Assessment of Salmonids and Their Habitat Conditions in the Walla Walla River Basin withinWashington

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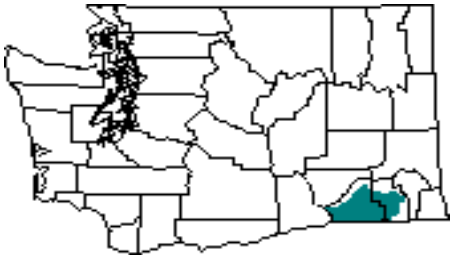
Assessment of Salmonids and Their Habitat Conditions in the Walla Walla River Basin within Washington:

2002 Annual Report

(Covers from March 1, 2002 to March 1, 2003)



By

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We appreciate the assistance from the Washington Department of Fish and Wildlife (WDFW) Snake River Lab (SRL). They shared equipment and provided us with electrofishing data from the Touchet River, North Fork Touchet, South Fork Touchet, Robinson Fork, and Wolf Fork. The Snake River Lab also collected DNA samples from the Touchet River adult trap. Other Fish Management personnel also provided valuable assistance: Chris Fulton, Rey Weldert, Mark Tuttle, Edward "Ty" Tyynismaa, Kristin Lyonnais, and Jeff McCowen assisted with data collection as well as data entry and data summarization.

Bill Neve and John Covert (DOE) provided valuable assistance both establishing and operating the constant recording stream flow monitors. Jim Shaklee was in charge of DNA analyses. We thank them all.

Joe Bumgarner (WDFW, SRL), Craig Contor and Michael Lambert, Confederated Tribes of the Umatilla Indian Reservation (CTUIR) reviewed this draft and provided comments for revisions. We appreciate their assistance in preparation of this report.

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Executive Summary

This study began in 1998 to assess salmonid distribution, relative abundance, genetics, and the condition of salmonid habitats in the Walla Walla River basin.

Stream flows in the Walla Walla Basin continue to show a general trend that begins with a sharp decline in discharge in late June, followed by low summer flows and then an increase in discharge in fall and winter. Manual stream flow measurements at Pepper bridge showed an increase in 2002 of 110-185% from July-September, over flows from 2001. This increase is apparently associated with a 2000 settlement agreement between the U.S. Fish and Wildlife Service (USFWS) and the irrigation districts to leave minimum flows in the river.

Stream temperatures in the Walla Walla basin were similar to those in 2001. Upper montane tributaries maintained maximum summer temperatures below 65 F, while sites in mid and lower Touchet and Walla Walla rivers frequently had daily maximum temperatures well above 68 F (high enough to inhibit migration in adult and juvenile salmonids, and to sharply reduce survival of their embryos and fry). These high temperatures are possibly the most critical physiological barrier to salmonids in the Walla Walla basin, but other factors (available water, turbidity or sediment deposition, cover, lack of pools, etc.) also play a part in salmonid survival, migration, and breeding success. The increased flows in the Walla Walla, due to the 2000 settlement agreement, have not shown consistent improvements to stream temperatures.

Rainbow/steelhead (*Oncorhynchus mykiss*) trout represent the most common salmonid in the basin. Densities of Rainbow/steelhead in the Walla Walla River from the Washington/Oregon stateline to Mojonnier Rd. dropped slightly from 2001, but are still considerably higher than before the 2000 settlement agreement. Other salmonids including; bull trout (*Salvelinus confluentus*), chinook salmon (*Oncorhynchus tshawytscha*), mountain whitefish (*Prosopium williamsoni*), and brown trout (*Salmo trutta*) had low densities, and limited distribution throughout the basin. A large return of adult spring chinook to the Touchet River drainage in 2001 produced higher densities of juvenile chinook in 2002 than have been seen in recent years, especially in the Wolf Fork. The adult return in 2002 was substantially less than what was seen in 2001.

