

Susitna-Watana Hydroelectric Project Preliminary Issue Topics List (October 21, 2011)

Preliminary issues identified from 1980s licensing efforts, data gap reports and agency consultations that are areas of interest potentially resulting from construction, presence of facilities, and operation and maintenance of the Project. This list is preliminary and will be further developed for inclusion in the PAD.

Geomorphology Issues

Reservoir Geomorphology Issues

- G1 Seasonal contributions from glacial and clear water systems to the total sediment input to Watana Reservoir by size fraction: boulder, cobble, gravel, sand and silt, 5 micron and smaller.
- G2 Trap efficiencies of Watana Reservoir relative to present day particle sizes in transport.
- G3 Potential longevity of Watana Reservoir as a result of sediment entrapment.
- G4 Potential change in river morphology from five miles below reservoir low pool to five miles upstream of reservoir high pool resulting from sediment entrapment.
- G5 Potential effects of Project operations on mass wasting, shoreline erosion, tributary mouth migration, and stability within the reservoir inundation zone.
- G6 Potential effect of Project construction activities, including access roads, transmission facilities, and borrow areas on sediment recruitment to Watana Reservoir.

Middle River Geomorphology Issues (Watana Dam Site (RM 184) downstream to Three Rivers Confluence (~RM 94))

- G7 Potential effects of Project operations on monthly sediment transport within the Middle River.
- G8 Potential effect of Project operations on the stability of tributary mouths within the Middle River.
- G9 Potential for streambed coarsening within the Middle River mainstem, side channels, and side sloughs.
- G10 Change in the Middle River channel types (mainstem, side channel, side slough, upland slough, tributary mouth, and exposed gravel bars) from 1985 to 2012.
- G11 Potential nature and magnitude of change to the Middle River channel types as a result of Project-induced change to ice processes, stream flow, and sediment transport.
- G12 Mainstem flow at Gold Creek Gage (RM 136.5) which initiates river flow in selected side channels and side sloughs.

- G13 Flow rates in selected side channel and side sloughs in relation to mainstem discharge at Gold Creek Gage (RM 136.5).
- G14 Potential effects of Project construction and operation on the recruitment and deposition of large wood within the Middle River.
- G15 Potential effects of Project and infrastructure construction (dam, access roads, borrow areas, transmission facilities) on sediment recruitment to Middle River tributaries.

Lower River Geomorphology Issues (Three Rivers Confluence (~RM 94) downstream to Cook Inlet (RM 0))

- G16 Potential effects of Watana Reservoir on monthly sediment transport to the Lower River, as measured at Sunshine Gage (RM 136.5).
- G17 Potential effects of Project construction and operation on the recruitment and deposition of large wood to the Lower River reach.
- G18 Potential effects of Project-induced changes to stream flow, ice processes, and sediment transport on channel type within the Lower River reach.

Fish and Aquatic Issues

Upper River Fish and Aquatic Issues (Upstream of the Watana Dam Site RM 184)

- F1 Seasonal utilization of the Upper Susitna River and its tributaries by resident and anadromous fish in terms of relative abundance, life stage, meso-habitat selection, and commonly observed association with habitat attributes.
- F2 Baseline primary and secondary production and growth rates of resident species of the Susitna River and its tributaries within and adjacent to the impoundment zone.
- F3 Potential of Watana Reservoir as resident fish winter and summer habitat.
- F4 Potential effect of fluctuating reservoir surface elevations on fish access and movement between the reservoir and its tributaries.
- F5 Potential effect of Watana Dam as fish migration barrier at RM 184 to fish communities above and below the dam.

Middle River Fish and Aquatic Issues (Watana Dam Site (RM 184) downstream to Three Rivers Confluence (~RM 94))

- F6 Seasonal utilization of the Middle River mainstem and its clear water tributaries by resident and anadromous fish in terms of relative abundance, life history stage, meso-habitat selection, and commonly observed association with habitat attributes.
- F7 Understanding of baseline fish species distribution and meso-habitat utilization in the Middle River reach relative to 1985.

