

SUSITNA-WATANA HYDROELECTRIC PROJECT

Formal ILP Proposed Study Plan Review

16 August 2012

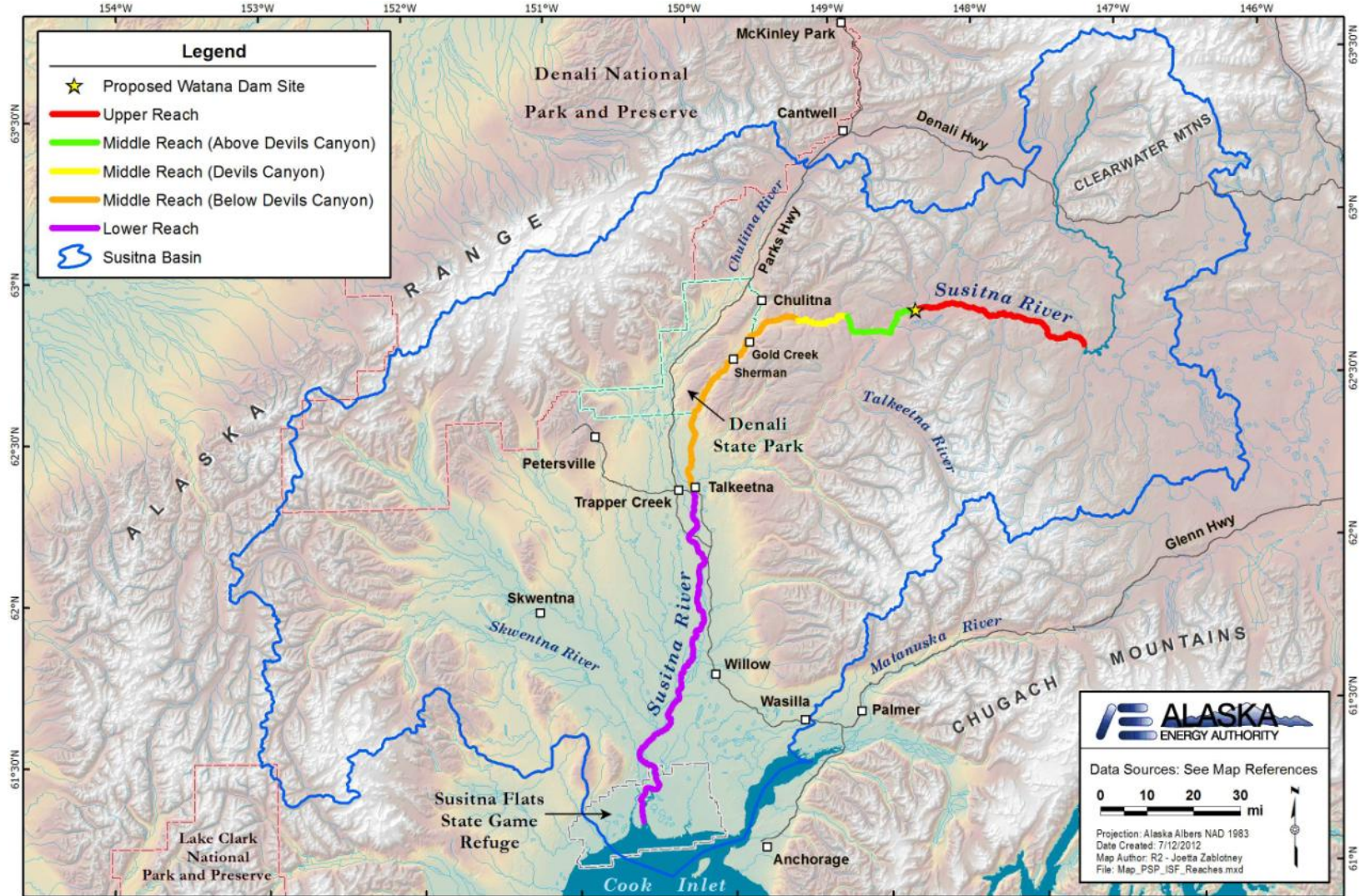
Prepared by:



