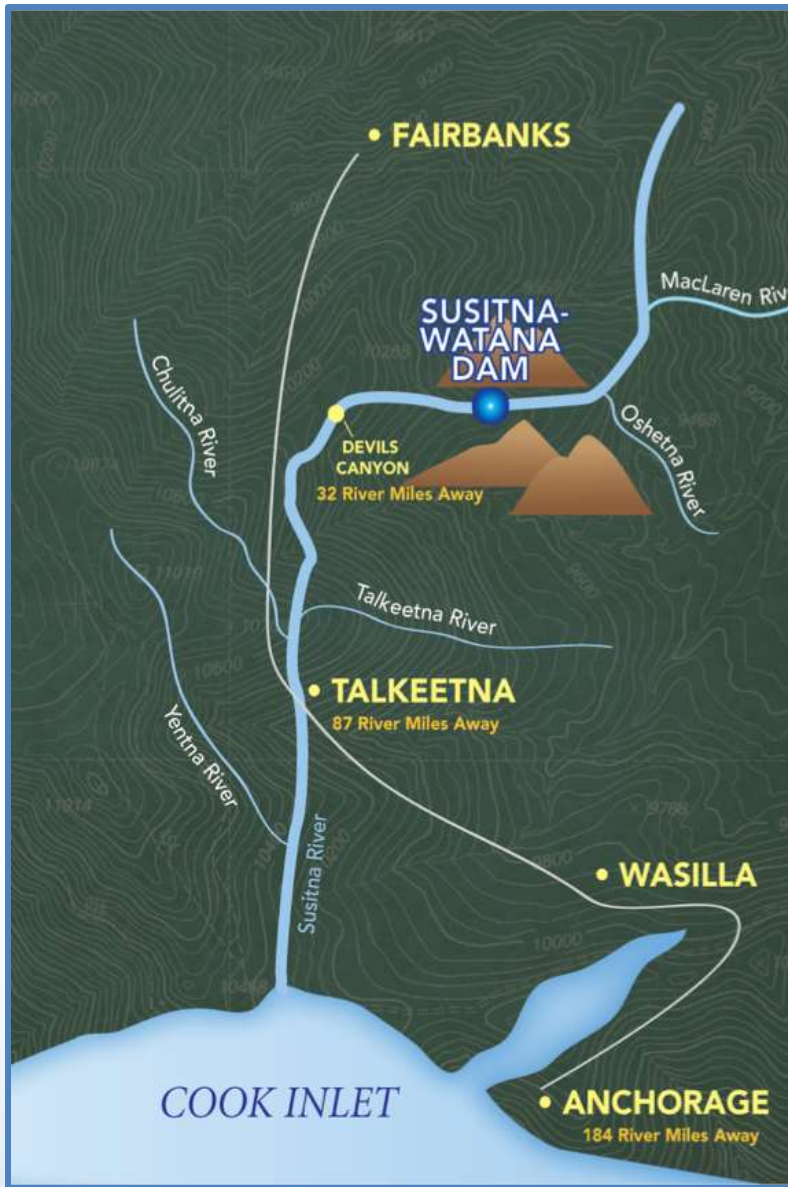


Technical Team Meeting

Study 9.8 River Productivity

3/21/14

Prepared by R2 Resource
Consultants, Inc.



Study 9.8 River Productivity Presentation Overview

- *Remaining FERC SPD Consultation Discussion*
- *Plan for 2014*
 - *Activities*
 - *Proposed Modifications*
- *Plan for 2nd Year Sampling*
 - *Activities*
 - *Proposed Modifications*
- *HSC/HSI Discussion*



Study 9.8 River Productivity FERC SPD Recommendations

- *Consult on Stable Isotope Site Selection*
 - September 23, 2013 TWG presentation
- *Dye Marking and Fish Tagging*
 - June 24, 2013 TWG discussion

Study 9.8 River Productivity Stable Isotope Site Selection

- FERC SPD recommendation:

“We recommend that AEA consult with NMFS and FWS when identifying the appropriate two focus areas for stable isotope sampling, where within the focus areas each type of stable isotope samples would be collected, and the number of adult salmon tissue samples to be collected.”

