Draft
Asotin Creek
Subbasin Summary

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Northwest Power Planning Council

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Asotin Creek Subbasin Summary

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Background

In 1980, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act (Act), which authorized the states of Idaho, Montana, Oregon, and Washington to create the Northwest Power Planning Council (Council). The Act directs the Council to develop a program to "protect, mitigate and enhance fish and wildlife, including related spawning grounds and habitat, on the Columbia River and its tributaries . . .affected by the development, operation and management of [hydroelectric projects] while assuring the Pacific Northwest an adequate, efficient, economical and reliable power supply" (NPPC 2000).

The Council's Columbia Basin Fish and Wildlife Program (Program) is the largest regional effort in the nation to recover, rebuild, and mitigate impacts on fish and wildlife. The Program expresses goals and objectives for the entire basin based on a scientific foundation of ecological principles. The Council has stated four overarching biological objectives for this Program. They are:

- A Columbia River ecosystem that sustains an abundant, productive, and diverse community of fish and wildlife.
- Mitigation across the basin for the adverse effects to fish and wildlife caused by the development and operation of the hydrosystem.
- Sufficient populations of fish and wildlife for abundant opportunities for tribal trust and treaty right harvest and for non-tribal harvest.
- Recovery of the fish and wildlife affected by the development and operation of the hydrosystem that are listed under the Endangered Species Act (ESA).

The Council will establish specific biological objectives at the province level and in subbasin plans identifying the changes needed in characteristics of the environment and target populations. The Council will amend into the Program locally developed plans for the 62 tributary subbasins of the Columbia River and a plan for the mainstem. These plans will be consistent with the goals and objectives for the basin.

A subbasin assessment and planning process will complete the Program at the subbasin level and provide the implementation plans out of which fish and wildlife projects are proposed for Bonneville Power Administration (BPA) funding to implement the Program. Subbasin plans will also be the context for review of proposals for BPA funding each year by the fish and wildlife agencies and tribes, the Independent Scientific Review Panel, and the Council. Until formal subbasin plans are created, interim documents called "subbasin summaries" will be used to guide project selection. Summaries are a compilation of all the existing information about a subbasin, including past and ongoing fish and wildlife activities, and current management plans, objectives and policies. This summary information will help to fulfill the inventory component of subbasin plans. These summaries will include as much information as possible until the more comprehensive plan is completed and eventually, the summaries will be replaced by subbasin plans.

On an interim basis, until subbasin plans identify actual targets, the Council has adopted the following regional objectives for anadromous fish:

- Halt declining trends in salmon and steelhead populations above Bonneville Dam by 2005. Obtain the information necessary to begin restoring the characteristics of healthy lamprey populations.

- Restore the widest possible set of healthy naturally reproducing populations of salmon and steelhead in each relevant province by 2012. Healthy populations are defined as having an 80 percent probability of maintaining themselves for 200 years at a level that can support harvest rates of at least 30 percent.
- Increase total adult salmon and steelhead runs above Bonneville Dam by 2025 to an average of 5 million annually in a manner that supports tribal and non-tribal harvest. Within 100 years achieve population characteristics that, while fluctuating due to natural variability, represent on average full mitigation for losses of anadromous fish.

The following objectives address resident fish losses:

- Complete assessments of resident fish losses throughout the basin resulting from the hydrosystem, expressed in terms of the various critical population characteristics of key resident fish species.
- Maintain and restore healthy ecosystems and watersheds, which preserve functional links among ecosystem elements to ensure the continued persistence, health, and diversity of all species including game fish species, non-game fish species, and other organisms.
- Protect and expand habitat and ecosystem functions as the means to significantly increase the abundance, productivity, and life history diversity of resident fish at least to the extent that they have been affected by the development and operation of the hydrosystem.
- Achieve population characteristics of these species within 100 years that, while fluctuating due to natural variability, represent on average full mitigation for losses of resident fish.

Specific wildlife objectives include:

- Quantify wildlife losses caused by the construction, inundation, and operation of the hydropower projects.
- Develop and implement habitat acquisition and enhancement projects to fully mitigate for identified losses.
- Coordinate mitigation activities throughout the basin with fish mitigation and restoration efforts, specifically by coordinating habitat restoration and acquisition with aquatic habitats to promote connectivity of terrestrial and aquatic areas.
- Maintain existing and created habitat values.
- Monitor and evaluate habitat and species responses to mitigation actions.

The *Asotin Creek Subbasin Summary* addresses the Council's Program by providing up-to-date information on biological inventories and watershed assessments. This summary also identifies factors believed to limit fish and wildlife populations, describes activities to protect and enhance fish and wildlife habitats, and summarizes data collection and resource needs.

Introduction

The Asotin Creek subbasin is approximately 325 square miles (mi^2) and is located in the southeastern corner of Washington. Elevations range from 800 feet to 6,223 feet. The subbasin is home to a variety of fish and wildlife species and habitats. Human development and land use influence habitat conditions. Much of Asotin Creek and its tributaries have been straightened, diked, or relocated. The straight, wide and shallow channel continuously adjusts in order to compensate for alterations to channel shape and location, floodplain disconnections, and

modifications to runoff patterns. The name "Asotin" is derived from the Nez Perce word, Heesut'iin, "Eel Creek" (Hitchum 1985). The subbasin was the center of a fishing village for collecting Pacific lamprey (*Entosphenus tridentatus*), now rarely found in the subbasin.

Resource managers and the public ultimately shape how and whether fish and wildlife species will persist. Fish and wildlife technicians and agency staff have found appropriate funding sources and leveraged money to implement cost effective projects in the Asotin Creek subbasin that provide long-term solutions to address the critical factors that are believed to limit fish and wildlife productivity.

Water quality, geomorphic instability, riparian function, sedimentation, insufficient instream habitat, out-of-basin effects, less than optimal passage/connectivity due to road culverts, data gaps, the presence of non-native species, and ecological productivity limit salmonid production in the subbasin. Wildlife populations have been impacted by habitat loss due to factors such as agricultural development, hydropower development, logging, road construction and maintenance, fire suppression, and the spread of noxious weeds.

Improving and expanding existing efforts including fisheries habitat enhancement, wildlife habitat protection, and research, monitoring and evaluation activities is critical to meeting protection and restoration goals within the subbasin.

Tenmile and Couse Creeks have been included in this document as part of the Asotin Creek subbasin. These streams drain into the Snake River south of Asotin. Little is known or documented about fish and wildlife resources or their habitat conditions in these two drainages. Both drainages are comprised of deeply incised canyons with croplands on the ridge tops and rangelands within the canyons. Trees and other woody vegetation exists along streams or in isolated wet seeps, primarily along the north or east slopes, and in the uplands in the upper portions of the watershed. Most hillsides are vegetated primarily with grasses and forbs. Fish and wildlife habitat conditions within these two watersheds are similar to those in Asotin Creek. Therefore, these two drainages will only be discussed in those sections where specific information exists.

Subbasin Description

General Location

The Asotin Creek subbasin is located in Asotin and Garfield Counties. The creek is a third order tributary to the Snake River with its headwaters originating in the Blue Mountains, continuing east into the Snake River at Asotin, Washington (Figure 1). Asotin Creek drains approximately 208,000 acres (325 mi^2) in the extreme northeast portion of the Blue Mountains.

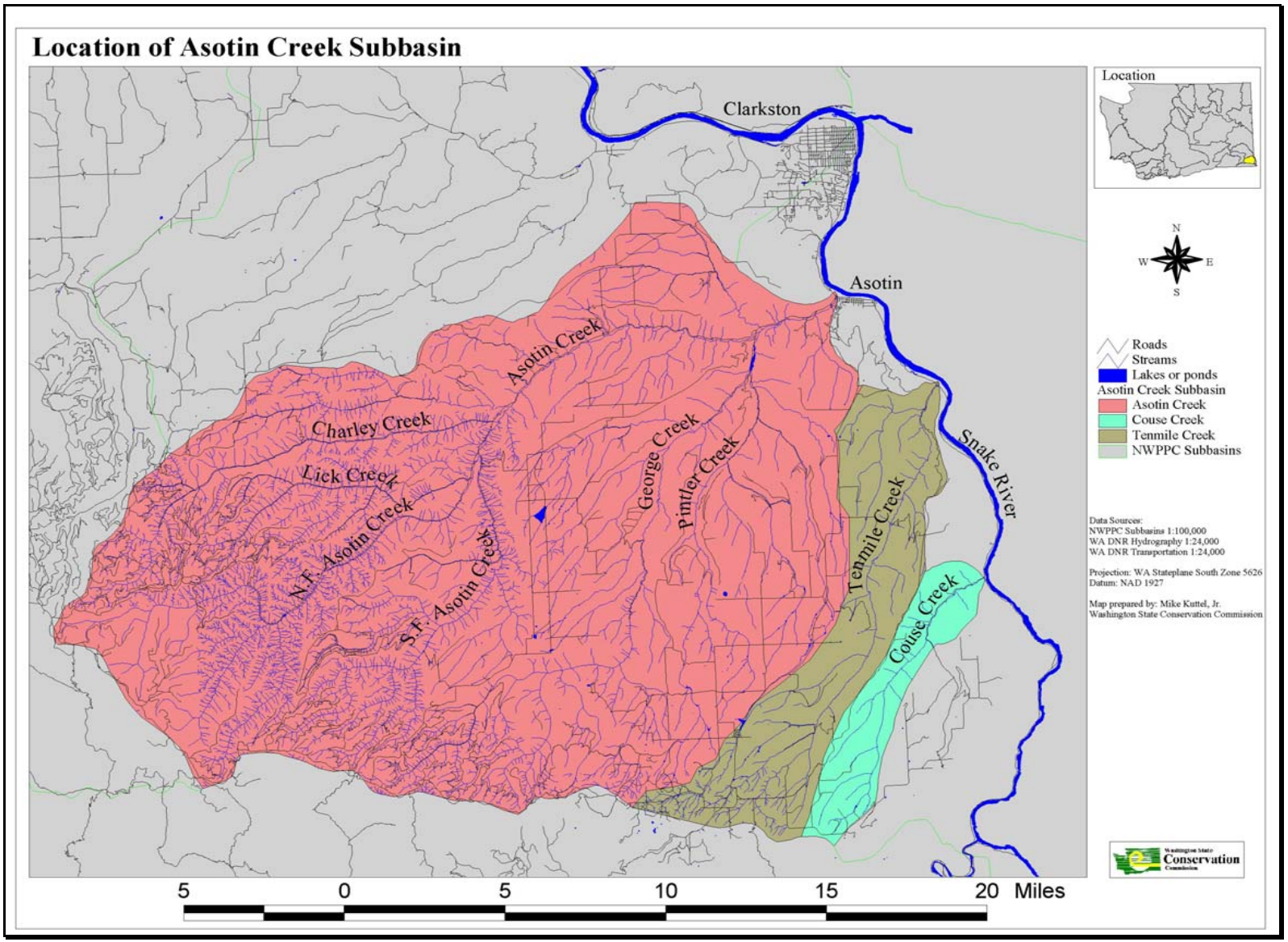

Figure 1. Location of Asotin Creek subbasin, Washington.

Drainage Area

Asotin Creek has two major drainages, the mainstem and George Creek. The mainstem drains 119,000 acres and flows into the Snake River at the city of Asotin, Washington. Major tributaries to the mainstem include Charley Creek, North Fork of Asotin Creek, South Fork of Asotin Creek, and Lick Creek. George Creek drains 89,000 acres and its major tributaries include Pintler Creek, Nims Gulch, Ayers Gulch, Kelly Creek, Rockpile Creek, and Coombs Canyon.

Topography/Geomorphology

Topography in the Asotin Creek subbasin consists of basaltic rocks, which include ancient fractured and folded lava flows. The bedrock is overlain by fine-grained loess soils that are highly erodible when exposed to the elements. Folding of the underlying bedrock has resulted in a plateau tilted slightly to the north and east. The increase in elevation from this uplift caused streams to cut down and form very steep, and generally narrow, v-shaped canyons. Figure 2 illustrates the topography of the Asotin Creek subbasin.

Asotin Creek historically had a less severe gradient, a meandering flow pattern with point bars that formed pools and riffles, and well developed floodplain connections. The point bars provided habitat for an entire aquatic community of plants and animals. The stream channel had long, deep pools and a well-developed thalweg. Today, much of Asotin Creek and its tributaries have been straightened, diked, or relocated. The straight, wide and shallow channel continuously adjusts in order to compensate for alterations to channel shape and location, floodplain disconnections, and modifications to runoff patterns. Flood events in conjunction with these channel modifications have resulted in a braided channel lacking instream structure, pools, and woody riparian vegetation (NRCS 2001). The loss of well-developed thalwegs with naturally functioning point bars is responsible for much of the loss of fish habitat.

As part of the *Asotin Creek Inventory and Assessment* (NRCS 2001), comprehensive geomorphic stream classifications with supporting data were completed on Asotin Creek in 1993 and 2000. A comparison of the geomorphic assessments is illustrated in Table 1.

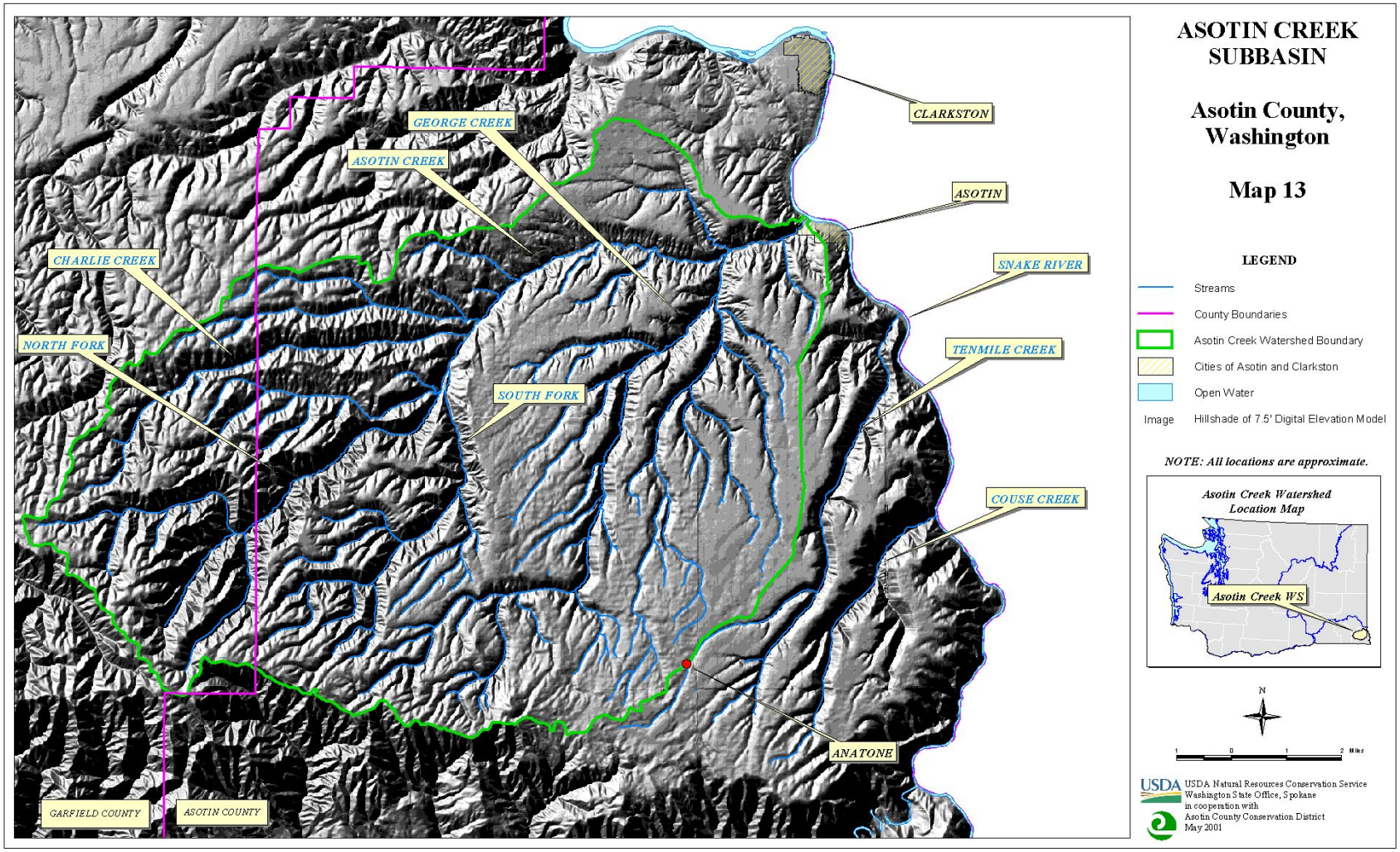

Figure 2. Topography of Asotin Creek subbasin, Washington.

Table 1. Comparison of selected geomorphic features, 1993 to 2000.

Geomorphic Feature	1993	2000	Trend	Comment
Meander vs. Braided	More Braided	Less Braided	+	Less braided system-less exposure to sunlight.
Width to Depth Ratio	Higher	Lower	+	Overall lower width to depth ratios, but some reaches need considerably more improvement and sinuosity.
Sinuosity (K)			O	Slightly higher sinuosity in reaches 4 and 5.
Floodplain Attachment			+	Some reaches have converted from B3c/B4c to C4 stream type due to finer material and aggradation from 1996 and 1997 flood. However, because system was re-straightened in some areas, headcuts are numerous on some stream segments.
Particle Size, D50	61.5 mm	52 mm	+	Finer D50 size class is closer to the remnant size class when Asotin Creek had more K, less slope, and higher meander width ratios. However, the straightening, entrenching and re-confining of Asotin Creek will eventually lead to a larger D50 size due to higher shear stress.

Soils

Soils in the Asotin Creek subbasin consist mostly of silt loams formed from loess or water deposited material, ranging from 10 inches to over 60 inches deep (Fuller 1986). All subbasin drainages contain thin deposits of river alluvium in current floodplains. The alluvium consists of gravel, sand, and silt derived from erosion of flood deposits, loess, and basalt (SCS 1984). Sedimentary interbeds and lava flows within the Columbia River Basalt Group are known to make good aquifers and may contain substantial ground water resources.

Volcanic ash from the eruption of Mt. Mazama (Crater Lake, Oregon) is found in soils located on top of the mountains and north-facing canyon slopes. Silt loams, formed in the loess, cover the plateau tops and shoulder slopes. They are moderately to well drained and highly erosive.

Soils in the canyons and mountains are formed in material weathered from basalt and loess. The basalts have weathered into coarse gravels, cobbles, and boulders with fine silts and clays. There are few sand-sized particles.

Climate

The region's climate is influenced by the Cascade Mountains to the west, the Pacific Ocean, and the prevailing westerly winds. The subbasin receives a mean annual precipitation of 23 inches

including a mean annual snowfall of 65 inches. Rainfall ranges from more than 45 inches in the higher elevations to 12 inches in the lower elevations. Ninety percent of the precipitation occurs between September and May with 30 percent of the winter's precipitation falling as snow. Snowfall at elevations less than 1,500 feet seldom lingers beyond three or four weeks, occasionally melting quickly enough to produce severe erosion (Kelley *et al.* 1982; Fuller 1986). Temperatures can range from -20°F in the winter to 105°F in the summer. The growing season in the subbasin is 115 to 155 days.

Native American History

The Asotin Creek subbasin is central to Nez Perce Tribal activities. The subbasin was an important meeting place for trade and was a hub for many trails that went in and out of the area. "Asotin" was derived from the Nez Perce word Heesut'iin, or "Eel Creek." Since time immemorial the subbasin was used as a village for fishing and collecting Pacific lamprey. Nez Perce occupation is evident through pictographs and known burial sites. Many Nez Perce sites are located along the banks of Asotin Creek and along the banks of the Snake River surrounding Asotin Creek. Looking Glass and Cloud Piler, prominent leaders of the Nez Perce Tribe (NPT) during the War of 1877 were from this area.

The subbasin is protected as a usual and accustomed area of the NPT via the treaty of 1855. Currently, the Asotin Creek subbasin provides fishing and hunting opportunities for tribal members. Although much of the subbasin is privately owned, tribal members still maintain an interest in the land and its resources.

Major Land Uses

Pasture and rangeland, cropland, and forestland are the predominant land uses within the Asotin Creek subbasin (Figure 3). Historic and current land uses have resulted in some portions of the subbasin undergoing stream channel instability (i.e., channel widening, down cutting, vertical cut banks, and excessive gully development). Approximately 33 percent of the lands in the Asotin Creek subbasin are in public ownership of which the Umatilla National Forest comprises 26 percent (Figure 4). There are 142 farm and ranch operators that own or lease agricultural lands in the subbasin. The size of agricultural holdings varies from 160 acres to 5,000 acres, with the average landowner owning or leasing 1,993 acres (Cook and Jordan 1994).

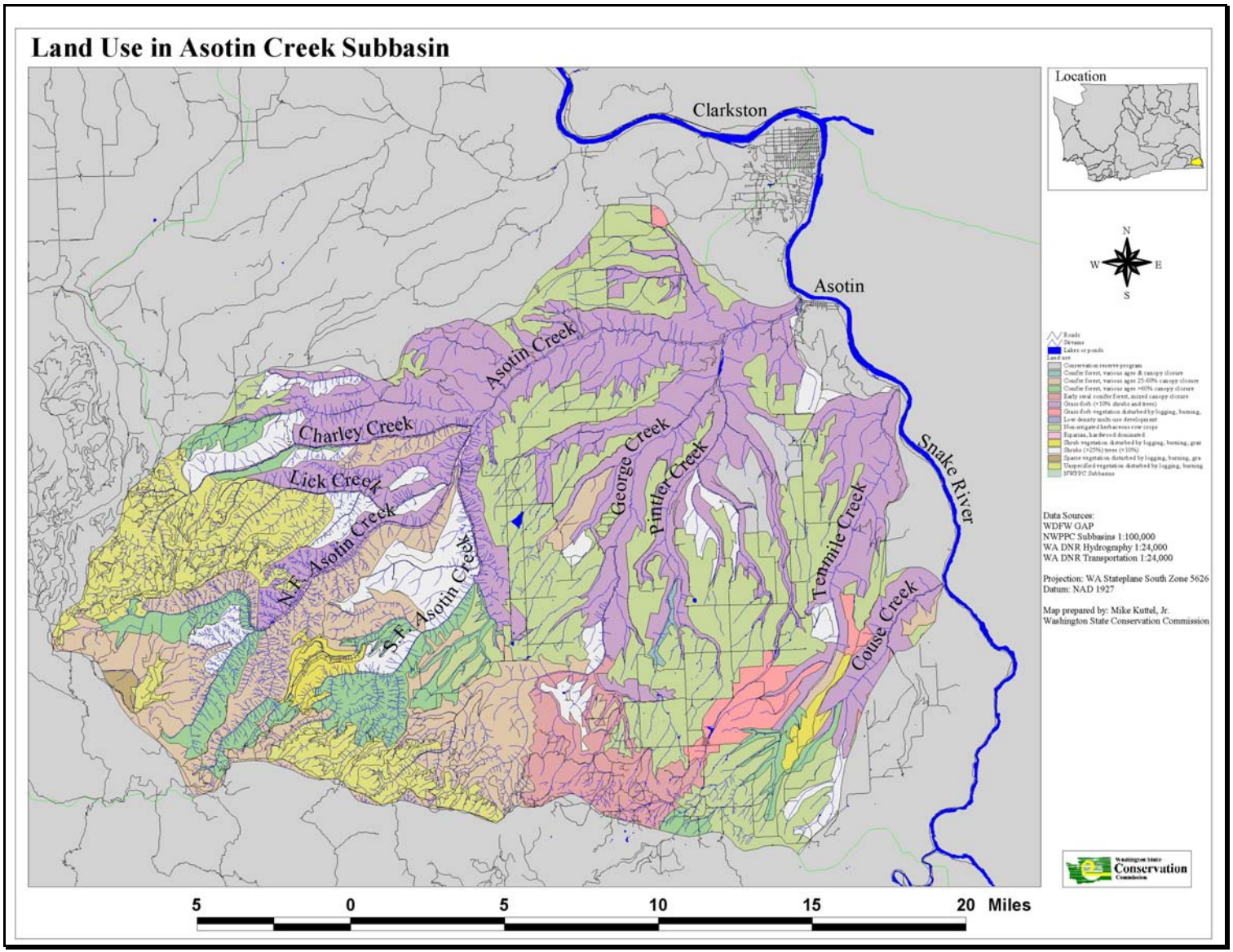

Figure 3. Land use in the Asotin Creek subbasin, Washington.

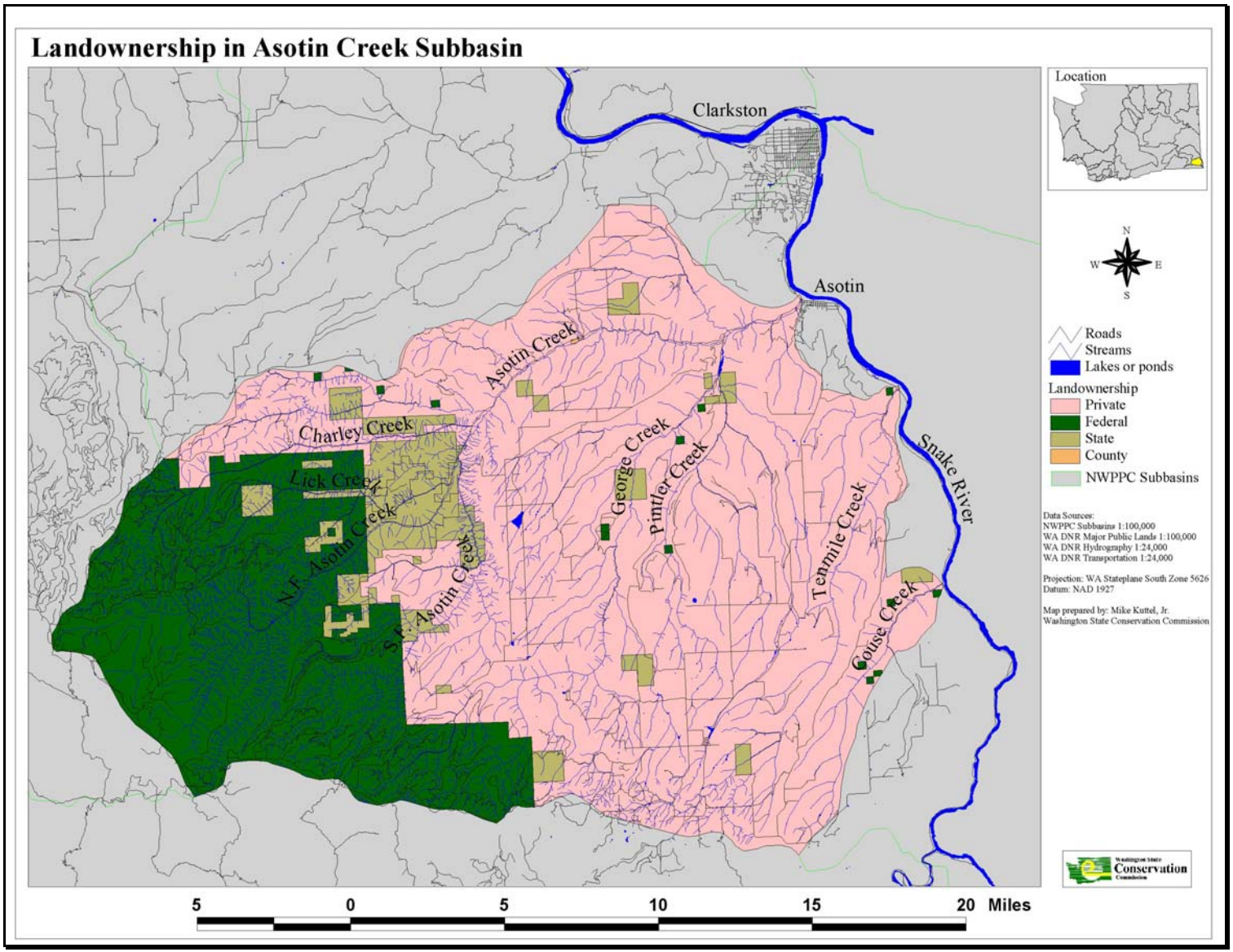

Figure 4. Land ownership in the Asotin Creek subbasin, Washington.

Pasture and Rangeland

Historically, livestock grazing in the Asotin Creek watershed began in the early 1800s. By the early 1900s, cattle, sheep, and wild horses grazed the watershed. The United States Forest Service (USFS) began regulating grazing on its lands and established the Asotin allotment in 1929 and the Peola-Pomeroy allotment in 1939.

Pasture and rangelands occupy 43 percent (90,393 acres) of the Asotin Creek watershed. Livestock are wintered in the lower portions of the subbasin from December through March. After calving, most cattle graze lower canyon slopes until forest grazing is available in June or July. Fall/winter pastures include grain and canyonside pastures.

In 1993, an estimated 70 percent of the streambanks on private rangelands adjacent to Asotin Creek were either excluded from livestock grazing or used only during spring or early summer. Thirty percent of the streambanks are grazed yearlong or between mid-summer and winter (ACCD 1995). Some riparian reaches next to confined winter-feeding areas lack trees, shrubs and effective ground cover due to trampling by livestock. Portions of riparian areas also show signs of overgrazing, such as reduced ground cover, hedging of shrubs, decreased shrub vigor, low diversity of plant species and poor age class structure.

Cropland

Approximately 26 percent (54,956 acres) of the Asotin Creek watershed is comprised of cropland consisting of winter wheat and spring barley with summerfallow every two to three years. Recent changes in federal commodity programs and seeding technology ("direct seeding") are reducing summerfallow acres, with significant saving in soil erosion. For a three-year rotation under conventional tillage and one year of summerfallow, estimated soil erosion in Asotin County would be on the order of 4 tons per acre per year. Under annual cropping with direct seeding, soil loss would be less than 1.0 ton per acre per year. These innovations have reduced summerfallow acreage in Asotin County by about one-third between 1997 and 2000 (J. Schroeder, NRCS, personal communication, 2001). The U.S. Department of Agriculture (USDA) classifies most of the cropland in Asotin County as highly erodible land. As a result, landowners participating in USDA commodity programs must follow a conservation compliance plan approved by the local Conservation District.

The Natural Resources Conservation Service (NRCS) estimates roughly 10 percent of the 23,649 tons of cropland soils moved by soil erosion are transported into the stream system (ACCD 1995). Total estimated sediment yield from all sources in the Asotin Creek watershed is 44,424 tons annually. The majority of this sediment comes from cropland, and enters the lower reaches of Asotin Creek. Although 30 percent of the cropland is enrolled in the Conservation Reserve Program (CRP), the highly erosive nature of the loess soil assures a relatively high total contribution from watersheds that contain managed croplands. The relative sediment delivery to the Snake River from the major subwatersheds includes 5 percent from Charley Creek; 8 percent from the South Fork; 10 percent from the North Fork; 23 percent from intermittent tributaries downstream of Charley Creek; and 54 percent from George Creek, Pintler Creek, and croplands adjacent to lower Asotin Creek.

Forestland

Forestland covers an estimated 62,621 acres (30 percent) of the Asotin Creek watershed, primarily in the north central portion of the subbasin. The primary timber type is Douglas fir

(*Pseudotsuga menziesii*). Other timber types include ponderosa pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta Douglasii*), grand fir (*A. grandis)*, Engelmann spruce (*Picea engelmannii*), and western larch (*Larix occidentalis*).

The majority of forestland is in the Umatilla National Forest and is managed by the USFS for multiple uses including timber management, livestock grazing, outdoor recreation, mining, and water management. The state of Washington and non-industrial private forestland owners manage the remaining forestland. Most of the private land has been harvested at least once. Historic timber harvesting on both public and private lands has removed blocks of merchantable trees from the riparian zone, especially on the National Forest. This has caused loss of shade, bank instability, erosion, and some hydrologic changes.

Roads

There are 4.1 to 5.0 miles of road per square mile in some of the forested subwatersheds. This high road density may be a contributing factor to sediment production and passage barriers from culverts. Many roads in the forested areas were built to facilitate timber harvest and logging operations and now provide access for administrative operations such as reforestation, surveys, monitoring, fire control, and public recreational access.

Road development and maintenance have impacted riparian vegetation in a number of ways. Roads located in the floodplain have contributed to a loss of riparian vegetation. Stream channels have been straightened or relocated to protect roads resulting in an increase in streambed gradient. Asotin Creek Road encroaches on the floodplain and is built across the channel, limiting the number of practices that can be used to restore the stream's natural geomorphic stability.

Many culverts are in need of replacement to reduce the risk of road failure and the subsequent addition of sediment into streams. Historically, most culverts were sized to pass 25-50-year storm events. In many cases, this sizing is not adequate to handle water and wood movement during large flood events. Culverts sized for a 100-year storm event are the same width as the stream channel and are able to easily pass the water and most debris associated with a large event.

Sediment delivered to streams from roads can generally be traced to surface erosion and mass failures. Overgrown road surfaces are well protected from surface erosion, but vegetation alone does not ensure a road’s stability. Many older roads, including those that are overgrown, contain mass failure risk factors such as log drainage structures, logs or slash in-fills, saturated fills, live stream culverts of inadequate size, streams diverted from their normal channels, or fills built on slopes too steep to remain stable. These deficiencies are often not easily corrected by anything short of complete reconstruction.

Many streams in the Asotin Creek subbasin are crossed multiple times by roads. These roads greatly affect the quality and continuity of aquatic ecosystems by interrupting the flow of water and material throughout the length of the stream. Streams depend on naturally occurring recruitment of material such as wood and gravel. These materials are critical in creating spawning and rearing habitats for fish and other aquatic organisms. Roads and culverts act like dams that constrict streamflow through a single, narrow area (an undersized culvert), often preventing the transportation of material downstream. These constriction points also cause gravel buildup (substrate deposition) and channel widening at the culvert inlet. Wide, shallow channels do not provide quality habitat for aquatic organisms. The channels below culvert outlets are typically downcut and scoured by the high velocity water caused by the constriction.

Roads and undersized culverts have been shown to function as barriers to the upstream movement of many fish and wildlife species, including amphibians and insects. Culvert outlets not in contact with stream bottoms do not allow for access since many organisms cannot negotiate the height of the falls. Undersized culverts constrict flows and increase water speeds, creating high velocity barriers and eliminating substrate from culvert bottoms. Substrate such as gravel and rocks provide low velocity areas for organisms to rest on their upstream migration. The presence of barriers can isolate small populations, limiting or preventing genetic exchange between populations and preventing the re-colonization of historic or recovering habitats.

Culverts also limit or prevent seasonal upstream movement by fish. Juvenile salmon, steelhead, and trout often seek refuge in small tributary streams during high water events. Without access to refuge habitats, fish may be washed downstream into poor quality or overcrowded habitats, reducing the chances of survival for individuals and populations, including those already on the ESA list and those related to National Forest tribal trust responsibilities.

Hydrology

Historic and current land use practices have altered the hydrologic cycle of Asotin Creek. Farming, timber harvesting, and urbanization have changed the water cycle, reducing water infiltration and accelerating runoff. To a lesser extent, modifications of the riparian zone, including tree removal, road building, grazing, soil compaction, and flood control projects also altered Asotin Creek hydrology. A diked channel that does not allow the stream to dissipate its flood energy across the floodplain results in faster, more intense runoff during storm events and an increase in instantaneous discharge. The topography of the region leads to high-energy runoff events during thunderstorms. Altering the natural channel geometry of a drainage network increases runoff velocity in stream channels (Rosgen 1996). Asotin Creek is now wider and shallower than it was historically. Changes in the hydrologic cycle are demonstrated by excessive runoff, altered peak flow regimes, lack of ground water recharge, reduction in soil moisture storage, and low late-season flow. A general hydrograph for Asotin Creek is illustrated in Figure 5. Stream channel straightening, an increase in slope, and flow velocity have caused a loss of instream fish habitat, especially pools.

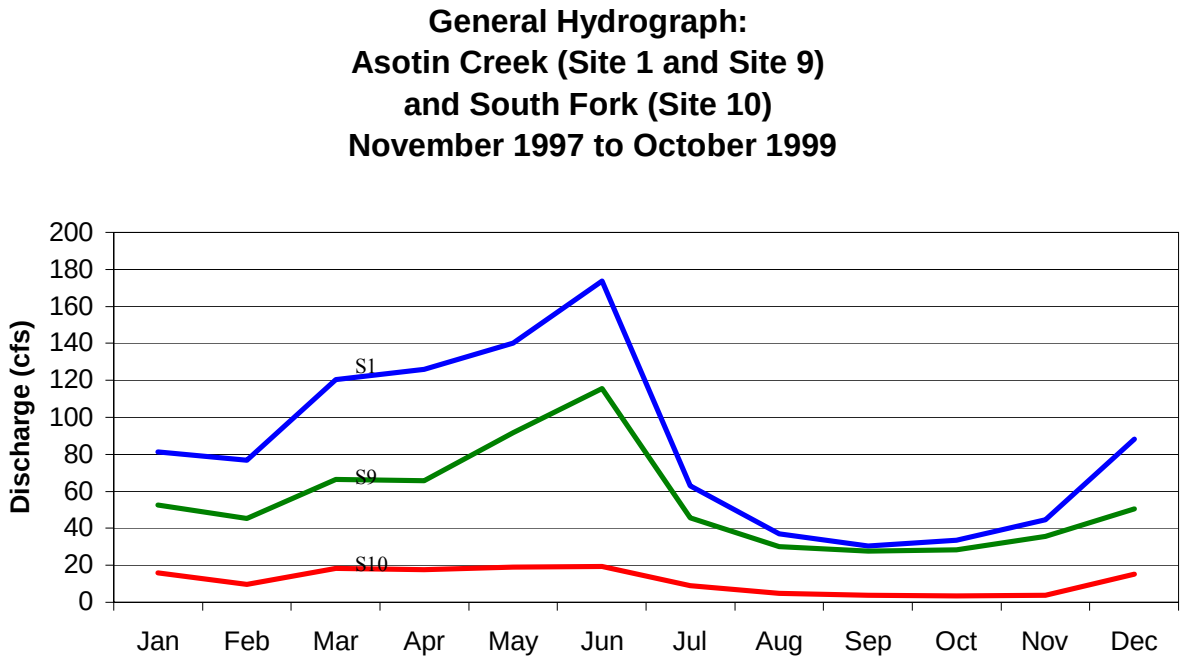

Figure 5. General hydrograph: Asotin Creek/South Fork, November 1997-October 1999 (ACCD 2000).

In 1993, the Washington Department of Ecology (WDOE) conducted an Instream Flow Incremental Methodology study on Asotin Creek using U.S. Geological Survey (USGS) gage records (Caldwell 1994). The study was initiated under the Water Resources Act of 1971 (Chapter 90.54 RCW), which requires WDOE to establish base flows to protect, and where possible, enhance and preserve a variety of instream beneficial uses such as fish, wildlife, navigation, recreation, aesthetics, and other environmental values. Data collection for the study is complete, and the modeling and subsequent flow recommendations are pending. It is expected there will not be any additional water available for new surface water appropriations (Caldwell 1994).

Stream Flow

The Asotin Creek watershed is comprised of 360 miles of perennial and intermittent stream channels (SCS 1984). There are three USGS gage stations on the mainstem of Asotin Creek. At gage number 13335050, located near the mouth, flows were only recorded during the 1989 water year. The Kearney Gulch gage (no.13334700), located at RM 5.3, just upstream of the mouth of George Creek, has records from 1960 to 1994 (Figure 6). During a flood on December 23, 1964, a peak flow of 2,580 cubic feet per second (cfs) was measured at the Kearney Gulch gage, which represents fifty-two percent (170 mi^2) of the watershed. Gage number 13334500, just upstream of Headgate Dam at RM 8.0, was used to measure flows from 1929 to 1960 (Figure 7). The USGS records indicate a mean annual flow of 74 cfs, a normal low flow of 15-30 cfs in late summer, and a normal high flow of 200 to 400 cfs between February and June.

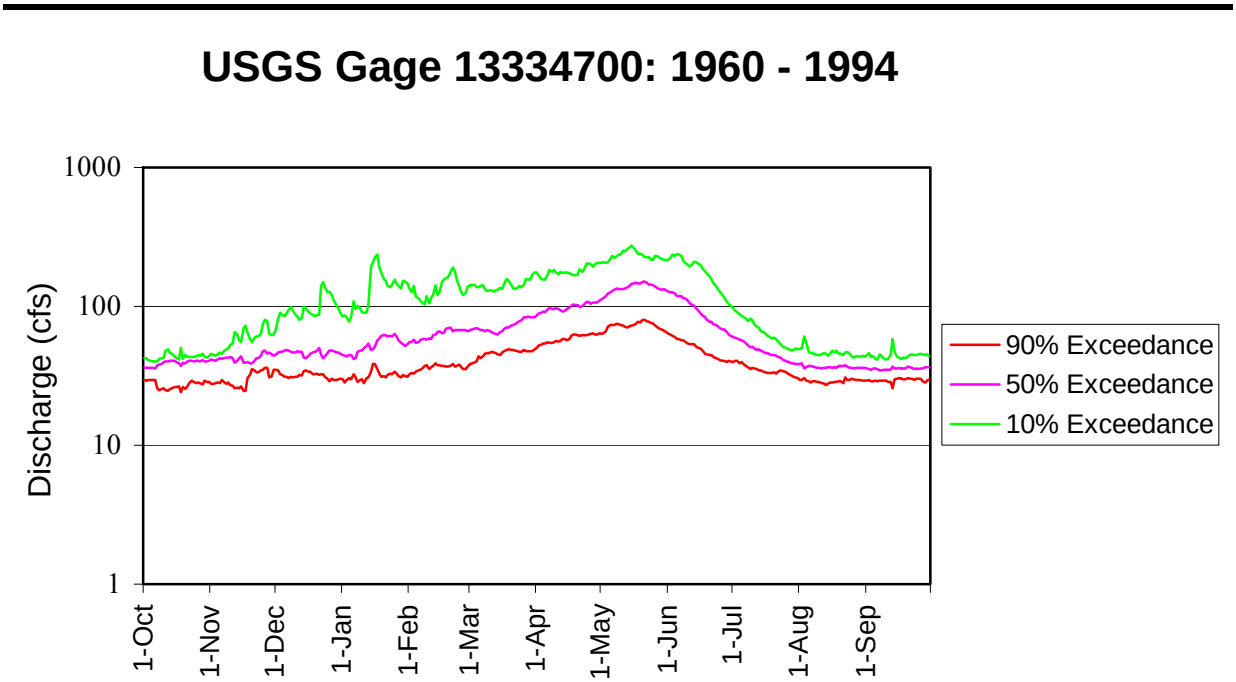

Figure 6. Asotin Creek exceedance curves for USGS gage no. 13334700, 1960-1994.