Instream Flow-Fish Goals and Objectives

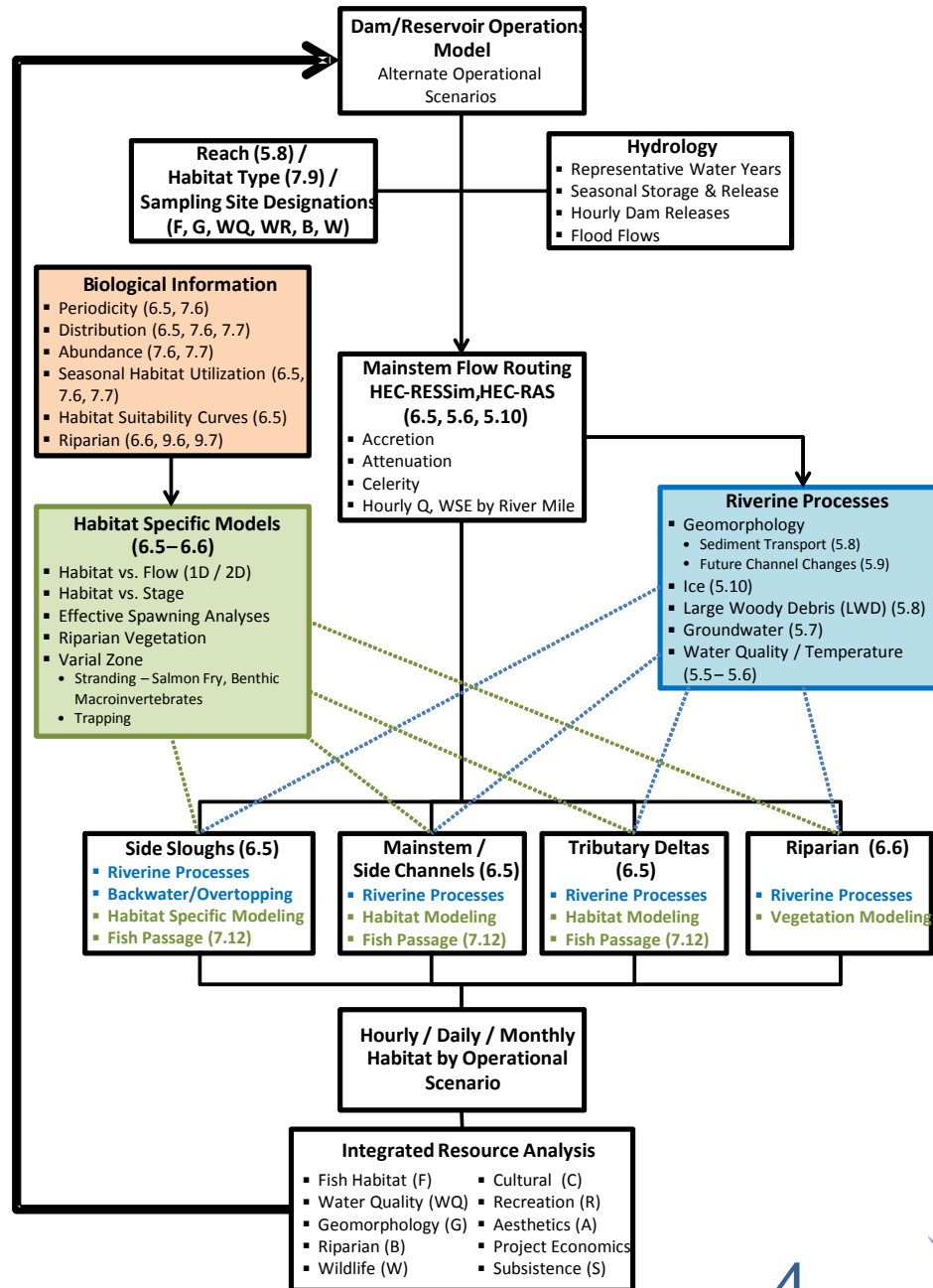
- Study sites to model mainstem and lateral habitats
- Hourly hydraulic routing model
- Seasonal, site-specific HSC/HSI
- Aquatic habitat models to produce hourly time series
- Evaluate existing conditions and alternate operational scenarios for wet/average/dry and warm/cold conditions
- Coordinate modeling and evaluations with other resources

Instream Flow-Fish Study Area (updated Figure 6.5-1)



Instream Flow Framework

(updated Figure 6.5-3)



Instream Flow-Fish Methods

- Technical Work Group (TWG)
- Habitat Mapping
- Mainstem Flow Routing Models
 - Unsteady flow models providing flow and water surface elevation by river mile on an hourly basis
 - summer ice-free model (R2)
 - winter ice-cover model (HDR)
 - X-sections RM 184 to RM 75 (excluding Devils Canyon)
 - water level recording stations
 - 2012 data collection efforts

Instream Flow-Fish Methods

- Habitat Suitability Criteria
 - Identify sampling locations, timing , methods with TWG
 - Collect data on all species, but sampling design targets species
 - Seasonal criteria
- Periodicity
- Species /lifestage criteria
 - species and size stranding susceptibility
 - trapping susceptibility
 - incubation and emergence timing

