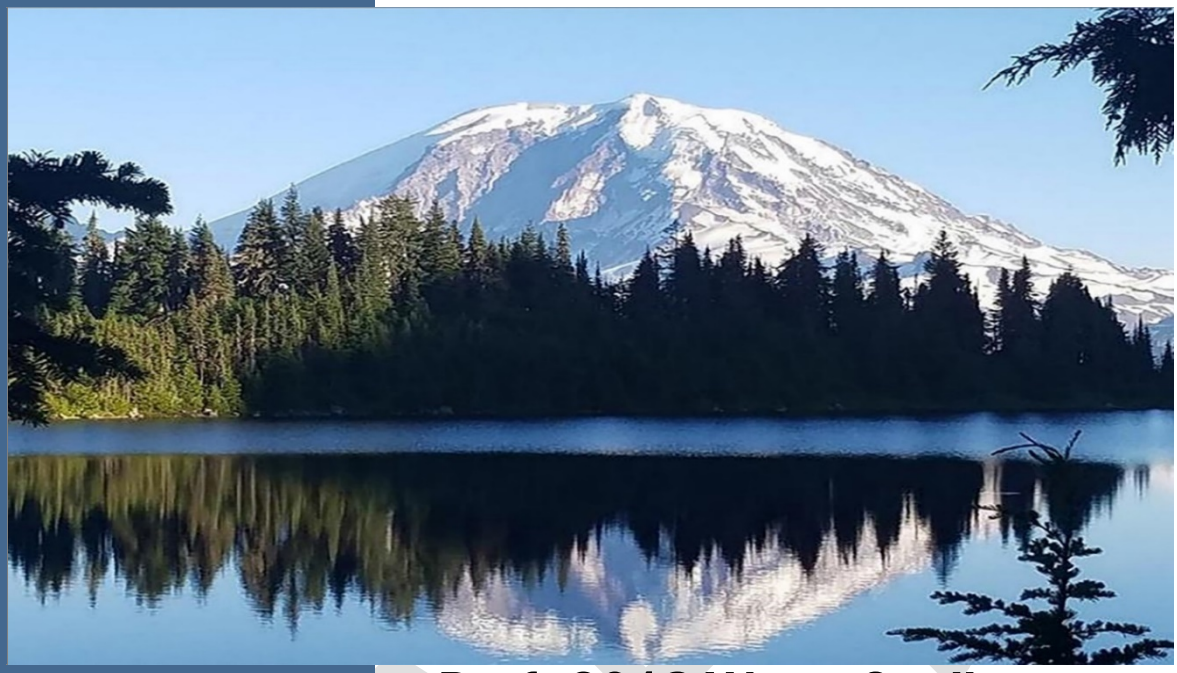

Draft 2018 Water Quality Assessment Submittal to EPA

4b Analyses for:

- Alpowa Creek
- Asotin Creek
- Couse Creek
- Deadman and Meadow Creeks
- Steptoe Creek
- Tenmile Creek
- Entiat River
- Yellowjacket Creek
- Kitsap County PIC Program
- Total Dissolved Gas

DEPARTMENT OF ECOLOGY
State of Washington

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[1] www.ecology.wa.gov/contact

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4b Analysis for Alpowa Creek
February 2021

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude 16 listings for bacteria, dissolved oxygen, pH, and temperature from the 303(d) list and place these water bodies in category 4b of the IR. The specific listings are:

- Bacteria—40556 ,40557, 40558, 45991, and 72288
- dissolved oxygen—47040, 47041 and 47042
- pH—50347 and 50348
- temperature—40536, 40538, 73618, 73625, 73626

These water bodies were in several other categories of the 2012 IR. Water bodies 40557, 40558, 45991, 47041, 47042, and 50348 were listed in Category 4b. Water bodies 40536 and 40538 were in category 2. Water bodies 40556 and 50347 were in category 5. Water bodies 72288, 73616, and 73626 were in category 3. Ecology's basis for excluding these water bodies from the 303(d) list is outlined in this evaluation.

Identification of Segment and Statement of Problem Causing Impairment

Alpowa Creek is located in Garfield and Asotin Counties in southeastern Washington. It originates from several springs in the forested foothills of the Blue Mountains, travels through a desert canyon, and meets the Snake River near Clarkston, Washington. For generations the Alpowa Creek canyon has been used to range and feed livestock. Wheat and barley are also grown in the watershed. The creek provides significant habitat for the threatened Snake River Steelhead trout.

After years of uncontrolled livestock access to the creek, a large portion of the riparian corridor was in poor condition, and the stream was consistently in violation of the state fecal coliform standard.

Monitoring data for the listed segments was collected from 1999 through 2007. Only 1999 and 2000 data is available for segment 40557, and it is limited. WSU data show that during those two years, segment 40557 showed excursions above the geometric bacteria criterion, but there is no further detail. Information for the other segments is better. The highest fecal coliform count recorded was 1840 fecal coliform units/100 mL on May 27, 2003 between river kilometers 12.7 and 13.9. The lowest dissolved oxygen recorded was 4.4 mg/L on April 29, 2003 between river kilometers 18.2 and 20.2. The highest pH recorded was 8.8 between river kilometers 12.7 and 13.9. The temperature impaired segments routinely exceeded the 17.5-degree criterion for spawning, rearing, and migration; and the 13-degree supplemental spawning criterion.

The impairments are the result of a combination of factors. Winter feeding and uncontrolled livestock access to the stream had eliminated much of the vegetation within the stream corridor. This degraded riparian area could not provide shade to the stream, resulting in high water temperatures. It also allowed manure to run directly into streams. In addition, the uncontrolled stream access allowed cattle to deposit manure directly into the water and to trample stream banks. There is also some evidence that failing septic systems may be contributing to the problem.

Livestock manure is a likely cause of the low dissolved oxygen and pH violations. Manure uses oxygen and lowers pH during decomposition by in-stream bacteria. Nutrients in the manure and from fertilizers stimulate excessive plant growth in the creek. This problem is exacerbated by high stream temperatures and an overabundance of sunlight exposure. Aquatic plants use oxygen for respiration at night and can raise the pH of the water during photosynthesis during the day. Controlling the excessive growth is key to meeting pH and dissolved oxygen criteria and improving the health of the aquatic community.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

Water quality target

The bacteria impaired segments of Alpowa Creek are designated primary contact recreation. Ecology now uses Escherichia coli (E. Coli) as the criteria in this watershed. E. Coli levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or a single sample when less than ten sample points exist) exceeding 320 CFU or MPN per 100 mL.

For the dissolved oxygen impaired segments, the standards require that the lowest one-day minimum be no lower than 8.0 mg/L.

For the pH impaired segments, the standard requires the pH to be within the range of 6.5 to 8.5, with a human-caused variation within this range of less than 0.5 units. For the temperature impaired segments, the designated uses are spawning, rearing and migration, and the temperature criterion is 17.5 degrees Centigrade. In addition, listings 40538 and 73618 also have a supplemental spawning criterion of 13 degrees Centigrade from February 15 to June 1.

Controls that will achieve water quality standards

The Department of Ecology's Eastern Regional Office has established a Livestock and Water Quality program that uses a unique collaborative approach to address livestock-related problems. Instead of using the standard process that starts with a Category 5 listing, establishing a TMDL for the stream, writing an implementation plan, and finally getting to actual implementation, this strategy goes straight to implementation. The strategy is applied in watersheds in which the cause of a water quality impairment is clear.

Ecology encourages implementation of a wide variety of best management practices, however, a primary focus of the program has been to restore degraded riparian corridors and eliminate unlimited animal access to streams. Healthy riparian areas can improve water quality and stream health in multiple ways, which make them a particularly valuable and cost-effective management practice. Healthy riparian areas:

- Slow bank erosion by holding soil in place during periods of high water.
- Reduce flood damage and sedimentation by slowing runoff and capturing the sediment that would otherwise be carried downstream.
- Help keep water cool and reduce light exposure in summer by shading the stream.
- Improve water quality by capturing sediment, nutrients, pesticides, pathogens, and other pollutants before they reach the stream.
- Enhance summer stream flow by improving water infiltration and storage.
- Create fish and wildlife habitat.
- Limit livestock manure inputs to the creek and riparian areas.

Ecology has a three-step riparian restoration strategy, which allows the department to efficiently apply resources to priority problem areas. The first step is to address the source of degradation-unlimited livestock access to streams and winter feeding operations in close proximity to the riparian corridor. Ecology relies primarily on livestock exclusion, and off-stream water supply to eliminate livestock access to the riparian area. In implementing this BMP, Ecology uses our 319 and centennial clean water grant guidelines, which require a minimum 75, 50 or 35-foot buffer between the livestock fence and the mean ordinary high water mark of the nearest stream bank depending on the type of stream. In many cases, the buffer width may be larger depending on the stream and site conditions.

By first addressing livestock access, Ecology seeks to abate the primary pollution sources—livestock in the stream, eroded stream banks, increased runoff, increased sedimentation, and subsequent transport of fecal matter. As vegetation naturally returns in the riparian area, site conditions become stabilized and the pollution sources are dramatically reduced. Also, this approach works to arrest morphological changes to the entire stream that are induced by erosion and sedimentation.

Ecology has spent much of its efforts and resources implementing this first step, in large part, because we have taken a holistic, watershed approach to protecting streams. By first addressing the primary sources of pollution and geomorphic change, Ecology can establish the necessary site conditions for successful restoration. Moreover, Ecology ensures that, first and foremost, the root problems are addressed for *the entire stream*, before resources are focused on site or segment specific restoration.

The second step occurs after a majority of site conditions have been stabilized, and the stream's entire geomorphic integrity is no longer jeopardized by the adjacent management practices. Ecology then conducts a reach by reach assessment to determine the appropriate trees and shrubs to be used for restoration. In some cases, federal programs require

revegetation as part of the cost-share program, and so restoration work occurs simultaneously with livestock exclusion.

The third step is to work with local land owners to promote continuous and proper management of upland grazing lands.

In addition to the Livestock and Water Quality Program, Ecology's Eastern Regional Office has established a similar collaborative approach to address crop production-related problems. Ecology encourages implementation of a wide variety of best management practices, however, a primary focus of effort has been establishing minimum land use setbacks, restoring degraded riparian corridors, and converting conventionally farmed land to conservation tillage practices.

Ecology teams with conservation districts, local governments, and landowners to provide technical assistance and funding for implementation of best management practices.

Ecology uses our regulatory authority as a backstop when collaborative efforts fail. The Water Pollution Control Act (RCW 90.48) gives Ecology the authority to take enforcement actions against nonpoint polluters.

RCW 90.48 makes it unlawful for any person to "cause, permit or suffer to be thrown, run, drained, allowed to seep or otherwise discharged … any organic or inorganic matter that shall cause or tend to cause pollution of" waters of the state. Any person who violates or creates a substantial potential to violate the provisions of Chapter 90.48 RCW is subject to an enforcement order from Ecology pursuant to RCW 90.48.120. Ecology is authorized to "issue such order or directive as it deems appropriate under the circumstances[.]" In addition to administrative orders, violating Chapter 90.48 RCW may result in injunctions, civil penalties, and notices of violations.

It is worth noting that RCW 90.48.120 gives Ecology the authority to take action in response to nonpoint source pollution, the statute also gives Ecology the authority to take action based on a "substantial potential" to pollute state waters via either a point or nonpoint pollution source. Consequently, Ecology not only has authority to take action following a NPS pollution occurrence (i.e. there was a discharge), but has specific statutory authority to act proactively to prevent NPS pollution from occurring in the first place. Ecology's authority includes the authority to require a nonpoint source polluter to implement specific best management practices (BMPs). Ecology's authority can be used to prevent nonpoint pollution and require BMPs, as necessary.

Ecology has used this regulatory backstop several times since 2016.

The result of these partnerships has been the implementation of best management practices at hundreds of sites across several watersheds where water quality and fish habitat issues exist.

By using a collaborative strategy, backed up by enforcement when necessary, Ecology has been able to create relationships and build trust with rural residents while improving water quality.

In the upper Alpowa Creek watershed, work with landowners began in 2003. Thirteen miles of riparian buffers were installed. The creek was fenced to protect it from livestock, and off-stream water sources were developed. Thousands of native trees and shrubs were planted in the stream corridor to help stabilize banks and shade the stream. These buffers were constructed using Natural Resource Conservation Service standards, which require a minimum width of 35 feet. Many of these buffers were wider than the minimum. For buffers installed with state or federal financial assistance, we require an agreement with the landowner stipulating that the buffer and fence will be maintained for at least 10 years. Ecology has also planted additional native trees and shrubs in the riparian area of the creek in cooperation with the Public Utility district.

Fencing was generally installed adjacent to or upstream of the impaired segments. However, we have also fenced portions of the stream where there are presently no Category 5 listings, but where there was unrestricted cattle access to the stream. Riparian buffers are left to revegetate naturally in those areas in which there is enough live native vegetation left to recover. In all other areas we are installing buffers by planting native plants.

More recently, in the last five years the Pomeroy CD in collaboration with the Palouse CD have utilized salmon recovery funds to establish over 484 Post Assisted Log Structures on Alpowa Creek resulting in increased pooling and floodplain storage to improve temperature and sedimentation concerns on over three miles of Alpowa Creek. To date, several thousand acres of cropland have been converted to direct seed or conservation tillage practices throughout the watershed.

Ecology's Eastern Regional Office is expanding its implementation work to the entire watershed instead of focusing on just upper Alpowa Creek. As of 2018, a significant portion of the upper Watershed had riparian buffers that have been established through use of funds from the Conservation Reserve Enhancement Program, but some of that has since been removed and grazed which will continue to receive focus in the coming years.

Ecology's recent watershed evaluations in 2020 resulted in the program identifying an additional four sites with active water quality concerns. Once prioritization was completed two landowners were sent technical and financial assistance letters from Ecology, and are currently in communication to draft a plan with the Pomeroy CD to protect water quality. These efforts will continue in 2021 to identify and document ongoing sites of concern to further implement new projects in the watershed.

Since the riparian buffers were installed, native vegetation is returning, and water quality monitoring data indicate that the stream is now meeting the state fecal coliform standard during most months. In addition, many landowners have been pleasantly surprised with the on-

the-ground results. While they point out that water quality and fish habitat projects create some new management challenges, they have also observed some exciting economic benefits to their operations. By providing off-stream water in strategic locations, livestock are now better dispersed throughout their range. This has resulted in healthier grasses and better forage. In turn, animals are typically more robust and healthy, and the amount of supplemental feed needed during the year is reduced.

As the amount of fecal coliform delivered to the stream is reduced with healthy riparian corridors providing shade, we expect minimum dissolved oxygen concentrations and pH levels to meet water quality criteria.

Description of requirements under which pollution controls will be implemented.

It is Ecology's best professional judgement that the pollution controls which have been installed will result in the water quality standards being met. Maintenance of these controls has been ensured through 10-year landowner agreements that were established as part of the funding agreements for these projects. Additionally, Ecology staff will continue to perform watershed evaluations in this watershed to ensure that BMPs stay in place.

Estimate or Projection of Time When Water Quality Standards Will be Met

It will take time for the riparian corridor to fully recover and for the stream to re-establish its natural geometry. Ecology estimates that the riparian buffers will have grown enough to be fully effective in 10-15 years. With continued project implementation in the upper Alpowa Creek, increased focus in the watershed will help to meet the standards for fecal coliform, dissolved oxygen and pH by 2030. Standards in the lower watershed and the temperature standards for the entire watershed should be met by 2035.

Schedule for Implementing Pollution Controls

As described earlier in this report, Ecology has worked with the conservation district, local governments, and landowners to implement a variety of best management practices in the upper Alpowa Creek watershed. It is our best professional judgment that this work will remedy the pollution problems in the impaired segments. Because it is our intention to restore the entire watershed and to prevent future pollution problems, we will be using monitoring data to track water quality improvements and to identify any new problem areas so they can be addressed. It will be an on-going process to get water bodies into compliance and to keep them in compliance.

Some work remains to be completed in the watershed. Landowners will now focus project implementation in the small tributaries to Alpowa Creek, where livestock still have uncontrolled access. Ecology's Livestock and Water Quality Program will continue to have an on-going

presence in the watershed, and will continue working to achieve compliance with state water quality standards.

We will use monitoring data and evidence of additional work completed in this watershed to determine whether these listings will stay in Category 4b in the next Water Quality Assessment.

Monitoring Plan to Track Effectiveness of Pollution Controls

Monitoring results will be used to establish whether these projects are improving water quality and overall stream health. Monitoring data can also help to identify additional problem areas that should be addressed. Monitoring results will be reported to the public and EPA through Ecology's IR report development process. Ecology is planning on moving forward with an effectiveness monitoring study to cover all the region's 4b starting in 2022.

Commitment to Revise Pollution Controls as Necessary

Ecology will maintain a presence in the Alpowa Creek watershed to ensure that water quality continues to improve. We fully expect the Eastern Regional Office livestock program to achieve compliance with water quality standards. However, if it does not, Ecology will work with the conservation district, local governments, and landowners to determine other controls that could be used to achieve compliance.

