

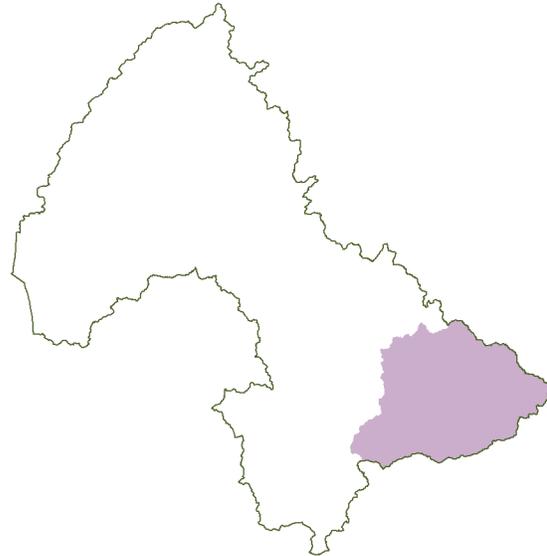
## 5.2 Cascade Mountains Ecological Region

### 5.2.1 Overview

The Cascade Mountains Ecological Region encompasses the southeastern part of the Chehalis Basin, including the Newaukum and Skookumchuck rivers and their tributaries, Stearns and Salzer creeks, and other tributaries to the east bank of the Chehalis River near Chehalis and Centralia (Figure 5-3). This region encompasses 424 square miles (greater than 270,000 acres) and represents approximately 16% of the overall Chehalis Basin. The Skookumchuck and Newaukum rivers arise in the Bald Hills, a lower-elevation spur of the Cascade Mountains. The highest elevation in the ecological region is Huckleberry Mountain at 3,800 feet. The Skookumchuck River arises around 3,000 feet in elevation near Huckleberry Mountain, the South Fork Newaukum River originates at Newaukum Lake at about 3,000 feet in elevation, and the North Fork Newaukum River originates near Windy Knob at about 2,600 feet in elevation.

The Cascades Mountains Ecological Region geology is predominantly volcanic and continental sedimentary rocks, including sandstone and conglomerate. Notably, the sedimentary Skookumchuck formation contains coal-bearing deposits. Some lobes of glacial deposits extend into the north side of the Skookumchuck River valley, providing coarse gravels to the river system. The Doty Fault Zone extends east of Centralia and Chehalis into the Cascades Mountains Ecological Region.

Precipitation in the Cascade Mountains Ecological Region is dominated by rainfall, with higher elevations occasionally receiving snow. Average annual precipitation is 45 to 75 inches and can be higher in the upper mountain areas. Generally, this



#### Important Features and Functions

- The Newaukum and Skookumchuck rivers support the majority of the spring-run Chinook salmon population in the Chehalis Basin. Improving conditions for this population, especially enhancing summer holding habitat, is a key consideration for restoration in these watersheds.
- Diverse channel gradient, confinement, and size is a natural condition of the landscape that affects channel and floodplain complexity in this region, but many reaches have become incised due to historical use of splash dams and other activities.
- Deep-seated landslides in the upper Newaukum River watershed produce episodic sediment flows to downstream reaches.
- Hanaford Creek has extensive floodplain wetlands, though channelization and industrial land use impacts are also prominent.
- Non-native species (basses, sunfishes, catfishes, perches, and bullfrogs) are observed in the lower reaches of the Newaukum and Skookumchuck rivers.

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part of the Chehalis Basin receives less precipitation than other parts of the basin and includes the low-elevation areas around Centralia and Chehalis.

The Cascade Mountains Ecological Region is primarily within Lewis County (215,712 acres, or 79%), with the northern portion within Thurston County (56,017 acres, or 21%). Cities and towns in this region include Bucoda, Centralia, and Chehalis.

### **Important Features and Functions (Continued)**

- There is a significant presence of hatchery fish.
- This ecological region supports multiple salmon and lamprey species.

