WRIA 55 – LITTLE SPOKANE RIVER WATERSHED CURRENT AQUATIC HABITAT CONDITIONS FOR RCW 90.94 NET ECOLOGICAL BENEFIT EVALUATION

DRAFT

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ACRONYMS AND ABBREVIATIONS

Ecology	Washington Department of Ecology
GIS	Geographical Information Services
IMP	Intermountain Province
NEB	Net Ecological Benefit
RCW	Revised Code of Washington
RKM	River Kilometer
SCD	Spokane Conservation District
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UCUT	Upper Columbia United Tribes
UGA	Urban Growth Area
WDFW	Washington Department of Fish and Wildlife
WRIA	Watershed Resource Inventory Area
WSDOT	Washington State Department of Transportation

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INTRODUCTION

Revised Code of Washington (RCW) 90.94 requires an update to the Water Resource Inventory Area (WRIA) 55 Watershed Plan (Plan) that identifies projects and actions necessary to offset potential impacts to instream flows associated with new permit-exempt domestic water use projected over the next twenty years. At minimum, water offset projects must offset new projected use at the WRIA scale. There may be instances where the amount of offsets provided in certain subbasins will be more or less than the projected new consumptive water use.[1] In those instances, non-water offset projects such as habitat restoration and water quality improvement projects can be included in the Plan so that, in its entirety, it will achieve a Net Ecological Benefit (NEB).

To determine if there will be a NEB from implementing the Plan it is important to understand the current aquatic habitat conditions within the WRIA. This report is a compilation of existing information related to aquatic habitat and water quality that will serve as a baseline in the NEB determination for WRIA 55. Aquatic habitat conditions that will be addressed include water quality impairments, loss of riparian vegetation and wetlands, and habitat connectivity and complexity.

EXISTING CONDITIONS IN LITTLE SPOKANE RIVER WATERSHED (WRIA 55)

The Little Spokane River watershed, or WRIA 55, supports a variety fish species (see attached Table 1) with redband trout being particularly important. Redband trout is a subspecies of rainbow trout and those within the Little Spokane River are included in the upper Columbia River basin geographic population group (*Oncorhynchus mykiss gairdneri*). Redband trout habitat is distributed throughout the Little Spokane River mainstem and the tributaries of Dartford, Deadman, Little Deep, Deer, Dragoon, Buck, and Otter Creeks (Western Native Trout Initiative 2010, Figure 1).

The freshwater habitat requirements for redband trout include clear, cold water streams that have coarse substrates in riffle-run area, adequate natural cover (e.g., overhanging vegetation, large woody debris, boulders), and pools that can act as a refuge during winter and other adverse conditions. Redband trout prefer water temperatures of 12 to 18 degrees Celsius (53.6 to 64.4 degrees Fahrenheit) and require dissolved oxygen at levels of at least 7 milligrams per liter. For embryo survivability, optimal conditions include water temperatures between 7 and 12 degrees Celsius and spawning gravels with less than 5 percent fines. Greater than 30 percent fines may result in low survival (Raleigh et al., 1984).

The ability of the Little Spokane River to support redband trout and other fish has been impacted by human activities throughout the watershed. WRIA 55 basin is primarily a rural landscape, except for the

[1] Ecology GUID-2094 notes that the NEB evaluation *"should describe the projected impacts and any offsets within each of the subbasins. Because all impacts at a minimum must be offset at the WRIA level, the evaluation should determine if the plan has succeeded in offsetting the impacts at the WRIA level. This means there may be instances where the amount of offsets provided in certain subbasins will be more or less than the projected new consumptive water use there. This is acceptable because the offsets are provided within the WRIA and in sufficient quantities."*

urbanized southern portion of the watershed included within and immediately adjacent to the Spokane County Urban Growth Area (UGA).

Land use designations within the rural areas of the WRIA 55 include Rural Traditional, Rural Activity Center, Small Tract Agriculture, Mineral Lands, and Forest Land. These land use designations allow development at lower densities and limit commercial and community services to rural residential centers such as Riverside, Colbert, Chattaroy, Eloika, and Elk. Industrial activities are limited to resource-based industries, including ranching, farming, mining and forestry operations.

Land use designations within the urbanized areas of WRIA 55 within and immediately surrounding the UGA include Rural-5; Low, Medium and High Density Residential; Neighborhood, Community, and Regional Commercial; Low Density Commercial-Industrial; Light and Heavy Industrial; Mixed Use; and Urban Reserve. These allow development at higher densities and allow more types of commercial and industrial activities.

Throughout WRIA 55, the Rural Conservation designation is used along portions of the Little Spokane River and its tributaries. This designation applies to environmentally sensitive areas, including critical areas and wildlife corridors, and reduces development density.

Historical and current land uses in the watershed such as timber harvest, agriculture, industrial sand/gravel extraction, and urbanization have altered hydrology of the Little Spokane River and its tributaries, and degraded water quality and habitat by removing riparian vegetation, draining wetlands, diverting water, and straightening stream channels.

State water quality standards are set to protect designated beneficial uses, which include aquatic life uses and water contact recreational uses for the Little Spokane River. The water quality criteria applicable to the Little Spokane River are listed below (Table A).

Table A. Little Spokane River Water Quality Criteria

Parameter	Criteria
Fecal coliform bacteria	Levels shall both not exceed a geometric mean value of 50 colonies/100 mL, and not have more than 10% of all samples obtained for calculating the geometric mean value exceeding 100 colonies/100 mL.
Temperature	Shall not exceed a 7-day average daily maximum temperature of 16 ºC due to human activities. When natural conditions exceed, or are within 0.3 ºC of the criterion, cumulative human-caused activities will not raise temperatures more than 0.3 ºC
Turbidity	Shall not exceed 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10% increase in turbidity when the background turbidity is more than 50 NTU.
Dissolved oxygen	Shall exceed 9.5 mg/L. When natural conditions exceed, or are within 0.2 mg/L of the criterion, cumulative human-caused activities will not decrease the dissolved oxygen more than 0.2 mg/L
pH	Shall be within the range of 6.5 to 8.5 standard units with a human-caused variation within the range of less than 0.5 units.

Notes: C = Celsius; mg/L = milligrams per liter; mL = milliliters; NTU = Nephelometric Turbidity Unit

However, the Little Spokane River mainstem, several tributaries and lakes within the watershed have been listed on the state's 303(d) list for non-attainment of various state water quality standards including fecal coliform bacteria, temperature, turbidity, dissolved oxygen, and pH. In particular, high

summer water temperatures, increased sediment in the water column, low dissolved oxygen and alkaline conditions within the Little Spokane River watershed are problematic for fish like redband trout.

A multi-parameter Total Maximum Daily Load (TMDL) was developed in 2012 for the Little Spokane River watershed to address fecal coliform bacteria, temperature, and turbidity (Ecology, 2012). A TMDL is a study that determines the maximum amount, or "load," of specific pollutants that a waterbody can receive and still maintain water quality standards and recommends load reductions for each pollutant source to achieve waterbody recovery. To meet the load reductions in the TMDL, the study's overall recommendations were to restore riparian vegetation; implement Best Management Practices (BMPs) to control non-point sources of fecal coliform bacteria, heat and sediment; and to educate watershed residents. A TMDL has not yet been developed to address dissolved oxygen or pH, though Ecology is anticipating a draft TMDL in 2020.

Restoring riparian functions has been a primary focal point in improving poor water quality and habitat conditions in the Little Spokane River. Riparian habitats perform several functions, and when improved simultaneously address multiple concerns by:

- Providing stormwater capture and treatment
- Protecting streambanks from erosion
- Providing a source of large woody debris, allowing complexity in stream habitats
- Providing cover and food resources for terrestrial invertebrates, birds, and mammals
- Delivering leaf litter, organic debris, and terrestrial invertebrates to streams, which are sources of food for fish and aquatic invertebrates
- Shading streams to maintain cool water temperatures necessary for cold water fish species and other aquatic organisms
- Providing off-channel aquatic habitat as a flood refugium for rearing and overwintering fish

Prior to the 2012 multiparameter TMDL recommending restoration of riparian habitat, there was recognition that riparian habitat had been impacted throughout the Little Spokane River watershed. An analysis of aerial photos using Geographical Information System (GIS) to compare 2002 riparian conditions with historical riparian areas was used to estimate riparian losses on the Little Spokane River and select tributaries. This analysis concluded that the Little Spokane River mainstem lost 61 percent of its riparian vegetation, with losses in the tributaries ranging from 56 to 93 percent (Christian 2003).

A later survey conducted in 2005 by the Spokane Conservation District (SCD) assessed the riparian condition of the Little Spokane River mainstem and select tributaries managed under Spokane County's Shoreline Master Program (SMP). This work assessed proper functioning condition and ecological condition of riparian habitat as well as restoration potential. Proper functioning condition was based on physical functions such as withstanding flood events and streambank stability. Ecological condition was based on habitat connectivity and diversity. From this work, the SCD identified 13 reaches with poor to fair riparian conditions, totaling approximately 18 river miles (Figure 2; Attached Table 4). Problems noted in these reaches include eroding streambanks, lack of large woody debris and riparian vegetation, well-established reed canarygrass, and inadequate livestock management. The presence of livestock, reed canary grass and residential lawns that go to the edge of the river are likely causes of riparian vegetation removal and continued suppression of natural regeneration (SCD 2005).

Since the publication of the 2012 TMDL (Ecology, 2012), the Lands Council (2015) compiled the 2005 SCD riparian condition surveys and other data to prioritize riparian restoration areas within the Spokane County portion of the Little Spokane River watershed. This prioritization was limited to the Little Spokane River mainstem and larger tributaries. From this work, the Lands Council recommended four general priority areas for riparian restoration to Ecology: Dragoon Creek near Wethy Creek, upper Deer Creek, West Branch Little Spokane above Eloika Lake, and the Little Spokane River mainstem between Little Deep Creek and the West Branch Little Spokane River.

Another focal point for improving conditions in WRIA 55 is improving aquatic habitat connectivity. Aquatic habitat connectivity includes longitudinal connectivity, or the connection between up- and downstream, and latitudinal connectivity, or the connection between the stream and its floodplain. Both are important for accessing spawning, foraging, and overwintering habitats necessary for reproduction and survival. Habitat fragmentation and alterations have been identified as threats to the viability of redband trout populations (Western Native Trout Initiative, 2010 and 2018; Interior Redband Conservation Team, 2016).

Longitudinal connectivity has been affected throughout the Little Spokane River watershed due to artificial barriers, primarily culverts. The Washington Department of Fish and Wildlife (WDFW) and the Washington Department of Transportation (WSDOT) maintain an inventory of artificial fish passage barriers in the Little Spokane River watershed. Currently, there is a total of 84 artificial barriers within the Little Spokane River watershed documented in this inventory (Figure 3). However, this number may change in the future as investigations of potential barriers are ongoing and as barriers are removed or replaced.

Poor longitudinal connectivity can contribute to problems facing redband trout such as isolation of populations. The Western Native Trout Initiative (Western Native Trout Initiative, 2010 and 2018) recommends restoring connectivity to historic habitats and improving fish passage to improve the status of redband trout. The Spokane Tribal Fisheries Anadromous Program in cooperation with the Northwest Fisheries Science Center created a GIS data layer and online tool that identifies and rates the intrinsic potential of the Little Spokane River watershed to support native steelhead/redband trout spawning and rearing. Intrinsic potential is the ability (low, moderate, high) to support redband habitat based on the natural characteristics of the stream reach without consideration to existing impacts.

The Spokane Tribe recommends that barriers isolating redband trout populations or preventing access to moderate or high intrinsic potential-rated habitat should be prioritized for correction. Using the Spokane Tribe's intrinsic potential habitat data, the Little Spokane River watershed has approximately 133.32 kilometers (82.85 miles) of stream rated as moderate to high intrinsic potential with only two artificial fish passage barriers potentially affecting access to these areas (Figure 4).

Latitudinal connectivity has been impacted from stream alterations to facilitate development and agricultural activities. A technical study prepared by PBS&J (2009) estimates that 21 percent of wetlands in the Little Spokane River watershed have been lost due to human activities, which includes those in the floodplain. Habitat restoration focusing on reconnecting floodplains, side channels and riparian zones is a strategy recommended by the Interior Redband Conservation Team (2016). The Western Native Trout Initiative also recommends restoring and improving altered channel habitats as an opportunity to improve the status of redband trout.