Due to poor water conditions and trouble getting personnel hired, spawning surveys were limited in 2002. Surveyors found only one redd in four Walla Walla River tributaries (Cottonwood Ck., East Little Walla Walla, West Little Walla Walla, and Mill Ck.), and 59 redds in Touchet River tributaries (10 in the North Fork Touchet, 30 in the South Fork Touchet, and 19 in the Wolf Fork. Bull trout spawning surveys in the upper Touchet River tributaries found a total of 125 redds and 150 live fish (92 redds and 75 fish in the Wolf Fork, 2 redds and 1 fish in the Burnt Fork, 0 redds and 1 fish in the South Fork Touchet, 29 redds and 71 fish in the North Fork Touchet, and 2 redds and 2 fish in Lewis Ck.).

A preliminary steelhead genetics analysis was completed as part of this project. Results indicate differences between naturally produced steelhead and those produced in the hatchery. There were also apparent genetic differences among the naturally produced fish from different areas of the basin. Detailed results are reported in Bumgarner et al. 2003.

Recommendations for assessment activities in 2003 included:

1) continue to monitor the Walla Walla River (focusing from the stateline to McDonald Rd.), the Mill Ck system, and the Little Walla Walla System.
2) reevaluate Whiskey Ck. for abundance and distribution of salmonids, and Lewis Ck. for bull trout density and distribution.
3) select or develop a habitat survey protocol and begin to conduct habitat inventory and assessment surveys.
4) summarize bull trout data for Mill Ck, South Fork Touchet, and Lewis Ck.
5) begin to evaluate temperature and flow data to assess if the habitat conditions exist for spring chinook in the Touchet River.

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 1998 bull trout (*Salvelinus confluentus*) were listed under the Endangered Species Act (ESA) as "Threatened" for the Walla Walla River and its tributaries. Steelhead (*Oncorhynchus mykiss*) were listed as "Threatened" in 1999 for the mid–Columbia River and its tributaries. These ESA listings emphasize the need for information about these 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 in December 1997 to the Bonneville Power Administration (BPA) to assess salmonid distribution, relative abundance, genetics, and the condition of salmonid habitats in the Walla Walla River basin.

The primary purposes of this project are to collect baseline biological and habitat data, to identify major data gaps, and to draw conclusions whenever possible. The study reported herein details the findings of the 2002 field season (March to November, 2002). All WDFW reports for this project are available on the BPA website at: www.efw.bpa.gov/cgi-bin/ws.exe/websql.dir/FW/PUBLICATIONS/QueryPublications.pl and type in Mendel for the authors last name.

Background

The Walla Walla River and its major tributaries, including the Touchet River, comprise a watershed of 1,758 square miles (ACOE 1997) and 2,454 major stream miles (Knutson et al. 1992). The majority of the watershed (73%) lies within the State of Washington, with the remainder in Oregon (Figure 1). The Walla Walla River originates from a fine network of deeply incised streams on the western slopes of the Blue Mountains. The Touchet River originates from similar streams on the northwestern slopes of the Blue Mountains, and also from seasonal streams draining Palouse hillsides to the north. The Walla Walla River drains into the Columbia River near Wallula Gap, about 21 miles above McNary Dam and 6 miles above the Oregon border. The Touchet River drains into the Walla Walla River just west of the town of Touchet, WA.

Historic and contemporary land–use practices have had a profound impact on the salmonid species abundance and distribution in the watershed. Fish habitat in area streams has been severely degraded by urban and agricultural development, grazing, tilling, logging, recreational activities, and flood control. Agricultural diversions have severely impacted stream flows in the Walla Walla River since the 1880s (Nielson 1950). Nearly all (99%) of the surface water diversions within Washington are for the purpose of irrigation (Pacific Groundwater Group

