Proposed Ketchikan to Shelter Cove Road
Ketchikan, Alaska
State Project No: 68405

Essential Fish Habitat Assessment

November 2014

Prepared for:

Alaska Department of Transportation and Public Facilities
Southeast Region
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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ADNR	Alaska Department of Natural Resources
AS	Alaska Statute
AWC	*Anadromous Waters Catalog*
BMPs	Best Management Practices
CFR	Code of Federal Regulations
DOT&PF	Alaska Department of Transportation and Public Facilities
EFH	Essential Fish Habitat
FMP	Fishery Management Plan
HAPC	Habitat areas of particular concern
IP	Individual Permit
MOA	Memorandum of Agreement
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
SWPPP	Stormwater Pollution Prevention Plan
USACE	United States Army Corps of Engineers

1.0 Introduction

The Department of Transportation and Public Facilities (DOT&PF) Southeast Region is proposing to expand the road system from the City of Ketchikan on Revillagigedo Island, Alaska (Figure 1). The purpose of the project is to provide a public surface transportation link that would extend the existing Ketchikan road system to the Shelter Cove road system. The DOT&PF has submitted an application for a United States Army Corps of Engineers (USACE) Individual Permit in compliance with Section 404 of the Clean Water Act.

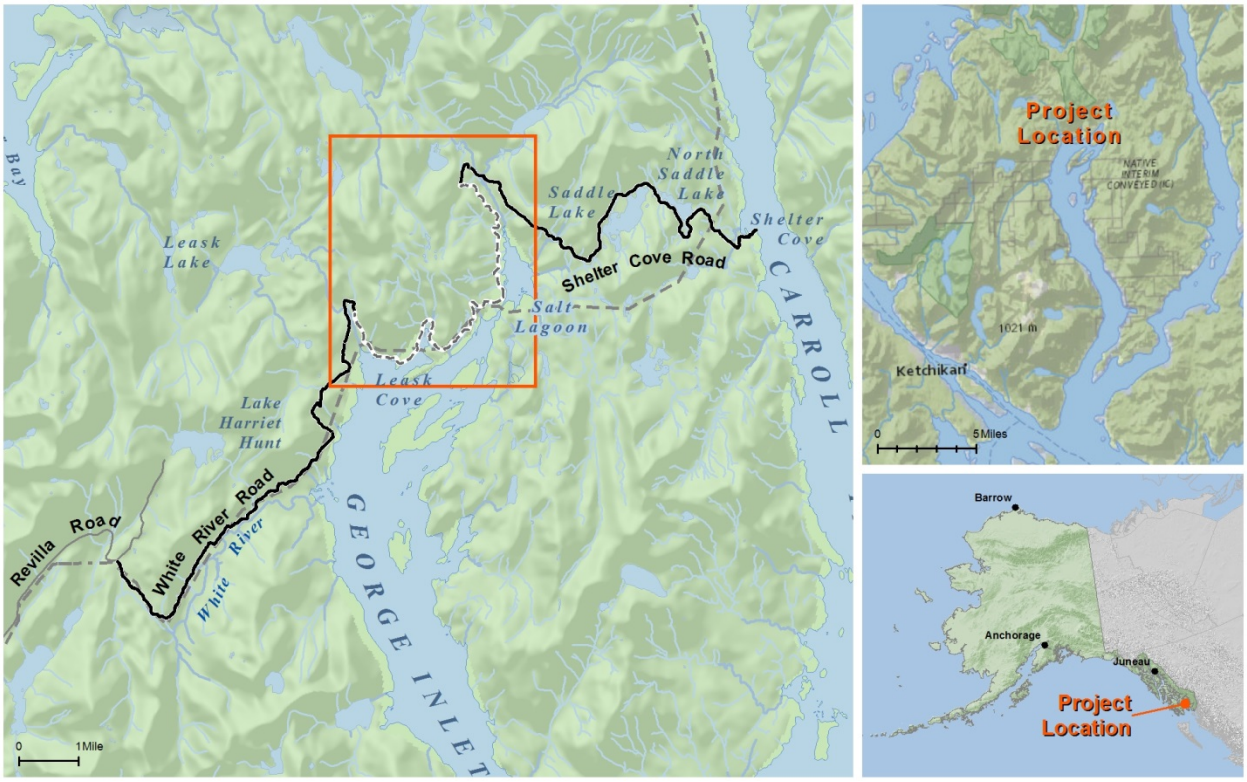

Figure 1. Project Vicinity Map for the Proposed Shelter Cove Road Project, 2014

In accordance with the Essential Fish Habitat (EFH) requirements of the Magnuson-Stevens Fishery Conservation and Management Act[1] (MSFCMA), this abbreviated EFH assessment presents a description of the proposed action, proposed conservation measures to minimize project effects, an analysis of the potential adverse impacts on EFH and managed species[2], and the federal agency's conclusion regarding the effects of the action. An abbreviated consultation

[1] The MSFCMA directs federal agencies to consult with the National Oceanic and Atmospheric Administration (NOAA) Fisheries when any of their activities may have an adverse effect on EFH.
[2] Fish species managed by a Fishery Management Plan (FMP) are considered EFH species.

procedure is being used because the proposed action would not result in substantial[3] adverse effects to EFH.

The MSFCMA defines EFH as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The MSFCMA notes that "for the purpose of interpreting the definition of EFH, 'waters' include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; 'substrate' includes sediment, hard bottom, structures underlying the waters, and associated biological communities, 'necessary' means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and 'spawning, breeding, feeding, or growth to maturity' covers a species full life cycle."

2.0 Proposed Action

The proposed action would construct an unpaved gravel 14-foot-wide, single-lane road designed to meet American Association of State Highway and Transportation Officials (AASHTO) standards for Very Low-Volume Local with a 20-mile-per-hour design speed and 10-foot-wide inter-visible turnouts, as needed. A detailed project description was provided in the Individual Permit (IP) application.

In summary, the new 7.29-mile road segment would extend from the existing White River Road terminus to the western extent of the existing Shelter Cove Road just north of George Inlet (Figure 2). Approximately 1.61 miles of road would be routed through wetlands or other jurisdictional waters of the United States (U.S.), while the other 5.68 miles would be routed through uplands.

[3] Substantial adverse effects are those that may pose a relatively serious threat to EFH and typically could not be alleviated through minor modifications to the proposed action (National Marine Fisheries Service [NMFS] 2004).

