

Big Canyon Creek Multi-layer Riparian Inventory

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Introduction

The Nez Perce Soil & Water Conservation District (NPSWCD) prioritized the Big Canyon Creek watershed for water quality and fish habitat based on fish distribution data (Kucera, 1986) and the Clearwater Subbasin Summary (Northwest Power Planning Council, 2001).

The NPSWCD identified the need for a reconnaissance level riparian inventory in order to identify and prioritize riparian areas for treatment. The inventory was completed on 182 miles of mainstem Big Canyon Creek and its tributaries. Little Canyon Creek and its tributaries were not included. The inventory was completed through a watershed habitat restoration contract funded by Bonneville Power Administration's (BPA) Fish and Wildlife Program.

Inventory Objectives

- 1) Determine the condition of existing riparian areas.
- 2) Determine extent and location of riparian areas needing treatment.
- 3) Prioritize areas for enhancement and restoration.

Background- Watershed Description

The Big Canyon Creek watershed begins at Mason Butte in Lewis County near the farming communities of Craigmont and Winchester, Idaho. It flows in a northerly direction for 31 miles through the Camas Prairie before draining into the Clearwater River approximately two miles north of Peck, Idaho (Figure 1). Elevation ranges from 4,639 feet at Mason Butte to 950 feet at the town of Peck. Average annual precipitation varies with the elevation, but ranges from 20 to 28 inches per year.

The approximately 85,000 acre watershed includes 51,000 acres in Lewis County and 34,000 acres in Nez Perce County. The watershed is divided into three subwatershed areas: Nichols Canyon, Sixmile-Posthole Canyon, and Cold Springs. Major drainages in the watershed include Little Canyon, Cold Springs Creek, Posthole Canyon, Sixmile Canyon, Nichols Canyon and several unnamed tributaries. Little Canyon Creek enters Big Canyon Creek about two miles upstream of the Clearwater River confluence.

The majority of land (85%) within the watershed is privately owned. The Nez Perce Tribe owns almost 8,000 acres, with the majority of those acres leased to non-tribal members.

Rolling plateaus of non-irrigated cropland typify the watershed's upland areas. Agricultural land comprises over 60% of the watershed acres. After leaving the uplands, drainages then flow through U-shaped canyons with steep walls. Many of these canyon areas are classified as rangelands. Big Canyon's rangeland areas and

relatively inaccessible canyon floor are moderately to heavily grazed. The 13% of forestland acres in the watershed are usually on the steep canyon slopes and drainages. These areas have been historically and/or recently logged. Riparian vegetation is generally sparse in the accessible areas of the watershed (Table 1).

Figure 1.

Big Canyon Creek watershed location map.