Since the identified intrinsic potential habitat does not consider impacts, stream reaches rated as moderate to high potential should be prioritized for conservation or restoration depending on actual conditions. PBS&J (2009) identified 115 sites for potential wetland restoration in WRIA 55, totaling 3,893 acres (Figure 5). Many of these sites are in proximity to a stream or lake, including moderate to high potential reaches, and were found to display some form of stream alteration such as stream straightening, stream relocation, stream or floodplain narrowing, or other alterations.

A third focal point for the Little Spokane River watershed is improving aquatic habitat complexity. To support diverse fish populations, streams should have a variety of instream habitat types (riffles, runs, pools) and structural components (large woody debris, undercut banks, boulders) to provide cover. The WDFW conducted surveys in the Little Spokane River watershed between 2001 and 2003 to establish baseline information regarding fish habitat and species distribution. These surveys included measurements of the physical habitat characteristics such as bankfull width, depth, gradient, and percent composition of the streambed substrate and determining the frequency of the available habitat types (riffle, run and pools). They also included fish surveys to determine species presence, relative abundance, population and density (McLellan 2002, 2003, and 2005).

Habitat complexity is necessary because homogenous habitats that result from water quality and habitat degradation typically benefit only a few, usually less desirable species. Species such as brook trout, brown trout, northern pike, smallmouth and largemouth bass, and common carp have been known to compete with redband trout for food and habitat (Western Native Trout Initiative, 2010 and 2018), and many of these species are found in the Little Spokane River watershed. In fact, the WDFW data indicate that eastern brook trout may have competitive advantages in the Little Spokane River system in lower velocity habitats (pool and runs) and in habitat dominated by fine substrates. While there is a mix of habitats throughout the watershed, most of the available fast water habitat is located within the systems on the eastern side of WRIA 55. Further, all but four streams within the Little Spokane River watershed have streambeds dominated by sand and finer particulates. In addition to potentially giving a competitive advantage to eastern brook trout, the WDFW surveys indicate that the predominance of fine substrates throughout the Little Spokane River watershed may be limiting interstitial habitat, spawning gravels, and overwintering habitat (McLellan 2002, 2003, and 2005; Attached Table 2).

Another concern regarding habitat complexity identified in the Little Spokane River watershed is the presence of invasive and noxious weeds. Ecology surveys conducted during the early 2000s identified Eurasian water-milfoil (*Myriophyllum spicatum*) in the West Branch Little Spokane subbasin in Sacheen Lake, Horseshoe Lake, Fan Lake, Eloika Lake and Diamond Lake. (Parsons and ONeal, 2000; Ecology, 2017). These locations are currently listed as impaired (Category 4c) due to the presence of the Eurasian water-milfoil, which can alter aquatic habitats by forming dense mats that shade out other aquatic plants, inhibit water flow, and degrade water quality. Control of these plants can be difficult, as they can spread by seed and stem fragments (WA NWCB). The riparian condition surveys conducted by the SCD (2005) noted that reed canarygrass (*Phalaris arundinacea*) is well-established throughout the riparian zone. While Ecology has not listed the Little Spokane River as impaired due to reed canarygrass, this species is highly invasive. It forms dense monocultures that displace native plant communities and constrict stream channels by promoting deposition of sediment.

The Upper Columbia United Tribes (UCUT), which includes the Couer d'Alene Tribe of Indians, Confederated Tribes of the Colville Reservation, Kalispel Tribe of Indians, Kootenai Tribe of Idaho, and the Spokane Tribe of Indians, is interested in possible reintroduction of anadromous fish to habitats upstream of the Chief Joseph and Grand Coulee dams. The UCUT in cooperation with the U.S. Geological Survey and WDFW conducted several preliminary investigations to determine the feasibility of reintroducing salmon and steelhead (UCUT, 2019). These preliminary investigations confirmed that reintroduction is feasible, and that there is moderate to high intrinsic potential habitat for steelhead (anadromous redband trout) (Figure 4) and Chinook (Figure 6) in the Little Spokane River watershed that is currently blocked by hydroelectric facilities on the Spokane River.

The Northwest Power and Conservation Council is responsible for planning efforts in the Columbia River basin conducted under the Northwest Power Act. The purpose of this planning is to develop a regional approach to balance energy development and impacts to fish and wildlife. The Council implements their broader Fish and Wildlife Program through subbasin plans, and the Spokane River and the Little Spokane River are included in the 2004 Intermountain Province (IMP) Subbasin Plan (GEI Consultants Inc., 2004). The IMP Subbasin Plan primarily focuses on strategies and actions to address fish and wildlife impacts from the Chief Joseph and Grand Coulee dams. Many of these strategies and actions are similar to and compatible with previously described such as habitat restoration, habitat protection, fisheries augmentation, education/outreach, and additional research, monitoring and planning.

EXISTING HABITAT CONDITIONS BY SUBBASIN

Otter Creek

The Otter Creek subbasin is approximately 143.2 square miles includes the upper Little Spokane River mainstem from the headwaters to just above its confluence with the West Branch Little Spokane River (RKM 34.2), and the tributaries of Otter and Dry Creeks. This subbasin spans both Pend Oreille and Spokane Counties. Population centers include Elk and Scotia, which were historically small logging communities. The land use within the subbasin includes Rural Traditional, Rural Conservation, Rural Activity Center, Mineral Lands and Forest Land.

Fish Species

The WDFW surveyed Otter and Dry Creeks in 2001 (McLellan 2002), and the Little Spokane River in its entirety in 2003 (McLellan 2005). However, this subbasin only includes the Little Spokane River Reaches 1 through 20 from the WDFW survey. During these surveys, 13 fish species were identified on the upper Little Spokane River. The surveyed tributaries were less diverse with only six species identified in Otter Creek and eight species in Dry Creek (Attached Table 1). Eastern brook trout were the most abundant species in Otter Creek and rainbow trout were the most abundant species in Dry Creek (McLellan 2002 and 2005).

Genetic studies of the rainbow trout population conducted by WDFW indicate that Otter Creek supports interior redband strain (*Oncorhynchus mykiss gairdneri*), not coastal strain rainbow trout (*Oncorhynchus mykiss irideus*). Samples from rainbow trout in Dry Creek was not included in the genetic analysis (McLellan 2002).

Stream Profiles and Instream Habitat

Otter Creek is a third order stream originating from springs located north of Hwy 2 along Fertile Valley Rd. It flows 15.4 kilometers (9.57 miles) in a southeast direction before entering the Little Spokane River at RKM 53.9 (river mile 33.49). It is a relatively low gradient stream (average gradient of 2 percent) with a small drainage area. Otter Creek is dominated by slow water habitats, with runs averaging 57 percent of the instream habitat and pools contributing another 12 percent. Fine particulates constitute a high percentage in Otter Creek (79 percent) resulting in high embeddedness (84 percent) of coarser bed materials (McLellan 2002, Attached Table 2).

Dry Creek is a second order stream with headwaters originating on the western slopes of Mt. Spokane. It flows 12.9 kilometers (8.02 miles) before discharging into the Little Spokane River at RKM 55.5 (river mile 34.49). Reflection Lake is connected to Dry Creek through its outlet stream Sheets Creek, which enters Dry Creek just upstream of its confluence with the Little Spokane River. Dry Creek is a moderate gradient (averaging 3 percent) stream. It is dominated by fast water habitats, with riffles accounting for 54 percent of the instream habitat. Dry Creek's streambed is primarily sand and other fine particulates, which constitute 65 percent of the substrate. However, Dry Creek is one of the few surveyed streams with greater than 20 percent gravel. This corresponds to a lower embeddedness than Otter Creek at 58 percent (McLellan 2002, Attached Table 2).

Even though Otter Creek has a higher percentage of fines and embeddedness than Dry Creek, the 2012 Multi Parameter TMDL does not require reductions in total suspended sediment (TSS) in Otter Creek to

address turbidity. However, the TMDL requires a 10 percent reduction in TSS in Dry Creek (Ecology 2012).

The Otter Creek subbasin has approximately 23 kilometers (14.29 miles) of habitat with moderate to high intrinsic potential for steelhead and 11.52 kilometers (7.16 miles) for chinook (Attached Table 3). For both species, this intrinsic potential habitat is largely located in the upper Little Spokane River mainstem and Dry Creek (Figures 4 and 6).

Fish Passage Conditions

There are 10 artificial fish passage barriers documented in WDFW/WSDOTs inventory located in this subbasin (Figure 3), which includes all except one of those noted in the WDFW surveys. The barriers are on Otter Creek and the upper Little Spokane River mainstem. Most of the barriers are culvert crossings on private roads, though there is one earthen dam that is associated with an irrigation pond near Allen Road. The artificial barrier from the 2003 WDFW survey not documented in the inventory is a concrete railroad culvert on the Little Spokane River at RKM 68.7 that was noted as a potential barrier. There are currently no fish barriers identified on Dry Creek.

Natural barriers are not included in the inventory, but two natural fish barriers were noted during WDFW surveys. One natural barrier is located 400 meters upstream from the mouth of Otter Creek. This natural barrier is described as a waterfall and connected chute. All the artificial barriers on the Otter Creek system are upstream of this natural barrier (McLellan 2002). The second natural barrier is a 4.27-meter waterfall on the upper Little Spokane River mainstem upstream of Chain Lake at RKM 69.4 (McLellan 2005). Another potential barrier noted in the WDFW survey not included in the inventory is the observation that Otter Creek was dry between Highway 2 and the irrigation pond near Allen Road.

The known artificial fish passage barriers are all located upstream of the high to moderate intrinsic potential habitat and, therefore, would not impede access to these areas (Figures 4 and 6). The intrinsic potential of habitat in Otter Creek appears to be limited to below the natural barrier.

Riparian Conditions

Riparian conditions were assessed along the Little Spokane River mainstem by the SCD (2005). Otter and Dry Creeks were not included in this survey. This subbasin includes nine reaches on the Little Spokane River mainstem totaling approximately 7.4 river miles. Much of the riparian habitat along this length was found to be in proper functioning condition with fair to good ecological rating. However, three reaches totaling about 3.2 miles were assessed as functional-at-risk (FAR) with poor ecological rating (Attached Table 4, Figure 2).

An estimate of riparian area lost on Otter Creek was included in Christian (2003), but Dry Creek was not included in this study. It is estimated that Otter Creek lost 89 percent of its original riparian habitat. The ability of the riparian zone to provide shade to meet the temperature water quality standard was assessed during the development of the 2012 TMDL. This included the entire length of the Little Spokane River mainstem and Otter and Dry Creeks. The TMDL requires much of the upper Little Spokane River mainstem to have a 50 to 99 percent improvement in shade, with Otter and Dry Creeks requiring an additional 61 percent and 36 percent respectively (Ecology 2012).

To meet water quality criteria, the TMDL requires a 90 percent fecal coliform reduction in Otter Creek, and 46 percent in Dry Creek.

PBS&J (2009) identified 24 potential wetland restoration sites in this subbasin, totaling approximately 801 acres (Figure 5). Fourteen of these sites are located adjacent to a stream. Six of those 14 sites are located adjacent to sections rated as moderate and high intrinsic potential habitat, and four are adjacent to reaches with poor riparian conditions (Attached Table 5).

West Branch Little Spokane River

The West Branch Little Spokane River subbasin is approximately 101.8 square miles. This subbasin includes the mainstem of the West Branch Little Spokane River and all its tributaries. Major tributaries discussed herein include Beaver, Buck, Heel, and Spring Heel Creeks. This subbasin also includes several lakes: Diamond, Sacheen, Trout, Horseshoe, Eloika, Lost and Fan Lakes. This subbasin spans Pend Oreille and Spokane Counties. Population centers within this subbasin include Diamond Lake, Eloika and the northern most part of Riverside. Land use in the subbasin includes Rural Traditional, Rural Conservation, Mineral Lands, Rural Activity Center. Recreational activities are focused around Diamond, Sacheen, Horeshoe and Eloika Lakes.

Fish Species

The lower West Branch Little Spokane River from the mouth to just above Eloika Lake and the tributaries Spring Heel, Heel, Buck, and Beaver Creeks were surveyed by WDFW in 2001. The lower West Branch Little Spokane River fish assemblage includes 13 species, but sculpin was the most abundant. The tributaries had less diverse fish assemblages with two species found in Beaver Creek, three in Buck Creek, one in Heel Creek, and three in Spring Heel Creek (Attached Table 1). Eastern brook trout were the most abundant species in Beaver and Spring Heel Creeks, and the only species found in Heel Creek. Rainbow trout were the most abundant species in Buck Creek (McLellan 2002).

