

## **Attachment 10**

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Initial Study Report Meetings

Action Item for Study 9.9

March 22, 2016

**Susitna-Watana Hydroelectric Project  
(FERC No. 14241)**

**Initial Study Report Meetings  
March 22, 2016  
Action Items**

**Characterization and Mapping of Aquatic Habitats  
Study Plan Section 9.9  
Supplement to  
Study Completion Report (November 9, 2015)**

Prepared for  
Alaska Energy Authority



Prepared by  
R2 Resource Consultants

April 2016

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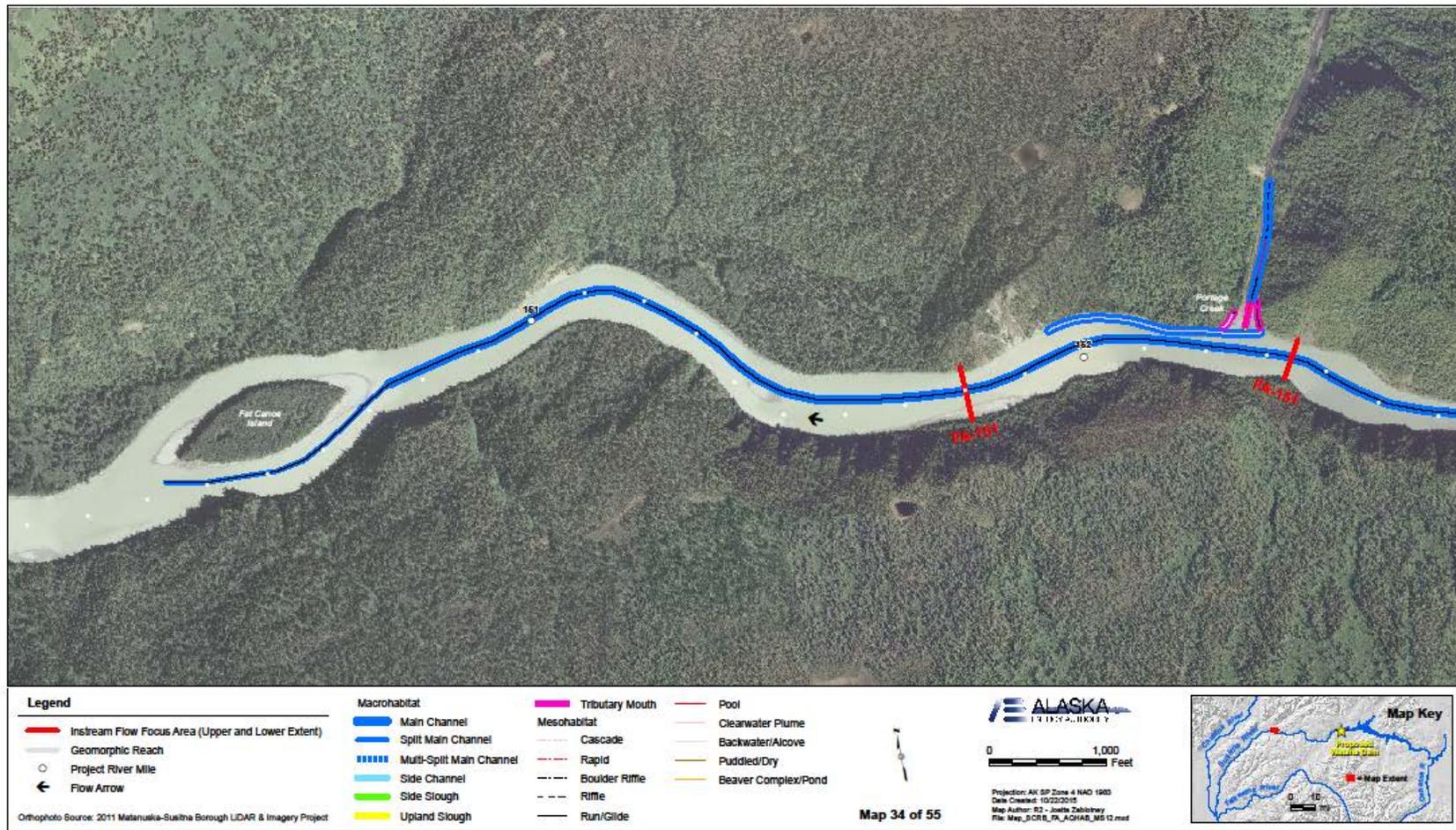
AEA held the Initial Study Report (ISR) Meeting for Study Plan Section 9.9 on March 22, 2016. Based on comments noted during the meeting, AEA reviewed habitat definitions and noted what might appear to a reviewer as an inconsistency in the definition of tributary mouth and clearwater plume habitats. In Table 9.9.4 of the Revised Study Plan for Study 9.9, tributary mouth was defined similarly to clearwater plume. Habitat mapping and characterization was conducted in a fashion that ensured that all clearwater plumes were delineated and characterized accurately during both remote and ground-based assessments. However, during study implementation habitat biologists characterized tributary mouth habitat as defined in Section 3.1 of the Middle Susitna River Remote Habitat Line Mapping Technical Memorandum (filed with FERC January 31, 2013) and Section 4.1.1.1 of the Study 9.9 Study Completion Report (filed November 9, 2015). This was necessary because not all tributaries contained clear water nor were associated with clearwater plumes. At this time, AEA has determined that the operational definition of tributary mouth required further clarification to accurately reflect mapping and characterization of these two habitat types. This supplement revises the definition of tributary mouth presented in Table 4.1.1 of the Study 9.9 Study Completion Report. The nature of this clarification is such that it applies only to the table where the definition of tributary mouth was provided. The narrative description in Section 4.1.1.1 of Study 9.9 SCR is accurate and remains unchanged. All of the presentation of the data in the 2015 report accurately reflects the areas delineated and characterized as tributary mouths and clearwater plumes; thus, these revisions should have no material effect on the habitat analysis.

