



**USDA Forest Service Watershed Condition Framework
YELLOWJACKET SUBWATERSHED
CAMP CREEK-CISPUS RIVER SUBWATERSHED
RESTORATION ACTION PLAN
Gifford Pinchot National Forest, Cowlitz Valley Ranger District**

Executive Summary

The *Yellowjacket and Camp Creek-Cispus River Subwatershed Restoration Action Plan* identifies limiting factors and prioritizes essential projects to restore watershed processes to enhance water quality and fish habitat on the Gifford Pinchot National Forest through implementation of essential projects. Through implementation of essential projects over the next seven years, conditions across both subwatersheds are expected to improve and move from functioning at risk to functioning properly.

The Yellowjacket and Camp Creek-Cispus River subwatersheds were selected as priorities for active restoration based on resource values, feasibility of improving watershed conditions through focused restoration projects, and strong ongoing partnerships and restoration projects:

- High percentage of National Forest System (NFS) ownership;
- Located within the Lower Cispus River Regional Focus Watershed designated in the Region 6 Aquatic Restoration Strategy. The main stem Cispus River through the Camp Creek-Cispus River subwatershed is a Key Watershed under the Northwest Forest Plan;
- These subwatersheds are important for fish reproduction and survival and support of diversity of species and life histories; the Lower Cispus River is instrumental in recovery efforts for Chinook and Coho salmon and Steelhead;
- Strong history of past restoration efforts, and upcoming investment through the Yellowjacket Vegetation Management project will leverage funds for aquatic restoration;
- Strong history of long-term partnerships, with opportunities to build additional partners;
- Upcoming investment in the Cowlitz basin through Tacoma Power's Cowlitz Restoration and Recover (CRR) fund as mitigation for the Cowlitz Hydropower License;



- The Lower Cispus Watershed is identified in DNR’s strategic plan as a Western Washington Priority Landscape (added in DNR’s 2021 update);
- Yellowjacket Creek, and the Cispus River and tributaries exceed temperature standards. The WA Dept of Ecology has placed Yellowjacket Creek in category 4(b) status. This designation allows the Forest to work collaboratively to establish a pollution control program to improve stream temperature through restoration projects;
- Cowlitz Tribal interest and ongoing partnership to prioritize, plan, and implement large-scale aquatic restoration projects;
- The Cowlitz River is identified as an EPA Coldwater Refuge; essential projects are designed to build resiliency to the hydrologic impacts of climate change.

Background

Location

Yellowjacket Creek and Camp Creek-Cispus Subwatershed are located on the Gifford Pinchot National Forest, near Randle, Washington (Figure 1).

Watershed Hierarchy

The watershed hierarchy and hydrologic unit (HU) names and numbers for the Yellowjacket and Camp Creek-Cispus River subwatersheds are shown in Table 1. Yellowjacket and Camp Creek-Cispus are two of the eight subwatersheds in the Lower Cispus River watershed.

Table 1: Watershed hierarchy for the Yellowjacket and Camp Creek-Cispus subwatersheds.

Basin (HUC 6)	Subbasin (HUC 8)	Watershed (HUC 10)	Subwatersheds (HUC 12)
Lower Columbia (170800)	Upper Cowlitz (17080004)	Lower Cispus River (1708000404)	Yellowjacket Creek (170800040402)
			Camp Creek-Cispus River (170800040403)



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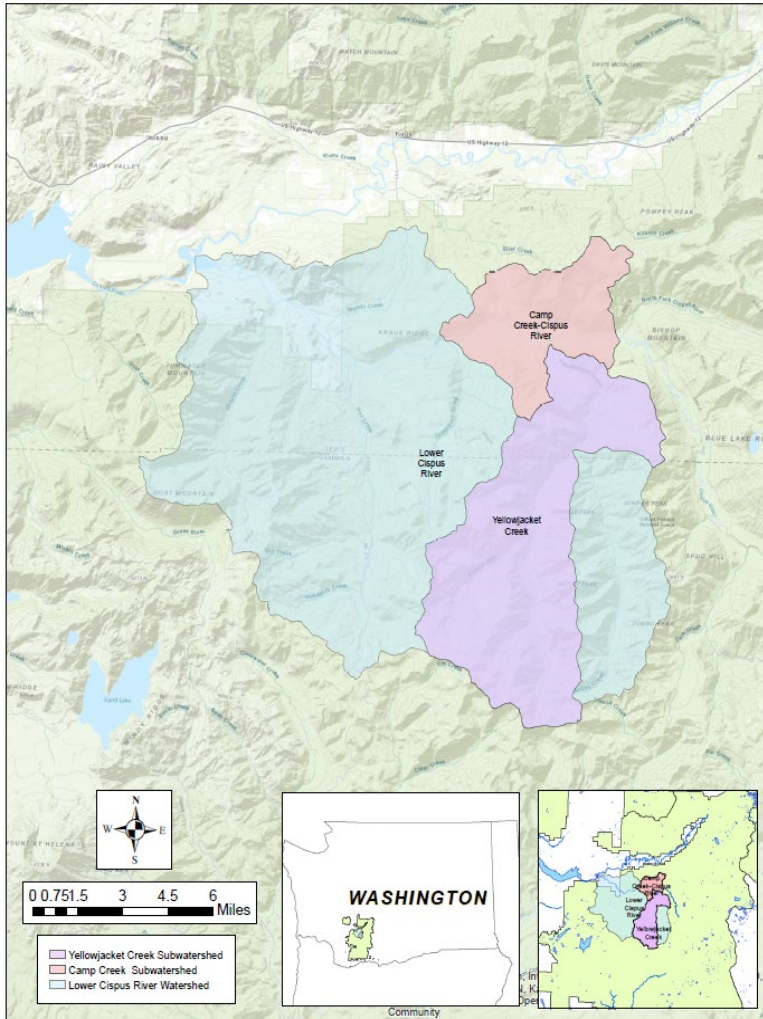


Figure 1. Location of the Yellowjacket and Camp Creek-Cispus River subwatersheds on the Gifford Pinchot National Forest.



Watershed Characterization

The watershed hierarchy of the Yellowjacket and Camp Creek-Cispus River subwatersheds is shown in Table 2. The 29,748-acre Yellowjacket subwatershed is located approximately 9 miles southeast of Randle, WA. The 15.5 mile creek flows northerly from its headwaters at 4,276 feet above mean sea level to its confluence (1,259 feet above mean seal level) with the Cispus River at river mile 17.2. Major streams include Yellowjacket Creek and its tributaries; Lambert Creek, High Bridge Creek, Galena Creek, Veta Creek, and Pinto Creek and its tributaries Pumice Creek, Stepladder Creek, and Badger Creek. McCoy Creek is the largest tributary to Yellowjacket Creek, but is in a separate subwatershed (HUC 170800040401) not included in this WRAP.

The 11,600-acre Camp Creek-Cispus River subwatershed is one of three subwatersheds in the Lower Cispus watershed that encompasses the main stem Cispus River (Table 2). Tributaries include Covell Creek, Stump Creek, Dry Creek, and Camp Creek.

