road construction to the USFS property boundary.

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) was subcontracted by LEI Engineering & Surveying, LLC (LEI) to delineate wetland and stream boundaries along the proposed road alignment. Field reconnaissance of wetland areas in the study area was conducted in September 2014 to aid in selecting the proposed alignment of the new road. After the final alignment was selected that avoided and minimized impacts to wetlands, a complete wetlands delineation and functional assessment was completed in June 2015 to document wetland boundaries and functions in the study area. The wetlands and streams survey occurred within the proposed limits of disturbance (approximately 100 feet to either side of the proposed centerline), including waste disposal and staging areas, scenic overlooks, and a day use area planned at the end of the new road and beginning of the resurfacing of the OHV trail.

This report describes the wetland and stream delineation methods used, documents data collected in the field, and provides an assessment of the value and functions of the delineated wetlands in the study area. The information in this report is provided to support project permit applications to the United States Army Corps of Engineers (USACE), Alaska Department of Environmental Conservation (DEC), and Alaska Department of Fish and Game (ADF&G).

1.1 Project Description and Study Area Location

The Katlian Bay Road would traverse lands owned and/or managed by the State of Alaska, USFS (Tongass National Forest–Sitka Ranger District), Shee Atiká (surface lands), and Sealaska Corporation (subsurface rights). The project is located in Township 55 South, Range 63 East, Section 2 and 3; Township 54 South, Range 63 East, Sections 25, 26, 34, and 35; and Township 54 South, Range 64 East, Sections 21, 22, 28, 29, and 30.

The project includes 8.8 miles of new single-lane road from Halibut Point Road to the north side of the Katlian River valley and encompasses intervisible turnouts, right-of-way clearing for visibility and safety requirements, three scenic overlooks of Katlian Bay, and a day use area at the end of new road construction. The study area for this report includes 100 feet on either side of the road alignment as shown in Appendix A. Construction of the proposed road would include the installation of culverts including: 248 corrugated aluminum pipe (CAP) culverts ranging in diameter from 2 feet to 12 feet; 5 structural pipe arch culverts with spans ranging from 6 feet to 26 feet; 14 structural plate pipe arch culverts with spans ranging from 6 feet 8 inches to 19 feet 6 inches; and 3 bridges consisting of pre-engineered structures with spans of approximately 66, 120, and 150 feet.

Temporary construction access would include using the terminal end of Halibut Point Road near Starrigavan Bay, existing NFS Road No. 75797 within Shee Atiká lands, as well as the use of the USFS log transfer facility (LTF) along the northern shoreline of Katlian Bay and NFS Road No. 7579 up to the intersection with NFS Road No. 75797. Another temporary construction access point would be established along the southern shoreline of Katlian Bay, approximately 2,000 feet west of the mouth of Katlian valley. A new Coxe River bridge crossing on NFS Road No. 7579, and two in-kind replacements of existing log stringer bridges along NFS Road No. 75797, would be proposed as partial fulfillment of compensatory mitigation obligations for the project.

The Katlian Bay Road would cross primarily undeveloped, forested lands that have been previously harvested. Existing unmaintained NFS logging roads are located within Katlian River valley. The USFS timber harvest in the early 1960s resulted in the removal of approximately 120 million board feet of timber from about 3,270 acres in the lower Katlian River valley (USFS and Sitka Tribe 2003).

The project is located within three United States Geologic Survey (USGS)-delineated Hydrologic Unit Code (HUC) 12 watersheds: 1) Sitka Sound-Frontal Pacific Ocean (includes Starrigavan Creek), 2) Katlian Bay-Frontal Sitka Sound, and 3) Katlian River (USGS 2004) (Figure 1-3). A HUC 12 is a sub-watershed within a larger drainage basin (e.g., Sitka Sound). Major stream crossings and proposed bridges for the project are shown on Figure 1-4.

1.2 Wetland Regulatory Environment

The U.S. Environmental Protection Agency (EPA) and USACE regulate freshwater wetlands and other waters of the United States under Section 404 of the Clean Water Act (CWA). The 2006 Rapanos Supreme Court decision held that EPA and USACE maintain jurisdiction over Traditional Navigable Waters (TNW), wetlands adjacent to or abutting TNW, non-navigable tributaries of TNW that are Relatively Permanent Waters (RPW), and wetlands that abut such tributaries. For those wetlands associated with non-navigable tributaries that are not Relatively Permanent Waters (non-RPW), the agencies will assert jurisdiction where they are found to have a significant nexus to a TNW.

DEC asserts jurisdiction over wetlands in Alaska under Section 401 (Water Quality Certification) of the CWA. Section 401 provides states the legal authority to review an application or project that requires a federal permit that might result in a discharge into a water of the United States. A Certificate of Reasonable Assurance from the DEC must be acquired to conduct the regulated activity.

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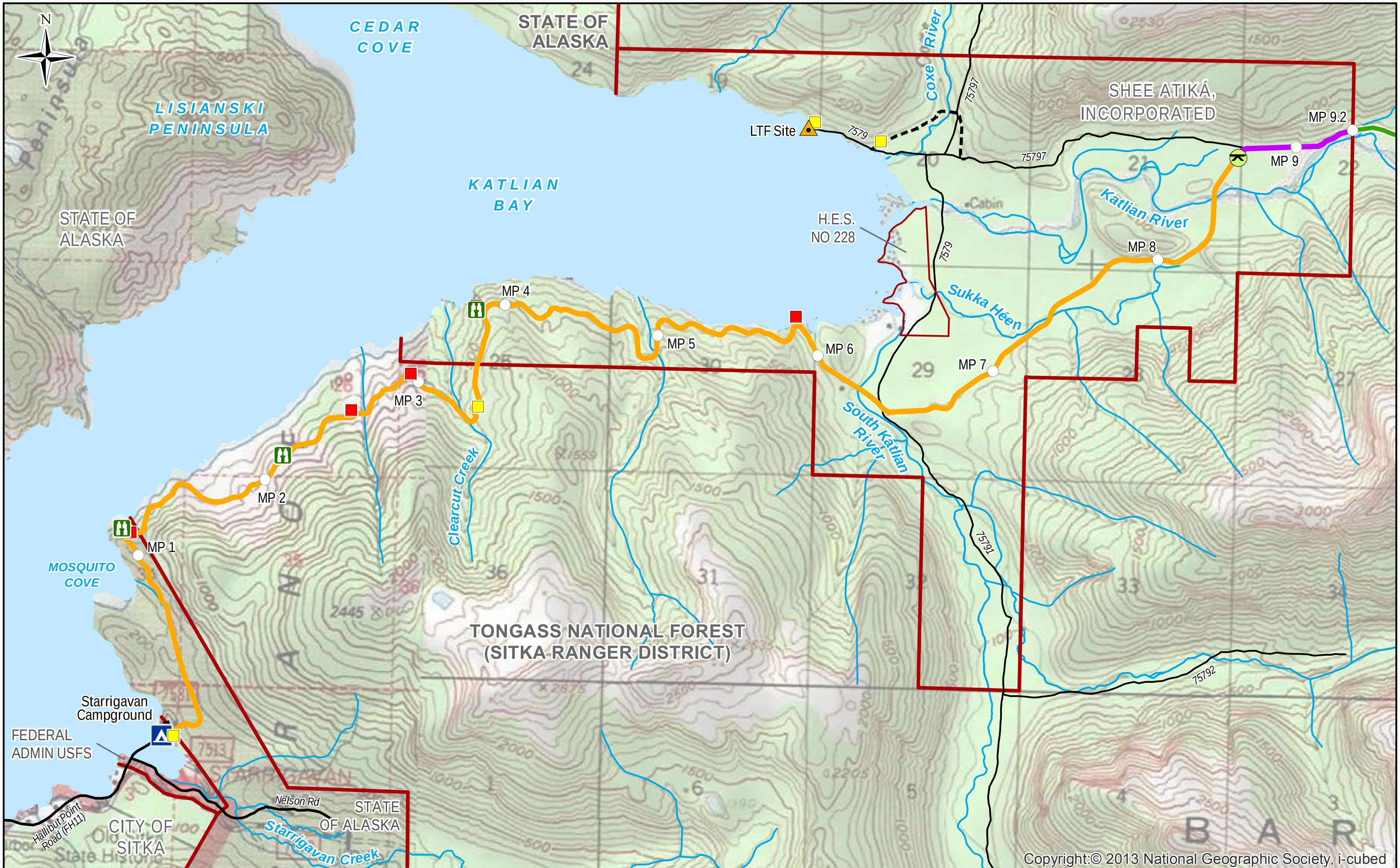

KATLIAN BAY ROAD CONSTRUCTION

FIGURE 1-2 Katlian Bay Road Alignment

- LTF Site
- Public Road
- National Forest System Road
- Stream
- Ownership Boundary
- USFS OHV Trail
- Viewpoint
- Day Use Area
- Staging Areas
- Waste Sites
- Milepost
- Alignment
- OHV Trail
- Access Road Revision

0 0.5 1
Miles Scale: 1:40,000

Reference:
Alaska State Geo-Spatial
Data Clearinghouse
www.asgdc.state.ak.us

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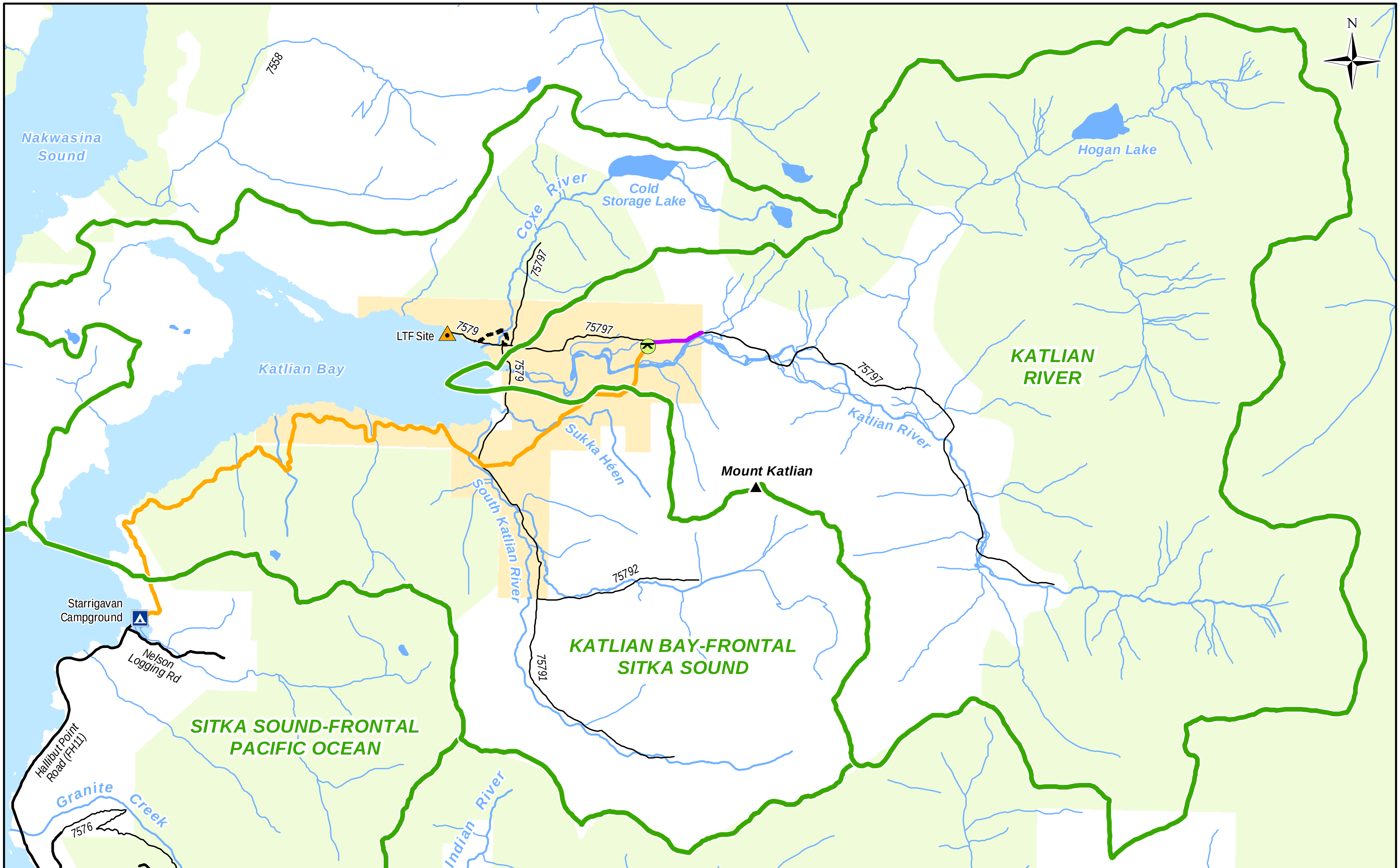

