

APPENDIX B1. TARGET FISH SPECIES FOR PASSAGE

1. TARGET SPECIES SELECTION RATIONALE

The proposed Susitna-Watana Project would block the upstream passage of Chinook salmon and resident fish that migrate through and otherwise use the dam site and upstream habitat in the Upper Susitna River and its tributaries. Likewise, the proposed dam and reservoir could potentially affect the downstream movement of fish in the Upper River that exhibit migratory behavior. This appendix provides a preliminary list of target species for consideration in the Study of Fish Passage Feasibility at Watana Dam.

As a first step in selecting target species, only those fish species that have been documented in the Upper River (upstream of the dam site) were considered. This criterion is based on the assumption that, compared to current conditions, the Project has the potential to affect connectivity of habitat and/or gene flow for species that have documented presence in the Upper River. From the list of Upper River fish species, target species were then selected based on the following three criteria.

- ***Exhibit migratory behavior*** – Fish passage has a greater importance to species that may exhibit migratory behavior as part of their natural life history compared to fish that exhibit only localized movement, especially when the migration is necessary to complete the life cycle of the species.
- ***High relative abundance*** – Species that are relatively abundant in the Upper River and its tributaries would theoretically utilize fish passage facilities with greater frequency than less abundant species, disregarding other criteria (e.g., migratory behavior).
- ***Importance to commercial, sport, or subsistence fisheries*** – Species that are harvested in commercial, sport, or subsistence fisheries have added importance with regard to the study of fish passage feasibility.

Preliminary target species were selected if they met two of the three criteria listed above. Because the amount of available information related to these criteria is inconsistent for each species, this assessment was qualitative and in some cases relied on assumptions based on out-of-basin literature. For each criterion, categorical scores of *High*, *Moderate*, and *Low/None* were assigned to each species and only those rated as *High* or *Moderate* were deemed to meet that criterion. This approach does not account for any current or future conservation or management objectives that may exist for a given species.

Table B1-1 shows the criteria scores for all fish species known to occur in the Upper River and identifies those selected as target species based on the criteria. For those selected as target species, the following sections provide a brief rationale for the scores assigned. Other appendices to this document provide further details regarding migratory behavior (Appendix B4) and relative abundance (Appendix B7) in support of these scores. Brief descriptions of other species that were not selected as target species but are known to occur in the Upper River and could potentially access passage facilities are provided in Appendix B2.

2. ARCTIC GRAYLING

- Evidence of movement between tributaries in the Upper River with use of the main channel as a migratory corridor (Delaney et al. 1981). In the Middle River, documented migrations of up to 40 miles to overwinter in the mainstem near Talkeetna (Sundet 1986).
- High relative abundance in the Upper Susitna River compared to catches of other species (Delaney et al. 1981; AEA unpublished data).
- An important species comprising a significant component of the sport fish harvest in the Susitna River Drainage (Jennings et al. 2007, 2011).

3. BURBOT

- Burbot are generally sedentary except for pre- and post-spawning migrations documented to extend up to 70 miles based on telemetry and mark-recapture studies in the Middle Susitna River (Schmidt et al. 1983).
- Widely distributed in the Upper River, but at relatively low abundance compared to other target species (Delaney 1981; AEA unpublished data).
- An important species comprising a significant component of the sport fish harvest in the Susitna River Drainage (Jennings et al. 2007, 2011).

4. CHINOOK SALMON

- Exhibit extensive upstream spawning and downstream smolt migrations as part of obligate anadromous life history.
- Low relative abundance based on juvenile sampling and adult aerial surveys in the Susitna River and its tributaries upstream of Devils Canyon (AEA unpublished data; Buckwalter 2011; Barrett 1985).
- Comprise a major component of the sport fish harvest in the Susitna River drainage (Jennings et al. 2007, 2011) and supports commercial (Shields 2010) and subsistence (Fall et al. 2009) harvest in Cook Inlet.

