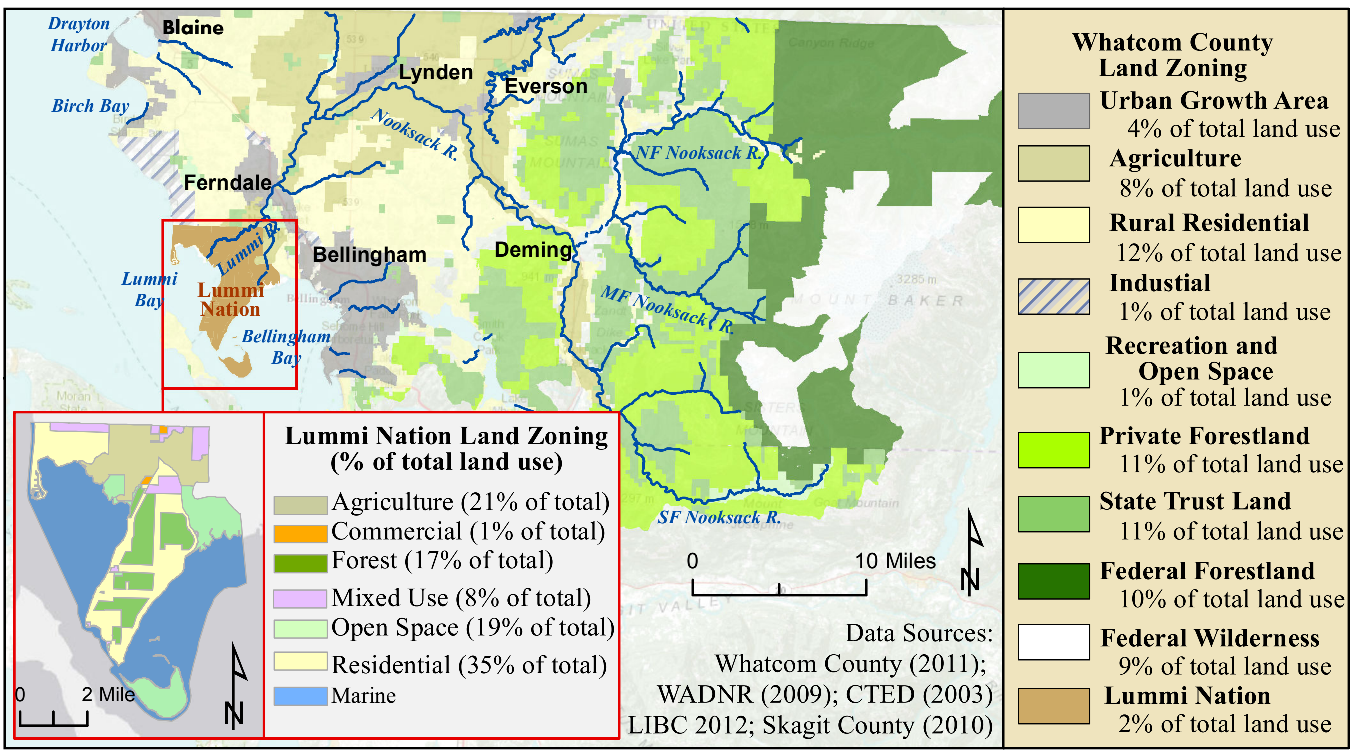
The Lummi Nation -- WRIA 1 (Mountains to the Sea)

WRIA 1 is 1410 square miles in area: 832 square miles of WRIA 1 is in the Nooksack River watershed, the largest single watershed in the WRIA. Forty-nine square miles of the Nooksack watershed is in Canada. It has three main forks: the North, Middle, and South that originate in the steep high-elevation headwaters of the North Cascades and flow westerly descending into flats of the Puget lowlands.The North and Middle Forks are glacial rivers and originate from Mount Baker. The South Fork is a snow/rain fed river and originates from the non-glaciated slope of theTwin Sisters peaks. The Middle Fork flows into the North Fork upstream of where the North Fork confluences with the South Fork to form the mainstem Nooksack River. The mainstem then flows as a low-gradient, low-elevation river until discharging through the Lummi Nation and into Bellingham Bay. Historically, the Nooksack River alternated between discharging into Bellingham Bay, and flowing through the Lummi River and discharging into Lummi Bay (Collins and Sheikh 2002).

The Nooksack River has five anadromous salmon species: pink, chum , Chinook , coho, sockeye; and three anadromous trout: steelhead, cutthroat and bull trout (Williams et al. 1975; Cutler et al. 2003).