KATLIAN BAY ROAD CONSTRUCTION

FIGURE 1-3
Watersheds Crossed by Katlian Bay Road

- LTF Site
- Mountain Peak
- Public Road
- National Forest System Road
- Day Use Area
- Alignment
- OHV Trail
- Access Road Revision
- Tongass National Forest
- Shee Atiká Corporation
- Hydrologic Unit Code 12 Watershed Boundary

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Miles Scale: 1:85,000

Reference:
Alaska State
Geo-Spatial Data Clearinghouse
www.asgdc.state.ak.us

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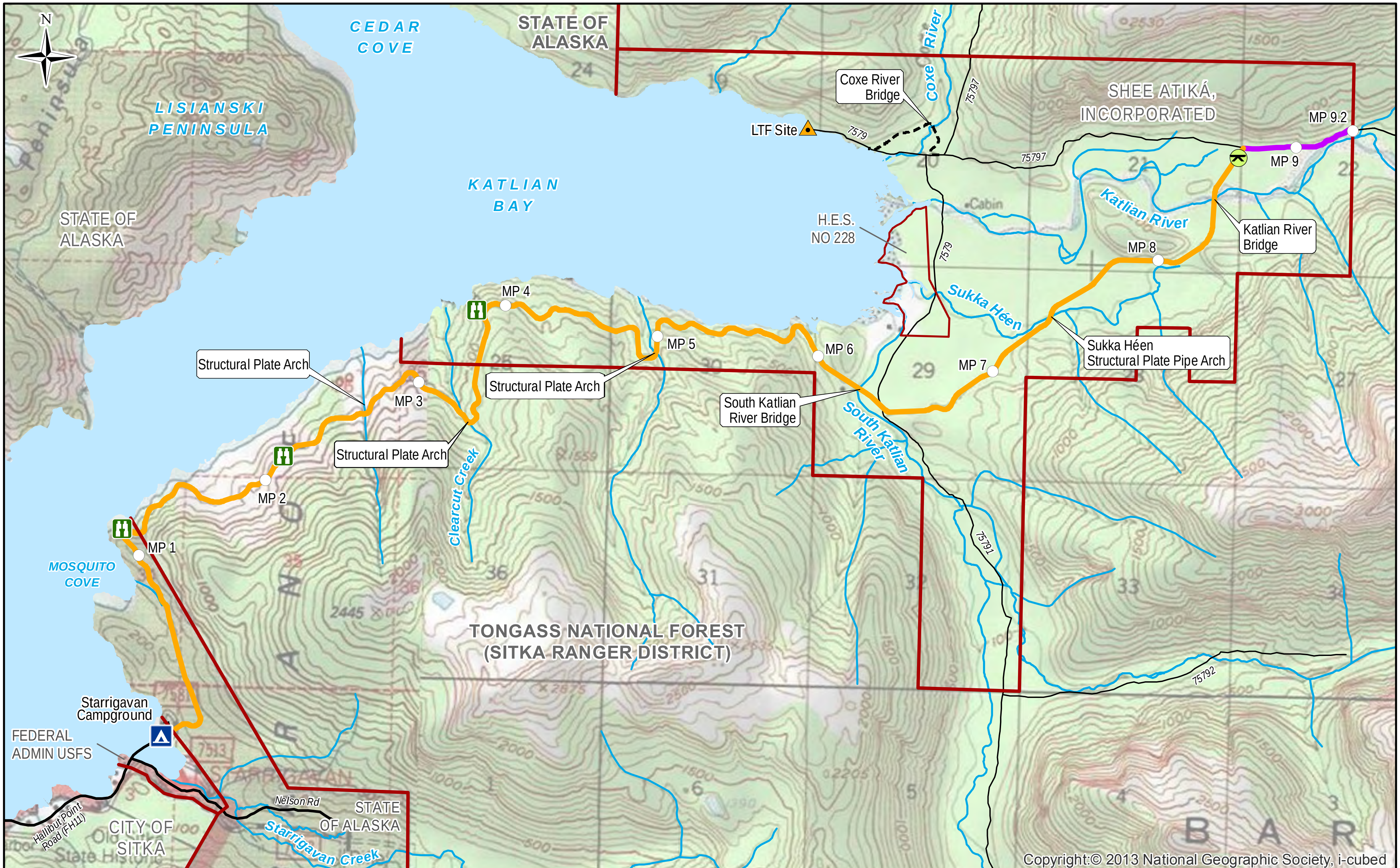

KATLIAN BAY ROAD CONSTRUCTION

FIGURE 1-4 Bridges and Major Crossings for the Proposed Action

- LTF Site
- Public Road
- National Forest System Road
- Stream
- Ownership Boundary
- Viewpoint
- Day Use Area
- Milepost
- Alignment
- OHV Trail
- Access Road Revision

0 0.5 1
Miles Scale: 1:40,000

Reference:
Alaska State Geo-Spatial
Data Clearinghouse
www.asgdc.state.ak.us

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Navigable waters of the United States are regulated under Section 10 of the Rivers and Harbors Act. These are waters that are subject to the ebb and flow of the tide and/or are presently used, have been used in the past, or could be used to transport interstate or foreign commerce. Section 10 states that USACE jurisdiction in tidal waterways extends to the mean high water (MHW) line. The USACE also asserts jurisdiction over tidal waters of the United States under Section 404 of the Clean Water Act. Section 404 states that USACE jurisdiction in tidal waterways extends to the high tide line (HTL).

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2 METHODS

Biologists from Amec Foster Wheeler conducted field reconnaissance in September 2014 and completed the wetland and streams delineation in the field in June 2015. The field effort included identifying wetlands and streams (Waters of the United States), delineating wetland boundaries and ordinary high water mark (OHWM) on streams, and characterizing and assessing wetland functions. Prior to the field investigation, Amec Foster Wheeler biologists reviewed available published wetland and stream information for the local area.

Wetlands were classified according to the Cowardin classification system (Cowardin et al. 1979), and wetland functions and values were qualitatively assessed to determine wetland categories. The Wetland Ecosystems Services Protocol for Southeast Alaska (WESPAK-SE) (Adamus 2013) was used as a guide in assessing wetland functions and values.

2.1 Scope of Report

The wetland and stream surveys and delineations occurred within the Area of Potential Disturbance from Starrigavan Campground at the end of Halibut Road to NFS Road No. 75979 (approximately 100 feet to either side of the proposed centerline). Although most waste and staging areas are located in uplands, there area a few areas that will need field surveys in 2016 to locate the areas outside of wetlands. Some wetlands and streams were surveyed beyond the Area of Potential Disturbance to better understand the significance and contribution of wetlands affected by the proposed project.

Two of the three staging areas, one of the waste areas, and the two log deck areas were identified for use by the project after the field survey was completed. These areas were reviewed using available desktop information and best professional judgment based on knowledge of field conditions. These areas are identified as the staging area near the Starrigavan Campground at the beginning of the project, the temporary construction access and staging area near the intertidal zone at the southern shoreline of Katlian Bay near milepost (MP) 5.25 (Figure 1-2), the waste area between MP 3.75 and MP 4 (Appendix A, Figure A10), and the log deck areas near MP 6.25 (Appendix A, Figure A16) and MP 7.5 (Appendix A, Figure A19). A more detailed field review of these waste and staging areas and log deck areas will occur as the locations for these areas are refined prior to preparation of the permitting application and drawings for this project.

Construction access along NFS Road No. 7579 and 75797 includes the in-kind replacement of two log stringer bridges, and re-location and construction of the new Coxe River crossing and access road (NFS Road No. 7579). Field review of the flagged alignment was completed in June 2015. The re-location and construction of NFS Road No. 7579 west of Coxe River would impact four small hillside drainages. Once the proposed route is surveyed and can be represented accurately, an addendum that addresses this area will be provided.

2.2 Review of Available Published Information

Available site information was reviewed prior to the field effort to identify previously documented wetlands, streams, or other site characteristics (e.g., vegetation patterns, topography, soils, and water courses) that would indicate the presence of wetlands and streams within the study area. These maps are typically used as guidance and do not supersede conditions in the field.

As part of this effort, the following sources were reviewed:

- Soils map and hydric soil list from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) (NRCS 2015a)
- USGS Topographic Map, Sitka A-4 (USGS 1954) and Sitka A-5 (USGS 1975) quadrangles, Alaska
- Aerial photography (dated 11/23/06) from Google Maps (2015)
- National Wetlands Inventory (U.S. Fish and Wildlife Service [USFWS] 2015)
- WESPAK-SE (Wetlands) Module – Level 1 (University of Alaska Southeast [UAS] 2015).

Wetland habitats are common in Alaska, covering approximately 174 million acres (USACE 2007). In Southcentral, Southeast, and Aleutian regions, wetlands cover approximately 9 million acres, or 5 percent of Alaska's total wetland resource. Wetlands are more abundant in the southeastern lowlands and commonly occur on slopes due to abundant precipitation and shallow bedrock. Muskeg wetland habitats are common in the maritime climate of southeast Alaska (Viereck et al. 1992).

2.3 Wetlands – Field Investigation

Wetlands are defined as "those 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). Amec Foster Wheeler biologists delineated wetlands in accordance with the three-parameter approach described in 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 2007). The *Regional Supplement* provides detailed regional guidance on identifying and interpreting field indicators for wetland hydrology, soils, and vegetation.

In general, to qualify as a wetland, specific vegetation, soil features, and hydrologic characteristics must be present. Definitions and wetland indicators for each of these three parameters are presented in Table 2-1. Using the routine on-site determination method, if an area exhibits characteristics for all three wetland parameters, or normally would exhibit those characteristics, the area is considered to be a wetland. If an area does not exhibit all three wetland parameters, then it is not considered a wetland. Problem area wetland determination procedures were utilized in difficult situations where one of the three wetland indicators may be temporarily absent.

