Nelson Dam Removal Project:
Water Supply, Riverine Process and Fish Passage Improvements

Nelson Dam is a large river-spanning concrete dam located on the lower Naches River just outside of the City of Yakima (Lat. 46.6316N, Long. 120.5872W. It diverts up to 50 CFS of water and provides most of the irrigation water used by the City of Yakima and the Naches Cowiche Canal Association. The dam itself is being undercut and has decaying concrete, and changes in sediment deposition have rendered the existing concrete fishway and fish screen ineffective under many flow conditions.

Radiotracking studies of steelhead (*Oncorhynchus mykiss*) movements have shown adult migration delays at the dam under flow conditions that fill the ladder with gravel while preventing passage over the crest of the dam. This impacts their subsequent spawning success and exposes them to higher predation risk in the easily accessed areas just below the dam (in fact the easiest place to catch adult steelhead for research purposes in the entire Naches Basin has been immediately below the dam). Even more significant delays occur for Coho Salmon (*O. kisutch*), which pass the dam in low flow fall conditions, and may occur for spring Chinook Salmon (*O. tshawytscha*) during years with lower river flows during May through July. Fish passage at Nelson Dam cannot be effectively analyzed using the existing Level B Fish Passage analysis but we estimate that the structure provides 33% upstream passage for adults during low flow conditions and during high flow conditions that mobilize gravel into the fishway. A fuller description of upstream passage issues at the site can be found in the Nelson Dam Replacement Environmental Memo prepared by Yakima County.

The current facility is not designed for upstream movement of juvenile fish even under optimal conditions. Downstream smolt passage mortalities are high due to the poor functioning of the current screen bypass. Mortality rates for bypassed fish are highest when sediment buries the outfall. Even when the outfall is not buried, fish reenter the river in a marginal area where low flows, shallow depths and river depth fluctuations create shallow pools where fish are exposed to stranding and predation. Figure 1 shows dead smolts found in a field visit in July 2019.

The City of Yakima (City) and Yakima County are working together to remove Nelson Dam and construct a new diversion that a) provides unimpeded upstream and downstream fish passage past the site for all species and life stages, b) provides more effective and easier to maintain fish screening at the site, c) allows for improved sediment transport and floodwater conveyance for several miles up and downstream of the site, d) allows for removal of two downstream diversions and associated levees, and, e) improves water supply reliability for four water purveyors. The project is currently in the design phase, and permitting work is underway.

The project will consolidate several smaller irrigation diversions that currently divert surface water downstream of Nelson Dam. The existing infrastructure for the Old Union Diversion (lat. 46.625176N, long 120.563677W and Fruitvale Diversion (lat. 46.624907N, long 120.566418W will be removed after the new consolidated diversion is completed. This work is already fully funded by a separate Department of Ecology Floodplain by Design grant to Yakima County. Although neither of these diversions currently block fish passage into the Naches River, they do: 1) cause false

attraction, 2) have aging fish screens that need to be upgraded to remain in compliance, requiring in-water work and subsequent temporary water quality degradation, 3) create a seasonal partial barrier for fish moving into Cowiche Creek (lat. 46.628N, long. 120.569W, and, 4) require levees and regular earthwork in the floodplain and channel. Removal of these two diversions and associated infrastructure will allow restoration of the Naches River floodplain in the 2 miles downstream of Nelson Dam and eliminate the seasonal partial barrier at the mouth of Cowiche Creek. For this reason, Cowiche Creek habitat miles are included in the upstream mileage total even though the Cowiche confluence is just below Nelson Dam.

Partners involved in the project include WDFW, NOAA Fisheries, the Yakama Nation, North Yakima Conservation District, the Bureau of Reclamation (BOR), the US Fish and Wildlife Service, and the Yakima Basin Fish and Wildlife Recovery Board. The project is included as a key recovery action in the Yakima Basin Steelhead Recovery Plan.