4b Analysis for Asotin Creek
December 2020

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude 17 temperature listings from the 303(d) list and place these water bodies in category 4b of the IR. The specific listings are:

- temperature—13851, 13852, 13854, 13858, 13860, 13862, 13863, 13985, 13986, 20352, 20354, 22425, 22426, 22427, 22429, 22430, 29321

Ecology's basis for excluding these water bodies from the 303(d) list is outlined in this analysis.

Identification of Segment and Statement of Problem Causing Impairment

The Asotin Creek watershed is located in the southeast corner of Washington State. The majority of the watershed occurs within Asotin County. Some headwater streams get their start in Garfield County. Asotin Creek drains approximately 208,000 acres. The creek originates in the mixed conifer forests of the Blue Mountains. It cuts through layers of basalt rock and flows through narrow canyons before empting into the Snake River at the town of Asotin, Washington.

The name "Asotin" is derived from the Nez Perce word, Heesut'iin, "Eel Creek" (Hitchman 1985). The Asotin Creek watershed was the center of a fishing village for collecting Pacific lamprey (*Entosphenus tridentatus*), now rarely found in the creek. The watershed is still home to threatened species of fish including Snake River Steelhead as well as Bull Trout and Spring Chinook Salmon.

Asotin Creek has several tributaries, the largest is George Creek. Asotin creek is divided between the North and South Forks in the upper watershed. Other tributaries include Charley Creek, and Lick Creek. The George Creek watershed is approximately 89,000 acres and its major tributaries include Pintler Creek, Kelly Creek, and Rockpile Creek.

The geology of Asotin Creek region is of interest given it results in specific land-use patterns. The watershed consists of layers of basaltic rocks, formed by multiple ancient lava flows. The bedrock has been covered by fine-grained soils that are highly erodible. Folding of the underlying bedrock has resulted in a plateau increased in elevation and tilted to the north and east. The uplifting of the bedrock has caused streams to cut down and form steep and narrow v-shaped canyons.

The Asotin Creek watershed climate varies dramatically between the upper and lower portions of the watershed. Rainfall ranges from more than 45 inches in the higher elevations of the Blue Mountains to 12 inches near the confluence with the Snake River. This substantial variation occurs over approximately 20 miles, a relatively short distance. Ninety percent of the

precipitation occurs between September and May with thirty percent of the winter's precipitation falling as snow. Snowfall at elevations less than 1,500 feet seldom lingers beyond three or four weeks, occasionally melting quickly enough to produce severe erosion.

Because of the differences in precipitation and elevation, vegetation also varies greatly in the watershed. Upland vegetation is dominated by mixed conifer forests in the upper watershed. The arid region near the Snake River is a shrub-steppe ecosystem dominated by sage and bunch grass. The stream corridor vegetation occurs in varying successional stages and consists mainly of alder and black cottonwood stands with mixed understory of shrubs. Ponderosa Pine is a dominant evergreen in much of the watershed. In the lower watershed, it typically occurs only in the transition zone between the riparian and upland areas. In the forested areas of the Blue Mountains, it is found throughout the uplands.

Multiple planning efforts have been completed in the Asotin Creek watershed. Most of these have been focused on salmon and steelhead recovery. The plans that have resulted all recognize stream temperature as a critical component of salmonid habitat and identify specific actions necessary to address temperature problems in the watershed. The Asotin Creek Model Watershed Plan proposed three implementation strategies to address the temperature problem:

- Streambank & Shoreline Protection
- Stream Channel Vegetation
- Fencing (Riparian)

The Bonneville Power Administration Sub-Basin Plan's strategies included management practices such as:

- Installing riparian buffers including livestock exclusion and planting
- Upholding existing land-use regulations
- Implementing conservation easements
- Decommissioning/paving roads

The Snake River Salmon Recovery plan identified riparian buffers and planting as primary tools to address temperature problems. The Middle Snake (WRIA 35) Watershed Plan identified stream temperature as a water quality problem and revegetation of stream corridors as a strategy to address it.

Much of the riparian vegetation in the Asotin Creek watershed is healthy compared to many eastern Washington watersheds. This is due to the rural location of the stream, the canyon geography that has prevented crop production along its banks, the public ownership of a significant portion of riparian area, and the extensive work by landowners to improve the riparian condition over the last several years.

However, there are five primary land-uses that cause nonpoint pollution and temperature problems in the Asotin watershed. Ecology's land use evaluation of the watershed has resulted in ranking the impacts causing the violations of temperature standards.

1) Livestock Feeding
2) Livestock Grazing
3) Urbanization
4) Forestry
5) Crop Production

Livestock Feeding—Winter feeding is a major source of impacts to riparian areas and vegetation on private lands. While many of the feeding areas have been fenced from surface water, much of that fence is too close to the creek to adequately protect surface water. Winter feeding areas continue to damage woody vegetation and prevent sapling recruitment and regeneration.

Livestock Grazing—Grazing activities also impact riparian vegetation, particularly in the upper portions of the watershed. Areas along the streams not ideal for winter feeding are often grazed from spring to fall. This includes some of the private forested areas.

Urbanization—Areas near Asotin are also likely contribute to temperature problems in the creek. Although the area is relatively small compared to the other land uses, the impacts to riparian vegetation are significant. Some homeowners have removed trees and shrubs and have lawns or pasture down to the water's edge. There are properties that own horses on small lots which access surface water and damage riparian vegetation. The city park and the Asotin Elementary school sports fields lack sufficient riparian vegetation.

Forestry—Historic timber harvesting on both public and private lands has removed many of the trees from the riparian zone. This has been particularly true on the Forest Service managed lands. Much of the shade in the upper watershed was lost due to historic logging activities. But, in recent years little logging has occurred in the riparian areas of the watershed. There has also been significant natural vegetation recovery and planting within the Umatilla National Forest.

Crop Production—Only a small portion of the riparian areas in the Asotin watershed are impacted by wheat and barley production. Most areas impacted by crop production occur in the upper Pintler Creek watershed where the streams are intermittent or ephemeral. In those areas, it is common for farming to occur up to streambanks or even through the stream channel.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

Water quality target

In the Asotin Creek watershed, the water quality standards designate the following aquatic life beneficial uses:

Char spawning and rearing: This use protects spawning or early juvenile rearing by native char, or use by other species similarly dependent on such cold water. This use also protects summer foraging and migration of native char; and spawning, rearing, and migration by other salmonid species.

Core summer salmonid habitat: This use protects summer season, defined as June 15 through September 15, salmonid spawning or emergence, or adult holding; summer rearing habitat by one or more salmonids; or foraging by adult and sub-adult native char. Other protected uses include spawning outside of the summer season, rearing, and migration by salmonids.

Salmonid spawning, rearing, and migration: This use protects salmon or trout spawning and emergence that only occur outside of the summer season (September 16 – June 14). Other uses include rearing and migration by salmonids.

In some waters, special considerations have been included because they are necessary to protect spawning and incubation of char and salmonid species. Supplemental spawning/incubation criteria have been established for specified time periods to protect these special uses. Based on the beneficial uses, a numeric temperature criteria standard is established.

Controls that will achieve water quality standards

Asotin Creek is a relatively small stream. The bankfull width of the Asotin mainstem is approximately 13 meters (37 feet). The bankfull widths of lower reaches of the North Fork Asotin Creek, the South Fork Asotin Creek, and George Creek vary, but are generally half that width (Stuart, 2012). As would be expected, stream width diminishes significantly in the upper portions of the watershed. Buffer widths must be adequate to shade the stream and protect against other factors influencing temperature.

In order to meet water quality standards, Ecology will work with partners to create 75-foot-wide well-vegetated buffers on both sides of the stream (150 feet total) within the Asotin watershed for all areas used for livestock feeding, livestock grazing, and crop production. Ecology will focus on perennial reaches where stream flow occurs during the critical temperature period (late spring – early fall). Areas of the upper watershed where streams are intermittent or ephemeral are important for other water quality parameters but will be a lower priority. They will be planted and/or fenced as additional funding allows.

Ecology will implement an additional set of BMPs for properties with livestock. These BMPs use the construction specifications of the Natural Resource Conservation Service Field Office Technical Guide (FOTG). They are:

Livestock Exclusion Fence—A constructed barrier to animals that protects the riparian buffer. The fencing materials and the type and design of fence installed shall be of a high quality and

durability. The type and design of fence installed must meet the management objective of excluding cattle from the riparian area. (FOTG Practice Code 382)

Watering Facility—A device to provide an adequate amount and quality of drinking water for livestock. Stock tanks should be installed as far from surface water as possible to protect against contamination of surface water via run-off or ground water connections. (FOTG Practice Code 361)

Stream Crossing—A stabilized area or structure constructed across a stream to provide a travel way for livestock. Stream crossings should be located in areas where the streambed is stable or where grade control can be provided to create a stable condition. (FOTG Practice Code 578)

For forest lands, the Washington State Forest Practices Rules (WAC 222-30) were developed with the expectation that the stream buffers and harvest management prescriptions were stringent enough to meet state water quality standards for temperature. These rules apply to all timber harvest on private lands within Washington. The program has some deficiencies, but provides a framework for bringing the forest practices rules and activities into full compliance with the water quality standards. Some additional discussions with the Department of Natural Resources (DNR) will occur to ensure water quality in Asotin Creek is adequately protected.

Currently, a no-cut buffer is required for fish bearing streams by the Forest Practices Rules. The rules establish a core zone of 30 feet from the stream where no harvest or construction is allowed. An additional 45-foot zone is also protected and no harvest is allowed except when:

- The basal area in the inner zone is greater than 110 square feet per acre and greater than 6 inches diameter. The harvest must leave at least 50 trees per acre including trees that shade the water.
- Thinning, and there are more than 100 trees per acre and the basal area is less than 60 square feet per acre. Still, 100 of the largest trees per acre must be left, including those that shade the stream.

Within the Umatilla National Forest, the Forest Service requires protected areas of 150 or 300 feet for perennial streams depending on the presence or absence of fish, but with exceptions. In addition, they require at least a 50 foot no-cut zone for non-fish-bearing intermittent streams. Some areas in the Umatilla National Forest will require additional planting based on historic harvest practices or natural events. Ecology will work with the Umatilla National Forest to ensure at least 75 feet of protection is required on all fish-bearing streams. In addition, some forest areas are subject to seasonal grazing. In these areas, a minimum of 35 feet of riparian corridor will be fenced to protect understory vegetation and prevent polluted run-off.

In the urbanized portion of the watershed, there are small areas 75-100ft vegetated buffers are not practical. This exception occurs primarily in lower Asotin Creek. Major roads or home locations do not allow for wider buffers. In these locations, Ecology will work to create 35 foot

minimum vegetated buffers. Small buffers will be installed in a very small portion of the watershed (less than 2%) and should not affect the ability to meet water quality standards.

A significant amount of riparian planting has been completed in the Asotin watershed. Since 1998, more than 200,000 trees and shrubs have been planted, although more implementation is needed to achieve compliance with Washington's temperature standards.

Best management practice (BMP) implementation can be broken into two broad categories, riparian protection fencing and riparian planting. When fencing is installed to protect the riparian area from livestock, associated BMP, such as off-stream watering and stream crossings may also be necessary. In many cases, stream reaches will need both kinds of implementation. There are also stream reaches in the watershed where no livestock are present but additional planting is needed to adequately shade the stream.

In the last five years, an additional six miles of Asotin Creek was protected, with another five miles of buffer enhanced with plantings of over 13,000 trees in the riparian area. This watershed can be increasingly complex to establish robust buffers due to its arid and rocky conditions. The Asotin County CD continues to focus efforts on enhancement and maintenance in the watershed. Ecology has partnered with the CD on an active grant in the watershed to promote overbank flow and floodplain connection to improve temperature and sedimentation concerns. This has resulted in installing 116 Beaver Dam Analogs (BDAs) throughout the watershed. The CD has recently submitted an FY22 state 319 water quality grant application to Ecology, which if funded will provide funding to protect and enhance an additional 40,000 stream feet and 20,000 trees to Asotin County watersheds, including Tenmile Creek. This grant would also provide enhanced technical assistance in the watershed to continue to see increased participation in water quality improvement projects.

In addition, farmers in the watershed are adopting direct seed technology, which is the practice of seeding a new crop into the standing stubble of a recently harvested crop without the traditional tillage of the ground. By doing so, soil erosion can be reduced by as much as 95 percent. This significantly reduces the volume of sediment washing into Tenmile Creek. All of these efforts will help address the temperature impairments. In recent years, the Asotin County CD has assisted in converting an additional 3400 acres to direct seed or conservation tillage in the watershed.

Ecology's Livestock and Water Quality Program has focused efforts back into Asotin Creek with recent watershed evaluations in 2020. As a result, the program identified an additional three sites with active water quality concerns. Once prioritization was completed one landowner was sent a technical and financial assistance letter from Ecology, and is currently in communication to draft a plan with the Asotin County CD which was included in their recent FY22 state 319 water quality grant application. These efforts will continue in 2021 to identify and document ongoing sites of concern to further implement new projects in the watershed.

Ecology uses our regulatory authority as a backstop when collaborative efforts fail. The Water Pollution Control Act (RCW 90.48) gives Ecology the authority to take enforcement actions against nonpoint polluters.

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Ecology has used this regulatory backstop several times since 2016.

Estimate or Projection of Time When Water Quality Standards Will be Met

It will take time for the riparian corridor to fully recover and for the stream to re-establish its natural geometry. Ecology estimates that the riparian buffers will have grown enough to be fully effective in 10-15 years. While Asotin Creek continues to see projects implemented, increased focus in the watershed will help to meet the temperature standard throughout the entire watershed by 2025.

Schedule for Implementing Pollution Controls

As described earlier in this report, Ecology has worked with the conservation district, local governments, and landowners to implement a variety of best management practices in the Asotin Creek watershed, and landowners are continuing to implement best management practices that protect the stream corridor and improve water quality. It is our best professional judgment that this work will remedy the pollution problems in the impaired segments. Because it is our intention to restore the entire watershed and to prevent future pollution problems, we will be using monitoring data to track water quality improvements and to identify any new

problem areas so they can be addressed. It will be an on-going process to get water bodies into compliance and to keep them in compliance.

Ecology's Livestock and Water Quality Program will continue to have an on-going presence in the watershed, and will continue working to achieve compliance with state water quality standards.

Monitoring Plan to Track effectiveness of Pollution Controls

Monitoring results will be used to establish whether these projects are improving water quality and overall stream health. Monitoring data can also help to identify additional problem areas that should be addressed. Monitoring results will be reported to the public and EPA through Ecology's IR report development process.

It takes time to implement riparian fencing and planting projects and time for planted vegetation to grow. Therefore, it is not necessary to monitor every year. At the same time, it is important to monitor frequently to capture water quality improvements over time as well as account for the annual variability that can result from different weather patterns. Ecology will use a two-year-on and two-year-off monitoring schedule to evaluate the effectiveness of this plan.

Commitment to Revise Pollution Controls as Necessary

Ecology will maintain a presence in the Asotin Creek watershed to ensure that water quality continues to improve. We fully expect the BMPs being implemented will achieve compliance with water quality standards. However, if they do not, Ecology will work with its local partners to determine other controls that could be used to achieve compliance.

4b Analysis for Couse Creek
December 2020

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude two listings from the 303(d) list and place these segments into category 4b. The specific listings are:

- Temperature—29318 and 29320

These water bodies were listed in category 4b of the 2012 IR. Ecology's basis for excluding these waterbodies from the 303(d) list is outlined in this evaluation.

Identification of Segment and Statement of Problem Causing Impairment

Couse Creek is located in Asotin County in southeastern Washington. The creek cuts through a deep canyon on its way to the Snake River. The plateaus above Couse Creek are farmed for wheat and barley, and the canyon is used for range and feeding livestock. Threatened Snake River Steelhead trout still return to Couse Creek each autumn.

Prior to 2001, livestock in the watershed had uncontrolled access to the creek, and were fed at several easy to reach locations along the stream. The riparian corridor was degraded. Trampling and overgrazing had damaged or removed many of the trees and shrubs along the stream corridor. This degraded riparian area could not provide shade to the stream, resulting in high water temperatures.

This is a sparsely populated area. There are no towns in the watershed and no point sources of pollution.

Monitoring data for these two segments was collected by the Washington Department of Fish and Wildlife, and covers the years 2000 through 2002. For segment 29318, data show that the highest daily temperature occurred in 2001. For that year, the 7-day mean of maximum daily temperature was 21.1 degrees Centigrade, and the maximum daily temperature was 23.4 degrees Centigrade from continuous measurements. For segment 29320, the highest temperatures occurred in 2000. For that year, the 7-day mean of maximum daily temperature was 23.3 degrees Centigrade, with a maximum daily temperature of 24.8 degrees Centigrade from continuous measurements.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

Water quality target

The designated uses for the two impaired segments are spawning, rearing and migration, and the temperature criterion is 17.5 degrees Centigrade. In addition, the segments have a supplemental spawning criterion of 13 degrees Centigrade from February 15 to June 1.