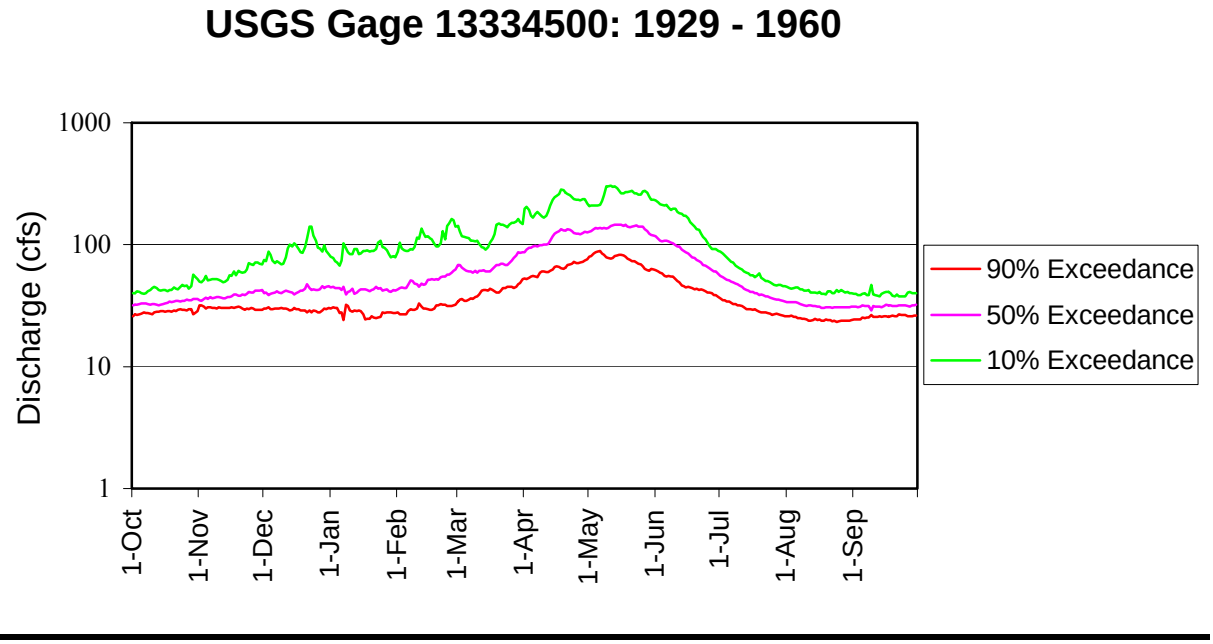

Figure 7. Asotin Creek exceedance curves for USGS gage no. 13334500, 1929-1960.

This flow, together with the flow from George Creek, was estimated at 6,500 cfs (ACOE 1966). It was the highest flow measured at the Headgate Dam since a 1904 flood flow of 1,180 cfs. A peak flow of 3,700 cfs was estimated at the Headgate Dame gage on January 15, 1974. This flow was calculated to be only a 57-year flood event (S. Blomgren, NRCS, personal communication, 1994). The lowest recorded flow was 13 cfs on January 11, 1963. George Creek (RM 3.1) and its main tributary, Pintler Creek (RM 1.1), form the largest subwatershed in the Asotin Creek subbasin. The upper reaches of these streams are perennial, but during summer and fall months George Creek usually has no surface flow connection to Asotin Creek. The North Fork (PM 14.7) and its main tributaries are also perennial, and at low flow, receive less than 1 cfs from Lick Creek (RM 0.9) and up to 7 cfs from its tributaries. Figure 8 illustrates the relative seasonal flows of Asotin Creek, the North Fork, the South Fork, and Charley Creek.

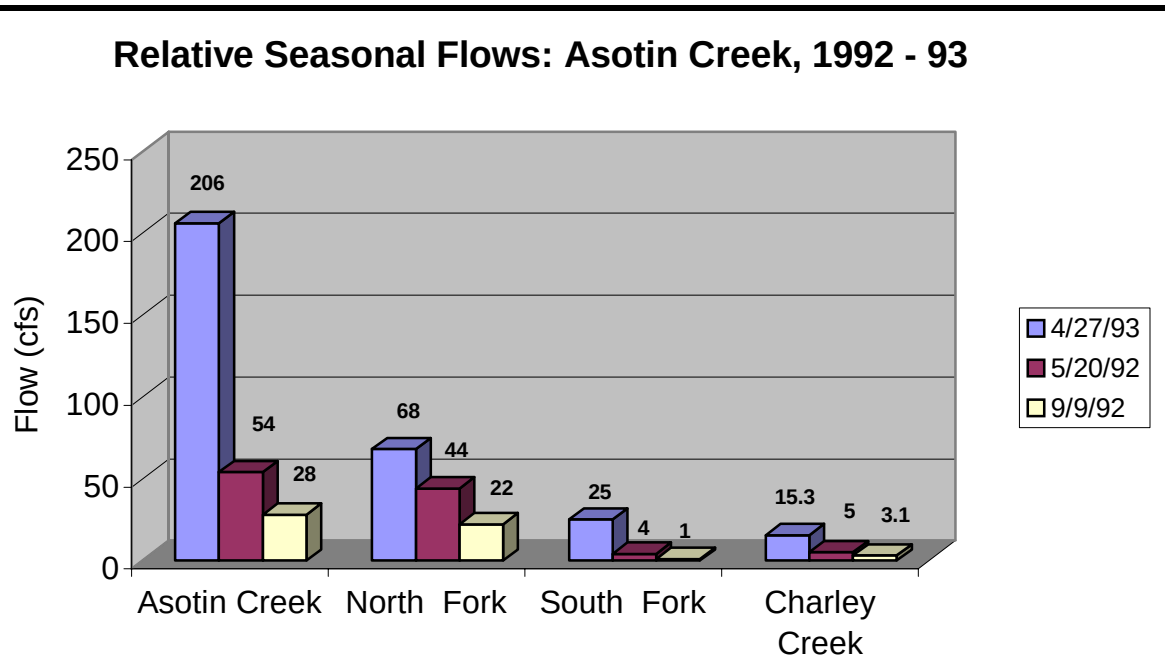

Figure 8. Relative seasonal flows on Asotin Creek, Washington, 1992-1993.

Water Demand

Several water right claims and state-issued water right certificates have been filed in the Asotin Creek subbasin (Table 2). For the purpose of estimating the valid underlying right associated with the claims filed for surface waters in this subbasin, the number of acres claimed is assumed to have associated allocations of 0.02 cubic feet per second, and 4 acre-feet per acre, per acre claimed.

Table 2. Asotin Creek subbasin water right claims and certificates.

Creek	Qi	Qa	Acres
Asotin Creek			
Certificates	3.11	464	116
Claims	1.54	308	77
Total	4.65	772	193
Charley Creek			
Certificates	0	0	0
Claims	1.5	184	75
Total	1.5	184	75
George Creek			
Certificates	0.08	12	3
Claims	0	0	0
Total	0.08	12	3
Mill Creek			
Certificates	0.20	40	10
Claims	20	4000	1000
Total	20.20	4040	1010

Note: The above totals do not include claims and certificates issued for the purpose of stockwater use.

According to WDOE records, private surface water right holders can continuously divert a total flow of 5 cfs from Asotin Creek for irrigation and stock watering. As early as 1956, the Washington Department of Fisheries (WDF) and the Washington Department of Game (WDG) recommended that the WDOE require all water diversions cease if the flow falls below 10 cfs measured at Headgate Dam at anytime of the year, 15 cfs at the Highway 129 Bridge in Asotin (01 July to 31 March), or 70 cfs at the Highway 129 Bridge in Asotin (01 April to 30 June).

Water Quality

The WDOE classifies Asotin Creek and its tributaries, including Lick Creek, Charley Creek, and George Creek, outside the Umatilla National Forest, as Class A (excellent) surface waters. Waters within the National Forest are considered Class AA (extraordinary). According to the WDOE, both classes of water "shall meet or exceed requirements for all beneficial uses."

Two significant water quality assessments were completed on Asotin Creek. The Asotin County Conservation District (ACCD), with a grant from the WDOE Centennial Clean Water Fund, sponsored a water quality study on Asotin Creek between November 1990 through January 1993 (Moore 1993). In addition, the ACCD and Washington State University (WSU) conducted a cooperative watershed study from November 1997 through November 1999 (ACCD 2000). Figure 9 illustrates the water quality monitoring stations used for both studies.

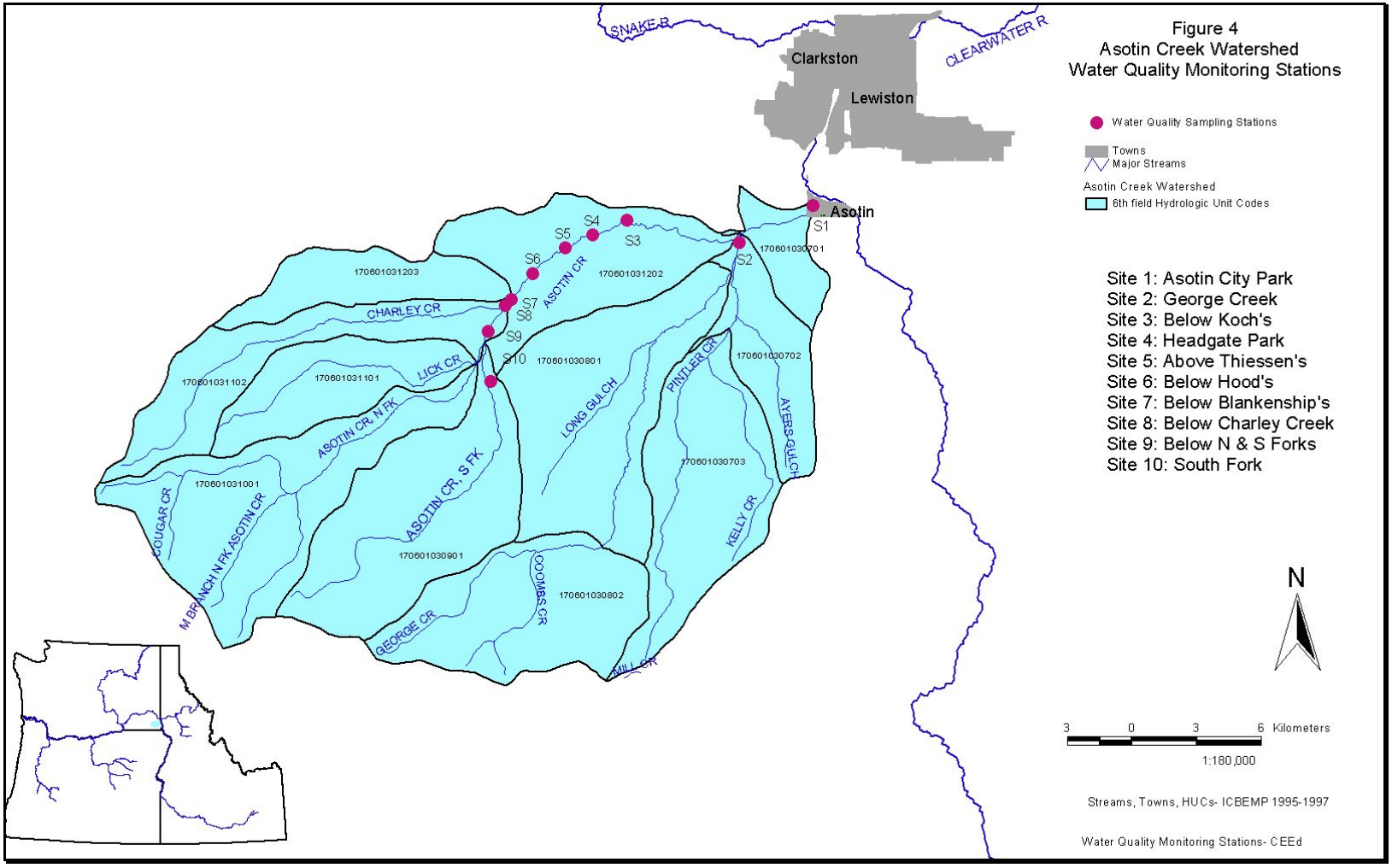

Figure 9. Asotin Creek water quality monitoring stations.

Total Maximum Daily Load

The 1972 Clean Water Act requires states to establish and administer numeric and narrative standards for specific pollutants in water bodies. When water bodies do not meet these standards, the Clean Water Act requires states to identify them. Total Maximum Daily Loads (TMDLs) are required for each water quality standard not met for each impaired water body.

In Washington, TMDLs are developed on a five-year rotating watershed schedule in which watersheds are divided into Water Quality Management Areas (WQMAs). Asotin Creek, from the mouth at the Snake River to the confluence of the North and South Forks, is being considered for a TMDL in the Upper Snake WQMA.

Temperature

A lack of riparian vegetation reduces stream shading and contributes to increased in-stream temperatures, especially in the summer months. The floods of 1964 and 1974 removed much of the riparian tree cover along the North and South Forks and the mainstem of Asotin Creek, downstream of the USFS boundary. This lack of vegetation contributed to elevated water temperatures throughout most salmonid rearing areas and some spawning areas.

According to various WDOE temperature models, stream temperature is directly related to solar radiation and ambient air temperature. Other factors include water depth, flow, volume, substrate, and ground water intrusion. Solar radiation and ambient air temperature are affected by elevation and shading, both topographic and vegetative. In 1992, the Pomeroy Ranger District (PRD) monitored temperatures within the Umatilla National Forest on the North and South Forks of Asotin Creek. Monitoring data indicate temperatures increase and exceed the state standard from the forks to the mouth during summer months. This rise in temperature is thought to stem from the lack of adequate shade from riparian areas along the mainstem.

During Washington Department of Fish and Wildlife (WDFW) periodic electrofishing surveys from 1980 to 2000, chinook juveniles were seldom found rearing in the mainstem of Asotin Creek during the summer (G. Mendel, WDFW, personal communication, 2001). Snake River investigators believe that temperatures above 68°F (D. Bennett, University of Idaho, 1994) or 70°F (G. Mendel, WDFW, personal communication, 1994) can cause a migration barrier to adult chinook.

Water quality monitoring results from 1990 through 1993 indicate that waters in the mainstem of Asotin Creek, outside the USFS boundary, do not meet state water quality standards for temperature (Moore 1993). Data from 1999 ACCD water quality monitoring indicate elevated temperatures continue to be a problem during July and August when average temperatures exceeded the 1998 WDOE standard of 18°C. Average mean daily temperatures in Asotin Creek for 2000 indicate elevated temperatures remain a problem (Figure 10).

Total Suspended Solids

The most significant natural process affecting the concentrations of total suspended solids (TSS) in a stream is soil erosion caused by precipitation. Other stream sediment sources in the Asotin Creek subbasin include runoff from livestock confinement areas, croplands, roads, and rangelands. Precipitation, either as snowmelt or rainfall, erodes soils and feeds the rivers, carries the sediment load, and moves weathered debris (Dunne and Leopold 1978). As a result, one can

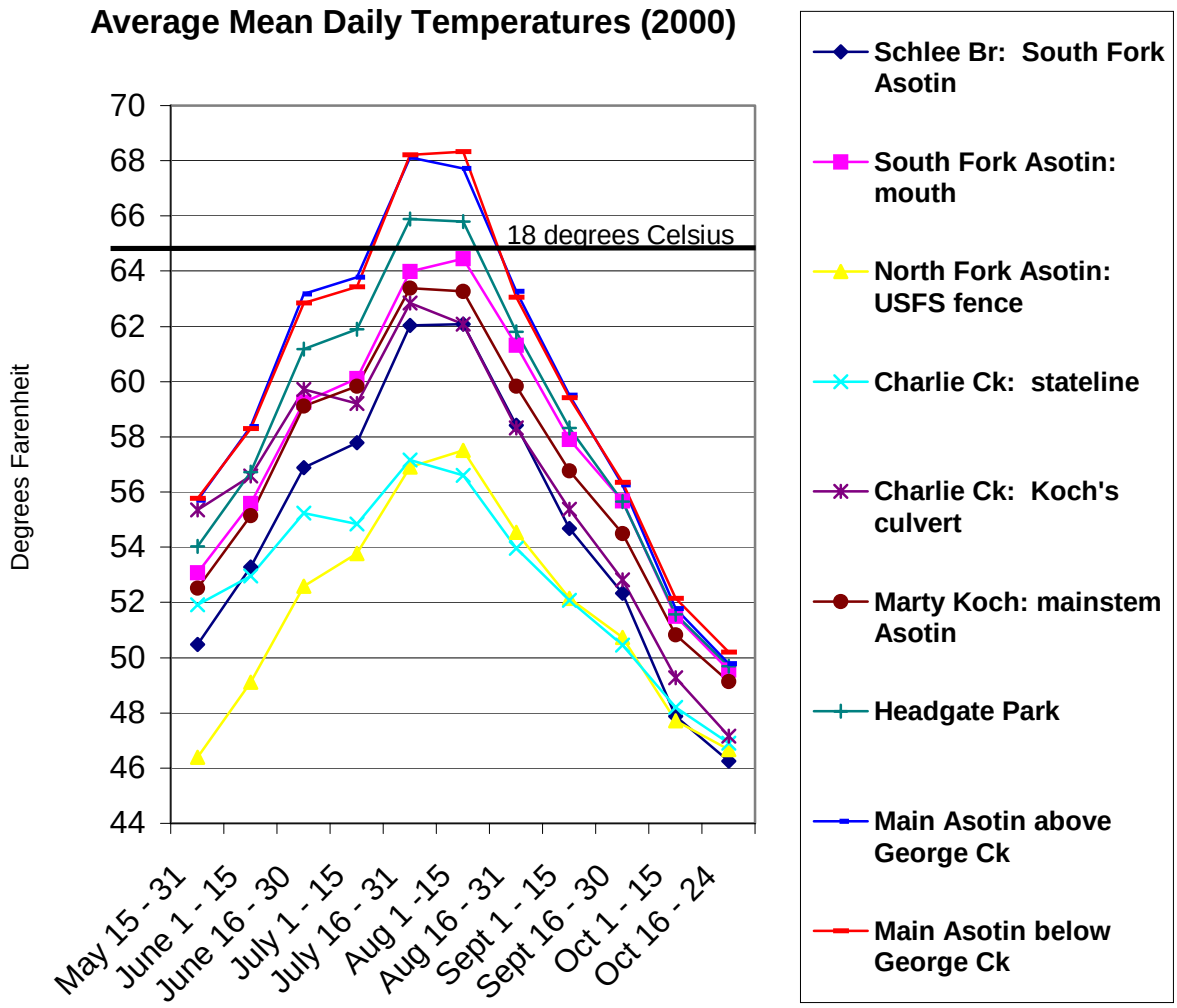

Figure 10. Average mean daily temperatures, Asotin Creek, Washington, 2000.

expect to see greater concentrations of TSS when spring snowmelt and winter storms contribute sediment to surface runoff. Changes in geology, topography, and land use along the river can affect sediment load as well. Bank erosion can occur in areas with reduced streambank stability or poorly managed ranching activities. Average sediment concentrations, expressed as TSS in milligrams per liter (mg/L), were below the recommended standard of 80 mg/L for continuous exposure to salmonids (USFWS 1995) at all stations, except one, during the 1997-1999 sampling period (Figure 11).

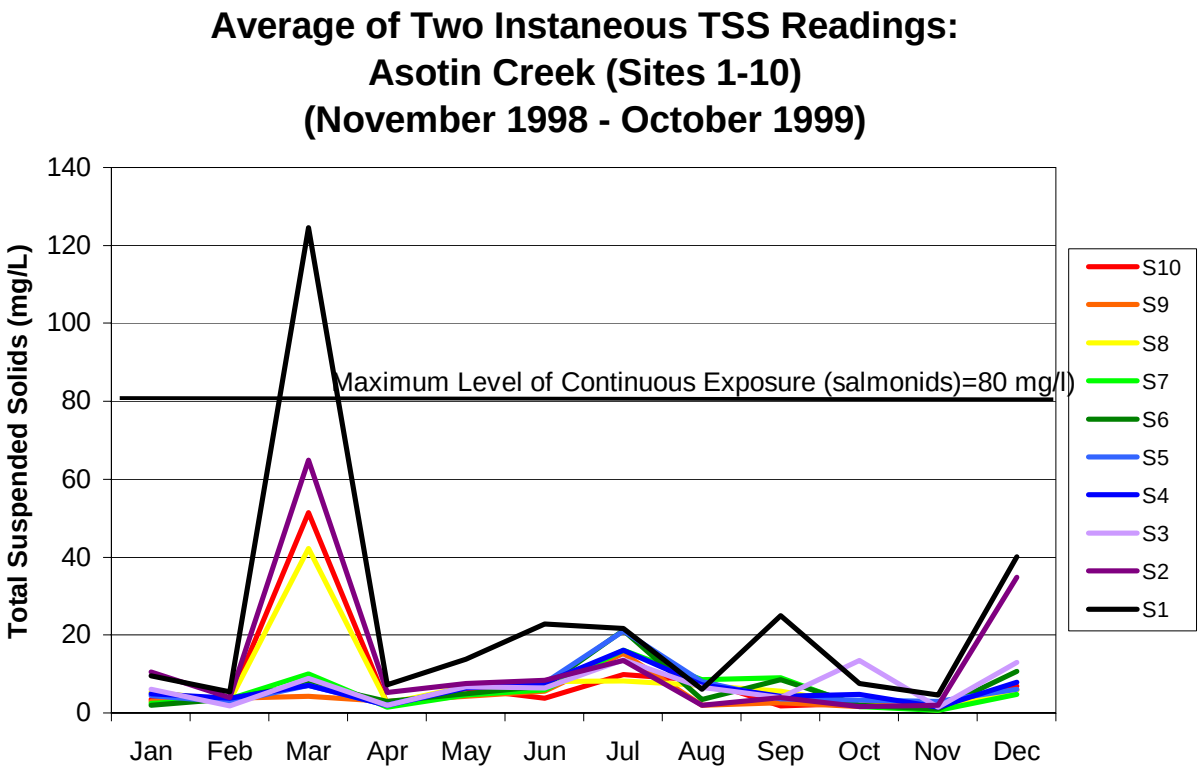

Figure 11. Average of two instantaneous TSS readings: Asotin Creek (sites 1-10), November 1998 - October 1999.

Fecal Coliform

Although fecal coliform is primarily a human health concern, it has associated impacts to salmonids resulting in changes to nutrient loading, pH, and oxygen levels. Moore (1993) found that waters in the mainstem Asotin Creek do not meet state water quality standards for bacteria. The ACCD (2000) confirmed that fecal coliform continues to be a problem. Based on the averages of the entire data set, coliform concentrations increased downstream, and on average fecal coliform levels were elevated from December to March. However, a comparison of fecal coliform data at each station indicates an overall decrease at each station over time. Livestock and domestic septic tanks may contribute to elevated fecal coliform levels in the mainstem Asotin Creek (M. Wainwright, WDOE, personal communication, 2001).

Asotin Creek is listed on the 1996 303(d) list for fecal coliform bacteria. The listing was based on 6 criteria exceedences out of 12 samples taken (50 percent) that were found beyond state water quality criterion at a monitoring station located near the mouth of Asotin Creek (RM 0.4) between of 1992 and 1993.

Asotin Creek is also on the 1998 303(d) list of impaired water bodies for fecal coliform bacteria for the segment that extends from the mouth to the confluence at the North and South Forks (RM 14.5). The 1998 303(d) listing is based on 3 criteria exceedences out of 12 samples taken (25 percent) between 1996 and 1997 at a monitoring station located near the mouth of Asotin Creek (RM 0.4).

Nutrient Loading

Moore (1993) hypothesized that the main source of nitrogen entering Asotin Creek was soil erosion from the adjacent road system rather than livestock. Nitrates, nitrites, ammonia, chlorides, and phosphates were at low levels and not a significant impact to overall water quality in Asotin Creek. Further sampling confirmed nutrient concentrations of all forms in Asotin Creek were very low.

Salmon carcasses may be an essential source of nutrients for both aquatic and terrestrial communities. Wilson and Halupka (1995) and Cedarholm *et al*. (2000) note that the availability of anadromous fish may be a critical factor in the survival and reproduction of some wildlife species. They note that wildlife species may change their distribution and breeding biology to capitalize on the abundance of anadromous fish. In addition, Cederholm (1989) described 22 species of mammals and birds that consumed coho salmon carcasses and Cederholm *et al.* (2000) found 137 species of birds, mammals, amphibians, and reptiles fed on salmon at one or more life stages. As a result of declines in salmon biomass, salmonid populations may be experiencing a negative nutrient feedback loop. Larkin and Slaney (1997) describe the potential for a negative feedback loop from loss of salmon carcasses that could have significant impacts on the production of several fish species. Larkin and Slaney (1997) also state that in streams with small salmon escapements, stocks already in decline are likely to decrease further in a negative feedback loop.

Nutrients from the decomposition of salmon carcasses are also available for stream and riparian plant production through decomposition. Bilby *et al.* (1996) noted that approximately 17 percent of the nitrogen in riparian vegetation on a coastal coho stream originated from salmon carcasses. Some stream reaches in the Grande Ronde subbasin (e.g., upper Lostine River, upper Minam River) are oligotrophic and production may be limited by this factor. There are, however, other reaches (e.g., Grande Ronde River below La Grande, Catherine Creek below Union) where the opposite condition – eutrophication – occurs as a result of human-caused nutrient pollution (DEQ 2000). Eutrophication results in excessive primary production and violations of water quality standards for dissolved oxygen and pH and may limit aquatic production in those stream reaches.

Vegetation

Historic Condition

Riparian

Historical records of the condition of riparian vegetation within the subbasin are limited. Photographic records from the 1920s of the lower portion of Asotin Creek above the George Creek confluence indicate the presence of scattered, mature black cottonwood (*Populus balsamifera ssp. trichocarpa*) (Figure 12). Periodic flooding events have substantially altered the riparian vegetation. Aerial photographs dating from the 1950s and interviews with local residents (G. Caldwell, subbasin resident, personal communication, 1999) indicate that the predominance of alder (*Alnus spp.*) in the lower Asotin Creek watershed is a relatively recent occurrence.

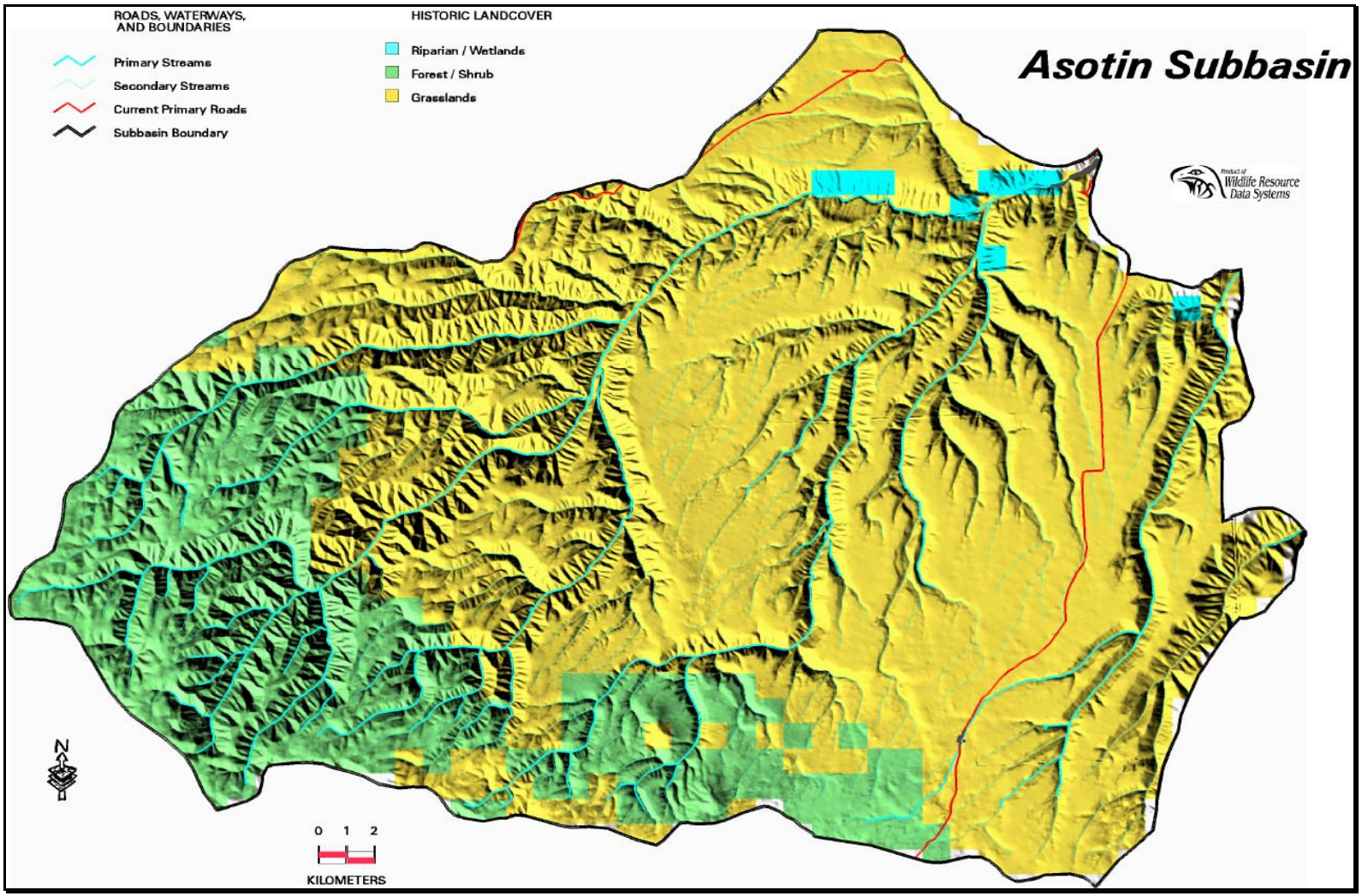

Figure 12. Historic vegetation classification, Asotin Creek subbasin, Washington.

Riparian communities dominated by hawthorn (*Crataegus spp*.) similar to those described by Daubenmire (1970) occur along stream courses in the upper portion of the watershed. Daubenmire (1970) concluded that these communities flourished with fire suppression following early settlement, and that they were particularly valuable for avian species on the Palouse.

Shrub-Steppe

Daubenmire (1970) described three plant associations broadly representative of shrub-steppe habitat in the Asotin Creek subbasin. Bluebunch-Sandberg bluegrass (*Agropyron spicatum- Poa secunda*) communities occupied the hottest and driest portions of the Palouse steppe. These communities were floristically simple, containing as few as 10 plant species. Bluebunch wheatgrass (*Pseudoroegneria spicata*) constituted about 85 percent of the plant biomass in this type. Bluebunch-fescue (*Agropyron spicatum - Festuca idahoensis*) grasslands occurred on plateau slopes and north-facing areas. These communities were intermediate in plant diversity, with notable perennial forbs and only occasional shrubs. The Fescue-snowberry (*Festuca idahoensis- Symphorocarpos alba*) type, occupying a band below the forestland, was distinguished by cold winters and increased floristic diversity of which shrubs were distinctive. Historically, the Fescue-snowberry association was a significant habitat type for sharptail grouse (Daubenmire 1970). Invasion by cheatgrass into these communities, influenced largely by cattle grazing, was apparent during the mid-1900s (Daubenmire 1970).

Existing Condition

Riparian

Forested riparian vegetation along Asotin Creek and other subbasin streams remains in transition, modified by recent flooding events. In 1993, about 64 percent of the riparian vegetation along Asotin Creek consisted of mixed successional stands of alder and black cottonwood (ACCD 1995). These stands of predominantly young age class (8 to 20 inches average diameter breast height) provided from 37 percent canopy cover near the mouth of the creek to 79 percent canopy cover at Headgate Park. Flooding in 1996-97 substantially reduced the riparian forest overstory on Asotin Creek. By 2000, only 16 percent of the Creek contained more than 70 percent canopy closure considered desirable for stream shading (NRCS 2001). Damage to riparian cover in the upper portion of the watershed was evident, where canopy cover was reduced approximately in half compared to pre-flood (1993) surveys. Douglas-fir and grand fir were the successional dominants in these older stands, with alder and ponderosa pine as notable components. Figure 13 illustrates current vegetative conditions in the Asotin Creek watershed.

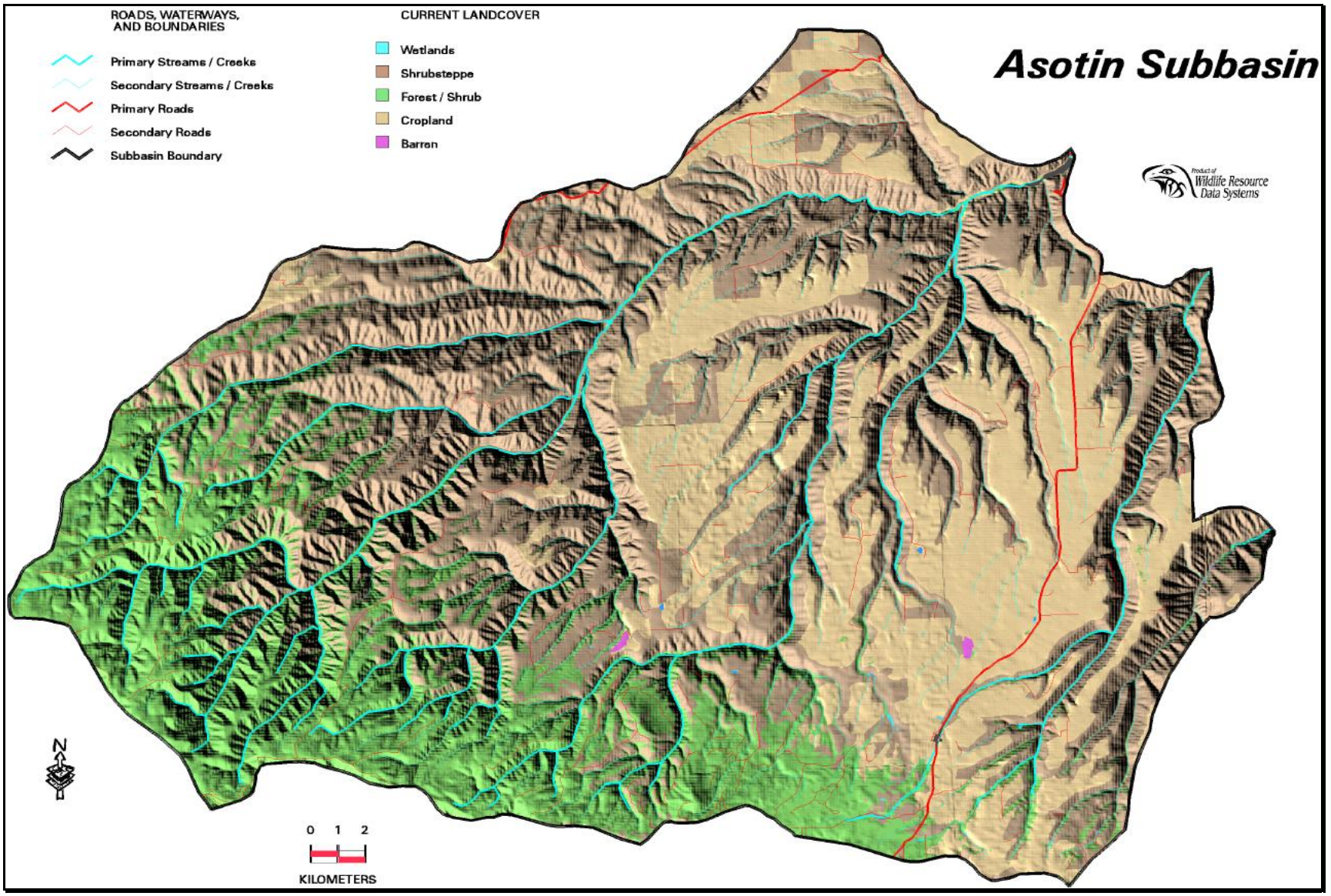

Figure 13. Current vegetation classification, Asotin Creek subbasin, Washington.

Understory shrubs typical of riparian forests include red-osier dogwood (*Cornus sericea*) and willows (*Salix spp*.), significant for their wildlife values (NRCS 2001). Herbaceous understory growth demonstrates disturbance in these communities. Cheatgrass (*Bromus tectorum*), Kentucky bluegrass (*Poa pratensis*), Reed canarygrass (*Phalaris arundinacea*), mullein (*Verbascum thapsus*), chicory (*Chicorium intybus*), and Scotch thistle (*Onopordum ananthium*) are among the most frequently encountered species.

Shrub-Steppe

The NRCS field office records from 1986 through 1993 indicate that while 68 percent of private rangelands surveyed in the Asotin Creek watershed are in "good" to "excellent" ecological condition, the status of shrub-steppe vegetation for this subbasin varies in relation to soil moisture (ACCD 1995). Shallow sites less susceptible to the spread of non-native plants needing limited soil moisture accounted for most of the higher ecological condition ratings. Approximately two-thirds of the loamy sites surveyed were in "fair" to "poor" ecological condition.

The clearest indication of rangeland trends in the watershed is a decline in range condition due to the spread of noxious weeds, primarily yellow starthistle (*Centaurea solstitialis*). The Asotin County Weed Board (Weed Board) estimates an increase in weed-infested acreage, from 2,000 acres in 1986 to over 15,000 acres in 1993 (ACCD 1995). About 9,000 acres occur primarily in the lower portion of the watershed, but isolated populations are also found along the South Fork and in George Creek above Wormell Gulch. Yellow starthistle thrives on south-facing, degraded sites formerly occupied by cheatgrass, but also invades native rangeland and CRP seedings. In other rangeland areas, diffuse knapweed (*Centaurea diffusa*), chervil (*Anthriscus sylvestris*), and Scotch thistle are spreading. Between 1954 and 1993, the USFS Asotin allotment experienced an improved trend for range vegetation (ACCD 1995).

Forestland

Fire suppression has eliminated the mosaic pattern of stand age classes and created a more continuous stand, enabling stand replacement fires to attain larger size. Wildlife, big game in particular, derives some benefit from these undisturbed stands. Fire exclusion has allowed stands that may have been totally or partially replaced by fire to remain fully intact, thus providing additional dense and multi-storied canopies to serve as hiding and thermal cover. However, fire supression has also resulted in stagnant, over-stocked stands that contain trees with low vigor and unnaturally high downed-woody fuel loadings. A mosaic of different seral stages and species would increase the productivity of forest stands, reduce the fire hazard by lowering fuel loadings, and, in the short term, reduce the total amount of big game cover. Adequate amounts of cover would still be present, but in a more sustainable state.

Current conditions are ripe for disturbances of the same types as historic regimes. However, because of the conditions created by past management activities and/or lack of management activities, it is likely that the disturbances would occur with a higher intensity and over a larger percentage watershed area.

Noxious Weeds

The Weed Board visually surveys an estimated 130 out of 627 mi^2 in Asotin County on an annual basis. Approximately 40 percent of the riparian areas are infested with members of

Asteraceae plant family, notably yellow starthistle and various knapweeds (*Centaurea diffusa*, *Centaurea biebesteinii*, *Acroptilon repens*). Seventy percent of rangelands are infested with yellow starthistle. The Weed Board found limited amounts of rush skeletonweed, *Chondrilla juncea*, and is attempting to contain leafy spurge (*Euphorbia esula*).

Yellow starthistle is a winter annual with yellow flowers. About 60 percent of the seeds produced by yellow starthistle survive dispersal (Sheley and Larson 1994). Birds, wildlife, humans, domestic animals, whirlwinds, and vehicles may transport the seeds. A single plant may produce up to 150,000 seeds. Studies show that 90 percent of the seed falls within 2 feet of the parent plant (Roche 1991). Of these seeds, 95 percent are viable, and 10 percent can remain viable for 10 years (Callihan *et al.* 1993). Yellow starthistle can grow more rapidly than most perennial grasses. It is deep-rooted and will grow twice as fast as annual grasses (Sheley and Larson 1995). Yellow starthistle displaces native plant communities and reduces plant diversity. It can accelerate soil erosion and surface runoff (Lacey *et al.* 1989). Yellow starthistle forms solid stands that drastically reduce forage production for wildlife.

Spotted knapweed is a deep tap rooted perennial that lives up to nine years (Boggs and Story 1987). Seed production ranges from 5,000 to 40,000/squre meter (m^2) (Shirman 1981). Seeds can germinate in the spring and fall when moisture and temperature are suitable (Watson and Renney 1974). Diffuse knapweed is a biennial that grows from a deep taproot. Seed production ranges from 11,200 to 48,000/m^2 (Shirman 1981). Wind, animals, and vehicles spread knapweeds. Diffuse knapweed reduces the biodiversity of plant populations, increases soil erosion (Sheley *et al.* 1997), threatens natural areas, (Schuller 1992) and replaces wildlife forage on range and pasture. Watson and Renney (1974) found that spotted knapweed infestations decreased bluebunch wheatgrass occurrence by 88 percent. Elk use was reduced by 98 percent on range dominated with spotted knapweed compared to bluebunch-dominated sites (Hakim 1979).

Rush skeletonweed can be a perennial, a biennial, or a short-lived perennial, depending on its location. Seed production ranges from 15,000 to 20,000 seeds. The seeds are adapted to wind dispersal but are also spread by water and animals. Rush skeletonweed reduces forage for wildlife. Its extensive root system enables it to compete for the moisture and nutrients that grasses need to flourish.

Leafy spurge is a perennial belonging to the Spurge family. The root system can penetrate the soil 8 to 10 feet. The plants will produce horizontal roots that enable colonies to enlarge. The seeds are in a capsule and, when dry, the plant can project the seeds as far as 15 feet. Seeds may be viable in the soil up to 8 years. Vehicles, mammals, and birds spread leafy spurge. Leafy spurge root sap gives off a substance that inhibits the growth of grasses and reduces forage for wildlife.

Fish and Wildlife Resources

Fish and Wildlife Status

Fish

The Asotin Creek subbasin supports a diverse collection of anadromous and resident fish species, some of which are on the ESA list (Table 3). Asotin Creek is an important Snake River tributary for anadromous salmonid production and is distinguished as a reserve for wild steelhead under current WDFW management policies (G. Mendel, WDFW, personal communication, 2001).

Spring Chinook

Historical records indicate that Asotin Creek once harbored a moderate run (>100 adults) of spring chinook salmon. However, recent surveys indicate few or no adult spring chinook annually spawn in Asotin Creek (ACCD 1995).

The first record of spring/summer chinook in Asotin Creek is found in a U.S. Fish and Wildlife Service (USFWS) publication (Parkhurst 1950), which was an analysis of numerous stream surveys by the former Bureau of Commercial Fisheries during the 1930s. Evidently, most of the streamflow had been diverted from the channel at Headgate Dam in August 1934, leaving 25 adult chinook stranded in the downstream reach. Local citizens and WDG personnel rescued the fish. They believed that this was the entire run. A local landowner told one of the surveyors that prior to 1935, there was a good chinook run in the South Fork of Asotin Creek. Pirtle (1957) surveyed several Snake River tributaries from 1954 to 56 and estimated an average of 18 adult chinook passed Headgate Dam each of the three years. Washington Department of Game personnel recall seeing an occasional chinook in both the South Fork and Charley Creek in the 1960s (Steele 1993). Current Chinook distribution is illustrated in Figure 14.

The first chinook spawning surveys were conducted by USFS in 1972 and 1973. Only the North Fork was surveyed. Since these surveys took place in the Umatilla National Forest, they would have missed any spawning that might have occurred in the five miles of similar habitat downstream of the National Forest boundary. In 1984, WDF began conducting annual surveys. The 1986 count and the 1988 to 1992 counts did not include upper Asotin Creek where much of the historical spawning occurred. Even though a few juvenile chinook have been found rearing in the South Fork, no adult surveys have been done there, or in Charley Creek, because adults were never seen during any of the previous WDF electroshocking surveys. These streams did not appear to have enough flow for spawning chinook (G. Mendel, WDF, personal communication, 1994). The Asotin Creek chinook counts follow the same trend in relative numbers, as do historical counts in the Imnaha River of Oregon. The same index section has been used for redd counts in the Imnaha River since 1957. The Imnaha River is only 48 miles upstream of Asotin Creek and is located on the same side of the Snake River. There are no dams between the Imnaha River and Asotin Creek. The 1972 count was the third highest in the Imnaha River since the construction of the Dalles Dam. The 1973 count was the highest.

1. The WDG installed and operated an adult steelhead trap on Headgate Dam from 1954 to 1961. It was maintained from the last week of February through the second week of June. Several young adult chinook were also trapped, counted and passed over the dam, though up to a dozen adult chinook jumped over the trap in some flows (J. Douglas, WDG, personal communication, 1994; Eldred and Douglas 1960). Krakenberg (1957) reported that the WDG trap operator had passed "about 50" chinook over the dam in 1956, but that none had yet arrived when he inspected the trap on June 3, 1957. Adult spring chinook were present prior to at least 1934, but were already being impacted by water withdrawals. (There is no record of fall chinook.)
2. Chinook may have spawned in the South Fork of Asotin Creek prior to 1935.
3. Adults were seen above Headgate Dam from 1954 to 1961.
4. Chinook may have spawned and/or reared in Charley Creek before the bridge was replaced with a culvert in 1965.
5. The highest recorded count of adult chinook occurred in 1972.

