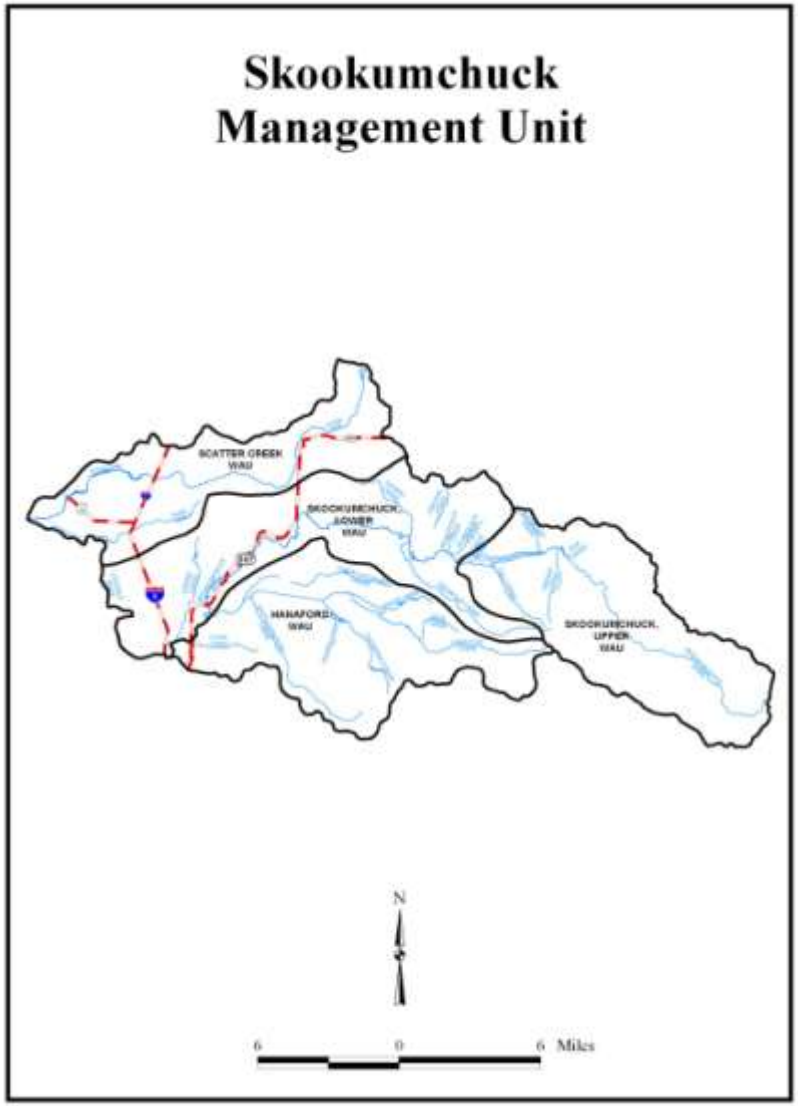
SKOOKUMCHUCK MANAGEMENT UNIT

SKOOKUMCHUCK RIVER



Description:

The Skookumchuck River, located in northern Lewis and southern Thurston Counties, drains a watershed of 181 square miles. The headwaters originate in the foothills of the Mt. Baker-Snoqualmie National Forest (elevation 3,000 feet) and flow for approximately 35 miles before joining the Chehalis River at RM 67.3. The mainstem has a steep gradient of 19 feet per mile from the headwaters to Bucoda, where it then lessens to five feet per mile or less until the confluence with the Chehalis. The mean annual rainfall of the watershed ranges from 40 to 80 inches. The headwaters have slopes moderately susceptible to erosion and the streambed consists of large, medium, and small gravels. Natural barriers include a low flow blockage for Chinook near RM 25.5 and a falls at RM 28.9.

Land use in the watershed is primarily forestry in the headwaters and agriculture in the lower reaches. The urban centers of Bucoda (RM 11) and Centralia (from RM 3 to the mouth) continue to grow, creating more impermeable surfaces. Located at RM 21.9, Skookumchuck Dam provides some minor flood control and has a storage capacity of 34,800 acre-feet with surface area of 550 acres when full. Two protected areas exist, one is at Shafer Park in the lower reach; the other is a state preserve in the headwaters. TransAlta removes 54 cfs at RM 7.2. When natural inflow drops below 95 cfs, the dam contributes up to 50 cfs to maintain minimum flows to compensate for the withdrawal.

