
Aerial view of watershed

QUILCEDA/ALLEN WATERSHED PLAN EXECUTIVE SUMMARY

Introduction

The Quilceda/Allen Watershed Management Plan was prepared by the Quilceda/Allen Watershed Management Committee (WMC) and Snohomish County Public Works, Surface Water Management Division (SWM). The plan is funded in part by a Centennial Clean Water Fund grant administered by the Washington State Department of Ecology. Local funding for the plan was provided through Watershed Management Area fees collected for the Quilceda/Allen watershed by SWM.

Location

The Quilceda/Allen watershed is in west central Snohomish County just north of the City of Everett. The watersheds for the two stream systems have been combined because of the proximity of the streams to each other and because both discharge into Ebey Slough in the lower Snohomish River delta. The combined watershed encompasses an area of 49 square miles (31,360 acres); Allen Creek drains about 11 square miles and Quilceda Creek drains about 38 square miles.

The Quilceda/Allen Watershed As a Natural Resource

The Quilceda/Allen watershed is a public resource to be managed and enjoyed by a variety of watershed users. Managing the watershed is not just about protecting the streams, wetlands and their inhabitants, but about protecting watershed residents, homes, and businesses as well.

Fish and Wildlife Habitat

Streams, wetlands, and riparian corridors provide habitat for fish and wildlife in and along Quilceda and Allen creeks. Chum and coho are the most common salmon species that spawn in these streams. Cutthroat trout are stream residents all year long. These fish depend on the pools and riffles in the streams and off-channel wetlands during their life cycle. Fallen logs and other woody debris from streamside forests create pools. Streamside habitat is also a source of

food for aquatic animals. In addition, it provides food, cover, and nesting sites for other species including the bald eagle, great blue heron, red-legged frog, and mule deer.

Clear, cool water from wetlands and ground water provides a constant water source to streams during the hot summer months when there is little rainfall. Even when some streams naturally dry up, pools in off-channel wetlands provide a summer home for young salmon and other fish. From this water, salmon and other aquatic animals and plants derive life giving oxygen and nutrients.

Commercial and sport fishing provide economic benefits from continued salmon production in Quilceda and Allen creeks. Many people depend on the salmon fishery for their livelihood. The salmon is also an important cultural resource to Tulalip tribal members.

Clean Water for Recreation


Kayaking in lower Quilceda

Clean water is essential to outdoor recreation in the watershed. Many children play in the water and ravines of Quilceda and Allen creeks. Jennings Park is located along a scenic stream section in lower Allen Creek. Children swim, wade, and play in the park's creek and pond, while adults watch the ducks, geese, gulls, and great blue herons there. Children are attracted to streams as places to explore. Kayakers, canoeists, and other recreational boaters use the lower Quilceda estuary for bird and wildlife watching. Stream and wetland buffers provide natural relief from the urban environment in many parts of the watershed.

Clean and Plentiful Water for Drinking

Drinking water reserves draw on the watershed's water storage capacity. The Tulalip, Getchell-Snohomish, and Marysville trough aquifers serve the watershed. Many residents, business owners, farmers, and the City of Arlington rely on the volume and quality of these ground water reserves. Forests and other open lands ensure that water can filter into the ground providing adequate ground water for the watershed.

Water Quality and Water Resource Problems in the Quilceda/Allen Watershed

Watershed residents have noticed a change in the watershed's streams. No longer do they observe the salmon that once were abundant in the creeks. Habitat along the creeks has changed, streams carry heavy sediment loads, and houses and roads have replaced hillside forests. These changes and others affect the quality of the streams and the quality of life of the area.

Stormwater Runoff

Stormwater runoff is water from precipitation that enters streams during storms. The amount, timing, and velocity of runoff are changed as impervious surfaces are constructed preventing water from infiltrating into the ground. Impacts to watershed hydrology include flooding, streambank erosion, stream channel downcutting, and loss of habitat for fish and wildlife. These problems are significant for the watershed's people and salmon, and they will increase as future development causes loss of open space and creation of more impervious surfaces. Computer modeling has shown that without mitigation stream flows in upper Quilceda Creek will increase by 82 percent when future development is complete.