Figure 5-3  
 Cascade Mountains Ecological Region Map



Aerial Photo Source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## 5.2.2 Historical Conditions and Changes

Historical records for the pre-Euro-American settlement condition are not available, but available historical records and maps indicate that the Cascade Mountains Ecological Region was dominated by old-growth Western hemlock forest, including other important species such as Douglas-fir and Western red cedar. Numerous prairies were present in the alluvial valleys, including both wet prairies that were typically inundated each spring and dry prairies that were not inundated (WNPS 1994). GLO maps show a large prairie adjacent to the lower Newaukum River and Dillenbaugh Creek, a large wet prairie adjacent to the lower South Fork Newaukum River, numerous smaller wetlands and prairies along the South Fork Newaukum River and its tributaries and the large Alpha Prairie in the upper Middle Fork Newaukum River, a large prairie around the confluence of the North Fork Newaukum River and Lucas Creek, and a large swamp with deep water and willow and ash along lower Stearns Creek. The numerous tributaries to the Chehalis River from the Cascade Mountains Ecological Region historically flooded frequently in their lower reaches and into the Chehalis River floodplain, as illustrated by the following quote from early settlers (Smith 1941):

*“One immigrant party, it is said, camped one night at McElroy’s, now the site of the Southwest Washington Fair Grounds just south of Centralia. In the morning, when they awoke, they found themselves on a tiny island in the center of a sea of water—a mile to dry land in all directions. McElroy (Salzer) Creek had flooded the area during the night.”*

Key changes that occurred in the Cascade Mountains Ecological Region following Euro-American settlement were extensive timber harvest and agricultural development in some areas, notably in the Newaukum and Skookumchuck river valleys, and urban development on the lower Newaukum and Skookumchuck rivers associated with Chehalis and Centralia and the major transportation corridors. Similar to other regions of the basin, splash dams were used (see the description in Section 2.1). At least three splash dams were known to have been used on the Skookumchuck River and one on the lower Newaukum River (Wendler and Deschamps 1955), contributing to wood removal and channel incision. Agricultural development as well as road, bridge, railroad, residential, and urban construction likely also incrementally moved and straightened many of the rivers and creeks in the Cascade Mountains Ecological Region over time. Other historical changes to rivers include the construction of Skookumchuck Dam in 1970 that entirely blocked fish access to the upper 20 miles of the mainstem Skookumchuck River and several tributaries, gravel mining in the Newaukum and South Fork Newaukum rivers until at least the 1970s, and construction of a water supply diversion at a small falls on the North Fork Newaukum River (RM 12.5) that blocked fish access



Infrastructure in the floodplain has disrupted natural processes, as illustrated by this riprap embankment protecting a bridge crossing.

until a ladder was constructed in 1970 (WDF 1975). Significant changes have occurred in the Hanaford Creek drainage associated with coal mining, channel straightening, and land drainage and filling. The Skookumchuck Dam augments flows in the Skookumchuck River to ensure a reliable water supply for the Centralia Steam Plant, but water withdrawals also reduce flow volumes.

To support the ASRP analysis and EDT modeling, the SRT developed assumptions of the channel lengths and areas of floodplain habitat that were likely to be present in historical conditions. These assumptions were based on the GLO mapping from the late 1800s, more recent historical aerial photographs, and interpretation of current LiDAR data that show remnant channels and other floodplain features across the basin. All of the primary rivers within the Cascade Mountains Ecological Region are generally unconfined with wide valleys. The upper reaches of the Skookumchuck and North Fork and South Fork Newaukum rivers are partially confined in narrower valleys. It is likely that channels and side channels would have historically been nearly double the current length, with 3 or more times the area of connected floodplain. In all of the streams and rivers of the Cascade Mountains Ecological Region, large wood has been removed from channels and channel incision has occurred to some extent.

### 5.2.3 Current Conditions

Current conditions reflect ongoing forest management; agricultural land uses; and residential, commercial, and industrial development. Land cover is 29% coniferous forest, 8% mixed forest, 6% deciduous forest, 23% shrub, 9% grassland, 9% agriculture, 8% developed, 5% wetland, and small percentages of other cover<sup>9</sup> (Figure 5-4).