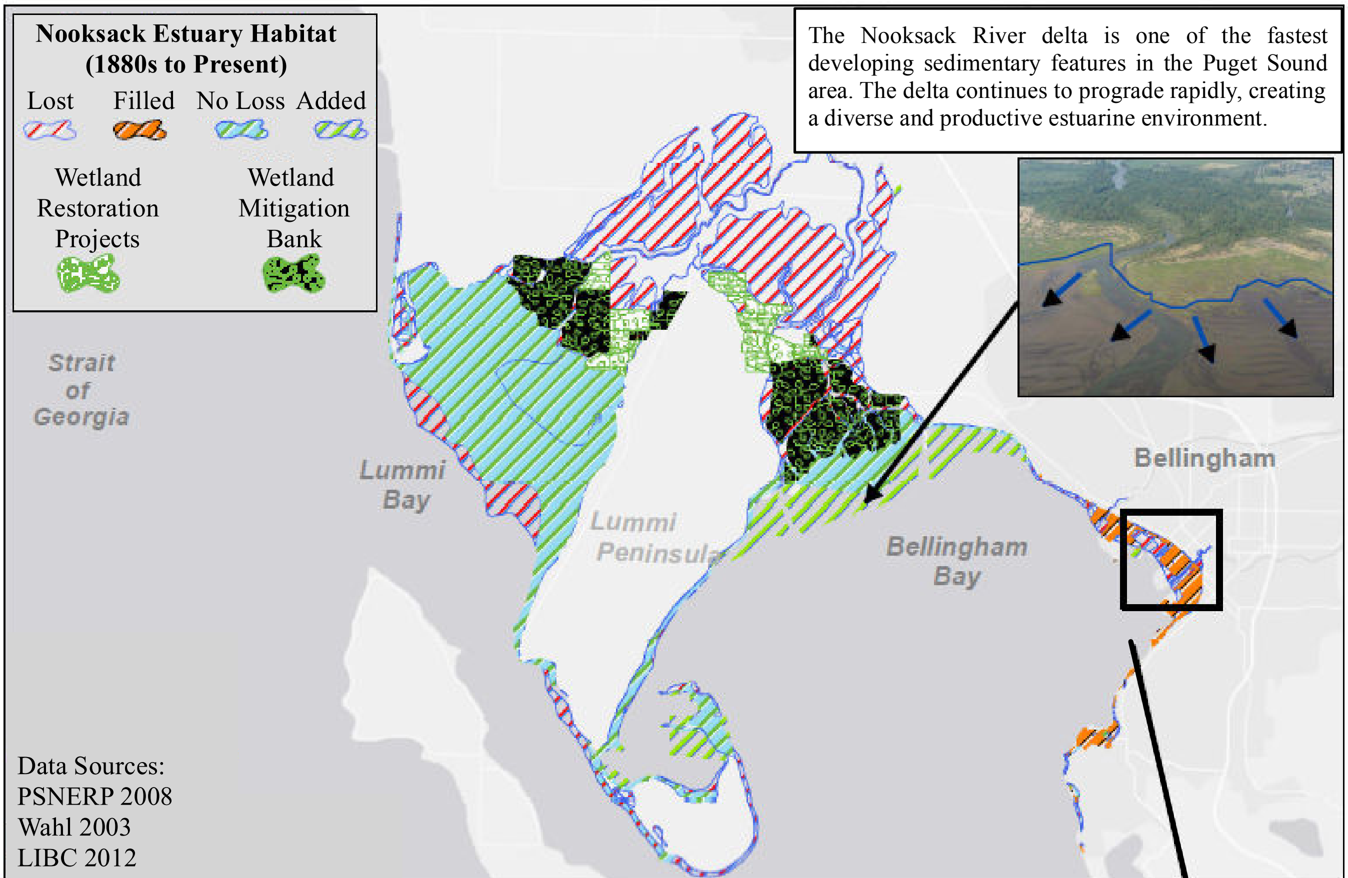


The Lummi are an aboriginal people who have fished, hunted, and gathered throughout their usual and accustomed grounds and stations and their traditional areas since time immemorial. Living in a region with many resources, the Lummis developed vibrant communities and a rich culture. By the mid-19th century, Euro-American settlers began to convert the landscape to accommodate faster rates of resource extraction and the historic life of the Lummi was forever changed.

Euro-Americans began settling the area in the mid-1800s primarily for the forest resources, with some arriving for opportunities in prairie farming and mining. Lowland clearing for agriculture began in earnest by the 1890s and by 1925 nearly all of the lower mainstem and delta forests had been denuded (WRIA 1 SRB 2005; Smelser 1970). Since 1950, land-use conversion has primarily been for commercial, residential, urban and industrial development (Smith 2002).

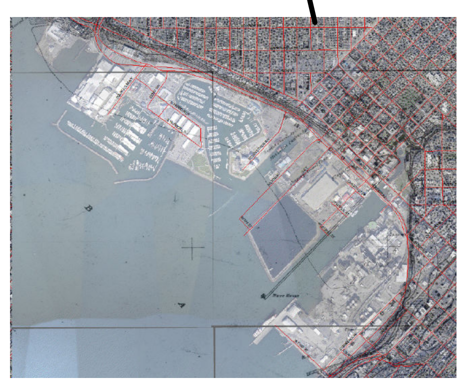
Lummi Nation Protects Wetlands in Lummi and Bellingham Bays

In the early 1900s, agricultural land conversion and associated sea wall construction, draining and diking significantly reduced historic subaerial estuarine habitat (Bortleson et al. 1980). Since then, sediment deposition throughout the Nooksack River delta has expanded historic intertidal estuarine habitat. According to the WRIA 1 Salmon Recovery Plan, the Nooksack River estuary is presently one of the healthiest and most pristine in the Puget Sound. Considering the healthy state of the Nooksack estuary,the Recovery Plan recommends continued protection and strategic restoration of the estuary.



For several thousand years, the Nooksack alternatively flowed through the Lummi River into Lummi Bay, and through the Nooksack River into Bellingham Bay (Bortleson et al. 1980). Around 1860, a large log jam changed the outlet course of the Nooksack River from the Lummi River to the Nooksack River. The new course of the river was very beneficial to sawmillsin Bellingham Bay, and considerable effort was exerted to keep it there (Deardorff 1992). Between 1926 and 1934, a dike separating the two rivers was built, and the Nooksack River has continued to discharge into Bellingham Bay ever since (Deardorff 1992).

