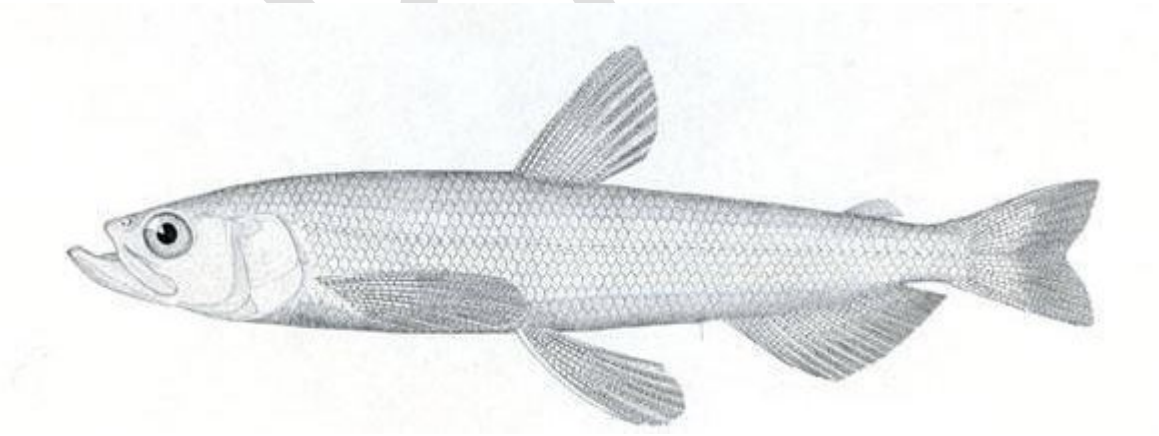
No fish species are being considered for official inclusion to the Whatcom County Critical Areas Code Species of Local Importance WCC 16.16.710(C,12,a). I believe that the criteria outlined in the existing code is not met for several of the species considered while undertaking this review and that additional protections beyond what is already required under WCC CAO. It clearly states in the existing code that in order for a species to be considered; declining in populations, documented sensitivity to habitat manipulation, cultural recreational or commercial special value or maintenance of habitat connectivity must be outlined. Additionally for a species to be added, relevant and effective management strategies that are jurisdictionally appropriate must be outlined as well as identifying effects on real property and landuse. Given that there are existing protections in place for the habitats that fresh water and anadromous fish require in order to complete their life histories, at the local jurisdictional level through the establishment of buffer areas of at least 100ft (shoreline streams =150ft) and development restrictions and setbacks for landuse changes, additional species specific protections do not seem warranted. While a static distance is one approach to buffer protections and was the preferred method during the last round of CAO code updates, WDFW is advising for a variable buffer width based on site potential tree height when determining riparian buffer widths.

While no species are being identified to be placed within the Species of local importance as defined by GMA there are species that do require closer attention within our local area. To achieve this I am proposing a "watch list" of fish species within the greater Whatcom County Area in order to gather information; presence / absence, population data, distribution, conduct suitable habitat surveys and other associated work in order to gather the required information needed to add these species to the list in the future, if warranted.



Longfin Smelt, (*Spirinchus thaleichthys)*

locally known as "Hooligan"

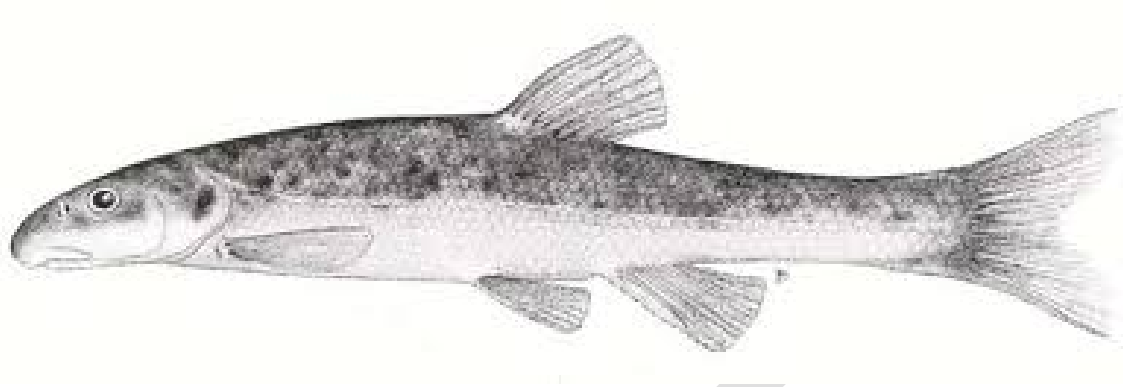
Biology / Life History: The Longfin Smelt is a marine/anadromous spawning forage fish species. It is considered a bony fish, that grows up to 14cm in length. They live in the marine waters of Bellingham Bay and nearby Puget Sound waters for the bulk of their 2 year life cycle. This species has been sampled at depths of up to 150m deep in open water areas but in low densities suggesting a relatively solo adult