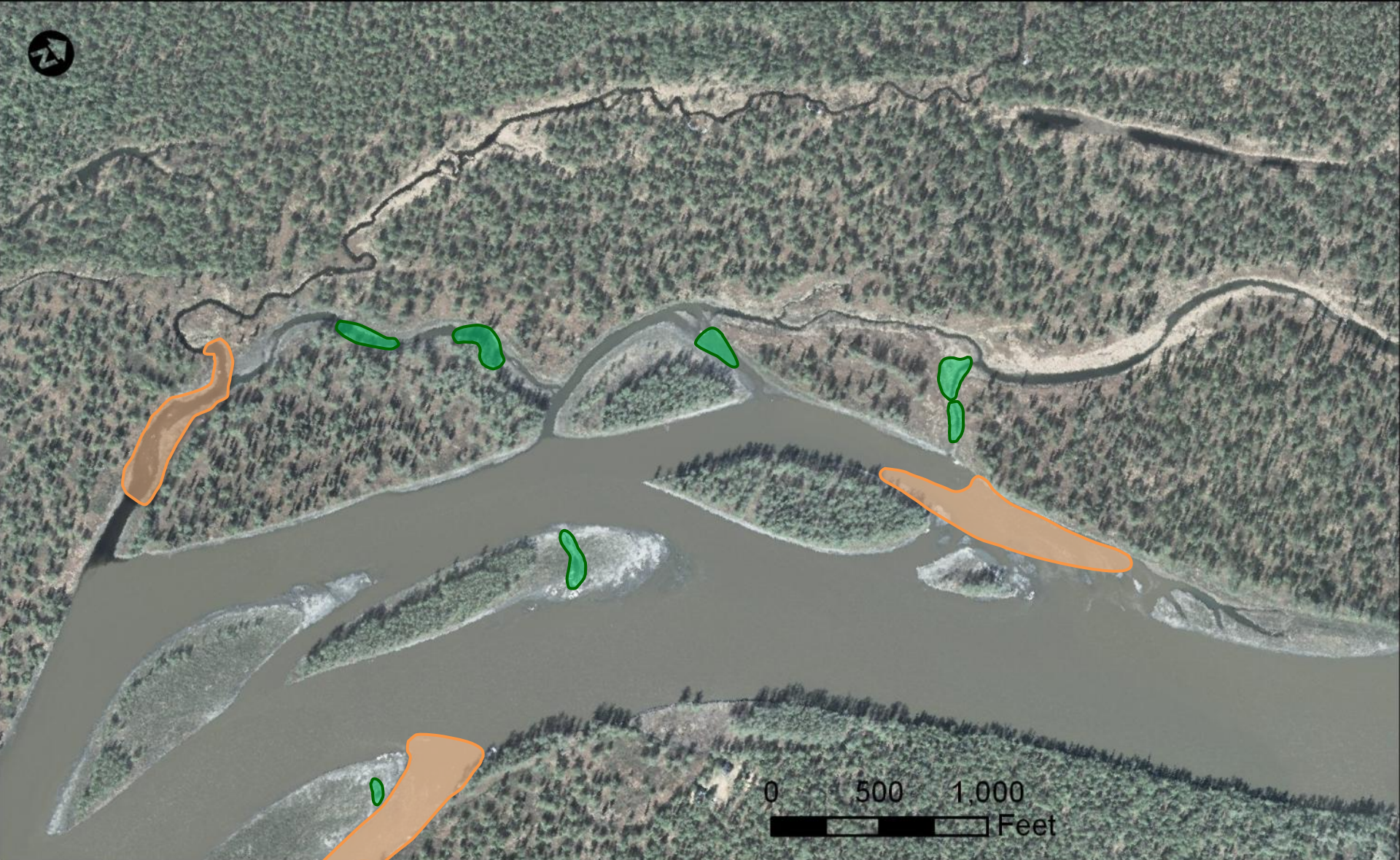
Instream Flow-Fish Methods

- Habitat Model Selection
 - Study site selection
 - Identify suite of habitat models
 - Identify target flow range
- Identify modeling assumptions
 - Minimum spawning depth, egg pocket depth
 - Incubation criteria
 - Stranding gradient and substrate
 - Habitat connectivity criteria
- Collect channel and hydraulic data
- Develop and calibrate Habitat Models
- Temporal Habitat Analyses
- TWG concurrence