An assessment of riparian conditions and functions by NOAA (Beechie 2018) indicates that the vast majority of the riparian areas in the Cascade Mountains Ecological Region are impaired for wood recruitment due to the young age of trees present within riparian areas. Fewer than 5% of the reaches in the Skookumchuck and Newaukum rivers have larger trees in the riparian zone. The lack of trees in the riparian zone also reduces cover and provides very low levels of shading.

#### Cascade Mountains Current Snapshot

**Condition of Watershed Processes:**

Hydrology – moderately impaired  
Floodplain connectivity – impaired  
Riparian condition – impaired  
Water quality – impaired

**Restoration Potential:** High

**Protection Potential:** Moderate

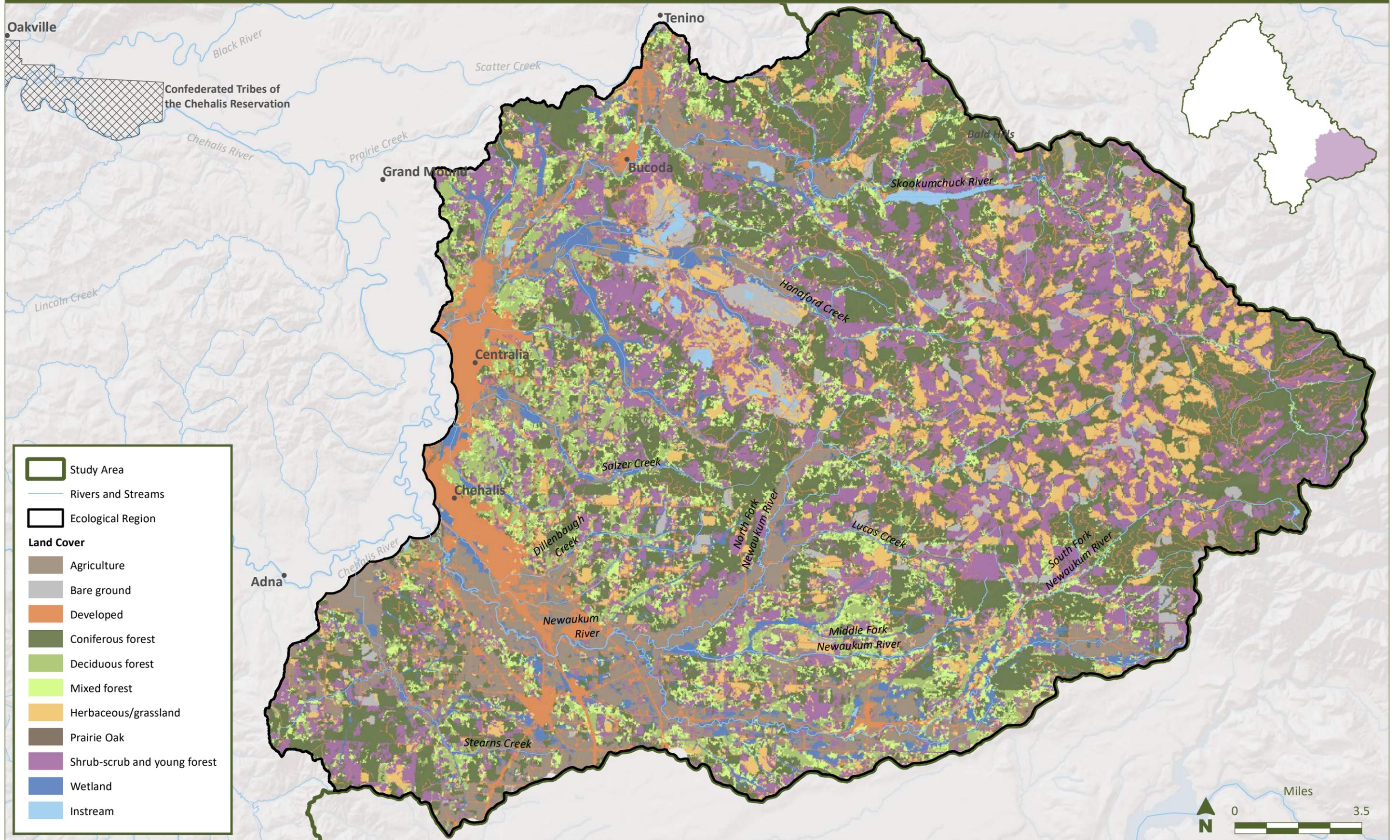
**Geographic Spatial Units:** Newaukum River, North Fork Newaukum River, South Fork Newaukum River, Middle Fork Newaukum River, Skookumchuck River, Hanaford Creek, Salzer Creek, and Stearns Creek