phase until spawning trigger occur. They return to the freshwater of the Nooksack River, the only river that has an identified and well-documented run in the Puget Sound basin. Spawning runs occur beginning in mid to late October and extend through November. Fish are usually observed in the middle or bottom portions of the water column as they move upstream to spawning areas. Females deposit adhesive eggs, clutch size ranging between 5000-24000, on sandy-gravelly substrate, rocks, and aquatic vegetation around the upper limits of tidal influence (in the vicinity of City of Ferndale / I-5 bridge crossing). Eggs hatch in about 40 days. After hatching, larvae enter surface waters and are swept downstream into brackish-water nursery areas in the river estuary and tidal delta. Samples of Longfin Smelt collected along the shorelines in the Strait of Juan de Fuca revealed that consume a variety of surface and deeper occurring prey items including calanoid copepods, mysids and amphipods. Near the Nooksack River mouth, samples of prey included juvenile mud-shrimp.

Status: The only well-documented marine/anadromous spawning population of longfin smelt in the Puget Sound Basin occurs in the Nooksack River and the adjacent marine waters of Bellingham Bay and neighboring Skagit and San Juan counties. Longfin smelt may have the most geographically restricted and vulnerable spawning habitat of any marine/ anadromous forage fish species in the Puget Sound Basin. Apart from the south Whatcom/west Skagit/ San Juan County region, they have been only rarely encountered elsewhere in Puget Sound. No biological data, stock assessment, or spawning habitat survey data exist for locally known marine population of longfin smelt. The Northwest Indian College has conducted creel surveys and was granted a National Science Foundation Grant to assess population size and structure of the longfin smelt in the Nooksack River and has an ongoing investigation that spans several years, but to date, has been unwilling to share data.

Threats: Longfin Smelt are have been observed to be in decline in other portions of their broader range outside of the Puget Sound Basin due to a variety of threats. Stream low flows and water diversions have been a leading concern that affects access to preferential spawning habitat. Low flows result in upstream movement of the productive freshwater-saltwater mixing zone, reducing the available size of favorable spawning habitat. Water diversions and pumping structures reduce the overall available instream flow and can entrain adults if not appropriately screened. The degree to which current diversion screening regulations effectively protect larvae from entrainment is unknown. Low flows can fail to disperse larvae downstream into productive nursery areas. Other potential threats include pesticide runoff from agricultural areas and invasions by exotic species, both plant and animal, that may displace or predate on adult or larval Longfin Smelt. Sedimentation due to human activities that wash through the watershed may also influence spawning substrate quality. Due to a two-year life cycle, relatively brief periods of reproductive failure could lead to extirpations.

Cultural Significance: Longfin Smelt is a tradition food source for local tribes. The species is high in oil and fat. The Longfin smelt were caught annually using dip nets and the fish were smoked, fried, dried or were rendered down for oil to be used later. The oil and preserved fish were highly sought after by other tribes that did not have access to similar fish oils. This allowed for trade and bartering with inland tribes. Longfin Smelt fishing remains a culturally significant subsistence activity practices by members of Lummi and Nooksack Tribes.



