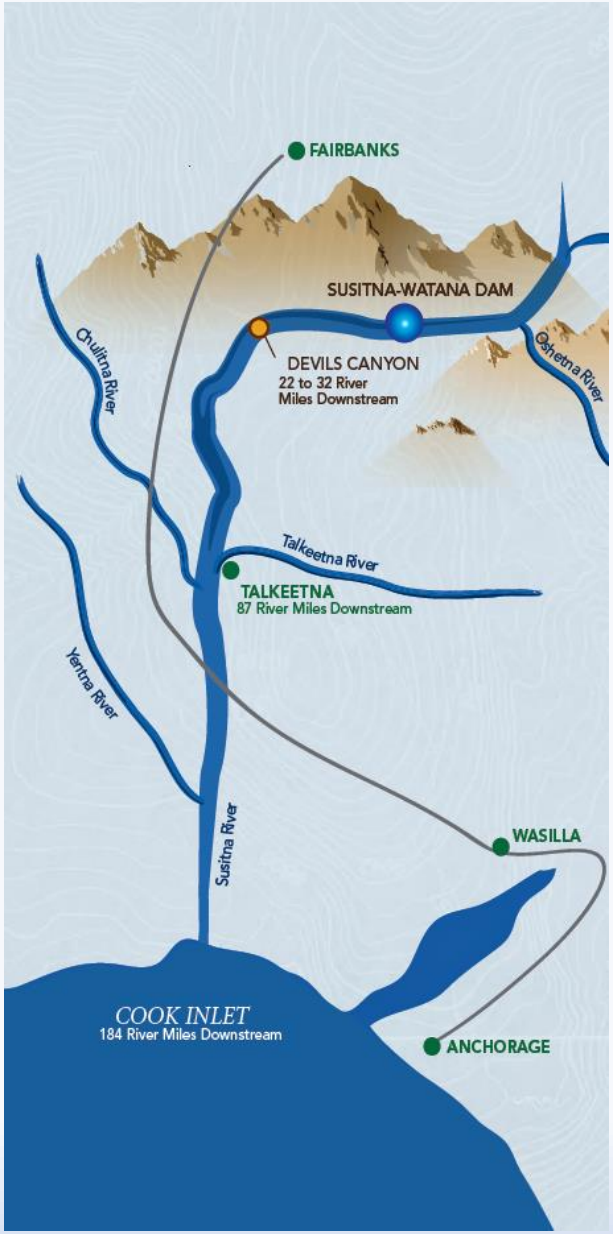


Initial Study Report Meeting

Study 9.12

Fish Passage Barriers in the Middle and Upper Susitna River and Susitna Tributaries

March 22, 2016

Prepared by

R2 Resource Consultants, Inc.

Study 9.12 Status

- **ISR Documents (ISR Part D Overview)**
  - Initial Study Report (Jun 3, 2014)
  - Fish Passage Criteria Tech Memo (Nov 14, 2014)
  - Study Implementation Report (Nov 6, 2015)
- **Objective 1 completed:**
  - 43 potential barriers investigated, 42 classified as barriers
  - Using remote imagery identified 433 potential beaver dams, 164 intact dams
- **Objective 2 initiated:**
  - 16 thalweg surveys at Middle River tributary mouths completed
  - Identified target fish species
  - Developed species/lifestage-specific passage criteria
- **Objective 3 and 4 remain to be completed.**
  - Determine approach for integrating passage criteria into modelling framework from IFS 8.5, GEO 6.5, FGM 6.6.