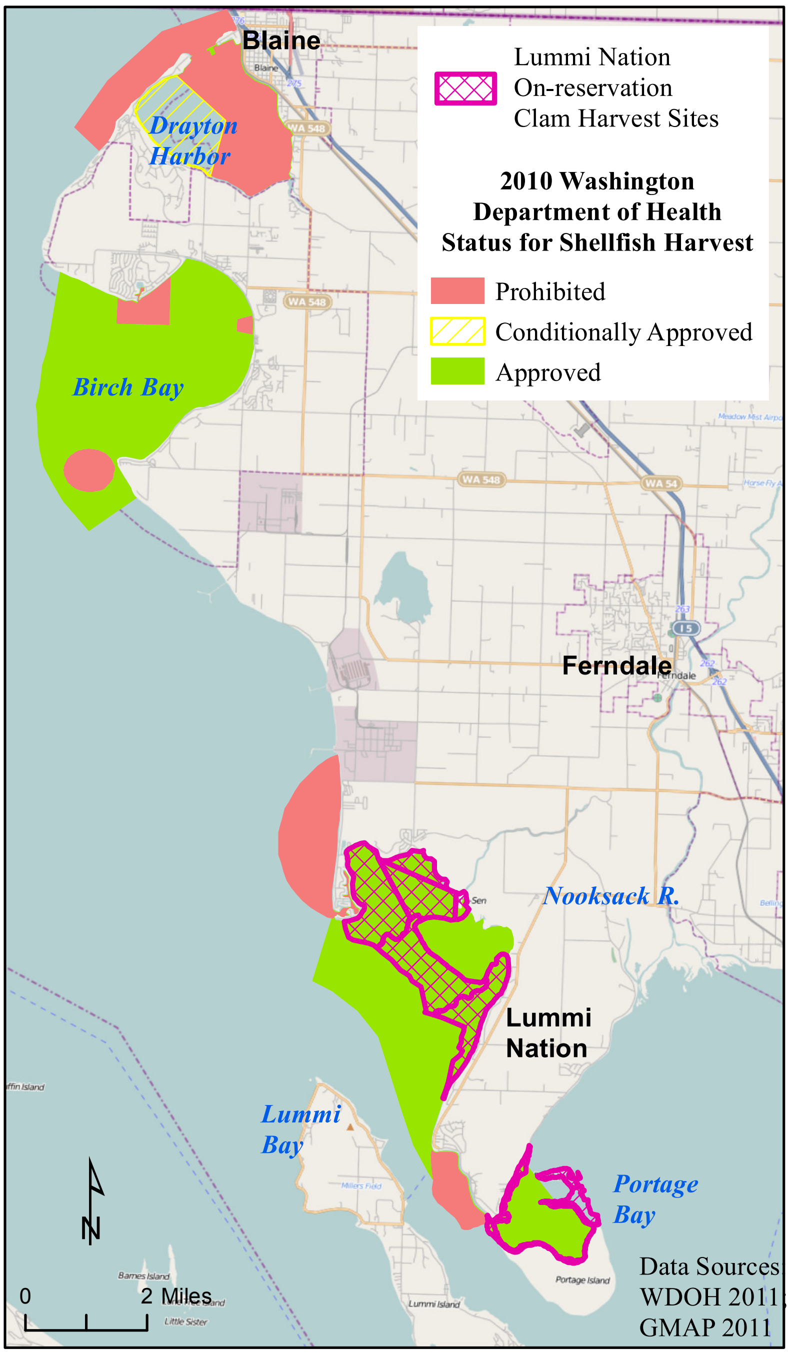
The long natural history of the Nooksack River alternatively discharging in both the Lummi and Bellingham Bay created a large wetland footprint in both estuaries. The Lummi Indian Nation is developing a wetland mitigation bank and restoration program that will protect and restore around ~2,750 acres of wetland habitat into the future.



Bellingham's waterfront has 747.6 acres of armoring, dredging and fill material impacts along the waterfront, with fill (453.3 acres) the majority of the impact (Wahl 2003). The city's shoreline provides substantially degraded habitat for anadromous salmon.

Current Conditions for Lummi Shellfish Harvest Favorable Future Conditions Remain Uncertain

In consultation with the Lummi Nation and under the Shellfish Consent Decree (Order Regarding Shellfish Sanitation, United States v. Washington [Shellfish], Civil Number 9213, Subproceeding 89-3, Western District of Washington, 1994), the Washington Department of Health (DOH) is responsible to the federal Food and Drug Administration (FDA) to ensure that the National Shellfish Sanitation Program (NSSP) standards for certification of shellfish growing waters are met on the Reservation. Primary fecal coliform pollution sources for shellfish beaches include livestock and failing septic systems located within the upstream watershed. Every time the State has to close shellfish beds, the Lummi's federal Treaty right to harvest shellfish is jeopardized. Currently shellfish harvest is "approved" by the Washington State Departmennt of Health in most of Lummi, Birch, and Portage Bays. In Drayton Harbor, however, shellfish harvest remains either prohibited" or "conditionally approved" due to continued high levels of fecal coliform bacteria.