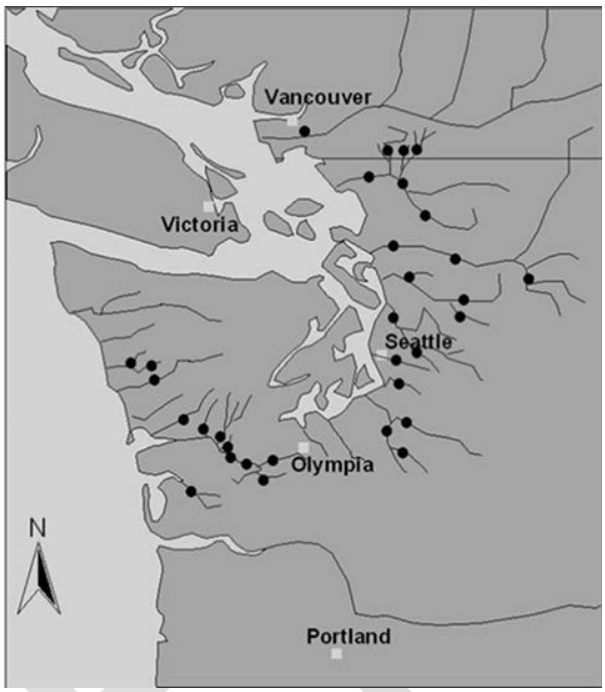
Nooksack Dace, *(Rhinichthys sp.)*

recently diverged from longnose dace ((*Rhinichthys cataractae*)

Evolutionary History: Nooksack Dace recently diverged from a common and widespread species, the longnose dace (*Rhinichthys cataractae*). As the range of its parental species contracted with the onset of glaciation, the fish of the Chehalis Valley were left as peripherally isolated populations (McPhail and Taylor 1996). The valley remained ice-free through all 4 major glaciations of the Pleistocene. Recent genetic work indicates that the Nooksack Dace have been reproductively isolated since well before the most recent glacial episode and perhaps since before the Pleistocene . There are other species that fall within this general classification of developing independently of a parent species in this geographically distinct area and are commonly referred to as Chehalis Fauna. Nooksack Dace were likely among the very first species to recolonize the post-glacial streams.

Biology and Life History: The Nooksack Dace is a small (<15 cm) stream dwelling cyprinid (minnow). The body is streamlined, with large pectoral fins and a snout that overhangs the mouth. Body coloration is grey-green above a dull, brassy lateral stripe and dirty white below. There is often a distinct black stripe on the head in front of the eyes. In juveniles, the stripe continues down the flanks to the tail. They are small-bodied fish that mature at an age class of 2 years with a maximum lifespan of 5 years. The Nooksack Dace have an extended spawning period that is based off stream water temperature but typically begins mid-April and extends through mid-July. Documentation suggests that some larger mature females may spawn more than once each year. Clutch size ranges from 200 to 2,000 eggs depending on female body size. Nooksack Dace spawn at night during the spring and usually at the upstream end of riffles. The nest site is a 10 cm diameter depression in the gravel cleaned and formed by probing with the snout by males prior to courtship and by both sexes during courtship. Males continue to guard and protect redd until young are hatched. Nooksack Dace are stream riffle specialists that primarily reside in coarse gravel and cobble substrate areas of fast flowing streams and rivers. Gut contents examined indicate that adult dace feed primarily on riffle-dwelling insects, including caddisfly and mayfly nymphs, dytiscid beetle larvae, and adult riffle beetles, while juveniles feed mainly in drifting zooplankton.

Status: Distribution of Nooksack Dace has been identified in approximately 20 different Western Washington stream systems and a handful of stream systems in the Southern British Columbia. In Washington, the species has been identified mainly in west slope drainages of the Cascades in stream and river systems that drain into Puget Sound. They are also found in the Chehalis River system and some west slope drainages of the Olympic Peninsula. Their presence in east slope drainages of the Olympic Peninsula, drainages that enter Hood Canal, have not been detected. They are also absent from drainages that feed into the Straits of Juan De Fuca to the north of the Olympic Peninsula. Population data is not currently available for the broader species distribution or at the local stream level, however, it is generally accepted that the species is in decline due to manipulations of habitat and low instream flows. Nooksack Dace is listed on the Canadian Species at Risk Act (Schedule 1) as Endangered.