Study 9.12 Objectives

- Locate and categorize all existing fish passage barriers located in selected tributaries in the Middle and Upper Susitna River

- Locate, identify the type (permanent, temporary, seasonal, partial), and characterize the physical nature of existing fish barriers within the Project's Zone of Hydrologic Influence (ZHI)

- Evaluate potential changes to existing fish barriers within the Project's ZHI

- Evaluate the potential creation of fish passage barriers within existing habitats (tributaries, sloughs, side channels, off-channel habitats) related to future flow conditions, water surface elevations, and sediment transport

Study 9.12 Components

- Fish Species Identification (ISR Part A, Section 4.1; 4)
- Passage Criteria for Identified Fish Species (ISR Part A, Section 4.2; 6)
- Site Selection (ISR Part A, Section 4.3; 6)
- Field Methods (ISR Part A, Section 4.4; 8)
- Modeling Methods (ISR Part A, Section 4.5; 11)

Study 9.12 Variances

- Fish species identification was delayed until 2014 to occur simultaneously with development of passage criteria.
- Delay in field surveys of existing barriers on Cook Inlet Regional Working Group (CIRWG) and Alaska Railroad Corporation (ARRC) lands (ISR Part A, Section 4.3.5)
- Change from field measurements of beaver dam attributes to model-based evaluation (IP Section 4.4.5)
- Additional aerial surveys of beaver dams occurred in coordination with the Riparian Vegetation Study 11.6 (2014 SIR, Section 4.4.4 and 5.3).

Summary of Results

(November 14, 2014 TM; SIR, Section 5.1)

AEA proposed species list revised after consultation with licensing participants.

Target Species
Chinook Salmon
Chum Salmon
Coho Salmon
Pink Salmon
Sockeye Salmon
Arctic Grayling
Arctic Lamprey [1]
Burbot
Dolly Varden
Humpback Whitefish[1]
Northern Pike[1,2]
Rainbow Trout

[1] Target species suggested for consideration by licensing participants.
[2] Northern Pike will be evaluated for mainstem velocity barrier.

Summary of Results

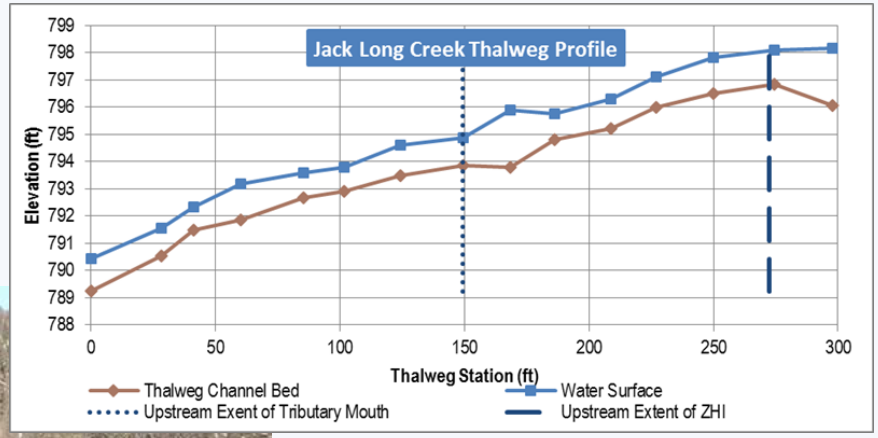
(November 14, 2014 TM; SIR, Section 5.1)

Fish Passage Criteria are presented by species/lifestage **(SIR, Section 5.1):**

- Table 5.1-2 Depth Criteria by Species/Lifestage
- Table 5.1-3 Pacific Salmon Leaping Height
- Table 5.1-4 Pool Depth and Channel Gradient
- Table 5.1-5 Swimming Speeds and Velocities

Summary of Results
(SIR, Section 5)

- 6 potential tributary barriers revisited; 4 re-classified as Fixed Barriers **(SIR, Section 5.2)**
- 9 thalweg surveys completed **(SIR, Section 5.4)**