**Salmon Use and Potential:** High for spring-run Chinook salmon, fall-run Chinook salmon, coho salmon, and steelhead

**Non-Salmon Use and Potential:** Coastal tailed frog, Van Dyke’s salamander, northern red-legged frog, North American beaver, Olympic mudminnow, largescale sucker, mountain whitefish, Pacific lamprey, riffle and reticulate sculpin, speckled dace, Western ridged mussel, great blue heron, and wood duck

<sup>9</sup> Land cover data from Multi-Resolution Land Characteristics Consortium, National Land Cover Database 2011, augmented by WDFW Habitat Guild 2015 floodplain data where available.

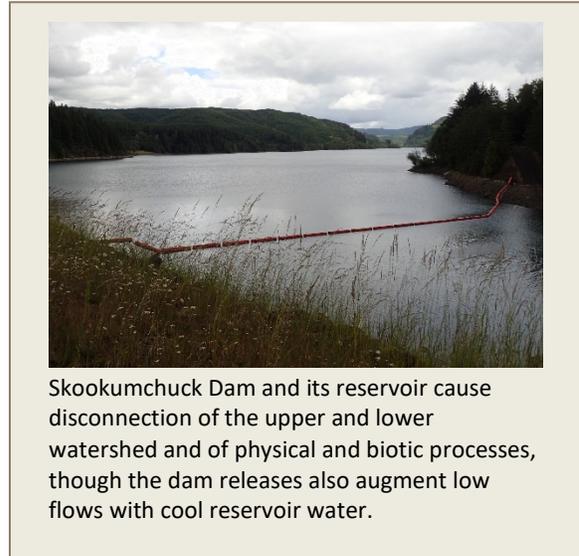
Figure 5-4  
 Cascade Mountains Ecological Region Land Cover



-  Study Area
-  Rivers and Streams
-  Ecological Region
- Land Cover**
-  Agriculture
-  Bare ground
-  Developed
-  Coniferous forest
-  Deciduous forest
-  Mixed forest
-  Herbaceous/grassland
-  Prairie Oak
-  Shrub-scrub and young forest
-  Wetland
-  Instream



Water quality is impaired in multiple reaches in the Cascade Mountains Ecological Region, primarily for temperature, low dissolved oxygen, and bacteria (Ecology 2018). Non-native invasive species are present in the mainstem Newaukum and Skookumchuck rivers. Recent temperature monitoring in the Newaukum (RM 4; RM 27.3 South Fork; RM 6.3 North Fork) and Skookumchuck (RMs 4.5 and 18.5) rivers by WDFW (2014 to 2015 data) indicates that downstream of Skookumchuck Dam, water temperatures increase<sup>10</sup> and regularly exceed the 16°C (61°F) core summer salmonid habitat criterion from May through September,<sup>11</sup> and they typically exceed the 13°C (55°F) supplemental spawning incubation criterion (September 15 to July 1) in September and May to July (Ecology 2016, 2011a). The *Upper Chehalis River Basin Temperature TMDL* (Ecology 2001) has designated a goal of 18°C (64°F) for the upper Chehalis River, with the primary goals of increasing shading along the Skookumchuck and Newaukum rivers and decreasing the width of the Newaukum River. It is also critical to prevent further reductions in flows and improve low flows if feasible.