6. The second highest count was made in 1973, during the same time that the Imnaha River had its second highest count since 1957.
7. There was still a fair run in 1984.
8. From 1980 to 1993 chinook spawning can be documented every year except 1992. No adults were found during two surveys in 1994 (Mendel 1994).
9. It is not possible to determine whether the high counts reflect a peak, a rise, or a decline in run size, though it is obvious that the Asotin Creek run, much like that of the Imnaha, has steadily declined since 1984.

Table 3. Fish species present in the Asotin Creek subbasin, Washington.

Species	Origin	Distribution
Bull trout (*Salvelinus confluentus*)	N	UW
Steelhead trout (*Oncorhynchus mykiss*)	N	WS
Spring Chinook salmon (*Oncorhynchus tshawytscha)*	N	E
Mountain whitefish (*Prosopium williamsoni)*	N	UNK
Northern pikeminnow (*Ptychocheilus oregonensis)*	N	UNK
Longnose dace (*Rhinichthys cataractae*)	N	UNK
Speckled dace (*Rhinichthys osculus)*	N	LW
Redside shiner (*Richardsonius balteatus*)	N	UNK
Chiselmouth (*Acrocheilus alutaceus*)	N	NM
Peamouth (*Mylocheilus caurinus*)	N	NM
Largescale sucker (*Catostomas macrocheilus*)	N	UNK
Bridgelip sucker (*Catostomas columbianus*)	N	WS
Pacific lamprey (*Entosphenus tridentatus*)	N	UNK
River lamprey (*Lampetra ayresi*)	N	UNK
Piute sculpin (*Cottus beldingi*)	N	WS
Smallmouth bass (*Micropterus dolomieui*)	E	UNK
Bluegill (*Lepomis macrochirus*)	E	NM
Crappie (*Pomoxis spp.*)	E	NM
Channel catfish (*Ictaluris punctatus*)	E	UNK
Carp (Cyprinus carpio)	E	LW

E = extirpated, UW = upper watershed, LW = lower watershed, WS = wide spread, NM = near mouth of major drainages, UNK = unknown

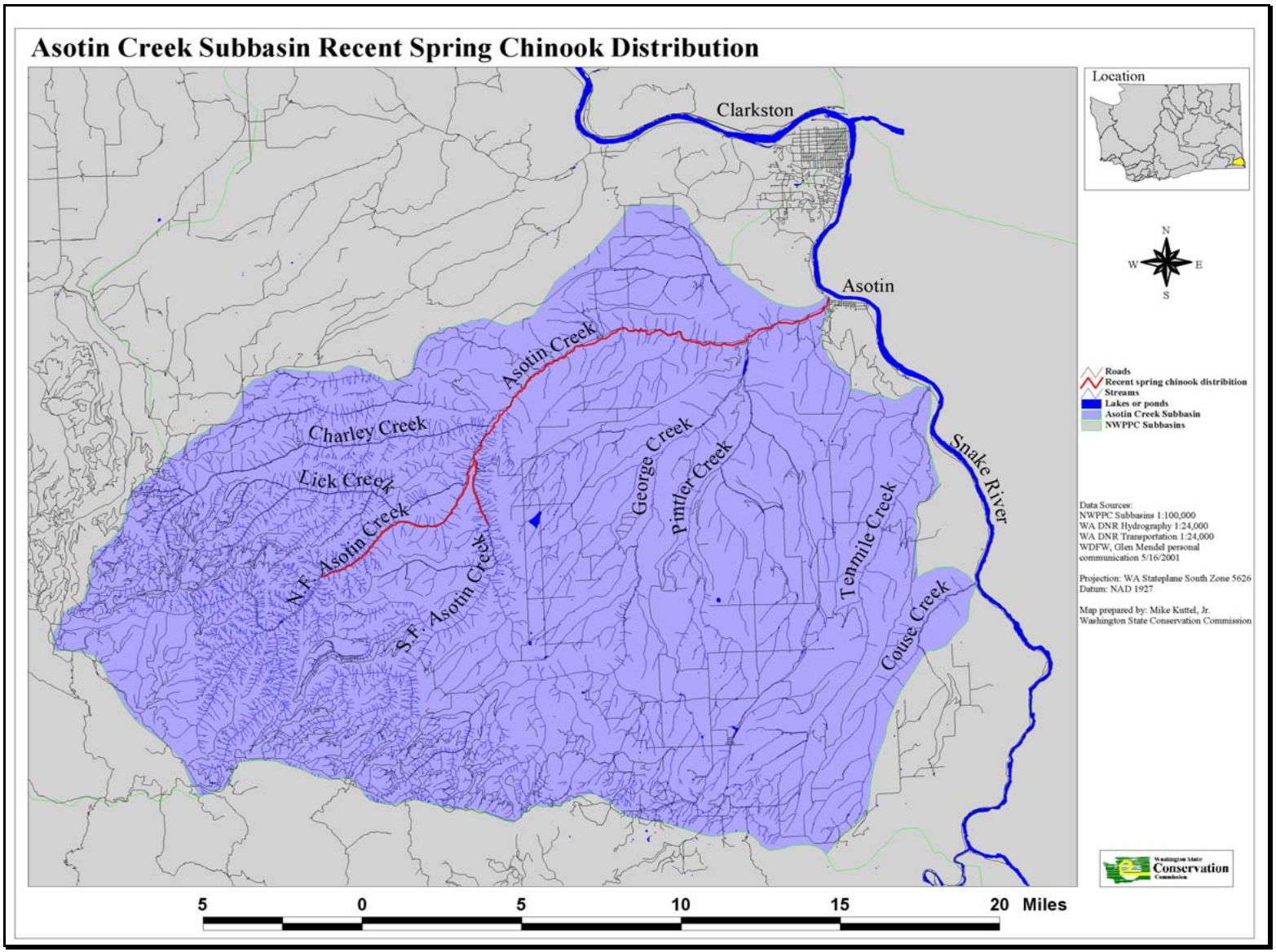

Figure 14. Asotin Creek subbasin recent spring chinook distribution.

The limited data that have been collected for Asotin Creek chinook indicate that their life history is similar to that of the Tucannon River spring/summer chinook. The adults enter the Columbia River in early spring, swim upstream 145 miles, and cross the Bonneville Dam by August 15. They continue for another 324 miles and cross seven more dams before reaching the mouth of Asotin Creek. These fish must negotiate two more dams than fish returning to the Tucannon River.

Most adults probably enter the creek during high flows in May and June, although none were seen at Headgate Dam prior to June 3. Once in the stream, they move at varying speeds from pool to pool until they find a suitable holding area where they may stay from one week to over three months prior to spawning. The preferred holding areas are usually pools, which have large woody debris or undercut banks for cover (Bugert *et al.* 1991). They spawn in the North Fork of Asotin Creek between late August and late September.

Fry emerge from the gravel in early spring of the next year and generally seek out deep pools. After living in the stream for approximately one year, they become smolts and migrate to saltwater. Biologists of the Yakima Tribe have shown that some juveniles of Yakima River chinook move downstream during fall, while others may enter dead-end side channels (Fast *et al.* 1991).

In the spring of 1986, WDG personnel installed a smolt trap in the mainstem of Asotin Creek about 200 feet downstream of the mouth of Charley Creek and trapped 181 juvenile chinook. The catch consisted of 165 fish, which were classified as smolts (12 to 13 months old) and 16 fingerlings, which had moved downstream at least four miles from any known spawning areas. A few juvenile chinook have also been found in the South Fork, 3.2 miles upstream of its junction with the North Fork (Viola *et al.* 1991) and were assumed to have swum there after hatching in the North Fork.

The trapping study showed that the peak of outmigration for Asotin Creek chinook was in early April and that most of the smolts had left by June 1. Since chinook smolts in the Tucannon River were found to move downstream at the rate of 25 miles in two to four days (Bugert *et al.* 1991), smolts should be able to leave the North Fork of Asotin Creek and arrive in the Snake River within four days.

Washington Department of Fish and Wildlife personnel have conducted tagging studies of naturally produced Tucannon River chinook each year since 1985. These studies indicate an overall return rate (egg to returning spawner) of 0.01-0.52 percent for Tucannon River chinook (Mendel *et al.* 1993). Although no similar studies have been done for Asotin chinook, they probably have a lower return rate than the Tucannon fish because they have two more dams to negotiate. Spring chinook return to the Tucannon River primarily as four-year old adults; chinook return at age three. Between 1985 and 1992 the age breakdown for 679 naturally spawned Tucannon River chinook was 1.8 percent for age three, 70.7 percent for age four, 27.4 percent for age five, and 0.1 percent for age six (Mendel *et al.* 1993). Asotin Creek salmon probably had a similar age structure. The largest chinook reported in Asotin Creek was estimated to be 30-35 pounds (Johnson 1972).

Steelhead/Rainbow trout

Summer steelhead runs have faired much better in the Asotin Creek watershed than those of the salmon. Historical records indicate that Asotin Creek once harbored strong runs (>800 adults) of summer steelhead. However, recent surveys indicate steelhead spawner escapement has declined to about 200 (ACCD 1995).

Summer steelhead are spring spawners. They enter the Columbia River during summer and fall and then enter the Asotin Creek watershed in February through April when water levels are highest and when temperatures are relatively cold. These conditions allow the fish to reach spawning grounds free of migration barriers from low flow and warm water.
Based on historic trapping data, Asotin Creek may have had runs that exceeded 1,000 steelhead adults between 1954 and 1961 (M. Schuck, WDFW, personal communication, 2001). The current WDFW escapement goal is to have 160 wild spawners in the system each year. Estimated escapements since 1986 have varied from 100 to 750 (WDFW 2001). The steelhead found in Asotin Creek are considered "A" run fish, which are smaller than their cousins, the "B" run fish. Most of these fish spend one year in the ocean, returning the following summer. Table 4 illustrates the results of spawning ground surveys within the Asotin Creek watershed since 1988 (Schuck *et al.* 1997, J. Bumgarner, WDFW, personal communication, 2001). Steelhead have been known to utilize almost all of the Asotin Creek subbasin with most of the spawning occurring in the upper mainstem, Charley Creek, the South Fork of Asotin Creek, and the North Fork and its tributaries (Figure 15, Figure 16). Charley Creek had some of the highest densities of juvenile steelhead in southeastern Washington according to recent WDFW fisheries surveys conducted in the mid-1980s (G. Mendel, WDFW, personal communication, 2001). Portions of George Creek were surveyed for the first time in 2000 to estimate the abundance and distribution of spawning steelhead (Figure 17).

Table 4. Summary of steelhead spawning surveys in the Asotin Creek watershed, Washington.

Year	North Fork		South Fork		Charley Creek		Mainstem	
	Obs	Exp	Obs	Exp	Obs	Exp	Obs	Exp
1988	72	NA	88	NA	37	NA	15	NA
1989	25	NA	21	NA	13	NA	--	NA
1990	17	NA	17	NA	0	NA	--	NA
1991	26	NA	0	NA	10	NA	--	NA
1992	27	27	23	23	19	19	3	3
1993	34	NA	50	50	8	NA	--	--
1994	22	33	11	17	8	NA	4	NA
1995	66	NA	32	NA	12	NA	--	--
1996	53	NA	65	NA	--	--	--	--
1997	NA	NA	NA	NA	NA	NA	NA	NA
1998	32	NA	19	NA	3	NA	NA	NA
1999	36	85	11	36	15	23	26	102
2000	9	33	16	34	16	21	25	60
2001	91	105	33	33	43	44	199	205

Obs = Observed, Exp = Expanded

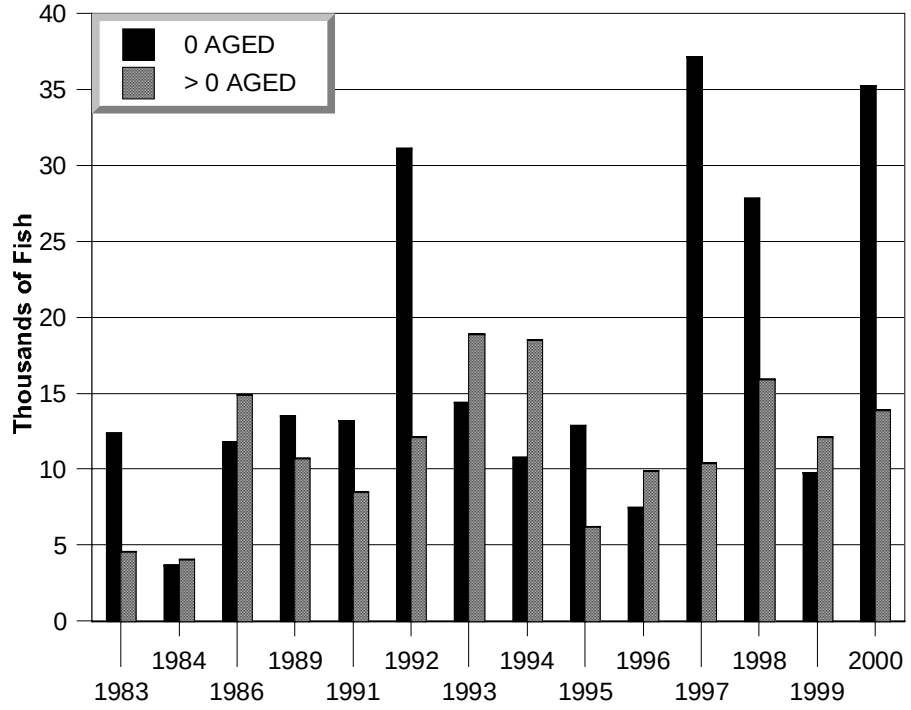

Figure 15. Estimates of juvenile steelhead abundance in the North Fork Asotin Creek from confluence with the South Fork upstream 4.6 miles to the USFS boundary, 1983-2000.

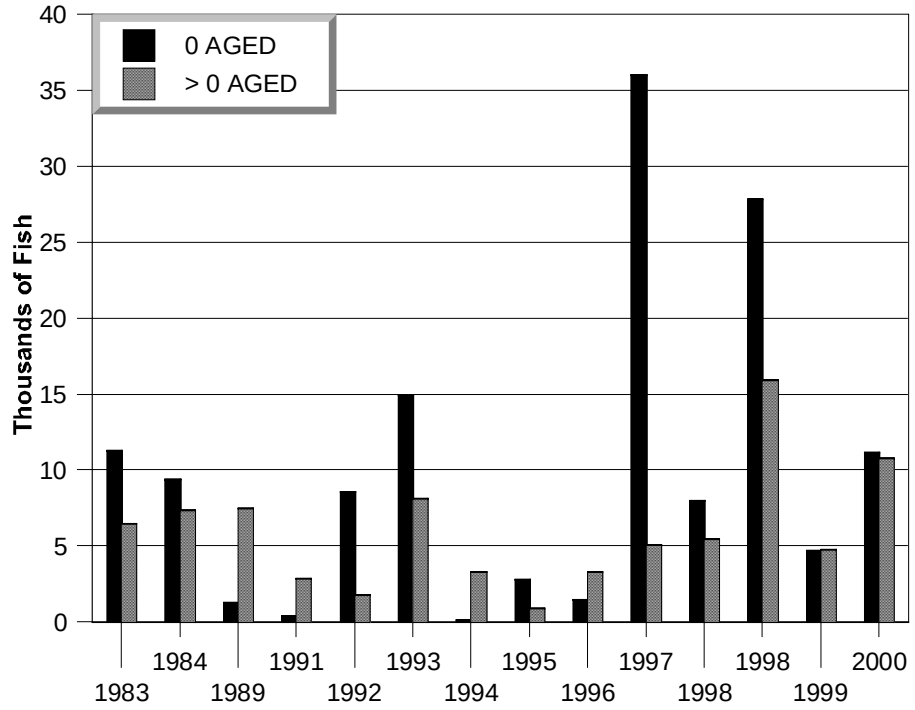

Figure 16. Estimates of juvenile steelhead abundance on South Fork Asotin Creek from the mouth upstream 3.5 miles to the first bridge crossing, 1983-2000.

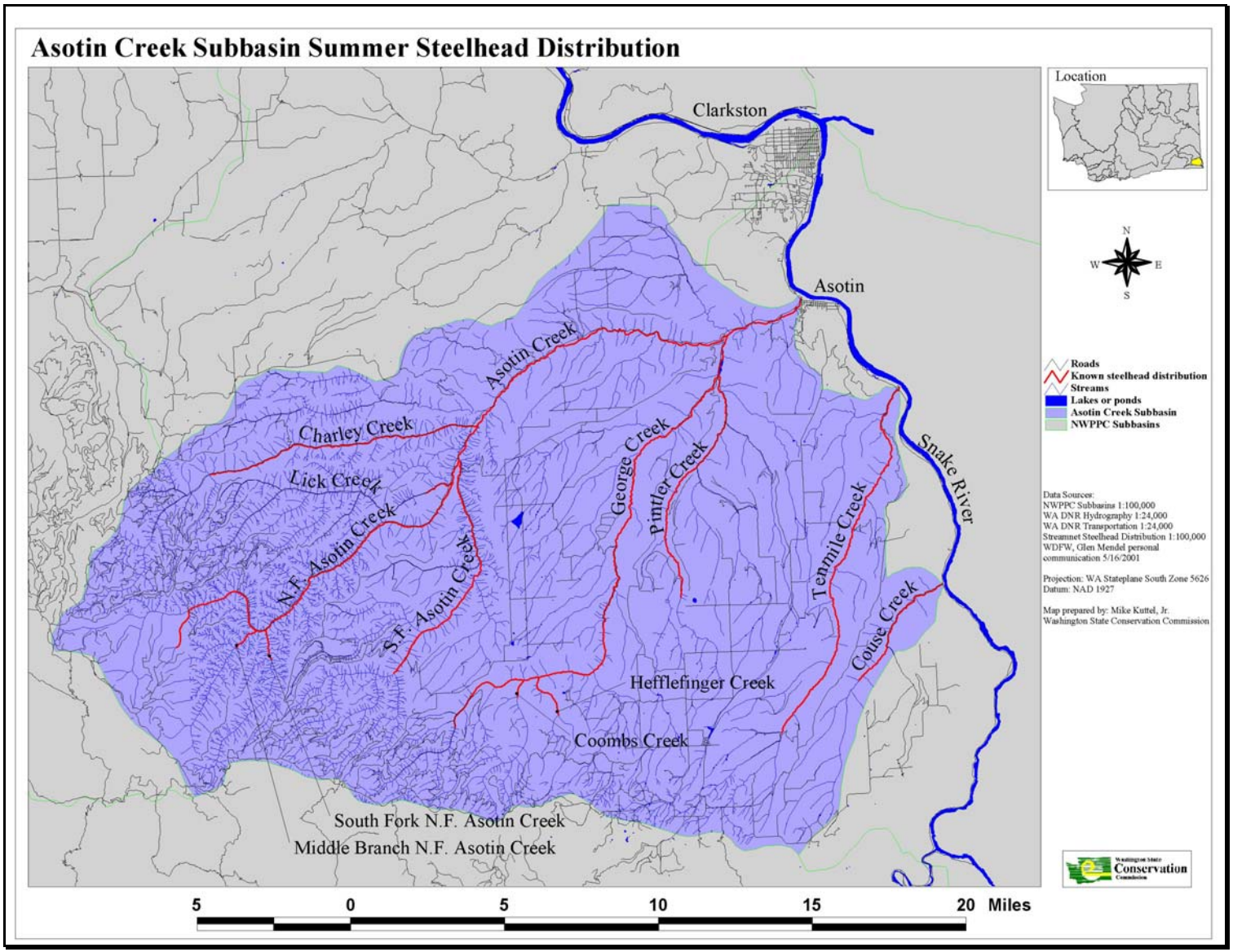

Figure 17. Asotin Creek subbasin summer steelhead distribution.

Lamprey

The name "Asotin" is derived from the Nez Perce word Heesut'iin, which means "Eel Creek" (Hitchum 1985). This implies that the stream probably had large runs of lampreys, commonly referred to as "eels." Lamprey were important in the diet of native Americans. No adult Pacific lamprey have been documented in Asotin Creek since at least 1980. However, Mendel (1994) and others have noticed small lamprey, which could have been either river lamprey, which, like the Pacific lamprey, are also anadromous and parasitic on other fish as adults, or western brook lamprey, which are blind and never leave the stream.

The Pacific lamprey spends up to six years in the stream and an unknown time in saltwater, where it grows up to 30 inches. The river lamprey has a similar life history, but grows only to 12 inches. The brook lamprey rarely exceeds seven inches. All lamprey spawn in clean gravel and cool flowing water. Pacific lamprey spawn in June and July. Brook and river lampreys spawn in April, May, or June. The adults of all three species die after spawning. The young hatch in two to three weeks.

Since their life histories are much the same as spring/summer chinook, lamprey suffer some of the same impacts. The National Marine Fisheries Service (NMFS) considers lamprey a species of concern. According to Kleist (1993), only 40 adults were counted going upstream through Ice Harbor Dam (12 in the day, 28 at night). Only ten were seen at Lower Granite Dam.

Bull trout

A 1993 USFS survey documented the presence of bull trout in the middle branch of the North Fork of Asotin Creek, the lower 1.5 miles of the South Fork of the North Fork of Asotin Creek, and in Charley Creek (Table 5). Spawning surveys indicate this population has very limited distribution (Figure 18). The *Salmonid Stock Inventory* (WDFW 1998) indicates bull trout presence in Charley Creek, the North Fork, and its tributaries. The WDFW considers bull trout a "category 1" species on the state list of threatened and endangered species and lists the Asotin Creek race as "high risk." In general, bull trout in this watershed are thought to be resident populations, but WDFW suspects it historically may have also had fluvial or adfluvial connections with the Snake River as observed in the Tucannon River (Underwood *et al.* 1995).

Table 5. Bull trout redd counts in the Blue Mountain Province, 1994-2000.

Subbasin Watershed	1994	1995	1996	1997	1998	1999	2000
Lower Snake/Tucannon	131	114	184	78	108	222	151
Lower Snake/Asotin							
NF. Asotin Creek	n/a	n/a	3	n/a	n/a	53	n/a
Cougar Creek	n/a	n/a	n/a	n/a	n/a	15	n/a
Upper Grande Ronde							
Lookingglass Creek	15	16	29	39	62	57	53

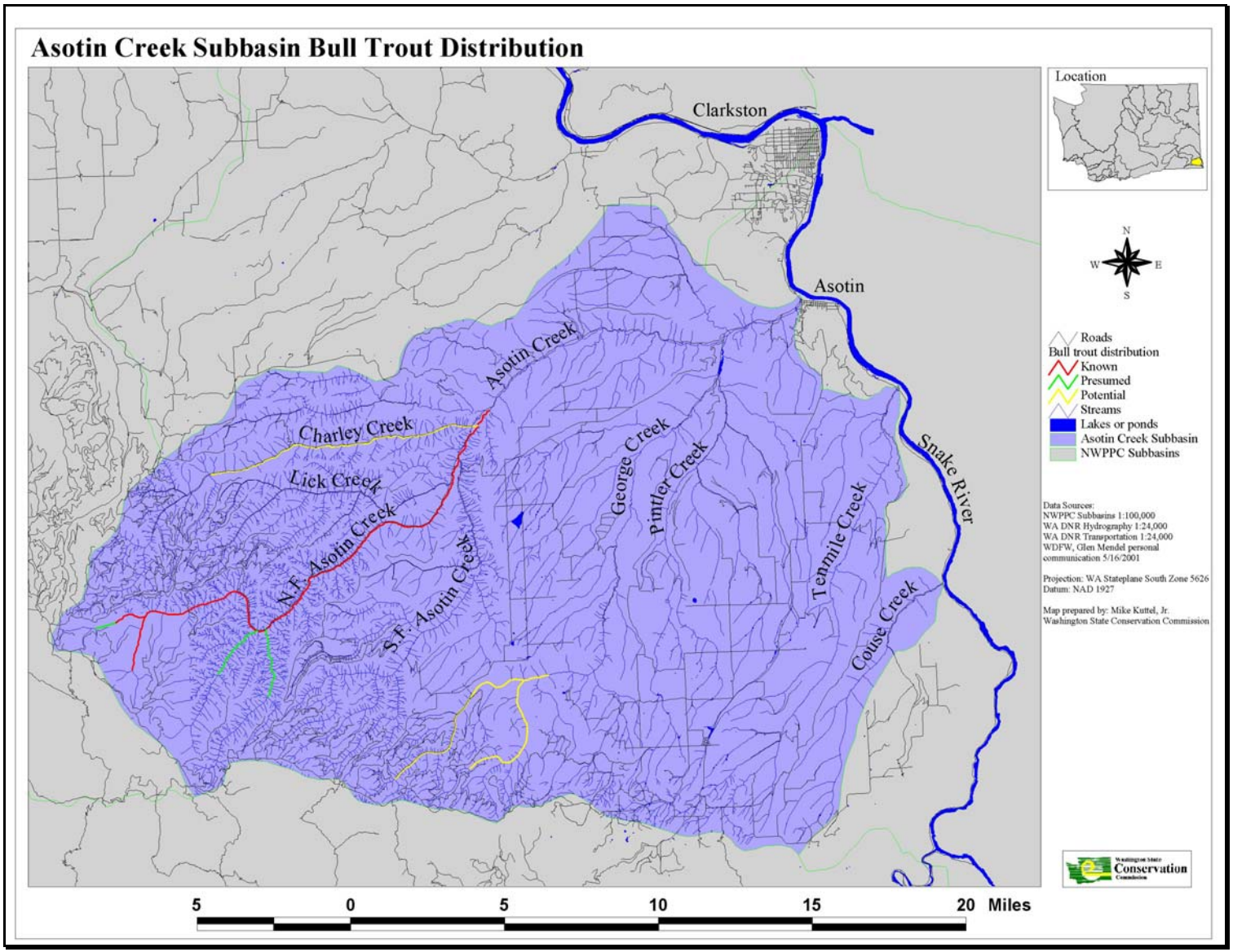

Figure 18. Asotin Creek subbasin bull trout distribution.

Wildlife

The Asotin Creek subbasin contains approximately 277 species of wildlife, including large and small mammals, passerines, waterfowl, upland birds, raptors, reptiles, and amphibians. Table 6 identifies Priority Habitat Species (PHS) within the subbasin. Population status varies by area and species. Some species are doing well, while others are listed as state threatened, candidate, or species of concern. Big game, upland birds, furbearers, and waterfowl are managed by state and federal agencies. The peregrine falcon is the only state endangered species in the subbasin, while the ferruginous hawk, sharptail grouse, and bald eagle are listed as state threatened species. Mule deer populations are near WDFW management objective, while elk and bighorn sheep populations are below management objective within the subbasin.

Table 6. Status of Priority Habitat Species (PHS) within the Asotin Creek subbasin, Washington.

Species	State Status	Population
Ferruginous hawk (*Buteo regalis*)	T	unknown
Peregrine falcon (*Falco peregrinus*)	E	1 nesting pair
Sharptail grouse (*Tympanuchus hasianellus)*	T	extirpated
Loggerhead shrike (*Lanis ludovicianus*)	C	unknown
Goshawk *(Accipiter gentilis)*	C	unknown
Bald eagle *(Haliaeetus leucopareia*)	T	wintering
Golden eagle (*Aquila chrysaetos*)	SC	declining
Chukar (*Aclectoris chukar*)	G	low
Wild turkey (*Meleagris gallopavo*)	G	stable
Sagebrush vole (*Largurus curtatus*)	SM	unknown
Bighorn sheep (*Ovis Canadensis*)	G -PHS	below MO
Mule deer (*Odocoileous hemionus)*	G-PHS	MO lowlands
Whitetail deer (*Odocoileous virginianus*)	G-PHS	MO
Elk (*Cervus elaphus*)	G-PHS	below MO

State Status: E = endangered, C = candidate, T = threatened, SC = species of concern,
G = game species, PHS = Priority Habitat Species SM = state monitor, MO = management objective.

Peregrine Falcon

The peregrine falcon is listed as a PHS and state endangered species. Nesting peregrines were documented in the subbasin in 1992. Peregrines have returned to the area to nest every year since 1992. From 1992 to 1997, the peregrines nested on the Washington side of the Snake River, and have nested on the Idaho side since 1998 (P. Fowler, WDFW, personal communication, 2001).

Sharptail Grouse

Sharptail grouse were plentiful in southeast Washington at the turn of the century. Hunting, livestock grazing, and loss of shrub steppe and riparian habitat resulted in extirpation of the sharptail grouse in the 1960s (Hudson 1984; Shroeder 2000).

Golden Eagle

The Asotin Creek subbasin golden eagle population appears to be declining. Of the five known nesting sites, none has been active over the last five years. Two nesting sites were destroyed when the trees supporting them collapsed, and one cliff nest washed out during a major thunderstorm. None of these nests have been reconstructed. Attempts to locate new nesting sites have failed.

Rocky Mountain Mule Deer

Rocky mountain mule deer are a PHS and primary big game species within the subbasin. Washington game management units 175, 178, and 181 lie within the subbasin. Mule deer populations in lowland habitats (GMU-178, 181) have increased over the last 5 years, while mule deer populations in the uplands, have declined dramatically (Figure 19). Habitat loss due to noxious weeds is a severe problem in GMU-181, especially along the Snake River breaks. Over the last 10 years, approximately 45,000 acres of agricultural croplands were placed into CRP, improving habitat conditions for mule deer. In the upland habitat, the lack of fire to stimulate browse species on the winter range, noxious weed invasion, land sub-divisions, and inter-specific competition with whitetail deer and elk are all potential limiting factors for mule deer (Hamlin *et al*. 1984; Unsworth *et al*. 1999; Whitaker and Lindzey 1999). Predation by cougar, black bear, and coyote also may be a significant factor in population declines in upland areas.

Rocky Mountain Elk

Elk populations in the subbasin are below management objective. The Asotin Creek subbasin contains two elk management units: 175-Lick Creek, and 181-Couse. The population management objective for the two units is 1,050 elk (WDFW 2000). Surveys in March 2001 produced a count of 731 elk within the subbasin. Bull and calf ratios are also below management objective. Adult bull ratios in GMU-175 declined in 2001 to a low of 1 adult bull/100 cows, compared to an average of 8.5 adult bulls/100 cows in other Blue Mountain management units. The Blue Mountains elk herd has been under spike-only management since 1989, and "any bull" permits have not been issued in GMU-175.

Calf ratios remained low at 19 calves/100 cows, compared to an average of 23 calves/100 cows for other management units. Calf production is optimal with a summer calf ratio of 53 calves/100 cows, but spring calf ratios show significant mortality has occurred over time (19 calves/100 cows). Meyers *et al.* (1999) identified calf mortality factors in a study from 1992 to 98. The study showed that calves suffered an annual mortality rate $\geq$ 58 percent, with predation accounting for $\geq$ 78 percent of the mortality.

Habitat conditions are deteriorating for elk within the subbasin due to logging, road building, ORV trail use, livestock grazing, noxious weeds, and fire suppression (Figure 20). Noxious weeds can reduce elk use of native range by up to 98 percent (Hakim 1979). Road densities and placement can have a negative impact on elk use of important habitat (Perry and Overly 1977). Management for quality habitat, selective harvesting, control of predators, and habitat acquisition are an important component for maintaining or increasing elk populations within the subbasin.

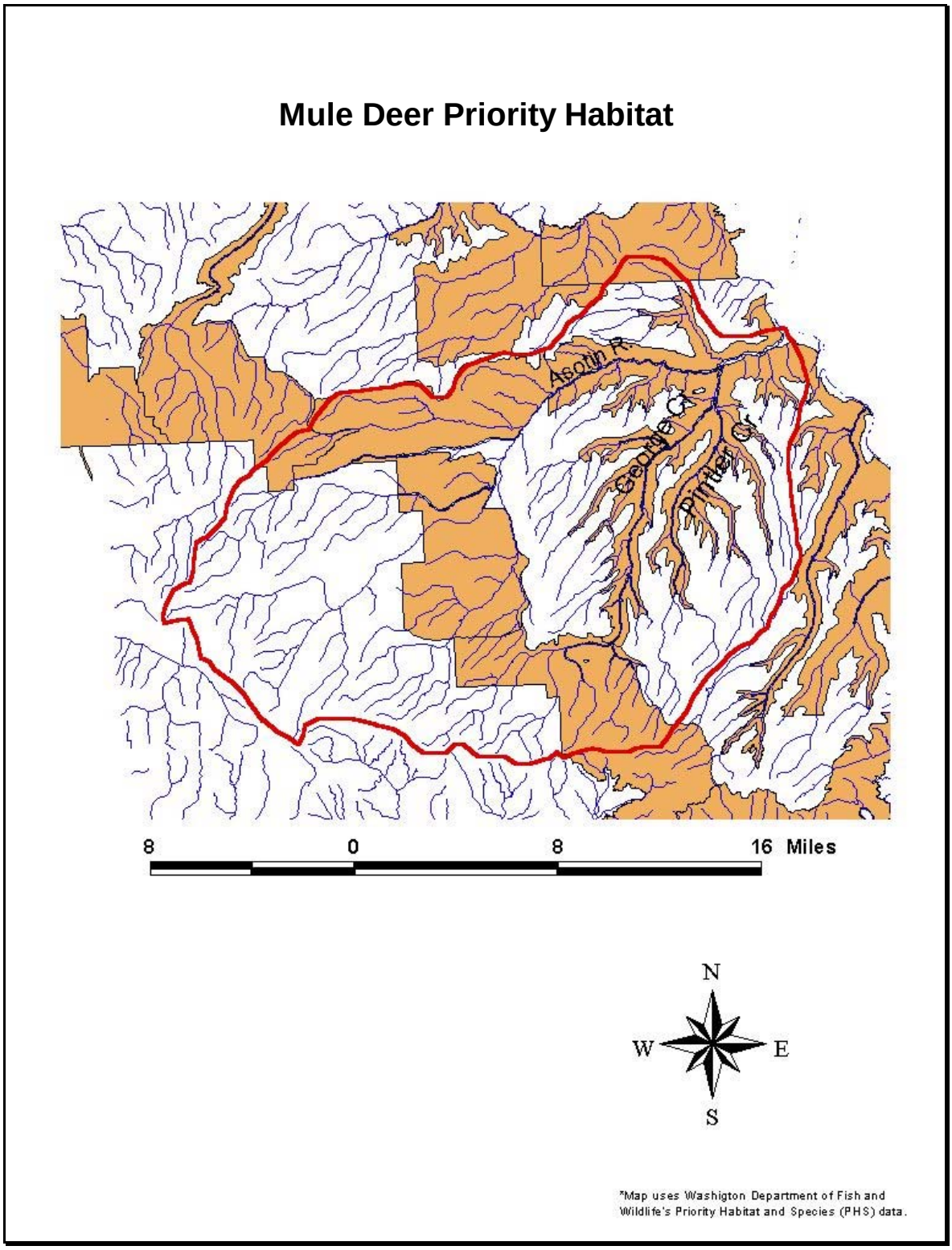

Figure 19. Mule deer priority habitat within the Asotin Creek subbasin, Washington.

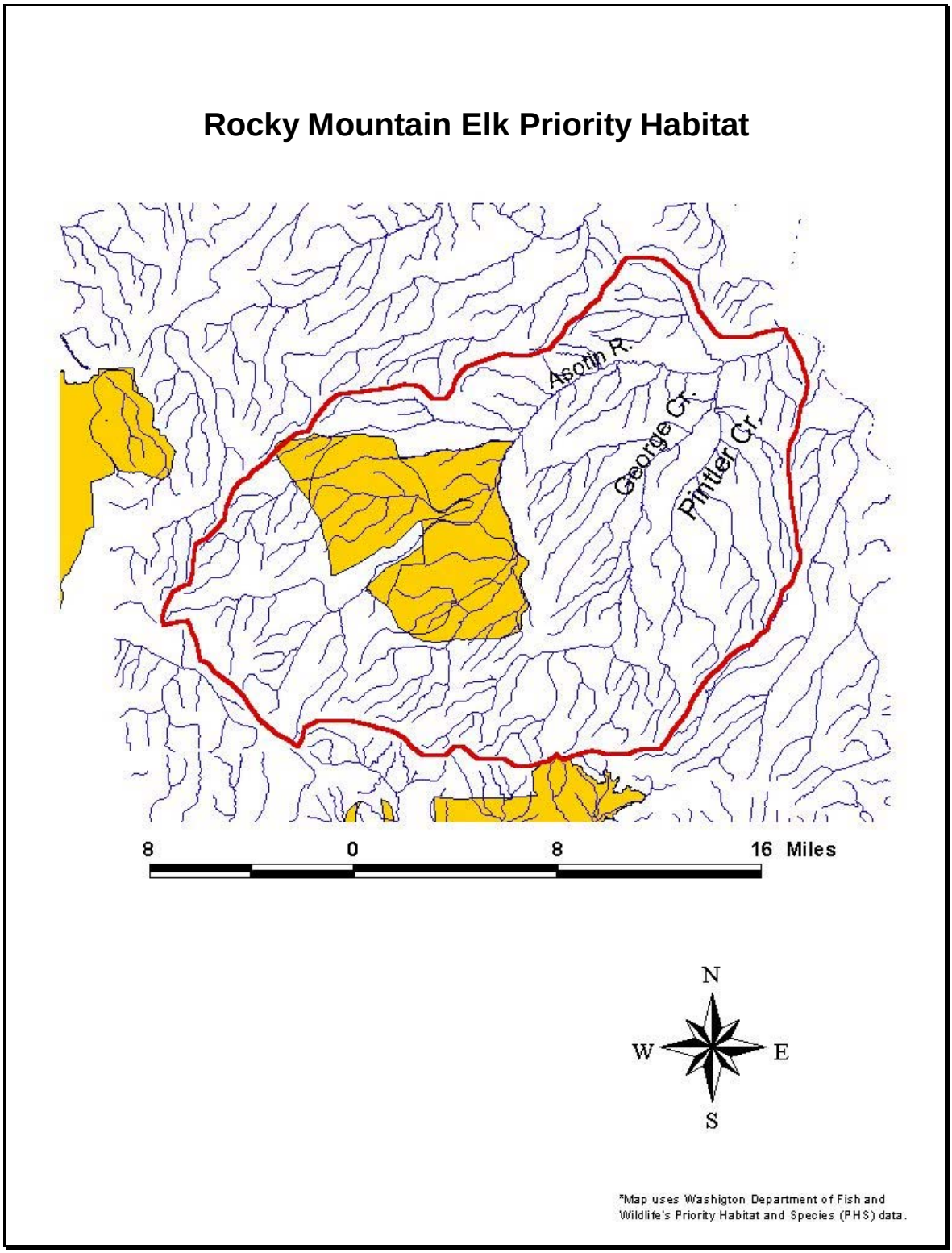

Figure 20. Rocky Mountain elk priority habitat in the Asotin Creek watershed, Washington.

Bighorn Sheep

Bighorn sheep populations within the subbasin are below management objective. The Washington portion of the Asotin Creek subbasin contains two populations of bighorn sheep. The Black Butte herd contains approximately 65 animals, and the Asotin Creek herd contains approximately 35 animals. The Black Butte herd sustained major losses (75 percent) when it was struck by a pasteurellosis epizootic in 1995 (Cassirer *et al*. 1996). Scabies has also caused problems for bighorn sheep within the subbasin (Foreyt *et al*. 1990). As a result of the die-off, the Hells Canyon Initiative (HCI) was formed between the Washington, Idaho, and Oregon state wildlife agencies, USFS, the Bureau of Land Management (BLM), and the Foundation for North American Wild Sheep. Disease is a significant problem for bighorn sheep herds throughout the western United States. The HCI was formed in an attempt to initiate research into the disease problem, and to implement habitat projects and other management activities to improve bighorn sheep populations and habitat within the three-state Hells Canyon area. Research is currently in progress to determine factors involved in the die-off and ways to improve survival (Cassirer *et al*. 2001).

Habitat degradation due to the spread of noxious weeds is a major problem on bighorn sheep range within the subbasin. Yellow starthistle is taking over thousands of acres of valuable habitat.

Habitat Areas and Quality

The contemporary character of the habitat in the Asotin Creek subbasin has been shaped through natural disturbance and land use. Road building and maintenance, urban and agricultural development, rural development, grazing, tilling, deforestation, water regulation, and flood control structures have combined to alter vegetation, soil properties, topography, runoff, water temperatures, instream flows and sedimentation. Changes to Asotin Creek watershed processes have yielded a mosaic of aquatic habitat ranging from high quality to severely degraded.

Development and operation of the Federal Columbia River Power System (FCRPS), which includes 13 mainstem dams used for hydropower, navigation, flood control, and irrigation in the Columbia River basin, resulted in widespread changes in riparian, riverine, and upland habitats. Because of the significant loss of mainstem habitat and habitat function associated with the FCRPS, tributary habitat has become more critical to the survival and recovery of ESA listed species throughout the Columbia basin. Because of direct and indirect effects of the FCRPS on fish and wildlife habitat, tributary habitat improvements are required of the Army Corps of Engineers (ACOE), the U.S. Bureau of Reclamation, and BPA for continued operation of the system under the ESA. These habitat improvement activities were specified in a NMFS Biological Opinion in December, 2000, entitled, *Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin.*

Fish

Habitat has been degraded as a result of farming, grazing, logging, road development, concentrated recreation, rural development, and catastrophic floods, which have occurred with greater frequency in recent years. Agriculture, road management, and livestock management practices coupled with local soil types and climate have contributed to increased sedimentation and a general reduction of riparian vegetation and instream cover. Loss of riparian vegetation has

likely contributed to the elevated stream temperatures observed in the lower half of the subbasin. Channelization of Asotin Creek has likely impacted fish production by reducing pool-riffle ratios and riparian vegetation.

Fish production restraints occur primarily in the mainstem of Asotin Creek and lower George Creek where steelhead rearing decreases because of elevated stream temperatures and increased sediment. Elevated stream temperatures can be largely attributed to loss of riparian vegetation, increased stream width, and reduced stream depth. Upper Asotin Creek, particularly the North Fork, on state and federal land has good to excellent spawning and rearing habitat for spring chinook, steelhead, bull trout, and whitefish. Additional areas with good to excellent habitat include portions of Charlie Creek, George Creek, and the South Fork of Asotin Creek.

The documented or suspected declines of salmonid populations within the subbasin and the resultant decreases of salmon carcass deposition suggest nutrient privation may be limiting subbasin productivity. Salmon provide enrichment to natal streams and the adjacent terrestrial environment through both direct consumption of carcasses and through decomposition. Salmon transport marine nutrients to natal streams and deposit those nutrients as carcasses when they die. Salmon carcasses have been shown to increase production at several trophic levels in streams, including periphyton production (Foggin and McClelland 1983; Kline *et al.* 1993; Schuldt and Hershey 1995), invertebrate production (Schuldt and Hershey 1995; Wipfli *et al.* 1998), and fish production (Bilby *et al.* 1996 and 1998). Nutrients from salmon are available through direct consumption by invertebrates, juvenile salmonids, and terrestrial animals or as dissolved nutrients following decomposition. Reductions in salmon biomass in natal streams may limit production at one or more trophic levels.

Wildlife

Wildlife habitats within the subbasin consist of riparian/floodplain, wetlands, shrub steppe/ agricultural, and forested uplands. Riparian/floodplain habitat is found along the Snake River, Asotin, Tenmile, and Couse Creeks, and their tributaries. The shrub steppe/ agricultural habitat type encompasses most of the subbasin and consists of croplands, CRP lands, rangeland, and shrub steppe habitat. Timbered uplands are comprised of ponderosa pine, Douglas-fir, grand fir, spruce, (*Picea* spp.). Native habitats within the subbasin have been altered by human development activities such as agriculture, the spread of noxious weeds, land subdivisions, and urban sprawl (Clarkston-Asotin).