Study 9.8 River Productivity Stable Isotope Site Selection

- *The RSP states: “Isotope samples will be collected from two of the River Productivity Study sampling stations in the Middle Susitna River, with three habitat-specific sampling sites per station, for a total of **six** sampling sites.”*
- *Sampling in 2013 collected isotope samples at each site with four of the River Productivity Study sampling stations, with a total of **16 sites (Draft ISR Section 4.7.3.1.)***
 - *FA-184 (Watana Dam Site), with three sites*
 - *FA-141 (Indian River), with four sites*
 - *FA-104 (Whiskers Slough), with five sites*
 - *RP-81 (Montana Creek), with four sites*



Study 9.8 River Productivity Stable Isotope Site Selection

- *This design has established sampling sites spanning over 100 river miles of the Susitna River, which are expected to include a large range in MDN inputs from upstream above Devils Canyon to downstream in the Lower River.*
- *By sampling isotopes primarily at Focus Areas, we maximize the value of these samples as complementary data to the fish stomach contents and other related datasets.*



Study 9.8 River Productivity Dye Marking and Fish Tagging

FERC SPD recommendations discussed at June 24, 2013 TWG Meeting.

- **FERC SPD states:**

"At each site (macrohabitat) sampled, AEA could mark the first 50 fish captured of each target species and age class to enable identification of individual fish upon recapture. These fish would be measured and weighed for growth studies as described above, and marked using PIT tags or subcutaneous dye injection to identify the sample site (macrohabitat) and date of capture."



Study 9.8 River Productivity Dye Marking and Fish Tagging

- **FERC SPD recommendation:**

“In consideration of the above, for fish sampled for use in the growth and trophic modeling studies, we recommend that AEA measure, weigh, and mark the first 50 fish of each target species and age class captured within each sampled macrohabitat by PIT-tagging to identify the capture station and date. We recommend that AEA collect fish for the trophic modeling studies at all available macrohabitat types (up to five per study station) in each Middle River and Lower River study station. Growth data collected from fish marked and recaptured in the same macrohabitat site should be used (if possible) to validate AEA's proposed growth rate potential model.”*

- PIT tags can generally be implanted in fish > 60 mm in length and a macrohabitat-specific subcutaneous dye injection should be used on fish less than 60 mm in length

Study 9.8 River Productivity Dye Marking and Fish Tagging

AEA focused fish marking efforts on PIT tagging rather than dye marking (Draft ISR Section 4.7.3.2.) for these reasons:

- *PIT tagging can produce large amounts of location data, providing robust estimates of habitat use by individual fish*
- *Almost all (97%) Chinook, coho, and rainbow trout sampled during June and July for the River Productivity Study were large enough to be PIT tagged (≥ 60 mm FL)*
- *Dye marking could only provide a small amount of location data for each fish, given the limited number of sampling events of this study (three per field season)*



Study 9.8 River Productivity Dye Marking and Fish Tagging

Other advantages of PIT tagging instead of dye marking:

- *If dye-marked fish were recaptured in the same habitat, it would not be clear whether they had remained there consistently or moved to another habitat and then returned.*
- *Dye markings would only be sufficient to mark groups of fish captured in the same habitat on the same date, not to identify individuals in the numbers proposed. Without the ability to identify individuals, growth trajectories could not be determined.*
- *The Fish Distribution and Abundance Study 9.6 was already conducting a PIT tag study, but not dye-marking. Using data and arrays from the concurrent study was the most efficient use of project resources and minimized handling of fish.*

Study 9.8 River Productivity 2014 Activities

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- *Analysis of 2013 data*
- *HSC/HSI Development*
- *Field collections to support UAF study components*
 - *Stable Isotope Analysis*
 - *Drift sampling*
 - *Fish diet sampling*



Study 9.8 River Productivity 2014 Study Modification

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Fish Diet Collections

- *2014 effort proposes dedicated fish collections at all stations with UAF collection efforts for Stable Isotope Analysis*
- *Stations include:*
 - *RP-81 (Montana Creek)*
 - *FA-104 (Whiskers Slough)*
 - *FA-141 (Indian River)*
 - *FA-184 (Watana Dam Site)*



Study 9.8 River Productivity 2014 Study Modification

Fish Diet Collections

- *Further consideration is needed for stations/sites above Devils Canyon (FA-173 and FA-184)*
- *2013 FDA collection efforts at these stations revealed lack of target species (Chinook and coho salmon juveniles, rainbow trout adults and juveniles)*
- *Options: Add Arctic grayling, other species; drop upper stations from trophic analysis efforts*