WDFW's Thermalscape model indicates that from 2013 to 2018, the majority of stream reaches of the Cascade Mountains Ecological Region (ranging from 48% [2018] to 64% [2015] of the reaches) had mean August temperatures equal to or exceeding 16°C (61°F) and are projected to increase to 75% and 96% of the reaches in 2040 and 2080, respectively, without restoration actions (Winkowski and Zimmerman 2019).

The NOAA model that incorporates mature riparian conditions and anticipated climate change shows a likely future increase in summer water temperatures ranging from 1.5°C (2.7°F) to more than 2.5°C (4.5°F) in this region by 2080 (Beechie 2018). Salzer and Hanaford creeks were the only areas in the Cascade Mountains Ecological Region where a lesser future water temperature increase was projected because current conditions are so poor that a mature riparian corridor could provide reduced water temperatures even with climate change. If riparian forests are not allowed to mature, temperature increases would be even higher.

The current river channels are predominantly one primary channel, although short side channels are present on the Skookumchuck and South Fork Newaukum rivers, with varying levels of incision throughout the region. Abbe et al. (2016, 2018) estimated levels of channel incision in several locations in the Cascade Mountains Ecological Region, including 0.4 to 2.5 feet on the Middle Fork Newaukum

<sup>10</sup> The temperature of the water released from Skookumchuck Dam typically ranges from 10 to 14°C (50 to 57°F), and the dam provides water supply to Skookumchuck Hatchery (Emrich 2018)

<sup>11</sup> The 7-day average daily maximum temperatures reached more than 25°C (77°F) in the lower Skookumchuck and lower Newaukum rivers, even though cool water is typically released from Skookumchuck Dam, and exceeded 20°C (68°F) in the North Fork Newaukum River.

River, nearly 10 feet on the lower Newaukum River, 1.3 to 6 feet on the North Fork Newaukum River, 2 to more than 11 feet on the South Fork Newaukum River, 0 to 6 feet on Stearns Creek, and 4 to 5 feet on the Skookumchuck River. Existing mapping of wetlands (Ecology 2011b) shows relatively large wetland areas adjacent to Stearns Creek; the Newaukum River; Dillenbaugh Creek; the Middle Fork, North Fork, and South Fork Newaukum rivers; and Salzer and Hanaford creeks.

Historical and current areas of floodplain marsh and beaver pond habitats were documented by NOAA using GLO mapping (Beechie 2018). They found the Skookumchuck River sub-basin (including Hanaford Creek) has lost 90% of its historical marsh habitat and the Newaukum River sub-basin has lost about 75%; the Skookumchuck River sub-basin has lost about 75% of its historical beaver pond habitat and the Newaukum River sub-basin has lost about 90%. Fish passage barriers include Skookumchuck Dam and numerous barriers on tributaries to all of the rivers. Approximately 200 fish passage barriers were incorporated into the EDT model<sup>12</sup> for the Cascade Mountains Ecological Region, with the largest number present on tributaries to the South Fork Newaukum River.

The percentage of fine sediment in streams was modeled by NOAA based on the density of roads and channel slope; this modeling indicated 14% to 15% fines are likely to be present in the Newaukum River and 19% to 21% fines in the lower Skookumchuck River, which is a substantial increase from modeled historical conditions that indicated 8% to 11% fines in the Newaukum River and 15% to 19% fines in the Skookumchuck River (Beechie 2018). Skookumchuck Dam prevents the transport of coarse sediment (gravels) and wood from the upper basin and WDFW Fish Program staff have observed a general trend of substrate below the dam becoming coarser over time (indication of gravel starvation).

The Cascade Mountains Ecological Region is currently the stronghold for spring-run Chinook salmon, with approximately 74% of spring-run Chinook salmon spawning occurring in the Skookumchuck and Newaukum rivers (Holt 2018a; 1991 to 2017 average), and fall-run Chinook salmon, coho salmon, and steelhead are also present. Non-salmon indicator species include coastal tailed frog, Van Dyke's salamander, northern red-legged frog, North American beaver, Olympic mudminnow, largescale sucker, mountain whitefish, Pacific lamprey, riffle and reticulate sculpin, speckled dace, and Western ridged mussel. The bird indicator species present include great blue heron and wood duck.