Controls that will achieve water quality standards

The Department of Ecology's Eastern Regional Office has established a Livestock and Water Quality Program that uses a unique collaborative approach to address livestock-related problems. Instead of using the standard process that starts with a Category 5 listing, establishing a TMDL for the stream, writing an implementation plan, and finally getting to actual implementation, this strategy goes straight to implementation. The strategy is applied in watersheds in which the cause of a water quality impairment is clear.

Ecology encourages implementation of a wide variety of best management practices, however, a primary focus of the program has been to restore degraded riparian corridors and eliminate unlimited animal access to streams. Healthy riparian areas can improve water quality and stream health in multiple ways, which make them a particularly valuable and cost-effective management practice. Healthy riparian areas

- Slow bank erosion by holding soil in place during periods of high water.
- Reduce flood damage and sedimentation by slowing runoff and capturing the sediment that would otherwise be carried downstream.
- Help keep water cool in summer by shading the stream.
- Improve water quality by capturing sediment, nutrients, pesticides, pathogens, and other pollutants before they reach the stream.
- Enhance summer stream flow by improving water infiltration and storage.
- Create fish and wildlife habitat.
- Limit livestock manure inputs to the creek and riparian areas.

Ecology has a three-step riparian restoration strategy, which allows the department to efficiently apply resources to priority problem areas. The first step is to address the source of degradation unlimited livestock access to streams and winter feeding operations in close proximity to the riparian corridor. Ecology relies primarily on livestock exclusion, and off-stream water supply to restrict livestock access to the riparian area. In implementing this BMP, Ecology uses our 319 and centennial clean water grant guidelines, which require a minimum 75, 50 or 35 foot buffer between the livestock fence and the mean ordinary high water mark of the nearest stream bank depending on the type of stream. In many cases, the buffer width may be larger depending on the stream and site conditions.

By first addressing livestock access, Ecology seeks to abate the primary pollution sources—livestock in the stream, eroded stream banks, increased runoff, increased sedimentation, and

subsequent transport of fecal matter. As vegetation naturally returns in the riparian area, site conditions become stabilized and the pollution sources are dramatically reduced. Also, this approach works to arrest morphological changes to the entire stream that are induced by erosion and sedimentation.

Ecology has spent much of its efforts and resources implementing this first step, in large part, because we have taken a holistic, watershed approach to protecting streams. By first addressing the primary sources of pollution and geomorphic change, Ecology can establish the necessary site conditions for successful restoration. Moreover, Ecology ensures that, first and foremost, the root problems are addressed for *the entire stream*, before resources are focused on site or segment specific restoration.

The second step occurs after a majority of site conditions have been stabilized, and the stream's entire geomorphic integrity is no longer jeopardized by the adjacent management practices. Ecology then conducts a reach by reach assessment to determine the appropriate trees and shrubs to be used for restoration. In some cases federal programs require revegetation as part of the cost-share program, and so restoration work occurs simultaneously with livestock exclusion.

The third step is to work with local land owners to promote continuous and proper management of upland grazing lands.

In addition to the Livestock and Water Quality Program, Ecology's Eastern Regional Office has established a similar collaborative approach to address crop production-related problems. Ecology encourages implementation of a wide variety of best management practices, however, a primary focus of effort has been establishing minimum land use setbacks, restoring degraded riparian corridors, and converting conventionally farmed land to conservation tillage practices.

Ecology teams with conservation districts, local governments, and landowners to provide technical assistance and funding for implementation of best management practices. Ecology uses our regulatory authority as a backstop when collaborative efforts fail. The Water Pollution Control Act (RCW 90.48) gives Ecology the authority to take enforcement actions against nonpoint polluters.

RCW 90.48 makes it unlawful for any person to "cause, permit or suffer to be thrown, run, drained, allowed to seep or otherwise discharged … any organic or inorganic matter that shall cause or tend to cause pollution of" waters of the state. Any person who violates or creates a substantial potential to violate the provisions of Chapter 90.48 RCW is subject to an enforcement order from Ecology pursuant to RCW 90.48.120. Ecology is authorized to "issue such order or directive as it deems appropriate under the circumstances[.]" In addition to administrative orders, violating Chapter 90.48 RCW may result in injunctions, civil penalties, and notices of violations.

It is worth noting that RCW 90.48.120 gives Ecology the authority to take action in response to nonpoint source pollution, the statute also gives Ecology the authority to take action based on a "substantial potential" to pollute state waters via either a point or nonpoint pollution source. Consequently, Ecology not only has authority to take action following a NPS pollution occurrence (i.e. there was a discharge), but has specific statutory authority to act proactively to prevent NPS pollution from occurring in the first place. Ecology's authority includes the authority to require a nonpoint source polluter to implement specific best management practices (BMPs). Ecology's authority can be used to prevent nonpoint pollution and require BMPs, as necessary.

Ecology has used this regulatory backstop several times since 2016.

The result of these partnerships has been the implementation of best management practices at hundreds of sites across several watersheds where water quality and fish habitat issues exist. By using a collaborative strategy, backed up by enforcement when necessary, Ecology has been able to create relationships and build trust with rural residents while improving water quality.

In the Couse Creek watershed, work with landowners began in 2002. Eight miles of riparian buffers were installed. The creek was fenced to protect it from livestock, and off-stream water was provided at several key points. Thousands of native trees and shrubs were planted in the stream corridor. Buffers are constructed using Natural Resource Conservation Service standards, which require a minimum width of 35 feet. For buffers installed with state or federal financial assistance, we require an agreement with the landowner stipulating that the buffer and fence will be maintained for at least 10 years.

In addition, farmers in the watershed are adopting direct seed technology, which is the practice of seeding a new crop into the standing stubble of a recently harvested crop without the traditional tillage of the ground. By doing so, soil erosion can be reduced by as much as 95 percent. This significantly reduces the volume of sediment washing into Couse Creek. All of these efforts will help address the temperature impairments. In the last few years, the Asotin County CD has assisted in converting an additional 652 acres to direct seed or conservation tillage in the watershed.

All of these efforts will help address the temperature impairments. Initial cattle exclusion fencing was generally installed adjacent to or upstream of the impaired segments. However, we have also fenced portions of the stream and tributaries where there are presently no Category 5 listings, but where there was unrestricted cattle access to the stream.

Riparian buffers are left to revegetate naturally in those areas in which there is enough live native vegetation left to recover. In all other areas we are installing buffers by planting native plants. We expect the planting to continue for a few seasons to ensure all buffers are adequate and healthy. As of 2006, all cattle in the watershed have been fenced out of the stream.

In the last five years, an additional thirteen miles of riparian buffer was enhanced with plantings of over 9,000 trees in the riparian area. This watershed can be increasingly complex to establish robust buffers due to its arid and rocky conditions. The Asotin County CD continues to focus efforts on enhancement and maintenance in the watershed. Ecology has partnered with the CD on an active grant in the watershed to promote overbank flow and floodplain connection to improve temperature and sedimentation concerns. This has resulted in installing 46 Beaver Dam Analogs (BDAs) throughout the watershed. The CD has recently submitted an FY22 state 319 water quality grant application to Ecology, which if funded will provide funding to protect and enhance an additional 40,000 stream feet and 20,000 trees to Asotin County watersheds, including Couse Creek.

The Couse Creek watershed continues to recover. Since 2006, many riparian areas have been placed into the Conservation Reserve Enhancement Program, which requires maintenance of riparian plantings. Ecology has completed additional planting to increase riparian vegetation. In addition, Ecology has been encouraging landowners to implement direct seed technology through the use of state Centennial and federal 319 grant funds; and Bonneville Power Administration Direct Seed Cost-share.

Changes to the watershed are obvious. Trees and shrubs are now growing in the riparian area, and the channel is more defined and stable, with more consistent surface flow. There are Steelhead trout in the creek. Landowners are noticing the changes, too. One Couse Creek landowner told Ecology, “Since we implemented these projects we have stands of grass I have never seen before. The stream corridor looks healthier than it did three years ago.”

Description of requirements under which pollution controls will be implemented

It is Ecology’s best professional judgment that the pollution controls that have been installed will result in the water quality standards being met. Maintenance of these controls has been ensured through 10-year landowner agreements that were established as part of the funding agreements for these projects. Additionally, Ecology staff will continue to perform watershed evaluations in this watershed to ensure that BMPs stay in place.

Estimate or Projection of Time When Water Quality Standards Will be Met

It will take time for the riparian corridor to fully recover and for the stream to re-establish its natural geometry. Ecology estimates that the riparian buffers will have grown enough to be fully effective in 10-15 years. While Couse Creek continues to see projects implemented, increased focus in the watershed will help to meet the temperature standard throughout the entire watershed by 2025.

Schedule for Implementing Pollution Controls

As described earlier in this report, Ecology has worked with the conservation district, local governments, and landowners to implement a variety of best management practices in the Couse Creek watershed. It is our best professional judgment that this work will remedy the pollution problems in the impaired segments. Because it is our intention to restore the entire watershed and to prevent future pollution problems, we will be using monitoring data to track water quality improvements and to identify any new problem areas so they can be addressed. It will be an on-going process to get water bodies into compliance and to keep them in compliance.

Ecology's Livestock and Water Quality Program will continue to have an on-going presence in the watershed, and will continue working to achieve compliance with state water quality standards.

Monitoring Plan to Track Effectiveness of Pollution Controls

Monitoring results will be used to establish whether these projects are improving water quality and overall stream health. Monitoring data can also help to identify additional problem areas that should be addressed. Monitoring results will be reported to the public and EPA through Ecology's IR report development process. Ecology is planning on moving forward with an effectiveness monitoring study to cover all the region's 4b starting in 2022.

Commitment to Revise Pollution Controls as Necessary

Ecology will maintain a presence in the Couse Creek watershed to ensure that water quality continues to improve. We fully expect the Eastern Regional Office livestock and water quality program to achieve compliance with water quality standards. However, if it does not, Ecology will work with the conservation district, local governments, and landowners to determine other controls that could be used to achieve compliance.

4b Analysis for Deadman and Meadow Creeks December 2020

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude the following listings in Deadman and Meadow Creeks from the 303(d) list and place these segments into category 4b of the IR:

- seven listings (18827, 18828, 18829, 18830, 18831, 18832, and 40534) for temperature
- six listings (40553, 40554, 40555, 45999, 46000, and 72286) for bacteria
- three listings (47172, 47173, and 47174) for dissolved oxygen
- four listings (50438, 50473, 50474, 50475) for pH

These segments were in various categories of the 2012 IR. Listings 18827, 18828, 40534, 40554, and 40555 were in category 4b. Listings 18829, 40553, 40555, 50438, 50475, 18830, 18831, 46000, 47172, 47173, 50473, and 50475 were in category 5. Listing 18832 was in category 1. Listing 45999 was in category 2. Listing 72286 was in category 3.

Ecology's basis for excluding these waterbodies from the 303(d) list is outlined in this evaluation.

Identification of Segment and Statement of Problem Causing Impairment

Deadman and Meadow Creek are located in Garfield County in southeastern Washington. Both flow roughly east to west through rolling hills before their confluences meet at the Snake River. This is arid country, with rainfall in some areas averaging as little as 11 inches annually.

Historically, the surrounding hills were covered in bunchgrass and sage, and the meandering creek provided habitat for Steelhead trout. Approximately half the watershed today is used for non-irrigated crops such as wheat and barley, primarily in the high areas of the watershed. The other half, primarily the bottomlands near streams, provides range for livestock. From November through March, cattle are typically fed along the valley floor, which serves as a refuge from the region's harsh winter weather.

This is a sparsely populated area. There are no towns in the watershed and no point sources of pollution. The few farmhouses are widely dispersed in the watershed, and there is no evidence that septic systems are contributing pollution to streams.

Data for all pollutants and segments was collected by Washington State University (WSU) and the Washington Department of Fish and Wildlife (WDFW) between 2000 and 2007. WSU's data showed excursions above the criteria for both temperature and fecal coliform. Data collected by the Washington Department of Fish and Wildlife shows that the highest daily temperatures occurred in 2001. For segment 18827, data show a 7-day mean of maximum daily temperature of 24.3 degrees Centigrade, with a maximum daily temperature of 25.6 degrees Centigrade

from continuous measurements. For segment 18828, data show a 7-day mean of maximum daily temperature of 20.7 degrees Centigrade, with a maximum daily temperature of 21.8 degrees Centigrade from continuous measurements. Dissolved oxygen data show consistent excursions below the criteria. pH data show both high and low pH excursions.

The impairments are the result of a combination of factors. Winter feeding and uncontrolled livestock access to the stream had eliminated much of the vegetation within the stream corridor. This degraded riparian area could not provide shade to the stream, resulting in high water temperatures. It also allowed manure to run directly into streams. In addition, the uncontrolled stream access allowed cattle to deposit manure directly into the water and to trample stream banks. The creek was shallow, wide, and muddy in many areas due to cattle trampling, and provided little habitat for Steelhead trout.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

Water Quality Target

The designated uses for the temperature impaired segments are spawning, rearing and migration, and the temperature criterion is 17.5 degrees Centigrade, year-round. Segments 18827 and 18829 also have a supplemental spawning criterion of 13 degrees Centigrade from February 15 to June 1.

The designated use for the bacteria impaired segments is primary contact recreation. Ecology now uses Escherichia coli (E. Coli) as the criteria in this watershed. E. Coli levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or a single sample when less than ten sample points exist) exceeding 320 CFU or MPN per 100 mL.

For the dissolved oxygen impaired segments, the standards require that the lowest one-day minimum be no lower than 8.0 mg/L.

For the pH impaired segments, the standard requires the pH to be within the range of 6.5 to 8.5, with a human-caused variation within this range of less than 0.5 units.

Controls that will achieve water quality standards

The Department of Ecology's Eastern Regional Office has established a Livestock and Water Quality Program that uses a unique collaborative approach to address livestock-related problems. Instead of using the standard process that starts with a Category 5 listing, establishing a TMDL for the stream, writing an implementation plan, and finally getting to actual implementation, this strategy goes straight to implementation. The strategy is applied in watersheds in which the cause of a water quality impairment is clear.

Ecology encourages implementation of a wide variety of best management practices, however, a primary focus of the program has been to restore degraded riparian corridors and eliminate unlimited animal access to streams. Healthy riparian areas can improve water quality and stream health in multiple ways, which make them a particularly valuable and cost-effective management practice. Healthy riparian areas:

- Slow bank erosion by holding soil in place during periods of high water.
- Reduce flood damage and sedimentation by slowing runoff and capturing the sediment that would otherwise be carried downstream.
- Help keep water cool in summer by shading the stream.
- Improve water quality by capturing sediment, nutrients, pesticides, pathogens, and other pollutants before they reach the stream.
- Enhance summer stream flow by improving water infiltration and storage.
- Create fish and wildlife habitat.
- Limit livestock manure inputs to the creek and riparian areas.

Ecology has a three-step riparian restoration strategy, which allows the department to efficiently apply resources to priority problem areas. The first step is to address the source of degradation unlimited livestock access to streams and winterfeeding operations in close proximity to the riparian corridor. Ecology relies primarily on livestock exclusion, and off-stream water supply to restrict livestock access to the riparian area. In implementing this BMP, Ecology uses our 319 and centennial clean water grant guidelines, which require a minimum 75, 50 or 35-foot buffer between the livestock fence and the mean ordinary high water mark of the nearest stream bank depending on the type of stream. In many cases, the buffer width may be larger depending on the stream and site conditions.

By first addressing livestock access, Ecology seeks to abate the primary pollution sources—livestock in the stream, eroded streambanks, increased runoff, increased sedimentation, and subsequent transport of fecal matter. As vegetation naturally returns in the riparian area, site conditions become stabilized and the pollution sources are dramatically reduced. Also, this approach works to arrest morphological changes to the entire stream that are induced by erosion and sedimentation.

Ecology has spent much of its efforts and resources implementing this first step, in large part, because we have taken a holistic, watershed approach to protecting streams. By first addressing the primary sources of pollution and geomorphic change, Ecology can establish the necessary site conditions for successful restoration. Moreover, Ecology ensures that, first and foremost, the root problems are addressed for *the entire stream*, before resources are focused on site or segment specific restoration.

The second step occurs after a majority of site conditions have been stabilized, and the stream's entire geomorphic integrity is no longer jeopardized by the adjacent management practices. Ecology then conducts a reach by reach assessment to determine the appropriate trees and shrubs to be used for restoration. In some cases, federal programs require

revegetation as part of the cost-share program, and so restoration work occurs simultaneously with livestock exclusion.

The third step is to work with local land owners to promote continuous and proper management of upland grazing lands.

In addition to the Livestock and Water Quality Program, Ecology's Eastern Regional Office has established a similar collaborative approach to address crop production-related problems. Ecology encourages implementation of a wide variety of best management practices, however, a primary focus of effort has been establishing minimum land use setbacks, restoring degraded riparian corridors, and converting conventionally farmed land to conservation tillage practices.

Ecology teams with conservation districts, local governments, and landowners to provide technical assistance and funding for implementation of best management practices. Ecology uses our regulatory authority as a backstop when collaborative efforts fail. The Water Pollution Control Act (RCW 90.48) gives Ecology the authority to take enforcement actions against nonpoint polluters.