Table 2. Acreage and ownership for the Yellowjacket and Camp Creek-Cispus subwatersheds

Subwatershed	NFS Land (acres)	Other Ownership (acres)	NFS Land (%)	Total Acres
Yellowjacket Creek	29,748	0	100	29,748
Camp Creek-Cispus River	10,850	750	94	11,600

Physiography

The Yellowjacket subwatershed has a contributing watershed area of nearly 67 square miles, spanning a vertical relief of 4,580 ft from its confluence with the Cispus at RM 17.1 (1,260 ft) to its headwaters at Yellowjacket Pass and Craggy Peak (5,840 ft) (USGS 2014). More than 75 percent of the watershed is forested (USFS 2003), with a mean annual precipitation of 92 inches (USGS 2016). Yellowjacket flows north through an alluvial valley and fan before joining the Cispus River.

Land Use

Management areas under the Northwest Forest Plan are shown in Table 3. The Yellowjacket subwatershed is entirely National Forest land, with 2/3 of the land base in the Matrix allocation, and approximately 300 acres in Late Successional Reserve. The 9,000-acre Dark Divide Roadless Area is located primarily in the Yellowjacket Creek subwatershed. The Camp Creek-Cispus River subwatershed has approximately 750 acres under private ownership, with the majority of Forest Service acres in the Adaptive Management and Late Successional Reserve management areas



Table 3. Northwest Forest Plan Management Area acreage

Management Area	Yellowjacket Creek Subwatershed Acres	Camp Creek-Cispus River Subwatershed Acres
Adaptive Management Area	54	6,062
Administratively Withdrawn Area	9,350	15
Congressionally Withdrawn Area	0	0
Late Successional Reserve	303	4,766
Managed Late Successional Area	0	0
Matrix	20,041	7
Other Ownership	0	750
Total	29,748	11,599

General Overview of Concerns

The primary factors affecting the proper functioning condition of these subwatersheds include:

- **Simplification and loss of aquatic habitat**, including a lack of deep complex pools, large wood, spawning gravels, and diverse riparian areas;
- **Loss of channel connectivity**, including off-channel habitat, side-channels, oxbows, and wetlands;
- **Loss of floodplain connectivity**. Many streams are incised and widened, and confined by adjacent roads and dikes; floodplains are not inundated during high flows;
- **Roads**. Road densities are moderate in the Yellowjacket subwatershed (1.9 mi/mi²) after decades of focus on decommissioning high risk roads. Road density in the Camp Creek-Cispus River subwatershed is high (3.3 mi/mi²). Approximately 10% of the road system in both subwatersheds is located in close proximity to streams, delivering sediment and altering watershed function;
- **Fragmented habitat**. There are several man-made barriers to aquatic organism passage in both subwatersheds. Downstream hydroelectric operations in the Cowlitz River have further fragmented habitat connectivity.
- **Water Quality** Many reaches in Yellowjacket, the Cispus River, and tributaries exceed temperature standards. Stream reaches exceeding temperature standards in Yellowjacket Creek are designated by the WA Department of Ecology in category 4(b)



status, meaning these reaches “have a pollution control program”. This designation allows the Forest to work collaboratively with Ecology to improve stream temperature through restoration projects.

Historic disturbances within the Yellowjacket and Cispus valley have altered the natural geomorphic and hydrologic conditions, resulting in reduced hydrologic function and aquatic habitat. Disturbances include stand replacing fires in the early 20th century, decades of riparian and in-stream salvage logging, stream cleaning, diking, and road building. The 1996 flood of record and was particularly intense in the Cispus watershed, resulting in widespread channel avulsions and downcutting. The cumulative impact of these disturbances has simplified stream channels across these subwatersheds; streams lack channel and riparian complexity and cover, and are disconnected from their floodplains and side channels. The loss of large trees which once recruited into the channel has resulted in accelerated lateral channel migration and widening, and a reduction in wood loading and subsequent channel destabilization. Transportation system infrastructure development has limited floodplain function and increased local channel incision. Confined flows lacking connection to floodplains result in accelerated stream velocities and basal shear stress. A combination of bridges and elevated floodplain roads have developed berms which severely limit floodplain function.

Important Ecological Values

Yellowjacket Creek and the Cispus River historically supported healthy wild populations of anadromous fish that included chinook, coho, steelhead, and coastal cutthroat. All of these distinct population segments are currently listed as species of concern, threatened or endangered under the Endangered Species Act (ESA). Streams in both subwatersheds support multiple life histories of Chinook, Coho, and Steelhead. Recent trap and haul efforts at the Cowlitz Hydrologic Project operated by Tacoma Power have improved fish numbers in the Cispus River and Yellowjacket Creek, with the long-term goal of strengthening natural reproduction and genetic integrity of wild salmon and steelhead.

The main stem Cispus River through the Camp Creek-Cispus River subwatershed is a Key Watershed under the Northwest Forest Plan in recognition of its anadromous fish populations. The Lower Cispus River Watershed is a Regional Focus Watershed designated in the Region 6 Aquatic Restoration Strategy. The Lower Cispus Watershed is identified in a 2021 update to DNR’s strategic plan as a Western Washington Priority Landscape. In addition, the Cowlitz River is identified by the US Environmental Protection Agency as a primary coldwater refuge in the Lower Columbia River based on modeled flow, cold water refuge volume, and temperature (EPA 2021, Palmer 2017).



Climate Vulnerability and Adaptation

Climate change is projected to alter stream temperature, snowpack, and flow regimes of streams in the Yellowjacket and Camp Creek-Cispus River subwatersheds as well as the larger Cispus River basin with potential consequences to physical watershed processes, infrastructure, chinook, coho, steelhead, and coastal cutthroat, and other native aquatic species. Warmer winter temperatures will generate less snow and more rainfall in winter months. This will mean more rapid runoff of incoming precipitation resulting in changes in the timing and magnitude of peak, and less storage of water in snowpacks into the summer months. Summer streamflows will likely be lower in the coming climate, and as such may be more easily heated.

The Variable Infiltration Capacity (VIC) hydrologic model produced by the Climate Impacts Group and the UW was used by the US Forest Service Rocky Mountain Research station to calculate a set of flow metrics for key flow attributes in the 1:100,000 scale National Hydrograph Dataset comparing historical metrics (1977-2006) with projections for the mid-century (2040) and end of century (2080) (Wenger et al. 2010). This dataset provides spatially explicit predictions of streams that are most vulnerable to decreases in low flows, and increases in bankfull flows to guide potential management actions to build resiliency.