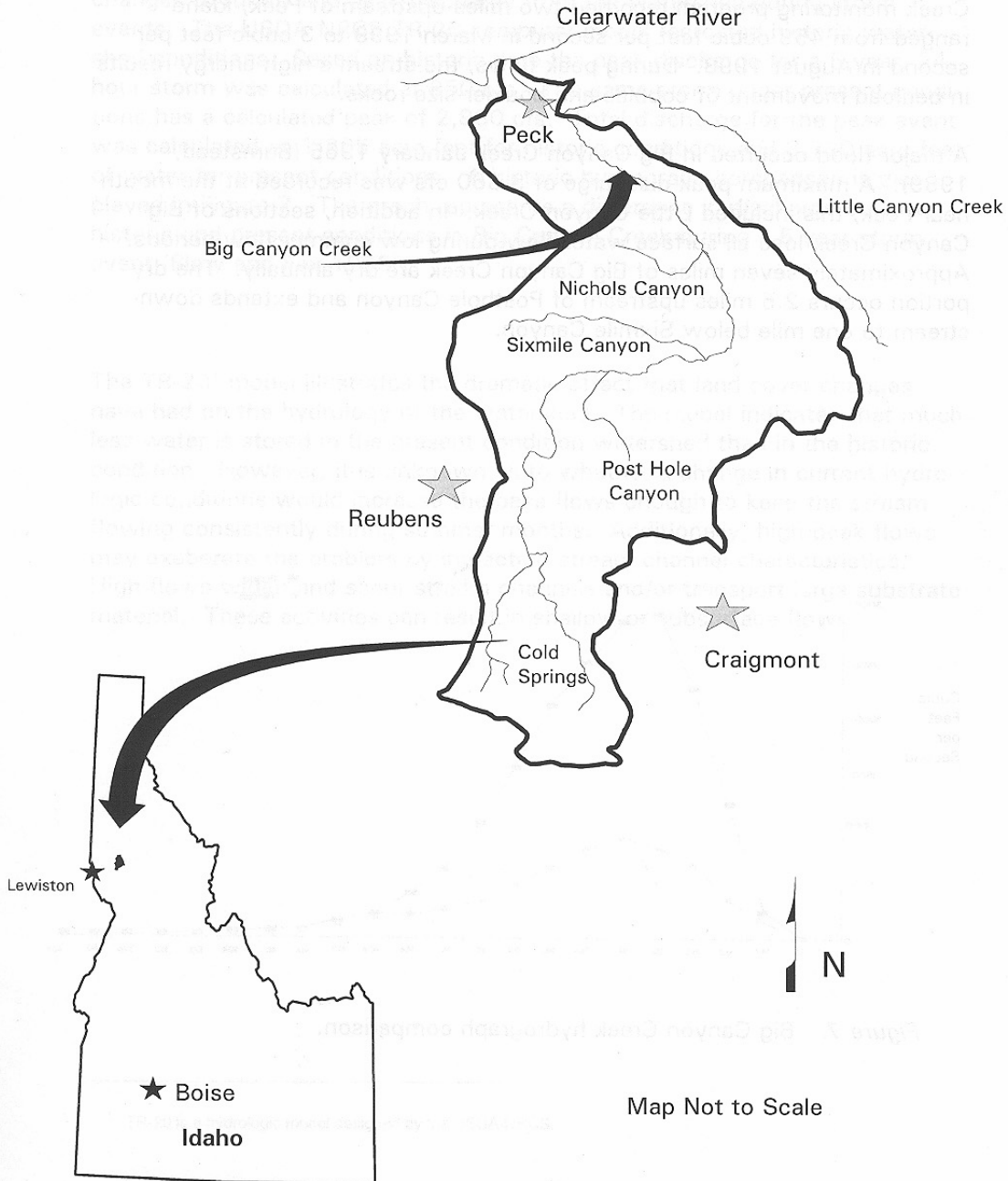


Table 1. Watershed Land Use

Land Use	Big Canyon Creek Watershed	Cold Springs	Sixmile-Posthole Canyon	Nichols Canyon
Cropland (Ac)	51,380	10,604	28,559	12,217
Pastureland (Ac)	2,417	1,684	704	29
Rangeland (Ac)	20,209	15	9,819	10,375
Forestland (Ac)	10,783	2,165	7,099	1,519
Urban (Ac)	214	0	0	214
Total (Acres)	85,003	14,468	46,181	24,354

Slopes from in the watershed range from 3-25%. Cropland soils on the upland areas include Nez Perce and Uhlorn, which were formed under prairie conditions and Taney, Setters, and Southwick loams which were originally forested, but cleared of timber to allow for cultivation (Hahn, unpub). The prairie soils are moderately well drained, however, the subsoil clay reduces permeability which results in springtime saturated soils and subsequent increased soil erosion.

Cut-over timber soils, specifically the Taney soils, also have a fragipan subsoil characteristic which restricts water and root movement into the subsoil. Setters subsoils have a high clay content which also results in low water permeability. During wet periods, perched water tables in these soils move water laterally down slope, thereby producing sidehill seeps. Often, the naturally low pH of the cut-over soils is further depressed by the application of acidifying nitrogen fertilizers. For pH below 5.5, soil aggregation may also be decreased, leading to increased soil losses and sediment delivery.

Gwin, Kettenbach, Meland, and Riggins, the major rangeland soils, are well drained and contain large amounts of rock fragments which limit their cropland and grazingland use. Lack of grazing management during the wet periods can result in compaction and downslope soil movement on steep slopes.

Forestland soils in the watershed include Klickson and Keuterville with Agatha inclusions. The soils are well drained and found on steep north and east canyon sideslope aspects. These soils have severe sedimentation potential when disturbed. Primary soil disturbance is generally due to logging activities.

The Big Canyon Creek watershed provides important habitat for both anadromous and resident fish. Anadromous fish species identified in the watershed include wild Snake River Basin A-run steelhead, Snake River fall chinook salmon, and possibly the recently reintroduced coho salmon. Resident fish include rainbow trout, brook trout, speckled dace, chiselmouth, northern squawfish, redbside shiner, bridgelip sucker, and paiute sculpin (Fuller et al, 1986). As with many anadromous streams in the Columbia River Basin, salmon and steelhead populations have declined significantly from historic levels (Idaho Department of Fish and Game et al.2000).