Table 2-1: Indicators of the Three Wetland Parameters

Parameter	Indicators
Wetland Vegetation	Dominant vegetation consists of wetland-adapted plant species, based on one or more of the following indicators: • Dominance Test: more than 50% of dominant vegetation is of facultative, facultative wetland, or obligate status as determined from the National List of Plant Species Occurring in Wetlands (Lichvar et al. 2014). • Prevalence Index: Prevalence index is 3.0 or less. The prevalence index is a weighted average that takes into account plant abundance and indicator status. • Plant morphological characteristics are evident.
Hydric Soils	A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding that persist long enough during the growing season to develop anaerobic conditions in the upper part of the soil. Hydric soils generally exhibit one or more of the following indicators: • Histosol (highly organic soil) • Histic epipedon (organic soil surface layer) • Sulfidic material (rotten-egg odor) • Aquic or peraquic moisture regime (saturation during the growing season); • Soil matrix colors that indicate a loss or movement of organic matter, iron, or manganese • The presence of redoximorphic features, which are locations within the soil structure of iron and manganese depositions and depletions • The presence of oxidized iron and manganese in specific abundance and distribution.
Wetland Hydrologic Conditions	Wetland hydrologic conditions, indicated by one or more of the following indicators: • Surface inundation visible on ground or aerial imagery; • Standing water or saturated soils at or above a depth of 12 inches • Surface water • High water table • Oxidized rhizospheres along living roots • Drift deposits • Water-stained or surface-scoured leaves • Wetland drainage patterns • Geomorphic position • Facultative-neutral test • Stunted or stressed plants.

Source: USACE 2007

To verify that the study area was thoroughly investigated for the presence or absence of wetlands and streams, the area was walked to examine vegetation, soil, and hydrologic conditions. When wetland areas were positively identified, their boundaries were delineated using the three-parameter approach by assessing the presence or absence of field indicators. If wetlands or watercourses extended beyond the study area, Amec Foster Wheeler biologists documented the direction of flow and estimated wetland extents on field maps.

Wetland determination data forms were completed at 66 data points to document wetland and upland conditions for wetland boundary determinations. Data point locations are shown on detailed wetland delineation maps provided in Appendix A. The completed wetland determination data forms are provided in Appendix D, and the data points are shown in Appendix A. Photographs of the study area are provided in Appendix B.

Wetland flag locations were field-surveyed by professional surveyors from LEI. Survey information was transferred to a Geographic Information System (GIS) for map production. Wetland Cowardin cover classes (Cowardin et al. 1979) were determined with the aid of aerial photography and field data.

2.3.1 Vegetation

Vegetation communities were recorded in the field throughout the study area. Representative vegetation communities were documented at the 66 data point locations. For each data point, three strata were inventoried—trees within a 30-foot radius, shrubs within a 15-foot radius, and non-woody herbaceous plants (including forbs, grasses, sedges, and rushes) within a 5-foot radius of the data point.

Plant species in each stratum were identified and the percent cover for each species was recorded on a wetland determination data form. Each species was identified and listed following the scientific nomenclature given in the USDA PLANTS database (NRCS 2015b). The wetland indicator status for each species was assigned using the 2014 National Wetland Plant List (Lichvar et al. 2014). The definitions for the indicator status are presented in Table 2-2.

Table 2-2: Definitions of Indicator Status

Indicator Symbol	Definition
OBL	*Obligate*. Species that almost always occur in wetlands (estimated probability greater than 99%) under natural conditions.
FACW	*Facultative wetland*. Species that usually occur in wetlands (estimated probability 67 percent to 99 percent), but occasionally are found in uplands.
FAC	*Facultative*. Species that are equally likely to occur in wetlands or uplands (estimated probability 34 percent to 66 percent).
FACU	*Facultative upland*. Species that usually occur in uplands (estimated probability 67 percent to 99 percent), but occasionally are found in wetlands.
UPL	*Upland*. Species that almost always occur in uplands under normal conditions (estimated probability greater than 99 percent).
NL	*Not Listed*. Species was not included in evaluation and does not have an indicator status. More often occurs with plant species that would be categorized as UPL if they had been included in the evaluation.
NI	*No indicator*. Species for which insufficient information was available to determine an indicator status.

Source: USACE 2007

Plant indicator status and the dominance test were used to determine the presence or absence of a wetland vegetation community. A location is considered to have a wetland vegetation community if more than 50 percent of the dominant species have an indicator status of FAC, FACW, or OBL. Dominant species are defined as those that individually or collectively account for more than 50 percent of the total areal coverage of vegetation in the stratum, plus any other species that, by itself, accounts for at least 20 percent of the total areal coverage (USACE 2007). If more than 50 percent of the dominant plant species in a community have wetland indictor status of OBL, FACW, or FAC, then the plant community is considered hydrophytic (wetland).

2.3.2 Hydric Soil

Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile (USACE 2007). Hydric soils exhibit certain characteristics that can be observed in the field. Such characteristics or indicators include high organic content, accumulation of sulfidic material, greenish or bluish-gray color (gley formation), and development of redoximorphic features. Hydric soil field indicators were evaluated per the *Field Indicators of Hydric Soils in the United States* (NRCS 2010) and the *Regional Supplement* (USACE 2007).

Soil samples were obtained at representative data points by digging a pit to a depth of at least 20 inches, or shallower if bedrock was encountered. Soil samples were then examined for hydric indicators. Soil colors were evaluated against a Munsell® soil color chart (Gretag Macbeth LLC 2000) to distinguish hydric from non-hydric soils.

2.3.3 Hydrology

While wetlands are defined in part by the presence of water, water does not need to be present throughout the entire year for an area to be considered a wetland. Wetland hydrologic conditions are considered present if, during the growing season, an area has 14 or more consecutive days of flooding or ponding, or a water table 12 inches or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10, depending on soil and plant community conditions (USACE 2007).

The presence of wetland hydrologic indicators was determined in each wetland and at each wetland data point. Primary indicators of wetland hydrology generally include areas of ponding or soil saturation, shallow water table, and evidence of previous water inundation or saturation (i.e., watermarks, drift lines, sediment deposits, and oxidized root channels). Secondary indicators include, but are not limited to, wetland drainage patterns, geomorphic position, stunted or stressed plants, micro-topographic relief, and water-stained leaves. When at least one primary or two secondary indicators were observed, wetland hydrology was assumed to occur during the growing season long enough to result in wetland conditions.

2.3.4 Problem Area Wetland Determination

Problem area wetland determination procedures were utilized in difficult wetland situations in which one of the three wetland indicators was temporarily absent, or in mosaic landscape situations where wetland and non-wetland components were too closely associated to be delineated or mapped separately (USACE 1987, 2007). Problem area wetlands include, but are not limited to, wetlands dominated by FACU species, evergreen forested wetlands, and wetland/non-wetland mosaics.

Wetlands dominated by FACU plant species, which typically include evergreen forest wetlands, require additional site evaluation procedures to positively identify wetlands. In these cases, landscape position and landform were considered, including: depressions, drainage ways, bottomlands, flats in sloping terrain, and seepage slopes (USACE 1987).

Wetland/non-wetland mosaics have complex microtopography with repeated small changes in elevation occurring over short distances (e.g., ridges and troughs). The horizontal distance from trough to ridge was 1 foot or less in some areas. In these situations, percent cover by wetlands in mosaics can be calculated using the point-intercept sampling method at fixed intervals along transects with the mosaic area. The wetland status was determined every two steps along a transect. The total number of wetland points was then divided by the total number of points sampled and multiplied by 100 to determine the percent wetland cover (USACE 2007).

In addition, problematic hydric soils are described as soils that meet the hydric soil definition but do not exhibit any of the traditional hydric soils indicators. Per the *Regional Supplement* (USACE 2007), if a soil lacks hydric indicators but is ponded or flooded, or has a water table within 12 inches of the surface for 14 or more consecutive days during the growing season in most years, then the soil is determined to be hydric.

2.3.5 Evaluation of the Growing Season

In Southeast Alaska, the preferred approach by the USACE for determining the growing season includes observing vegetation green-up, growth, and maintenance as an indicator of biological activity occurring above and below ground (USACE 2007). The growing season is considered to have begun when two or more different non-evergreen vascular plant species are observed growing on the site, such as emergence of herbaceous plants from the ground, appearance of new growth from vegetative crowns, and bud burst on woody plants. In addition, the observed biological indicators of the growing season should be compared to the median dates (i.e., 5 years in 10, or 50 percent probability) of 28-degree Fahrenheit air temperatures in spring and fall, based on long-term records gathered at National Weather Service meteorological stations and reported in WETS tables by the NRCS.

The field surveys in September 2014 and June 2015 were completed during the growing season. Non-evergreen vascular plants were observed growing after leaf-out and before senescence. Using climate data from Sitka Airport, the average beginning and ending dates for the growing season in the study area as determined from long-term weather records are March 15 and November 16, respectively, for a total growing season of 245 days (NRCS 2015c). Using the growing season table in the *Regional Supplement* (USACE 2007), the growing season in the coastal western hemlock–Sitka spruce forest ecoregion occurs from April 29 to September 28.

2.4 Wetland Classification and Functions Assessment

Wetlands were classified according to the Cowardin classification system (Cowardin et al. 1979), and wetland functions and values were qualitatively assessed to determine USACE wetland categories. The WESPAK-SE (Adamus 2013) was used as a guide in assessing wetland functions and values. Wetland functions were also evaluated based on the hydrogeomorphic (HGM) classification system (Brinson 1993) and the documented wetland functions associated with the different HGM classes of wetlands.

Three major wetland functions were evaluated, including biogeochemical functions, hydrologic functions, and wildlife habitat functions (Hanson et al. 2008). Hydrologic functions include water flow moderation (flood protection), groundwater recharge, and shoreline and erosion protection. Biogeochemical functions include water quality treatment, nutrient and organic export, and carbon sequestration and storage. Wildlife habitat functions include biological productivity and support for diversity.

The Cowardin system was designed to apply a hierarchical classification system to wetlands with respect to their position in the landscape, habitat/vegetative form, hydrologic conditions, and water quality conditions (Cowardin et al. 1979). This system is typically used for an ecologically based understanding of wetland habitat functions.

The WSPAK-SE is a standardized method for rapidly assessing ecosystem services (functions and values) of tidal and non-tidal wetlands of Southeast Alaska (Adamus 2013). Field observations are combined with available maps and existing resource information to evaluate the level of functions provided by wetland areas that are being assessed.

HGM classification for wetlands clarifies the relationship between hydrology and geomorphology for a wetland system. The classification system is based on the geomorphic setting, water source, and hydrodynamic patterns for each wetland. These three elements are responsible for maintaining many of the functional features of wetland ecosystems (Brinson 1993).

After classifying wetlands by Cowardin and HGM class and assessing wetland attributes per WESPAK-SE, wetlands were categorized based on functions and values provided. The USACE provides guidance for categorizing wetlands based on wetland functions and values (USACE 2014). Three categories are described:

- Category I (High): These are wetlands that 1) provide habitat for threatened or endangered species that has been documented; 2) represent a high quality example or a rare wetland type; 3) are rare within a given region; 4) provide habitat for very sensitive or important wildlife or plants; and/or 5) are undisturbed and contain ecological attributes that are impossible or difficult to replace within a human lifetime, if at all. Examples of the latter are mature forested wetlands unique to an ecoregion that may take a century to develop and certain bogs and fens with special plant populations that have taken centuries to develop. The position and function of the wetland in the landscape plays an integral role in overall watershed health.
- Category II (Moderate): They can be very important for a variety of wildlife species and can be critical for the watershed depending on where they are located. In contrast to Category I wetlands, Category II wetlands do not provide critical habitat for any threatened or endangered species or species of concern. Generally these wetlands are pristine, not fragmented, common, but more productive and sustain higher biodiversity compared with Category III wetlands.
- Category III (Low): These wetlands are usually plentiful in the watershed often with the least biodiversity. Category III wetlands are not rare or unique and overall productivity and species diversity are relatively low. These wetlands may be

impacted by humans (or by fire or other natural events) and are not considered pristine examples.

Wetland categories are used by the USACE to determine adequate mitigation and compensation for wetland impacts associated with Section 404 individual and nationwide permits.