Sediment


Poorly maintained erosion control

One of the most visible and destructive types of pollution to watershed salmon habitat and aquatic animals is excess sediment. The sediment fills in spawning gravel, smothers salmon eggs, and can kill young salmon if their gills become clogged. Stream channels slowly become filled with sediment that provides a substrate for vegetation to grow and causes flooding and habitat destruction. The major sediment source occurring today is from construction. There is continual land clearing and exposing and moving of earth for all types of development related activities--new homes and businesses; roads; water, sewer, and power lines; and culverts. Heavy rains carry large amounts of sediment from exposed soils to the stream. Some watershed streams are already unsuitable for salmon spawning and rearing because of sediment, and watershed development is rapidly increasing. A walk down Allen Creek west of 67th Avenue NE reveals a stream particularly hard hit by heavy sediment loads.

Bacteria, Nutrients, and Urban Pollutants

In rural and agricultural areas, water quality has been degraded by fecal coliform bacteria and high nutrient levels from livestock waste and failed septic systems. Water quality testing has found extremely high bacteria levels in almost all watershed streams and high nutrient levels as well. Bacteria levels have exceeded state standards by as many as ten times, and lead and copper levels exceed the chronic limit in most watershed streams. Excessive nutrients in water cause excessive plant growth that can deplete the stream's oxygen supplies. Low dissolved oxygen is a problem in both upper and lower Allen Creek. Urban runoff collects chemicals from fertilizers, herbicides, pesticides, fungicides, petroleum, detergents, and heavy metals and discharges them into stream water. These pollutants can be toxic to aquatic animals and harmful to humans as well.

Solid Waste and Garbage

Streams along roads and through residential areas are littered with garbage, and streambanks are lined with grass clippings, compost piles, and pet waste that adds nutrients as rainwater washes them into streams. Dumpsites along the stream contain lead acid batteries and other car parts, adding metals and toxic chemicals to stream water. Residential neighborhoods along streams and roadside streams, especially Allen Creek along 67th Avenue NE, receive the largest amounts of garbage.

Stream and Wetland Habitat Degradation

Former horse pasture along mainstem Quilceda Creek. Restoration to begin spring 2002.

Stream channel alterations along roads, around fields, and through developed areas have resulted in aquatic habitat loss. Channeled streams have no structural diversity and usually have little streamside vegetation. These stream sections were found to have poor salmon rearing habitat. Livestock access to the channeled streams has caused streambank erosion and water pollution. People regard these channeled streams as ditches and often use them as garbage dumps.

Streamside vegetation removal has occurred throughout the watershed. In urban areas, even where regulated buffers have been left along the streams, vegetation is still removed to create lawns and openings to the stream. Farmers clear their land to the stream edge. The result is streambank erosion and fish and wildlife habitat degradation.

Logging activities along the ravine edges above the creeks have resulted in erosion; logging of forested wetlands has caused loss of water storage capacity. Sedimentation from logging activities has also occurred. Streambank stability has been affected by logging along a segment of the Middle Fork Quilceda Creek.

Wetlands have been drained and filled or have been degraded from livestock grazing, human trampling, and garbage dumping. Wetlands play a very important role in this watershed in maintaining water quality, allowing for aquifer recharge, providing fish and wildlife habitat, storing water, and as a source of water for streams. However, wetlands continue to be lost despite protective regulations. Over 100 acres of wetlands has been lost in the Munson Creek drainage basin alone.

Ground Water

Ground water is a little understood resource. To many residents it is the source of flooding problems in their crawl spaces and yards as homes were constructed without regard to the high water table. The importance of ground water to the watershed is its contribution to stream flow and its use as drinking water. Both ground water contamination and depletion could result from more development. A U. S. Geological Survey study done for the county found that the

Marysville trough aquifer was highly susceptible to contamination, and an Ecology study stated that creation of impervious surfaces over the water table that prevents water from filtering into the ground could lower the water table and decrease stream flows.

