

Appendix 10-B

Watershed Planning Assessment



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memorandum

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to Alex Dupey, MIG
from Jessica Redman, Katie Carroz
subject Watershed Planning Assessment

ESA and MIG are assisting the City of Monroe with their Comprehensive Plan Update. As part of this process, ESA reviewed available information regarding ecological conditions in the Snohomish Watershed (WRIA 7) to help inform future land use planning decisions. The Washington Department of Ecology (Ecology) recommends assessment of watershed conditions during planning so that local jurisdictions can ensure a more functional and resilient natural environment, determine the root cause of watershed issues and develop appropriate solutions, and identify and resolve potential conflicts between future land use actions and protection of critical areas. This document includes: 1) a watershed characterization of the three watersheds located within the City limits using Ecology's Puget Sound Watershed Characterization Project (PSWCP) database, and 2) recommendations and actions the City could take to improve and/or restore water flow, water quality, and fish and wildlife habitat.

French Creek Watershed

The majority of the City lies within the French Creek Watershed. Within the City limits, this watershed is highly developed and includes the majority of the residential developments to the northwest and southeast of State Route (SR) 522, the commercial developments along Highway 2 east of Lewis Road, the Evergreen Speedway and State Fairgrounds, the Fryelands Business Park, and Lake Tye. Outside of the City limits, to the northwest, agriculture is the dominant land use. French Creek originates in the Cascade foothills to the northeast and is a major tributary to the Snohomish River, with the confluence approximately 1.5 miles south of the City of Snohomish and approximately 0.8-mile south of the confluence of the Snohomish and Pilchuck Rivers. French Creek does not flow within the City limits; however, Cripple Creek, and several other tributaries to French Creek (e.g., Homestead Creek, Creation Creek, Arena Creek, Backhoe Creek) flow in to the City from the north and northeast (City of Monroe 2015).

Water Flow

The PSWCP indicates that the majority of this watershed is of highest importance in terms of water flow processes (Ecology 2022a). The watershed exhibits a high level of importance for surface storage (i.e., depressional wetlands, lakes, and/or floodplains), a high level of importance for recharge (i.e., high permeability, high precipitation), and a high level of importance for water discharge (i.e., floodplains intersecting permeable deposits, wetlands on slopes). However, due to the extent of development within the watershed, these water flow processes are highly degraded. The combination of high importance and high degradation suggests that this watershed would be a high priority for actions that would restore water flow processes. The exception to this is the portion of the French Creek Watershed located near the northern extent of the City limits, north of Highway 2 and west of N. Kelsey Street. Compared to surrounding areas, this portion of the watershed had a moderate surface storage and discharge function pre-development and is considered a low priority restoration. This area

may be appropriate for some additional development, but restoration of remaining important areas (e.g., open spaces, wetlands, riparian areas) could also be beneficial.

Water Quality

Based on the results of the PSWCP (Ecology 2022a), sediment export throughout the French Creek Watershed is moderately high to high, with the highest sediment export functions in the watershed occurring near the northern portion of the City limits, north of Highway 2 and west of N. Kelsey Street. Sediment transport is generally higher where high gradient streams are deposited into lower gradient reaches, such as the Cripple Creek system that is located in this area. These areas are more susceptible to excess sediment loads resulting from human activities that expose soils and increase runoff without providing adequate erosion and sediment control.

Additionally, French Creek south of Highway 2 and the Lake Tye inlet, both located in the northwest extent of the City limits, are on the Ecology 303(d) list for dissolved oxygen. The French Creek watershed is also included in the Snohomish River Tributaries Fecal Coliform Total Maximum Daily Load (TMDL) (Ecology 2001) and the Snohomish River Estuary TMDL for ammonia and dissolved oxygen (Ecology 1999).