Genetic analysis by WDFW indicates that the rainbow trout population in Buck Creek is distinct from the Spokane Hatchery stock of rainbow trout, but found that the two populations were closely related. This may indicate that the Buck Creek rainbow population's ancestry has substantial influence from coastal rainbow hatchery genes (McLellan 2002).

Stream Profiles and Instream Habitat

The West Branch is a fourth order stream. It originates at Diamond Lake and flows 32.3 kilometers (20.07 miles) before entering the Little Spokane at RKM 34.2 (river mile 21.31). On its way toward the Little Spokane River, the West Branch LSR flows through a series of lakes: Sacheen, Trout, Horseshoe and Eloika Lakes. The lower West Branch Little Spokane River is a low gradient stream (average 2 percent) dominated by slow-water habitats, with runs contributing 57 percent of the instream habitat. The West Branch streambed substrate is dominated by sand (McLellan 2002, Attached Table 2).

The headwaters of Beaver Creek are in the Huckleberry Mountains north of Horseshoe Lake (note: there are two Beaver Creeks in WRIA 55; this one is a tributary to the West Branch Little Spokane River and the other is a tributary to Dragoon Creek, which is discussed later). Beaver Creek originally flowed into Fan Lake but was diverted into the West Branch Little Spokane River in the early 1990s. Although Beaver Creek originates in mountainous terrain, it is a relatively low-gradient stream (average 1 percent) dominated by slow water habitats. Runs and pools constitute 95 percent of instream habitat. However,

unlike other low-gradient streams within WRIA 55, the dominant streambed substrate in Beaver Creek is gravel. In fact, Beaver Creek has the highest percentage of gravel in WRIA 55 at 35 percent (McLellan 2002, Attached Table 2).

The headwaters of Buck and Heel Creeks are also in the Huckleberry Mountains north of Horseshoe Lake. Buck and Heel Creeks are relatively high gradient streams (average of 3 and 5 percent respectively) consisting primarily of riffle habitat at 75 and 52 percent respectively. However, both streams have a good proportion of pools to provide refuge for fish, comprising more than 20 percent of the instream habitat for both creeks. Though the streambed substrate in these streams is dominated by sand, the proportion of gravel and cobble to sand and fine particulates is nearly equal (McLellan 2002, Attached Table 2).

Spring Heel Creek originates from a spring two kilometers east of confluence with Heel Creek and flows through Lost Lake then into the West Branch Little Spokane River. Spring Heel Creek is a spring-fed, low-gradient stream that has an equal distribution of riffles, runs and pools. Sand and other fine particulates constitute 81 percent of the streambed in Spring Heel Creek (McLellan 2002, Attached Table 2).

In terms of streambed substrates, the proportions of fine particulates to coarser streambed materials in this subbasin are such that the embeddedness is relatively low (40 percent and less on average) compared to other subbasins (McLellan 2002, Attached Table 2). Perhaps this is due to the presence of the various connected lakes, which may be providing a natural sediment sink for the system. Even with this benefit, the TMDL requires TSS reductions on both Beaver Creek (30 percent reduction) and Buck Creek (40 percent reduction) to meet water quality standards. Reductions are not required on the mainstem (Ecology 2012).

The West Branch Little Spokane River subbasin has approximately 0.395 kilometers (0.25 miles) of habitat with moderate to high intrinsic potential for both steelhead and chinook (Attached Table 3). For both species, this intrinsic potential habitat is largely located in the mainstem of the West Branch Little Spokane River (Figures 4 and 6).

Fish Passage Conditions

There are eight fish passage barriers documented in WDFW/WSDOTs inventory located in this subbasin (Figure 3), including all of those identified during WDFW surveys. Most of these are located on Beaver Creek/Ponderosa Lake tributaries and include five culverts and one dam.

Natural barriers are not included on the inventory, and there were seven natural barriers identified by WDFW during surveys in the West Branch Little Spokane River. This includes two natural barriers on the West Branch Little Spokane River mainstem, three on Beaver Creek and two on Buck Creek. One of the natural barriers on the mainstem West Branch Little Spokane River is located 1200 meters upstream from the mouth and is described as a complex of waterfalls and chutes. The second natural barrier is a waterfall where the West Branch Little Spokane River enters Horseshoe Lake. Natural barriers on Beaver Creek include two waterfalls about 5 meters high located 810 and 830 meters upstream of Horseshoe Lake and a landslide in a steep section of the stream that buried 16.2 meters of the stream. The natural barriers on Buck Creek include two chutes, with the first about 1 kilometer above the Horseshoe Lake Road crossing (McLellan 2002).

The known artificial fish passage barriers are all located upstream of the high to moderate intrinsic potential habitat and, therefore, would not impede access to these areas (Figures 4 and 6).

Riparian Conditions

Riparian conditions on the West Branch Little Spokane River were assessed by SCD (2005). However, this survey only included 3.9 river miles along the West Branch Little Spokane River mainstem. Most of the surveyed length was found to be in proper functioning condition with fair to good ecological ratings. Two reaches totaling one river mile were found to be in a functional-at-risk condition with a poor to fair ecological rating (Attached Table 4, Figure 2).

Christian (2003) estimated 57 percent of the historic riparian area was lost on West Branch Little Spokane River. The ability of the existing riparian zone to provide shade to meet the temperature water quality standard was assessed during the development of the TMDL. This assessment includes 18.6 river miles on the West Branch Little Spokane River. To meet the temperature water quality standard, the TMDL requires only 11 percent additional shade on the West Branch, which is the lowest increase required along any tributary (Ecology 2012).

The TMDL requires fecal coliform reductions only on the West Branch Little Spokane River tributaries of Moon (28 percent) and Beaver Creeks (5 percent) (Ecology 2012).

PBS&J (2009) identified 17 potential wetland restoration sites in this subbasin, totaling approximately 600 acres (Figure 5). Seven of these sites are located adjacent to a stream or lake. However, two of these seven sites are located adjacent to the lower West Branch Spokane River sections rated as moderate and high intrinsic potential habitat or as having poor riparian conditions (Attached Table 5).

Beaver Creek

The Beaver Creek subbasin is approximately 72.9 square miles and includes the upper Dragoon Creek mainstem from the headwaters to the confluence with Beaver Creek, as well as the tributary itself. This subbasin spans Stevens and Spokane Counties. Population centers include a portion of the City of Deer Park and Clayton. Historically, Deer Park was largely based on timber industry and then became an agricultural center, though some logging continues. Clayton was primarily a brick and tile manufacturing town, though there was also timber industry. Outside of the Deer Park city limits, land use in the subbasin primarily includes Small Tract Agriculture and Rural Traditional. There are also small areas of Rural Conservation, Mineral Land and Urban Reserve.

Fish Species

The upper Dragoon Creek mainstem, Beaver Creek and the smaller tributary of Spring Creek were surveyed by WDFW in 2002. However, this subbasin only includes Dragoon Creek Reaches 1 through 14 from the survey. During this survey, WDFW identified 10 species on the upper Dragoon Creek mainstem. The tributaries included in this subbasin are less diverse with seven species identified in Beaver Creek and four in Spring Creek (McLellan 2003, Attached Table 1).

Stream Profiles and Instream Habitat

This subbasin consists of low gradient streams (average gradient of 1 percent) dominated by slow water habitats. Runs consisted of 93 and 100 percent of the instream habitat in Beaver and Spring Creeks respectively. Therefore, much of the available fast water habitat in this subbasin is concentrated in the

upper mainstem of Dragoon Creek. The streambed in the upper Dragoon Creek and its surveyed tributaries is dominated by sands and finer particulates, with coarser streambed materials highly embedded. Percent embeddedness reaches over 90 percent within the upper Dragoon Creek mainstem as well as in Beaver and Spring Creeks, which is higher than any other subbasin within WRIA 55 (McLellan 2003, Attached Table 2). To meet water quality standards for turbidity, the TMDL requires a 60 percent reduction of TSS in Dragoon Creek above Deer Park (Ecology 2012).

The Beaver Creek subbasin has 9.44 kilometers (5.87 miles) of stream rated as high to moderate intrinsic potential habitat for steelhead and 9.64 kilometers (5.99 miles) for chinook (Attached Table 3). Much of the available high to moderate intrinsic potential habitat in this subbasin is located within the upper mainstem of Dragoon Creek (Figures 4 and 6).

Fish Passage Conditions

There are seven artificial fish passage barriers in this subbasin documented in the WDFW/WSDOT inventory (Figure 3). Most of these are culverts on private roads, though one on the upper Dragoon Creek is a dam. The known artificial fish passage barriers are all located upstream of the high to moderate intrinsic potential habitat and, therefore, would not impede access to these areas (Figures 4 and 6). Riparian conditions on the Dragoon Creek mainstem were surveyed by SCD (2005). However, this subbasin only includes about 1.3 miles of the Dragoon Creek mainstem surveyed, from the Hwy 395 bridge crossing to the Beaver Creek confluence just below Antler Rd. bridge (Reaches 1 and a small portion of Reach 2). This section of Dragoon Creek was found to be in proper functioning condition with fair to good ecological rating (Attached Table 4).

An estimate of riparian area lost on Dragoon Creek was included in Christian (2003), but Beaver Creek was not included in this study. It is estimated that Dragoon Creek lost 70 percent of its original riparian habitat. The ability of the existing riparian zone to provide shade to meet the temperature water quality standard was assessed during the development of the TMDL. This assessment includes 25 river miles on Dragoon Creek. To meet the temperature water quality standard, the TMDL requires 55 percent more shade along Dragoon Creek (Ecology 2012).

PBS&J (2009) identified nine potential wetland restoration sites within the subbasin totaling about 587 acres (Figure 5). Seven of these sites are directly adjacent to either the Dragoon Creek mainstem or Beaver Creek. Two of these five sites are located adjacent to sections rated as moderate and high intrinsic potential habitat (Attached Table 5).

The upper mainstem of Dragoon Creek flows mostly through small tract agricultural land, which may contribute to high concentrations of fecal coliforms. Consequently, the TMDL requires a large reduction in fecal coliform along Dragoon Creek. Though different reductions are required at different points, the point furthest downstream in this subbasin, Crawford Road, requires a 95 percent reduction (Ecology 2012).

Dragoon Creek

The subbasin is approximately 87.4 square miles and includes the West Branch Dragoon Creek and the lower Dragoon Creek mainstem below the Beaver Creek confluence. This subbasin spans both Stevens and Spokane Counties. A portion of the Deer Park city limits is located within this subbasin. Land use outside of the Deer Park city limits is primarily Small Tract Agriculture and Rural Traditional. A portion of

the lower Dragoon Creek mainstem is designated Rural Conservation, and small tracts of Mineral Lands are located near Deer Park.

Fish Species

The Dragoon Creek mainstem and the West Branch Dragoon Creek were surveyed by WDFW in 2002. This subbasin only includes the Dragoon Creek Reaches 15 through 28 from the survey. WDFW identified 12 fish species within this lower portion of Dragoon Creek and nine species in West Branch Dragoon Creek. Genetic studies from WDFW indicate that Dragoon Creek supports rainbow trout subpopulations that are more closely related to coastal subspecies, suggesting substantial coastal influence (McLellan 2003, Attached Table 1).

Stream Profiles and Instream Habitat

Both the lower mainstem and the West Branch of Dragoon Creek are low gradient streams with the dominant instream habitat being runs. However, the mainstem offers more of a mix of instream habitat types. The streambed substrate in this subbasin is dominated by sand and fine particulates. However, the fines are contributing to a higher average embeddedness (90 percent) in the West Branch Dragoon Creek compared to the lower mainstem (60 percent) (McLellan 2003, Attached Table 2). To meet water quality standards, the TMDL requires a 35 percent reduction in TSS in the West Branch Dragoon Creek and 60 percent reduction in the mainstem at Crescent Road (Ecology 2012).

The Dragoon Creek basin has 24.03 kilometers (14.93 miles) of stream rated as high to moderate intrinsic potential habitat for steelhead and 22.02 kilometers (13.68 miles) for chinook (Attached Table 3). It has the highest potential of any subbasin for steelhead and the second highest for chinook. Much of this is found on the lower mainstem (Figures 4 and 6).

Fish Passage Conditions

There is one fish passage barrier documented in the WDFW/WSDOT inventory located in this subbasin. It is the culvert on the US 395 crossing of Dragoon Creek mainstem. This barrier is located within a continuous length of stream rated as moderated to high potential intrinsic habitat with approximately 13 river miles upstream of the barrier (Figures 4 and 6).