Flooding and Drainage

Localized but serious drainage problems result in road flooding. Crawl spaces and yards fill with water, even in areas where upstream development has not yet occurred. The primary causes are the high ground water table, loss of wetlands and their storage function, and nonexistent drainage systems or systems in need of repair, replacement, or upgrading. For example, the road and subdivision near the intersection of 140th Avenue NE and 23rd Street NE flood during heavy rains. Despite the flooding, a considerable amount of development is proposed upstream.

Projecting The Future of the Quilceda/Allen Watershed

The future of the watershed can be projected by comparing developed portions of the watershed with less developed areas, looking at other watersheds with high density development, and using computer modeling to predict future stream flows.

Salmonid Rearing Habitat Loss

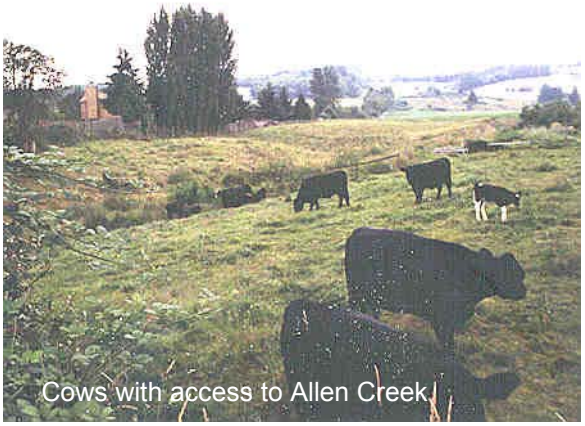

Lower Allen Creek in the Snohomish floodplain

Within the watershed, the Allen basin has undergone more development than the Quilceda basin. Although the salmon numbers have declined in both basins, there appear to be fewer salmon returning to the Allen stream system than Quilceda. A comparison of instream salmon rearing habitat in Quilceda, Middle Fork Quilceda, and Allen creeks shows significantly better habitat in both Quilceda and Middle Fork Quilceda creeks than Allen Creek. The Snohomish River floodplain at the mount of Allen Creek has been diked for agricultural use decreased the amount of rearing habitat along the river by about 600 acres.

Mainstem Allen Creek receives the combined impacts of urban and agricultural development. Stream habitat is less diverse, and streamside vegetation is sparse along Allen Creek. Almost all of Quilceda Creek has riparian areas of trees and shrubs, including deep, wide, forested ravines in lower Quilceda Creek. The Middle Fork has sustained greater impacts from agriculture than the mainstem Quilceda. However, instream habitat diversity remains high in both streams because of the large area of undeveloped forest surrounding the headwaters and fewer impacts along the stream.

With greater development infringing on the Quilceda stream system, removal of riparian vegetation will cause of loss of streamside and instream habitat diversity. The future will bring further reductions of coho salmon numbers.

Water Quality Problems


Cows with access to Allen Creek

A comparison of the less developed Quilceda/Allen watershed with the more densely developed North and Swamp Creek watersheds illustrates differences in water quality. Although the hydrologic characteristics of these two watersheds are different, the impacts to North and Swamp creeks are typical of densely developed watershed. Water temperatures measured in North and Swamp creeks were higher than temperatures in Quilceda and Allen creeks. Water temperature in urbanized areas rises with removal of riparian vegetation and lowering of stream flows. Dissolved oxygen levels were considerably lower in North and Swamp creeks than Quilceda and Allen creeks reflecting the higher level of urban pollutants in the water. Bacteria, nitrate, and phosphate levels were all higher in Quilceda and Allen creeks from agricultural and rural land uses. These differences suggest the importance of maintaining riparian habitat for shade and to filter pollutants, and strengthening water quality efforts in all new development. Education for streamside residents is also needed to maintain and improve the riparian corridors.

Increased Stormwater Runoff

In many Snohomish County areas, streams that once flowed throughout the year are now dry in the summer. This condition results from the increased construction of impervious surfaces, which changes runoff patterns to streams, and the conversion of significant amounts of forestland. Without water, these streams cannot support fish populations.

Computer streamflow modeling in the Quilceda/Allen watershed predicts high winter flows under future land use conditions, due to the loss of forest and increased impervious surfaces that come with development. There could be a concomitant decrease in summer stream flows. Hillside salmon spawning streams will sustain some of the most severe impacts as increased flows scour out hillside spawning gravel.