Both the steelhead and fall chinook salmon are listed as “threatened” by the National Marine Fisheries Service (NMFS) under the Endangered Species Act (ESA). The ESA considers both the fall chinook salmon and the steelhead within the Clearwater subbasin to be part of the Snake River evolutionary significant unit (ESU). Since chinook primarily spawn below the North Fork Clearwater confluence (Garcia et al, 1999), Big Canyon Creek’s habitat and water quality play a significant role in the overall long-term success. Considerable potential exists for improving anadromous fish populations in Big Canyon Creek (Kucera et al. 1983).

Problem History

Clearwater Subbasin Summary Draft (2001) states one subbasin-wide primary limiting factor for resident salmonid populations is the impact of land management activities on stream hydrology, sedimentation, habitat distribution and complexity, and water quality (Columbia Basin Fish and Wildlife Authority, 1999). For the lower Clearwater Assessment unit, the identified limiting factors are temperature, base flow, flow variation, sediment, watershed disturbances, habitat degradation, exotics, and connectivity/passage (Columbia Basin Fish and Wildlife Authority, 1999). In the Big Canyon watershed, low stream flows and a lack of adequate multi-layered riparian vegetation have reduced the suitability of the creek and its tributaries as quality spawning and rearing habitat. In addition, sediment, nutrients, and bacteria from existing land-use practices are adversely impacting water quality (NPSWCD, 1995).

Methods

This reconnaissance level riparian inventory procedure was developed by the USDA-Natural Resources Conservation Service (NRCS) and adapted by NPSWCD.

“Multi-layer” is defined as having all of the following vegetative types: grass, forb, shrub, and tree. The woody component can be either shrub or tree, or both. A single line of tree is not considered meeting the 15 feet wide condition, even if the crown of the tree is wider than 15 feet. Condition ratings are for riparian areas identified as possibly having multi-layers during the aerial photo interpretation. Any riparian area that does not have multi-layered vegetation will be categorized either as bare-m, meaning that is not multi-layered and has only one type of vegetation due to management practices (timber harvest, cropland, pasture), or simply bare, meaning that there is no vegetation or only one type of vegetation.

Condition of the existing riparian areas were classified as multi-layered or not, using the following categories:

- a) <15ft: Less than 15 feet of multi-layered vegetation.
- b) >15ft: Greater than or equal to 15 feet of multi-layered vegetation.
- c) Bare-m: Not multi-layered (consists of only one of the vegetative types) or no vegetation due to management practices.
- d) Bare: No vegetation.

The inventory was completed using the following steps:

- 1) 1999 United States Government Services Digital Ortho-Quads and topographical maps were used to identify riparian areas.
- 2) Data was entered into ArcView-GIS as an overlay.
- 3) The aerial photo was field checked:
Completing field visits to accessible points in the watershed and determining if the aerial photo category was correct.
- 4) Results from the field evaluation were compared to the aerial photo interpretation.
- 5) Approximately 50% of the areas in the watershed were field investigated. The difference between the aerial photo interpretation and the field survey were minimal, about 5% (4 incorrect out of 82). The changes were never drastic, usually from <15ft to >15 ft or bare to <15ft.
- 6) The ArcView-GIS overlay was altered to incorporate the field inventory changes (Figure 2).