Whiskers Slough

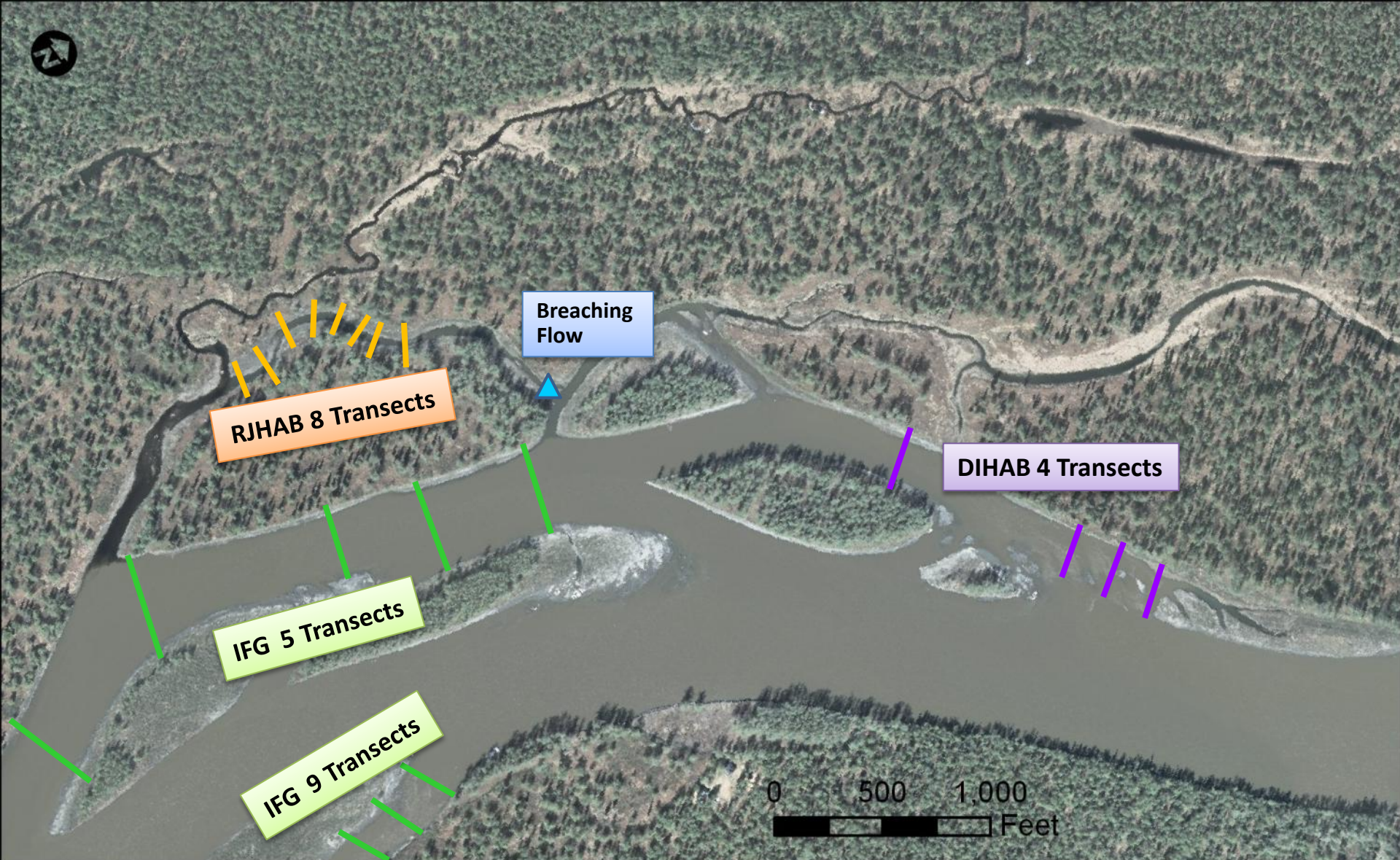


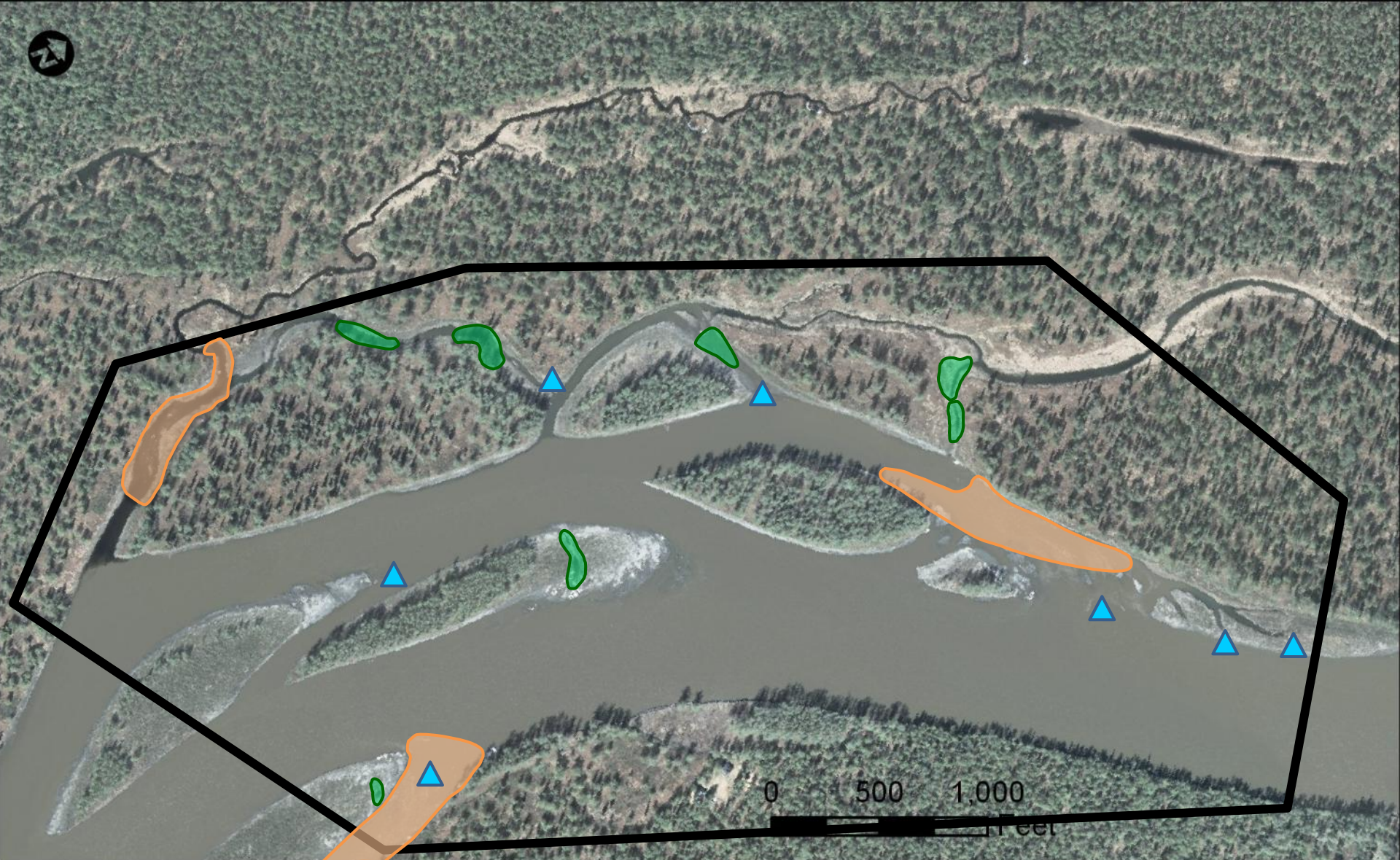


 Salmon Spawning

 Trapping







-  Salmon Spawning
-  Trapping
-  Breaching Flow

Instream Flow – Fish

Table 6.5-2. Assessment of physical and biological processes and potential habitat modeling techniques.