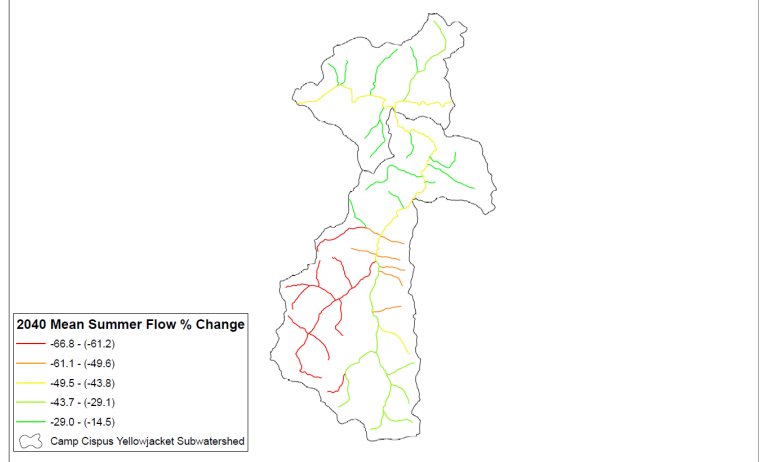
Low Flows

Projections for decreases in mean summer low flows for the 2040s and 2080s are shown in Figure 2. These projections indicate that summer low flows will likely decrease across these subwatersheds, particularly in the Pinto, Veta, and Yellowjacket Creeks. The magnitude of decreases in low flow is greater across these subwatersheds in the 2080s, with the spatial distribution of streams at greatest risk of low flow decreases similar to the 2040 predictions.



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2040 Projected Decrease (% Change) in Mean Summer Flow



2080 Projected Decrease (% Change) in Mean Summer Flow

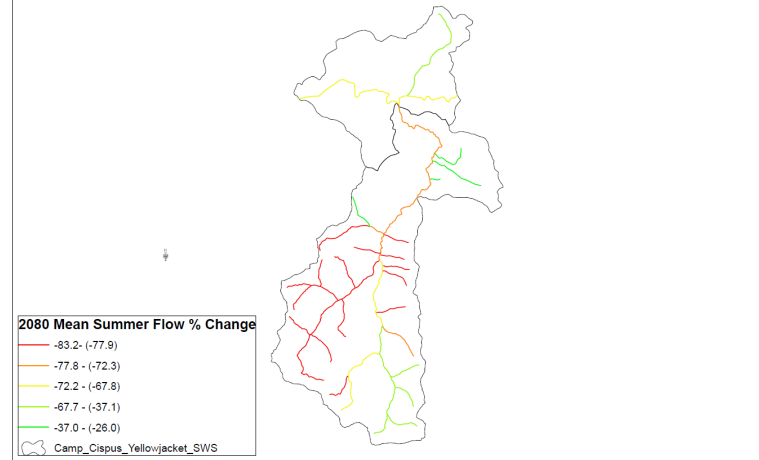


Figure 2. Projected low flow decreases from the VIC flow-metric project (Wenger et al. 2010). Note the different scales symbolized for the 2040s and 2080s.



Bankfull Flows

Projected increases in bankfull flows in the Camp Creek-Cispus River and Yellowjacket subwatersheds for the 2040 and 2080s are shown in Figure 3. Bankfull increases in the 2040s are predicted to be greatest Pinto, Veta, lower Yellowjacket, Camp, and Dry Creeks. The magnitude of predicted increases in bankfull flows is greater in the 2080s, following a similar pattern to the 2040s, with greater increases in upper Yellowjacket and Pumice Creeks, and the Cispus River.

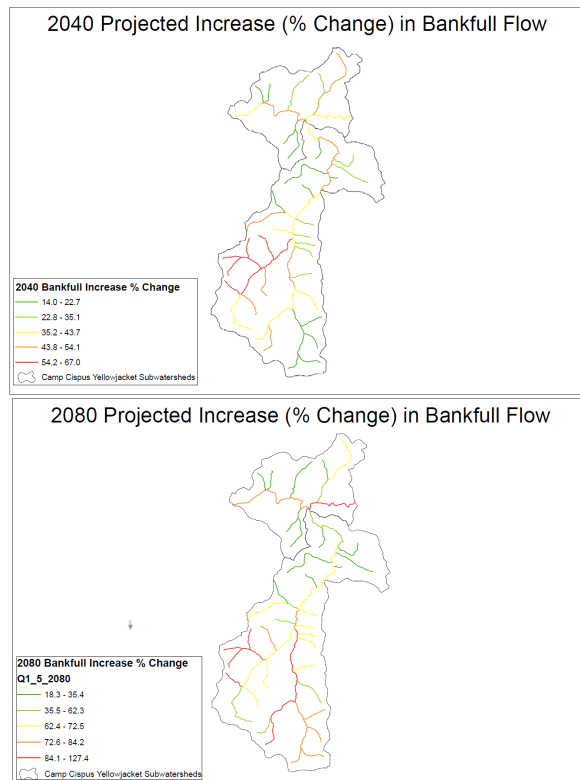


Figure 3. Projected bankfull flow increases in the Yellowjacket and Camp Creek-Cispus River from the VIC flow-metric project (Wenger et al. 2010). Note the different scales symbolized for the 2040s and 2080s.



Stream Temperature

The map sequence in Figure 4 shows stream temperature warming projections from the NorWeST project which uses existing temperature data and models projected stream temperature changes (% change) under the A1B warming trajectory for the 2040s and 2080's across western states (Isaak et al. 2016). Projected increases under the 2040 scenario range from 1° C to 1.3 °C and are highest in the main stem Cispus River and Yellowjacket Creek. Projected increases for the 2080s show the same spatial pattern for projected temperature increases, however the magnitude of increase is higher, ranging from 1.5°C to 2.1°C.

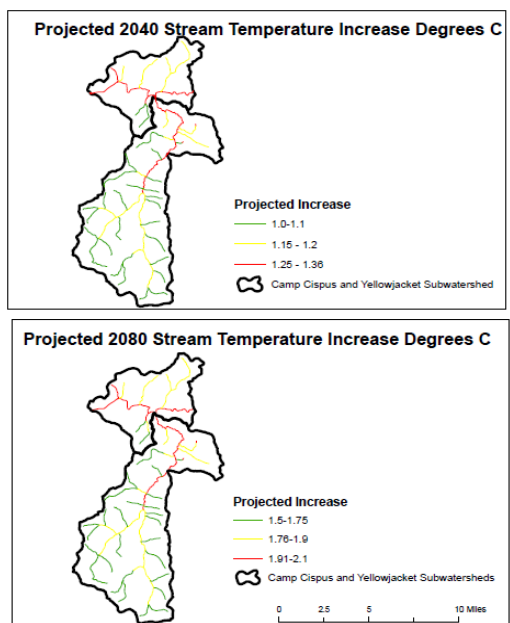


Figure 4. Projected temperature increases in the Yellowjacket and Camp Creek-Cispus River subwatershed from the NorWeST project (Isaak et al. 2016).



Climate Change Vulnerability Resilience

The Gifford Pinchot National Forest completed a climate change vulnerability assessment in October 2019 (Hudec et al.) With respect to watershed stewardship, this analysis focused on potential thermal impacts to anadromous fish species, emphasizing the need to build aquatic habitat resiliency and connectivity to build resiliency. Key goals include:

- Strategic prioritization or restoration of natural thermal, hydrologic, and wood regimes;
- Management of fluvial connectivity and assisted migration;
- Maintain and diversify aquatic monitoring programs;
- Detection and removal of non-native species.