RCW 90.48 makes it unlawful for any person to "cause, permit or suffer to be thrown, run, drained, allowed to seep or otherwise discharged … any organic or inorganic matter that shall cause or tend to cause pollution of" waters of the state. Any person who violates or creates a substantial potential to violate the provisions of Chapter 90.48 RCW is subject to an enforcement order from Ecology pursuant to RCW 90.48.120. Ecology is authorized to "issue such order or directive as it deems appropriate under the circumstances[.]" In addition to administrative orders, violating Chapter 90.48 RCW may result in injunctions, civil penalties, and notices of violations.

It is worth noting that RCW 90.48.120 gives Ecology the authority to take action in response to nonpoint source pollution, the statute also gives Ecology the authority to take action based on a "substantial potential" to pollute state waters via either a point or nonpoint pollution source. Consequently, Ecology not only has authority to take action following a NPS pollution occurrence (i.e. there was a discharge), but has specific statutory authority to act proactively to prevent NPS pollution from occurring in the first place. Ecology's authority includes the authority to require a nonpoint source polluter to implement specific best management practices (BMPs). Ecology's authority can be used to prevent nonpoint pollution and require BMPs, as necessary.

Ecology has used this regulatory backstop several times since 2016.

The result of these partnerships has been the implementation of best management practices at hundreds of sites across several watersheds where water quality and fish habitat issues exist. By using a collaborative strategy, backed up by enforcement when necessary, Ecology has been able to create relationships and build trust with rural residents while improving water quality.

In the Deadman Creek watershed, work with landowners began in 2002. Twenty-nine miles of riparian buffers were installed prior to 2014. In spring of 2014, ¾ mile of new cattle exclusion fence was installed in Meadow Creek and ¼ mile in Deadman Creek. The creek was fenced to protect it from livestock, and several off-stream watering facilities were installed. Feeding locations were moved away from the stream to prevent polluted runoff. Trees and shrubs were planted to stabilize banks, shade the stream, and provide wildlife habitat. Buffers are constructed using Natural Resource Conservation Service standards, which require a minimum width of 35 feet. For buffers installed with state or federal financial assistance, we require an agreement with the landowner stipulating that the buffer and fence will be maintained for at least 10 years.

Fencing was generally installed adjacent to or upstream of the impaired segments. However, we are also fencing portions of the stream where there are presently no Category 5 listings, but where there is unrestricted cattle access to the stream. Riparian buffers are left to revegetate naturally in those areas in which there is enough live native vegetation left to recover. In all other areas we are installing buffers by planting native plants. By 2008, 80 percent of the cattle had been fenced out of the stream.

More recently, over the last 5 years the Pomeroy CD has added an additional 1.6 miles of livestock exclusion fencing on lower Deadman Creek with planting to help with revegetation. An additional site near the conjunction of the North and South Fork Deadman provided additional off-stream watering. In partnership with Ecology, the CD installed off-stream watering for a heavily polluted site on North Deadman Creek which will soon be under a CREP contract with another 2.5 miles of livestock exclusion fencing being added in 2021.

In Meadow Creek the Pomeroy CD has recently worked with two separate landowners to install open bottom culverts to access winter feeding grounds and prevent livestock crossing through surface water. In partnership with Ecology, the CD installed another mile of livestock exclusion fencing along Meadow Creek as well as a small spring-fed tributary. A major recent effort seen in this watershed has been the addition of both Beaver Dam Analogs (BDAs) as well as beaver re-location to assist with increasing annual water flows and promote floodplain storage for water temperatures and sedimentation. Both Deadman and Meadow Creek watersheds have seen a large increase of cropland shifting into direct seed or conservation tillage practices with increased technical assistance from the Pomeroy CD.

Most BMPs remain in good shape, although there was some backsliding prior to Ecology's 2013 re-assessment of the watershed. There had been gates and stream crossings left open and a few sections of fence that had not been completed. These are fixed now. Ecology has collected data that indicates an improving trend in the watershed, but there are data gaps so it is inconclusive, and the water is not yet meeting standards.

Ecology's Livestock and Water Quality Program has focused efforts back into Deadman and Meadow Creeks with recent watershed evaluations in 2020. As a result, the program identified an additional eighteen sites with active water quality concerns. Once prioritization was completed one landowner was sent a technical and financial assistance letter from Ecology, and is currently in communication to draft a plan with the Pomeroy CD. These efforts will continue in 2021 to identify and document ongoing sites of concern to further implement new projects in the watershed.

Description of requirements under which pollution controls will be implemented

It is Ecology's best professional judgment that the pollution controls that have been installed will result in the water quality standards being met. Maintenance of these controls has been ensured through 10-year landowner agreements that were established as part of the funding agreements for these projects. Additionally, Ecology staff will continue to perform watershed evaluations in this watershed to ensure that BMPs stay in place.

Estimate or Projection of Time When Water Quality Standards Will be Met

It will take time for the riparian corridor to fully recover and for the stream to re-establish its natural geometry. Ecology estimates that the riparian buffers will have grown enough to be fully effective in 10-15 years. While Deadman and Meadow Creek continue to see projects implemented, increased focus in the watershed will help to meet temperature, fecal coliform, dissolved oxygen, and pH standards by 2035.

Schedule for Implementing Pollution Controls

As described earlier in this report, Ecology has worked with the conservation district, local governments, and landowners to implement a variety of best management practices in the Deadman and Meadow Creeks watershed. It is our best professional judgment that this work will remedy the pollution problems in the impaired segments. Because it is our intention to restore the entire watershed and to prevent future pollution problems, we will be using monitoring data to track water quality improvements and to identify any new problem areas so they can be addressed. It will be an on-going process to get water bodies into compliance and to keep them in compliance.

A few sites where cattle are adversely affecting water quality remain in the watershed, and Ecology's Livestock and Water Quality Program will continue working with landowners to address these problem areas.

In addition, farmers throughout the watershed are adopting conservation tillage practices that reduce soil erosion and keep sediment out of the stream. These practices also improve rain and snowmelt infiltration and reduce the change of damaging spring floods. A new challenge in the watershed is a noxious weed called False Indigo. As cattle are excluded from the stream

corridor, this aggressive invader moves in. The Pomeroy Conservation District has a grant from the Department of Ecology to remove the weed and plant native trees and shrubs in its place. Ecology's livestock and water quality program will continue to have an on-going presence in the watershed, and will continue working to achieve compliance with state water quality standards.

Monitoring Plan to Track Effectiveness of Pollution Controls

Monitoring results will be used to establish whether these projects are improving water quality and overall stream health. Monitoring data can also help to identify additional problem areas that should be addressed. Monitoring results will be reported to the public and EPA through Ecology's IR report development process. Ecology is planning on moving forward with an effectiveness monitoring study to cover all the region's 4b starting in 2022.

Commitment to Revise Pollution Controls as Necessary

Ecology will maintain a presence in the Deadman Creek watershed to ensure that water quality continues to improve. We fully expect the Eastern Regional Office Livestock and Water Quality Program to achieve compliance with water quality standards. However, if it does not, Ecology will work with the conservation district, local governments, and landowners to determine other controls that could be used to achieve compliance.

4b Analysis for Tenmile Creek
December 2020

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude six listings from the 303(d) list and place these segments into category 4b. The specific listings are:

- temperature—18835, 18836, 20355, 20356, 29317
- bacteria—72313

The temperature impaired water bodies were listed in category 4b and the bacteria impaired water body was listed in category 3 of the 2012 IR. Ecology's basis for excluding these waterbodies from the 303(d) list is outlined in this evaluation.

Identification of Segment and Statement of Problem Causing Impairment

Tenmile Creek is located in Asotin County in southeastern Washington. Mill Creek is a tributary of Tenmile Creek. Tenmile Creek drops 2000 feet from the fringes of the Blue Mountains to the Snake River. The canyon created by the creek provides habitat for a variety of wildlife including deer, elk, coyote, and many species of birds. Even cougar are known to frequent the area. Tenmile Creek is also home to threatened Snake River Steelhead trout.

The Tenmile Creek canyon is important range for cattle. It also provides an excellent location for winter feeding. Feeding at the canyon's base protects livestock from harsh winter weather. However, a century of these activities left the stream corridor in poor condition. Many of the trees were damaged or removed, and stream banks were trampled and overgrazed. Winter feeding and uncontrolled livestock access to the stream had eliminated much of the vegetation within the stream corridor. This degraded riparian area could not provide shade to the stream, resulting in high water temperatures.

This is a sparsely populated area. There are no towns in the watershed and no point sources of pollution.

Monitoring data for the temperature impaired segments was collected by the Washington Department of Fish and Wildlife, and covers the years 2000 through 2002. For segment 18835, the highest daily temperature occurred in 2001. Data show a 7-day mean of maximum daily temperature of 22.8 degrees Centigrade, with a maximum daily temperature of 23.8 degrees Centigrade from continuous measurements. For segment 18836, the highest daily temperature occurred in 2002. Data show a 7-day mean of maximum daily temperature of 17.9 degrees centigrade, with a maximum daily temperature of 20.1 degrees Centigrade from continuous measurements. For segments 20355, 20356, and 29317, data was collected only in 2000. For segment 20355, data show a 7-day mean of maximum daily temperature of 24.2 degrees Centigrade, with a maximum daily temperature of 25.3 degrees Centigrade from continuous measurements. For segment 20356, data show a 7-day mean of maximum daily temperature of

25.5 degrees Centigrade, with a maximum daily temperature of 26.2 degrees centigrade from continuous measurements. For segment 29317, data show a 7-day mean of maximum daily temperature of 20.4 degrees Centigrade, with a maximum daily temperature of 21.6 degrees Centigrade from continuous measurements.

Monitoring data for the bacteria impaired segment was collected in water years 2005, 2006, and 2007. In 2005 3 of 6 samples (50%) showed an excursion of the % criterion for the waterbody, and the geometric mean of 165.7 exceeded the geometric mean criterion. In 2006, 3 of 13 samples (23%) showed an excursion of the % criterion for the waterbody, and the geometric mean of 57 did not exceed the geometric mean criterion. In 2007, 1 of 6 samples (17%) showed an excursion of the % criterion for the waterbody, and the geometric mean of 46.4 did not exceed the geometric mean criterion.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

Water Quality Target

The designated uses for listings 18835, 18836, and 20355 are spawning, rearing and migration, and the temperature criterion is 17.5 degrees Centigrade, with a supplemental spawning criterion of 13 degrees Centigrade from February 15 to June 1.

The designated use for listings 20356 and 29317 is core salmonid habitat, and the temperature criterion is 16 degrees Centigrade, with a supplemental spawning criterion of 13 degrees Centigrade from February 15 to June 15.

The designated use for listing 72313 is primary contact recreation. Ecology now uses Escherichia coli (E. Coli) as the criteria in this watershed. E. Coli levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or a single sample when less than ten sample points exist) exceeding 320 CFU or MPN per 100 mL.

Controls that will achieve water quality standards

The Department of Ecology's Eastern Regional Office has established a Livestock and Water Quality Program that uses a unique collaborative approach to address livestock-related problems. Instead of using the standard process that starts with a Category 5 listing, establishing a TMDL for the stream, writing an implementation plan, and finally getting to actual implementation, this strategy goes straight to implementation. The strategy is applied in watersheds in which the cause of a water quality impairment is clear.

Ecology encourages implementation of a wide variety of best management practices, however, a primary focus of the program has been to restore degraded riparian corridors and eliminate unlimited animal access to streams. Healthy riparian areas can improve water quality and stream health in multiple ways, which make them a particularly valuable and cost-effective management practice. Healthy riparian areas:

- Slow bank erosion by holding soil in place during periods of high water.
- Reduce flood damage and sedimentation by slowing runoff and capturing the sediment that would otherwise be carried downstream.
- Help keep water cool in summer by shading the stream.
- Improve water quality by capturing sediment, nutrients, pesticides, pathogens, and other pollutants before they reach the stream.
- Enhance summer stream flow by improving water infiltration and storage.
- Create fish and wildlife habitat.
- Limit livestock manure inputs to the creek and riparian areas.

Ecology has a three-step riparian restoration strategy, which allows the department to efficiently apply resources to priority problem areas. The first step is to address the source of degradation – unlimited livestock access to streams and winterfeeding operations in close proximity to the riparian corridor. Ecology relies primarily on livestock exclusion, and off-stream water supply to restrict livestock access to the riparian area. In implementing this BMP, Ecology uses our 319 and centennial clean water grant guidelines, which require a minimum 75, 50 or 35-foot buffer between the livestock fence and the mean ordinary high water mark of the nearest stream bank depending on the type of stream. In many cases, the buffer width may be larger depending on the stream and site conditions.

By first addressing livestock access, Ecology seeks to abate the primary pollution sources—livestock in the stream, eroded streambanks, increased runoff, increased sedimentation, and subsequent transport of fecal matter. As vegetation naturally returns in the riparian area, site conditions become stabilized and the pollution sources are dramatically reduced. Also, this approach works to arrest morphological changes to the entire stream that are induced by erosion and sedimentation.

Ecology has spent much of its efforts and resources implementing this first step, in large part, because we have taken a holistic, watershed approach to protecting streams. By first addressing the primary sources of pollution and geomorphic change, Ecology can establish the necessary site conditions for successful restoration. Moreover, Ecology ensures that, first and foremost, the root problems are addressed for *the entire stream*, before resources are focused on site or segment specific restoration.

The second step occurs after a majority of site conditions have been stabilized, and the stream's entire geomorphic integrity is no longer jeopardized by the adjacent management practices. Ecology then conducts a reach by reach assessment to determine the appropriate trees and shrubs to be used for restoration. In some cases, federal programs require revegetation as part of the cost-share program, and so restoration work occurs simultaneously with livestock exclusion.

The third step is to work with local land owners to promote continuous and proper management of upland grazing lands.

In addition to the Livestock and Water Quality Program, Ecology's Eastern Regional Office has established a similar collaborative approach to address crop production-related problems. Ecology encourages implementation of a wide variety of best management practices, however, a primary focus of effort has been establishing minimum land use setbacks, restoring degraded riparian corridors, and converting conventionally farmed land to conservation tillage practices.

Ecology teams with conservation districts, local governments, and landowners to provide technical assistance and funding for implementation of best management practices. Ecology uses our regulatory authority as a backstop when collaborative efforts fail. The Water Pollution Control Act (RCW 90.48) gives Ecology the authority to take enforcement actions against nonpoint polluters.

RCW 90.48 makes it unlawful for any person to "cause, permit or suffer to be thrown, run, drained, allowed to seep or otherwise discharged … any organic or inorganic matter that shall cause or tend to cause pollution of" waters of the state. Any person who violates or creates a substantial potential to violate the provisions of Chapter 90.48 RCW is subject to an enforcement order from Ecology pursuant to RCW 90.48.120. Ecology is authorized to "issue such order or directive as it deems appropriate under the circumstances[.]" In addition to administrative orders, violating Chapter 90.48 RCW may result in injunctions, civil penalties, and notices of violations. It is worth noting that RCW 90.48.120 gives Ecology the authority to take action in response to nonpoint source pollution, the statute also gives Ecology the authority to take action based on a "substantial potential" to pollute state waters via either a point or nonpoint pollution source. Consequently, Ecology not only has authority to take action following a NPS pollution occurrence (i.e. there was a discharge), but has specific statutory authority to act proactively to prevent NPS pollution from occurring in the first place. Ecology's authority includes the authority to require a nonpoint source polluter to implement specific best management practices (BMPs). Ecology's authority can be used to prevent nonpoint pollution and require BMPs, as necessary. Ecology has used this regulatory backstop several times since 2016.

The result of these partnerships has been the implementation of best management practices at hundreds of sites across several watersheds where water quality and fish habitat issues exist. By using a collaborative strategy, backed up by enforcement when necessary, Ecology has been able to create relationships and build trust with rural residents while improving water quality.

In the Tenmile Creek watershed, work with landowners began in 2002. As of 2014, twelve miles of riparian buffers were installed. The creek was fenced to protect it from livestock, and thousands of native trees and shrubs were planted in the stream corridor. Buffers are constructed using Natural Resource Conservation Service standards, which require a minimum width of 35 feet. For buffers installed with state or federal financial assistance, we require an agreement with the landowner stipulating that the buffer and fence will be maintained for at least 10 years.

Initial cattle exclusion fencing was generally installed adjacent to or upstream of the impaired segments. However, we have also fenced portions of the stream where there are presently no

Category 5 listings, but where there was unrestricted cattle access to the stream. Riparian buffers are left to revegetate naturally in those areas in which there is enough live native vegetation left to recover. In all other areas we are installing buffers by planting native plants. At this time, most of the upstream riparian areas have been restored. Planting is continuing where buffers need additional plants.

In addition, farmers in the watershed are adopting direct seed technology, which is the practice of seeding a new crop into the standing stubble of a recently harvested crop without the traditional tillage of the ground. By doing so, soil erosion can be reduced by as much as 95 percent. This significantly reduces the volume of sediment washing into Tenmile Creek. All of these efforts will help address the temperature impairments. In the last few years, the Asotin County CD has assisted in converting an additional 500 acres to direct seed or conservation tillage in the watershed.