Riparian/Floodplain

Riparian habitat is limited and highly vulnerable to degradation from various human activities and development, and WDFW classifies riparian habitat a priority habitat. Since the arrival of settlers in the early 1800s, 50 to 90 percent of the riparian habitat in Washington has been lost or modified. Riparian zones along the Snake River and Asotin Creek have been lost and fragmented by agricultural development and subdivision. The Conservation Reserve Enhancement Program (CREP) and riparian buffer options under the continuous CRP signup offer incentives for landowners to reestablish riparian vegetation along designated watercourses. Participation in these programs promises to provide quality habitat in wildlife sensitive areas.

Wetlands

There are 406 acres of wetlands in the Asotin Creek watershed. An estimated 319 acres are associated with streams and 87 acres are isolated areas dispersed throughout croplands. National Wetlands Inventory maps were updated In 1990 using the Asotin County Soil Survey, high elevation infrared photography, USDA color slides, and field visits.

Shrub Steppe/Agricultural

Shrub steppe habitat covered nearly all non-forested lands east of the Cascade range in Washington, and only 50 percent remained in 1970 (Daubenmire 1970). Subbasin shrub steppe habitat has been lost to agricultural development. Livestock grazing results in a slow impact to the composition and structure of native vegetative communities (Dobler and Eby 1990). Species dependent on shrub steppe habitat have been extirpated or populations are severely depressed. In recent years, approximately 45,000 acres have been removed from agricultural production in eastern Garfield and Asotin counties (T. Johnson, WDFW, personal communication, 2000) and placed in CRP. Most of the existing CRP contracts will continue through 2007-2008. The CRP has benefited numerous wildlife species within the subbasin by providing landowners with incentives to re-establish grassland habitat.

Forestlands

Forested habitat has been altered by agriculture, logging, road construction and maintenance, ORV trail placement and use, fire suppression, the spread of noxious weeds, and silvicultural practices. Silvicultural practices and fire suppression have reduced diversity within the vegetative community resulting in negative impacts to many wildlife species. The upper Pataha and Lick Creek, Charley Creek, and Asotin Creek watersheds have been heavily logged and roaded.

Watershed Assessment

Instream Habitat Improvement in Southeast Washington (1979-1991). Work includes instream habitat projects designed for resident trout and installed and described in *An Evaluation of Instream Habitat Alterations in Southeast Washington*, 1983-1989 (Viola *et al.* 1991) and *Instream Habitat Improvement in Southeast Washington--A Summary with Guidelines for Construction* (Mendel and Ross 1988).

Field Assessment and Design of Instream Habitat Improvement Projects on Asotin Creek and the Tucannon River (1983): Site evaluation, hydrologic analysis and design recommendations for the Tucannon River and Asotin Creek.

Lyons Ferry Hatchery Evaluation Annual Reports for Spring Chinook and Steelhead (1984-2000). These reports summarize the yearly activities of the WDFW as they relate to the Lower Snake River Compensation Program (LSRCP) and include recommendations for hatchery and wild production of spring chinook salmon, steelhead, and hatchery rainbow trout.

Asotin Wildlife Area Management Plan (1997): This draft report details WDFW management of lands within the Asotin Creek subbasin.

Southeast Washington Cooperative River Basin Study (1984): The objective of this study is to provide a basin-wide evaluation of existing land management and stream habitat conditions related to erosion and sediment problems.

Asotin Creek Model Watershed Plan (1995): This plan addresses resource problems at the watershed scale and coordinates the application of the previously recommended activities. Alternatives were designed to improve and restore aquatic habitat. A Landowner Steering Committee recommended the protection and restoration of fish habitat and associated riparian areas in order to increase the Asotin Creek productivity.

Wy-Kan-Ush-Mi Wa-Kish-Wit: Spirit of the Salmon. Vol. I. (1996): Emphasizes cultural, legal, biological, and institutional contexts and provides recommendations.

Wy-Kan-Ush-Mi Wa-Kish-Wit: Spirit of the Salmon. Vol. II. (1996): Specific subbasin breakdown for fish population status/goals, problems impacting fish, ongoing and recommended actions, including law enforcement, instream flow and passage, watershed management for water quality, riparian restoration, range management, forest management, mining impact reduction, and artificial production.

SE Washington Steelhead Genetic Assessment (1999): A comparison of the genetic structure of steelhead populations from several Snake River tributaries. One year of data from MSAT DNA samples is discussed.

Asotin Creek Water Quality Monitoring Final Report (2000): Includes a watershed overview, monitoring protocol, sampling and parameter schedule, lab and statistical methods, results and discussions on temperature, total suspended solids, fecals, nutrients, discharge and storm events, and conclusions.

Asotin Creek Inventory and Assessment Report (2001): In July 2000, the ACCD and the NRCS agreed to "*update progress toward goals identified in the 1995 Asotin Creek Model Watershed Plan, to document changes which have occurred due to flooding in 1996 and 1997, and to complete inventory information from previous studies."* A technical team surveyed 20 miles of the mainstem Asotin Creek, 3 miles of the South Fork Asotin Creek, 2 miles of the North Fork Asotin Creek, and 5 miles of Charley Creek. The inventory methodology, comparisons, and results are discussed in detail in this report.

Interior Columbia Basin Ecosystem Management Project (ICBEMP): Initiated by the USFS and BLM to respond to critical issues in the interior Columbia Basin, including forest and rangeland health, anadromous fish concerns, and terrestrial species concerns. This project provides a comprehensive assessment for USFS and BLM administered lands. Several associated assessments derived from this project and conducted by Science Integration Team characterize historical and current conditions and associated trends, and document accelerated changes in vegetation patterns, fish and wildlife distributions, and terrestrial and aquatic ecosystem processes that have occurred in the past century.

Cursory Assessments of Salmonids and their Habitats in George, Tenmile and Couse Creeks in Asotin County, 2000 (2001): The ACCD and WDFW determined salmonid distribution, relative abundance and basic habitat conditions within these previously unsampled watersheds.

Major Limiting Factors

The Asotin Creek subbasin is an example of the sensitivity of watersheds in the interior Columbia Basin to human activities. The primary limiting factors that have contributed to the current depressed status of fish, wildlife and their associated habitats are broadly classified into habitat degradation and non-native species competition. Habitat degradation can be described as the loss of quality, quantity, diversity and connectivity of habitat components and function. Many environmental and managed factors contribute to and influence these limiting factors and their resulting impacts on fish, wildlife, and habitat resources. The limiting factors must be addressed in an appropriate fashion to provide short and long term benefits for recovery efforts to be successful. Combined immediate and accumulative efforts addressing various limiting factors are critical to attaining management objectives.

Two key physical concerns form the context for the analysis of habitat conditions, the limiting factors for fish and wildlife resources, and ultimately the restoration recommendations for the subbasin. Land use practices have altered the hydrologic cycle. Land use, together with hydrologic changes, have resulted in some portions of the subbasin reflecting stream channel instability in the form of channel widening, downcutting, vertical cut banks, and excessive gully development. Each of the limiting factors specifically within the Asotin Creek subbasin is related, in part, to the broad-scale problems of hydrology and basin-wide stream channel instability.

Fish

Key factors that occur at the local and regional level limiting fish production include water quality, geomorphic instability, riparian function, sedimentation, insufficient instream habitat, less than optimal passage/connectivity due to road culverts, out-of-basin effects, data gaps, the introduction and proliferation of non-native species, and ecological productivity. A formal limiting factors analysis has not been completed for Tenmile and Couse Creeks. However, local technical experts have reached consensus that temperature, sediment, minimal streamflows, and degraded instream habitat for adult and juvenile salmonids are limiting salmonid production. More information on these two watersheds is included in the Mid-Snake subbasin.

Regional Scale

While clearly acknowledged as a problem in the subbasin, regional scale (out-of-subbasin) limiting factors are often difficult to link to a given fish population. Anadromous fish production in the Asotin Creek subbasin is limited by two primary factors. Adult escapement of salmon and steelhead is currently being determined by out-of-subbasin issues and is insufficient to fully seed the available habitat. The carrying capacity of the habitat and fish survival have been reduced within the subbasin by land management activities, which impact hydrology, sedimentation, habitat distribution and complexity, and water quality. It is generally accepted that hydropower development on the lower Snake and Columbia Rivers is the primary cause of decline and continued suppression of Snake River salmon and steelhead (IDFG 1998; CBFWA 1991; NPPC 1992; NMFS 1995, 1997; NRCS 1995; Schaller *et al.* 1999; Williams *et al.* 1996). There is less

agreement that the hydropower system is the primary factor limiting recovery (Mamorek and Peters 1998). This limiting factor has the effect of keeping yearly effective population size (Nb) low, increasing genetic risk and demographic risk of localized extinction.

Local Scale

Local scale (in-subbasin) limiting factors can be linked to specific fish populations. It is important to acknowledge that factors limiting local fish production or survival may differ from those defined across a broader scale, and that limiting factors in a given location may vary between species. Documentation of limiting factors is influenced by limited information in some areas and for some species. The lack of information may also be a limiting factor to effectively assess population viability or implement artificial propagation.

Aquatic habitats in the subbasin and nearby subbasins have undergone chronic and acute destabilization throughout recent history. Historic unmanaged grazing, mining, logging, stream channelization, riparian clearing, wetlands filling, and other developments have contributed to reduced riparian and stream habitat productivity. Ongoing effects from livestock grazing, instream heavy equipment use, road-related activities, rural development, and catastrophic floods are responsible for many negative effects to spawning and rearing habitat. Spring chinook salmon and summer steelhead production is limited primarily by existing spawning and rearing conditions. Land use activities have detrimentally affected fish habitat, water quality, and water quantity. These activities act to destabilize natural hydrologic processes and amplify the impacts of natural events such as storms. Riparian habitat degradation is one of the most serious fish habitat problems in the subbasin. Riparian losses lead to secondary effects that are equally harmful and limiting, including increased water temperature, low summer flows, excessive winter runoff, and sedimentation. Water withdrawals and channel modification have had negative impacts on instream and riparian habitats and contribute to temperature and flow problems. The largest scale impacts to riparian habitat have taken place where most channel modifications occur as a result of livestock grazing, agriculture, road construction, rural development, and flood control.

Water Quality

Water temperature is the primary water quality factor limiting salmonid productivity in the Asotin Creek subbasin. Historic and current temperature data indicate that the lower reaches of Asotin Creek have temperatures in excess of 70°F (24.0°C) during the summer months. High fecal coliform concentrations are also a concern for Asotin Creek, which is on the 1996 and 1998 303(d) list of impaired waters for fecal coliform bacteria.

Geomorphic Instability

Most reaches on Asotin Creek have a fraction of the pools a stream of this type should, one pool for every 3 to 4 bankfull discharge widths. The ratio of riffles/runs to pools has increased. Levees constructed for flood control have diminished the ability of Asotin Creek to create adequate complex pool habitat, off-channel rearing areas, and floodplain access. The amount of unvegetated stream banks has increased streambank erosion, resulting in sedimentation and impacting fish during the egg and pre-emergent fry stages.

Riparian Function

The ability of Asotin Creek to dissipate flood energy across a floodplain has diminished due to diked channels, land use practices, floodplain detachment following flooding, and decreased riparian woodlands. Percent of canopy cover tends to increase with increased elevation. Grazing and recreational impacts have decreased vegetative cover, resulting in diminished riparian filtration and stabilization functions, increased surface exposure to radiant heat, and increased bank instability.

Sedimentation

Land use practices have increased sediment delivery to the drainages and reduced floodplain and riparian function to filter and stabilize streambanks. Fragile soils and land use practices have contributed fine sediments to the system, causing gravel to become cemented and impacting spawning areas. Continued upland treatments are needed to store and utilize precipitation in the uplands and minimize sediment production at its source.

Passage / Connectivity - Road Culverts

The degree to which connectivity limits fish migration and production within the Asotin Creek subbasin is underrepresented by existing data and reports. No data source exists which accurately documents known or potential barriers to fish migration within the subbasin in a useable and widespread format. Particularly lacking are records of culvert conditions in relation to fish passage, which is believed to be a limiting factor in the Asotin Creek subbasin. Although data have been collected on culvert conditions during a variety of field surveys, the data often are not available in the detail and format necessary to map the locations of surveyed culverts, determine the amount and quality of habitat blocked, or assess their capability of passing fish.

Insufficient Instream Habitat

Significant human actions throughout the subbasin have destabilized Asotin Creek. Road construction, channelization and diking, and forest and farm management practices have lead to a loss of instream fish habitat. Catastrophic floods have also impacted high quality fish habitat.

Out-of-Basin Effects

Managers have identified that fishery resources within the Asotin Creek subbasin are affected by outside variables such as migration corridor survival, ocean productivity, and pollution. Managers agree that actions to recover listed salmonid populations cannot succeed in the subbasin without coordinated basinwide efforts.

Non-native Species

The introduction and proliferation of non-native species of fish, such as smallmouth bass, wildlife, plants, such as yellow starthistle, and insects pose a significant threat to the ecological health of the subbasin.

Data Gaps

The lack of complete fish life history, fish population, habitat characterization, and assessments limit the ability of managers to establish reliable spawning escapements, assess habitat carrying

capacity, and direct in-basin habitat restoration or species recovery actions in the most efficient, cost effective manner.

Ecological Productivity

Research has established a strong link between marine nutrient loading from salmonid carcasses and the ecological health of fish, wildlife, forest resources, and primary productivity of the subbasin. The documented or suspected declines of salmon populations within the Columbia River basin and the resultant decreases of salmon carcass deposition suggest nutrient privation may limit subbasin productivity.

Wildlife

Wildlife populations within the subbasin have been impacted by habitat loss due to agricultural development, hydropower development, other influences from human development such as logging and road construction, fire suppression, and the spread of noxious weeds. Habitat degradation in the Blue Mountains threatens existing populations of elk, mule deer, and bighorn sheep by reducing the forage and habitat base, especially winter range. Conflicts between elk and agriculture are influenced by several factors and fluctuate in intensity from year to year. Habitat acquisition and enhancements are important measures to maintain and/or increase wildlife populations within the Asotin Creek subbasin.

Agricultural Development

Agricultural development has altered or destroyed vast amounts of native shrub steppe habitat, and fragmented riparian/floodplain habitat in the Asotin Creek subbasin. Agricultural operations have increased sediment loads and introduced herbicides and pesticides into streams.

Hydropower Development

Hydropower development on the Snake and Columbia Rivers provided water to develop the shrub steppe habitat for irrigated croplands, orchards, vineyards, and pulp tree plantations.

Other Influences from Human Development

Logging, road building, ORV trails and use, livestock grazing, and subdivision have modified the structure and composition of the forest community, negatively impacting wildlife species dependent on early-seral stage communities.

Roads

The transportation system of the Asotin Creek subbasin is a potential limiting factor to wildlife populations. Road densities and placement can have a negative impact on elk use of important habitat (Perry and Overly 1977). More than 65 species of terrestrial vertebrates in the interior Columbia River basin have been identified as being negatively affected by road-associated factors (Wisdom *et al.* 2000) (Table 7), which can negatively affect terrestrial vertebrate habitats and populations. Increasing road densities can reduce big game habitat effectiveness or increase vulnerability to harvest. Motorized access facilitates firewood cutting and commercial harvest, which can reduce the suitability of habitats surrounding roads to species that depend on large trees, snags, or logs (USFS 2000). Roads also aid the spread of noxious weeds. Roads increase

the amount of edge habitat in the landscape, increasing habitat suitability for edge dependent species. Populations of reptiles, which use roads for thermal regulation, wide ranging forest carnivores, and migrating amphibians are particularly vulnerable to the effects of road mortality.

Fire Suppression

Fire suppression results in the loss of species diversity by allowing the spread of shade tolerant species such as Douglas fir and grand fir. Prior to fire suppression, wildfires kept shade-tolerant species from encroaching on established forest communities. The lack of fire within the ecosystem has resulted in significant changes to the forest community and has negatively impacted wildlife. Changes in forest habitat components have reduced habitat availability, quality, and utilization for wildlife species dependent on timbered habitats.

Noxious Weeds

Noxious weeds, primarily yellow starthistle and spotted knapweed, have taken over thousands of acres of wildlife habitat within the subbasin. Yellow starthistle displaces native plant species and reduces plant diversity (Lacey *et al*. 1974). Watson and Renney (1974) found that spotted knapweed decreased bluebunch wheatgrass by 88 percent. Elk use was reduced by 98 percent on range dominated by spotted knapweed compared to bluebunch-dominated sites (Hakim 1979).

Artificial Production

There is no artificial production activity in the Asotin Creek subbasin. Until recently, the WDFW stocked Asotin Creek and Charley Creek with "catchable" sized rainbow trout. Stocking with trout was reduced, redistributed, and finally terminated in 2000 because of conflicts with ESA. The WDFW stocked steelhead into Asotin Creek in the 1960s and 1980s. The WDFW is currently managing the Asotin Creek subbasin as a wild salmonid refuge; therefore, it is no longer stocked. The NPT and WDFW have discussed reintroduction of spring chinook salmon, but there is not agreement about which stock of chinook to use and how soon, or how to begin reintroduction.

Table 7. Road-associated factors that are damaging to terrestrial vertebrates.

Road-associated Factor	Effect of Factor in Relation to Roads
Snag reduction	Reduction in density of snags due to their removal near roads, as facilitated by road access
Down log reduction	Reduction in density of large logs due to their removal near roads, as facilitated by road access
Habitat loss and fragmentation	Loss and resulting fragmentation of habitat due to establishment and maintenance of road and road right-of-way
Negative edge effects	Specific case of fragmentation for species that respond negatively to openings or linear edges created by roads
Over-hunting	Nonsustainable or nondesired legal harvest by hunting as facilitated by road access
Over-trapping	Nonsustainable or nondesired legal harvest by trapping as facilitated by road access
Poaching	Increased illegal take (shooting or trapping) of animals as facilitated by road access
Collection	Collection of live animals for human uses (e.g., amphibians and reptiles collected for use as pets) as facilitated by the physical characteristics of roads or by road access
Harassment or disturbance at specific use sites	Direct interference of life functions at specific use sites due to human or motorized activities, as facilitated by road access (e.g. increased disturbance of nest sites, breeding leks or communal roost sites)
Collisions	Death or injury resulting from a motorized vehicle running over or hitting an animal on the road
Movement Barrier	Preclusion of dispersal, migration or other movements as posed by a road itself or by human activities on or near a road or road network
Displacement or avoidance	Spatial shifts in populations or individual animals away from a road or road network in relation to human activities on or near a road or road network
Chronic negative interaction with humans	Increased mortality of animals due to increased contact with humans, as facilitated by road access

Existing and Past Efforts

Various state and federal agencies, tribes, and local watershed groups have developed planning documents, policies, and management guidelines for fish and wildlife habitat protection and enhancement in the Asotin Creek subbasin. The most effective plans and efforts are those that have been collaboratively developed and implemented, adequately funded, and produce on-the-ground results in both the short and long term.

Past efforts include a WDG Instream Habitat Improvement Project in the early to mid-1980s. This project was funded by the ACOE through the LSRCP and included researching current knowledge of instream habitat improvement methods and implementing instream improvements on publicly owned portions of Asotin Creek. A monitoring and evaluation study was included in this project. Several reports were generated over a period of more than 10 years (e.g., Ransom 1981; Mendel and Hallock 1984; Mendel and Ross 1988; Orsborn and Bumstead 1983; Viola 1991).

The Asotin Creek Model Watershed planning effort was developed as part of the Council's *Strategy for Salmon.* More specifically, the Council called for locally based model watershed planning efforts to develop and implement fish and wildlife habitat protection and restoration measures.

The Asotin Creek subbasin restoration efforts have been expanded with planning, management, and funding being supported by programs outside of the Council's Program. While effectiveness in implementing these plans, policies, and regulations varies, efforts to increase inter-agency coordination and cooperation are being made throughout the subbasin.

Fish

Many projects have been implemented in the Asotin Creek subbasin the overall purpose of which is to improve fisheries habitat to ensure self-sustaining populations. Using the *Asotin Creek Model Watershed Plan* (Plan) (ACCD 1995), the ACCD is the primary entity coordinating habitat projects on both private and public lands within the Asotin Creek watershed. Approximately 276 projects have been implemented as of 1999. In 2000, 20 of these projects were funded in part by BPA. These projects used a variety of methods to enhance and protect watershed conditions. Instream work for fish habitat included construction of hard structures (e.g., vortex rock weirs), meander reconstruction, placement of large woody debris and whole trees, and improvements to off-channel rearing habitat. Thirty-eight pools were created with these structures. Three miles of stream benefited from riparian improvements such as vegetative plantings (17,000 trees and shrubs) and noxious weed control. Two sediment basins, 67 acres of grass seeding, and 745 acres of direct seeding were implemented to reduce sediment production and delivery to streams in the subbasin.

Asotin County Conservation District

Asotin Creek Model Watershed Program

The Council, BPA, local agency representatives, and landowners designated the Asotin Creek watershed a "model watershed" in 1993. The *Asotin Creek Model Watershed Plan* (Plan) was completed in 1995 and integrated land uses and problems throughout the watershed. Spring chinook was a primary focus of the Plan. The Plan was the first of its kind to be funded by BPA in the state of Washington that deals specifically with watershed restoration and protection of endangered anadromous fish habitat.

Technical agencies, local landowner and citizen committees, and the ACCD collaborated to identify resource issues and recommended solutions. The Plan identifies the limiting factors affecting salmonids in Asotin Creek, which include sedimentation, temperature, lack of quality and quantity pool habitat as well as water quality problems from elevated fecal coliform levels.

Since 1996, implementation funding can be divided into six main categories: instream, riparian, upland, monitoring, information and education (I&E), and administration.

Instream

Efforts to improve instream pool habitat, reduce streambank sedimentation, and create complex fish habitat began in 1997. Projects reduce stream width and increase stream depth. Utilization of rootwads and large woody debris recreate natural conditions. Rock structures in the form of vortex rock weirs, j-hooked rock vanes, and rock vanes help form pools and sort spawning gravels. The benefits from instream habitat projects are instantaneous habitat improvements for juvenile and adult salmonids and increased bank stability at each site. From 1996 to 2000, 151 pools have been installed at an average cost of $1,714 per structure. The BPA contributed a total of $338,512 for instream projects (Figure 21).

The process used to identify and prioritize instream and riparian habitat projects on Asotin Creek must address at least one each of the following issues:

- Listed ESA species affected and number of species affected by reach.
  - North Fork Asotin Creek: steelhead and bull trout (documented), spring chinook (historic)
  - South Fork Asotin Creek: steelhead and spring chinook (documented), bull trout (suspected)
  - Charley Creek: steelhead (documented) and bull trout (suspected and historic)
  - Mainstem Asotin Creek: steelhead (documented), bull trout and spring chinook (historic)

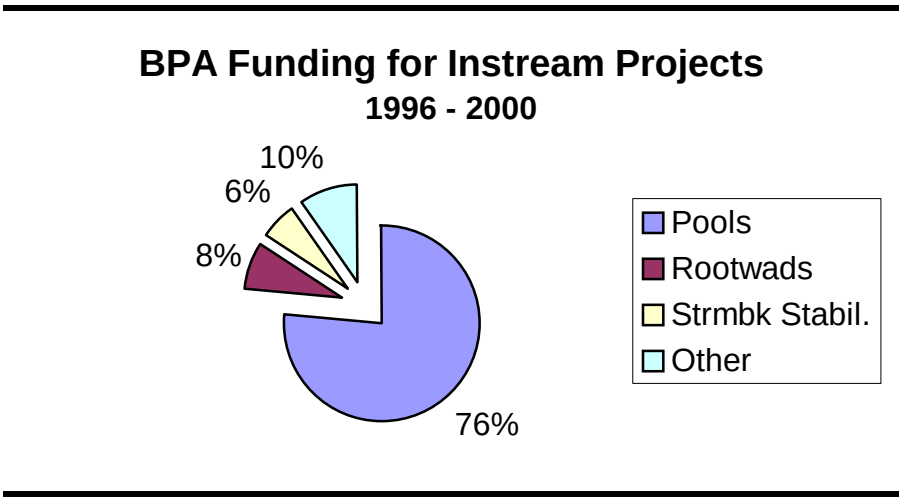

Figure 21. BPA funding for instream projects, 1996-2000.

- Priority limiting factors for stream reaches.

All habitat projects located in prime steelhead spawning and rearing areas address at least two limiting factors. Primary limiting factors identified in the *Asotin Creek Model Watershed Plan* are lack of suitable resting and rearing pools with complex cover and stream temperature. Instream habitat structures in North Fork Asotin Creek, South Fork Asotin Creek, Charley Creek, and mainstem Asotin Creek are priorities according to local technical representatives. Instream project design must meet NRCS standards and specifications, incorporate geomorphic stream classification (Rosgen 1966), and must have NMFS and USFWS concurrence.

Expected benefits of instream projects will be a short-term solution with the expectation of long-term results such as increased smolt-to-adult survival and instream structures continuing to function as designed for increased complex pool habitat for all life stages of salmonids.

- Cost effectiveness / cost share from outside sources.

The ACCD works with three different funding sources and leverages all funding sources to help minimize costs. Financial support from cooperating state and federal agencies for administrative and technical assistance and landowner in-kind contributions also hold down project costs.

- Size of area affected by this project or estimated benefits.

Larger projects that affect critical habitat and address numerous limiting factors are a priority with the main benefits being an increase in the quality of pool habitat. Studies completed at Headgate Park in 1996 and 1997 showed that 60 to 71 percent of juvenile steelhead occupied pool habitat comprising less than 3.3 percent of the available habitat (Garrett and Osborne). Juvenile over-winter survival has been identified as a limiting factor in the Columbia River basin (Baumgarner and Schuck 2001) and monitoring projects will be conducted to determine if this applies to Asotin Creek.

- Relationship to other projects.

  A total of 151 pools have been installed from 1996 to 2000. Using the *Quality Pool Index* (Platts *et al.* 1983), there are 81 high quality pools. The ACCD and its partners planted 30,000 trees and constructed 26,000 feet of riparian fencing. The ACCD is partnering with the USFS to monitor sediment, cobble embeddedness, and macro-invertebrates.

The Salmon Recovery Funding Board process requires assumptions for local instream habitat project funding eligibility:

- Projects that decrease stream length (straighten the stream) are not eligible for funding;
- Barrier removal projects that do not open up useable habitat are not eligible funding;
- ESA-listed stocks are equally important and will not be treated preferentially, but projects that affect a greater number of endangered species will be a higher priority; and
- Limiting factors have to be identified in a limiting factors analysis, assessment, or through technical consensus, and projects with great temporal longevity and geographic size will be prioritized over short-lived, smaller projects.

Figure 22, Figure 23, and Figure 24 illustrate the distribution of BPA-funded instream projects throughout the Asotin Creek subbasin.

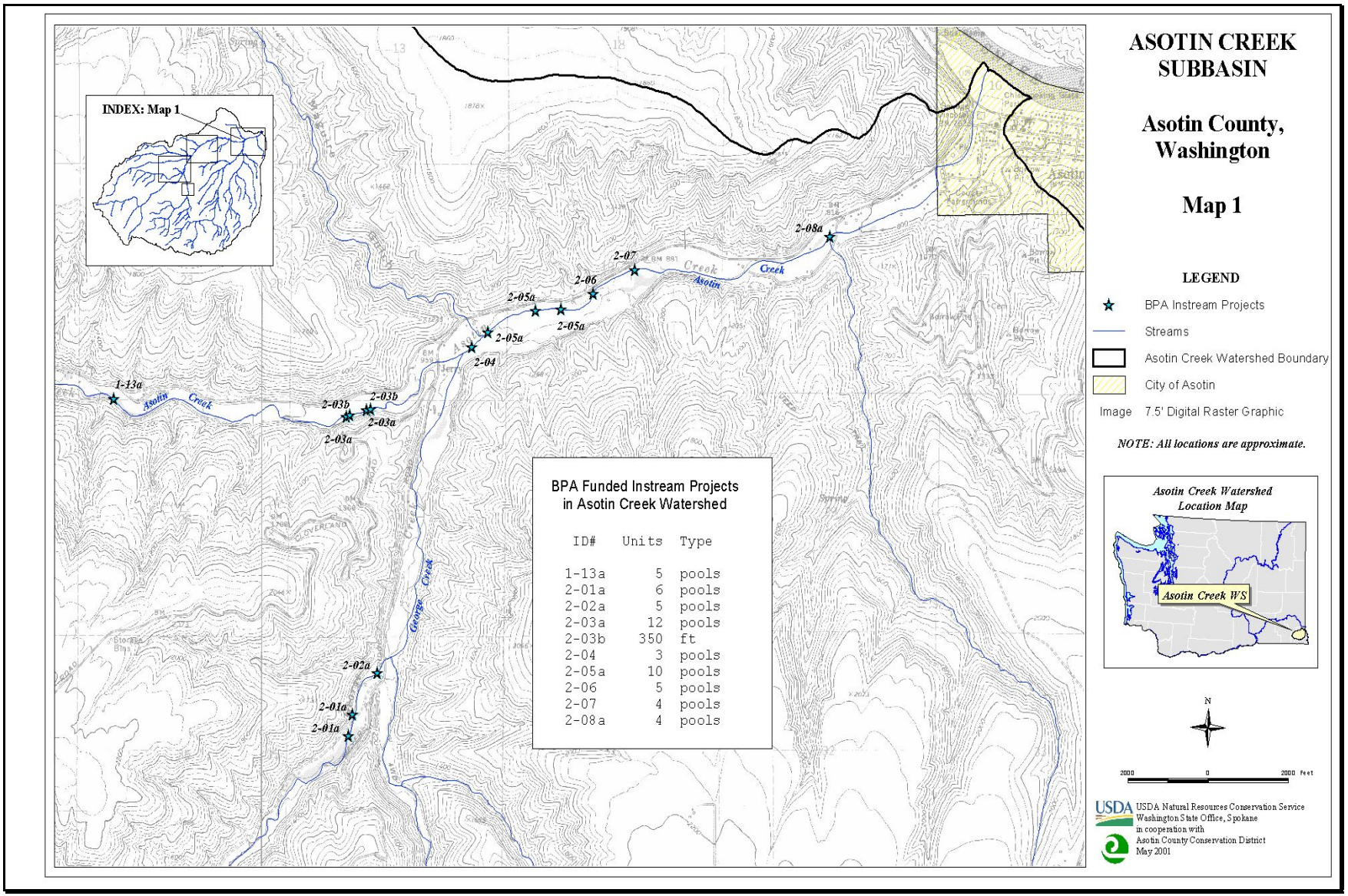

Figure 22. BPA-funded instream projects (1996-2000): lower Asotin Creek.

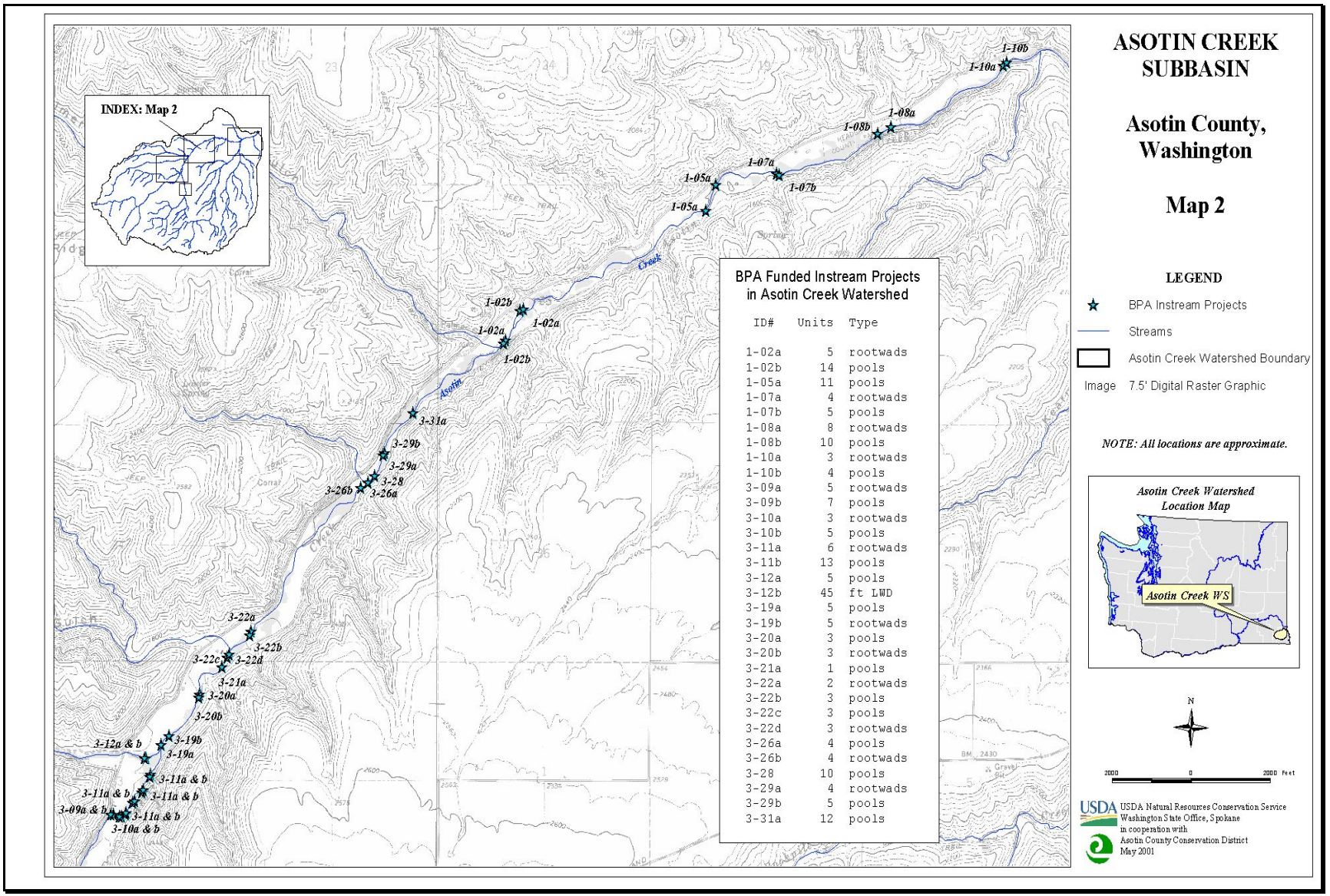

Figure 23. BPA-funded instream projects (1996-2000): mainstem Asotin Creek.

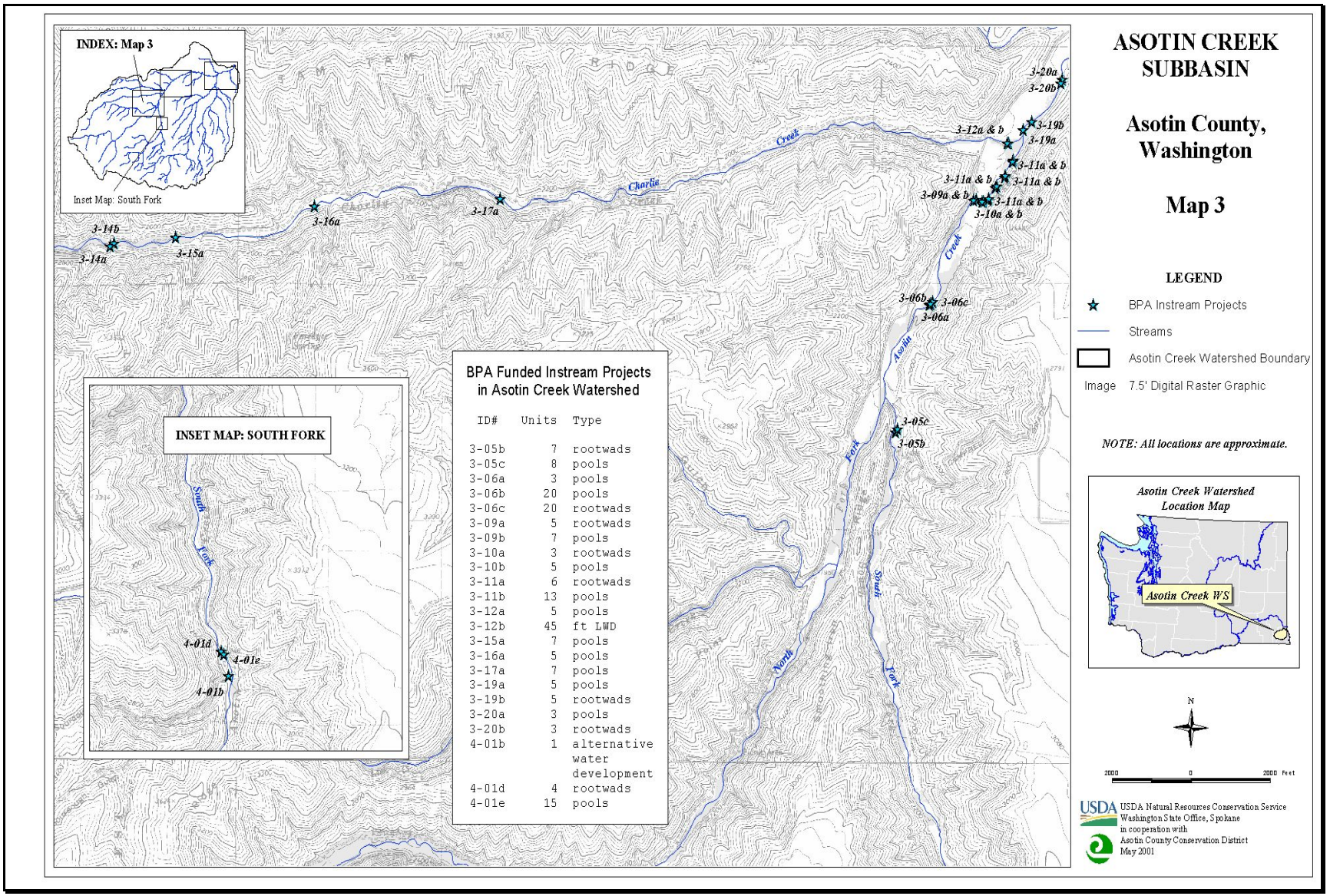

Figure 24. BPA-funded instream projects (1996-2000): tributaries and upper Asotin Creek.

Riparian

Riparian projects to reduce stream temperature, sedimentation, and improve bank stability include fencing streams to reduce direct animal pressure on streambanks and allow for natural reproduction of riparian areas; alternative water developments with fencing projects to allow animals sources of water without utilizing the stream; and tree planting in areas where instream structures have been installed and where floods or human impacts have destroyed the vegetation.

The benefits from riparian projects include buffers that set "side boards" between which the river can meander and return to natural functions; connectivity of the stream and floodplain; increased flow as water is retained in the soil profile longer than pre-project land use; and cooler water temperatures at each site. From 1996 to 2000, BPA contributed $152,762 for funding riparian projects (Figure 25).

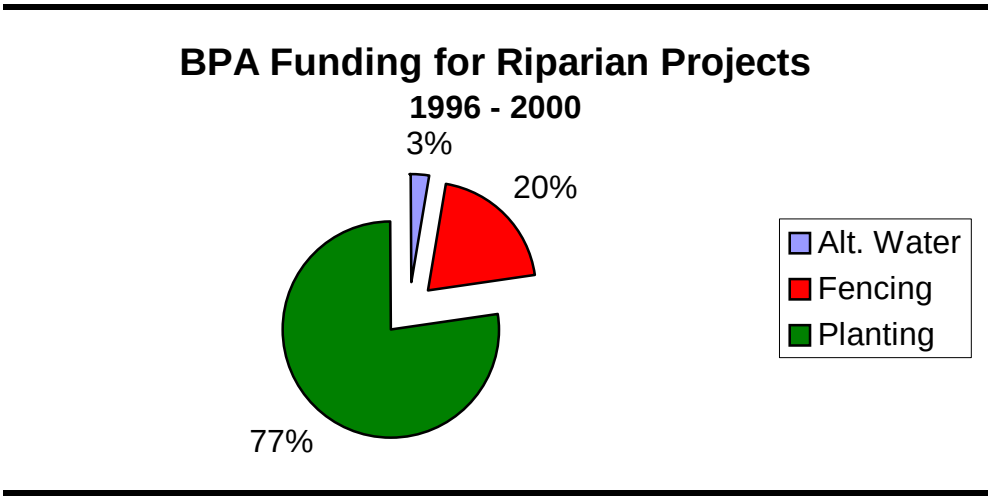

Figure 25. BPA funding for riparian projects, 1996-2000.

The Salmon Recovery Funding Board process requires assumptions for local riparian habitat project funding eligibility:

- Any project that protects riparian areas are eligible for funding; and
- Projects in locations of cool water that do not currently have healthy riparian areas are preferred over projects in lower stream reaches that are already near the temperature threshold for salmonids.

Figure 26 - 28 illustrate the distribution of BPA-funded riparian projects throughout the Asotin Creek subbasin.

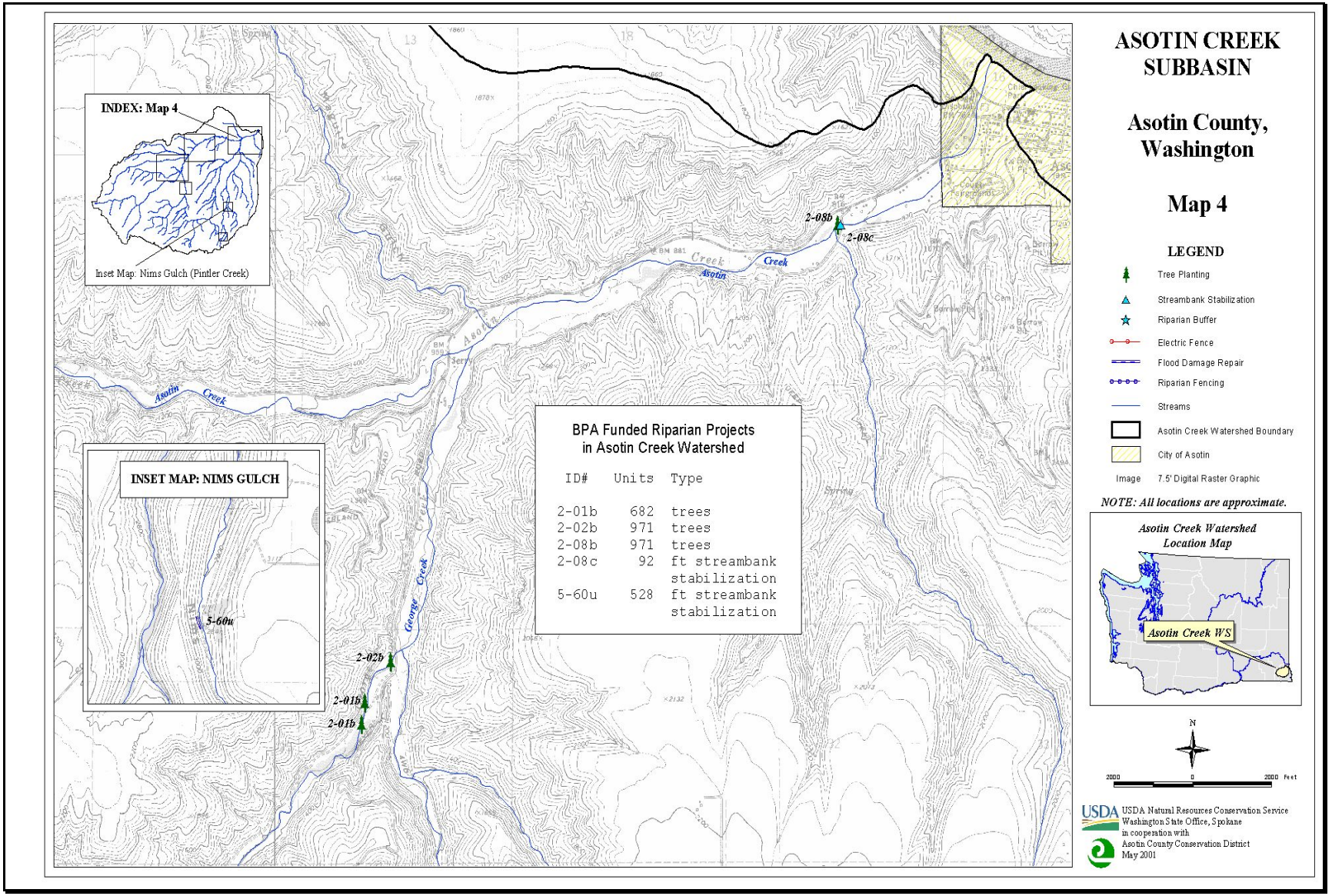

Figure 26. BPA-funded riparian projects (1996-2000): lower Asotin Creek.