Essential projects in this WRAP are prioritized in alignment with these goals. Aquatic restoration projects in this WRAP focus on restoration and enhancement of aquatic function to maintain and strengthen resilient aquatic ecosystems that maintain function under climate change stressors. Aquatic restoration projects focus on increasing instream large wood to encourage the formation of deep pool habitat, increasing shade, and reconnecting side channels and floodplains. These improvements allow the stream system to hold water longer, accelerate shade development and other riparian functions, and decrease width to depth ratios of alluvial channels to make them less vulnerable to temperature increases, and more resilient to increases in peak and low flows. This work also focuses on improving the resiliency of the road system—decommissioning roads that are no longer needed for long-term management, closing and stabilizing roads that are needed for long-term management but not in the near-term, relocating roads away from riparian areas where feasible, and upgrading culvert crossings to improve aquatic habitat connectivity and increase hydraulic capacity to reduce future failure risk.

Essential Projects to improve watershed conditions and increase resiliency to the potential impacts of climate change are focused in streams where hydrologic impacts from climate change are projected to be greatest. For example, projected decreases in low flows are expected to be greatest in Yellowjacket and Pinto Creeks, where the Forest and partners are targeting restoration projects to improve the functions to build resiliency to decreased low flows. Increases in bankfull flows are projected to show the greatest increases in Yellowjacket and Camp Creeks, where aquatic organism passage improvement projects are planned to improve hydraulic capacity of these crossings to reduce potential failure. Infrastructure improvements proposed in this WRAP will increase the resiliency of the road system to these changes.



Watershed Conditions

The FS Watershed Condition Framework (FS-977, 2011) and Watershed Condition Classification (FS-978, 2011) rated watersheds on 12 Indicators and 24 Attributes. These attributes were in four Process Categories: Aquatic Physical, Aquatic Biological, Terrestrial Physical, and Terrestrial Biological. These 24 Attributes were evaluated to give an overall score/rating of between 1.0 and 3.0 corresponding to a Good, Fair, or Poor overall rating for FS lands. Watershed condition scores for both subwatersheds are shown in Table 4.

- **Current Condition Class:** Yellowjacket Subwatershed: 1.9, Functioning at Risk
 Camp Creek Cispus River Subwatershed: 2.0 Functioning at Risk
- **Target Condition Class:** Improve conditions in both subwatersheds to Functioning Properly

Table 4. Watershed condition classification for the Yellowjacket and Camp Creek-Cispus River subwatershed.

Process Category	Indicator	Attribute	Yellowjacket Subwatershed Score	Camp Creek-Cispus River Subwatershed Score	Comments
Aquatic Physical			1.8	1.8	
	Water Quality		2.0	2.0	
		Impaired Waters	2.0	2.0	Portions of the Cispus River, Pumice Creek, and Greenhorn Creek are on the 303(d) list as impaired for temperature. Portions of the Cispus River and Pinto Creek are listed as “waters of concern” for temperature. Portions of Yellowjacket Creek are in 4(b) status and the FS is implementing a pollution control plan to improve temperature through targeted restoration.
		Water Quality Problems	2.0	2.0	Both subwatersheds rated a 2 based on diminished aquatic function and temperature exceedances in reaches that are not currently identified as impaired, or “waters of concern”



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Process Category	Indicator	Attribute	Yellowjacket Subwatershed Score	Camp Creek-Cispus River Subwatershed Score	Comments
	Water Quantity		1.0	1.0	Both subwatersheds lack significant man-made diversions. There are dams downstream on the Cowlitz River, but they do not impact flow in the Cispus River or Yellowjacket Creek.
	Aquatic Habitat		2.5	2.3	
		Habitat Fragmentation	2.0	2.0	There are numerous barriers to aquatic organism passage in both subwatersheds. There are several dams on the Cowlitz River downstream of these subwatershed that cause fragmentation for anadromous fish species, although there is a salmon reintroduction program in the upper Cowlitz.
		Large Woody Debris	2.5	2.0	There is a lack of large wood in most stream reaches.
		Channel Shape and Function	3.0	3.0	Many reaches (>25%) in both subwatersheds are incised and widened with shallow pools and homogenous habitat. Many streams are disconnected from side channels and floodplains.
Aquatic Biological			1.9	1.9	
	Aquatic Biota		2.3	2.3	
		Life Form Presence	3.0	3.0	Chinook, Coho, Steelhead, and Coastal Cutthroat are listed as threatened or endangered under the ESA are present but not in large populations.
		Native Species	2.0	2.0	Residual and at times isolated native endemic species are located in specific aquatic habitats. Some non-native species may be present but native species are self-sustaining where found. Downstream of these watersheds aquatic habitat is disconnected by dams.



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Process Category	Indicator	Attribute	Yellowjacket Subwatershed Score	Camp Creek-Cispus River Subwatershed Score	Comments
		Exotic and/or Invasive Species	2.0	2.0	Brook trout are present and have lowered the health and sustainability of native species (between 25 and 50 percent of the historic native aquatic life bearing habitats have exotic and/or aquatic invasive species present and/or there has been an expansion of exotic and/or aquatic invasive species over the last decade).
	Riparian Wetland Vegetation	Vegetation Condition	1.5	1.5	Riparian areas generally lack structural and species diversity with low recruitment potential to provide instream habitat structure and complexity.
Terrestrial Physical			1.7	2.0	
	Roads and Trails		2	2.3	
		Open Road Density	2	3	
		Road Maintenance	2	2	Roads across both subwatersheds do not receive regular maintenance.
		Proximity to Water	2	2	Approximately 10% of the road network is in close proximity to streams
		Mass Wasting	2	2	Mass wasting potential is fairly high in both subwatersheds, past mass wasting events have resulted in road washouts
	Soils		1.3	1.7	
		Soil Productivity	1.0	2.0	
		Soil Erosion	1.0	1.0	
		Soil Contamination	2.0	2.0	
Terrestrial Biological			1.8	1.8	



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Process Category	Indicator	Attribute	Yellowjacket Subwatershed Score	Camp Creek-Cispus River Subwatershed Score	Comments
	Fire Regime	Fire Condition Class	2.0	2.0	
	Forest Cover	Loss of Forest Cover	1.0	1.0	
	Terrestrial Invasive Species	Extent and Rate of Spread	3.0	3.0	
	Forest Health		1.0	1.0	
		Insect and Disease	1.0	1.0	
		Ozone	1.0	1.0	
Final Score			1.9	2.0	Functioning at risk



Restoration Goals, Objectives, and Opportunities

Goal and Desired Conditions

The goal for these subwatersheds is to implement restoration projects to improve self-sustaining watershed functions to move watershed conditions scores from functioning at risk to functioning properly. Implementation of essential projects in this WRAP will continue to build the processes that support a healthy and diverse aquatic and riparian ecosystem that is resilient to large scale disturbance (wildfire, impacts of climate change, and large flood events) through implementation of the following goals (Table 5):

Table 5. Restoration goals to improve watershed conditions.

