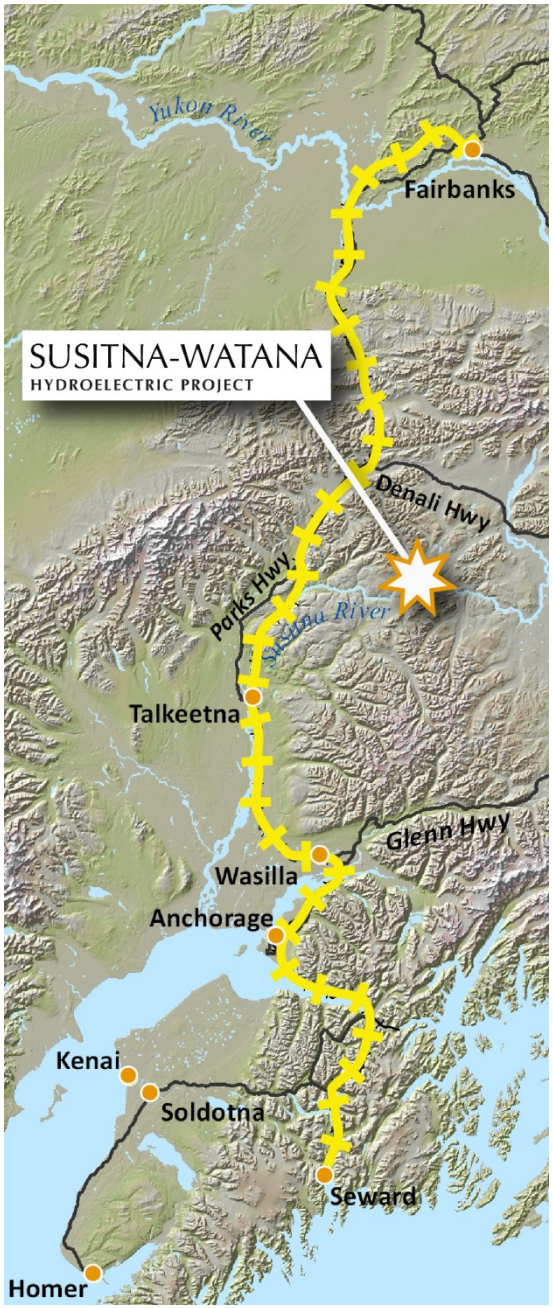

SUSITNA-WATANA
HYDROELECTRIC PROJECT

Formal ILP Proposed Study Plan Review

August 16, 2012

URS and Tetra Tech, Inc.