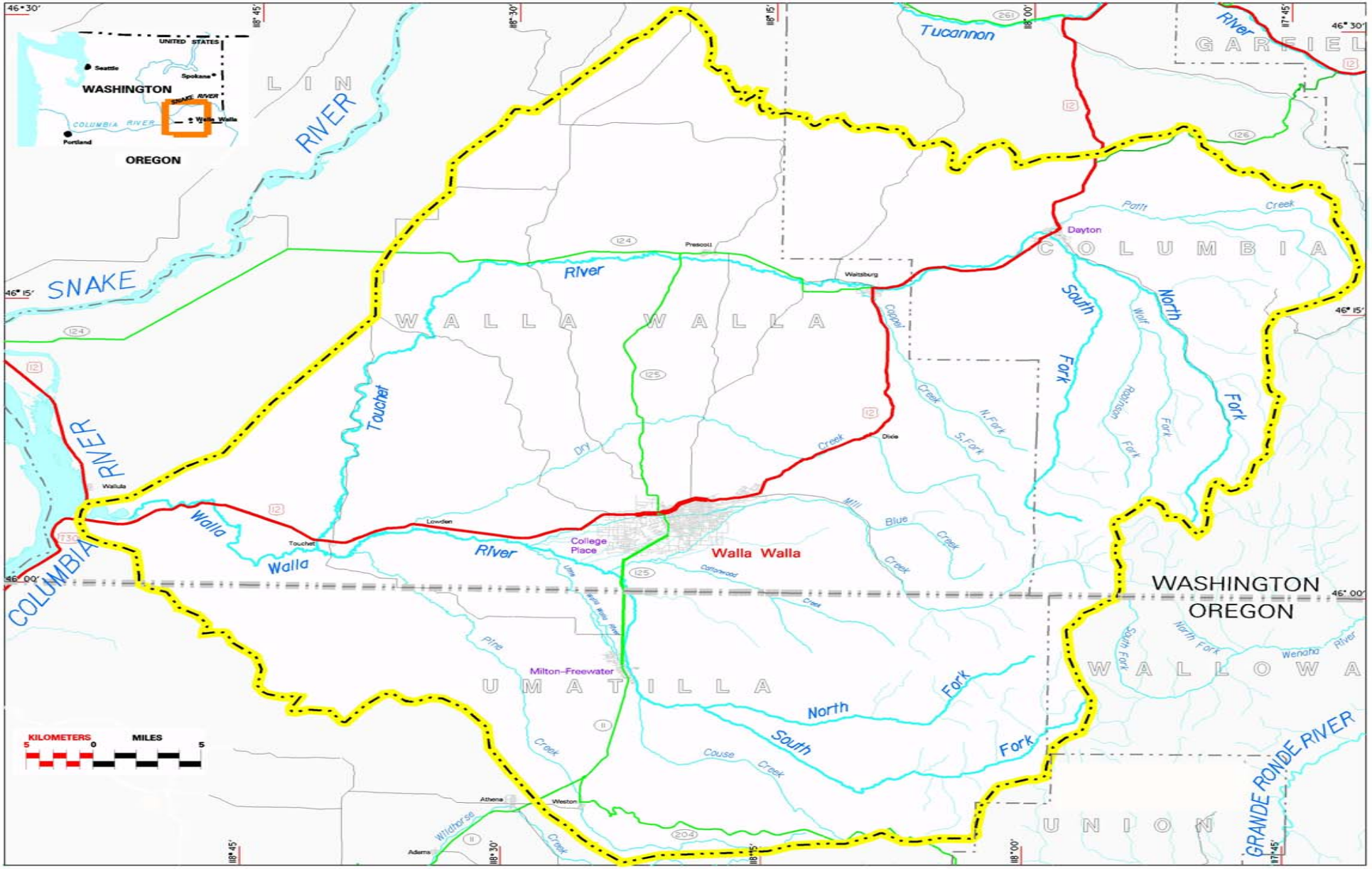

Figure 1. Walla Walla watershed (modified from map courtesy of USACE, Walla Walla District).

1995). The reduced stream flows created by irrigation withdrawals adversely impact salmonid survival within the basin. Additionally, many unscreened or partly screened diversions and fish passage barriers exist within the basin.

Out-of-basin manmade impacts to local fish populations have also been substantial. Salmon migrating to or from the ocean must pass through four dams and reservoirs in the Columbia River before reaching their destination. Juvenile and adult salmonid mortalities occur as they pass through each reservoir or dam. Other impacts include over-harvest, habitat destruction in the lower Columbia River and estuaries, predation, and industrial pollution. In addition, natural environmental fluctuations (drought, floods, and ocean productivity) have impacted the local fish populations.