Goal 1: Improve or maintain aquatic physical condition in the Yellowjacket and Camp Creek-Cispus River subwatersheds		
Indicator Improved	Objective	Essential Projects
Water Quality/Impaired Waters	Improve watershed functions to maintain and improve water temperature as prescribed in the TMDL and 4(b) implementation plan for the Yellowjacket Subwatershed. Create resilient watershed conditions to maintain acceptable water temperatures as climate warms.	Culvert replacements and removals, road hydrologic stabilization or decommissioning, large wood placement, and stream restoration.
Habitat Fragmentation	Improve aquatic organism passage at numerous crossings throughout the subwatersheds through replacement of undersized culverts.	
Large Woody Debris	Increase frequency and size of large woody debris to improve hydrologic function, water storage capacity, pool frequency, channel complexity, floodplain reconnection, and increase pool frequency and depth. Improve riparian structural diversity and downed wood. Encourage wood transport through the stream system by upgrading undersized crossings.	



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Channel Shape and Function	Improve channel shape and function in the subwatershed to improve hydrologic function, water quality, floodplain and side channel connectivity, and aquatic habitat.	
Goal 2: Improve or maintain aquatic biological condition in the Yellowjacket and Camp Creek-Cispus River subwatersheds		
Indicator Improved	Objective	Essential Projects
Life Form Presence	Improve and maintain habitat Chinook, Coho, Steelhead, and Coastal Cutthroat	Culvert Replacements and Removals, Road Hydrologic Stabilization or Decommissioning, Road Storm Damage Risk Reduction, Wood Placement, Road Relocation
Native Species	Improve and maintain native species presence throughout the subwatershed.	
Riparian Vegetation Condition	Improve riparian habitat condition and function, and downed wood.	
Goal 3: Improve or maintain terrestrial physical condition in the Yellowjacket and Camp Creek-Cispus River subwatersheds		
Indicator Improved	Objective	Essential Projects
Open Road Density	Decrease open road density, and reduce hydrologic impacts of closed roads.	Culvert Replacements and Removals, Road Hydrologic Stabilization or Decommissioning, Road Storm Damage Risk Reduction, Road Relocation
Road Maintenance	Reduce erosion and sedimentation from the road system. Improve long-term road stability and reduce long-term maintenance.	
Proximity to Water	Reduce erosion and sedimentation from hydrologically connected roads.	



Alignment with National, Regional, or Forest Priorities

The project goals of reducing the erosion potential, improving aquatic organism passage, improving water quality, increasing long-lived species within the riparian corridor, and improving the understanding of existing conditions and processes is consistent with national, regional, and forest priorities. The Yellowjacket Creek subwatershed and activities proposed in this WRAP have been identified as a high priority on the Gifford Pinchot National Forest in alignment with the National Watershed Condition Framework.

Alignment with State or Local Goals

Activities proposed are aligned with state and local goals. The Washington Department of Fish and Wildlife, WA Department of Ecology, U.S. Fish and Wildlife Service, National Marine Fisheries Service, the Cowlitz Tribe, and other local partners collaborated to identify limiting factors and essential projects in this WRAP.

Partnership Involvement

Partners are expected to play diverse roles in the completion of WRAP projects. For projects, such as those involving environmental analysis required by the National Environmental Policy Act (NEPA), the Forest Service would have responsibility for completing most required tasks. For the majority of projects, partner roles include subject-matter expertise, funding, contracting, grants and labor (paid and volunteer). Possible partners include: Cowlitz Indian Tribe, Cascade Forest Conservancy, Pinchot Partners Collaborative, Tacoma Power, Lower Columbia Salmon Recovery Board, WA Department of Natural Resources, Lewis Conservation District, Cispus Learning Center, and Lewis County.

Socioeconomic Considerations

Completing the restoration plan will improve and protect the water resources of the Yellowjacket and Camp Creek-Cispus River subwatersheds. Completion of this restoration plan will help to contribute to the local economy directly by providing contracting work to implement several of the proposed projects. Indirectly, restoration efforts will enhance and continue recreational activities that will contribute to the local economies by providing jobs in the tourism industry. Projects will also provide volunteer opportunities to connect local communities.

This watershed restoration plan supports a multi-million-dollar investment to reintroduce salmon to the Upper Cowlitz. Success of this effort is dependent on preserving and improving quality habitat to promote robust freshwater survival of salmonids.



Yellowjacket Creek Subwatershed Essential Projects

Essential Project #1: Stream Restoration

Essential Activity #1: Yellowjacket Creek Stream Restoration Reach 1 (RM 0.0- 1.2)

- Attribute/Indicator Addressed: Channel shape and function, flow characteristics, habitat fragmentation, native species life form presence, and riparian vegetation condition through placement of large woody debris and re-vegetation of riparian areas.
- Project Description: Restore approximately 1 mile of stream channel at the Mouth of Yellowjacket Creek through installation of grade control structures, construction of log jams, and floodplain and side channel reconnection.
- Partners: Cowlitz Tribe, Tacoma Power, Lower Columbia River Salmon Recovery Board
- Estimated costs: \$1,000,000
- Schedule: Planning ongoing; implementation: 2019-2025

Essential Activity #2: Yellowjacket Creek Stream Restoration Reach 2-5 (RM 1.2 - 5)

- Attribute/Indicator Addressed: Channel shape and function, flow characteristics, habitat fragmentation, native species life form presence, and riparian vegetation condition through placement of large woody debris and re-vegetation of riparian areas.
- Project Description: Restore approximately 1 mile of stream channel at above Yellowjacket Creek bridge to upper anadromous available habitat through installation of grade control structures, construction of log jams, and floodplain and side channel reconnection.
- Partners: Cowlitz Tribe, Tacoma Power, Lower Columbia River Salmon Recovery Board
- Estimated costs: \$1,200,000
- Schedule: Planning ongoing; implementation: 2023-2027

Essential Activity #3: Pinto Creek Stream Restoration

- Attribute/Indicator Addressed: Channel shape and function, flow characteristics, habitat fragmentation, native species life form presence, and riparian vegetation condition through placement of large woody debris and re-vegetation of riparian areas.



- Project Description: Restore approximately 1 mile of stream channel in Pinto Creek through installation of grade control structures, construction of log jams using wood from the adjacent Riparian Reserve, and floodplain and side channel reconnection.
- Partners:
- Estimated costs: \$150,000
- Schedule: Planning 2022; implementation: 2022-2025

Essential Project #2: Road Decommissioning and Hydrologic Stabilization

Essential Activity #1: Road Decommission and Hydrologic Stabilization

- Attribute/Indicator Addressed: Habitat fragmentation, water quality and quantity, native species life form presence, channel shape and function, riparian vegetation condition, open road density, road maintenance, and road proximity to water
- Project Description: Decommissioning of approximately 6.2 miles of un-needed roads, and hydrologic stabilization (close stabilization) on approximately 2 miles of closed roads needed for future management. Proposed roads and treatments shown in Table 6. All road treatments are included in the Yellowjacket EA and the forthcoming DN/FONSI. Roads identified for treatment in this WRAP are subject to change based on the final Decision for the Yellowjacket Project.
- Partners/funding mechanism: Stewardship, retained receipts, KV, DNR, Legacy Roads and Trails
- Estimated costs: \$500,000
- Schedule: Planning completed in Yellowjacket EA; Implementation 2022-2027

Table 6. Proposed road decommissioning and close stabilize treatments in the Yellowjacket Creek subwatershed.