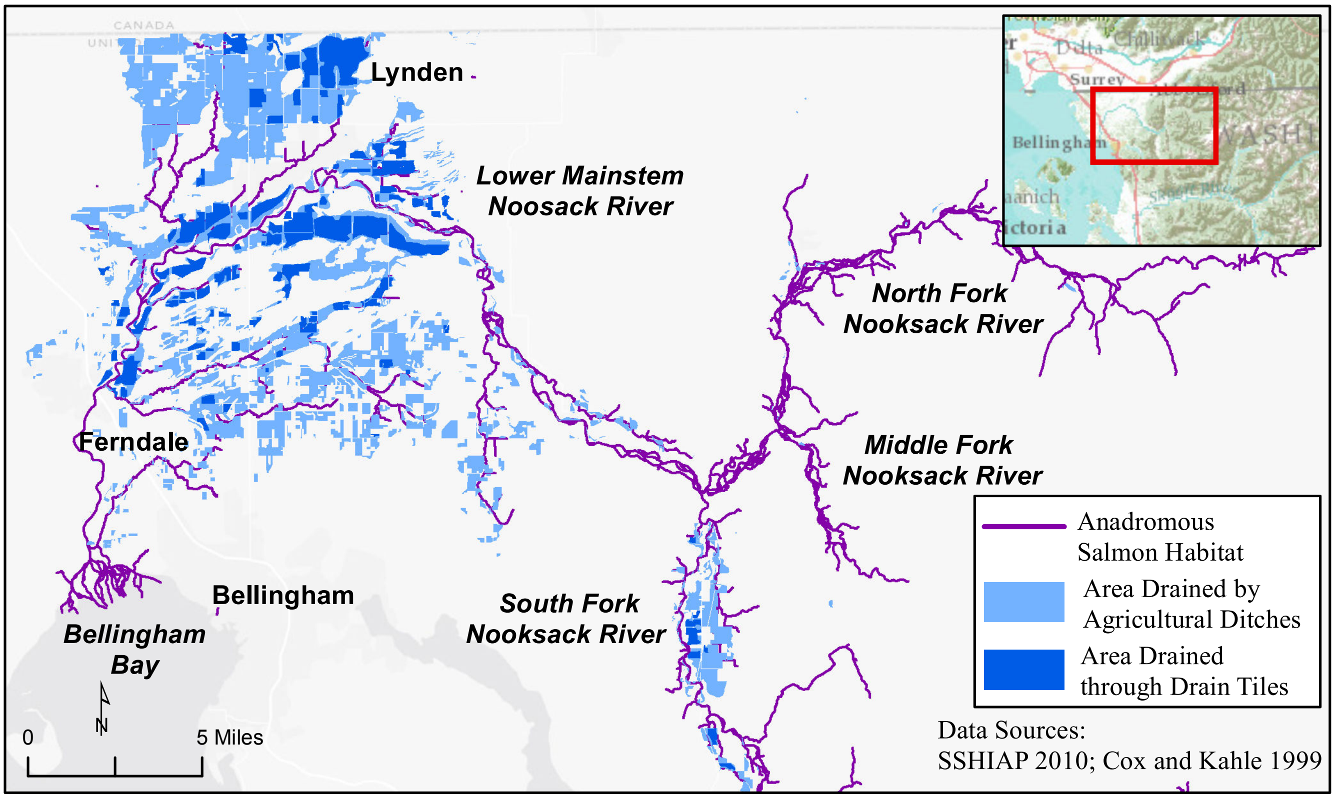


Bivalve shellfish have been prominent in the Lummi diet and culture since time immemorial. The Lummi and the Tribes of western Washington have treaty rights dating back to the 1850s guaranteeing them continued commercial, ceremonial, and subsistence harvest of shellfish in their usual and accustomed areas. Increased harvest pressure and degraded water quality have substantially reduced the shellfish available for Lummi to harvest and their ability to exercise the Treaty Rights guaranteeing them a sustainable shellfish harvest.

Shellfish growing areas are managed according to the requirements of the National Shellfish Sanitation Program, which is administered by the Food and Drug Administration. Since 1982, water quality has been monitored throughout shellfish growing areas to ensure compliance, and numerous efforts to control fecal coliform pollution have been implemented. While current conditions are favorable for Lummi's shellfish harvest in Portage and Lummi bays, fecal coliform levels in the Nooksack River have steadily increased in recent years and there remains a level of uncertainty as to how long favorable conditions will continue.

Ditching and Draining of Wetlands Has Resulted in Decreased Summer Low Flows in the Nooksack River

According to the WRIA 1 Salmonid Recovery Plan, human-caused decreases in the magnitude of low stream flows is limiting the area of wetted habitat available to salmon in the Nooksack River system. Additionally, low streamflows impede upstream migration of prespawners, reduce the intragravel flows needed for regulation of temperature and dissolved oxygen, and increase the risk of terrestrial predation on juvenile salmon in shallower water along stream banks (WRIA 1 SRB 2005). In addition to out of stream diversions for agricultural, industrial, and municipal supply purposes, one of the primary human causes of salmon-limiting stream flows in the lower Nooksack basin is the continued ditching and draining of wetlands which removes the natural storage of winter precipitation from the landscape (WRIA 1 SRB 2005).