- F8 Understanding of baseline primary and secondary production in the Middle River reach relative to 1985.
- F9 Potential effect of Project flow regime on anadromous fish migration above Devil's Canyon (~RM 150).
- F10 Potential effect of Project-induced changes to stream flow, stream temperature, sediment transport, ice processes, and channel morphology on anadromous spawning and incubation habitat availability and suitability above Devil's Canyon.
- F11 Potential influence of the proposed Project flow regime and the associated response of tributary mouths on fish movement between the mainstem and tributaries within the Middle River reach.
- F12 Potential influence of anticipated mainstem water surface elevations and the absence of winter ice cover on upwelling in side slough habitats.
- F13 Influence of Project-induced changes to mainstem water surface elevations July through September on adult salmon access to upland sloughs, side sloughs, and side channels.
- F14 Potential effect of Project-induced changes to streamflow, stream temperature, sediment transport, ice processes, and channel morphology (streambed coarsening) on anadromous fish spawning and incubation habitat availability and suitability in the mainstem and side channels in the Middle River.
- F15 Potential effect of Project-induced changes to monthly streamflow, stream temperature, and sediment transport on primary and secondary production in the mainstem and side channels of the Middle River.
- F16 Potential effect on growth rates of juvenile salmon and resident fish inhabiting the mainstem and side channels of the Middle River in response to anticipated Project-induced changes to primary and secondary production and stream temperatures.
- F17 Potential effect of Project-induced changes to aquatic macro-habitat attributes (flow rate, temperature, channel structure, and water quality) during winter and summer within each channel type (mainstem, side channel, side slough, upland slough, tributary mouth, and tributary).
- F18 Potential effect of Project-induced warmer winter stream temperatures in the Middle River reach attracting resident species and northern pike from the lower reach.

Lower River Fish and Aquatic Issues (Three Rivers Confluence (~RM 94) downstream to Cook Inlet (RM 0))

- F19 Understanding of baseline anadromous run size and composition relative to 1985 understanding.
- F20 Baseline distribution and macro-habitat preferences of northern pike.

F21 Baseline distribution of northern pike relative to distribution of anadromous juveniles.

Water Quality Issues

WQ1 Potential effect of the Project and operations on temperature, turbidity, total dissolved/suspended solids, dissolved oxygen, pH, metals, and chemical/nutrient characteristics of the mainstem river downstream from the proposed Watana dam site (RM 184).

WQ2 Potential effect of the Project operations and reservoir surface elevation fluctuations on temperature, turbidity, total dissolved/suspended solids, dissolved oxygen, pH, metals, and chemical/nutrient characteristics within the reservoir.

WQ3 Potential effects of the proposed dam operations on total dissolved gas concentrations downstream of the Project.

Wildlife Resources

W1 Potential loss and alteration of big game, furbearer, small mammal, and bird habitats, including den sites, mineral licks, cover, forage plants, prey, nutrient flow, and habitat productivity, due to reservoir creation and operation.

W2 Potential physical and behavioral blockage and alteration of movements due to reservoir water and ice conditions; access corridors; transmission corridors; patterns of human activity and disturbance.

W3 Potential changes in adult and juvenile wildlife mortality risks due to fluctuating water and ice conditions; disturbance or collisions within access road corridors and transmission corridors; changes in predator abundance and distribution.

W4 Potential changes in hunting, harvest, predation, noise, and disturbance patterns due to altered human access from reservoir, river, road, and transmission corridor development.

W5 Potential reduction or altered habitat suitability for birds or mammals of conservation concern.

Botanical Resources

B1 Potential changes in vegetation and wetland communities and productivity related to solar radiation, temperature moderation, erosion and dust deposition due to development of the reservoir, access road, and transmission corridors.

B2 Potential changes in vegetation, wetland, and related wildlife-habitat values related to spread of invasive plants.

B3 Potential changes in wetland function, vegetation succession patterns, and riparian wildlife-habitat relationships related to altered hydrologic regimes, changes from riverine to

lacustrine habitat, and interruption of natural fire spread patterns due to reservoir filling and operation.

- B4 Potential reduction in rare plant populations related to reservoir filling, access and transmission corridor development, erosion, dust deposition, and spread of invasive plants.

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