Fish and Wildlife Habitat

The French Creek watershed contains a large percentage of the wetlands mapped within the City limits. One especially large wetland associated with Cripple Creek is located north of Highway 2, west of the Evergreen State Fairgrounds. The U.S. Fish and Wildlife Service's (USFWS) National Wetland Inventory (NWI) maps this as a palustrine forested (PFO), palustrine scrub-shrub (PFO), and palustrine emergent (PEM) seasonally flooded wetland (USFWS 2022). The Cripple Creek corridor connects this wetland to an undeveloped upland forest in the northern extent of the City. Another PFO/PSS wetland, associated with Arena Creek, is mapped east of the Evergreen Speedway, also adjacent to this upland forested area. A PFO/PEM wetland is also mapped north of SR 522 within Park Meadows City Park (USFWS 2022, City of Monroe 2015).

The only streams with documented salmonid use in the French Creek Watershed are Cripple Creek and Creation Creek (NWIFC 2022). Both streams originate in areas of rural residential development north of the City. They both flow south through the large wetland complex north of Highway 2, pass through a culvert under Highway 2, and enter a series of agricultural ditches before joining French Creek outside of the City limits to the west. Coho have been documented in the reaches of both Cripple Creek and Creation Creek that occur within the City limits (NWIFC 2022). Riparian conditions upstream of the wetland area, outside of the City Limits are generally intact with mature forest cover. However, within the wetland, the majority of the riparian areas support low shrubs and/or grasses that provide minimal shade, woody debris inputs or habitat structure.

Additionally, the Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) online maps show Lake Tye as an area of waterfowl concentrations and notes use by winter concentrations of mallard duck, America wigeon, northern shoveler, wood duck, bufflehead, American coot, merganser, and green-winged teal (WDFW 2022).

Woods Creek Watershed

The Woods Creek Watershed is located in the eastern portion of the City, to the east of Chain Lake Road north of Highway 2 and east of Kelsey Street, south of Highway 2. Land use within this watershed is primarily commercial development with residential developments adjacent to the stream in the lower reaches. Woods Creek

originates in the Cascade foothills near Lake Roesiger to the northeast and is the largest lowland tributary of the Skykomish River (Snohomish County 2013). Woods Creek enters the City limits south of Old Owen Road and joins the Skykomish River at Al Borlin Park in the eastern extent of the City. Two additional tributaries to Woods Creek, Cutthroat Creek and Brown Road Creek, are also within the City's urban growth area.

Water Flow

Based on the results of the PSWCP, in its natural state, the majority of this watershed exhibits a moderate high level of importance for surface storage, and a high level of importance for recharge and discharge. However, due to the extent of development within the watershed, these water flow processes are highly degraded and therefore, this watershed has the highest priority for restoration (Ecology 2022a).

Water Quality

Based on the results of the PSWCP (Ecology 2022a), the Woods Creek Watershed has the highest potential sediment export rate. Additionally, the lower reaches of Woods Creek within City limits has the highest percentage of unstable banks and highly erodible banks within the system (Snohomish County 2013). Residential and commercial developments that are located immediately adjacent to the stream can also be a source of pollutants and sedimentation.

The reach of Woods Creek within City limits is not a 303(d)-listed stream. However, approximately two miles upstream, Woods Creek is listed for dissolved oxygen. Additionally, the Woods Creek Watershed is part of the Snohomish River Tributaries Fecal Coliform TMDL (Ecology 2001) and the Snohomish River Estuary TMDL for ammonia and dissolved oxygen (Ecology 1999).

Fish and Wildlife Habitat

Woods Creek is recognized as a high priority stream for salmonids in the Watershed Restoration and Enhancement Plan – WRIS 7 Snohomish Watershed (Ecology 2022b). Documented salmonid species in the lower reached of Woods Creek include chum salmon, coho salmon, pink salmon, and Endangered Species Act-listed species Chinook salmon and steelhead trout (NWIFC 2022). However, habitat limitations in the watershed include high fine sediment, low wood volume and frequency, unstable banks, and lack of shallow pools (Snohomish County 2013). Additionally, riparian areas near Highway 2 are dominated by Himalayan blackberry, an invasive species that provides little shade or wood input.

The only wetlands mapped within the Woods Creek Watershed are PFO and PSS riparian wetlands adjacent to the Creek from the confluence of the Skykomish River, upstream to Highway 2 (USFWS 2022; City of Monroe 2015). These wetlands provide a forested connection from upland forested area of Al Borlin park to the Skykomish River; however, buffer functions are likely reduced due to the adjacent developments.