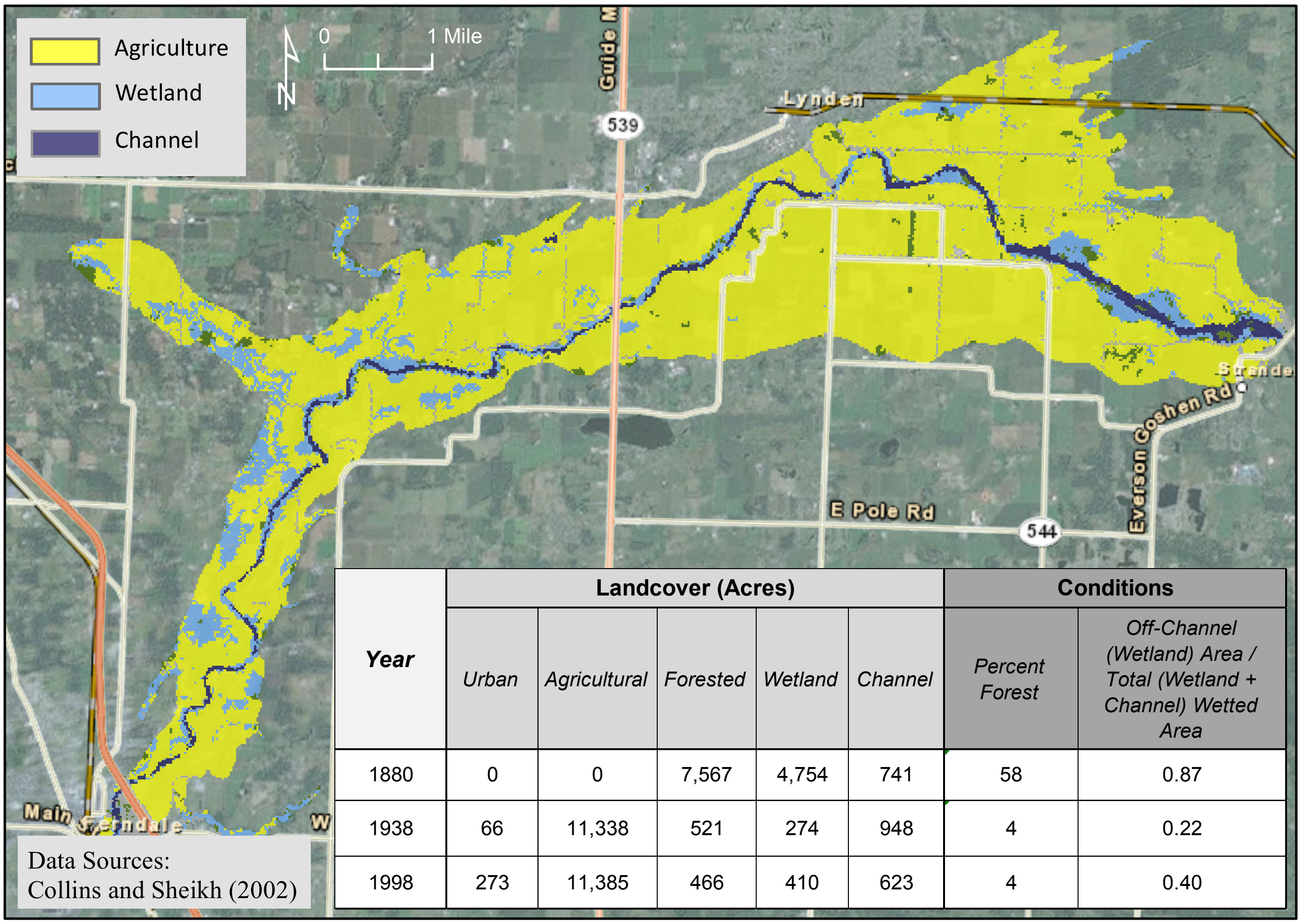


Prior to the arrival of Euro-Americans, the lowland areas of the Nooksack River and independent coastal drainages were covered in dense forest primarily composed of red alder (Alnus rubra) and Western Red Cedar (Thuja plicata) (Collins and Sheikh 2002). By 1925 the native forest landscape had been almost completely logged and cleared (Smelser 1970). By 1938 the cleared landscape had been almost entirely converted to agriculture (Collins and Sheikh 2002).

Because most of the landscape was poorly drained, numerous surface drainage ditches and subsurface tile drains were installed to remove surface water and shallow ground water to allow greater agricultural use of the land (Cox and Kahle 1999). Overall, the drainage systems work and water is removed from the landscape relatively rapidly compared to historic conditions. Although the drainage modifications allow for soil preparations and planting to occur earlier in the growing season than would be possible without the drainage, once the water leaves the landscape and flows downstream, it is no longer available to support instream flow during the low flow months of the summer. In essence, the drainage bypasses the storage that once existed in the forests and wetlands that once occupied the landscape.

Wetland Restoration Needed on Agricultural Lands in the Lower Nooksack River Floodplain

The WRIA 1 Salmonid Recovery Plan recommends a return to historical wetland conditions in the lower mainstem Nooksack (WRIA 1 SRB 2005). Historically in the Nooksack floodplain, off channel wetland habitat dominated wetted habitat area. In 1880, there were 4,754 acres of wetland to 741 acres of channel. By 1938, nearly 4,500 acres (95%) of off-channel wetland area had been cleared, drained and converted to agriculture, and wetlands were only 22% of total wetted habitat area. As of 1998, the lower mainstem still had less than 10% of its historical wetland area. In addition to wetland losses, straightening natural meandering of the Nooksack River for easier navigation and management has resulted in lost channel length and reduced area of wetted channel habitat. For example, from 1880 to 1938, channel length was reduced by 35% between Rivermile (RM) 15 and RM 19 (Collins and Sheikh 2002).



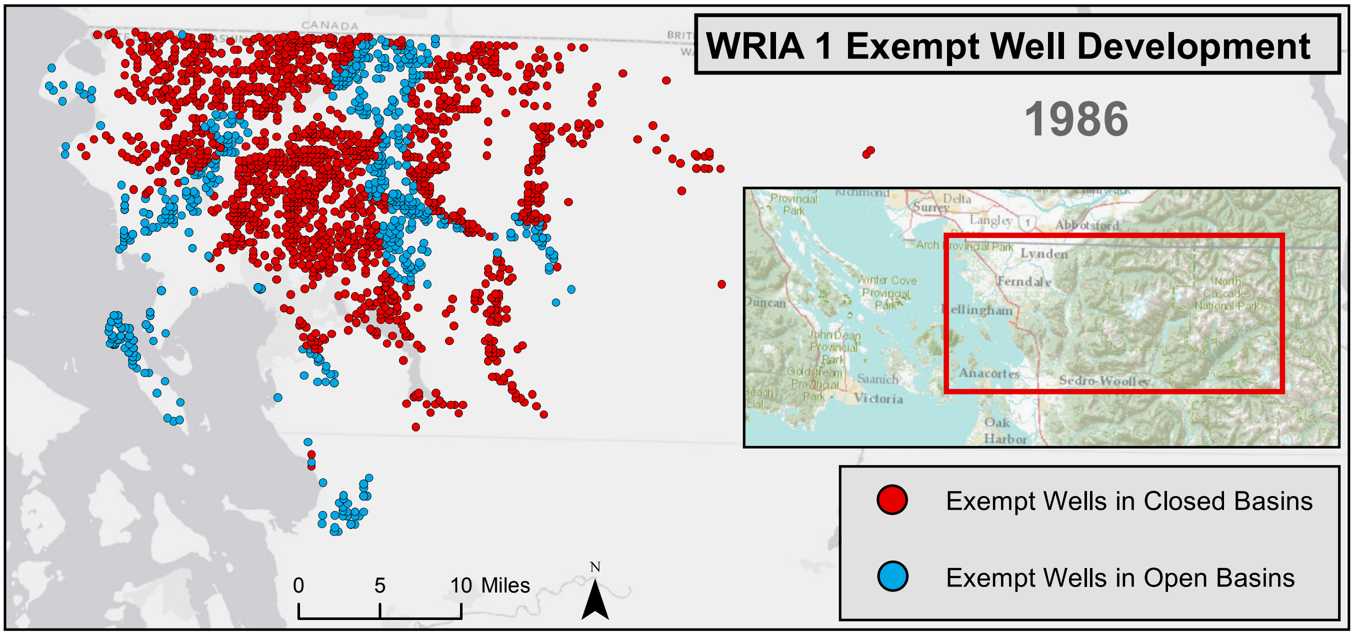
Year	Landcover (Acres)					Conditions	
	Urban	*Agricultural*	*Forested*	*Wetland*	*Channel*	*Percent Forest*	*Off-Channel (Wetland) Area / Total (Wetland + Channel) Wetted Area*
1880	0	0	7,567	4,754	741	58	0.87
1938	66	11,338	521	274	948	4	0.22
1998	273	11,385	466	410	623	4	0.40