SCR Reference	Description
Sections 4.1.1.1 (p. 6); Table 4.1.1 (p. 34);	The definition of tributary mouth was changed from "clear water areas that exist where tributaries flow into Susitna River main channel or side channel habitats (upstream tributary habitat will be mapped as a separate effort)" to "Extends from the confluence with the Susitna River upstream in the tributary to the permanent vegetation line indicative of the ordinary high water mark of the Susitna River". Revised text appears in Table 4.1.1 below.

**Table 4.1.1. Nested and tiered habitat mapping units and categories for macrohabitats and mainstem channel mesohabitats.**

Level	Unit	Grouping	Category	Definitions
1	Major Hydrologic Segment	Segments	Upper, Middle, Lower River	Upper River – PRM –187.1 – 261.3 (habitat mapping extended up to mainstem PRM 235.1 and included the Oshetna River. Middle River - PRM –102.4 – 187.1 Lower River - PRM 0 – 102.4
2	Geomorphic Reach	Upper River Segment	6 reaches	Geomorphic reaches that uniquely divide the Major Hydrologic Segments based on geomorphic characteristics.
		Middle River Segment	8 reaches	
		Lower River Segment <sup>1</sup>	6 reaches	
3	Macrohabitat	Main Channel Habitat	Single Main Channel	Single dominant main channel.
			Split Main Channel	Two dominant channels.
			Multiple Split Main Channel	Three or more distributed dominant channels.
			Side Channel	Channel that is turbid and connected to the active main channel but represents non-dominant proportion of flow <sup>1</sup>
			Tributary Mouth	<b>Extends from the confluence with the Susitna River upstream in the tributary to the permanent vegetation line indicative of the ordinary high water mark of the Susitna River.</b>
		Off-Channel Habitat <sup>2</sup>	Side Slough	Overflow channel contained in the floodplain, but disconnected from the main channel.
			Upland Slough	Similar to a side slough, but contains a vegetated bar at the head that is rarely overtopped by mainstem flow. Has clear water. <sup>1</sup> .
		Tributary Habitat	Single Channel	Single dominant channel
			Split Channel	Two dominant channels
			Channel complex	Three or more distributed dominant channels

Level	Unit	Grouping	Mesohabitat	Definitions
4	Mesohabitat	Fast water	Rapid	Swift, turbulent flow including small chutes and some hydraulic jumps swirling around boulders. Exposed substrate composed of individual boulders, boulder clusters, and partial bars. Lower gradient and less dense concentration of boulders and white water than Cascade. Moderate gradient; usually 2.0-4.0 percent slope.
			Riffle	A fast water habitat with turbulent, shallow flow over submerged or partially submerged gravel and cobble substrates. Generally broad, uniform cross-section. Low gradient; usually 0.5-2.0 percent slope.
			Run/Glide	A habitat area with minimal surface turbulence with generally uniform depth that is greater than the maximum substrate size. Velocities are on border of fast and slow water. Gradients are approximately 0 to less than 2 percent. Generally deeper than riffles with few major flow obstructions and low habitat complexity.
		Slow Water	Pool	Slow water habitat with minimal turbulence and deeper due to a strong hydraulic control.
			Pool subtypes	Straight Scour Pool: Formed by mid-channel scour. Generally with a broad scour hole and symmetrical cross-section.
				Plunge Pool: Formed by scour below a complete or nearly complete channel obstruction (logs, boulders, or bedrock). Pool must be Substrate is highly variable. Frequently, but not always, shorter than the active channel width.
				Lateral Scour Pool: Formed by flow impinging against one stream bank or partial obstruction (logs, root wad, or bedrock). Asymmetrical cross-section. Includes corner pools in meandering lowland or valley bottom streams.
				Backwater Pool: Found along channel margins; created by eddies around obstructions such as boulders, root wads, or woody debris. Part of active channel at most flows; scoured at high flow. Substrate typically sand, gravel, and cobble. Generally not as long as the full channel width.
		Isolated Pool: Areas of puddled or stranded water		
		Special Habitat Feature	Clearwater Plume	Discharge from a tributary that forms a pronounced area of clearwater, in contrast to the turbid water of the main channel, along the main channel shoreline. The length, breadth, and depth of the clearwater plume depend on the relative discharge between the tributary and the main channel, relative turbidity, and on mixing conditions along the shoreline. A clear water plume will be mapped as if it were a separate mesohabitat type.
			Backwater	Found along channel margins and generally within the influence of the active main channel with no independent source of inflow. Water is not clear. A backwater will be mapped as if it were a separate mesohabitat type.
			Beaver Complex	Complex ponded water body created by beaver dams. A beaver dam will be mapped as if it were a separate mesohabitat type.
		Tributary Mesohabitat		Tributary mesohabitats were typed using the classification system described in Table 4.1.2



Characterization and Mapping of Aquatic Habitats (9.9) Study Completion Report

Appendix B: Upper and Middle River Mainstem Surveys, 2013-2014

Figure 1. Depiction of habitat mapping of Portage Creek that delineates tributary mouth macrohabitat and clearwater plume mesohabitat separately.