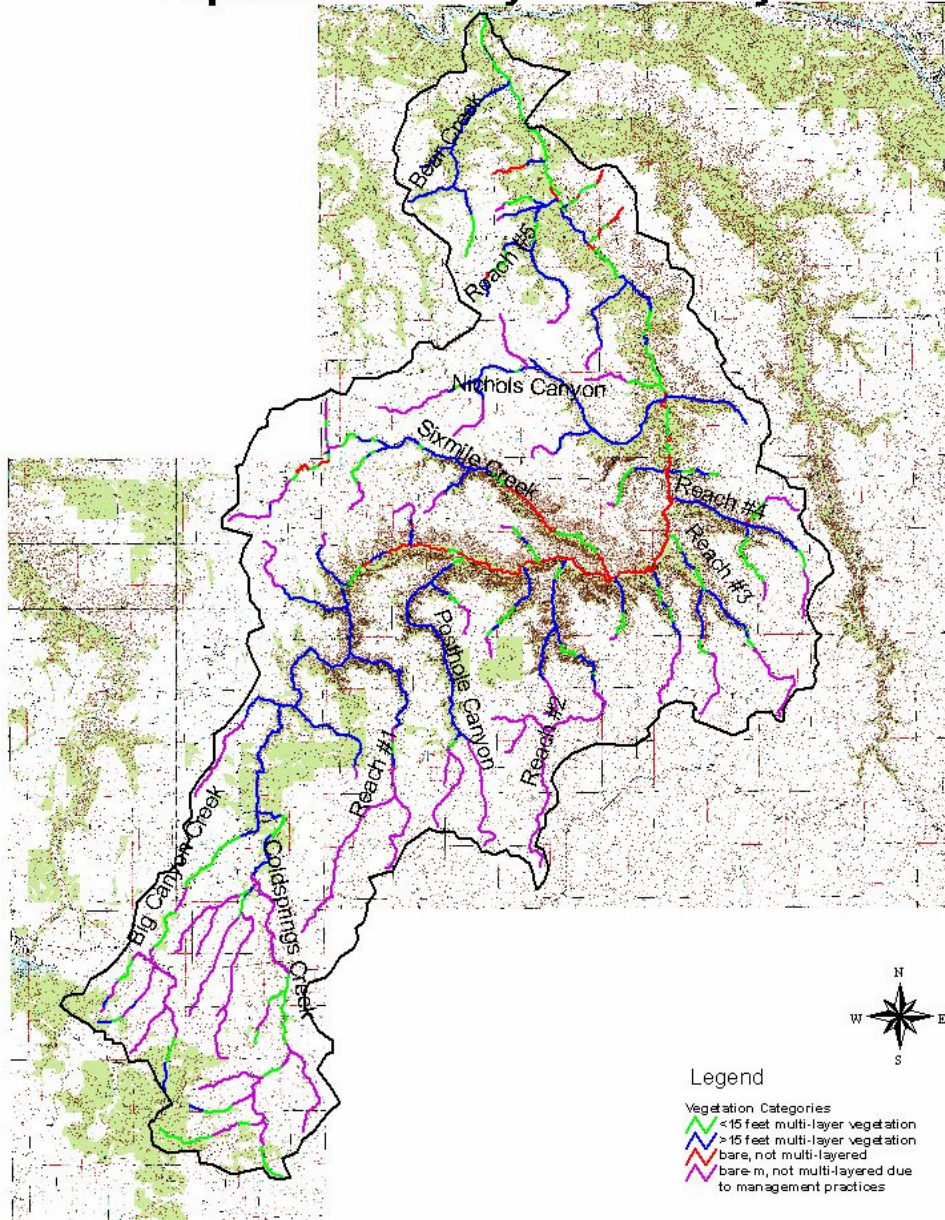
Data Summary

Table 2- Data summary.

Stream/Reach	Total miles	<15	>15	Bare-m	Bare
Big Canyon Creek	154.56	20%(30.6mi)	33%(51.1mi)	39%(59.86mi)	8%(13mi)
Mainstem Big Canyon Creek	39.3	31%(12.1mi)	29%(11.2mi)	25%(10mi)	15%(6mi)
Bear Creek	6.1	14%(0.9mi)	86%(5.2mi)	0	0
Reach #5	6.97	23%(1.6mi)	60%(4.2mi)	2%(0.17mi)	15%(1mi)
Nichols Canyon	12	2%(0.2mi)	61%(7.3mi)	37%(4.5mi)	0
Reach #4	7.29	29%(2.1mi)	41%(3mi)	1%(0.09mi)	29%(2.1mi)
Reach #3	8.3	20%(1.6mi)	36%(2.8mi)	44%(3.9mi)	0
Sixmile Canyon	14.4	26%(3.7mi)	28%(4mi)	19%(2.8mi)	27%(3.9mi)
Reach #2	12	7%(0.7mi)	28%(3.5mi)	65%(7.8mi)	0
Posthole Canyon	11.5	7%(0.7mi)	44%(5.1mi)	49%(5.7mi)	0
Reach #1	9.3	2%(0.2mi)	29%(2.7mi)	69%(6.4mi)	0
Cold Springs Creek	27.4	25%(6.8mi)	8%(2.1mi)	67%(18.5mi)	0

Figure 2.

Big Canyon Creek Riparian Multi-layer Inventory



Conclusions

Objective 1- Determine the condition of existing riparian areas:

- A total of 154.56 miles were surveyed.
- 33% of the surveyed miles have >15 feet riparian vegetation.
- 20% of the mile surveyed have some vegetation but need a wider riparian area.
- 8% of miles surveyed are non-vegetated due to flooding and other natural occurrences.
- 39% of miles surveyed miles are non-vegetated due to management practices (timber harvest, cropping, grazing).

Objective 2- Determine the extent and location of riparian areas needing treatment.

- Treatment areas are listed as those with bare-m, bare, then < 15 LF. Locations are identified in figure 2. Extents are listed in table 2.
- Table 2 illustrates the data summary.

Objective 3- Prioritize areas for treatment.

High- 59.86 miles of non-vegetated areas due to management.

Medium- 13 miles of non-vegetated; 30.6 miles of less than 15 feet wide.

Low- 51.1 miles of 15 feet wide multi-layered vegetation.

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