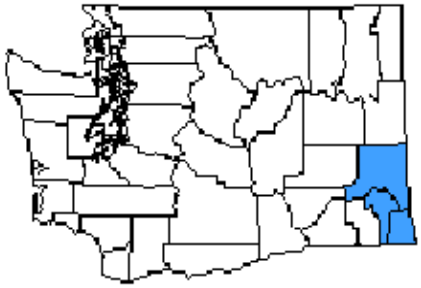
Brief Assessment of Salmonids and Stream Habitat Conditions in Snake River Tributaries of Asotin, Whitman and Garfield Counties in Washington

March 2001-June 2003 - Final Report



By

Glen Mendel, Jeremy Trump, Chris Fulton, and Mike Gembala
Washington Department of Fish and Wildlife
Fish Program - Fish Management Division
529 West Main Street, Dayton, WA 99328

For

Salmon Recovery Funding Board, Olympia, Washington
IAC Contract # 00-1696N

In Cooperation With

Asotin Conservation District - Clarkston, Washington
Garfield Conservation District - Pomeroy, Washington
Palouse Conservation District - Pullman, Washington
Whitman Conservation District - Colfax, Washington

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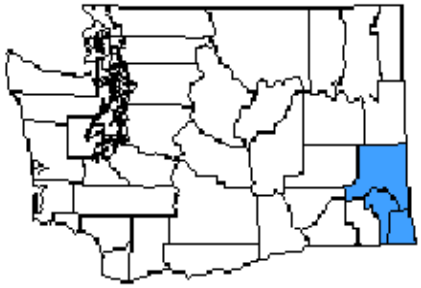

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Acknowledgments

Funding and equipment for this study was provided by a number of different entities. The Salmon Recovery Funding Board and the Interagency Committee for Outdoor Recreation (IAC), Olympia, Washington, granted and administered, respectively, primary funding for this study. Additional funding in terms of in-kind labor, and/or equipment was provided by the Washington Department of Fish and Wildlife, the Asotin County Conservation District, the Garfield Conservation District, the Palouse Conservation District, and the Whitman Conservation District. This study would not have been possible without those contributions.

Many individuals assisted with this project. We would like to thank Rollie Geppert and Tara Galuska (IAC contract coordinators) for their assistance and support during this study.

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We would like to extend thanks to the following WDFW personnel who contributed their efforts in collecting, entering, and summarizing data: Dave Karl, Rey Weldert, Mark Tuttle, Kristin Lyonnaise, Edward "Ty" Tyynismaa, and Jeff McCowan.

Perhaps most importantly, we would like to thank all of the private landowners who gave permission for field activities to be carried out on their property. Without access to the streams on private property, this study would not have been possible.

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Executive Summary

Little documentation exists regarding stream habitat conditions or salmonid abundance and distribution in many of the small tributaries of the Snake River, or George Creek, within Asotin, Garfield and Whitman counties of Washington. This project is an extension and continuation of the brief assessments of salmonids and their habitats in Asotin County (Mendel et al. 2001). The Washington Department of Fish and Wildlife (WDFW) entered into a cooperative effort with the Asotin, Pomeroy, Palouse, and Whitman conservation districts to conduct brief assessments of several small streams that are tributaries of the Snake River, or in the George Creek watershed of Asotin Creek, to begin development of baseline information about fish and their habitat conditions. The study streams included Tenmile, Couse and George creeks, and their tributaries, in Asotin County, Meadow and Deadman creeks, and their tributaries, in Garfield County, and Wawawai, Steptoe, Almota, Penawawa and Alkali Flat creeks, and their tributaries, in Whitman County.

WDFW submitted a proposal to the Washington State Salmon Recovery Funding Board for partial funding of this project for 2001 and 2002. The fieldwork was later extended through June 2003. The Conservation Districts provided cost share by contributing services (by obtaining authorization for access from private landowners or providing landowner contact information) or materials (temperature monitors). WDFW provided substantial cost share in the form of goods and services (with many donated man-hours) for the fieldwork, as well as the data summarization and report preparation.

Our brief assessment efforts consisted of the following: 1) in April or May we conducted steelhead spawning surveys, took streamflow measurements, and deployed temperature monitors; 2) in summer or early fall we electrofished various sites to determine fish distribution and relative abundance, downloaded temperature monitors, and took streamflow measurements; 3) in fall we retrieved temperature monitors and took streamflow measurements; 4) we also developed and conducted a habitat survey during the spawning surveys (as a late addition to our other efforts). We also collected tissue samples from some adult or juvenile steelhead to begin assessing genetic characteristics of these populations.

The streams in this study are mostly on privately owned lands and generally have low stream flows (usually < 1.5 cfs) during summer and fall. Maximum temperatures are often marginal during summer, and some areas have temperatures that are lethal to salmonids. Passage problems exist on several streams.

Steelhead/rainbow trout were found in nearly every stream sampled, although in some cases they were in very low abundance. We were unable to confirm steelhead spawning in Steptoe, Meadow, or Alkali Flat creeks. We found higher than expected steelhead spawning abundance in Tenmile, George and Almota creeks. Steelhead production in Penawawa, Deadman and Wawawai is likely quite low.

We make recommendations regarding needed additional monitoring of fish use and habitat conditions in these streams for the future.

Introduction

Concerns about the decline of native salmon and trout populations have increased among natural resource managers and the public in recent years. As a result, a multitude of initiatives have been implemented at the local, state, and federal government levels. These initiatives include management plans and actions intended to protect and restore salmonid fishes and their habitats.

In 1997, Snake River summer steelhead (*Oncorhynchus mykiss*) were listed as "Threatened" under the Endangered Species Act (ESA). This and other ESA listings have emphasized the need for information about threatened salmonid populations and their habitats.

The Washington Department of Fish and Wildlife (WDFW) is entrusted with "the preservation, protection, and perpetuation of fish and wildlife....[and to] maximize public recreational or commercial opportunities without impairing the supply of fish and wildlife (WAC 77.12.010)." In consideration of this mandate, the WDFW submitted a proposal to the Washington State Salmon Recovery Funding Board to assess salmonid distribution and habitat conditions in some small Snake River tributaries in Southeast Washington.

In 2001, the WDFW Fish Management office in Dayton, WA, began a monitoring project to investigate fish populations and habitat in tributaries of the Snake River and in George Ck, an Asotin Ck tributary, within Asotin, Garfield, and Whitman counties in cooperation with their respective county Conservation Districts and the Washington State Salmon Recovery Funding Board (through the Interagency Committee for Outdoor Recreation –IAC). The purpose of this project was to continue the monitoring efforts begun with the Asotin County Conservation District (ACD) in 2000, and collect similar initial baseline data for streams within the Garfield Conservation District (GCD), Palouse Conservation District (PCD) and Whitman Conservation District (WCD).

Information collected during this project will be useful to government agencies and land managers as future decisions are made regarding fish management, land use, and habitat restoration within Asotin, Garfield, and Whitman counties. Landowners and managers may also benefit from increased access to grants because of the documented presence of steelhead and an assessment of habitat conditions.

Study Purpose and Objectives

The purpose of this study was to assess salmonid relative abundance and distribution, and obtain general habitat information for selected Asotin Creek or Snake River tributaries within Asotin, Garfield, and Whitman counties. This study continued the work carried out in 2000 within Asotin County (Mendel et al., 2001), and began similar efforts within Garfield and Whitman counties. For most of the selected streams, fish or fish habitat data have never been collected previously. Similar surveys are being conducted in the Walla Walla Basin (Mendel et al., 2003). The objectives of this project were to perform baseline monitoring of salmonid populations and their habitats by 1) conducting spawning surveys and electrofishing surveys to determine relative abundance and distribution of steelhead or resident redband trout, 2) monitoring water temperature throughout the spring, summer and fall, 3) collecting stream discharge information during the spring, summer, and fall, and 4) conducting a general habitat inventory. We also collected some genetic samples from steelhead in these streams.
Specific objectives for this project included the following:

- Conduct steelhead spawning surveys to determine spawn timing, distribution and relative abundance;
- Establish constant recording temperature data loggers to monitor water temperatures and evaluate their potential effects on salmonid survival, passage, spawning and rearing.
- Conduct periodic stream discharge measurements during the spring, summer, and fall to document the availability of water for fish use.
- Conduct electrofishing in the spring or summer to determine fish abundance and distribution in each stream.
- Collect general habitat inventory information to help identify limiting factors in each stream.
- Collect genetic samples from steelhead for use in stock assessment.

Methods

Study Area

The study area encompasses selected Snake River tributaries, plus the George Creek system in the Asotin watershed, in the following three counties of southeastern Washington: Asotin, Whitman and Garfield. We focused on these tributaries because little or no information existed regarding salmonid use or habitat conditions (Figure 1).

Stream Reaches

Representative stream reaches were identified based on general physical characteristics and readily identifiable landmarks. General physical characteristics included: slope, width, depth, and temperature; as well as, predominant adjacent land uses. Landmarks included towns, roads, and bridges.

Individual Site Selection

Most of the study streams are in private ownership; therefore it was necessary to obtain permission from landowners to access potential sites. Owners of property bordering the study streams were identified from county assessment records, or from information provided by the Conservation Districts. Landowners were then contacted in person, by telephone, or by mail for authorization to access the streams. For convenience, public land was utilized whenever possible. Study sites were distributed to comprehensively cover most of the study streams (Appendix A). Sites are listed and identified in order from upstream to downstream.

River miles were determined by measuring 1:24000 USGS topographic maps with a digital map wheel from the confluence of each stream to the study site. These locations should be considered approximate due to the limited precision of this method.

Electrofishing sites were selected randomly from access areas. Selections of top and bottom net locations were also randomized. Site lengths sometimes had to be modified to avoid unsuitable stream features, such as deep pools, rapids, multiple channels, and/or for safety concerns.

Habitat Assessment

Stream Flows

Stream discharge was measured manually at selected sites according to standard techniques (Armour and Platts 1983) using a Swoffer model 2100 flow meter. Discharge was calculated in cubic feet per second (cfs) with a Quattro Pro spreadsheet.

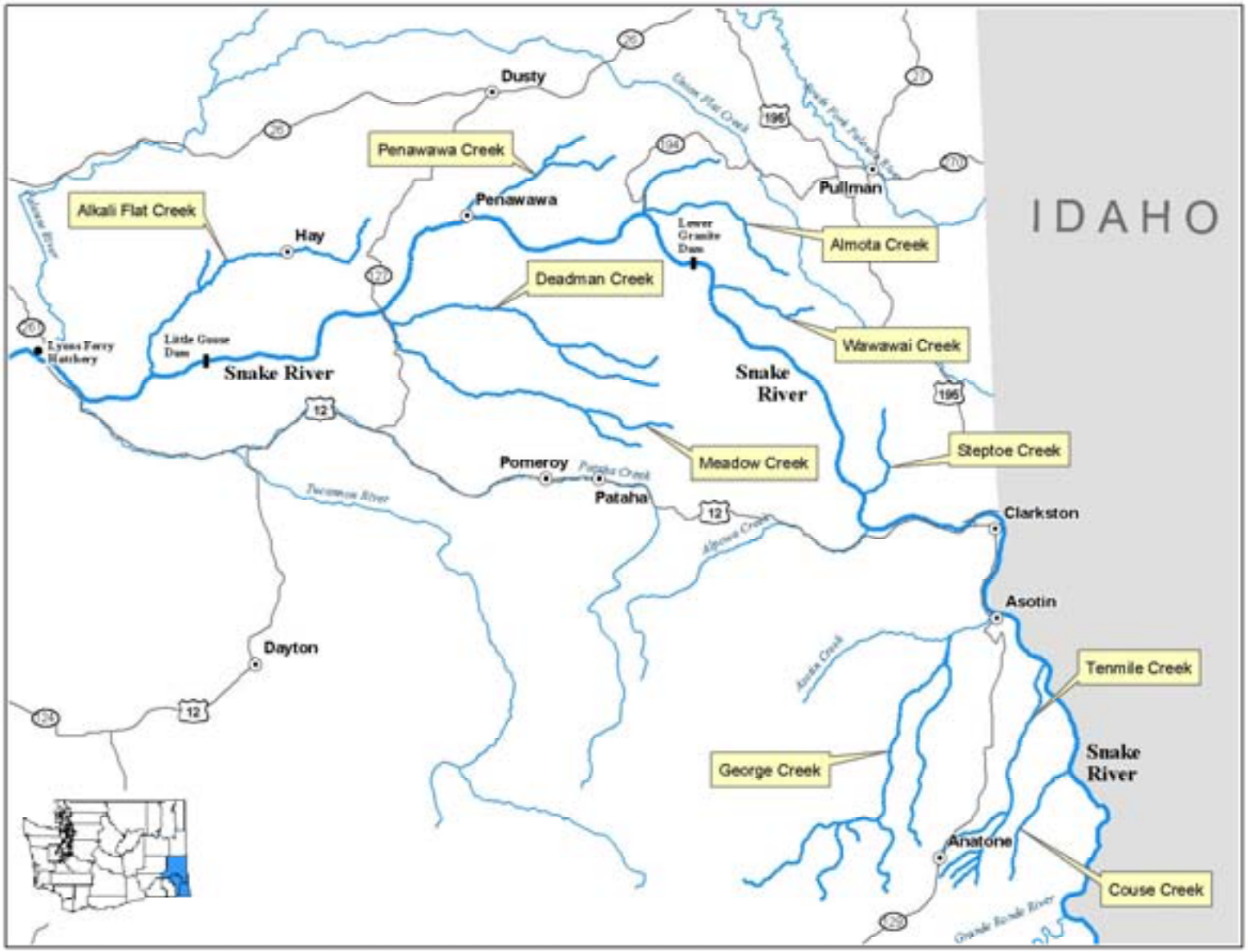

Figure 1. Vicinity map showing study streams and major landmarks in southeast Washington.

Stream Temperatures

We used two methods to collect water temperatures. Water temperature (°F) was measured manually at each site using standard field thermometers. The second method involved the use of temperature data loggers (Onset Corporation, Optic StowAway, or TidbiT Temp Data Logger®), which were set to continuously measure temperatures in °F at 30 minute intervals. The monitors were placed at sites throughout the study area (Appendix A, Figures 2-9). WDFW maintained the temperature monitors and downloaded the data using an Optic Stowaway Shuttle®. Temperature data were downloaded from the shuttle into Boxcar 4.0 software. Boxcar 4.0 was used to calculate daily minimum, maximum, and mean temperatures, which were exported to Quattro Pro spreadsheets. Data in Quattro Pro was used to make graphs showing minimum, maximum, and mean temperatures (Appendix B). The accuracy of field thermometers and data loggers was evaluated using a certified laboratory calibrated thermometer (Kessler Instruments).

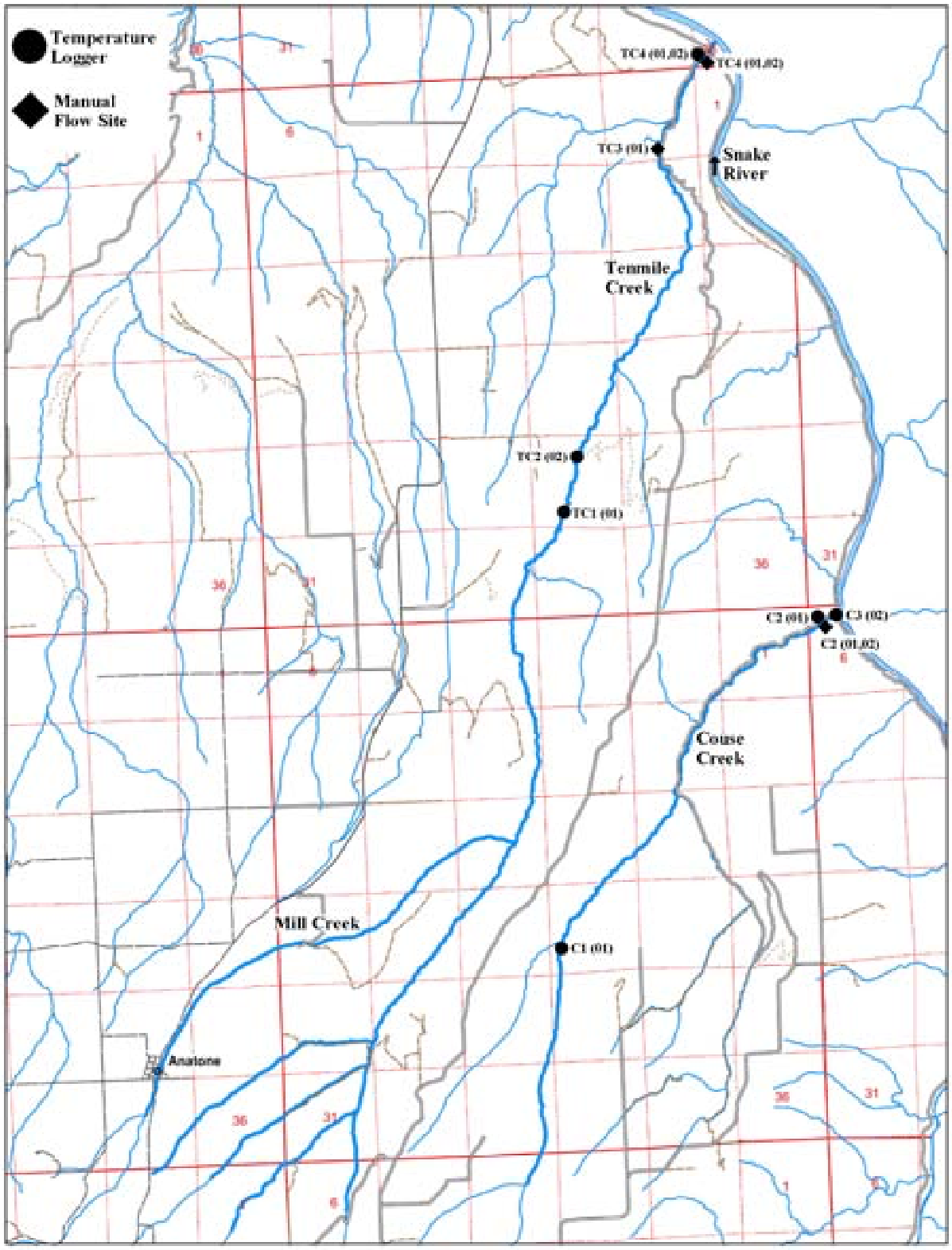

Figure 2. Relative locations of temperature loggers and manual flow sites in Tenmile and Couse Ck (sample year indicated in parentheses).

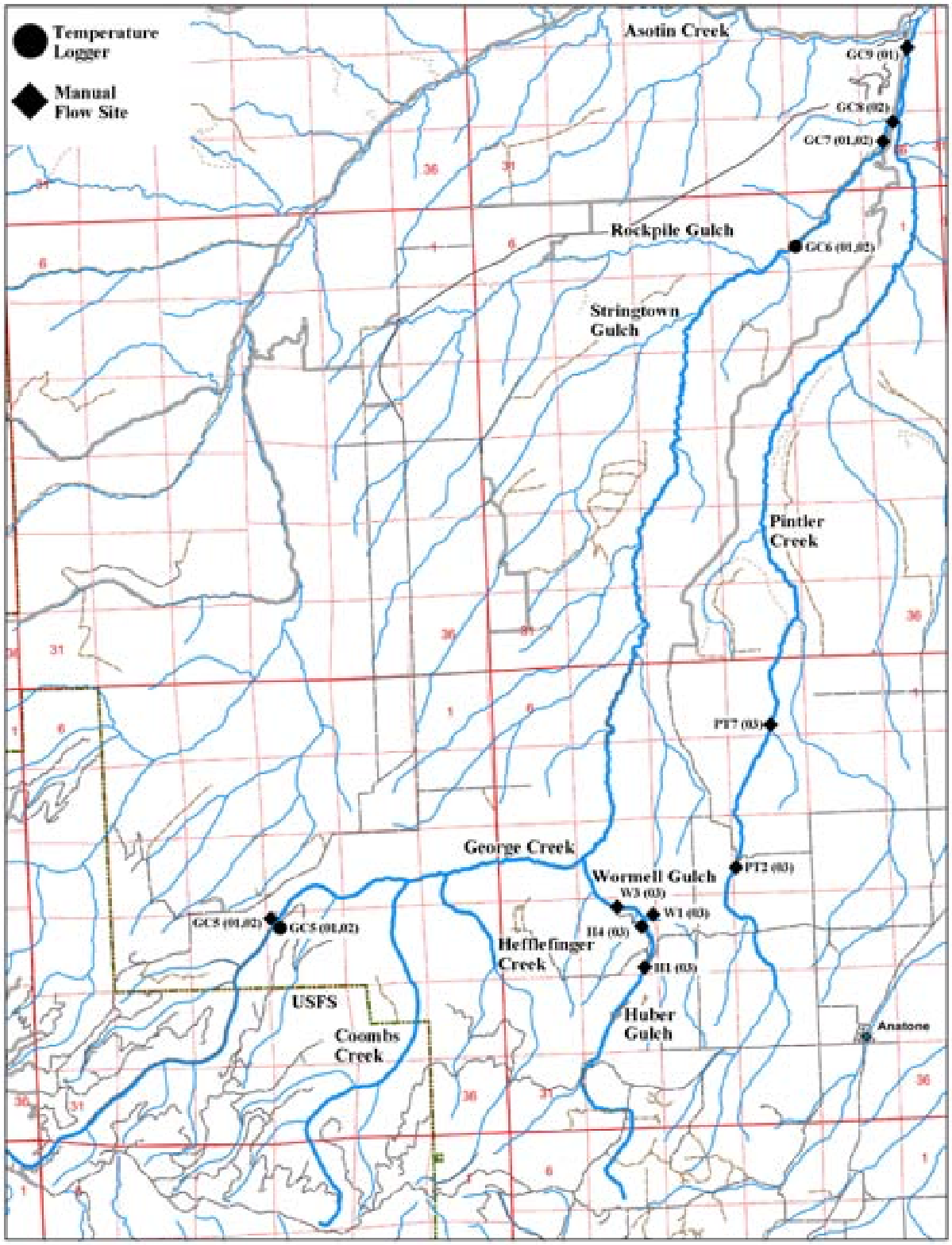

Figure 3. Relative locations of temperature loggers and manual flow sites in George Ck., Huber Gulch, Wormell Gulch, and Pintler Ck (sample year indicated in parentheses).

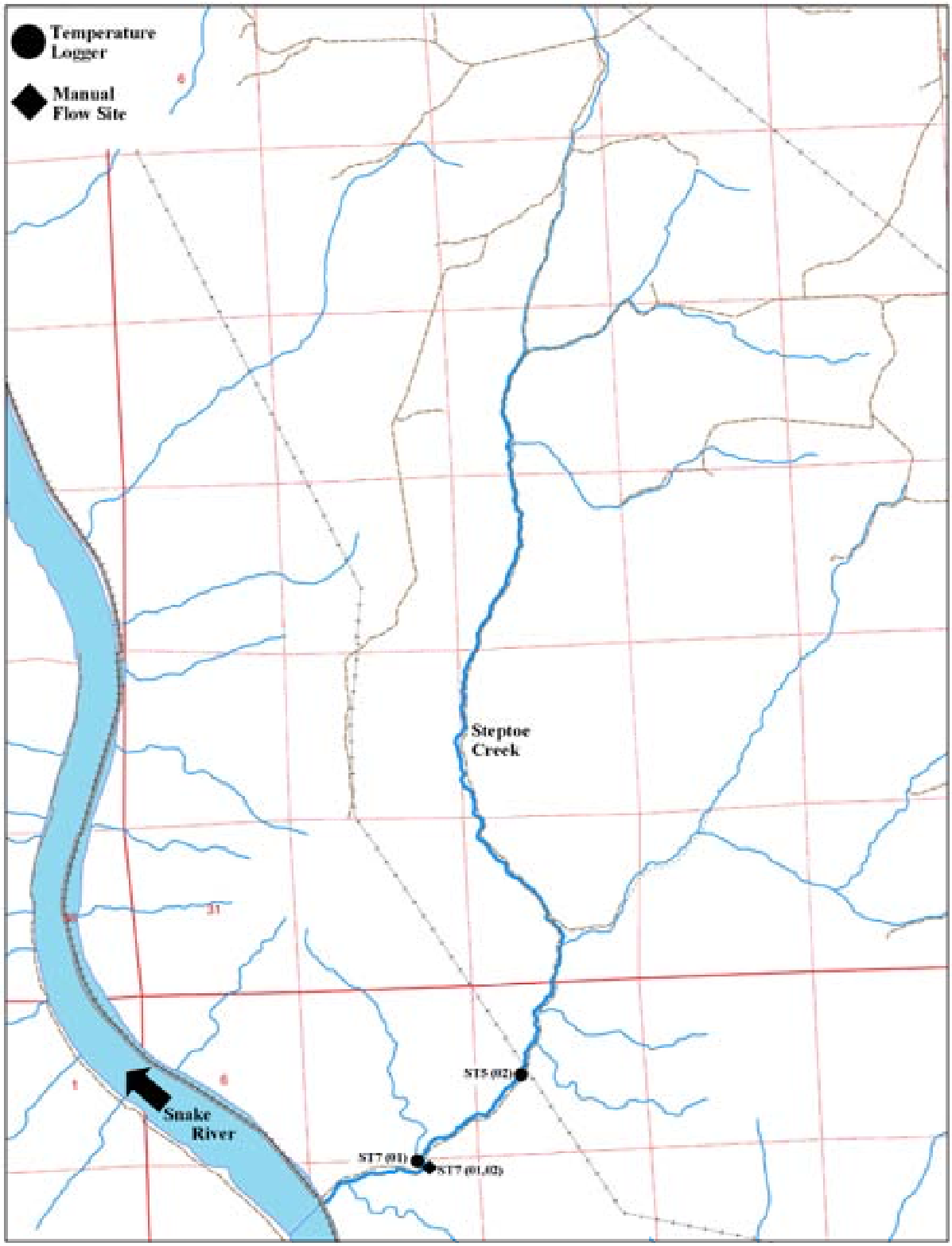

Figure 4. Relative locations of temperature loggers and manual flow sites in Steptoe Ck (sample year indicated in parentheses).

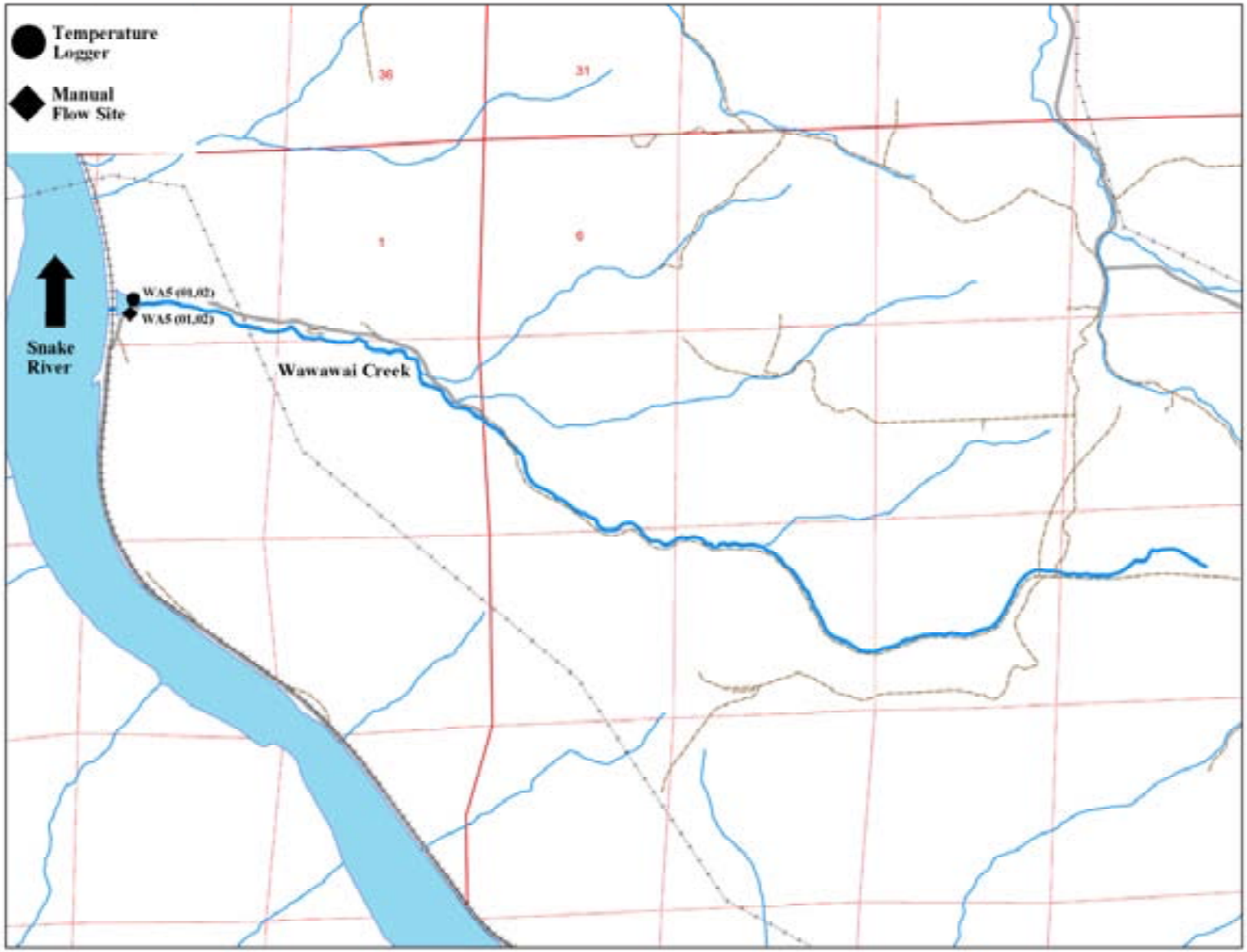

Figure 5. Relative locations of temperature loggers and manual flow sites in Wawawai Ck (sample year indicated in parentheses).

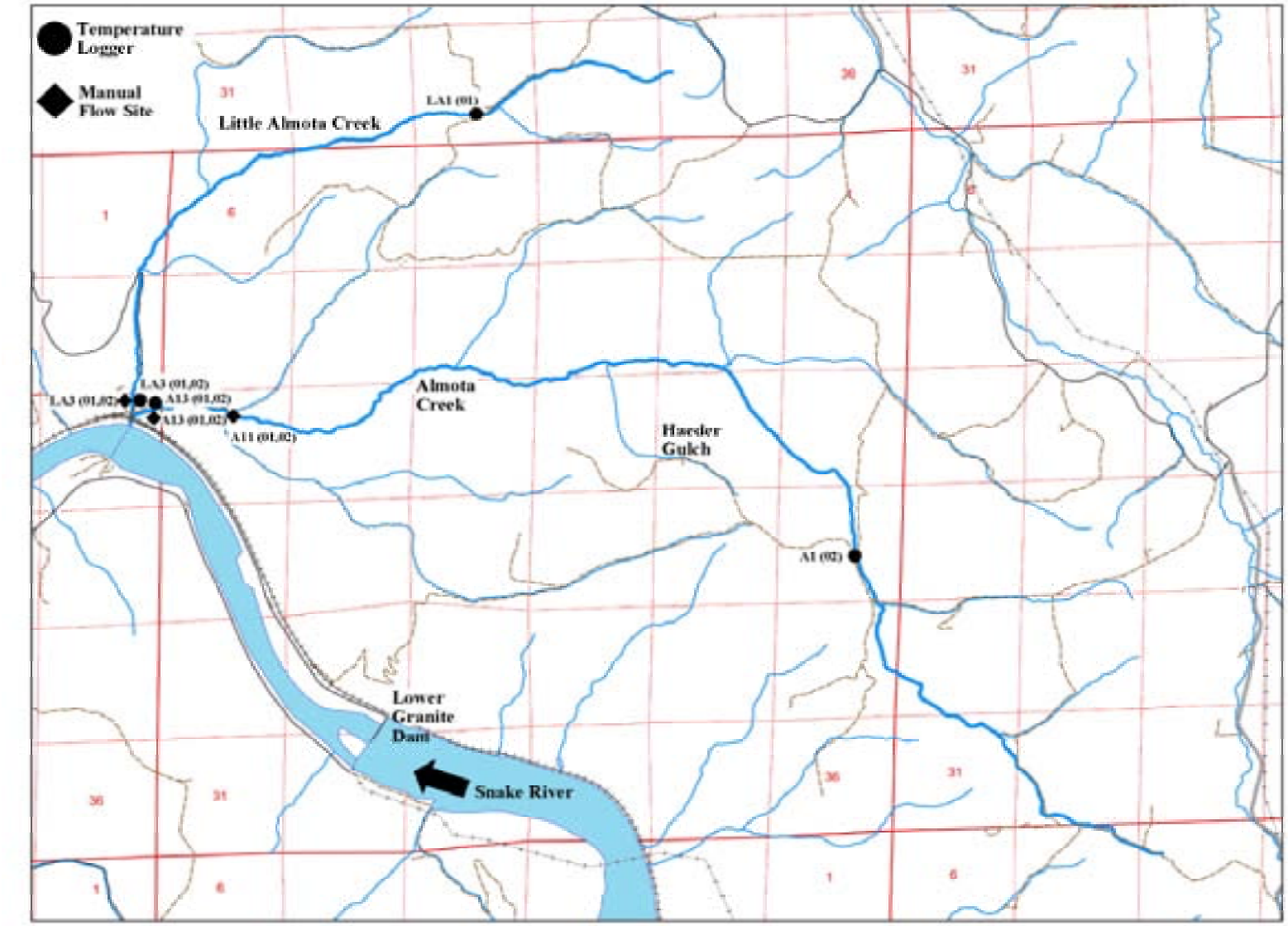

Figure 6. Relative locations of temperature loggers and manual flow sites in Almota and Little Almota Ck (sample year indicated in parentheses).

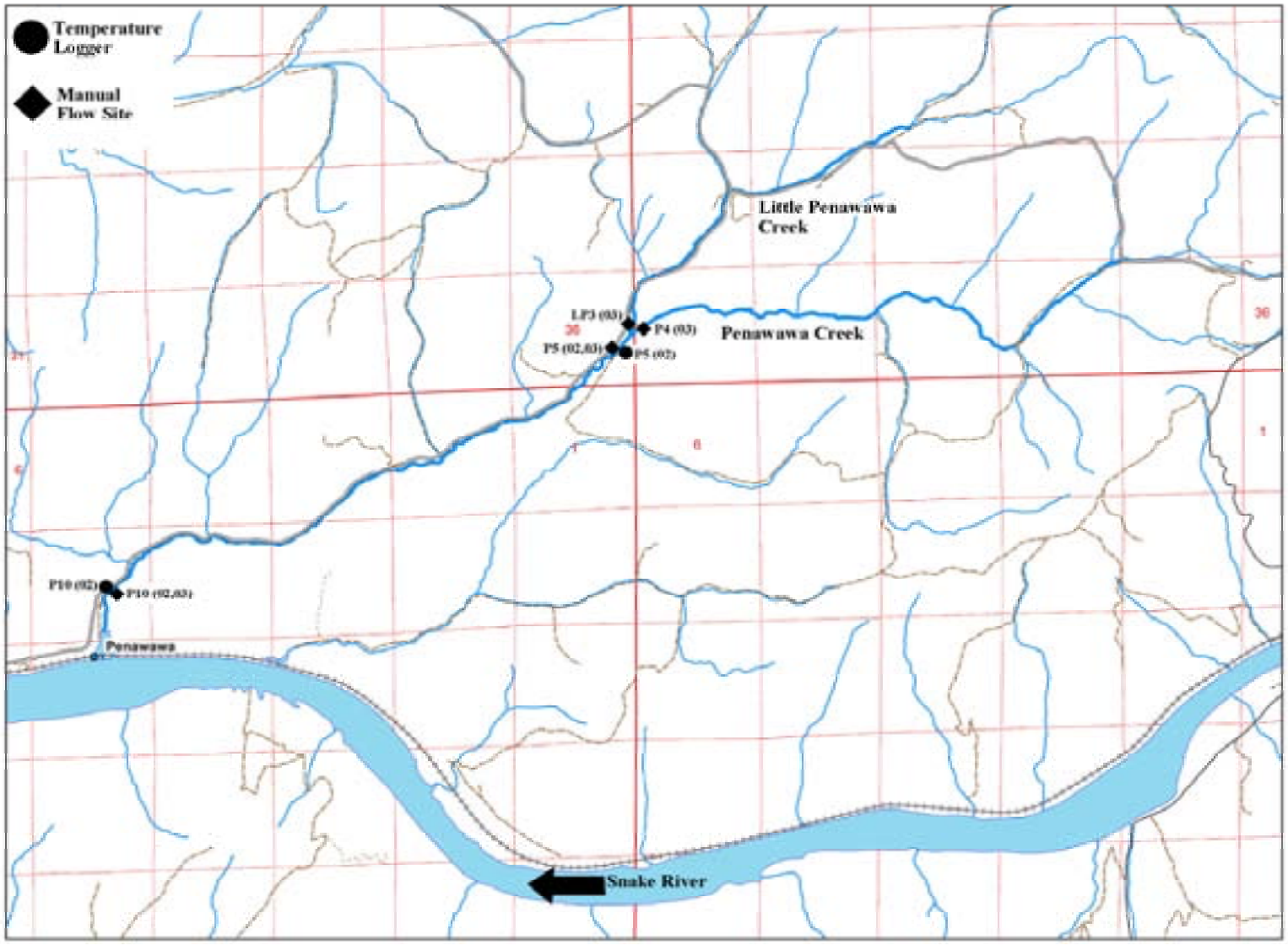

Figure 7. Relative locations of temperature loggers and manual flow sites in Penawawa and Little Penawawa Ck (sample year indicated in parentheses).

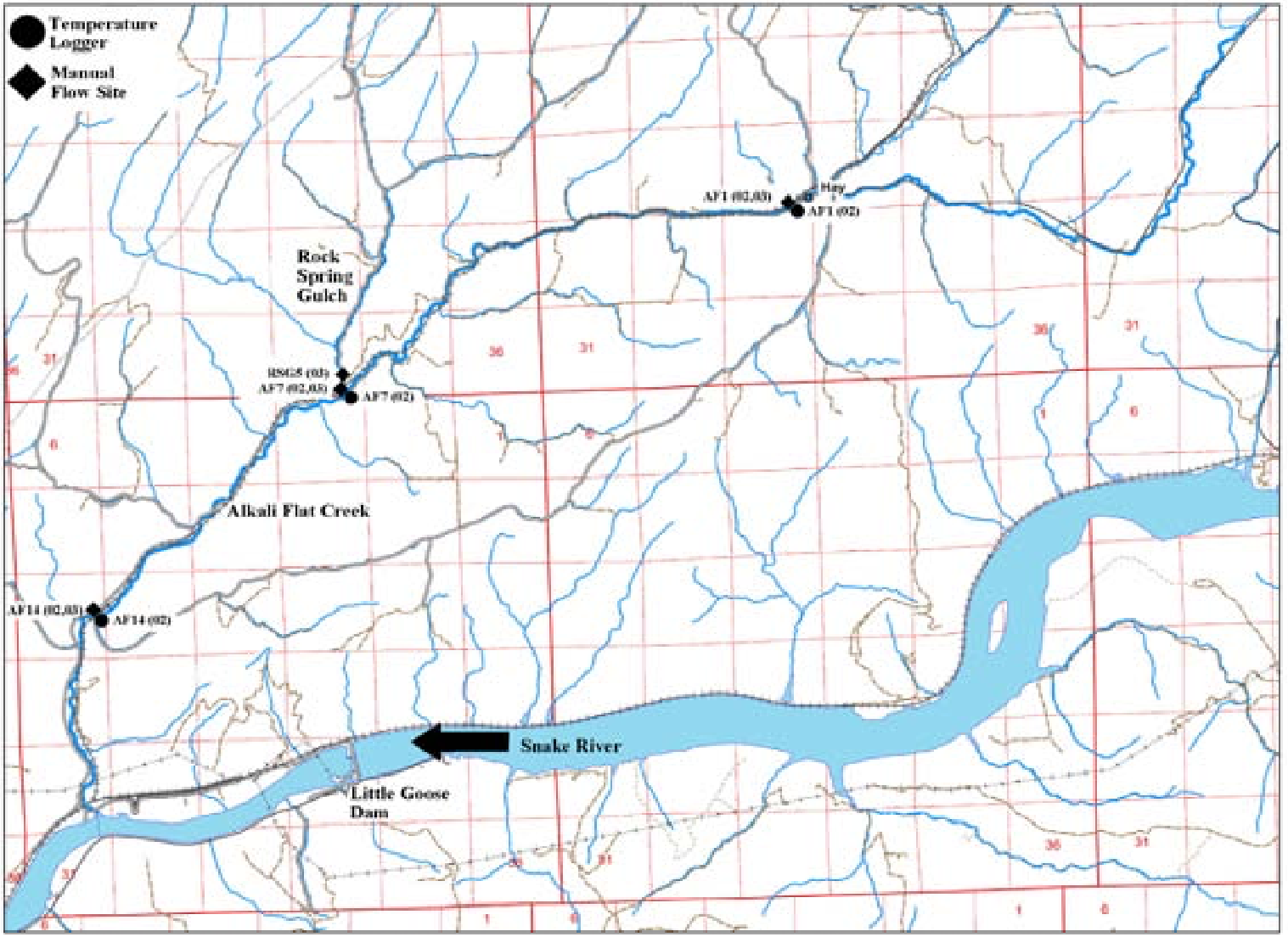

Figure 8. Relative locations of temperature loggers and manual flow sites in Alkali Flat Ck. and Rock Spring Gulch (sample year indicated in parentheses).

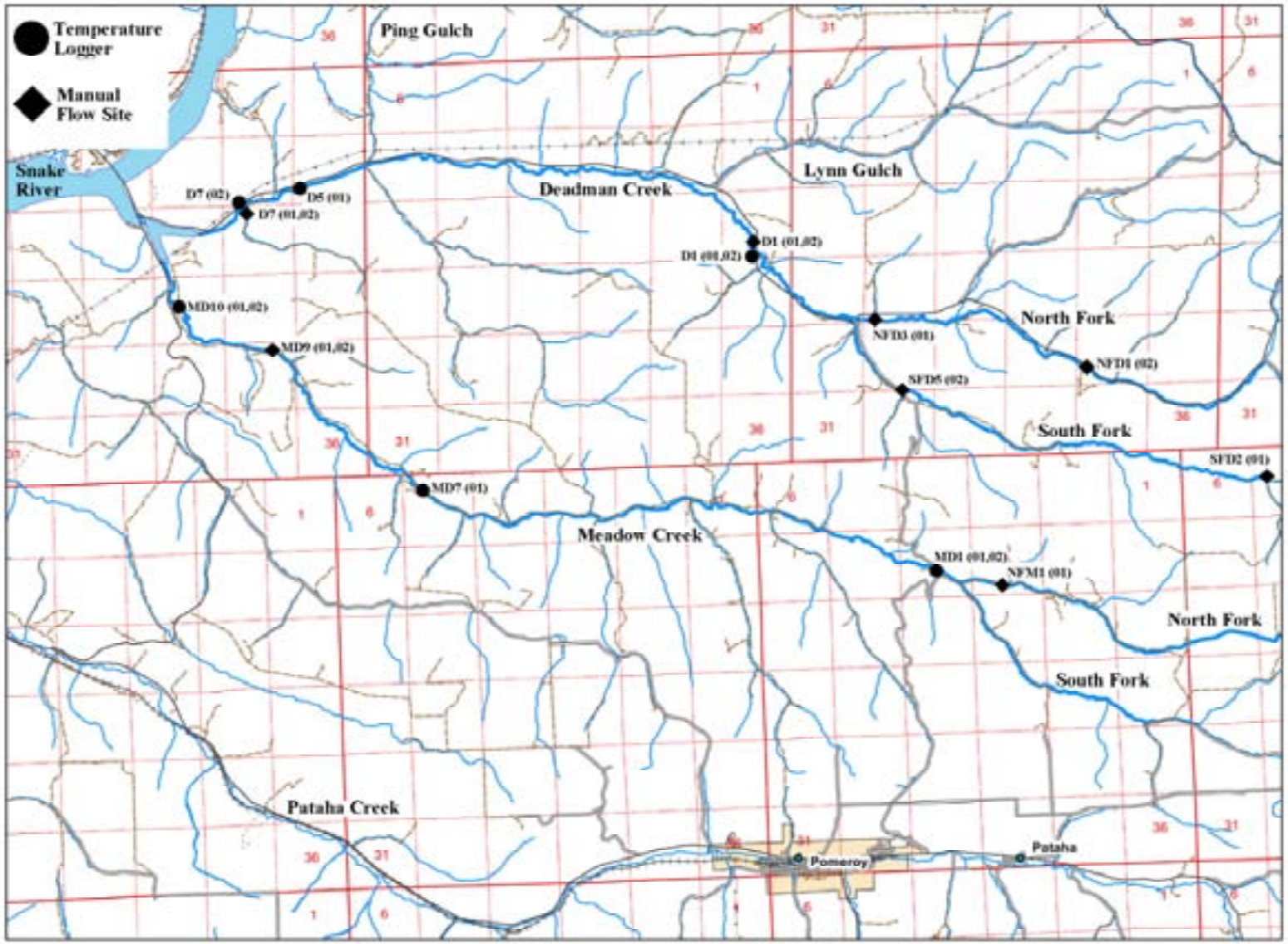

Figure 9. Relative locations of temperature loggers and manual flow sites in Deadman and Meadow Ck (sample year indicated in parentheses).

Limiting Factor Identification

One of the study goals was to identify and document physical barriers to salmonid passage, spawning and rearing. Field personnel noted the presence of potential barriers and provided the information to local biologists or conservation district coordinators to consider habitat rehabilitation efforts.

Physiological barriers to salmonid passage and survival, in the form of excessive temperatures, inadequate flows, and degraded habitat were also identified by examining tables and graphs of data collected by instream temperature monitors and manual sampling. Maximum temperatures, as well as the number of days with temperatures exceeding 75°F (lethal to salmonids if prolonged), and presence or absence of salmonid fishes at study sites, were factors taken into consideration.

Habitat Assessment

We developed a quick habitat assessment method based on the data gaps identified in the Snake River Limiting Factors Report (Kuttel 2002). These habitat assessments were conducted during the spring months as part of our steelhead spawning surveys. This brief assessment technique enabled each team of field personnel to complete several miles of steelhead spawning surveys while conducting an assessment of habitat conditions. Data were collected at different intensity levels and time intervals: 1) general assessments occurred between transects, while detailed assessments occurred both 2) within a belt transect (about 10 ft wide) across the stream width and, 3) directly on the transect line (Appendix C). Cross channel transects were established at pre-selected time intervals of 3-10 minutes to provide random locations for the transect line and belt transect measurements.

Data collected between transects included assessments of the number and types of barriers and diversions, general bank conditions, a count of obvious pools (that would remain during summer) and the presence or absence of side channels.

Data collected within the belt transect consisted of an assessment of bank stability (good, fair, poor), eroding banks, animal damage (good, fair, poor), riparian vegetation width on each bank, percentage of shade (between 1000 and 1400 hrs during summer), floodplain connectivity, pool quality, primary habitat type, large woody debris (LWD) and habitat cover types.

Data collected on the transect line included stream width, average and maximum stream depth, substrate type and an estimate of the degree of embeddedness, as well as a description of the composition of riparian vegetation.

Fish Stock Assessment

Distribution and Abundance

Electrofishing

A Smith-Root Model 11A or 12B electrofishing backpack unit was used to collect fish at various study sites throughout the study areas (Figures 10-16). We used pulsed DC (direct current) between 300 and 500 volts. Two different types of electrofishing surveys (quantitative and qualitative) were used during our sampling.

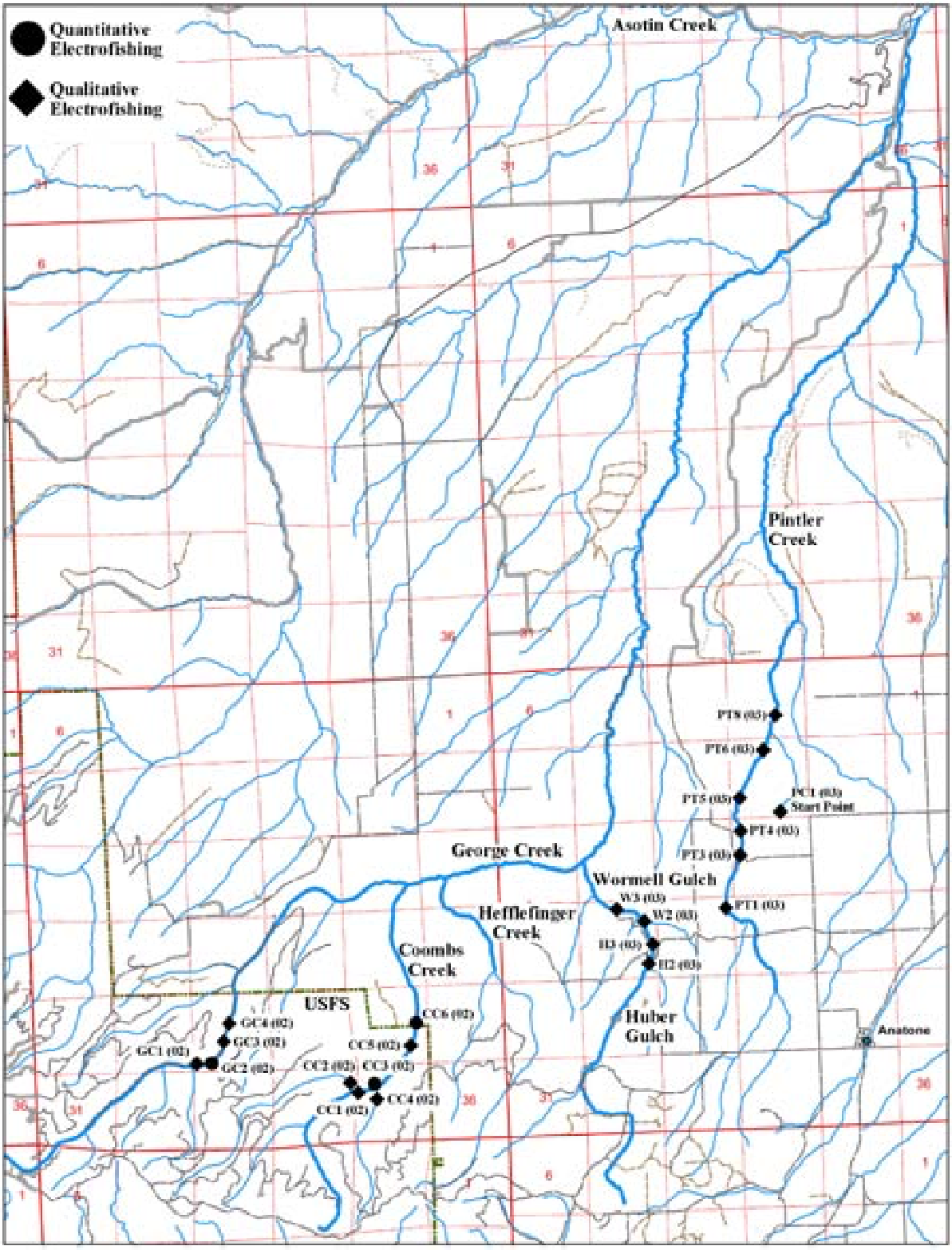

Figure 10. Relative locations of electrofishing sites in George Ck., Coombs Ck., Huber Gulch, Wormell Gulch, Pintler Ck., and a tributary to Pintler Ck (sample year indicated in parentheses).