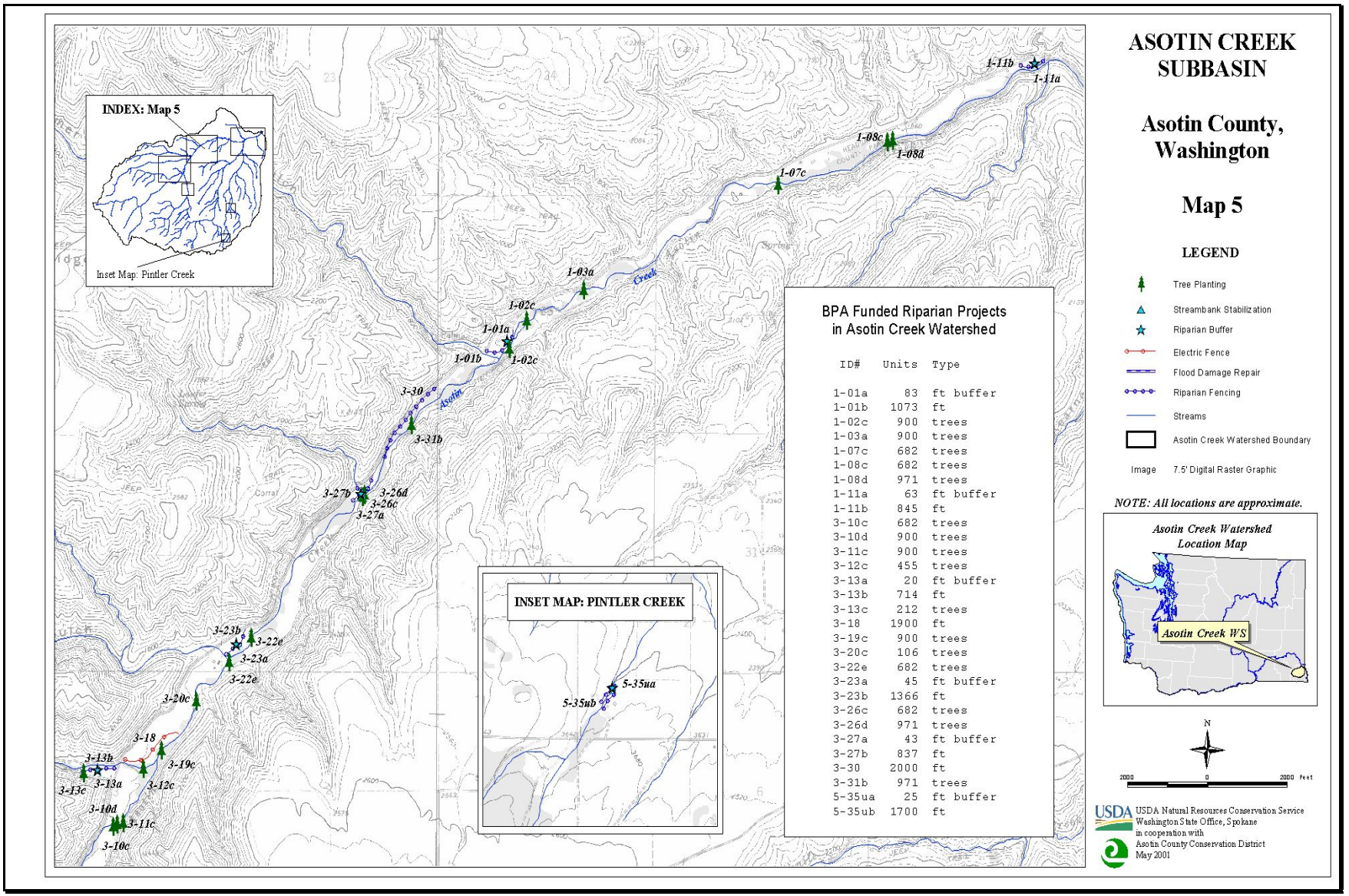

Figure 27. BPA-funded riparian projects (1996-2000): mainstem Asotin Creek.

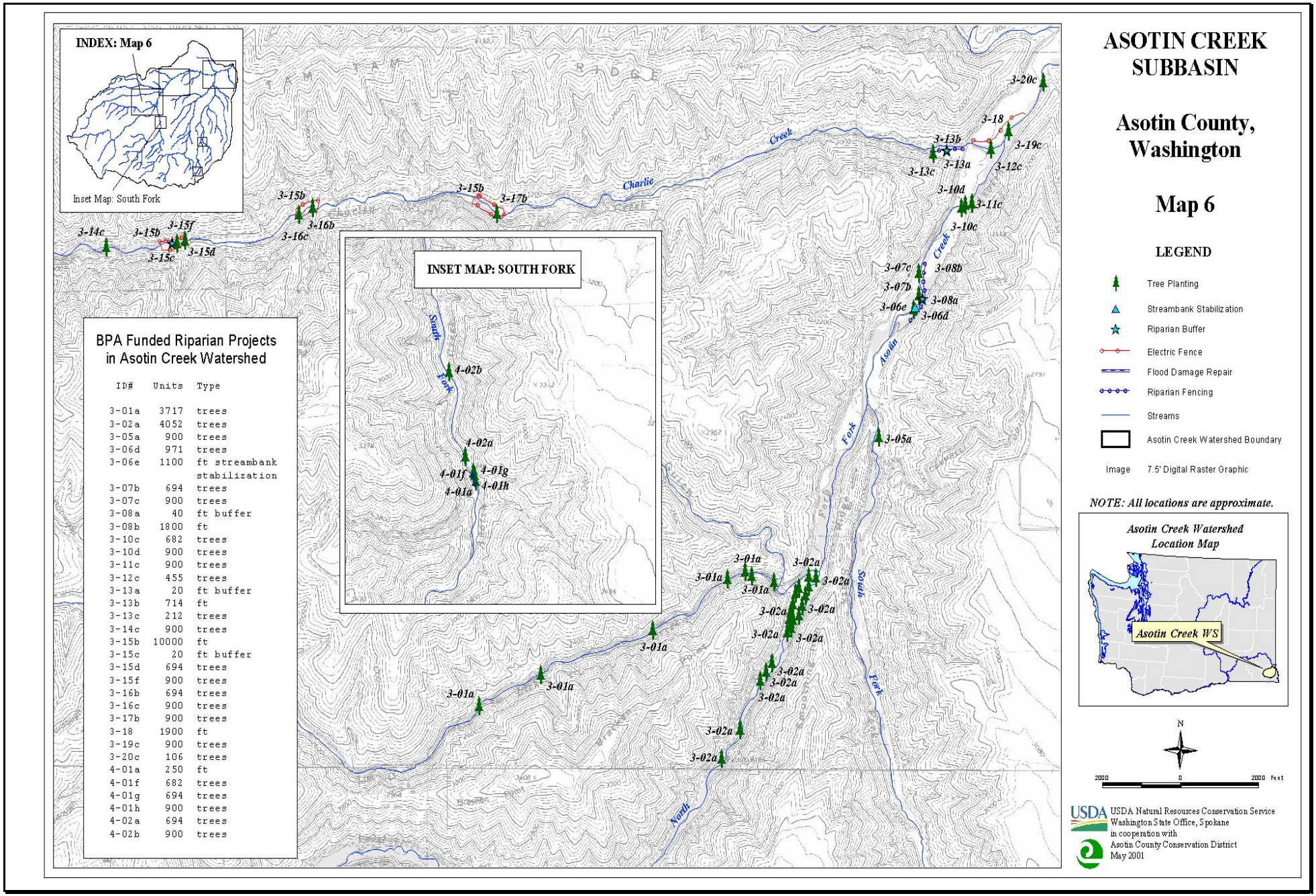

Figure 28. BPA-funded riparian projects (1996-2000): tributaries and upper Asotin Creek.

Uplands

Most of the sediment delivered to Asotin Creek and its tributaries comes from the upland agricultural areas. Best Management Practices (BMPs) can be installed to reduce the amount of soil leaving these areas. The BMPs targeted to improve water quality and fish habitat include upland sediment basins designed to catch sediment; terraces to direct runoff to sediment basins or grassed water ways and filter strips; strip cropping; and direct seeding of crops. Results indicate summerfallow acres have been reduced and erosion has been reduced by 75 percent on those acres.

The benefits from upland sediment reduction projects include greater soil moisture holding capacity, which reduces runoff from tilled soils and reduces erosion due to water infiltration. From 1996 to 2000, BPA contributed $124,081 for funding upland projects (Figure 29).

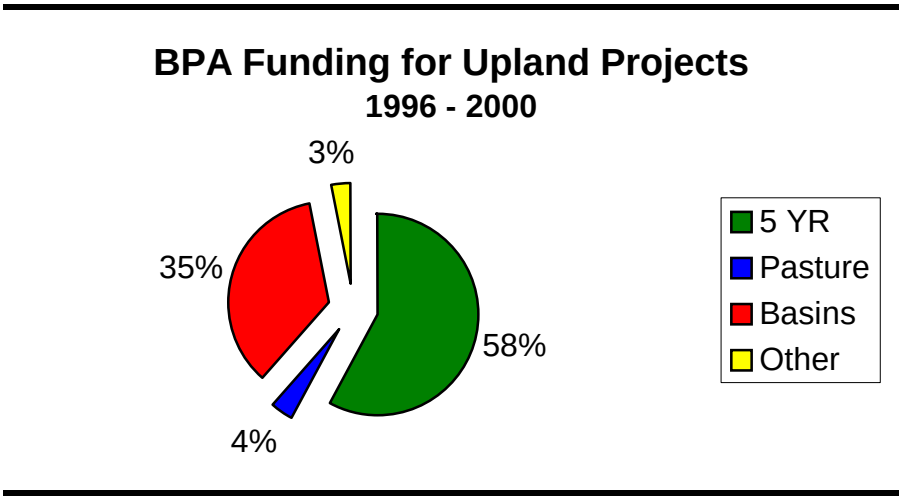

Figure 29. BPA funding for upland projects, 1996-2000.

The Salmon Recovery Funding Board process requires assumptions for local upland habitat project funding eligibility:

- Any project that reduces agricultural sediment (limiting factor for salmonid recovery); and
- The NRCS identified upland BMPs as eligible for funding. Sponsor will establish maximum allowable acreage for project upstream of ESA listed species spawning and rearing. If a sediment origin is below a spawning and rearing area, the less likely it will impact salmonids (sedimentation is not a limiting factor in a passageway).

Figure 30 and Figure 31 illustrate the distribution of BPA-funded upland projects throughout the Asotin Creek subbasin.

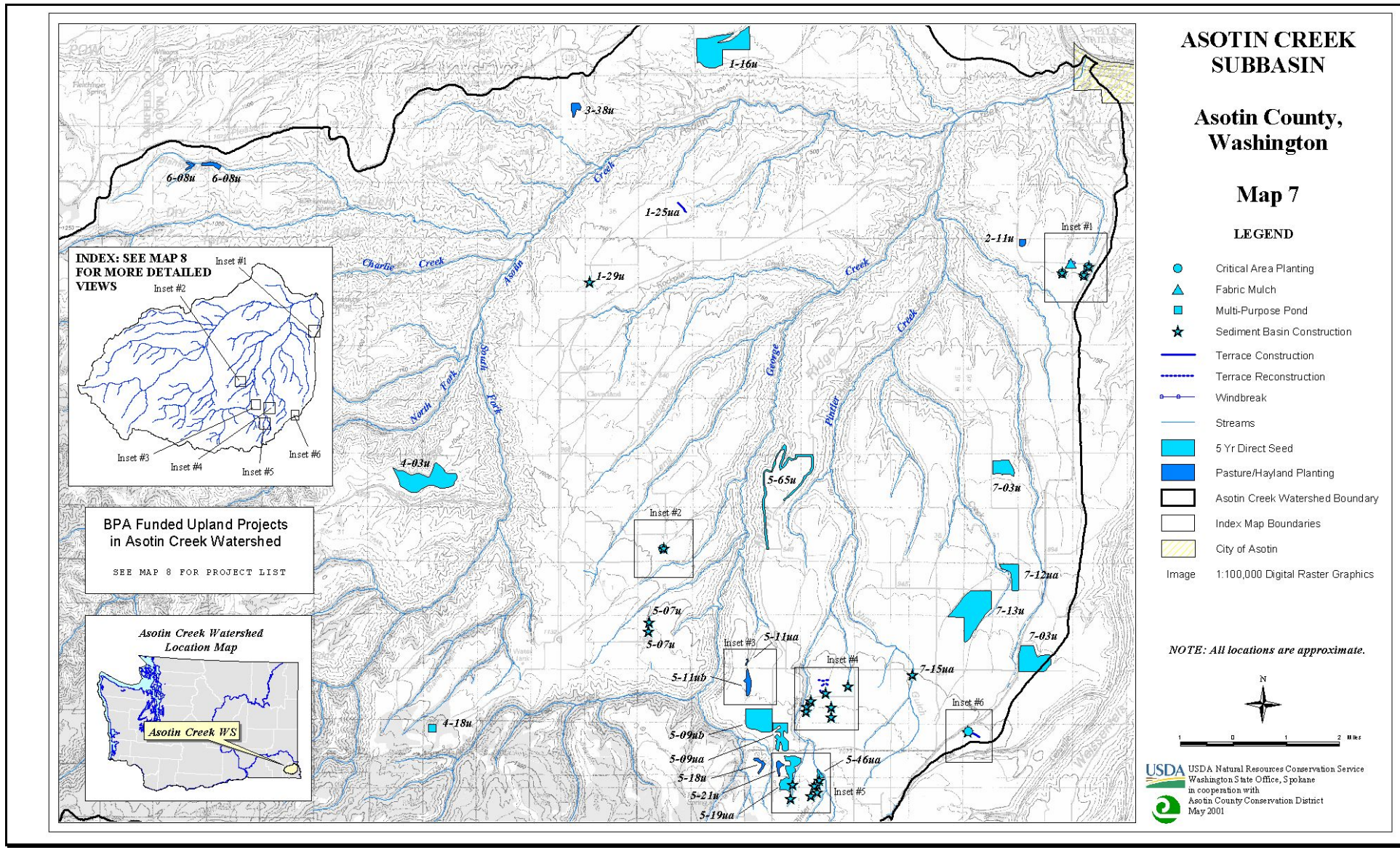

Figure 30. BPA-funded upland projects (1996-2000): lower Asotin Creek watershed.

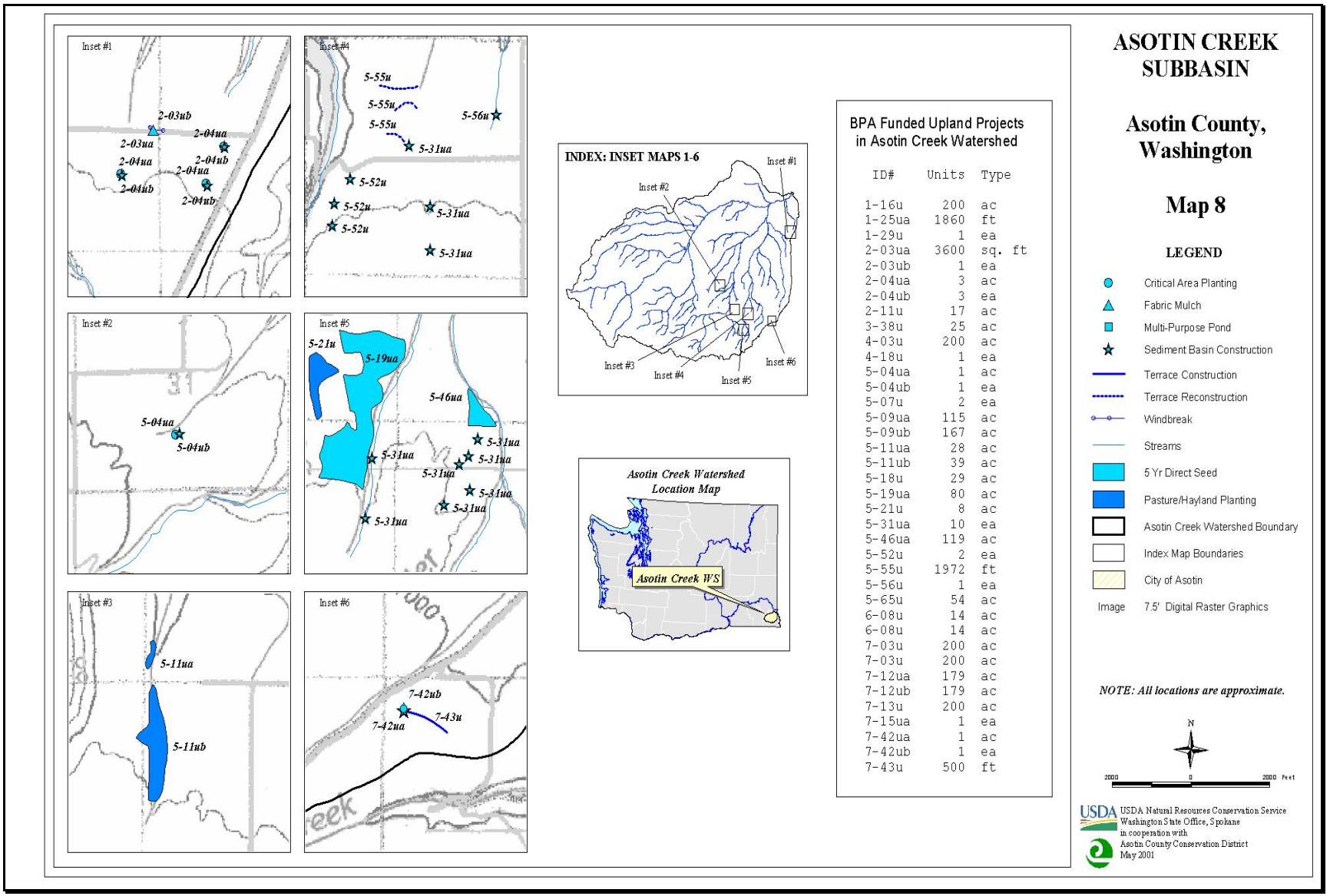

Figure 31. BPA-funded riparian projects (1996-2000): upper Asotin Creek watershed.

Monitoring

The WDFW has conducted pre- and post-habitat implementation monitoring at most instream habitat project sites since 1998. The WDFW is also monitoring redd locations to determine if spawning fish are keying in on habitat structures. The results will be utilized for future funding requests for habitat structures in Asotin Creek and surrounding streams in which ESA species have been listed and documented. The WDFW documented juvenile steelhead and spring chinook utilizing instream habitat structures that have been installed since 1997. Results also indicate a strong preference by juveniles for the instream structures as over-wintering habitat because of the slower velocities and complex hiding areas. The BPA has contributed a total of $24,324 toward monitoring projects. Figure 32 summarizes the total amount of BPA funding spent on instream, riparian, upland and monitoring projects from 1996 to 2000.

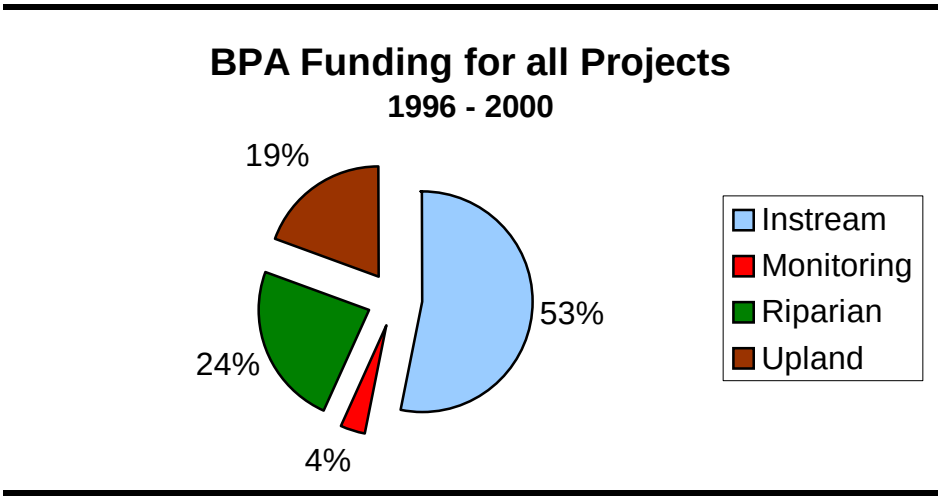

Figure 32. BPA funding for all projects, 1996-2000.

Information and Education

The I&E program was established to inform and educate landowners, agency personnel, students, and the public about the progress made inside the Asotin Creek watershed. Some of the successful programs the ACCD has offered to local youths include the Envirothon Competition, which is a hands-on competition for students in grades 9-12. Students are tested on their knowledge of forestry, wildlife, water, soils, and current environmental issues. The Salmon in the Classroom program provides four classrooms with aquariums to view the salmonid lifecycle. Each class receives trout eggs in the eyed stage and students watch the development of the eggs and monitor tank conditions and keep growth records. Speakers teach students about lifecycles of the trout and their habitat needs throughout all life stages. Students have also installed brush revetment projects on eroding streambanks, planted trees and shrubs, and collected willow cuttings.

The ACCD provides numerous programs for local landowners, agencies, and co-managers. Annual meetings, workshops, tours, production of a quarterly newsletter (receiving national recognition), and project reports provide groups with the information they need to make good resource decisions.

Administration

Another factor that can be attributed to the success of the Asotin Creek watershed programs is low overhead costs. Through its partnership with other agencies, the ACCD is able to circulate funds directly to the programs that benefit resources. Without BPA funding, the ACCD would not have been able to secure alternative funding to help offset prioritized habitat project costs. The ACCD was awarded $912,702 by BPA from 1996 to 2000 for all of its programs, including I&E and administration (Figure 33).

A combination of BPA, Washington State Conservation Commission (WCC), and state funding has been used to implement projects to address the limiting factors identified in the Plan. Figure 34 illustrates the total level of funding within the watershed for project implementation.

Table 8 summarizes the Asotin Creek Model Watershed projects funded by BPA from 1996 to 2000. Asotin Creek watershed habitat project final reports can be found at http://www.efw.bpa.gov.

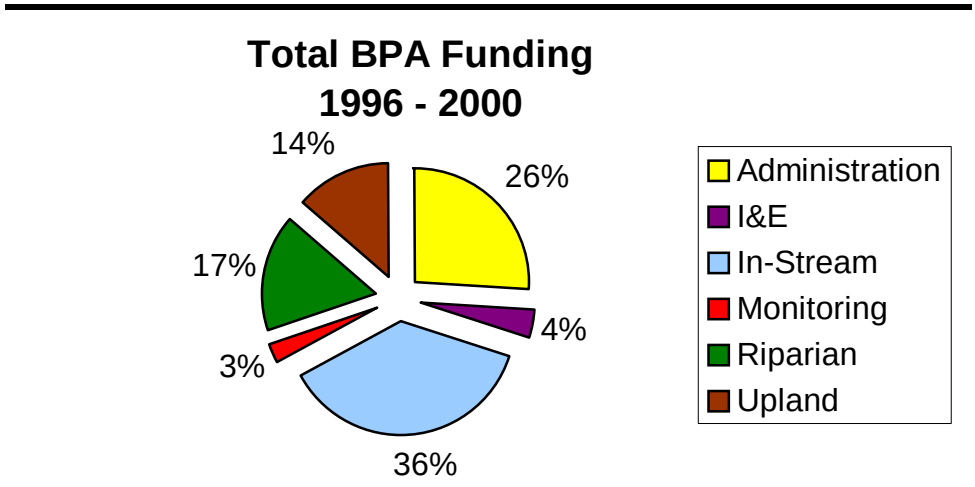

Figure 33. Total BPA funding for the Asotin Creek watershed, 1996-2000.

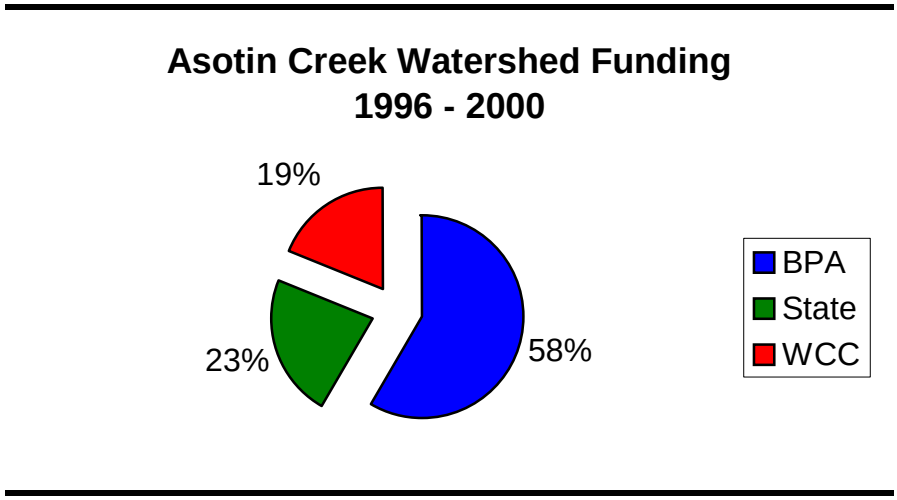

Figure 34. Asotin Creek watershed funding, 1996 - 2000.

Table 8. Asotin Creek Model Watershed projects funded by BPA, 1996-2000.

Project No.	Purpose	Project Type
199401804	Asotin Creek Watering Troughs	Riparian
199605800	Asotin Creek Early Action Project	Instream
199708000	Asotin Creek Upland Sediment Reduction	Upland
199708600	Asotin Watershed Upland BMPs	Upland
199708700	Lick Creek Water Gap II	Riparian
199709900	Asotin Creek Riparian Fencing / Rock Blasting	Riparian
199804400	Asotin Creek Woody Materials	Instream
199804500	Asotin Creek Fish Structure Monitoring	I & E
199804600	Asotin Watershed Channel and Riparian Restoration	Instream
199804700	Asotin Creek Information and Education	I & E
199900200	Asotin Watershed Project Implementation	Admin
199905200	Asotin Creek Five-Year Minimum Till Program	Upland
199905400	Asotin Creek Instream Project Monitoring	I & E
199905500	Asotin Creek Channel Restoration	Instream
200000800	Asotin Watershed Yellow starthistle Control	Upland
200003200	Asotin Creek Native Tree Nursery	Riparian
200004700	GIS Mapping Asotin Creek Watershed Habitat	I & E
200005300	Asotin Creek Riparian Planting	Riparian
200005400	Asotin Creek Riparian Fencing	Riparian
200006700	Asotin Creek Channel and Floodplain Restoration	Instream

Asotin County Conservation District

Instream

Efforts to improve instream pool habitat, reduce streambank sedimentation, and create complex fish habitat began in 1997 and have continued to 2001. The projects reduce stream width and increase stream depth. Rootwads with attached large woody debris have been utilized to recreate natural conditions. Rock structures in the form of vortex rock weirs, j-hooked rock vanes and rock vanes have been utilized to form pools and sort spawning gravels. During the last three years, the ACCD installed 100 pools at an average cost of $833 per structure. From 1996 to 2000, the total amount of state and federal funding used for instream projects was $111,870 (Figure 35). The distribution of non-BPA funded instream projects implemented in the Asotin Creek watershed is illustrated in Figure 36.

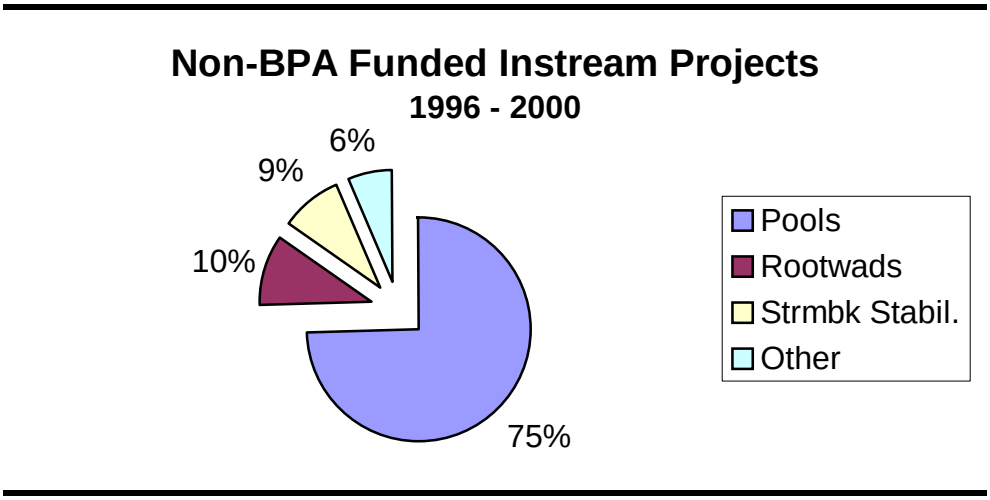

Figure 35. Non-BPA funded instream projects, 1996-2000.

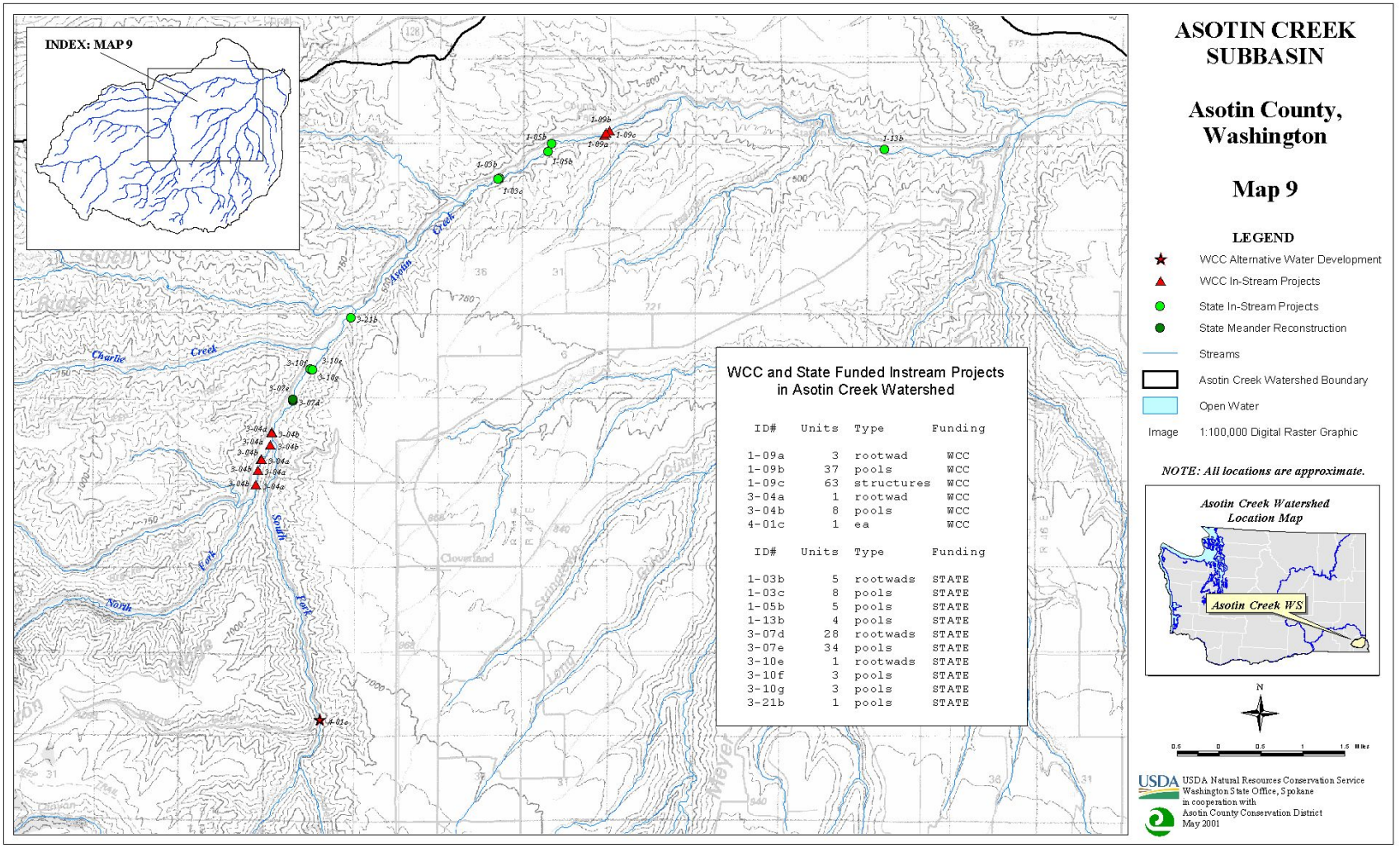

Figure 36. Non-BPA funded instream projects (1996-2000): Asotin Creek watershed.

Riparian

Riparian projects to reduce sedimentation and temperature and improve bank stability include fencing of the stream to reduce direct animal pressure on streambanks and allow for natural reproduction of riparian areas; alternative water developments with fencing projects to allow animals sources of water without utilizing the stream; and tree planting in areas where instream structures have been installed and where floods or human impacts have devastated the vegetation. From 1996 to 2000, the ACCD utilized $167,800 in state funding for riparian projects (Figure 37). The distribution of non-BPA funded riparian projects implemented in the Asotin Creek watershed is illustrated in Figure 37.

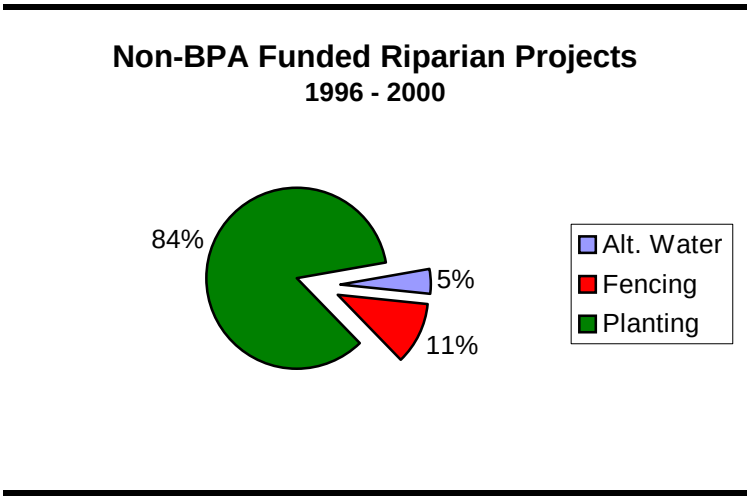

Figure 37. Non-BPA funded riparian projects, 1996-2000.

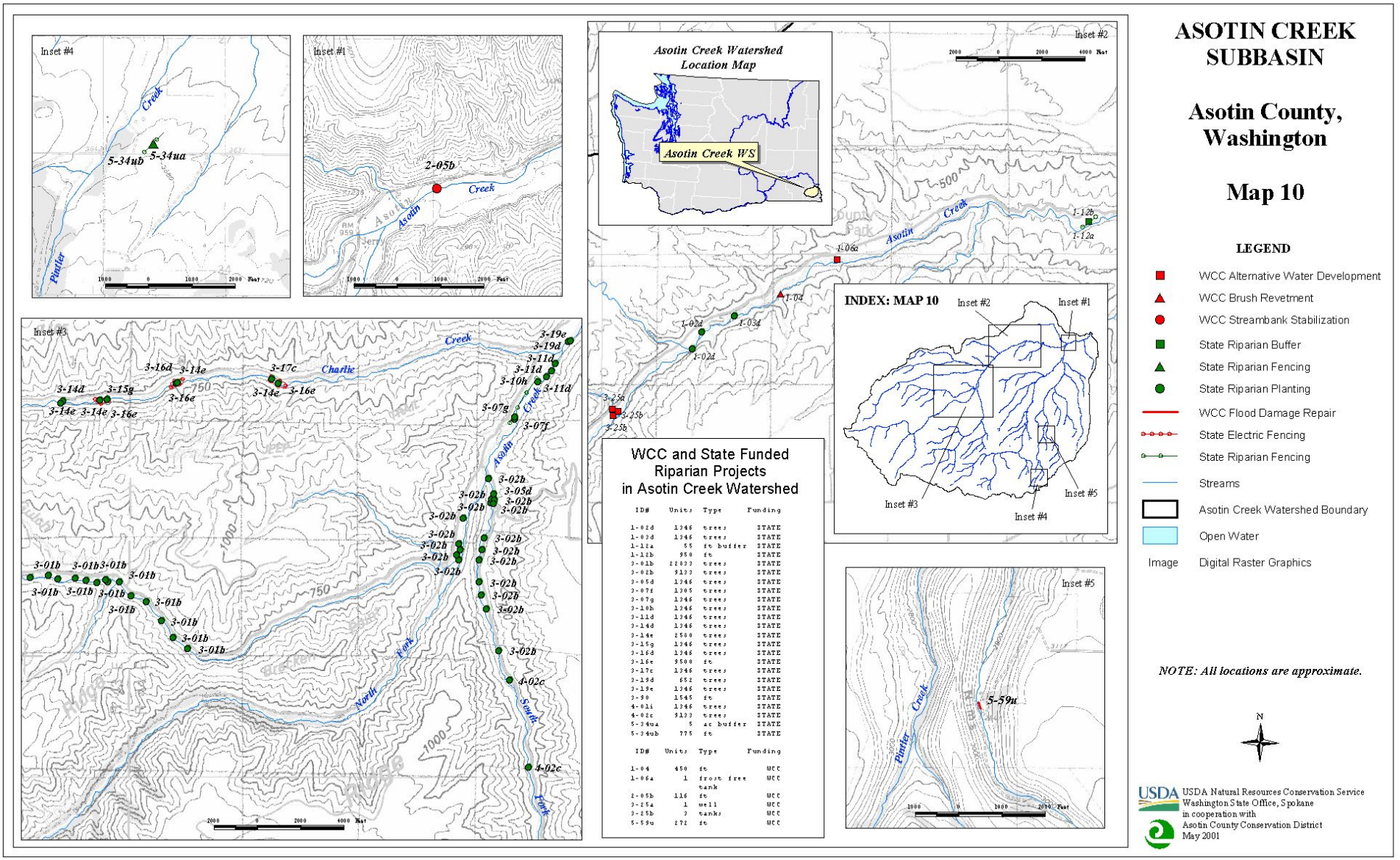

Figure 38. Non-BPA funded riparian projects (1996-2000): Asotin Creek watershed.

Uplands

Most of the sediment delivered to Asotin Creek and its tributaries comes from upland agricultural areas. Best Management Practices can be implemented to reduce the amount of soil leaving these areas. The BMPs targeted to improve water quality and fish habitat include upland sediment basins designed to catch sediment, terraces to direct runoff to sediment basins or grassed water ways and filter strips, strip cropping, and direct seeding of crops reducing summer-fallow acres and reducing erosion by 95 percent on those acres. A total of $301,605 of state funds was targeted to upland practices from 1996 to 2000 (Figure 39). Figure 40 summarizes non-BPA funding for instream, riparian, upland and monitoring projects from 1996 to 2000. The distribution of non-BPA funded upland projects implemented in the Asotin Creek watershed is illustrated in Figure 41.

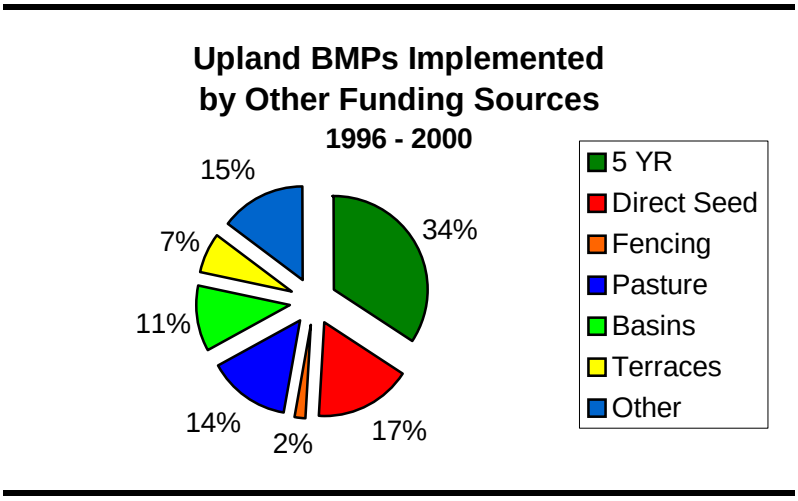

Figure 39. Upland BMPs implemented by other funding sources, 1996-2000.

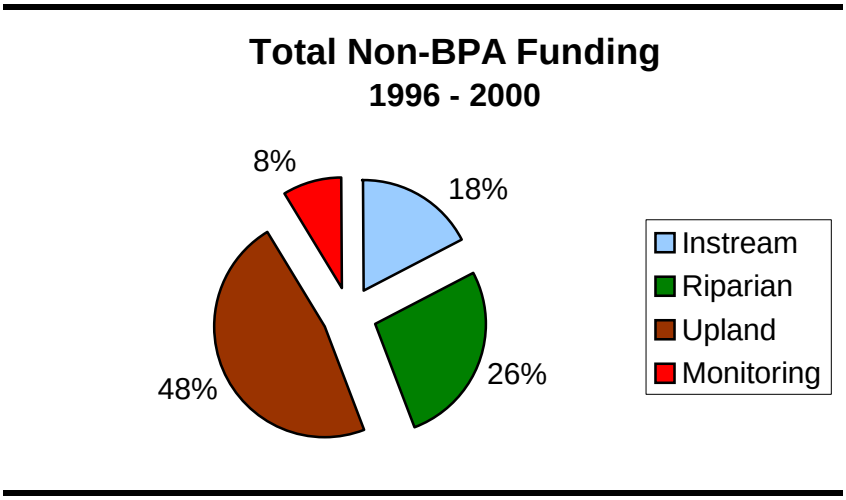

Figure 40. Total non-BPA funding, 1996-2000.