Study 9.8 River Productivity Second Year Sampling Activities

14

- *Repeat of 2013 sampling efforts, without UAF components*
- *Possible Talkeetna station sampling (dependent on result from 2013)*
- *Implement Proposed Modifications*



Second Year Proposed Study Modifications

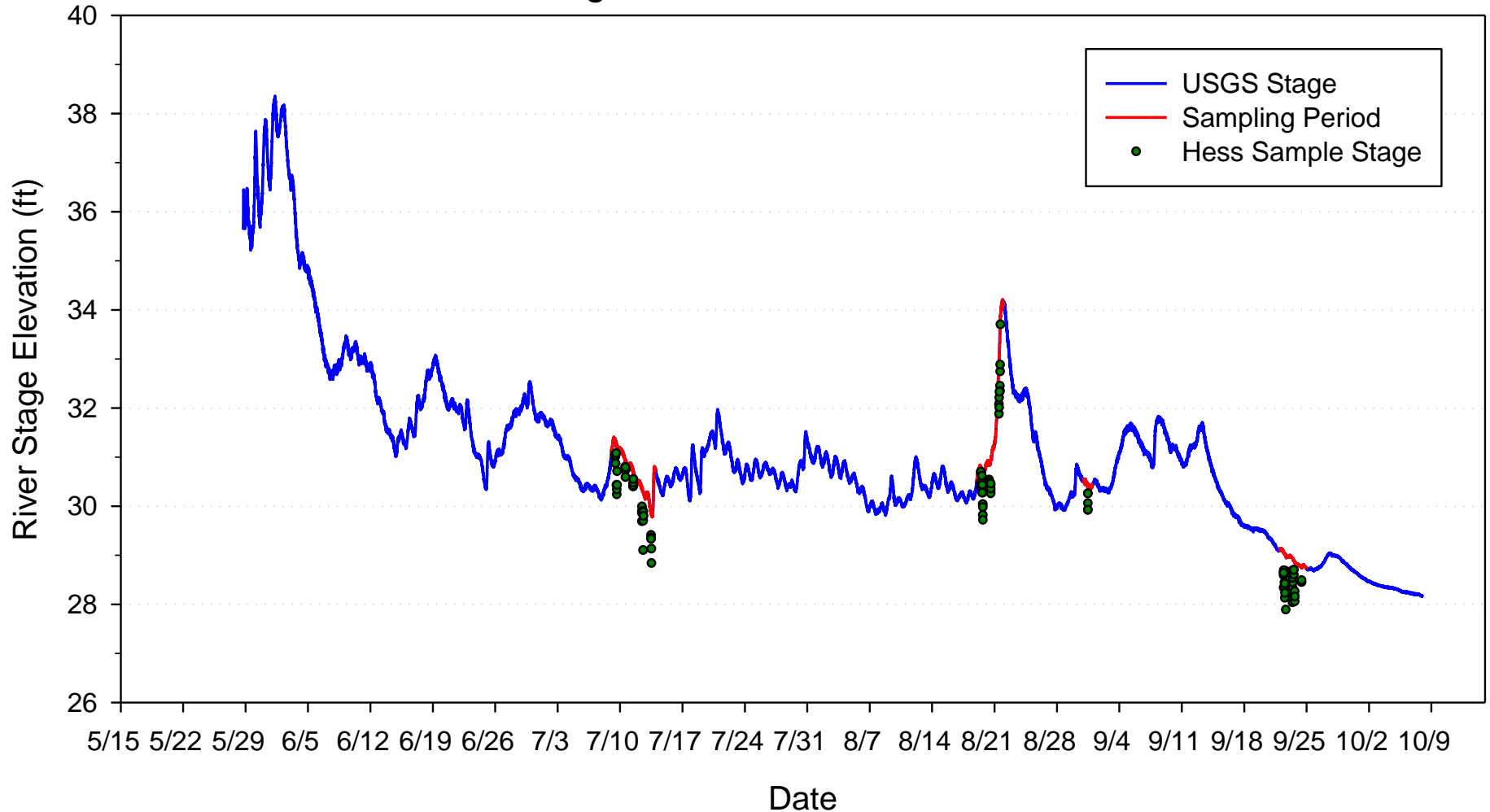
Benthic Sampling and Shoreline Fluctuations

