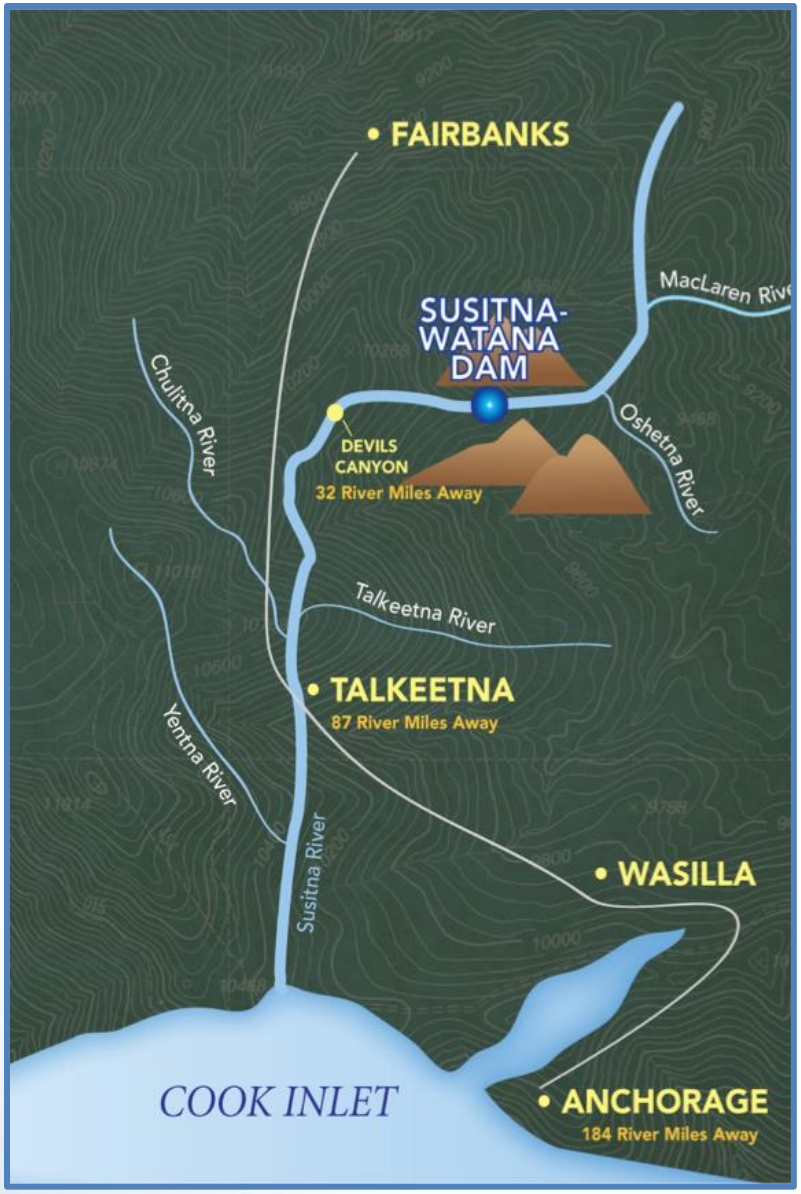

Technical WorkGroup Meeting

Q3 2013 TWG

RSP 7.6

Ice Processes Studies - Update

Sept. 25, 2013

Prepared by:
Jon Zufelt, PhD, PE,
Steve Ertman, PhD, PE
HDR, Inc.

RSP 7.6 – Presentation Overview

- *Report detailing 2012 freeze-up and 2013 breakup completed*
- *Modeling efforts*
  - *Middle River (River1D, River2D)*
  - *Lower River (HEC-RAS)*
- *Upcoming Modeling meetings*
- *Fall freeze-up data acquisition program*

RSP 7.6 – Q3 2013 Update
Ice-Processes Modeling

- ***Capabilities Enhancements for River1D Model***
  - Effort led by Dr. Faye Hicks, River Ice Research Group, University of Alberta (UA)
  - HEC-RAS to River1D geometry file converter
  - Ability to model compound channels (i.e., main channel and left/right overbanks)
  - Ability to model natural cross-section geometry
  - Ability to work directly with Imperial or SI units
  - Updating User Manual to reflect new capabilities.

RSP 7.6 – Q3 2013 Update
River1D Model Middle River

- Surveyed geometry at 88 cross sections
  - Main channel only. Awaiting overbank geometry to be developed by others from high-res LiDAR.
  - Interpolated cross sections at 0.2-mile spacing.
- Main-channel Manning's *n* from R2's HEC-RAS open-water model. Need overbank roughness.
- Upstream inflow hydrograph from USGS 15291700 (Susitna River above Tsusena Creek).
  - Calibration interval: August 11-17, 2012

River1D Model Middle River – cont'd

- HDR validating lateral inflows at request of UA.
- Steady-flow test run conducted with successful convergence.
- Unsteady, open-water calibration (calibration interval: August 11-17, 2012) matched R2's results.
- Additional in-channel open water calibration runs to be conducted.
- HDR continues to collect and compile winter data to support ice-processes modeling.
- Input data needs for River2D open water modeling identified

RSP 7.6 – Q3 2013 Update
HEC-RAS Modeling -Lower River

- Goal of the Lower River modeling to assess effects of increased winter flows on winter water and ice levels at two sites (Sunshine and Susitna Station)
- Uses existing data gathered in other studies
- In a steady sense, addition of an ice cover at Susitna Station raises the stage 6 feet (corresponds to measured freeze-up PT data)
- Raising January flow from 10K to 18K cfs results in an additional 2 ft of stage (steady model)
- Freeze-up process under higher discharges would likely alter the cover characteristics.

RSP 7.6 – Q3 2013 Update Modeling Meetings

29 August 2013 – *Modeling & Study Integration Internal Interdisciplinary Team Meeting* (online)

- Generated River1D/River2D summaries outlining model inputs, outputs, units, data needs, and interdependencies with other models.

10 October 2013 – *2nd Modeling Integration Internal Interdisciplinary Team Meeting* (online)

14-15 November 2013 – *Riverine Modeling & Study Integration Meeting* (Seattle, WA)

- With agency attendance.

RSP 7.6 – Variances

- *No variances from Approved Study Plan*

RSP 7.6 – Next Steps
Plan for Q4 2103

- Continued River1D modeling (open and ice)
- 2013 Freeze-up observation program
  - Previous efforts and data required for River1D model guide program planning and efficiency
  - Time Lapse Camera maintenance early October
  - 12 freeze-up flights beginning ~Nov 1
  - White paper on impacts of hydropower (and non-hydropower changes) on winter ice regime