Physical & Biological Processes	Habitat Types			
	Mainstem	Side Channel	Slough	Tributary Mouths
Spawning	PHAB/VZM	PHAB	PHAB/HabMap	PHAB/RFR
Incubation	RFR/VZM	PHAB	PHAB/HabMap	PHAB/RFR
Juvenile Rearing	PHAB/RFR	PHAB	PHAB/HabMap	PHAB/RFR
Adult Holding	RFR	RFR	PHAB/HabMap	PHAB/RFR
Macroinvertebrates	VZM/WP	VZM/WP	PHAB/HabMap/WP	NA
Standing/Trapping	VZM	VZM	VZM/WP	VZM/WP
Upwelling/Downwelling	FLIR	HabMap/FLIR	HabMap/FLIR	HabMap/FLIR
Temperature	WQ	WQ	WQ	WQ
Ice Formation	IceProcesses/WQ/RFR	IceProcesses/WQ/RFR	HabMap/Open leads	NA

PHAB-Physical Habitat Simulation Modeling (1D, 2D, and empirical); VZM-Varial Zone Modeling; RFR-River Flow Routing Modeling; FLIR- Forward-looking Infrared Imaging; HabMap-Surface Area Mapping; WQ-Water Quality Modeling; WP-Wetted Perimeter Modeling.

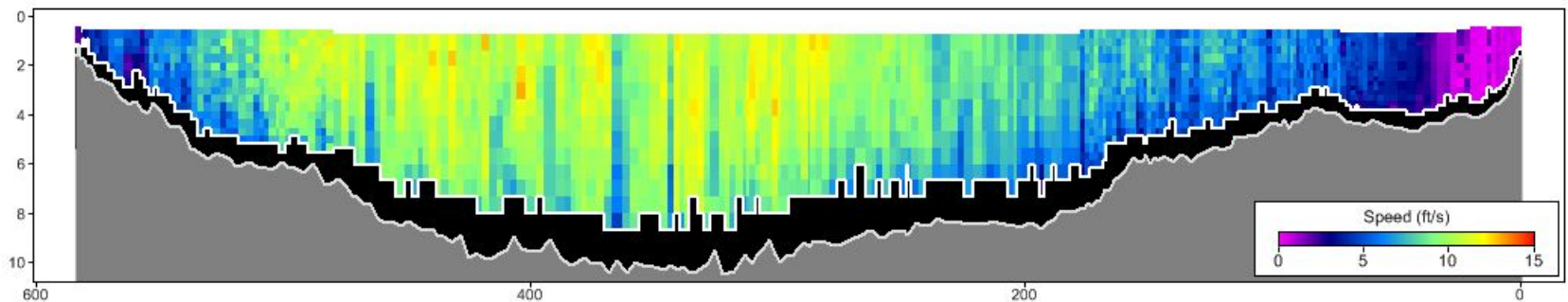
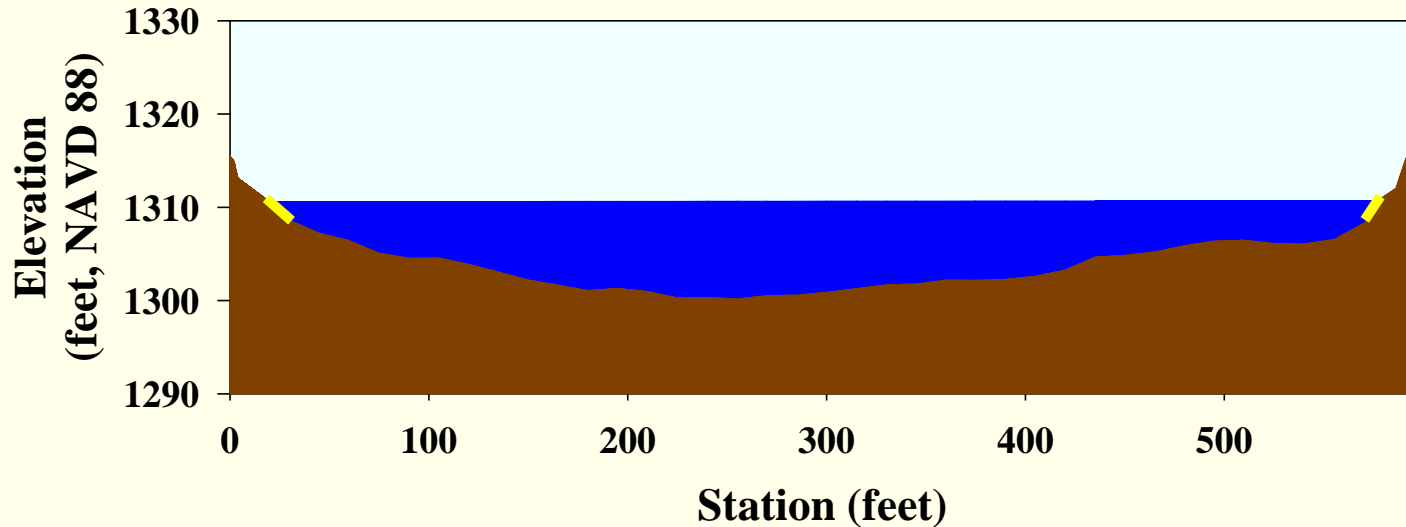