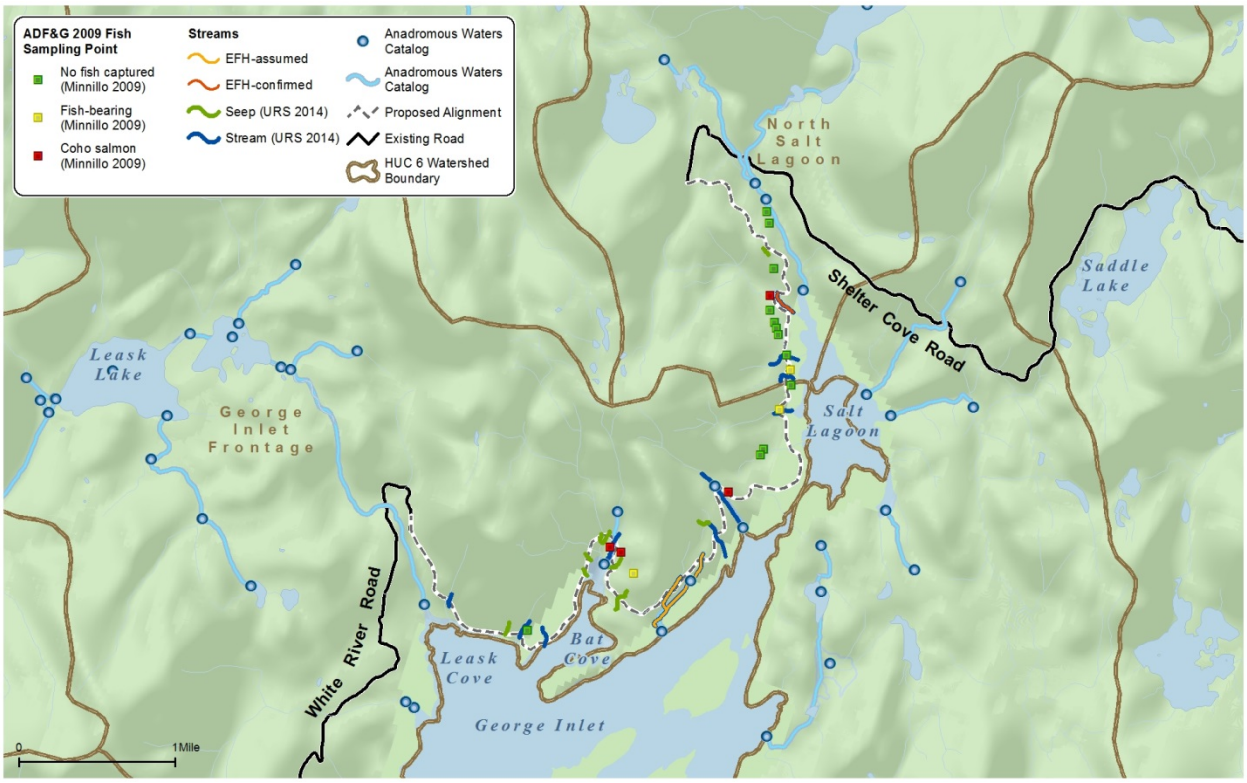

Figure 2. Proposed Road Alignment for the Ketchikan to Shelter Cove Road Project, November 2014

The proposed road design includes several types of culverts to ensure drainage is adequately maintained throughout the project area. The proposed culverts range in size from 24 to 78 inches in diameter, depending on intended use. In general, uses include upland drainage, wetland and/or waters drainage, or fish passage.

The proposed alignment would cross 21 stream channels. The project proposes to install culverts designed for fish passage in fish-bearing streams to comply with the Fish Passage Act, the Anadromous Fish Act, and the Memorandum of Agreement (MOA) between the ADF&G and DOT&PF for the design, permitting, and construction of culverts for fish passage.

Not all streams have been sampled for fish presence within the vicinity of the proposed crossing location. However, based on available information, the project would cross seven channels in five stream drainages known or assumed to have EFH for coho salmon (*Oncorhynchus kisutch*) and/or pink salmon (*O. gorbuscha*). Additionally, three drainages that would be crossed have been documented to support fish species (Minnillo 2009) that are not FMP-managed and

therefore are not considered EFH[4]. A description of the EFH and FMP-managed species that would be affected by the proposed action is provided below.

The remaining streams include small, high-gradient drainages where fish have either not been captured or would not be expected to occur due to unsuitable habitat (e.g., gradient), as well as a few streams where fish presence may occur but has not been confirmed. Where the alignment crosses streams or other small drainages that do not support fish, drainage culverts would be installed to convey surface drainage. Additional field data will be collected in coordination with the ADF&G in streams that would be crossed where fish presence or absence has not yet been confirmed.

3.0 EFH Designations in the Project Area

The proposed road alignment would traverse the eastern portion of the George Inlet Frontage watershed and the southern portion of the North Salt Lagoon watershed; both watersheds drain into George Inlet (Figure 2). The proposed alignment would require crossing seven stream channels in drainages that are confirmed or assumed to have EFH. Coho salmon and pink salmon are the only species managed under a federal FMP that are known to occur in project area streams.

Estuarine and marine habitat in George Inlet and Salt Lagoon provides EFH for other federally managed species, in addition to coho and pink salmon. While the project would affect streams within these watersheds, it would not adversely affect EFH in estuarine and marine waters or other federally managed species. The proposed alignment would not affect any known habitat areas of particular concern[5] (HAPC).

The primary EFH drainages that would be crossed in the George Inlet Frontage watershed, from west to east, include:

1) Unnamed stream, flows into the head of Bat Cove west of *Anadromous Waters Catalog* (AWC) Stream #101-45-10340
2) AWC Stream #101-45-10340, flows into the head of Bat Cove
3) AWC Stream #101-45-10350, flows into George Inlet just east of Bat Point
4) AWC Stream #101-45-10360, flows into the top of George Inlet

The only documented EFH stream that would be crossed in the North Salt Lagoon watershed is:

5) Unnamed stream, flows into Salt Lagoon just south of AWC Stream #101-45-10380

[4] In 2009, an ADF&G fisheries biologist sampled for fish presence or absence in streams crossed by a preliminary road alignment. Results are presented in the *Leask Lake to Shelter Cove Stream Inspection* memorandum (Minnillo 2009). Minnillo identified Streams #10, 12, and #16 as supporting fish species not managed under a federal FMP, such as cutthroat trout (*O. clarkii*) and/or Dolly Varden (*Salvelinus malma)*.

[5] HAPCs are smaller habitat areas within EFH that meet these considerations: importance of ecological function, sensitivity, stress from human-induced activities, and rarity.