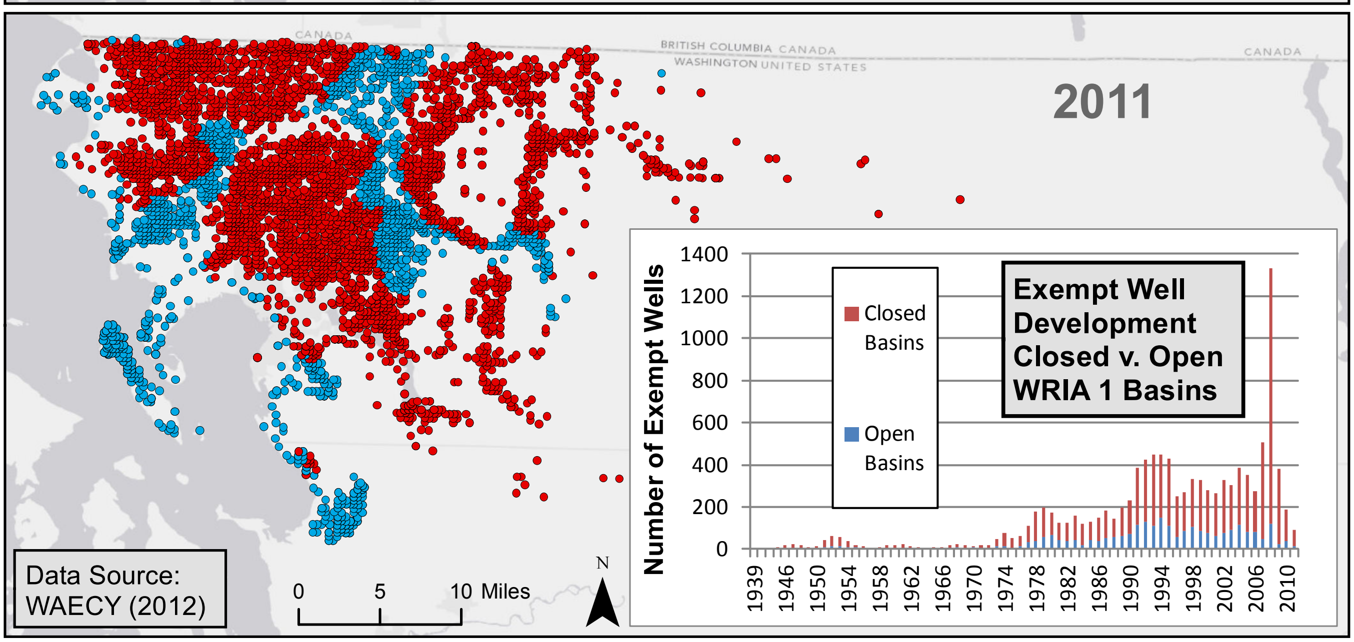
Data Sources:
Collins and Sheikh (2002)

The lower mainstem of the Nooksack River historically meandered through a complex of wetlands and beaver dams. Now, the lower mainstem floodplain is single threaded river through cropland, hay fields, and drainage ditches. The lower mainstem has suffered the greatest loss of habitat area and function from historical conditions, and the losses have been especially costly for rearing juvenile Chinook. In addition, productivity of pre-spawning migrant, over-winter rearing, and over-summer rearing life stages are all limited by the loss of historic off-channel wetland habitat in the lower mainstem (WRIA 1 SRB 2005). While not the most limiting factor to Chinook recovery, all Nooksack stocks of Chinook are affected by conditions in the lower mainstem. Restoration of floodplain wetland conditions in the lower mainstem toward historic conditions remains a long-term goal of the Recovery Plan (WRIA 1 SRB 2005).

Exempt Well Development Expands in WRIA 1 While Instream Flow Rules Continue to be Violated

Since 1986, exempt wells in WRIA 1 have increased 270% from an estimated 3,294 wells to an estimated 12,195 wells. Approximately 77%, of that increase has been in basins either seasonally closed or closed year-round to water withdrawal. From 1986 to 2009, flows in the Nooksack River failed to meet instream flow rule requirements 72% of the time during the July-September flow period (Essington et al. 2012).