2012 Flow Routing Transect RM 170



“Brailey” RM 170.0 – Single Channel

Q = 31,000 cfs – June 21, 2012



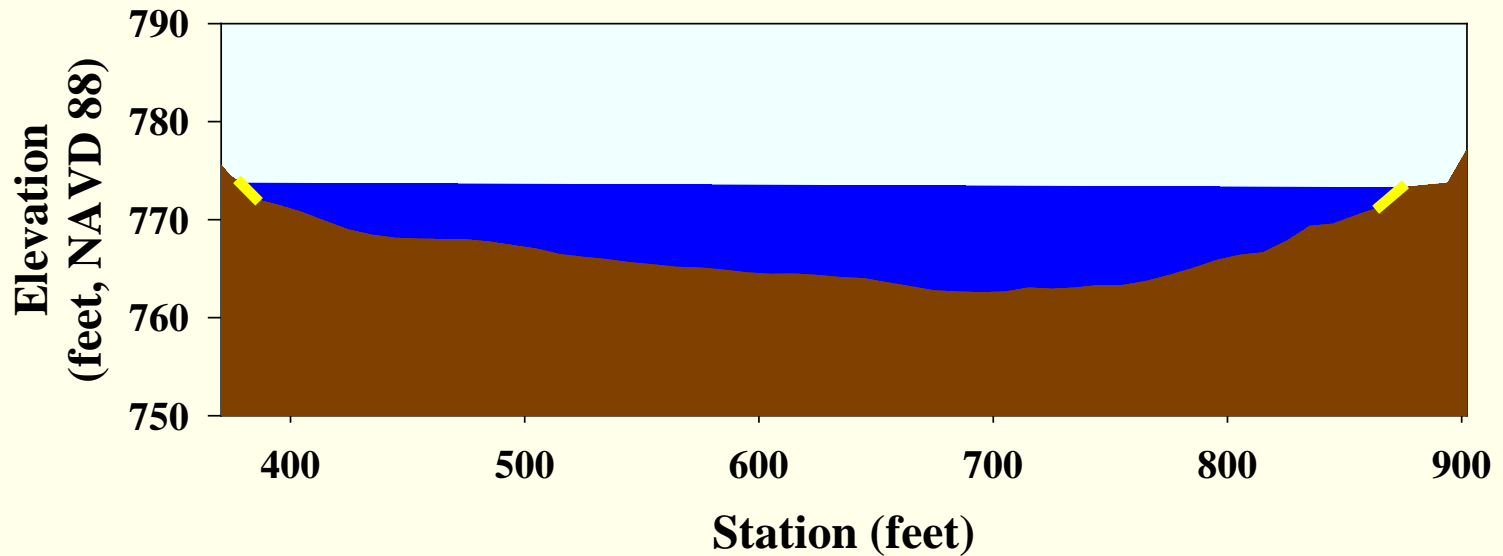
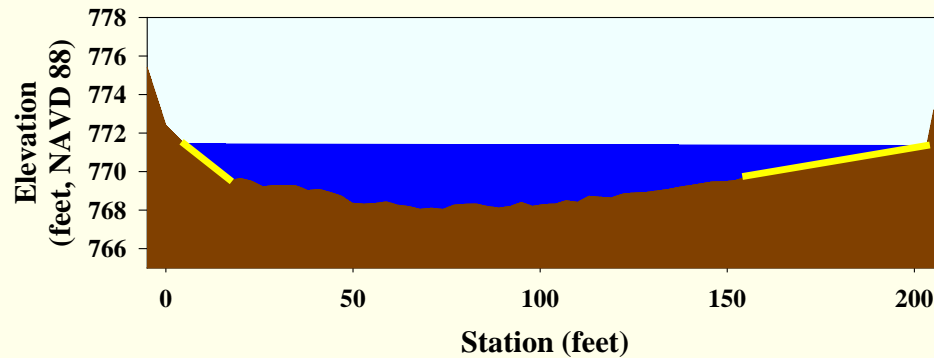


2012 Flow Routing Transect RM 143.2



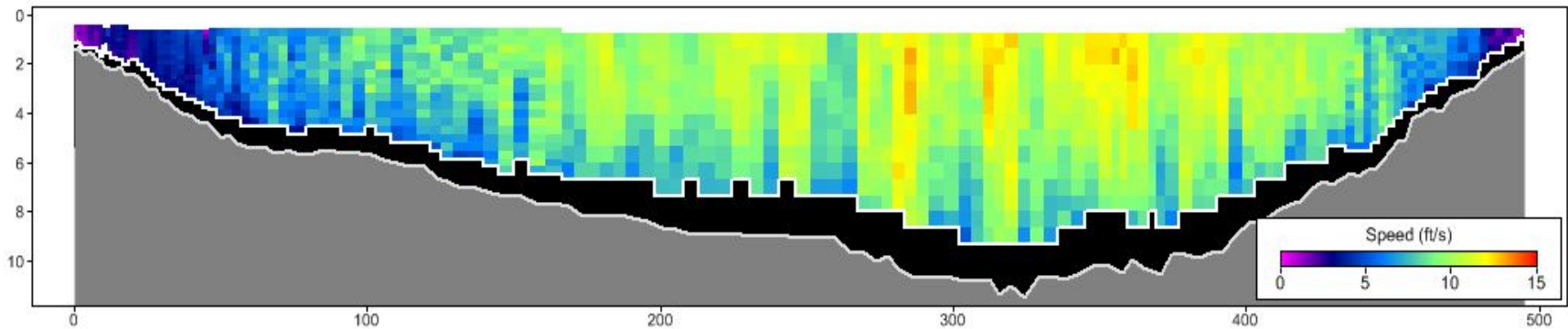
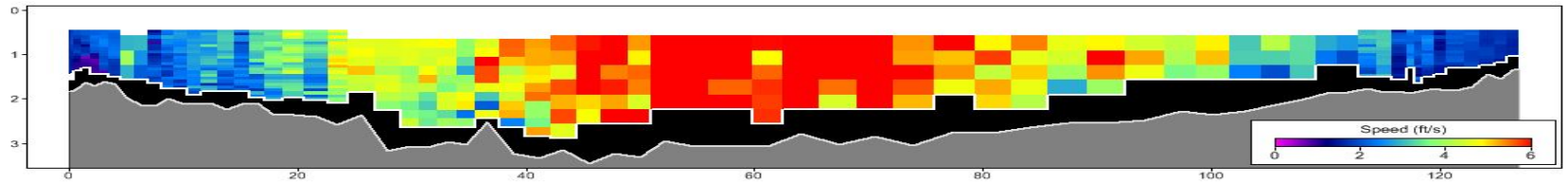
“Brailey” RM 143.2 – Main/Side Channels