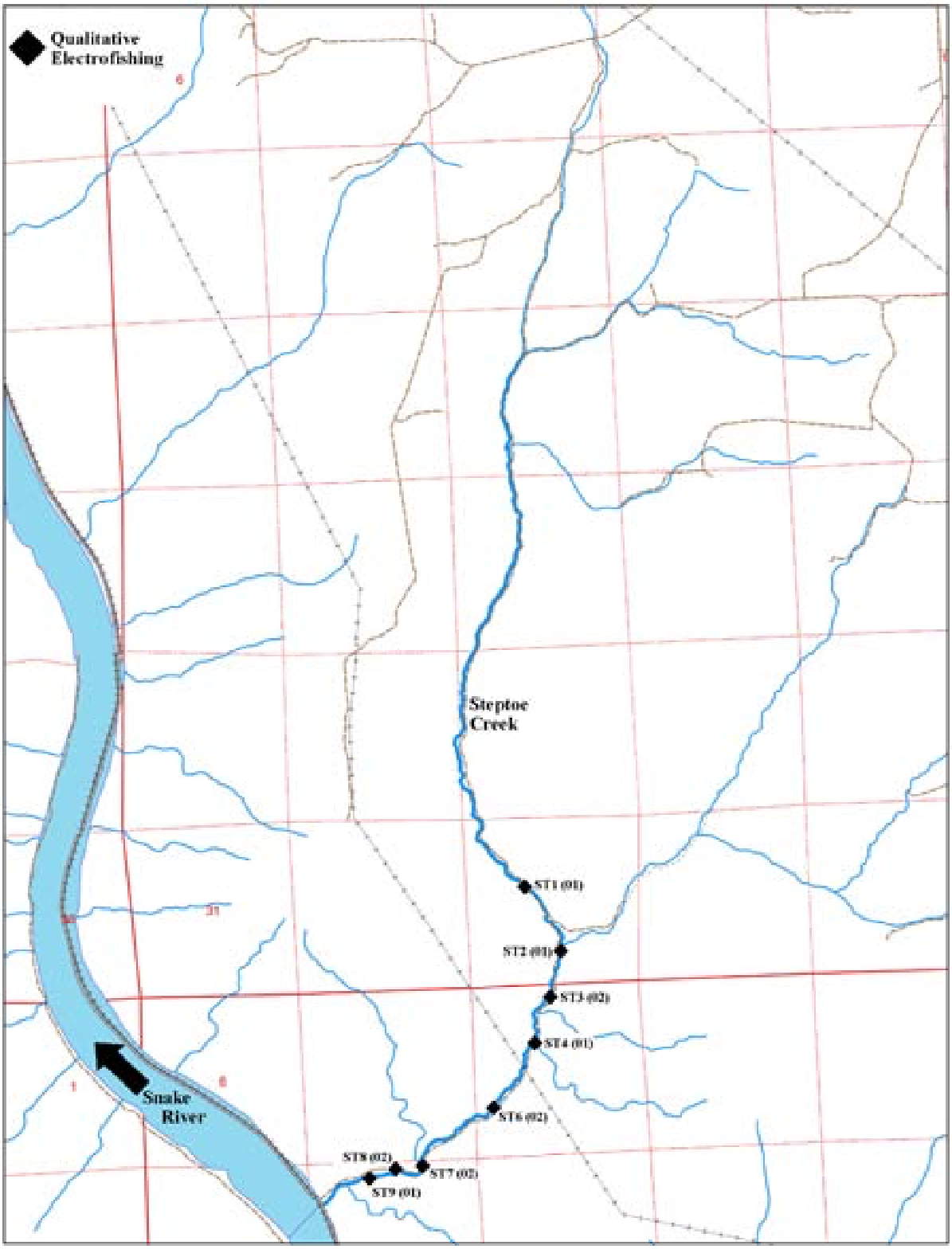

Figure 11. Relative locations of electrofishing sites in Steptoe Ck (sample year indicated in parentheses).

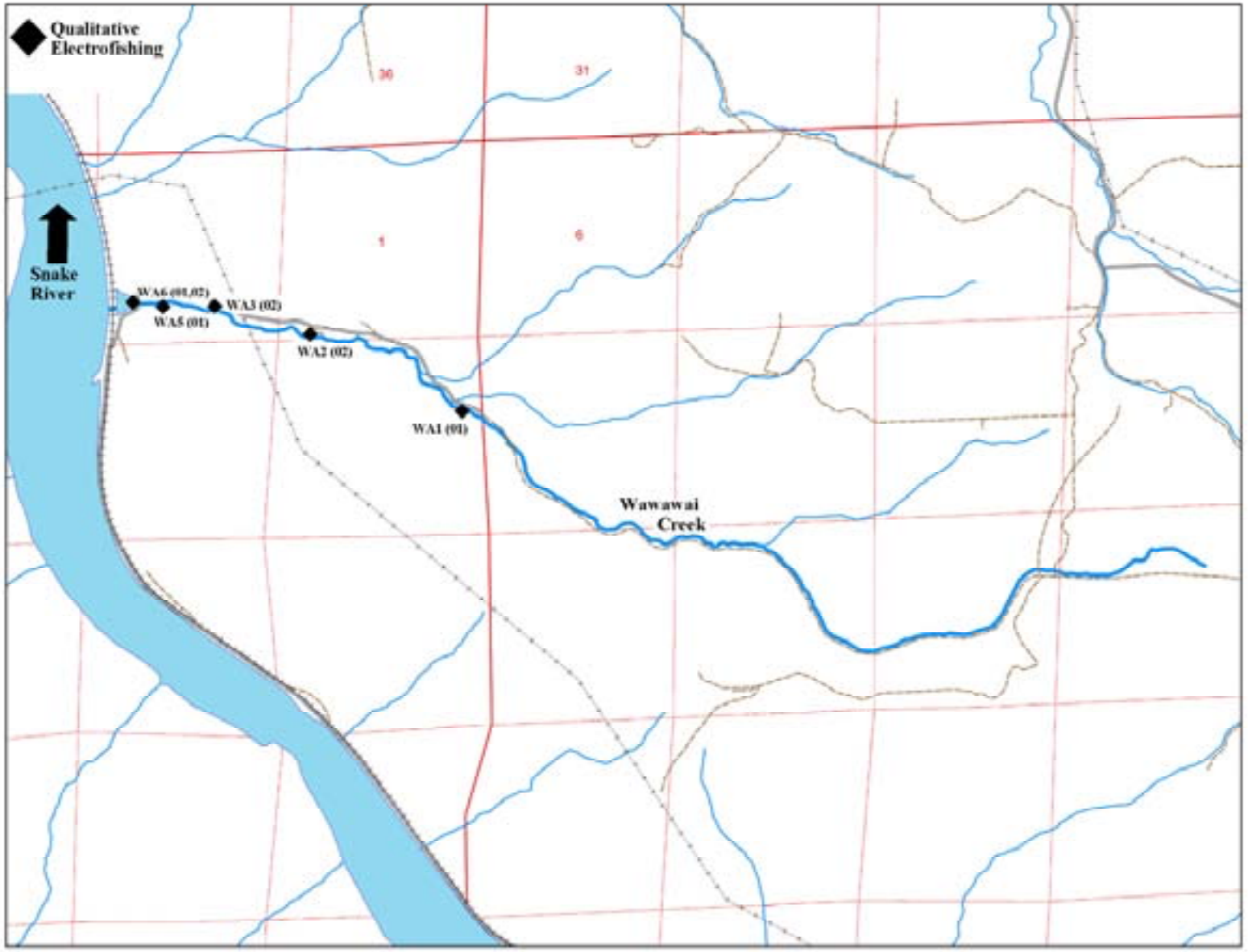

Figure 12. Relative locations of electrofishing sites in Wawawai Ck (sample year indicated in parentheses).

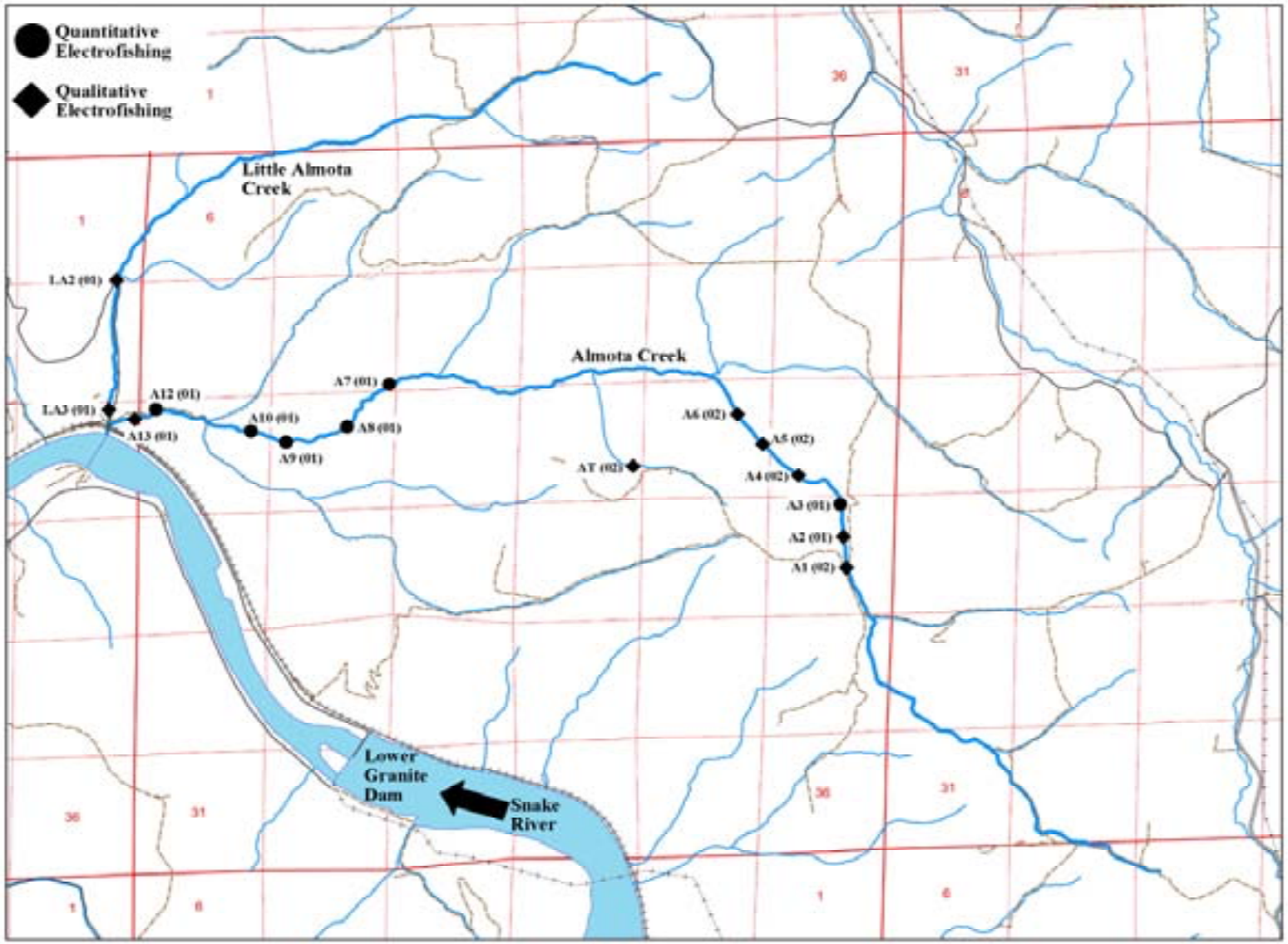

Figure 13. Relative locations of electrofishing sites in Almota Ck., a tributary to Almota Ck., and Little Almota Ck (sample year indicated in parentheses).

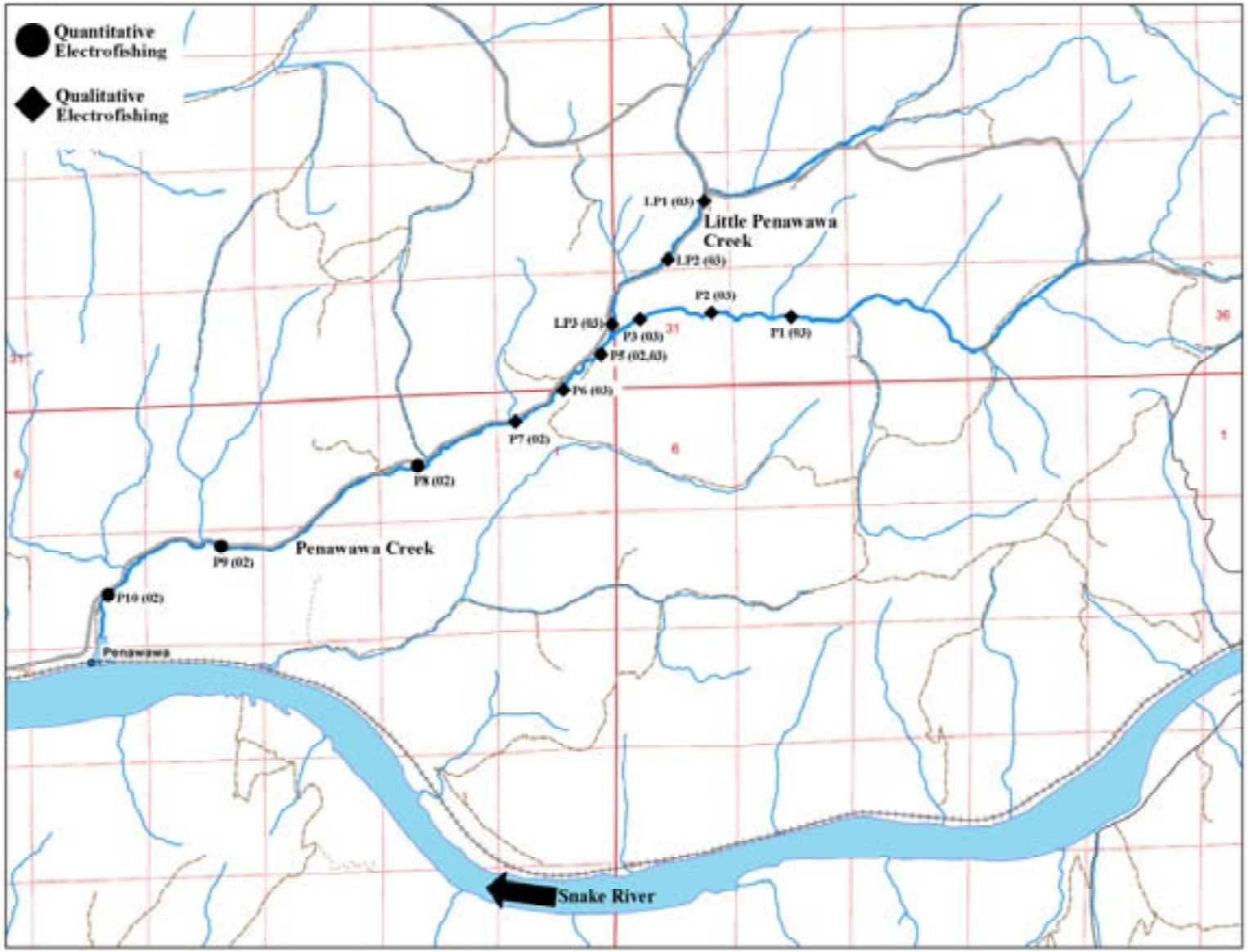

Figure 14. Relative locations of electrofishing sites in Penawawa and Little Penawawa Ck (sample year indicated in parentheses).

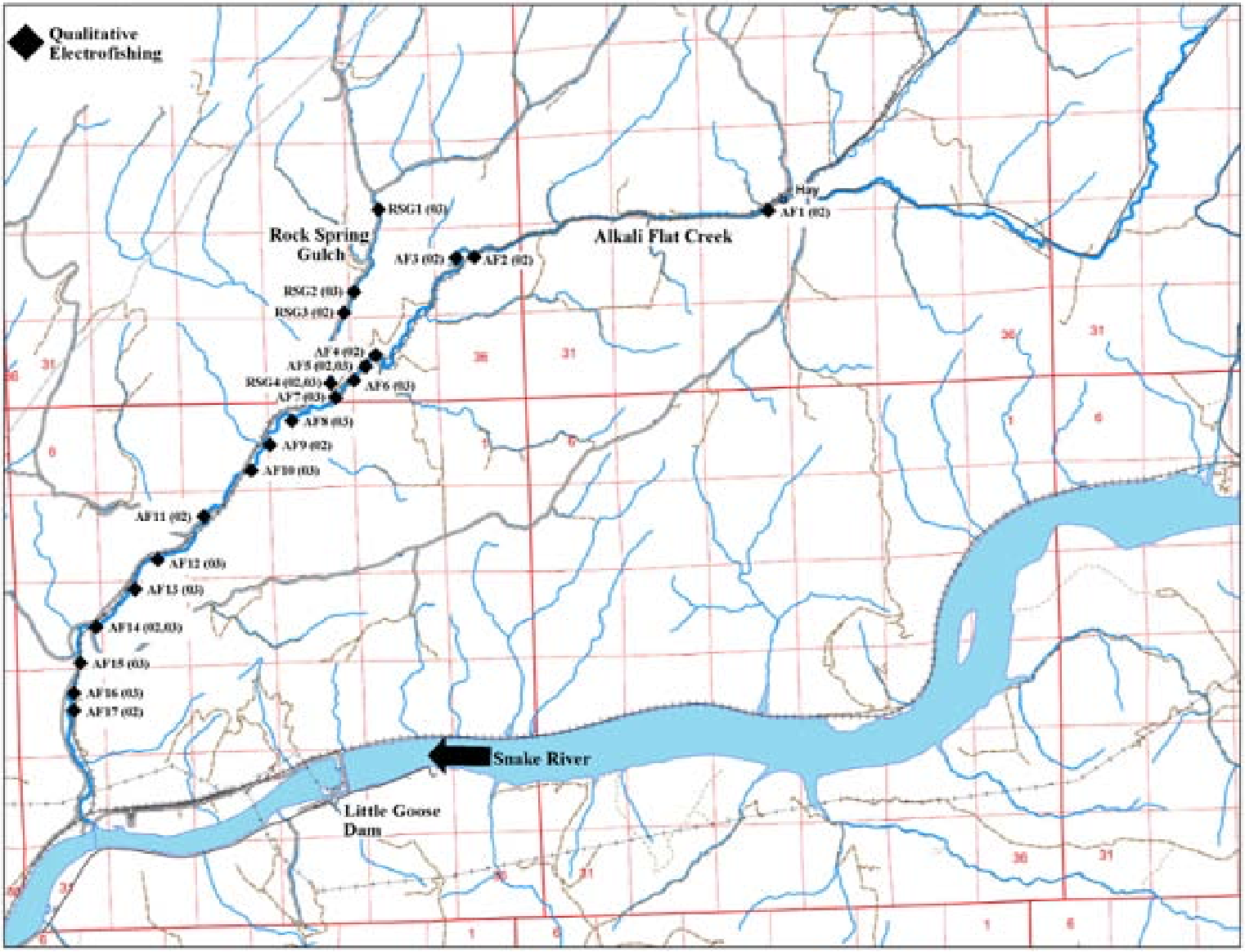

Figure 15. Relative locations of electrofishing sites in Alkali Flat Ck. and Rock Spring Gulch (sample year indicated in parentheses).

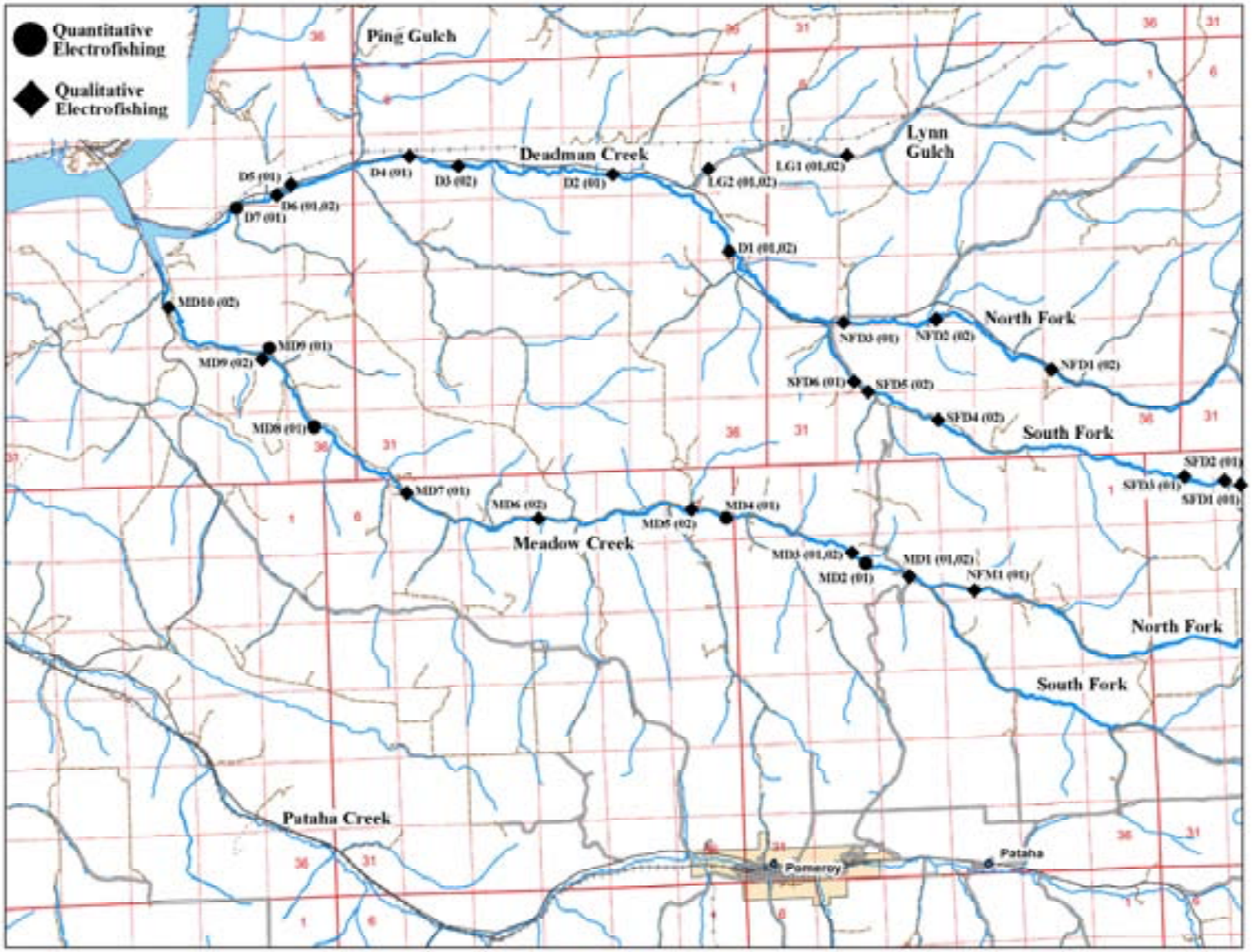

Figure 16. Relative locations of electrofishing sites in Deadman and Meadow Ck (sample year indicated in parentheses).

Quantitative Electrofishing

Quantitative electrofishing sites were delimited by placing block nets, spanning the channel, approximately 30 to 50 meters apart. Block nets prevented fish from entering or leaving the site, so that estimates of salmonid populations and densities could be calculated (Platts et al. 1983). The operator usually began at the upstream net and worked downstream, covering the entire wetted width. In sites with heavy sedimentation the operator would begin at the bottom net and work upstream to maintain enough water clarity to efficiently capture fish. One "pass" was completed when the net opposite the start was reached. All sites received at least two sequential passes. A 60% reduction was required between the first and second passes for each salmonid species and estimated age class. If the 60% reduction was not met, a third pass was conducted. Stunned fish were collected with dip nets and held separately in buckets by sampling "pass" until they could be measured and recorded. Collected fish were anesthetized with FINQUEL® (MS-222 tricaine methane sulfonate). Once anesthetized the following information was collected; identification (genus or species), weight (g), and fork length (mm).

Fork lengths collected during quantitative electrofishing were used to create length frequency histograms. The histograms were used to determine age classes (Mendel et al. 1999). Age class groupings were specific for each stream or stream reach (Figure 17).

A removal–depletion software program developed by the U.S. Forest Service (Van Deventer and Platts, 1983) was used to calculate population estimates and densities (# of fish/100 m^2) for each salmonid species, by age class. The average weight (grams) of each age class is available to be multiplied by the density to estimate biomass (g of fish /100 m^2) available per age class.

The area sampled was determined by multiplying site length by the average of four or more site width measurements. A brief description of the riparian area, bank stability, substrate, pool/riffle ratio, and the presence of large woody debris (LWD) were recorded for each site.

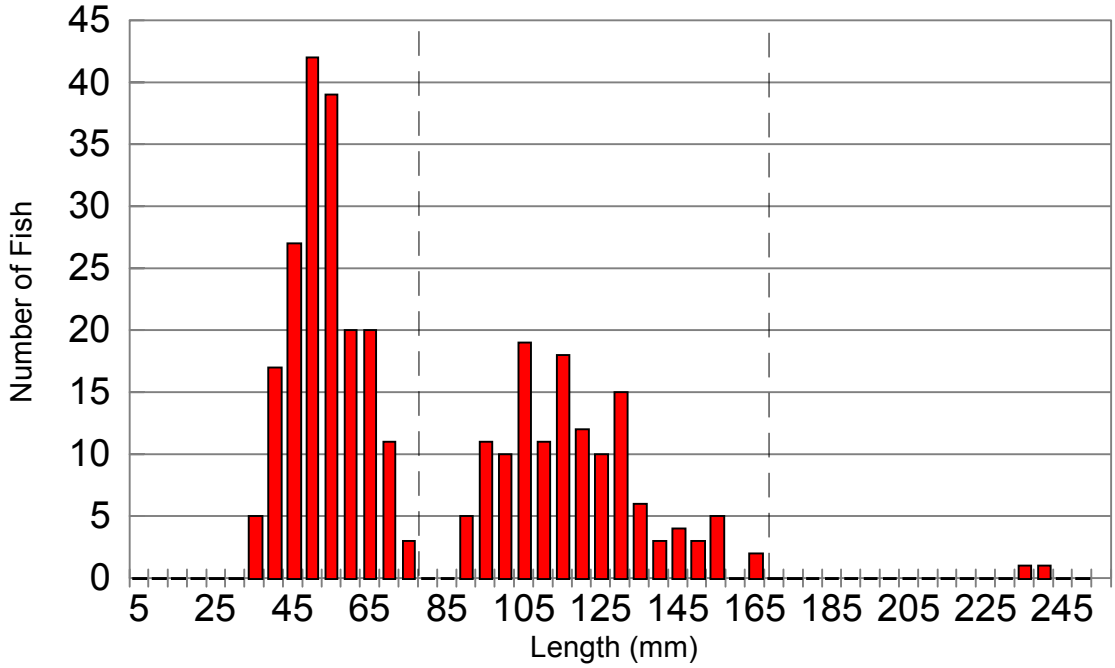

Figure 17. Length frequency and age class delineations for George Ck, from Stringtown Gulch to Rockpile Gulch, 2000 (taken from Mendel et al., 2001).

Qualitative Electrofishing

We also conducted qualitative electrofishing surveys at several sites in the study area. These surveys enabled us to cover larger areas relatively quickly as they did not entail the use of block nets or repeat sampling passes. We electrofished at these sites by moving upstream and capturing fish to determine species presence, size of fish (age class) and their relative abundance. The length and average width of area sampled were recorded as well as a brief description of the riparian area, bank stability, substrate, pools/riffle ratio, and the presence of large woody debris (LWD). This method supplemented our more intensive quantitative electrofishing surveys to provide a more complete view of fish distribution and abundance.

Fish identification for both quantitative and qualitative electrofishing sites included genus and species for all *Salmonidae* (Salmonids) and *Cyprinidae* (minnows); and genus only for *Cottidae* (sculpins), *Catostomidae* (suckers), and *Petromyzontidae* (lamprey). Our sampling protocol was to collect and measure 10-20 of each non–salmonid species at each site. Non–salmonid species were assigned a relative abundance ranking value based on general observations made during electrofishing at each site (Table 1). Ranked values were averaged to determine a relative abundance for each species per designated stream reach (Appendix D). Relative abundance data were tabulated to provide qualitative comparisons between reaches and species.

Table 1. Categories of relative abundance (per site) for non–salmonids .		
Category	**Count (individuals seen)**	**Ranking Value**
Absent	0	0
Rare	1-3	1
Uncommon	4-10	2
Common	11-100	3
Abundant	100+	4

Steelhead Spawning Surveys

Surveyors generally walked downstream and visually identified spawning fish and/or redds (nests) in April or May. Redds were usually readily identifiable, characterized by an area of clean gravel with a large depression and mound. Each redd observed was assigned a two–part identification (ID) code representing the survey number and the redd number. A flag was hung in adjacent vegetation, and marked with the ID code, the date, and the surveyor's initials, so the same redd would not be counted in subsequent surveys. Each redd was recorded in a notebook with the date, time, ID code, general description of the redd, size, score of its observability and its location. Counts were tallied for each designated stream reach. When possible, we captured observed adult steelhead with dipnets and sampled fish or carcasses for length, sex, marks (to determine wild or hatchery origin), scales, DNA fin clips and tags.

Genetic Sampling

Tissue samples were collected from some salmonids by WDFW personnel for later genetic analyses for stock assessment purposes. Fin clips or opercle punches were obtained from adult steelhead and juvenile rainbow trout/steelhead. Tissue samples were placed in tubes of 95% ethanol for preservation, labeled and retained or transported to the WDFW Genetics Stock Identification Lab in Olympia. Fin clips provide sufficient DNA material for genetic analysis, without killing the fish (Olsen et al. 1996). A non–lethal method of genetic sampling was preferred due to the current ESA listings for wild steelhead in the Snake River basin.

Results and Discussion

Habitat Assessment

Stream Flows

Stream discharge measurements were only taken periodically throughout the study (Appendix E). Most of the stream flows were taken while we were conducting other work in the area (spawning surveys, electrofishing surveys, or checking temperature monitors) to provide a general idea of water availability during spawning and rearing during spring, summer and fall. All streams in this study are flow limited during late spring, summer and fall. Several stream reaches have some degree of dry channel with subsurface stream flows (ie. Couse, Tenmile, George, Pintler, Steptoe, Wawawai, North Fork Deadman, South Fork Deadman and North Fork Meadow creeks). Stream discharges were less than 1.5 cfs during summer and fall at all measured locations, except lower Deadman and Meadow creeks.

Stream Temperatures

Water temperatures are similar from 2001 to 2002 throughout Asotin, Garfield and Whitman counties. Temperatures follow a trend of cold spring temperatures that rise consistently until the middle of July when they plateau at summer highs. They remain at summer highs until late August or early September when they descend toward winter lows. Only a few areas that we sampled were able to maintain summer temperatures of less than 65°F. They included Tenmile Ck in 2002 (TC-2), upper George Ck in 2001 (GC-5), and Meadow Ck in 2001 and 2002 (MD-1) (Appendix B). While only a few areas had cool summer temperatures, many reached temperatures that can be lethal for salmonids (75-84°F, Bjornn and Reiser 1991). This generally occurred during mid-summer, when photoperiod is long and evening cooling is brief. Sites with maximum water temperatures greater than 75°F included Tenmile Ck in 2002 (TC-4), George Ck in 2001 and 2002 (GC-6), Steptoe Ck in 2001 (ST-7), Almota Ck in 2002 (A-13), Little Almota Ck in 2001 and 2002 (LA-3), Penawawa Ck in 2002 (P-5, 10), Alkali Flat Ck in 2002 (AF-1, 7, 14), and Deadman Ck in 2001 (D-5) and in 2002 (D-7) (Appendix B). However, at night, temperatures would usually decrease to within reasonable physiological limits for steelhead/rainbow trout (≤65-70°F).

Limiting Factors Identification and Habitat Inventory

Habitat conditions varied widely from stream to stream (Table 2, Appendix F). Average bank condition and percent eroding bank ranged from good banks with 0% erosion to poor banks with up to 87.4% erosion. Riparian width ranged from 0.6' to 300'+, and % shade went from 0% to 76.7 %. Average percent of Large Woody Debris (LWD) also varied widely from 0% to 12.1% (Table 2).

Portions of Steptoe, Little Almota, Meadow, North Fork Meadow and Couse creeks had numerous barriers, poor bank conditions (approaching an average score of 3). Most of Couse, Steptoe, Alkali Flat, North Fork Deadman, South Fork Deadman, and Deadman had very little shade available.

All measured stream reaches were deficient in large woody debris.

Table 2. Habitat assessment summaries for select streams in Asotin, Whitman and Garfield Counties, 2001 and 2002.

Stream/Reach	# of Barriers[a]	# of Diversions	Avg. Bank Condition	Avg. % Eroding Bank	Avg. Riparian Width	Avg. % Shade	Avg. Pool Quality (# of Pools Sampled)	Avg. % LWD	Avg. Stream Width
Couse Ck. 2001									
1st Brg. up Couse Ck Rd. to Snake River Rd.	7	0	2.4	L-34.6% R-37.1%	L-11.3' R-24.1'	7.3%	1 (2)	10.8%	7.1'
Tenmile Ck. 2001									
RM 6.1 to Bedrock Falls	0	0	L-1.9 R-2.6	L-18% R-48%	L-22' R-31'	26%	1.3 (3)	4.2%	14.5'
Bedrock Falls To Snake River Rd.	0	0	L-2.3 R-2.2	L-36.4% R-35.9%	L-10.9' R-6.8'	27.5%	1 (1)	3.2%	13.8'
George Ck. 2001									
Trent Grade culvert to Mouth of Heffelfinger	1	0	1.5	L-18% R-10.5%	L-53' R-100'	66%	1.9 (6)	12.1%	14.1'
Stringtown to Meyer Rd. Brg.	0	0	2.1	L-31.5% R-33.3%	L-27.1' R-26.9'	42.8%	1.8 (6)	4.9%	22.2'
Coombs Ck. 2001									
2.0 miles above mouth to mouth	1	0	1.6	L-33.5% R-30.5%	300+	28.5%	1 (1)	8%	12.5'
Steptoe Ck. 2001									
Forks to mouth	9	0	2.1	L-22.5% R-23%	L-4' R-5'	15.5%	2.4 (5)	1.5%	6.2'
Steptoe Ck. 2002									
Forks to 0.2 miles above mouth	4	0	2.8	L-35.8% R-44.6%	L-23.7' R-13.8'	46.3%	2 (2)	0.4%	6.6'
Wawawai Ck. 2001									
1st Culvert to mouth	1	0	1.5	L-0% R-7.5%	L-27.5' R-35.0'	67.5%	N/A	2.5%	5'
Wawawai Ck. 2002									
0.3 miles above 1st culvert to mouth	1	0	1.8	L-26.6% R-30%	L-70' R-71.7'	76.7%	N/A	5.8%	7.2'
Almota Ck. 2001									
Top of Haeder Gulch to mouth	0	0	1.9	L-39.7% R-31.3%	L-36.6' R-43.8'	53.1%	2.5 (2)	3.1%	8.3'
Almota Ck. 2002									
Forks To mouth	1	0	L-2.4 R-2.3	L-29% R-40%	L-36' R-25.7'	29.7%	3 (1)	0.5%	8.1'
Little Almota Ck. 2001									
Benedict Rd. culvert to mouth	13	0	2.8	L-79.1% R-87.4%	L-59.9' R-51.9'	53.5%	2.5 (2)	5.9%	4.9'
Penawawa Ck. 2002									
Forks to mouth	5	0	2.3	L-44.8% R-51.2%	L-29' R-33.4'	19.3%	2.5 (12)	1%	9.1'
Alkali Flat Ck. 2002									
Hay to Rock Spring Gulch	4	0	2.2	L-45% R-43.6%	L-21.4' R-22.7'	25%	3 (1)	0%	8.5'
Rock Spring Gulch to 0.9 miles above mouth	0	0	2.5	L-28.5% R-24.5%	L-34.7' R-43'	3.5%	3 (2)	0%	9.2'

[a] Types of barriers on each stream reach listed in Appendix F.

Table 2 (Cont.) Habitat assessment summaries for select streams in Asotin, Whitman and Garfield Counties, 2001 and 2002.

Stream/Reach	# of Barriers[a]	# of Diversions	Avg. Bank Condition	Avg. % Eroding Bank	Avg. Riparian Width	Avg. % Shade	Avg. Pool Quality (# of Pools Sampled)	Avg. % LWD	Avg. Stream Width
N.F. Deadman Ck. 2001									
RM 1.4 to RM 1.0	0	0	2.9	L-41% R-62.9%	L-12.1' R-10'	0.7%	N/A	0%	6.7'
S.F. Deadman Ck. 2001									
RM 1.5 to RM 0.8	4	0	2	L-8.3% R-16.6%	L-0.6' R-7.7'	0%	2 (1)	0%	5'
Deadman Ck. 2001									
RM 6.5 to RM 2.9	1	1	2.6	L-61.7% R-59.1%	L-8.3' R-9.8'	13.1%	2 (1)	2.3%	8.5'
N.F. Meadow Ck. 2001									
1.8 miles above mouth to mouth	Yes	0	2.3	47.8%	L-4.4' R-3.3'	45%	N/A	1.7%	6.4'
Meadow Ck. 2001									
1.5 miles above 1st brg. to Meadow Ck. turnoff at Hwy 271	Yes	0	2.6	54.5%	L-4.8' R-4.7'	20.8%	1 (2)	1.8%	11.2'

[a] Types of barriers on each stream reach listed in Appendix F.

Fish Stock Assessment

Distribution and Abundance

Densities of two salmonid species were calculated from quantitative electrofishing sites (Table 3). The identified salmonid species were rainbow/steelhead trout and mountain whitefish. Rainbow/steelhead trout were widely distributed, while only one juvenile mountain whitefish was found in lower Penawawa Creek. We conducted electrofishing surveys on 21 streams, and found salmonids in all but four of the streams: Steptoe Ck, a tributary on Almota Ck (off of Haeder Rd.), Rock Spring Gulch (Alkali Flat tributary), and Lynn Gulch (Deadman tributary) (Table 3, Table 4).

Age 0+ rainbow/steelhead were generally found in the highest densities, followed by age 1+, and then adult (≥8 in). Age 1+ fish predominated at two sites George Creek (GC-2) and Almota Creek (A-3). Adult rainbow/steelhead were rarely seen during electrofishing and were generally in low densities when found, although they did predominate at one site, Meadow Creek (MD-4).

Spawning surveys were conducted on 14 streams in 2001, 11 streams in 2002, and one stream in 2003. The number and distribution of steelhead redds was fairly limited in most of the streams surveyed, but was good in a few (Tables 5-7). Tenmile Creek (2001 and 2002), George Creek (2001), and Almota Creek (2001) had redd counts of over 4.2 redds per mile. Wawawai Creek in 2001 had a very high estimate of redds per mile (10.0), but only one redd was found and surveys were limited to the lowest 0.1 miles of the stream.

Electrofishing

Quantitative Electrofishing

Quantitative electrofishing conducted in the summer of 2001 and 2002 on various streams in Asotin, Whitman, and Garfield counties produced densities of rainbow/steelhead trout that ranged from 0.0 to 159.2 fish per 100 m^2 at sampled sites (Table 3). Sub-yearling (age 0+) trout were the most abundant age class with densities up to 159.2 fish per 100 m^2, yearling (age 1+) trout also had good densities, up to 35.4 fish per 100 m^2, in some of the upper reaches. Adult (≥8 in) rainbow/steelhead trout were seen mainly in upper reaches at lower densities, between 0.0 and 7.5 fish per 100 m^2. Mountain whitefish was the only other salmonid found during our electrofishing surveys and it was only one sub-yearling at one site on lower Penawawa Creek (Table 3).

Table 3. Densities of salmonids from quantitative electrofishing sites in Asotin, Whitman and Garfield Counties, summer of 2001 and 2002. Sites are listed in order from upstream to downstream.

					Densities (#/100m^2)					
					rainbow/steelhead					
Stream Reach	Date	Site Length	Mean Width	Area	Age/Size					Age/Size
Site Name	(mm/dd/yy)	(m)	(m)	(m^2)	0+	1+	≥8 in	Total	Other Species[b]	0+
George Ck										
GC-2	08/27/02	30	2.54	76.2	21.0	35.4	0.0	56.4		
Coombs Ck										
CC-3	08/27/02	30	2.60	78.0	89.7	32.1	0.0	121.8		
CC-6	08/27/02	30	2.54	76.2	47.2	10.5	0.0	57.7		
Almota Ck										
A-3	09/27/01	35	3.04	106.4	0.0	20.7	7.5	28.2		
A-7	09/18/01	50	2.84	142.0	43.7	3.5	0.7	47.9		
A-8	09/18/01	30	2.32	69.6	38.8	10.0	1.4	50.2		
A-9	09/18/01	30	2.60	78.0	12.8	3.8	0.0	16.6		
A-10	09/18/01	35	2.24	78.4	8.9	5.1[a]	0.0	14.0		
A-12	09/18/01	30	2.52	75.6	15.9	7.9	0.0	23.8		
Penawawa Ck										
P-8	07/10/02	22	2.82	62.0	1.6	0.0	0.0	1.6		
P-9	07/10/02	30	2.22	66.6	159.2	0.0	0.0	159.2		
P-10	07/10/02	30	1.86	55.8	21.5	0.0	0.0	21.5	MTW	1.8
Deadman Ck										
D-7	08/27/01	30	2.86	85.8	10.5[a]	3.5	0.0	14.0		
Meadow Ck										
MD-2	07/31/01	30	3.26	97.8	1.0	0.0	0.0	1.0		
MD-4	07/31/01	30	2.20	66.0	0.0	0.0	4.5	4.5		
MD-8	08/27/01	30	3.56	106.8	0.0	0.0	0.0	0.0		
MD-9	08/27/01	30	3.14	94.2	0.0	0.0	0.0	0.0		

[a] Calculated using the sum of the passes, due to poor reduction between successive passes.
[b] MTW= mountain whitefish

Qualitative Electrofishing

Qualitative electrofishing surveys were conducted in the summer of 2001 and 2002, and also during the spring of 2003. The focus in spring 2003 was to sample areas that may be limited due to lack of water or high temperatures during the summer months. Qualitative electrofishing was completed at multiple sites on 10 streams in 2001, 14 streams in 2002, and eight streams in 2003 (Table 4). While the data from these surveys have little statistical value, it helps to quickly assess the distribution of fish in each stream.

Table 4. Relative abundance of fish from qualitative electrofishing sites in Asotin, Whitman and Garfield counties, 2001-2003.

Stream	Site #	Date	Site Length (m)	Avg. Width (m)	Relative Abundance	Comments
George Ck	GC-1	08/27/02	25	3.8	Two 0+ RBT's and seven 1+ RBT's found.	High intensity survey, no lengths taken on fish
	GC-3	08/27/02	26	2.6	Five 0+ RBT's (25-30mm) and ten 1+ RBT's (80-120mm) found.	High intensity survey.
	GC-4	08/27/02	26	2.6	Six 0+ RBT's (50-68mm) and 17 1+ RBT's (75-128mm) found. TF-rare, Crayfish-present	High intensity survey.
Coombs Ck	CC-1	08/27/02	38	1.3	Five 0+ RBT's (52-74mm) and 12 1+ RBT's (80-142mm) found. TF-rare	Moderate intensity survey.
	CC-2	08/27/02	25	1.2	No fish found.	Moderate intensity survey. Stream nearly dry.
	CC-4	08/27/02	25	1.3	No fish found.	Moderate intensity survey. Very little water.
	CC-5	08/27/02	41	2.5	25 0+ RBT's (45-62mm) and 16 1+ RBT's (73-152mm) found.	High intensity survey.
Huber Gulch	H-2	05/07/03	10	3.6	Two 1+ RBT's (98 and 110 mm) found, and saw one other RBT.	Moderate intensity survey.
	H-3	05/07/03	65	3.5	Ten 1+ RBT's (75-108mm) found, and saw some others. Crayfish-present	Moderate intensity survey.
Wormell Gulch	W-2	05/07/03	30	3.6	Four 0+ RBT's (62-69mm), and 13 1+ RBT's (75-195mm) found. Crayfish-present	Moderate intensity survey.
	W-3	05/07/03	45	2.9	Nine 0+ RBT's (60-70mm), and 16 1+ RBT's (73-95mm) found. Crayfish-present	Moderate intensity survey.
Pintler Ck	PT-1	04/30/03	50	1.9	Ten 1+ RBT's (78-162mm) found. LND-common	Moderate intensity survey, water was turbid from rain.
	PT-3	04/30/03	65	2.4	One 0+ RBT (67mm) and 12 1+ RBT's (72-114mm) found. SD-uncommon	High intensity survey.
	PT-4	04/30/03	76	3.6	One 0+ RBT (65mm) and 23 1+ RBT's (74-182mm) found. SD-rare, Crayfish-present	High intensity survey, murky water.
	PT-5	04/30/03	47	3.4	Two 0+ RBT's (59 and 69mm) and 15 1+ RBT's (75-113mm) found. SD-rare, Crayfish-present	High intensity survey.
	PT-6	04/30/03	60	3.7	Two 0+ RBT's (70mm) and 20 1+ RBT's (77-189mm) found. SD-rare, Crayfish-present	Moderate intensity survey.
	PT-8	04/30/03	55	2.4	Four 0+ RBT's (48-70mm), 13 1+ RBT's (72-198mm) and 1 adult RBT (212mm) found. LND-rare	Moderate intensity survey, water was very turbid from rain.
Pintler Ck Trib.	PC-1	04/30/03			No fish found	Light intensity, little water.

*RBT=rainbow trout, SD=speckled dace, LND=longnosed dace, SCP=sculpin, BLS=bridgelip suckers, NPM=northern pikeminnow, SMB=smallmouth bass, YB=yellow bullhead, TF=tailed frogs.
Rare=≤3, Uncommon=4-10, Common=11-100, and Abundant=≥101

Table 4 (Cont.). Relative abundance of fish from qualitative electrofishing sites in Asotin, Whitman and Garfield counties, 2001-2003.

Stream	Site #	Date	Site Length (m)	Avg. Width (m)	Relative Abundance	Comments
Steptoe Ck	ST-1	09/10/01	60	1.0	No fish found.	Moderate intensity survey.
	ST-2	09/10/01	60	N/A	No fish found.	High intensity survey.
	ST-3	07/01/02	61	1.7	No salmonids found. SD-rare	High intensity survey.
	ST-4	09/10/01	60	2.0	No fish found.	High intensity survey.
	ST-6	07/01/02	88	1.8	No fish found.	High intensity survey.
	ST-7	07/01/02	55	1.3	No fish found.	Moderate intensity survey.
	ST-8	07/01/02	30	1.7	No fish found.	High intensity survey.
	ST-9	09/10/01	60	2.0	No fish found.	High intensity survey.
Wawawai Ck	WA-1	07/01/01	50	1.8	One 1+ RBT (97mm) found.	High intensity survey.
	WA-2	09/10/02	60	3.0	No fish found.	Moderate intensity survey.
	WA-3	07/01/02	50	1.8	No fish found.	High intensity survey.
	WA-4	07/01/02	60	1.5	Six 0+ RBT's (48-61mm) and one 1+ RBT (90mm) found.	High intensity survey.
	WA-5	09/10/01	60	3.0	Eight 0+ RBT's (72-104mm), and one 1+ RBT (167mm) found.	High intensity survey.
	WA-6	09/10/01	5	5.0	Thirteen 0+ RBT's (58-98mm), and one 1+ RBT (115mm) found. SD-rare	High intensity survey, sampled pool directly below culvert then creek went into thick blackberries and was unsampleable.
	WA-6	07/01/02	20	3.8	Two 0+ RBT's (61 and 64mm) found. SD-uncommon	High intensity survey.
Almota Ck	A-1	08/14/02	30	1.3	No salmonids found. SD-rare	Light intensity survey.
	A-2	09/27/01	30	N/A	Five 1+ RBT's (134-197mm), and three adult RBT's (216-242mm) found. SD-rare	High intensity survey, fish were found only in pools.
	A-4	08/14/02	30	1.6	No fish found.	High intensity survey. Quantitative effort, but was called after first pass when no fish were found.
	A-5	08/14/02	30	2.2	No fish found.	High intensity survey. Quantitative effort, but was called after first pass when no fish were found.
	A-6	08/14/02	30	1.4	Three 0+ RBT's (57-62mm) and four 1+ RBT's (170-195mm) found.	Moderate intensity survey. Half of site was a large pool that held the fish.
	A-13	09/18/01	30	3.0	Three 0+ RBT's (68-78mm), and six 1+ RBT's (127-156mm) found. SD-common, crayfish-rare	Moderate intensity survey, grass choking channel and heavy siltation.
Almota Ck Tributary	AT-1	08/14/02	30	2.0	No fish found.	Moderate intensity survey. Very little water.
Little Almota Ck	LA-2	09/18/01	30	1.9	No fish found.	Moderate intensity survey. Very little water.