ALASKA ENERGY AUTHORITY

Resource Area Proposed Studies

- Section 5.11 Glacial and Runoff Changes Study

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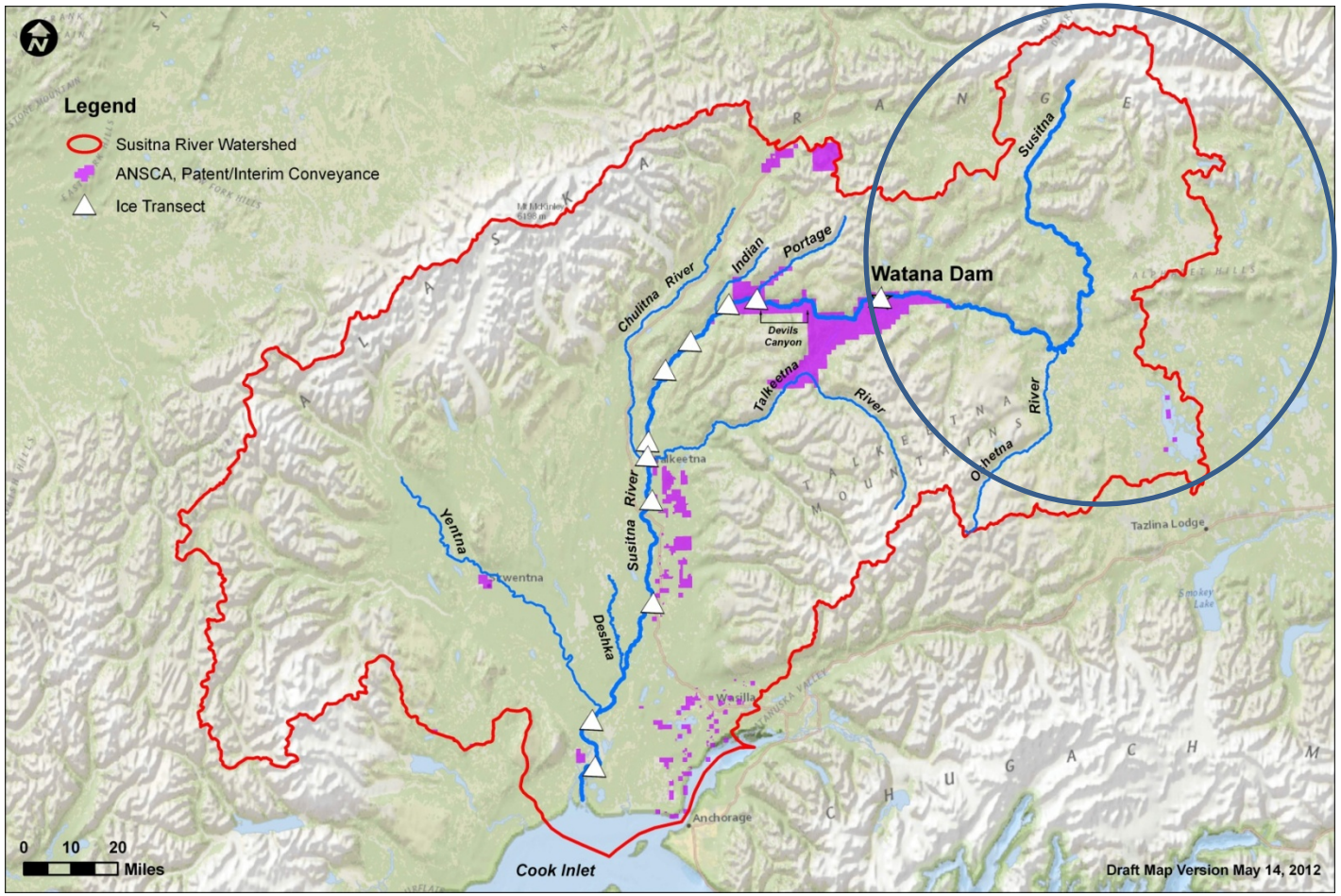
Glacial Runoff Changes
Goals and Objectives

- Review existing literature relevant to glacial retreat in Southcentral Alaska and the Susitna watershed; summarize potential future changes that include estimates of current run-off via mass wasting of glaciers, timing, and trends.
- Develop a modeling framework that includes the effects of glacier wastage and retreat through year 2100.
- Project future river runoff in the Susitna-Watana basin to the year 2100 using available future climate predictions.
- Develop conceptual models that qualitatively assess potential effects of climate change based on permafrost, vegetation, and runoff patterns, and adjusting river runoff for sensitivity analyses.

Glacial Runoff Study Area



The proposed study area is the Susitna River basin upstream of the proposed Watana Dam site.

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Glacial Runoff Changes
Methods

- Review Existing Literature
  - Determine current rate and trend of glacier loss
  - Identify factors contributing to these rates of loss
- Develop a Modeling Framework
  - Fully-distributed temperature index mass balance model
  - Uses temperature and precipitation to determine snow and ice melt and resulting runoff
  - Hourly and annual timelines for determination of runoff rates

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Glacial Runoff Changes
Expected Results

- Analyze Changes in Glacial Systems
  - Trends over time in:
    - Temperature
    - Flow
    - Water Quality
  - Modeling framework used to predict water quality conditions over time (hourly, annual)
- Changes in Sediment Delivery
  - Glacial surges responsible for increased sediment delivery to rivers
    - Predicted sediment delivery from such an event will be described
    - A high degree of variability associated with these predictions so sensitivity is relegated to one or more order of magnitude

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Glacial Runoff Changes
Relationship to other Studies

- PSP Section 5.5; Baseline Water Quality Monitoring
  - Characterize suspended sediment conditions throughout the study area (RM 10.1 through RM 233.4)
  - Focus on RM 184.1 to RM 233.4 for projecting Glacial Runoff Changes and impact to water quality, productivity, and habitat availability
- PSP Section 5.8; Geomorphology Study
  - Characterize current sediment supply conditions in the Middle and Lower River
  - Couple current condition with contribution from the Upper River

Glacial Runoff Changes
Relationship to other Studies

- PSP Section 5.9; Fluvial Geomorphology Modeling below Watana Dam
  - Predict changes in sediment delivery to sites downstream of the proposed dam
  - Downstream sediment delivery (below dam) predictions based on projected changes in upstream hydrology and sediment delivery
- PSP Section 6.5; Fish and Aquatic Instream Flow Study
  - WUA results will reflect projected changes to physical habitat conditions downstream of the dam site
  - Projected physical habitat changes will be determined from Fluvial Geomorphology Modeling (PSP Section 5.9)

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