A brief description of habitat conditions and fish presence within the vicinity of each proposed EFH crossing identified above, as well as dimensions of each proposed crossing conveyance, is provided below. The section that follows provides a brief description of the FMP-managed species for which EFH has been identified.

3.1 EFH Stream Crossings

The identification of freshwater EFH was based primarily on the AWC and results of fish presence surveys that were conducted at 19 streams along the previous 2009 alignment by ADF&G biologist Mark Minnillo. Minnillo sampled for fish presence and recorded habitat conditions within roughly 100 feet of the 2009 road alignment. In general, fish were not captured in habitat where estimated stream gradient exceeded 6 percent. Methods and results of that field effort are presented in the *Leask Lake to Shelter Cove Stream Inspection* memorandum (Minnillo 2009).

The currently proposed alignment has been refined since the 2009 stream survey was conducted; therefore, some crossing locations have changed. In many cases, the proposed stream crossing is located within the same general vicinity. In other cases, the proposed route would cross a stream either upstream or downstream of the location sampled in 2009, or would cross a new stream drainage not sampled in 2009. In these cases, professional judgment and the best available information were used to assess the likelihood of fish presence, based primarily on proximity of the stream to known fish habitat and stream gradient, as discussed below. The DOT&PF will continue to coordinate with the ADF&G during upcoming Title 16 permitting efforts and as design progresses to confirm the presence or absence of fish where existing data are insufficient.

The section that follows provides a summary of the fish presence and habitat data collected in 2009, where applicable.

Unnamed stream (western Bat Cove stream; Culverts P-66 and P-68)
This unnamed stream empties into the head of Bat Cove just west of AWC Stream #101-45-10340. This stream was not previously cataloged as anadromous, but was recently found to support rearing coho salmon (identified as Stream #18[6] in Minnillo 2009; see Figure 3). The proposed crossing location would be in the same vicinity as habitat sampled in 2009.

The channel was recorded as having a gradient of less than 2 percent and a width of 15 feet near the proposed crossing location. Substrate was dominated by gravel and cobble. Habitat characteristics were noted to be similar to those of AWC Stream #101-45-10340. Fish sampling occurred in two locations; juvenile coho salmon were captured from both locations (Figure 3; Minnillo 2009). The project proposes to construct a fish passage culvert to cross this stream

[6] This stream also corresponds to stream 10 identified in the *Final Preliminary Jurisdictional Determination of Waters of the United States and Wetlands, Shelter Cove Road Project* (URS Corporation [URS] 2014).

(Culvert P-66[7]). The culvert would be 42 inches in diameter and 56 feet long, and would require 9.6 cubic yards of bedding material below ordinary high water.

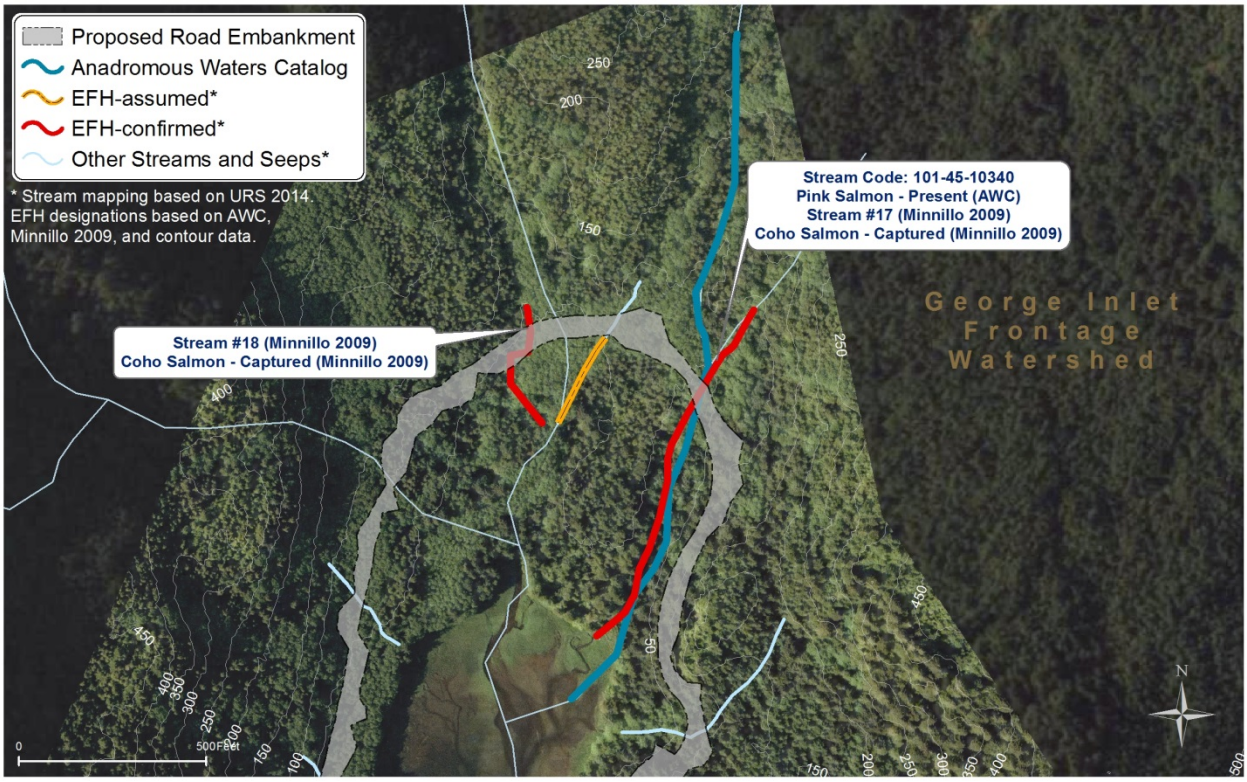

Figure 3. Essential Fish Habitat Stream Crossing Locations along the Proposed Alignment for the Ketchikan to Shelter Cove Road Project, November 4, 2014

Wetland scientists noted the presence of a small seep just to the east of this stream that would also be crossed by the proposed road segment. The seep was not sampled for fish presence in 2009; therefore, fish presence or absence has not been confirmed. While this small seep may be connected to a known anadromous stream farther downstream, based on its steep gradient at the crossing location, it is assumed not to support fish upstream of the crossing location[8]. At this time, the project proposes to install a 24-inch drainage culvert (P-68) at this location. However, further coordination with ADF&G will occur to confirm whether or not fish passage would be required at this location.