*RBT=rainbow trout, SD=speckled dace, LND=longnosed dace, SCP=sculpin, BLS=bridgelip suckers, NPM=northern pikeminnow, SMB=smallmouth bass, YB=yellow bullhead, TF=tailed frogs.
Rare=≤3, Uncommon=4-10, Common=11-100, and Abundant=≥101

Table 4 (Cont.). Relative abundance of fish from qualitative electrofishing sites in Asotin, Whitman and Garfield counties, 2001-2003.

Stream	Site #	Date	Site Length (m)	Avg. Width (m)	Relative Abundance	Comments
Little Almota Ck (Cont.)	LA-3	09/18/01	100	2.0	Two 0+ RBT's (78 and 93mm) found. SD-common	Light intensity survey, sporadic sampling.
Penawawa Ck	P-1	04/24/03	87	3.0	Two 1+ RBT's (115 and 133mm) and 1 adult RBT (210mm) found. BLS-rare	Moderate intensity survey, heavy grass along and in stream.
	P-2	04/24/03	174	2.8	No fish found.	Moderate intensity survey.
	P-3	04/24/03	75	3.2	Four 1+ RBT's (165-180mm) and two adult RBT's (262 and 264mm) found. BLS-rare	Moderate intensity survey.
	P-5	07/10/02	40	2.5	No salmonids found. SD-common	High intensity survey.
	P-5	04/24/03	100	2.3	One 1+ RBT (180mm) found. SD-rare, BLS-common	Moderate intensity survey.
	P-6	04/24/03	117	2.9	One adult RBT (210mm) found.	Moderate intensity survey.
	P-7	07/10/02	54	2.9	One 0+ RBT (63mm) and two adult RBT's (250 and 259mm) found. SD-uncommon, BLS-common	Moderate intensity survey.
Little Penawawa Ck	LP-1	04/24/03	75	1.8	Nine 1+ RBT's (147-184mm) and two adult RBT's (229 and 250mm) found.	Moderate intensity qual, water was very muddy and made it hard to see fish.
	LP-2	04/24/03	126	2.1	Nine 1+ RBT's (141-184mm) and two adult RBT's (230 and 235mm) found.	Moderate intensity qual, water was very muddy and made it hard to see fish.
	LP-3	04/24/03	75	1.7	Three 1+ RBT's (134-160mm) found. SD and BLS-rare	Moderate intensity qual, water was very muddy and made it hard to see fish.
Alkali Flat CK	AF-1	08/13/02	90	5.2	One 0+ RBT (107mm) and seven 1+ RBT's (136-150mm) found.	High intensity survey.
	AF-2	08/13/02	20	10.0	Two RBT's seen.	Light intensity survey. Deep pools made it hard to electrofish effectively.
	AF-3	08/13/02	40	3.0	12 1+ RBT's (121-168mm) found and three RBT's escaped.	Moderate intensity survey. Large pool covered by duckweed.
	AF-4	08/13/02	15	4.8	One 1+ RBT (170mm), one adult RBT (302mm) found and one RBT escaped.	Moderate intensity survey. Deep pool could not be electrofished effectively.
	AF-5	08/13/02	20	N/A	No fish found.	Moderate intensity survey.
	AF-5	04/14/03	50	2.3	15 0+ RBT's (44-48mm), two 1+ RBT's (178 and 199mm), and two adult RBT's (228 and 337mm) found. BLS-common	High intensity survey.
	AF-6	04/14/03	97	2.8	Four adult RBT's (205-312mm) found. BLS-common, NPM-rare	Moderate intensity survey.

*RBT=rainbow trout, SD=speckled dace, LND=longnosed dace, SCP=sculpin, BLS=bridgelip suckers, NPM=northern pikeminnow, SMB=smallmouth bass, YB=yellow bullhead, TF=tailed frogs.
Rare=≤3, Uncommon=4-10, Common=11-100, and Abundant=≥101

Table 4 (Cont.). Relative abundance of fish from qualitative electrofishing sites in Asotin, Whitman and Garfield counties, 2001-2003.

Stream	Site #	Date	Site Length (m)	Avg. Width (m)	Relative Abundance	Comments
Alkali Flat Ck (Cont.)	AF-7	04/14/03	30	2.0	No salmonids found. BLS-uncommon	Moderate intensity survey.
	AF-8	04/14/03	83	3.0	No salmonids found. BLS-common	Moderate intensity survey.
	AF-9	08/13/02	78	2.2	No salmonids found. SD-rare	Moderate intensity survey.
	AF-10	04/14/03	70	2.3	No salmonids found. YB-rare	Moderate intensity survey.
	AF-11	08/13/02	88	6.1	No salmonids found. SD-common	Moderate intensity survey.
	AF-12	04/14/03	22	1.5	No salmonids found. BLS-common	Moderate intensity survey.
	AF-13	04/14/03	30	3.6	Three adult RBT's (215-340mm) found. BLS-common, SMB-rare	Moderate intensity survey.
	AF-14	08/13/02	79	5.4	No salmonids found. SD, BLS-common	Moderate intensity survey.
	AF-14	04/14/03	30	1.5	No salmonids found. BLS-rare	Moderate intensity survey.
	AF-15	04/14/03	18	1.5	No salmonids found. BLS-common, NPM-uncommon	Moderate intensity survey.
	AF-16	04/14/03	35	2.0	No salmonids found. BLS-rare	Moderate intensity survey.
	AF-17	08/13/02	80	3.2	No salmonids found. NPM and SD-uncommon, BLS-rare	Moderate intensity survey.
Rock Spring Gulch	RSG-1	04/14/03	70	2.0	No fish found. Leeches-present	Moderate intensity survey, large deep pool with a barrier at the top.
	RSG-2	04/14/03	58	2.0	No fish found.	Moderate intensity survey.
	RSG-4	04/14/03	65	1.5	No salmonids found. BLS-common	Moderate intensity survey.
	RSG-3	08/13/02	83	3.0	No fish found.	Moderate intensity survey.
	RSG-4	08/13/02	65	2.1	No salmonids found. BLS-rare, SD-common.	Moderate intensity survey.
North Fork Deadman Ck	NFD-1	07/30/02	64	0.8	No salmonids found. SD-uncommon	High intensity survey, very little water.
	NFD-2	07/30/02	72	1.5	One 1+ RBT (110mm) found. SD- common, BLS-uncommon, SCP-rare	High intensity survey.
	NFD-3	08/30/01	60	2.5	Two 0+ RBT's (80 and 82mm) found. SD-common, BLS-uncommon	High intensity survey.
South Fork Deadman Ck	SFD-1	09/10/01	200	N/A	One adult RBT (300mm) found. SD-abundant, BLS-rare	High intensity survey, fish was found in pool.
	SFD-2	08/30/01	100	N/A	No salmonids found. SD-abundant, BLS-common	Moderate intensity survey.
	SFD-3	09/10/01	200	3.5	No salmonids found. SD-common, BLS-abundant	Moderate intensity survey.
	SFD-4	08/06/02	60	1.7	No salmonids found. SD-common	Moderate intensity survey.

*RBT=rainbow trout, SD=speckled dace, LND=longnosed dace, SCP=sculpin, BLS=bridgelip suckers, NPM=northern pikeminnow, SMB=smallmouth bass, YB=yellow bullhead, TF=tailed frogs.
Rare=≤3, Uncommon=4-10, Common=11-100, and Abundant=≥101

Table 4 (Cont.). Relative abundance of fish from qualitative electrofishing sites in Asotin, Whitman and Garfield counties, 2001-2003.

Stream	Site #	Date	Site Length (m)	Avg. Width (m)	Relative Abundance	Comments
SF Deadman Ck (Cont.)	SFD-5	08/06/02	76	1.9	No salmonids found. SD-common	Moderate intensity survey.
	SFD-6	08/30/01	60	N/A	No salmonids found. SD-common BLS-uncommon	Moderate intensity survey.
Deadman Ck	D-1	08/30/01	70	3.5	No salmonids found. SD-common	Moderate intensity survey.
	D-1	07/30/02	70	1.6	One 0+ RBT (72mm) found. SD-common	High intensity survey.
	D-2	08/30/01	30	3.9	No salmonids found. SD-common	High intensity survey.
	D-3	07/30/02	65	4.6	Three 0+ RBT's (89-90mm) and four 1+ RBT's (122-133mm) found. SCP and BLS-uncommon SD-common	Moderate intensity survey.
	D-4	08/27/01	30	1.7	No salmonids found. BLS and crayfish-rare, SD-uncommon	High intensity survey.
	D-5	08/30/01	250	N/A	No salmonids found. SD-common BLS-rare	Light intensity survey, sampled moving water between beaver dams.
	D-6	07/30/02	34	3.4	13 0+ RBT's (39-80mm) found. BLS and CP-rare, SD-uncommon	High intensity survey.
	D-6	08/30/01	75	3.0	22 0+ RBT's (64-100mm) and two 1+ RBT's (108 and 119mm) found. SD-uncommon, BLS-rare	High intensity survey, below lowest beaver dam.
Lynn Gulch	LG-1	08/30/01	100	1.2	No fish found.	Light intensity survey, very low flow.
	LG-1	07/30/02	30	1.0	No fish found.	Moderate intensity survey.
	LG-2	08/30/01	100	1.2	No salmonids found. SD-rare	Moderate intensity survey, very low flow.
	LG-2	07/30/02	30	2.5	No salmonids found. SD-common	Moderate intensity survey.
North Fork Meadow Ck	NFM-1	07/31/01	30	1.3	No salmonids found. SD-uncommon	High intensity effort.
Meadow Ck	MD-1	07/31/01	30	5.3	No salmonids found. SD-uncommon	Light intensity survey, hard to find water due to grass choking stream.
	MD-1	08/06/02	102	3.9	No salmonids found. SD-common	Moderate intensity survey.
	MD-3	08/06/02	187	4.5	One adult RBT (240mm) found. SD-abundant	Moderate intensity survey.
	MD-3	07/31/01	30	2.5	One 1+ RBT (192mm) found. SD-abundant	
	MD-5	07/31/02	40	N/A	No salmonids found. SD-common	Moderate intensity survey.

*RBT=rainbow trout, SD=speckled dace, LND=longnosed dace, SCP=sculpin, BLS=bridgelip suckers, NPM=northern pikeminnow, SMB=smallmouth bass, YB=yellow bullhead, TF=tailed frogs.
Rare=≤3, Uncommon=4-10, Common=11-100, and Abundant=≥101

Table 4 (Cont.). Relative abundance of fish from qualitative electrofishing sites in Asotin, Whitman and Garfield counties, 2001-2003.

Stream	Site #	Date	Site Length (m)	Avg. Width (m)	Relative Abundance	Comments
Meadow Ck (Cont.)	MD-6	07/31/02	47	2.0	No salmonids found. SD-common	Moderate intensity survey.
	MD-7	07/31/01	30	1.6	No salmonids found. SD-common	Moderate intensity survey, grass choked channel.
	MD-9	07/31/02	50	N/A	No salmonids found. BLS-uncommon, SD-common	Moderate intensity survey.
	MD-10	07/31/02	50	N/A	No salmonids found. SD-common, BLS-uncommon, Crayfish-rare	Moderate intensity survey.

*RBT=rainbow trout, SD=speckled dace, LND=longnosed dace, SCP=sculpin, BLS=bridgelip suckers, NPM=northern pikeminnow, SMB=smallmouth bass, YB=yellow bullhead, TF=tailed frogs.
Rare=≤3, Uncommon=4-10, Common=11-100, and Abundant=≥101

Steelhead Spawning Surveys

Spawning surveys were conducted in all three counties in 2001 and 2002, and only one stream in Whitman County was surveyed in 2003. The surveys covered a total of 111.5 miles of potential and known spawning habitat. Most of the areas were walked only once because of the extent of area to be covered, but a few areas were walked twice. The total distance walked, including duplicated areas, was 128.2 miles: 50.5 miles in Asotin County, 43.9 miles in Whitman County, and 33.8 miles in Garfield County.

Asotin County

Steelhead spawning surveys in Asotin County were conducted in five streams in 2001 and three streams in 2002. The three main streams surveyed were Couse Ck, Tenmile Ck, and George Ck, with two tributaries of George Ck, Coombs Ck and Hefflefinger Ck, also being sampled in 2001 (Table 5). Some of these surveys were a continuation from surveys conducted in 2000 (Mendel et al, 2001).

Couse Ck was surveyed for 5.4 miles in 2001 and no redds were identified. There was also no live or dead steelhead found during the surveys. In 2002, 3.1 miles were surveyed and three redds were found, along with one live fish and five dead fish. Tenmile Ck was surveyed for 6.0 miles in 2001 and 29 redds were observed (4.8 redds per mile). Surveyors also observed 14 live fish during the surveys. The same 6.0 miles of Tenmile were surveyed again in 2002 and 25 redds (4.2 redds per mile), 32 live fish, and two dead fish were observed. George Ck was surveyed for 8.7 miles in 2001 and 42 redds, 16 live fish and two dead fish were observed. In 2002 only 3.6 miles of upper George Ck were surveyed and one redd was seen. The lower sections were not surveyed because of high, turbid flows on the day that surveys were conducted. We also surveyed the lower parts of two tributaries to George Ck in 2001, Coombs Ck (2 miles) and Hefflefinger Ck (0.6 miles). In Coombs Ck we observed two redds, and in Hefflefinger we observed one redd (Table 5).

Table 5. Steelhead spawning survey summary for Asotin County, 2001-2002.

Reach/Date	Survey	Stream Section	Surveyed Miles	Redds	Redds per mile	Fish Observed	
Couse Ck						Live	Dead
04/03/01	1	River mile 5.5 to river mile 3.2 (A)	2.3	0	0.0	0	0
04/03/01	1	River mile 3.2 to river mile 1.6 (B)	1.6	0	0.0	0	0
04/03/01	1	River mile 1.6 to river mile 0.1 (C)	1.5	0	0.0	0	0
04/18/01	2	River mile 3.2 to river mile 1.6 (B)	1.6	0	0.0	0	0
04/18/01	2	River mile 1.6 to river mile 0.1 (C)	1.5	0	0.0	0	0
		Total	**5.4**	**0**	**0.0**	**0**	**0**
Couse Ck							
05/02/02	1	River mile 3.2 to river mile 2.8 (D)	0.4	2	5.0	0	1
05/02/02	1	River mile 2.8 to river mile 2.1 (E)	0.7	1	1.4	0	0
05/02/02	1	River mile 2.1 to river mile 1.0 (F)	1.1	0	0.0	0	3
05/02/02	1	River mile 1.0 to river mile 0.1 (G)	0.9	0	0.0	1	1
		Total	**3.1**	**3**	**1.0**	**1**	**5**
Tenmile Ck							
04/03/01	1	River mile 6.1 to river mile 0.1 (H)	6.0	9	1.5	7	0
04/23/01	2	River mile 6.1 to river mile 3.7 (I)	2.4	16	6.7	0	0
04/23/01	2	River mile 3.7 to river mile 1.3 (J)	2.4	4	1.7	5	0
04/23/01	2	River mile 1.3 to river mile 0.7 (K)	0.6	0	0.0	2	0
04/23/01	2	River mile 0.7 to river mile 0.1 (L)	0.6	0	0.0	0	0
		Total	**6.0**	**29**	**4.8**	**14**	**0**
Tenmile Ck							
04/04/02	1	River mile 6.1 to river mile 3.7 (I)	2.4	3	1.3	10	0
04/04/02	1	River mile 3.7 to river mile 0.1 (M)	3.6	5	1.4	6	0
04/24/02	2	River mile 6.1 to river mile 3.7 (I)	2.4	11	4.6	6	1
04/24/02	2	River mile 3.7 to river mile 0.1 (M)	3.6	6	1.7	10	1
		Total	**6.0**	**25**	**4.2**	**32**	**2**
George Ck							
05/17/01	1	River mile 19.5 to river mile 17.5 (N)	2.0	2	1.0	0	0
05/08/01	1	River mile 17.5 to river mile 14.9 (O)	2.6	11	4.2	4	0
04/18/01	1	River mile 5.7 to river mile 3.6 (P)	2.1	14	6.7	9	0
04/18/01	1	River mile 3.6 to river mile 1.6 (Q)	2.0	15	7.5	3	2
		Total	**8.7**	**42**	**4.8**	**16**	**2**
George Ck							
05/02/02	1	River mile 19.0 to river mile 15.4 (R)	3.6	1	0.3	4	0
		Total	**3.6**	**1**	**0.3**	**4**	**0**
Coombs Ck							
05/08/01	1	River mile 2.0 to river mile 0.0 (S)	2.0	2	1.0	0	0
		Total	**2.0**	**2**	**1.0**	**0**	**0**
Hefflefinger Ck							
05/08/01	1	River mile 0.6 to river mile 0.0 (T)	0.6	1	1.7	0	0
		Total	**0.6**	**1**	**1.7**	**0**	**0**

A: Forks to 1st brg. up Couse Ck Rd., B: 1st brg. up Couse Ck Rd. to 1.5 miles above Snake River Rd., C: 1.5 miles above Snake River Rd. to Snake River Rd., D: 1st brg. up Couse Ck Rd. to 0.4 miles below 1st brg. up Couse Ck Rd., E: 0.4 miles below 1st brg. up Couse Ck Rd. to 2.0 miles above Snake River Rd., F: 2.0 miles above Snake River Rd. to 0.9 miles above Snake River Rd., G: 0.9 miles above Snake River Rd. to Snake River Rd., H: RM 6.1 to Snake River Rd., I: RM 6.1 to Bedrock falls, J: Bedrock falls to 1.2 miles above Snake River Rd., K: 1.2 miles above Snake River Rd. to 0.6 miles above Snake River Rd., L: 0.6 miles above Snake River Rd. to Snake River Rd., M: Bedrock falls to Snake River Rd., N: 2.0 miles above Trent Grade to Trent Grade, O: Trent Grade to Mouth of Hefflefinger Ck, P: Stringtown to 2.0 miles above Meyer Rd. brg., Q: 2.0 miles above Meyer Rd. brg. to Meyer Rd. brg., R: Forest Service Line to Coombs Ck mouth, S: RM 2.0 to Mouth, T: RM 0.6 to Mouth

Whitman County

Steelhead spawning surveys in Whitman County were conducted in four streams in 2001, five streams in 2002 and one stream in 2003. Surveys were completed in Steptoe Ck, Wawawai Ck, Almota Ck, and Little Almota Ck in 2001. In 2002, we expanded or surveys to include Penawawa Ck and Alkali Flat Ck. In 2003, we were able to resurvey Alkali Flat Ck and Penawawa Ck, but water clarity in Penawawa Ck was too poor to survey. We were also going to survey in Little Penawawa Ck but it also was too turbid to make accurate observations (Table 6).

Steptoe Ck was surveyed for 1.9 miles in 2001 and 2002, but no redds were seen either year. We observed one redd, four live fish, and one dead fish in the lowest 0.1 miles of Wawawai Ck in 2001, but when we returned in 2002 and expanded the survey to the lowest 0.4 miles no redds or fish were observed. Almota Ck was by far the most productive steelhead stream that we surveyed in Whitman County. In 2001 we surveyed 4.7 miles and observed 25 redds, nine live fish, and one dead fish. In 2002 we found 14 redds, one live fish, and 15 dead fish in 5.6 miles surveyed, even though this survey was not conducted until May and likely was too late in the season to reflect peak counts. Little Almota Ck was surveyed for 5.2 miles in 2001 with no redds or fish observed. Penawawa Ck was surveyed for 6.0 miles in 2002, with eight redds, one live fish, and four dead fish being observed. Alkali Flat Ck was surveyed for 12.0 miles in 2002 and 6.1 miles in 2003, but no redds or fish were observed in either year (Table 6).

Table 6. Steelhead spawning survey summary for Whitman County, 2001-2003.

Reach/Date	Survey	Stream Section	Surveyed Miles	Redds	Redds per mile	Fish Observed	
Steptoe Ck						Live	Dead
04/17/01	1	River mile 2.1 to river mile 1.1 (A)	1.0	0	0.0	0	0
04/17/01	1	River mile 1.1 to river mile 0.2 (B)	0.9	0	0.0	0	0
		Total	**1.9**	**0**	**0.0**	**0**	**0**
Steptoe Ck							
04/23/02	1	River mile 2.1 to river mile 1.1 (A)	1.0	0	0.0	0	0
04/23/02	1	River mile 1.1 to river mile 0.2 (B)	0.9	0	0.0	0	0
		Total	**1.9**	**0**	**0.0**	**0**	**0**
Wawawai Ck							
4/17/01	1	River mile 0.1 to river mile 0.0 (C)	0.1	1	10.0	4	1
		Total	**0.1**	**1**	**10.0**	**4**	**1**
Wawawai Ck							
04/23/02	1	River mile 0.4 to river mile 0.1 (D)	0.3	0	0.0	0	0
04/23/02	1	River mile 0.1 to river mile 0.0 (C)	0.1	0	0.0	0	0
		Total	**0.4**	**0**	**0.0**	**0**	**0**
Almota Ck							
04/24/01	1	River mile 4.7 to river mile 1.0 (E)	3.7	8	2.2	5	0
04/24/01	1	River mile 1.0 to river mile 0.1 (F)	0.9	15	16.7	3	1
04/24/01	1	River mile 0.1 to river mile 0.0 (G)	0.1	2	20.0	1	0
		Total	**4.7**	**25**	**5.3**	**9**	**1**
Almota Ck							
05/08/02	1	River mile 5.7 to river mile 4.7 (H)	1.0	1	1.0	0	2
05/08/02	1	River mile 4.7 to river mile 1.0 (E)	3.7	9	2.4	0	10
05/08/02	1	River mile 1.0 to river mile 0.1 (F)	0.9	4	4.4	1	3
		Total	**5.6**	**14**	**2.5**	**1**	**15**
Little Almota							
04/24/01	1	River mile 5.2 to river mile 1.4 (I)	3.8	0	0.0	0	0
04/24/01	1	River mile 1.4 to river mile 0.0 (J)	1.4	0	0.0	0	0
		Total	**5.2**	**0**	**0.0**	**0**	**0**
Penawawa Ck							
04/29/02	1	River mile 6.0 to river mile 4.3 (K)	1.7	6	3.5	1	0
04/29/02	1	River mile 4.3 to river mile 2.3 (L)	2.0	2	1.0	0	0
04/29/02	1	River mile 2.3 to river mile 0.0 (M)	2.3	0	0.0	0	4
		Total	**6.0**	**8**	**1.3**	**1**	**4**
Alkali Flat Ck							
04/30/02	1	River mile 12.9 to river mile 6.4 (N)	6.5	0	0.0	0	0
04/30/02	1	River mile 6.4 to river mile 0.9 (O)	5.5	0	0.0	0	0
		Total	**12.0**	**0**	**0.0**	**0**	**0**
Alkali Flat Ck							
4/14/03	1	River mile 7.0 to river mile 6.4 (P)	0.6	0	0.0	0	0
4/14/03	1	River mile 6.4 to river mile 0.9 (O)	5.5	0	0.0	0	0
		Total	**6.1**	**0**	**0.0**	**0**	**0**

A: Forks to RM 1.1, B: RM 1.1 to 0.2 miles above mouth, C: 1st culvert to Mouth, D: 0.3 miles above 1st culvert to 1st culvert, E: Haeder Gulch to Barn at end of lower Rd., F: Barn at end of lower Rd. to 1st culvert, G: 1st culvert to mouth, H: Forks to Haeder Gulch, I: Jenkins/Benedict Rd. to 2nd culvert, J: 2nd culvert to Mouth, K: Forks to End of pavement, L: End of pavement to RM 2.3, M: RM 2.3 to Mouth, N: Brg. in Hay to Rock Spring Gulch, O: Rock Spring Gulch to 0.9 miles above mouth, P: Falls to Rock Spring Gulch

Garfield County

Steelhead spawning surveys in Garfield County focused on two main streams and their tributaries, Deadman Ck and Meadow Ck. Surveys were conducted in Deadman Ck in both 2001 and 2002, while Meadow Ck was only surveyed in 2001 (Table 7).

North Fork Deadman Ck was surveyed for 0.4 miles in 2001 and 2.3 miles in 2002 with no redds or fish observed. South Fork Deadman Ck was also surveyed both years with no redds or fish seen. In Deadman Ck we observed nine redds and ~24 live fish in 6.2 miles in 2001, and one redd, one live fish, and 11 dead fish in 8.9 miles in 2002. In 2001 up to 12 beaver dams appeared to be blocking adult steelhead (this is where all the live fish were seen) at about river mile 1.5 until WDFW staff opened spillways at each dam. North Fork Meadow Ck and Meadow Ck were both surveyed in 2001, but no redds or fish were observed in any of the surveys (Table 7). Many fish passage barriers were seen during the surveys. The barriers included one small barrier falls, grass intruding and choking out the stream, and areas that have blown in with tumbleweeds and Russian thistle and silt deposition that created small dams.

Table 7. Steelhead spawning survey summary for Garfield County, 2001-2002.

Reach/Date	Survey	Stream Section	Surveyed Miles	Redds	Redds per mile	Fish Observed	
NF Deadman						Live	Dead
05/22/01	1	River mile 1.4 to river mile 1.0 (A)	0.4	0	0.0	0	0
		Total	**0.4**	**0**	**0.0**	**0**	**0**
NF Deadman							
05/07/02	1	River mile 4.2 to river mile 1.9 (B)	2.3	0	0.0	0	0
		Total	**2.3**	**0**	**0.0**	**0**	**0**
SF Deadman							
05/22/01	1	River mile 1.5 to river mile 0.8 (C)	0.7	0	0.0	0	0
		Total	**0.7**	**0**	**0.0**	**0**	**0**
SF Deadman							
05/07/02	1	River mile 3.7 to river mile 1.6 (D)	2.1	0	0.0	0	0
		Total	**2.1**	**0**	**0.0**	**0**	**0**
Deadman Ck							
05/22/01	1	River mile 9.4 to river mile 8.2 (E)	1.2	0	0.0	0	0
05/22/01	1	River mile 6.7 to river mile 4.5 (F)	2.2	1	0.5	0	0
04/17/01	1	River mile 4.5 to river mile 2.9 (G)	1.6	8	5.0	0	0
05/22/01	1	River mile 2.9 to river mile 1.4 (H)	1.5	0	0.0	0	0
05/22/01	2	River mile 4.5 to river mile 2.9 (G)	1.6	0	0.0	0	0
		Total	**6.5**	**9**	**1.4**	**0**	**0**
Deadman Ck							
05/07/02	1	River mile 9.4 to river mile 6.4 (I)	3.0	0	0.0	0	1
05/07/02	1	River mile 6.4 to river mile 3.2 (J)	3.2	0	0.0	0	0
05/07/02	1	River mile 3.2 to river mile 0.5 (K)	2.7	1	0.4	1	10
		Total	**8.9**	**1**	**0.1**	**1**	**11**
NF Meadow Ck							
04/12/01	1	River mile 1.8 to river mile 0.0 (L)	1.8	0	0.0	0	0
		Total	**1.8**	**0**	**0.0**	**0**	**0**
Meadow Ck							
04/12/01	1	River mile 14.2 to river mile 13.9 (M)	0.3	0	0.0	0	0
04/12/01	1	River mile 13.9 to river mile 11.1 (N)	2.8	0	0.0	0	0
04/12/01	1	River mile 11.1 to river mile 9.1 (O)	2.0	0	0.0	0	0
04/12/01	1	River mile 9.1 to river mile 7.8 (P)	1.3	0	0.0	0	0
04/13/01	1	River mile 4.0 to river mile 2.4 (Q)	1.6	0	0.0	0	0
04/13/01	1	River mile 2.4 to river mile 0.6 (R)	1.8	0	0.0	0	0
		Total	**9.8**	**0**	**0.0**	**0**	**0**

A: RM 1.4 to RM 1.0, B: 2.0 miles above Mayview/Blachly Rd. to Mayview/Blachly Rd., C: RM 1.5 to RM0.8, D: RM 3.7 to RM 1.6, E: 1st brg. on Lower Deadman Rd. to 1.2 miles below 1st brg. on Lower Deadman Rd., F: RM 6.7 to RM 4.5, G: RM 4.5 to RM 2.9, H: RM 2.9 to Stream ford at farm, I: 1st brg. on Lower Deadman Rd. to 5.2 miles above Willow Gulch Rd., J: 5.2 miles above Willow Gulch Rd. to 2.6 miles above Willow Gulch Rd., K: 2.6 miles above Willow Gulch Rd. to Willow Gulch Rd., L: 2.25 miles above Gould City Rd. brg. to mouth, M: Confluence of North and South Fork to Gould City brg., N: Gould City brg. to Ben Day Gulch Rd., O: Ben Day Gulch Rd. to 2.0 miles below Ben Day Gulch Rd., P: 2.0 miles below Ben Day Gulch Rd. to RM 7.8, Q: 1.6 miles above 1st brg. on Meadow Ck Rd. to 1st brg. on Meadow Ck Rd., R: 1st brg. on Meadow Ck Rd. to Meadow Ck Rd. turnoff at Highway 127

Genetic Sampling

Fin clips were collected from a total of 98 fish in the study area in 2001 and 2002. Sixty six of theses samples were taken from adult steelhead during spawning walks, the other 32 samples were collected from juveniles during electrofishing surveys.

Of the 66 samples of adult steelhead 43 were collected in 2001 and 23 were collected in 2002. In 2001, the following numbers of samples were taken from these streams; 12 samples were taken from George Ck, 10 from Almota Ck, nine each from Tenmile Ck and Deadman CK, and three from Wawawai Ck. In 2002 the 23 samples were collected as follows; 15 from Tenmile Ck, four from Deadman Ck, two from Couse Ck, and one each from Penawawa Ck and Almota Ck.

All 32 of the juvenile fish sampled were collected during electrofishing surveys in 2002. Twenty five of the samples were collected in George Ck, six in Penawawa Ck, and one in Meadow Ck. Genetic analyses will be completed in the future.

Stream Profiles

Asotin County

Couse Creek

Spawning surveys were conducted on portions of Couse Ck in both 2001 and 2002. In 2001, surveys were conducted from the Couse Ck Forks downstream to Snake River Rd. bridge (5.4 miles) on 3 April, and from the first bridge up Couse Ck Rd. down to the Snake River Rd. bridge (3.1 miles) on 18 April. No redds or fish were observed during either of these surveys (Table 5). This may be attributed to low spring flows in 2001 that limited access and available spawning habitat to steelhead. The only survey in 2002 was from the first bridge up Couse Ck Rd. to Snake River Rd. bridge (3.1 miles) on 2 May. Three redds, one live fish and one dead fish were observed during the survey (Table 5). Scales and DNA samples were taken from the one live fish and one of the dead fish. In 2003, a landowner and the Conservation District Coordinator notified us of 1-2 dozen steelhead observed in Couse Ck. Six redds and one live fish were also observed in surveys done in April and May of 2000 (Mendel et al., 2000).

No electrofishing surveys were conducted on Couse Ck. in 2001, 2002, or the spring of 2003. Couse Ck was not as high a priority as some other streams, as some electrofishing had been completed in 2000 (Mendel et al., 2001).

Couse Ck is a small tributary to the Snake River above Asotin. Couse Ck is highly limited by water availability. In 2001 the area downstream of the first bridge up Couse Ck Rd. had large dewatered sections, and a logjam above Snake River Rd. seen during habitat and spawning surveys appeared to be impassable. This area of the stream was severely damaged during recent floods and has little to no riparian vegetation (Figs. 18 and 19) although upstream and downstream areas have good riparian buffers (Figs. 20 and 21). This area of the stream was also grazed which didn't allow for recovery of

vegetation, but has since been included in the Conservation Reserve Enhancement Program (CREP) to improve riparian buffers. The area above the bridge has a narrow but dense riparian zone of young deciduous trees. It has good spawning areas, but is periodically inaccessible to adult steelhead during low spring flows.

Figure 18. Couse Ck just below the first bridge during spring flows, April 2000. This area dry goes dry during the summer.

Figure 19. Couse Ck below the first bridge during spring flows, April 2000. This area goes during the summer.

Figure 20. Lower Couse Ck in riparian area, October 2002.

Figure 21. Lower Couse Ck in riparian area, October 2002.

Tenmile Creek

Spawning surveys in 2001 and 2002, were conducted from river mile 6.1 downstream to the bridge at Snake River Rd. In 2000, surveys included parts of Tenmile Ck upstream of this (Figure 22), but the lower 6.1 miles had the highest concentration of redds (Mendel et al., 2001), so this is where we focused our most recent efforts. In 2001, we walked two surveys and observed 29 redds and 14 live fish (Table 5). We were able to capture and take scale and DNA samples on six of the 14 fish. During the two surveys conducted in 2002, we observed 25 redds, 32 live fish, and two dead fish. Scale and DNA samples were taken from the two dead fish and 13 of the live fish (Table 5).

Tenmile Ck was electrofished in 2000 (Mendel et al., 2001, Figure 23), but no electrofishing occurred in 2001, 2002 or the spring of 2003.

Figure 22. Spawning survey on upper Tenmile Ck, April 2000.

Figure 23. Electrofishing crew on lower Tenmile Ck just below where road comes off the ridge, July 2000.

Tenmile Ck is another small Snake River tributary above Asotin, and has relatively good steelhead numbers. We documented 4.8 and 4.2 redds/mile in 2001 and 2002, respectively. While most of the section has a fair riparian zone, there is one section of stream from approximately river mile 1.6 to river mile 2.0 that is a deposition zone affected by recent flooding. This area has little to no riparian vegetation and severe scour and deposition from the floods. This flood-scarred area generally goes dry by late spring or early summer. The biggest problem with Tenmile Ck through this section is the lack of available water during late summer and early fall. Flow measurements at the Snake River Rd. bridge show lows of 0.7 cfs in 2001 and on October 28th, 2002 the flow was not even measurable (Appendix E). Juvenile survival may be severely limited when all that is available is scattered pools during summer and fall. Habitat conditions are shown from near the in channel pond near the headwaters (Figs. 24 and 25) to middle or lower Tenmile Ck (Figs. 26-37).

Figure 24. Pond on upper Tenmile Ck, April 2000.

Figure 25. Near pond on upper Tenmile Ck, April 2000.

Figure 26. Confluence of Tenmile Ck and Mill Ck, April 2000.

Figure 27. Middle Tenmile Ck below the mouth of Mill Ck, April 2000.

Figure 28. Middle Tenmile Ck canyon showing riparian area below the mouth of Mill Ck, April 2000.

Figure 29. Middle Tenmile Ck canyon showing flood damaged area below mouth of Mill Ck, April 2000.

Figure 30. Middle Tenmile Ck in moderate riparian area, April 2000.

Figure 31. Middle Tenmile Ck in flood damaged area, April 2000.

Figure 32. Dewatered area of middle Tenmile Ck, April 2000.

Figure 33. Middle Tenmile Ck in dewatered area, April 2000.

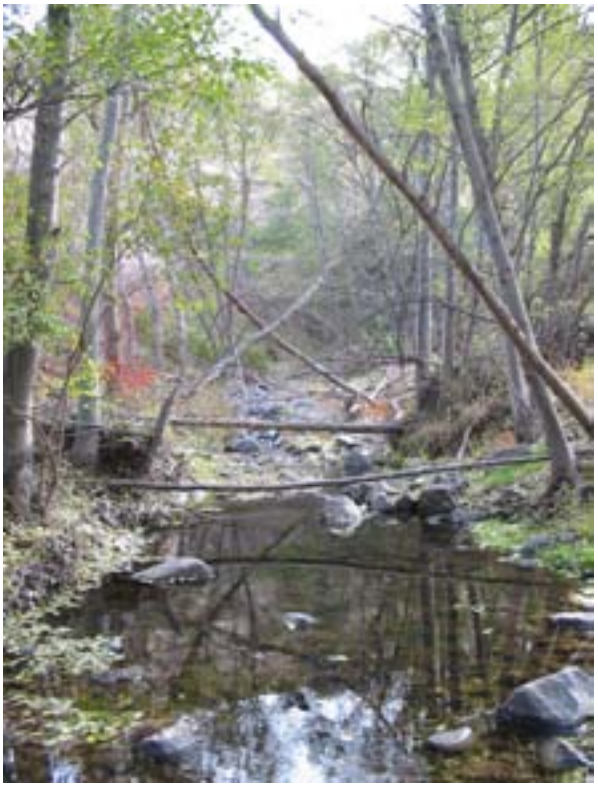

Figure 34. Tenmile Ck in riparian area above dewatered zone, October 2002.

Figure 35. Lower Tenmile Ck ~1.4 miles above mouth, July 2000.

Figure 36. Riparian zone just above the dewatered zone on lower Tenmile Ck, October 2002.

Figure 37. Dewatered zone just above where the road leaves the creek on lower Tenmile Ck, October 2002.

George Creek

Steelhead spawning surveys were conducted on George Ck in both 2001 and 2002 (Figs. 38 and 39), although this stream was not surveyed as extensively as in 2000 (Mendel et al., 2001). In 2001 surveys were completed on upper and lower George Ck. Upper George Ck was surveyed from 2.0 miles above Trent Grade to the mouth of Hefflefinger Ck (4.6 miles), while lower George Ck was surveyed from Stringtown to Meyers Rd. bridge (4.1 miles). These sections were walked one time and 42 redds, 16 live fish, and two dead fish were observed (Table 5). DNA and scale samples were collected from two dead fish and nine live fish. In 2002 only upper George Ck was surveyed because lower George Ck flows were too high and turbid to accurately survey. We were not able to return and try again. The survey on upper George Ck was from the Forest Service line to the mouth of Coombs Ck. One redd and four live fish were seen during this survey (Table 5), although high water conditions made this survey difficult, and no samples were collected from fish.

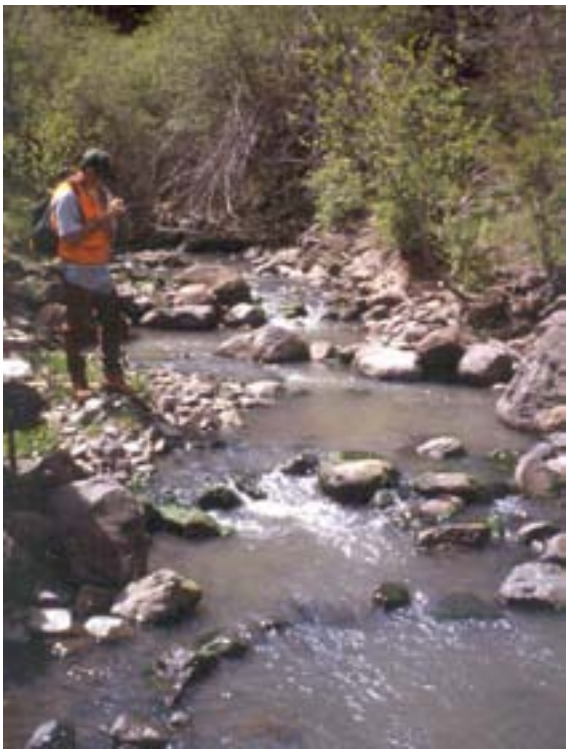

Figure 38. Spawning survey below Wormell Gulch on George Ck, May 2000.

Figure 39. Spawning survey on George Ck below Wormell Gulch, May 2000.

Four electrofishing surveys were conducted on upper George Ck (above the Forest Service line) on August 27th,2002. One of the four sites was done quantitatively, while the other three were done qualitatively. We concentrated our efforts on upper George Ck to see if we could locate bull trout in the system. We had already confirmed steelhead use through spawning surveys, and previous electrofishing. Doing qualitative sites allowed us to cover more area in a shorter period of time than if we had done quantitative sites. We found 32 rainbow/steelhead juveniles during our qualitative surveys, of which 13 were age 0+ fish and 19 were age 1+ fish. No adults (≥ 8in) were seen during these surveys (Table 4). The estimates from our quantitative surveys showed a total density for rainbow/steelhead trout to be 56.4 fish/100m^2. The highest density was of age 1+ fish at 35.4 fish/100m^2 followed by age 0+ fish at 21.0 fish/100m^2 (Table 3). We did not find any bull trout during our surveys, but we did find tailed frogs (Table 4) that often share similar habitat as bull trout. Habitat conditions appeared to likely be favorable for bull trout.

George Ck is a large tributary to Asotin Ck in Asotin County. George Ck has a wide range of climates and habitat types. Its headwaters are in the Umatilla National Forest and it descends through ~18 miles of private land in a deep narrow canyon to its confluence with Asotin Ck. We surveyed approximately 1.5 miles above the United States Forest Service (USFS) boundary. In the lower end of USFS property George Ck is a low gradient mountain stream (Figs. 40-42), with gravel/cobble substrate and a riparian zone of conifers with some brush understory. In general, the habitat in the National Forest is good, but there is some sign of animal damage due to grazing. As George Ck moves onto private ground it looks similar for ~1.0 mile to what is above the USFS line (Figure 42). Below this the riparian zone begins to change; the conifers slowly start to thin and the brush and deciduous understory becomes more dense. The stream also changes as it moves off of

the USFS property. The stream has a higher gradient where the substrate is dominated by medium to large cobble and boulders. The main stream habitat types are cascades and pocket water, with some large woody debris (LWD) and some moderate pools (Table 2, Figs. 43 and 44, Appendix F). While there are still some good areas for spawning, overall, available spawning habitat decreases through this section. The culvert at Trent Grade is a potential barrier, where the road crosses the culvert is under sized and slightly perched (Figs. 45 and 46). We have seen adult steelhead above this point, but at high flows it would likely be a velocity barrier. From about Wormell Gulch down to Meyers Ridge Rd. the stream takes a different look. It meanders through a much wider canyon and has a narrow, sporadic, mostly deciduous riparian zone (Figs. 47-56). This section of stream has good areas for spawning with a lot of small and medium cobble, but is limited by water availability in the summer. There are moderate amounts of sedimentation that increases as you move downstream. This area has been grazed and animal damage is high in some areas (Appendix F). Below Meyers Ridge Rd. down to the mouth the stream makes a drastic change. This section includes a wide large deposition area near the mouth of Pintler Ck (Figure 57), and has little riparian vegetation. The stream often goes dry in this area from early summer through early to late fall, depending on when fall rains recharge the stream.

Figure 40. Upper George Ck near the USFS boundary, May 2000.

Figure 41. Upper George Ck, showing area of steep gradient, May 2000.

Figure 42. Upper George Ck above Trent Grade Rd., May 2000.

Figure 43. Upper George Ck just below Trent Grade, October 2002.

Figure 44. Upper George Ck ~2.0 miles above Wormell Gulch, July 2000.

Figure 45. Downstream portion of Trent Grade culvert, August 2002.

Figure 46. Upstream portion of Trent Grade culvert, notice eroded and unprotected road fill, August 2002.

Figure 47. George Ck near mouth of Wormell Gulch, May 2000.

Figure 48. Spawning survey on George Ck below the mouth of Wormell Gulch, May 2000.

Figure 49. George Ck below Wormell Gulch, May 2000.

Figure 50. George Ck below Wormell Gulch, May 2000.

Figure 51. George Ck below Wormell Gulch, May 2000.

Figure 52. George Ck below Wormell Gulch, May 2000.

Figure 53. Mouth of Rockpile Gulch, April 2000.

Figure 54. George Ck at mouth of Stringtown Gulch, April 2000.

Figure 55. From stream ford above Meyers Ridge Rd. looking upstream, October 2002.

Figure 56. From stream ford above Meyers Ridge Rd. looking downstream, October 2002.

Figure 57. George Ck near the mouth of Pintler Ck looking downstream, October 2002.

Coombs Creek

In 2001, Coombs Ck was surveyed for steelhead spawning from two miles above the mouth to the mouth. Two redds were found and no fish were observed during the survey.

Electrofishing surveys were conducted on Coombs Ck on August 27th, 2002. Four qualitative and two quantitative sites were done from just below the Forest Service line upstream to river mile 3.3. The two quantitative sites CC-3 and CC-6 had total densities for rainbow/steelhead trout of 121.8 and 57.7 fish/100m^2, respectively. Age 0+ fish dominated in both sites. No adults (≥ 8in) were seen in either site (Table 3). In the four qualitative surveys CC-1, CC-2, CC-4, and CC-5, 30 age 0+ fish and 28 age 1+ fish were collected. These fish were all found in two sites CC-1 and CC-5, the other two sites had little water and no fish were found.

Coombs Ck is a tributary to upper George Ck, and has similar habitat to upper George. Like George Ck it begins in the National Forest and descends onto private land in drier habitat. It has a wide (over 300 feet) riparian zone, that provides good shade and high amounts of LWD to the stream (Table 2, Appendix F). There is good spawning habitat, though we have not documented high steelhead use of this area. Salmonid use has been documented from the mouth up into the National Forest. Recent logging activity on private land may have future effects on this creek, so it should be surveyed again in the future.

Hefflefinger Creek

In 2001, we also took a quick look into lower Hefflefinger. A steelhead spawning survey was conducted from 0.6 miles above the mouth down to the mouth, and one redd was seen.

No electrofishing was conducted on Hefflefinger in 2001, 2002 or 2003, but one lower site was done in 2000 (Mendel et al., 2001).

Huber Gulch

In the spring of 2003 we attempted to walk a spawning survey from Sangster Rd. to the mouth, but the water conditions were too turbid to allow accurate counts.

Electrofishing surveys on Huber Gulch were conducted on May 7th, 2003. Two qualitative sites were sampled, producing 11 1+ rainbow/steelhead trout. We also saw several other rainbow/steelhead juveniles but were unable to capture them (Table 4). This was the same day that we were going to do a steelhead spawning survey, but visibility was poor, so this made it difficult to capture all the fish during electrofishing.

Huber Gulch is a tributary to Wormell Gulch that flows into George Ck. The area of Huber Gulch that we sampled (Sangster Rd. to the mouth) was very homogeneous. It had a very thick riparian zone that was a scattered pine overstory with brush understory. The substrate was mostly small to medium cobble, with some boulders and moderate sedimentation. It appeared to have decent spawning habitat although the poor water clarity made it difficult to judge. While fish were found in both electrofishing sites during spring, this stream is usually dry during summer.

Wormell Gulch

Wormell Gulch was also not surveyed because of turbid water conditions that made spawning surveys impossible.

Two electrofishing surveys were conducted on Wormell Gulch on May 7th, 2003. These sites were both below the mouth of Huber Gulch. We found 13 age 0+ and 29 age 1+ rainbow/steelhead trout during these surveys (Table 4). Water visibility was not very good during the surveys, so we may have missed some fish. We stayed below the mouth of Huber Gulch because in Wormell Gulch there was very little water above this point, and there was a barrier falls on Wormell Gulch ~20 meters above the mouth of Huber Gulch.

Wormell is one of the tributaries to upper George Ck. We sampled Wormell from the mouth of Huber Gulch down to 0.9 miles above the mouth. The habitat was very similar to Huber. It has scattered pine overstory and very thick brush understory. The substrate increased in size to medium to large cobble and boulders, and sedimentation was also moderate. There was available spawning habitat, but poor water clarity wouldn't allow accurate spawning surveys.

Pintler Creek

We attempted to do steelhead spawning surveys on Pintler Ck from Pine Grove Rd. downstream to just below the eastern unnamed tributary off of Savage Rd., in the spring of 2003. However, poor water clarity made it impossible to get accurate counts.

We conducted qualitative electrofishing at six sites on Pintler Ck on April 30th, 2003 from 0.5 miles above Pine Grove Rd. to river mile 8.9 (0.2 miles below unnamed tributary in section 3). We found 10 age 0+, 93 age 1+ and one adult rainbow/steelhead trout (Table 4, Figs 58 and 59). The stream

had very poor water visibility on most of the sites that we surveyed, making it difficult to capture all the fish. This combined with the fact that these sites were done in early spring may explain the low numbers of age 0+ fish.

Figure 58. Rainbow trout (~155mm) found in upper Pintler Ck, April 2003. Notice silvery (smolt-like) appearance.

Figure 59. Rainbow trout (~180mm) found in upper Pintler Ck, April 2003. Notice resident trout coloration.

Pintler Ck is a tributary to lower George Ck. The stream channel above Sangster Rd. was quite open and fairly steep (Figure 60). The stream below Sangster Rd. had similar habitat throughout. It had a riparian zone consisting of scattered pines and cottonwoods with brush (mostly Hawthorn) understory. The substrate ranged from small to large cobble with occasional boulders. There were several sections of spawning habitat and sedimentation was moderate throughout (Figs. 61 and 62). Bank stability was fair at most of the sites we sampled, and erosion was limited. Although middle and lower Pintler Ck were not surveyed during this study, we have included photographs to show habitat conditions observed in 2000 (Mendel et al., 2001, Figs. 63-67).

Figure 60. Looking upstream from Pine Grove Rd. on upper Pintler Ck. Trout were found here in April 2003.

Figure 61. Pintler Ck ~2.0 miles below Pine Grove Rd. looking upstream, April 2003.

Figure 62. Pintler Ck ~2.0 miles below Pine Grove Rd. looking downstream, April 2003.

Figure 63. Lower Pintler Ck in riparian area above Kelly Ck, July 2000.

Figure 64. Rewatered area of Pintler Ck below Kelly Ck, July 2000. Dry for ~½ mile upstream.

Figure 65. Mouth of Ayers Gulch, April 2000.

Figure 66. In lower Ayers Gulch, April 2000.

Figure 67. Lower Pintler Ck, April 2000. This area goes dry in the summer.