2.5 Watercourses

Watercourses were identified in the field and cross-referenced with the ADF&G's Anadromous Waters Catalog (Johnson and Coleman 2015), USGS topographic maps, and National Hydrography Dataset (USGS 2004). Factors used in determining the presence and location of OHWM included an assessment of stream bank characteristics, scour lines, vegetation communities, gravel sorting, and depositional areas. Indicators of OHWM include marks upon the soil that create a distinction between that of the abutting upland and a change in vegetation.

Shallow concentrated flows created by topographic features on steep slopes (i.e., draws, drainages, and washes) along the south side of Katlian Bay were located with a Global Positioning System unit at the center point where they crossed the alignment, and lateral extents up- and down-slope were mapped using topographic contours while in the field due to site constraints from working on steep slopes. These minor streams were cross-referenced with survey stakes to confirm accuracy of their location. LiDAR (Light Detecting and Ranging) data were used to map overflow channels in the Katlian River floodplain. The OHWM along major streams were surveyed by LEI to support the design of bridges, structural plate arches, and pipe arch culverts, and to avoid and minimize impacts below the OWHM at these crossings. Major streams were surveyed approximately 150 feet upstream and downstream at each planned crossing.

All watercourses in the study area with an OHWM were documented and characterized to support USACE classification and jurisdictional determinations. Streams were characterized by flow duration (perennial or intermittent), substrate composition, and fish presence. Flow paths to TNWs were assessed in the field and by reviewing available published information and topographic maps following field data collection. Streams with year-round flows or continuous seasonal flows (typically greater than 3 months) were classified as a RPWs. Streams without year-round or seasonally continuous flows (generally less than 3 months) were classified as non-RPWs.

Fish presence (anadromous and resident) in streams was evaluated in the field by ADF&G biologists in May 2015 (ADF&G 2015).

2.6 Marine Shorelines

Tidal data provided by the USACE was reviewed for the marine shoreline at the staging area near MP 5.25 to determine MHW and HTL. MHW is the line on the shore established by the average of all high tides over an 18.6 year period due to variations in tides. HTL is the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. Physical markings or other indicators, such as lines of vegetation or drift deposits, were not used to determine the MHW or HTL in the field.

Relative to mean lower-low water as the vertical datum, or “0” elevation, MHW for the Sitka area is identified as +9.1 feet, and HTL is +12.7 (USACE 2015).

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3 RESULTS

This section presents the results of the background literature review and field investigation for the study. Wetland habitat classes (Cowardin et al. 1979) mapped in the study area include palustrine forested wetlands (PFO), PFO / palustrine scrub-shrub (PSS), and PFO / palustrine emergent wetland (PEM) mosaics. The mosaics typically have ericaceous plants suitable to acidic conditions and peat soils and are locally referred to as muskeg. Regarding watercourses, 137 stream crossings were identified in the study area, with the majority occurring as intermittently flowing drainages on steep slopes along the south side of Katlian Bay.

The following presents a summary of topography, soil series, and vegetation communities in the study area. Details about streams are provided in Section 3.2, and a description of wetland habitats and functions are presented in Section 3.3. Photographs of the study area, streams, and wetlands are provided in Appendix B.

3.1 Study Area Description

The project begins approximately 7 miles north of Sitka, Alaska, at the end of Halibut Road, and continues for 9.2 miles to the property boundary between Shee Atiká and USFS lands. The proposed road is located within evergreen forested habitat above the shorelines of Starrigavan Bay, and Katlian Bay, and terminates at the north side of the Katlian River valley at NFS Road No. 75797. The Katlian River valley includes three major river systems (South Katlian River, Sukka Héen, and Katlian River) and has extensive secondary growth red alder (*Alnus rubra*) stands as a result of previous logging in the valley in the early 1960s (USFS and Sitka Tribe 2003). Former logging roads in the Katlian River valley are the only remaining improvements in the study area.

3.1.1 Topography

The study area is characterized by steep topography with a small proportion of valley bottom area relative to the steep slopes. The western portion of the study area (approximately 6 miles) includes steep terrain with stream crossings over deep gorges and otherwise mostly hillside drainage. The eastern portion of the study area (about 3 miles) includes relatively flat, alluvial terrain with the three major river systems. The majority of the road location is less than 400 feet above mean sea level (MSL), with the highest point at approximately 550 feet above MSL near the Gorge Bridge location and the lowest point near the South Katlian River crossing at approximately 12 feet above MSL. The proposed road is entirely outside of tidally influenced areas.

3.1.2 Soils

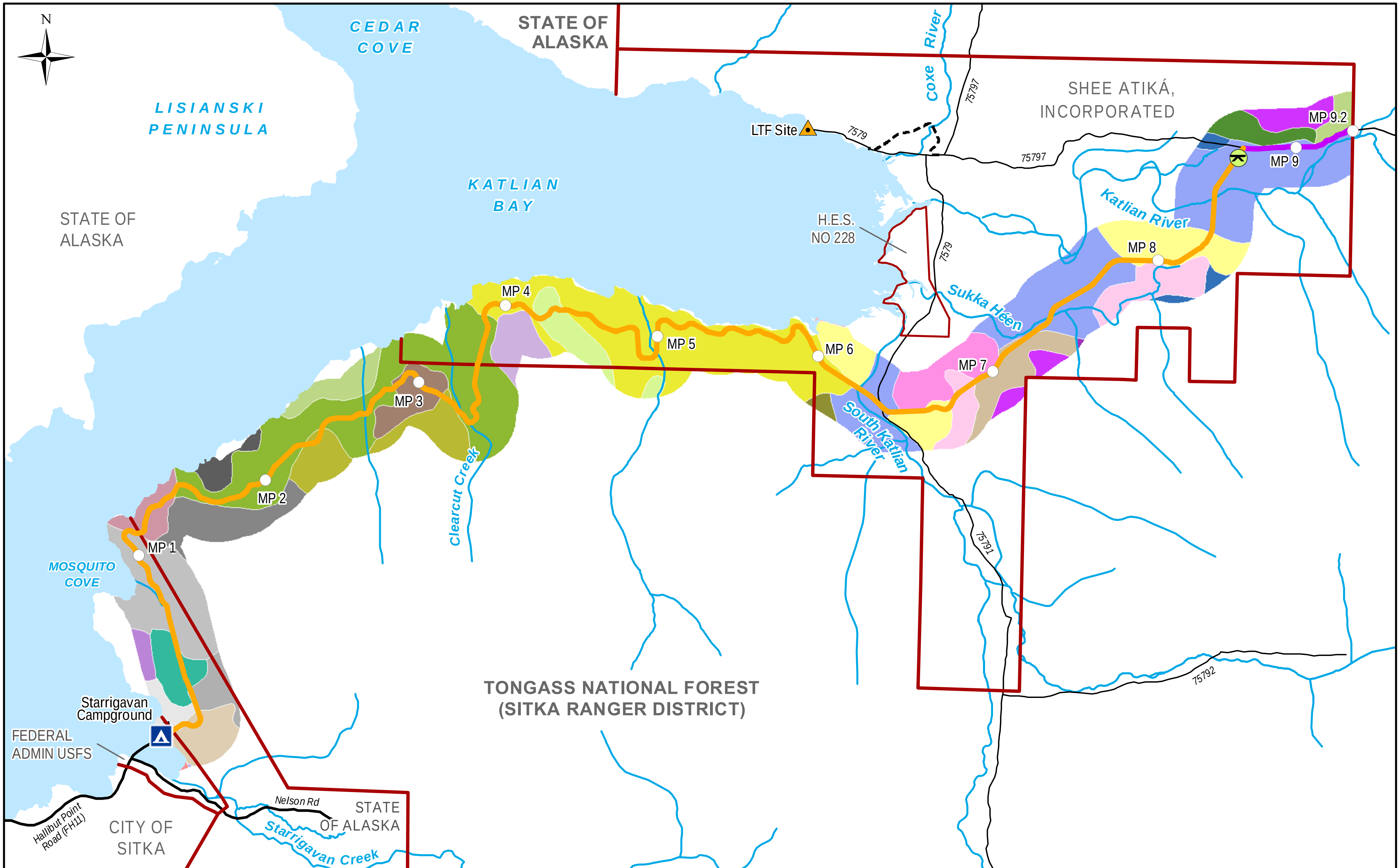
The NRCS mapped 18 soil units in the project area as presented in Table 3-1 and shown on Figure 3-1 (and accompanying spate sheet), with 12 of the 18 mapped soil units classified as hydric by NRCS (2015a). Drainage classes vary from very poorly drained to well drained. The majority of the western portion of the study area (approximately 6 miles) is mapped as Kupreanof gravelly silt loam, shallowly incised; Verstovia-McGilvery complex, broken; and Sitka-Partofshikof complex, broken, all of which occur on 56 percent to 75 percent slopes.

The majority of the eastern portion of the study area in the Katlian River valley (approximately 3 miles) is mapped as Tuxekan silt loam, floodplains, occurring on 0 percent to 5 percent slopes.

Table 3-1: Mapped Soil Units in the Project Area[1]

Soil Series	Slope (%)	Drainage Class	Landscape Position	Hydric Classification
Kina peat	0 – 5	Very poorly drained	Depressions on terraces	Hydric
Kina-Sukoi association, sloping lowlands	6 – 35	Very poorly to poorly drained	Hills, depressions on hills	Hydric
Kupreanof gravelly silt loam	6 – 35	Somewhat poorly drained	Hills	Hydric
Kupreanof gravelly silt loam, shallowly incised	56–75	Somewhat poorly drained	Mountains	Non-hydric
Kupreanof gravelly silt loam, smooth	56–75	Somewhat poorly drained	Mountains	Non-hydric
Kupreanof-Tolstoi complex, smooth	56 – 75	Somewhat poorly to moderately well drained	Mountains	Non-hydric
McGilvery-Mosman-Rock outcrop complex	76 – 140	Well drained	Mountains	Non-hydric
Mitkof loam, smooth	36 – 55	Somewhat poorly drained	Mountains	Hydric
Nakwasina muck, smooth	36 – 55	Poorly drained	Depressions on mountains	Hydric
Partofshikof silt loam, broken	36 – 55	Somewhat poorly drained	Hills, mountains	Hydric
Partofshikof-Sukoi complex	36 – 55	Somewhat poorly to poorly drained	Hills, mountains	Hydric
Sitka and Partofshikof soils, subalpine	36 – 55	Well to somewhat poorly drained	Hills, mountains	Hydric
Sitka-Partofshikof complex, broken	56 – 75	Well drained	Hills, mountains	Hydric
Sukoi, Kaikli, and Verstovia soils, subalpine	36 – 55	Very poorly to poorly drained	Hills, mountains, depressions on hills and mountains	Hydric
Tuxekan silt loam, floodplains	0 – 5	Well drained	Flood plains on alluvial fans	Hydric
Verstovia-McGilvery complex	36 – 55	Well drained	Hills	Hydric
Verstovia-McGilvery complex, broken	56 – 75	Well drained	Hills, mountains	Non-hydric
Verstovia-McGilvery complex, broken	76 – 120	Well drained	Hills, mountains	Non-hydric

Note: [1] Soils units and hydric soil list from the NRCS (2015a)



KATLIAN BAY ROAD CONSTRUCTION

FIGURE 3-1
Natural Resources Conservation Service Soils Map

- LTF Site
- Public Road
- National Forest System Road
- Stream
- Ownership Boundary
- Day Use Area
- Milepost
- Alignment
- OHV Trail
- Access Road Revision

0 0.5 1
Miles Scale: 1:40,000

Reference:
Alaska State Geo-Spatial Data Clearinghouse
www.asgdc.state.ak.us

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3.1.3 Vegetation

The study area is located within the coastal forest vegetation zone (Viereck et al. 1992). Three main vegetation community types were identified within the study area during the 2014 and 2015 field surveys as described below, and mapped at the landscape scale (Figure 3-2).