[7] Culvert (P-00) refers to the Pipe ID identified in the permit figures submitted with the IP application.
[8] Stream gradient is estimated as approximately 20% over 100 ft; this would likely present a barrier to upstream migrating adult coho and pink salmon unless sufficient resting places are available (Alaska Department of Natural Resources [ADNR] 2007).

AWC Stream #101-45-10340 (eastern Bat Cove stream; Culvert P-69)
This is the easternmost of the two streams that drain into the head of Bat Cove (Figure 3). The AWC identifies this stream as providing habitat for pink salmon (ADF&G 2014). This stream was also recently found to support coho salmon (identified as Stream #17 in Minnillo 2009).

This stream was recorded as 10 to 15 feet wide with a gravel/cobble substrate and gradient less than 2 percent near the crossing location. The proposed crossing location is located just downstream of the habitat sampled in 2009. However, juvenile coho salmon were captured and observed throughout the stream reach between Bat Cove and the proposed crossing location (Minnillo 2009). The project proposes to install a fish passage culvert to cross this stream (Culvert P-69). The culvert would be 42 inches in diameter and 34 feet long, and would require that 9.6 cubic yards of fill material be placed below the ordinary high water line.

AWC Stream #101-45-10350 (east of Bat Point; Culverts P-99 and P-110)
The proposed alignment would cross this drainage in two locations – the primary stream channel and a tributary stream channel – as shown on Figure 4 and described below. Fish presence and absence data are not available for the proposed crossing locations in either channel. Neither stream channel was sampled for fish presence since the previous 2009 alignment was routed farther upstream to the northwest and did not cross either channel.

The AWC identifies the lower 0.5 mile of the primary stream channel as habitat for both coho and pink salmon (AWC Stream # 101-45-10350). The current upstream extent of anadromous fish habitat is located roughly 850 feet downstream of the proposed crossing location. While the stream gradient increases farther upstream near its headwaters and in the vicinity of the proposed crossing location, the AWC data do not confirm the presence or absence of a fish passage barrier upstream of the anadromous extent shown[9] (ADF&G 2014). Therefore, additional information would be necessary to determine whether a fish passage culvert would be required at this location.

Based on its connectivity to known anadromous habitat, however, the proposed action currently assumes fish passage would be required at this crossing location. The project proposes to install a 36-inch, 84-foot-long culvert (P-110) at this location. Culvert installation would require that 8.9 cubic yards of fill be placed below the stream's ordinary high water line. However, the DOT&PF will coordinate with the ADF&G to confirm if fish passage would be necessary.

[9] Based on review of available contour data, the stream gradient may exceed the gradient threshold for pink salmon but may not preclude the upstream passage of adult coho salmon (ADNR 2007).

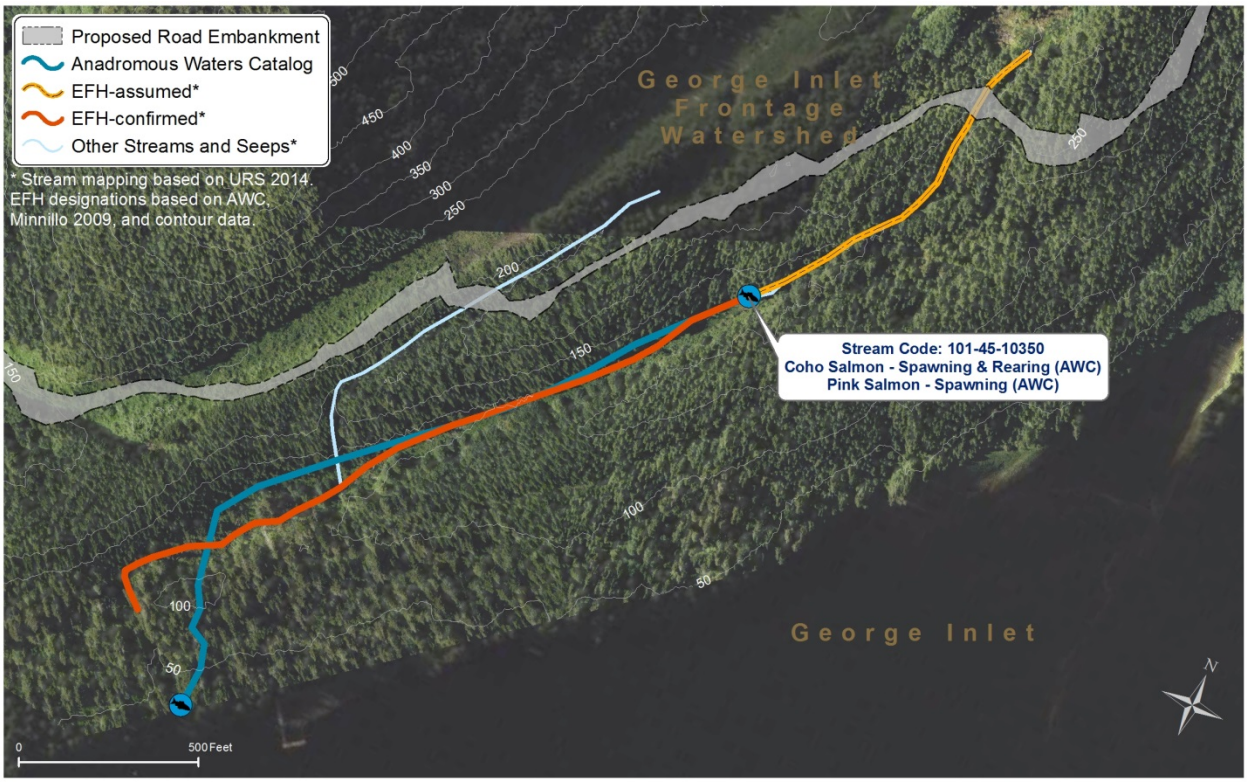

Figure 4. Essential Fish Habitat Stream Crossings along the Proposed Alignment for the Ketchikan to Shelter Cove Road Project, November 2014

The project would also require crossing a small, high-gradient tributary stream[10] in this drainage. While fish species distribution has not been determined for the tributary stream, it is unlikely to provide habitat for anadromous fish due to an extremely steep gradient[11] near its confluence with AWC Stream #101-45-10350. The DOT&PF will coordinate with the ADF&G to determine whether or not fish passage would be required for resident fish at this location. At this time, the proposed culvert (P-99) would be 36 inches in diameter and 68 feet long, and would require that 8.9 cubic yards of fill be placed below the stream's ordinary high water line.