Riparian Conditions

Riparian conditions on the Dragoon Creek mainstem were surveyed by SCD (2005). This subbasin includes nine reaches totaling 16.2 river miles from the survey. The West Branch Dragoon Creek was not included in the survey. Most of the surveyed length of Dragoon Creek was found to be in proper functioning condition with fair to good ecological rating. Approximately 1.9 miles along three sections on the mainstem were noted to be in functional-at-risk condition with poor to fair ecological ratings (Attached Table 4, Figure 2).

Christian (2003) estimated that the West Branch Dragoon Creek and Dragoon Creek respectively lost 69 and 70 percent of their original riparian area. The ability of the existing riparian zone to provide shade to meet the temperature water quality standard was assessed during the development of the TMDL. This assessment includes 25 river miles on Dragoon Creek. To meet temperature water quality standard, the TMDL requires an additional 55 percent shade along Dragoon Creek.

PBS&J (2009) identified 19 potential wetland restoration sites within this subbasin totaling 798 acres (Figure 5). Twelve of these sites are located directly adjacent to a stream. Of these, four sites are located adjacent to sections rated as moderate and high intrinsic potential habitat, including immediately adjacent to the US 395 crossing. However, none of the restoration sites are located adjacent to sections with poor riparian habitat conditions (Attached Table 5).

The lower mainstem of Dragoon Creek and the West Branch Dragoon Creek flow mostly through small tract agricultural land, which may contribute to high concentrations of fecal coliforms. Consequently, the TMDL requires an 89 percent reduction in fecal coliforms in the West Branch Dragoon Creek and 70 percent reduction at the mouth of Dragoon Creek (Ecology 2012).

Little Spokane/Deer Creek

The Little Spokane/Deer Creek subbasin is approximately 71.9 square miles and includes the middle Little Spokane River mainstem from below the West Branch Little Spokane River confluence to just above the Dragoon Creek confluence and the tributaries of Deer and Bear Creeks. Population centers included in the subbasin include the eastern portion of Deer Park, the southern portion of Riverside and Chattaroy. Outside of these population centers, the primary land use designations include Rural Traditional and Rural Conservation. There is also forest land in the headwaters of Deer Creek and several small tracts of Mineral Land. Notable recreational features include Bear Lake Park and Antler Springs Golf Course.

Fish Species

Deer and Bear Creeks were surveyed by WDFW in 2001, followed by Little Deer Creek in 2002, and the Little Spokane River in 2003. This subbasin only includes 15.6 kilometers (9.69 miles) of the Little Spokane River mainstem (Reaches 21 through 29 from the WDFW survey). During these surveys, WDFW observed 16 species within the section of the Little Spokane River mainstem included in this subbasin. The tributaries are less diverse with nine species observed in Bear Creek, four species in Deer Creek and two in Little Deer Creek (McLellan 2002, 2003, and 2005; Attached Table 1).

Eastern brook trout were the most abundant species in Bear Creek, but rainbow trout was the most abundant species in Deer Creek. Despite stocking efforts, the WDFW indicated that rainbow trout likely failed to establish a population in Bear Creek due to habitat conditions, either directly from habitat preference or indirectly through interspecific competition. Genetic studies from WDFW indicate that Deer Creek including Little Deer supports interior redband subspecies of rainbow trout, not coastal subspecies of rainbow trout (McLellan 2002).

Stream Profiles and Instream Habitat

Deer Creek is a fourth order stream with headwaters originating on the western slopes of Mt. Spokane at 1,305 meters. It flows 20.9 kilometers (20.99 miles) in a southwesterly direction and into the Little Spokane River at RKM 37 (river mile 22.99). As relatively high-gradient streams, Deer and Little Deer Creeks are dominated by riffle habitat (McLellan 2002 and 2003).

Bear Creek is a second order stream originating from two springs located approximately 1 kilometer west of Eloika Lake. It flows 11.9 kilometers (7.39 miles) in a southeasterly direction through Little Trout Lake to the confluence with Little Spokane at RKM 44.8 (river mile 27.84). Bear Creek is occasionally connected with Bailey's Lake through a small outlet ditch. As a low-gradient, spring-fed stream Bear

Creek is dominated by slow water habitats. Runs contribute 63 percent of Bear Creek's instream habitat and riffles 34 percent. In was noted by WDFW that wide wetlands along upper Bear Creek are likely accessible to fish during high water periods (McLellan 2002).

The streambed is dominated by gravels in Little Deer Creek and by sand and finer particulates in Deer Creek, Bear Creek and the Little Spokane River. The embeddedness in Deer and Bear Creeks are relatively high (63 and 74 percent respectively). The embeddedness in Little Deer Creek is relatively low (49 percent) compared to other parts of WRIA 55 (Attached Table 2). To meet water quality standards, the TMDL requires an 80 percent reduction in TSS in Deer Creek. Bear Creek does not require reductions in TSS (Ecology 2012).

Deer Creek subbasin contains 31.03 kilometers (19.28 miles) of stream rated as high to moderate intrinsic potential habitat for steelhead and 20.89 kilometers (12.98 miles) of stream for chinook (Attached Table 3). Much of this is located on the Little Spokane River mainstem and Deer Creek. Bear Creek was not identified as having high or moderate intrinsic potential habitat for either steelhead or chinook (Figures 4 and 6).

Fish Passage Conditions

Twelve artificial barriers are documented in the WDFW/WSDOT inventory in this subbasin, and all are located on Deer Creek and its tributaries (Figure 3). Most of these barriers are culvert crossings on private roads. However, there are also several culverts on state-owned roads, including the concrete culvert at the Highway 2 crossing near the mouth of the creek. Not included on the inventory is the concrete culvert at the railroad crossing 200 meters upstream from the Highway 2 crossing. During the WDFW survey, Deer Creek was also noted to go dry between the Elk Chattaroy Rd and railroad crossing (McLellan 2002). The fish passage barriers near the mouth of Deer Creek could impact access to the moderate to high intrinsic potential habitat upstream (Figures 4 and 6).

Riparian Conditions

Riparian conditions were assessed on the Little Spokane River mainstem by SCD (2005), but Deer and Bear Creeks were not included in these surveys. This subbasin includes approximately 10.65 river miles surveyed along the Little Spokane River mainstem (Reaches 7 through 12 with about half of Reach 13, which spans across subbasins). Nearly half of this, or 4.9 river miles, were found to have riparian habitat in functional-at-risk condition with poor to fair ecological condition. An additional 1.6 river miles, though in proper functioning condition, was given a poor to fair ecological rating (Attached Table 4, Figure 2).

Christian (2003) estimated Bear and Deer Creeks respectively lost 56 and 86 percent of their historical riparian area. The ability of the existing riparian zone to provide shade to meet the temperature water quality standard was assessed during the development of the TMDL. This assessment includes 15 river miles on Deer Creek and 6.2 miles on Bear Creek. To meet temperature water quality standard, the TMDL requires a 50 to 99 percent increase in shade along section of the LSR mainstem within this subbasin. In addition, the required increase in shade along Bear and Deer Creeks are 19 and 39 percent respectively (Ecology 2012).

PBS&J (2009) identified 16 potential wetland restoration sites within this subbasin, totaling approximately 472 acres. Half of these are located immediately adjacent to a stream. Five adjacent to

moderate and high intrinsic potential, but one also has poor riparian conditions (Figure 5 and Attached Table 5).

To meet water quality standards, the TMDL requires an 87 percent reduction in fecal coliforms in Deer Creek and 24 percent reduction in Bear Creek (Ecology 2012).

Little Deep Creek

The Little Deep Creek subbasin is 49.9 square miles and includes the middle Little Spokane River mainstem from below the Dragoon Creek confluence to just above the Deadman Creek confluence and the tributary of Little Deep Creek. Little Deep Creek's tributaries discussed herein include the North and South Forks and Pell Creek. The entire subbasin is within Spokane County. The only population center within the subbasin is Colbert. Primary land use designations include Rural Traditional and Rural Conservation. There is also Forest Land in the headwaters of Little Deep Creek and some Small Tract Agricultural land. In the southern portion of the subbasin near the Deadman Creek confluence, there is some land designated Low Density Residential, Urban Reserve and Low Density Commercial-Industrial.

Fish Species

The Little Spokane River mainstem, Little Deep Creek and its tributaries were surveyed by WDFW in 2003. During this survey, WDFW observed seven fish species within the Little Deep Creek mainstem. Its tributaries have less diverse fish assemblages with five species observed in the North Fork, four in the South Fork and only one in Pell Creek (McLellan 2005; Attached Table 1).

Speckled dace was the most abundant species in the Little Deep Creek mainstem. Rainbow trout were the most abundant species in both the North and South Forks and the only species found in Pell Creek. Genetic results indicated that the rainbow trout in Little Deep Creek and its tributaries are a single population that have had little influence from the Spokane Hatchery stock of rainbow trout, suggesting they are native redband rainbow trout (McLellan 2005).

Stream Profiles and Instream Habitat

Little Deep Creek is a low-gradient stream that flows across the Valley Prairie. The instream habitat in the Little Deep Creek mainstem almost constitutes an equal amount of riffle and runs. The streambed substrate in the mainstem is dominated by sand with other fines (McLellan 2005 and Attached Table 2).

The North Fork originates on Mt. Spokane and is a moderate gradient stream (average gradient of 2.4 percent). The dominant habitat type is riffles with a good proportion of runs to provide slow-water habitat. The North Fork is one of four streams within WRIA 55 where the streambed substrate is dominated by gravel (McLellan 2005 and Attached Table 2).

Pell Creek and the South Fork also originate on Mt. Spokane, but are relatively high-gradient streams (average 4.3 and 5 percent gradients respectively). Both have riffles comprising about three-fourths of the instream habitat. The streambed substrate in Pell Creek is dominated by sand, but also has some of the highest proportion of gravel of any stream within WRIA 55. The South Fork is equally dominated by sand and gravel (McLellan 2005 and Attached Table 2).

The embeddedness of coarser substrates increases downstream within the subbasin. The South Fork and Pell Creek having the lowest embeddedness at 48 and 54 percent respectively. The North Fork and Little Deep having higher embeddedness at 65 and 77 percent respectively (McLellan 2005 and Attached

Table 2). To meet water quality standards, the TMDL requires an 80 percent reduction in TSS in Little Deep Creek (Ecology 2012).

Little Deep Creek subbasin has 18.49 kilometers (11.49 miles) of stream rated moderate to high intrinsic potential habitat for steelhead and 18.23 kilometers (11.33 miles) for chinook (Attached Table 3). This is largely contained in the Little Deep Creek mainstem, though the South Fork has habitat capacity for steelhead only (Figures 4 and 6).

Fish Passage Conditions

Little Deep Creek has four fish passage barriers documented in the WDFW/WSDOT inventory (Figure 3). This includes all but one of the barriers noted in the WDFW survey. The known fish passage barriers are all located upstream of the available moderate to high intrinsic potential habitat and, therefore, are not impacting fish movement (Figures 4 and 6).

Riparian Conditions

Riparian conditions were assessed on the Little Spokane River mainstem by the SCD (2005), but the Little Deep Creek watershed was not included in the survey. This subbasin includes approximately 8 river miles of the assessed Little Spokane River mainstem (Reach 14 and portions of Reaches 13 and 15, which span multiple subbasins). Most of the river miles assessed along the section of the Little Spokane River mainstem within this subbasin were found to be in proper functioning condition with fair to good ecological ratings. However, one river mile was assessed as functional-at-risk with a fair ecological rating (Attached Table 4, Figure 2).

Christian (2003) estimated that Little Deep Creek lost 93 percent of its historical riparian area. The ability of the existing riparian zone to provide shade to meet the temperature water quality standard was assessed during the development of the TMDL. This assessment did not include or specify requirements for Little Deep Creek. To meet temperature water quality standard, the TMDL requires 15 to 19 percent increase in shade along the LSR mainstem within this subbasin (Ecology 2012).

PBS&J (2009) identified seven potential wetland restoration sites within this subbasin totaling approximately 133 acres (Figure 5). Six of these are immediately adjacent to a stream. Five adjacent to moderate and high intrinsic potential, but one adjacent to moderate and high intrinsic potential with poor riparian conditions (Attached Table 5).

To meet water quality standards, the TMDL requires a 95 percent reduction in fecal coliform in Little Deep Creek (Ecology 2012).