Skykomish River Watershed

The Skykomish River Watershed is located along the Skykomish River along the southern extent of the City. Though only a small portion of the City limits are within this watershed, it is the largest of the three watersheds and also contains the Town of Sultan and the City of Gold Bar to the east of Monroe. Land use within the City limits in this watershed include Al Borlin Park, Skykomish River Park, and the Cadman sand and gravel operation. No other streams occur within the portion of the Skykomish Watershed within City limits.

Water Flow

Based on the results of the PSWCP (Ecology 2022a), in its natural state, this watershed exhibits a moderate high level of importance for surface storage and discharge, and a high level of importance for recharge. However, due to the extent of development within the watershed, these water flow processes are highly degraded and therefore, this watershed has a high priority for restoration.

Water Quality

Based on the results of the PSWCP (Ecology 2022a), the Skykomish Watershed has the highest potential sediment export rate. River banks and floodplains are dominated by alluvial deposits consisting of silt, sand, and gravel and are naturally unstable and highly erodible (Ecology 2022b). Recreational developments (i.e., parks and trails) and the Cadman operation are also likely a source of pollutants and sedimentation.

The reach of the Skykomish River, adjacent to Al Borlin Park, is listed on Ecology's 303(d) as temperature impaired. According to the Washington State Water Quality Standards (WAC173-201A-200), the temperature for core salmonid habitat is not to exceed 16 degrees Celsius. However, between July 22, 2022 and September 14, 2022, the 7-day mean daily maximum (7DADmax) exceeded the criterion on 28 of 55 days (51%) (Ecology 2022c). The Skykomish River Watershed, within the City limits, is currently not part of a TMDL.

Fish and Wildlife Habitat

Documented salmonid species in the Lower Skykomish River include chum salmon, coho salmon, pink salmon, Chinook salmon, rainbow trout, and steelhead trout (NWIFC 2022). Backwater channels west of the Cadman facility also provides suitable habitat for rearing and refuge. Except for the boat ramp and Skykomish River Park, the majority of the riparian areas within this watershed are covered by a bank of mature forest, providing a high quality buffer between the River and adjacent development. However, much of the shrub layer, primarily along the backwater channel and near the Cadman operation, is dominated by Himalayan blackberry.

At the eastern extent of the City limits, within the Skykomish River Watershed, is the East Monroe Heritage Site. This is former agricultural area that contains wetlands and a second backwater channel. Riparian areas along this channel are also dominated by Himalayan blackberry. The City recently received a grant to acquire and preserve this property.

Several wetlands are mapped within the portion of the Skykomish River Watershed including large tracts of PFO wetland areas adjacent to the River near Al Borlin Park and the Cadman operation (USFWS 2022). Surrounded by development on all sides except for the River, these forested wetlands likely provide refuge for terrestrial and avian species using the river corridor.

Recommendations

Even though the results of the PSWCP designate all three watersheds as a high priority for restoration, restoration to pre-development conditions of water flow, water quality, and habitat on a large scale is not practical due to the developed nature of the City. Instead, the City should focus on best management practices to protect and conserve these processes during future development actions, and find opportunities to repair and remove past degradations to restore these processes and functions where practical. Table 1 summarizes several recommended conservative and restorative actions, taken by other municipalities in the region, and the specific function they could improve.