Pintler Creek Tributary

A roving electrofishing survey was conducted on an unnamed, eastern tributary to Pintler Ck off of Savage Rd. in the spring of 2003. The survey crew electrofished off and on from river mile 1.2 to the mouth of the tributary. This tributary had very little water and a thick riparian belt that was almost completely Hawthorn (Figure 68). No fish were found during our survey (Table 4).

Figure 68. Pintler Ck tributary off of Savage Rd. no fish were found here, April 2003.

Whitman County

Steptoe Creek

Spawning surveys were conducted in Steptoe Ck from the forks to 0.2 miles above the mouth in both 2001 and 2002. No redds or fish were observed in either year.

Electrofishing surveys were conducted on Steptoe Ck on September 10, 2001 and July 01, 2002. All the electrofishing sites were done in a qualitative manner. We surveyed a total of eight sites, four in 2001 and four in 2002. In 2001, no fish of any kind were seen at any of the sites, while in 2002 no salmonids were seen in any site, but speckled dace were captured in very low numbers at one site (Table 4). A flash flood occurred in the late summer, early fall of 2001 before we electrofished. This may explain the lack of fish during electrofishing in 2001, because numerous small fish were observed during spawning surveys earlier in the year.

Steptoe Ck is a small Snake River tributary in Whitman County. Steptoe Ck is highly limited by water availability with the manual discharge measurements ranging from 0.2 cubic feet/second (cfs) to 1.2 cfs (Appendix E). The areas we surveyed have been grazed and riparian vegetation is sporadic, with some areas totally devoid of vegetation (Figs. 69-73). There are two road crossings on the creek and both are possible barriers to fish passage. Both culverts are perched and have steep gradients, with little water flow even if fish get into them (Figs. 70 and 71). The biggest barrier to steelhead use is at the mouth. A delta has formed where the creek meets the backwater of the Snake

River. Here the stream breaks into several channels and in some cases filters into the substrate, leaving little or no access from the Snake to the stream. If access and passage for the stream was improved there are plenty of sections of the stream with good spawning habitat.

Figure 69. Steptoe Ck above second culvert showing County Road Department work, February 2002.

Figure 70. Downstream portion of the first culvert on Steptoe Ck, October 2002.

Figure 71. Looking downstream from first culvert on Steptoe Ck, October 2002.

Figure 72. Steptoe Ck below first culvert, February 2002.

Figure 73. Steptoe Ck above mouth, October 2002.

Wawawai Creek

Steelhead spawning surveys were done in Wawawai Ck in 2001 and 2002. In 2001, we only had time to survey the section from the first culvert down to the mouth (0.1 miles). In this short section we were able to observe one redd, four live fish, and one dead fish (Table 6), but there was a side channel where we could hear fish moving, that we couldn't see because it was completely covered by blackberries. In 2002, we surveyed from 0.3 miles above the first culvert to the mouth, but no redds or fish were seen. Spawning surveys were conducted on Wawawai Ck in 1988 by the Washington Department of Wildlife, during these surveys 51 adult steelhead were observed (Schuck et al., 1989).

Electrofishing surveys were conducted on Wawawai Ck on September 10, 2001 and July 01, 2002. We did seven qualitative sites, three in 2001 and four in 2002. These sites ranged from two miles above the first culvert on Wawawai Grade to just below the first culvert. We found 21 age 0+ and two age 1+ rainbow/steelhead trout in 2001, and eight age 0+ and two age 1+ rainbow/steelhead in 2002 (Table 4).

Wawawai Ck is another small tributary of the Snake River in Whitman County. This stream comes out of the ground ~2.5 miles above the mouth (Figure 74). The stream has a nice riparian belt for most of the area that water is available (Figure 75). Stream flows are low with our highest reading at 1.3 cfs, but steelhead were observed spawning in the lowest 0.1 miles of the stream. The stream has good spawning and rearing areas. There is a partial barrier at the culvert 0.1 miles above the mouth. The culvert is slightly perched, at a steep gradient, and the water spills out onto a boulder, allowing little access into the culvert (Figure 76). The section from the culvert down, and also just above the culvert, is becoming over grown with blackberry bushes (Figure 77), which may eventually take over the stream. While there are only a few miles of available water, it would be worth improving passage at the culvert. There is unused spawning habitat above the culvert.

Figure 74. Upper Wawawai Ck drainage above available water, October 2002.

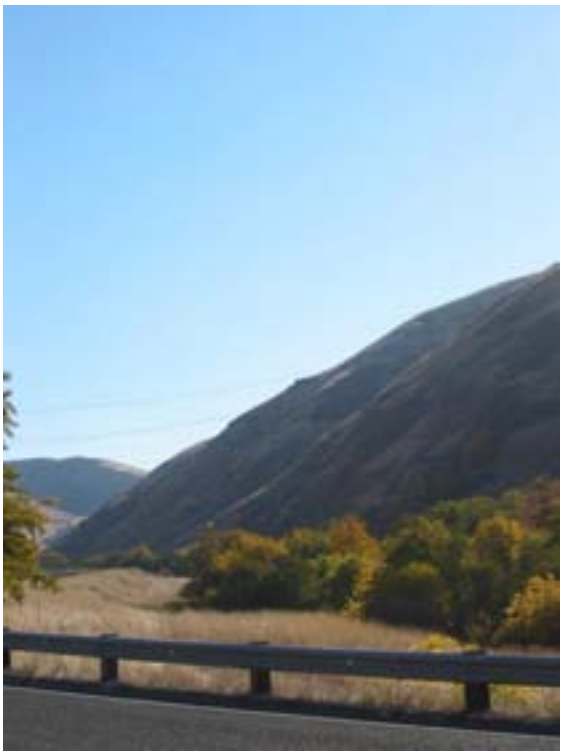

Figure 75. Riparian zone on Wawawai Ck just above first culvert, October 2002.

Figure 76. Wawawai Ck looking up into the first culvert, October 2002.

Figure 77. Wawawai Ck below first culvert stream covered in blackberries, February 2002.

Almota Creek

Almota Creek was surveyed in both 2001 and 2002 for steelhead spawning. Surveys were conducted from Header Gulch to the mouth in 2001 (4.7 miles), and from the upper Forks to the culvert above the mouth in 2002 (5.6 miles). In 2001, 25 redds, nine live fish, and one dead fish were observed, and in 2002, 14 redds, one live fish and 15 dead fish were observed. The survey was conducted about two weeks too late in 2002, as most of the dead fish had deteriorated. Scales and DNA samples were taken from seven live fish in 2001 and one live fish in 2002. The one dead fish in 2001 was a hatchery fish that had an adipose/left ventral fin clip (AdLV), which meant that it had a coded wire tag (CWT) in its snout. This fish was sampled for scales, DNA, and the snout was taken for the CWT. The CWT indicated the fish originated from nearby Lyons Ferry Hatchery. All the dead fish in 2002 were too deteriorated to sample effectively.

We conducted electrofishing at eight sites in 2001 and four sites in 2002. These sites were from LaFollette Rd (Figs. 78 and 79). down to just above river mile 6.0 and then from just below river mile 3.0 to just above the culvert on Almota Rd. In 2001, six of the surveys were quantitative, and two were done qualitative. Density measurements from the quantitative sites were generally highest for age 0+ rainbow/steelhead trout. This was not true for the uppermost quantitative site, where no age 0+ rainbow/steelhead were observed. Total densities ranged from 14.0 fish/100m^2 to 50.2 fish/100m^2 (Table 3). We also found three age 0+, 11 age 1+, and three adult rainbow/steelhead trout in the two qualitative sites in 2001 (Table 4). In 2002, we found three age 0+ and four age 1+ rainbow/steelhead trout during our electrofishing surveys (Table 4). We also conducted one qualitative survey on the upper end of a tributary to Almota Ck that runs along Haeder Rd., but no fish were found at that site.

Almota Ck is a small Snake River tributary that enters the Snake River in Whitman County just downstream of Lower Granite dam. The headwaters of the stream drain farmland and wooded canyons (Figs 80 and 81). We surveyed Almota Ck up to LaFollette Rd. (river mile 8). From LaFollette Rd. culvert down ~1.5 miles the stream has a steep gradient and has mainly large plunge pools and cascades. Below this it begins to flatten out to the mouth. There is good spawning habitat as far upstream as we conducted spawning surveys (Table 6). The riparian vegetation is generally fair to good throughout (Figs 82-87), but some animal damage due to grazing was evident. While most of the habitat is good, there is heavy sedimentation, especially in the lower part of the stream. While water availability decreases during summer, temperatures (Appendix B) remain cool enough for salmonid survival. Decreasing sediment load and improving riparian vegetation should help this stream become even more productive than currently.

Figure 78. LaFollette Rd. culvert on upper Almota Ck, April 2001.

Figure 79. Upper Almota Ck showing pools of water with little flow, August 2002.

Figure 80. Upper Almota watershed in April 2001 before logging operation.

Figure 81. Upper Almota watershed in October 2002 after logging operation.

Figure 82. Almota Ck below Haeder Gulch, April 2001.

Figure 83. Almota Ck below Haeder Gulch, April 2001.

Figure 84. Lower Almota Ck in riparian zone, October 2002.

Figure 85. Lower Almota Ck in riparian zone, October 2002.

Figure 86. Lower Almota Ck at temperature logger site looking upstream, October 2002.

Figure 87. Lower Almota Ck at temperature logger site looking downstream, October 2002.

Little Almota Creek

Little Almota Ck was surveyed for steelhead redds and adults in 2001 from the Jenkins/Benedict Rd. culvert to the mouth (5.2 miles), but no redd or fish were seen.

Electrofishing surveys were conducted in Little Almota Ck on September 18th, 2001. Qualitative surveys were completed at two sites from just above the culvert at the hairpin corner on Almota Rd. to the culvert at the mouth. We found no fish at the upper site, but found two 0+ rainbow/steelhead trout at the lower site (Table 4).

Little Almota Ck is a tributary of Almota Ck in Whitman County. During the steelhead spawning survey in 2001, we found several barriers that would limit spawning habitat to below the second culvert at Almota Rd. Above that to Benedict Rd. the stream runs through at narrow canyon with several natural barrier falls. There was also a head cut that created a natural barrier falls a short distance below the culvert on Almota Rd. Low stream discharge and high summer temperatures may also limit fish survival and distribution in this stream.

Penawawa Creek

Penawawa Ck was surveyed in 2002 from the forks to the mouth (6 miles). In 2003, we attempted to survey each of the forks but it was raining hard and the water clarity was poor, so the survey was cancelled. However, in 2002, eight redds, one live fish and four dead fish were observed in mainstem Penawawa Ck (Table 6). Only one of the dead fish was in good enough condition to sample for scales and DNA. The one live fish was not captured for sampling.

Electrofishing surveys were completed in Penawawa Ck on July 10th, 2002 and April 24th, 2003 (Figs 88 and 89). Five sites were done in 2002 from Getz-AE-Seavers Rd. to 0.4 miles above mouth, and five sites were done in 2003 from 1.6 miles above the mouth of Little Penawawa Ck to 0.5 miles below Getz-AE-Seavers Rd. Electrofishing sites in 2002 consisted of three quantitative sites and two qualitative sites. At the three quantitative sites we found only age 0+ rainbow/steelhead trout, and one 0+ age mountain whitefish. Densities ranged from 1.6 to 159.2

fish/100m^2 for rainbow/steelhead trout and the density for mountain whitefish at the lowest site was 1.8 fish/100m^2 (Table 3). During qualitative electrofishing in 2002 we found one age 0+ and two adult rainbow/steelhead trout (Table 4). In 2003, we found one age 0+, seven age 1+ and six adult rainbow/steelhead trout during qualitative electrofishing (Table 4).

Figure 88. Electrofishing on Penawawa Ck ~0.3 miles above the mouth of Little Penawawa Ck, April 2003.

Figure 89. Rainbow trout found in Penawawa Ck, April 2003.

Penawawa Ck is a small tributary to the Snake River in Whitman County. The upper end of Penawawa is surrounded by agricultural cropland and has little other than grass and brush for a riparian buffer (Figs 90-92). In spots at the upper end of where we sampled the grass was beginning to takeover the stream channel in some areas (Figure 92). As you move downstream the brush and some small deciduous trees increase until just above the mouth of Little Penawawa Ck., where a large, wide riparian wetland exists (Figure 93). From just above the mouth of Little Penawawa Ck down to the end of the pavement there has been grazing and agricultural use. The banks in this area are highly degraded and animal damage was high (Appendix E, Figs. 94-96). Below the end of the pavement the riparian vegetation begins to increase, but is sporadic from there to the cutoff road about 0.4 miles above the mouth (Figs. 97-103). Below the cutoff road the vegetation is very dense and wide (Figure 104). Sedimentation is moderate to heavy throughout the stream depending on location. There is good spawning habitat to just above the mouth of Little Penawawa Ck. A series of beaver dams from the end of the pavement down about 2.0 miles appeared to be impassible (Figs. 101 and 102), but we observed an adult steelhead above them. Riparian improvement to the upper drainage could help decrease sedimentation and increase fish use.

Figure 90. Upper Penawawa Ck ~1.3 miles above mouth of Little Penawawa Ck looking upstream, April 2003.

Figure 91. Upper Penawawa Ck ~1.3 miles above mouth of Little Penawawa Ck looking downstream, April 2003.

Figure 92. Upper Penawawa Ck showing grass encroaching in the stream ~1.6 miles above the mouth of Little Penawawa Ck, April 2003.

Figure 93. Riparian area on upper Penawawa Ck ~1.0 miles above the mouth of Little Penawawa Ck, April 2003.

Figure 94. Penawawa Ck below Getz-AE-Seavers Rd., July 2002.

Figure 95. Penawawa Ck below Getz-AE-Seavers Rd., October 2002. Notice aquatic vegetation covering the water.

Figure 96. Penawawa Ck ~0.5 miles below Getz-AE-Seavers Rd., July 2002.

Figure 97. Penawawa Ck in riparian zone below the end of the pavement, July 2002.

Figure 98. Lower Penawawa Ck in riparian zone, July 2002.

Figure 99. Lower Penawawa Ck just out of the riparian zone. Note: grass is encroaching on the stream, July 2002.

Figure 100. Penawawa Ck, below end of pavement, showing sporadic riparian zone, October 2002.

Figure 101. Beaver dam on lower Penawawa Ck at approximately river mile 4.0, April 2002.

Figure 102. Another beaver dam on lower Penawawa Ck at approximately river mile 4.0, April 2002.

Figure103. Penawawa Ck ~0.4 miles above the mouth, looking upstream, October 2002.

Figure104. Penawawa Ck, ~0.4 miles above mouth, looking downstream towards the Snake River, October 2002.

Alkali Flat Creek

Alkali Flat Creek was walked for steelhead spawning surveys in both 2002 and 2003. In 2001, we surveyed from the bridge in the town of Hay to 0.9 miles above the mouth. In 2002, we surveyed from the falls (river mile 7.0) to 0.9 miles above the mouth. During both years of surveying no redds or adult steelhead were seen.

Electrofishing surveys were conducted on Alkali Flat Ck on August 13th, 2002 and April 14th, 2003. In all, nineteen qualitative surveys were completed on Alkali Flat Ck from the bridge in the town of Hay, WA, to 1.2 miles below the second bridge. Nine sites were completed in 2002, and ten sites were done in 2003. We found one age 0+, 20 age 1+ and one adult rainbow/steelhead trout in 2002, and 15 age 0+, two age 1+ and nine adult rainbow/steelhead trout, and one smallmouth bass in 2003 (Table 4, Figs. 105-107).

Figure 105. Rainbow trout (~300mm) found in Alkali Flat Ck ~4.0 miles below Hay, August 2002.

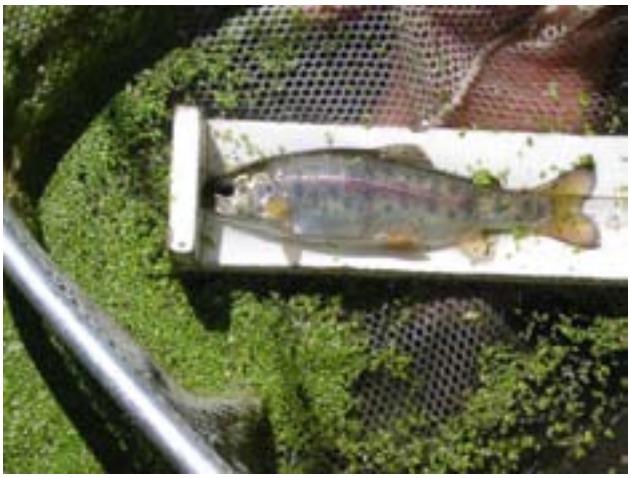

Figure 106. Rainbow trout (~170mm) found in Alkali Flat Ck ~4.0 miles below Hay, August 2002.

Figure 107. Smallmouth bass (285mm) found in lower Alkali Flat below Rock Spring Gulch, April 2003.

Alkali Flat Ck is a long drainage with its headwaters in crop and rangelands near Dusty, WA. It drains into the Snake River just below Little Goose dam. Our sampling occurred from the town of Hay, WA down to the impounded area about 0.9 miles above the mouth (Figs. 108-119). The riparian vegetation is limited to grass, with a rare tree or shrub. The stream runs at a low gradient and in the upper reaches it looks like a series of small, long ponds connected by small spills of water (Figs. 110 and 111). The grass and aquatic vegetation in some of these areas covers the surface of the stream and the substrate has a layer of sediment or mud on gravel to boulders. There are small

sections of usable spawning habitat if the fish can get to them. Fish use appears to be limited to a few resident rainbow trout. There is a fall (~6.0 feet high, Figure 109) at river mile 7.0 that would be a barrier to steelhead at low flows. Below the falls the steam alternates from a rock bottom substrate to large mud bottom pools. This continues down to the mouth of Rock Spring Gulch, where the stream develops more of a small to medium cobble substrate and long riffle/run sections. There are some usable spawning areas below the falls, but no steelhead were seen using these areas (Figs 112-115). Fish use in this area seems to be limited during summer months. In summer of 2002, no salmonids were found below the falls, but in the spring of 2003, all the sites below the falls contained several rainbow/steelhead trout. The main reason fish use is limited is likely because temperatures in this section are marginal, with anything from at least the first bridge (Figs. 116-119) downstream being lethal to salmonids (Appendix B).

Figure 108. Alkali Flat Ck looking upstream at the bridge in Hay, October 2002.

Figure 109. Falls on middle Alkali Flat Ck, April 2002.

Figure 110. Alkali Flat Ck ~4.0 miles below Hay, August 2002.

Figure 111. Alkali Flat Ck near falls, August 2002.

Figure 112. Alkali Flat Ck looking upstream toward the mouth of Rock Spring Gulch, October 2002.

Figure 113. Alkali Flat Ck below Rock Spring Gulch showing limited riparian vegetation, October 2002.

Figure 114. Alkali Flat Ck just below Rock Spring Gulch looking down stream channel, October 2002.

Figure 115. Alkali Flat Ck below Rock Spring Gulch, October 2002.

Figure 116. Alkali Flat Ck just above second bridge, October 2002.

Figure 117. Alkali Flat Ck looking down from the second bridge, October 2002.

Figure 118. Lower Alkali Flat Ck one of several gradient brakes, April 2003.

Figure 119. Lower Alkali Flat Ck below second bridge, April 2003.

Rock Spring Gulch

No Spawning surveys were conducted on Rock Spring Gulch.

We conducted electrofishing surveys in Rock Spring Gulch on August 13th, 2002 and April 14th, 2003. Surveys were done on two sites in 2002, and three sites in 2003, ranging from river mile 2.3 to the mouth. No salmonids were found in any of the surveys (Table 4).

Rock Spring Gulch is a tributary to Alkali Flat Ck in Whitman County. Limited sampling was conducted in Rock Spring Gulch to see if there was any fish use in this stream. We did not find any salmonids using the stream, but some juvenile bridgelip suckers and speckled dace were found in the lower end of the stream. Riparian vegetation is mostly grass, but there are areas with some deciduous trees (Figs. 120-122). The stream is highly impacted by a road that crosses the lower end several times (Figs 123 and 124), and definitely affects fish passage. Sedimentation seems to be heavy in most of the areas we sampled.

Figure 120. Upper Rock Spring Gulch, April 2003.

Figure 121. Deep in channel pool on upper Rock Spring Gulch, April 2003.

Figure 122. Riparian zone on Rock Spring Gulch, April 2003.

Figure 123. Upper road crossing on Rock Spring Gulch, stream flows year around, April 2003.

Figure 124. Bottom road crossing on Rock Spring Gulch looking downstream (stream flows year around), April 2003.

Garfield County

North Fork Deadman Creek

NF Deadman Ck was surveyed in both 2001 and 2002. In 2001, one survey was conducted from river mile 1.4 to river mile 1.0 (0.4 miles). In 2002, we surveyed from river mile 4.2 to river mile 1.9 (2.3 miles). No redds or fish were seen during either survey.

Electrofishing surveys were completed in NF Meadow Ck on August 30th, 2001 and July 30th, 2002. One site was done in 2001, while two sites were surveyed in 2002. We found two age 0+ rainbow/steelhead trout in 2001 and one age 1+ rainbow/steelhead trout in 2002. The uppermost site in 2002 had very little water when we surveyed.

South Fork Deadman Creek

SF Deadman Ck was surveyed in 2001 and 2002. One survey from river mile 1.5 to river mile 0.8 (0.7 miles) was completed in 2001, while in 2002, one survey was conducted from river mile 3.7 to river mile 1.6 (2.1 miles). No redds or fish were observed during the surveys in 2001 or 2002.

We did six qualitative electrofishing sites on SF Deadman Ck, two each on August 30th and September 10th,2001 and two on August 6th, 2002. One adult rainbow trout was found at the upper most site in 2001. This was the only salmonid found in any of the sites (Table 4).

Deadman Creek

Steelhead spawning surveys were completed in Deadman Ck in 2001 and 2002. In 2001, surveys were conducted from the first bridge on Lower Deadman Rd. down 1.2 miles and from river mile 6.7 to river mile 1.5 (6.4 miles). Most of this area was surveyed one time, but the section from river mile 4.5 to river mile 2.9 was surveyed twice. In the section from river mile 2.9 to river mile 1.5 there was a series of beaver dams that were opened by WDFW staff, because they were blocking the upstream movement of about two dozen adult steelhead. A total of nine redds and several fish were observed. In 2002, we surveyed from the first bridge on Lower Deadman Rd. to Willow Gulch Rd. During the survey we observed one redd, one live fish, and 11 dead fish. We were able to take DNA and scale samples on four of the 11 dead fish, the others were too decomposed to sample.

Electrofishing surveys in Deadman Ck were conducted on September 27th and 30th of 2001, and July 30th of 2002. In 2001, one quantitative and five qualitative sites were done, while in 2002 three qualitative sites were done. Density estimates from the quantitative site show a total density of rainbow/steelhead trout at 14.0 fish/100m^2 (Table 3). During qualitative electrofishing surveys in 2001, we did not locate any salmonids except at the lowest site where we found 22 age 0+ and two age 1+ rainbow/steelhead trout. In 2002, we found 17 age 0+ and four age 1+ rainbow/steelhead trout (Table 4).

Deadman Ck is a tributary that joins the Snake River at Central Ferry. Sampling was done between the first bridge on Lower Deadman Rd. to Willow Gulch Rd (Figs 125-130). Riparian vegetation is

very sporadic with some areas having lots of mature trees, while others areas are grazed pastureland or agricultural fields with little or no vegetation. The watershed drains cropland and rangeland that leads to a moderate to high sediment load in the stream. There is fair to poor spawning habitat available that is being utilized by a few steelhead. We also discovered a series of beaver dams that at least partially blocks fish passage, and cuts off miles of usable habitat.

Figure 125. Upper Deadman Ck looking upstream at the first bridge on Lower Deadman Rd., October 2002.

Figure 126. Looking downstream from just below the first bridge on Lower Deadman Rd., October 2002.

Figure 127. Riparian area on Deadman Ck below first bridge on Lower Deadman Rd., October 2002.

Figure 128. Deadman Ck ~2.0 miles below first bridge on Lower Deadman Rd. showing lack of riparian zone, October 2002.

Figure 129. WDFW staff opening one of 8-12 beaver dams on lower Deadman Ck near the farm at river mile 1.2, April 2001.

Figure 130. Deadman Ck looking upstream from Willow Gulch Rd., October 2002.

Lynn Gulch

Lynn Gulch was not surveyed for steelhead spawning.

Lynn Gulch was electrofished on August 30th, 2001 and July 30th, 2002. Two qualitative sites were done each year, and no salmonids were found in any of the sites.

Lynn Gulch is a tributary to Deadman Ck, and light sampling was done to look for fish use. No salmonids were found, but speckled dace were found at one site. Upper Lynn Gulch had a thin belt of mature deciduous trees surrounded by farmland and bunchgrass hillsides (Figure 131), while in the lower end only scattered trees and bunchgrass hillsides existed (Figure 132). This system has little water, high sedimentation, and little for usable spawning habitat.

Figure 131. Upper Lynn Gulch showing riparian vegetation, October 2002.

Figure 132. Lower Lynn Gulch showing lack of riparian vegetation, October 2002.

North Fork Meadow Creek

In 2001, we walked one spawning survey on NF Meadow Ck from river mile 1.8 to the mouth. No redds or fish were seen during the survey.

One qualitative electrofishing survey was done on NF Meadow Ck on July 31st, 2001, but no salmonids were found.

NF Meadow Ck has a sparse riparian buffer, little water and high sedimentation. There is a lot of agriculture on surrounding hills. Only a small section was sampled, and no salmonid use was documented.

South Fork Meadow Creek

We intended to conduct surveys (spawning and electrofishing), place temperature loggers, and take flows on SF Meadow Ck, but there was not enough water in the creek at any point during our sampling.

Meadow Creek

Steelhead spawning surveys were conducted in Meadow Ck in 2001, from the confluence of the North and South Forks to river mile 7.8, and from 1.6 miles above the 1st bridge on Meadow Ck Rd. to the Meadow Ck Rd. turn off on highway 127 (9.8 miles). No redds or fish were observed during the survey.

Electrofishing on Meadow Ck was done on July 31st and August 27th, 2001 and July 31st and August 6th, 2002. Four quantitative and three qualitative sites were done in 2001, while six qualitative surveys were done in 2002. Density estimates from 2001, ranged from 0.0 to 4.5 fish/100m^2, with two of the sites at 0.0 fish/100m^2 (Table 3). We found one age 1+ rainbow/steelhead trout at one site and at the other two sites found no salmonids (Table 4). In 2002, we conducted six qualitative electrofishing sites. In these sites we found one adult rainbow/steelhead at one site, but no other salmonids were found (Table 4).

Meadow Ck joins the Snake River at Central Ferry in Garfield County. Meadow Ck was surveyed from the forks down to 0.4 miles above the mouth (Figs. 133-140). This stream has been highly impacted by human activities (Figs. 133-135 and 138-140). The riparian zone is sparse in the upper end (Figs. 133-135) and the lower end is overrun by False Indigo (Figs. 139 and 140). The natural stream meander has been reduced causing severe incising in some areas. Sedimentation is high and grass has begun to fill in the stream channel in several areas, causing sediment to be trapped in the system. There were also many barriers created by Russian thistle and tumbleweeds blowing into the stream and then being clogged with sediment (Figs. 136 and 137). Some spawning habitat exists in the upper end, but a lack of fish passage limits spawning access. There is also some spawning habitat in the lower end of the system, but no spawning activity has been confirmed. Some fish use still exists, but no sign of reproduction was found, as only a few adult and sub-adult rainbow/steelhead trout. This system would have to have a lot of work to clear out the sediment

problems and open up passage. Native riparian buffer enhancement and reduction of sediment delivery would likely be most beneficial for fish use.

Figure 133. Meadow Ck looking upstream from Gould City Rd. bridge showing grass that has taken over the stream channel, August 2002.

Figure 134. Upper Meadow Ck ~0.5 miles below Gould City Rd. bridge, August 2002.

Figure 135. Overview of upper Meadow Ck below Gould City Rd. bridge showing crop land surrounding stream and sparse riparian vegetation, August 2002.

Figure 136. Meadow Ck below Ben Day Gulch showing tumble weeds and Russian thistle plugging the stream, April 2001.

Figure 137. Lower Meadow Ck showing grass, tumbleweeds, and silt accumulations that cause barriers to fish migration, April 2001.

Figure 138. Meadow Ck just above first bridge on Meadow Ck Rd. in an area that has been grazed, October 2002.

Figure 139. Overview of lower Meadow Ck showing dense belt of False Indigo, October 2002.

Figure 140. Close up image of False Indigo on lower Meadow Ck, October 2002. Note: no open channel flow.

Conclusions and Recommendations

This project provided an enlightening, although brief, glimpse of habitat conditions, fish distribution and relative abundance in many miles of these small streams that are entirely, or mostly, on private lands. Until this study, and its predecessor in Asotin County (Mendel et al. 2001), little or nothing was documented regarding fish use or stream habitat conditions for these streams.

All these streams suffer from very limited (less than 1.5 cfs) surface water during summer and fall, moderate to high levels of fine sediments, and most have higher water temperatures than preferred by salmonids. Some stream reaches have water temperatures that are lethal for salmonids during summer and early fall, or the channel is dry in some places. Passage problems exist in several of these streams.

We developed the following preliminary conclusions and recommendations based on our cursory surveys of streams in Asotin, Garfield and Whitman counties:

1. We developed and implemented a quick habitat inventory technique in 2001 in response to data gaps identified in development of the salmonid habitat limiting factors water resource inventory for Snake River areas in Washington (Kuttle 2002). This technique provided some useful information regarding habitat conditions and it was relatively quick to collect the data. We were able to conduct these surveys in the spring while surveying many miles to assess the status of steelhead spawning. However, the selected time intervals between transect measurements were often too long to provide a sufficient sample size for the belt and line transect measurement data. The technique was new and untested and failed to provide useful information regarding pool-riffle ratios, and some other commonly used baseline measurements. It could be reviewed and revised to be more useful, but a better option would probably be to conduct detailed habitat assessments using either the Oregon Habitat assessment method, or some other standardized, commonly used habitat assessment technique.

2. Steptoe, Wawawai, Alkali Flat, Meadow and Deadman creeks likely have some limited value to steelhead, although steelhead were not confirmed in Meadow, Alkali Flat, or Steptoe creeks during this study. Reports from landowners or information from WDFW district files indicate steelhead have been observed in Steptoe and Alkali Flat creeks, respectively, in the past 20 years.

3. This study provided the first recent documentation of steelhead use in Penawawa, Wawawai and Deadman creeks. These streams have little water during summer and high quantities of sediment in the substrate, as well as other habitat problems. Steelhead production from these streams is probably quite low. Penawawa Creek has the most immediate potential for increased production of these three streams. The most immediate restoration efforts for Penawawa Creek should focus on restoring woody riparian vegetation to provide shade and reduce the canarygrass that is choking out the channel, and reducing sediment delivery to the stream. All of these streams would benefit from increases in summer and fall stream discharges. Passage at the lowermost culvert on Wawawai Creek should be improved to allow more steelhead to access this stream.

4. Almota and Tenmile creeks have higher than anticipated steelhead use. Both could benefit from increased summer and fall stream flows, reduced sediment inputs and improved riparian conditions. Streamflows may be improved by development of a stable riparian buffer.

5. The summer 2001 flash flood in Steptoe Creek and subsequent channel work by the Whitman County Road Department damaged instream habitat and passage conditions throughout much of the stream channel. A large delta and braided channel presently at the mouth of the stream likely precludes steelhead from accessing the stream from the Snake River.

6. The George Creek system has substantial steelhead use (as documented by this study and Mendel et al. 2001) and some indication of bull trout use in the head waters (as documented by the USFS). The salmonid production in this system could be enhanced by reducing sediment delivery to the stream, increasing riparian vegetation, and increasing or at least maintaining summer and fall stream flows. A passage problem exists at the Trent Ridge Road culvert. This culvert is a partial barrier to fish passage and the culvert is likely to fail in the near future and deposit much of the road fill material into the stream channel. This culvert should be replaced by a larger culvert with adequate armoring to protect the road fill. Another possible barrier is in upper Pintler Creek. An in-channel pond may be blocking fish access upstream. We documented salmonids just downstream of the pond during spring 2003.

7. We documented steelhead/rainbow trout use of Huber Gulch during the spring of 2003, even though that same area is normally dry during the summer.

8. Additional monitoring of stream habitat conditions and salmonids should occur in the near future. We suggest the following monitoring efforts:
a) establish index spawning survey areas in each stream and survey these areas at least twice during the spring spawning period, for one or two years, and then at approximately three to five year intervals.
b) if time and funds allow, extend fish sampling surveys into portions of these streams and their tributaries to document the extent of spring or summer fish use in these drainages. For example, further examination is needed in Hefflefinger, parts of Wormell and other small tributaries or headwater areas in the upper George Creek drainage. Extensive surveys in upper George and Coombs creeks are needed to try to find bull trout and document their relative abundance and distribution.
c) collect additional steelhead genetic samples (particularly from George Creek drainage, Tenmile and Couse creeks, and Almota Creek) to provide adequate sample sizes from some of these watersheds to assist with stock assessment efforts and management of these populations.
d) examine stray hatchery fish for marks and use genetics analyses to try and determine the source and relative abundance of hatchery fish in the small streams listed above in c).
e) conduct further examination of fish that appear to be redband trout and try to determine a method to differentiate from steelhead and to understand their distribution and life history better.
f) conduct detailed stream habitat inventories during summer or fall in most of these drainages. This will aid in determining habitat conditions as well as restoration needs. It will also provide a baseline of information to monitor whether habitat conditions degrade or improve in the future.

g) conduct spring and summer fish distribution and relative abundance surveys every 3-5 years to monitor the populations and improve our knowledge of them within these watersheds. This effort will provide a baseline of information to monitor fish use and relative abundance over a period of many years.
k) establish constant recording streamflow monitors in most of these streams for 1-3 yrs to develop a better understanding of flow regimes available.

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Appendices A-F

Appendix A. Study site locations for Asotin, Garfield, and Whitman Counties, 2001-2003.

Stream Reach	Year	Site#	RM[a]	Location (within sect. is listed as smallest qtr. sect. of qtr. sect.)	Sample Type[b]	GPS Coordinates[c]		Comments
						North	West	
Couse Creek	2001	C1	5.3	T8N,R46E,Sect 22,NW¼,SW¼	T			100 meters above forks
	2001	C2	0.2	T8N,R47E,Sect 6,NW¼,NW¼	T,F			0.1 miles up Couse Creek Rd
	2002	C2	0.2	T8N,R47E,Sect 6,NW¼,NW¼	F[d]			0.1 miles up Couse Creek Rd
	2002	C3	0.1	T8N,R47E,Sect 6,NE¼,NW¼	T			Snake River Rd bridge
Tenmile Creek	2001	TC1	6.1	T9N,R46E,Sect 27,SE¼,SW¼	T	46 13.325	117 01.880	River mile 6.1
	2001	TC3	1.4	T9N,R46E,Sect 2,SW¼,SE¼	F			1.2 miles above Snake River Rd
	2001	TC4	0.2	T10N,R46E,Sect 36,SW¼,SW¼	T,F	46 17.800	116 59.534	Snake River Rd bridge
	2002	TC2	5.4	T9N,R46E,Sect 27,SW¼,NE¼	T			River mile 5.4
	2002	TC4	0.2	T10N,R46E,Sect 36,SW¼	T[d],F[d]			Snake River Rd bridge
George Creek	2001	GC5	17.5	T8N,R44E,Sect 22,NW¼,NW¼	T,F			Trent Grade
	2001	GC6	3.6	T9N,R45E,Sect 2, NW¼,SW¼	T			~0.5 mi. below Rockpile Gulch
	2001	GC7	1.7	T10N,R45E,Sect 36,SE¼,NW¼	F			First stream ford
	2001	GC9	0.4	T10N,R45E,Sect 25,NW¼,NE¼	F			0.4 miles above mouth
	2002	GC1	19.7	T8N,R44E,Sect 28,SW¼,SW¼	EL	46 7.839	117 18.888	River mile 19.7
	2002	GC2	19.7	T8N,R44E,Sect 28,SW¼,SW¼	EQ	46 7.839	117 18.888	25 meters below first site
	2002	GC3	19.3	T8N,R44E,Sect 28,NE¼,SW¼	EL	46 8.364	117 18.338	1.8 miles above Trent Grade
	2002	GC4	19.0	T8N,R44E,Sect 28,SE¼,NW¼	EL	46 8.577	117 18.259	1.5 miles above Trent Grade
	2002	GC5	17.5	T8N,R44E,Sect 22, NW¼,NW¼	T[d],F[d]			Trent Grade
	2002	GC6	3.6	T9N,R45E,Sect 2,NW¼,SW¼	T[d]			~0.5 miles below Rockpile Gulch
	2002	GC7	1.7	T10N,R45E,Sect 36,SE¼,NW¼	F[d]			First stream ford
	2002	GC8	1.4	T10N,R45E,Sect 36,NE¼,NW¼	F			Above Meyer Ridge Rd bridge
Coombs Creek	2002	CC1	3.3	T8N,R44E,Sect 35,SW¼,NW¼	EL			1.4 miles above USFS boundary
	2002	CC2	0.1	T8N,R44E,Sect 35,NW¼,NW¼	EL			North Fork Coombs Creek in section 35
	2002	CC3	3.1	T8N,R44E,Sect 35,SE¼,NW¼	EQ			1.2 miles above USFS boundary
	2002	CC4	0.1	T8N,R44E,Sect 35,SE¼,NW¼	EL			South Fork Coombs Creek at base of Lost Cabin Ridge
	2002	CC5	2.2	T8N,R44E,Sect 26,NE¼,SE¼	EL			0.3 miles above USFS boundary
	2002	CC6	1.9	T8N,R44E,Sect 26,SE¼,NE¼	EQ			At USFS boundary

[a] River mile
[b] EQ-Quantitative electrofishing (density estimates); EL-Qualitative electrofishing; T-Temperature; F-Flow
[c] GPS coordinates were taken in the following format D°M.M' in a NAD 27 datum file.
[d] Same site for 2001 and 2002

Appendix A. Study site locations for Asotin, Garfield, and Whitman Counties, 2001-2003.

Stream Reach	Year	Site#	RM[a]	Location (within sect. is listed as smallest qtr. sect. of qtr. sect.)	Sample Type[b]	GPS Coordinates[c] North	GPS Coordinates[c] West	Comments
Huber Gulch	2003	H1	0.6	T8N, R45E, Sect 20, SE¼, SE¼	F			3 meters above Sangster Road culvert
	2003	H2	0.6	T8N, R45E, Sect 20, SE¼, SE¼	EL			Just below Sangster Road culvert
	2003	H3	0.5	T8N, R45E, Sect 20, SE¼, SE¼	EL			0.5 miles above mouth
	2003	H4	0.0	T8N, R45E, Sect 20, SE¼, NE¼	F			10 meters above mouth of Huber Gulch
Wormell Gulch	2003	W1	1.2	T8N, R45E, Sect 20, SE¼, NE¼	F			10 meters above mouth of Huber Gulch
	2003	W2	1.2	T8N, R45E, Sect 20, SE¼, NE¼	EL			10 meters below mouth of Huber Gulch
	2003	W3	0.9	T8N, R45E, Sect 20, NW¼, NE¼	EL, F			0.9 miles above mouth
Pintler Creek	2003	PT1	11.6	T8N, R45E, Sect 21, NE¼, NE¼	EL			~0.5 miles above Pine Grove Road
	2003	PT2	11.1	T8N, R45E, Sect 15, NW¼, SW¼	F			20 meters above Pine Grove Road
	2003	PT3	11.1	T8N, R45E, Sect 15, NW¼, SW¼	EL			5 meters below Pine Grove Road
	2003	PT4	10.6	T8N, R45E, Sect 15, NW¼, NW¼	EL			River mile 10.6
	2003	PT5	10.1	T8N, R45E, Sect 10, NW¼, SW¼	EL			River mile 10.1
	2003	PT6	9.4	T8N, R45E, Sect 10, NE¼, NW¼	EL			River mile 9.4
	2003	PT7	9.1	T8N, R45E, Sect 3, SW¼, SE¼	F			River mile 9.1, near tributary mouth
	2003	PT8	8.9	T8N, R45E, Sect 3, NW¼, SE¼	EL			0.2 mile below tributary mouth
Pintler Ck Trib	2003	PC1	1.2 - 0	T8N, R45E, Sect 10	EL			Savage Road to tributary mouth
Steptoe	2001	ST1	2.9	T12N,R45E,Sect 33,SW¼,NW¼	EL			0.5 miles above Stuart Canyon
Creek	2001	ST2	2.4	T12N,R45E,Sect 33,SW¼,SE¼	EL			60 meters below forks
	2001	ST4	1.8	T11N,R45E,Sect 4,SE¼,NW¼	EL			0.4 miles below second culvert
	2001	ST7	0.8	T11N,R45E,Sect 8,NW¼,NE¼	T,F	46 27.266	117 11.622	At first culvert
	2001	ST9	0.5	T11N,R45E,Sect 8,NE¼,NW¼	EL			First farm on the right
	2002	ST3	2.1	T11N,R45E,Sect 4,NE¼,NW¼	EL			~0.1 miles below second culvert
	2002	ST5	1.6	T11N,R45E,Sect 4,NE¼,SW¼	T	46 27.754	117 10.815	~0.6 miles below second culvert
	2002	ST6	1.4	T11N,R45E,Sect 4,NW¼,SW¼	EL			~0.6 miles above first culvert
	2002	ST7	0.8	T11N,R45E,Sect 8,NW¼,NE¼	EL,F[d]			At first culvert
	2002	ST8	0.6	T11N,R45E,Sect 8,NW¼,NE¼	EL			~0.2 miles below first culvert

[a] River mile
[b] EQ-Quantitative electrofishing (density estimates); EL-Qualitative electrofishing; T-Temperature; F-Flow
[c] GPS coordinates were taken in the following format D°M.M' in a NAD 27 datum file.
[d] Same site for 2001 and 2002

Appendix A. Study site locations for Asotin, Garfield, and Whitman Counties, 2001-2003.

Stream Reach	Year	Site#	RM[a]	Location (within sect. is listed as smallest qtr. sect. of qtr. sect.)	Sample Type[b]	GPS Coordinates[c] North	GPS Coordinates[c] West	Comments
Wawawai	2001	WA1	2.1	T13N,R43E,Sect 12,SE¼,NE¼	EL			2.0 miles above culvert
Creek	2001	WA5	0.3	T13N,R43E,Sect 2,SE¼,SW¼	EL			400 meters above culvert
	2001	WA6	0.1	T13N,R43E,Sect 2,SE¼,SW¼	EL,T,F			First culvert on Wawawai Grade Rd
	2002	WA2	1.1	T13N,R43E,Sect 1,SW¼,SW¼	EL			~1.0 miles above first culvert
	2002	WA3	0.8	T13N,R43E, Sect 2, SW¼,SE¼	EL			~0.7 miles above first culvert
	2002	WA4	0.5	T13N,R43E,Sect 2,SW¼,SE¼	EL			~0.4 miles above first culvert
	2002	WA6	0.1	T13N,R43E,Sect 2,SE¼,SW¼	EL[d],T[d],F[d]			First culvert on Wawawai Grade Rd
Almota	2001	A2	7.7	T14N,R43E,Sect 24,SW¼,NE¼	EL	46 41.163	117 20.516	0.3 miles below culvert on LaFollette Rd
Creek	2001	A3	7.4	T14N,R43E,Sect 24,NW¼,NE¼	EQ	46 41.419	117 20.528	0.6 miles below culvert on LaFollette Rd
	2001	A7	2.8	T14N,R43E,Sect 8,SE¼,SE¼	EQ	46 42.410	117 25.105	River mile 2.8
	2001	A8	2.2	T14N,R43E,Sect 17,SW¼,NE¼	EQ	46 42.106	117 25.610	River mile 2.2
	2001	A9	1.7	T14N,R43E,Sect 17,SW¼,NW¼	EQ	46 42.002	117 26.244	River mile 1.7
	2001	A10	1.4	T14N,R43E,Sect 18,SE¼,NE¼	EQ	46 42.090	117 26.597	River mile 1.4
	2001	A11	1.0	T14N,R43E,Sect 18,NW¼,NE¼	F			Just above Hungate Grade
	2001	A12	0.4	T14N,R43E,Sect 18,NW¼,NW¼	EQ	46 42.254	117 27.611	0.6 miles above culvert on Almota Rd
	2001	A13	0.2	T14N,R42E,Sect 13,NE¼,NE¼	EL,T,F	46 42.223	117 27.798	Above culvert on Almota Rd
	2002	A1	8.0	T14N,R43E,Sect 24,NW¼,SE¼	EL,T			Just below culvert on LaFollette Rd
	2002	A4	6.9	T14N,R43E,Sect 13,SW¼,SW¼	EL	46 41.586	117 20.919	1.1 miles below culvert on LaFollette Rd
	2002	A5	6.5	T14N,R43E,Sect 14,NE¼,SE¼	EL	46 41.793	117 21.235	1.5 miles below culvert on LaFollette Rd
	2002	A6	6.2	T14N,R43E,Sect 13,SE¼,NE¼	EL			1.8 miles below culvert on LaFollette Rd
	2002	A11	1.0	T14N,R43E,Sect 18,NW¼,NE¼	F			Just above Hungate Grade
	2002	A13	0.2	T14N,R42E,Sect 13,NE¼,NE¼	T[d],F[d]			Above culvert on Almota Rd
Almota Ck Trib.	2002	AT1	0.9	T14N,R43E,Sect 14,NE¼,SE¼	EL			Haeder Rd tributary
Little Almota	2001	LA1	5.1	T15N,R43E,Sect 33,NW¼,SE¼	T			Culvert at Benedict/Jenkins Rd.
Creek	2001	LA2	1.4	T14N,R42E,Sect 1,SE¼,SE¼	EL			Culvert at hairpin curve on Almota Rd
	2001	LA3	0.1	T14N,R42E,Sect13,NW¼,NE¼	EL,T,F			Above first culvert
	2002	LA3	0.1	T14N,R42E,Sect 13,NW¼,NE¼	T[d],F[d]			Above first culvert

[a] River mile
[b] EQ-Quantitative electrofishing (density estimates); EL-Qualitative electrofishing; T-Temperature; F-Flow
[c] GPS coordinates were taken in the following format D°M.M' in a NAD 27 datum file.
[d] Same site for 2001 and 2002

Appendix A. Study site locations for Asotin, Garfield, and Whitman Counties, 2001-2003.

Stream Reach	Year	Site#	RM[a]	Location (within sect. is listed as smallest qtr. sect. of qtr. sect.)	Sample Type[b]	GPS Coordinates[c]		Comments
						North	West	
Penawawa Creek	2002	P5	6.0	T15N,R41E,Sect 36,NE¼,SE¼	EL,T,F			5 meters above Getz-AE-Seavers Rd bridge
	2002	P7	4.9	T14N,R41E,Sect 1,NW¼,NW¼	EL			~0.8 miles above Penawawa Rd/Streevy Rd junction
	2002	P8	3.9	T14N,R41E,Sect 2,NE¼,SW¼	EQ			Near the Penawawa Rd/Streevy Rd junction
	2002	P9	1.8	T14N,R41E,Sect 9,NW¼,NE¼	EQ			~1.2 stream miles above railroad tracks at mouth
	2002	P10	0.6	T14N,R41E Sect 8, NW¼, SE¼	EQ,T,F			~0.6 stream miles above railroad tracks at mouth
	2003	P1	7.8	T15N, R42E, Sect 32, SE¼, NW¼	EL			~1.6 miles above Little Penawawa Ck mouth
	2003	P2	7.1	T15N, R42E, Sect 31, SE¼, NE¼	EL			~1.0 miles above Little Penawawa Ck mouth
	2003	P3	6.5	T15N, R42E, Sect 31, SW¼, NW¼	EL			~0.3 miles above Little Penawawa Ck mouth
	2003	P4	6.3	T15N, R42E, Sect 31, SW¼, NW¼	F			Just above the mouth of Little Penawawa Ck
	2003	P5	6.0	T15N, R41E, Sect 36, NE¼, SE¼	EL, F			Getz-AE-Seavers Rd bridge
	2003	P6	5.5	T15N, R41E, Sect 36, SW¼,SE¼	EL			0.5 miles below Getz-AE-Seavers Rd bridge
	2003	P10	0.6	T14N,R41E, Sect 8, NW¼, SE¼	F[d]			~0.6 miles above railroad tracks at mouth
Little Penawawa Creek	2003	LP1	1.7	T15N, R42E, Sect 30, SE¼, NE¼	EL			Culvert at forks
	2003	LP2	1.0	T15N, R42E, Sect 30, SE¼, SW¼	EL			0.7 miles below forks
	2003	LP3	0.1	T15N, R41E, Sect 36, NE¼, SE¼	EL, F			0.1 miles above mouth
Alkali Flat Ck	2002	AF1	12.9	T14N,R39E,Sect 21,SE¼,SE¼	EL,T,F			~90 meters below bridge in Hay, WA.
	2002	AF2	9.3	T14N,R38E,Sect 25,SE¼,NW¼	EL	46 40.329	117 59.615	River mile 9.3
	2002	AF3	9.1	T14N,R38E,Sect 25,SE¼,NW¼	EL	46 40.241	117 59.696	River mile 9.1
	2002	AF4	7.1	T14N,R38E,Sect 35,NE¼,SW¼	EL	46 39.217	118 01.148	Directly above falls
	2002	AF5	7.0	T14N,R38E,Sect 35,NW¼,SW¼	EL			Directly below falls
	2002	AF7	6.4	T14N,R38E,Sect 34,SE¼,SE¼	T,F			Mouth of Rock Spring Gulch
	2002	AF9	5.3	T13N,R38E,Sect 4,SE¼,NE¼	EL			~1.1 road miles below Rock Spring Gulch
	2002	AF11	4.0	T13N,R38E,Sect 9,SE¼ ,NW¼	EL			~2.2 road miles below Rock Spring Gulch
	2002	AF14	2.0	T13N, R38E, Sect 18, NE¼, SE¼	EL,T,F			Second bridge
	2002	AF17	0.8	T13N, R38E, Sect 19, SW¼, NE¼	EL			~1.2 road miles below second bridge
	2003	AF1	12.9	T14N, R39E, Sect 21, SE¼,SE¼	F[d]			~90 meters below bridge in Hay, WA.
	2003	AF5	7.0	T14N, R38E, Sect 35, NW¼, SW¼	EL			Directly below falls

[a] River mile
[b] EQ-Quantitative electrofishing (density estimates); EL-Qualitative electrofishing; T-Temperature; F-Flow
[c] GPS coordinates were taken in the following format D°M.M' in a NAD 27 datum file.
[d] Same site for 2001 and 2002

Appendix A. Study site locations for Asotin, Garfield, and Whitman Counties, 2001-2003.

