4b Analysis for Upper Alpowa Creek

The Washington Department of Ecology (Ecology) Integrated Report (IR), which was submitted to EPA in May 2008, has excluded three listings (40557, 40558, and 45991) for fecal coliform, two listings (47041 and 47042) for dissolved oxygen, and one listing (50348) for pH in Upper Alpowa Creek from the 303(d) list and placed these waterbodies in category 4b of the IR. Water bodies 40557 and 40558 were listed in Category 5 of the 2004 IR. The other water bodies are included on the 2008 list because we have new data. 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

Alpowa Creek is located in Garfield County 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.

The impaired segments are:

- 40557, fecal coliform, on Alpowa Creek between river kilometers 11.7 and 12.7.
- 45991, fecal coliform, on Alpowa Creek, between river kilometers 12.7 and 13.9.
- 47041, dissolved oxygen, on Alpowa Creek, between river kilometers 12.7 and 13.9.
- 50348, pH, on Alpowa Creek, between river kilometers 12.7 and 13.9.
- 40558, fecal coliform, on Alpowa Creek, between river kilometers 18.2 and 20.2.
- 47042, dissolved oxygen, on Alpowa Creek, between river kilometers 18.2 and 20.2.

The impaired segments are illustrated on the map on page 7.

Monitoring data for the listed segments was collected from 1999 through 2006. Only 1999 and 200 data is available for segment 40557, and it is sketchy. WSU data show that during those two years, segment 40557 showed excursions above the geometric 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 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 streambanks. 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 instream 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 fecal coliform impaired segments of Alpowa Creek are designated primary contact recreation. Fecal coliform levels must not exceed a geometric mean value of 100 colonies/100mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) exceeding 200 colonies/100mL. 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 segment, 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 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 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 requires a minimum 35 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 conducts a reach by reach assessment to determine the appropriate trees and shrubs to be used for restoration. Ecology is currently partnering with universities to study the genetic make-up of local riparian seed banks. Ecology then establishes nurseries to propagate the site appropriate plant material. 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.

Ecology teams with conservation districts, local governments, and landowners to provide technical assistance and funding for implementation of best management practices. Ecology uses a traditional regulatory process only when collaborative efforts fail.

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 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. 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.

As shown on the map on page 7, 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.

In this watershed, most cattle have now been excluded from the stream. However, monitoring data show occasional high fecal coliform counts, so the program is continuing to look for other sources. There are one or two isolated farmhouses in the watershed that might be contributing. It's also possible that we are seeing the result of 100 years of cattle grazing in this watershed, with old manure still washing into the stream during spring high water.

Our experience has shown that it is not always necessary to create buffers on entire creeks in order to achieve compliance with standards. For instance, in this area, which is largely arid, not all riparian areas can support trees and shrubs. Also, many small streams pass through areas of ravines and steep topography, which naturally limit animal access and at the same time shade the stream. There are also some areas where cattle are not grazed, so the riparian areas are in good shape now.

One thing we expect to learn through this program is exactly how much riparian restoration is required to get these streams into compliance with water quality standards and keep them in compliance. The intent of the Livestock and Water Quality Program is to restore the watershed so that all streams consistently comply with standards for all pollutants. We will continue installing buffers and other management practices until this goal is met.

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, 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 judgment 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..

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 years, so upper Alpowa Creek will be meeting the standards for fecal coliform, dissolved oxygen and pH throughout the entire watershed by 2017.

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.