AWC Stream #101-45-10360 (top of George Inlet; Culvert P-120)

This stream, which flows into the northern portion of George Inlet, provides EFH for pink salmon (ADF&G 2014; Figure 5). The stream was sampled at two locations at the bottom of a steep gorge roughly 50 feet upstream and downstream of the proposed alignment (identified as Stream #15 in Minnillo 2009). The proposed crossing location is within the same general vicinity of habitat sampled in 2009. The stream was 15 feet wide with cobble/boulder substrate and had a gradient of approximately 2 to 5 percent within the reach sampled (Minnillo 2009).

[10] The primary channel (AWC 101-45-10350) and tributary correspond to streams 7 and 8, respectively, in URS 2014.
[11] Based on review of available contour data, stream gradient is estimated to exceed 30% over a distance of 180 ft; this gradient would likely preclude the upstream passage of adult coho and pink salmon (ADNR 2007).

Cutthroat trout was the only species captured in 2009. However, the presence of juvenile pink salmon would not be expected since juvenile pink salmon out-migrate soon after emergence (e.g., prior to June). Pink salmon typically do not recruit well to minnow trapping, which was the primary sampling method. Further inspection of this stream was recommended to determine the extent of anadromous habitat and identify if a fish passage barrier may exist downstream of the proposed alignment (Minnillo 2009). Either way, fish passage would likely be required. Therefore, the project proposes to construct a fish passage culvert to cross this stream. The culvert (P-120) would be 36 inches in diameter and 200 feet long, and would require that 11.9 cubic yards of fill material be placed below the ordinary high water line.

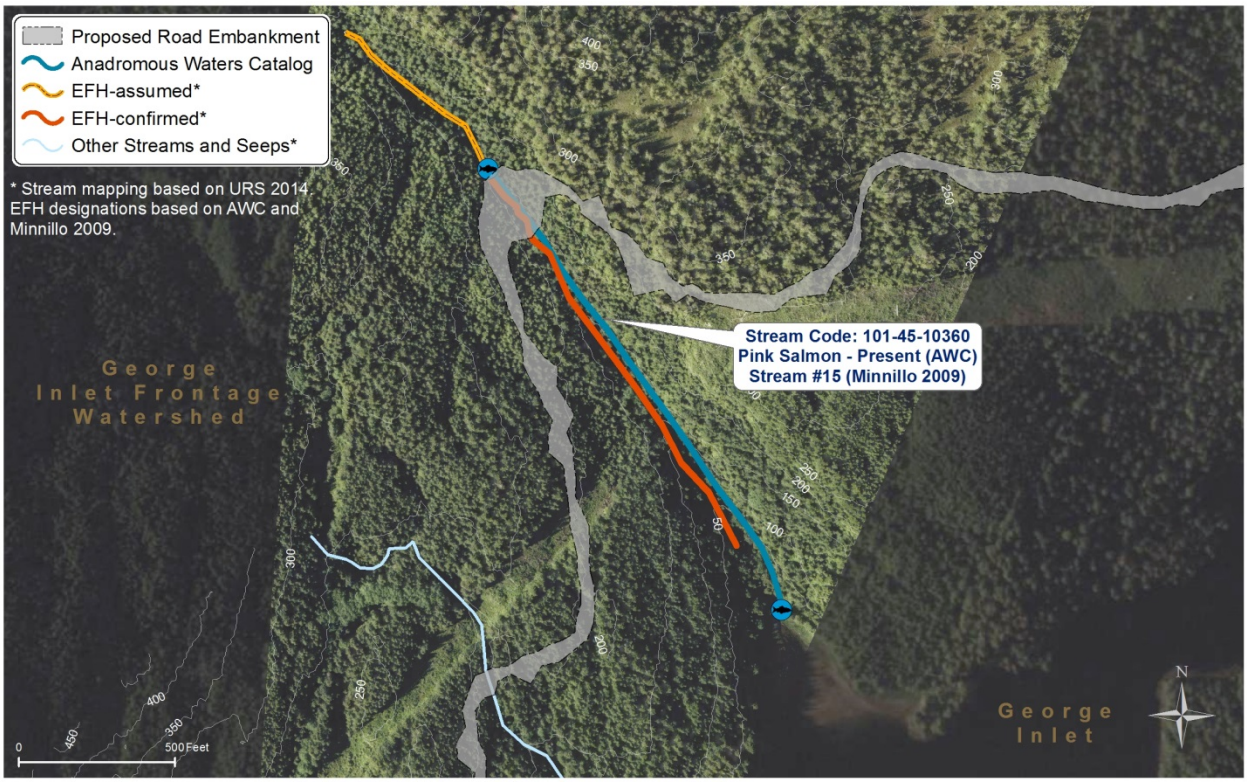

Figure 5. Essential Fish Habitat Stream Crossings along the Proposed Alignment for the Ketchikan to Shelter Cove Road Project, November 2014

Unnamed stream drainage (flows into Salt Lagoon; Culvert P-168)

This unnamed stream flows into Salt Lagoon just south of AWC Stream #101-45-10380[12]. This stream was recently found to provide EFH for coho salmon and support cutthroat trout and Dolly Varden (Minnillo 2009). The stream was sampled for fish presence at two locations within 50 feet of the 2009 alignment (identified as Stream #4 in Minnillo 2009; see Figure 6). The stream reach sampled was 20 feet wide with a gradient of 1 to 2 percent; substrate consisted of rubble,

[12] AWC stream 101-45-10380 provides EFH for coho, pink, chum (*O. keta*), and sockeye (*O. nerka*) salmon and habitat for anadromous steelhead trout (*O. mykiss*; ADF&G 2014).

cobble, and boulder (Minnillo 2009). The proposed route would cross this stream at a point approximately 600 feet downstream of the habitat sampled in 2009.

The project proposes to construct a fish passage culvert to cross this stream. The culvert (P-168) would be 48 inches in diameter and 81 feet long, and would require that 10.4 cubic yards of fill be placed below the stream's ordinary high water.