Stream Reach	Year	Site#	RM[a]	Location (within sect. is listed as smallest qtr. sect. of qtr. sect.)	Sample Type[b]	GPS Coordinates[c] North	GPS Coordinates[c] West	Comments
Alkali Flat Ck	2003	AF6	6.7	T14N, R38E, Sect 35, SW¼, SW¼	EL			First site below of falls
Continued	2003	AF7	6.4	T14N, R38E, Sect 34, SE¼, SE¼	EL, F			Just above mouth of Rock Spring Gulch
	2003	AF8	5.8	T13N, R38E, Sect 3, NE¼, NW¼	EL			0.5 miles below Rock Spring Gulch
	2003	AF10	4.9	T13N, R38E, Sect 4, NW¼, SE¼	EL			1.5 miles below Rock Spring Gulch
	2003	AF12	3.0	T13N, R38E, Sect 8, NW¼, SE¼	EL			1.0 mile above second bridge
	2003	AF13	2.5	T13N, R38E, Sect 17, NE¼, NW¼	EL			0.5 miles above second bridge
	2003	AF14	2.0	T13N, R38E, Sect 18, NE¼, SE¼	EL,F			Second bridge
	2003	AF15	1.5	T13N, R38E, Sect 18, SW¼, SE¼	EL			0.5 miles below second bridge
	2003	AF16	1.0	T13N, R38E, Sect 19, NW¼, NE¼	EL			1.0 mile below second bridge
Rock Spring	2002	RSG3	1.0	T14N,R38E,Sect 27,SE¼,SE¼	EL			~1.0 road mile above mouth
Gulch	2002	RSG4	0.3	T14N,R38E,Sect 34,NW¼,SE¼	EL			~0.3 miles above mouth
	2003	RSG1	2.3	T14N, R38E, Sect 23, SE¼, SW¼	EL			River Mile 2.3
	2003	RSG2	1.3	T14N, R38E, Sect 26, NW¼, SW¼	EL			River Mile 1.3
	2003	RSG4	0.3	T14N, R38E, Sect 34, NW¼, SE¼	EL			River Mile 0.3
	2003	RSG5	0.0	T14N, R38E, Sect 34, SE¼, SE¼	F			10 feet above mouth
NF Deadman CK	2001	NFD3	0.5	T13N,R42E,Sect 20, SW¼,SW¼	EL,F			0.2 miles above Gould City bridge
	2002	NFD1	4.2	T13N,R42E,Sect 26,NW¼,SW¼	EL,F			~3.7 miles above Gould City bridge
	2002	NFD2	1.9	T13N,R42E,Sect 21,SE¼,SW¼	EL			~1.5 road miles above Gould City bridge
SF Deadman	2001	SFD1	7.9	T12N,R43E,Sect 5,NE¼,SE¼	EL	46 33.038	117 26.739	0.5 miles above Bell Plain Rd bridge
Creek	2001	SFD2	7.3	T12N,R43E,Sect 5,SW¼,NW¼	EL,F	46 33.120	117 27.508	Bell Plain Rd bridge
	2001	SFD3	6.7	T12N,R43E,Sect 6,SW¼,NE¼	EL	46 33.191	117 28.239	0.6 miles below Bell Plain Rd bridge
	2001	SFD6	1.2	T13N,R42E,Sect 29,SW¼,SW¼	EL	46 34.526	117 34.586	0.5 miles below Mayview Rd
	2002	SFD4	2.7	T13N,R42E,Sect 33,SE¼,NW¼	EL			~2.3 miles above Gould City
	2002	SFD5	1.6	T13N,R42E,Sect 29,SW¼,SE¼	EL,F			Gould City Rd Bridge
Deadman Creek	2001	D1	9.4	T13N,R41E,Sect 13,SE¼,SW¼	EL,T,F	46 36.310	117 36.499	Below first bridge on Lower Deadman Rd
	2001	D2	6.8	T13N,R41E,Sect 10,NW¼,SE¼	EL	46 37.350	117 38.702	River mile 6.8
	2001	D4	3.3	T13N,R41E,Sect 7,SE¼,NE¼	EL	46 37.657	117 42.429	Ranch at River Mile 3.3

[a] River mile
[b] EQ-Quantitative electrofishing (density estimates); EL-Qualitative electrofishing; T-Temperature; F-Flow
[c] GPS coordinates were taken in the following format D°M.M' in a NAD 27 datum file.
[d] Same site for 2001 and 2002

Appendix A. Study site locations for Asotin, Garfield, and Whitman Counties, 2001-2003.

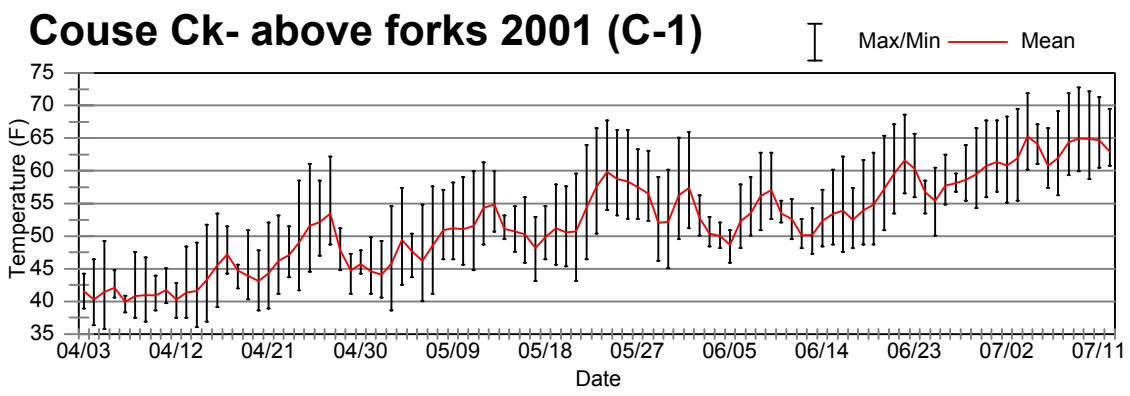
Stream Reach	Year	Site#	RM[a]	Location (within sect. is listed as smallest qtr. sect. of qtr. sect.)	Sample Type[b]	GPS Coordinates[c] North	GPS Coordinates[c] West	Comments
Deadman Creek	2001	D5	1.4	T13N,R40E,Sect 12,SW¼,SW¼	EL,T			Stream ford at farm (RM 1.4)
Continued	2001	D6	1.2	T13N,R40E,Sect 11,SE¼,SE¼	EL			Bridge at farm (RM 1.2)
	2001	D7	0.5	T13N,R40E,Sect 14,NE¼,NW¼	EQ,F	46 37.094	117 45.671	Willow Gulch Rd. bridge
	2002	D1	9.4	T13N,R41E,Sect 13,SE¼,SW¼	EL,T[d],F[d]	46 36.310	117 36.499	Below first bridge on Lower Deadman Rd
	2002	D3	4.0	T13N,R41E,Sect 8,NE¼,SW¼	EL			~3.6 road miles below Lynn Gulch Rd Jct.
	2002	D6	1.2	T13N,R40E,Sect 11,SE¼,SE¼	EL			Bridge at farm (RM 1.2)
	2002	D7	0.5	T13N,R40E,Sect 14,NE¼,NW¼	T,F[d]			Willow Gulch Rd bridge
Lynn Gulch	2001	LG1	3.3	T13N,R42E,Sect 8,NW¼,SE¼	EL			~2.5 miles up Lynn Gulch Rd
	2001	LG2	0.8	T13N,R41E,Sect 12,NW¼,SW¼	EL			~0.3 miles up Lynn Gulch Rd
	2002	LG1	3.3	T13N,R42E,Sect 8,SW¼,NE¼	EL[d]			~2.5 miles up Lynn Gulch Rd
	2002	LG2	0.8	T13N,R41E,Sect 12,NE¼,SW¼	EL[d]			~0.3 miles up Lynn Gulch Rd
NF Meadow Ck	2001	NFM1	0.7	T12N,R42E,Sect 10,SE¼,SW¼	EL, F	46 31.919	117 32.279	0.7 miles up North Fork Meadow Creek Rd
Meadow	2001	MD1	13.8	T12N,R42E,Sect 9,NE¼,SW¼	EL, T	46 32.168	117 33.591	Below Gould City bridge
Creek	2001	MD2	13.2	T12N,R42E,Sect 8,SE¼,NE¼	EQ	46 32.770	117 32.240	0.4 miles below Gould City bridge
	2001	MD3	13.1	T12N,R42E,Sect 8,SE¼,NE¼	EL	46 32.346	117 34.347	~0.6 miles below Gould City bridge
	2001	MD4	10.9	T12N,R41E,Sect 1,NE¼,SE¼	EQ	46 32.958	117 36.822	3.0 miles below Gould City bridge
	2001	MD7	5.6	T12N,R41E,Sect 5,NE¼,NW¼	EL, T	46 33.377	117 42.648	4.8 miles up Meadow Creek Rd
	2001	MD8	3.5	T13N,R40E,Sect 36,NE¼,NW¼	EQ	46 34.355	117 44.374	3.1 miles up Meadow Creek Rd
	2001	MD9	2.2	T13N,R40E,Sect 26,NW¼,NE¼	EQ, F	46 35.217	117 45.226	First bridge on Meadow Creek Rd
	2001	MD10	0.4	T13N,R40E,Sect 22,SE¼,NW¼	T			Above farmhouse bridge
	2002	MD1	13.8	T12N, R42E,Sect 9,NE¼,SW¼	EL[d],T[d]			Below Gould City Mayview Rd bridge
	2002	MD3	13.1	T12N,R42E,Sect 8,SE¼,NE¼	EL[d]	46 32.261	117 34.219	~0.6 miles below Gould City bridge
	2002	MD5	10.4	T12N,R41E,Sect 1,NE¼,SW¼	EL			Junction of Wild Horse Hill Rd and Meadow Creek Rd
	2002	MD6	7.7	T12N,R41E,Sect 3,NW¼,SW¼	EL			0.7 mile below Weimer Hill Rd
	2002	MD9	2.4	T13N,R40E,Sect 26,NE¼,NE¼	EL[d],F[d]			First bridge on Meadow Creek Rd
	2002	MD10	0.4	T13N,R40E,Sect 22,SE¼,NW¼	EL,T[d]			Above farmhouse bridge

[a] River mile

[b] EQ-Quantitative electrofishing (density estimates); EL-Qualitative electrofishing; T-Temperature; F-Flow

[c] GPS coordinates were taken in the following format D°M.M' in a NAD 27 datum file.

[d] Same site for 2001 and 2002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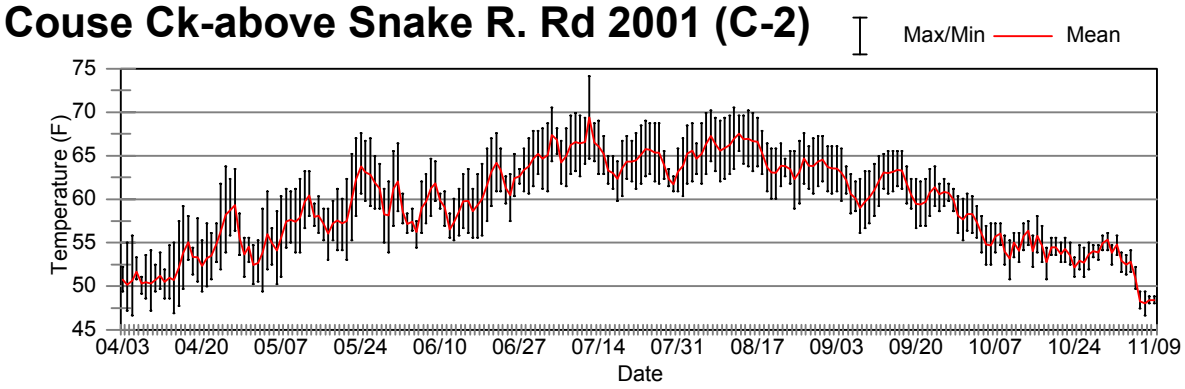
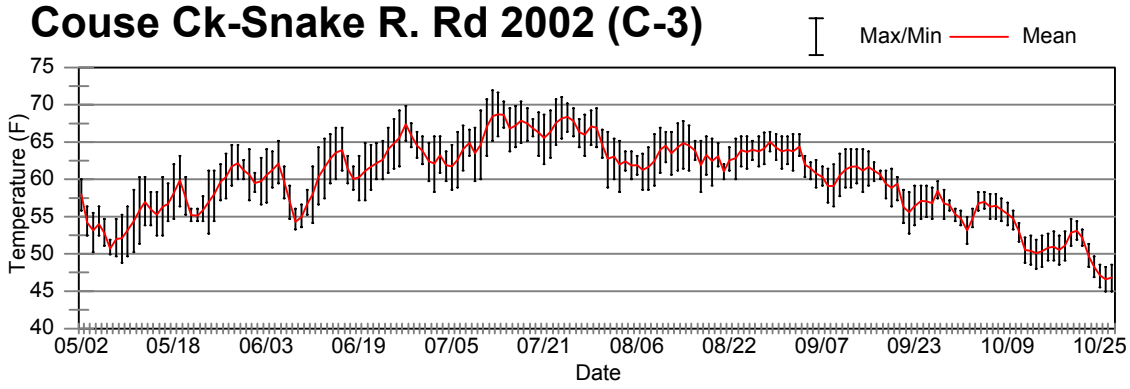
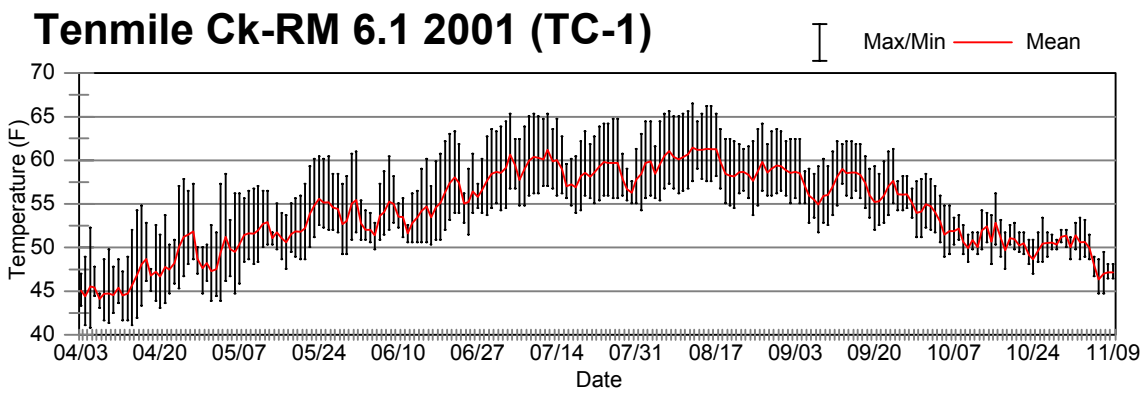
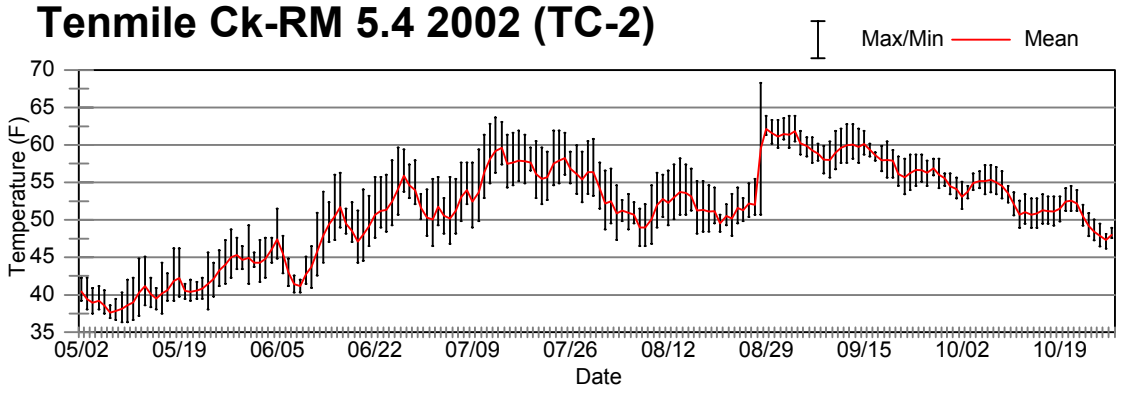
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
35
04/03
04/12
04/21
04/30
05/09
05/18
05/27
06/05
06/14
06/23
07/02
07/11
Date


Couse Ck-above Snake R. Rd 2001 (C-2)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
04/03
04/20
05/07
05/24
06/10
06/27
07/14
07/31
08/17
09/03
09/20
10/07
10/24
11/09
Date


Couse Ck-Snake R. Rd 2002 (C-3)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
05/02
05/18
06/03
06/19
07/05
07/21
08/06
08/22
09/07
09/23
10/09
10/25
Date


Tenmile Ck-RM 6.1 2001 (TC-1)
Max/Min
Mean
Temperature (F)
70
65
60
55
50
45
40
04/03
04/20
05/07
05/24
06/10
06/27
07/14
07/31
08/17
09/03
09/20
10/07
10/24
11/09
Date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Max/Min
Mean
Temperature (F)
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65
60
55
50
45
40
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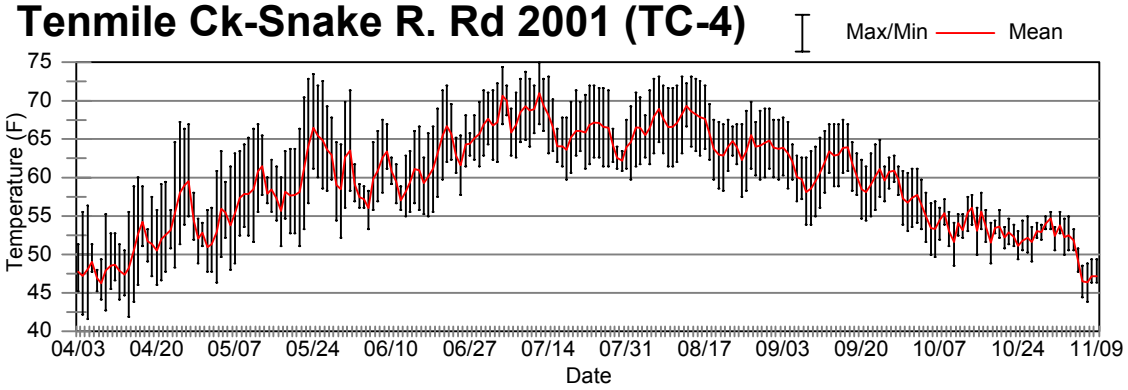
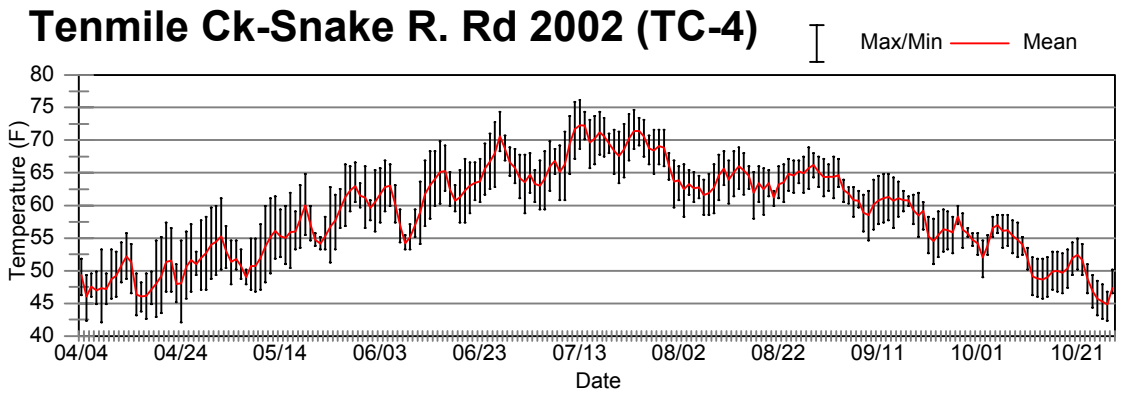
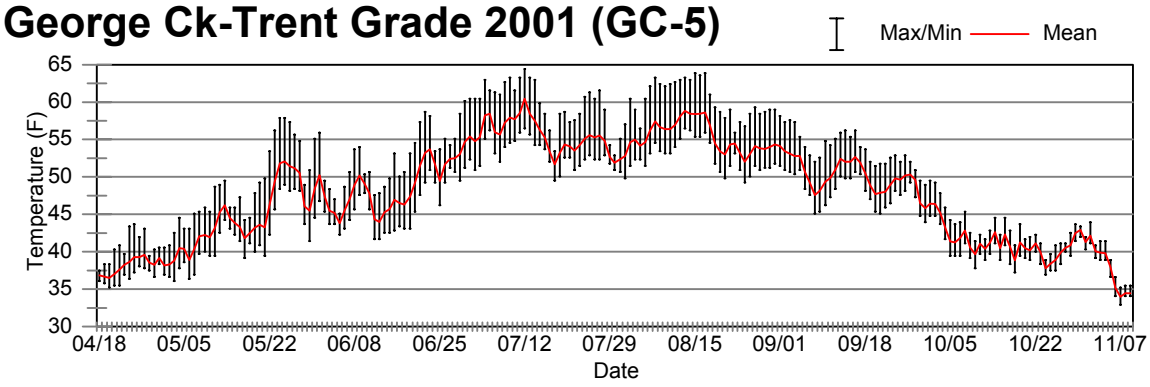
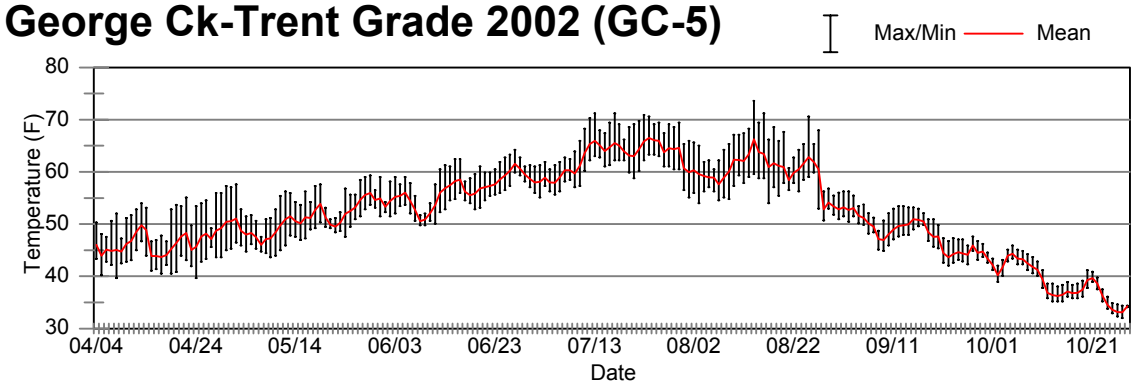
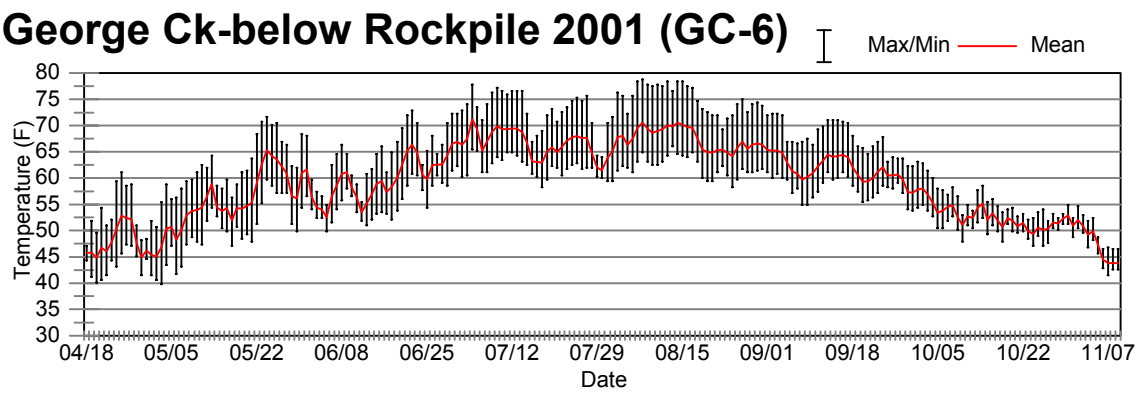
05/19
06/05
06/22
07/09
07/26
08/12
08/29
09/15
10/02
10/19
Date

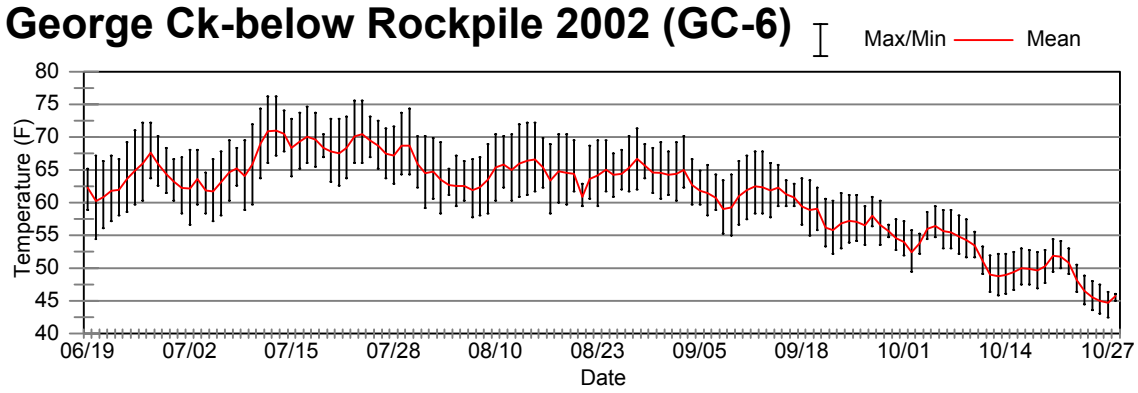

Tenmile Ck-Snake R. Rd 2001 (TC-4)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
04/03
04/20
05/07
05/24
06/10
06/27
07/14
07/31
08/17
09/03
09/20
10/07
10/24
11/09
Date

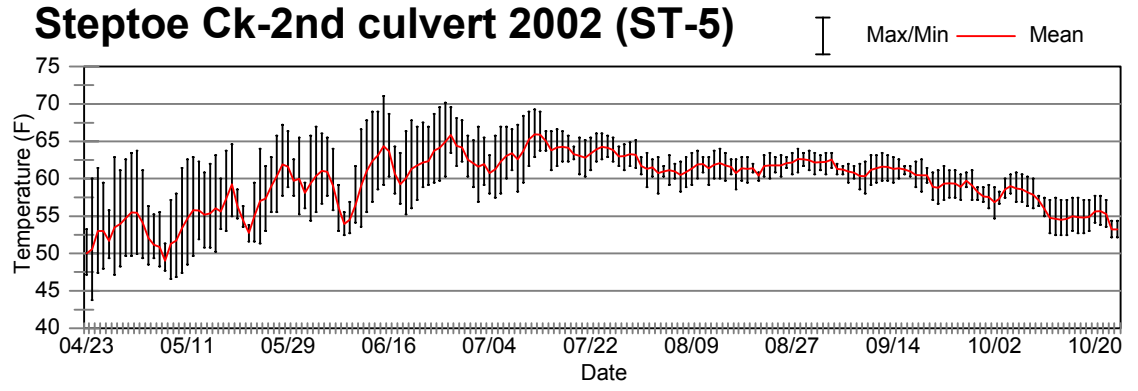

Tenmile Ck-Snake R. Rd 2002 (TC-4)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
04/04
04/24
05/14
06/03
06/23
07/13
08/02
08/22
09/11
10/01
10/21
Date

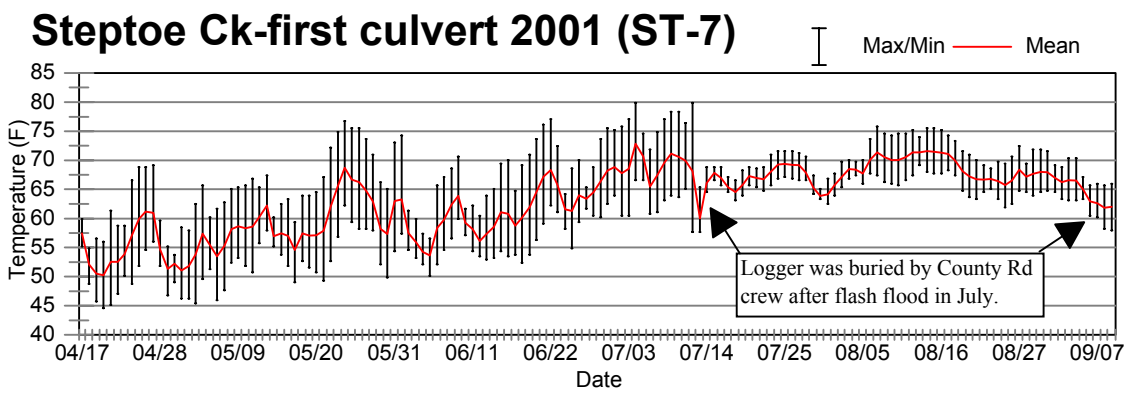

George Ck-Trent Grade 2001 (GC-5)
Max/Min
Mean
Temperature (F)
65
60
55
50
45
40
35
30
04/18
05/05
05/22
06/08
06/25
07/12
07/29
08/15
09/01
09/18
10/05
10/22
11/07
Date

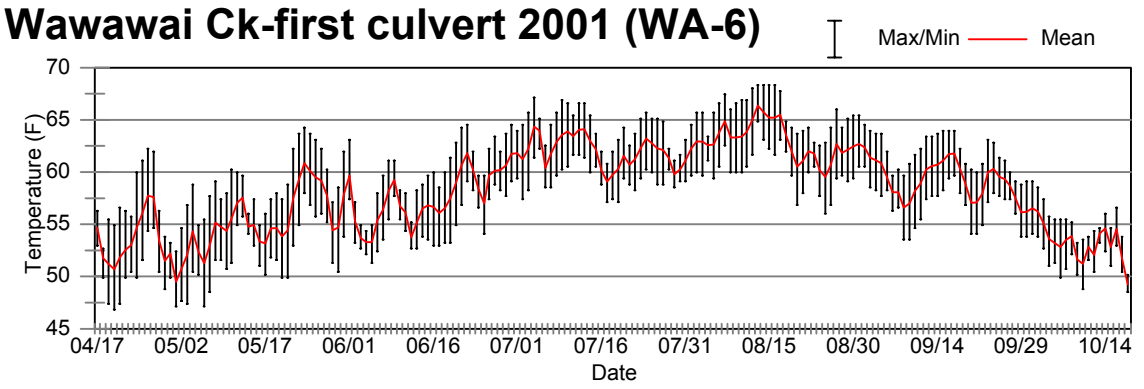

George Ck-Trent Grade 2002 (GC-5)
Max/Min
Mean
Temperature (F)
80
70
60
50
40
30
04/04
04/24
05/14
06/03
06/23
07/13
08/02
08/22
09/11
10/01
10/21
Date

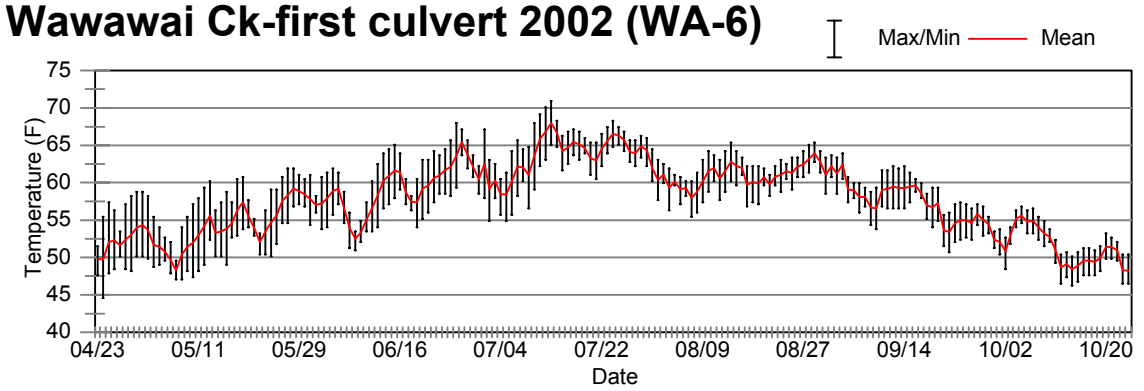

George Ck-below Rockpile 2001 (GC-6)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
30
04/18
05/05
05/22
06/08
06/25
07/12
07/29
08/15
09/01
09/18
10/05
10/22
11/07
Date

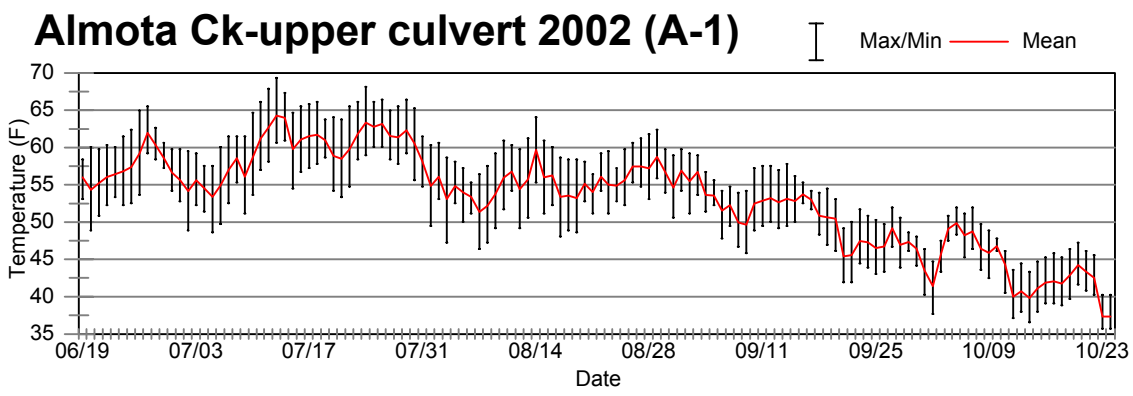

George Ck-below Rockpile 2002 (GC-6)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
06/19
07/02
07/15
07/28
08/10
08/23
09/05
09/18
10/01
10/14
10/27
Date

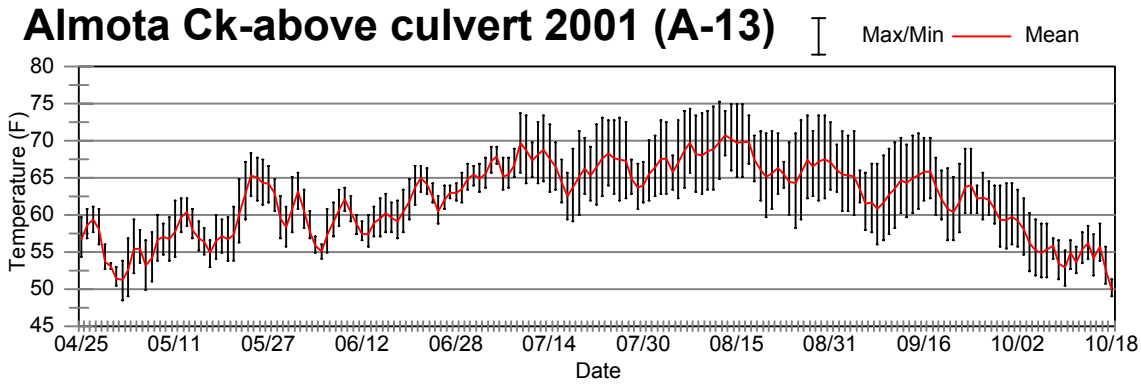

Steptoe Ck-2nd culvert 2002 (ST-5)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
04/23
05/11
05/29
06/16
07/04
07/22
08/09
08/27
09/14
10/02
10/20
Date

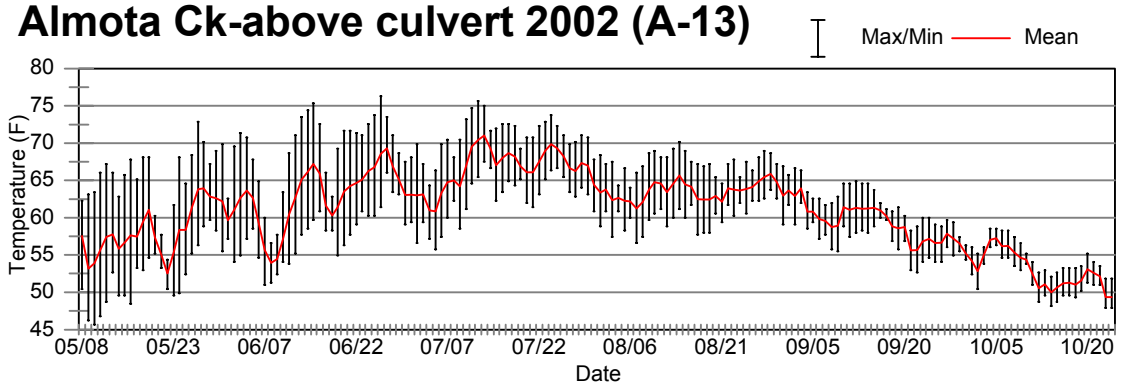

Steptoe Ck-first culvert 2001 (ST-7)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
04/17
04/28
05/09
05/20
05/31
06/11
06/22
07/03
07/14
07/25
08/05
08/16
08/27
09/07
Date
Logger was buried by County Rd crew after flash flood in July.

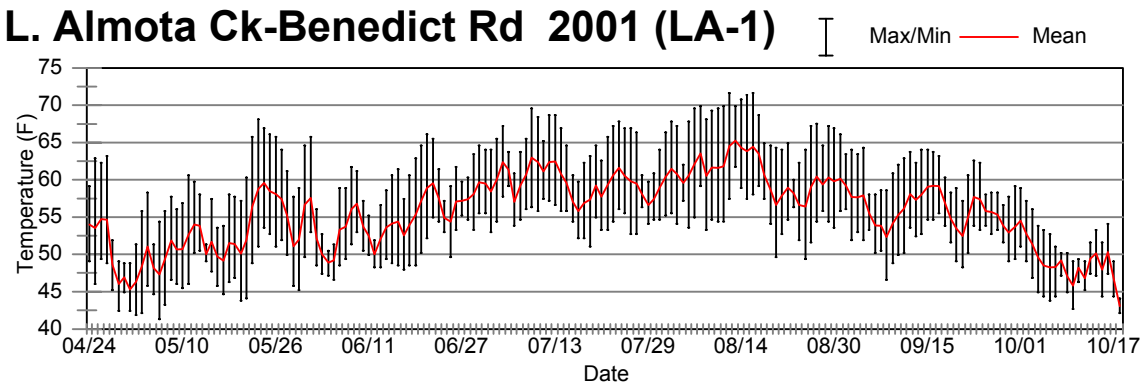

Wawawai Ck-first culvert 2001 (WA-6)
Max/Min
Mean
Temperature (F)
70
65
60
55
50
45
04/17
05/02
05/17
06/01
06/16
07/01
07/16
07/31
08/15
08/30
09/14
09/29
10/14
Date

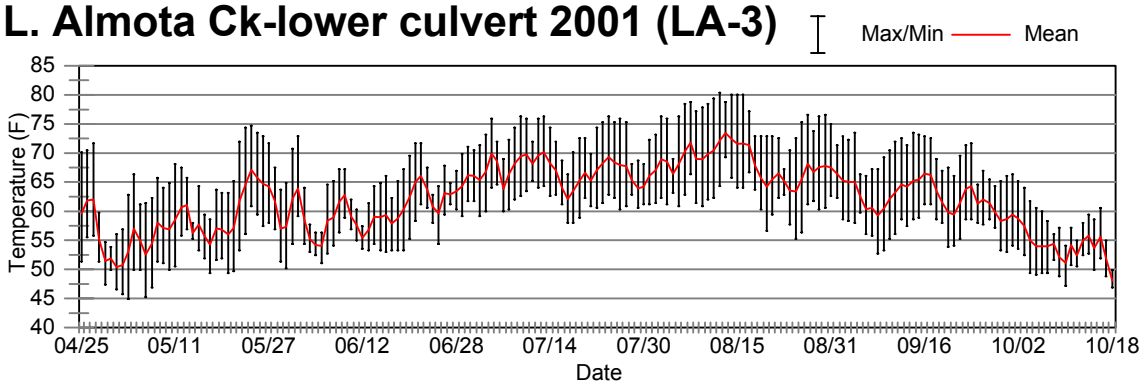

Wawawai Ck-first culvert 2002 (WA-6)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
04/23
05/11
05/29
06/16
07/04
07/22
08/09
08/27
09/14
10/02
10/20
Date

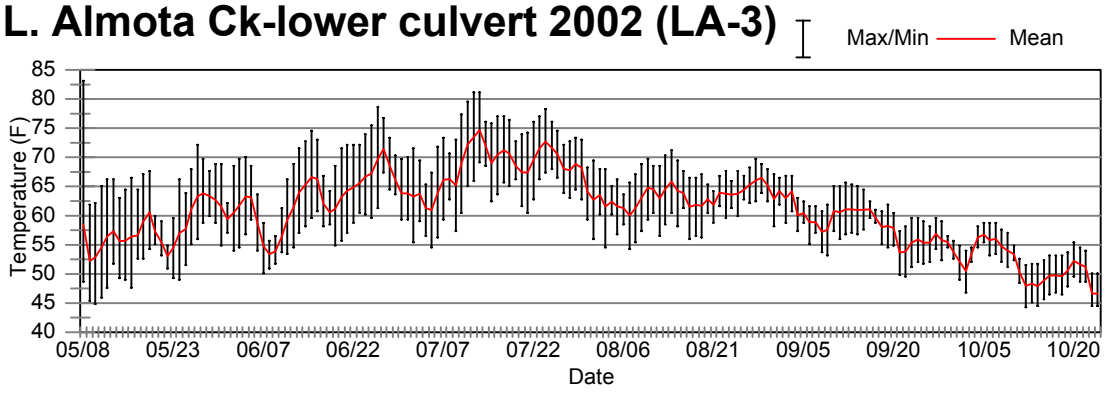

Almota Ck-upper culvert 2002 (A-1)
Max/Min
Mean
Temperature (F)
70
65
60
55
50
45
40
35
06/19
07/03
07/17
07/31
08/14
08/28
09/11
09/25
10/09
10/23
Date

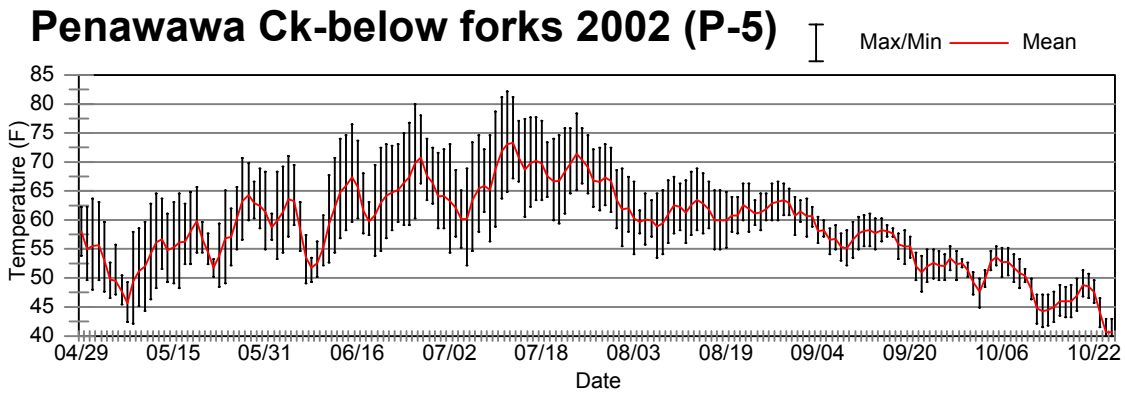

Almota Ck-above culvert 2001 (A-13)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
04/25
05/11
05/27
06/12
06/28
07/14
07/30
08/15
08/31
09/16
10/02
10/18
Date

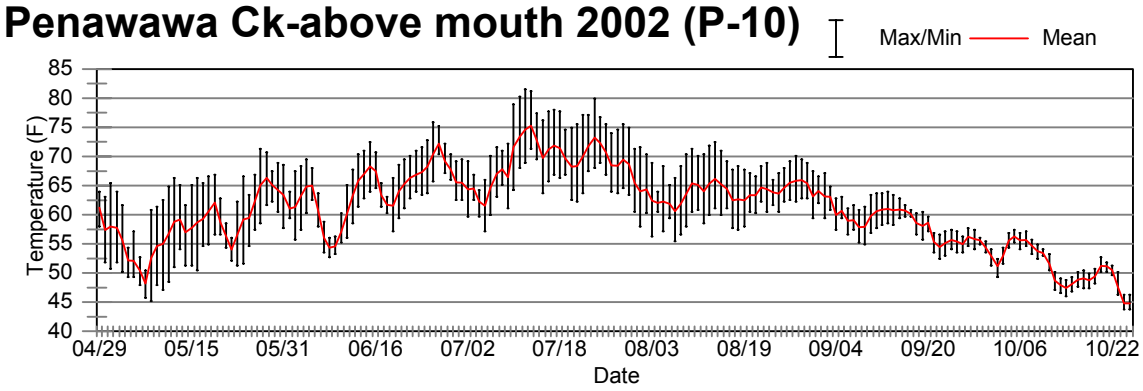

Almota Ck-above culvert 2002 (A-13)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
05/08
05/23
06/07
06/22
07/07
07/22
08/06
08/21
09/05
09/20
10/05
10/20
Date

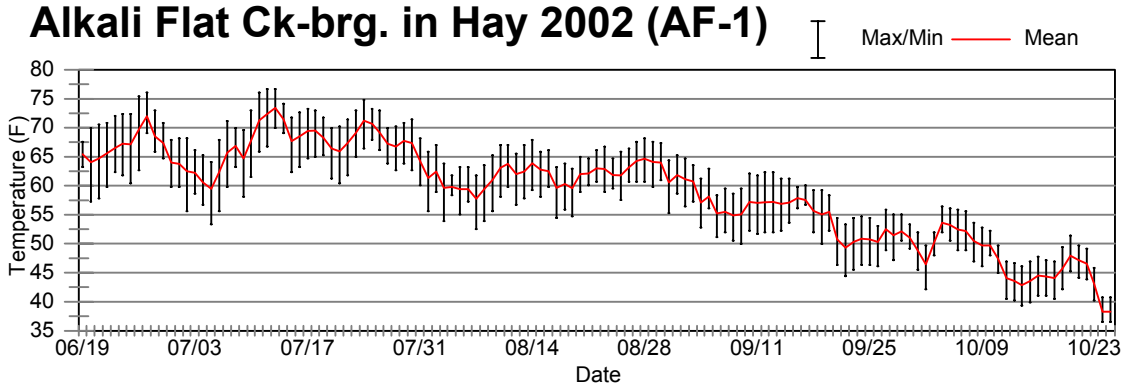

L. Almota Ck-Benedict Rd 2001 (LA-1)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
04/24
05/10
05/26
06/11
06/27
07/13
07/29
08/14
08/30
09/15
10/01
10/17
Date

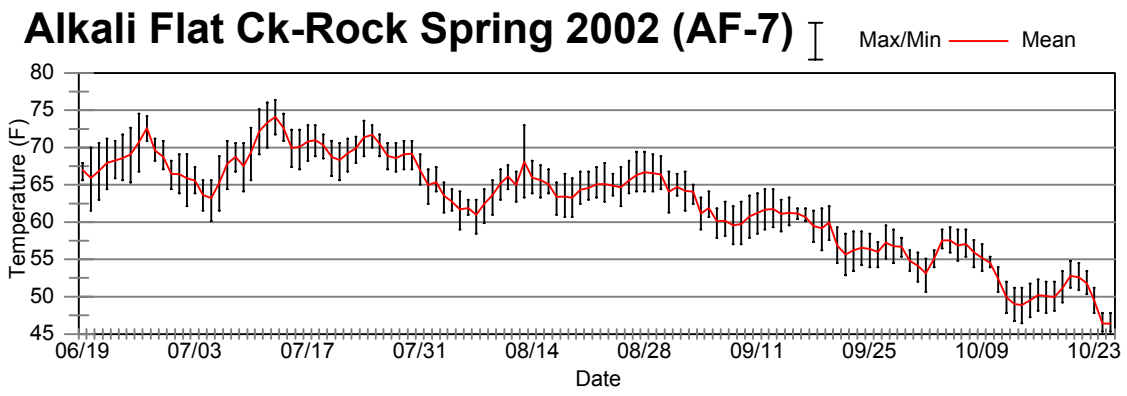

L. Almota Ck-lower culvert 2001 (LA-3)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
04/25
05/11
05/27
06/12
06/28
07/14
07/30
08/15
08/31
09/16
10/02
10/18
Date