5. DOLLY VARDEN

- Limited available information regarding migration but some evidence from 1980s Middle River studies suggest upstream spawning movements up tributaries and post-spawn movements to the mainstem for overwintering (Schmidt et al. 1983; Sautner and Stratton 1983; Sundet and Wenger 1984).
- Infrequently encountered in the Upper River during 1980s studies (Delaney et al. 1981) though more recent sampling upstream of Devils Canyon indicates a higher relative abundance and broader distribution compared to other species (AEA unpublished data; Buckwalter 2011)

- An important species comprising a significant component of the sport fish harvest in the Susitna River Drainage (Jennings et al. 2007, 2011).

6. HUMPBACK WHITEFISH

- Evidence of upstream spawning migration (>10 miles) in the main channel of the Middle River (Schmidt et al. 1983; Sundet and Wenger 1984). Limited indication of possible spring migration from overwintering areas (Schmidt et al. 1983).
- Low relative abundance compared to other species based on sampling upstream of Devils Canyon (AEA unpublished data; Buckwalter 2011; Delaney et al. 1981).
- Whitefish spp. comprise a small component of the sport fish harvest in the Susitna River Drainage (Jennings et al. 2007, 2011). In addition, whitefish are components of subsistence harvest in several AK rivers.

7. LONGNOSE SUCKER

- In the Middle River, some indication of limited upstream movement in the spring associated with spawning, though migration distances are unknown (Schmidt et al. 1983). Adults are generally thought to move from lakes into inlet streams or from deep pools to shallow, gravel-bottomed areas in streams (Morrow 1980). Longnose suckers are not thought to exhibit any definite migrations except to and from spawning areas (Morrow 1980).
- Moderate relative abundance compared to other species based on sampling upstream of Devils Canyon (Delaney et al. 1981; Buckwalter 2011; AEA unpublished data).
- Longnose sucker are not listed in sport fish harvest reports (Jennings et al. 2007, 2011) and are thought to comprise a negligible component of sport fish harvest. However, Morrow (1980) describes harvest elsewhere in their range outside of Alaska. Likewise, longnose sucker have been reported as a component of subsistence harvest in various parts of Alaska (Krieg et al. 2005; Simeone and Kari 2005; Andersen et al. 2004).

8. ROUND WHITEFISH

- In the Middle River, some evidence of an upstream migration in the main channel thought to be associated with spawning (Schmidt et al. 1983; Sundet and Wenger 1984). Some fish documented moving over 10 miles.
- Moderate relative abundance compared to other species based on sampling upstream of Devils Canyon (Delaney et al. 1981; Buckwalter 2011; AEA unpublished data).
- Whitefish spp. comprise a small component of the sport fish harvest in the Susitna River Drainage (Jennings et al. 2007, 2011).

9. REFERENCES

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10. TABLES

Table B1-1. List of fish species documented in the Upper Susitna River, a qualitative assessment of their potential for migratory behavior, relative abundance, and harvest importance, and the identification of preliminary target species for the Study of Fish Passage Feasibility at Watana Dam.

Species	Latin Name	Migratory Potential	Relative Abundance	Harvest Importance	Target Species
Arctic Grayling	<i>Thymallus arcticus</i>	Moderate	High	High	✓
Burbot	<i>Lota lota</i>	Moderate	Low	High	✓
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	High	Low	High	✓
Dolly Varden	<i>Salvelinus malma</i>	Moderate	High	High	✓
Humpback Whitefish ¹	<i>Coregonus pidschian</i>	Moderate	Low	Moderate	✓
Lake Trout	<i>Salvelinus namaycush</i>	Low	Low	High	
Longnose Sucker	<i>Catostomus catostomus</i>	Moderate	Moderate	None	✓
Round Whitefish	<i>Prosopium cylindraceum</i>	Moderate	Moderate	Moderate	✓
Sculpin ²	<i>Cottus spp.</i>	Low	High	None	

Notes:

- 1 Whitefish species that were not identifiable to species by physical characteristics in the field were called humpback by default. This group may have included lake (*Coregonus clupeaformis*) or Alaska (*Coregonus nelsonii*) whitefish.
- 2 Sculpin species were generally not differentiated in the field. In addition to slimy sculpin (*Cottus cognatus*), species may include others belonging to the *Cottus* genus.