1. **Sitka spruce–western hemlock/false azalea** (*Picea sitchensis–Tsuga heterophylla/Menziesia ferruginea*): This evergreen forest vegetation community is the dominant upland coastal habitat on sloping hillsides in the study area.
2. **Red alder** (*Alnus rubra)*: The red alder deciduous forest has over 60 percent canopy cover and occurs in floodplains, swamps, riparian areas, and valley bottoms.
3. **Lodgepole pine** (*Pinus contorta*) open woodlands (muskeg): This dwarf lodgepole pine vegetation community occurs on boggy, poorly drained sites with organic soils and sphagnum mosses and is interspersed with ericaceous shrubs, sedge (*Carex* sp.) meadows, and pockets of standing water.

The Sitka spruce–western hemlock evergreen forest community occurs on steep slopes above Katlian Bay, Katlian River, and South Katlian River valley bottoms and typically has a shrub understory consisting mainly of false azalea (*Menziesia ferruginea*) with a bryophyte groundcover. Alaska-cedar occurs infrequently (*Callitropsis nootkatensis*). Recently logged areas (less than 50 years ago) that have increased sun exposure from a more open canopy also include red huckleberry (*Vaccinium parvifolium*) and oval-leaf blueberry (*Vaccinium ovalofium*).

Forested wetland seeps and steep drainages occur within the Sitka spruce–western hemlock vegetation community. Forested wetland seeps include devil's club (*Oplopanax horridus*) and *Vaccinium* species and commonly have an herbaceous layer of skunk cabbage (*Lysichiton americanus*), fernleaf goldthread (*Coptis aspleniifolia*), and ladyfern (*Athyrium filix-femina*). Steep drainages typically have a canopy of red alder with an understory of Sitka alder (*Alnus viridus*), devil's club, salmonberry (*Rubus spectabilis*), and various fern species (e.g., ladyfern, spreading woodfern [*Dryopteris expansa*], deer fern [*Blechnum spicant*]).

The red alder vegetation community occurs in logged areas in the South Katlian, Sukka Héen, and Katlian River valleys in the valley bottoms, swamps, floodplains, and riparian sites. Upland red alder communities include Sitka spruce and western hemlock saplings and commonly have an understory of cow parsnip (*Heracleum maximum*) and multiple fern species. Red alder communities in forested swamp habitat are often intermixed with Sitka spruce and hemlock saplings, pockets of open water, and an herbaceous layer of skunk cabbage and ladyfern. False azalea and *Vaccinium* sp. shrubs occur on hummocks, nurse logs, and old growth stumps.

The lodgepole pine open woodlands are generally large expanses of peatlands or bog wetlands (muskeg). Muskegs in the study area are characterized by a mosaic of stunted conifer trees, patches of shrub and emergent vegetation, and pockets of open water. Forest cover at the edges of open peatlands typically includes Alaska-cedar and western hemlock.

Organic peat deposits, acidic water, and a vegetative groundcover of *Sphagnum* moss are characteristic of this community. Ericaceous, woody shrubs suited for growing in saturated, acidic environments are typically intermixed with dwarf trees, such as lodgepole pine and western hemlock. Ericaceous shrubs typically found include dwarf blueberry (*Vaccinium caespitosum*), crowberry (*Empetrum nigrum*), and Labrador tea (*Rhododenron groenlandicum*). Sedge meadows and pockets of open water are interspersed with the dwarf tree and shrub plant communities. Muskeg wetland habitats are common in the maritime climate of southeast Alaska (Viereck et al. 1992).

Much of the forest in valley bottoms in the study area has been logged. The most intensive logging occurred in the Katlian River, Sukka Héen River, and South Katlian River valley bottoms where clear-cut prescriptions were employed without stream buffers (Sitka Tribe and USFS 2003). Dense red alder stands limit the growth of Sitka spruce and western hemlock saplings that occur in the understory. Additionally, black cottonwood (*Populus trichocharpa*) trees were not observed in the study area during the 2014 and 2015 field studies even though they are known to occur in valley floors that are prone to flooding.

No invasive plant species were observed along the proposed road alignment.

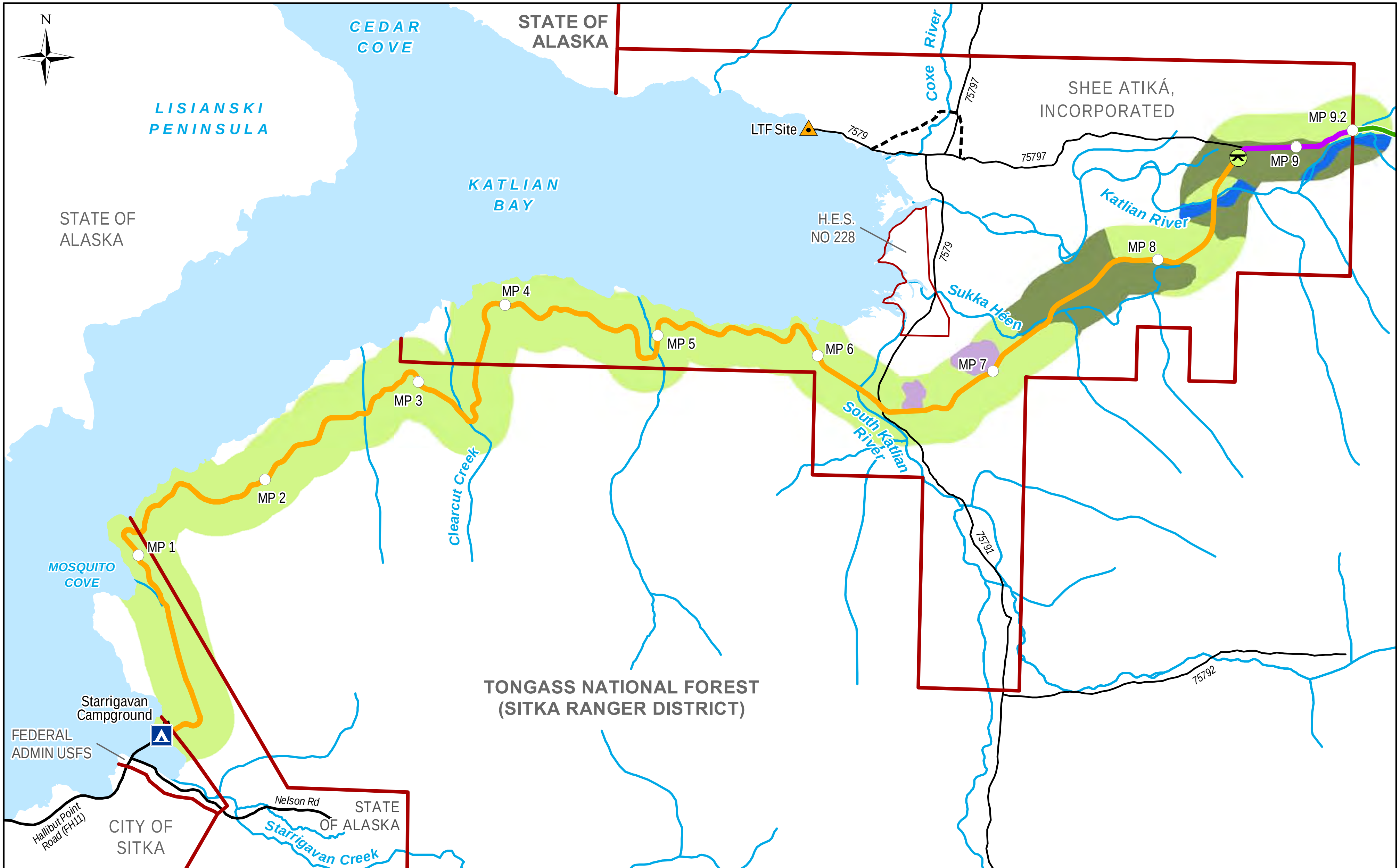
3.1.4 Existing Wetland Mapping

The USFWS National Wetlands Inventory mapped mainly palustrine, forested, needle-leaved evergreen, saturated (PFO4B) wetlands in the study area and vicinity (The large expanses of PFO4B wetlands include smaller components of palustrine scrub-shrub, broad-leaved deciduous / emergent, persistent, saturated (PSS1/EM1B) wetlands. Palustrine scrub-shrub, broad-leaved deciduous, temporarily flooded (PSS1A) wetlands are mapped within the Katlian River valley, and the Katlian River is mapped as riverine upper perennial, unconsolidated shore / bottom (R3US/UB) habitat. Intertidal estuarine, emergent and aquatic bed (E2EM and E2AB) habitat is mapped at the east end of Katlian Bay at the mouth of the Katlian valley.

3.2 Watercourses

The project crosses three HUC 12 watersheds: 1) Sitka Sound–Frontal Pacific Ocean (190102121206), 2) Katlian Bay–Frontal Sitka Sound (190102121202), and 3) Katlian River (190102121201) (USGS 2004) (Figure 1-3).

A total of 136 freshwater watercourses were identified in the study area (Figure 3-4; Figure A1–Figure A23 in Appendix A). Watercourses have been named consecutively from MP 0 to MP 9.3. Most occur as shallow concentrated flows created by topographic features on steep slopes (i.e., draws, drainages, and washes) along the south side of Katlian Bay between MP 0 and MP 6. The alignment traverses steep terrain in this area, and flows in many of these hillside watercourses emanate from groundwater seeps and are driven by precipitation. Watercourses in the lowlands (approximately MP 6 to MP 9.3) include several large rivers and associated floodplains, side channels, and smaller tributaries.



KATLIAN BAY ROAD CONSTRUCTION

FIGURE 3-2 Major Vegetation Cover Types for Katlian Bay Road

LTF Site
Public Road
National Forest System Road
Stream
Ownership Boundary
Day Use Area
Milepost
Alignment
OHV Trail
Access Road Revision
USFS OHV Trail

Vegetation Cover
Alder
Sitka Spruce / Western Hemlock / False Azalea
Lodgepole Pine Open Woodlands
Riverine