Deadman Creek/Peone Creek

The Deadman Creek/Peone Creek subbasin is 83.9 square miles and includes the entire Deadman Creek watershed, excluding the Little Deep Creek watershed. This subbasin is located entirely within Spokane County, and the lower subbasin includes a portion of the Urban Growth Area. Mead is the only population center in the subbasin. Land use designations in the more urbanized area of the subbasin includes High and Low Density Residential, Low Density Commercial-Industrial, Neighborhood and Community Commercial, Urban Reserve, Mineral Land, and Heavy Industrial. Rural areas of the subbasin are designated under Rural-5, Small Tract Agriculture, and Rural Traditional. In the headwaters, there is also a large amount of land designated under Rural Conservation, with portions designated as Forest

Land. Notable features in the subbasin includes portions of Mt. Spokane State Park in the headwaters and a Spokane County Conservation Futures property, the Feryn Conservation Area, along the Deadman Creek mainstem at the Peone Creek confluence.

Fish Species

Deadman Creek, its South Fork and the tributary Burping Brook were surveyed by WDFW in 2003. During the survey, WDFW observed 10 species within the Deadman Creek mainstem. The fish assemblage in the South Fork Deadman Creek only consisted of three species and Burping Brook only two species (McLellan 2005, Attached Table 1).

Sculpin were the most abundant species observed in the Deadman Creek mainstem. The most abundant species in the tributaries were eastern brook trout in Burping Brook and rainbow trout in the South Fork. Genetic results indicated that the rainbow trout in Deadman Creek and its South Fork are one population that have had little influence from the Spokane Hatchery stock of rainbow trout, suggesting they are native redband rainbow trout (McLellan 2005).

Stream Profiles and Instream Habitat

In the Deadman Creek subbasin, the dominant instream habitat is riffle. However, the Deadman Creek mainstem offers a better mix of fast and slow water habitats than its tributaries. The Deadman Creek mainstem consists of 61 percent riffles with runs at 23 percent and pools at 16 percent. In Burping Brook, riffles constitute a much higher proportion of instream habitat at 84 percent. South Fork instream habitat is comprised of 81 percent riffles (McLellan 2005 and Attached Table 2).

Streambed substrate throughout the system is dominated by sand, but there is a relatively high percent of gravel compared to other subbasins. The embeddedness of the gravels increases downstream with Burping Brook and South Fork at 58 and 56 percent respectively, and Deadman Creek at 70 percent (McLellan 2005 and Attached Table 2).

To meet water quality standards, the TMDL set reductions in TSS at several points along Deadman Creek: 70 percent reduction at the mouth of Deadman Creek, a 45 percent reduction above the Little Deep confluence, a 95 percent reduction at Heglar Road, and 40 percent at Holcombe Road. There is also a 40 reduction in TSS required in Peone Creek (Ecology 2012).

Deadman Creek subbasin has 20.91 kilometers (12.99 miles) of stream rated as moderate to high intrinsic potential habitat for steelhead and 18.57 kilometers (11.54 miles) for chinook (Attached Table 3). Much of this is within the Deadman Creek mainstem and the South Fork. Despite the high number of barriers, they are all located above the available moderate to high intrinsic potential habitat in the subbasin (Figures 4 and 6).

Fish Passage Conditions

This subbasin has the highest number of fish passage barriers documented in the WDFW/WSDOT inventory at 35 (Figure 3). Most of these are culvert crossings on Burping Creek and the South Fork. Most of the known fish passage barriers are located upstream of the continuous stretch of moderate to

high intrinsic potential habitat on the Deadman Creek mainstem and, therefore, are not impacting access to this area (Figures 4 and 6).

Riparian Conditions

Riparian conditions on Deadman Creek were surveyed by SCD (2005). The survey included 23 river miles along the mainstem of Deadman Creek, and did not include the tributaries. Most of the surveyed stream length was found to be in proper functioning condition with a fair to good ecological rating. However, 9.5 river miles were found to be in a functional-at-risk condition with 2.7 of these miles in poor ecological condition (Attached Table 4, Figure 2).

Christian (2003) estimated that Deadman Creek lost 74 percent of its historical riparian area. The ability of the existing riparian zone to provide shade to meet the temperature water quality standard was assessed during the development of the 2012 TMDL. This assessment included 21 miles on Deadman Creek. To meet water quality standards for temperature, the TMDL requires a 46 percent increase in shade along Deadman Creek (Ecology 2012). The WDFW noted that low densities of salmonids in the middle reaches of Deadman Creek were likely due to the high temperatures experienced during their survey (McLellan 2005).

PBS&J (2009) identified eight potential wetland restoration sites within this subbasin totaling approximately 319 acres (Figure 5). Six of these sites are located adjacent to a stream. Four of those six are adjacent to sections of Deadman Creek rated as moderate to high intrinsic potential habitat (Attached Table 5).

Little Spokane/Dartford Creek

The Little Spokane/Dartford Creek subbasin includes Dartford Creek and the lower Little Spokane River mainstem from just below the Deadman Creek confluence to the mouth, excluding the portion of the lower watershed influenced by the Spokane Valley Rathdrum Prairie aquifer. This subbasin is located entirely within Spokane County, and includes a portion of the Urban Growth Area. Notable features in the subbasin include the Wandemere Golf Course, Pine River Park, Glenneden Park and Haynes Estates Conservation Area.

Fish Species

The Little Spokane River and Dartford Creek were surveyed by WDFW in 2003. This subbasin includes Little Spokane River Reaches 35 through 41 from the survey. During the survey, the WDFW observed nine fish species in the lower reaches of the Little Spokane River that are within this subbasin. In Dartford Creek, WDFW only observed three species (Attached Table 1). Rainbow trout were the most abundant species observed in Dartford Creek. Genetic results indicate that the rainbow trout in Dartford Creek have had little influence from the Spokane Hatchery stock of rainbow trout, suggesting they are native redband rainbow trout (McLellan 2005).

Stream Profiles and Instream Habitat

In the portion of the Little Spokane River mainstem included within this subbasin, the instream habitat is a mix of riffles and runs. This portion of the Little Spokane River is the only segment where the streambed substrate is not dominated by sand. Here the streambed is dominated by cobbles. However,

the sand component contributes to a 66 percent embeddedness along this portion of the Little Spokane River (McLellan 2005 and Attached Table 2).

Dartford Creek is a moderate gradient stream (average gradient of 2.5 percent) that flows through a residential area. The instream habitat in Dartford Creek instream is predominantly riffles and the streambed is comprised mostly of sand. Dartford Creek has high embeddedness at 75 percent (McLellan 2005 and Attached Table 2). To meet water quality standards, the TMDL requires a 90 percent reduction in TSS in Dartford Creek (Ecology 2012).

The Dartford Creek subbasin has 6.03 kilometers (3.75 miles) of stream rated as moderate to high intrinsic potential habitat for steelhead and 2.83 kilometers (1.76 miles) for chinook (Attached Table 3). Much of the habitat potential is within the Little Spokane River mainstem. Dartford Creek only has capacity for steelhead (Figures 4 and 6).

Fish Passage Conditions

There are no fish barriers within this subbasin documented in the WDFW/WSDOT inventory (Figure 3). However, the WDFW survey noted a potential fish passage barrier on Dartford Creek at RKM 0.2. The barrier consisted of a square concrete culvert suspected to limit the distribution of smaller fish encountered in the stream (McLellan 2005).

Riparian Conditions

Riparian conditions on the Little Spokane River mainstem were conducted by SCD (2005), but Dartford Creek was not included in the survey. This subbasin includes approximately 13 river miles surveyed on the lower Little Spokane River mainstem (Reaches 16 through 20, and a portion of Reach 15 which spans multiple subbasins). The riparian habitat along this segment of the Little Spokane River was found to be in proper functioning condition with fair to good ecological ratings (Attached Table 4, Figure 2).

The ability of the riparian zone to provide shade to meet the temperature water quality standard was assessed during the development of the TMDL. This assessment included 6.8 river miles on Dartford Creek. To meet temperature standard, the lower portion of the LSR mainstem requires up to a 50 percent increase in shade around Dartford, but much lower increases of up to 15 percent below Dartford. In addition, the TMDL requires a 40 percent increase in shade along Dartford Creek (Ecology 2012).

To meet water quality standards, the TMDL requires a 63 percent reduction in fecal coliforms in Dartford Creek (Ecology 2012).

PBS&J (2009) identified seven potential wetland restoration sites in the Dartford Creek subbasin totaling approximately 116 acres (Figure 5). Four of these sites are located immediately adjacent to a stream. Two of those four sites are adjacent to sections of the lower Little Spokane River mainstem rated as moderate to high intrinsic potential habitat (Attached Table 5).

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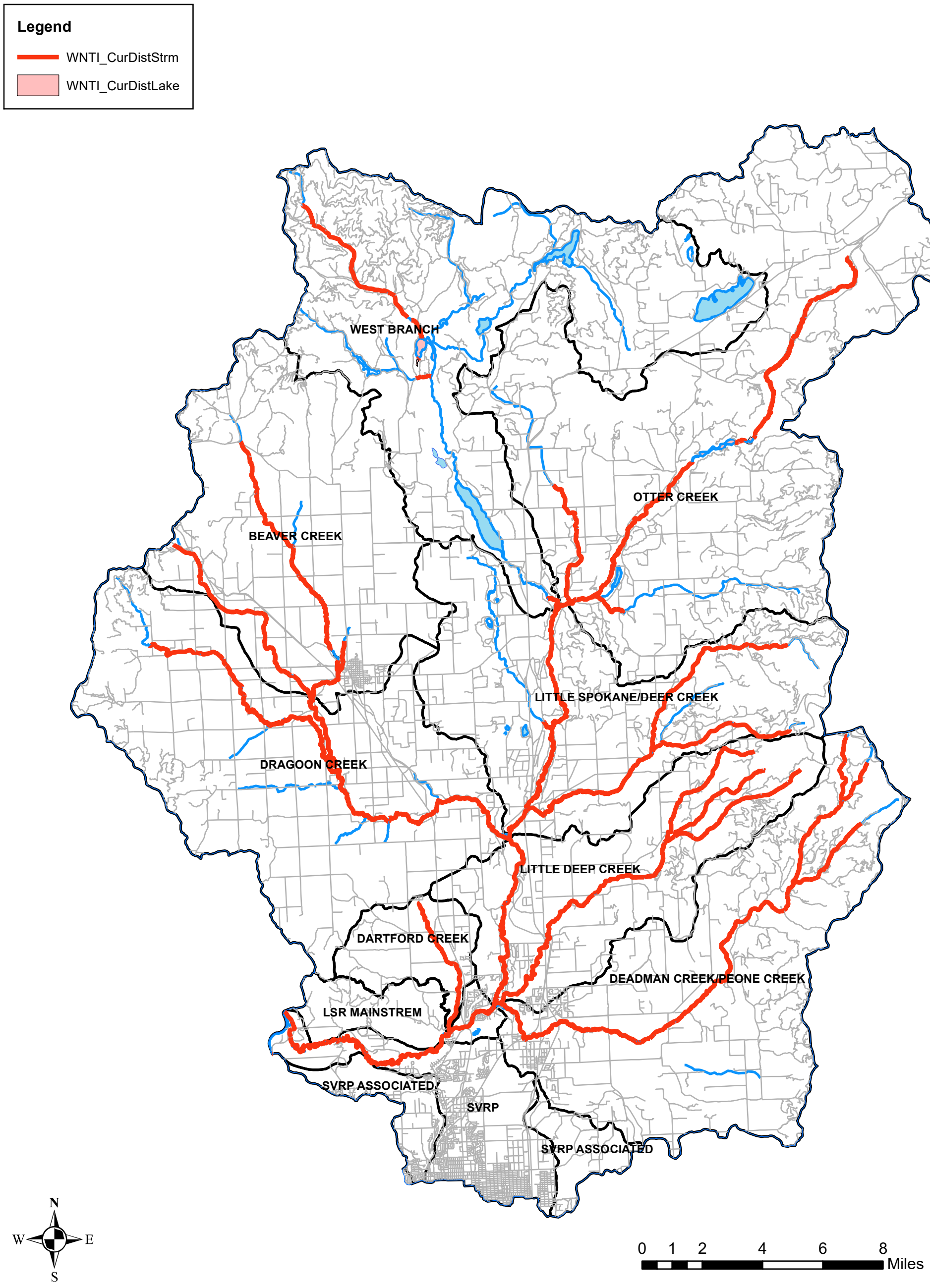

