SUSITNA-WATANA HYDRO

IFS-TT: Riverine Modeling Proof of Concept Meetings

Goals, Structure, and Outcome

April 15, 16 and 17, 2014

GOAL: *This IFS-TT Proof of Concept (POC) meeting is a follow-up to the November 13-15, 2013 IFS-TT Riverine Modelers Meeting that provided a forum to review and discuss the riverine models and describe model linkages (see http://www.susitna-watanahydro.org/wp-content/uploads/2014/02/2013.11.13Modelers_Notes.pdf). The POC meeting is designed to advance the understanding of these models and how Project operations that influence riverine processes and fish habitats will be evaluated. This will be accomplished by demonstrating the application of the models specific to two key biological metrics (effective spawning/incubation habitat, and juvenile rearing habitat) at one Middle River Segment Focus Area (FA), FA-128 (Slough 8A). Modeling will include two scenarios – Existing Conditions and Operational Scenario (OS) – 1. Emphasis will be placed on demonstrating the model process and example model results. The overall goal of the meeting is to PROVE via demonstration that the modeling process is CONCEPTUALLY sound (Proof of Concept) and can be broadly applied to other areas of the Middle River Segment. The meeting will also briefly review the analytical approach being applied to the Lower River Segment.*

STRUCTURE: ***The meeting is structured into three sessions:***

- **Session One (Day 1) – POC APPROACH, MODELING INPUTS, MODELING/ANALYTICAL TOOLS**

  This session will open with an overview of the Goals and Objectives of the meetings, a review of the agenda, and a brief review of the issues and questions raised during the November 13-15, 2013 IFS-TT Riverine Modelers Meeting. This will be followed by a review of the underpinnings and components of the POC including the basis for selection of FA-128 (Slough 8A), selection of Biological Metrics, and the hydrology applied in the analysis. Following this, the major system modeling inputs will be described including a discussion of Representative Years, Hydrology and the Operational Scenario that will be illustrated, the Reservoir and Riverine Water Quality Models, the Open-water Flow Routing Model, the 1D Ice Processes Model, and 1D Geomorphology Model. The afternoon session will bring the discussion down to the Focus Area level, which for the POC is centered on FA-128 (Slough 8A). Each resource modeler will step through the respective models and analytical tools that have been developed at FA-128 (Slough 8A) that will be used for evaluating fish habitat related Project effects. This will commence with Geomorphology and be followed by Groundwater. The sessions will be interactive, with participants encouraged to ask questions of the modelers as models/empirical data are discussed. Time permitting, additional resource models may be presented in the afternoon.

- **Session 2 (Day 2) – FA-128 MODELING/ANALYTICAL TOOLS (continued) and ADDRESSING BIOLOGICAL QUESTIONS AT FA-128**

  During the morning session, the remaining resource models and analytical tools developed specific to FA-128 (Slough 8A) will be described: Ice Processes and Water Quality. In addition, the Biological inputs specific to FA-128 (Slough 8A) will be described. The majority of the session will illustrate how the models and analytical tools will be used for computing two biological metrics under different flow and seasonal characteristics (Open-water and Ice Covered Conditions). The two biological metrics are Effective Spawning/Incubation Habitat, and Salmonid Rearing Habitat. Each of these metrics will be described, and data dependencies and inputs from other models defined, so there is a clear understanding of how the different resource models feed information into the habitat models. Several example outputs will be presented illustrating the quantitative determination of habitats for different flows, two scenarios (Existing Conditions and OS-1), and seasons. The session will again be interactive.

- **Session 3 (Day 3 – half day session) – MIDDLE RIVER CONSIDERATIONS AND LOWER RIVER APPROACH**

  This half-day session will include a recap of Day 2 activities and will be followed by a discussion on options for Spatial Extrapolation of habitat model outputs to other unmeasured sections of the Middle River. This will be followed by a discussion of the Habitat Modeling being conducted in the Lower River Segment. Example results for two Lower River fish habitat modeling sites will be discussed as part of the review of study plan implementation. The session will conclude with an open discussion in which Participants can bring up questions on any of the previous days materials.

OUTCOME: *At the end of this meeting Participants will have a better understanding of:*

- The models and analytical tools being used for each resource study;
- Model outputs and how these serve as model inputs into the determination of habitat metrics at each of the Focus Areas;
- The types of habitat model outputs that will be generated under different flow and seasonal conditions;
- Options that are available for extrapolating habitat model results to other unmeasured areas in the Middle River Segment;
- The habitat modeling methods that are being applied in the Lower River Segment.