Road	Treatment	Estimated Miles
2800020	decommission	0.1
2800021	decommission	0.2
2800022	decommission	0.1
2800165	Close/stabilize	0.2



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2809014	Close/stabilize	0.8
2809660	Close/stabilize	0.1
2810040	Close/stabilize	0.1
2810600	Close/stabilize	0.1
2810605	decommission	0.3
2810606	decommission	0.5
2810608	decommission	0.1
2810660	decommission	0.3
2810661	decommission	0.4
2810699	decommission	0.2
2900030	decommission	0.3
2900033	decommission	0.2
2900043	Close/stabilize	0.4
2900044	decommission	0.2
2900045	decommission	0.6
2900057	decommission	0.8
2900692	decommission	0.4
2900693	decommission	0.2
2900694	Close/stabilize	0.3
2904604	decommission	0.1
7600087	decommission	0.1
7600655	decommission	0.1
7713687	decommission	0.2
7713689	decommission	0.4
7713690	decommission	0.2
7713691	decommission	0.2



Essential Project #3: Aquatic Organism Passage Culvert Replacement

Essential Activity #1: Replacement or Removal of Fish Barrier Culverts

Culvert Replacements and removals on High Bridge Creek on the 29 Road, and Yellowjacket Creek Road 2810041

- Attribute/Indicator Addressed: Habitat fragmentation, water quality, native species life form presence
- Project Description: Replacement of a barrier culverts on High Bridge Creek and Yellowjacket Creek with road crossings to accommodate aquatic organism passage.
- Partners/funding mechanism: Stewardship, retained receipts, KV, DNR, Legacy Roads and Trails
- Estimated costs: \$1,000,000
- Schedule: Planning 2020-2025; implementation: 2022-2025



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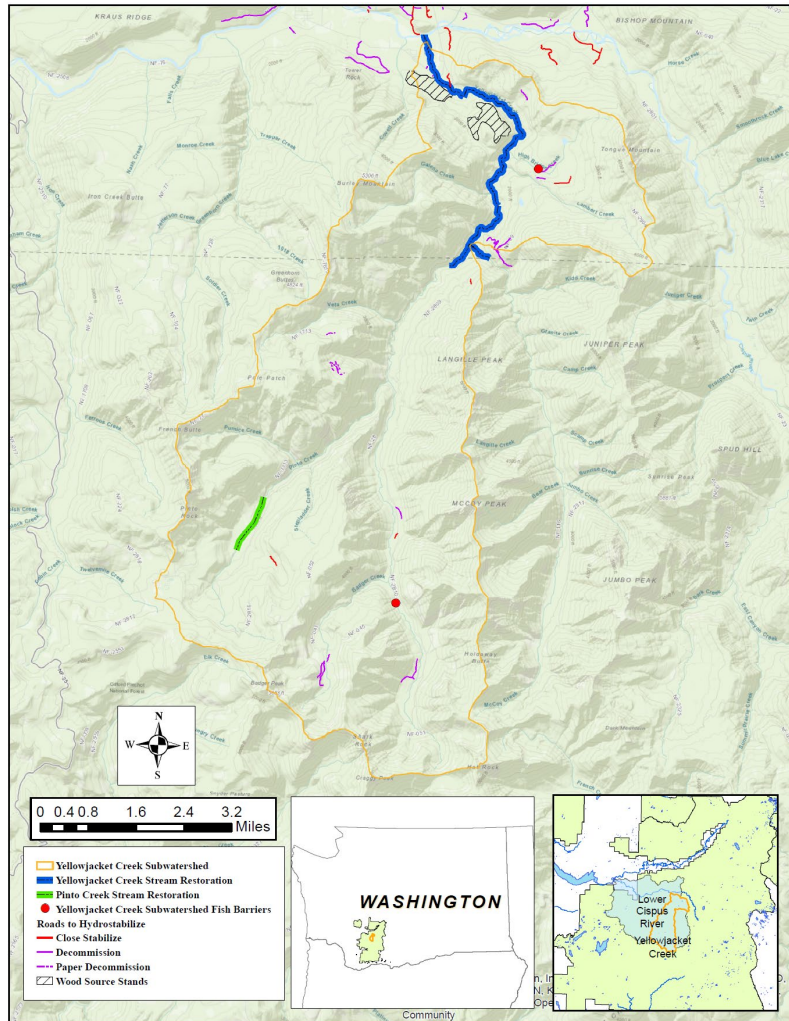


Figure 5. Essential projects in the Yellowjacket subwatershed.



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Table 7. Yellowjacket Creek Essential Project timeline, description, and cost.

Essential Activity	Reach, Project Location	Project Type	Products, Outcomes	Trees Needed (#)	Estimated Funding Needed for Completion	Design (D)/ Permitting (P)/ Implementation (I) Year									
						'19	'20	'21	'22	'23	'24	'25	'26	'27	
Yellowjacket Creek Stream Restoration	Reach 1 (RM 0.0-1.2)	Stream Restoration	1.2 miles of stream restoration. Improving anadromous fish spawning and rearing habitat.	2,500	\$1,000,000	D/P	I	D/P/I	D/P/I	I	I	I			
	Reach 2-5 (RM 1.2-5; above 28 bridge to end of anadromy)		3.8 miles of stream restoration. Improving anadromous fish spawning and rearing habitat.		\$1,200,000					D/P	I	I	I	I	
	Pinto Creek Stream Restoration		1.0 miles of stream restoration. Improving resident fish spawning and rearing habitat.	1000	\$150,000				D/P	I	I				



Road closures and decommissioning	See table 6	Decommissioning and close stabilization	6.2 miles of road decommissioning and 2 miles of hydrologic stabilization	N/A					D	D/I	D/I	I	I	I
Aquatic Organism Passage	High Bridge Road 2900 Crossing and Yellowjacket Creek Road 2810041 Crossing	AOP Culvert Replacements	2.5 of miles of habitat opened	N/A	\$1,000,000				D/P	I	I	I		

Camp Creek-Cispus River Essential Projects

Essential Project #1: Road Relocation and Road Improvement

Essential Activity #1: Forest Road 2801 Relocation

- Attribute/Indicator Addressed: Water quality and quantity, aquatic habitat, riparian vegetation condition, open road density, road maintenance, and road proximity to water
- Project Description: Relocation of the 2801 Road to the toe of the hillslope on the south side of the valley on the western flank of Tonge Mountain
- Partners: Cowlitz Tribe, SRFB funding
- Estimated costs: \$300,000
- Schedule: Planning 2021-2023, implementation 2023