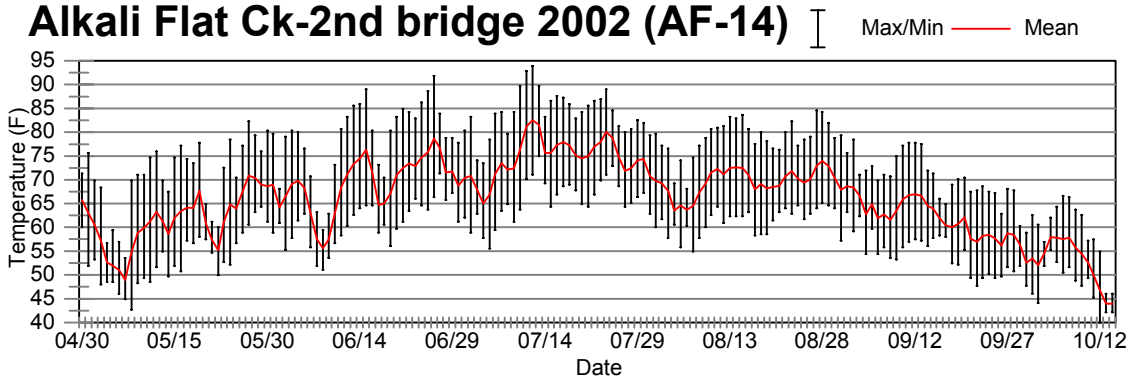

L. Almota Ck-lower culvert 2002 (LA-3)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
05/08
05/23
06/07
06/22
07/07
07/22
08/06
08/21
09/05
09/20
10/05
10/20
Date

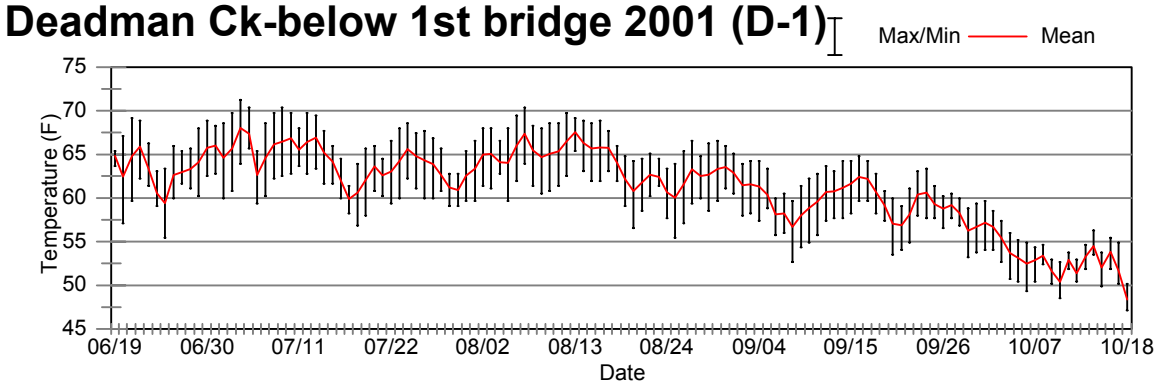

Penawawa Ck-below forks 2002 (P-5)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
04/29
05/15
05/31
06/16
07/02
07/18
08/03
08/19
09/04
09/20
10/06
10/22
Date


Penawawa Ck-above mouth 2002 (P-10)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
04/29
05/15
05/31
06/16
07/02
07/18
08/03
08/19
09/04
09/20
10/06
10/22
Date

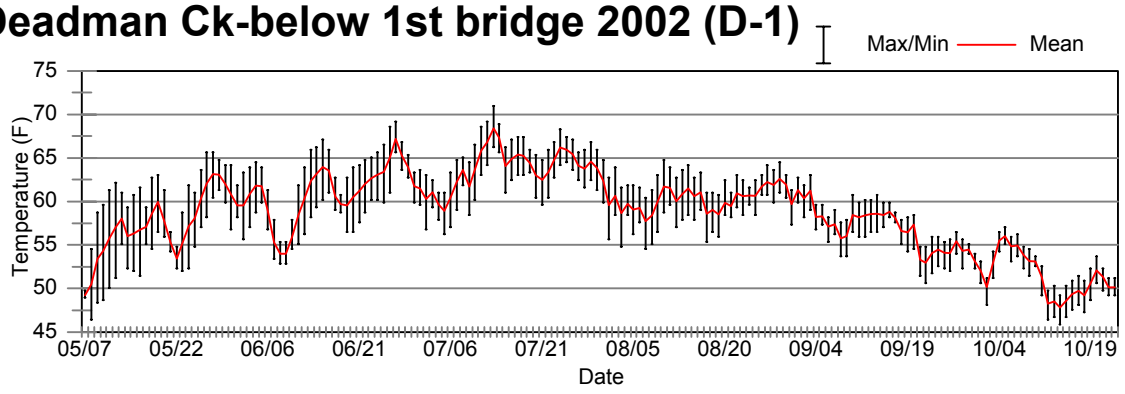

Alkali Flat Ck-brg. in Hay 2002 (AF-1)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
06/19
07/03
07/17
07/31
08/14
08/28
09/11
09/25
10/09
10/23
Date


Alkali Flat Ck-Rock Spring 2002 (AF-7)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
06/19
07/03
07/17
07/31
08/14
08/28
09/11
09/25
10/09
10/23
Date

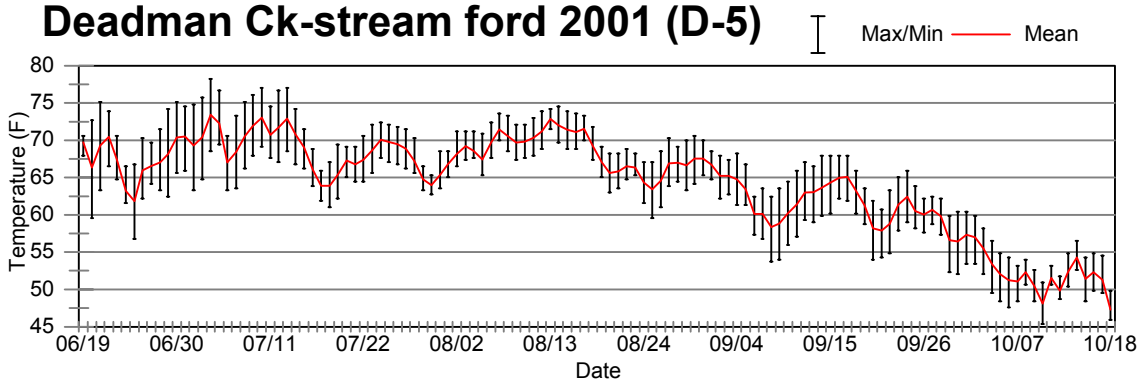

Alkali Flat Ck-2nd bridge 2002 (AF-14)
Max/Min
Mean
Temperature (F)
95
90
85
80
75
70
65
60
55
50
45
40
04/30
05/15
05/30
06/14
06/29
07/14
07/29
08/13
08/28
09/12
09/27
10/12
Date


Deadman Ck-below 1st bridge 2001 (D-1)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
06/19
06/30
07/11
07/22
08/02
08/13
08/24
09/04
09/15
09/26
10/07
10/18
Date

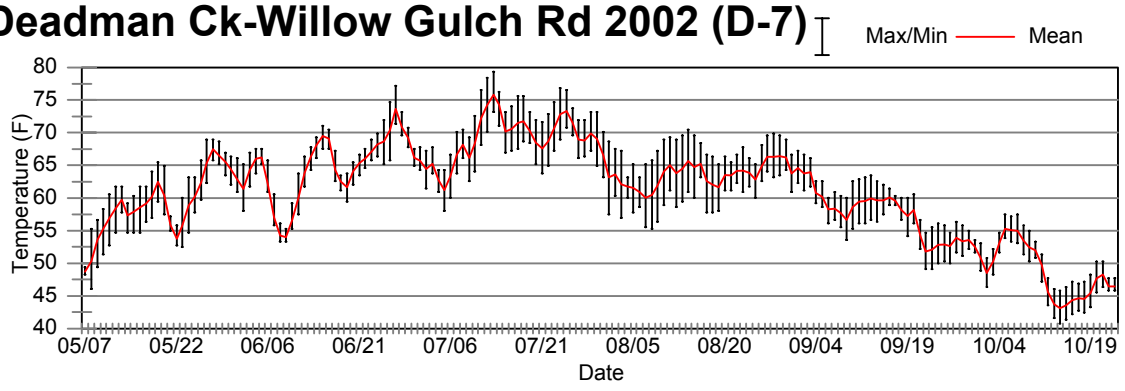
Deadman Ck-below 1st bridge 2002 (D-1)

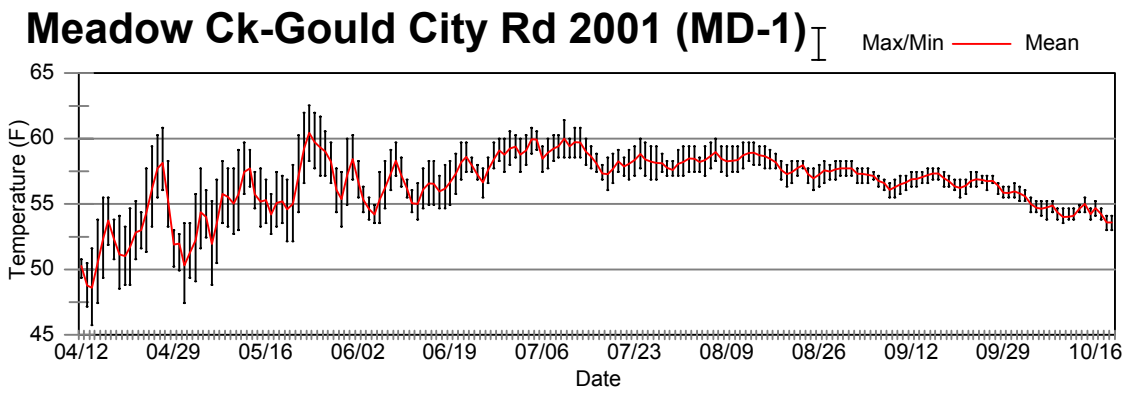


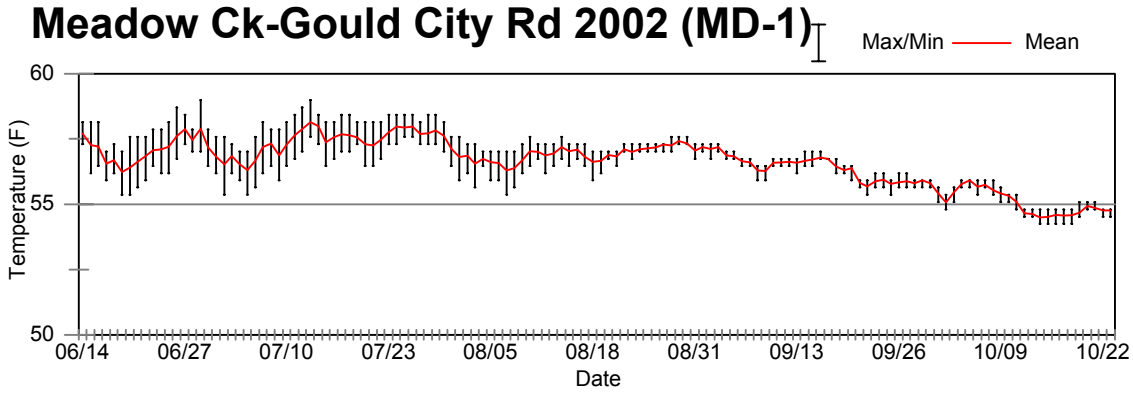
Deadman Ck-stream ford 2001 (D-5)

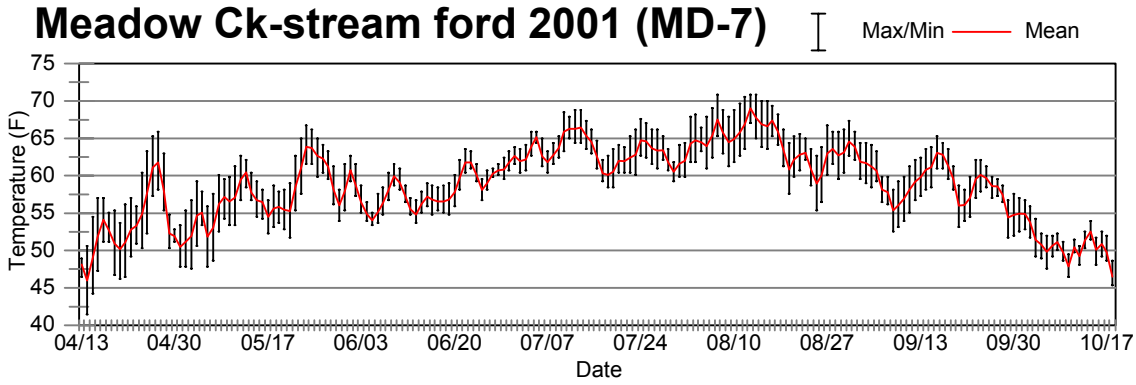


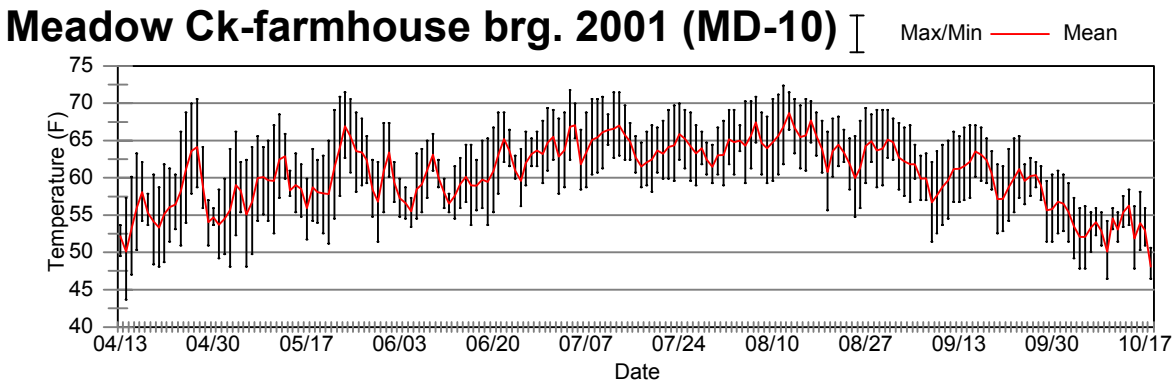
Deadman Ck-Willow Gulch Rd 2002 (D-7)

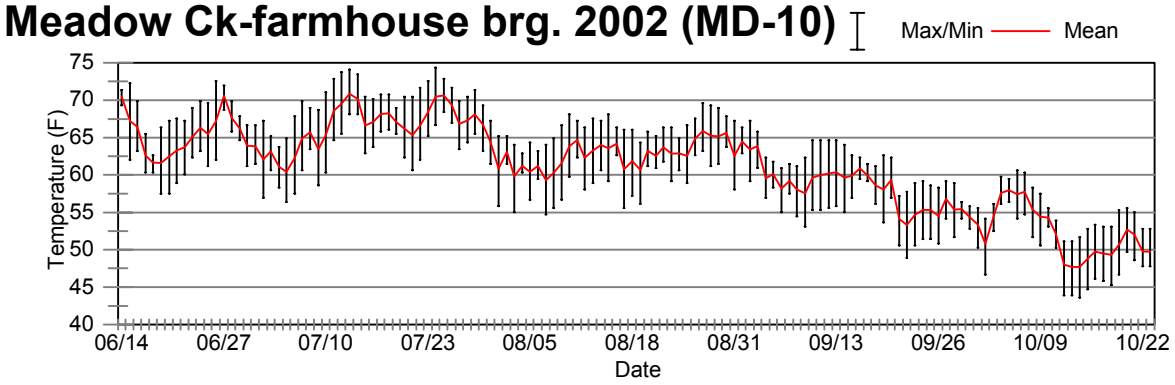



Meadow Ck-Gould City Rd 2001 (MD-1)
Max/Min
Mean
Temperature (F)
65
60
55
50
45
04/12
04/29
05/16
06/02
06/19
07/06
07/23
08/09
08/26
09/12
09/29
10/16
Date


Meadow Ck-Gould City Rd 2002 (MD-1)
Max/Min
Mean
Temperature (F)
60
55
50
06/14
06/27
07/10
07/23
08/05
08/18
08/31
09/13
09/26
10/09
10/22
Date


Meadow Ck-stream ford 2001 (MD-7)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
04/13
04/30
05/17
06/03
06/20
07/07
07/24
08/10
08/27
09/13
09/30
10/17
Date


Meadow Ck-farmhouse brg. 2001 (MD-10)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
04/13
04/30
05/17
06/03
06/20
07/07
07/24
08/10
08/27
09/13
09/30
10/17
Date


Meadow Ck-farmhouse brg. 2002 (MD-10)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
06/14
06/27
07/10
07/23
08/05
08/18
08/31
09/13
09/26
10/09
10/22
Date

Appendix C: Habitat data forms 2001-2002.

Habitat Limiting Factors Worksheet Start Time__________ Stop Time__________ Stream Name_________________________

Date_____/_____/_____ Sampler(s) Name_____________ Time Between Sites_______min. Reach__________________________

Ref	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Transect number	Barriers (BT)	Diversions (BT)	Bank Cond. (BT)	Pool Count (BT)	Side Channel (BT)	Bank Stability (B)	% Eroding Bank (B)	Animal Damage (B)	Riparian Width (B)	% Shade (B)	Flood-plain Comm. (B)	Pool Quality (B)	% Primary Habitat (B)	%LWD (B)	Stream Width (T)	Type & Embed. (L1) (T)	Type & Embed.	Type & Embed.	Type & Embed.	Type & Embed.	Type & Embed.	Depth ¼ (L1) (T)	Depth ½	Depth ¾	Max. Depth
Riparian Type-L&R (Most common first, w/Ht.)													Combined Avg. Ht.								Max Ht.				
Stream Cover Type-%										Comments:															
Riparian Type-L&R (Most common first, w/Ht.)													Combined Avg. Ht.								Max Ht.				
Stream Cover Type-%										Comments:															
Riparian Type-L&R (Most common first, w/Ht.)													Combined Avg. Ht.								Max Ht.				
Stream Cover Type-%										Comments:															
Riparian Type-L&R (Most common first, w/Ht.)													Combined Avg. Ht.								Max Ht.				
Stream Cover Type-%										Comments:															
Riparian Type-L&R (Most common first, w/Ht.)													Combined Avg. Ht.								Max Ht.				
Stream Cover Type-%										Comments:															
Riparian Type-L&R (Most common first, w/Ht.)													Combined Avg. Ht.								Max Ht.				
Stream Cover Type-%										Comments:															

Appendix C: Habitat data forms 2001-2002.

Habitat Worksheet Criteria: start/stop locations, start/stop times, stream name, date, sampler name(s), transect interval time. **Note: (BT)**=Between Transects **(B)**=Belt of the transect **(T)**=Transect Line.

Data to be collected Between Transects:

***Barriers & Diversions** – Note height, width, depth of jump pool. If possible GPS readings, measurements. Use comments section for brief description.

***Bank condition** – **1=Good**, each bank is damaged 0-25%, **2=Fair**, 25-50% damage, **3 Poor**, > 50% damage.

* **Pool count** – count the number of obvious pools.

***Side Channel(s)** – Yes or No

Data to be collected within the Transect Belt:

***Bank Stability – 1=Good**, Sloping/gradual w/ vegetation, wood, or rocks – **stable**. **2=Fair**, some sloping - **less stable**. **3=Poor**, Cut or severe angle w/ active erosion - **unstable**. (**eg**. Left bank has fair bank angle, right bank has good angle L2,R1)

* **% eroding bank – eg.** L 40% / R 15%

***Animal damage** – **1=Good**, little to no evidence of damage due to livestock, near natural vegetation. **2=Fair**, #50% of transect damaged by livestock - mod to high erosion w/ partial vegetation. **3=Poor**, > 50% Damage, severe erosion and sloughing, no evidence of bank or vegetation recovery.

eg. L1,R1 = both banks little to no animal damage.

***Riparian width** – An estimate of width (# of feet) of the riparian zone, for each bank. (**eg**. L 25' / R 100').

Note: None=upland vegetation, gravel, rock, soil ***designate which one it is**.

* **% Shade** – Estimate the percentage of shade that would exist over the stream between 10 am & 3 pm during summer months.

***Flood plain connectivity –** Yes or No, in a "normal" high-water event, is there access to a flood plain. Determine for both banks, (**eg.** L Yes / R No).

* **Pool quality** – **1=Good**, a pool that will exist during low summer flows, and provides excellent cover. **2=Fair**, a pool that has potential to exist during summer flows and will provide some cover. **3=Poor**, the pool may not exist during summer flows and provides no additional cover.

***Primary habitat** – Habitat type(s) that exist within the belt: **1=Pool, 2=riffle, 3=run, 4=cascade, 5=pocketwater, 6=side channel**.

* **% Primary habitat** – What percentage of the transect belt is primary habitat.

* **% LWD** – Estimate of the % of Large Woody Debris, in or touching the water, within the belt.

***Stream Cover Types and Percentages** – The % of the following cover type(s) that exist in the belt: **U**=Undercut Bank, **L**=Large Woody Debris, **B**=Boulder, **T**=Turbulence, **V**=Vegetation (**eg.** Undercut ban on one full bank in transect= U 50%)

Data to be collected on the Transect Line:

***Stream Width –** Measured in feet on the transect line.

***Substrate type and degree embedded** – At least 4 measurements per transect - each cell $6 square inches and not > 12 square inches. Start from left bank facing downstream on the transect line.

(**eg.** Cobble with 25% surface covered = C2

Substrate Types:		**Degree Embedded:**
B=Boulder > 12 inches	**S=Sand**	**1=Good**, <25% surface covered
C=Cobble 3-12 inches	**M=Mud, Silt, Clay**	**2=Fair**, <50% surface covered
G=Gravel 0.2-3 inches	**R=Bedrock**	**3=Poor**, >50% surface covered

***Riparian vegetation** – Estimate the mix of species within the transect belt for each bank. List the most abundant type first, then list the other Veg. types after it. (**eg.** Left Bank, shrubs (most common), with an average height of 4 feet, plus Coniferous trees that are 80 feet tall = L 3,5 (4'/80'))

Types of Vegetation – 1=Forbs, 2=Grasses, Sedges, Rushes, 3=Shrubs (max 6 ft.), 4=Deciduous Trees, 5=Coniferous Trees, 6=Grazed Pasture, 7=Crops (name them).

***Depth of stream** - measure in feet at 1/4, 1/2, and 3/4 of width.

***Maximum depth** - record max. depth in feet.(thalweg ?)

Appendix D. Table 1. Relative Abundance of Non-salmonids from electrofishing sites, 2001.

	Steptoe Ck	Wawawai Ck	Almota Ck	Little Almota Ck	NF Deadman Ck	SF Deadman Ck	Deadman Ck	Lynn Gulch	NF Meadow Ck	Meadow Ck
Cyprinidae Unknown dace species *Rhinichthys spp.*	0	0	2	0	0	0	0	0	0	0
Speckled dace *Rhinichthys osculus*	0	1	2	2	3	4	3	1	2	3
Longnose dace *Rhinichthys cataractae*	0	0	2	0	0	0	0	0	0	0
Catostomidae Bridgelip suckers *Catostomus columbianus*	0	0	1	0	2	3	1	0	0	1
Crayfish[a] *Pacifastacus spp.*	0	0	1	0	0	0	1	0	0	1

[a] Noted by genus only, not identified by species.

Appendix D. Table 2. Relative Abundance of Non-salmonids from electrofishing sites, 2002.

	George Ck	Coombs Ck	Steptoe Ck	Wawawai Ck	Almota Ck	Almota Tributary	Penawawa Ck	Alkali Flat Ck	Rock Spring Gulch	NF Deadman Ck	SF Deadman Ck	Deadman Ck	Lynn Gulch	Meadow Ck
Cyprinidae Speckled dace *Rhinichthys osculus*	0	0	1	1	1	0	3	2	3	3	3	3	3	3
Northern Pikeminnow *Ptychocheilus oregonesis*	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Catostomidae Bridgelip suckers *Catostomus columbianus*	0	0	0	0	0	0	3	1	0	2	0	2	0	2
Cottidae Sculpin[a] *Cottus spp.*	0	1	0	0	0	0	0	0	0	1	0	1	0	0
Centrarchidae Crappie[a] *Pomoxis spp.*	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Tailed Frogs *Ascalphus truei*	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Crayfish[a] *Pacifastacus spp.*	1	0	0	0	0	0	0	0	0	0	0	0	0	1

[a] Noted by genus only, not identified by species.

Appendix D. Table 3. Relative Abundance of Non-salmonids from electrofishing sites, 2003.

	Huber Gulch	Wormell Gulch	Pintler Ck	Pintler Ck Tributary	Penawawa Ck	Little Penawawa Ck	Alkali Flat Ck	Rock Spring Gulch
Cyprinidae Speckled dace *Rhinichthys osculus*	0	0	2	0	1	1	0	0
Longnose dace *Rhinichthys cataractae*	0	0	2	0	0	0	0	0
Northern Pikeminnow *Ptychocheilus oregonesis*	0	0	0	0	0	0	1	0
Catostomidae Bridgelip suckers *Catostomus columbianus*	0	0	0	0	2	1	3	2
Centrarchidae Smallmouth Bass *Micropterus dolomieu*	0	0	0	0	0	0	1	0
Ictaluridae Yellow Bullhead *Ameiurus natalis*	0	0	0	0	0	0	1	0
Crayfish[a] *Pacifastacus spp.*	1	1	1	0	0	0	0	0

[a] Noted by genus only, not identified by species.

Appendix E. Manual discharge (cfs) measurements for Asotin, Whitman and Garfield Counties, 2001-2003.

County	Stream	Site	Date	CFS	Width (M)	Temp (F)	Time	Comments
Asotin	Couse Ck	C-2	04/03/01	1.8	2.25	51.0	16:18	First pullout
			04/18/01	2.4	1.90	51.0	13:00	
			07/12/01	0.8	1.90	68.0	15:02	
			11/09/01	1.0	2.40	49.0	9:23	
	Couse Ck	C-2	05/02/02	2.2	3.00	60.0	14:30	First pullout
			08/28/02	0.8	1.95	N/A	8:40	
			10/28/02	0.9	2.60	52.0	13:30	
	Tenmile Ck	TC-3	04/23/01	3.4	3.50	53.0	15:41	1.2 mi above Snake River Rd.
	Tenmile Ck	TC-4	04/03/01	5.3	2.80	50.0	15:43	Snake River Rd.
			07/12/01	0.7	3.50	68.0	11:31	
			11/09/01	0.9	1.90	50.0	13:07	
	Tenmile Ck	TC-4	04/04/02	29.0	5.20	48.0	15:54	
			04/24/02	11.3	5.30	54.0	15:49	
			08/28/02	0.8	4.10	N/A	9:17	
			10/28/02	N/M[a]	N/A	50.0	12:45	No measurable flow
	George Ck	GC-5	04/18/01	6.3	3.40	37.0	14:20	Trent Grade Culvert
			05/08/01	7.3	3.60	46.0	16:16	
			07/12/01	0.5	2.70	61.0	16:36	
	George Ck	GC-5	08/27/02	0.6	1.70	51.0	17:30	Trent Grade Culvert
			10/28/02	0.2	1.20	35.0	8:57	
	George Ck	GC-7	04/18/01	21.7	5.40	48.0	15:32	First stream ford
	George Ck	GC-7	06/19/02	10.1	6.20	64.0	13:55	First stream ford
			08/28/02	1.4	6.20	65.0	11:20	
			10/28/02	1.1	3.50	53.0	10:13	
	George Ck	GC-8	05/02/02	99.6	9.40	54.0	17:31	Meyer Rd. Bridge
	George Ck	GC-9	04/03/01	17.7	7.90	47.0	17:08	0.4 miles above mouth
	Huber Gulch	H-1	05/07/03	5.9	3.50	46.0	13:20	10 ft. above Sangster Rd.
	Huber Gulch	H-4	05/07/03	6.3	3.80	41.0	11:30	30 ft. above mouth
	Wormell Gulch	W-1	05/07/03	0.2	1.50	41.0	10:50	30 ft. above Huber Gulch mouth
	Wormell Gulch	W-3	05/07/03	6.8	2.90	45	12:15	0.9 miles above mouth
	Pintler Gulch	PT-2	04/30/03	2.7	2.50	45	13:55	60 ft. above Pine Grove Rd.
	Pintler Gulch	PT-7	04/30/03	2.8	2.70	50	12:21	15 ft. below trib.
Whitman	Steptoe Ck	ST-7	04/17/01	1.2	1.90	58.0	12:50	First Culvert
			07/09/01	0.2	4.55	68.0	10:45	
			10/18/01	0.7	0.90	51.0	10:03	
	Steptoe Ck	ST-7	04/23/02	1.2	2.10	54.0	12:06	First Culvert
			06/19/02	0.6	1.40	67.0	12:45	
			07/01/02	0.5	1.30	67.0	10:50	
			10/23/02	0.5	1.60	49.0	9:53	
	Wawawai Ck	WA-6	10/18/01	0.4	2.70	51.0	10:42	First Culvert
	Wawawai Ck	WA-6	04/23/02	1.3	3.40	50.0	14:15	First Culvert
			06/19/02	0.8	3.50	57.0	12:15	
			07/01/02	0.4	4.00	60.0	13:10	
			10/23/02	N/M[a]	N/A	N/A	N/A	
	Almota Ck	A-11	09/18/01	0.9	3.80	70.0	15:06	Stream ford at barn
	Almota Ck	A-11	05/08/02	2.8	3.10	62.0	16:03	Stream ford at barn

[a] Water level was too low for accurate measurements—no measurable flow.

Appendix E (Cont). Manual discharge (cfs) measurements for Asotin, Whitman and Garfield Counties, 2001-2003.

County	Stream	Site	Date	CFS	Width (M)	Temp (F)	Time	Comments
Whitman Cont.	Almota Ck	A-13	04/24/01	4.0	1.85	56.0	18:00	100yds above first culvert
			07/09/01	0.9	2.05	70.0	14:26	
			09/18/01	0.9	1.50	65.0	14:52	
			10/18/01	1.7	2.80	52.0	12:05	
	Almota Ck	A-13	08/14/02	0.5	2.30	64.0	11:35	100yds above first culvert
			10/23/02	1.4	3.00	49.0	12:30	
	Little Almota Ck	LA-3	04/24/01	1.1	2.10	60.5	17:00	Above first culvert
			07/09/01	0.5	2.00	73.0	13:16	
			09/18/01	0.6	1.45	68.0	14:33	
			10/18/01	0.7	1.00	50.0	11:40	
	Little Almota Ck	LA-3	05/08/02	1.6	1.50	59.0	16:28	Above first culvert
			08/14/02	0.3	0.75	65.0	11:14	
			10/23/02	0.5	1.40	46.0	11:40	
	Penawawa Ck	P-4	04/24/03	4.1	2.10	56	12:55	Above forks
	Penawawa Ck	P-5	10/24/02	1.0	3.70	42.0	13:26	Getz-AE-Seavers Rd.
	Penawawa Ck	P-5	04/24/03	4.9	2.40	56.0	14:20	Getz-AE-Seavers Rd.
	Penawawa Ck	P-10	04/29/02	7.6	2.20	61.0	14:01	Lower road
			07/10/02	1.3	1.40	77.0	15:30	
	Penawawa Ck	P-10	04/24/03	7.7	1.80	56	13.31	Lower road
	Little Penawawa	LP-3	04/24/03	1.4	1.90	56	12:40	Above forks
	Alkali Flat Ck	AF-1	06/19/02	0.9	1.60	60.0	10:30	Below bridge in Hay
			10/24/02	1.1	2.20	39.0	11:15	
	Alkali Flat Ck	AF-1	04/14/03	1.9	2.10	54	10:26	Below bridge in Hay
		AF-7	10/24/02	2.1	2.70	42.0	12:15	Below Rock Spring Gulch
		AF-7	04/14/03	2.2	2.80	61	14:10	Below Rock Spring Gulch
		AF-14	04/30/02	4.0	3.90	72.0	15:40	Above first bridge
			06/19/02	2.2	2.40	61.0	9:25	
			08/13/02	1.2	3.10	75.0	12:15	
			10/24/02	2.4	3.00	38.0	10:00	
		AF-14	04/14/03	4.9	4.10	N/A	N/A	Above first bridge
	Rock Spring Gulch	RSG-5	04/14/03	0.7	1.10	66	14:19	10 feet above mouth
Garfield	NF Deadman Ck	NFD-1	05/07/02	1.7	1.60	42.0	13:25	Spur Rd.
			10/22/02	N/M[a]	N/A	N/A	N/A	
	NF Deadman Ck	NFD-3	08/30/01	3.0	1.30	66.0	13:46	0.2 mi above confluence bridge
	SF Deadman Ck	SFD-2	08/30/01	0.8	2.05	66.0	12:30	Bell Plain Rd. bridge
	SF Deadman Ck	SFD-5	05/07/02	2.2	4.40	44	12:52	SF Deadman Rd. bridge
			10/22/02	N/M[a]	N/A	N/A	N/A	
	Deadman Ck	D-1	07/09/01	3.5	3.40	70.0	16:18	First bridge on Deadman Ck Rd.
			10/18/01	4.0	2.60	50.0	13:35	
	Deadman Ck	D-1	07/31/02	1.3	3.70	63.0	13:45	First bridge on Deadman Ck Rd.
			10/22/02	3.0	2.70	51.0	11:10	
	Deadman Ck	D-7	07/10/01	2.6	3.60	72.0	11:15	Willow Gulch Rd. bridge
	Deadman Ck	D-7	05/07/02	6.2	3.60	48.0	14:07	Willow Gulch Rd. bridge
	NF Meadow Ck	NFM-1	04/13/01	0.3	1.10	41.0	10:16	1.0 mi above forks
			10/18/01	N/M[a]	N/A	50.0	14:35	No Measurable flow

[a] Water level was too low for accurate measurements—no measurable flow.

Appendix E (Cont). Manual discharge (cfs) measurements for Asotin, Whitman and Garfield Counties, 2001-2003.								
County	**Stream**	**Site**	**Date**	**CFS**	**Width (M)**	**Temp (F)**	**Time**	**Comments**
Garfield Cont.	Meadow Ck	MD-9	04/13/01	2.7	2.00	54.0	11:47	First bridge
			07/10/01	2.1	2.15	73.0	12:11	
			10/18/01	2.1	2.10	55.0	14:12	
	Meadow Ck	MD-9	07/31/02	1.5	1.90	73.0	14:15	First bridge
			10/22/02	1.5	2.00	51.0	9:45	
[a] Water level was too low for accurate measurements—no measurable flow.								

Appendix F. Table 1. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name(s):	JT	
Stream Name:	Couse Ck		Time Interval:	10 min.	
Date:	4/18/01		Start time:	10:43	
Reach:	First Brg up Couse Ck Rd to 1.5 miles above Snake River Rd Brg		Stop time:	12:28	
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5
Barriers	1	1	2	1	0
Diversions	0	0	0	0	0
Bank condition	3	3	2	3	3
Bank angle	2	2	3	2	3
% Eroding bank	20%	50%	65%	10%	75%
Animal Damage	2	2	2	2	3
Riparian Width	None rock	L 0' / R 2'	None rock	L 0' / R 2'	5'
Pool count	2	2	1	1	3
Pool quality	N/A	N/A	N/A	N/A	N/A
Primary habitat	3	2	2	2	2
% Primary Habit	75%	80%	65%	80%	75%
% LWD	0%	0%	0%	0%	25%
Width	9'	10'	8.5'	6'	6'
Type & Embed. (L1)	C2	C2	C1	C1	B2
Type & Embed.	C3	B1	G1	C1	B2
Type & Embed.	G3	C1	C1	B1	C3
Type & Embed.	C2	C1	C1	G1	G3
Type & Embed.	No Entry	No Entry	No Entry	No Entry	No Entry
Depth ¼	0.45'	0.45'	0.25'	0.15'	0.5'
Depth ½	0.4'	0.5'	0.2'	0.2'	0.6'
Depth ¾	0.25'	0.65'	0.25'	0.25'	0.45'
Max. Depth	0.5'	0.65'	0.35'	0.3'	0.65'
Riparian type (L & R Bank)	L&R 1,2	L none / R 1,2	None rocks	L none / R 1,3	L&R 4,6
Ave. Ht.	0.2	0.5	N/A	1'	25'
Max. Ht.	0.5	0.75	N/A	2'	30'
% Shade	0%	5%	0%	5%	40%
Cover type %	None	B 5% / T 10% / V 50%	None	None	L 25%
B/D Comments	Steep gradient and large boulders with little or no water	Steep gradient with down tree and large boulders with little or no water	Two ~15' sections with steep gradient and large boulders with little or no water	Steep cobble gradient with very little water	None
Floodplain connectivity	Yes	No	No	L Yes / R No	No
Sidechannel	No	No	No	No	No

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name:	MG			
Stream Name:	Couse Ck		Time Interval:	10 min.			
Date:	4/18/01		Start time:	10:50			
Reach:	1.5 miles above Snake River Rd Brg to Snake River Rd Brg		Stop time:	12:40			
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7
Barriers	1	0	1	0	0	0	0
Diversions	0	0	0	0	0	0	0
Bank condition	2	2	2	3	2	L 2 / R 2	2
Bank angle	L 2 / R 2	L 2 / R 2	L 2 / R 2	L 3 / R 3	L 2 / R 2	L 2 / R 2	L 1 / R 2
% Eroding bank	L 30% / R 25%	L 30% / R 25%	L 25% / R 25%	L 60% / R 60%	L 15% / R 40%	L 25% / R 20%	L 10% / R 30%
Animal Damage	2	1	2	2-3	L 2 / R 2	L 2 / R 2	L 1 / R 1
Riparian Width	L 10' / R 5'	L 20' / R 100'	L 50' / R 75'	L 0' / R 40'	L 20' / R 10'	L 20' / R 40'	L&R 10'
Pool count	4	5	3	1	5	2	1
Pool quality	N/A	1	N/A	N/A	1	N/A	N/A
Primary habitat	2,3	1,3	3,4	2,3	1,2,3,4	2,3	2,3
% Primary Habit	2 40% / 3 60%	1 40% / 3 60%	3 80% / 4 20%	2 40% / 3 60%	1 70% / 2,3,4 10%	2 40% / 3 60%	2 70% / 3 30%
% LWD	20%	25%	0%	10%	40%	10%	0%
Width	8'	7'	4'	6'	10'	7'	4'
Type & Embed. (L1)	C2	C2	B2	B2	M	C3	R
Type & Embed.	C2	C3	B2	C2	C2	C2	R
Type & Embed.	C3	B2	C2	C2	B2	C2	R
Type & Embed.	C3	C2	C2	B2	B2	C2	R
Type & Embed.	C2	No Entry	B2	No Entry	C2	No Entry	R
Depth ¼	6"	8"	6"	6"	1'	6"	8"
Depth ½	5"	18"	4"	6"	1.5'	6"	9"
Depth ¾	6"	2'	6"	8"	2'	8"	6"
Max. Depth	8"	2'	6"	8"	3'	8"	9"
Riparian type (L & R Bank)	L 2,3,4 / R 3,4	L 2,3 / R 2,3,4	L&R 2,3,4	L none / R 2,3,4	L 2,3,4 / R 3,4	L&R 3,4	L 3,4 / R 2,3,4
Ave. Ht.	L&R 7'	L 5' / R 7'	L&R 6'	6'	L 6' / R 10'	L 6' / R 7'	L&R 8'
Max. Ht.	L&R 30'	L 15' / R 40'	L&R 50'	30'	L&R 50'	L 40'	L&R 20'
% Shade	5%	10%	5%	0%	5%	10%	2%
Cover type %	L 20% / T 80%	L 40% / T 60%	T 90%	T 20% / P 20%	L 40% / T 40% / B 20%	B&L 10% / T 80%	T 100%
B/D Comments	Log jam may be passable at higher flows	None	Log jam impassible	None	None	None	None
Floodplain connectivity	No	No	No	No	No	No	No
Sidechannel	No	No	No		No	No	No

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name	RW, MG						
Stream name	Tenmile Ck		Time interval	10 min.						
Date	4/23/01		Start	10:49						
Reach:	River Mile 6.1 to Bedrock falls		Stop	15:41						
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9	Transect#10
Barriers	0	0	0	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	L 1 / R 2	L 3 / R 2	L 1 / R 3	L 3 / R 3	L 2 / R 3	L 2 / R 2	L 1 / R 3	L 2 / R 2	L 3 / R 3	L 1 / R 3
Bank angle	2	L 3 / R 2	L 0 / R 3	L 3 / R 3	L 2 / R 3	L 2 / R 2	L 3 / R 3	2	3	L 2 / R 3
% Eroding bank	R 50%	L 50% / R 0%	L 0% / R 100%	L 50% / R 50%	L 0% / R 100%	L 10% / R 0%	L 0% / R 10%	0%	L&R 70%	L 0% / R 100%
Animal Damage	0	2	0	0	3	L 3 / R 2	0	1	2	3
Riparian Width	L 15' / R 30'	L 15' / R 40'	L 0' / R 100'	L 10' / R 50'	L 50' / R 0'	0'	L 0' / R 40'	L 30' / R 40'	0	L 100' / R 10'
Pool count	0	3	5	5	5	3	3	3	2	1
Pool quality	N/A	N/A	1	N/A	N/A	N/A	1	N/A	2	N/A
Primary habitat	2	3	4	3	3	2	3	3	4	2
% Primary Habit	100%	100%	100%	80%	100%	100%	L 20% / R 80%	100%	100%	100%
% LWD	0%	10%	0%	0%	20%	0%	2%	0%	0%	10%
Width	15'	17'	7.5'	17.3	12'	24'	9'	8'	11'	24'
Type & Embed. (L1)	C2	C2	B	C2	C2	G2	C2	C2	C2	C2
Type & Embed.	C2	C2	B	C2	C2	B1	C2	C2	B3	C2
Type & Embed.	C2	C2	B	C2	C2	C2	C2	C3	B3	C2
Type & Embed.	C2	C2	B	C2	C2	B1	C2	C2	B3	C2
Type & Embed.	C2	C2	B	C2	C2	C2	C2	C2	C2	C2
Depth ¼	0.9'	0.5'	0.5'	0.9'	0.4'	1'	0.7'	0.2'	0.5'	0.5'
Depth ½	0.5'	0.7'	0.6'	0.6'	0.7'	0.5'	1'	0.6'	0.8'	0.9'
Depth ¾	0.5'	0.5'	0.8'	0.3'	0.9'	0.7'	0.6'	0.6'	0.5'	0.5'
Max. Depth	0.9'	0.7'	0.8'	0.9'	1'	1'	1'	0.6'	0.8'	0.9'
Riparian type (L & R Bank)	L 3,4 / R 2,3,4	L 3,4 / R 2,3,4	L 3 / R 2,3,4	L 2,4 / R 2,3,4	L 2,3,4 / R 2	L&R 2,3	L rock / R 3	L 3 / R 2,3	L 3 / R 3	L 3,4 / R 2,3
Ave. Ht.	15'	15'	20'	15'	20'	8'	6'	8'	0'	15'
Max. Ht.	60'	60'	60'	80'	60'	40'	8'	30'	3'	60'
% Shade	50%	20%	80%	50%	40%	0%	0%	10%	0%	10%
Cover type %	0%	T 10%	T 100%	L 10%	L 10%	T 70%	0%	B 20% / T 20%	T 100%	B 10% / T 40%
B/D Comments	None	None	None	None	None	None	None	None	None	None
Floodplain connectivity	L No / R Yes	L No / R Yes	No	No	L Yes / R No	L Yes / R No	No	Yes	No	L Yes / R No
Sidechannel	No	No	No	No	No	No	No	No	No	Yes??