Figure 1
Current Distribution of Redband Trout by Subbasin
Little Spokane River watershed/WRIA 55

SPOKANE COUNTY
WATER RESOURCES

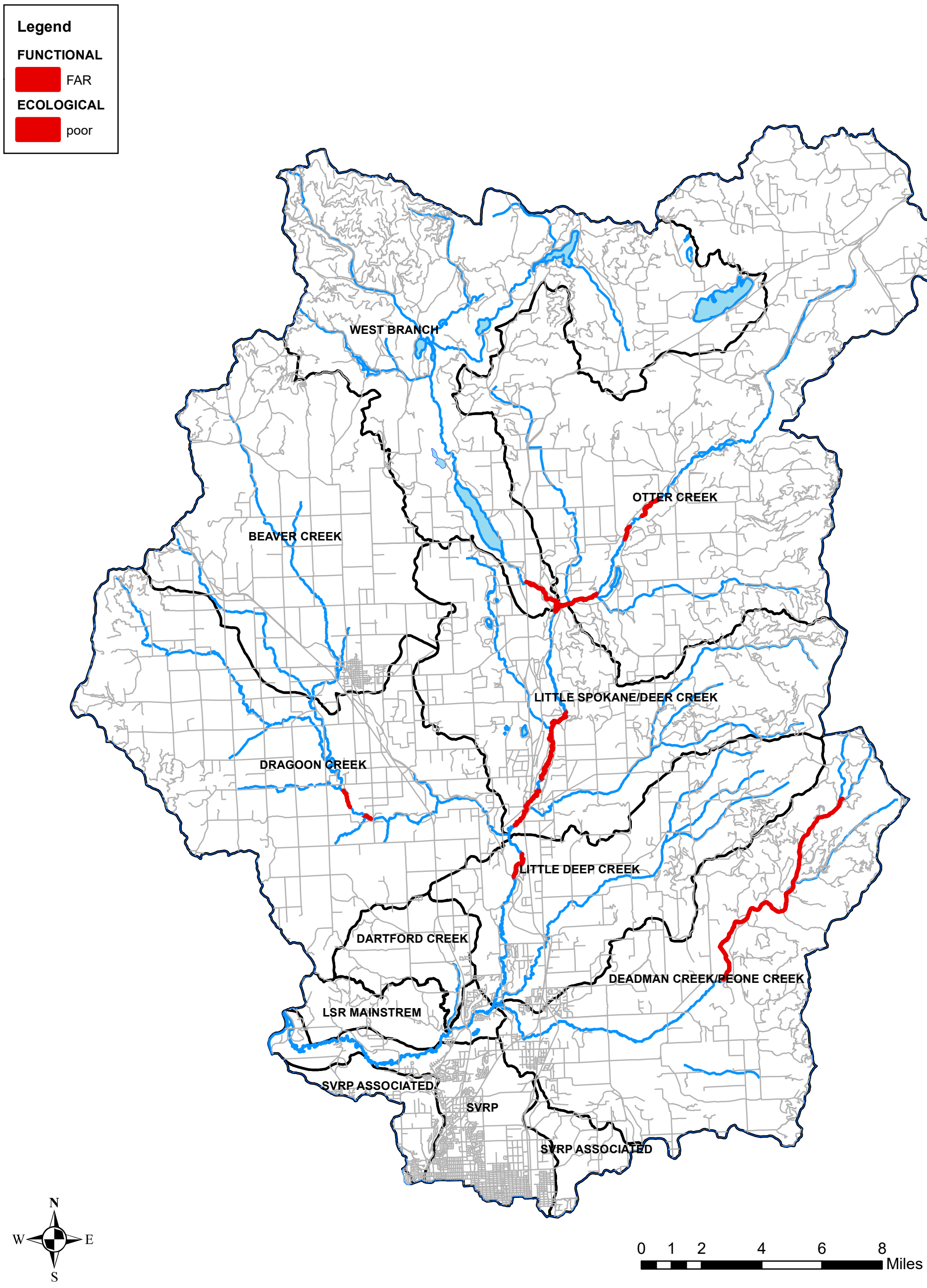

Figure 2
Poor Riparian Habitat by Subbasin
Classified as Functional-at-Risk (FAR) and Poor Ecological Rating
Little Spokane River watershed/WRIA 55

SPOKANE COUNTY
WATER RESOURCES

Legend

Fish Passage

Barrier

WEST BRANCH

OTTER CREEK

BEAVER CREEK

LITTLE SPOKANE/DEER CREEK

DRAGOON CREEK

LITTLE DEEP CREEK

DARTFORD CREEK

DEADMAN CREEK/PEONE CREEK

LSR MAINSTREM

SVRP ASSOCIATED

SVRP

SVRP ASSOCIATED

N

W E

S

0 1 2 4 6 8

Miles

Figure 3
Fish Passage Barriers by Subbasin
Little Spokane River watershed/WRIA 55

SPOKANE COUNTY
WATER RESOURCES

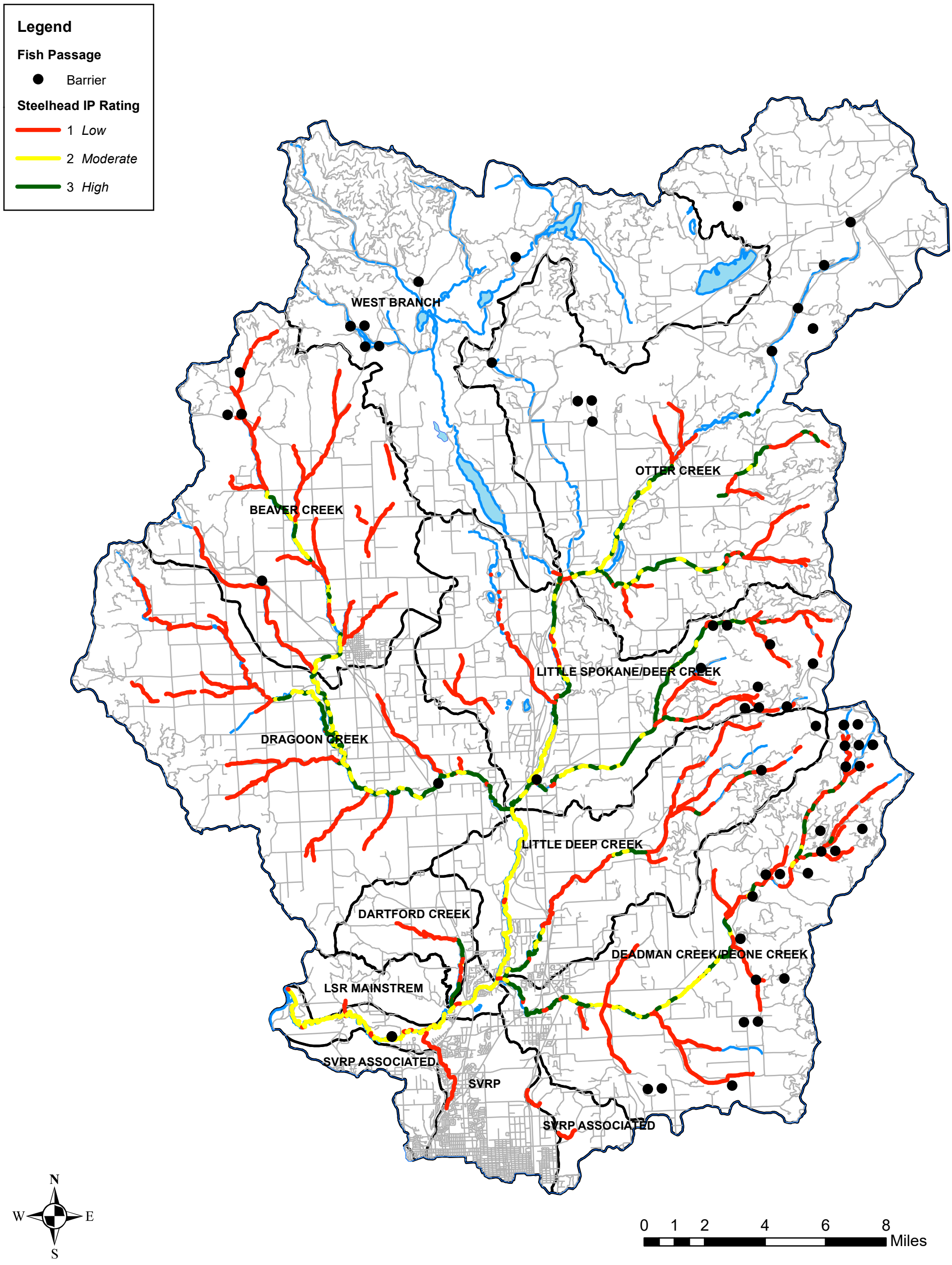

Figure 4
Intrinsic Potential Habitat for Steelhead/Redband and Fish Passage Barriers by Subbasin
Little Spokane River watershed/WRIA 55

SPOKANE COUNTY
WATER RESOURCES

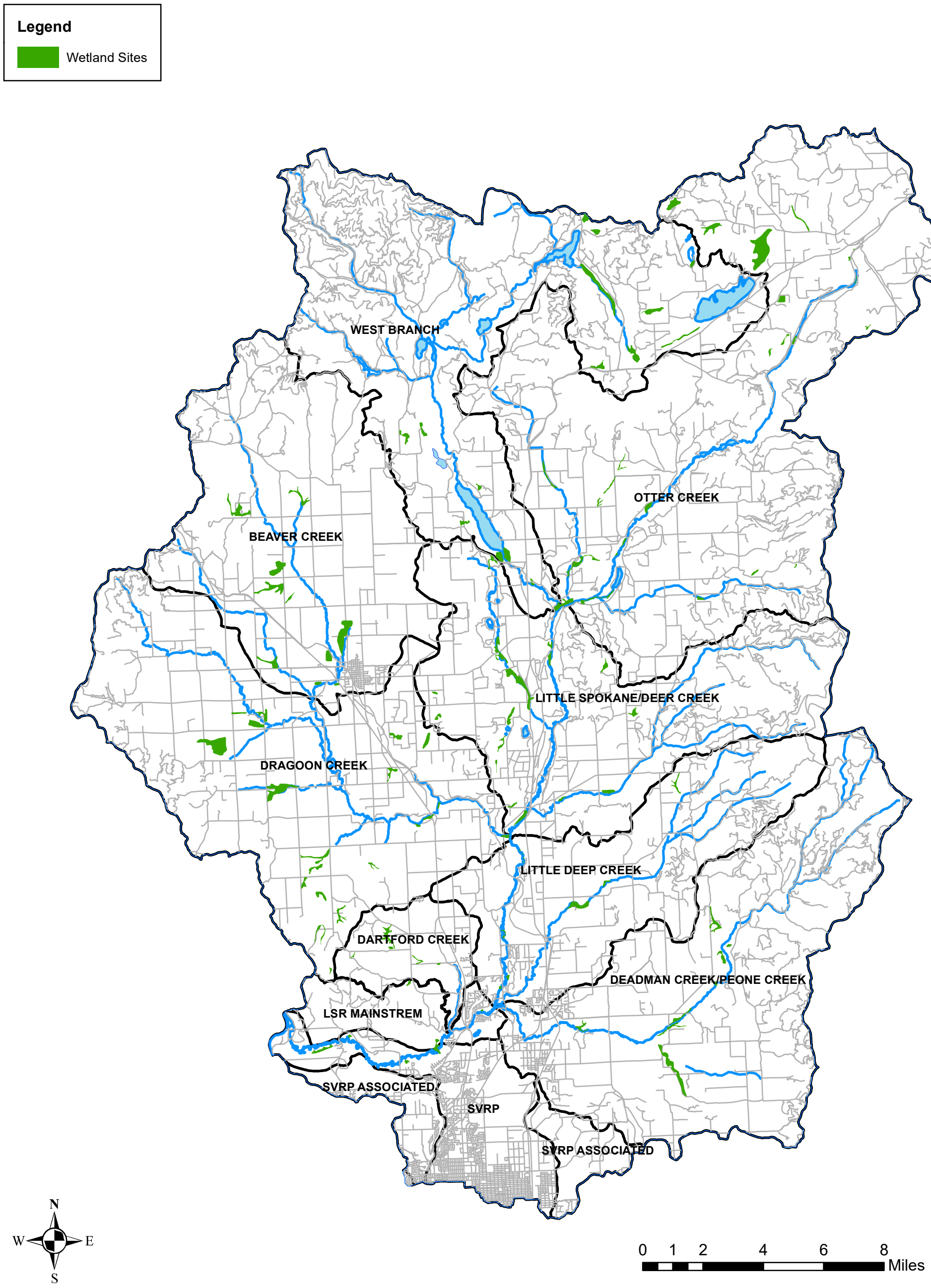

Figure 5
Potential Wetland Restoration Sites by Subbasin
Little Spokane River watershed/WRIA 55