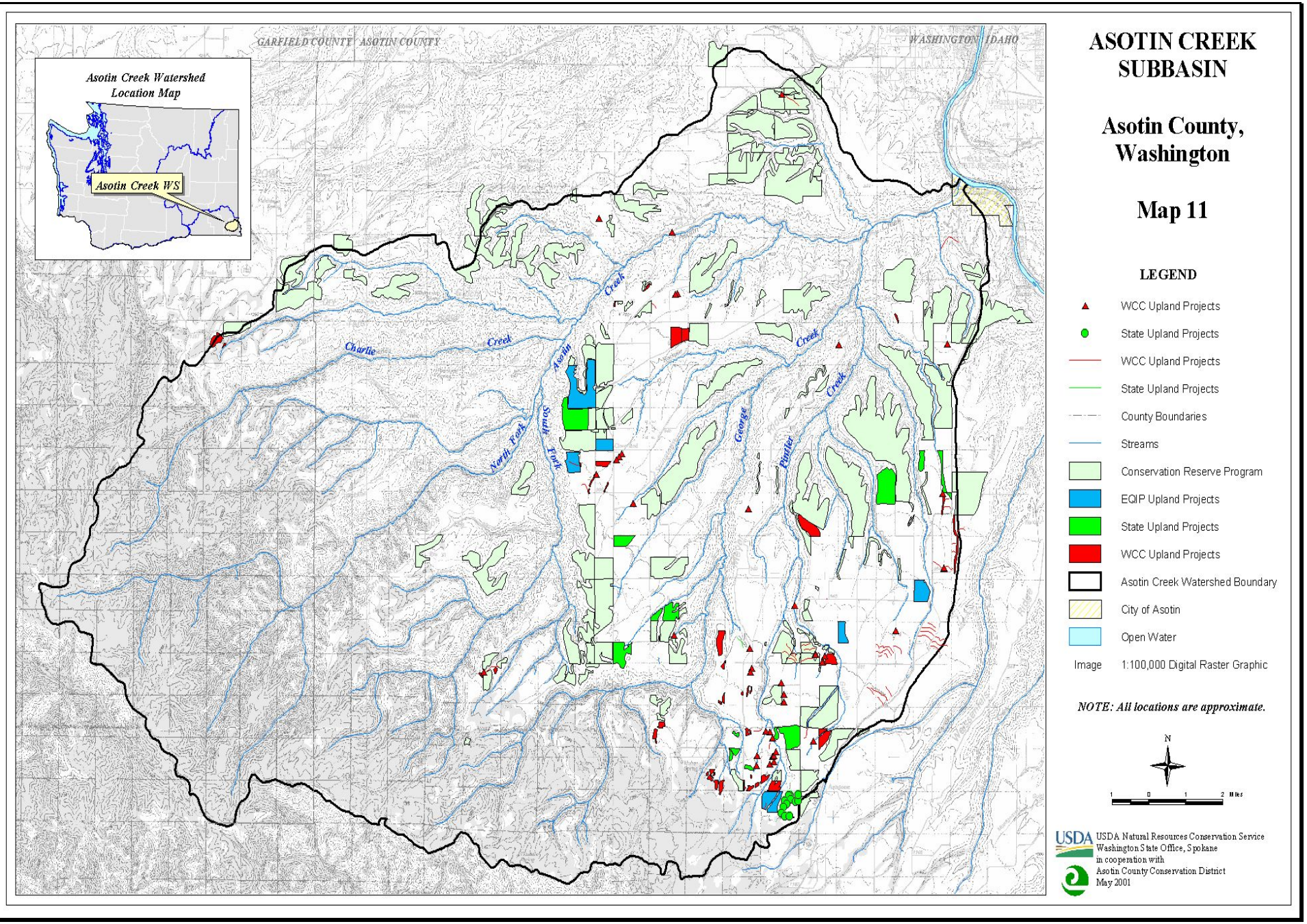

Figure 41. Non-BPA funded upland projects (1996-2000): Asotin Creek watershed.

Other Watersheds

Historically, Tenmile and Couse Creek were important tributaries to the Snake River for steelhead and were utilized by the NPT for herbs, wildlife, and fisheries. Tribal members would cross the Snake River and use these tributaries as corridors to hunting and fishing grounds located on the Grande Ronde River.

The ACCD and WDFW identified spawning and rearing steelhead in Tenmile and Couse Creeks, resulting in habitat projects becoming a priority (Mendel *et al*. 2001). These steelhead runs are of wild origin and hatchery fish have never been released into the two streams.

The ACCD is working with landowners in the headwaters of these streams to reduce sedimentation through BMPs. Tenmile and Couse Creeks lie outside the Asotin Creek watershed boundary and have not benefited from BPA funding. The ACCD has worked with the WCC, Salmon Recovery Funding Board, and federal USDA programs to implement projects for water quality and habitat improvements. Approximately 14 percent ($176,000) of the funding received by ACCD has been spent outside the Asotin Creek watershed compared to $1,098,960 available for projects inside the Asotin Creek watershed (Figure 42). Funding for riparian, instream, and upland projects are needed in both of these drainages. The ACCD believes that utilizing BPA funds for habitat restoration in these watersheds is a priority.

The USDA-sponsored programs play an important role in Asotin County. A total of 26,793 acres of marginal crop and pasturelands have been enrolled in CRP. The Environment Quality Incentives Program (EQIP), targeted to the uplands, has also proven to be a popular program. The majority of funds have been used to implement direct seeding on an additional 1,522 acres over five years. Other projects implemented through EQIP include grassed waterways, sediment basins, and pasture/hayland planting. The USFS has partnered with ACCD to install 36 pools in Asotin Creek. The amount of USDA funding spent in Asotin County totals $1,486,627 (Table 9). The distribution of non-BPA funded projects implemented outside the Asotin Creek watershed is illustrated in Figure 43.

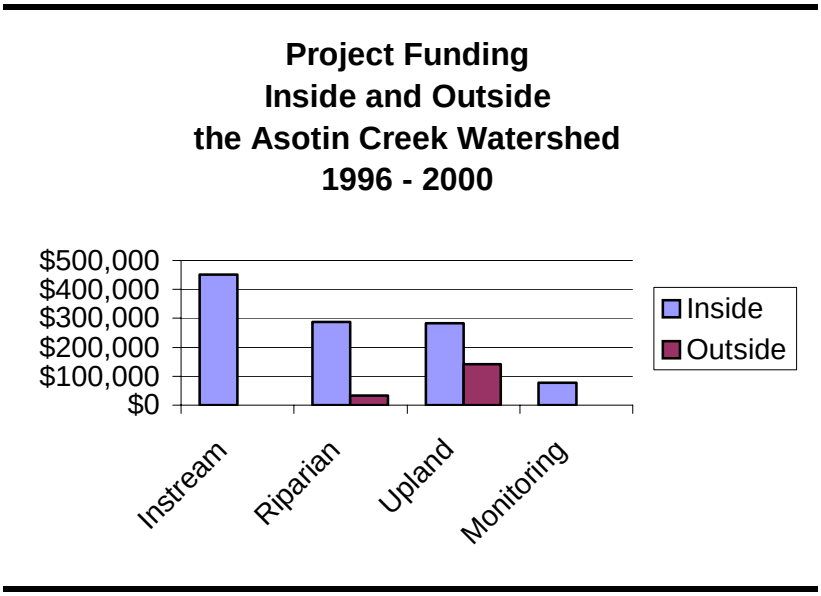

Figure 42. Comparison of project funding inside and outside the Asotin Creek watershed, 1996-2000.

Table 9. Asotin Creek watershed projects funded outside the Council's Program.

Funding Program	Acres/Purpose	Funding (Landowner Contribution)	Year (Contracts)
SRFB	2 riparian fencing projects, 9 direct seeding contracts for 5 years on 1,579 acres of cropland to reduce erosion by 90%	$236,705	1999
LSRCP (WDFW)	Monitor spring chinook & steelhead populations		1980 - 2001
USFS (PRD)	Road obliteration, cut slope plantings, fencing, prescribed fire, habitat restoration	$59,750.00	1998
U.S. Department of Agriculture			
CRP	16,967.7	$875,040	(68)
EQIP	787.7	$19,497.03	(3)
BMPs	no-till, pasture/hayland planting, nutrient & pest management, sediment basins, grass waterways		
EQIP	803.9	$20,097.50	(2)
BMPs	no-till, nutrient & pest management, sediment basins grass waterways		
WHIP	Asotin Creek watershed		(1)
WHIP	off-channel rearing areas, fencing	$6,910	
Washington State Conservation Commission			
Water Quality	Lick Creek water gap	$1,501.64	1996
	Hood alternative water development	$13,816.01	1997
Instream Projects	Schlee alternative water development repairs	$894.62	1996
	Headgate Park instream habitat and monitoring project	$21,351.76	1996
	North Fork Asotin Creek instream habitat project	$16,631.25	1996
Upland Cost-Share	BMPs to reduce erosion	$78,734 ($26,242)	1996 – 1999
Upland Implementation	BMPs to reduce erosion	$15,552 ($30,078)	1997 – 1999
Water Quality Monitoring	Water quality monitoring in Asotin Creek	$37,000.00	1997 – 1999
Upland BMPs	Cost-share BMPs with private landowners	$66,000.00	2000 – 2001
HB 2496 Habitat Restoration Block Grant			
Habitat Restoration	28,165 ft. fencing, 2 instream projects, 42 pools and tree plantings	$123,150.56	1998
Upland Cost-share	Upland BMPs to reduce erosion	$1,849 ($1,849)	1998

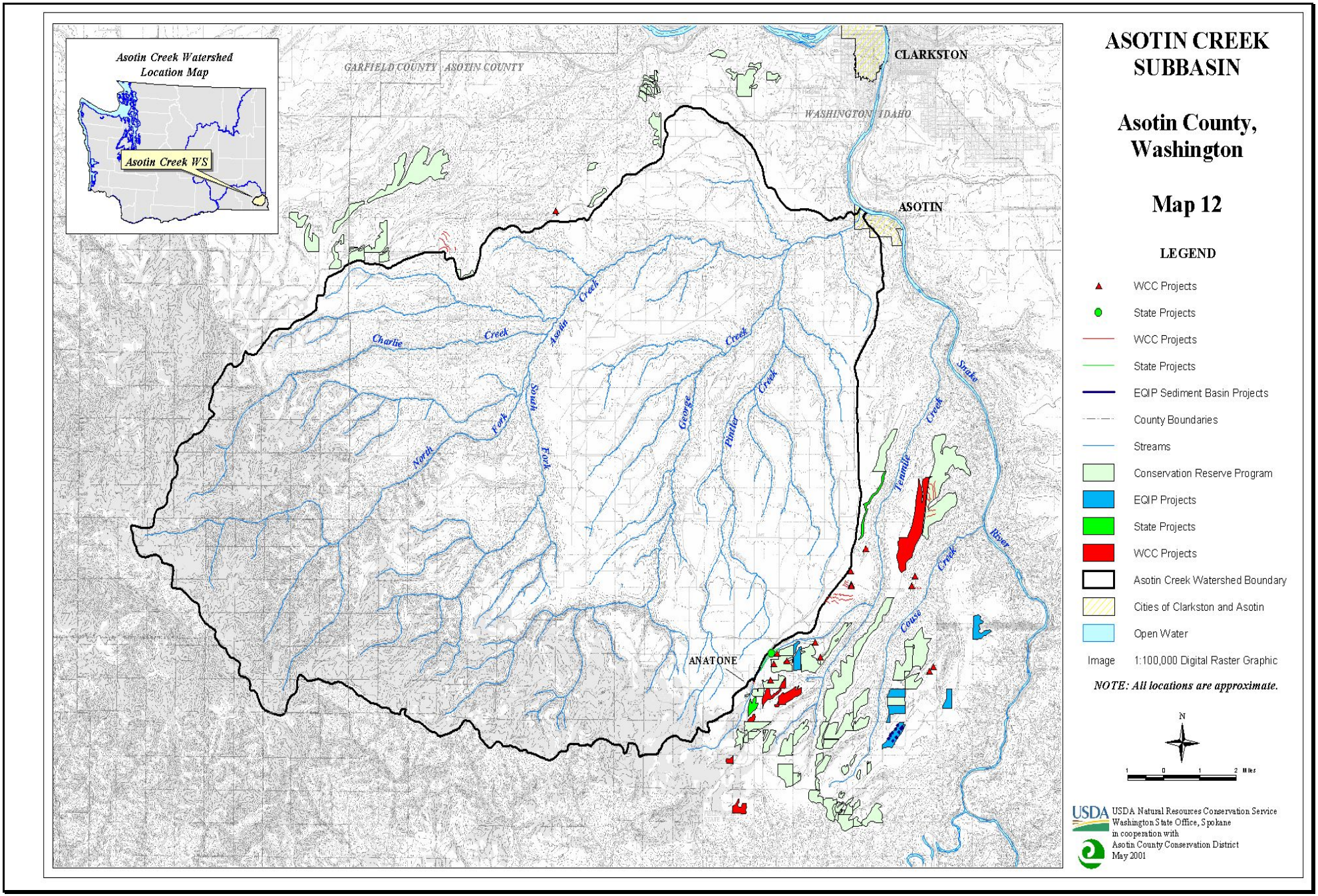

Figure 43. Non-BPA funded upland projects (1996-2000): Tenmile and Couse Creeks.

Existing and Past Efforts

Summary of Past Efforts and Accomplishments By Year

Asotin County Conservation District - Asotin Creek Model Watershed Program

1991:
- Implemented Asotin Creek Water Quality Monitoring Project.

1993:
- Initiated collaboration with citizens and agency representatives on sensitive fish and wildlife resource issues.

1994:
- Agricultural collaboration with citizens and agency representatives on sensitive fish and wildlife resource issues.
- Completed watershed analysis for Asotin Creek watershed.

1995:
- Asotin Creek Model Watershed Plan completed.
- ISCO water sampling units and HOBO temperature meters deployed in watershed.
- BPA early action projects completed on Asotin Creek.
- WCC grant funding for upland and riparian restoration projects in watershed.
- Frost-free watering troughs installed at three locations in watershed.

1996:
- Continue water quality and temperature and monitoring throughout watershed.
- Continue tree-planting efforts with local schools and volunteer groups.
- Initiated BPA early action instream habitat restoration projects.
- Implemented Headgate Park pre- and post- monitoring of habitat restoration projects funded by WCC.

1997:
The installation and completion of fish and wildlife restoration projects on Asotin Creek include: 11 in-stream habitat restoration projects; 3 riparian exclusion fences; 6 riparian fences; 14 sediment basins; 54 sediment basin cleanouts; 1 multi-purpose pond construction; 1,800 ft. of terraces; and 1 three-month water quality study. Instream project objectives were to increase the number of large pools with complex fish habitat containing large woody debris, re-establish the streambank stability, and reduce in-stream temperatures. Most of the projects were cost-shared on private land with the landowner paying 50 to 100 percent of the projects costs and signing a ten- year maintenance agreement. The ACCD has used many of these projects for tours and workshops for local students.

1998:
Approximately 246 projects have been implemented through the *Asotin Creek Model Watershed Plan* as of 1998. Fifty-nine of these projects were funded through the Council's Program, and used a variety of methods to enhance and protect watershed conditions. Instream work for fish habitat included construction of hard structures (e.g. vortex rock weirs), meander reconstruction, placement of large woody debris and whole trees to create off-channel rearing habitat. A total of 139 pools were created with these structures. Three miles of stream benefited from riparian improvements such as fencing, vegetative plantings, and noxious weed control. Two alternative water developments were completed, providing off-stream watering sources for livestock. A total of 20,500 ft. of upland terraces, 7 sediment basins, 187 acres of grass seeding, 850 acres of direct seeding and 18 sediment basin cleanouts were implemented to reduce sediment production and delivery to streams in the watershed.

1999:
Approximately 276 projects have been implemented through the *Asotin Creek Model Watershed Plan* as of 1999. Twenty of these projects were funded in part through the Council's Program. A total of 38 pools were created using habitat structures. Three miles of stream benefited from riparian improvements such as vegetative plantings (17,000 trees and shrubs) and noxious weed control. Two sediment basins, 67 acres of grass seeding, and 745 acres of minimum till were implemented to reduce sediment production and delivery to streams in the watershed.

2000:
The Asotin Creek Riparian Tree Planting Project (BPA Project No. 99-1320 D) coordinated BPA and the Governor's Salmon Recovery Funding to plant approximately 53,100 trees and shrubs in the Asotin Creek watershed. These trees will provide shade and long-term large woody debris recruitment to the stream.

Wildlife

Summary of Past Efforts

A number of projects have been implemented to improve wildlife habitat. Most of these projects have been with the USFS, Rocky Mountain Elk Foundation, and the WDFW Upland Restoration Program.

- Weed control projects: USFS, WDFW – Asotin Wildlife Area.
- Controlled burns: USFS – WDFW – RMEF – BMEI – Asotin Wildlife Area and National Forest lands.
- Road and area closure programs: Winter Range Closures-Elk Calving Area Closures – USFS and WDFW –Asotin Wildlife Area-Lick Creek drainage.
- Forage enhancement projects: RMEF projects - Asotin Creek Wildlife Area.
- Land Acquisitions: Weatherly property adjoins Asotin Wildlife Area in the upper Charley Creek drainage.
- Upland restoration projects: WDFW – Asotin Wildlife Area, and private lands.

Accomplishments By Year

None reported.

Present Subbasin Management

Existing Plans, Policies, and Guidelines

Multiple agencies and entities are involved in management and protection of fish and wildlife populations and their habitats in the Asotin Creek subbasin. Federal involvement in this arena stems from ESA responsibilities. Numerous federal, state, and local land managers are responsible for multi-purpose land and water management, including the protection and restoration of fish and wildlife habitat. Several planning documents, policies, and management guidelines for fish and wildlife habitat protection in the subbasin are briefly described below.

Federal Government

U.S. Forest Service

The USFS, through the PRD, has increased efforts to improve fish and wildlife habitat in the Umatilla National Forest. The USFS manages the forest according to the *Umatilla National Forest Plan*, which is prepared and reviewed with the public every 10 years. However, due to the presence of the ESA threatened Snake River chinook salmon and steelhead, the PRD manages the forest according to *Assessment of Ongoing Management Activities* (USFS 1993 and 1996) as approved by the NMFS. The USFS uses other plans to guide management decisions on National Forest lands, including:

PACFISH: A USFS team of fish biologists developed these guidelines to protect and enhance anadromous fish habitat on USFS lands. The guidelines will be used in the interim until the *Umatilla National Forest Plan* is approved by NMFS. A 1993 Presidential team of scientists, the Forest Ecosystem Management Assessment Team (FEMAT), developed various alternatives for management of USFS and BLM lands for protection of spotted owls, marbled murrelets, and anadromous fish. None of the FEMAT alternatives has been adopted, but PACFISH recommendations are followed. The basic components of the PACFISH aquatic conservation strategy are:

- Riparian habitat conservation areas: Lands along streams and unstable areas where special standards and guidelines govern land use.
- Key watersheds: A system of large refugia comprising watersheds that are crucial for protecting at-risk fish stocks and providing high-quality water.
- Watershed analysis: Procedures for evaluating geomorphic and ecological processes to guide watershed restoration and monitoring programs and delineate riparian reserves.
- Watershed restoration: Comprehensive and long-term land management activities to restore watershed health, riparian ecosystems, and other management activities.
- Monitoring: Continuing, interdisciplinary assessment of how fish habitats and populations respond to watershed restoration and other management activities.

The *Land and Resource Management Plan* (1994): Divides the Asotin Creek subbasin into 15 land management strategies (Table 10).

Table 10. USFS management strategies in the Asotin Creek subbasin, Washington.

Management Strategies*		Acres
A4	Viewshed 2	1,129
A6	Developed Recreation	34
A9	Special Interest Area	37
C1	Dedicated Old Growth	2,239
C3	Big Game Winter Range	6,189
C3a	Sensitive Big Game Winter Range	8,324
C4	Wildlife Habitat	27,618
C5	Riparian (Fish and Wildlife)	1,785
C8	Grass-Tree Mosaic	9,241
E2	Timber and Big Game	6,543
P	Private and Other Ownership	2,342
Total		65,481

*Management strategy definitions are included in Appendix C.

Upper Charley Subwatershed Ecosystem Restoration Projects Environmental Impact Statement (EIS): Results provide the basis for restoration planning processes. The EIS contains specific desired future conditions and strategies to achieve subwatershed goals and describes five alternatives to land and resource management in the Upper Charley analysis area (7,700 acres). Partnership opportunities have been explored with several agencies, including the ACCD, WDFW, and private landowners to:

- enhance vegetation diversity;
- reduce potential catastrophic fire by reducing down fuel loadings;
- collaborate on fish habitat projects both on and off federal lands;
- reduce effects of past management activities;
- develop plans to return natural flow patterns in tributary streams;
- propose wildlife projects to enhance habitat or supplement needed resources; and
- determine the long-term needs necessary to sustain threatened, endangered, and sensitive fish and wildlife species, and maintain clean cold water and healthy vegetation.

The Umatilla National Forest Plan: Describes specific goals, desired future condition, and objectives for the National Forest and guides forest management. Each desired future condition describes objectives, the anticipated level of goods and services once the Plan is fully implemented. The Plan also identifies standards and guidelines resource areas. This document may be acquired on CD-ROM from the Umatilla National Forest.

U.S. Fish and Wildlife Service

The USFWS budgets for and administers the operation, maintenance, and evaluation of the LSRCP spring and fall chinook, steelhead, and rainbow trout programs in the Lower Snake River basin. The Water Resources Development Act of 1976, Public Law 94-587, authorized the LSRCP to offset losses caused by the four Lower Snake River dam and navigation lock projects (ACOE 1975). The USFWS also has permitting and oversight responsibilities to protect and

enhance bull trout and other listed or sensitive fish or wildlife species within the subbasin under the ESA.

Bonneville Power Administration

The BPA is a federal agency established to market power produced by the federal dams in the Columbia River basin. The BPA provides funding for fish and wildlife protection and enhancement to mitigate for the loss of habitat resulting from hydroelectric construction and operations.

Farm Services Agency

The Farm Services Agency (FSA) administers USDA farm commodity programs such as CRP and EQIP; operating and emergency loans; conservation and environmental programs; emergency and disaster assistance; domestic and international food assistance; and international export credit programs. Delivery of conservation programs is completed through the Clarkston, Washington field office co-located with the NRCS and the ACCD.

Natural Resource Conservation Service

One of the purposes of the NRCS is to provide consistent technical assistance to private land users, tribes, communities, government agencies, and conservation districts. The NRCS assists in developing conservation plans, provides technical field-based assistance including project designs, and encourages the implementation of conservation practices to improve water quality and fisheries habitat. Programs include the CRP, River Basin Studies, Forestry Incentive Program, Wildlife Habitat Improvement Program, EQIP, and Wetlands Reserve Program.

National Marine Fisheries Service

The NMFS is part of the National Oceanic and Atmospheric Administration. The NMFS has ESA administration and enforcement authority for anadromous fish. The NMFS reviews ESA petitions, provides regulations and guidelines for activities that affect listed species, and develops and implements recovery plans for listed species in the Asotin Creek subbasin. The NMFS is also involved in anadromous and marine species research to provide knowledge required for fisheries management.

The NMFS recently developed the FCRPS Biological Opinion and the Basinwide Salmon Recovery Strategy, which contain actions and strategies for habitat restoration and protection throughout the Columbia River basin. Federal land management will be implemented by current programs that protect aquatic habitats (PACFISH, ICBEMP).

Tribal Government

Nez Perce Tribe

The NPT is responsible for managing, protecting, and enhancing treaty fish and wildlife resources and habitats for present and future generations. Tribal government headquarters are located in Lapwai, Idaho with offices in Kamiah and Orofino, Idaho. Nez Perce Tribal members have federal reserved treaty fishing and hunting rights pursuant to the 1855 Treaty with the United States government. The NPT individually and/or jointly implements restoration and mitigation activities throughout areas of interest and influence in north central Idaho. These lands

include but are not limited to the entire Asotin Creek subbasin in which the NPT held aboriginal title.

The vision of the NPT Department of Fisheries Resources Management is to manage fisheries resources to provide for healthy, self-sustaining populations of historically present species and to management and promote healthy ecosystem processes and rich species biodiversity. Inherent in this vision is a desire to provide for harvestable fish populations.

The fisheries headquarters are located in Lapwai, Idaho with a field office in Orofino and McAll, Idaho, and Enterprise, Oregon. Nez Perce Tribal fish and wildlife activities relate to all aspects of management, including recovery, restoration, mitigation, enforcement, and resident fish programs. Nez Perce Tribal policies and plans applicable to subbasin management include *Wy-Kan-Ush-Mi Wa-Kish-Wit: Spirit of the Salmon* (CRITFC 1996a, 1996b) and the Nez Perce Fish and Wildlife Code.

State Government

Washington Department of Fish and Wildlife

The WDFW is responsible for preserving, protecting, and perpetuating populations of fish and wildlife in the state of Washington. Washington laws, policies, and guidelines include:

Hydraulic Code (RCW 75.20.100-160): This law requires that any person, organization, or government agency that conducts any construction activity in or near state waters must comply with the terms of a Hydraulic Project Approval permit issued by WDFW. State waters include all marine waters and fresh waters. The law's purpose is to ensure that construction is done in a manner that prevents damage to the state's fish, shellfish, and their associated habitats.

Strategy to Recover Salmon (part of *Extinction is not an Option*): The strategy is intended to be a guide, and it articulates the mission, goals, and objectives for salmon recovery. The goal is to restore salmon, steelhead, and trout populations to healthy harvestable levels and improve those habitats on which the fish rely. The early action plan identifies specific activities related to salmon recovery that state agencies will undertake in the 1999-2001 biennium and forms the first chapter in a long-term implementation plan currently under development. The early actions are driven by the goals and objectives of the strategy. Many of the expected outcomes from the early actions will directly benefit regional and local recovery efforts.

The *Bull Trout and Dolly Varden Management Plan*: Describes the goal, objectives, and strategies to restore and maintain the health and diversity of self-sustaining bull trout and Dolly Varden stock and their habitats.

The *Wild Salmonid Policy for Washington:* Describes the direction the WDFW will take to protect and enhance native salmonids. The document includes proposed changes in hatchery management, general fish management, habitat management, and regulation/enforcement.

The *Draft Steelhead Management Plan*: Describes the goals, objectives, policies, and guidelines to be used to manage the steelhead resource.

Washington Priority Habitats and Species (PHS): A guide to management of fish and wildlife "critical areas" habitat on all state and private lands as they relate to the Growth Management

Act of 1990. The recommendations address upland as well as riparian habitat and place emphasis on managing for the most critical species and its habitat.

Wildlife species management or recovery plans (e.g., *Blue Mt. Elk Herd Management Plan 2000*, *Statewide Elk Management Plan*, *Bighorn Sheep Herd and Statewide Management Plan*, *Black Bear, State Ferruginous Hawk Recovery Plan*, *Bald Eagle Recovery Plan*).

The *Draft Snake River Wild Steelhead Recovery Plan:* This plan is an assessment of problems associated with the continuing decline in natural steelhead populations within the Snake River basin and includes recommendations to reverse the decline. The WDFW manages fisheries and fish populations to provide diverse recreational opportunity and conserve or enhance indigenous populations.

The *Lower Snake River Compensation Plan*: This program is funded by BPA and the USFWS through the LSRCP, and the WDFW administers and implements the Washington portion of the program. The program mitigates for the loss of fish populations and recreational opportunities resulting from construction of the four lower Snake River dams. Specific mitigation goals include "in-place" and "in-kind" replacement of adult salmon and steelhead. The WDFW developed implementation plans as part of the LSRCP.

The WDFW Snake River *Fishery Management and Evaluation Plan* (FMEP): A plan required by NMFS for all fisheries in the Snake River and its tributaries in Washington. The plan is an assessment of fisheries effects on listed anadromous salmonids. The WDFW Enforcement Program enforces state laws concerning illegal harvest, fish passage, water surface screening requirements and stream hydraulics permitting. These state laws are normally in direct support of the protection provisions of the ESA for listed species. In the Asotin Creek subbasin, officers patrol streams for closed season harvest or taking of protected species listed under both state law and the federal ESA. Officers also monitor for illegal habitat modification, alteration, and destruction on area streams and ensure projects within the ordinary high water mark is conducted under authority of and in accordance with appropriate state Hydraulic Project Approval (HPA) permits.

Washington Department of Ecology

The WDOE's mission is to protect, preserve, and enhance Washington's environment and promote the wise management of air, land, and water for the benefit of current and future generations. The agency monitors and sets regulatory standards for water quality within the subbasin. The WDOE is also responsible for water resource management, instream flow rule development, shoreline management, floodplain management, wetland management, and provides support for watershed management in the Asotin Creek subbasin.

The WDOE regulates surface and ground water quality within the Asotin Creek subbasin. The 1972 Clean Water Act authorizes and requires states to establish water quality standards for specific pollutants. Every four years, the WDOE is required to list in Section 303(d) of the Clean Water Act those water bodies that do not meet surface water quality standards (Appendix A). The WDOE utilizes data collected by agency staff as well as data from tribal, state, local governments, and industries to determine whether or not a waterbody is listed on the 303(d) list. Total Maximum Daily Loads must be completed for every parameter that exceeds state water

quality standards on listed water bodies. The WDOE proposes several changes to surface water quality standards and the current classification system (Appendix B).

Washington Department of Natural Resources

The Washington Department of Natural Resources (WDNR) manages state land throughout the Asotin Creek subbasin. These lands are located in sections 16 and 36 within each township. The main goal of the WDNR is to maximize monetary returns from state lands in order to fund schools. The WDNR also enforces and monitors logging practice regulations on private lands.

Local Government

Asotin County

Asotin County has enacted policies and ordinances to provide for the preservation of local streams and their riparian areas. These local regulations are meant to aid the preservation and restoration of fish populations.

Asotin County Shorelines Master Program (1994): The Shorelines Master Program (Program) is responsible for protecting the classified Shorelines of Statewide Significance. The Program is based on goals and objectives directed towards specific land uses that are within 200 feet of the ordinary high water mark. The Program offers a cooperative balance by local and statewide interests in the management and development of the shoreline areas by requiring local governments to plan and regulate shoreline development. The program is essentially a shoreline comprehensive plan with a distinct environmental orientation applicable to shoreline areas and customized to local circumstances.

Asotin County Zoning Ordinance (April 2001): Asotin County has three separate zones within the areas of the Asotin Creek subbasin: Ag-Transition, Rural Residential, and Agricultural. To minimize development impacts within the subbasin, Asotin County designated minimum lot sizes for each zone. The Ag-Transition zone, 5 percent of the watershed, has a minimum lot size of one acre. The Rural Residential zone, approximately 25 percent of the watershed, consists of a five 5-acre minimum lot size. The Agricultural zone, 70 percent of the watershed, is comprised of 40-acre minimums.

Flood Damage Prevention Ordinance (1988): The intent of this ordinance is to restrict or prohibit uses which may be dangerous to health, safety, and property due to water or erosion hazards. The ordinance also is intended to control the alteration of the natural floodplain and stream channel, which would help keep the stream channel within the riparian areas. Asotin County monitors filling, grading, and dredging within the floodplain.

Critical Areas Ordinance (1988): This ordinance is an overlay of the above programs and ordinances in recognizing the sensitivity of the shorelines, floodplains, riparian areas, and wetlands, and minimizes the impacts from development.

Asotin County Weed Board

The primary functions of the Weed Board is to provide technical assistance to the citizens of Asotin County, develop effective control strategies for noxious weeds, and encourage people to

be good land stewards. Funding for the Asotin County Weed Control Program is made possible by local county tax revenues. Since 1986, more than $100,000 from state and county funds has been utilized for yellow starthistle control measures.

Weed Board Performance Objectives

1. Develop and maintain an accurate and comprehensive noxious weed inventory with special emphasis toward locating and destroying new invading species.
2. Develop an effective educational program to be disseminated as required to schools and all user groups as necessary.
3. Weed control staff will strive to be current with the latest techniques in noxious weed control methods.
4. Weed control staff will maintain response to public need as the top priority.
5. Every effort will be made to facilitate landowners in achieving compliance with RCW 17.10.

Asotin County Conservation District

The ACCD is Asotin County's designated lead agency for watershed planning and implementation. The ACCD is responsible for the implementation of the *Asotin Creek Model Watershed Plan* and the Washington State Salmon Recovery Act within Asotin County. The primary function of the ACCD is to assist landowners and land managers with adoption of BMPs to conserve and improve renewable natural resources. Through its volunteer Board of Supervisors and affiliated agencies, the ACCD also identifies resource conservation issues and secures and administers cost-sharing programs.

Goals, Objectives, Strategies, and Recommended Actions

Fish

Fisheries goals, objectives, strategies, and recommended actions overlap between resource management entities. The subbasin planning process will identify and clarify mutually respected goals, objectives, strategies, and actions to facilitate fish, wildlife, and associated habitat restoration.

Nez Perce Tribe

The Fisheries/Watershed program vision focuses on protecting, restoring, and enhancing watersheds and treaty resources within the ceded territory of the NPT under the Treaty of 1855. These activities are accomplished using a holistic approach, which encompasses entire watersheds, ridge top to ridge top, emphasizing all cultural aspects. Results aim toward maximizing historic ecosystem productive health for the restoration of anadromous and resident fish populations.

Goals (CRITFC 1996a):

1. Restore anadromous fish in rivers and streams at levels to support the historical, cultural, and economic practices of the tribes.
2. Emphasize strategies that rely on natural production and restore degraded stream and riparian habitat in order to create healthy river systems to achieve this goal.
3. Protect tribal sovereignty and treaty rights.

4. Reclaim anadromous and resident fish resource and the environment on which the resource depends for future generations.

Habitat Objectives (CRITFC 1996a):

1. Increase anadromous and resident fish populations through tribal, federal, and state coordinated supplementation, management, and habitat restoration.
2. Restrict or eliminate land management activities such as logging, road building, grazing, and mining that are harming the health of riparian ecosystems including water quality degradation, stream habitat degradation, loss of riparian vegetation, streambank destabilization, and altered hydrology.
3. Improve water quality, including reducing temperatures for cold water biota to less than 60°F, sedimentation, and agricultural runoff.
4. Restore riparian ecosystems.
5. Restore instream habitat to natural conditions.
6. Restore spawning and rearing habitat.

Habitat Strategies:

1. Coordinate habitat protection and restoration as co-managers with federal, state, and local agencies.
2. Develop watershed assessments to prioritize restoration work, resource management, and planning efforts.
3. Continue project implementation designed to restore hill slope hydrology.
4. Reduce sedimentation, cobble embeddedness, stream temperature to Columbia River Inter-Tribal Fish Commission (CRITFC) water quality standards for streams supporting cold water biota.
5. Continue project implementation designed to protect and restore riparian areas, restore wetlands and floodplain areas, restore the hydrologic connectivity between terrestrial and aquatic ecosystems.
6. Continue project implementation to reduce grazing impacts on stream systems and riparian areas.
7. Implement projects that investigate the impacts of invasive exotic plants and participate in coordinated control efforts.
8. Implement projects to restore areas impacted by mining activity.
9. Continue project implementation to reduce road densities.
10. Inventory and evaluate natural and artificial passage barriers.
11. Provide passage for aquatic species as a part of developing sustainable and productive aquatic ecosystems.
12. Develop a monitoring and evaluation program to determine the extent and quality of habitat available to anadromous and resident fishes.
13. Expand monitoring to evaluate the success of restoration projects.
14. Coordinate monitoring programs at the subbasin scale in order to facilitate data sharing.
15. Use data from all monitoring and evaluation efforts to improve watershed scale planning, decision-making, as well as refine management and restoration practices.
16. Inventory riparian and wetland areas.

17. Acquire lands for improved habitat protection, restoration, and connectivity and for mitigation of lost fisheries/wildlife habitat.
18. Develop projects designed to research the link between aquatic and terrestrial ecosystems including understanding the importance of salmon carcasses in nutrient cycles.

Washington Department of Fish and Wildlife

Goal 1. Protect, restore, and enhance the abundance and distribution of wild summer steelhead, spring chinook salmon, bull trout and other indigenous fish in the Asotin Creek subbasin to provide non-consumptive fish benefits including cultural or ecological values.

Goal 2. Maintain, enhance, or restore sustainable fishery and harvest opportunities for anadromous and resident fish.

Goal 3. Maintain or enhance genetic and other biological characteristics of natural and hatchery produced anadromous and resident fish.

Objective 1. Increase native spring chinook salmon to sustainable and harvestable levels or reintroduce spring chinook of appropriate stock to the subbasin. Determine the wild escapement goal to meet this objective.

Objective 2. Increase native summer steelhead to sustainable and harvestable levels. Refine the wild fish escapement goal and needs.

Objective 3. Restore and maintain the health and diversity of bull trout and other resident salmonids to sustainable and harvestable levels. Determine the spawning escapement goal and population needs of resident fish.

Strategy 1. Protect, enhance, or restore the abundance and distribution of indigenous fish.

Recommended Actions:

1.1. Evaluate or refine methods to establish recovery goals, escapement goals, and desired future conditions.
1.2. Refine methods for determining carrying capacities for salmonids in subbasin streams to establish biologically sound restoration and target goals.
1.3. Establish wild/natural fish goals for recovery, escapement, desired future condition, and harvest implementation plans.
1.4. Provide protection for federal and state threatened and sensitive fish species in resource management plans.
1.5. Enforce federal, state, tribal, and local land use regulations to protect fish habitats.
1.6. Increase enforcement of laws and fishing regulations pertaining to illegal take of fish (all life stages).

Strategy 2. Protect, enhance, or restore water quality to improve the survival, abundance, and distribution of anadromous and resident fish.

Recommended Actions:

2.1. Reduce stream temperatures by restoring or enhancing riparian vegetation and floodplain function and increasing instream flows.

2.2. Increase water quality monitoring and enforcement of existing regulations to maintain or enhance water quality. Use the Clean Water Act, Section 401, and the Washington Fish and Forests regulations to protect and restore water quality and fish habitat.

2.3. Complete the TMDL process and implement measures to remove streams from 303d listings under the Clean Water Act and improve water quality.

2.4. Support timely updates and resource inventories related to local land use plans to prevent further development and degradation of floodplains, wetlands, riparian buffers, and other sensitive areas.

2.5. Properly maintain, relocate or eliminate forest, public and private roads in riparian or other sensitive areas.

2.6. Implement the CREP, Continuous Conservation Reserve Program, Wetland Reserve Program, and other pertinent federal, state, tribal, and local programs.

2.7. Monitor and evaluate efforts to improve water quality and use the data to assist in management decisions.

2.8. Use existing programs to reduce sediment delivery to stream channels from roads, agriculture, logging, and other land use activities.

Strategy 3. Protect, enhance, and restore instream and riparian habitat to improve the survival, abundance, and distribution of anadromous and resident fish.

Recommended Actions:

3.1. Enforce federal, state, tribal, and local land use regulations to protect fish habitats.

3.2. In the short term, plant native vegetation, construct pools, and place woody debris in streams to increase channel complexity and provide pools and cover for fish.

3.3. Over the long term, modify land use to improve stream sinuosity, channel stability, width/depth ratio, pool frequency, size and quality, and large woody debris recruitment in the stream to provide benefits to fish habitat quantity and quality.

3.4. Reduce sediment deposition in area streams by reducing erosion and sediment delivery to waterways.

3.5. Improve watershed conditions to reduce high water events and reduce instream substrate scour, deposition, or movement.

3.6. Improve floodplain function to improve stream channel stability, hypothetic flows, and instream habitat diversity.

3.7. Improve or eliminate stream fords and other substrate disturbances.

3.8. Monitor and evaluate the quantity and quality of fish habitat in the basin to provide baseline information and to assess the success of management strategies.

3.9. Monitor and evaluate efforts to protect, enhance and restore instream and riparian habitats and utilize the data to assist in management decisions.

3.10 Identify, prioritize, and protect critical habitat to improve production and survival of indigenous fish.

Strategy 4. Protect, enhance, and restore instream flows to improve passage conditions and increase rearing habitat for anadromous and resident fish.

Recommended Actions:

4.1. Evaluate the location and timing of dewatered or flow limited stream reaches and prioritize them for instream flow restoration and enhancement activities.

4.2. Refine and/or determine flows needed for salmonid migration and rearing.

4.3. Increase stream flows by improving the efficiency of irrigation systems and conversion of conserved water to instream flows.

4.4. Increase stream flows by lease and/or purchase of water rights.

4.5. Increase monitoring of water use and instream flows. Use collaborative efforts or enforcement of existing regulations and water rights to increase available instream water.

4.6. Modify state water laws to allow water users to transfer water for instream use and to provide adequate protection downstream.

4.7. Evaluate efforts to protect, enhance, and restore instream flows

Strategy 5. Restore or enhance upstream or downstream passage for resident and anadromous fish.

Recommended Actions:

5.1. Identify and evaluate passage or screening needs within the subbasin and prioritize implementation of restoration.

5.2. Modify or remove culverts, bridges, grade controls, and water diversion structures as necessary to improve passage.

5.3. Implement screening of all diversions (pump and gravity) to meet state and NMFS criteria. Achieve compliance with state screening and passage laws.

5.4. Operate and maintain all fish passage facilities to ensure proper function and efficient passage of fish.

5.6. Monitor river conditions and operation of passage facilities to ensure adequate fish passage.

Strategy 6. Use artificial production, as necessary, to maintain, restore, or enhance indigenous fish populations and harvest opportunities.

Recommended Actions:

6.1. Evaluate the need for further hatchery supplementation or augmentation for bull trout, steelhead, spring chinook, and resident trout. Complete the artificial production Master Plan or a Hatchery Genetics Management Plan (HGMP) for the subbasin before increasing hatchery production. Implement artificial production plans as appropriate.

6.2. Evaluate acclimation costs and benefits for hatchery steelhead. Complete long-term planning for the use of acclimation.

6.3. Implement a comprehensive study to assess the risks and benefits of steelhead supplementation activities in the subbasin to determine

effectiveness of rebuilding natural steelhead while maintaining their genetic structure and long-term viability.

6.4. Continue hatchery production and releases of rainbow trout in area ponds and lakes to provide harvest and recreational fishing opportunities.

Strategy 7. Maintain warmwater or other fisheries as appropriate without conflicting with indigenous fish needs.

Recommended Actions:

7.1. Assess distribution, abundance, and biological characteristics of nonindigenous fish within the basin.

7.2. Evaluate non-indigenous fisheries.

7.3. Develop a fishery management plan for non-indigenous fish.

7.4. Monitor the fishery and adjust the plan and regulations.

Strategy 8. Monitor and evaluate the productivity, abundance, distribution, and genetic and other biological characteristics of indigenous anadromous and resident fish to provide baseline data and assess the success of management strategies.

Recommended Actions:

8.1. Conduct redd and carcass surveys to monitor and determine adult salmonid spawning escapements.

8.2. Evaluate the need for adult trapping or counting facilities.

8.3. Evaluate juvenile anadromous fish production, migration timing, and survival by operating a smolt trap in lower Asotin Creek.

8.4. Conduct biological surveys to monitor and evaluate juvenile anadromous and resident fish distribution, abundance, condition, habitat use, life history, etc.

8.5. Continue baseline genetic and biological monitoring and evaluation of indigenous salmonid populations in the subbasin.

Strategy 9. Improve out-of-basin survival of migratory fish.

Recommended Actions:

9.1. Support efforts to improve passage and survival of migrant fish downstream of the subbasin.

9.2. Support research within the Columbia River basin to fully understand the role of native and introduced predators on indigenous fish.

9.3. Conduct monitoring of migratory fish to determine survival rates, timing, and distribution outside the basin.

Washington Department of Ecology

The WDOE recommends the following water quantity/quality goals and objectives for the Asotin Creek subbasin:

Goal: Maintain, restore, and enhance the quality and quantity of habitat necessary to sustain and restore indigenous fish.

Objective 1. Maintain or improve instream flows.

Strategies:

1.1. Evaluate the location and timing of flow limited stream reaches and prioritize them for instream flow restoration and enhancement activities.

1.2. Complete the process for establishing and adopting into rule instream flows needed for salmonids.
1.3. Develop cooperative and coordinated approaches with co-managers and the public to restore and enhance instream flows.
1.4. Increase monitoring and regulation of water use and instream flows to ensure compliance with existing water use authorizations. Meter existing water diversions consistent with the overall metering strategy for WRIA 35.
1.5. Assist in improvement of efficiency of irrigation systems to reduce diverted quantities of water.
1.6. Pursue targeted and appropriate water purchases and leases for trust instream water rights as a method to enhance and restore instream flows.

Objective 2. Meet Washington surface water quality standards for temperature in Asotin Creek.

Strategies:

2.1. Complete a TMDL for temperature on Asotin Creek in accordance with the Clean Water Act.
2.2. Determine waste load allocations and load allocations for temperature in the segment of the Asotin Creek from the mouth, at the Snake River, to the confluence of the North and South Forks.
2.3. Complete a detailed implementation plan for Asotin Creek that will outline steps required to meet temperature waste load allocations and load allocations
2.4. Complete and implement a monitoring plan for temperature on Asotin Creek that will serve to determine the success of the TMDL and detailed implementation plan.

Objective 3. Meet Washington surface water quality standards for bacteria in Asotin Creek.