Threats: Nooksack Dace rely on riffles sections of stream channels. These areas are among the shallowest of stream all aquatic habitats and consequently are among the first to shrink as flows decline. When riffle habitats lack sufficient water, Nooksack Dace find refuge in pool habitats where both abundance and growth rate decline have been documented as being reduced. Being a small fish that is forced into pool and scour holes puts them at risk of predation by other piscivorous fish that typically occupy these habitat units. Riparian habitat is important to the Nooksack Dace. Benthic insectivores and riverine specialists like Nooksack Dace are among the most sensitive fish species to the loss of wooded riparian areas. Observed Nooksack Dace are linked with healthy riparian areas and believed to be linked with the reduced sediment inputs, reduced stream temperature and healthier macroinvertebrate community structure typical of these areas.

Salish Sucker *(Catostomus sp.)*

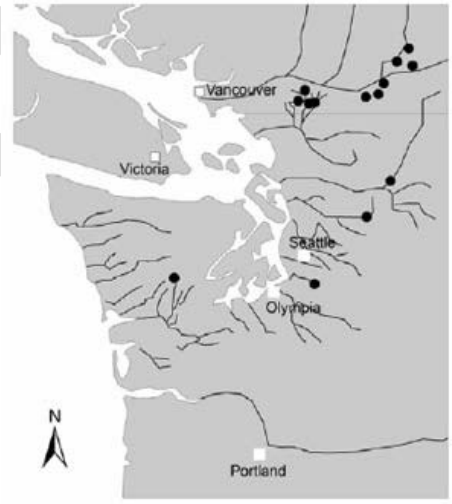
recently diverged from longnosed sucker (*Catostomus catostomus*)

Evolutionary History: Similar to the Nooksack Dace, the Salish Sucker is considered part of the Chehalis Fauna. An evolutionarily distinct population the developed in a geographically protected and ice free area in central Washington during the Pleistocene Period. The Salish Sucker diverged from the

Longnose Sucker in western Washington and western British Columbia during the last four major glaciations and became reproductively isolated. Populations of *Catostomus catostomus* east and west of the Cascade Mountains are referred to as Longnose Sucker and Salish Sucker, respectively, and they differ morphologically, i.e., snout size and lateral line scale counts. Salish Sucker is common referred to as a dwarf form of the Longnose Sucker.

Biology and Life History: Salish Sucker is a relatively small fish with most measuring 15-20cm in overall length but have been observed up to 30cm. Females are generally larger than males. Adult Salish suckers use a variety of habitat types. They are found in small headwater streams and associated slow water habitats including ponds and beaver impounded areas. In Washington several lake populations also exist. They are caught in a variety of water velocities and depths, but are most often found in slow currents over sand or silt substrate in areas with in-stream vegetation and over-stream cover. Winter habitat remains unknown, but it seems likely that stream populations would migrate to protected edge areas and off channel refuge locations to escape from the frequent high flows associated with winter rains. Salish Suckers spawn in riffles over fine gravel in the Spring when water temperatures reach warms to 7–8°C, typically beginning in March or April. The period is very protracted and individuals in spawning condition have been captured throughout the summer, even in late July at water temperatures in excess of 20°C. Salish suckers prefer broadcast spawning where adhesive eggs are spread on gravel and rock substrate and any other vegetation or detritus within the spawning area.

Status: Salish suckers are known from 6 river systems of the Puget Sound Lowlands and the lower Fraser Valley (Fig. 1). These are: the lower Fraser (Salmon and Salwein rivers, and Semiault Creek); the Little Campbell River; the Nooksack system (Bertrand, Cave, Pepin, and Fishtrap creeks) and Whatcom Lake; the Stilliguamish drainage (Twin Lakes); the Green River; and Lake Cushman of the Skokomish system (McPhail and Taylor 1996). Salish Sucker has been identified and classified as Endangered in Canada. At the state level, the Washington Department of Fish and Wildlife (WDFW) list the Salish Sucker as a "monitored species," a designation for species that are not considered endangered, threatened or sensitive. These listings may reflect the fact that Salish Sucker populations are more stable in Washington and declining rapidly in British Columbia (Spinelli and Garrett 2017)



Threats: Loss of habitat is the main threat associated with the species. The channelization of waterways for agricultural drainage, draining of wetlands and ponded areas and the removal of beaver and impoundments. Hypoxia or low dissolved O2 is also identified as a leading cause of potential decline. Invasion of non-native vegetation that choke out shallow and slow moving aquatic habitats is linked to an decrease in available dissolved O2. Locally this is mainly attributed to the annual grow up and die off in Reed Canary Grass choked channels.