

POTENTIAL NEAR-TERM HABITAT PROTECTION, RECONNECTION, AND RESTORATION OPPORTUNITIES

The data collected in the Lower Snoqualmie River mainstem and tributary habitat inventories and the tributary temperature data have informed the development of the WRIA 7 Near-Term Action Agenda (Snohomish Basin Salmon Recovery Forum, 2001). Furthermore, the data will be applied by King County and the WRIA 7 Technical Committee in identifying specific habitat protection, reconnection, and restoration actions for the Snoqualmie Watershed as part of the long-term WRIA 7 salmonid conservation plan. Protection projects include acquisitions and conservation easements. Reconnection projects include removing or retrofitting culverts, levees, revetments, and other structures that block fish passage or disconnect rivers from floodplain and watershed processes. Restoration projects include improving salmonid habitat in instream, riparian, and upland areas (e.g., native plant revegetation), as well as acquisitions and conservation easements that preserve future restoration options.

Lower Snoqualmie River Mainstem Project Ideas

The Near-Term Action Agenda includes several project ideas that could be implemented in the next two to five years to protect and improve habitat conditions for salmonids in the Snoqualmie River. These project ideas are not a comprehensive list of opportunities and generally pertain to the following mainstem reaches: the confluence with Harris Creek to the confluence with the Tolt River (approximately RM 21-24), immediately upstream and downstream of the confluence with Griffin Creek (approximately RM 26-27), and the confluence with the Raging River and immediately downstream (RM 34-35). These reaches were identified as focus areas, which are areas that support high levels of spawning, rearing, holding, and/or refuge for chinook salmon. Riparian habitat conditions in the focus areas were rated as fair to good (Snohomish Basin Salmon Recovery Forum, 2001). The habitat inventory data for the focus areas are consistent with this rating. The data show a moderate amount of bank hardening, few erosional features, few cattle access points, few artificial floodplain features but many back channels and tributaries, relatively moderate to high concentrations of LWD, more native than nonnative shrubs, and moderate to high riparian tree density including some larger trees.

For the reach between the mouths of Harris Creek and the Tolt River, there are several floodplain reconnection opportunities (Snohomish Basin Salmon Recovery Forum, 2001). King County WLRD is beginning a feasibility study to determine the habitat benefits to salmonids that would result from removing a levee on the LB of the County-owned "Chinook Bend" property at RM 22.6. Likely benefits include increasing the complexity of the main channel, restoring the river's capacity to develop side channels and capture LWD, and decreasing the redd scour that could be caused by the channel constriction that exists at present.

Other potential floodplain reconnection projects include:

- Improving the connection between Harris Creek oxbows in public (WDFW) ownership and the Snoqualmie River by removing bank hardening and restoring the river's ability to migrate.
- Restoring the main channel of the Snoqualmie River on the RB at RM 23.3 by setting back the levee and allowing back channel formation.

- Enhancing a remnant side channel on the LB at RM 24.2 within the 450-acre King County Tolt MacDonald Park by removing bank hardening and thereby restoring its connection to the Snoqualmie River.

The vegetation in Tolt MacDonald Park is currently a mixed second growth forest dominated by black cottonwood; Himalayan blackberry and other nonnative plants have invaded portions of the park following initial clearing efforts (Lucchetti et al., in review). Other project opportunities in the reach between RM 21-24 are native vegetation planting in the riparian corridor of the park and restoring native vegetation and removing barriers to channel migration and fish passage in the WDFW-owned Stillwater Wildlife Unit (Snohomish Basin Salmon Recovery Forum, 2001).

Historical information about riparian vegetation species on the banks of the mainstem Snoqualmie River (Collins and Sheikh, 2002) should be applied to selecting the combination of trees and shrubs for native plant revegetation projects at these and other locations.

Despite extensive bank hardening within Tolt MacDonald Park, a set of large swales and side channels still exists. Considerable additional restoration could be accomplished by reconnecting and restoring more of the off-channel habitats that remain cut off from the mainstem Snoqualmie and lower Tolt Rivers in and near the park. Baseline and trend monitoring of habitat conditions in this area would provide useful background information for designing reconnection and restoration projects as well as for evaluating the success of such projects after they are implemented. Parameters to be included in baseline and trend monitoring are vegetation maturity and forest complexity (patchiness, snags, woody debris on the forest floor, instream and off-channel LWD loadings), the amount and type of aquatic habitats, and fish and wildlife use and diversity (Lucchetti et al., in review).

Two project opportunities have been proposed for the reach immediately upstream and downstream of the confluence of the mainstem Snoqualmie River with Griffin Creek. These include improving the surface water connection between the river and an oxbow on the LB at RM 27.9, and acquiring land inside the large LB river bend to allow improved connections between the river and several oxbow and wetland habitats.