Strategies:

3.1. Complete a TMDL for bacteria for Asotin Creek in accordance with the Clean Water Act
3.2. Complete waste load allocations and load allocations for bacteria in the segment of Asotin Creek from the mouth, at the Snake River, to the confluence of the North and South Forks.
3.3. Complete a detailed implementation plan for bacteria on Asotin Creek that will outline steps required to meet bacteria waste load allocations and load allocations.
3.4. Complete and implement a monitoring plan that will serve to determine the success of the TMDL and detailed implementation plan.

Objective 4. Address water quality and habitat problems associated with livestock operations.

Strategies:

4.1. Document potential water quality issues associated with livestock operations in Asotin Creek, Tenmile Creek, and Couse Creek.
4.2. Identify landowners and operators where potential water quality problems exist.

4.3. Develop and implement plans that address water quality and habitat issues using available financial assistance such that enforcement actions by state and federal agencies can be avoided.

Asotin County Conservation District

Goal: Restore sustainable, naturally producing populations to support tribal and non-tribal harvest and cultural and economic practices while protecting the biological integrity and genetic diversity of these species in the watershed.

Objective 1. Reduce pre-spawner adult mortality.

Strategies:

1.1. Implement riparian planting projects for long-term large woody debris recruitment for shade.
1.2. Increase habitat complexity by adding large woody debris into instream projects.
1.3. Increase pool quantity and quality, decrease width/depth ratio with instream structures, and implement long-term natural floodplain and channel restoration.
1.4. Increase sinuosity to return Asotin Creek to its natural form.

Objective 2. Increase incubation success.

Strategies:

2.1. Continue upland cost-share for sediment reduction projects.
2.2. Construct instream structures designed to scour and sort spawning gravels.
2.3. Implement riparian plantings for streambank stabilization and large woody debris recruitment.
2.4. Design riparian management plans for alternative water and fencing projects.
2.5. Increase sinuosity to return Asotin Creek to its natural form.

Objective 3. Increase juvenile salmonid survival.

Strategies:

3.1. Implement instream habitat restoration according to sound fluvial geomorphic principals.
3.2. Increase pools with large woody debris to improve over-winter survival of juveniles.
3.3. Decrease width and increase stream depth.
3.4. Identify cool water refugia and protect and restore in-stream and riparian habitat.
3.5. Construct off-channel rearing areas from springs and add large woody debris component for habitat complexity.
3.6. Implement riparian plantings for shade, cover, and large woody debris recruitment.
3.7. Design riparian management plans with fencing and off-site watering.
3.8. Increase sinuosity to return Asotin Creek to its natural form.

Objective 4. Manage Asotin Creek as a reserve for wild steelhead.

Objective 5. Begin planning for spring chinook re-introduction with an appropriate stock.

Wildlife

U.S. Forest Service

The USFS goals, objectives, strategies, and recommended actions can be found in the *Land and Resource Management Plan*, available from the USFS and the ACCD. Plan listings include 26 goals, desired future condition descriptions for each natural resource area, forest management objectives, and a resource summary. The Plan also includes forest-wide standards and guidelines, which serve as the strategies for management objectives emphasized by USFS manuals, handbooks, policies, and appropriate laws at the local state and federal levels. Recommended actions are tied to each management area discussion.

Washington Department of Fish and Wildlife

The primary wildlife goal for the Asotin Creek subbasin is to protect, enhance, restore, maintain and/or increase PHS wildlife populations and habitats to viable or management objective levels for ecological, social, recreational, subsistence, and aesthetic purposes.

Sharptail Grouse

Status: State threatened, federal species of concern

Limiting Factors: Loss of shrub steppe habitat. Sharptails extirpated, no viable population from which to build (Hudson 1954; Schroeder 2000).

Goal: Re-establish a viable sharptail grouse population within the subbasin.

Objective 1. Establish six viable leks (100-150 birds) within the subbasin over five years.

Strategies:

1.1. Inventory suitable habitat conditions and sites for re-introductions. Evaluation time: 6 months.

1.2. Re-introduce sharptail grouse.

1.3. Improve habitat quality of CRP lands to make suitable for sharptails; establish abundant legumes within CRP.

1.4. Use artificial leks to establish breeding sites.

Bighorn Sheep

Status: State game species.

Limiting Factors: Mortality due to due pasteurellosis, predation, and scabies infections.

Goal: Establish and maintain a viable bighorn sheep population along the Snake River corridor above Asotin and within the Asotin Creek drainage.

Objective 1. Increase the bighorn sheep population in the Snake River corridor to management objective, and the Asotin Creek herd to 70+ animals within 10 years.

Strategies:

1.1. Develop techniques to control scabies mites (parasites) in free ranging bighorn sheep.

1.2. Supplement the population if bighorn sheep numbers drop below 15 breeding ewes.

1.3. Monitor adult mortality if predation from mountain lion and coyotes is a limiting factor. Initiate predator control until bighorn population is at population objective level.
1.4. Control noxious weeds on bighorn sheep range.

Mule Deer

Status: State game species.
Limiting Factors: Currently, mule deer populations in the uplands have declined. Factors contributing to the decline may be fire suppression, predation, and competition with white-tailed deer (Hamlin *et al.* 1984; Unsworth *et al.* 1999; Whitaker and Lindzey 1999).
Goal: Maintain the mule deer population at current levels in the lowlands, and increase populations in the uplands.

Objective 1. Increase mule deer populations to 1980 level.

Strategies:

1.1. Improve range conditions in the lowland by controlling the spread of yellow starthistle and knapweed.
1.2. Improve habitat in the uplands through controlled burning.
1.3. Determine productivity and adult mortality factors in mule deer.

Rocky Mountain Elk

Status: State game species.
Limiting Factors: Conflicts with agriculture, noxious weed invasion, roads, silvicultural practices, fire suppression, calf mortality (predation), and mortality of adult cows in the Lick Creek unit (Myers *et al.* 1998).
Goal: The elk population in GMU-175 Lick Creek is below management objective by approximately 250 head (WDFW 2000).

Objective 1. Increase the wintering elk population in GMU-175 Lick Creek to between 850-1,000 head. Increase post-season bull ratios to a minimum of 15 bulls/100 cows, with a minimum of 10 adult bulls/100 cows.

Strategies:

1.1. Improve habitat conditions through forage enhancement projects, control of noxious weeds, and the use of controlled burns.
1.2. Reduce disturbance in key habitat through road-area closures and increased enforcement.
1.3. Monitor and reduce adult elk mortality in GMU-175 Lick Creek.
1.4. Regulate all elk hunting.

Asotin Wildlife Area

The Asotin Wildlife Area is located in the upper Asotin Creek watershed and borders the Umatilla National Forest and private lands. The wildlife area is home to a wide variety of wildlife species, including neotropical migrants, mountain lion, black bear, elk, mule deer, whitetail deer, and bighorn sheep.

Location: Upper Asotin Creek watershed, 20 miles west of Asotin, Washington.
Size: 14,000 acres.

Limiting Factors: Declining habitat values from fire suppression and noxious weeds.
Goal: Improve habitat conditions on the wildlife area for elk and other wildlife.

Objective 1. Enhance 1,000 acres of key habitat areas over the next five years.

Strategies:

1.1. Expand elk habitat base and acquire private lands adjacent to the wildlife areas that are important elk winter range.
1.2. Increase noxious weed treatment and monitoring.
1.3. Increase use of fire in conifer stands to improve habitat conditions.
1.4. Initiate forage enhancement projects on the wildlife area.
1.5. Aggressively enforce ORV regulations and area closures.

Upland Restoration Program

The WDFW uses the Upland Restoration Program as a tool to promote recreational access and implement cooperative habitat protection and restoration projects on private lands within the Asotin Creek subbasin. The program concentrates habitat improvement efforts on restoring native habitats for game species, PHS assemblages, and other wildlife species.

Location: Garfield and Asotin Counties.
Limiting Factors: Declining habitat values on private land.
Goal: Enroll private landowners in WDFW habitat/access restoration programs.

Objective: Improve habitat conditions for wildlife on private lands and increase recreational access.

Strategies:

1.1. Improve habitat conditions in riparian zones by planting shrubs, trees, and filter strips.
1.2. Improve habitat condition on native rangelands by controlling noxious weeds, installing of guzzlers, and seeding various vegetative species to enhance the cover and forage base for wildlife.
1.3. Improve wildlife habitat conditions on CRP lands by planting a diverse mix of forage species.
1.4. Improve upland habitats through water developments, weed control, and forage enhancement projects.
1.5. Increase the diversity of wildlife, and increase populations on private land by improving habitat condition.
1.6. Increase public recreational access through WDFW access programs with private landowners.
1.7. Control and enforce access programs for landowners.

Research, Monitoring, and Evaluation Activities

A variety of research, monitoring, and evaluation activities occur in the Asotin Creek subbasin. Ongoing monitoring and evaluation activities associated with WDFW and the LSRCP are the most extensive. The WDFW has been monitoring and evaluating fish and wildlife and their habitats in the Asotin Creek subbasin for several decades. The ACCD works cooperatively with WDFW and others to coordinate various assessments and monitoring activities to maintain consistency and cost efficiency. The WSU Center for Environmental Education and the NRCS

maintain assessment validity and credibility for water quality, upland BMPs and project engineering.

Fish

BPA-funded Research, Monitoring and Evaluation Activities

Asotin County Conservation District

The BPA, through the Asotin Creek Model Watershed Program, funds the Asotin Creek Watershed Habitat Monitoring Project, conducted by WDFW Snake River Lab. Pre-construction and one year post-construction habitat measurements taken for comparative analyses. The analyses include: 1) site length, 2) maximum and mean site depth, 3) mean wetted width, 4) mean thalweg depth, 5) quantitative and qualitative counts of wood debris, 6) number of pools, 7) pool quality, 8) pool area, 9) pool depth, and 10) a fluorescent dye rate. Snorkeling is implemented to determine fish utilization. Details of the methods and results are provided in Bumgarner *et al.* (2000).

Washington Department of Fish and Wildlife

In 1990, BPA funded a research project aimed at identifying competitive interactions between spring chinook salmon, steelhead trout, and bull trout in several streams in southeastern Washington. In 1990, Martin (1992) conducted bull trout electrofishing surveys in the upper North Fork of Asotin Creek. Five adult bull trout (>250 mm) and 3 juvenile bull trout were captured in four of the seven upper most five sites sampled; a total of 16 sites were sampled on WDFW and USFS land between Lick Creek and the Middle Fork. In 1991, the same sites were sampled and only one juvenile bull trout was collected in all sites sampled (Martin 1992).

Non BPA funded Research, Monitoring and Evaluation Activities

Asotin County Conservation District

The ACCD bases its monitoring strategy on the recommendation of the Statewide Strategy to Recover Salmon and includes tracking information on priority performance measures for project implementation, effectiveness, and validation. Implementation monitoring is straightforward and answers the question, "Did we do what we said we would do and do it correctly?" Effectiveness monitoring requires technical data and answers the question, "Does the action taken achieve the objective?" Validation monitoring is designed to examine key assumptions associated with the actions taken.

The WDFW evaluated habitat areas before and after instream structures were installed to monitor habitat composition and species densities. Vegetation monitoring of riparian planting sites is ongoing and will determine survival and growth rates of native trees and shrubs.

The Asotin Creek Watershed Water Quality Monitoring Project includes specific objectives to provide baseline data to assess the current water quality status of Asotin Creek, and provide evidence for effective evaluation of ACCD efforts that address key water quality parameters through habitat restoration efforts. Grab samples taken every two weeks at ten stations are analyzed for the most critical water quality parameters, sediments, temperature, and fecal coliform. Other parameters sampled and analyzed include ammonia, nitrate, total Kjeldahl nitrogen, and total phosphorous. Stream discharge is also measured monthly at three stations.

The WDFW completed baseline fish assessments in 2000 utilizing WCC Limiting Factors Grant Funds on Tenmile, George, and Couse Creeks. These efforts include fish distribution,

abundance, genetic characterization, run size estimates, and a limited amount of habitat utilization data.

The ACCD is currently developing a Snake River Region Salmon Recovery Strategy (Strategy) for the SRFB. The Strategy will contain a historical description of the region, factors for decline, and desired future condition. The Strategy will also identify the types of projects beneficial to salmon recovery in the subbasin and will contain a prioritized list of projects for funding consideration by the SRFB.

Washington Department of Fish and Wildlife

The WDFW is funded by the USFWS as part of the LSRCP to evaluate hatchery and natural production of salmonids in southeastern Washington. Annual monitoring and evaluation of salmonid production and demographics has been ongoing since 1984 in Asotin Creek. Specifically, WDFW conducts annual steelhead trout and chinook salmon spawning surveys and juvenile steelhead and salmon population abundance surveys in Asotin Creek, South Fork Asotin Creek, North Fork Asotin Creek, and Charley Creek. In addition to the annual activities and as part of a multi-basin investigation of steelhead residualism, WDFW conducted a hatchery rainbow trout abundance and predation study in 1990 (Martin *et al.* 1993).

Results of Annual Steelhead Trout Surveys

From 1983 to 1998, juvenile steelhead trout abundance ranged from 3,100 fish to 37,100 fish between the confluence of the North and South Forks of Asotin Creek upstream to the USFS boundary. The highest abundance was in 1997, followed by 1998.

In 1998, WDFW conducted spawning ground surveys of 13 miles of Asotin Creek including the North Fork of Asotin Creek. The WDFW estimated 51 steelhead redds in the areas surveyed, or 3.9 redds per mile. The average number of redds per mile in this section between 1986 and 1996 was11.5 and ranged from 37.2 in 1986 to 3.5 in 1990.

Results of Annual Spring Chinook Salmon Surveys

Asotin Creek was surveyed for spring chinook salmon spawning activity from Lick Creek upstream to the USFS boundary between 1985 and 1992 (Mendel 1992). Eight redds were reported in 1985, one in 1986, three in 1987, zero in 1989, two in 1990, and zero in both 1991 and 1992. There have been attempts to located spring chinook salmon redds in recent years; however, only 2 redds in 1993, one in 1997, and one in 2000 have been found.

Miscellaneous Salmon and Trout Information

In 1986, the WDG (Schuck 1988) deployed a smolt trap in Asotin Creek near the mouth. The trap was fished continuously for 63 days, catching 903 steelhead and 181 spring chinook salmon smolts. Trap efficiency was not calculated so production estimates cannot be made. Spawning ground surveys were conducted in years preceding trapping, but no adult-to-smolt ratios have been calculated. The WDG also attempted steelhead trapping in the South Fork of Asotin Creek and steelhead smolt and adult trapping in Charley Creek for two years.

Instream Habitat Alterations

In the early 1980s, WDFW cooperated with the ACOE and LSRCP to install and assess instream habitat improvement structures in Asotin Creek (Mendel and Hallock 1984; Mendel and Ross

1988; Viola 1991). The goals of the project were 1) to improve salmonid rearing habitat, specifically for larger fish, and 2) to evaluate the effectiveness of attempts to improve instream habitat.

The evaluation reports concluded that benefits of the instream habitat structures were 1) older age class trout density increase, 2) increased spawning use by adults, and 3) concentrated use by hatchery fish. The recommendations suggest that instream habitat improvements be made only when a complete watershed assessment has been completed and the assessment documents that instream habitat is limiting production. The report also states that a more complete ecosystem approach toward rebuilding fish stocks is desirable, where all factors such as riparian restoration are coupled with the improvement of instream habitat. It also states that instream habitat enhancements are short-term and other ecosystem efforts are needed for long-term results.

Wildlife

BPA-funded Research, Monitoring and Evaluation Activities

None reported.

Non BPA-funded Research, Monitoring and Evaluation Activities

Washington Department of Fish and Wildlife

The WDFW operates multiple wildlife projects within the Asotin Creek subbasin. Annual surveys are conducted for deer and elk, and diversity species. The Upland Restoration Program works with private landowners to improve wildlife habitat on private lands.

- Asotin Wildlife Area: forage enhancement and weed control projects.
- Elk monitoring of elk relocated from Hanford.
- Bighorn sheep surveys.
- Bighorn sheep disease monitoring and treatment.
- Deer/elk surveys.
- Deer/elk harvest surveys.
- Elk reproductive study.
- Elk calf mortality study.
- Elk population and damage assessment study.
- Forage enhancement projects of elk.
- Elk fence maintenance and expansion.
- Asotin Wildlife Area weed control.
- Asotin Wildlife Area field restoration
- Upland restoration projects: private land.
- Habitat acquisitions: Weatherly property.

Statement of Fish and Wildlife Needs

The fish and wildlife needs in the Asotin Creek subbasin are similar to those in other subbasins. Research, monitoring, and evaluation are a vital component of the implementation of habitat and species protection, restoration, and recovery work in the subbasin. The most critical needs are associated with either protecting currently productive habitat or restoring degraded habitat for both fish and wildlife resources.

Combined Aquatic and Terrestrial Needs

1. Develop and implement BMPs on agricultural, mining, grazing, logging, and development activities to protect, enhance, and/or restore fish and wildlife habitat, streambank stability, watershed hydrology, and floodplain function.
2. Develop and implement comprehensive and consistent subbasin databases related to both aquatic and terrestrial resources and establish a centralized data repository to promote more effective resource management.
3. Coordinate monitoring and evaluation efforts at the subbasin and provincial level to maximize effectiveness and minimize redundancy.
4. Continue ongoing, and establish new monitoring and evaluation programs for fish supplementation, habitat restoration and improvement, habitat baseline conditions, water quality and water quantity improvements, conditions, and trends.
5. Complete road inventories and assess impacts to aquatic and terrestrial resources. Use information to facilitate transportation planning and to reduce road densities. Support planned road closures on public land, and encourage closure of other roads.
6. Expand the cooperative/shared approach to research, monitoring, and evaluation between tribal, federal, state, local, and private entities to facilitate restoration and enhancement measures.
7. Use appropriate measures (e.g., land purchases, conservation easements, landowner cooperative agreements, exchanges) to acquire lands when opportunities arise for improved habitat protection, restoration, connectivity, and for mitigation of lost fish and wildlife habitat).
8. Protect pristine and significant fish and wildlife habitats directly threatened by subdivision, recreation, or extractive resource uses.
9. Support timely updates and resource inventories related to local land use plans to further prevent degradation of floodplains, wetlands, riparian, and other sensitive areas.
10. Continue to develop watershed assessments at multiple scales to facilitate integrated resource management and planning efforts.

Fish

Water Quality

1. Reduce stream temperature, sediment, and embeddedness to levels that meet appropriate standards for supporting self-sustaining populations of aquatic species.
2. Reduce impacts from agricultural sediment, fertilizer, pesticide loading, confined animals operations, stormwater and road runoff, wastewater effluent, mining, and logging.

Habitat / Passage

1. Protect and restore riparian and instream habitat structure, form, and function to provide suitable holding, spawning, and rearing areas for anadromous and resident fish.
2. Protect, restore, and create riparian, wetland, and floodplain areas within the subbasin and establish connectivity.
3. Inventory and evaluate natural and artificial passage barriers within the subbasin investigating their connectivity between populations, their role in population isolation, and associated passage and flow issues. Remove or modify where aquatic considerations have been met.

4. Improve or re-establish well developed, mature riparian buffers, increased channel stability and sinuosity, and floodplain connectivity throughout the subbasin.
5. Decrease water temperatures and sediment delivery to Asotin Creek.
6. Identify, protect, or purchase critical watershed areas or water rights for the protection of native species and their habitats.
7. Improve instream fish habitat quality and quantity.
8. Improve fluvial geomorphic conditions for attainment of self-sustainable fish populations and reduction of sediment delivery due to streambank erosion.
9. Reduce water temperatures.
10. Reduce upland erosion and sedimentation delivery rates to decrease the percentage of fines in spawning gravels.
11. Continue to implement the *Asotin Creek Model Watershed Plan* to restore, maintain, or enhance spawning and rearing habitat.
12. Characterize the current productive capacity of the subbasin for salmonid production and recommend minimum and desired annual escapements by species.

Enforcement / Education

1. Better educate the public on issues and policies important to natural resource restoration, protection, and enhancement to encourage meaningful public participation.
2. Improve enforcement of laws and codes related to protection of fish, wildlife and their habitats, through coordinated conservation enforcement activities by the NPT, state, and federal agencies.
3. Ascertain the present level of compliance with screening and passage requirements for the subbasin.
4. Increase efforts to control illegal harvest of ESA listed salmonids.

Data Gaps / Assessment

1. Assess the effect of non-native fish species on resident and migrant salmonid juveniles.
2. Assess the need and response of fish populations to increased marine nutrient availability.
3. Conduct a full assessment of the abundance, distribution, habitat use, life history, biological characteristics, and status of the following species:
    - mountain whitefish
    - bull trout
    - torrent sculpin species
    - margined sculpin
    - Pacific and River lamprey species
    - redband trout
    - westslope cutthroat trout
    - wild steelhead
4. Assess factors limiting the production of spring chinook salmon and the potential for spring chinook reintroduction.
5. Assess factors limiting the production of steelhead.
6. Assess factors limiting the production and sustainability of bull trout.
7. Develop spawner/recruit databases from information collected to determine full seeding levels of spring chinook and steelhead for the subbasin.

8. Determine subbasin-specific hooking mortality rates for juvenile and adult steelhead, bull trout or chinook salmon released in sport fishing seasons.
9. Evaluate catch-and-release effects on whitefish, bull trout, chinook salmon, and resident wild rainbow/redband trout.
10. Conduct on-the-ground assessment of previous actions, current habitat conditions, water quality, and usage.
11. Expand monitoring and assessment activities to improve understanding of bull trout distribution, abundance, life histories, and movements.
12. Conduct data collection efforts to determine quantitative habitat conditions.

Artificial Production

1. Determine the level of stray non-endemic salmon and steelhead that enter Asotin Creek and recommend actions to mitigate their effect.
2. Determine whether captive brood Tucannon spring chinook can be used effectively to reestablish extirpated populations in Asotin Creek. Determine the appropriate spring chinook stock for reintroduction and the preferred methods and timing for reintroduction efforts.
3. Increase native stock steelhead and spring chinook to sustainable levels

Natural Production

1. Initiate a cooperative project to address juvenile and adult passage problems in the subbasin (screens, culverts, diversions).
2. Assess the efficacy of habitat improvement projects within the subbasin to alleviate factors limiting the production of native salmonids.
3. Increase wild steelhead and spring chinook to sustainable levels.
4. Determine escapement and harvest management goals for naturally produced salmonids.
5. Increase deposition of salmonid carcasses and nutrient cycling to enhance ecological productivity.

Wildlife

Noxious Weeds

1. Inventory and map the distribution of noxious weeds.
2. Develop and use restoration techniques for noxious weed infested communities.
3. Continue control programs for noxious weeds to restore natural habitat conditions and communities for wildlife species and improve watershed function.
4. Develop an information and education stewardship program for noxious weeds.

Data Gaps / Assessment

1. Inventory potential sharptail grouse habitat; re-introduce sharptail grouse into the subbasin.
2. Develop technique to control pasteurellosis outbreaks, and scabies in free ranging bighorn sheep.
3. Increase deer surveys.
4. Maintain elk surveys.
5. Maintain bighorn sheep surveys.
6. Determine mortality rate and factors for adult bighorn sheep.

Habitat

1. Enhance forage base for elk on Asotin Wildlife Area and National Forest lands.
2. Control the spread of noxious weeds on the Asotin Wildlife Area and within the subbasin.
3. Improve and diversify the vegetative composition of CRP in order to provide better habitat for existing wildlife populations.
4. Improve road closure programs on National Forest lands.
5. Reduce ORV use on National Forest lands.
6. Use controlled burns to improve habitat in the timbered uplands.
7. Acquire important areas of wildlife habitat as they become available.

Subbasin Recommendations

Projects and Budgets

Continuation of Ongoing Projects

Project: – 199401805 - Continued Coordination and Implementation of Asotin Creek Watershed Projects

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Sponsor: Asotin County Conservation District (ACCD)

Short Description:

Coordinate, assess, protect, restore and monitor holistically based fish habitat cost-share programs in Asotin Creek watershed. Continue "grass-root" public and agency cooperation and collaboration for identified priority projects benefiting ESA species

Abbreviated Abstract

Asotin Creek, a tributary to Snake River in Water Resource Inventory Area (WRIA) #35 is home to ESA listed stocks of Snake River summer steelhead (Oncorhynchus mykiss), spring chinook (Oncorhynchus tshawytscha), and bull trout (Salvelinus confluentus) and is managed as a wild steelhead reserve by Washington Department of Fish and Wildlife (WDFW). High stream temperatures, sediment deposition in spawning and rearing areas and lack of suitable pools are factors limiting salmonid production as identified by Asotin Creek Model Watershed Plan (Plan).

The Plan was the first completed in Washington dealing specifically with ESA listed species in partnership with BPA, Natural Resources Conservation Service (NRCS), WDFW, U.S. Forest Service (USFS), Department of Natural Resources (DNR), Washington State Conservation Commission (WCC), Asotin County Conservation District (ACCD), Nez Perce Tribe, citizens and local landowners. The indigenous fish species most actively targeted for management in the watershed are summer steelhead and spring chinook salmon. The goals for these species are to restore sustainable, naturally producing populations to support tribal and non-tribal harvest and cultural and economic practices while protecting the biological integrity and genetic diversity of these species.

Enhancing and protecting Asotin Creek's diverse habitat is a goal of landowners and agency representatives. Spearheaded by ACCD, habitat projects have been completed within the watershed to address limiting factors over the past six years. Prioritized projects have been identified by landowners and agencies resulting in improved water quality and habitat for ESA listed fish species. In-stream, riparian and upland habitat projects are being utilized as models for tours and workshops resulting in information and education dissemination. Two completed in-stream projects and the Asotin Creek Model Watershed Newsletter have received national recognition. Innovative stream meander reconstruction and riparian plantings have received critical acclaim from cooperating agencies and have resulted in partnering BPA and Washington State Salmon Recovery Funding Board (SRFB) funds. The Plan provides a framework for improving the overall health of the watershed and completing protection and enhancement projects will allow for greater adult and juvenile survival at each freshwater lifestage and can result in more offspring surviving to begin migration to the ocean.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
	Asotin Upland Implementation Grant	WCC Upland BMP's funds partnered with BPA & SRFB
	SRFB Grants (November for FY 02)	Future SRFB Grants need 15% match, BPA & WCC funds.
	Asotin County CREP Grant	WCC CREP Grant needs funds for an additional position.
27001	Asotin County Buffer Program with Emphasis on Protecting and Restoring Couse & Tenmile Creeks	Proposal that builds on projects and landowner relationships from Asotin Creek watershed
27002	Assess Salmonids in Asotin Creek Watershed	"New" for FY 2002-2006. Evaluating current productivity and survival rates of anadromous and resident salmonids in Asotin Creek. This would answer a reoccurring question from ISRP to how our projects are affecting salmonids
27014	Protecting and Restoring Asotin Creek Watershed	"New" for FY 2002 -2006 for Upper watershed sedimentation issues on Forest Service, WDFW and private land road issues. Nez Perce Tribe Fisheries Watershed Prog.

Relationship to Existing Goals, Objectives and Strategies

This project proposal is to continue on-going restoration activities and will coordinate and integrate the Plan and Model Watershed Technical Lead funding. These work together to protect and restore fish and wildlife habitat in the Asotin Creek basin. The Technical Lead's duty is to bridge the gap between landowners and agency representatives on sensitive resource issues on Asotin Creek and its tributaries. The Plan provides the framework for such recovery.

Matching funds from the Washington State Legislature through the SRFB and WCC have been used to restore critical habitat throughout Asotin County. Without current cost-share incentives, priority habitat restoration projects would be impossible to install on private property.

The Lower Snake River Compensation Plan programs the direction of the Lyons Ferry Hatchery, and provides the assessment for hatchery supplementation and recovery efforts. Hatchery reared fish released have not occurred in Asotin County since 1996, but currently Co-Managers are looking at spring chinook re-introduction with an appropriate stock. WDFW is requesting funding for an adult and smolt trap on Asotin Creek, since these are obvious data gaps. Historic fish monitoring on Asotin Creek has entailed spawning ground surveys, summer juvenile densities, pre- and post-habitat enhancement evaluations, summer water temperature monitoring and for the past two winters snorkeling surveys.

The WDFW's Fish Management Southeastern Washington group has partnered with the "Model Watershed" to evaluate salmonid use in George Creek and its tributaries. These areas had been exempt from the "Model Watershed's" actions in the past due lack of information regarding habitat conditions and salmonid use. Recent information indicated substantial use by steelhead and a population of wild rainbow/redband trout. Habitat limiting factors are similar to Asotin Creek's except for some portions of the George Creek basin are more water limited than elsewhere in Asotin Creek (Glen Mendel, personal communications 2001). Most of the limited water appears to be natural occurring rather than from water withdrawals.

United States Department of Agriculture NRCS's Conservation Reserve Enhancement Program (CREP) and Continuous Conservation Reserve Program (CRP) provides financial and technical assistance to plant riparian buffers along streams utilized by salmonids. Combining these projects with BPA or SRFB funding to enhance and accelerate habitat restoration and effectively re-establish proper riparian and floodplain connection and function is a local priority and identified in the NMFS Reasonable and Prudent Actions.

Review Comments

Addresses RPA 153, which requires a connection to CREP and commitments of at least 15 years. Although there is no specific reference to sediment and temperature monitoring in the proposal, the work is being performed through this project by the USFS and WDFW. Species that benefit from the proposed work include all life stages of spring chinook, bull trout, and steelhead. The sponsors indicated that there are 15+ CREP commitments (15 year commitments) in place.

Budget

FY02	FY03	FY04
$ 297,285.00 Category: High Priority Comments:	$ 346,000.00 Category: High Priority	$ 347,000.00 Category: High Priority

New Projects

Project: – 27001 - Asotin County Riparian Buffer and Couse and Tenmile Creeks Protection and Restoration Project

Sponsor: Asotin County Conservation District (ACCD)

Short Description:

Implement BMP's to protect and enhance watersheds in Asotin County with ESA listed steelhead and chinook. Utilize cost-share from USDA, WCC and SFRB as match to BPA Funds to implement riparian buffers under the CREP Program (RPA Actions 152 & 153).

Abbreviated Abstract

The Asotin County Conservation District (ACCD), working in parntnerships with the Natural Resource Conservation Service (NRCS), WDFW, Department of Ecology (DOE), US Forest Service (USFS), Nez Perce Tribe (NPT), and especially the private landowners, provides leadership in protection and implementation of watershed projects focused on improving watershed health. Working in concert with local, state and federal agencies strengthens our ability to develop, implement and leverage funds for economic feasablity based on sound science, which drives our protection and restoration projects.

Wild steelhead spawning outside the Asotin Creek watershed in Couse and Tenmile Creeks needs to continue to be assessed for factors limiting production. Current technical consesus identifies these stocks as a local priority for protection and restoration projects. Currently ACCD is encouraging landowners to research the Conservation Reserve Enhancement Program (CREP) to see if it fits in with their goals and objectives. Cooperation and interest is beginning to take hold and we currently have more sign-ups for CREP than our current workload can handle in Asotin County.

This proposals goals are to implement riparian buffer systems, upland BMP's and instream habitat in watersheds that drain to the Snake River and are home to ESA listed steelhead and chinook and address limiting factors recently identified in the "Asotin Creek Subbasin Summary" (Summary) draft, May 25th, 2001. It will dedicate 1 FTE to provide technical assistance and planning support needed to implement at least 22 riparian buffer contracts on approximately 1,323 acres covering an estimated 26 miles of anadroumous fish bearing streams. Buffer widths will be between 50 and 180 feet on each side of the stream. Implementation will include prescribed plantings, fencing, alternative watering systems, lease payments on riparian areas will be for 10 - 15 year periods and related enhancements not covered by the USDA CREP funding. We envision BPA funds being utilized to enhance buffers and help landowners off-set cost related to bigger projects with enhanced activities including instream structures for ESA listed steelhead, chinook and resident rainbow / redband trout.

This proposal meets a critical need in Asotin Creek subbasin. Technical staff shortfalls for developing plans has created a backlog of potential buffer projects. Within Asotin County area of the Asotin Creek subbasin 24 individuals have expressed interst in entering into long-term buffer program and there is a potential to enroll others.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199401805	Continue Coordination and Implementation of Asotin Creek Watershed Projects	"Model Watershed" project that began in the early 90's on Asotin Creek. Previous projects completed on Asotin Creek have inspired landowners throughout the county to participate with ACCD. Trust is at a peak both with local, state and federal agencies
27014	Protecting and Restoring Asotin Creek	"New" project proposed for FY 2002 - 2006 funding for Upper watershed sedimentation issues on Forest Service, WDFW, and private land roads issues. Nez Perce Tribe Fisheries Watershed Program.
	Upland Implementation Grant	WCC Grant to improve water quality and install upland BMP's. Partner funds to help off-set restoration costs.
	WCC CREP Grant	Partner CREP Grant and BPA funds to off-set high cost of fencing, alternative water, and rental payments for riparian buffers
	Future SRFB Grant	Partnering funding sources so that one entity is not taking on all the projects costs. Spreading the wealth and informing and educating our local youth, landowners and agency representative of the sensitive resource issues.

Relationship to Existing Goals, Objectives and Strategies

This project proposal is to continue on-going restoration activities and will coordinate and integrate the Plan, Strategy and Continue Coordination and Implementation of Asotin Creek Watershed funding. These work together to protect and restore fish and wildlife habitat in the Asotin County. The Technical Lead's duty is to bridge the gap between landowners and agency representatives on sensitive resource issues on Asotin Creek and its tributaries. The Plan and Summary provide the framework for such recovery.

Matching funds from the Washington State Legislature through the SRFB and WCC have been used to restore critical habitat throughout Asotin County. Without current cost-share incentives, priority habitat restoration projects would be impossible to install on private property.

USDS NRCS CREP and Continuous Conservation Reserve Program (CRP) provides financial and technical assistance to apply riparian buffers along streams identified with ESA

fish species. Combining these projects with BPA or SRFB funding to enhance and accelerate habitat restoration and effectively re-establish proper riparian and floodplain connection and function is a local priority and identified in the NMFS Reasonable and Prudent Actions.

Objective 1. (Under Planning and Design Phase)
Coordinate Asotin County projects and Riparian Buffer Prioritization and Planning

Task a. Administer, coordinate, and communicate watershed activities to residence and agencies. Build local support similar to what has been developed in Asotin Creek watershed.

Task b. Coordinate citizen / agency task groups and tie into Asotin Creek Technical Advisory Group.

Task c. Develop project proposals and submit for funding.

Task d. Submit NEPA's and BA's to BPA for submittal to NMFS and USFWS for concurrence of instream habitat projects.

Task e. Produce final report of accomplishment for habitat projects and report M&E analysis and validation.

These are listed logically in the sequence they occur for a given CREP plan.

Objective 2.
The principal objective of this proposal is to implement at least 22 new CREP/CRP riparian buffer system agreements with participating landowners covering 26 miles of anadromous fish streams and approximately 1,323 riparian acres.

Task a. Meet with interested landowners on site to assess eligibility of stream reach for program. Anadromous fish streams are eligible for CREP buffers while all streams are eligible for continuous CRP buffers. Specific sites are eligible depending on the condition of the resources on site. We currently have requests for enrollment in the CREP/CCRP programs for riparian buffers of which 22 are within the Blue Mountain province. All of those requests are in the Asotin Creek Subbasin. All of the requests are in various stages of processing. Programmatic checklists are used for making the assessment.

Task b. Obtain landowner signups.

Task c. Develop CRP/CREP plan. Resource inventory and environmental checklist are completed early in the NRCS Nine Step Planning Process. Planting prescriptions are completed with input from NRCS Field Office Tech Guide, livestock grazing management plans are developed as needed, with alternatives considered for water sources, pasture configuration, etc. Once the plan is completed and approved, a contract is made between Farm Services Agency and the landowner to implement the plan. The planning task is the focus of most of this project's effort, constituting about 70% of the workload.

Task d. Enter into protective conservation agreements with participating landowners for contiguous stream reaches in good condition. Our experience to date with CREP has shown that occasionally streams on one ownership will have good

quality riparian areas between degraded reaches. The good quality areas are not eligible for CREP. This task and the associated cost share task #3a enable some cost share on the otherwise ineligible reach. In at least one instance locally, having this ability would have been enough to convince one landowner to sign up his entire stream. This allows a systems approach rather than the sometimes fragmented approach that results from programmatic constraints.

Task e. Appropriate documentation in the producer file is completed by the planner, and progress reporting is done. That completes the planning/design process.

Implementation is funded in part by state of Washington (25%), in part by USDA (50%), and in part by the landowner (25%). The landowner portion may be in cash or in-kind. Upon completion of a practice, USDA issues a "practice incentive payment", an amount equivalent to 40% of the practice cost.

Objective 3.
Secure additional funding and cooperative partnerships.

Task a. Match funds with local, state and federal agencies whenever possible.

Task b. Initiate cost-share programs throughout Asotin County in areas with ESA species

Objective 1. (Under Construction / Implementation Phase)
Reduce instream water temperatures to 18 c.

Task a. Riparian fencing and alternative water developments to reduce direct animal pressure on streams identified with ESA species. Partner with CRP / CREP and SRFB to reduce funding authorities costs.

Task b. Riparian planting projects for long-term LWD recruitment, shade and cover. Partner with CRP / CREP and SRFB to accomplish more acres and stream miles.

Task c. Jump-start LWD component by incorporating it into complex habitat and streambanks for cover.

Task d. Increase # of pools and decrease stream width-to-depth ratios by installing geomorphic restoration projects in prioritized stream reaches to reduce stream temperatures.

Objective 2. Increase quality of pools w/LWD to nine pools per mile.

Task a. Install instream habitat projects according to geomorphic stream classification in priority areas

Task b. Identify properly functioning stream reaches and protects those areas. Enroll into CRP / CREP or identified programs.

Objective 3. Reduce sediment deposition in spawning gravels by reducing cropland erosion and stabilizing streambanks.

Task a. Continue upland cost-share for sediment reduction practices (direct seed, pasture/hayland, sediment basin and noxious weed control).

Task b. Instream structures geomorphically designed to scour and sort spawning gravels and re-establish floodplains and depositional features.

Task c. Riparian fencing, alternative water developments associated with CRP / CREP to stabilize and recruit LWD on streambanks.

Objective 4. Provide technical assistance during implementation.

Task a. "After contract approval, provide additional technical assistance as may be required by the landowner to implement the approved plan."

Task b. Provide cost-share for conservation practices identified to enhance and compliment CRP / CREP.

Operation and Maintenance are not required in this project. Actual operation and maintenance is a funded item in the CRP/CREP contracts whereby the landowner receives a small fee per acre to cover maintenance costs. The landowner is responsible under the contract for the maintenance.

Objective 1. (Under Monitoring and Evaluation Phase)
Planning, coordinating and implementing project assessments and monitoring.

Task a. Fund priority monitoring projects outside Asotin Creek.

Task b. Expand WDFW pre- and post-habitat assessments on half the instream structures outside Asotin Creek.

Task c. Continue WDF steelhead spawner utilization and summer-time juvenile densities on Couse and Tenmile Creeks.

Task d. Complete and submit reports describing assessments and monitoring results.

Objective 2. Verify CRP / CREP buffers are installed and functioning according to plan.

Task a. Inspect riparian protective measures cost-share for continuing functionality and effectiveness.

Review Comments

The proposed work would allow for stabilizing channel conditions in Tenmile and Couse creeks (creeks which are major producers of sediment to the Snake River). With increased water quality resulting from this work, the WDFW suggests there would be an increase in listed fall chinook spawning at the mouths of the creeks; however, reviewers expressed concern that measurable outcomes are absent from many of the objectives. Although the proposal lacks monitoring for temperature and sediment the work, such parameters are being monitored. The CREP leases will be for 15 years. Reviewers suggest results from this work would aid management from a long-term standpoint; however, the work may not be critical at this time. Project addresses RPA 400 and partially address RPA 153.

Budget

FY02	FY03	FY04
$294,200.00 Category: High Priority Comments:	$294,200.00 Category: High Priority	$294,200.00 Category: High Priority

Project: - 27002 - Assess Salmonids in the Asotin Creek Watershed

Sponsor: Washington Department of Fish and Wildlife (WDFW)

Short Description:

Evaluate the current productivity and survival rates of anadromous and resident salmonids in Asotin Creek. Develop a habitat based spring chinook reintroduction plan and determine if supplementation is required to sustain a wild steelhead population.

Abbreviated Abstract

Washington Department of Fish and Wildlife (WDFW), as part of ongoing Lower Snake River Compensation Plan (LSRCP) monitoring and evaluations, have conducted spawning ground surveys and summer electrofishing or snorkeling surveys in most southeast Washington streams (including Asotin Creek) to determine indigenous salmonid (steelhead/rainbow, chinook, bull trout, whitefish) distribution and relative abundance. Further, the surveys have provided some information about the distribution of native non-salmonids and introduced species within the basin. Extensive efforts have been underway in Asotin Creek (federal and State funded) to correct habitat problems which may have contributed to the decline and/or extinction of ESA listed populations of salmonids.

The purpose of this project is to expand our monitoring and evaluation of steelhead and bull trout populations in Asotin Creek, and develop a habitat quality linked, spring chinook reintroduction plan. The assessment will require construction of one new adult salmonid trap in the basin, and will include trapping, tagging and monitoring of spawning for all species. Juvenile tagging will also be included in FY2002 to fully describe the productive nature of the creek and its tributaries, and life history patterns and survivals within the basin. Electrofishing and snorkeling will be used to capture juvenile fish, document densities and estimate populations during summer, and a rotary migrant trap located near the adult trap will be employed to estimate smolt outmigration. Smolt trapping would be initiated in Asotin Creek in 2002. PIT tags will be used to help estimate smolt to adult survivals and eventually parent-to-progeny survival rates, and identify life stage(s) within the populations that may be experiencing higher than expected mortality, possibly associated with habitat problems.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199401805	Implement Asotin Watershed Plan	Watershed recovery is under way in Asotin Creek, but limited monitoring of the effects of habitat work have been undertaken. This project will provide direct biological sampling of populations over time.

Project ID	Title	Nature of Relationship
	LSRCP Monitoring	Project will build from biological database developed by LSRCP monitoring. Staff will be shared with LSRCP program for efficiency, coordination of effort and continuity of data collection.
	LSRCP Production	Part of the proposed project will develop a chinook reintroduction plan for the watershed. Supplementation is a likely means for reintroduction, and existing LSRCP production facilities will be used to raise an appropriate stock of fish.
	USFWS Bull Trout Status Review	The project will provide data on adult bull trout movement and juvenile abundance to the ESA status review and recovery plan, and may provide adult data to the Snake River bull trout radio telemetry study proposed under the Columbia Plateau Province.

This proposal is a logical extension of existing biological monitoring within Asotin Creek, and the expanding assessment, planning and recovery efforts funded by state, federal and private monies for listed salmonids in the subbasin. We have worked cooperatively with basin managers and planners to provide population data to prioritize stream reaches for habitat improvements funded by Washington's SRFB and under the Councils FWP to benefit salmonids.

The WDFW proposed project would supplement the ACCD project (Project #199401805 - Coordinate and Implement the Asotin Creek Watershed Plan), and a new proposal by the Nez Perce Tribe to address the sedimentation issues on Forest Service, WDFW and private land. It would provide adult salmonid trapping data from the basin that are necessary for adequate monitoring of adult steelhead and bull trout returns to these basins, and eventually to serve to evaluate chinook reintroduction. Additionally, this proposed project could aid USFWS, WDFW and others' efforts to radio tag and track bull trout within the Snake Basin.

