APPENDIX B2. OTHER SPECIES POTENTIALLY ACCESSIBLE TO ANY PASSAGE FACILITIES

1. INTRODUCTION

Appendix B1 describes proposed target species for the Study of Fish Passage Feasibility at Watana Dam. These target species were identified based on their documented presence in the Upper Susitna River, the degree to which they are expected to exhibit migratory behavior, their relative abundance, and their importance to harvest. Two other taxa, lake trout and sculpin, have also been identified in the Upper Susitna basin but were not proposed as target species for the Study of Fish Passage Feasibility at Watana Dam. Nonetheless, these taxa would have the potential to encounter fish passage facilities at the Project. This appendix provides a summary of available life history, distribution, and abundance information for these taxa, as well as rationale by which they are proposed as non-target species.

2. LAKE TROUT

2.1. General Life History and Periodicity

Similar to other species of char, lake trout spawn in the fall generally between September and October before freeze-up (Morrow 1980). Lake trout are broadcast spawners and do not excavate a redd, but instead congregate in large groups over coarse, rocky habitats at night and broadcast eggs and milt over spawning beds. Lake trout are a slow-growing, long lived fish species that spend their entire lives in lake habitats. Lake trout are sexually mature after 5 to 8 years. Larvae emerge in the spring though little is known about subsequent juvenile behavior. Lake trout are slow-growing and can often live for 25 years, though have been documented as old as 62 years (Burr 1987). Lake trout generally do not spawn every year. Little is known about their early life history. Prey items include a combination of zooplankton, aquatic invertebrates, and other fish species (Bendock 1994).

2.2. Distribution and Relative Abundance

Lake trout primarily occupy deep lake habitats that can include both clear-water and glacial lakes, although they tend to only occupy clear-water systems in northern Alaska (Bendock 1994). Lake trout have been documented in lake outlet channels, though their use of connected stream and river systems is less clear (Burr 1987).

Jennings (1985) reported that Lake trout occur in relatively large and deep lakes throughout the Susitna Basin. Occasionally, lake trout can also be found in the inlet or outlet streams of these lakes (Jennings 1985). Lake trout were not captured during surveys of mainstem-influenced areas of the Susitna River below Devil Canyon in the 1980s (ADF&G 1981, 1983; Schmidt et al. 1984). They are most widely distributed in the upper Susitna River drainage, but also are present in lakes of the eastern side of the Susitna River drainage. Lake trout distribution in the Susitna River basin is not well understood, but they have been documented in Beaver, Clarence, Crater, Curtis, Stephens, Louise, Little Louise, and Butte lakes (Burr 1987) as well as Deadman and Sally lakes (Sautner and Stratton 1983).

Little detailed information is available from the studies of the 1980s regarding lake trout in the Susitna River basin. The most detailed information comes from sampling during 1981 in

Deadman Lake and during 1981 and 1982 in Sally Lake, which would have been inundated under the proposed project configuration of the 1980s (Delaney et al. 1981a; Sautner and Stratton 1983). Sampling in Sally Lake during 1981 was primarily by gillnet with some angling; only angling was attempted at Deadman Lake. Lake trout were captured in both Sally Lake (32 fish, 2 by angling) and Deadman Lake (3 fish, all by angling). Lake trout in Sally Lake were captured in less than 6 feet of water and within 100 feet of shore. The length of Lake Trout in Sally Lake ranged from 305 mm to 508 mm with a mean of 410 mm. Most scales removed from Lake Trout were unreadable, precluding age determination. During 1982, sampling in Sally Lake resulted in the capture of 32 Lake Trout (Sautner and Stratton 1983). Similar to the 1981 sampling, fish sizes ranged from 260 to 490 mm with an average length of 419 mm.

2.3. Rationale as Non-Target Species

- Lake trout are thought to exhibit little migratory behavior outside of lacustrine habitat, with observations of movement to lotic habitat in the Susitna Basin limited to inlet/outlet streams (Jennings 1985). Thus, any connectivity afforded by passage facilities would be expected to provide little benefit for this species.
- Although frequently found in some Susitna Basin lakes, lake trout were not documented in the mainstem Susitna River (AEA unpublished data; Jennings 1985; Sautner and Stratton 1983). While the potential exists for lake trout to inhabit the Project reservoir following impoundment, it appears unlikely that they would move past the dam site under current conditions.
- Although lake trout are an important component of sport fisheries in the Susitna Basin (Jennings et al. 2007, 2011), their importance with regard to the study of fish passage feasibility is thought to be negligible. Should lake trout ultimately inhabit the future Project reservoir, predation by lake trout and entrainment may be considerations. Predation risks associated with Fish Passage are addressed in Appendix B9. The probability of lake trout inhabiting the future Project reservoir and potential entrainment risks will be considered in RSP 9.10 - The Future Watana Reservoir Fish Community and Risk of Entrainment Study.
- During 2012 Fish and Aquatics Technical Working Group meetings, it was raised and confirmed by ADF&G that lake trout are not native species in the Susitna Basin, further supporting their designation as a not-target species for the Study of Fish Passage Feasibility at Watana Dam.