Historic timber harvest practices have significantly altered habitat in the watershed. Three splash dams constructed in the 1920's located at River Miles 3.7, 11.5, and 23.8, blocked an estimated 50 to 90 percent of fish runs. The dams also washed out gravel, leaving incised channels and reducing access to off-channel habitat.

The largest tributary of the Skookumchuck is Hanaford Creek, which drains 58 square miles with an annual flow of 85 cfs that is highly altered coal mining activities. Rural residences and farms are predominant land uses in the lower nine miles of the tributary.

Major Tributaries: Hanaford, Thompson, Johnson, Salmon, Bloody Run, Fall, Pheeny, Baumgard, Laramie, Eleven, Twelve, Three, and Hospital Creeks

Land Uses: Forestry, Agriculture and Rural Residences

Anadromous Fish Stocks: Coho*, cutthroat, winter steelhead*, Spring Chinook*, and Fall Chinook (* denotes priority stock)

Skookumchuck River Tier 1 Concerns

Skookumchuck River Tier 1	FLOODPLAIN	
Symptom	**Cause**	**General Actions**
➡ Loss of floodplain function: (74 of 185 miles) in Skookumchuck subbasin.	➡ Ditching and channel realignment that does not allow for floodwater storage (36 miles in lower watershed – Skookumchuck MS, Coffee Creek, Salmon Creek, and Johnson Creek) (Smith Wenger 2001). ➡ Construction of "floodplain" roads that inhibit floodplain functions (3 miles lower Skookumchuck, 0.8 miles Salmon Creek, 2 miles Johnson Creek), 3.4 miles Thompson Creek) (Smith Wenger 2001). ➡ Development in the floodplain has limited mobility of the river. ➡ Riprap is located in the Skookumchuck mainstem from RM 3 to RM 6 and is located in parts of Hanaford Creek. (Smith Wenger 2001). ➡ Flooding occurs in Bucoda due to restriction of the channel.	➡ Assess floodplain for off-channel and wetland habitat ➡ Determine extent of impact "floodplain" roads have on floodplain functions • 3 miles in the lower Skookumchuck, 0.8 miles Salmon Creek, 2 miles Johnson Creek), 3.4 miles Thompson Creek have 'floodplain' roads. • Floodplain roads are in upper Skookumchuck (above dam) on Weyerhaeuser Mainline from RM 27-36.2 and Twelve Creek, Laramie Creek, and Range Creek. ➡ Reconnect, enhance, and/or restore potential off-channel, floodplain, and wetland habitat • 36 miles in lower watershed – Skookumchuck, Coffee Creek, Salmon Creek, and Johnson Creek. ➡ Protect (fee simple/easement) key properties to facilitate natural channel migration and reconnection to the floodplain ➡ Relocate gravel mining/harvesting away from shorelines, 100-year floodplains, and stream channels ➡ Remove hard armoring (riprap) or implement bioengineering techniques in place of hard armoring • Skookumchuck RM 3 – RM 6. ➡ See LWD section
	➡ Hanaford Creek floodplain has been highly impacted by activities of the steam plant and agriculture. Lower 8.25 miles has inaccessible settling ponds (Smith Wenger 2001).	➡ Determine feasibility of restoring floodplain in Hanaford Creek

Skookumchuck River Tier 1	RIPARIAN	
Symptom	**Cause**	**General Actions**
➡ The riparian condition for the lower reaches is considered to be in poor condition and will not significantly contribute LWD. Areas identified as riparian being the number one impact are (Smith Wenger 2001): • Lower Skookumchuck • Thompson Creek • Johnson Creek • Salmon Creek • Hanaford Creek • South Hanaford Creek ➡ Riparian conditions in the Upper Skookumchuck are rated as being in poor condition (Smith Wenger 2001). • Young dense deciduous - 25% • Mature conifer - 15% • Conifer of all ages - 30% • Mixed deciduous with conifer - 26%	➡ Riparian vegetation removal by agriculture (primary), urban/suburban development, logging in the lower Skookumchuck and its tributaries (Smith Wenger 2001). ➡ Riparian conditions in the upper Skookumchuck drainage have been converted from primarily conifer to a mix of conifer and deciduous dominant as a result of logging. ➡ 66% of assessed streams above the dam are below target shade levels and 79% of the mainstem above the dam are below target levels (Smith Wenger 2001).	➡ Control invasive species. See Section 5. ➡ Interplant conifers in deciduous dominant areas where appropriate in upper Skookumchuck ➡ Protect by fee simple or easement key properties of riparian habitat ➡ Revegetate open riparian areas with native plants and interplant confer in deciduous dominant areas where appropriate • Lower Skookumchuck, Thompson Creek, Johnson Creek, Salmon Creek, Hanaford Creek, South Hanaford Creek. ➡ Riparian fencing to exclude or reduce livestock access • At the 9 sites identified in the LFA (40 miles).