Table 1. Recommended Actions to Conserve or Restore Watershed Functions

Action ¹	Watershed Function Improved by Action		
	Water Flow	Water Quality	Fish and Wildlife Habitat
Establish design guidelines to encourage subdivisions to cluster lots (minimizing mass clearing / grading and maximizing open space).	X		X
Integrate open space requirements with tree protection and sensitive areas standards to encourage tree protection, wider sensitive areas buffers, and/or reforestation as an alternative to pocket parks.	X		X
Widen the minimum landscape strip width for roadways to provide adequate space for successful tree growth.	X	X	X
Set vegetation cover thresholds for open spaces areas (~ 50% native shrubs and trees); and provide preference for establishing open space adjacent to habitat corridors and sensitive areas			X
Define the most useful and applicable Low Impact Development (LID) BMPs and require their use in new development activities. Include BMPs in City's Critical Areas Ordinance (CAO).		X	
Define the most useful and applicable erosion control methods and require their use in new development activities. Include erosion control methods in City's CAO.		X	
Identify and prioritize stormwater retrofit opportunities, especially actions to reduce effective impervious areas		X	
In UGAs, create centralized stormwater facilities to offset onsite requirements.		X	
Incentivize stormwater LID approaches – strategies could include a rain garden reimbursement program, or incentives that provide additional development opportunity when LID approaches are used.	X	X	
Create educational outreach program (workshops, informational handouts, and website updates).	X	X	X

Action ¹	Watershed Function Improved by Action		
	Water Flow	Water Quality	Fish and Wildlife Habitat
Increase protections for depressional wetlands by limiting allowances for buffer alteration and/or requiring LID approaches for surrounding development.	X	X	X
Identify and establish additional protections for fish and wildlife habitat corridors, limiting habitat fragmentation as future development occurs. Any development occurring along a habitat corridor be required to ate habitat value and develop a plan to maintain or improve existing habitat connections			X
Improve mechanisms to ensure long term protection of mitigation sites, by requiring that sites be placed in a conservation easement, and additional performance standards criteria.		X	X
Limit buffer modification allowances for wetlands associated with salmonid-bearing streams.		X	X
Restore riparian areas of salmonid-baring streams (i.e., Woods Creek and Skykomish River) through the removal of invasive species and subsequent planting of native trees.*	X	X	X
Restore rearing habitat in Woods Creek and the Skykomish River backwater channels, through the installation of large wood to stabilize banks and create pools. Would also aid in floodwater storage.*	X	X	X

¹All listed actions from table above are from the City of Duvall Watershed Plan (ESA 2015) except for those denoted with a * which are based on local knowledge.

References

City of Monroe. 2015. City of Monroe Comprehensive Plan. Available online at: <https://monroewa.gov/831/2015-2035-Comprehensive-Plan>. Accessed: December 2022.

Ecology (Washington State Department of Ecology). 2022a. Puget Sound Watershed Characterization Project. Available online at: <https://apps.ecology.wa.gov/coastalatlas/wc/landingpage.html>. Accessed: December 2022.

Ecology. 2022b. Watershed Restoration and Enhancement Plan – WRIA 7 Snohomish Watershed. Ecology Publication: 22-11-013. Available online at: <https://apps.ecology.wa.gov/publications/documents/2211013.pdf>. Accessed: December 2022.

Ecology. 2022c. Water Quality Atlas Online Mapper. Available online at: <https://apps.ecology.wa.gov/waterqualityatlas/wqa/map>. Accessed: December 2022.

Ecology. 2001. Snohomish River Tributaries Fecal Coliform Total Daily Maximum Daily Load Submittal Report. Available online at: <https://apps.ecology.wa.gov/publications/documents/0010087.pdf>. Accessed: December 2022.

Ecology. 1999. Snohomish River Estuary Total Maximum Daily Load Submittal Report. Available online at: <https://apps.ecology.wa.gov/publications/documents/9957.pdf>. Accessed: December 2022.

NWIFC (Northwest Indian Fisheries Commission). 2022. Statewide Integrated Fish Distribution (SWIFD) Online Map. Available online at: <https://geo.nwifc.org/swifd/>. Accessed: December 2022.