3. SCULPIN

3.1. General Life History and Periodicity

Sculpin observed in the Susitna River during the 1980s were generally not differentiated by species, and as a result, there is little information about individual species (AEA 2012). The slimy sculpin (*Cottus congnatus)* is the most abundant sculpin species and the only sculpin species conclusively identified as present within the Susitna River drainage (Delaney et al. 1981a, 1981b). This section includes information specific to slimy sculpin where available, but otherwise may reflect information related to sculpin *(Cottus spp.)* generally.

Slimy sculpin spawn between late March and late May following ice break-up in freshwater streams and lakes. Males construct a nest, approximately 2 to 4 cm high, beneath the cover of rocks and logs. As a ripe female approaches the nest, courtship ensues, and milt and eggs are released into the nest (Morrow 1980). Males usually mate with two or three females, who deposit their eggs into the male's nest. Males attend the nest for approximately 30 days during incubation (Morrow 1980; Scott and Crossman 1973). One week after hatching, the young leave the nest and occupy habitats similar to those used by adult sculpin. Sexual maturity is normally reached at age 2, and slimy sculpin may live up to 7 years. Aside from movement into shallow spawning waters, migration seldom occurs with this species (Morrow 1980).

Sculpin in the Susitna River are sedentary with spawning, juvenile rearing and adult movements confined to a limited area (Schmidt et al. 1983). Limited periodicity data is available for sculpin species in the Susitna River. Late July catches of young-of-the-year suggests that spawning occurs between spring break-up and mid-June (Delaney et al. 1981b). The duration of incubation is thought to be about 30 days (Morrow 1980).

3.2. Distribution and Relative Abundance

The slimy sculpin is a freshwater species that resides in lakes and streams (Mecklenburg et al. 2002). As lake residents, they can be found from rocky near-shore shallows to depths up to 210 m, although depths ranging from 37 to 108 m appear to be most common (McPhail and Lindsey 1970; Mecklenburg et al. 2002). As stream residents, slimy sculpin prefer fast-flowing streams with rocky and gravelly bottoms (Mecklenburg et al. 2002; Scott and Crossman 1973). Slimy sculpin spawning habitat typically includes rocky lake shores and gravel-bottom streams with water depths of 2 to 30 cm. Spawning occurs when water temperatures are between 4.5°C and 10°C (McPhail and Lindsey 1970; Morrow 1980).

Sculpin are distributed throughout the mainstem Susitna River (ADF&G 1981, 1983). Sculpin were documented in the lower, middle, and upper Susitna River during the 1980s (AEA 2012). Below Devils Canyon, slimy sculpin were widely distributed and occurred at almost all study sites (Schmidt et al. 1983). Sculpin were documented in most locations sampled in the upper Susitna River, including abundant populations in the Oshetna River, Fog Creek and Tsusena Creek (Delaney et al. 1981a). Slimy sculpin were captured in minnow traps within all tributaries sampled in 1981 except Jay Creek (Delaney et al. 1981a). Sculpin were also collected in Sally Lake in the Upper Susitna River drainage (Delaney et al. 1981a).

Slimy sculpin almost exclusively eat insects (Morrow 1980). Aquatic insect larvae and nymphs (e.g., mayflies, caddisflies, dipterans, and odonates) are primary food items for fish of all sizes, although larger fish tend to consume larger prey items (Scott and Crossman 1973). Predation on crustaceans and small fish, and consumption of aquatic vegetation have also been reported for this species (Morrow 1980; Scott and Crossman 1973).

Sculpin were observed in all Designated Fish Habitat sites sampled in 1982 (Schmidt et al. 1983). Populations of slimy sculpin in the Upper Segment were widely distributed in almost all tributary streams sampled (Delaney et al. 1981b), however their abundance relative to Lower and Middle segment populations is uncertain. Upstream of Devils Canyon, slimy sculpin were most abundant in the Oshetna River, Fog Creek, and Tsusena Creek (Delaney et al. 1981a).

3.3. Rationale as Non-Target Species

- Sculpin in the Susitna River are sedentary with spawning, juvenile rearing and adult movements confined to a limited area (Schmidt et al. 1983). Thus, any connectivity afforded by passage facilities would be expected to provide little benefit for this species.
- While abundant and widely distributed, sculpin are not targeted for harvest and lack the added importance of harvested species with regard to fish passage considerations.

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