Skookumchuck River Tier 1	FISH PASSAGE	
Symptom	**Cause**	**General Actions**
➡ Skookumchuck dam is the only major artificial barrier blocking 3.6 miles of Chinook and 8 miles of coho habitat. Steelhead are trucked above the dam (Smith Wenger 2001). ➡ Smaller barriers, such as culverts, exist throughout the system.	➡ Construction of the TransAlta dam at RM 21.9. ➡ Placement of undersized stream crossing structures.	➡ Continue steelhead supplementation provided by TransAlta. Evaluate adding coho and Chinook supplementation ➡ Correct barrier culverts. See Section 4 for guidelines. ➡ Improve fish passage at fishways and add a fishway to those structures that do not have them ➡ Remove dams where feasible

Skookumchuck River Tier 2 Concerns

Skookumchuck River Tier 2	WATER QUANTITY	
Symptom	**Cause**	**General Actions**
➡ Low flows are a problem during the summer. Instream flows are not met on the Skookumchuck for an average of 33 days per year. ➡ Flooding has been an ongoing problem within the Skookumchuck subbasin (Smith Wenger 2001). ➡ More data is needed.	➡ TransAlta removes water for industrial purposes. Trans Alta has a water right for 54 CFS at RM 7.2 (Smith Wenger 2001). Up to 50 cfs are added to natural inflow with the goal of maintaining minimum flows of 95 cfs below the dam at RM 21.9. Higher flows of 140 cfs are provided during Chinook migration. ➡ Irrigation water rights account for 893 acre feet (Smith Wenger 2001). ➡ In 1993 there were 22 active water pumping locations within the Skookumchuck subbasin (Smith Wenger 2001). ➡ Water is also used for mining, gravel quarries, and livestock watering (Smith Wenger 2001). ➡ Past land use practices have contributed to the high peak flows of the Skookumchuck River including timber harvest and manipulated drainage.	➡ Determine if water withdrawals are being followed in accordance with current water rights ➡ Evaluate dam flows to determine if they need to be adjusted to better accommodate fish ➡ Reduce water withdrawals from surface sources ➡ See “floodplain” section for natural flood storage actions.

Skookumchuck River Tier 2	WATER QUALITY	
Symptom	**Cause**	**General Actions**
➡ The lower mainstem Skookumchuck is rated poor for water quality and is on the 1998 303(d) List for temperature, pH, and fecal coliform near the mouth (Smith Wenger 2001). ➡ South Hanaford, lower Salmon, lower Johnson, Baungard, Bigwater, Three Forks, Deer, Deep, Eleven, and Twelve creeks are rated poor for water quality because of existing poor riparian conditions (Smith and Wenger). ➡ Hanaford Creek was recorded as having high temperatures and low DO levels in the early 1990’s (Smith Wenger 2001).	➡ Loss of riparian areas likely contributes to high temperatures (Smith Wenger 2001). ➡ Livestock access likely contributes to fecal coliform (Smith Wenger 2001). ➡ Urban stormwater runoff (Smith Wenger 2001). ➡ See sediment section	➡ See Riparian actions ➡ See Sediment actions ➡ TMDL Implementation – Temperature, pH, fecal coliform