SPOKANE COUNTY
WATER RESOURCES

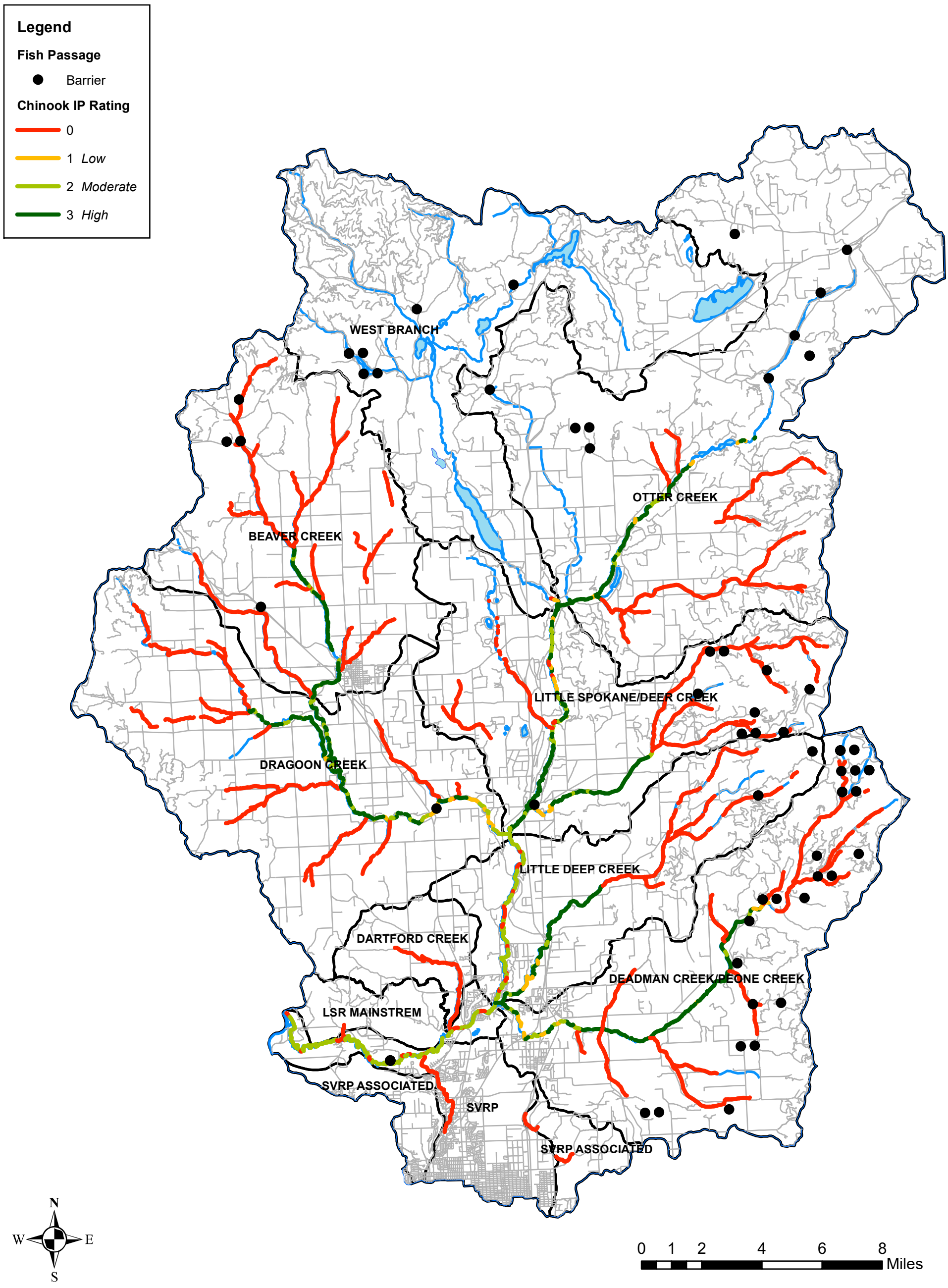

Figure 6
Intrinsic Potential Habitat for Chinook and Fish Passage Barriers by Subbasin
Little Spokane River watershed/WRIA 55

SPOKANE COUNTY
WATER RESOURCES

Table 1. Fish species by subbasin and waterbody. Data compiled from McLellan 2002, 2003 and 2005.

Subbasin	Waterbody (Reach #s)*	Eastern brook trout Salvelinus fontinalis	Lake trout S. namaycush	Brown trout Salmo trutta	Rainbow Trout Onchorhynchus mykiss	Kokanee O. nerka	Mountain whitefish Prosopium williamsoni	Pygmy whitefish P. coulteri	Black crappie Pomoxis nigromaculatus
Otter Creek	LSR (1 - 20)	X			X		X		
	Otter	X		X	X		X		
	Dry	X		X	X		X		
	Chain Lake**				O	O	O		
WB	WB			X	X		X		
	Beaver	X			X				
	Buck	X			X	O			
	Heel	X							
	Spring Heel	X							
	Diamond Lake**				O				
	Sacheen Lake**	O		O					
	Fan Lake**				O				
	Trout Lake**	O			O				
	Horseshoe Lake**		O		O	O	O	O	
	Eloika Lake**			O	O				
Deer	LSR (21 - 29)	X			X		X		
	Deer	X			X				
	Little Deer	X			X				
	Bear	X			X		X		
Beaver	Beaver	X		X	X				
	Upper Dragoon (1-14)	X		X	X		X		
	Spring	X		X	X				
Dragoon	West Branch Dragoon	X		X	X				
	Lower Dragoon (15 - 28)	X		X	X		X		
	Mud	O							
	Wethey Creek**	O		O	O		O		
Little Deep	LSR (30 - 34)				X				
	Little Deep				X		X		
	North Fork	X			X				
	South Fork	X			X				
	Pell Creek				X				
Deadman	Deadman Creek	X			X		X		
	South Fork	X			X				
	Burping Brook	X			X				
Dartford	LSR (35 - 41)			X	X		X		
	Dartford	X			X				

X Species observed during WDFW surveys conducted between 2001 and 2003

O Species noted as present from other sources as summarized in McLellan 2002, 2003, and 2005.

* Reach numbers from WDFW surveys provided where waterbody is divided by multiple subbasins

** Waterbody not included in WDFW surveys

Table 1. Fish species by subbasin and waterbody. Data compiled from McLellan 2002, 2003 and 2005.

Subbasin	Waterbody (Reach #s)*	Redside shiners Richardsonius balteatus	Bluegill Lepomis macrochirus	Grass pickerel Esox americanus vermiculatus	Green sunfish Lepomis cyanellus	Northern pikeminnow Ptychocheilus oregonensis	Largemouth bass Micropterus salmoides	Smallmouth bass M. dolomieui
Otter Creek	LSR (1 - 20)	X	X			X	X	
	Otter							
	Dry					X	X	
	Chain Lake**	O				O		
WB	WB		X	X			X	
	Beaver							
	Buck			O				
	Heel							
	Spring Heel						X	
	Diamond Lake**				O		O	
	Sacheen Lake**				O		O	
	Fan Lake**			O	O		O	
	Trout Lake**				O		O	
	Horseshoe Lake**		O		O			
	Eloika Lake**			O	O		O	O
Deer	LSR (21 - 29)	X		X		X		
	Deer							
	Little Deer							
	Bear				X			
Beaver	Beaver	X						
	Upper Dragoon (1-14)	X				X		
	Spring							
Dragoon	West Branch Dragoon	X						
	Lower Dragoon (15 - 28)	X				X		
	Mud							
	Wethey Creek**							
Little Deep	LSR (30 - 34)	X				X		
	Little Deep	X						
	North Fork	X						
	South Fork	X						
	Pell Creek							
Deadman	Deadman Creek	X				X		
	South Fork							
	Burping Brook							
Dartford	LSR (35 - 41)	X				X		
	Dartford							

X Species observed during WDFW surveys conducted between 2001 and 2003

O Species noted as present from other sources as summarized in McLellan 2002, 2003, and 2005.

* Reach numbers from WDFW surveys provided where waterbody is divided by multiple subbasins

** Waterbody not included in WDFW surveys

Table 1. Fish species by subbasin and waterbody. Data compiled from McLellan 2002, 2003 and 2005.

Subbasin	Waterbody (Reach #s)*	Carp Cyprinus carpio	Chiselmouth Acrocheilus alutaceus	Longnose dace Rhinichthys cataractae	Speckled dace R. oculus	Pumpkinseed Lepomis gibbosus	Bridgelip sucker Catostomus columbianus	Largescale sucker C. macrocheilu	Longnose sucker C. catostomus
Otter Creek	LSR (1 - 20)		X	X	X		X	X	
	Otter				X				
	Dry			X					
	Chain Lake**		O					O	
WB	WB			X		X			
	Beaver								
	Buck								
	Heel								
	Spring Heel								
	Diamond Lake**					O			
	Sacheen Lake**					O			
	Fan Lake**					O			
	Trout Lake**								O
	Horseshoe Lake**					O			O
	Eloika Lake**					O			
Deer	LSR (21 - 29)		X	X	X	X	X	X	
	Deer			X					
	Little Deer								
	Bear			X	X		X		
Beaver	Beaver				X		X		
	Upper Dragoon (1-14)				X		X		
	Spring								
Dragoon	West Branch Dragoon		X	X	X		X		
	Lower Dragoon (15 - 28)		X	X	X		X		
	Mud								
	Wethey Creek**								
Little Deep	LSR (30 - 34)			X		X	X	X	
	Little Deep			X	X		X		
	North Fork				X		X		
	South Fork				X				
	Pell Creek								
Deadman	Deadman Creek		X	X	X		X		
	South Fork								
	Burping Brook								
Dartford	LSR (35 - 41)		X				X	X	
	Dartford			X					

X Species observed during WDFW surveys conducted between 2001 and 2003

O Species noted as present from other sources as summarized in McLellan 2002, 2003, and 2005.

* Reach numbers from WDFW surveys provided where waterbody is divided by multiple subbasins

** Waterbody not included in WDFW surveys

Table 1. Fish species by subbasin and waterbody. Data compiled from McLellan 2002, 2003 and 2005.

Subbasin	Waterbody (Reach #s)*	White sucker C. commersi	Tench Tinca tinca	Yellow bullhead Ameiurus natalis	Black bullhead A. melas	Brown bullhead A. nebulosus	Yellow perch Perca flavescens	Slimy sculpin Cottus cognatus	Mottled Sculpin C. bairdi	Torrent sculpin C. rotheus
Otter Creek	LSR (1 - 20)		X					X		
	Otter								X	
	Dry								X	X
	Chain Lake**		O				O			
WB	WB		X	X			X		X	
	Beaver									
	Buck							X		
	Heel									
	Spring Heel			X						
	Diamond Lake**					O	O			
	Sacheen Lake**		O			O	O			
	Fan Lake**		O	O			O			
	Trout Lake**		O			O	O			
	Horseshoe Lake**			O			O			
	Eloika Lake**		O	O	O	O	O			
Deer	LSR (21 - 29)		X	X			X		X	
	Deer								X	
	Little Deer									
	Bear							X		
Beaver	Beaver								X	
	Upper Dragoon (1-14)					X			X	
	Spring								X	
Dragoon	West Branch Dragoon								X	X
	Lower Dragoon (15 - 28)								X	X
	Mud									
	Wethey Creek**									
Little Deep	LSR (30 - 34)								X	
	Little Deep									X
	North Fork									
	South Fork									
	Pell Creek									
Deadman	Deadman Creek								X	
	South Fork								X	
	Burping Brook									
Dartford	LSR (35 - 41)								X	
	Dartford									

X Species observed during WDFW surveys conducted between 2001 and 2003

O Species noted as present from other sources as summarized in McLellan 2002, 2003, and 2005.

* Reach numbers from WDFW surveys provided where waterbody is divided by multiple subbasins

** Waterbody not included in WDFW surveys

Table 2. Fish habitat characteristics by Subbasin. Data compiled from McLellan 2002, 2003 and 2005.