Total Q = 32,700 cfs – June 27, 2012



“Brailey” RM 143.2 – Main/Side Channels

Total Q = 32,700 cfs – June 27, 2012



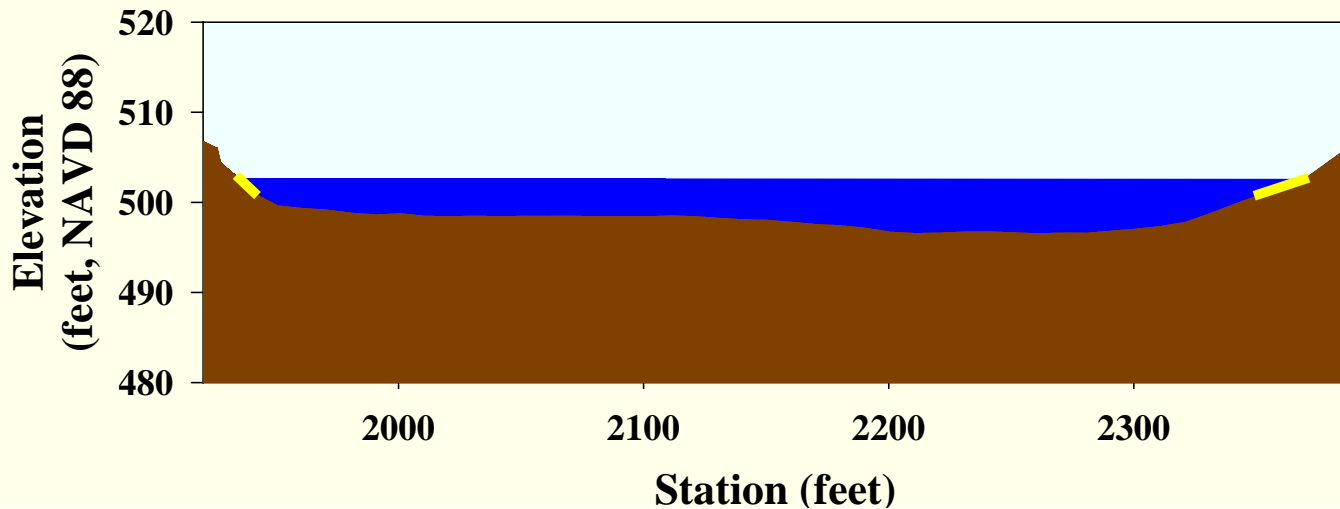
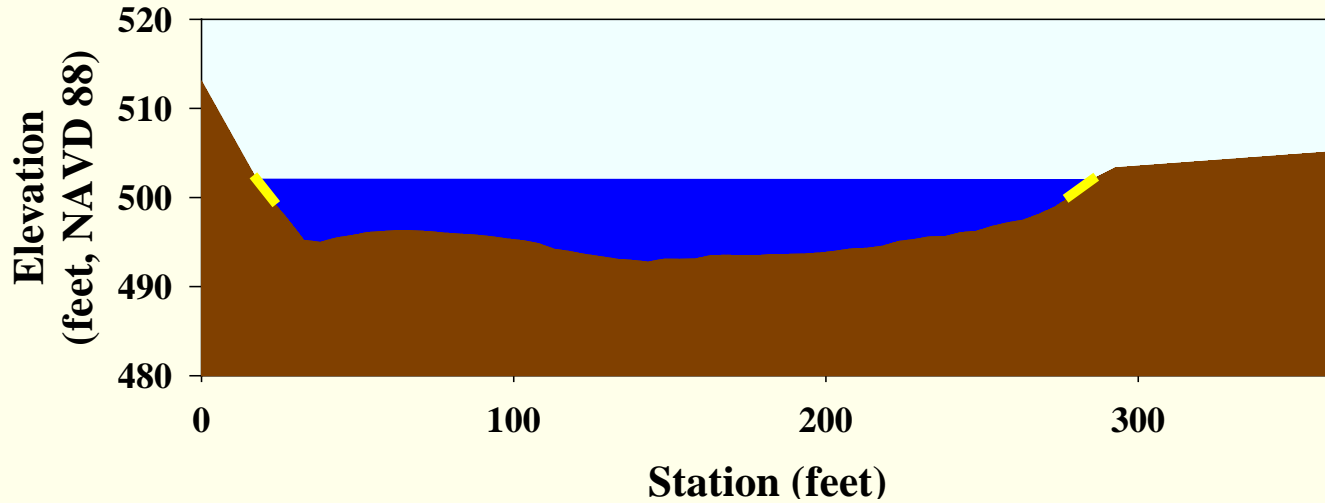