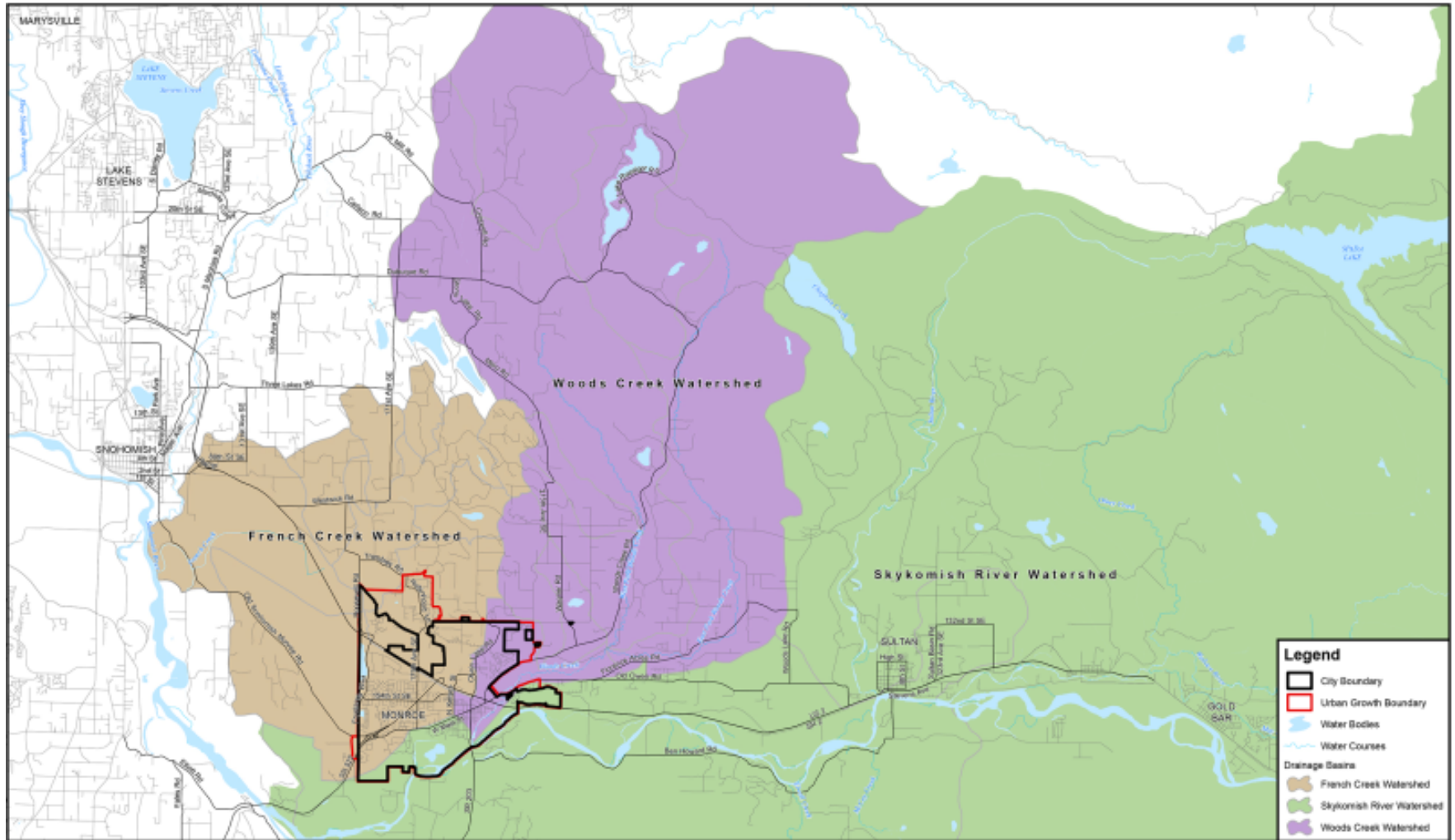
Snohomish County. 2013. Woods Creek Watershed Habitat Conditions Report. Available online at: <https://snohomishcountywa.gov/ArchiveCenter/ViewFile/Item/2173>. Accessed: December 2022.

USFWS (U.S. Fish and Wildlife Service). 2022. National Wetland Inventory (NWI) Online Map. Available online at: <https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/>. Accessed: December 2022.

WDFW (Washington Department of Fish and Wildlife). 2022. Priority Habitat and Species on the Web. Available online at: <https://geodataservices.wdfw.wa.gov/hp/phs/>. Accessed: December 2022.