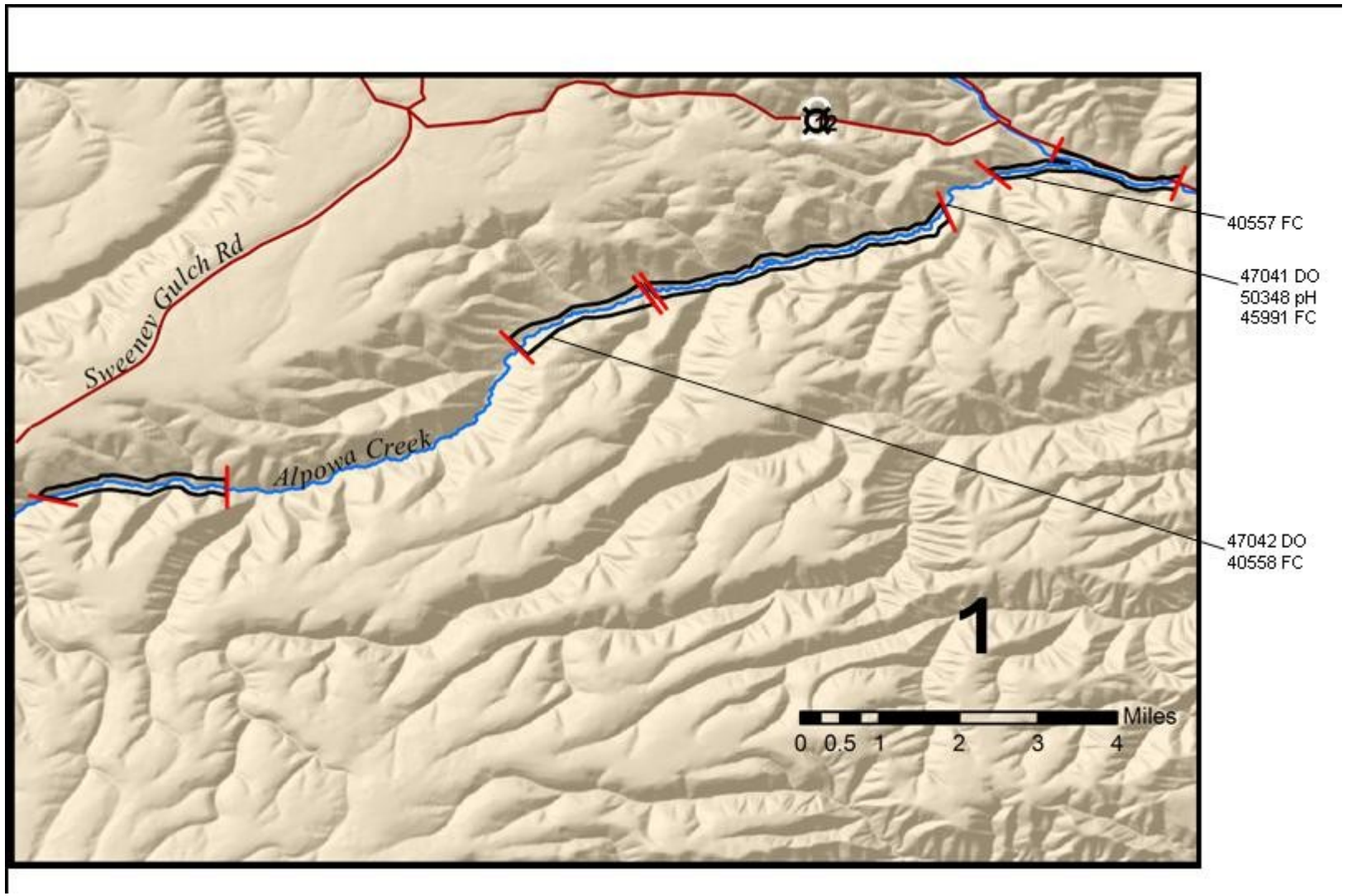
Monitoring Plan to Track Effectiveness of Pollution Controls

The Asotin County Conservation District is monitoring water quality in Alpowa Creek 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.

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.



Map shows locations of fencing installed, shown by black lines, which are not to scale. In areas in which some riparian vegetation was intact and expected to recover once cattle were removed, we are depending on natural revegetation. In all other areas riparian buffers were installed by planting native plants. Part of the project is to continually assess condition of the buffers and to plant or replant those that are not recovering quickly enough.

Category 4b listings are labeled by listing identification number and pollutant.