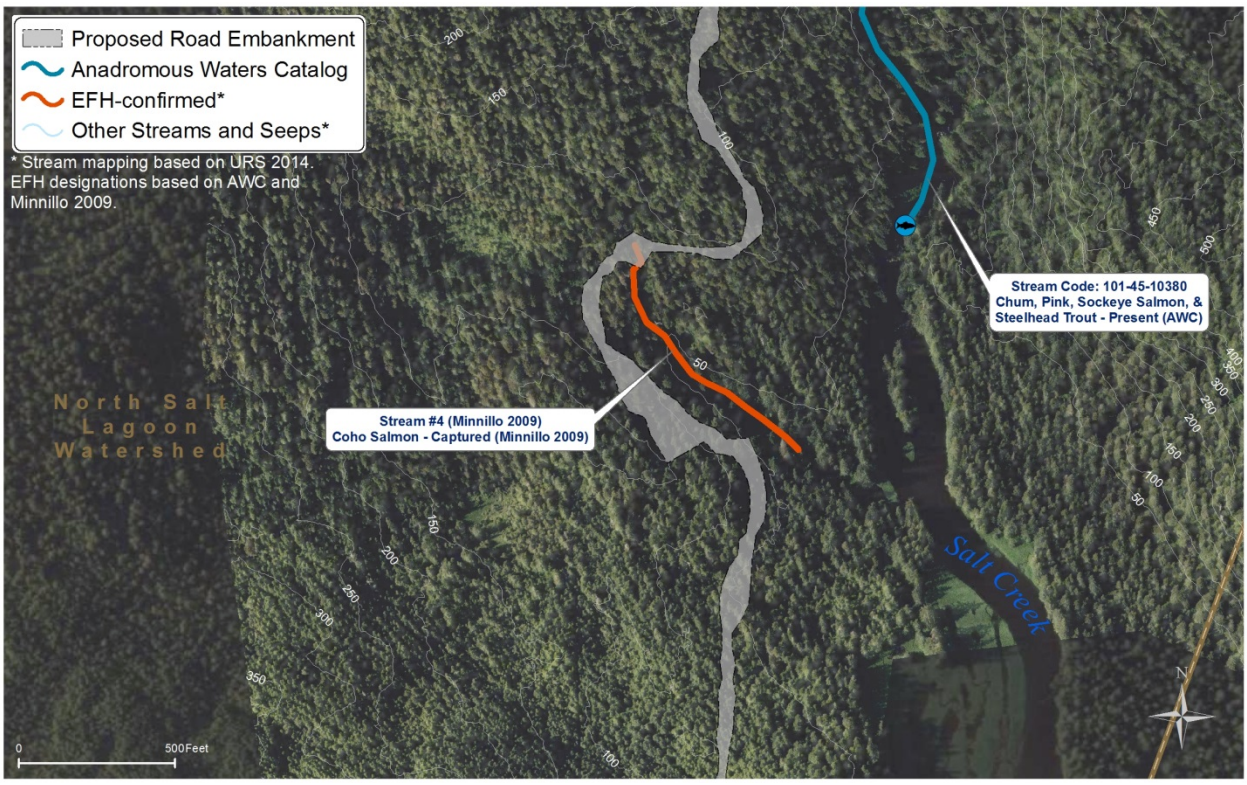

Figure 6. Essential Fish Habitat Stream Crossings along the Proposed Alignment for the Ketchikan to Shelter Cove Road Project, November 2014

3.2 Federal FMP-Managed Species

Coho salmon

Coho salmon occupy more diverse habitats during its lifecycle than other anadromous salmonids using freshwater, nearshore, and offshore environments (Elliott 2007). In Alaska, adult coho salmon enter their spawning stream systems between July and November, usually during periods of high runoff. Throughout southeast Alaska, coho salmon typically move into their spawning systems in August through October, and spawning may extend into the winter months (Bethers et al. 1995). Run-timing specific to project-area streams is not available.

Coho salmon eggs develop during the winter and hatch in early spring, and the embryos remain in the gravel until they emerge in May or June (Bethers et al. 1995). The newly emerged fish occupy shallow stream margins, usually among submerged woody debris, undercut banks, or

other slower-water habitats (Bethers et al. 1995; Elliott 2007). Coho salmon typically reside in freshwater streams from 1 to 3 years before out-migrating to sea (Elliott 2007; Bethers et al. 1995). Timing of juvenile outmigration specific to project-area streams is not available, but typically occurs from early April through late May throughout southeast Alaska.

Coho salmon have been documented in five stream drainages considered EFH in the project area. Coho salmon use habitat in project area streams for both spawning and rearing. Juvenile coho salmon were recently captured from three drainages in the project area (Minnillo 2009). The presence of adult coho salmon had previously been documented in two streams crossed, one of which was not sampled in 2009 (ADF&G 2014).

Pink salmon

In southeast Alaska, pink salmon typically enter local spawning streams between late June and mid-August; however, spawning timing can vary with different salmon runs in adjacent streams or even within the same stream (Bethers et al. 1995). Pink salmon generally spawn in small rivers near the coast and in intertidal stream channels and estuaries near the mouths of rivers (Kingsbury 1994; Bethers et al. 1995). The presence of adult pink salmon has been documented by the AWC in three stream drainages that would be crossed by the proposed alignment.

Favored spawning habitat includes shallow riffles located in both freshwater and intertidal channels, where flowing water breaks over coarse gravel or cobbles, and in the downstream ends of pools (Kingsbury 2004; National Academy of Sciences 1971). Pink salmon mature and complete their entire life cycle in 2 years. The 2-year life span has created genetically distinct populations such that salmon that spawn in odd and even years in a particular stream are reproductively isolated from each other.

Pink salmon spend the least amount of time in freshwater environments, compared to other Pacific salmon species. Juvenile pink salmon do not over-winter in streams but generally out-migrate to coastal waters soon after they emerge in late winter and spring. Run-timing specific to project area streams in not available; in southeast Alaska, juvenile pink salmon typically move downstream in April and May (Bethers et al. 1995). Throughout the spring and early summer, juvenile pink salmon likely utilize the nearshore habitat throughout Salt Lagoon and George Inlet prior to moving offshore.

4.0 Proposed Conservation Measures

The DOT&PF proposes the following conservation and mitigation measures to avoid, minimize, or mitigate adverse impacts to EFH.

Design avoidance measures:

- The alternative that would meet the proposed overall project purpose and would impact the least amount of waters of the U.S. would be selected by DOT&PF.

- Road dimensions would be the minimum required to meet the overall project purpose.
- To the extent practicable and in consideration of design criteria constraints, the proposed road alignment would be rerouted to avoid impacts to waters of the U.S. (including EFH; see Avoidance and Minimization map set and table in Attachment D of IP application).
- Where practicable, the design would incorporate 2:1 side slopes, as recommended for slope stability and traffic safety, to avoid impacts to wetlands and other waters.
- The project would be designed to include a 50-foot buffer for anadromous waters and EFH, except where streams would be crossed, to avoid impacts to riparian habitat.