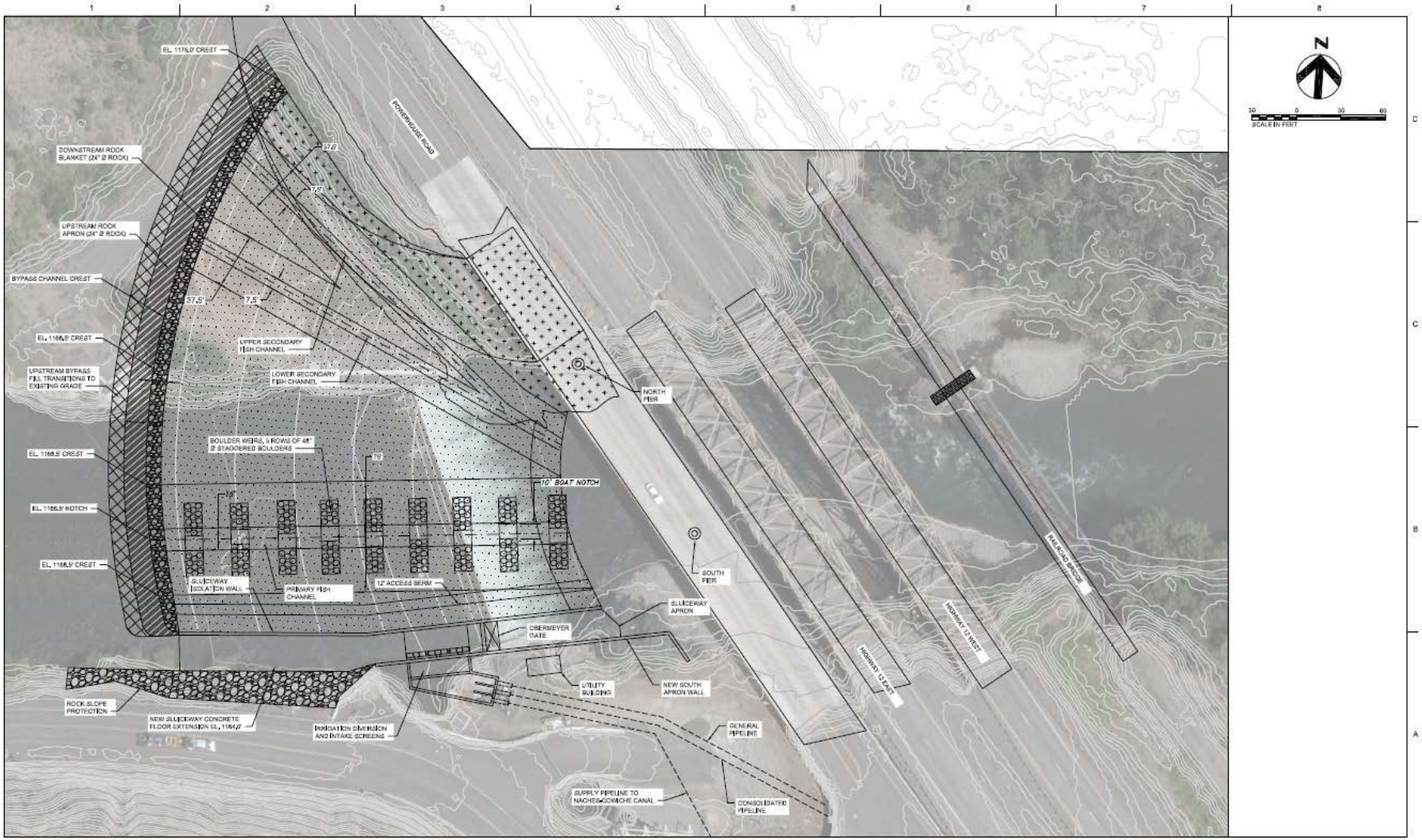
When completed, the project will provide unimpeded fish passage to 223 miles of currently accessible anadromous fish habitat upstream of the dam.[1] This number will rise by an additional 57 miles following completion of planned fish passage facilities at three BOR dams (Tieton, Clear Creek and Bumping). As noted above, the project will also allow removal of a seasonal partial passage barrier at the mouth of Cowiche Creek which provides unimpeded access to another 29 miles of anadromous habitat. The total potentially accessible mileage is 309 miles.

1. **Anticipated Costs**

The construction cost of $16,450,000 for the removal of the Dam, fish screens and fish ladder; and the new diversion structure with roughened channel. $8,210,000 for new pipe line conveyances to accommodate the diversion consolidations. Estimated by HDR from 60% design. The City of Yakima has secured $7,500,000 in bond funding for construction, and Yakima County has secured $4,476,000 from the Floodplain by Design program, leaving $12,684,000 yet to be secured. The City has applied to the Fish Barrier Removal Board for $4,134,000. The City will continue to pursue funding from Ecology Yakima Basin Integrated Plan funds, the Bureau of Reclamation and/or the Bonneville Power Administration.

The design contract total is $1,819,600, which is being fully funded by City of Yakima and Yakima County, with $75,000 in support from the Open River Fund.

[1] Mileage calculations were using the WDFW SWIFD Steelhead Distribution Layer



Overview Nelson Dam Removal Site Plan, showing Roughened Channel Fishway and Crest, Consolidated Surface Water Intake and Sluiceway.