Hatchery enhancement of steelhead no longer occurs under the LSRCP program or other WDFW actions, but hatchery enhancement has been identified as a possible management alternative for steelhead rebuilding and spring chinook salmon reintroduction within the basin. The ongoing LSRCP actions in the basin (steelhead / salmon monitoring) are committed to aiding with recovery of listed populations in Asotin Creek, while providing congressionally mandated mitigation of salmon and steelhead runs and lost fishing opportunities in the Snake River. Ongoing monitoring and evaluation actions funded by LSRCP would be complemented by this proposal and provide a full description of population status. Once a chinook reintroduction plan was complete, co-managers may need to work together to develop a hatchery master plan and/ or and HGMP for any additional hatchery production. Supplementation production of steelhead (instead of mitigation production) and production of chinook for reintroduction, if deemed appropriate, could be reared in LSRCP owned facilities operated by WDFW.

Relationship to Existing Goals, Objectives and Strategies

Objective 1. Estimate escapement of hatchery and wild steelhead and salmon into the Asotin Creek drainage above George Creek.

Task a. Design and obtaining permits for construction activities to improve fish passage and build an adult salmonid trap at Headgate Dam on Asotin Creek.

Task b. Operate an adult resistivity counter on an Asotin Creek tributary throughout the adult salmonid migration period. Assess its usefullness for tributary sampling.

Task c. Construct the Headgate Dam Trap.

Task d. Operate the adult trap on Asotin Creek throughout the adult salmonid migration period. Enumerate, determine sex, origin, and lengths. Externally mark or tag to allow documentation of fall back and escapement. Collect biological samples.

Task e. Use mark recapture or total counts to estimate adult escapement past the adult trap.

Task f. Continue, or expand, spawning surveys in each basin during late February through the end of spawning in May. Locate and mark each redd and record the data.

Task g. Estimate total steelhead/salmon redds in each of the drainages. Use index area counts, redd visibility duration, and other means as necessary to estimate the total redds.

Task h. Calculate the number of redds per female and per spawner. Estimate total egg deposition within each basin based on average fecundity from wild origin fish collected at LSRCP traps in Tucannon and Walla Walla basins for local brood stock development.

Task i. Use LSRCP estimates of chinook redds in Asotin Creek and spring chinook fecundity from Tucannon River to calculate egg deposition in the subbasin.

Objective 2. Evaluate bull trout use of Asotin Creek watershed.

Task a. Implement tasks 1.a, b, c and d above to count and biologically sample bull trout passing the adult trap.

Task b. PIT tag captured adult bull trout to document multiple spawnings in subsequent years.

Task c. Remove a fin clip from adult bull trout for tissue to genetically characterize the populations. Archive the samples.

Task d. Provide captured bull trout data as part of cooperative radio telemetry projects for bull trout and recovery planning in the Snake Basin, and assist with existing bull trout spawning surveys as needed.

Task e. Continue noting juvenile bull trout distribution as part of LSRCP, USFS and WDFW management surveys with electrofishing or snorkeling.

Objective 3. Document juvenile steelhead life history patterns and survival rates from Asotin Creek.

Task a. Electrofish to collect parr and presmolts to PIT tag fish and determine abundance, distribution and survival between life stages.

Task b. Operate a rotary screw trap in Asotin Creek near the adult trap.

Task c. Capture, enumerate and PIT tag steelhead migrants.

Task d. Collect length, weight, and scale samples from steelhead smolts to determine age structure of the population.

Task e. Remove a fin clip and tissue sample from trap mortalities to genetically characterize the population.

Task f. Mark and release known numbers of naturally produced steelhead migrants upstream of the trap to recapture and calibrate trap efficiency.

Task g. Estimate the number of steelhead / salmon smolts annually leaving Asotin Creek.

Objective 4. Evaluate smolt-to-adult return rates and parent to progeny rates of naturally produced steelhead in Asotin Creek.

Task a. Collect information on detected PIT tagged juveniles during downstream migration at Lower Granite Dam etc., and from returning steelhead/salmon detected at Columbia and Snake River dams and sampled in commercial or sport fisheries.

Task b. Estimate smolt-to-adult survival rates based on PIT tag recoveries of adults captured in basin traps

Task c. Determine adult returns produced by natural spawners (parent to progeny rates) to evaluate the status of the steelhead /salmon populations and their response to habitat improvement, and the potential need for LSRCP supplementation in the future.

Task d. Relate salmonid survivals to habitat improvements in the subbasin using monitoring and evaluation data collected by multiple agencies.

Objective 5. Continue steelhead genetic sampling and analysis within the basin to determine the genetic status wild steelhead in the basin and whether hatchery fish have substantially altered the stock.

Task a. Gather steelhead genetic samples from adults and juveniles from other tasks.

Task b. Send the samples to the WDFW genetics lab and conduct DNA analyses.

Objective 6. Coordinate with comanagers the development of a spring chinook reintroduction plan for Asotin Creek.

Task a. Develop a draft spring chinook reintroduction plan based on habitat indices, and chinook stock analysis from historic WDFW and LSRCP data.

Task b. Submit a draft plan to NMFS for review and approval.

Objective 7. Coordinate, compile, analyze and report results.

Task a. Compile and report results monthly or quarterly from each task to interested parties and co-managers within the basin, as well as to BPA.

Task b. Provide annual reports in hardcopy and electronic format to BPA and interested parties within the basin.

Task c. Coordinate all actions with fishery co-managers, watershed coordinators and other interested parties in the basin. Provide written and oral summaries to interested parties as necessary to ensure timely inclusion of results in planning efforts.

Review Comments

This proposal represents an attempt to address the concerns that the ISRP has had for the last 3-5 years relative to Project 199401805. Project 199401805 has provided field measurements of water flows and temperatures, and extensive riparian and upland measurements coupled with WDFW data on salmonid rearing and spawning distribution and abundance. With the extensive planning document and preliminary habitat improvements, the proposed work would build from baseline monitoring and focus on collecting data to address more specific concerns about naturally produced steelhead and general salmonid productivity in Asotin Creek. These data are key elements necessary for watershed and fish stock restoration planning and implementation within the subbasin. The proposed work provides monitoring for proposal 27014. Project addresses RPA 180.

Budget

FY02	FY03	FY04
$316,885.00 Category: High Priority Comments:	$228,600.00 Category: High Priority	$230,430.00 Category: High Priority

Project: - 27009 - SSHIAP - Blue Mountain Province

Sponsor: Washington Department of Fish and Wildlife (WDFW)

Short Description:

Project will provide routed & segmented hydrolayer, and collate and synthesize data on 19 aquatic habitat variables over an estimated 10,000 mi of streams in 2 salmonid-bearing subbasins in the WA portion of this Province.

Abbreviated Abstract

The Salmon and Steelhead Habitat Inventory and Assessment Project (SSHIAP) is a partnership-based information system that characterizes freshwater and estuary habitat conditions and distribution of salmonid stocks in Washington. The SSHIAP system provides a consistent residence, tracking, and data delivery mechanism for these key habitat data elements. To date, SSHIAP efforts have been focused in western Washington; this project reflects the expansion of SSHIAP to the Columbia Plateau Province of eastern Washington. Work under this project will: 1) update the base USGS hydrolayer to reflect current water channel locations, 2) utilize a recently developed GIS program to automate stream segmentation based on physical characteristics and habitat type, 3) assemble and assimilate existing current and historic salmonid habitat in Washington portions of the Blue Mountain Province, and 4) deliver web-based and hardcopy products to users. Project Partners on this effort include: USFWS, Washington

Conservation Commission-Limiting Factors Analysis, and the Washington Department of Fish and Wildlife (lead). All work will be conducted during FYs 2002 and 2003.

Relationship to Other Projects

Relationship to Existing Goals, Objectives and Strategies

1) **Relationship and furthering the goals of the 2000 FWP**:
2000 FWP p. 22 under D. Strategies: *"In general, the purpose of the strategies at the basin level is to allow maximum local flexibility while assuring that subbasin plans follow the best available scientific knowledge, are consistent with one another, and, together, for a well-integrated, well-organized, and comprehensive fish and wildlife program".*

Work under this project is in focused support of the strategies, in that the SSHIAP data system uses scientifically-supported protocols and methodologies, the latest computer technology and programming skills, and robust delivery mechanisms. Further, the stated purpose of this proposal is to assemble, assimilate, and expand upon existing salmonid habitat data sets to provide a consistent, organized, integrated, and comprehensive habitat information base across the Province (as well as across all of Washington).

2000 FWP p. 22 under 2. Linkage of general biological objectives with strategies: *"Because this is a habitat-based program, implementation strategies will vary depending on the current condition and the restoration potential of the habitat for the species and life stages of interest. …… the first consideration in any particular area is the current condition of the habitat for spawning and rearing and the potential for protection or restoration of that habitat for natural production."*

And, FWP p. 25 under 3. Habitat Strategies: *"Primary strategy: Identify the current condition and biological potential of the habitat, and then protect or restore it to the extent described in the biological objectives."*

Under this proposal, SSHIAP is specifically focused on assembling and delivering current and historical habitat conditions for key aquatic and riparian habitat variables at the 1:24,000 scale for approximately 10,000 miles of mainstem Snake River and tributaries in the Blue Mountain Province (for a map of the anadromous ESUs in the Columbia Basin, (see http://www.salmonrecovery.gov/Final_Strategy_Map_2.pdf).

2) Relationship to Subbasin Summaries
There are 2 subbasins within the Washington part of the Blue Mountain Province (Asotin Creek and Grande Ronde). At this time, both of these subbasins have draft subbasin summaries (see http://www.cbfwa.org/files/province/plateau/subsum.htm). Subbasin summaries are a compilation of all the existing information about a subbasin, including past and ongoing fish and wildlife activities, current management plans, and objectives and policies, and are being used to guide project selection. Much of the summary information is helping to fulfill the inventory component of subbasin plans. Problems and general needs relevant to or supported by work done under this proposal include:

Draft Asotin Creek Subbasin Summary p. 40 under Passage/Connectivity - Road Culverts: "The degree to which connectivity limits fish migration and production within the Asotin Creek subbasin is underrepresented by existing data and reports. No data source exists which accurately documents known or potential barriers to fish migration within the subbasin in

a useable and widespread format. Particularly lacking are records of culvert conditions in relation to fish passage, which is believed to be a limiting factor in the Asotin Creek subbasin.";

Draft Asotin Creek Subbasin Summary p.41 under Data Gaps: "The lack of complete …habitat characterization, and assessments limit the ability of managers to establish reliable spawning escapements, assess habitat carrying capacity, and direct in-basin habitat restoration or species recovery actions in the most efficient, cost effective manner.";

Draft Grande Ronde Subbasin Summary p. 160 under General Needs: 2. "Ensure aquatic and terrestrial subbasin databases are compatible and accessible to all parties." And 5. "Development of Federal Recovery Plans for threatened and endangered species to provide recovery guidance for state, tribal and local entities."; And

Draft Grande Ronde Subbasin Summary p. 160 under Aquatic Habitat (enhancement): 1. "Replace culverts that present passage barriers and sediment sources based on a prioritized assessment of existing installations." ; 4. "Using existing assessments, seek out opportunities for cooperative habitat restoration and enhancement projects on public and private land."; 5. "Restore, protect, and create riparian, wetland, and floodplain areas within the subbasin and establish connectivity."; p.161 under Aquatic Habitat (monitoring): 5. "Need to characterize rearing and spawning habitats and monitor changes in amount and distribution."; p. 161 under Aquatic Habitat (planning): 1. "Continue to develop and update watershed assessments at multiple scales (i.e. transect, reach, watershed) to facilitate integrated resource management and planning efforts. Ensure that databases used for the development of assessments are sufficiently maintained and available to relevant entities."

Subbasin Goals supported by SSHIAP: Restore anadromous fish in rivers and streams at levels to support the historical, cultural, and economic practices of the tribes; emphasize strategies that rely on natural production and restore degraded stream and riparian habitat in order to create healthy river systems; protect, restore, and enhance the abundance and distribution of wild summer steelhead, spring chinook, bull trout, and other indigenous fish in the Asotin Creek subbasin to provide non-consumptive fish benefits including cultural and ecological values; maintain, restore, and enhance the quality and quantity of habitat necessary to sustain and restore indigenous fish; restore sustainable, naturally producing populations to support tribal and non-tribal harvest and cultural and economic practices while protecting the biological integrity and genetic diversity of these species in the watershed (Stovall 2001).

Promote the existence of high quality habitats that are protected, degraded habitats that are restored and connected to other functioning habitats, and a system where further degradation of tributary and water quality is prevented; protect, restore, and enhance native anadromous and resident fish populations in the Grande Ronde River Basin; emphasize restoration strategies that rely on natural production and healthy river systems; reclaim the anadromous fish resource and the environment upon which it depends for future generations; conserve, restore, and recover native resident fish populations; protect, enhance, and restore wild and natural populations of spring and fall chinook, summer steelhead, bull trout, shellfish, and other indigenous fish in the Grande Ronde Basin; protect and enhance fish habitat of endemic stocks of resident and anadromous salmonids, and maximize natural fish production potential; productive, healthy, and sustainable wild populations of anadromous spring and fall chinook salmon, summer steelhead, and resident trout populations and protected habitat for their continued viability (Nowak 2001).

Subbasin Objectives supported by SSHIAP: Increase anadromous and resident fish populations through tribal, federal, and state coordinated supplementation, management, and habitat restoration; restrict or eliminate land management activities such as logging, road building, grazing, and mining that are harming the health of riparian ecosystems including water quality degradation, stream habitat degradation, loss of riparian vegetation, streambank destabilization, and altered hydrology; restore riparian ecosystems; restore spawning and rearing habitat; increase native spring chinook salmon to sustainable and harvestable levels or reintroduce spring chinook of appropriate stock to the subbasin - determine the wild escapement goal to meet this objective; increase native summer steelhead to sustainable and harvestable levels - refine the wild fish escapement goal and needs; restore and maintain the health and diversity of bull trout and other resident salmonids to sustainable and harvestable levels - determine the spawning escapement goal and population needs of resident fish; maintain or improve instream flows; meet Washington surface water quality standards for temperature in Asotin Creek; meet Washington surface water quality standards for bacteria in Asotin Creek; address water quality and habitat problems associated with livestock operations; reduce pre-spawner adult mortality; increase incubation success; increase juvenile salmonid survival; manage Asotin Creek as a reserve for wild steelhead (Stovall 2001).

Restore and increase tributary flows to improve fish spawning, rearing, and migration; screen diversions, combine diversions, and rescreen existing diversions to comply with NMFS criteria to reduce overall mortality; reduce passage obstructions to provide immediate benefit to migration, spawning, and rearing; monitor the status of environmental attributes potentially affecting salmonid populations, their trends, and associations with salmonid population status; assess quality of available regional databases, in terms of accuracy and completeness, which represent habitat quality throughout the basin; eliminate barriers to fish passage; improve habitat for migrating, spawning, and rearing anadromous fish; reverse declining trends of bull trout populations in the Grande Ronde River Basin; Increase natural production of anadromous salmonids to meet carrying capacities of the basin; design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserve the genetic integrity of native species, and contributes to attainment of RMOs; cooperate with federal, state, and tribal fish management agencies to identify and eliminate impacts associated with habitat manipulation, fish stocking, fish harvest, and poaching that threaten the continued existence and distribution of native fish stocks inhabiting federal lands; restore and recover historically present fish species; provide for harvestable, self-sustaining populations of anadromous and resident fish species in their native habitat; manage aquatic resources for healthy ecosystem function and rich species biodiversity; integrate aquatic habitat and species management with terrestrial species management; reintroduce and restore coho salmon in the Grande Ronde subbasin; coordinate watershed restoration activities; improve instream habitat diversity for salmonid spawning and rearing; enhance riparian condition (vegetation, function, etc.); improve adult and juvenile salmonid fish passage; improve water quality; achieve a net gain in fish habitat quantity and quality in the subbasin; develop a habitat database that provides a basis for monitoring short- and long-term change; protect and enhance populations of all existing native non-game species at self-sustaining levels throughout their natural geographic ranges by supporting the maintenance, improvement, or expansion of habitats and by conducting other conservation actions; continue to assist landowners/cooperators in meeting local, state, and federal natural resource goals; continue to address fish passage issues related to irrigation diversions; continue to address riparian ecosystem restoration and enhancement (Nowak 2001).

Review Comments

Proposal addresses RPA 154. The reviewers question whether the 75-80% accuracy rate is acceptable and whether the work would be performed at the correct scale. The reviewers express concern that the results may be too coarse and that there should be "ground truthing" before implementing the proposed work. In addition, the reviewers suggest that other techniques (e.g., GAP analysis) provide similar data. The reviewers indicated that there was a lack of coordination with other managers.

Budget

FY02	FY03	FY04
$200,000.00 Category: Recommended Action Comments:	$30,000.00 Category: Recommended Action	$30,000.00 Category: Recommended Action

Project: - 27014 - Protect and Restore the Asotin Creek Watershed

Sponsor: Nez Perce Tribal Fisheries Watershed Program (NPT-FWP)

Short Description:

Contribute to an on-going watershed restoration effort by working in collaboration with private and federal entities to address sedimentation into stream and tributaries from road related sources on forested ground within the watershed.

Abbreviated Abstract

Asotin Creek, a tributary to the Snake River in Water Resource Inventory Area (WRIA) #35 is home to ESA listed stocks of Snake River summer steelhead (Oncorhynchus mykiss), spring chinook (Oncorhynchus tshawytscha), and bull trout (Salvelinus confluentus) and is managed as a wild steelhead reserve by Washington Department of Fish and Wildlife (WDFW). High stream temperatures, sediment deposition in spawning and rearing areas and lack of suitable pools are factors limiting salmonid production as identified by the Asotin Creek Model Watershed Plan (Plan). The indigenous fish species most actively targeted for management in the watershed are summer steelhead and spring chinook salmon. The goals for these species are to restore sustainable, naturally producing populations to support tribal and non-tribal harvest and cultural and economic practices while protecting the biological integrity and genetic diversity of these species.

This new project proposes to complement an on-going watershed restoration and protection effort to address sedimentation into fish habitat from upland forested areas of the watershed. All aspects of the project are performed collaboratively and cost shared with the Umatilla National Forest (UNF), Asotin County Conservation District (ACCD), Washington Department of Fish and Wildlife (WDFW) and private landowners. Local experts in fisheries management have stated prolonged introductions of sediment as a one of the highest limiting factor for chinook, steelhead, and bull trout populations.

FY 2002-06 activities include projects that will continue to move toward reducing sediment deposition in spawning gravels and rearing areas by addressing sediment sources from forest roads on private and Umatilla National Forest land within the watershed. This proposal via a partnering/cost share agreement with the UNF, ACCD and private landowners will obliterate 10 miles of road per year, beginning with 22.04 miles of road that have been identified for obliteration in the Charley Creek subwatershed. Charley Creek, an upper tributary, has been determined to have some of the highest densities of juvenile steelhead in southeastern Washington according to local WDFW fisheries surveys. This project proposes to work with private, WDFW, and the UNF to survey, assess and identify roads for restoration treatment to reduce sediment delivery into Asotin Creek and tributaries.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199401805	Continue Coordination & Implementation of Asotin Creek Watershed Projects	Our project proposal compliments this effort by addressing upland sediment sources due to forest roads.
27002	Assess Salmonids in the Asotin Creek Watershed	This new project proposal will evaluate productivity and survival rates on anadromous and resident fish. Our proposal will reduce sedimentation from forest roads, therefore protecting and restoring fish habitat.

Relationship to Existing Goals, Objectives and Strategies

The objectives of this proposal are to address sedimentation into fisheries habitat due to upland, forest road sources through road obliteration of unneeded roads and working with ACCD and landowners on road related issues.

Long-term M&E will be tiered to project proposal # 19941805, Continue Coordination and Implementation of Asotin Creek Watershed Projects.

Asotin Subbasin Summary

Goals and Objectives

The goals and objectives of the summary are many from many different agencies. This project works towards many of these goals and objectives but for this proposal will focus on the goals and objectives of the Nez Perce Tribe. The goals and objectives of the Nez Perce Tribe that this project proposal strives to meet are listed below:

Goals:

- Restore anadromous fishes to the rivers and streams that support the historical, cultural and economic practices of the Nez Perce Tribe. Emphasize restoration strategies that rely on natural production and healthy river systems
- Protect tribal sovereignty and treaty rights
- Reclaim the anadromous fish resource and the environment upon which it depends for future generations

- Conserve, restore and recover native resident fish populations including sturgeon, west slope cutthroat trout, and bull trout
- Protect Nez Perce cultural resources, including enforcement of ARPA and NAGPRA, Antiquities Act, and other related laws.

Objectives:

- Restore anadromous fishes to historical abundance in perpetuity
- Rebuild resident fish populations in order to restore and sustain traditional subsistence fisheries for native resident fish species
- Produce healthy productive ecosystems, for the increase of anadromous fish populations to parallel the goals and objectives of the Wy-Kan Ush-Mi Wa-Kish-Wit
- Protect, restore, and enhance watersheds and all treaty resources within the ceded territory of the Nez Perce Tribe under the Treaty of 1855
- Coordinate tribal, federal and state supplementation, management, habitat restoration and habitat protection efforts to increase anadromous and resident fish populations.

This project proposal addresses the following RPA actions:

Action #150: In subbasins with listed salmon and steelhead, BPA shall fund protections of currently productive non-Federal habitat, especially if at risk of being degraded, in accordance with criteria and priorities BPA and NMFS will develop by June 1, 2001.

Within the analysis area, steelhead, spring Chinook salmon, and bull trout populations are currently listed as "Threatened" under the Endangered Species Act (ESA).

This project proposal will protect currently productive habitat from being degraded by further mass wasting by obliterating roads no longer needed on the transportation system.

Although a portion of the proposed project does occur on lands administered by the Forest Service, these are lands to which the Tribe has treaty-reserved fishing, hunting, and gathering rights. As such, the Tribe serves as a co-manager of these resources with federal and state resource agencies.

Action #152: The action agencies shall coordinate their efforts and support offsite habitat enhancement measures undertaken by other Federal agencies, states, TRIBES, and local governments.

Funding this project will allow action agencies meet their action objective of supporting important habitat enhancement measures (rd obliteration, barrier culvert replacements) and locations (Nez Perce Tribal Ceded Territory) undertaken by the Nez Perce Tribe. This support will work towards meeting the federal governments trust responsibility to the Nez Perce Tribe.

Review Comments

The proposal addresses RPAs 152 and 400. Monitoring for the proposed work will be performed through Project 199401805 and the LSRCP.

Budget

FY02	FY03	FY04
$121,000.00 Category: High Priority Comments:	$124,600.00 Category: High Priority	$128,400.00 Category: High Priority

Project: - 27025 - Acquire South Fork Asotin Creek Property

Sponsor: Rocky Mountain Elk Foundation (RMEF)

Short Description:

Acquire and protect the 8,500-acre Schlee property in southeastern Washington. This shrub-steppe habitat harbors elk and mule deer, while its streams provide a critical link in the Asotin Creek watershed for federally endangered anadromous fish.

Abbreviated Abstract

The Rocky Mountain Elk Foundation is working to acquire and protect the 8,500-acre South Fork Asotin Creek (Schlee) property, located about 15 miles southwest of Clarkston, Washington. Surrounded by national forest and state lands, the property consists mainly of shrub-steppe rangeland, along with 1,480 acres of Conservation Reserve Program (CRP)/cropland, 40,000 lineal feet of stream waterfront and 400 acres of wetlands. The South Fork of Asotin Creek runs for approximately two miles across one portion of the property and George Creek runs for about 1.5 miles across the other portion.

This key landscape provides high-quality habitat for shrub-steppe-dependent species, and for federally endangered anadromous and critical native fish stocks. Large and small game are abundant, with the property offering important elk winter range and calving grounds. Because of its location adjacent to state and federal lands, the acquisition of this property will facilitate more comprehensive habitat protection and management for the entire Asotin Creek watershed.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
9401805	"Implementation of Asotin Creek Watershed Projects"	Fisheries enhancements within the same watershed
9202602	"Implement Eastern Washington Model Watershed Projects"	Habitat management & improvements within the same watershed
	"Asotin Creek Model Watershed Plan"	Defines needs and prescribes solutions to fish and wildlife habitat concerns within Asotin Creek watershed

The BPA-funded "Asotin Creek Model Watershed Plan" laid the groundwork for determining, prioritizing and implementing habitat conservation and restoration work in the Asotin Creek watershed. This plan will help guide the management recommendations and habitat restoration projects on the Schlee property itself. The acquisition also helps continue the work accomplished through several other BPA-funded projects aimed at improving fish and wildlife habitat in the Asotin Creek region, including "Implementation of Asotin Creek Watershed Projects" (9401805) and "Implement Eastern Washington Model Watershed Projects" (9202602). In addition, WDFW is planning to significantly increase monitoring of both smolt and adult anadromous fish in the Asotin Creek Watershed and has submitted a proposal to BPA for 2002 funding.

Relationship to Existing Goals, Objectives and Strategies

Proposal objectives, tasks and methods

Objective 1: Acquire, protect, maintain, and develop a management plan for 8,500 acres of shrub-steppe, riparian, and fish habitat and related wildlife/fish assemblages within the Asotin Creek watershed by the end of FY 2003.

Tasks & Strategies:

Task a. Complete fee title acquisition of the 8,500-acre Schlee property during 2002. (The landowner has signed a letter of intent to sell.)

Task b. Convey ownership of property to Washington Department of Fish and Wildlife within two years following acquisition of the property.

i. Incorporate the Schlee property into WDFW's wildlife management plans for the Asotin Creek Wildlife Area to ensure consistency with existing regional and local landscape, habitat, and wildlife program goals and objectives. (WDFW will develop the management plan with assistance from the RMEF.)

ii. Coordinate management-planning activities with the Washington Department of Natural Resources, U.S. Forest Service, and private landowners and conduct public outreach activities as required.

Task c. Conduct interim custodial maintenance activities including weed control, fence maintenance, and signage, while management strategies and plans are developed

Task d. Develop a five-year management/implementation plan by the end of FY 2003.

i. Identify and prioritize both terrestrial and fish habitat enhancement needs on the Schlee property and include passive restoration strategies.

ii. Develop habitat restoration goals, objectives, and strategies consistent with management goals, objectives, and programs, such as CRP and anadromous/resident recovery efforts, implemented on adjacent state, federal, and private lands.

iii. Identify and address immediate and long-term habitat quality, protection, and maintenance issues including weed control, perimeter fencing, and wildlife forage production.

iv. Evaluate the Schlee property and surrounding landscape as a potential sharp-tailed grouse restoration site. If warranted, include sharp-tailed grouse habitat management strategies and reintroduction measures in the management plan.

v. Incorporate habitat enhancement project proposals reviewed by the Elk Foundation Project Advisory Committee and funded by the Elk Foundation.
vi. Include the Blue Mountains Elk Initiative's (BMEI) ongoing habitat enhancement and research projects.
vii. Develop public recreational strategies for the Schlee property including hiking, hunting, equestrian, and wildlife watching. (RMEF and WDFW will collaborate on public educational materials.)

Task e. Complete baseline stream and riparian habitat inventories and mapping.
i. Include ripple-to-pool ratios, riparian vegetation, in-stream structure, gradient, fish passage barriers, and unstable bank/erosion areas.
ii. Identify species assemblages occupying stream corridors.

Objective 2: Monitor habitat protection and enhancement efforts and wildlife response to management activities beginning in FY 2003.

Tasks & Methods:

Task a. Evaluate stream conditions: monitor erosion, measure sediment, check water temperature, and survey fish populations using existing protocols established by WDFW.

Task b. Monitor wildlife range utilization and wildlife response to management actions in accordance with existing WDFW protocols.

Task c. Conduct baseline Habitat Evaluation Procedures (HEP)/vegetation transects and monitor habitat quality and results of plan implementation as stated in Appendix A: "Mitigation Project Monitoring and Evaluation Protocols."

Review Comments

Proposal addresses RPA 150 and 153. The sponsor indicated that the land owner is serious about selling the property and that there is a letter of intent and that the property owner has been approached by another party that has indicated that they are interested in purchasing the property if the RMEF purchase does not materialize. The reviewers indicated that the property would not be available for purchase in another three years. The RMEF is actively looking for matching funds to aid in purchasing the property; however, the sponsor indicated that the uncertainty of receiving BPA funds has limited the sponsors ability to secure matching funds. Although the sponsor has coordinated the efforts with the WDFW and has received support fom local sports groups, there has been a lack of coordination with the NPT. The sponsor submitted an addendum to the NWPPC staff during the project presentation in LaGrande, OR; however, the reviewers did not have an opportunity to review the addendum. According to the sponsor, the addendum possessed modified M&E plans as well as a modified budget. Although fish populations could benefit indirectly from the purchase and management of this property, the target species are wildlife populations. The Wildlife Committee rated the project as having significant wildlife benefits using the criteria of permanence, size, connectivity to other habitat, and juxtaposition to public lands. There are potential benefits for listed steelhead.

Budget

FY02	FY03	FY04
$3,489,500.00 Category: High Priority Comments:	$47,000.00 Category: High Priority	$23,000.00 Category: High Priority

Research, Monitoring and Evaluation Activities

Needed Future Actions

The fish and wildlife needs in the Asotin Creek subbasin are similar to those in other subbasins. Research, monitoring, and evaluation are a vital component of the implementation of habitat and species protection, restoration, and recovery work in the subbasin. The most critical needs are associated with either protecting currently productive habitat or restoring degraded habitat for both fish and wildlife resources.

Combined Aquatic and Terrestrial Needs

1. Develop and implement BMPs on agricultural, mining, grazing, logging, and development activities to protect, enhance, and/or restore fish and wildlife habitat, streambank stability, watershed hydrology, and floodplain function.
2. Develop and implement comprehensive and consistent subbasin databases related to both aquatic and terrestrial resources and establish a centralized data repository to promote more effective resource management.
3. Coordinate monitoring and evaluation efforts at the subbasin and provincial level to maximize effectiveness and minimize redundancy.
4. Continue ongoing, and establish new monitoring and evaluation programs for fish supplementation, habitat restoration and improvement, habitat baseline conditions, water quality and water quantity improvements, conditions, and trends.
5. Complete road inventories and assess impacts to aquatic and terrestrial resources. Use information to facilitate transportation planning and to reduce road densities. Support planned road closures on public land, and encourage closure of other roads.
6. Expand the cooperative/shared approach to research, monitoring, and evaluation between tribal, federal, state, local, and private entities to facilitate restoration and enhancement measures.
7. Use appropriate measures (e.g., land purchases, conservation easements, landowner cooperative agreements, exchanges) to acquire lands when opportunities arise for improved habitat protection, restoration, connectivity, and for mitigation of lost fish and wildlife habitat).
8. Protect pristine and significant fish and wildlife habitats directly threatened by subdivision, recreation, or extractive resource uses.
9. Support timely updates and resource inventories related to local land use plans to further prevent degradation of floodplains, wetlands, riparian, and other sensitive areas.
10. Continue to develop watershed assessments at multiple scales to facilitate integrated resource management and planning efforts.

FISH

Water Quality

1. Reduce stream temperature, sediment, and embeddedness to levels that meet appropriate standards for supporting self-sustaining populations of aquatic species.

2. Reduce impacts from agricultural sediment, fertilizer, pesticide loading, confined animals operations, stormwater and road runoff, wastewater effluent, mining, and logging.

Habitat / Passage

1. Protect and restore riparian and instream habitat structure, form, and function to provide suitable holding, spawning, and rearing areas for anadromous and resident fish.
2. Protect, restore, and create riparian, wetland, and floodplain areas within the subbasin and establish connectivity.
3. Inventory and evaluate natural and artificial passage barriers within the subbasin investigating their connectivity between populations, their role in population isolation, and associated passage and flow issues. Remove or modify where aquatic considerations have been met.
4. Improve or re-establish well developed, mature riparian buffers, increased channel stability and sinuosity, and floodplain connectivity throughout the subbasin.
5. Decrease water temperatures and sediment delivery to Asotin Creek.
6. Identify, protect, or purchase critical watershed areas or water rights for the protection of native species and their habitats.
7. Improve instream fish habitat quality and quantity.
8. Improve fluvial geomorphic conditions for attainment of self-sustainable fish populations and reduction of sediment delivery due to streambank erosion.
9. Reduce water temperatures.
10. Reduce upland erosion and sedimentation delivery rates to decrease the percentage of fines in spawning gravels.
11. Continue to implement the Asotin Creek Model Watershed Plan to restore, maintain, or enhance spawning and rearing habitat.
12. Characterize the current productive capacity of the subbasin for salmonid production and recommend minimum and desired annual escapements by species.

Enforcement / Education

1. Better educate the public on issues and policies important to natural resource restoration, protection, and enhancement to encourage meaningful public participation.
2. Improve enforcement of laws and codes related to protection of fish, wildlife and their habitats, through coordinated conservation enforcement activities by the NPT, state, and federal agencies.
3. Ascertain the present level of compliance with screening and passage requirements for the subbasin.
4. Increase efforts to control illegal harvest of ESA listed salmonids.

Data Gaps / Assessment

1. Assess the effect of non-native fish species on resident and migrant salmonid juveniles.
2. Assess the need and response of fish populations to increased marine nutrient availability.
3. Conduct a full assessment of the abundance, distribution, habitat use, life history, biological characteristics, and status of the following species:

    - mountain whitefish
    - bull trout
    - torrent sculpin species
    - margined sculpin
    - Pacific and River lamprey species

- redband trout
- westslope cutthroat trout
- wild steelhead

4. Assess factors limiting the production of spring chinook salmon and the potential for spring chinook reintroduction.
5. Assess factors limiting the production of steelhead.
6. Assess factors limiting the production and sustainability of bull trout.
7. Develop spawner/recruit databases from information collected to determine full seeding levels of spring chinook and steelhead for the subbasin.
8. Determine subbasin-specific hooking mortality rates for juvenile and adult steelhead, bull trout or chinook salmon released in sport fishing seasons.
9. Evaluate catch-and-release effects on whitefish, bull trout, chinook salmon, and resident wild rainbow/redband trout.
10. Conduct on-the-ground assessment of previous actions, current habitat conditions, water quality, and usage.
11. Expand monitoring and assessment activities to improve understanding of bull trout distribution, abundance, life histories, and movements.
12. Conduct data collection efforts to determine quantitative habitat conditions.

Natural Production

1. Initiate a cooperative project to address juvenile and adult passage problems in the subbasin (screens, culverts, diversions).
2. Assess the efficacy of habitat improvement projects within the subbasin to alleviate factors limiting the production of native salmonids.
3. Increase wild steelhead and spring chinook to sustainable levels.
4. Determine escapement and harvest management goals for naturally produced salmonids.
5. Increase deposition of salmonid carcasses and nutrient cycling to enhance ecological productivity.

WILDLIFE

Noxious Weeds

1. Inventory and map the distribution of noxious weeds.
2. Develop and use restoration techniques for noxious weed infested communities.
3. Continue control programs for noxious weeds to restore natural habitat conditions and communities for wildlife species and improve watershed function.
4. Develop an information and education stewardship program for noxious weeds.

Data Gaps / Assessment

1. Inventory potential sharptail grouse habitat; re-introduce sharptail grouse into the subbasin.
2. Develop technique to control pasteurellosis outbreaks, and scabies in free ranging bighorn sheep.
3. Increase deer surveys.
4. Maintain elk surveys.
5. Maintain bighorn sheep surveys.
6. Determine mortality rate and factors for adult bighorn sheep.

Habitat

1. Enhance forage base for elk on Asotin Wildlife Area and National Forest lands.
2. Control the spread of noxious weeds on the Asotin Wildlife Area and within the subbasin.

3. Improve and diversify the vegetative composition of CRP in order to provide better habitat for existing wildlife populations.
4. Improve road closure programs on National Forest lands.
5. Reduce ORV use on National Forest lands.
6. Use controlled burns to improve habitat in the timbered uplands.
7. Acquire important areas of wildlife habitat as they become available.

Actions by Others

Table 1. Subbasin Summary FY - Funding Proposal Matrix

Project Proposal ID	**19940180****5**	**27001**	**27002**	**27009**	**27014**	**27025**
Provincial Team Funding Recommendation	**High Priority**	**High Priority**	**High Priority**	**Recommended Action**	**High Priority**	**High Priority**

Note: + = potential or anticipated effect on subbasin objectives.

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Appendix A: Washington State Water Quality Standards

	Class AA (Extraordinary)	Class A (Excellent)	Class B (Good)	Class C (Fair)
Fecal Coliform	Shall not exceed 50 colonies/100 ml and no more than 10% of samples can exceed 100 colonies/100 ml.	Shall not exceed 100 colonies/100 ml and no more than 10% of samples can exceed 200 colonies/100 ml.	Shall not exceed 200 colonies/ 100 ml and no more than 10% of samples can exceed 400 colonies/100 ml	No limits
Water Temperature	Shall not exceed 16 degrees C (68F) due to human activities. For temperatures Exceeding 16C, activities raising temperatures .3 C will not be allowed.	Should not exceed 18 degrees C (64 F) due to human activities. For temperatures exceeding 18 C, activities raising temperatures .3 C will not be allowed.	Should not exceed 21 degrees C (69F) due to human activities. For temperatures exceeding 21C, activities raising temperatures .3 C will not be allowed.	Temperatures shall not exceed 22 degrees C (71F)
Dissolved Oxygen	Dissolved oxygen shall exceed 9.5 mg/L.	Dissolved oxygen shall exceed 8.5 mg/L.	Dissolved oxygen shall exceed 6.5 mg/L.	Dissolved oxygen shall exceed 4 mg/L.
Total Dissolved Gas	Total dissolved gas shall not exceed 110% saturation	Total dissolved gas shall not exceed 110% saturation	Total dissolved gas shall not exceed 110% saturation	Total dissolved gas shall not exceed 110% saturation
PH	Shall be within a range of 6.5 to 8.5 with human-caused variation of less than .5 units.	Shall be within a range of 6.5 to 8.5 with human-caused variation of less than .5 units.	Shall be within a range of 6.5 to 8.5 with human-caused variation of less than .5 units.	Shall be within a range of 6.5 to 8.5 with human-caused variation of less than .5 units.
Turbidity	Shall not exceed 5 NTU over background turbidity, if background turbidity is 50 NTU or less. If background turbidity exceeds 50 NTU, there can not be an increase greater than 10%.	Shall not exceed 5 NTU over background turbidity, if background turbidity is 50 NTU or less. If background turbidity exceeds 50 NTU, there can not be an increase greater than 10%.	Shall not exceed 5 NTU over background turbidity, if background turbidity is 50 NTU or less. If background turbidity exceeds 50 NTU, there can not be an increase greater than 10%.	Shall not exceed 5 NTU over background turbidity, if background turbidity is 50 NTU or less. If background turbidity exceeds 50 NTU, there can not be an increase greater than 10%.
Toxic, Radioactive, or Other Harmful Material	Shall be below limits, which have potential, singularly or cumulatively, to affect common water uses or sensitive biota.	Shall be below limits which have potential, singularly or cumlatively, to affect common water uses or sensitive biota.	Shall be below limits which have potential, singularly or cumlatively, to affect common water uses or sensitive biota.	Shall be below limits which have potential, singularly or cumatively, to affect common water uses or sensitive biota.
Ammonia	No numerical standards exist, but calculations are made in reference to pH and water temperature	No numerical standards exist, but calculations are made in reference to pH and water temperature	No numerical standards exist, but calculations are made in reference to pH and water temperature	No numerical standards exist, but calculations are made in reference to pH and water temperature
Flow	No numerical standards, but water quality shall meet common water uses.	No numerical standards, but water quality shall meet common water uses.	No numerical standards, but water quality shall meet common water uses.	No numerical standards, but water quality shall meet common water uses.
Sediment	No numerical standards, but water quality shall meet common water uses.	No numerical standards, but water quality shall meet common water uses.	No numerical standards, but water quality shall meet common water uses.	No numerical standards, but water quality shall meet common water uses.
Habitat Modifications	No numerical standards, but water quality shall meet common water uses.	No numerical standards, but water quality shall meet common water uses.	No numerical standards, but water quality shall meet common water uses.	No numerical standards, but water quality shall meet common water uses.

Appendix B: Washington Department of Ecology Proposed Water Quality Standards

The proposed changes to the surface water quality standards will affect many aspects of water quality including: monitoring programs, permits, TMDLs and the WDOE's list of impaired waters [303(d) List]. An overview of the proposed changes follows:

The Classification System – The current classification system of AA, A, B, C and Lake Classes assigns characteristic uses to each class with lower classes supporting fewer uses. The proposed changes in standards will be coupled with the appropriate assignment of uses to waterbodies so that they support the same uses covered under the current Class structure, or a "Use-Based System".
Anti-degradation – The anti-degradation section of the standards is a set of procedures to ensure that beneficial uses are properly supported. It will allow the degradation of high quality waters only where it is necessary and in the overriding public interest and allow waters of unique quality to be set aside from future degradation.
Bacteria Standards – Revise Indicator Bacteria for human health protection.
Dissolved Oxygen Criteria – Revise Dissolved Oxygen Criteria for protection of aquatic life including salmonid spawning, salmonid rearing, and warm water fish spawning and rearing.

Temperature Criteria – Revise Temperature Criteria for protection of aquatic life including Bull Trout & Dolly Varden; Salmon, Steelhead and Cutthroat Spawning; Salmon, Steelhead, and Cutthroat Rearing; Non-anadromous Rainbow Trout; Warm Water fish spawning and rearing.

Ammonia Standard - Apply new EPA acute ammonia criteria values to all freshwater and apply the new EPA chronic values to non-salmonid waters, and continue to use existing chronic criteria in salmonid waters.

Appendix C: USFS Management Strategy Definitions

The Land and Resource Management Plan for the Umatilla National Forest divides the Forest into 25 different land management strategies. Eleven of these strategies apply to the Asotin Creek subbasin. For more detailed descriptions, refer to the Umatilla National Forest Land and Resource Management Plan Final Environmental Impact Statement.

Management Strategy A4, Viewshed 2: Manage the area seen from a travel route, use area, or body of water where some forest visitors have a major concern for the scenic qualities (sensitivity level 2) as a natural appearing, to slightly altered landscape.

Management Strategy A6, Developed Recreation: Provide recreation opportunities that are dependent on the development of structural facilities for user conveniences where interaction between users and evidence of others is prevalent.

Management Strategy A9, Special Interest Areas: Manage, preserve, and interpret areas of significant cultural, historical, geological, botanical, or other special characteristics for educational, scientific, and public enjoyment purposes.

Management Strategy C1, Dedicated Old Growth: Provide and protect sufficient suitable habitat for wildlife species dependent upon mature and/or overmature forest stands, and promote a diversity of vegetation conditions for such species.

Management Strategy C3, Big Game Winter Range: Manage big game winter range to provide high levels of potential habitat effectiveness and high quality forage for big game species.

Management Strategy C3A, Sensitive Big Game Winter Range: Manage big game winter range to provide high levels of potential habitat effectiveness and high quality forage for big game species (at or above the current levels).

Management Strategy C4, Wildlife Habitat: Manage Forest lands: provides high levels of potential habitat effectiveness for big game and other wildlife species with emphasis on size and distribution of habitat components (forage and cover areas for elk, and snags and dead and down materials for all cavity users). Unique wildlife habitats and key use areas will be retained or protected.

Management Strategy C5, Riparian (Fish and Wildlife): Maintain or enhance water quality, and produce a high level of potential habitat capability for all species of fish and wildlife within the designated riparian habitat areas while providing for a high level of habitat effectiveness for big game.

Management Strategy C8, Grass Tree Mosaic (GTM): On areas known as grass-tree mosaic (GTM), provide high levels of potential habitat effectiveness, high quality forage for big game wildlife species, visual diversity, and protect erosive soils.

Management Strategy D2, Research Natural Area: Preserve naturally occurring physical and biological units where natural conditions and processes are maintained, insofar as possible, for the purposes of: 1) comparison with those lands influenced by man, 2) provision of educational and research areas for ecological and environmental studies, and 3) preservation of gene pools for typical and rare and endangered plants and animals.

Management Strategy E2, Timber and Big Game: Manage Forest lands to emphasize production of wood fiber (timber), encourage forage production, and maintain a moderate level of big game and other wildlife habitat.

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