0 0.5 1
Miles Scale: 1:40,000

Reference:
Alaska State Geo-Spatial Data Clearinghouse
www.asgdc.state.ak.us

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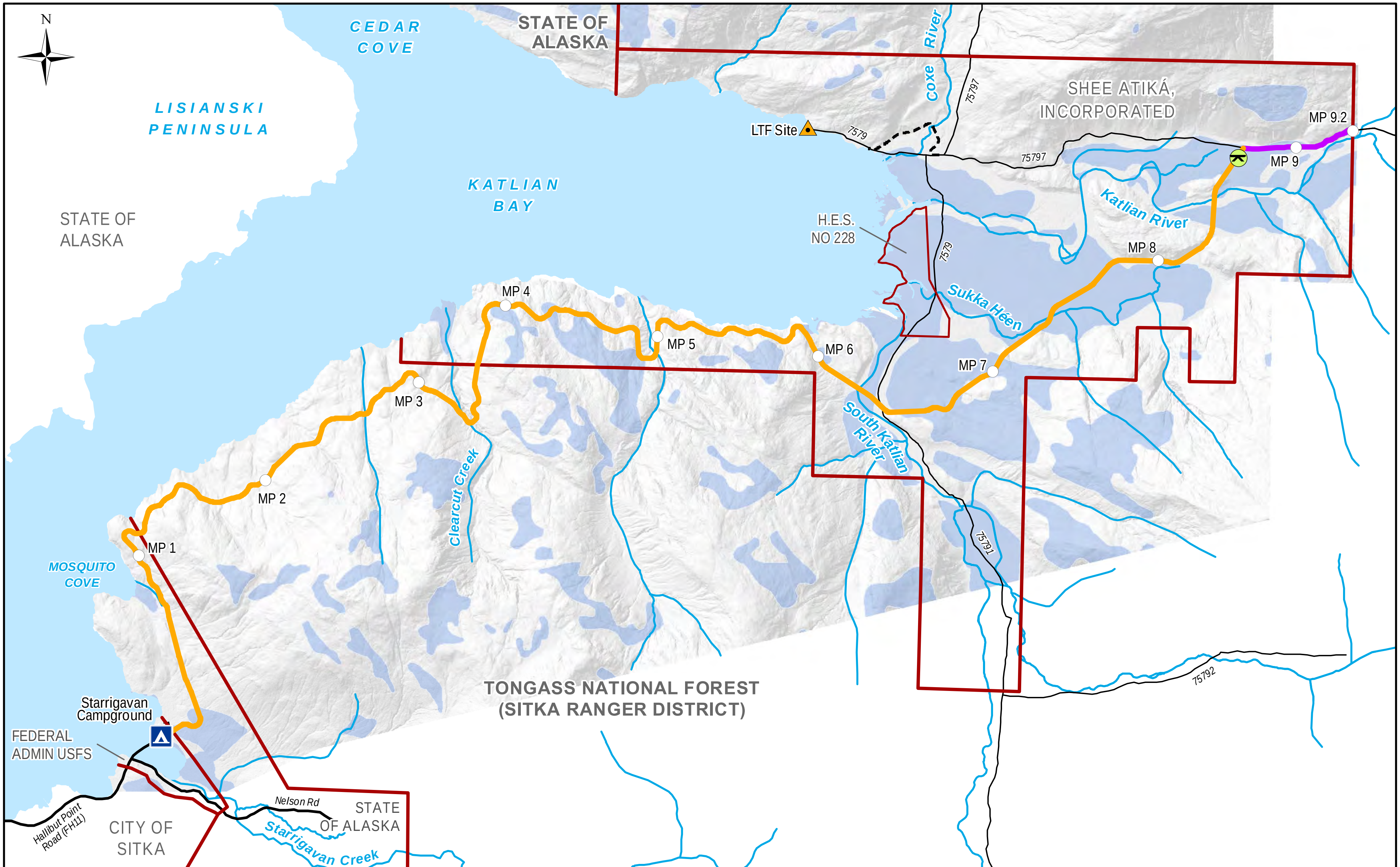

KATLIAN BAY ROAD CONSTRUCTION

FIGURE 3-3
National Wetlands Inventory Map

LTF Site	Day Use Area
Public Road	Milepost
National Forest System Road	Alignment
Stream	OHV Trail
Ownership Boundary	Access Road Revision
NWI Wetlands	

0 0.5 1
Miles Scale: 1:40,000

Reference:
Alaska State Geo-Spatial
Data Clearinghouse
www.asgdc.state.ak.us

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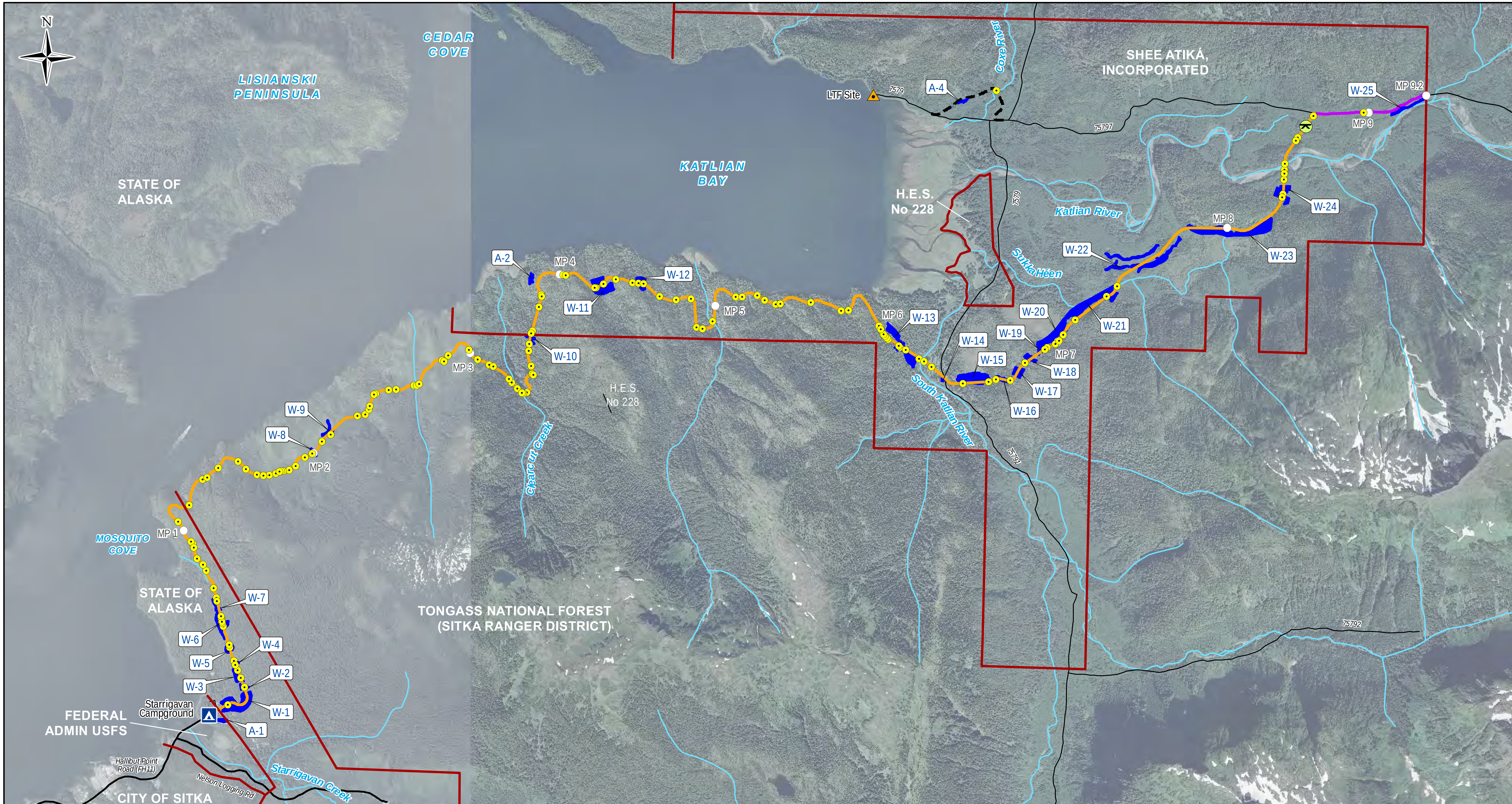

KATLIAN BAY ROAD CONSTRUCTION

FIGURE 3-4
Wetlands Delineation Index Map

LTF Site
Public Road
National Forest System Road
Ownership Boundary
Day Use Area
Milepost
Alignment
OHV Trail
Access Road Revision
Stream Crossing
Wetlands Crossed by the Alignment

0 0.5 1
Miles Scale: 1:27,000

Reference:
Alaska State Geo-Spatial Data Clearinghouse
www.asgdc.state.ak.us

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Major watercourses (i.e., rivers and creeks) crossed by the proposed road alignment include:

- Unnamed tributary to Katlian Bay near MP 2.63 (report ID #31)
- Clearcut Creek near MP 3.35 (report ID #34)
- Unnamed tributary to Katlian Bay near MP 4.94 (report ID #42)
- South Katlian River near MP 6.24 (report ID #51)
- Sukka Héen River near MP 7.39 (report ID #61)
- Katlian River near MP 8.49 (report ID #64A).

All 136 streams identified in this report have been characterized by fish presence, substrate composition, and flow duration (Appendix C, Table C-1). Drainage paths to TNW are also described in Appendix C, Table C-1, as well as the USACE classifications for streams in the study area.

Of the 136 mapped watercourses, 97 were classified as perennial RPWs, 30 as seasonal RPWs, and 9 as non-RPWs. The nine non-RPWs occur as overflow channels in the floodplains of South Katlian River and Katlian River. TNWs in the vicinity of the study area include the tidally influenced areas of Katlian Bay and Starrigavan Bay in Sitka Sound. All watercourses in the study area are hydrologically connected to Katlian Bay or Starrigavan Bay, both of which are TNWs and are therefore regulated by the USACE as waters of the United States. The USACE does not identify navigable waters as occurring within the alignment of the new road (USACE 2015a).

Only 9 of the 136 mapped watercourses in the study area are known to support anadromous or resident fish per direct field observations and/or listing in the Anadromous Waters Catalog (Johnson and Coleman 2015). These include catalogued watercourse numbers:

- 113-44-10080, Clearcut Creek (report ID #34)
- 113-44-10070, unnamed tributary to Katlian Bay (report ID #42)
- 113-44-10050, South Katlian River (report ID #51)
- 113-44-10040, Sukka Héen River (report ID #61)
- 113-44-10030, Katlian River (report ID #64A)

and uncatalogued watercourses:

- #50H (unnamed tributary to South Katlian River)
- #57 (unnamed tributary in South Katlian River basin)
- #59 (unnamed tributary to Sukka Héen River)
- #60 (unnamed tributary to Sukka Héen River).

However, note that the alignment crosses watercourses #34 and #42 in high-gradient areas well above major barriers to fish passage and therefore likely do not have fish present in the study area in these reaches.

ADF&G reports the following freshwater fish species in watercourses within the study area in the Katlian valley (Johnson and Coleman 2015) (ADF&G 2015a):

- Coho salmon (*Oncorhynchus kisutch*)
- Chum salmon (*O. keta*)
- Pink salmon (*O. gorbuscha*)
- Dolly Varden char (*Salvelinus malma*).

3.3 Wetland Habitat Types and Functions and Values Assessment

Approximately 45 acres of wetlands were mapped within the vicinity of the road alignment. Twenty-five wetlands (identified in this report as W-1 through W-25) were delineated within the study area. Wetlands were classified within the Cowardin (Cowardin et al., 1979), HGM (Brinson 1993), and WESPAK-SE (Adamus 2014) systems. Primary functions provided by wetlands in the study area include improving water quality and nutrient cycling (biogeochemical functions), hydrology (flood storage and reducing erosion), and supporting wildlife habitat diversity.

The purpose of classifying wetlands by HGM class is to assess the opportunity and performance level of the wetlands to provide these functions based on landform and landscape position. Wetland HGM classes present in the study area include slope, riverine, and depressional. WESPAK-SE wetland types are also based on differences in wetland functions. WESPAK-SE wetland types identified in the study area include forested peatland, open peatland, and floodplain. Cowardin habitat classes observed in the study area include PFO4A/B, PFO1A/B, PFO4/PEM1B, PFO4/PSS1B, and PUB3x. For the purposes of this report, these wetland attributes (hydrology, landscape position, and habitat) have been combined to develop wetland types specific to the study area: evergreen forested, red alder swamp, slope muskeg (bog), and pond. These wetland classes are summarized in Table 3-2.