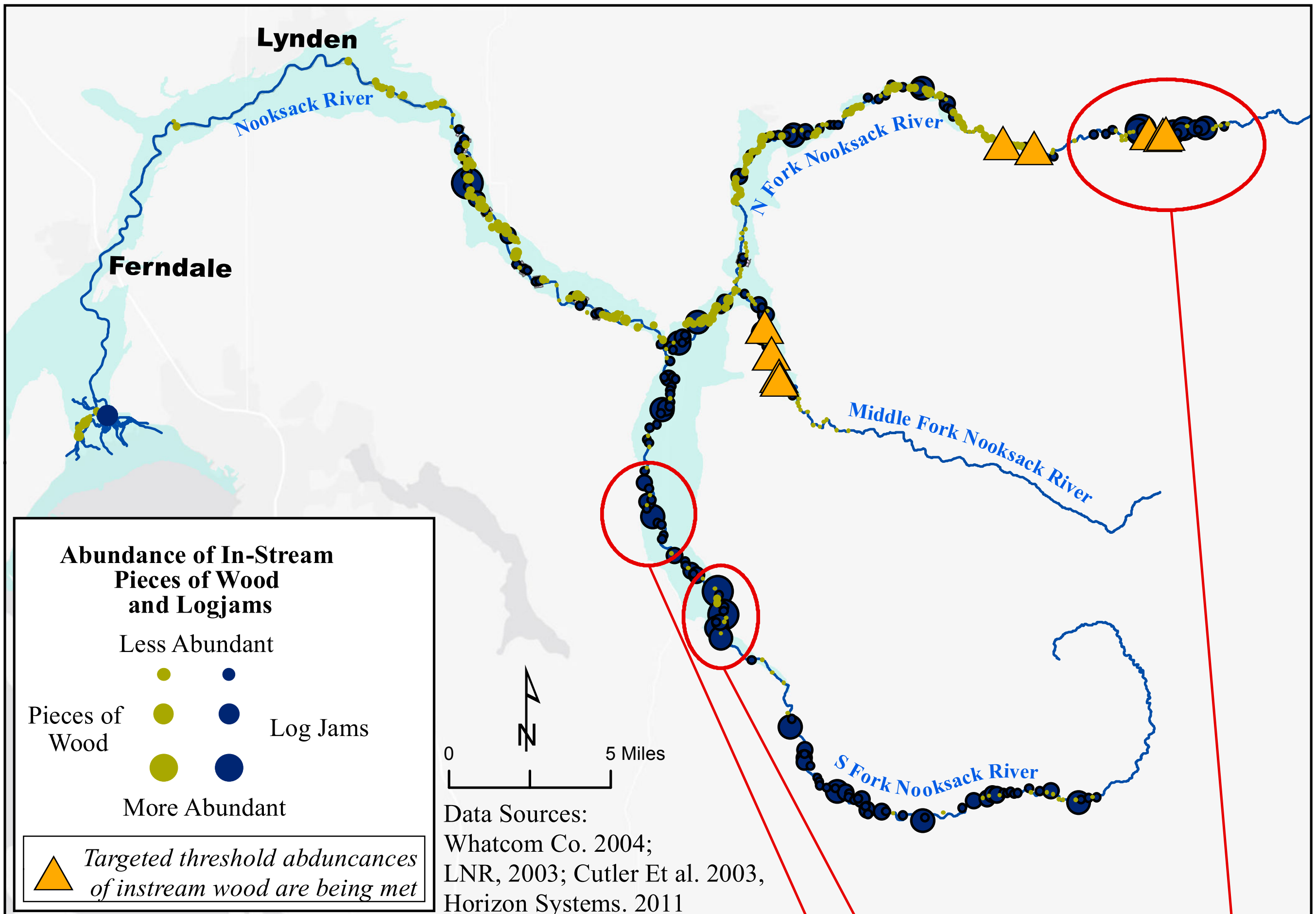




According to the WRIA 1 Salmonid Recovery Plan, not meeting instream low flows in streams results in loss of habitat connectivity, reduced habitat volume, stranding of juvenile salmon, higher stream temperature, and general decrease in water quality. The WRIA 1 watershed instream flow rules were set in 1986 to "protect and preserve" instream resources from low flow exceedances. As displayed in the map and table above, permit exempt wells have continued to be developed in WRIA 1 since 1986. While legal under State water law, continued exempt well development in basins targeted for limited or no additional withdrawal under the State flow rule is in direct conflict with the guidance of the Salmonid Recovery Plan, which recommends reducing out of stream uses in sub-basins impacted by low instream flows.

Nooksack River Needs Continued Active Engineered Logjam Restoration To Restore Wood to the Channel

According to the WRIA 1 Salmonid Recovery Plan, instream wood has a role in channel stability, habitat diversity and overall habitat quantity and quality, all limiting habitat factors to Chinook Recovery (WRIA 1 SRB 2005). Based on GIS measured lengths from 2003, there is an estimated 103 miles of known Chinook fish distribution in the mainstems of the Nooksack River system. The WRIA 1 Salmonid Recovery Plan recovery thresholds for abundance of instream wood are only being met in 1% of that habitat.