All hatchery releases in this ecological region originate from Skookumchuck Hatchery and are integrated programs. These consist of coho salmon and steelhead releases for mitigation and harvest opportunity purposes and are detailed as follows:

- There are four coho salmon fry releases by schools or conservation districts totaling about 50,000 fish (sized less than 1 gram per fish). The scales of these programs are not large enough to significantly contribute to population sizes.
- One remote incubation box is intended to rear 40,000 coho salmon eyed eggs to fry. These fish are too small to mark and are also not believed to contribute to adult returns.

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<sup>12</sup> Fish passage barrier data from WDFW processed through EDT model.

- One cooperative project in Stearns Creek releases 46,000 coho salmon smolts each year.
- Skookumchuck Hatchery releases 100,000 coho salmon and 75,000 steelhead into the Skookumchuck River to mitigate for lost harvest opportunity caused by Skookumchuck Dam. Skookumchuck Hatchery also provides fish released into the Newaukum River (Lake Carlisle, Gheer Creek). Releases in the Willapa Hills Ecological Region are described in Section 5.1.3 and further detailed as follows:
  - Net pens in Lake Carlisle are operated by Onalaska High School. Skookumchuck Hatchery provided fry-sized fish for these programs. Fish reared in these net pens are released into Gheer Creek. There is also on-site rearing at the high school for steelhead. The goal is to release 50,000 normal-timed and 50,000 late-timed coho salmon and 25,000 steelhead smolts into Gheer Creek. Another 5,000 pre-smolt steelhead are released into the Newaukum River.
  - The Skookumchuck Hatchery releases of steelhead in the Skookumchuck River appear to be reducing the genetic diversity of the wild steelhead population in the Skookumchuck River based on recent genetic work (Seamons et al. 2017).

## 5.2.4 Limiting Factors

Limiting factors for salmonids have been identified in several assessments of the Chehalis Basin, including the EDT (ICF 2019) and NOAA modeling (Beechie 2018) conducted for the ASRP and earlier studies (GHLE 2011; Smith and Wenger 2001). Additional limiting factors and a diagnosis of what is working and what is broken in the ecological region were determined by the SRT, drawing on local basin knowledge and reconnaissance conducted within the region.

The combined results of these assessments indicate that the major issues for salmonids in the region are as follows (in relative order of importance):

- High water temperatures (significant issue for spring-run Chinook salmon, including lack of cold-water holding pools)
- Low habitat diversity (lack of side channels, large wood, floodplain habitats, and beaver ponds)
- Reduced quantity and quality of instream habitats
- Poor riparian conditions
- Flow conditions (both low and high flows)
- Fish passage barriers
- Predation
- Fine sediment
- Channel instability

These identified issues for salmonids are consistent with earlier findings from Smith and Wenger (2001) and the Chehalis Basin Lead Entity (GHLE 2011), which indicated that the key limiting factors in this ecological region include riparian conditions, loss of floodplain connectivity, sediment conditions, fish passage barriers, lack of large wood, water quantity, and high water temperatures. Model results are in agreement in relative priorities of limiting factors.

### Diagnostic Snapshot

- There is a lack of wood, channel incision, poor riparian conditions, and disconnected floodplains throughout this region.
- Lower reaches of the Newaukum and Skookumchuck rivers have high water temperatures.
- Many landowners farm or mow grasses to the channel edge, which reduces shading (temperature), food inputs (terrestrial insects), and other stream characteristics.
- WDFW snorkel and passive integrated transponder (PIT)-tag studies showed that juvenile coho salmon and steelhead are present in the lower South Fork Newaukum River in May and June, but some combination of mortality and upstream migration in July results in limited use for summer rearing habitat.
- Invasive plant species, including reed canarygrass, knotweeds, and blackberries, are present.
- Many areas lack stable gravel due to a lack of wood. The lower extents of the Newaukum and Skookumchuck river sub-basins are heavily silted from upstream land uses and runoff. Siltation reduces survival of incubating eggs and affects the availability of benthic food resources.
- Spring-run Chinook salmon reach summer holding areas by late June and remain there throughout the summer until spawning begins in September. During this holding period, they are highly vulnerable to illegal harvest, which is known to occur within this ecological region.
- Skookumchuck Dam disconnected the upper and lower watershed and disrupted wood and sediment transport processes.
- Salzer, China, Coal, and Dillenbaugh creeks all have visible urban creek impacts.