Skookumchuck River Tier 3 Concerns

Skookumchuck River Tier 3	SEDIMENT	
Symptom	**Cause**	**General Actions**
➡ Sediment is estimated to be high. Actual estimates have not been made since the 1970's (Smith Wenger 2001): • Skookumchuck RM 0-7.2 - 26% • Skookumchuck RM 7.2-22.1 - 19% • Salmon Creek - 50% • Johnson Creek - 33% • Thompson Creek - 30% ➡ Reduced transport of sediments, high fines, gravels below dam. ➡ Hanaford Creek was noted as having a clay streambed in the 1970's, it is not known if it is natural or human induced (lower 8.9 miles) (Smith Wenger 2001). ➡ The tribs in upper portion of the Skookumchuck are primarily transport reaches and do not have much LWD for instream structure/substrate retention (Smith Wenger 2001).	➡ High road densities of 5.4 m/sq miles of drainage in the Skookumchuck drainage and 6.0 miles of road per square mile in the Hanaford subbasin (Smith Wenger 2001). ➡ In the past, the 2000 Mainline Road contributed up to 50% road surface sediment to the Skookumchuck River (Smith Wenger 2001). ➡ Bigwater and Drop Creeks are noted as having mass wasting problems associated with roads. ➡ Livestock access was noted at nine sites along the Skookumchuck totaling 40 miles (Smith Wenger 2001). ➡ Dam obstructs natural transport processes. ➡ Coal mining operations and high road densities of 6 m/sq miles in the Hanaford subbasin are likely contributors (Smith Wenger 2001).	➡ Determine if sedimentation is a problem in Hanaford Creek ➡ Identify those roads that are contributing to sediment loading ➡ Install riparian fencing to exclude or reduce livestock access ➡ Placement/input of gravels below dam ➡ Reduce road densities by abandoning and/or decommissioning roads to reduce sediment loading ➡ Upgrade all logging roads to comply with Forest and Fish Agreement (1999) • Check on 2000 Mainline Road upgrades.

Skookumchuck River Tier 3	LARGE WOODY DEBRIS (LWD)	
Symptom	**Cause**	**General Actions**
➡ The upper Skookumchuck drainage indicates poor LWD levels (Smith Wenger 2001). Areas of poor pool habitat are: • Pheeney Creek • Lower Fall Creek • Drop Creek • Laramie Creek ➡ Channel incision in the Skookumchuck headwaters, Eleven, Twelve, Drop, Deer, Three Forks, Bigwater, Range, and Pheeney Creeks does not allow for adequate utilization of floodplain (Smith Wenger 2001). ➡ LWD levels in the lower Skookumchuck are estimated to be low because of poor LWD recruitment potential.	➡ In the 1920s, 3 splash dams were constructed at RM 3.7, RM 11.5, and RM 23.8. The last splash dam was not removed until 1969 (Smith Wenger 2001). ➡ Between 1970's - 1990's 19 dam break floods impacted an estimated 15 miles of channel in Drop, Deer, Three Forks, Eleven, Twelve, Bigwater, Range, Fall, & Pheeney Creeks ➡ These areas have naturally low levels of LWD: • Upper mainstem to confluence of Eleven Creek • Lower Baumgard Creek • Lower Pheeney Creek • Hospital Creek • Fall Creek ➡ Current riparian conditions do not contribute adequate LWD; LWD is removed at Skookumchuck Dam at RM 21.9	➡ Determine LWD quantities ➡ Develop agreement with dam managers to collect LWD at dam, and place it downstream rather than remove it from system ➡ Develop LWD supplementation plan that will install logjams in key places to improve instream channel structure and habitat diversity. ➡ Install LWD pieces in conjunction with other restoration projects. ➡ See Riparian actions

SCATTER CREEK

Description:

The Scatter Creek mainstem is approximately 20 miles in length and drains an area of 43 square miles. The mouth of Scatter Creek is at RM 55.2 on the Chehalis River. Hydrological sources for the creek are ground and surface waters. Occasionally flowing subsurface, the entire system is shallow, with some pools and refuges throughout. From 1993 to 1999, the mean annual flow near the mouth was 79 cfs, with maximum and minimum flow of 1362 cfs and 2.9 cfs respectively. The streambed consists of a mixture of large, medium, and small gravels. There are moderately erodible gravel slopes in the headwaters.

The primary land uses in the watershed are agriculture in the lower basin and forestry in the headwaters. Urban development is occurring throughout the watershed with increasing coverage of impermeable surfaces. There are several protected properties in the watershed, which includes Heernett Foundation (800 acres), The Nature Conservancy (650 acres), and the State of Washington (450 acres).