Table 3-2: Wetland Habitat Types in the Study Area

Wetland Habitat Type	Cowardin Class[1]	HGM Class[2]	WESPAK-SE Wetland Type[3]	Functional Rating
Evergreen forest	Palustrine forested needle-leaved evergreen, temporarily flooded / saturated (PFO4A/B)	Slope, Riverine	Forested Peatland, Floodplain	Medium
Red alder swamp	Palustrine forested broad-leaved deciduous, temporarily flood / saturated (PFO1A/B)	Riverine, Depressional	Floodplain	Medium
Slope muskeg (bog)	Palustrine forested needle-leaved evergreen / emergent persistent, saturated (PFO4/PEM1B), Palustrine forested needle-leaved evergreen / scrub-shrub broad leaved-deciduous, saturated (PFO4/PSS1B)	Slope	Open Peatland	High
Pond	Palustrine unconsolidated bottom, mud, excavated (PUB3x)	Depressional	Floodplain	Low

Notes: [1] Cowardin et al. 1979
[2] Brinson 1993
[3] Adamus 2013

3.3.1 Overview

Beginning at the Starrigavan Campground at MP 0, evergreen forest (PFO4B) wetland habitats occur on sloping hillsides (Wetlands 1, 8, and 12) and in an area with ridges and troughs with incised drainages (Wetlands 2 through 7). Seeps emanate from the hillsides to create linear wetland features that grade into broader wetland areas on more gradual terrain at lower elevations (Wetlands 2, 3, and 9). Incised hillside watercourses develop wetland fringes as grades decrease within individual drainage pathways (Wetlands 4, 5, and 7).

Evergreen forest habitat also occurs in Wetlands 6 and 13, which are situated at watershed divides. Wetland 6 is located at the watershed divide between Starrigavan Bay and Katlian Bay. This wetland has hummocky microtopography and several surface water rivulets that drain downslope toward a steep hillside, which directs water south to Starrigavan Bay and north toward Katlian Bay. Wetland 13 hydrology is supported by several hillside groundwater seeps that coalesce into a larger wetland that drains southeast to South Katlian River. A separate wetland outside of the study area is located approximately 75 feet northwest of Wetland 13 and also receives surface water from several small (average 2 feet wide), hillside watercourses. This wetland drains directly to Katlian Bay near the mouth of Katlian valley.

Wetlands 10, 11, 15, 16, 17, 18, 19, and 20 are slope muskeg (bog) habitats (PFO4/PEM1B and PFO4/PSS1B) that occur on flat lowlands, plateaus on gently sloping hillsides, or in saddles between topographic highs. Wetlands 10 and 11 are situated on plateaus at the top of bluffs on the south side of Katlian Bay, and Wetlands 15, 17, 18, 19, and 20 occur on gently sloping hillsides that grade into lowlands within the South Katlian River and Sukka Héen River basins. Wetland 16 is situated in a saddle that slopes and drains to Wetland 15.

Wetland 14 is a permanently ponded (PUB3x), former gravel pit excavated in the floodplain of South Katlian River.

Red alder swamp (PFO1A/B) and evergreen forest (PFO4A/B) wetland habitats occur at the eastern end of the study area in the Sukka Héen River and Katlian River floodplains in the lowlands of Katlian valley. These wetlands are identified as Wetlands 21, 22, 23, 24, and 25. Wetland 21 and 23 are situated at the toe of slope along Sukka Héen River, and Wetland 25 is situated at the toe of slope along Katlian River. Wetland 22 is generally confined within a linear channel that drains to Sukka Héen River. Wetland 24 is a saturated swamp that receives overflows from Katlian River. Hydrology in these wetlands is supported by shallow groundwater and temporary flooding.

3.3.2 Evergreen Forest Wetland

Cowardin Class: Palustrine forested needle-leaved evergreen, temporarily flooded (PFO4A) and saturated (PFO4B)
HGM Classes: Slope, Riverine
WESPAK-SE Wetland Type: Forested Peatland, Floodplain
Wetland ID within the study area: W-1, W-2, W-3, W-4, W-5, W-6, W-7, W-8, W-9, W-10, W-12, W-13, W-21, W-23

Evergreen forest wetlands are dominated by a canopy of western hemlock (FAC) and Sitka spruce (FACU), and typically have a shrub understory of oval-leaf blueberry (FAC), salmonberry (FACU, and devil's club (FACU). Herbaceous species frequently included skunk cabbage (OBL), fernleaf goldthread (FAC), and ladyfern (FAC). Red and sitka alder occasionally occurred as minor components in the understory along near linear seeps. In contrast, vegetation in adjacent uplands was typically dominated by Sitka spruce (FACU) in the canopy, and false azalea (FACU) in the shrub understory. Herbaceous plants in the uplands included twisted-stalk (*Streptopus amplexifolius*, FACU), bunchberry (*Cornus canadensis*, FACU), spreading woodfern (FACU), and deer fern (FAC). Groundcover included bryophytes in upland and wetland habitats. Plant communities were frequently intermixed due to hummocks, nurse logs, and old growth stumps.

Soil profiles in these wetlands typically had fibric material to varying depths, and hydric soil indicators A1 (Histosol) and A2 (Histic epipedon) were frequently observed. Histosols are identified by having 16 inches or more of saturated organic material measured form the soil surface, and Histic Epipedons have surface horizons of 8 inches or more saturated organic material (USACE 2007). Soil profiles in seep areas with running water were dark (10YR 2/1) and mucky, and hydric conditions were determined to be present if indicators of wetland hydrology and hydrophytic vegetation were also present (USACE 1987 and 2007). All wetland soil profiles had one or more primary wetland hydrology indicators present: surface water (A1), a high water table (A2), and/or saturation within 12 inches of the surface (A3).

Wetland/non-wetland mosaics occurred in W-1 and W-12. W-1 has an area factor 0.6, as 46 of 65 point-intercepts were positive for wetlands and 19 were not. W-12 has an area factor of 0.7, as 14 of 20 point-intercepts were positive for wetlands.

3.3.3 Red Alder Swamp

Cowardin Class: Palustrine forested broad-leaved deciduous, temporarily flooded (PFO1A) and saturated (PFO1B)

HGM Class: Riverine, Depressional
WESPAK-SE Wetland Type: Floodplain
Wetland ID within the study area: W-22, W-23, W-24, W-25

Vegetation in red alder swamps included a red alder (FAC) canopy with an understory of skunk cabbage (OBL), enchanter's nightshade (*Circaea alpine*, FACW), and ladyfern (FAC). Sitka spruce (FACU) and western hemlock (FAC) saplings are interspersed amongst red alder saplings in both wetlands and uplands. Upland vegetation communities were also dominated by red alder in the canopy and included cow parsnip (FACU), false hellbore (*Veratrum viride*, FAC), and ladyfern in the herbaceous layer.

Hydric soil indicator A14 (Alaska Redox) was often observed in mineral soils in wetlands, whereas upland soil profiles typically had brighter matrices without redoximorphic features. Hydric soils had a mineral layer with a gleyed matrix with 10 percent or more distinct or prominent redoximorphic concentrations occurring as pore linings. Wetland hydrology was indicated by water tables within 10 inches from the surface (Primary Wetland Hydrology Indicator A2) and drainage patterns (Secondary Wetland Hydrology Indicator B10).

3.3.4 Slope Muskeg (bog)

Cowardin Class: Palustrine forested needle-leaved evergreen / emergent persistent, saturated (PFO4/PEM1B), Palustrine forested needle-leaved evergreen / scrub-shrub broad leaved-deciduous, saturated (PFO4/PSS1B)
HGM Class: Slope
WESPAK-SE Wetland Type: Open peatland
Wetland ID within the study area: W-10, W-11, W-15, W-16, W-17, W-18, W-19, W-20

Slope muskeg (bog) habitat (PFO4/PEM1B and PFO4/PSS1B) occurred in the study area along the south side of Katlian Bay (W-10, W-11) and in the Katlian valley (W-15, W-16, W-17, W-18, W-19, W-20). This habitat type consisted of mosaics of stunted conifer trees, patches of shrub and emergent vegetation, and occasional pockets of open water. Dwarf trees included Alaska-cedar (FAC), lodgepole pine (FAC), and western hemlock (FAC); shrub vegetation included dwarf blueberry (FACW) and Labrador tea (FAC). Dominant plants in the emergent meadows included deer cabbage (*Nephrophyllidium crista-galli*, OBL), few-flowered sedge (*Carex pauciflora*, OBL), cottongrass (*Eriophorum* angustifolium, OBL), spike-rush (*Elocharis* sp., OBL), and dwarf dogwood (*Cornus suecica,* FAC). Pockets of open water were interspersed within the emergent plant communities. A thick layer of *Sphagnum* moss overlayed organic soils. Muskeg habitats were easily identified due to the significant change in vegetation community at the edges.

Hydric Soil Indicators A1 (Histosol) or A2 (Histic Epipedon) were observed at all of the wetland data points within this wetland type. All soil profiles were saturated to the surface (Wetland Hydrology Indicator A3) and/or had a shallow water table within 12 inches of the surface (Wetland Hydrology Indicator A2) due to shallow bedrock. Secondary Wetland Hydrology Indicators included drainage patterns (B10) and stunted or stressed plants (D1).

3.3.5 Pond

Cowardin Class: Palustrine unconsolidated bottom, mud, excavated (PUB3x)
HGM Class: Depressional
WESPAK-SE Wetland Type: Floodplain
Wetland ID within the study area: W-14

One pond habitat (PUB3x) was delineated in the floodplain of the South Katlian River. This wetland includes a red alder (FAC) forest fringe around standing water in a depression. No fish were observed in the pond. Soil profiles had muck beginning at the surface.

3.3.6 Wetland Functions and Values Assessment

Primary functions provided by wetlands in the study area include improving water quality and nutrient cycling (biogeochemical functions), hydrology (flood storage and reducing erosion), and supporting wildlife habitat diversity. Wetland HGM classes present in the study area include slope, riverine, and depressional. WESPAK-SE wetland types identified in the study area include forested peatland, open peatland, and floodplain. Cowardin classes observed in the study area include PFO4A/B, PFO1A/B, PFO4/PEM1B, PFO4/PSS1B, and PUB3x. For the purpose of assessing wetland functions for this report, these wetland attributes (hydrology, landscape position, and habitat) have been combined to develop wetland types specific to the study area: evergreen forest, red alder swamp, slope muskeg (bog), and pond.

Evergreen forest and red alder swamps that occur in floodplains in the Katlian valley provide significant biogeochemical, hydrologic, and wildlife habitat functions that are valued by society. Performance of biogeochemical functions in these riparian wetlands is high due to the export of nutrients and organic carbon to streams that supports the aquatic food chain (Hanson et al. 2008). These wetlands have herbaceous plant assemblages in the understory and frequently interact with surface waters from temporary flooding and thus discharge (export) nutrients to surface waters with fish resources (anadromous and resident) that are valued by society. Evergreen forested wetlands on slopes with peat soils function to provide climate regulation through carbon sequestration and storage (Mitsch and Gosselink 2007), but do not significantly export nutrients due their location above floodplains.

Significant hydrologic functions provided by evergreen forest and red alder swamp wetlands include flood storage and reducing erosion. These wetlands capture flood water and slow velocities to protect in-stream resources (Hanson et al. 2008). These wetlands also protect against soil erosion by capturing sediment during floods and dissipating high-energy flows. These functions are valued by society because the Katlian River is listed by the DEC on the Section 303(d) list of impaired waters for non-attainment of sediment and turbidity standards (UAS 2015). Evergreen forested wetlands on slopes above floodplains do not have significant hydrologic functions because these systems discharge surface water rather than recharging groundwater.

Evergreen forest (PFO4A/B) and red alder swamp wetlands (PFO1A/B) provide habitat for large mammals that occur in the study area, notably brown bear (*Ursus arctos*) and Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) (UAS 2015). The Katlian and South Katlian River valleys have high habitat suitability ratings for brown bear, whereas the evergreen forest wetlands on slopes along Katlian Bay and Starrigavan Bay are rated as low. Areas with the highest winter habitat suitability ratings for Sitka black-tailed deer occur near South Katlian River and Starrigavan Creek, whereas the Katlian River valley is rated moderate. No sensitive wildlife species were observed in wetlands during the field surveys in 2014 or 2015. Wildlife use of forested habitat is affected by forest structure and forest age. Older forests generally provide high quality habitat for forest-dependant mammals and birds compared with younger forests due to increased structural complexity (Deal et al. 2013).