Since 2008, Ecology has completed a large project that includes installation of a Conservation Reserve Enhancement Program buffer and moving a feeding operation further upland with a 75-foot setback. A large proportion of the riparian work in the watershed was funded with federal cost-share funds, which require landowner maintenance. Projects funded with state dollars have 10-year landowner agreements requiring maintenance.

In the last five years, an additional mile of Tenmile Creek was protected, with another thirteen miles of buffer enhanced with plantings of over 8,000 trees in the riparian area. This watershed can be increasingly complex to establish robust buffers due to its arid and rocky conditions. The Asotin County CD continues to focus efforts on enhancement and maintenance in the watershed. Ecology has partnered with the CD on an active grant in the watershed to promote overbank flow and floodplain connection to improve temperature and sedimentation concerns. This has resulted in installing 53 Beaver Dam Analogs (BDAs) throughout the watershed. The CD has recently submitted an FY22 state 319 water quality grant application to Ecology, which if funded will provide funding to protect and enhance an additional 40,000 stream feet and 20,000 trees to Asotin County watersheds, including Tenmile Creek.

The Tenmile and Mill Creek watershed continues to recover. Each year, the benefits to water quality and fish habitat are more dramatic. Native cottonwood, alder, and willow trees are quickly returning to the stream banks. Grasses along the stream are healthier and more deeply rooted. Additionally, manure and exposed soil are no longer visible near the creek. Steelhead trout are returning to the creek to spawn in greater numbers than have been recorded in several decades.

Description of requirements under which pollution controls will be implemented

It is Ecology's best professional judgement that the pollution controls that have been installed will result in the water quality standards being met. Maintenance of these controls has been ensured through 10-year landowner agreements that were established as part of the funding agreements

for these projects. Additionally, Ecology staff will continue to perform watershed evaluations in this watershed to ensure that BMPs stay in place

Estimate or Projection of Time When Water Quality Standards Will be Met

It will take time for the riparian corridor to fully recover and for the stream to re-establish its natural geometry. Ecology estimates that the riparian buffers will have grown enough to be fully effective in 10-15 years. While Tenmile Creek continues to see projects implemented, increased focus in the watershed will help to meet the temperature standard throughout the entire watershed by 2025.

Schedule for Implementing Pollution Controls

As described earlier in this report, Ecology has worked with the conservation district, local governments, and landowners to implement a variety of best management practices in the Tenmile Creek watershed, and landowners are continuing to implement best management practices that protect the stream corridor and improve water quality. It is our best professional judgment that this work will remedy the pollution problems in the impaired segments. Because it is our intention to restore the entire watershed and to prevent future pollution problems, we will be using monitoring data to track water quality improvements and to identify any new problem areas so they can be addressed. It will be an on-going process to get water bodies into compliance and to keep them in compliance.

Ecology's Livestock and Water Quality Program will continue to have an on-going presence in the watershed, and will continue working to achieve compliance with state water quality standards.

Monitoring Plan to Track Effectiveness of Pollution Controls

Monitoring results will be used to establish whether these projects are improving water quality and overall stream health. Monitoring data can also help to identify additional problem areas that should be addressed. Monitoring results will be reported to the public and EPA through Ecology's IR report development process. Ecology is planning on moving forward with an effectiveness monitoring study to cover all the region's 4b starting in 2022.

Commitment to Revise Pollution Controls as Necessary

Ecology will maintain a presence in the Tenmile Creek watershed to ensure that water quality continues to improve. We fully expect the Eastern Regional Office livestock and water quality program to achieve compliance with water quality standards. However, if it does not, Ecology will work with the conservation district, local governments, and landowners to determine other controls that could be used to achieve compliance.

4b Analysis for Steptoe Creek
December 2020

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude eight listings from the 303(d) list and place these segments into category 4b. The specific listings are:

- Temperature – 72995, 18833, 18834, 73628
- Bacteria – 46705, 77228, 45337
- pH – 50351

Ecology's basis for excluding these waterbodies from the 303(d) list is outlined in this evaluation.

Identification of Segment and Statement of Problem Causing Impairment

Steptoe Creek is a small tributary in the Snake River watershed (WRIA 35), located in the southeast corner of Washington State. Steptoe Creek drains 14,000 acres of primarily agricultural lands. Steptoe Creek watershed is comprised of two creeks, Steptoe Creek and Stuart Creek. These combine to form Steptoe Creek mainstem at stream mile 2.5 upstream from the mouth. Both are perennial spring fed streams that provide habitat for ESA listed Snake River Steelhead Trout.

Many of the stream reaches in the Steptoe Creek watershed have been subjected to more than a century of livestock grazing and feeding impacts. Streams lack sufficient riparian protection from livestock grazing. Reaches subject to winter feeding activities often have significantly reduced populations of trees and shrubs and lack adequate herbaceous ground cover. Portions of riparian areas that are not subject to feeding also show signs of overgrazing from range cattle. These signs include bare soils, compaction, erosion, cattle trailing, low tree and shrub species diversity, wide and shallow stream morphology, and a lack of young age-class woody species.

Much of the upper watershed is under crop production and it is common to produce crops to the edge of eroding streambanks. Ephemeral stream channels are typically farmed and subject to significant annual gully formation in conventional tillage systems. It is estimated that more than 60% of the crop ground is in a conventional tillage cropping system. Conventional tillage is usually defined as a Soil Tillage Intensity Rating (STIR) of more than 30. STIR is a system of estimating how much the soil is disturbed in order to seed crops. Conventional tillage systems are higher disturbance systems that typically reduce infiltration and cause more erosion.

While land area is split equally in the watershed between the two primary land uses, areas adjacent to perennial stream flow are dominated by livestock production. Nearly 80% of these riparian areas are currently grazed. This is a sparsely populated area. There are no towns in the watershed and no point sources of pollution.

In 2006 and 2007, the Department of Ecology performed extensive water quality monitoring in the Snake River area. Water quality was monitored at three locations in Steptoe Creek for multiple parameters including temperature, fecal coliform bacteria, dissolved oxygen, pH, and turbidity.

There had been little change in land-use since from when the data was collected until restoration actions began in 2016. We can conclude the data from that time was representative of the condition up to 2016. In addition to fecal coliform exceedances, the 2006-2007 data shows some low dissolved oxygen, high pH, and turbidity increases between the middle watershed and lower watershed. Future effectiveness monitoring is warranted in the Steptoe Creek watershed and plans are discussed in this document.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

Water Quality Target

The designated use for listings 72995, 18833, 18834, and 73628 are spawning, rearing and migration, and the temperature criterion is 17.5 degrees Centigrade.

The designated use for listing 46705, 77228, and 45337 is primary contact recreation. Ecology now uses Escherichia coli (E. Coli) as the criteria in this watershed. E. Coli levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or a single sample when less than ten sample points exist) exceeding 320 CFU or MPN per 100 mL.

The designated use for listing 50351 is spawning, rearing and migration, and the pH criterion is within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

Controls that will achieve water quality standards

The Department of Ecology's Eastern Regional Office has established a Livestock and Water Quality Program that uses a unique collaborative approach to address livestock-related problems. Instead of using the standard process that starts with a Category 5 listing, establishing a TMDL for the stream, writing an implementation plan, and finally getting to actual implementation, this strategy goes straight to implementation. The strategy is applied in watersheds in which the cause of a water quality impairment is clear.

Ecology encourages implementation of a wide variety of best management practices, however, a primary focus of the program has been to restore degraded riparian corridors and eliminate unlimited animal access to streams. Healthy riparian areas can improve water quality and stream health in multiple ways, which make them a particularly valuable and cost-effective management practice. Healthy riparian areas:

- Slow bank erosion by holding soil in place during periods of high water.

- Reduce flood damage and sedimentation by slowing runoff and capturing the sediment that would otherwise be carried downstream.
- Help keep water cool in summer by shading the stream.
- Improve water quality by capturing sediment, nutrients, pesticides, pathogens, and other pollutants before they reach the stream.
- Enhance summer stream flow by improving water infiltration and storage.
- Create fish and wildlife habitat.
- Limit livestock manure inputs to the creek and riparian areas.

Ecology has a three-step riparian restoration strategy, which allows the department to efficiently apply resources to priority problem areas. The first step is to address the source of degradation – unlimited livestock access to streams and winterfeeding operations in close proximity to the riparian corridor. Ecology relies primarily on livestock exclusion, and off-stream water supply to restrict livestock access to the riparian area. In implementing this BMP, Ecology uses NRCS riparian buffer standards, which require a minimum 35-foot buffer between the livestock fence and the mean ordinary high water mark of the nearest stream bank. In many cases, the buffer width may be larger depending on the stream and site conditions.

By first addressing livestock access, Ecology seeks to abate the primary pollution sources—livestock in the stream, eroded streambanks, increased runoff, increased sedimentation, and subsequent transport of fecal matter. As vegetation naturally returns in the riparian area, site conditions become stabilized and the pollution sources are dramatically reduced. Also, this approach works to arrest morphological changes to the entire stream that are induced by erosion and sedimentation.

Ecology has spent much of its efforts and resources implementing this first step, in large part, because we have taken a holistic, watershed approach to protecting streams. By first addressing the primary sources of pollution and geomorphic change, Ecology can establish the necessary site conditions for successful restoration. Moreover, Ecology ensures that, first and foremost, the root problems are addressed for *the entire stream*, before resources are focused on site or segment specific restoration.

The second step occurs after a majority of site conditions have been stabilized, and the stream's entire geomorphic integrity is no longer jeopardized by the adjacent management practices.

Ecology then conducts a reach by reach assessment to determine the appropriate trees and shrubs to be used for restoration. In some cases, federal programs require revegetation as part of the cost-share program, and so restoration work occurs simultaneously with livestock exclusion. The third step is to work with local land owners to promote continuous and proper management of upland grazing lands.

In addition to the Livestock and Water Quality Program, Ecology's Eastern Regional Office has established a similar collaborative approach to address crop production-related problems.

Ecology encourages implementation of a wide variety of best management practices, however, a primary focus of effort has been establishing minimum land use setbacks, restoring degraded riparian corridors, and converting conventionally farmed land to conservation tillage practices.

Ecology teams with conservation districts, local governments, and landowners to provide technical assistance and funding for implementation of best management practices. Ecology uses our regulatory authority as a backstop when collaborative efforts fail. The Water Pollution Control Act (RCW 90.48) gives Ecology the authority to take enforcement actions against nonpoint polluters.

RCW 90.48 makes it unlawful for any person to "cause, permit or suffer to be thrown, run, drained, allowed to seep or otherwise discharged … any organic or inorganic matter that shall cause or tend to cause pollution of" waters of the state. Any person who violates or creates a substantial potential to violate the provisions of Chapter 90.48 RCW is subject to an enforcement order from Ecology pursuant to RCW 90.48.120. Ecology is authorized to "issue such order or directive as it deems appropriate under the circumstances[.]" In addition to administrative orders, violating Chapter 90.48 RCW may result in injunctions, civil penalties, and notices of violations. It is worth noting that RCW 90.48.120 gives Ecology the authority to take action in response to nonpoint source pollution, the statute also gives Ecology the authority to take action based on a "substantial potential" to pollute state waters via either a point or nonpoint pollution source. Consequently, Ecology not only has authority to take action following a NPS pollution occurrence (i.e. there was a discharge), but has specific statutory authority to act proactively to prevent NPS pollution from occurring in the first place. Ecology's authority includes the authority to require a nonpoint source polluter to implement specific best management practices (BMPs). Ecology's authority can be used to prevent nonpoint pollution and require BMPs, as necessary.

Ecology has used this regulatory backstop several times since 2016.

The result of these partnerships has been the implementation of best management practices at hundreds of sites where water quality and fish habitat issues exist. By using a collaborative strategy, backed up by enforcement when necessary, Ecology has been able to create relationships and build trust with rural residents while improving water quality. In the Steptoe Creek watershed, work with landowners largely begun in 2016. The Snake River Salmon Recovery Board partnered with the Palouse Conservation District to replace a perched culvert at river mile 0.5 that blocked upstream migration of ESA listed Snake River Steelhead Trout.

Most of the 0.5 miles of Steptoe Creek upstream from the mouth to the existing barrier had historically been the site of a livestock confinement area. The entire confinement area was located in the floodplain, the limited livestock fencing on site was located within 20 feet of the stream and livestock had access to surface water in some of this area. A major effort took place in 2018 – 2020 at this site that, relocated feeding areas and holding corrals off the creek, installed 5,000 feet of livestock exclusion fencing, and planted 12 acres of riparian buffer. 61 instream post

assisted log structures (PALS) were installed along 2,200 feet of Steptoe Creek directly upstream of this site over the summer of 2020.

Approx. 4 miles up from the mouth of Steptoe Creek is another large livestock operation that Ecology staff had been attempting to work with since 2002. Ecology issued an Administrative Order for this site in December 2018. Since the Order issuance, 1.7 miles of exclusion fencing and several off-stream watering facilities have been installed. Two additional off-stream watering facilities, another 0.75 miles of exclusion fencing, one livestock crossing, a corral relocation, and 13.5 acres of riparian restoration are planned for implementation on this site in 2021 and 2022.

Riparian buffers and livestock BMPs are constructed using NRCS standards, which require a minimum width of 35 feet. For buffers installed with state or federal financial assistance, we require a 50' minimum buffer along Steptoe Creek, and an agreement with the landowner stipulating that the buffer and livestock BMPs will be maintained for at least 10 years.

Initial cattle exclusion fencing was generally installed adjacent to the impaired segments. However, we have also fenced portions of the stream where there are presently no Category 5 listings, but where there was unrestricted cattle access to the stream. Riparian buffers are left to revegetate naturally in those areas in which there is enough live native vegetation left to recover. In all other areas we are installing buffers by planting native plants. Planting is continuing where buffers need additional plants.

In addition, farmers in the upper watershed are adopting direct seed technology, which is the practice of seeding a new crop into the standing stubble of a recently harvested crop without the conventional tillage of the ground. By doing so, soil erosion can be reduced by as much as 95 percent. This significantly reduces the volume of sediment washing into Steptoe Creek. The Palouse Conservation District has been the recipient of several direct seed cost-share program Ecology grants that have made it easier for farmers to transition from conventional tillage to conservation tillage practices.

For crop production areas in the upper watershed, vegetated buffer width may be adjusted based on the upland STIR and whether or not seasonal flow occurs during or near the critical temperature period. For long term intermittent and perennial stream reaches with a STIR greater than 30, no buffer should be less than 75 feet wide. In tillage areas, no buffer should be less than 35 feet wide regardless of flow and STIR.

The Steptoe Creek watershed continues to recover. Each year, the benefits to water quality and fish habitat are more dramatic. Native cottonwood, alder, and willow trees are quickly returning to the stream banks. Grasses along the stream are healthier and more deeply rooted. Additionally, manure and exposed soil are becoming less common near the creek.

Description of requirements under which pollution controls will be implemented

It is Ecology's best professional judgment that the pollution controls that have been installed and planned will result in the water quality standards being met. Maintenance of the installed controls have been ensured through 10-year landowner agreements that were established as part of the funding agreements for these projects. Additionally, Ecology staff will continue to perform watershed evaluations in this watershed to ensure that BMPs stay in place.

Estimate or Projection of Time When Water Quality Standards Will be Met

It will take time for the riparian corridor to fully recover, and for the recently installed and planned future plantings to mature. Ecology estimates that the riparian buffers will have grown enough to be fully effective in 10-15 years, so Steptoe Creek will be meeting the standards for fecal coliform, temperature, and pH by 2031-2036.

Schedule for Implementing Pollution Controls

As described earlier in this report, Ecology has worked with the conservation district, local governments, and landowners to implement a variety of best management practices in the Steptoe Creek watershed, and landowners are continuing to implement best management practices that protect the stream corridor and improve water quality. It is our best professional judgment that this work will remedy the pollution problems in the impaired segments. Because it is our intention to restore the entire watershed and to prevent future pollution problems, we will be using monitoring data to track water quality improvements and to identify any new problem areas so they can be addressed. It will be an on-going process to get water bodies into compliance and to keep them in compliance.

Ecology's Livestock and Water Quality Program will continue to have an on-going presence in the watershed, and will continue working to achieve compliance with state water quality standards.

Monitoring Plan to Track Effectiveness of Pollution Controls

The Palouse Conservation District (PCD) is taking the lead on future effectiveness monitoring in the Steptoe Creek watershed. PCD recently submitted an FY22 state 319 water quality grant application to Ecology, which if funded will include a robust monitoring effort to begin December 2021. Proposed water quality monitoring will be conducted at three locations along Steptoe Creek in conjunction with livestock exclusion, riparian restoration, and in-stream structure installation throughout Steptoe Canyon.