Major Tributaries: Several unnamed tributaries

Land Uses: Forestry, agriculture, and rural residences

Anadromous Fish Stocks: Fall Chinook, coho, cutthroat, and winter steelhead

Scatter Creek Tier 1 Concerns

Scatter Creek Tier 1	RIPARIAN	
Symptom	**Cause**	**General Actions**
➡ Riparian corridor condition in the Scatter Creek subbasin is poor with 50% being open or hardwoods and about 40% converted to non-forest uses. Invasive species exist. ➡ Prairie Creek was identified as having poor levels of riparian vegetation in the lower reach (Smith & Wenger 2001).	➡ Much of the riparian corridor along the Scatter Creek mainstem has riparian loss due to land conversion (Smith & Wenger 2001).	➡ Control invasive species. See Section 5. ➡ Riparian fencing to exclude or reduce livestock access. ➡ Revegetate open riparian areas with native plants, with wider buffers. • RM 1, 5, 8, 9, and 12.5 are priority areas

Scatter Creek Tier 1	WATER QUALITY	
Symptom	**Cause**	**General Actions**
➡ Scatter Creek is on the 303(d) List for temperature, fecal coliform, and pH.	➡ The primary cause of warm temperatures is likely poor riparian conditions. Livestock access is a likely contributor of some of the fecal coliform in the Scatter Creek subbasin (Smith Wenger 2001).	➡ TMDL Implementation – Temperature, pH, fecal coliform.

Scatter Creek Tier 1	WATER QUANTITY	
Symptom	**Cause**	**General Actions**
➡ Scatter Creek is not meeting base flow requirements and is closed to further appropriations. Scatter Creek has some segments that go dry during the summer months.	➡ Summer low flows are a result of water withdrawal (surface and shallow aquifer) and natural conditions (Smith Wenger 2001). Data is needed to understand the effects of withdrawals and land cover changes in this prairie subbasin. ➡ Atlantic salmon fish hatchery and development may contribute to upper basin withdrawal.	➡ Conduct a water balance study. ➡ Reduce water withdrawals from surface sources.

Scatter Creek Tier 2 Concerns

Scatter Creek Tier 2	SEDIMENT	
Symptom	**Cause**	**General Actions**
➡ Sediment quantity and quality are considered poor in the Scatter Creek basin. Four out of five sampled segments (RM 1, 8, 11.5, and 12.5) contained sediment amounts exceeding 17% and one was documented as 44.9%.	➡ Sedimentation is likely the product of surface runoff from the high density of roads in the basin (5.3 miles of road per square mile) (Lunetta et al. 1997). ➡ Gravely unstable slopes in headwaters create mass wasting ➡ Sedimentation is also caused by the 11.7 miles of wild stock access to the streambanks.	➡ Erosion control treatments along forest roads, i.e., revegetation, bioengineering, and willow cuttings to reduce mass wasting. ➡ Reduce road densities by abandoning and/or decommissioning roads to reduce sediment loading. ➡ Riparian fencing to exclude or reduce livestock access.

Scatter Creek Tier 2	FISH PASSAGE	
Symptom	**Cause**	**General Actions**
➡ Several road crossings within Scatter Creek drainage are undersized and do not allow adequate fish passage. These structures also inhibit transport of streambed material down-stream and can cause channel scour directly downstream.	➡ Placement of undersized stream crossing structures. Refer to Lewis County Conservation District Culvert Inventory 2004 for specific locations and Thurston Conservation District SC stream assessment.	➡ Correct barrier culverts. See Section 4 for guidelines.

Scatter Creek Tier 3 Concerns

Scatter Creek Tier 3	FLOODPLAIN	
Symptom	**Cause**	**General Actions**
➡ Little off-channel habitat exists in basin. Floodplain habitat in Scatter Creek subbasin is considered to be in good condition due to limited bank hardening and channelization.	➡ Naturally limited side-channel habitat except at RM 11-12. Limited floodplain impacts but these activities may be more profound because of naturally limiting off-channel habitat.	➡ Assess floodplain for off-channel and wetland habitat. ➡ Implement alternative methods of bank stabilization (bioengineering).

Scatter Creek Tier 3	LARGE WOODY DEBRIS (LWD)	
Symptom	**Cause**	**General Actions**
➡ LWD surveys indicated levels to be fair-good in the Scatter Creek subbasin between RM 1-12.5, with poor LWD quantities at RM 9.	➡ Although current LWD levels are fair-good, current riparian conditions will not provide much LWD recruitment. Historically riparian areas were mostly deciduous trees (oak and ash) with low recruitment ability.	➡ Determine LWD quantities ➡ Develop LWD supplementation plan to install logjams to improve instream channel structure and habitat diversity ➡ Install LWD pieces in conjunction with restoration projects ➡ See riparian actions