Based on these wetland assessment tools, evergreen forest and red alder swamp wetlands in the study area are recommended as Category II (moderate) wetlands per the USACE wetland category definitions (USACE 2014). These forested floodplain and slope wetlands do not provide critical habitat for sensitive species and have been previously disturbed by logging, but do significantly provide functions that are valued by society.

Slope muskeg (bog) wetlands in the study area provide significant biogeochemical and habitat functions and a moderate level of hydrologic functions. Regarding biogeochemical functions, muskegs have recently been recognized for their role in regulating global climate by storing large amounts of carbon in peat deposits (Mitsch and Gosselink 2007). In the Katlian valley, these wetlands export nutrients and organic carbon to down-gradient surface waters during precipitation events, which supports aquatic habitat for fish. Due to the streams in the study area with anadromous and resident fish populations, this function is a highly valued ecosystem function.

Slope muskeg (bog) wetlands in the study area receive most of their water from precipitation rather than runoff, streams, or groundwater and therefore provide a moderate level of hydrologic functions. The opportunity to recharge groundwater is limited as these systems are likely perched above the local water table (Hanson et al. 2008), or are underlain by shallow bedrock, such as the muskegs on plateaus along the south side of Katlian Bay. Muskeg wetlands provide erosion protection by stabilizing soils, but since they are located in low energy environments, the performance of this function is not significant. The opportunity to provide this function is also limited because no impaired waters listed by DEC have surface connections to slope muskegs in the study area per the WESPAK-SE module (UAS 2015).

Slope muskeg wetlands (PFO4/PEM1B, PFO4/PSS1B) typically perform a high level of wildlife habitat functions due the unique habitat structure and plant communities. Combined with acidic conditions, muskegs are low in nutrients necessary for plant growth, which results in unique vegetation communities with special adaptations (ericaceous shrubs). Even though muskeg wetlands are common within the southeast Alaska region, they provide habitat diversity in the Katlian valley forested landscape and surrounding forested slopes along Katlian Bay. The unique plant communities in muskegs provide foraging opportunities for large mammals. These wetlands are valuable to society due to hunting and passive recreation opportunities.

Slope muskeg (bog) wetlands in the study area provide a high level of biogeochemical and wildlife habitat functions and are therefore suggested to be categorized as Category I (high) wetlands (USACE 2014). They do not provide critical habitat for sensitive species and are not a rare wetland type or rare in the region. However, these wetlands are productive ecosystems with unique plant assemblages that are valuable habitats in the watershed in which they occur, are undisturbed, and contain ecological attributes that are impossible or difficult to replace within a human lifetime.

One wetland (W-14) is recommended to be categorized as Category III (low) per USACE (2014) definitions. It is classified as a permanently ponded (PUB3x), former gravel pit, which was excavated in the floodplain of South Katlian River. This wetland has low biodiversity, and no fish were observed in the pond during the 2015 field surveys. It is likely supported by shallow groundwater and does not have an apparent surface connection to South Katlian River. This wetland likely traps sediment during major flood events.

3.3.7 Wetlands Summary

Wetland habitat types, Cowardin classes, HGM classes, WEPAK-SE types, functional ratings, and sizes within the study area are summarized in Table 3-3. Wetland areas are shown on Figures A1 through A23 in Appendix A.

3.4 Waters of the U.S. Jurisdiction

Wetlands in the study area are hydrologically connected to watercourses that drain to either Starrigavan Bay or Katlian Bay, both of which are part of Sitka Sound, a TNW. Wetlands mapped in the study area abut perennial and seasonal RPWs that are hydrologically connected to a TNW as reported in Table D-1 in Appendix D. Flow paths to TNWs for each wetland are provided in Table 3-4.

The USACE regulates the discharge of dredged or fill material into wetlands, streams, and other drainages that connect to Waters of the United States under Section 404 of the CWA. The USACE requires notification for all disturbances to wetlands, to streams, and potentially to other drainages. The USACE makes jurisdictional determinations regarding these water resources. It is anticipated that the USACE will exert jurisdiction over these streams and wetlands in the study area.

Table 3-3: Summary of Wetlands within the Study Area

Wetland ID	Wetland Habitat Type	Cowardin Class[1]	HGM Class[2]	WESPAK-SE Wetland Type[3]	Functional Rating	Impact Area (acres)
1	Evergreen forest	PFO4B	Slope	Forested Peatland	Medium (II)	0.54[4]
2	Evergreen forest	PFO4B	Slope	Forested Peatland	Medium (II)	0.08
3	Evergreen forest	PFO4B	Slope	Forested Peatland	Medium (II)	0.13
4	Evergreen forest	PFO4B	Slope	Forested Peatland	Medium (II)	0.02
5	Evergreen forest	PFO4B	Slope	Forested Peatland	Medium (II)	0.01
6	Evergreen forest	PFO4B	Slope	Forested Peatland	Medium (II)	0.27
7	Evergreen forest	PFO4B	Slope	Forested Peatland	Medium (II)	0.03
8	Evergreen forest	PFO4B	Slope	Forested Peatland	Medium (II)	0.03
9	Evergreen forest	PFO4B	Slope	Forested Peatland	Medium (II)	0.48
10	Slope muskeg (bog), Evergreen forest	PFO4/PEM 1 and PFO4B	Slope	Open Peatland, Forested Peatland	High (I)	0.12
11	Slope muskeg (bog)	PFO4/ PEM1B	Slope	Open Peatland	High (I)	0.33
12	Evergreen forest	PFO4B	Slope	Forested Peatland	Medium (II)	0.15[5]
13	Evergreen forest	PFO4A/B	Slope	Forested Peatland, Floodplain	Medium (II)	0.06
14	Pond	PUB3x	Depressional	Floodplain	Low (III)	0.01
15	Slope muskeg (bog)	PFO4/ PEM1B	Slope	Open Peatland	High (I)	0.54
16	Slope muskeg (bog)	PFO4/ PEM1B	Slope	Open Peatland	High (I)	0.27
17	Slope muskeg (bog)	PFO4/ PEM1B	Slope	Open Peatland	High (I)	0.23
18	Slope muskeg (bog)	PFO4/ PEM1B	Slope	Open Peatland	High (I)	0.10
19	Slope muskeg (bog)	PFO4/ PSS1B	Slope	Open Peatland	High (I)	0.09
20	Slope muskeg (bog)	PFO4/ PEM1B	Slope	Open Peatland	High (I)	0.04
21	Evergreen forest	PFO4B	Riverine, Depressional	Floodplain	Medium (II)	0.19

Wetland ID	Wetland Habitat Type	Cowardin Class[1]	HGM Class[2]	WESPAK-SE Wetland Type[3]	Functiona l Rating	Impact Area (acres)
22	Red alder swamp, Evergreen forest	PFO1A/B	Riverine, Depressional	Floodplain	Medium (II)	0.18
23	Red alder swamp, Evergreen forest	PFO1B and PFO4A/B	Riverine, Depressional	Floodplain	Medium (II)	0.88
24	Red alder swamp	PFO1A/B	Riverine, Depressional	Floodplain	Medium (II)	0.44
					Total	**5.20**

Notes: All wetlands shown on Figures A1 through A23 in Appendix A.
HGM = hydrogeomorphic; PFO4B = palustrine forested needle-leaved evergreen, saturated; PFO1A/B = palustrine forested broad-leaved deciduous, temporarily flood / saturated; PFO4/PEM1B = palustrine forested needle-leaved evergreen / emergent persistent, saturated; PFO4/PSS1B = palustrine forested needle-leaved evergreen / scrub-shrub broad leaved-deciduous, saturated; PUB3x = palustrine unconsolidated bottom, mud, excavated.
[1] Cowardin et al. 1979
[2] Brinson 1993
[3] Adamus 2013
[4] Area includes calculation factor of 0.6
[5] Area includes calculation factor of 0.7

Table 3-4: Summary of Flow Paths from Wetlands in the Study Area to a TNW

Wetland ID	Wetland Abutting a RPW	Wetland Adjacent to a RPW	Receiving Watercourse and Flow Path to TNW (Sitka Sound, Starrigavan Bay, Katlian Bay,)
1	X		Watercourse 1 – Drains into Starrigavan Bay in Sitka Sound
2	X		Watercourse 2 – Drains into Starrigavan Bay in Sitka Sound
3	X		Watercourses 3 and 4 – Drains into Starrigavan Bay in Sitka Sound
4	X		Watercourse 5 – Drains into Starrigavan Bay in Sitka Sound
5	X		Watercourse 7 – Drains into 113-41-10148, then to Starrigavan Bay in Sitka Sound
6	X		Watercourse 9 – Drains into 113-41-10148 then to Starrigavan Bay; and, Watercourses 10-13 – Drains into 113-44-10090 then to Katlian Bay in Sitka Sound
7	X		Watercourse 13 – Drains into 113-44-10090 then to Katlian Bay in Sitka Sound
8	X		Watercourse 27 – Drains into Watercourse 26 then into Katlian Bay
9		X	Watercourse 27B – Drains into Watercourse 26 then into Katlian Bay
10	X		Watercourse 36A – Drains into Clearcut Creek then into Katlian Bay
11	X		Watercourses 37B, 37C, and 37D – Drains into Katlian Bay
12	X		Watercourses 38B and 38C – Drains into Katlian Bay
13	X		South Katlian River – Drains into Katlian Bay
14		X	South Katlian River – Drains into Katlian Bay
15		X	Wetland adjacent to South Katlian River that drains to Katlian Bay
16	X		Watercourse 55 – Drains to Wetland 15 that is adjacent to South Katlian River that drains to Katlian Bay
17		X	Watercourse 56 – Drains to Wetland 15 that is adjacent to South Katlian River that drains to Katlian Bay
18		X	Watercourse 57 – Drains to Wetland 15 that is adjacent to South Katlian River that drains to Katlian Bay
19		X	Wetland adjacent to Sukka Héen River that drains to Katlian Bay
20		X	Wetland adjacent to Sukka Héen River that drains to Katlian Bay
21	X		Sukka Héen River – Drains to Katlian Bay
22	X		Sukka Héen River – Drains to Katlian Bay
23	X		Sukka Héen River– Drains to Katlian Bay
24	X		Watercourse 61A and 62 – Drains to Katlian River then to Katlian Bay
25	X		Katlian River – Drains to Katlian Bay

Notes: HGM = hydrogeomorphic; PFO4B = palustrine forested needle-leaved evergreen, saturated; PFO1A/B = palustrine forested broad-leaved deciduous, temporarily flood / saturated; PFO4/PEM1B = palustrine forested needle-leaved evergreen / emergent persistent, saturated; PFO4/PSS1B = palustrine forested needle-leaved evergreen / scrub-shrub broad leaved-deciduous, saturated; PUB3x = palustrine unconsolidated bottom, mud, excavated.

[1] Cowardin et al. 1979

[2] Brinson 1993

[3] Adamus 2013

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4 STATEMENT OF LIMITATION

The wetland boundaries, classifications, functional ratings, and jurisdictional assessments described herein are the professional opinion of Amec Foster Wheeler staff based on the circumstances and site conditions at the time of this study. These professional opinions were developed in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our signed proposal. These findings are considered preliminary until the USACE makes verification of jurisdiction and confirms the wetland determination, boundary locations, and classifications.

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