These sites will be instrumented with pressure sensors and monumented reference points to gauge stage height, providing a 15-minute water level dataset. Rating curves for Steptoe Creek will be developed using continuous stage height measurements in combination with routine and storm event discharge measurements over three years. In addition to discharge, grab samples

and water quality readings from a YSI ProDSS will be collected monthly and during storm events providing data on fecal coliform bacteria, inorganic nitrogen, phosphorus, suspended sediment concentrations (SSC), pH, dissolved oxygen, electric conductivity, turbidity, and temperature. Concentrations of fecal coliform bacteria, nitrate/nitrate/ammonia, total phosphorus, orthophosphate, and SSC will be flow weighted and annual pollutant loads will be calculated for each location.

Commitment to Revise Pollution Controls as Necessary

Ecology will maintain a presence in the Steptoe Creek watershed to ensure that water quality continues to improve. We fully expect the Eastern Regional Office Livestock and Water Quality Program to achieve compliance with water quality standards. However, if it does not, Ecology will work with the conservation district, local governments, and landowners to determine other controls that could be used to achieve compliance.

4b Analysis for Entiat River
February 2021

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude two temperature listings (3731 and 73057), from the 303(d) list and place these water bodies in category 4b of the IR. Ecology's basis for excluding these water bodies from the 303(d) list is outlined in this analysis.

Identification of Segment and Statement of Problem Causing Impairment

These segments are located just above the mouth of the Entiat River, which empties into the Columbia River. The most likely causes of the temperature impairment are the loss of riparian vegetation and changes to the channel width-to-depth ratio caused by sedimentation from roads, timber harvest, and agricultural practices.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

The Entiat Watershed Planning Group produced the Coordinated Resource Management Plan in 1999. This plan evaluated the watershed's condition and made recommendations designed to protect water quality and threatened and endangered fish. The sources of temperature impairment in the Entiat River are identified in the plan as:

- Reduced riparian shade resulting from removal of riparian vegetation and stream widening.
- Timber harvest and roads on Forest Service land in the upper basin also contribute to loss of riparian shade and degraded channel conditions.

The plan made several recommendations to help cool the water.

- Work with landowners to maintain and enhance riparian vegetation and wetlands, and implement streambank planting.
- Continue to work with NRCS on conserving water used for irrigation.
- Continue compliance with the forest practices rules, which protect riparian areas and allow for their re-establishment.
- Promote incentives for landowners to restrict unlimited access to streams by livestock.

The plan also included a recommendation to further plan under the Watershed Planning Act to evaluate base flow needs and establish minimum in-stream flows. The subsequent WRIA 46 Entiat Watershed Management Plan, which incorporated the findings of the Coordinated Resource Management Plan and recommended establishment of instream flows, was adopted unanimously by the Chelan County Board of Commissioners on September 13, 2004. The instream flow recommendations were codified as Chapter 173- 546 of the Washington Administrative Code.

Land ownership in the basin is approximately 85% federal, which is primarily in the upper basin, 6% state, and 9% private. The upper watershed is in Wenatchee National Forest. Between the forest boundary, at river mile 26 and river mile 11.7, the land use is primarily rural residential, either year round or seasonal, with a few dispersed pasture areas. Below river mile 11.5, the use is predominantly pear and apple orchards with some rural residential use.

The watershed planning committee performed an aerial remote sensing survey and used the Stream Network Temperature Model (SNTEMP) to identify problem areas in the river and to test different scenarios of best management practices implementation. The model was used to evaluate the effects of three alternative actions, singly and in combination. The three are:

1. Increase in stream flow,
2. System wide increase in riparian shade, and
3. Reduction in channel width in the lower river.

Increases to streamflow were evaluated because a larger mass of water would take longer to warm. Increased shade was evaluated because it would reduce the amount and intensity of solar radiation reaching the water, thus reducing the water temperature. In the Entiat River watershed, numerous forest fires, combined with flood control measures in the lower 15 river miles, have significantly reduced the overall amount and quality of riparian vegetation along the river. The Entiat Watershed Planning Unit has recommended actions that would increase the riparian vegetation within the watershed, as well as reduce the threat of future forest fires that would threaten both the existing and proposed improved riparian vegetation. Decreased channel width was evaluated because it is expected that the channel will return to a more normal geomorphology once functioning riparian areas are re-established.

Based on the results of the model simulations performed with SNTEMP, the following recommendations were made:

- SNTEMP predicted reductions in water temperatures for all three alternative actions, suggesting that implementation of any of the three actions would help reduce water temperatures to some extent.
- Of the feasible alternatives, SNTEMP predicted the largest reductions in water temperatures when riparian shade was increased by 50% (Alternative Action 3). Therefore, an aggressive approach to increasing the current riparian shade conditions throughout the watershed should be undertaken to address high water temperatures.
- In addition, if Entiat Watershed Planning Unit resources are available, decreases to channel width in the lower 10 RMs in conjunction with changes in shade should also be considered (Alternative Action 4).
- A 10% change in streamflow is not likely to significantly affect water temperature.

As identified in the watershed plan and in the SNTEMP analysis of the Entiat River, the most effective best management practices to address the temperature listing are revegetating riparian

areas, preventing further riparian vegetation removal, and restoring channel geomorphology and width-to-depth ratios.

Wenatchee National Forest has an approved TMDL, prepared by the Department of Ecology, which specifies areas throughout the forest where riparian shade must be maintained or re-established. The Forest Service is also required to comply with state water quality standards. Implementation of the TMDL should restore 85% of the watershed to a fully functioning riparian condition and help re-establish the original channel geomorphology. Management of state and privately owned lands in the watershed must comply with the state forest practices rules, which are designed to achieve compliance with the state water quality standards and the Clean Water Act. For the remainder of the watershed, the 9% that is privately owned and not used for forestry, the watershed plan recommends re-establishing and maintaining riparian vegetation along at least 50% of the stream. The area is subject to wildfires, which make it unlikely that a higher percentage of riparian vegetation could be continuously maintained. This percentage is similar to that prescribed in the eastside section of the state forest practices rules.

Implementation of the Wenatchee National Forest TMDL, combined with required compliance with the state forest rules and the riparian restoration strategy for the remainder of the land in the watershed is expected to restore riparian areas in the watershed to a fully functioning condition. This will result in compliance with the state water quality standards either by cooling the river to or below the numeric criterion or by achieving the Entiat River's natural condition.

Several enforceable pollution controls will assure implementation of the watershed plan.

- The Forest Service land is subject to the Wenatchee National Forest TMDL.
- The remainder of the watershed is subject to the state forest practices rules for forestry land uses.
- The agricultural and residential uses in the lower watershed are subject to the Chelan County Shoreline Master Program and critical areas ordinance, both of which are designed to minimize or eliminate impacts to riparian vegetation due to development activities on private lands.
- The Entiat Water Resources Management Program has been codified as Chapter 173- 546 of the Washington Administrative Code. This rule establishes enforceable minimum in-stream flow requirements for the upper and lower Entiat River and the Mad River, a tributary of the Entiat.

State and local agencies are working together to restore Entiat riparian areas. The following projects were completed prior to 2008.

- The Department of Fish and Wildlife completed the Wilson side channel reconnection project in 2004. This project consisted of placing a diversion pipe in the Entiat River that provides an estimated 10 cubic feet per second of flow through 1,000 feet of rehabilitated side channel. The side channel was restored using large woody debris, boulders, and riparian plantings. The project is located at river mile 6.7.

- The Department of Fish and Wildlife completed an off channel habitat project in 2004. This project deepened a .3-acre spring-fed pond and installed rootwads to provide habitat and cover for juvenile fish. The pond's outlet stream was cleared and deepened, and several large woody debris structures were installed along the Entiat River just upstream and downstream of the stream outlet. The project is located at river mile 6.2.
- Chelan County Public Works, with the cooperation of several other agencies, replaced the Stormy Creek culvert in 2004 with a pre-cast concrete bridge. The slope in the area was regarded from 6% to 4%, spawning gravel was placed in the creek, and riparian vegetation was planted. Approximately ½ mile of fish habitat was reopened.
- The Cascadia Conservation District re-vegetated an estimated 1.3 acres of riparian vegetation between river mile 3.2 and 3.8 in 2005 and 2006. In 2007, an additional 1.1 acres were re-vegetated at several locations in the drainage. • Three surface water diversions were converted to groundwater wells for four irrigators in the basin. Wells were installed at river miles 4.0 and 6.3.
- The Bridge-to-Bridge, Phase 1 project consisted of the installation of a rock crossvane, side-channel habitat improvements, irrigation intake and outfall improvements, and riparian restoration. A rock crossvane was constructed to convey water into the Chelan County PUD irrigation side-channel, canal and intake pipe. The rock crossvane and the eleven rootwads were constructed to increase pool habitat and instream complexity. The rehabilitated side-channel had three boulder clusters and two log structures (constructed from 4 logs) installed to increase complexity and off-channel habitat. The slide-gate to the irrigation intake was replaced to allow year round watering of the 1000 feet of irrigation canal. The irrigation outfall structure had an additional flashboard installed and two rock step-pools installed to assist in fish passage. This project was designed by the NRCS and installed by the Cascadia Conservation District in fall of 2006 at river mile 3.2.
- The Milne Project, located between river mile 2.8 and river mile 3.2, consisted of the installation of 13 logs with rootwads, six boulder barbs, six boulder clusters, and an irrigation diversion barb with sluice gate. Riparian planting along the access areas was also completed. The structures were installed in September 2007 with funds from the Salmon Recovery Funding Board and US Bureau of Reclamation.
- The Hanan-Detwiler rock crossvane and large woody debris were installed at rivermile 5.1 with funding from the Salmon Recovery Funding Board and US Bureau of Reclamation. The rock crossvane will serve to convey water into the HananDetwiler irrigation system and provide pool habitat. The two log structures each consisted of two logs with rootwads installed into the banks to provide fish habitat and a source of gravel through scouring. The project was completed in October 2007.

The following projects were completed after 2008.

- The Roaring Creek Flow Enhancement and Barrier Removal project removed two surface water diversions from Roaring Creek between RM 0.85 and RM 1.3. This project was completed in 2010. • The 2010 Lower Entiat Riparian Restoration Project restored 4.3 acres (.65 miles) of riparian habitat directly adjacent the Entiat River.

- The 2011 Entiat Riparian Project restored 4.2 acres of riparian habitat directly adjacent the Entiat River, by installing native riparian trees, shrubs, and native grasses (5 of 5 sites), livestock exclusion fencing (1 of 5 sites) and temporary irrigation systems (3 of 5 sites), and controlling of noxious weeds at all five sites. The Roaring Creek Flow Enhancement and Barrier Removal project removed two surface water diversions from Roaring Creek between RM 0.85 and RM 1.3. This project was completed in 2010.
- The 2010 Lower Entiat Riparian Restoration Project restored 4.3 acres (.65 miles) of riparian habitat directly adjacent the Entiat River.
- The 2011 Entiat Riparian Project restored 4.2 acres of riparian habitat directly adjacent the Entiat River, by installing native riparian trees, shrubs, and native grasses (5 of 5 sites), livestock exclusion fencing (1 of 5 sites) and temporary irrigation systems (3 of 5 sites), and controlling of noxious weeds at all five sites. 2014 WQA—4B Analysis for Entiat River Page 5.
- The Entiat RM 21.5 LWD and Riparian Restoration project established woody riparian vegetation at the site by combining the installation of 14 large woody debris (LWD) structures along 645 feet of existing bank with an accompanying 100-foot wide, approximately 1.9 acre, riparian planting area behind it. This project was completed in 2010.
- The 2010 Surface Water to Wells Conversion project replaced a 1.5 cfs surface water diversion for the Gaines Ditch in the lower Entiat River with four irrigation wells. Replacing the surface water diversion avoids fish entrainment and mortality, as well as providing water savings through higher delivery efficiencies. The conversion also keeps surface water in stream during low flow, peak irrigation use periods in late summer and fall.
- The 2012 Tyee Ranch project installed 4.5 acres of riparian plantings, placement of engineered log jams and other large woody debris (LWD) structures, an excavated re-connection to floodplain and abandoned side channels.
- In 2014 five salmon habitat restoration projects were completed in the lower seven miles of the Entiat River. Three project sponsors were involved in the 2014 Entiat River habitat project implementation; Yakama Nation (YN) with a project at (RM 2.3-3.3), Chelan County Natural Resource Department (CCNRD) with two projects (RM 1.65 and RM 4.0-4.3), and Cascadia Conservation District (CCD) with two projects (RM 0.8-2.3 and RM 6.7-7.8). Project elements include habitat logs and boulder clusters placed along the channel margins, improvements to existing side channel areas, two engineered log jams near the upstream end of two side channels to provide habitat and help direct flow into the side channels, and the creation of two new off channel alcoves, for high flow refuge.
- In 2017 several habitat projects were completed. The Yakama Nation, in collaboration with the US Forest Service Entiat Ranger District, enhanced side-channel connections and added engineered log structures along two areas of the Upper Middle Entiat. These projects offer more habitat for endangered salmon species. The Chelan Douglas Land Trust (CDLT) purchased 26 acres of property for protection which included approximately 4,425 feet of critical riverbank. The Cascade Columbia Fisheries Enhancement Group (CCFEG), a local non-profit organization which works to restore native fish habitat, removed two fish passage barriers along Stormy Creek, opening up about three miles of

salmon habitat. The Fisheries Enhancement Group partnered with the US Fish and Wildlife Service to complete the work.

Estimate or Projection of Time When Water Quality Standards Will be Met

Because it will take time to complete restoration projects and for new vegetation to grow, we estimate that compliance with the temperature standard will be achieved in 2028.

Schedule for Implementing Pollution Controls

As described earlier in this report, the Entiat River Planning Unit has already begun implementing restoration projects, and continues to work with other agencies to design projects, obtain funding, and complete the actual restoration work. There is a good record of on-going implementation, and we expect this to continue.

Monitoring Plan to Track Effectiveness of Pollution Controls

The Entiat River is monitored by one of Ecology's long term monitoring stations so there will be direct information available to determine whether implementation activities are making a difference.

Commitment to Revise Pollution Controls as Necessary

Ecology will continue to work with the Entiat River Planning Unit to ensure that implementation continues and that water quality in the Entiat River continues to improve. We fully expect the program to achieve compliance with water quality standards. However, if it does not, Ecology will work with the planning unit to determine other controls that could be used to achieve compliance.

4b Analysis for Yellowjacket Creek
February 2021

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude three listings (19866, 19868, 19869) for temperature on Yellowjacket Creek from the 303(d) list and placed these water bodies in category 4b of the IR. Listing 19866 was listed in category 5 of the 2008 IR. Listings 19868 and 19869 were in category 4b. Ecology's basis for excluding these water bodies from the 303(d) list is outlined in this evaluation

Identification of Segment and Statement of Problem Causing Impairment

Yellowjacket Creek is one of eight subwatersheds within the Lower Cispus River watershed. 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. The mean stream gradient is 3.7%, calculated from digitized 7.5- minute topographic maps.

The below table summarizes the monitoring network for the watershed. Since 2016, several sites were added to the temperature monitoring network:

- Resumed monitoring in Pumice Creek in 2017,
- Resumed monitoring at Pinto Creek at the mouth of Yellowjacket Creek in 2017,
- New site added at Badger Creek at the 2810-041 Road in 2019,
- New site added at Yellowjacket Creek at RM 11 in 2019,
- New site added at Veta Creek at the Yellowjacket confluence at the 28 road in 2019,
- New site added at High Bridge Creek at the 29 road in 2019,
- New site added at Galena Creek in 2019, and
- New site added at Lambert Creek in 2019

The Forest Service plans to continue monitoring at all current sites as part of the ongoing commitment to monitor and improve water quality in the Yellowjacket Creek subwatershed.

Most monitored tributaries of Yellowjacket Creek did not exceed 16°C in the years monitored. Veta Creek had a short window of exceedance in 2020. Pumice Creek exceed 16°C in two of the twelve years it was monitored, and McCoy Creek had one exceedance in ten years of monitoring. Exceedances in lower Yellowjacket Creek were measured at the confluence of the Cispus River (fifteen of twenty years monitored), and upstream of the McCoy Creek confluence (four of eighteen years monitored). Exceedances were not observed in Yellowjacket at river mile 11, although this site has only two years of monitoring data. All sites on the Cispus River have numerous exceedances. Monitoring data show that exceedances are most common in broad alluvial channels that have been incised and widened from past and continuing land use practices.

Table 1 Temperature summaries at monitoring sites in Yellowjacket Creek, tributaries, and the Cispus River.