- *Stage changes largely limited to main channel macrohabitats (main channel, side channel)*
 - *approximately 24% of Hess samples collected in 2013 were potentially dewatered in the 30 days prior to sampling*
- *Stage changes common in Spring and Summer periods; Fall period showed steady decline in stage.*



Study 9.8 River Productivity 2013 Sampling

USGS Gage near Tsusena: FA-173 and FA-184



Second Year Proposed Study Modifications

Benthic Sampling and Shoreline Fluctuations

- Take samples at the 12-14 inch depth maximum allowed by the Hess device, if available within the site.*
- For periods with large stage changes, attach a 1-ft. extension to the Hess sampler, allowing it to sample in depths of up to 2 ft. if necessary*
- Equip one team member with a dry suit, so that samples can be retrieved at increased depths (if within safety limits due to velocities)*



Study 9.8 River Productivity

Second Year Proposed Study Modifications

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Colonization Sampling

- *2013 efforts focused on differing conditions of turbidity and temperature.*
- *This affected other colonization influences of depth, velocity, and substrate.*
- *Stage changes at main channel macrohabitat sites were also a factor, resulting in dewatering of samplers.*



Second Year Proposed Study Modifications

Colonization Sampling

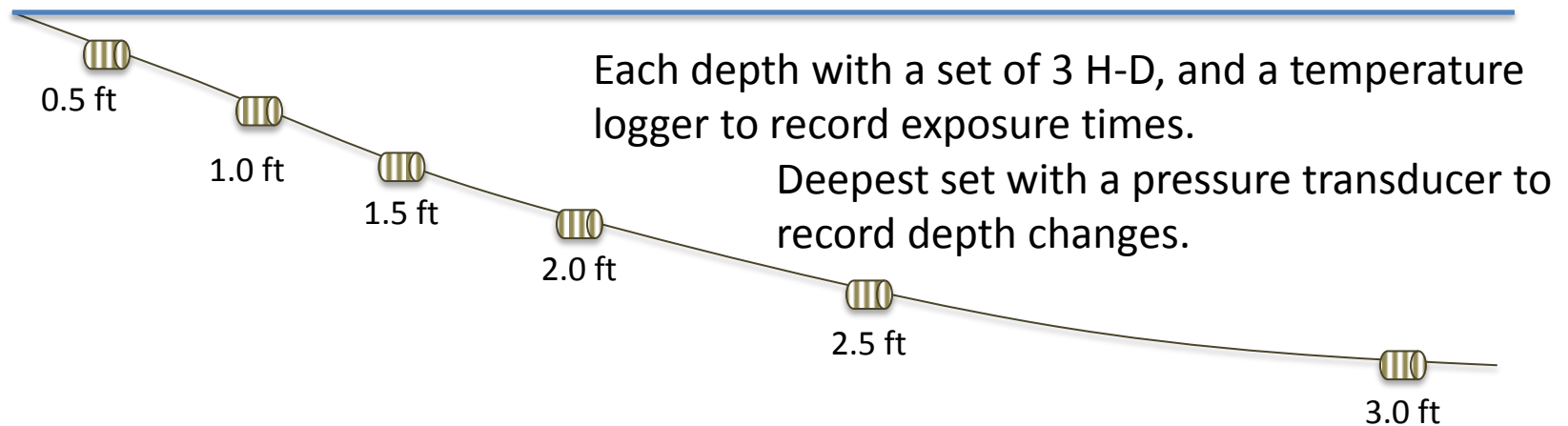
- *Deploy Hester-Dendy sets in each macrohabitat type (essentially all 5 sites within FA-104 [Whiskers Slough])*
- *Deploy sets on the bottom, at a greater depth, instead of with 2 sets (shallow, 1 ft; deep, 2 ft), or*
- *Possibly install floating units, to control depth*
 - *Floating units run higher risk of loss or disturbance*
 - *Colonization would be limited to drift pathway only*



Second Year Proposed Study Modifications

Colonization Sampling

- *On the main channel, deploy sets at increasing 0.5 ft increments to record effects of stage changes and exposures.*
- *Set for 4-6 week periods, for 2-3 collections over the season.*



Break