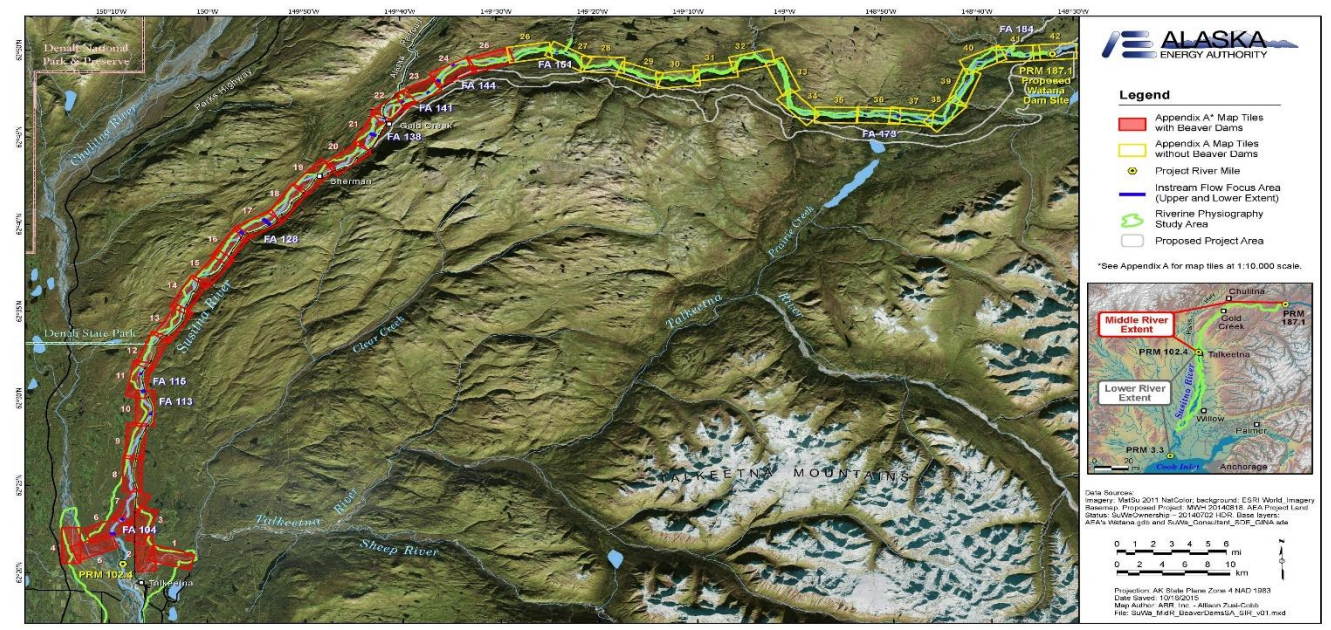


Summary of Results

(SIR, Section 5.3 and Appendix A)

Review of remote imagery for ~ 89 miles of the Middle River

- Identified 433 potential beaver dams.
- There were 164 intact dams, 34 partial dams, and 147 not intact dams (Appendix A).
- The integrity of 88 dams could not be determined from remote imagery.



Modifications

(ISR Part D – Section 7.2)

No modifications to the Study Plan are proposed to complete the study and meet Study Plan objectives

Steps to Complete Study 9.12

(ISR Part D – Section 8)

1. Analyze the physical barrier and geomorphological field data with reservoir operations and projected surface water elevations to evaluate potential for elimination and creation of Upper River tributary barriers.
2. Within Middle River FAs, use the results of 2D modeling and passage criteria to evaluate existing and potential depth and velocity barriers (associated with sloughs, tributary mouths and beaver dams) for target species and life stages.
3. In the Middle River outside of FAs, characterize existing barriers in selected tributary mouths using 2013 and 2014 survey data. Use results of 1-D models, survey data, and passage criteria to evaluate potential for creation or elimination of barriers.
4. Evaluate the potential for alteration of a velocity barrier to Northern Pike between the Middle and Lower River.
5. If potential for barrier creation in Middle River tributaries is evident (in # 2 and 3), use the Instream Flow model to evaluate potential creation of barriers in Lower River tributary mouths.

Licensing Participants Proposed Modifications to Study 9.12?

- Agencies
- CIRWG members and Ahtna
- Public