Stream Name	Monitoring Location	Maximum 7-day average temperature in 2020 (°C)	Years monitored	Years temperature exceeded maximum 7-day average of 16 °C (# and years)	Highest maximum 7-day average temperature (°C)
Pumice Creek	At confluence with Pinto Creek	14.0	12 2001-2005, 2007, 2009-2010, 2017-2020	2 2001 and 2009	16.6 (2009)
Pinto Creek	At confluence with Yellowjacket Creek	13.5	5 2001-2003, 2019-2020	0	15.2 (2001)
Pinto Creek	At 2800-144 Road	n/a	1 2001	0	12.1 (2001)
Badger Creek	At mouth	n/a	1 2001	0	12.0 (2001)
Badger Creek	At 2810-041 Road	11.8	1 2020	0	11.8 (2020)
Veta Creek	At confluence with Yellowjacket Creek	16.4	2 2019, 2020	1 2020	16.4 (2020)
Galena Creek	Near Yellowjacket Confluence	13.7	2 2019-2020	0	13.7 (2020)
Lambert Creek	At 29 Road	10.8	2 2019-2020	0	10.9 (2019)
High Bridge Creek	At 29 Road	12.8	2 2019-2020	0	12.8 (2020)
McCoy Creek	At Confluence with Yellowjacket Creek	15.1	10 2001, 2009-2014, 2017-2020	1 2009	16.6 (2009)
Yellowjacket Creek	Above McCoy Creek	15.3	18	4 2004, 2006, 2009, 2015	17.3 (2015)

Stream Name	Monitoring Location	Maximum 7-day average temperature in 2020 (°C)	Years monitored	Years temperature exceeded maximum 7-day average of 16 °C (# and years)	Highest maximum 7-day average temperature (°C)
			2001, 2003-2010, 2012-2020		
Yellowjacket Creek	At confluence with Cispus River	18.3	21 1996, 1999-2017, 2020	15 2000-2003, 2005-2007, 2009, 2012-2017, 2020	20.9 (2015)
Yellowjacket Creek	River Mile 11	11.2	2 2019, 2020	0	11.6 (2019)
Cispus River	Above North Fork Cispus River	13.9	18 1994, 2000, 2003-2011, 2013-2016, 2018-2020	3 2005, 2009, 2015	17.1 (2015)
Cispus River	Above Yellowjacket Creek	16.2	9 2000, 2011-2015, 2017-2018, 2020	6 2013-2015, 2017-2018, 2020	18.4 (2015)
Cispus River	Below Greenhorn Creek	17.5	16 2000, 2003-2005, 2007, 2009-2020	14 2003- 2005, 2007, 2009-2010, 2012-2015, 2017-2020	20.0 (2015)
Cispus River	Below Iron Creek (at Forest boundary)	17.5	21 1999-2020	19 2000-2007, 2009-2010, 2012-2020	19.9 (2015)

*Site added since 2014.

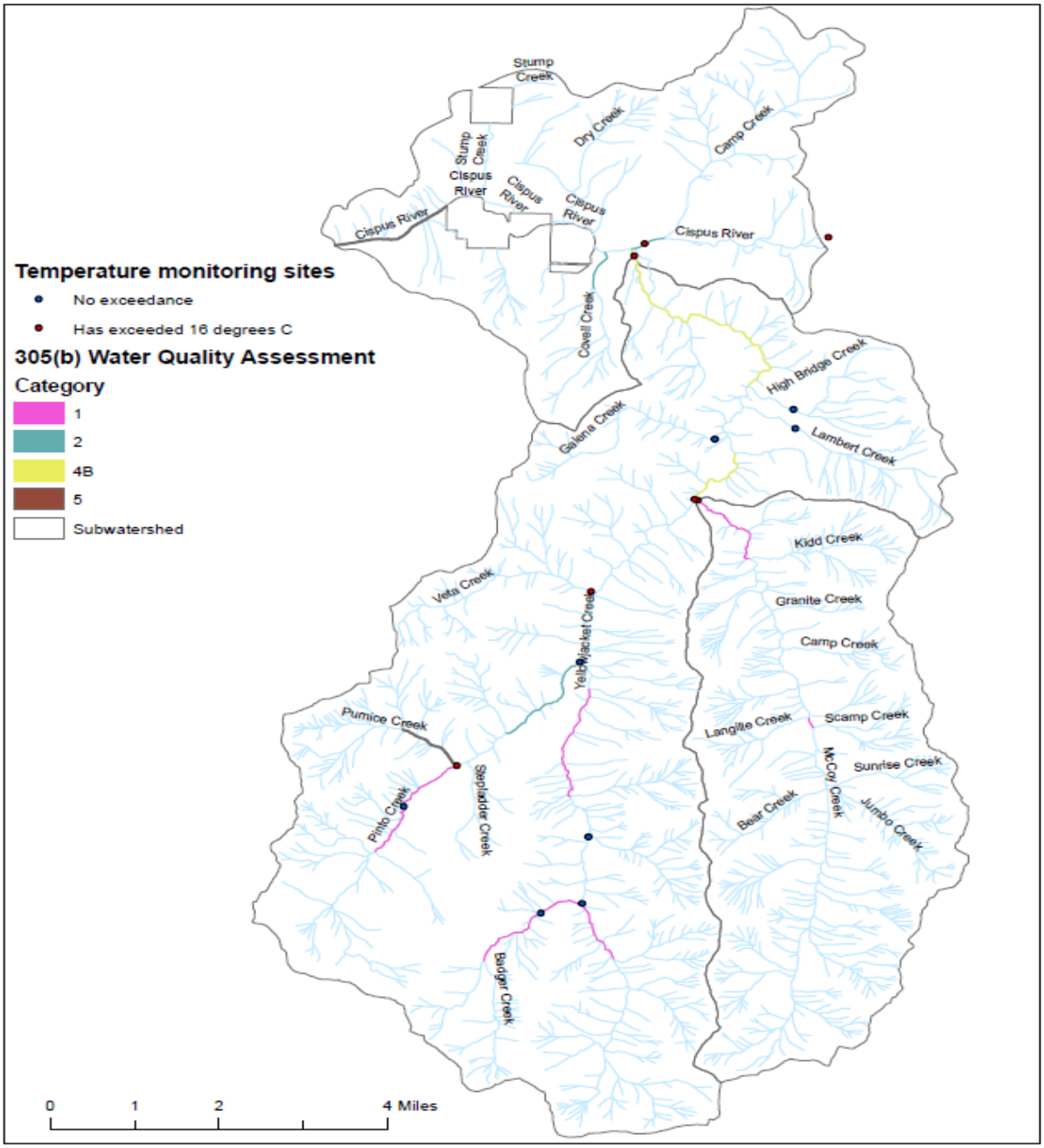

Figure 1. Map of Yellowjacket Creek, McCoy Creek, and Camp Creek-Cispus River subwatersheds, temperature monitoring sites, and 305(b) status.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

The designated use for the temperature impaired segments of Yellowjacket Creek is core summer salmonid habitat, and the temperature criterion is 16 degrees centigrade, year round. In addition, the segments have a supplemental spawning criterion of 13 degrees centigrade from February 15 to June 15.

Most riparian areas in the watershed will be restored by passive restoration, which means letting the areas recover on their own. This process can take 100 years or more. In addition, the Forest Service has implemented some active riparian restoration projects, which generally involve thinning riparian stands to encourage the remaining trees to grow faster and therefore provide more shade sooner. Stream temperatures in the smaller tributaries in the upper watershed should improve within the next five to ten years as vegetation grows and streambank stability increases (barring any additional natural disturbances or extreme climatic trends). Stream temperatures in the lowest reaches of the Yellowjacket Creek watershed will take longer to show improvement because the stream has widened and shallowed from excessive sediment inputs. In this area, lowered stream temperatures will depend as much on the stream recovering its natural geometry and stability as on restoring riparian shade.

Work that the Forest Service has done and plans to do to address road related sediment problems will also help to solve the temperature impairments in Yellowjacket Creek. The stream has widened and shallowed because of human caused sedimentation, and as roads are repaired, decommissioned, and routinely maintained, the sediment load to streams will decrease.

However, stream recovery takes time even when sediment delivery is decreased. Streams may take a decade or more to move past excessive sediment loads, and the amount of time this takes depends on the magnitude of flow events that occur. Consequently, stream widths may narrow temporarily and then widen again after a flow event that is large enough to move some of the excessive sediment load stored within the streams. As channel stability improves through time, other restoration treatments, such as placement of large wood in the channel, will become more viable.

It is anticipated that with the completion of identified high priority work, episodic inputs of accelerated sediment from roads, undersized or aging culverts, and bank instability will be decreased from the channel condition imprints observed historically. The overall effectiveness of these treatments should become evident by increased watershed stability in response to future flood events. Monitoring of BMP effectiveness and periodic aerial photo interpretation would help define recovery trends and timeframes.

Again, implementation of projects to improve temperature on the Forest fall into three primary categories: 1) Road treatments, 2) Riparian Reserve enhancement, and 3) stream restoration. Treatment types, and the objectives these projects fulfil to restore watershed processes to improve temperature are shown in Table 2.

Table 2 Treatment types, and objectives and definitions of treatments.

Treatment Type	**Definition and objectives**
Road Treatments	
Decommission	Road decommissioning includes activities that stabilize and restore uneeded roads to a more natural state to mitigate

Treatment Type	Definition and objectives
	hydrologic risk and reduce erosion and sedimentation. Decommissioning treatments can include all of the following techniques; revegetation, installation of waterbars, removal of culverts and road fill, removal of unstable road shoulders, full road prism obliteration and restoration of natural slope. Type and scale of treatment is dependent on site-specific considerations. Decommissioned roads will not be used in the future and are left in a state where erosion and sedimentation risk is eliminated.
Culvert upgrades/replacements	Replacement of culvert crossings to facilitate aquatic organism passage and improve hydraulic function to restore processes that improve temperature. Culvert replacements reduce the risk of crossing failure and the episodic input of sediment associated with these failures.
Reconstruction/maintenance	Road reconstruction and maintenance involves the improvement of existing roads to improve safety, service and environmental standards. Practices include refurbishing ditches and other drainage structures, rebuilding inlets and outlets, shaping road surface to drain properly, slope and fill stabilization, and improvement of surfacing.
Close/hydrologic stabilization	Hydrologic stabilization is a technique to store and stabilize roads to avoid, minimize, or mitigate adverse effects to water quality, aquatic habitat, and riparian resources. Hydrologically stabilized roads minimize erosion and hydrologic connectivity between the road and stream system. Practices include, but are not limited to, removal of culverts and fill presenting an unacceptable risk of failure or flow diversion, and suitable measures to ensure the road surface will intercept, collect, and remove water from the road surface in a manner that reduces concentrated flow in ditches, culverts, and over fill slopes and road surfaces without frequent maintenance. Roads that are hydrologically stabilized would remain as part of the FS road system; therefore the intent is to retain the integrity of the roadway to the extent practicable, and measures would be implemented to reduce sediment delivery from the road surface road fills to reduce the risk of crossing failure and stream diversion.
Riparian Reserve Enhancement	Vegetation treatment objectives for Riparian Reserves as defined in the Northwest Forest Plan are to accelerate the development of late successional stand characteristics which in the long-term, will provide shade to perennial streams. Actions include thinning densely stocked young stands to reduce

Treatment Type	Definition and objectives
	competition during the early stages of growth and addressing stands that were identified in a shade model as lacking effective shade to perennial streams.
Stream Restoration	Restoration of hydrologic, floodplain, and riparian function through placement of in-stream large wood structures to scour pools, sort gravels, support floodplain forest succession, re-engage relict side channels, and provide shade. Large wood structures are generally positioned to encourage development of a multi-thread channel network, providing side channel and off-channel habitat throughout a range of flows to encourage sustenance of summer low-flows and encourage Riparian Reserve development. Projects also include planting of adapted native trees and shrubs to accelerate riparian restoration. Wood for projects is generally acquired through harvest of upland stands, and trees from the adjacent Riparian Reserve.

Projects completed in the Yellowjacket subwatershed that contribute toward improving the functions that will eventually lower stream temperature are shown in Table 3. There were no projects completed in the McCoy Creek subwatershed in this timeframe.

Table 3 Projects completed in the Yellowjacket subwatershed since 2014.

Project Type	Total	Location and year
Culvert upgrades	5 crossings	Forest Road (FR) 2800-000 at MP 9.1, 2017 FR 2809-000 at MP 0.1, 2017 FR 2800-000 at MP 7.8, 2018 FR 2810-000 at MP 1.3, 2019 FR 2810-000 at MP 1.9, 2019
Road Decommission	0.5 miles	FR 7700-239, 2016
Road reconstruction and maintenance	31.7 miles	FR 7700-000 23 miles 2019 FR 7605-000 9.7 miles 2019
Riparian Reserve Enhancement	2015 9.8 acres 2016 18.6 2017 18.5 acres 2019 5 acres 2020 13.3 acres	Pinto Creek-2015, 2016 Veta Creek-2015 Yellowjacket Creek 2017, 2019, 2020
Yellowjacket Stream Restoration	6 large wood installed at the	2020

Project Type	Total	Location and year
	mouth of Yellowjacket Creek	

Watershed Condition Framework

The Forest Service developed and began implementing the Watershed Condition Framework (WCF) in 2011 to provide a consistent, comparable, and credible process for improving the health of watersheds on national forests and grasslands. The WCF forms the basis for the management of aquatic resources on the Forest and includes 6-steps: a) classification of watershed condition at the subwatershed scale; b) prioritization of watersheds for restoration; c) development of Watershed Restoration Action Plans (WRAP) for Priority Watersheds; d) implementation of the integrated restoration projects defined in those plans; e) tracking of restoration accomplishments; and f) monitoring and verification. Additional details are available in the Watershed Condition Framework document (USDA Forest Service, 2011a. Watershed Condition Framework. FS-977. Washington, DC. 24 pp.) and Watershed Condition Classification (WCC) Technical Guide (USDA Forest Service, 2011b. Watershed Condition Classification Technical Guide. FS-978. Washington, DC. 41 pp.).

The Forest is in the process of designating the Yellowjacket subwatershed as a priority watershed under step c of the WCF, based on water quality concerns, and the strong focus of ongoing and planned aquatic and riparian restoration in the subwatershed. The WRAP for the Yellowjacket subwatershed is under development with a final draft anticipated in early 2021. The WRAP for the Yellowjacket subwatershed classifies watershed condition, and presents essential projects the Forest and partners will complete over the next five years. Upon completion of these essential projects, the FS anticipates that overall watershed condition will be improved in the Yellowjacket subwatershed, and that the functional processes that will eventually improve temperatures in Yellowjacket Creek have been restored, or are on a trajectory toward restoration.

Designation of the Yellowjacket subwatershed as a priority is in alignment with the Yellowjacket Restoration project, and will position the Forest to leverage funds from multiple sources to ensure aquatic restoration projects are implemented.

Vegetation Management Project Planning

The Gifford-Pinchot National Forest has developed a 10-year vegetation management plan that identifies planning areas across the Forest where vegetation restoration projects will be planned and implemented. The Yellowjacket subwatershed is within the current planning area for the Yellowjacket Restoration project. The project is currently under pre-NEPA analysis, with a final NEPA decision planned for early 2022, with implementation following over the next five to ten years. Most planned projects in the Yellowjacket subwatershed are identified in this report are part of this larger planning effort. Including these aquatic restoration projects as part of the larger Yellowjacket project planning process will open funding opportunities and ensure that projects are completed in a timely fashion.

Roads Analysis

The Forest completed a Forest-wide Travel Analysis Report in 2015 (USDA Forest Service. 2015. Travel analysis report Gifford Pinchot National Forest. Vancouver, WA. 47 p.) under the Travel Management Rule (36 CFR 212) resulting in a prioritization of roads on national forest lands that addresses access and environmental risk, including water quality, setting the stage for further reductions in road miles and targeted improvement in the remaining road system. This report provides a recommendation for management for all roads under the Forest's jurisdiction.

This broad-scale Forest-level analysis will be applied at the project scale to inform road treatments in the Yellowjacket project. Additional analysis tools are useful to along with the Geomorphic Analysis and Inventory Project_Lite (GRAIP_Lite) (Nelson, N. Luce, C. and T Black. 2019. GRAIP_Lite: A system for road impact assessment. USDA Forest Service Rocky Mountain Research Station, Boise Aquatic Sciences Lab. 145 p) GRAIP_Lite is a system of spatial analysis tools developed by the Forest Service Rocky Mountain Research Station that models road-related sediment impacts to stream habitats. This model in combination with field reconnaissance will be used in the Yellowjacket project planning process to determine areas where roads present a higher risk to the stream system, and prioritizing roads for restoration or remediation efforts.

Climate Vulnerability Analysis and Climate Resiliency

The Gifford Pinchot National Forest completed a climate change vulnerability assessment in October 2019 (Hudec, J.L. Halofsky, J.E., Peterson, D.L., and Ho, J.J., eds. 2019. Climate change vulnerability and adaptation in southwest Washington. Gen. Tech. Rep. PNW-GTR-977. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 249 p.) With respect to maintenance and enhancement of the functions that improve temperature, this analysis focused on potential thermal impacts to anadromous fish species, emphasizing the need to build aquatic habitat resiliency and connectivity. Key themes 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

The Forest is working toward these goals and focusing efforts to build resiliency in watersheds where aquatic function has been compromised through past land use practices. Essential projects in the Yellowjacket Creek WRAP focus on building resiliency, particularly in reaches of Yellowjacket Creek that have been incised and widened where temperature is elevated.

Estimate or Projection of Time When Water Quality Standards Will be Met

Waters in Yellowjacket Creek will continue to violate temperature standards until excess sediment has worked its way out of the system and streams have recovered their natural geometry and the riparian areas have recovered. Given the time it takes for natural systems to recover, Ecology estimates that it will take 40 years for Yellowjacket Creek to meet the temperature standard.