Design minimization measures:

- Existing drainage patterns would be maintained; properly sized and designed culverts would be used in appropriate locations to maintain the natural flow patterns and timing of surface water inflows to adjacent wetlands and waters.
- The proposed alignment would be rerouted so stream crossings would be as close to perpendicular to the axis of the channel as engineering and routing conditions allow.
- Properly sized and designed culverts would be installed to minimize impacts to fish in fish-bearing streams to comply with the Fishway Act (or Fish Passage Act, Alaska Statute [AS] 16.05.841), the Anadromous Fish Act (AS 16.05871), and the MSFCMA. Fish passage will be designed in accord with Tier 1 guidelines in the MOA between the ADF&G and DOT&PF for the design, permitting, and construction of culverts for fish passage.

Construction minimization measures:

- Timing windows for in-water work would be incorporated into the construction schedule to avoid in-water work during critical life stages for EFH species and other salmonids in order to minimize potential adverse effects to salmonids. For example, in-water work would be timed to avoid those times when juvenile salmon are out-migrating. In southeast Alaska, in-water construction is generally restricted from April 1 through June 15, although this timing window may be adjusted based on permit stipulations.
- When water velocity allows and prior to starting work, a silt fence or floating silt curtain would be used downstream or around the crossing. Where required, a fish barrier net may be used upstream and downstream of the crossing to prevent fish from entering the work area.
- At no time would the construction activities result in a migration barrier for adult or juvenile salmonids. Prior to installing culverts in fish-bearing waters, personnel experienced in fish removal/transport would isolate and remove fish from the work area in accordance with an ADF&G fish resource permit and project plans and specifications. Once fish are removed, the stream flow would be temporarily diverted so that the crossing location would be isolated from the flowing stream. Fish passage would be maintained in the temporary diversion channel in accordance with ADF&G permit

stipulations. Diversion techniques would likely involve creating a temporary diversion channel, plugging the natural channel upstream and downstream of the construction area, and temporarily rerouting flow into the diversion channel.

- Typical procedures for temporary stream diversions in fish-bearing waters are as follows:
  - The diversion channel would be sized to carry anticipated stream flows during the construction period.
  - During excavation, the diversion channel would be isolated from the stream to be diverted at the upstream and downstream ends of the diversion channel.
  - The bed and banks of the diversion channel would be constructed of material that will not erode at expected flows.
  - Diversion of flow into the temporary diversion channel would be conducted by first removing the downstream plug and then the upstream plug, and closing the upstream end and then the downstream end of the natural channel and diverted stream.
  - Fish that become stranded in dewatered channels would be immediately captured and returned to the active channel without further harm, pursuant to a valid Fish Restoration Plan.
  - If a tributary stream enters the former channel within the diversion area, it would be connected in a suitable manner to the new channel.
  - Fish passage in the temporary diversion channel would be maintained in accordance with ADF&G Division of Habitat authorization.
  - Re-diversion of flow into the natural stream channel would be conducted by removing the downstream plug from the natural channel and then the upstream plug, and closing the upstream end and then the downstream end of the diversion channel.
  - All man-made materials would be removed from the diversion channel, the channel backfilled, and stream banks stabilized.
  - All disturbed areas would be re-vegetated with naturally occurring woody plants and grasses if appropriate.
- Any stream bank affected by the work would be restored and stabilized. The stream bed and banks would be backfilled and restored to the pre-existing course, condition, capacity, and location.
- The DOT&PF would prepare, or would require the construction contractor to prepare, an SWPPP and would require compliance with that plan. The plan would clearly describe BMPs required during construction to prevent erosion and runoff from entering aquatic habitats.
- Erosion and sediment control measures (perimeter protection) such as silt fences and straw wattles would be placed around wetlands and waters within the disturbance limit (within 15 feet).
- Temporarily disturbed areas, including slopes, would be re-contoured to match existing contours and stabilized within 7 days of the completion of construction in the area. Silt fences, curtains, and other structures would be installed properly and maintained in a

functioning manner for the life of the construction period where fill material and exposed soils might cause transport of sediment or turbidity beyond the immediate construction site.

- Project limits in waters of the U.S. would be clearly identified in the field (e.g., staking, flagging, silt fencing, existing footprint for maintenance activities, etc.) prior to clearing and construction to ensure avoidance of impacts to waters of the U.S. (including wetlands) beyond project footprints.
- Equipment would remain inside the identified project limits, and would not be stored, maintained, or repaired in waters of the U.S. Temporary stockpiles and equipment staging areas would be located in uplands or previously disturbed areas whenever possible.
- Contaminant-free embankment and surface materials would be used during construction to avoid introducing contaminated material to the project area.
- The work would not adversely alter existing hydrology of waters of the U.S.
- The authorized structure, pipe, or associated fill would not impede flood flows. To the extent practicable, excavation equipment would work from an upland site (e.g., the top of the culvert at road crossings) to minimize adding fill into waters of the U.S. If it is not practicable to work from an upland site, excavation equipment would minimize disturbance to the channel or stream bank and bottom (other than the removal of accumulated sediments or debris).

Compensate for unavoidable impacts:

- The DOT&PF would work with the appropriate resource and regulatory agencies during development of a mitigation plan to offset unavoidable impacts.

5.0 Analysis of Effects to EFH

This section presents an analysis of the effects the proposed project would have on EFH with the proposed conservation and mitigation measures. An adverse effect refers to any impact that reduces quality or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

5.1 Direct Effects

The proposed action would discharge 75,760 cubic yards of fill material for the roadway embankment and road surface across 9.6 acres of wetlands. The project would also discharge 178 cubic yards of fill material in 21 streams below the ordinary high water line during culvert installation. Approximately 5.80 acres of wetlands and other waters of the U.S. would be temporarily disturbed during construction. This would include ground-disturbing activities in 5.73 acres of wetlands and 0.06 acre in streams that flow through upland habitat.

The proposed project would build a road that traverses the eastern portion of the George Inlet Frontage watershed and the southern portion of the North Salt Lagoon watershed and result in 21 new stream crossings in these watersheds. To minimize impacts, the dimensions of the road are the minimum required to meet the overall project purpose. In addition to the potential loss of habitat and habitat function, the potential adverse impacts to aquatic habitat from the existence of roads in watersheds, according to the NFMS (2011), include:

1) Increased surface erosion, including mass wasting and fine sediment deposition;
2) Changes in water temperatures;
3) Elimination or introduction of migration barriers such as poorly designed culverts;
4) Changes in stream flow;
5) Introduction of invasive species;
6) Changes in stream channel configuration; and
7) Introduction and/or concentration of pollutants.