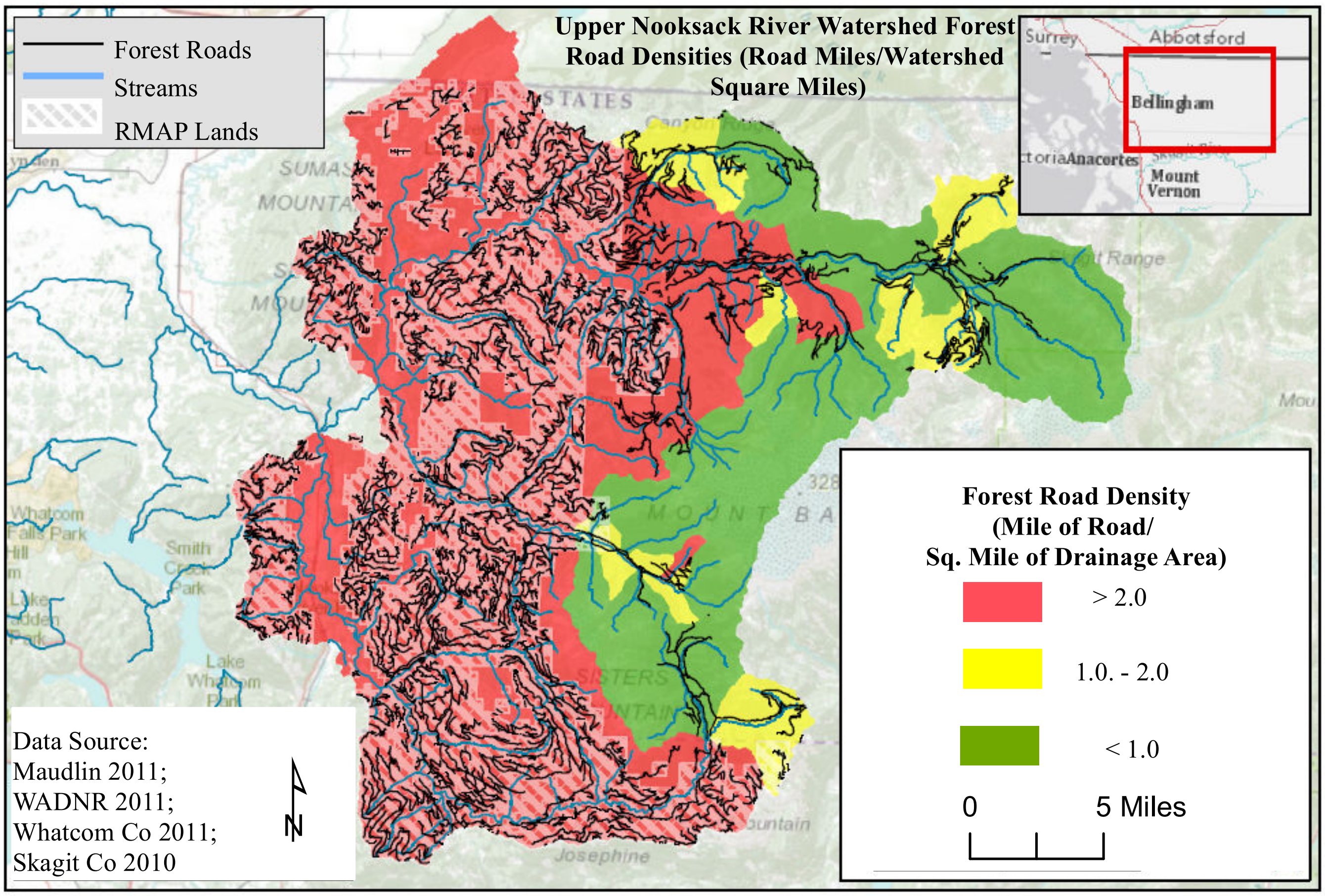


Man-made or Engineered Logjams on both the North Fork Nooksack River and the South Fork Nooksack River have been a significant and successful component of the WRIA1 Salmon Recovery Plan.

Archival data suggests that instream wood was historically very abundant in Puget Sound river systems, including the Nooksack River (Collins and Sheikh 2002). Settlers' descriptions from the 1800s of logjams 3/4 of a mile long are not uncommon (Collins and Sheikh 2002). The combination of land-clearing, riparian forest logging, splash damming, and instream wood removal for navigation have all combined to leave the Nooksack River currently with a relatively low abundance of instream wood. The lower mainstem continues to be managed for flood control and navigation. There is little to no accumulation of in-stream wood between Lynden, WA, and the delta of the river. The upper mainstem and the forks have a relative abundance of instream wood, but still very low compared to historic levels. The relatively higher levels of wood instream in the upper watershed is in part attributable to the engineering and construction of logjams. Since riparian forests are still dominated by young, small diameter trees, active logjam construction remains necessary to improve in-stream wood abundances in the Nooksack River system(WRIA 1 SRB 2005).

Forest Road Maintenance and Abandonment Key to Improving Upper Nooksack River Water Quality

The WRIA 1 Salmonid Recovery Plan (2005) points to watershed forest road density as one indicator of watershed health. Streams and stream habitat degradation have been associated with road densities greater than or equal to 2 miles of road length per square mile of watershed area (NOAA 1996). There are more than 1,376 miles of forest roads currently mapped in the upper Nooksack watershed, and forest road densities exceed 2 miles of road length per square mile of watershed area in over 65% of the upper Nooksack's watershed area. To decrease road densities under 2 miles of road length per square mile of watershed area in the upper Nooksack watershed, a total of 458 miles of road will need to be either abandoned, orphaned, or maintained with no drainage problems. An estimated 399 miles of those closures and/or repairs are scheduled to occur by way of the Road Maintenance and Abandonment Plans (RMAP) required for state and private roads.



No alteration of the human landscape has a greater and more far reaching effect on aquatic habitat than roads (NRC 2003). The majority of forest roads in the Upper Nooksack basin are on private industrial and state lands. All of these fall under the RMAP mandate and were originally scheduled to be repaired by 2016. An extension has been granted, and private industrial and state forestland owners can apply to have RMAP work completed by 2021. RMAP road repair has not been tracked so the current status of road condition is not clear.

It is expected that RMAP repairs will improve water quality in the upper Nooksack River watershed by fixing road drainage problems. Considering the role improved water quality plays in Chinook recovery, it is important that forestland owners try to complete their RMAP repairs by the originally negotiated date of 2016.

Summary

WRIA 1 and Whatcom County have seen great economic growth since the late 1800s but not without environmental cost. Water quality continues to decline, water quantity continues to decline, lands remain cleared of forests, wetlands have been filled and drained, channel lengths have been shortened, and fish and wildlife continue to suffer great losses in habitat quality and quantity. To change these trends will require more than just site-scale restoration of fish and wildlife habitat. Watershed health has to be restored.

- The Nooksack River and Lummi River estuaries have some of the most pristine habitat remaining in the Puget Sound. The Lummi Nation is creating a wetland mitigation bank and implementing land acquisition and restoration projects that will protect and restore the estuaries into the future.

- From 1986 to 2009, based on USGS stream gage flow measurements at Ferndale, WA, the Nooksack River failed to meet State set minimum instream flows 72 percent of the time during the July-September low flow period. While low flows have continued to decline in the Nooksack River, much of historic wetland area in the lower mainstem basins remains ditched or tile drained for agriculture, and the development of exempt wells has continued to increase.

- The productivity of pre-spawning migrant, over-winter rearing, and over-summer rearing life stages are all limited by the loss of historic off-channel wetland habitat in the lower mainstem (WRIA 1 SRB 2005). As agriculture is far and away the dominant land use in the lower Nooksack floodplain, to restore off-channel habitats will require changes in the current paradigm of agricultural land management within this area.

- To reach the WRIA 1 Salmonid Recovery Plan suggested threshold for forest road density in the forks subbasins of the Nooksack river watershed, a total of 458 miles of road will need to be either closed or otherwise repaired. An estimated 399 miles of those closures and/or repairs are scheduled to occur by 2021 through the Road Maintenance and Abandonment Plans (RMAP) required for state and private roads.

- Every time shellfish beds are closed due to pollution from upstream sources, the Lummi's Federal Treaty right to harvest shellfish is jeopardized. Currently shellfish harvest is "approved" by the Washington State Department of Health in most of Lummi, Birch and Portage Bays. In Drayton Harbor, however, shellfish harvest remains either "prohibited" or "conditionally approved" due to continued high levels of fecal coliform bacteria.

- There is an estimated 103 miles of mainstem river Chinook habitat in the Nooksack river system, and the WRIA 1 Salmon Recovery Plan thresholds for abundance of instream wood are only being met in 1.2 miles of that habitat. The areas of desired abundance in the North Fork are in part a result of active restoration and the construction of engineered logjams.

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