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name	JT, MT		
Stream name	Tenmile Ck		Time interval	10 min.		
Date	4/23/01		Start	12:00		
Reach:	Bedrock Falls to 1.2 miles above Snake River Rd		Stop	14:35		
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6
Barriers	0	0	0	0	0	0
Diversions	0	0	0	0	0	0
Bank condition	2	3	2	2	2	2
Bank angle	2	2	2	2	2	2
% Eroding bank	0%	100%	25%	10%	L 0% / R 100%	0%
Animal Damage	1	1	1	1	3	1
Riparian Width	4'	None	L 5' / R 10'	L 50' / R 20'	L&R 10'	L 30' / R 10'
Pool count	2	0	4	5	4	4
Pool quality	N/A	N/A	1	N/A	N/A	N/A
Primary habitat	2	2	1	3	2	3
% Primary Habit	70%	60%	95%	90%	50%	60%
% LWD	0%	0%	30%	0%	0%	5%
Width	10.5'	11'	12.5'	15.5'	17.5'	12.5'
Type & Embed. (L1)	B1	C1	M	B1	C1	M
Type & Embed.	C1	C1	C2	C1	C1	G2
Type & Embed.	C1	C1	C2	B2	C1	C1
Type & Embed.	C1	G1	M	M	C1	C1
Type & Embed.	N/A	N/A	N/A	N/A	N/A	C3
Depth ¼	0.5'	0.5'	1'	0.5'	0.7'	0.6'
Depth ½	0.5'	0.6'	1.4'	0.8'	0.6'	0.7'
Depth ¾	0.5'	0.4'	0.8'	0.4'	0.5'	0.3'
Max. Depth	0.5'	0.6'	1.5'	0.8'	0.7'	0.7'
Riparian type (L & R Bank)	L&R 4	None/Flood	L 2 / R 1,4	L&R 1,4	L&R 2	L&R 4
Ave. Ht.	10'	0'	L 1' / R 20'	L&R 15'	N/A	L 20' / R 15'
Max. Ht.	25'	0'	L 2' / R 40'	L&R 35'	N/A	L 35' / R 30'
% Shade	2%	0%	85%	60%	0%	30%
Cover type %	T 50%	T 15%	T 5% / L 30% / U 30%	T 5% / B 5%	B 5% / T 20%	B 5% / T 5%
B/D Comments	None	None	None	None	None	None
Floodplain connectivity	Yes	Yes	Yes	L Yes / R No	L Yes / R No	No
Sidechannel	No	Yes	No	No	No	No

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name	JT
Stream name	Tenmile Ck		Time interval	10 min.
Date	4/23/01		Start	10:45
Reach:	1.2 miles above Snake River Rd to 0.6 miles above Snake River Rd		Stop	11:15
	Transect #1	Transect #2		
Barriers	0	0		
Diversions	0	0		
Bank condition	3	2		
Bank angle	3	2		
% Eroding bank	90%	25%		
Animal Damage	3	1		
Riparian Width	5'	5'		
Pool count	3	2		
Pool quality	N/A	N/A		
Primary habitat	2	2		
% Primary Habit	90%	80%		
% LWD	0%	0%		
Width	6'	7.5'		
Type & Embed. (L1)	G3	G2		
Type & Embed.	C1	C1		
Type & Embed.	C1	C1		
Type & Embed.	C1	G3		
Type & Embed.	N/A	N/A		
Depth 1/4	0.4'	0.25'		
Depth 1/2	0.45'	0.4'		
Depth 3/4	0.3'	0.3'		
Max. Depth	0.5'	0.5'		
Riparian type (L & R Bank)	L 4,6 / R cliff	L&R 2,4		
Ave. Ht.	20'	5'		
Max. Ht.	30'	20'		
% Shade	30%	30%		
Cover type %	V 5%	B 5%		
B/D Comments	None	None		
Floodplain connectivity	L Yes / R No	Yes partial		
Sidechannel	No	No		

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name	MT
Stream name	Tenmile Ck		Time interval	10 min.
Date	4/23/01		Start	10:40
Reach:	0.6 miles above Snake River Rd Brg to Snake River Rd Brg		Stop	11:10
	Transect #1	Transect #2	Transect #3	
Barriers	0	0	0	
Diversions	0	0	0	
Bank condition	L 2 / R 3	2	L 3 / R 1	
Bank angle	3	1	L 3 / R 1	
% Eroding bank	L 40% / R 0%	L 10% / R 25%	L 100%/ R 20%	
Animal Damage	2	2	2	
Riparian Width	2'	L&R 8'	1'	
Pool count	2	1	2	
Pool quality	N/A	N/A	N/A	
Primary habitat	2	2	3	
% Primary Habit	100%	80%	75%	
% LWD	0%	0%	0%	
Width	15'	24'	20'	
Type & Embed. (L1)	C1	C1	B2	
Type & Embed.	C1	B1	B2	
Type & Embed.	C1	C1	C3	
Type & Embed.	C1	C1	B1	
Type & Embed.	C1	C1	G1	
Depth 1/4	0.3'	0.5'	0.4'	
Depth 1/2	0.6'	0.3'	0.6'	
Depth 3/4	0.5'	0.2'	0.8'	
Max. Depth	0.6'	0.5'	0.8'	
Riparian type (L & R Bank)	L 4 / R 4	L 4 / R 2,4	L 2 / R 2,4	
Ave. Ht.	15'	12'	20'	
Max. Ht.	40'	15'	40'	
% Shade	50%	5%	10%	
Cover type %	T 30%	T 50%	T 60%	
B/D Comments	None	None	None	
Floodplain connectivity	No	No	No	
Sidechannel	No	Yes	No	

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	RW, DK						
Stream Name:	George Ck		Time Interval:	7 min.						
Date:	5/8/01		Start time:	9:30						
Reach:	Trent Grade culvert to Mouth of Hefflefinger		Stop time:	15:25						
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9	Transect # 10
Barriers	0	0	0	1	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	2	1	1	1	2	1	3	2	1	1
Pool Count	4	3	8	4	4	4	4	3	3	3
Side Channel(s)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Bank Stability	L 1 / R 3	L&R 1	L 2 / R 1	L 1 / R 1	L 3 / R 1	L 1 / R 1	L 2 / R 1	L 1 / R 1	L 1 / R 1	L 1 / R 1
% Eroding Bank	L 0% / R 100%	L 0% / R 0%	L 60% / R 0%	L 10% / R 0%	L 60% / R 0%	L 0% / R 0%	L 35% / R 0%	L 10% / R 5%	L 0% / L 0%	L 5% / R 0%
Animal Damage	1	1	1	1	1	1	1	1	1	1
Riparian Width	L 30' / R 100'	L 30' / R 100'	L 5' / R 100'	L 30' / R 100'	L&R 100'	L 30' / R 100'	L 75' / R 100'	L&R 100'	L&R 100'	L 30' / R 100'
% Shade	50%	80%	65%	65%	75%	75%	60%	70%	20%	100%
Floodplain connectivity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Pool Quality	N/A	1	2	2 or 3	2	3	1	N/A	N/A	N/A
Primary Habitat	5	1	4	4	4	4	1	2	2	2
% Primary Habitat	100%	70%	100%	100%	100%	100%	100%	100%	100%	100%
% LWD	1%	5%	5%	85%	5%	0%	10%	5%	1%	4%
Stream Width	18'	7'	10'	35'	7'	18'	7'	17'	11'	11'
Type & Embed.	C1	B1	C3	Log	C1	B2	C1	B1	C1	C1
Type & Embed.	C2	B1	C1	Dam	C1	B2	C1	C1	C1	C1
Type & Embed.	C1	B1	B1	Over	C1	C3	C1	C1	C1	C1
Type & Embed.	C1	B1	B1	Transect	C1	C1	C1	C1	B1	C1
Type & Embed.	No Entry	No Entry	C2	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry
Depth 1/4	1'	1'	0.5'	0.6'	1'	0.8'	2'	0.8'	0.6'	0.8'
Depth 1/2	1'	1.3'	1.1'	1.5'	1'	0.3'	1'	0.7'	0.5'	0.6'
Depth 3/4	0.9'	0.9'	1.5'	0.8'	1'	0.3'	0.4'	0.5'	0.7'	0.4'
Max. Depth	1'	1.3'	1.5'	1.5'	1'	0.9'	2.2'	1'	0.7'	0.8'
Riparian Type - L & R Bank	L 5,4(30'/80') / R 5,4(20'/60')	L 5,4(40'/80') / R 5,4(40'/90')	L 4,5(20'/30') / R 4,5(40'/80')	L 4,5(35'/85') / R 4,5(35'/150')	L 5(50'/90') / R 5,4(50'/90')	L&R 5,4 (45'/90')	L&R 5,4 (50'/90')	L&R 5,4 (90'/120')	L&R 5 (25'/80')	L 5,3(90'/100') / R 5(90'/100')
Stream Cover Type %	B 10% / T 5%	B 25% / T 60% / L 5% / U 6%	B 10% / U 10% / T 50% / V 1%	L 80%	B 10% / T 60% /U 5%	B 10% / T 40%	B 5% / L 20% / T 50%	B 2% / L 5%	L 1% / T 30%	B 1% / L 4% / T 20% / V 50%
Comments	None	Lots of great cover.	None	Large logjam partial barrier.	Lots of LWD hanging over water.	Small shallow sidechannel in Belt	Boulder enhanced scour pool.	Redd on Left Bank. SH1-6	None	None

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name(s):	DK, MT					
Stream Name:	George Ck		Time Interval:	10 min					
Date:	4/18/01		Start time:	12:26					
Reach:	Stringtown to 2 miles above Meyer Rd Brg		Stop time:	14:00					
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9
Barriers	0	0	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0	0
Bank condition	1	1	2	1	2	1	1	1	2
Bank angle	L 1 / R 1	L 2 / R 1	L 1 / R 1	L 3 / R 1	1	L 1 / R 2	L 2 / R 1	L 2 / R 1	
% Eroding bank	L 0% / R 0%	L 20% / R 10%	L 0% / R 0%	L 90% / R 0%	0%	L 0% / R 25%	L 10% / R 0%	L 0% / R 3%	
Animal Damage	1	1	1	1	1	1	1	2	
Riparian Width	0'	L 5' / R 0'	L 15' / R 15'	L 25' / R 5'	L 10' / R 5'	L 5' / R 10'	L&R 3'	L&R 4'	L&R 80'
Pool count	3	6	3	0	2	1	0	0	0
Pool quality	N/A	N/A	N/A	N/A	0	0	3	2	2
Primary habitat	2	2	2&3	5	2&3	2			
% Primary Habit	10%	100%	3 60% / 2 40%	100%	2 50% / 3 50%	100%			
% LWD	0%	25%	0%	0%	35%	0%			
Width	9'	47'	8'	24.5'	34.3'	28.2'	21.5'	22.1'	26'
Type & Embed. (L1)	C1	B1	C1	C1	B1	C1	C1	C1	C1
Type & Embed.	C1	C1	C1	B1	C1	C1	G1	C2	C1
Type & Embed.	C1	C1	C1	C1	C1	C2	G2	C1	C1
Type & Embed.	C1	C1	C1	C1	C1	C1	G1	C1	C1
Type & Embed.	C1	C2	C1	C1	G2	G2	C1	C1	C1
Depth ¼	0.7'	0.3'	1.4'	0.3'	0.6'	1'	0.8'	0.6'	1'
Depth ½	0.8'	0.3'	1.3'	0.8'	0.1'	1'	0.9'	1.3'	0.9'
Depth ¾	0.7'	0.9'	0.8'	0.5'	0.8'	0.6'	0.5'	0.9'	0.6'
Max. Depth	1'	0.9'	1.5'	0.9'	1.3'	1'	1.2'	1.3'	1'
Riparian type (L & R Bank)	L&R Rock	L&R 3,4	L none / R 4	L 3 / R 4	L 2 / R 4	L&R 2,4	L 2 / R 4	L 5 / R 2,3,4	L&R 2,3,4,5
Ave. Ht.	N/A	8'	10'	L 5' / R 7'	10'	10'	12'	20'	25'
Max. Ht.	N/A	12'	15'	L 5' / R 10"	15'	12'	12'	70'	100'
% Shade	0%	20%	60%	20%	10%	25%	25%	30%	85%
Cover type %	T 5%	10%	T 20% / V 5%	B 15% / T 25%	B 10% / L 10%	T 5%	T 5%	0%	T 5%
B/D Comments	None	None	None	None	None	None	None	None	None
Floodplain connectivity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sidechannel	A	Top of Braid	No	No	No	No	No	No	No

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name(s):	RW						
Stream Name:	George Ck		Time Interval:	10 min.						
Date:	4/18/01		Start time:	10:45						
Reach:	2 miles above Meyer Rd Brg to Meyer Rd Brg		Stop time:	15:57						
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9	Transect #10
Barriers	0	0	0	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	2	2	1	3	L 3 / R 2	2	3	3	3	3
Bank angle	1	2	1	L 3 / R 3	L 1 / R 2	L 2 / R 1	3	3	3	3
% Eroding bank	0%	L 50% / R 0%	0%	L 0% / R 100%	L 0% / R 0%	0%	L&R 100%	100%	L 100% / R 100%	100%
Animal Damage	1	1	1	3	L 1 / R 2	1	3	3	3	3
Riparian Width	L 30' / R 15'	L 20' / R 0'	L 20' / R 20'	L 150' / R 15'	L 5' / R 15'	L 30' / R 0'	0'	L 10' / R 10'	0'	1'
Pool count	1	0	1	0	0	2	0	0	0	0
Pool quality	2		N/A	N/A	N/A	1	N/A	N/A	N/A	N/A
Primary habitat	3	4	2	2	2	4	2	2	2	2
% Primary Habit	100%	100%	100%	100%	80%	60%	100%	100%	100%	100%
% LWD	10%	10%	10%	0%	0%	0%	0%	0%	0%	0%
Width	10'	17.5'	17'	20'	20'	22'	35'	23'	27'	26'
Type & Embed. (L1)	C2	B1	C2	C2	R	C2	C2	C2	C2	C3
Type & Embed.	M	B2	C2	C2	B1	C2	C2	C3	C2	C3
Type & Embed.	C2	B2	C1	B2	C2	C1	C2	C2	C2	C3
Type & Embed.	C2	C1	C1	C3	C2	G2	C2	C2	C2	C2
Type & Embed.	B2	C1	M	B1	C2	G2	G2	C3	C2	C2
Depth 1/4	1.1'	0.7'	0.7'	0.7'	0.5'	0.8'	0.5'	0.7'	0.7'	0.2'
Depth 1/2	1.7'	1.3'	0.8'	1'	0.5'	1'	0.6'	0.7'	0.6'	0.3'
Depth 3/4	2'	1.5'	1'	1.3'	0.1'	1'	0.3'	0.6'	0.5'	0.6'
Max. Depth	2'	1.5'	1.1'	1.3'	1.3'	3'	1'	0.9'	0.7'	0.8'
Riparian type (L & R Bank)	L 4 / R 4	L 4 / R 2	L 4 / R 4	L 4 / R 3	L rock / R 4	L 4,3 / R rock	None	L 4 / R 4	None	None
Ave. Ht.	30'	L 50' / R 0.5'	60'	L 40' / R 4'	R 60'	L 20'	0'	No Entry	0'	0'
Max. Ht.	50'	L 60' / R N/A	80'	40'	R 60'	L 40'	0'	No Entry	0'	0'
% Shade	90%	100%	100%	20%	50%	30%	0%	0%	0%	0%
Cover type %	U 50% / W,D 10%	B 100% / T 100%	V 40% / T 60%	T 100%	T 60%	D 50% / T 50%	T 75%	T 10%	T 40%	V 5%
B/D Comments	Undercut bank 2.5'	None	None	None	None	None	None		None	None
Floodplain connectivity	L Yes / R No	L Yes / R Yes	L No / R Yes	L Yes / R No	L No / R Yes	L No / R No	L No / R Yes	L No / R No	No	L Yes / R Yes
Sidechannel	None	None	2	None	1	2	3	3+	4	2

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name:	RW				
Stream Name:	George Ck		Time Interval:	10 min.				
Date:	4/18/01		Start time:	10:45				
Reach:	2 miles above Meyer Rd Brg to Meyer Rd Brg		Stop time:	15:57				
	Transect #11	Transect #12	Transect #13	Transect #14	Transect #15	Transect #16	Transect #17	Transect #18
Barriers	0	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0
Bank condition	3	3	2	3	L 3 / R 2	3	L 2 / R 2	L 1 / R 3
Bank angle	L 1 / R 3	3	2	L 3 / R 2	L 2 / R 2	3	L 3 / R 2	L 1 / R 2
% Eroding bank	L 0% / R 100%	L&R 100%	0%	L 100% / R 10%	L 50% / R 0%	100%	L 25% / R 0%	L 0% / R 50%
Animal Damage	2	L 1 / R 2	1	L 2 / R 2	1	1	1	L 1 / R 3
Riparian Width	5'	L&R 100'	L&R 100'	L&R 100'	L 0' / R 150'	L 0' / R 50'	L 10' / R 10'	L 5' / R 15'
Pool count	1	2	2	2	1	0	1	0
Pool quality	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A
Primary habitat	3	3	1	3	3	2	4	3
% Primary Habit	60%	80%	90%	100%	100%	60%	100%	100%
% LWD	0%	1%	40%	0%	0%	0%	0%	0%
Width	22'	15'	25'	19'	16'	26'	21'	17'
Type & Embed. (L1)	C3	C3	C2	C2	C2	C2	B1	C2
Type & Embed.	C3	C3	C2	C2	C2	C2	C3	C2
Type & Embed.	C2	C3	C2	C1	C2	C2	B2	C2
Type & Embed.	C2	C2	C2	C2	C2	C2	C2	C2
Type & Embed.	C2	C3	C2	C2	C3	C2	B2	C2
Depth ¼	0.4'	1'	1.9'	0.9'	1.2'	0.5'	0.5'	0.9'
Depth ½	0.8'	1.2'	2'	1'	1.4'	1.2'	1'	0.9'
Depth ¾	1'	1'	1'	0.6'	1'	0.9'	0.7'	0.6'
Max. Depth	1.1'	1.3'	2.5'	1'	1.5'	1.1'	1'	1.1'
Riparian type (L & R Bank)	L&R 3,6	L 4 / R 4	No Entry	L 4 / R 4	L 2 / R 4	L rock / R 4	L rock / R 4	L 4&rock / R 4
Ave. Ht.	6'	20'	60'	40'	60'	60'	60'	60'
Max. Ht.	6'	60'	80'	80'	60'	60'	60'	60'
% Shade	0%	40%	90%	70%	20%	70%	100%	100%
Cover type %	T 30% / V 10%	W,D 10%	T 60%	V 10% / T 10%	0%	B 10% / T 60%	B 20%	T 50% / U 50%
B/D Comments	None	None	None	None	None	None	None	None
Floodplain connectivity	L Yes / R No	No	Yes	Yes	No Entry	L Yes / R No	L No / R Yes	L No / R No
Sidechannel	3	3	2	2	1	0	2	0

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	JT, MG						
Stream Name:	Coombs Ck		Time Interval:	10 min.						
Date:	5/8/01		Start time:	9:58						
Reach:	2 miles above mouth to mouth		Stop time:	13:30						
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9	Transect #10
Barriers	0	0	1	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	1	2	L&R 2	L&R 1	L&R 1	L&R 2	L&R 2	L&R 3	L&R 1	L&R 1
Pool Count	2	4	2	5	2	2	3	3	3	1
Side Channel(s)	1	0	3	3	1	1	0	2	1	No
Bank Stability	L&R 1	L 3 / R 1	L&R 2	L 3 / R 1	L&R 1	L 1 / R 2	L 2 / R 3	L 2 / R 3	L 2 / R 1	L 1 / R 2
% Eroding Bank	L 0% / R 10%	L 100% / R 0%	L 30% / R 50%	L 90% / R 0%	L 5% / R 10%	L 0% / R 75%	L 20% / R 75%	L 30% / R 60%	L 60% / R 20%	L 0% / R 5%
Animal Damage	1	1	1	1	1	1	1	1	1	1
Riparian Width	L&R 300'	L 300' / R 300'	L&R 300'+	L&R 300'+	L&R 300'+	L&R 300'+	L&R 300'+	L&R 300'+	L&R 300'+	L&R 300'+
% Shade	25%	20%	10%	60%	50%	10%	10%	70%	10%	20%
Floodplain connectivity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pool Quality	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Primary Habitat	2	1	2	2	3	3	4	3	2	2
% Primary Habitat	60%	70%	80%	90%	70%	55%	80%	55%	60%	65%
% LWD	15%	0%	10%	0%	15%	0%	15%	5%	20%	0%
Stream Width	12'	17'	13'	12'	15'	10'	11'	12.5'	11'	11'
Type & Embed.	C1	C2	B1	C1	C2	C1	G1	C2	C1	C1
Type & Embed.	C1	C1	C1	C1	G2	C1	C1	C1	C1	G1
Type & Embed.	C1	C1	C1	C1	C1	C1	C1	C1	C1	C1
Type & Embed.	C1	C1	G1	C1	B1	C1	C1	C2	C2	C1
Type & Embed.	G2	B1	C1	G2	C1	C1	B1	C3	M	C1
Depth ¼	0.5'	0.9'	0.6'	0.5'	0.7'	0.8'	0.5'	1'	1.3'	0.5'
Depth ½	1'	1.9'	1'	0.7'	0.8'	1'	1.4'	1.3'	1.3'	0.7'
Depth ¾	0.4'	0.8'	0.4'	0.5'	0.7'	0.5'	0.8'	0.5'	0.6'	1.2'
Max. Depth	1'	2.1'	1'	0.8'	0.9'	1'	1.4'	1.5'	1.3'	1.2'
Riparian Type - L & R Bank	L 5,3(6'/60') / R 5,3(15'/60')	L 5,2(20'/75') / R 5,3(10'/75')	L 5,3(30'/80') / R 5,3(15'/70')	L 5,3(15'/75') / R 5,3(20'/80')	L 5,3(25'/70') / R 5,3(25'/70')	L 5,3(20'/65') / R 5.3(25'/60')	L 5,3(30'/60') / R 5,3(20'/60')	L 5,3(30'/75') / R 5,3(40'/75')	L 5,3(30'/80') / R 5,3(30'/75')	L 5,3(30'/80') / R 5,3(15'/60')
Stream Cover Type %	B 5% / L 15% / T 50%	B 20% / T 20%	B 10% / T 40%	B 5% / T 30%	B 5% / L 15% / T 10%	B 5% / T 20%	B 10% / L 15% / T 40%	B 10% / L 5% / T 30%	B 10% / L 20% / T 40%	B 5% / T 30%
Comments	None	None	Log Jam, would be passable @ higher flow.	None	None	None	None	None	None	None

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name	JT
Stream name	Steptoe Ck		Time interval	6 min.
Date	4/17/01		Start	11:08
Reach:	Forks to 1.1 miles above mouth		Stop	12:18
	Transect #1	Transect #2	Transect #3	Transect #4
Barriers	1	0	2	0
Diversions	0	0	0	0
Bank condition	2	2	3	2
Bank angle	2	3	2	2
% Eroding bank	L 0% / R 0%	L 100% / R 50%	L 50% / R 50%	L 0% / R 10%
Animal Damage	3	2	2	3
Riparian Width	0' rock wall	L 0' / R 10'	None rock	None rock
Pool count	3	2	6	3
Pool quality	N/A	2	N/A	N/A
Primary habitat	2	1	3	2
% Primary Habit	90%	75%	80%	95%
% LWD	0%	0%	5%	0%
Width	5'	6'	7.5'	7.5'
Type & Embed. (L1)	M	G3	M	G2
Type & Embed.	C3	C3	G2	C2
Type & Embed.	B2	G1	B3	C2
Type & Embed.	C3	G3	C3	G2
Type & Embed.	No Entry	No Entry	No Entry	No Entry
Depth ¼	0.45'	0.6'	0.45'	0.4'
Depth ½	0.5'	0.7'	0.6'	0.5'
Depth ¾	0.5'	0.5'	0.55'	0.45'
Max. Depth	0.5'	0.8'	0.75'	0.55'
Riparian type (L & R Bank)	L&R 6	L 2 / R 3,4	L 2 / R 2	L 6 / R 6
Ave. Ht.	N/A	7'	3"	N/A
Max. Ht.	N/A	20'	6"	N/A
% Shade	0%	70%	50%	0%
Cover type %	B 5%	B 10% / T 5%	L 5% / B 5%	B 2% / V 2%
B/D Comments	1 split channel with steep gradient	None	2 small falls 2.5' high with small jump pool	None
Floodplain connectivity	No	No	L No / R Yes	L Yes / R No
Sidechannel	No	No	No	No

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name:	MG		
Stream Name:	Steptoe Ck		Time Interval:	6 min.		
Date:	4/17/01		Start time:	11:05		
Reach:	1.1 miles above mouth to mouth		Stop time:	12:20		
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6
Barriers	0	0	2	3	1	0
Diversions	0	0	0	0	0	0
Bank condition	2	2	2	L 2 / R 2	L 2 / R 2	L 2 / R 2
Bank angle	L 3 / R 2	L 2 / R 2		L 3 / R 2	L 2 / R 2	L 2 / R 2
% Eroding bank	L 50% / R 20%	L 25% / R 25%	0%	L 60% / R 30%	L 20% / R 15%	L 20% / R 30%
Animal Damage	L 3 / R 2	L 2 / R 2	L 1 / R 1	L 1 / R 1	L 2 / R 2	L 2 / R 2
Riparian Width	0'	30'	0'	0'	0'	10'
Pool count	2	2	3	3	1	1
Pool quality	N/A	2	N/A	3	3	2
Primary habitat	2,6	1,4,6	3	1,2	2,5	2,3
% Primary Habit	2 90% / 5 10%	1 20% / 4 70% / 6 10%	99%	1 80% / 2 20%	2 95% / 5 5%	2 90% / 3 10%
% LWD	0%	10%	0%	0%	0%	0%
Width	5'	6'	4'	14'	3'	4'
Type & Embed. (L1)	C2	M	G1	C2	C2	C2
Type & Embed.	B2	M	G1	C2	C2	C2
Type & Embed.	M	C3	M	C3	C3	C2
Type & Embed.	C2	M	M	C3	B2	C3
Type & Embed.	M	B2	S	M	C2	C2
Depth ¼	6"	6"	2"	1'	6"	6"
Depth ½	8"	1'	5"	1'	8"	8"
Depth ¾	6"	8"	5"	1.5'	6"	7"
Max. Depth	8"	1'	5"	1.5'	8"	8"
Riparian type (L & R Bank)	L&R 2,6	L 2,5 / R 2,3,5	L 2 / R 2	L 2 / R 2	L 2 / R 2	L 2 / R 2,3,4
Ave. Ht.	3"	15'	6"	3"	4"	L 5" / R 15'
Max. Ht.	3"	25'	6"	5"	5"	25'
% Shade	0%	15%	0%	0%	0%	10%
Cover type %	B 30% / T 70%	B 10% / L 10%	None	T 35%	B 5% / T 95%	B 30% / T 70%
B/D Comments	None	None	None	None	None	None
Floodplain connectivity	No	No	No	No	No	No
Sidechannel	No	No	No	No	No	No

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name:	JT, MG
Stream name	Wawawai Ck		Time interval:	10 min.
Date	4/17/01		Start Time:	14:07
Reach:	First culvert to mouth		Stop Time:	16:00
	Transect #1	Transect #2		
Barriers	1	0		
Diversions	0	0		
Bank condition	1	2		
Bank angle	L 2 / R 1	2		
% Eroding bank	L 0% / R 10%	L 0% / R 5%		
Animal Damage	1	1		
Riparian Width	L 30' / R 30'	L 25' / R 40'		
Pool count	1	2		
Pool quality	N/A	N/A		
Primary habitat	2	2		
% Primary Habit	90%	75%		
% LWD	5%	0%		
Width	5'	5'		
Type & Embed. (L1)	M	M		
Type & Embed.	G2	G2		
Type & Embed.	C2	C1		
Type & Embed.	C3	C1		
Type & Embed.	No Entry	No Entry		
Depth ¼	0.25'	0.25'		
Depth ½	0.5'	0.45'		
Depth ¾	0.5'	0.4'		
Max. Depth	0.5'	0.55'		
Riparian type (L & R Bank)	L 1,4 / R 3,4	L 1,3 / R 1,4		
Ave. Ht.	L 7' / R 7'	L 5' / R 10'		
Max. Ht.	L 30' / R 30'	L 8' / R 30'		
% Shade	60%	75%		
Cover type %	L 5%	B 5% / V 30%		
B/D Comments	Driftwood @ Mouth	None		
Floodplain connectivity	L No / R Yes	Yes		
Sidechannel	No Entry	1~150 yds. Covered by blackberries		

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	GM, DK						
Stream Name:	Almota Ck		Time Interval:	10 min.						
Date:	4/24/01		Start time:	13:15						
Reach:	Top of Haeder Gulch to Barn at end of lower farm Rd.		Stop time:	17:46						
	Transect #1 (Haeder Gulch tributary)	Transect #2 (Side channel at Trans. #1)	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9	Transect # 10
Barriers	0	0	0	1 Partial	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	2	2	2	2	2	2	1	1	2	1
Bank angle	L 2 / R 3	L 3 / R 1	L 3 / R 1	L 1 / R 1	L 1 / R 1	L 2 / R 3	L 2 / R 1	L 1 / R 1	L 1 / R 1	L 1 / R 1
% Eroding bank	L 0% / R 100%	L 100% / R 0%	L 100% / R 0%	0%	L 0% / R 5%	L 30' / R 90'	L 50% / R 0%	0%	0%	0%
Animal Damage	1	1	2	1	0	1	1	1	1	1
Riparian Width	L 10' / R 50'	L 10' / R 50'	50'	L 75' / R 10'	L&R 45'	L&R 100'	L 30' / R 100'	L 0' / R 25'	L 15' / R 25'	L 50' / R 50'
Pool count	0	0	0	5	3	1	3	6	2	2
Pool quality	N/A	N/A	N/A	N/A	N/A	3	N/A	N/A	2	N/A
Primary habitat	2	2	2	2	4	1	2	2	1	2
% Primary Habit	100%	100%	100%	100%	100%	50%	100%	100%	75%	100%
% LWD	0%	0%	0%	0%	0%	5%	0%	0%	25%	20%
Width	7.5'	4'	6.5'	15'	6.5'	8.5'	10'	11'	5'	9'
Type & Embed. (L1)	G2	C2	C2	G3	B3	M	C1	G1	G1	G3
Type & Embed.	C2	C2	C2	C3	G3	C1	B3	G3	G1	G2
Type & Embed.	C2	C2	C2	C3	G3	C2	C1	C2	G1	G1
Type & Embed.	C2	C2	G2	C3	G3	C2	C2	C2	G1	G2
Type & Embed.	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry
Depth ¼	0.4'	0.2'	0.5'	0.2'	0.7'	0.9'	0.4'	0.3'	1.2'	0.6'
Depth ½	0.5'	0.35'	0.2'	0.2'	0.4'	0.8'	0.6'	0.5'	0.6'	0.5'
Depth ¾	0.3'	0.3'	0.5'	0.2'	0.1'	0.7'	0.5'	0.5'	2'	0.4'
Max. Depth	0.5'	0.45'	0.5'	0.2'	0.7'	1.1'	0.7'	0.5'	2.2'	0.7'
Riparian type (L & R Bank)	L 2,4 / R 3,4	L 2 / R 3,7	L 2,3 / R 3,4	L&R 3,4	L 3,4 / R 2,3,4	L&R 3,4	L&R 2	L&R 2,3	L&R 2,3	L 2,3 / R 3,4
Ave. Ht.	L 50' / R 20'	8'	20'		30'	15'	12'	5'	6'	25'
Max. Ht.	L&R 50'	8'	25'	50'	75'	50'	20'	12'	10'	55'
% Shade	60%	0%	5%	75%	80%	50%	25%	100%	90%	50%
Cover type %	T 5%	T 25%	0%	T 5%	B 5% / T 10%	L 10% / U 5%	B,T	0%	L 25% / U 50%	U,L,V
B/D Comments	None	None	None	Small falls may be partial blockage at times	None	None	None	None	None	None
Floodplain connectivity	Yes fair	Yes fair	Yes fair	Yes good	Yes, but in narrow canyon	No poor	Yes fair	No	Yes fair	Yes fair narrow
Sidechannel	No	Yes (#3)	Yes (#2)	No	No	Braid below pool	No	No	No	No

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	GM, DK
Stream Name:	Almota Ck		Time Interval:	10 min.
Date:	4/24/01		Start time:	13:15
Reach:	Top of Haeder Gulch to Barn at end of lower farm Rd.		Stop time:	17:46
	Transect # 11	Transect # 12	Transect # 13	
Barriers	0	0	0	
Diversions	0	0	0	
Bank condition	3	2	3	
Bank angle	L 3 / R 3	L 3 / R 1	L 2 / R 3	
% Eroding bank	L 20% / R 100%	L 80% / R 5%	L 30% / R 55%	
Animal Damage	1	2	2	
Riparian Width	L&R 30'	L 10' / R 40'	L 5' / R 0'	
Pool count	2	3	4	
Pool quality	N/A	N/A	N/A	
Primary habitat	2	2	2	
% Primary Habit	100%	100%	100%	
% LWD	0%	0%	0%	
Width	6.25'	8.5'	12.8'	
Type & Embed. (L1)	B3	G1	C2	
Type & Embed.	B3	C2	G3	
Type & Embed.	C3	G1	C2	
Type & Embed.	C3	G1	G3	
Type & Embed.	No Entry	No Entry	G3	
Depth ¼	0.5'	0.5'	0.6'	
Depth ½	0.8'	0.4'	0.5'	
Depth ¾	0.7'	0.2'	0.7'	
Max. Depth	0.8'	0.5'	0.7'	
Riparian type (L & R Bank)	L&R 3,4	L 2,3 / R 3,4	L&R 3	
Ave. Ht.	10'	20'	5'	
Max. Ht.	40'	60'	5'	
% Shade	50%	95%	5%	
Cover type %	B 5%	T	B,V	
B/D Comments	None	None	None	
Floodplain connectivity	No poor	Yes fair	Yes fair	
Sidechannel	No	Yes	No	
Stopped at GPS coordinates N 46.42.027 W 117.026.104				

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	JT, MG
Stream Name:	Almota Ck		Time Interval:	10 min.
Date:	4/24/01		Start time:	14:40
Reach:	Barn at end of lower farm Rd to Mouth		Stop time:	16:52
	Transect #1	Transect #2	Transect #3	
Barriers	0	0	0	
Diversions	0	0	0	
Bank condition	2	2	2	
Bank angle	2	1	2	
% Eroding bank	65%	0%	80%	
Animal Damage	1	1	1	
Riparian Width	L 40' / R 100'	L 100' / R 10'	L&R 15'	
Pool count	3	3	2	
Pool quality	N/A	N/A	N/A	
Primary habitat	2	3	2	
% Primary Habit	70%	85%	75%	
% LWD	0%	0%	0%	
Width	7'	9'	6'	
Type & Embed. (L1)	C2	G3	C2	
Type & Embed.	C2	C3	G2	
Type & Embed.	G2	C2	G1	
Type & Embed.	G2	G2	C3	
Type & Embed.	M	No Entry	No Entry	
Depth ¼	0.5'	0.5'	1'	
Depth ½	1'	0.5'	1'	
Depth ¾	0.4'	1'	0.5'	
Max. Depth	1'	1'	1'	
Riparian type (L & R Bank)	L&R 1,4	L&R 1,4	L 1,4 / R None	
Ave. Ht.	L 20' / R 25'	L 20' / R 8'	L 15' / R 0'	
Max. Ht.	L 40' / R 45'	L 35' / R 30'	L 35' / R 0'	
% Shade	75%	70%	20%	
Cover type %	U 10% / T 20%	B 10%	T 30%	
B/D Comments	None	Braided channel between transect 1 & 2	None	
Floodplain connectivity	No	Yes	L No / R Yes	
Sidechannel	No	No	No	

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name	RW, MT						
Stream name	Little Almota Ck		Time interval	10 min.						
Date	4/24/01		Start	11:39						
Reach:	Benedict Rd culvert to culvert at switchback		Stop	17:00						
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9	Transect #10
Barriers	0	2	0	1	1	1	1	2	2	0
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	3	3	3	3	3	3	3	3	3	3
Bank angle	3	3	3	3	3	L 1 / R 3	3	3	3	3
% Eroding bank	100%	100%	100%	L 0% / R 100%	100%	L 0% / R 40%	100%	100%	100%	100%
Animal Damage	0	0	0	0	0	0	0	0	0	0
Riparian Width	L 20' / R 40'	L 30' / R 60'	L 150' / R 50'	100'	L&R 150'	L&R 150'	Wide	100'	Wide	L&R 40'
Pool count	2	3	1	0	1	1	0	2	2	1
Pool quality	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	N/A
Primary habitat	3	3	3	Couldn't read	2	4	2	2	1	3
% Primary Habit	10%	100%	100%	Couldn't read	Couldn't read	100%	100%	100%	Couldn't read	100%
% LWD	0%	0%	20%	30%	20%	0%	0%	0%	0%	10%
Width	2.5'	3.5	3.5'	4'	6'	5'	5'	5.5'	5'	5'
Type & Embed. (L1)	M	M	M	M	B	B	B	C3	B	M
Type & Embed.	M	M	M	B3	B	B	B	B3	B	C3
Type & Embed.	M	M	M	B3	B	B	B	B	B	C3
Type & Embed.	M	M	M	B3	B	B	B	B3	B	C3
Type & Embed.	M	M	M	M	B	B	B	C3	B	M
Depth ¼	0.4'	0.5'	0.5'	0.2'	0.5'	0.2'	0.1'	0.4'	0.5'	0.1'
Depth ½	0.5'	0.5'	0.5'	0.4'	0.1'	0.3'	0.1'	0.5'	1'	0.4'
Depth ¾	0.5'	0.4'	0.4'	0.4'	0.2'	0.5'	0.3'	0.5'	0.8'	0.1'
Max. Depth	0.5'	0.5'	0.5'	0.4'	0.5'	0.5'	0.3'	0.5'	1'	0.5'
Riparian type (L & R Bank)	L 2,4,5 / R 4	L 2,3,4,5 / R 3,4	L&R 3,4,5	L cliff / R 3,4,5	L&R 2,3,4,5	L&R 3	L&R 3,4	L&R 3,4	L&R 3,4	L&R 3
Ave. Ht.	50'	15'		30'		15'				
Max. Ht.	100'	100'	150'	100'	150'	60'	70'	100'	100'	40'
% Shade	50%	70%	90%	80%	20%	10%	90%	80%	90%	60%
Cover type %	Mud100%	Mud 100%	B 10% / L 20%	B 20% / T 50%	0%	T 30%	B 5%	B 20%	B 20%	L 10%
B/D Comments	None	2 Waterfalls	None	1 waterfall 12' high	Barrier with 6' mud pool	10' Barrier	1 Barrier	2 Barriers	2 Barriers	None
Floodplain connectivity	No	No	No	No	No	No	No	No	No	L No / R Yes
Sidechannel	No	No	No	No	No	No	No	No	No	No

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name	RW, MT
Stream Name:	Little Almota Ck		Time interval	10 min.
Date	4/24/01		Start	11:39
Reach:	Benedict Rd culvert to culvert at switchback		Stop	17:00
	Transect #11	Transect #12	Transect #13	
Barriers	2	0	0	
Diversions	0	0	0	
Bank condition	3	L 2 / R 2	L 3 / R 3	
Bank angle	3	L 2 / R 2	3	
% Eroding bank	100%	0%	100%	
Animal Damage	0	0	3	
Riparian Width	L 100' / R 30'	30'	15'	
Pool count	2	3	3	
Pool quality	N/A	0	N/A	
Primary habitat	2	3	2	
% Primary Habit	100%	100%	100%	
% LWD	10%	0%	0%	
Width	5'	5.3'	7.5'	
Type & Embed. (L1)	C3	M	C3	
Type & Embed.	C3	M	C3	
Type & Embed.	C3	M	B3	
Type & Embed.	C3	B	C3	
Type & Embed.	B	B	B3	
Depth ¼	0.4'	0.25'	0.4'	
Depth ½	0.2'	0.5'	0.5'	
Depth ¾	0.2'	0.4'	0.4'	
Max. Depth	0.4'	0.5'	0.5'	
Riparian type (L & R Bank)	L&R 3,4	L&R 3,4	L&R 3,4	
Ave. Ht.				
Max. Ht.	60'	60'	40'	
% Shade	60%	60%	60%	
Cover type %	T 20%	B 10%	T 40%	
B/D Comments	None	None	None	
Floodplain connectivity	No	L No / R Yes	No	
Sidechannel	No	1	6	

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name	MG, JT
Stream Name:	Little Almota Ck		Time interval	10 min.
Date	4/24/01		Start	13:18
Reach:	Culvert at switchback to mouth		Stop	14:20
	Transect #1	Transect #2	Transect #3	Transect #4
Barriers	0	0	1	0
Diversions	0	0	0	0
Bank condition	3	2	2	3
Bank angle	3	2	3	2
% Eroding bank	95%	50%	100%	100%
Animal Damage	2	1	1	3
Riparian Width	L 5' / R 0'	L 0' / R 6'	L 5' / R 5'	L 3' / R 2'
Pool count	3	1	1	0
Pool quality	N/A	N/A	2	N/A
Primary habitat	2	3	1	3
% Primary Habit	85%	60%	70%	75%
% LWD	0%	0%	10%	0%
Width	4.5'	7.5'	3.5'	5'
Type & Embed. (L1)	C2	C2	C2	G2
Type & Embed.	C2	G2	C2	G2
Type & Embed.	C2	G2	C2	G2
Type & Embed.	C2	G2	C2	G3
Type & Embed.	None	C2	None	None
Depth ¼	0.4'	0.5'	0.5'	0.2'
Depth ½	0.5'	0.5'	0.9'	0.5'
Depth ¾	0.2'	0.4'	0.9'	0.2'
Max. Depth	0.5'	0.5'	0.9'	0.5'
Riparian type (L & R Bank)	L 1,3	R 1,4	L&R 1,4	L 3,4 / R 4
Ave. Ht.	L1'	15'	L 10' / R 5'	10'
Max. Ht.	L5'	20'	L 35' / R 40'	20'
% Shade	0%	20%	60%	10%
Cover type %	T 5%	T 10%	B 5% / T 40% / W 10%	0%
B/D Comments	None	None	4' Barrier with only 1' Pool Depth	None
Floodplain connectivity	No	Yes	No	L Yes / R No
Sidechannel	No	No	No	No

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	JT, DK			
Stream Name:	N.F. Deadman Ck		Time Interval:	3 min.			
Date:	5/22/01		Start time:	13:15			
Reach:	No Entry		Stop time:	13:40			
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7
Barriers	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0
Bank condition	2	3	3	3	3	3	3
Pool Count	0	0	0	0	0	0	0
Side Channel(s)	No	No	No	No	No	No	No
Bank Stability	L 1 / R 1	L 1 / R 2	3	3	3	3	3
% Eroding Bank	L 0% / R 0%	L 50% / R 50%	L 90% / R 90%	L 75% / R 90%	L 50% / R 65%	L 30% / R 90%	L 60% / R 55%
Animal Damage	2	3	3	3	2	2	2
Riparian Width	L 15' / R 0'	L 0' / R 0'	L 20' / R 20'	L 10' / R 20'	L 10' / R 10'	L 10' / R 10'	L 20' / R 10'
% Shade	5%	0%	0%	0%	0%	0%	0%
Floodplain connectivity	Yes	Yes	No	No	No	No	No
Pool Quality	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Primary Habitat	3	2	2	2	2	2	2
% Primary Habitat	100%	100%	90%	70%	75%	80%	65%
% LWD	0%	0%	0%	0%	0%	0%	0%
Stream Width	3.5'	8.5'	8.5'	7.5'	7'	6.2'	5.5'
Type & Embed.	C3	G2	M	M	M	G3	M
Type & Embed.	C3	G2	C3	C3	C3	C3	M
Type & Embed.	C3	G2	C3	B2	C3	B2	M
Type & Embed.	C3	M	C3	C3	C3	C3	M
Type & Embed.	No Entry	M	M	M	M	No Entry	M
Depth ¼	1.8'	0.6'	0.7'	0.5'	0.7'	0.6'	1.7'
Depth ½	1.8'	0.6'	1'	0.9'	0.9'	0.8'	1.5'
Depth ¾	2'	0.5'	1.1'	0.7'	0.7'	0.5'	0.8'
Max. Depth	2'	0.7'	1.1'	0.9'	0.9'	0.8'	1.7'
Riparian Type - L & R Bank	L 4,2(15'/20') / R 2(2'/3')	L 2,6(No Entry) / R 2,6(No Entry)	L 6,4(10'/20') / R 6,4(10'/20')	L 6(6"/2') / R 6(6'/3')	L 6 / R 6	No Entry	L 6,4(5'/15') / R 6(2'/4')
Stream Cover Type %	V 5%	0%	T 5%	B 5% / T 5%	T 5% / V 5%	0%	T 5% / V 5%
Comments	Deep, narrow Run	None	None	None	None	None	None

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	RW		
Stream Name:	S.F Deadman Ck		Time Interval:	3 min.		
Date:	5/22/01		Start time:	13:15		
Reach:	No Entry		Stop time:	14:00		
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6
Barriers	0	0	0	0	1	3
Diversions	0	0	0	0	0	0
Bank condition	2	2	1	2	3	2
Pool Count	1	1	0	0	2	1
Side Channel(s)	No	No	No	No	No	No
Bank Stability	2	1	1	1	3	2
% Eroding Bank	L 50% / R 0%	L 0% / R 0%	L 0% / R 0%	L 0% / R 0%	L 10% / R 100%	0%
Animal Damage	1	1	1	1	1	1
Riparian Width	L 0' / R 40'	L 0' / R 0'	L 4' / R 6'	L 0' / R 0'	L 0' / R 0'	L 0' / R 0'
% Shade	0%	0%	0%	0%	0%	0%
Floodplain connectivity	Yes	No	Yes/Fair	No	No	No
Pool Quality	2	N/A	N/A	N/A	N/A	N/A
Primary Habitat	1	2	3	3	3	3
% Primary Habitat	60%	100%	100%	100%	80%	100%
% LWD	0%	0%	0%	0%	0%	0%
Stream Width	7.5'	6'	3'	3.3'	5'	5'
Type & Embed.	C2	C2	R	R	C2	B2
Type & Embed.	C3	C2	R	R	C2	C2
Type & Embed.	M	C1	R	R	C3	C3
Type & Embed.	M	C1	R	M	C2	R
Type & Embed.	M	C2	R	R	C2	R
Depth ¼	1.6'	0.2'	1.3'	0.8'	0.6'	1.1'
Depth ½	1.7'	0.4'	1.3'	0.8'	0.8'	0.8'
Depth ¾	1.6'	0.6'	1'	0.8'	0.6'	0.8'
Max. Depth	1.7'	0.6'	1.3'	0.8'	0.8'	1.1'
Riparian Type - L & R Bank	L 2,4(10'/40') / R 2,4(< 2')	L 2,1(2'/3') / R 2,1(2'/3')	L 2(2'/3') / R 2(2'/3')	L 2(2.5'/3') / R 2(2.5'/3')	L 1,2(2'/3') / R 1,2(2'/3')	L 1,2(2'/3') / R 1,2(2'/3')
Stream Cover Type %	V 10%	B 10% / T 40%	V 50%	V 10%	T 5% / V 10%	B 10%
Comments	None	None	None	None	Barrier of sage and other debris.	None

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	DK						
Stream Name:	Deadman Ck		Time Interval:	5 min.						
Date:	5/22/01		Start time:	10:11						
Reach:	1st Brg on Lower Deadman Rd to 1 mile below 1st Brg on Lower Deadman Rd		Stop time:	12:30						
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9	Transect # 10
Barriers	0	0	0	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	2	2	3	2	3	3	3	2	2	2
Pool Count	1	0	0	1	0	1	0	0	0	1
Side Channel(s)	Yes	Yes	No	No	Yes	No	Yes	No	Yes	Yes
Bank Stability	L 1 / R 1	L 2 / R 1	L 2 / R 2	L 1 / R 1	L 1 / R 3	L 2 / R 2	L 3 / R 1	L 1 / R 1	L 2 / R 1	L 1 / R 1
% Eroding Bank	L 0% / R 0%	L 40% / R 0%	L 30% / R 30%	L 0% / R 0%	L 5% / R 65%	L 40% / R 40%	L 60% / R 5%	L 5% / R 5%	L 50% / R 10%	L 0% / R 0%
Animal Damage	2	2	2	2	3	3	3	2	2	1
Riparian Width	L 0' / R 5'	L 3' / R 7'	L 3' / R 15'	L 0' / R 12'	L 0 ' / R 0'	L 0' / R 0'	L 0' / R 0'	L 0' / R 0'	L 0' / R 0'	L 2' / R 2'
% Shade	10%	0%	0%	0%	0%	0%	0%	0%	0%	20%
Floodplain connectivity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pool Quality	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Primary Habitat	2	3	3	2	3	3	2	2	6	2
% Primary Habitat	100%	100%	75%	100%	100%	100%	100%	100%	75%	100%
% LWD	0%	0%	5%	2%	0%	0%	0%	0%	0%	0%
Stream Width	7'	11'	3.5'	8.5'	8'	8.5'	16.5'	11'	9.5'	4.5'
Type & Embed.	B3	M	C3	G2	G3	C3	C3	C3	G2	C2
Type & Embed.	B2	M	C3	C3	G3	C3	C3	B3	G2	C2
Type & Embed.	C2	C3	C3	G3	G3	C3	C3	B3	C2	C2
Type & Embed.	C2	M	C3	C3	C3	M	C3	C3	C2	C2
Type & Embed.	No Entry	No Entry	No Entry	No Entry	G3	No Entry	No Entry	No Entry	No Entry	No Entry
Depth ¼	0.7'	1'	1.2'	1'	0.8'	1.2'	0.5'	0.8'	0.5'	0.5'
Depth ½	0.7'	1.2'	1.2'	1.1'	1'	1.1'	0.5'	0.8'	0.5'	0.5'
Depth ¾	0.8'	1.2'	1.2'	0.8'	1'	0.7'	0.8'	0.7'	0.6'	0.9'
Max. Depth	0.8'	1.3'	1.2'	1.1'	1'	1.2'	0.8'	0.9'	0.6'	0.9'
Riparian Type - L & R Bank	L 2,4(1'/3') / R 4,2(5'/9')	L 2,4(3'/5') / R 4,2(5'/9')	L 2,4(2'/3') / R 4,2(7'/10')	L 2(1') / R 4,2(5'/9')	L 2 / R 2	L 2 / R 2	L 2 / R 2	L 2 / R 2	L 2(1'/1') / R 2(1'/1')	L 2(2'/3') / R 2(2'/3')
Stream Cover Type %	R 5% / T 10%	V 5%	U 10% / V 5%	B 5% / V 5%	V 5%	0%	0%	T 1% / V 2%	T 10% / V 5%	T 5% / V 10%
Comments	None	Overhanging grass is only cover.	None	Actively incising, straight w/gradient & no riparian.	None	Heavy cattle traffic	15' Mud bank on left bank.	None	Sidechannel 4.5' wide, Main channel 5' wide.	Crossed fence, no cattle, and lots of grass.