Management Recommendations

This watershed plan has strong management recommendations to address watershed problems. These management recommendations were selected because they would best maintain the salmon resource, protect water quality, and prevent flooding given the land use decisions that have been made for the watershed.

Controlling Stormwater Runoff

The major watershed concern is controlling stormwater runoff. The best way to prevent an increase in stormwater runoff is to maintain watershed forests, wetlands, and low density land use. This plan recommends forest and wetland preservation along the Quilceda and Middle Fork Quilceda headwaters. The plan also recommends that further computer modeling be conducted to determine what specific actions must be taken in each sub-basin to maintain stream flows at current levels. Until that is accomplished, the standards in Ecology's Stormwater Manual for the Puget Sound Basin should be used by all jurisdictions. Infiltration facilities should be constructed where possible to decrease discharge into streams and allow for aquifer recharge.

Proper maintenance of detention, retention, and water quality facilities insures that they function as designed to slow and reduce stormwater runoff and clean the water. When regular maintenance is not done, sediment and other pollutants build up in these facilities until they no longer function properly. The plan calls for actions that ensure routine maintenance procedures by all jurisdictions and individuals.

Reduction of Nonpoint Pollution

There are several recommendations that are designed to reduce nonpoint pollution from the variety of sources. The plan proposes to "reduce unnatural sediment input into stream to levels that can be transported out of the system by stream flow at all times of the year." Since sediment is one of the biggest problems, the plan recommends that clearing ordinances be developed and grading ordinances strengthened. A rating system for clearing and grading activities for new development on steep slopes would be developed to prevent erosion. The plan also recommends training programs to demonstrate appropriate erosion control techniques.

Reduction of nutrient and fecal coliform bacteria in stream water is addressed through farm plans and workshops in agricultural areas and through a septic system inventory and septic maintenance education program in unsewered areas. A campaign to educate residents on their pollutant contributions is proposed. Maintaining wetlands and buffers that provide water quality functions is important as well to meet water quality objectives.

Enhancing Water Resources

The main strategy to prevent streams, wetlands, and ground water from degradation is through retention of forest, riparian corridors, and open space, combined with economic incentives. Development of a recovery plan for coho salmon is a strategy designed to build upon the information collected as part of the

planning process. This recovery plan will develop further strategies to protect coho salmon habitat and to prioritize stream sections and wetlands for enhancement and rehabilitation.

Ground water protection in the Marysville trough is addressed through maintaining low-density land use and limiting the amount of impervious surface in new development through design standards. The Marysville trough aquifer is recommended for critical aquifer recharge designation because of the ground water's contribution to stream flow. These recommendations meet the objective of supporting land uses and policies to protect ground water quality and quantity.

Preventing Drainage and Flooding Problems


Flooding at 67th and 95th

Drainage and flooding issues throughout the watershed are addressed through design of drainage plans for both developed and developing areas. The watershed plan also identifies several areas where culverts need replacing and drainage systems need upgrading.

Cultural Resources

Cultural resources are addressed through education. An oral history video will be produced that will record the stream history by interviews with watershed residents. The plan encourages the use of natural systems located near schools as outdoor laboratories.

Implementation

Agencies and jurisdictions that will implement individual plan actions, an implementation schedule, and estimated costs are included in the implementation section of this document (tables 9 and 10, pages 168 and 172). The schedule and cost estimates are preliminary and are included as a planning tool to assist in budgeting. Any implementation done under this plan is subject to the implementing agencies and groups obtaining funding to carry out the management recommendations. Final responsibility for implementation and cost sharing will be subject to negotiation between Snohomish County, local cities, The Tulalip Tribes, and agencies and through interlocal agreements.

Conclusion

The Quilceda/Allen Watershed Management Committee believes it is essential to implement strong management recommendations to meet the watershed's goals. These goals include maintaining salmon habitat and productivity, improving water quality, protecting wetlands and ground water, educating watershed citizens, and providing for cultural opportunities for watershed residents. The committee is optimistic that this plan can make a difference.