Essential Activity #2: Forest Road 28 and 2801011 Road Improvement for Cispus River side channel



- Attribute/Indicator Addressed: Water quality and quantity, aquatic habitat, riparian vegetation condition, open road density, road maintenance, and road proximity to water
- Project Description: Relocation of the 2801 Road to the toe of the hillslope on the south side of the valley can allow Cispus River to connect to its floodplain. Improvements to the 28 road will be needed to allow for full connectivity. The project also includes substantial in-stream and side channel restoration, and may include a new bridge structure to accommodate a wider multi-threaded crossing of the Cispus River.
- Partners: Cowlitz Tribe, SRFB funding
- Estimated costs: \$3,000,000
- Schedule: Planning 2021-2023, implementation 2023

Essential Project #2: Aquatic Organism Passage Culvert Replacement

Essential Activity #1: Replacement or Removal of Fish Barrier Culverts

- Attribute/Indicator Addressed: Habitat fragmentation, water quality, native species life form presence
- Project Description: Replacement of a barrier culverts on Camp, Covell, and Stump Creeks with road crossings to accommodate aquatic organism passage (Table 8).
- Partners: Cowlitz Tribe, Salmon Recovery Board, Tacoma Power
- Estimated costs: \$2,400,000
- Schedule: Planning 2020-2025; implementation: 2021-2026

Table 8. Aquatic organism passage improvement projects in the Camp Creek-Cispus River subwatershed

Stream Name	Road Number
Camp Creek	2300000
Covell Creek	7600000
Stump Creek 1	2300000
Stump Creek 2	2300000
Stump Creek 3	2306000



Essential Project #3: Road Decommissioning and Hydrologic Stabilization

Essential Activity #1: Road Decommission and Hydrologic Stabilization

- Attribute/Indicator Addressed: Habitat fragmentation, water quality and quantity, native species life form presence, channel shape and function, riparian vegetation condition, open road density, road maintenance, and road proximity to water
- Project Description: Decommissioning of approximately 12.3 miles of un-needed roads, and hydrologic stabilization (close stabilization) of approximately 3.8 miles of closed roads needed for future management. Proposed roads and treatments shown in Table 9. All road treatments are included in the Yellowjacket EA and the forthcoming DN/FONSI. Roads identified for treatment in this WRAP are subject to change based on the final Decision for the Yellowjacket Project.
- Partners/funding mechanism: Stewardship, retained receipts, KV, DNR, Legacy Roads and Trails
- Estimated costs: \$850,000
- Schedule: Planning completed in Yellowjacket EA; Implementation 2022-2027

Table 9. Proposed road decommissioning and close stabilize treatments in the Camp Creek-Cispus River subwatershed.

Road	Treatment	Estimated Miles	Timing
2300086	decommission	1.0	After treatment of Yellowjacket stands 32 and 33
2300087	decommission	0.3	ASAP or when treating Yellowjacket stands 2300086
2300098	decommission	0.2	After stream restoration
2300099	Close/stabilize	0.3	After stream restoration
2300101	decommission	0.2	After stream restoration
2300105	decommission	0.1	After stream restoration
2300107	decommission	0.2	After stream restoration
2300120	decommission	0.7	ASAP
2300122	decommission	0.1	ASAP



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2300604	decommission	0.1	ASAP
2300662	decommission	0.4	ASAP
2300663	decommission	0.3	ASAP
2306020	decommission	0.1	After treating Yellowjacket Stand 30
2306031	decommission	1.4	After treating Yellowjacket Stand 34
2306687	decommission	0.1	ASAP
2306688	decommission	0.3	ASAP
2308000	decommission	0.8	ASAP
2308658	decommission	0.1	ASAP
2308659	decommission	0.1	ASAP
2308660	decommission	0.1	ASAP
2800651	Close/stabilize	0.3	ASAP
2800652	Close/stabilize	0.1	ASAP
2801011	decommission	0.4	ASAP
2801012	decommission	0.1	ASAP
2801030	Close/stabilize	0.4	After treating Yellowjacket Stand 41
2900031	decommission	0.6	
5500080	decommission	1.0	After treatment of Yellowjacket stands 4 and 5
5500108	Close/stabilize	1.6	After treatment of Yellowjacket stands 6, 7, 8, 10, 11, 12
5500120	decommission	1.2	After treatment of Yellowjacket stand 22
5500645	Close/stabilize	0.1	After treatment of Yellowjacket stand 78
5500676	decommission	0.1	



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5500678	decommission	0.1	
5500695	Close/stabilize	1.0	
7600075	decommission	1.7	ASAP
7600656	decommission	0.3	
7600671	decommission	0.2	ASAP

Essential Project #4: Stream Restoration

Essential Activity #1: Cispus River Restoration (above and below 28 Bridge Crossing)

- Attribute/Indicator Addressed: Channel shape and function, flow characteristics, habitat fragmentation, native species life form presence, and riparian vegetation condition through placement of large woody debris and re-vegetation of riparian areas.
- Project Description: Restore approximately 1.5 miles of stream channel in Cispus River through installation of grade control structures, construction of log jams, and floodplain and side channel reconnection.
- Partners: Cowlitz Tribe, Tacoma Power
- Estimated costs: \$1,300,000
- Schedule: Planning 2019; Implementation: 2020-2025

Essential Activity #2: Camp Creek Restoration

- Attribute/Indicator Addressed: Channel shape and function, flow characteristics, habitat fragmentation, native species life form presence, and riparian vegetation condition through placement of large woody debris and re-vegetation of riparian areas.
- Project Description: Restore approximately 1.2 miles of stream channel in Camp Creek (RM 0.0 -1.7) through installation of grade control structures, construction of log jams, and floodplain and side channel reconnection.
- Partners: Cascade Forest Conservancy, Tacoma Power
- Estimated costs: \$300,000
- Schedule: Planning 2021; Implementation: 2022-2024