Limiting factors and threats to non-salmon indicator species are not well understood, but they potentially include high water temperatures, migration barriers, changes in flow conditions and water level variations, fine sediments, riparian conditions, and non-native predator species (as identified for Pacific lamprey by Clemens et al. [2017]). Invasive fish species may also present a special problem to the non-salmon fauna in the few higher-elevation lakes and ponds in this ecological region.

## 5.2.5 Strategies and Actions in the Ecological Region

### 5.2.5.1 Habitat and Process Protection

Many of the protection actions described in Section 4.2.1 are appropriate in the Cascade Mountains Ecological Region, particularly acquisitions or easements to protect high-functioning habitats. Based on existing conditions, the following areas and actions are recommended for a protection focus:

- Protect this ecological region at a high intensity because of its critical function as a spring-run Chinook salmon core area and its high vulnerability to increasing development.
- Protect headwater lakes in the Skookumchuck River sub-basin for unique amphibian assemblages and species diversity.

The majority of the Cascade Mountains Ecological Region is within Lewis County, which has regulations and policies in place to maintain forest cover, increase riparian canopy, protect streams from development, and protect surface and groundwater and reduce withdrawals. The Lewis County SMP identifies priority habitat as those habitat types with unique or significant value to one or more species, including fish spawning habitat, and contains regulations that new development should not interfere with the process of channel migration (Lewis County 2017). The County has a policy to support projects from the Lewis County Shoreline Restoration Plan (Lewis County 2016), the ASRP, and the lead entities for salmon recovery.

The northern portion of the ecological region is within Thurston County, which has regulations in place to protect water quantity and quality; maintain or increase forest cover; establish and protect riparian habitat; protect streams, wetlands, floodplains, and prairies from development; limit impervious surfaces; and allow channel migration.



Stream conditions lacking wood and mature riparian areas are common throughout the Cascade Mountains Ecological Region.



The upper South Fork Newaukum River, including the Pigeon Springs area, is a key cold-water refuge for spring-run Chinook salmon and other indicator species that should be protected.

As part of the community planning strategy (see Section 5.2.5.3), funding support to align both counties' regulations with the ASRP and conduct enforcement will be considered.

Additionally, general protection priorities for Lewis County in the Cascade Mountains Ecological Region are as follows:

- Protect cold water habitats in all forks of the Newaukum River (and key tributaries).
- Protect overwintering habitats in the lower North Fork and South Fork Newaukum rivers.

General protection priorities for Thurston County in the Cascade Mountains Ecological Region are as follows:

- Protect cold water inputs.

### **5.2.5.2 Restoration**

The restoration actions described in Section 4.2.2 are all appropriate in the Cascade Mountains Ecological Region. Based on existing conditions, the following areas and actions are recommended for a restoration focus:

- Conduct restoration at a high intensity because of the region's critical function as a spring-run Chinook salmon core area.
- Install stable functional wood structures and beaver dam analogs throughout the Skookumchuck and Newaukum rivers to trap sediment and smaller wood, creating stable spawning and incubation habitat and cool-water pools.
- Strategically select wet prairie habitats, such as those in Stearns and Hanaford creeks, where larger, contiguous areas of the habitat could be restored.
- Restore riparian buffers and instream wood for shading, channel complexity, and floodplain connectivity to improve summer rearing and holding habitat for salmonids, starting in the upper reaches of the Skookumchuck and Newaukum river forks and moving downstream. Restore riparian areas to maintain cool water temperatures moving downstream on the Skookumchuck and Newaukum rivers.
- Reconnect floodplains where feasible, as there are many low-gradient reaches and channel incision levels that still allow for floodplain connectivity. This would also promote groundwater aquifer recharge and low flow maintenance. Large wood structures can promote this connectivity.