2012 Flow Routing Transect RM 117.2



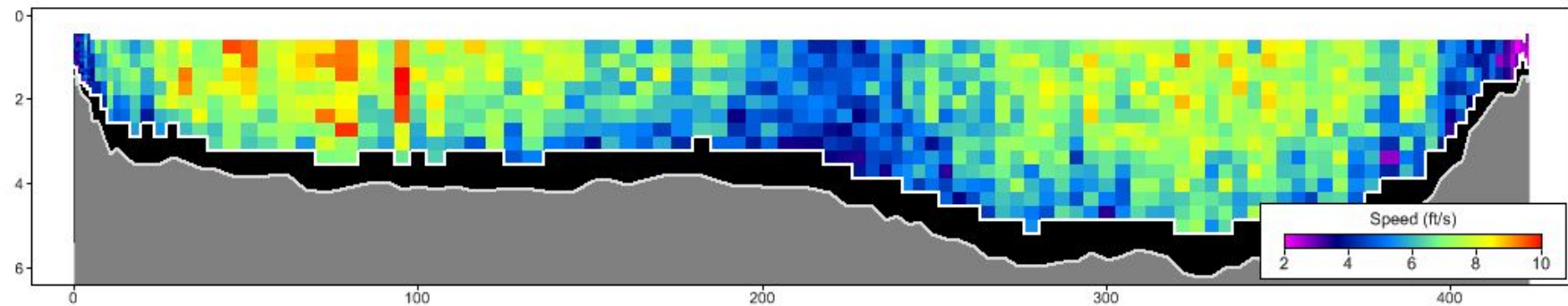
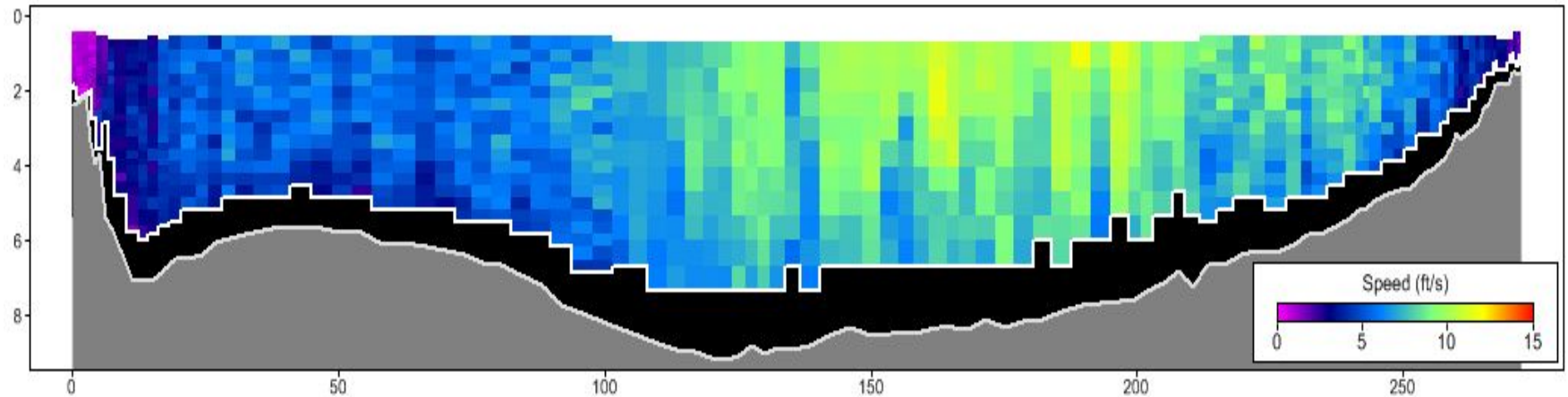
“Brailey” RM 117.2 – Left/Right Channel

Total Q = 23,000 cfs – July 6, 2012



“Brailey” RM 117.2 – Left/Right Channel

Total Q = 23,000 cfs – July 6, 2012



Instream Flow-Fish

Summary of 2012 Activities

- Habitat mapping (coordinate with geomorphology, GIS)
- Instream Flow-Fish Site Selection
 - June 15 aerial recon
 - July 17-18 on-ground recon (jet boat/helicopter)
 - late August interdisciplinary coordination
 - September on-ground agency recon (jet boat)
- HSC data collection
 - July (snorkeling)
 - August (seining/snorkeling/biotelemetry)
 - September (seining/snorkeling/biotelemetry/DIDSON on a stick(?))

Instream Flow-Fish **Expected 2012 Results**

- Executable Open-water Mainstem Flow Routing Model
- Habitat Mapping (*Coordinated with Instream Flow-Riparian, Geomorphology, Groundwater, Ice*)
- 1980s HSC criteria and comparison with 2012 Susitna HSC data and recent data from other rivers
- Tentative Selection of “Intensive” Sites (*Coordinated with Instream Flow-Riparian, Geomorphology, Groundwater, Ice*)
- Revised Study Plan
- Tentative identification of habitat specific models
- Technical Memos



Instream Flow-Fish Schedule

Task	Primary Activity
Study plan	Fall 2012
Study site selection	Fall 2012 – Spring 2013
Habitat model selection	Fall 2012 – Spring 2013
Ice-free hydraulic routing model	December 2012 – Spring 2013
Winter hydraulic routing model	Fall 2013 - 2014
HSC Fish: field data collection	2012-2014
Collect physical and hydraulic data	2013-2014
Habitat model development	Late 2013
Hydraulic model calibration and integration	2014
Habitat metrics	Late 2014
Alternate scenario post-processing (following Study completion)	<i>Spring 2015</i>

Instream Flow-Fish

Questions/Concerns?