Schedule for Implementing Pollution Controls

Projects planned in the Yellowjacket subwatershed over the next five years are shown in Table 4. With the exception of the Yellowjacket stream restoration, projects are in the pre-NEPA planning phase and are subject to change based on the results of the NEPA analysis.

Table 4 Projects planned in the Yellowjacket subwatershed through 2025

Project Name	**Description**
Road Reconstruction	40-50 miles of treatment anticipated
Motorized trail reconstruction	Approximately 10 miles of motorized trails treated
Culvert Replacements	3 fish aquatic organism passage improvement projects: Veta Creek (FR 7713-000), High Bridge Creek (FR 2900-000) Badger Creek (FR 2810-041) 1 culvert replacement for hydraulic upgrade on Yellowjacket Creek at FR 2810-041
Road Hydrologic stabilization	Approximately 15 miles of road treated
Unauthorized road closures	Full removal of unauthorized roads in the Pumice and Pinto Creeks headwaters
Riparian Reserve Enhancement	Approximately 50 acres of Riparian Reserve enhancement throughout riparian areas in the Yellowjacket subwatershed
*Yellowjacket Creek Stream Restoration RM 1-6	Installation of large woody debris, side channel reconnection, and riparian enhancement in Yellowjacket Creek from the 28 Road to the McCoy Creek confluence Improve hydrologic function in Yellowjacket Creek and promote deep pool formation, side channel and floodplain connectivity, and old forest characteristics in Riparian Reserves adjacent to Yellowjacket Creek.
Pinto Creek Stream Restoration	Improve hydrologic function in Pinto Creek through installation of large woody debris to promote deep pool formation, side channel and floodplain connectivity, and promote old forest characteristics in Riparian Reserves adjacent to Pinto Creek.

*Yellowjacket Creek Stream Restoration-The Yellowjacket Stream Restoration is the largest planned active restoration project, with the potential to deliver direct benefits to stream temperature in Yellowjacket Creek. The Forest is partnering with is Cowlitz Tribe and multiple funding agencies to complete the project over the next four years.Temperature exceedances in lower Yellowjacket Creek are a direct effect of diminished aquatic function. Past land use practices have resulted in an incised and widened channel with areas of channel instability, few stable wood accumulations, rapid bank erosion and lateral channel adjustment, and isolated floodplain terraces. The channel habitat is dominated by low gradient riffle and pool sequence with abundant cobble (mean D50 ranging from 137-232 mm). Large wood is sparse throughout

the first 1.7 miles of Yellowjacket Creek, averaging 11 pieces of large wood>24 in diameter per mile. The Yellowjacket Restoration project includes restoration of instream and off channel habitats to enhance natural geomorphic and hydrologic processes through installation of large wood. Most of the restoration reach will result in no less than two active channels, more than doubling the channel length and available edge habitat to improve riparian function and decrease stream temperature. The placement of large wood in Yellowjacket will be such that they enhance flow deflection into side and distributary channels, with some minor excavation at the inlets to introduce perennial flow. Log jams will also encourage pool formation and enhance water storage and hyporheic exchange, which will improve stream temperatures. Approximately 36 large engineered log jams will be installed in Yellowjacket Creek on approximately six miles of stream. Project implementation began in 2020, with phased work continuing for the next four years.

Monitoring Plan to Track Effectiveness of Pollution Controls

As detailed above the Forest Service monitor temperatures at multiple locations. They plan to continue monitoring at all current sites as part of the ongoing commitment to monitor and improve water quality in the Yellowjacket Creek subwatershed.

Commitment to Revise Pollution Controls as Necessary

The Gifford Pinchot National Forest is required under the Forest Plan for the forest, as amended by the Northwest forest Plan (NWFP), to adjust and adapt activities if monitoring demonstrates that goals and objectives of the plan are not being met. In addition, an interagency aquatic monitoring effort, Aquatic-Riparian Effectiveness Monitoring Protocol (AREMP) has been in place since the inception of the NWFP with requirements to evaluate the effectiveness of the NWFP aquatic conservation strategy, and address watershed condition trends across the NWFP area. The outcomes of AREMP will be critical in determining whether implementation is working and if additional management practices will be needed.

Ecology expects that implementation activities completed and planned in the Yellowjacket watershed will achieve compliance with state water quality standards. However, if they do not, Ecology will work with the Forest Service to determine other controls that could be used to achieve compliance.

4b Analysis for Kitsap County Pollution Identification and Correction (PIC) Program February 2021

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude the following listings for fecal coliform from the 303(d) list and place these water bodies in category 4b of the IR. Ecology's basis for excluding these waterbodies from the 303(d) list is outlined in this evaluation.

- Bacteria—7652, 10370, 10371, 10375, 10376, 10387, 23695, 74746, 7633, 74656, 7643, 53094, 53113, 53110, 53117, 38667, 43034, 53101, 53091, 36197, 53106, 38524, 53108, 74678, 38528, 53109, 7645, 7646, 7647, 52902, 60190, 38833, 53096, 38863, 53100, 74639, 38816, 53097, 74792, 74793, 53116, 7636, 7640, 7641, 7643, 10387, 53095, 53149, 53150, 53187 and 53188.

Kitsap County segments proposed for category 1 that were previously in category 4b include:

- 7651-Martha-John Creek
- 7637-Dogfish Creek
- 10389-Purdy Creek
- 38460-Boyce Creek
- 38616-Gorst Creek

Identification of Segment and Statement of Problem Causing Impairment

These creeks are located in various parts of Kitsap County. The fecal coliform pollution in these streams was identified by Kitsap County through its on-going monitoring program. The primary sources of bacteria pollution in Kitsap County are:

- Failing septic and sewer systems
- Faulty stormwater systems
- Pet and livestock waste
- Runoff from farms

Description of Pollution Controls and How They Will Achieve Water Quality Standards

In the early 1990s, Kitsap County agencies faced several difficult issues:

- The Public Health District sought more permanent funding to deal with shellfish closures, failing septic systems, and other water quality problems.
- The Department of Public Works needed to develop a stormwater management program in response to the U.S. Environmental Protection Agency's National Pollutant Discharge Elimination System Permit Program.

- The conservation district needed to respond to 1989 legislative approval to seek a fee to fund programs for landowner assistance.
- The Department of Community Development sought more permanent funding for state mandated watershed planning efforts.

A group of County Managers and Commissioners with a long range vision for water quality began working together to design a coordinated interagency partnership to meet multiple needs in the county. In October 1993, after two years of planning and public process, the Kitsap County Board of Commissioners adopted Ordinance 156-1993, establishing the Kitsap County Surface and Stormwater Management Program (KCSSWM). The goals of the program are to:

- Protect public health and natural resources.
- Minimize institutional costs.
- Meet state and federal regulatory requirements.
- Provide a permanent funding source to address nonpoint source pollution.

Kitsap Public Health is the primary agency responsible for monitoring, identifying, and prioritizing nonpoint fecal pollution correction programs in Kitsap County. In response to the fecal pollution problem, Kitsap Public Health developed a Pollution Identification and Correction (PIC) program, an Onsite Sewage System (OSS) Monitoring and Maintenance program, and a Water Protection Complaint Response program. The PIC program receives a significant portion of its funding from Kitsap County's Surface and Stormwater Management (SSWM) Program. SSWM fees are assessed on properties in the unincorporated area of Kitsap County. Fees appear on annual property tax billings.

Kitsap Public Health's PIC program, OSS Monitoring and Maintenance program and Complaint response program utilize existing local regulations and authority to address FC pollution sources and enforce correction when necessary. These programs incorporate a strong educational element to prevent future fecal pollution.

The Kitsap Public Health District has monitored major streams and marine waters for FC on a routine basis since 1996. This extensive monitoring program has resulted in the listing of many Kitsap County marine and freshwater bodies for fecal coliform pollution on Washington State's 303(d) List of impaired or threatened waters. During the 2013 water year, both stream and marine stations were typically sampled once each month.

Fewer samples may be collected at a monitoring station due to lack of flow during the dry season, hazardous weather conditions, equipment failures, or other circumstances.

The PIC Program uses water quality monitoring data to identify priority water bodies for clean up. The primary focus of the monitoring program is to assess long-term pollution trends associated with human sewage and animal waste from nonpoint sources. Health District staff sample water quality monthly at approximately 95 stations on 54 streams and 67 marine stations. Field equipment measures turbidity, dissolved oxygen, pH, and temperature. Fecal coliform samples

are analyzed by an Ecology accredited laboratory. Data are used to identify areas in need of pollution control and to evaluate the effectiveness of the correction program.

Clean up projects are designed to address the causes and sources of bacterial water pollution in specific geographic areas that the trend monitoring program has identified. SSWM provides funding for PIC projects. The goal of each PIC project is to:

- Protect public health.
- Protect shellfish resources.
- Preserve, protect, and restore surface water quality.

The best management practices (BMPs) being used to improve water quality include a requirement to properly operate and maintain on-site systems in the watershed. Kitsap Public Health District is actively engaged in on-site system education, dye testing of suspect systems, and enforcement of the Kitsap County Board of Health Ordinance 2008- 11, On-Site Sewage System and General Sewage Sanitation Regulations, which requires proper design, installation, repair, operation and maintenance of on-site septic systems. In addition, the Kitsap Conservation District assists small farm owners and owners of livestock to implement BMPs for animal waste management and farm pollution control. The conservation district's role is as a non-regulatory agency. When a regulatory approach is needed, the Health District enforces the Solid Waste Regulations (KCBOH 2004-2).

Several enforceable pollution controls will assure that compliance with water quality standards is achieved.

- Kitsap County Ordinance 156-1993, establishing the Surface and Stormwater Management Program, which created an on-going, stable source of funding.
- Kitsap County Board of Health Ordinance 2008-11, On-Site Sewage System and General Sewage Sanitation Regulations, which requires proper design, installation, repair, operation and maintenance of on-site septic systems.
- Kitsap County Board of Health Ordinance 2004-2, Solid Waste Regulations, which regulate handling and disposal of animal manure and pet waste; animal waste violations are enforced by the Health District under this ordinance.
- RCW 90.72, Shellfish Protection Districts.

Estimate or Projection of Time When Water Quality Standards Will be Met

All waters in Kitsap County are subject to one of the following standards for bacteria. The county-wide monitoring program compares monitoring data with the appropriate standard to determine whether the water body is on an improving trend and whether it has achieved compliance with standards.

Primary Contact Recreation Bacteria Criteria in Fresh Water

Table 5 Primary contact recreation bacteria criteria in fresh water

Bacterial Indicator	Criteria
E. Coli	E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL.
Fecal coliform (expires 12/31/2020)	Fecal coliform organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 100 mL.

Marine

Table 6 Primary contact recreation bacteria criteria in marine water

Bacterial Indicator	Criteria
Fecal Coliform bacteria	Fecal coliform organ-ism levels are used to protect shellfish harvesting. Criteria are ex-pressed as colony forming units (CFU) or most probable number (MPN). Fecal coliform must not exceed a geometric mean value of 14 CFU or MPN per 100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 CFU or MPN per 100 mL.

Ecology expects that most of the water bodies covered by Kitsap County's PIC program will achieve compliance with bacteria standards by 2025. However, it should be noted that bacteria problems are likely to re-occur as septic systems age and properties change hands, so it should not be considered a failing of the PIC program if some waters move into category 1, and then occasionally move back into category 4b. In fact, an issue to remember with nonpoint pollution is that it is not the kind of thing that can be fixed just once. Instead, it requires continual vigilance, which is just what the PIC program provides.

Schedule for Implementing Pollution Controls

As described earlier in this report, Kitsap County has already implemented the PIC program and is continuing periodic monitoring, identifying problems, and fixing them. This is an on-going program, exactly what's needed to solve nonpoint pollution problems and to keep them from happening again.

Monitoring Plan to Track Effectiveness of Pollution Controls

Kitsap County has a countywide monitoring program. Samples are taken monthly and compared to the bacteria standard. Assessment results are reported to the public and EPA through Kitsap County's website and through Ecology's IR report development process.

Commitment to Revise Pollution Controls as Necessary

Ecology will continue to work with Kitsap County to ensure that the PIC program continues. We fully expect the program to achieve compliance with bacteria water quality standards throughout the county. However, if it does not, Ecology will work with Kitsap County to determine other controls that could be used to achieve compliance.

4b Analysis for Total Dissolved Gas (TDG) Impairments Addressed by Federal Energy Regulatory Commission (FERC) licenses February 2021

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude six listings for TDG from the 303(d) list and place these segments into category 4b. The specific listings are:

- 15183, 15184—Spokane River
- 6532- Lewis River, Swift #1 Tailrace
- 6542—Lewis River, Yale Tailrace
- 6533—Swift Creek #2 Power Canal
- 6535— Lewis River, Swift #2 Tailrace

All of the listings were in category 5 of the 2012 IR. Ecology's basis for excluding these waterbodies from the 303(d) list is outlined in this evaluation.

Identification of Segment and Statement of Problem Causing Impairment

Segments 15183 and 15184 are located in the Spokane River downstream of Avista's Long Lake Dam. Segment 6532 is located within the bypass channel downstream of Pacificorp's Swift No. 1 Project, 6542 is located downstream of Pacificorp's Yale Project within the tailrace, 6533 is located downstream of PacifiCorp's Swift No. 1 Project within the power canal, and 6535is located downstream of Cowlitz County Public Utility District (PUD) Swift No. 2 Project within the tailrace, all in the Lewis River. Impairments in these segments are caused by exceedance of Washington's TDG criterion, which requires that TDG shall not exceed 110 percent of saturation at any point of sample collection. The TDG exceedances at these locations are caused by large spills from the dams.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

Under section 401(a)(1) of the Clean Water Act (CWA), the Federal Energy Regulatory Commission may not issue a license for a hydroelectric project unless the state water quality certifying agency has issued a Water Quality Certification (WQC)for the project or has waived certification by failing to act within a reasonable period of time, not to exceed one year. Section 401(d) of the CWA provides that state certification shall become a condition of any federal license that authorizes construction or operation of the project.

The FERC license for Long Lake Dam was issued June 18, 2009, and is available here: https://www.ezview.wa.gov/Portals/_1962/images/FERC%20401s/SpokRvrCleancopyOrder6702FERC2545.pdf

The FERC licenses for the Yale, Swift No. 1, and Swift No. 2 Projects and the WQCs were issued on October 9, 2006 and four amendments were issued on December 21, 2007, January 17, 2008, October 3, 2008, and November 7, 2011.These three Projects are listed as Lewis River Hydroelectric Projects and individual dams are located below the Lewis River link, and are available here: https://ecology.wa.gov/Regulations-Permits/Permits-certifications/401-Water-quality-certification/Certifications-for-hydropower-licenses.

For all three of these FERC licenses, the Department of Ecology has issued a CWA 401 WQC that requires compliance with state water quality standards for TDG. The WQC are typically a component of the FERC licenses.

All of the 401 WQCs contain the following requirements: (1) compliance with all state water quality standards approved by the EPA; (2) compliance with sediment quality standards;(3) prohibition of discharge of any solid or liquid waste to the waters of Washington; and (4) reservation of Washington Ecology's authority.

Estimate or Projection of Time When Water Quality Standards Will be Met

The Long Lake Project completed structural modifications and designed spillway protocols in 2016 as specified in their approved TDG Water Quality Attainment Plan. Currently, effectiveness monitoring for those modifications and protocols is being conducted. Evaluation of the effectiveness monitoring will be completed by 2023. Therefore, the Long Lake Project should achieve compliance by 2023. Ecology will continue to work with Avista as part of their dam compliance and review TDG spill data collected.

The Lewis River Projects (Yale, Swift No. 1 and Swift No. 2) are currently working on compliance with the TDG standards. A Water Quality Management Plan was approved on March 25, 2013 which included these three Projects. The Swift No. 1 Project spill related TDG Attainment Plan was approved on February 25, 2014. Therefore, Yale and Swift No. 2 Projects should have achieved compliance by March 25, 2023 and Swift No. 1 should have achieved compliance by February 25, 2024. Ecology routinely reviews data related to TDG spills provided by PacifiCorp and Cowlitz County PUD.

Schedule for Implementing Pollution Controls

Pollution controls are presently in place for all four projects, as required by the FERC licenses.

Monitoring Plan to Track Effectiveness of Pollution Controls

The FERC license holders are required to monitor TDG and to implement control and attainment measures. They are also required to develop and implement a TDG attainment plan if monitoring indicates that TDG exceeds 110 percent saturation. Reductions in TDG will improve water quality for aquatic organisms, specifically fish species, inhabiting the project area.

Commitment to Revise Pollution Controls as Necessary

If gas abatement plans are required, and if monitoring to test the effectiveness of the gas abatement controls implemented through the plans shows that the TDG abatement measures identified in the plans and subsequently employed are not successful in meeting the water quality criterion within the first ten (10) years of discovery of TDG criterion exceedances caused by spill, Ecology will require further activities to meet the water quality criterion. Significant structural or operational revisions that may impose potentially unreasonable costs or create potentially unreasonable societal effects may be evaluated as part of a formal Use Attainability Analysis consistent with the federal and state water quality regulations after the ten-year compliance period has ended.