Stearns Creek is a priority for lowland marsh and prairie restoration. Like other creeks in the Cascade Mountains Ecological Region, much of Stearns Creek is restricted by fish passage barriers, channelization, poor riparian conditions, loss of floodplain habitats, and high water temperatures.

- Remove fish passage barriers where good quality habitat exists upstream; fish passage barriers are most significant in Hanaford Creek and the South Fork Newaukum River tributaries.
- Evaluate the potential benefits and costs of Skookumchuck Dam removal or operational changes to benefit aquatic species.
- Implement and monitor the early action restoration projects in the Skookumchuck and South Fork Newaukum rivers to evaluate the effectiveness of restoration techniques and identify additional opportunities for restoration projects.

Priority areas for restoration in the Cascades Mountains Ecological Region include the lower Skookumchuck River, the mainstem Newaukum River and all forks, Hanaford Creek, and Stearns Creek. Actions in the Skookumchuck and Newaukum rivers will most directly address spring-run Chinook salmon habitat.

### **5.2.5.3 Community Planning**

As noted in Section 4.2.3, community planning actions would be coordinated with state and local governments, landowners, and other stakeholders to ensure the long-term success of the ASRP. Focus programs and policies that could be developed or investigated in the Cascade Mountains Ecological Region include the following:

- WDFW could evaluate Skookumchuck Hatchery releases of hatchery fish on wild populations, consider options to reduce and minimize genetic and competitive effects, and evaluate the effectiveness of hatchery outplants at providing adult returns.
- Discuss with Lewis County additional planning measures that could effectively promote and protect the following:
  - Maturation of riparian forest and wood recruitment for retention of spawning gravel and sources
  - Cold water temperatures and floodplain connectivity
  - Beaver ponds
- Discuss with Thurston County additional planning measures that could effectively promote and protect the following:
  - Floodplain connectivity
  - Surface and groundwater volumes through reduction of withdrawals
  - Improved wood recruitment for retention of spawning gravel and sources
- As the Chehalis Basin Strategy becomes more integrated, coordinate the ASRP with the CFAR Program to build habitat restoration and protection actions into community flood risk reduction efforts (such as restoring areas where structures and people have been relocated from floodplains).

#### **5.2.5.4 Community Involvement**

As noted in Section 4.2.4, community involvement and voluntary landowner participation are essential to the success of the ASRP, and the actions described in that section will be further evaluated for the Cascade Mountains Ecological Region in Phases 2 and 3 based on the restoration and protection scenario selected. Based on the specific issues in this area, the following actions are recommended for focused community involvement:

- Increase community involvement in protecting spring-run Chinook salmon in summer holding areas.
- Provide education and public awareness to reduce poaching.
- Continue outreach, engagement, and involvement processes to incorporate landowner expertise into ASRP planning and local implementation efforts.
- Partner with and support the efforts of existing local organizations (see Appendix E for a list of potential partner organizations).

#### **5.2.5.5 Institutional Capacity**

The institutional capacity strategy is intended to build on and support the work of existing organizations, as well as support creativity in how local organizations approach working toward the goals of the ASRP. The actions described in Section 4.2.5 will be further evaluated for the Cascade Mountains Ecological Region in Phases 2 and 3 based on the restoration and protection scenario selected. Based on the specific issues in this area, the following focused institutional capacity actions are recommended:

- Increase enforcement against poaching.
- Provide incentives to willing landowners for riparian planting in agricultural areas.
- Provide technical training on process-based restoration practices and principles.
- Provide funding for groups and individuals interested in restoration projects.
- Build on and support the work of existing organizations with missions that overlap with the ASRP vision (see Appendix E for a list of potential groups).