Approximately 33% of the riparian area at the confluence of the mainstem Snoqualmie River with the Raging River is in public ownership. There are opportunities to modify flood and erosion control facilities to enhance instream and riparian habitat at this location. Potential acquisition and floodplain reconnection projects in this reach include enhancing the connection between the mainstem channel and an existing small side channel at RM 35 by retrofitting a small culvert in the LB levee, and acquiring land at RM 34.3, then removing part or all of the existing RB levee to increase the frequency and amount of flow through an existing side channel (Snohomish Basin Salmon Recovery Forum, 2001).

In addition to the three reaches described above, the Snoqualmie River mainstem habitat inventory data will help identify other river reaches where habitat conditions are good (i.e., mostly native vegetation, relatively mature trees, presence of LWD, tributaries, and back channels, little or no bank hardening, few channel modifications and other artificial structures, and little or no cattle access). Additional habitat protection, reconnection, and restoration opportunities will be identified for the Snoqualmie Watershed portion of the long-term WRIA 7 salmonid conservation and recovery plan.

King County WLRD staff have reviewed the cattle access data from the summer of 2000 and are in the process of working with the landowners to identify and develop defined access points that will allow regrowth of trampled riparian vegetation, help to prevent excessive erosion of

riverbanks, and benefit water quality, thereby contributing to improved salmonid habitat conditions at affected locations.

Tributaries Project Ideas

The *Snohomish River Basin Chinook Salmon Near Term Action Agenda* (Snohomish Basin Salmon Recovery Forum, 2001) includes project ideas that could be implemented in the next 2 to 5 years to protect and improve habitat conditions for salmonids in the Raging River, Griffin Creek, and the Tolt River.

The mouth of the Raging River and the mouth of Griffin Creek were identified as focus areas for chinook salmon. An acquisition/floodplain reconnection opportunity exists in the lower Raging River from RM 0.4 to the mouth. Levees constrain this reach of the river and prevent the main channel from meandering. Development is much less dense along the RB, where there are several houses and a golf course. Where there are willing landowners, land could be acquired in this reach. The levees could then be set back, relocated or removed in order to restore natural delta processes and hydraulic connectivity between the Raging River and its floodplain (Snohomish Basin Salmon Recovery Forum, 2001).

Potential restoration projects in Griffin Creek are:

- Improving the quantity and quality of bank edge habitat in the wetland complex at the mouth of the creek by planting native riparian vegetation.
- Placing LWD in the wetland complex at the mouth of the creek to provide diverse cover for juvenile fish (Snohomish Basin Salmon Recovery Forum, 2001).

The Tolt River mainstem (RM 0-8.2) and South Fork (RM 0-1.6) was identified as a focus area because the river provides high quality spawning habitat for about 20% of the chinook salmon that return to the Snoqualmie Watershed to spawn. The channel location shifts over time, creating dynamic and diverse habitats within the active channel, and productive side-channel habitats. Riparian habitat conditions in this focus area were rated as fair to good (Snohomish Basin Salmon Recovery Forum, 2001). This rating is consistent with the initial habitat inventory conducted on the Tolt River in 2001, as there was little bank hardening, few erosional features, few artificial floodplain features but many back channels and tributaries, relatively high concentrations of LWD, more native than nonnative shrubs, and moderate to high riparian tree density including some larger trees in these reaches.

The lowest 1.6 miles of the Tolt River are constrained by levees. However, King County and the City of Seattle are investigating the feasibility of relocating or reconfiguring these flood control facilities in order to reconnect the historic floodplain area and side channels to the main channel of the river while preserving flood protection and the integrity of key bridges. See the "Other New Field Studies" section of this report for more details on this project.

Another potential opportunity in the lower Tolt River is to acquire land where there are willing landowners; some of the land in this reach is residential, while other areas are held in large, single-ownership forest tracts. Numerous side channels that wind through the floodplain and offer habitat diversity would then be protected. Acquiring undeveloped land behind dikes would preserve the option to set back or remove the dikes in the future (Snohomish Basin Salmon Recovery Forum, 2001).

Other protection or restoration projects in the Snoqualmie River tributaries will be identified as the stream walks continue in the summer of 2002. Areas of good habitat, (i.e., mostly native vegetation, relatively mature trees, presence of LWD, side channels and back channels, little or no bank hardening, few channel modifications and other artificial structures, and little or no cattle access) will be noted for potential acquisition and protection. Areas with good opportunities for restoration, such as a perched culvert that could be replaced thus restoring connectivity and fish passage, will be identified and flagged.