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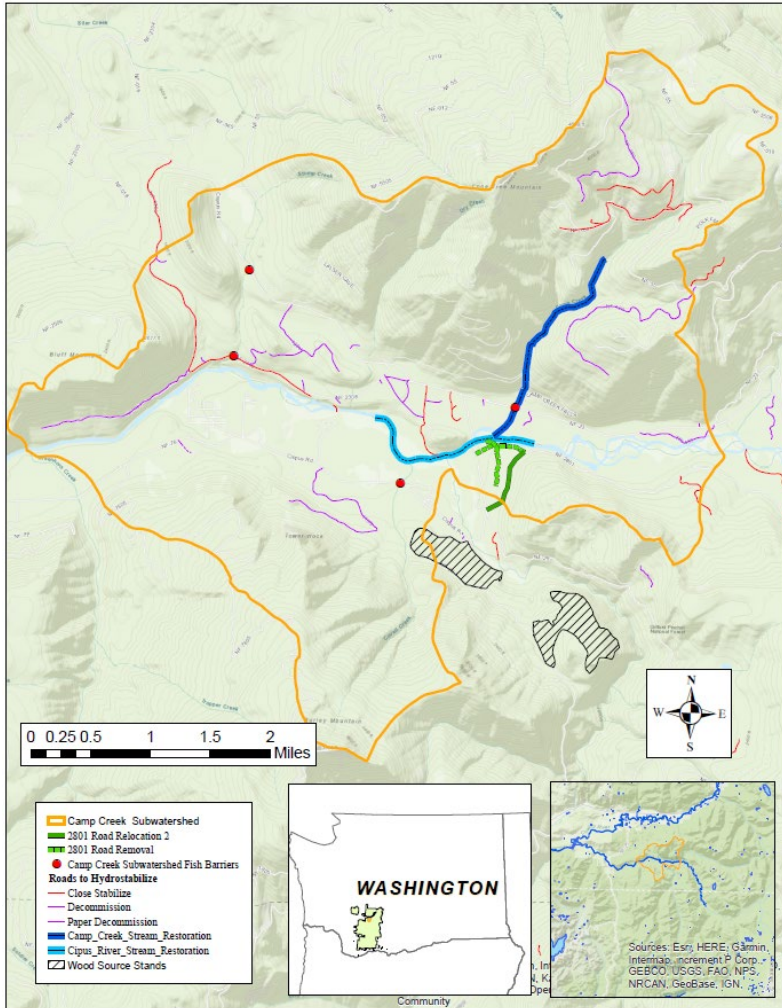


Figure 6. Essential projects in the Camp Creek subwatershed.



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Table 10. Camp Creek Cispus River Essential Projects description, timeline, and costs.

Essential Activity	Reach, Project Location	Project Type	Products, Outcomes: Miles Improved or other Metrics	Trees Needed (#)	Estimated Funding Needed for Completion	Design (D)/ Permitting (P)/ Implementation (I) Year									
						'19	'20	'21	'22	'23	'24	'25	'26	'27	
Forest Road 2801 Relocation	2801 Road	Road Relocation			\$300,000				D	D/I	I	I	I		
Forest Road 28 Improvement for Cispus River side channel	28 Road and side channel above and below on Cispus River	Road Improvement			\$3,000,000				D	D	D	D/I	I	I	
Cispus River Restoration	Above and Below 28 Bridge Crossing	Stream Restoration	1.5 miles of stream restoration. Improving anadromous fish spawning and rearing habitat.	2,500	\$1,300,000	D/P	I	D/P/I	D/P/I	I	I	I	I		



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Camp Creek Restoration	Reach 1-3 RM 0-1.7		1.7 miles of stream restoration. Improving anadromous fish spawning and rearing habitat.	1,500	\$300,000					D	D/P	I	I	I	I
Aquatic Organism Passage	Camp Creek (23 Road Crossing), Covell Creek (76 Road Crossing), Stump Creek (1 at 23 Road Crossing and 2306 Crossing)	AOP Culvert Replacements	2.5 of miles of habitat opened	N/A	\$2,400,000	D	D	D/P	D/P/I	D/P/I	D/P/I	I			
Road closures and decommissioning	See table 6	Road decommissioning and hydrologic stabilization RowanEu	Decommissioning of 12.3 miles of road and close stabilization of 3.8 miles of road	N/A					D	D/I	D/I	I	I	I	



Estimated Timelines, Project Scheduling, and Costs

Table 11. Yellowjacket Creek Subwatershed Essential Project cost estimates.

FY	Task	FS Cost	Partner Cost	Total Cost
2019-2025	Yellowjacket Creek Reach 1 (RM 0.0- 1.2)	\$200,000	\$800,000	\$1,000,000
2023-2027	Yellowjacket Reach 2-5 (RM 1.2-5; above 28 bridge to end of anadromy)	\$200,000	\$1,000,000	1,200,000
2022-2025	Pinto Creek Stream Restoration (RM 3-4)	\$150,000.00	0	\$150,000
2022-2027	Road closures and decommissioning	\$500,000.00	\$0	\$500,000
2022-2025	Aquatic Organism Passage	\$1,000,000.00	0	\$1,000,000
Total by contributor		\$2,050,000	\$1,800,000	
			Total	\$3,850,000



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Table 12. Camp Creek-Cispus River Subwatershed Essential Project cost estimates.

FY	Task	FS Cost	Partner Cost	Total Cost
2022-2025	Forest Road 2801 Relocation	\$150,000	\$150,000	\$300,000
2022-2027	Forest Road 28 Improvement for Cispus River side channel	\$1,500,000	\$1,500,000	\$3,000,000
2019-2026	Cispus River Restoration	\$300,000.00	1000000	\$1,300,000
2022-2027	Camp Creek Restoration	\$50,000.00	\$250,000	\$300,000
2019-2025	Aquatic Organism Passage	\$1,400,000.00	1,000,000	\$2,400,000
2022-2027	Road closures and decommissioning	\$850,000	0	\$850,000
Total by contributor		\$4,250,000	\$3,900,000	
			Total	\$8,150,000



Restoration Project Monitoring and Evaluation

a. The forest will monitor:

- Effectiveness and implementation of BMPs during and after project implementation.
- Stream habitat parameters through the Region 6 stream survey protocol.
- Additional monitoring will be identified as projects are planned and implemented.

b. Monitoring will be done in cooperation with:

- Cowlitz Tribe, Cascade Forest Conservancy

Additional Restoration Projects

This Watershed Restoration Action Plan is a living document that will evolve over time given changing ecological conditions, funding opportunities, partner interest, and shifting priorities. There are several projects in both subwatersheds identified that are not considered “essential”, however the Forest or partners may implement these projects in the future. These projects are shown in Table 13.

Table 13. Additional restoration projects considered non-essential at the time of WRAP finalization.

Subwatershed	Project	Notes
Yellowjacket	Upper Yellowjacket Stream Restoration	
	High Bridge Creek Stream Restoration	
	Badger Creek Stream Restoration	
	Lambert Creek Culvert upgrade 29 Road	Crossing not identified in fish passage barrier database, however additional assessment is needed to determine passage status. Culvert is undersized.
Camp Creek-Cispus River	Cispus River fish acclimation pond development	In recovery plan. Partnership interest



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	Dry Creek FR 23 Culvert Upgrade	Crossing not identified in fish passage barrier database, however additional assessment is needed to determine passage status. Culvert is undersized. Lewis County has an interest in partnering on potential replacement.
	Upper Cispus River Restoration Reach upstream of Camp Creek and downstream of North Fork Campground	Large-scale restoration project not currently planned for restoration, but if funds become available, would be a high-priority project.

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Reviewing Official: Eric Veach, Forest Supervisor, Gifford Pinchot National Forest

Reviewing Official Signature: _____ **Date** _____

The Forest/Unit Supervisor's signature signifies:

- approval of the priority watershed
- the validity of the planned essential projects
- verification that all watershed condition class attribute ratings in the WCATT database for this watershed accurately reflect the assessment results.

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Reviewers: Nikia Hernandez, District Ranger, Cowlitz Valley Ranger District; Mike McConnell, Hydrologist, Cowlitz Valley Ranger District