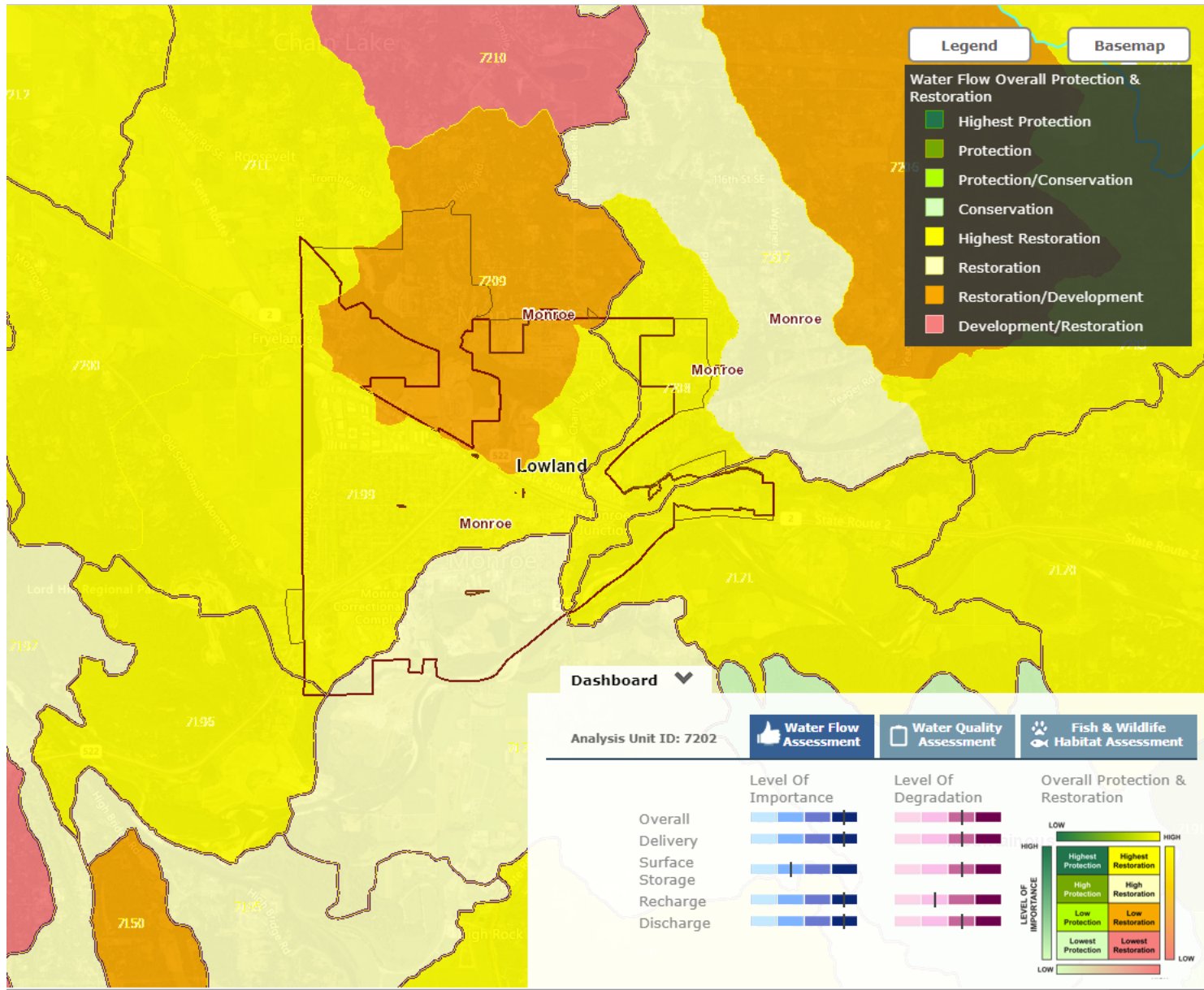
FIGURES

Figure 1. Subwatersheds Within Monroe City Limits



Source: City of Monroe Comprehensive Plan (2015)

Figure 2. Results of Puget Sound Watershed Characterization Project



Source: Ecology (2022a)