		Stream Characteristics									Mean % Habitat Occurrence			Mean % Composition of Substrate and % Embeddedness									
Subbasin	Waterbody (Reach #s)*	Stream Order	Length (km)	Headwater Elevation (m)	Mouth Elevation (m)	Mean Wetted Width (m)	Mean Bankful Width (m)	Mean Depth (cm)	Mean Max Depth (cm)	Mean % Gradient	Riffle	Pool	Run	Organic	Muck	Silt	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock	Embed
Otter Creek	LSR (1 - 20)	--	25.7	667	546	9.6	11.4	43	72	1.7	12	3	85	24	3	20	38	5	3	4	4	0	92
	Otter	3	15.4	817	546	1.8	2.8	15	27	2.0	31	12	57	2	15	13	51	9	4	2	5	1	84
	Dry	2	12.9	963	552	2.7	3.7	18	33	3.0	54	6	40	4	1	16	44	22	5	3	3	1	58
WB	WB	4	32.3	713	546	10.7	12.6	35	63	2.0	34	18	48	1	5	8	28	11	12	8	10	15	32
	Beaver	2	20.1	878	594	1.8	3.3	6	12	1.0	27	10	63	0	0	12	25	35	22	6	0	0	36
	Buck	3	10.3	1244	600	3.5	5.1	13	26	3.0	75	21	4	0	0	5	45	21	23	3	1	1	38
	Heel	2	7.7	1280	664	2.0	3.2	10	19	5.0	73	25	2	0	0	2	39	30	14	4	10	0	40
	Spring Heel	2	4.8	692	616	2.9	3.8	29	47	1.0	33	33	33	1	6	2	72	6	3	2	1	6	41
Deer	LSR (21 - 29)	--	15.6	546	512	12.5	14.2	36	65	1.8	17	0	83	7	5	8	51	4	7	4	12	0	80
	Deer	4	20.9	1305	515	2.3	4.3	10	21	2.0	52	18	30	1	0	11	54	20	7	3	2	2	63
	Little Deer	3	10.2	1463	604	1.2	3.4	6	12	4.0	79	15	6	1	0	7	27	30	18	10	5	0	49
	Bear	2	11.9	634	521	2.9	15.2	24	40	2.0	34	3	63	4	18	15	35	19	4	2	4	0	74
Beaver	Beaver	3	13.0	731	636	1.7	3.5	21	28	1.0	5	2	93	8	51	16	19	3	2	0	0	0	96
	Upper Dragoon (1-14)	--	16.1	770	636	3.2	6.7	31	55	1.2	15	20	65	4	12	23	48	7	5	1	0	0	94
	Spring	2	2.7	649	639	3.8	5.1	33	57	1.0	0	0	100	14	19	20	46	0	0	0	0	0	100
Dragoon	West Branch Dragoon	4	18.5	704	611	2.3	4.6	25	42	1.1	15	9	76	5	10	32	39	4	8	1	0	0	90
	Lower Dragoon (15 - 28)	5	20.2	636	512	7.0	11.6	38	67	1.3	36	15	49	6	2	4	35	9	26	9	5	4	60
Little Deep	LSR (30 - 34)	--	11.4	512	497	15.6	17.4	49	84	1.1	25	0	75	1	0	16	42	10	13	13	5	0	79
	Little Deep	3	15.6	609	499	2.8	4.0	19	35	1.1	43	17	40	0	0	28	40	15	11	4	2	0	77
	North Fork	2	8.0	1254	609	1.6	2.8	9	16	2.4	67	10	23	1	3	23	25	34	6	4	4	0	65
	South Fork	2	3.9	1408	609	1.9	3.2	9	18	5.0	74	21	5	0	0	13	25	25	14	13	8	2	48
	Pell Creek	1	7.4	943	610	1.2	2.8	5	10	4.3	73	13	14	1	1	18	30	25	14	6	1	6	54
Deadman	Deadman Creek	4	33.8	1494	497	3.7	5.4	15	30	3.5	61	16	23	0	0	14	31	13	17	12	11	1	70
	South Fork	2	8.7	1383	747	2.0	3.5	7	15	4.3	81	14	5	0	0	5	35	28	18	7	7	0	56
	Burping Brook	2	2.4	1566	1003	1.7	3.1	6	14	11.6	84	10	6	5	0	7	37	17	14	10	11	0	58
Dartford	LSR (35 - 41)	6	19.9	497	471	16.8	19.5	39	74	1.7	65	0	35	1	0	7	24	12	41	14	4	0	66
	Dartford	3	7.6	580	487	2.1	2.8	12	21	2.5	86	8	6	2	0	16	49	12	10	3	4	4	75

* Reach numbers from WDFW surveys provided where waterbody is divided by multiple subbasins. Data from these reaches is averaged for the section included in the subbasin.

Table 3. Amount of Intrinsic Potential Habitat for Steelhead and Chinook by Subbasin. Stream kilometers calculated in ArcGIS using Intrinsic Potential Habitat datalayer developed by the Spokane Tribe.

Subbasin	Steelhead Intrinsic Potential (River Kilometers)				Chinook Intrinsic Potential (River Kilometers)					Moderate to High Combined	
	Low (1)	Moderate (2)	High (3)	Total	None (0)	Low (1)	Moderate (2)	High (3)	Total	Steelhead	Chinook
Otter Creek	25.74	7.19	15.81	48.74	36.02	1.20	1.60	9.92	48.74	23.00	11.52
WB	0.40	0.00	0.39	0.79	0.20	0.20	0.00	0.39	0.79	0.39	0.39
Deer	36.75	9.46	21.57	67.78	44.88	2.00	4.99	15.89	67.76	31.03	20.88
Beaver	58.05	5.40	4.04	67.49	57.85	0.00	1.24	8.40	67.49	9.44	9.64
Dragoon	49.63	8.40	15.62	73.65	48.03	3.60	5.61	1.64	58.88	24.02	7.25
Little Deep	27.03	12.09	6.40	45.52	25.89	1.40	9.29	8.94	45.52	18.49	18.23
Deadman	49.09	7.10	13.81	70.00	48.83	2.60	2.49	1.61	55.53	20.91	4.10
Dartford	5.84	3.63	2.41	11.88	9.04	0.00	2.83	0.00	11.87	6.04	2.83
WRIA 55	252.53	53.27	80.05	385.85	270.74	11.00	28.05	46.79	356.58	133.32	74.84

Table 4. Riparian habitat conditions by subbasin. Data compiled from SCD (2005).

Subbasin	Waterbody	Reach	Length (River Miles)	Functional Condition Rating	Ecological Rating	Restoration Potential	Development Risk
Otter Creek	Little Spokane mainstem	1-A	0.6	PFC	Good	NA	Medium
		1-B	0.7	PFC	Good	NA	Medium
		1-C	0.8	FAR	Poor	Good	Medium
		1-D	0.6	PFC	Fair-good	NA	Medium
		2	0.5	FAR	Poor	Good	Medium
		3	1	PFC	Fair-good	NA	Medium
		4	1	PFC	Good	NA	Medium
		5	0.3	PFC	Good	NA	Medium
		6	1.9	PFC	Poor	Good	Medium
WB	WB	1	0.5	PFC	Good	NA	Medium
		2	0.4	PFC	Fair-good	NA	Medium
		3	0.9	PFC	Fair-good	Good	Medium
		4	0.5	FAR	Fair	Fair-good	Medium
		5	1.1	PFC	Good	NA	Medium
		6	0.5	FAR	Poor	Fair-good	Medium
Deer	Little Spokane mainstem	7	1.6	PFC	Poor-fair	Fair	Medium
		8	0.5	PFC	Fair	Good	Medium
		9	1.9	PFC	Fair-good	NA	Medium
		10	3.6	FAR	Poor	Good	Medium
		11	0.8	PFC	Good	NA	Medium
		12	1.3	FAR	Poor-fair	Good	Medium
		13	0.95 (1.9)	PFC	Fair-good	NA	Medium
Beaver	Dragoon	1	1.3	PFC	Fair-good	NA	NA
Dragoon	Dragoon	2	3	PFC	Fair	Fair-good	NA
		3	0.6	PFC	Poor-fair	Fair-good	NA
		4	3.1	PFC	Fair	Fair-good	High
		5	0.9	FAR	Poor-fair	Fair-good	High
		6	0.7	PFC	Fair-good	Fair	High
		7	0.4	FAR	Poor-fair	Fair-good	High
		8	1.8	PFC	Good	Good	High
		9	1.4	PFC	Fair-good	Fair	Medium
		10	4.3	PFC	Fair-good	Fair	Medium
Little Deep	Little Spokane mainstem	13	0.95 (1.9)	PFC	Fair-good	NA	Medium
		14	1	FAR	Fair	Fair-good	Medium
		15	6.1 (9.2)	PFC	Fair	Fair-good	Medium
Deadman	Deadman Creek	1	2	PFC	Good	NA	NA
		2	6.8	FAR	Good	Fair	NA
		3	0.9	FAR	Poor	Good	NA
		4	1.8	FAR	Poor	Good	NA
		5	2.8	PFC	Fair	Fair	NA
		6	1.7	PFC	Fair-good	NA	NA
		7	2	PFC	Fair-good	NA	Medium
		8	5	PFC	Fair-good	Fair-good	High
Dartford	Little Spokane mainstem	15	3.1 (9.2)	PFC	Fair	Fair-good	Medium
		16	0.4	PFC	Good	NA	Low
		17	0.3	PFC	Good	NA	Low
		18	2.9	PFC	Fair	NA	Low
		19	5.3	PFC	Good	NA	Low
		20	1.1	PFC	Good	NA	Medim

Table 5. Potential wetland restoration sites adjacent to waterbodies by subbasin. Adjacency to moderate to high intrinsic potential habitat and poor riparian conditions is also indicated.

Subbasin	Wetland Site Name	Size (acres)	Adjacent to:	
			Moderate to High Instrinsic Potential Habitat	Poor Riparian Conditions
Otter Creek	Little Spokane	57.64	X	X
	Reflection	34.84	X	X
	Otter 1	60.28		
	Otter 2	13.25		
	Otter 3	15.82		
	Otter 4	14.88		
	County Line E	30.57		
	Blanchard	12.92	X	
	Nelson 1	10.81		
	Elk 1	10.14	X	X
	Elk 2	3.89	X	
	Camden	28.29	X	X
	Scotia	11.43		
	Penrith	4.2		
WB	Little Spokane	57.64	X	X
	Eloika Road S	5.62		X
	Eloika SE	49.3		
	Eloika S	38.57		
	Sacheen S	144.94		
	Highway 211 E	62.61		
	Diamond SW	38.71		
	Mallard	13.99		
Deer	Chattaroy 1	34.84	X	X
	Chattaroy 5	9.73	X	
	Chattaroy 6	27.65	X	
	Bear 1	61.49		
	Bear 2	131.53		
	Eloika SW	24.37		
	Milan 1	13.37	X	
	Milian 2	20.92	X	
Beaver	Beaver	53.31		
	Deer	159.89		
	Deer West 2	12.79	X	
	Deer West 3	7.29	X	
	Clayton 2	87.95		
	Loon	83.93		
	Oregon	47.53		

Table 5. Potential wetland restoration sites adjacent to waterbodies by subbasin. Adjacency to moderate to high intrinsic potential habitat and poor riparian conditions is also indicated.

Subbasin	Wetland Site Name	Size (acres)	Adjacent to:	
			Moderate to High Instrinsic Potential Habitat	Poor Riparian Conditions
Dragoon	Chattaroy 3	14.32	X	
	Dragoon 1	7.73	X	
	Dragoon 2	16.02	X	
	Dragoon 3	7.66	X	
	Wildrose 2	22.03		
	Wildrose 3	27.98		
	Wildrose 4	51.28		
	Wildrose 5	13.35		
	Mud	58.48		
	Frog 2	16.24		
	Frog 3	52.98		
	Frog 4	35.73		
Little Deep	Chattaroy 4	4.24	X	X
	Buckeye	9.2	X	
	Colburt 1	7.9	X	
	Colburt 2	4.88	X	
	Woolard 1	66.34		
	Woolard 2	12.77	X	
Deadman	Deadman 1	26.39	X	
	Deadman 2	30.37	X	
	Deadman 3	30.51	X	
	Moffatt	137.64		
	Peone 1	5.36	X	
	Madison	52.06		
Dartford	Ballard 1	13.26		
	Ballard 2	3.69		
	Dartford 1	31.23	X	
	Colburt 3	2.99	X	