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet		Sampler Name:	DK
Stream Name:	Deadman Ck	Time Interval:	5 min.
Date:	5/22/01	Start time:	10:11
Reach:	1st Brg on Lower Deadman Rd to 1 mile below 1st Brg on Lower Deadman Rd	Stop time:	12:50
	Transect # 11		
Barriers	0		
Diversions	0		
Bank condition	1		
Pool Count	0		
Side Channel(s)	No		
Bank Stability	L 1 / R 1		
% Eroding Bank	L 0% / R 0%		
Animal Damage	1		
Riparian Width	L 2' / R 2'		
% Shade	30%		
Floodplain connectivity	No		
Pool Quality	N/A		
Primary Habitat	3		
% Primary Habitat	100%		
% LWD	0%		
Stream Width	3.5'		
Type & Embed.	C2		
Type & Embed.	C2		
Type & Embed.	C1		
Type & Embed.	C2		
Type & Embed.	No Entry		
Depth ¼	1.1'		
Depth ½	1.2'		
Depth ¾	1.3'		
Max. Depth	1.3'		
Riparian Type - L & R Bank	L 2(2'/3') / R 2(2'/3')		
Stream Cover Type %	T 5% / U 10% / V 25%		
Comments	Tight channel		

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler name	RW					
Stream name	Deadman Ck		Time interval	6 min.					
Date	4/17/01		Start	10:50					
Reach:	River Mile 4.5 to River Mile 2.9		Stop	12:30					
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9
Barriers	0	0	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0	0
Bank condition	3	3	3	3	3	2	3	2	2
Bank angle	3	3	3	3	2	2	2	2	2
% Eroding bank	L 100% / R 0%	L 50% / R 0%	0%	L 0% / R 10%	0%	0%	10%	L&R 10%	L&R 20%
Animal Damage	L&R 1	1	1	1	L&R 2	L&R 2	3	2	2
Riparian Width	L 10' / R 15'	L 0' / R 10'	0'	15'	L 10' / R 5'	0'	0'	0	0
Pool count	0	0	0	1	1	1	3	2	2
Pool quality	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A
Primary habitat	3	3	2	3	1	3	3	3	2
% Primary Habit	100%	100%	2 75% / 5 25%	3%	100%	100%	100%	3 70% / 2 30%	100%
% LWD	0%	0%	0%	30%	20%	0%	0%	0%	0%
Width	7'	6'	5'	6'	10'	4'	4.5'	5'	10'
Type & Embed. (L1)	M	M	C2	G3	M	C3	G3	C3	C3
Type & Embed.	M	R3	C2	G3	M	C3	C3	C3	C3
Type & Embed.	M	R3	C2	C3	M	C3	C3	C3	C3
Type & Embed.	M	R3	C2	C3	M	C3	G3	C3	C3
Type & Embed.	M	M	C2	M	M	C3	M	C3	C3
Depth ¼	1.4'	2.3'	1.2'	1.1'	2.7'	1'	1.5'	1'	0.6'
Depth ½	1.7'	2.1'	1.5'	1.1'	2.7'	1'	1.7'	1'	0.6'
Depth ¾	2'	2'	1.5'	0.8'	2.7'	1'	1.6'	1'	0.5'
Max. Depth	2'	2.3'	1.5'	1.1'	2.7'	1'	1.7'	1'	1'
Riparian type (L & R Bank)	L&R 2,3 (6')	L&R 2	L&R 2	L&R 2,3 (2')	L&R 2,3	L&R 2(6")	L&R 2	L&R 2	L 3 / R 2
Ave. Ht.	6'	3"	6"	No Entry	2'	6"	>1'	>1'	<1'
Max. Ht.	12'	6"	6"	6'	8'	2'	<1'	<1'	4'
% Shade	30%	0%	0%	0%	0%	0%	0%	0%	0%
Cover type %	U 100%	U 100%	T 75%	U 100%	L,W 20% / D 80%	D 100% / T 100%	T 100%	T 100% / V 10%	
B/D Comments	None	None	None	None	None	None	None	None	None
Floodplain connectivity	Yes/Fair	Yes	L Yes / R Dredged	L Yes / R No	Yes	Yes very braided	Yes	Yes	Yes
Sidechannel	No	2	3	1	1	5	3	3	3

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	RW				
Stream Name:	Deadman Ck		Time Interval:	5 min.				
Date:	5/22/01		Start time:	10:07				
Reach:	River Mile 4.5 to River Mile 2.9		Stop time:	No Entry				
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8
Barriers	0	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0
Bank condition	3	3	3	3	2	3	1	3
Pool Count	0	0	1	2	0	0	0	0
Side Channel(s)	Yes 3	Yes 2	Yes 3	Yes	No	Yes	No	No
Bank Stability	2	3	3	L 3 / R 3	2	3	1	3
% Eroding Bank	L&R 10%	L&R 100%	100%	100%	L 50% / R 50%	L 100% / R 100%	0%	L 100% / R 100%
Animal Damage	2	3	3	3	1	2	1	3
Riparian Width	L 0' / R 5'	L 10' / R 0'	L&R 0'	L 20' / R 5'	L&R 20'	L&R 30'	L&R 30'	L 15' / R 30'
% Shade	0%	10%	0%	0%	80%	40%	50%	10%
Floodplain connectivity	Yes	Yes	No	Yes	No	Yes	Yes fair	No
Pool Quality	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A
Primary Habitat	3	3	3	3	3	1	3	3
% Primary Habitat	100%	100%	100%	100%	100%	100%	100%	100%
% LWD	0%	0%	0%	0%	40%	0%	20%	0%
Stream Width	9'	10'	3.5'	4'	4.5'	5'	6'	5'
Type & Embed.	M	M	R	R	R	R	M	R
Type & Embed.	C3	C3	R	R	R	R	M	R
Type & Embed.	C3	C3	R	R	R	R	M	R
Type & Embed.	C3	C3	R	R	R	R	M	R
Type & Embed.	M	M	R	R	R	R	M	M
Depth ¼	0.7'	0.5'	1.2'	1'	0.8'	2.6'	1'	1.9'
Depth ½	0.9'	0.9'	1.4'	1.2'	1'	2.6'	1'	1.4'
Depth ¾	0.7'	0.6'	1.1'	1.3'	0.9'	2.1'	1.4'	1.5'
Max. Depth	1'	0.9'	1.4'	1.3'	1'	2.6'	1.4'	2'
Riparian Type - L & R Bank	L 2(1'/3') / R 2(1'/6')	L&R 2,4 (20'/40')	L&R 2,1(1'/1')	L 2(>1') / R 2,3(1'/6')	L&R 2,3(4'/6')	L&R 2(4'/4')	L 2,3(3'/10') / R 2,3(6'/10')	L&R 2,3(1'/4')
Stream Cover Type %	0%	0%	0%	0%	L 40% / V 60%	U 10% / V 20%	L 20% / U 50%	0%
Comments	None	No noticeable cover.	Split, channel braided.	None	No Grazing	None	None	None

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	JT						
Stream Name:	Deadman Ck		Time Interval:	5 min.						
Date:	5/22/01		Start time:	10:00						
Reach:	River Mile 2.9 to stream ford at farm		Stop time:	11:40						
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9	Transect # 10
Barriers	0	1	0	0	0	0	0	0	0	0
Diversions	0	0	0	0	1	0	0	0	0	0
Bank condition	3	3	3	3	3	3	3	3	3	3
Pool Count	0	0	0	0	0	0	0	0	0	0
Side Channel(s)	No	No	No	No	No	No	No	No	Yes	Yes 4
Bank Stability	3	3	3	3	3	3	3	3	3	3
% Eroding Bank	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Animal Damage	1	1	1	1	1	1	1	1	3	3
Riparian Width	L 20' / R 10'	L 10' / R 20'	L 20' / R 20'	L 10' / R 25'	L&R 15'	L&R 10'	L&R 10'	L&R 10'	L&R 0'	L&R 0'
% Shade	20%	5%	80%	10%	5%	5%	5%	0%	0%	0%
Floodplain connectivity	No	No	No	No	No	No	No	No	Yes	Yes
Pool Quality	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Primary Habitat	3	3	3	3	2	2	2	2	2	3
% Primary Habitat	100%	100%	100%	98%	100%	70%	75%	75%	65%	80%
% LWD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Stream Width	10.5'	17.3'	11'	8'	5'	9.2'	5.4'	16.3'	9'	15'
Type & Embed.	M	M	M	C3	C3	M	C3	C3	M	M
Type & Embed.	M	M	C3	C3	C2	C3	C2	M	M	M
Type & Embed.	M	M	B2	C3	B2	C2	C2	C3	M	M
Type & Embed.	M	M	C3	B3	C3	C2	C2	M	M	M
Type & Embed.	M	M	M	M	No Entry	No Entry	C3	C2	M	M
Depth ¼	1.5'	1'	0.8'	1.5'	1'	0.4'	1'	0.6'	0.5'	1'
Depth ½	2.5'	1'	1'	1.5'	1.3'	0.7'	1.5'	0.7'	1'	0.5'
Depth ¾	2.5'	1.5'	1.4'	1.7'	1.1'	1.2'	1.3'	0.5'	1.5'	2.5'
Max. Depth	3'	1.5'	1.4'	1.7'	1.3'	1.2'	1.5'	1'	1.5'	2.5'
Riparian Type - L & R Bank	L 2,4(3'/15') / R 2,4(3'/20')	L 2,3(5'/7') / R 4,2(15'/30')	L 4,2(15'/30') / R 4,2(15'/30')	L 2(3'/5') / R 4,2(10'/18')	L 2(4'/5') / R 2(4'/5')	L 2(3'/5') / R 2(3'/5')	L 2(3'/4') / R 2(3'/4')	L 2(2'/4') / R 2(2'/4')	L&R 6 Grazed Pasture	L&R 6 Grazed Pasture
Stream Cover Type %	0%	0%	B 5%	V 5%	B 5% / T 75%	B 5% / T 40%	T 60% / U 5% / V 5%	B 5% / T 40% / U 10%	T 20% / V 5%	V 20%
Comments	At least 3' of mud.	Beaver dam 90% rebuilt, may not be passable	None	None	None	None	None	None	None	None

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	JT, MG					
Stream Name:	N.F. Meadow Ck		Time Interval:	5 min.					
Date:	5/3/01		Start time:	9:32					
Reach:	1.8 miles above mouth to mouth		Stop time:	10:35					
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9
Barriers	Yes	Yes	Yes	5	2	Yes	Yes	Yes	Yes
Diversions	0	0	0	0	0	0	0	0	0
Bank condition	2	3	2	2	2	3	3	2	2
Bank angle	2	2	2	3	2	3	3	2	2
% Eroding bank	60%	55%	0%	80%	50%	95%	70%	0%	20%
Animal Damage	2	2	2	1	1	1	1	1	1
Riparian Width	0'	0'	0'	L 10' / R 5'	L 15' / R 15'	L 10' / R 5'	0'	0'	L 5' / R 5'
Pool count	0	1	1	0	1	0'	0	1	0
Pool quality	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Primary habitat	2	2	2	3	2	3	2	3	3
% Primary Habit	90%	75%	80%	70%	60%	100%	70%	85%	90%
% LWD	0%	0%	0%	10%	5%	0%	0%	0%	0%
Width	5'	5.5'	10'	4.5'	4.5'	2.5'	9'	7'	10'
Type & Embed. (L1)	M	M	M	M	M	M	M	M	M
Type & Embed.	M	C3	Concrete 1	M	C2	M	M	M	M
Type & Embed.	M	C2	Concrete 2	M	C2	M	M	G2	M
Type & Embed.	M	M	M	M	M	M	M	M	M
Type & Embed.	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	M
Depth ¼	0.2'	0.4'	0.2'	0.2'	0.5'	0.5'	0.2'	0.2'	0.2'
Depth ½	0.5'	0.6'	0.5'	0.5'	0.3'	0.5'	0.1'	0.4'	0.4'
Depth ¾	0.2'	0.5'	0.3'	0.2'	0.2'	0.5'	0.5'	0.1'	0.5'
Max. Depth	0.5'	0.6'	0.5'	0.5'	0.5'	0.5'	0.5'	0.4'	0.5'
Riparian type (L & R Bank)	6 Grazed Past.	6 Grazed Past.	6 Grazed Past.	L 1,2,4 / R 1,3	L 1,4 / R 1,2,4	L 1,3 / R 1	6 Grazed Past.	L&R 1	L 1,3 / R 1,2,4
Ave. Ht.	0.2	0.2	0.2	L 5' / R 3'	L&R 10'	L&R 1.5'	0.2	0.2	L 3' / R 10'
Max. Ht.	0.5	0.5	1 meter	L 30' / R 5'	L 30' / R 20'	L 5' / R 2'	1.5	1'	L 5' / R 15'
% Shade	0%	0%	0%	60%	90%	75%	50%	40%	90%
Cover type %	V 5% / T 70%	T 50% / V 5%	T 60% / V 5%	L 10% / V 40%	L 5% / T 40%	V 90%	V 90%	V 60%	V 90%
B/D Comments	Weeds choking stream ~50%	Weeds choking stream ~30%, plus 1 Rock Falls Barrier	Weeds choking stream~ 20%	Weeds choking stream	Weeds choking stream	Weeds choking stream ~ 70%	Weeds choking stream ~ 90%	Weeds choking stream ~ 95%	Weeds choking stream ~ 95%
Floodplain connectivity	R Yes / L No	No	No Entry	No	Yes/R.B. only	No	No	Yes	Yes
Sidechannel	No	No	No Entry	No	No	No	No	No	No

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	JT, MG						
Stream Name:	Meadow Ck		Time Interval:	5 min.						
Date:	5/3/01		Start time:	10:45						
Reach:	No Entry		Stop time:	11:37						
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9	Transect #10
Barriers	0	0	3	0	0	0	1	Yes	Yes	Yes
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	3	3	3	3	3	3	3	3	3	2
Bank angle	3	3	3	3	3	2	3	3	2	2
% Eroding bank	100%	85%	80%	65%	50%	15%	75%	70%	35%	20%
Animal Damage	3	3	1	2	1	1	1	1	1	1
Riparian Width	0'	0'	L 5' / R 15'	0'	0	0'	1'	L 10' / R 5'	L&R 10'	L 20' / R 30'
Pool count	1	2	4	1	1	3	0	2	1	2
Pool quality	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	1
Primary habitat	3	3	1	3	2	3	3	2	2	1
% Primary Habit	95%	95%	90%	60%	60%	100%	60%	50%	70%	80%
% LWD	0%	0%	5%	0%	0%	0%	0%	10%	0%	15%
Width	20'	8'	12'	8'	17'	18'	11'	8'	12'	16'
Type & Embed. (L1)	M	M	M	R	C2	C3	M	M	M	M
Type & Embed.	B3	M	M	R	R	C#	M	C2	C2	M
Type & Embed.	M	M	M	S	R	M	C2	M	C2	M
Type & Embed.	M	M	M	C2	R	M	C2	M	M	M
Type & Embed.	M	M	M	No Entry	M	M	M	M	M	No Entry
Depth ¼	0.2'	0.6'	3'	0.6'	0.5'	1'	0.6'	0.4'	0.3'	1.5'
Depth ½	0.5'	0.5'	1.5'	0.9'	0.5'	1.5'	0.7'	0.8'	0.6'	2'
Depth ¾	0.1'	0.2'	1'	0.5'	0.5'	1'	0.4'	0.5'	0.4'	1.1'
Max. Depth	0.5'	0.6'	3.5'	0.9'	0.5'	1.5'	0.7'	0.9'	0.6'	2.5'
Riparian type (L & R Bank)	6	6	L 1,4 / R 1,2,4	R. Bank 6	L&R 1	L&R 1	L 1,3 / R 1	L&R 1,3	L&R 1,3	L&R 1,4
Ave. Ht.	N/A	N/A	L 10' / R 15'	6"	2"	6"	L 1' / R 3"	L&R 2'	2'	L 5' / R 10'
Max. Ht.	N/A	N/A	L 40' / R 30'	1'	1'	1.5'	L 3' / R 1'	L&R 4'	5'	L 15' / R 25'
% Shade	0%	0%	80%	10%	20%	0%	5%	20%	10%	60%
Cover type %	V 5%	V 5%	L 5% / U 10%	T 20%	T 30% / V 5%	V 15%	V 5%	T 60% / V 30%	T 70% / V 20%	L 10% / V 30%
B/D Comments	None	None	3 bedrock falls ~2' tall no launch pool.	None	None	None	Weeds choking stream, steep cobble gradient below.	Weeds choking creek.	Weeds choking creek.	Weeds choking stream.
Floodplain connectivity	No	No	No	No	No	No	No	No	No	No
Sidechannel	No	No	No	No	No	No	No	No	No	No

Appendix F. Table 1 Continued. Habitat data sheets from Couse Ck, Tenmile Ck, George Ck, Coombs Ck, Steptoe Ck, Wawawai Ck, Almota Ck, Little Almota Ck, N.F. Deadman Ck, S.F. Deadman Ck, Deadman Ck, N.F. Meadow Ck, and Meadow Ck, 2001.

Limiting Factors Worksheet			Sampler Name:	MG, JT						
Stream Name:	Meadow Ck		Time Interval:	5 min.						
Date:	5/3/01		Start time:	12:20						
Reach:	No Entry		Stop time:	13:20						
	Transect #1	Transect #2	Transect #3	Transect #4	Transect #5	Transect #6	Transect #7	Transect #8	Transect #9	Transect #10
Barriers	Yes	Yes	Yes	Yes	0	Yes	Yes	2	0	0
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	3	2	2	2	2	2	3	2	2	2
Bank angle	3	2	2	3	2	2	2	2	2	1
% Eroding bank	35%	60%	45%	60%	40%	60%	75%	20%	80%	20%
Animal Damage	1	1	1	1	1	2	3	2	3	2
Riparian Width	L 5' / R 0'	L 10' / R 5'	10'	5'	10'	L 5' / R 1'	L 0' / R 2'	0'	0'	L 5' / R 0'
Pool count	4	2	1	2	1	1	1	1	0	0
Pool quality	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Primary habitat	2	3	3	3	3	3	3	3	2	2
% Primary Habit	70%	60%	70%	75%	80%	60%	78%	90%	80%	75%
% LWD	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Width	10'	10'	7.5'	11.3'	5.4'	13'	15'	6'	11'	4'
Type & Embed. (L1)	M	M	M	M	M	M	M	M	C2	G3
Type & Embed.	M	M	M	G3	M	M	M	M	B2	G2
Type & Embed.	M	M	M	C2	M	M	B3	C3	C1	C1
Type & Embed.	M	M	M	C3	M	M	C2	M	C3	C2
Type & Embed.	M	M	M	M	M	M	M	M	M	M
Depth ¼	0.3'	0.8'	0.2'	0.4'	0.7'	0.4'	0.3'	0.5'	0.3'	0.3'
Depth ½	0.6'	1.2'	0.5'	0.8'	0.8'	0.7'	0.5'	0.8'	0.5'	0.6'
Depth ¾	0.2'	0.6'	0.4'	0.6'	1.2'	0.6'	0.8'	0.5'	0.5'	0.4'
Max. Depth	0.7'	1.3'	0.5'	0.85'	1.3'	0.7'	0.8'	0.8'	0.7'	0.6'
Riparian type (L & R Bank)	L 1,3 / R 1	L&R 1,3	L&R 1,3	L 1,3 / R 1	L&R 1,3	L&R 1,3	L 1,6 / R 1,3,6	L&R 1,6	L&R 6	L 1,3,6 / R 1,6
Ave. Ht.	L 3' / R 2"	L&R 3'	L&R 4'	L 3' / R 6"	4'	L 3' / R 1'	L 2" / R 6"	L&R 6"	No Entry	L 2' / R 6"
Max. Ht.	L 5' / R 7"	L&R 5'	L&R 6'	L 5' / R 1.2'	7'	L 4' / R 2'	L 6" / R 1'	L&R 1'	No Entry	L 3' / R 1'
% Shade	30%	30%	60%	10%	75%	5%	0%	0%	0%	0%
Cover type %	V 30%	V 20%	V 15%	V 15%	0%	V 15%	B 5% / V 10%	V 10%	B 5% / T 30%	V 5% / T 15%
B/D Comments	Weeds choking stream ~ 30%.	Weeds choking stream ~ 60%	Weeds choking stream ~ 45%	Weeds + bedrock falls ~3.5' tall, no launch pool.	None	Weeds choking stream ~ 40%	Weeds choking stream ~ 50%	Weeds choking stream	None	None
Floodplain connectivity	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Sidechannel	No	No	No	No	No	No	No	No	No	No

Appendix F. Table 2. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name:	JT, ET		
Stream Name:	Steptoe Ck		Time Interval:	4 min		
Date:	4/23/02		Start time:	10:35		
Reach:	Forks to River Mile 1.1		Stop time:	12:27		
	Transect # 1	Transect#2	Transect # 3	Transect # 4	Transect # 5	Transect # 6
Barriers	1	0	0	0	0	0
Diversions	0	0	0	0	0	0
Bank condition	2	3	3	3	3	3
Pool count	1	0	0	2	1	2
Sidechannel	2	1	1	0	0	0
Bank Stability	L 2 / R 1	L&R 1	L 1 / R 3	L 3 / R 1	L 2 / R 1	L&R 3
% Eroding bank	L 15% / R 0%	L 0% / R 10%	L 0% / R 100%	L 100% / R 5%	L 5% / R 0%	L&R 100%
Animal Damage	2	3	1	1	2	3
Riparian Width	L 5' / R 15'	L 15' / R 5'	L 25' / R 0'	L 35' / R 15'	L 15' / R 100'	0'
% Shade	5%	95%	95%	95%	85%	0%
Floodplain connectivity	L&R Yes	L Yes / R No	L Yes / R No	L&R No	L No / R Yes	L&R No
Pool quality	N/A	N/A	N/A	3	N/A	N/A
Primary habitat	3	2	2	1	3	2
% Primary Habit	70%	85%	90%	70%	95%	95%
% LWD	0%	0%	5%	0%	0%	0%
Width	6'	10'	5.5'	5.5'	8.5'	5.5'
Type & Embed. (L1)	B1	G3	G1	G1	M3	M3
Type & Embed.	B1	G3	G1	C1	G1	C1
Type & Embed.	G1	B3	C1	G1	G2	C1
Type & Embed.	C1	C1	C1	G1	C2	G1
Type & Embed.	G3	C2	G1	C3	M	S2
Depth ¼	0.5'	0.25'	0.4'	0.6'	0.75'	0.3'
Depth ½	0.9'	0.3'	0.45'	0.9'	0.6'	0.3'
Depth ¾	0.5'	0.5'	0.4'	0.8'	0.5'	0.2'
Max. Depth	1'	0.6'	0.45'	0.9'	0.75'	0.3'
Riparian type (L & R Bank)	L 6 / R 4,6	L 4,6 / R 6	L 4,6 / R 0	L 3,6 / R 4	L 4,6 / R 4,3	L&R 6
Ave. Ht.	L .5' / R 15'	L 15' / R .5'	L 35' / R 0'	L 6' / R 30'	L 30' / R 35'	N/A
Max. Ht.	L .5' / R 25'	L 35' / R .5'	L 40' / R 0'	L 10' / R 35'	L 35' / R 50'	N/A
Cover type %	B 30% / V 5%	B 5% / V 15%	B,L,T 5%	B,T 10% / U 15%	V 5%	None
B/D Comments	Multiple channels with main channel plugged with boulders and downed trees from flood, may be passable at high flows	None	None	None	None	None

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name:	CF, MG		
Stream Name:	Steptoe Ck		Time Interval:	5min		
Date:	4/23/02		Start time:	10:24		
Reach:	River Mile 1.1 to 0.2 miles above mouth		Stop time:	11:57		
	Transect # 1	Transect # 2	Transect # 3	Transect # 4	Transect # 5	Transect # 6
Barriers	0	1	0	1	1	0
Diversions	0	0	0	0	0	0
Bank condition	3	3	2	3	3	3
Pool count	3	4	1	1	2	3
Sidechannel	0	2	2	1	1	1
Bank Stability	L 2 / R 3	L 2 / R 3	L 3 / R 2	L 1 / R 3	L&R 3	L&R 3
% Eroding bank	L 15% / R 50%	L 50% / R 100%	L 50% / R 10%	L 0% / R 50%	L 50% / R 25%	L&R 95%
Animal Damage	1	3	3	2	2	2
Riparian Width	L 150' / R 15'	L&R 1'	0'	L 3' / R 4'	L 15' / R 5'	L 20' / R 5'
% Shade	30%	0%	0%	0%	75%	75%
Floodplain connectivity	L Yes / R No	L Yes / R No	Yes	No	No	No
Pool quality	N/A	N/A	N/A	N/A	1	N/A
Primary habitat	2	2	2	2	1	1
% Primary Habit	95%	100%	95%	65%	65%	75%
% LWD	0%	0%	0%	0%	0%	0%
Width	8'	5'	7'	8'	4'	6'
Type & Embed. (L1)	G1	G1	G1	G1	G2	G3
Type & Embed.	C2	G2	G1	G1	G2	G3
Type & Embed.	C1	G2	G1	C1	G2	B3
Type & Embed.	G1	C3	G1	C1	G2	C3
Type & Embed.	G1	C3	G1	C1	G2	C3
Depth ¼	0.3'	0.3'	0.1'	0.4'	0.5'	0.4'
Depth ½	0.3'	0.4'	0.2'	0.5'	1'	0.5'
Depth ¾	0.2'	0.5'	0.5'	0.1'	1'	0.5'
Max. Depth	0.8'	0.5'	0.5'	0.5'	1.1'	0.6'
Riparian type (L & R Bank)	L&R 2	L&R 2	None	L cliff / R 2	L&R 2	L 3 / R 2
Ave. Ht.	12"	2"	0'	3"	5'	7'
Max. Ht.	2'	4"	0'	5"	6'	15'
Cover type %	T,V 45% / B 10%	B 5% / T 95%	T 95% / V 5%	T 65% / V 35%	T 70% / V 30%	T 75% / B 15% / V 10%
B/D Comments	None	Culvert, no launch point	No riparian	Partial,4-6' drop no launch pool	Split channel very low flow	

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name: JT, ET
Stream Name:	Wawawai Ck		Time Interval: 4 min
Date:	4/23/02		Start time: 13:20
Reach:	0.3 miles above 1st culvert to 1st culvert		Stop time: 14:10
	Transect # 1	Transect # 2	Transect # 3
Barriers	0	0	0
Diversions	0	0	0
Bank condition	2	3	3
Pool count	0	0	2
Sidechannel	0	0	0
Bank Stability	L 3 / R 2	L&R 3	L 2 / R 1
% Eroding bank	L 100% / R 50%	L&R 100%	L 30% / R 0%
Animal Damage	2	2	2
Riparian Width	L 100' / R 40'	L 100' / R 60'	L 100' / R 30'
% Shade	75%	60%	80%
Floodplain connectivity	L No / R Yes	No	Yes
Pool quality	N/A	N/A	N/A
Primary habitat	2	2	4
% Primary Habit	85%	65%	65%
% LWD	15%	10%	0%
Width	9'	6'	5'
Type & Embed. (L1)	C2	C3	M
Type & Embed.	C1	C2	C1
Type & Embed.	B1	M	B1
Type & Embed.	G1	M	C1
Type & Embed.	M	C3	B2
Depth ¼	0.6'	0.6'	0.3'
Depth ½	0.3'	0.5'	0.6'
Depth ¾	0.2'	0.3'	0.5'
Max. Depth	0.6'	0.6'	0.6'
Riparian type (L & R Bank)	L&R 4,3	L&R 4,3	L&R 4,3
Ave. Ht.	L 30' / R 20'	L 45' / R 35'	L&R 40'
Max. Ht.	L 50' / R 40'	L 50' / R 60'	L 70' / R 60'
Cover type %	L 15% / B 5%	L 10% / B 5%	B 5%
B/D Comments	None	None	None

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name: MG, CF
Stream Name:	Wawawai Ck		Time Interval: 5 min
Date:	4/23/02		Start time: 13:25
Reach:	1st culvert to mouth		Stop time: 13:43
	Transect # 1	Transect # 2	Transect # 3
Barriers	0	0	0
Diversions	0	0	0
Bank condition	1	1	1
Pool count	0	1	1
Sidechannel	0	0	1
Bank Stability	1	1	1
% Eroding bank	L&R 10%	L&R 10%	L&R 10%
Animal Damage	0	0	0
Riparian Width	L 40' / R 100'	L 30' / R 100'	L 50% / R 100%
% Shade	80%	75%	95%
Floodplain connectivity	Yes	L No / R Yes	L Yes / R No
Pool quality	N/A	N/A	N/A
Primary habitat	3	3	3
% Primary Habit	60%	75%	80%
% LWD	10%	0%	0%
Width	5'	8'	10'
Type & Embed. (L1)	C3	B3	M
Type & Embed.	C3	B3	M
Type & Embed.	C3	B3	M
Type & Embed.	C3	B3	G3
Type & Embed.	M	B3	G3
Depth ¼	0.1'	0.4'	0.7'
Depth ½	0.4'	0.8'	0.3'
Depth ¾	0.6'	0.6'	0.2'
Max. Depth	0.6'	0.8'	0.8'
Riparian type (L & R Bank)	L 2,4 / R 3	L 3 / R 3	L 2 / R 3
Ave. Ht.	10'	15'	3'
Max. Ht.	50'	20'	6'
Cover type %	T 70% / V,L,U 10%	B 50% / V 30% / P,T 10%	V 100%
B/D Comments	None	None	None

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name:	RW, GM					
Stream Name:	Almota Ck		Time Interval:	6 min					
Date:	5/8/02		Start time:	12:15					
Reach:	Forks to Haeder Gulch		Stop time:	No Entry					
	Transect # 1	Transect #2	Transect # 3	Transect # 4	Transect # 5	Transect # 6	Transect # 7	Transect # 8	Transect # 9
Barriers	0	0	0	0	0	0	0	0	1
Diversions	0	0	0	0	0	0	0	0	0
Bank condition	3	3	3	2	1	2	L 3 / R 2	1	1
Pool count	4	4	4	3	1	3	4	4	3
Sidechannel	0	1	1	2	0	1	0	1	1
Bank Stability	3	L 1 / R 3	1	1	1	2	3	1	L 1 / R 3
% Eroding bank	100%	L 0% / R 100%	0%	0%	>10%	R 20%	L 100% / R 30%	0%	R 100%
Animal Damage	0	0	0	1%	0	0	10%	0	0
Riparian Width	L 5' / R 10'	L&R 100'	L&R 100'	L 20' / R 50'	L 50' / R 30'	L 0' / R 20'	L 50' / R 20'	L&R 30'	L 5' / R 15'
% Shade	0%	25%	75%	50%	75%	0%	50%	40%	50%
Floodplain connectivity	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Pool quality	N/A	N/A	N/A	N/A	N/A	3	N/A	N/A	N/A
Primary habitat	2	2	2	2	2	2	2	2	2
% Primary Habit	100%	85%	100%	60%	100%	70%	100%	100%	100%
% LWD	0%	0%	0%	0%	2%	0%	0%	0%	0%
Width	2m	1m	1.1m	1.8m	2.1m	2.3m	2.3m	3.6m	1.5m
Type & Embed. (L1)	G3	G3	G3	G1	G1	C3	C2	C1	C3
Type & Embed.	G3	G3	G3	G2	G2	C3	C3	C1	C3
Type & Embed.	G3	G3	G1	G3	B3	C3	C3	M3	C2
Type & Embed.	G3	C3	M	G1	G2	C2	C3	C2	G2
Type & Embed.	G3	C3	M	G1	G2	C2	C3	C2	G2
Depth ¼	0.2'	0.4'	0.4'	0.4'	0.7'	0.3'	0.4'	0.4'	0.5'
Depth ½	0.4'	0.5'	0.5'	0.5'	0.4'	0.5'	0.5'	0.3'	0.6'
Depth ¾	0.5'	0.5'	0.5'	0.5'	0.3'	0.6'	0.3'	0.3'	0.5'
Max. Depth	0.6'	0.5'	0.5'	0.5'	0.7'	0.6'	0.5'	0.4'	0.6'
Riparian type (L & R Bank)	L&R 2,3	L&R 3,2	L&R 3,2	L 4 / R 3	L&R 3,4	L&R 3,2	L&R 3,2	L 3 / R 2	L&R 3
Ave. Ht.	12'	20'	20'	20'	20'	4'	10'	15'	8'
Max. Ht.	25'	50'	50'	50'	75'-100'	16'	40'	25'	15'
Cover type %	B >5%	V,B	V,B	V,B	T,B	B,V	B	B	B
B/D Comments	Narrow deeply incised heavy sediment open canopy	None	None	Best spawn habitat so far	Possible redd in transect steeper channel gradient	Pool .7m deep, no cover	10m above cross fence	Wide and shallow stream bed w/ steep narrow walls	Cascade, partial barrier 4' high

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name:	MG, ET, JT		
Stream Name:	Almota Ck		Time Interval:	10 min		
Date:	5/8/02		Start time:	13:42		
Reach:	Haeder gulch to barn at end of lower farm Rd		Stop time:	14:33		
	Transect # 1	Transect # 2	Transect # 3	Transect # 4	Transect # 5	Transect # 6
Barriers	0	0	0	0	0	0
Diversions	0	0	0	0	0	0
Bank condition	2	2	2	3	3	3
Pool count	2	2	3	5	3	1
Sidechannel	1	3	1	1	1	1
Bank Stability	L&R 1	L&R 2	L&R 2	L&R 2	L 3 / R 1	L&R 3
% Eroding bank	L&R 10%	L&R 50%	L 35% / R 30%	L 40% / R 50%	L 90% / R 0%	L 15% / R 100%
Animal Damage	1	2	3	3	3	3
Riparian Width	L 30' / R 0'	L 60' / R 5'	L 50' / R 5'	L 30' / R 0'	0'	L 10' / R 0'
% Shade	0%	5%	5%	60%	5%	5%
Floodplain connectivity	L No / R Yes	No	No	L No / R Yes	No	L No / R Yes
Pool quality	N/A	N/A	N/A	N/A	N/A	N/A
Primary habitat	3	3	2	2	3	2
% Primary Habit	90%	60%	100%	95%	75%	90%
% LWD	0%	5%	0%	0%	0%	0%
Width	13'	7'	10.5'	11'	8.5'	13.7'
Type & Embed. (L1)	G2	C3	M	C3	G3	C3
Type & Embed.	G2	C3	G3	C2	C2	C3
Type & Embed.	G2	C3	C2	C2	G2	G2
Type & Embed.	C2	C3	C2	C2	C2	C3
Type & Embed.	C2	C3	B2	C3	R3	M
Depth ¼	0.6'	1.3'	0.4'	0.5'	0.4'	0.2'
Depth ½	0.5'	1.4'	0.6'	0.5'	0.7'	0.4'
Depth ¾	0.4'	0.7'	0.5'	0.4'	0.7'	0.7'
Max. Depth	0.6'	1.5'	0.6'	0.5'	0.75'	0.7'
Riparian type (L & R Bank)	L 3,2 / R 1,2	L 3 / R 2	L 3,4 / R 3,6	L 3,6 / R 6	L 6 / R BR	L 3,6 / R 6
Ave. Ht.	L 8' / R 1'	L 15' / R 1'	L 10' / R 5'	L 6' / R 1'	L 1' / R 0'	L 6' / R 1'
Max. Ht.	L 10' / R 18"	L 30' / R 18"	L 25' / R 7'	L 10' / R 1'	L 1' / R 0'	L 10'
Cover type %	V 10%	L 5% / T 70% / V 25%	V 5%	V 5%	B,V 5%	V 10%
B/D Comments	None	None	None	None	BR-Bedrock	None

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name:	CF				
Stream Name:	Penawawa Ck		Time Interval:	6 min				
Date:	4/29/02		Start time:	11:10				
Reach:	Fork down to end of pavement		Stop time:	12:50				
	Transect # 1	Transect # 2	Transect # 3	Transect # 4	Transect # 5	Transect # 6	Transect # 7	Transect # 8
Barriers	0	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0
Bank condition	2	2	2	2	2	3	3	3
Pool count	6	3	7	10	7	9	3	1
Sidechannel	2	2	1	3	1	0	0	0
Bank Stability	2	2	3	L 3 / R 2	L 3 / R 2	3	3	3
% Eroding bank	30%	20%	50%	40%	50%	50%	100%	75%
Animal Damage	1	1	2	3	3	3	3	3
Riparian Width	L 10' / R 20'	L 100' / R 200'	L 5' / R 20'	L 0' / R 100'	L 20' / R 5'	20'	L 10' / R 0'	L 10' / R 20'
% Shade	50%	0%	20%	80%	0%	0%	0%	0%
Floodplain connectivity	No	Yes	Yes	L No / R Yes	L No / R Yes	No	No	No
Pool quality	2	2	2	3	3	3	3	3
Primary habitat	3	3	1	2	2	3	2	2
% Primary Habit	100%	100%	50%	100%	100%	100%	100%	100%
% LWD	0%	0%	0%	0%	0%	0%	0%	0%
Width	9'	8'	8'	8'	8'	7'	10'	6'
Type & Embed. (L1)	C2	C3	G2	C2	C2	B3	C3	C2
Type & Embed.	C2	C3	C2	C2	C2	B3	C3	C2
Type & Embed.	C2	M3	G2	C2	C2	B3	C3	C2
Type & Embed.	C2	M3	G2	C2	C2	M3	C3	C2
Type & Embed.	C2	M3	G2	C2	C2	M3	C3	C2
Depth ¼	0.9'	1.5'	0.6'	0.5'	0.8'	0.8'	0.6'	0.6'
Depth ½	0.6'	1.8'	0.9'	0.7'	0.6'	1.1'	0.8'	0.8'
Depth ¾	0.6'	1.2'	1'	0.7'	0.9'	1.2'	0.5'	0.6'
Max. Depth	0.9'	2'	1.2'	0.7'	1'	1.6'	0.8'	0.8'
Riparian type (L & R Bank)	L 2 / R 4	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2
Ave. Ht.	5'	10"	8"	6"	1'	6"	4"	6"
Max. Ht.	35'	2'	2'	8"	3'	8"	6"	8"
Cover type %	T 100%	T 100%	U,T 50%	T 100%	T 100%	T 100%	T 100%	T 100%
B/D Comments	Heavy silt	None	None	None	None	None	None	None

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name:	JT, ET						
Stream Name:	Penawawa Ck		Time Interval:	6 min						
Date:	4/29/02		Start time:	10:45						
Reach:	End of pavement to River Mile 2.3		Stop time:	13:00						
	Transect # 1a	Transect #1b (sidechannel in transect 1)	Transect # 2	Transect # 3	Transect # 4	Transect #5	Transect # 6	Transect # 7	Transect # 8	Transect #9
Barriers	0	0	0	0	0	0	4	2	5	0
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	3		2	3	2	2	2	3	3	2
Pool count	2		2	2	1	0	3	6	5	2
Sidechannel	1		1	0	0	0	0	0	0	0
Bank Stability	3		L 3 / R 1	L 2 / R 3	L 1 / R 3	L 3 / R 2	L 1 / R 3	L 2 / R 3	L 2 / R 1	L&R 2
% Eroding bank	L&R 100%	L&R 100%	L 100% / R 0%	L&R 10%	L 5% / R 90%	L 100% / R 30%	L 5% / R 100%	L 50% / R 100%	L 50% / R 10%	L 20% / R 10%
Animal Damage	1	1	2	1	2	1	1	2	1	3
Riparian Width	Grass	Grass	Grass	L 0' / R 30'	Grass	Grass	L 30' / R Grass	L 0' / R 10'	L 50' / R 20'	L&R 15'
% Shade	5%	5%	5%	5%	5%	5%	50%	10%	40%	10%
Floodplain connectivity	No	No	L No / R Yes	L Yes / R No	No	L No / R Yes	L Yes / R No	L Yes / R No	L No / R Yes	No
Pool quality	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	N/A
Primary habitat	3	3	2	2	2	2	2	1	3	3
% Primary Habit	85%	75%	90%	75%	85%	85%	85%	100%	100%	90%
% LWD	0%	5%	0%	10%	0%	0%	0%	15%	0%	0%
Width	6.5'	6.5'	8'	8'	7'	8'	11'	15'	8'	7.5'
Type & Embed. (L1)	M	C3	G3	C3	R2	C2	M	M	M	M
Type & Embed.	G1	B2	G3	C2	R2	C2	B3	M	G3	C3
Type & Embed.	C2	B2	C2	C2	R1	C2	C1	M	C3	B3
Type & Embed.	G2	C3	C1	C1	B2	C2	C3	M	R3	C3
Type & Embed.	G3	G3	M	C1	C3	C2	C3	M	M	C3
Depth ¼	0.6'	0.6'	1'	1.1'	1'	0.7'	0.7'	TO DEEP	1.5'	0.8'
Depth ½	0.8'	0.6'	0.7'	0.8'	1'	0.6'	1'	TO DEEP	1.4'	1'
Depth ¾	0.6'	0.6'	0.2'	0.3'	1.4'	0.5'	0.7'	TO DEEP	1.2'	1.3'
Max. Depth	0.8'	0.6'	1'	1.1'	1.4'	0.7'	1'	TO DEEP	1.5'	1.3'
Riparian type (L & R Bank)	Grass	Grass	Grass	R 2,4	Grass	Grass	L 2,4 / R Grass	L Grass / R 2,3	L 4,3 / R 4,2	L&R 4,2
Ave. Ht.	1'	1'	1'	R 12'	1'	1'	L 12 / R Grass	L 0' / R 4'	20'	L 15' / R 25'
Max. Ht.	1'	1'	1'	R 60'	1'	1'	45'	6'	L 20' / R 40'	L 25' / R 45'
Cover type %	V 10%	V 10% / L 5%	V 5%	L 10% / V 5%	0%	V 10% / B 5%	V,T 10%	L 15% / V 5%	V 5%	V 5%
B/D Comments	Side channel	Side channel	None	Beaver dam	None	None	4 beaver dams 5' ht. no jump pool pictures and GPS points of first two dams	2 beaver dams that look impassable, 5' tall no jump pool	5 beaver dams	None

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name:	JT, ET
Stream Name:	Penawawa Ck		Time Interval:	6 min
Date:	4/29/02		Start time:	10:54
Reach:	End of Pavement to River Mile 2.3		Stop time:	14:20
	Transect# 10	Transect # 11		
Barriers	0	0		
Diversions	0	0		
Bank condition	2	2		
Pool count	9	8		
Sidechannel	1	2		
Bank Stability	1	2		
% Eroding bank	L&R 10%	L&R 10%		
Animal Damage	1	2		
Riparian Width	L&R 10'	L 5' / R 20'		
% Shade	75%	10%		
Floodplain connectivity	No	No		
Pool quality	2	3		
Primary habitat	2	2		
% Primary Habit	100%	100%		
% LWD	0%	0%		
Width	14'	7'		
Type & Embed. (L1)	B1	B1		
Type & Embed.	B1	B1		
Type & Embed.	B1	B1		
Type & Embed.	B1	B1		
Type & Embed.	B1	B1		
Depth ¼	0.9'	0.7'		
Depth ½	0.8'	0.8'		
Depth ¾	0.8'	1'		
Max. Depth	0.9'	1.2'		
Riparian type (L & R Bank)	L&R 2	L 2,4 / R 2		
Ave. Ht.	1'	L 60' / R 1'		
Max. Ht.	2'	80'		
Cover type %	T 100%	T 100%		
B/D Comments	None	None		

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name:	MG, RW						
Stream Name:	Penawawa Ck		Time Interval:	8 min						
Date:	4/29/02		Start time:	10:45						
Reach:	River Mile 2.3 to mouth		Stop time:	13:35						
	Transect # 1	Transect # 2	Transect # 3	Transect # 4	Transect # 5	Transect # 6	Transect # 7	Transect # 8	Transect # 9	Transect # 10
Barriers	0	0	0	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	3	3	3	3	2	2	2	2	1	1
Pool count	0	0	3	3	2	2	2	1	4	2
Sidechannel	0	0	1	4	3	2	2	3	5	5
Bank Stability	3	3	2	3	2	L 1 / R 2	1	1	L 1 / R 3	2
% Eroding bank	L 50% / R 70%	L 70% / R 50%	L&R 10%	L 75% / R 95%	L 30% / R 40%	L 5% / R 60%	L 10% / R 25%	L 10% / R 20%	L 15% / R 80%	L&R 50%
Animal Damage	1	L 1 / R 2	1	0	0	L 0 / R 2	1	0	0	0
Riparian Width	L&R 100'	L&R 100'	L&R 100'	L&R 20'	L 20' / R 10'	0'	L 30' / R 0'	L 40' / R 60'	L 100' / R 50'	L 45' / R 30'
% Shade	0%	40%	10%	10%	70%	0%	5%	40%	10%	0%
Floodplain connectivity	No	No	No	No	No	No	No	L No / R Yes	No	No
Pool quality	N/A	N/A	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A
Primary habitat	3	3	3	1	3	3	3	3	2	2
% Primary Habit	100%	80%	80%	55%	55%	85%	95%	90%	85%	95%
% LWD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Width	6'	10'	6'	5.5'	5.5	10'	20'	8'	11.5'	12'
Type & Embed. (L1)	M	M	G2	M	C2	M	G3	C3	C3	G3
Type & Embed.	M	M	G2	M	C2	C2	G2	C2	C3	G2
Type & Embed.	M	M	G2	M	G2	C2	M	C3	G3	C3
Type & Embed.	M	M	G2	M	G2	C3	M	C2	G2	C2
Type & Embed.	M	M	G3	M	G2	C3	M	C2	G2	C2
Depth ¼	1.6'	1.5'	0.7'	1.5'	1'	2'	1'	1.3'	0.8'	0.8'
Depth ½	1.5'	0.7'	0.6'	1.8'	1'	1.1'	0.9'	1'	0.8'	0.6'
Depth ¾	1.1'	0.8'	0.6'	1.7'	0.8'	0.7'	0.2'	1'	0.4'	0.6'
Max. Depth	1.9'	1.5'	1'	1.8'	1'	2'	1'	1.5'	1'	0.9'
Riparian type (L & R Bank)	L&R 2	L 1,4 / R 1	L 1,2 / R 1,2	L&R 2	L 4 / R 2	None	L 4 / R 2	L 2,4 / R 1,2	L 2 / R 4	L 2/4 / R 2
Ave. Ht.	1'	L 25' / R 1'	0.5'	0.75'	L 25' / R 2'	0	L 30' / R 0.5'	L 20' / R 2'	L 1' / R 20'	No Entry
Max. Ht.	2'	L 50' / R 1.5'	1'	1.25'	30'	0	L 40' / 0.75'	L 25' / R 1.5'	L 2' / R 30'	No Entry
Cover type %	D 100%	D 80% / V,U 10%	T 60% / V 40%	T 60% / V 40%	T 65% / V 35%	D	V 85%	T 75% / V 25%	T 65% / B 30% / V 5%	T 90% / V 10%
B/D Comments	None	None	None	None	None	None	None	None	None	None

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name:	JT		
Stream Name:	Alkali Flat Ck		Time Interval:	15 min		
Date:	4/30/02		Start time:	10:53		
Reach:	Hay down		Stop time:	13:25		
	Transect # 1	Transect# 2	Transect # 3	Transect # 4	Transect # 5	Transect # 6
Barriers	0	0	0	0	0	3
Diversions	0	0	0	0	0	0
Bank condition	3	3	3	3	3	2
Pool count	0	2	0	2	2	2
Sidechannel	0	0	0	1	1	4
Bank Stability	L 3 / R 2	L&R 3	L 3 / R 2	L&R 3	L 1 / R 2	L 1 / R 3
% Eroding bank	L 80% / R 20%	L&R 100%	L 95% / R 50%	L 100% / R 95%	L 10% / R 5%	L 10% / R 90%
Animal Damage	1	1	1	1	1	1
Riparian Width	GRASS	GRASS	GRASS	GRASS	GRASS	GRASS
% Shade	10%	5%	5%	15%	40%	90%
Floodplain connectivity	L No / R Yes	L&R No	No	No	Yes	L Yes / R No
Pool quality	N/A	N/A	N/A	N/A	N/A	N/A
Primary habitat	3	3	3	3	3	channel plugged with grass
% Primary Habit	85%	90%	100%	95%	90%	0%
% LWD	0%	0%	0%	0%	0%	0%
Width	4.5'	9'	7.5'	5.5'	3.5'	15'
Type & Embed. (L1)	M	M	M	M	M	GRASS
Type & Embed.	M	M	M	B3	M	GRASS
Type & Embed.	G3	M	M	C3	C3	GRASS
Type & Embed.	G3	M	M	C3	C3	GRASS
Type & Embed.	M	M	M	M	M	GRASS
Depth ¼	0.5'	0.75'	0.6'	0.7'	1.1'	0.7'
Depth ½	0.8'	1'	1.1'	1.3'	1.3'	0.5'
Depth ¾	0.6'	0.8'	0.7'	0.8'	1'	0.9'
Max. Depth	0.8'	1.2'	1.2'	1.3'	1.4'	1.2'
Riparian type (L & R Bank)	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2
Ave. Ht.	1'	1'	1'	1'	1'	1'
Max. Ht.	1.5'	1.5'	1.5'	1.5'	1.5'	1.5'
Cover type %	V 20%	V 20%	V 10%	0%	0%	0%
B/D Comments	None	None	None	None	None	channel plugged with grass

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name:	MG, RW	
Stream Name:	Alkali Flat Ck		Time Interval:	15 min	
Date:	4/30/02		Start time:	11:35	
Reach:	Rock Spring Gulch up		Stop time:	13:25	
	Transect # 1	Transect # 2	Transect # 3	Transect # 4	Transect # 5
Barriers	0	Falls	0	0	0
Diversions	0	0	0	0	0
Bank condition	1	1	1	2	2
Pool count	7	8	6	6	8
Sidechannel	0	1	3	3	5
Bank Stability	L&R 1	L 3 / R 1	L&R 1	L&R 1	L&R 3
% Eroding bank	L&R 5%	L 85% / R 5%	L&R 10%	L&R 20%	L&R 80%
Animal Damage	0	0	0	0	0
Riparian Width	L 90' / R 20'	L 5' / R 100'	L 60' / R 30'	L 50' / R 60'	L 30' / R 40'
% Shade	95%	10%	5%	0%	0%
Floodplain connectivity	L Yes / R No	L No / R Yes	No	Yes	No
Pool quality	N/A	N/A	N/A	N/A	3
Primary habitat	3	2	3	3	1
% Primary Habit	95%	85%	80%	100%	100%
% LWD	0%	0%	0%	0%	0%
Width	2'	4.5'	12.5'	12'	18'
Type & Embed. (L1)	M	C3	C3	C3	C3
Type & Embed.	B3	C3	B3	C3	C3
Type & Embed.	B3	C3	C2	G3	M
Type & Embed.	B3	C3	C2	C3	M
Type & Embed.	C3	C3	C2	C3	M
Depth ¼	1.3'	0.7'	0.6'	0.7'	1.5'
Depth ½	1.1'	0.7'	0.6'	1'	1.5'
Depth ¾	1.3'	0.6'	0.6'	0.8'	1.3'
Max. Depth	1.3'	0.7'	0.7'	1'	1.5'
Riparian type (L & R Bank)	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2
Ave. Ht.	1.5'	1.5'	1.5'	1.5'	1.5'
Max. Ht.	2'	2'	2'	2'	3'
Cover type %	V 95% / T 5%	V 75% / T 25%	T,V 40% / B 20%	V 60%	V 10%
B/D Comments	SNAKES	None	None	None	None

Appendix F. Table 2 Continued. Habitat data sheets from Steptoe Ck, Wawawai Ck, Almota Ck, Penawawa Ck, and Alkali Flat Ck, 2002.

Limiting Factors Worksheet			Sampler Name:	CF, ET						
Stream Name:	Alkali Flat Ck		Time Interval:	15 MIN						
Date:	4/30/02		Start time:	11:30						
Reach:	Rock Spring Gulch to 0.9 miles above mouth		Stop time:	14:20						
	Transect # 1	Transect # 2	Transect # 3	Transect # 4	Transect # 5	Transect # 6	Transect # 7	Transect # 8	Transect # 9	Transect # 10
Barriers	0	0	0	0	0	0	0	0	0	0
Diversions	0	0	0	0	0	0	0	0	0	0
Bank condition	3	3	3	2	2	2	2	2	3	3
Pool count	7	6	9	4	4	3	1	4	3	3
Sidechannel	2	1	0	2	2	0	0	0	1	0
Bank Stability	3	3	3	2	2	1	1	2	2	2
% Eroding bank	L&R 50%	L&R 50%	L 100% / R 20%	L&R 10%	L&R 20%	L&R 5%	L&R 5%	L&R 5%	L 20% / R 50%	L&R 20%
Animal Damage	2	2	1	2	2	0	0	0	3	3
Riparian Width	L&R 75'	L&R 10'	L 0' / R 100'	L 80' / R 50'	L 12' / R 60'	L&R 20'	L 20' / R 30'	L 50' / R 30'	L 50' / R 5'	L 30' / R 50'
% Shade	0%	0%	10%	0%	25%	0%	0%	0%	0%	0%
Floodplain connectivity	Yes	L No / R Yes	L No / R Yes	Yes	Yes	L Yes / R No	Yes	Yes	L Yes / R No	Yes
Pool quality	3	N/A	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A
Primary habitat	3	2	3	3	2	3	3	3	3	3
% Primary Habit	100%	100%	100%	85%	100%	90%	100%	100%	100%	100%
% LWD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Width	10'	7'	12'	9'	7'	12'	10'	12'	6'	7'
Type & Embed. (L1)	M3	C2	B3	B3	C2	B2	B3	M3	M3	B3
Type & Embed.	M3	C2	B3	B3	C2	B2	M3	M3	M3	C3
Type & Embed.	M3	C2	B3	S3	C2	B2	M3	M3	C3	C3
Type & Embed.	M3	C2	B3	M3	C2	B2	M3	M3	C3	M3
Type & Embed.	M3	C2	B3	B3	C2	B2	M3	M3	M3	M3
Depth ¼	0.9'	0.7'	0.6'	0.8'	0.6'	0.5'	1'	1'	0.7'	0.7'
Depth ½	1'	0.7'	0.8'	0.6'	0.8'	0.8'	1.3'	1.3'	1'	1.3'
Depth ¾	0.7'	0.8'	1.3'	1.1'	0.8'	0.6'	1.1'	1.3'	0.6'	0.7'
Max. Depth	1'	0.8'	1.3'	1.2'	0.9'	0.9'	1.3'	1.3'	1.1'	1.5'
Riparian type (L & R Bank)	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2	L&R 2
Ave. Ht.	2'	0.75'	1'	1'	2'	1'	1'	1'	1'	1'
Max. Ht.	3'	1'	1'	1'	3'	1'	1'	1'	1'	1'
Cover type %	B	T 95% / V 5%	B 80% / V 20%	B 80% / V 20%	V,T 50%	B 80% / T,V 10%	V 10%	V 20%	T 80% / V 20%	V,T 50%
B/D Comments	None	None	None	None	None	None	None	None	3rd pool 250yrd long	Severe animal damage cattle water hole between transects