Surface erosion. Road building and maintenance activities can negatively affect aquatic habitat by increasing rates of natural landslides and sedimentation, and unpaved roads can increase surface erosion. Improperly engineered, constructed, or maintained roads can destabilize slopes and increase erosion rates. Increased surface erosion results in an increase in fine sediment deposition, which can decrease fry emergence and juvenile fish density, and alter the benthic composition (NMFS 2011). The rate of erosion is a function of storm intensity, road surface material, road slope, and traffic levels. To minimize the potential for erosion to adversely affect fish-bearing streams, the project design incorporates 2:1 side slopes for slope stability, where practicable. The proposed road is not expected to generate high levels of traffic. Additional BMPs to minimize impacts to streams would be implemented during construction.

Water temperature. Roads built adjacent to streams can result in increased water temperatures due to changes in vegetation and sunlight (NMFS 2011). To avoid impacting riparian habitat and vegetation to the point of causing increased water temperatures, the project was designed to include a 50-foot buffer for anadromous waters and EFH, except where streams would be crossed.

Migration barriers. The project proposes to install culverts designed to provide fish passage at stream crossing sites considered EFH for coho and/or pink salmon. Fish passage culverts would be designed to meet Tier 1 guidelines in the *Memorandum of Agreement between the ADF&G and DOT&PF for the Design, Permitting, and Construction of Culverts for Fish Passage*, August 3, 2001.

In accordance with the MOA, culvert crossings would be designed to maintain natural stream conditions such as flow, substrate, and existing fish passage efficiency. At a minimum, two types of fish passage culverts would be used, depending primarily on stream gradient and width. In general, culverts without baffles would be used in low- to moderate-gradient streams.

Culverts with baffles to retain substrate would be used at crossing sites where gradient exceeds 3 percent.

While culverts would be designed to meet the MOA fish passage requirements and minimize permanent impacts, activities in or near EFH would impact habitat. Impacts to EFH would primarily be temporary in nature and related primarily to culvert installation. Temporarily diverting the creek to allow the installation of culverts would temporarily impair habitat function. However, passage would be maintained during construction activities in accordance with ADF&G permit stipulations. The project would follow a number of measures to avoid and/or minimize impacts to EFH and fish species, as described in Section 4.0. No substantial permanent, long-term adverse impacts would be expected as a result of culvert installation.

Other temporary impacts could include a temporary increase in turbidity levels. While a temporary increase in turbidity would be possible in the channel and open waters during construction activities, impacts would be minimal and temporary in nature. Impacts would be minimized by adhering to BMPs during construction, as outlined in the SWPPP, to prevent erosion and runoff from entering aquatic habitats. Once construction has ceased, the proposed project would not be expected to cause increased turbidity or measurably impact EFH or managed species.

Stream flow. In accordance with the MOA, culvert crossings would be designed to maintain natural stream conditions, including stream flow, as outlined above. To minimize impacts to aquatic habitats, the existing drainage patterns would be maintained, and properly sized and designed culverts would be used in appropriate locations to maintain the natural flow patterns and timing of surface water inflows to adjacent wetlands and waters. The proposed work would not adversely alter existing hydrology of waters of the U.S., including EFH.

Invasive species. Roads can serve as vectors for the introduction of invasive species to watersheds by creating habitat suitable for invasive species; by planting invasive vegetation along roadsides for erosion control; and for unintentional introduction of invasive species from vehicular or other traffic traveling the road (NMFS 2011). Disturbed areas would be re-vegetated with naturally occurring woody plants and grasses, where appropriate; invasive species would not be planted and transported to the project area.

Channel configuration and habitat alteration. Substantial changes to the stream channel configuration can result from improperly sized culverts or old culverts that have deteriorated structurally over time. Installation of culverts changes the stream channel configuration by channelizing the stream course over the length of the culvert. While some habitat functions would be lost or altered (e.g., floodplain function of stream within the culvert), the existing drainage patterns would be maintained, and properly sized and designed culverts would be used to maintain the natural flow patterns and effectively maintain the configuration of the channel. At stream crossing locations, the existing, naturally day-lighted channels would be routed through the length of the non-day-lighted culverts (>400 linear feet).

Construction activities would have primarily temporary impacts and minimal effects on coho and/or pink salmon and EFH. At a minimum, an estimated 121 cubic yards of fill would be placed in EFH below the ordinary high water line for the installation of fish passage culverts.

To minimize potential adverse effects to salmonids, timing windows for in-water work would be incorporated into the construction schedule to avoid in-water work during critical life stages for EFH-listed species and other salmonids. For example, in-water work would be timed to avoid those times when juvenile salmon are out-migrating. In the southeast Alaska, in-water construction is generally restricted from April 1 through June 15, although this timing window may be adjusted in permit stipulations.

Pollutants. Contaminant-free embankment and surface materials would be used during construction to avoid introducing contaminated material to the project area. Standard spill-prevention measures would be implemented during construction; spill clean-up equipment (e.g., oil-absorbent pads) would be available onsite during construction. The presence of a new road would lead to motorized vehicle use and result in an increase of pollutants from vehicular runoff; pollutants could eventually reach waters of the U.S., including EFH.

5.2 Indirect Effects

Indirect impacts are those impacts outside the immediate influence of construction and operation of the project. They may be physically some distance from the project or may occur later in time as a “spin-off” or induced effect of the project.

The presence of a new road would lead to motorized vehicle use and result in an increase of traffic within the project area. An increase in human access could potentially lead to increased fish harvest by sport and subsistence users. However, the level of increased use is not anticipated to have substantial effects to fish populations. Indirect impacts could also include the loss of prey or a reduction in species fecundity, primarily associated with EFH and wetlands. However, the proposed project is not expected to change the fecundity of EFH species or result in a substantial loss of prey species that EFH species rely upon. The relatively small loss of EFH and wetland habitat is not likely to result in substantial reduction of prey species populations. Indirect impacts are expected to be limited.

6.0 Conclusion of Effects

Although EFH would be impacted, the proposed project would not cause major adverse impacts to fish populations. Species would be expected to move successfully between habitats upstream and downstream of fish passage culverts. Based on the anticipated impacts and proposed conservation measures, the proposed project is not expected to have adverse affects on EFH or managed species in the project area.

7.0 References

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