Historically the basin probably produced substantial runs of both spring chinook (*Oncorhynchus tshawytscha*) and summer steelhead. The last substantial run of wild chinook took place in 1925; thereafter chinook populations continued a precipitous decline, and the species is considered extirpated in the basin (Nielson 1950, ACOE 1997). Anecdotal accounts and reports of historic fisheries in adjacent basins, indicate that chum (*Oncorhynchus keta*) and coho (*Oncorhynchus kisutch*) could have occurred in substantial numbers in the Walla Walla Basin (Pirtle 1957), but little written documentation exists. Endemic steelhead persist throughout much of the basin, but the population is considered depressed (WDF and WDW 1993). Historically as many as 300,000, and presently as many as 225,000, non-endemic hatchery steelhead (Lyons Ferry stock) have been released annually in the middle Touchet and lower Walla Walla rivers under the Lower Snake River Compensation Program (LSRCP) to provide harvest mitigation for the four lower Snake River dams.

Not all native salmonids in the basin are anadromous. Mountain whitefish (*Prosopium williamsoni*), bull trout and rainbow/redband trout (*Onchorhynchus mykiss*) exist within the basin. However, only rainbow/redband trout retain a wide distribution. In the past, bull trout are thought to have been widely distributed in the basin. Currently, bull trout distribution is generally limited to montane upper tributaries of the Touchet River, Walla Walla River, and Mill Creek (Mongillo 1993). However, bull trout are known to migrate into the middle or lower reaches of these rivers during the winter months. Many factors have led to the decline of bull trout in southeast Washington. Damaged riparian vegetation, increased sedimentation, and decreased water flows have resulted in elevated water temperatures beyond the tolerance of this cold water species (Mongillo 1993). Introduced rainbow trout and brown trout (*Salmo trutta*) may have increased competition or predation for bull trout.

Several non-native fish species have been introduced to support recreational fishing, or they have strayed into the basin. The Washington Department of Game (now WDFW) began stocking brown trout in the Touchet River in July, 1965. Stocking of brown trout was discontinued in 1999 due to concerns about competition, hybridization, and predation with native bull trout, steelhead, or rainbow/redband trout. Common carp (*Cyprinus carpio*) were introduced as early as 1884 (Walla Walla Daily Journal 1884). Channel catfish (*Ictalurus punctatus*), smallmouth bass (*Micropterus dolomieu*), and bluegill (*Lepomis macrochirus*) are some of the warm water fish that now occur in the lower basin. Additionally, in 1999, three-spine stickleback

(*Gasterosteus aculeatus*) were found in the Walla Walla River by WDFW personnel involved with this project.

Study Purpose and Objectives

The purpose of this study is to assess steelhead and bull trout distribution, densities, habitat, and genetic composition in the Walla Walla watershed. In addition we wanted to document fish passage, rearing, and spawning conditions for steelhead and to examine environmental factors for potential reintroduction of chinook salmon.

Specific objectives and tasks were outlined in WDFW's proposal and statement of work to the Bonneville Power Administration (BPA Project # 199802000). Some tasks had to be scaled back or postponed. Multi–year study objectives include:

1. Assess baseline habitat conditions for salmonids in the Washington portion of the Walla Walla watershed;
2. Determine salmonid distribution and relative abundance in the Washington portion of the Walla Walla watershed; and
3. Identify genetic stocks of steelhead and bull trout in the Walla Walla watershed.

Specific objectives and tasks were outlined in the statement of work. Tasks included:

- Establish constant recording temperature and flow data loggers in the Walla Walla River basin, to identify available water, as well as temperature limitations for salmonid passage, spawning and rearing;
- Conduct biweekly manual stream flow and temperature measurements to calibrate the instream monitor data outputs, and to provide data for reaches that did not have instream discharge monitors in place;
- Monitor water quality by sampling dissolved oxygen, pH, turbidity, and conductivity (This task has been deferred);
- Conduct electrofishing to determine salmonid distribution, and abundance;
- Conduct snorkel surveys during the spring and summer to supplement electrofishing data and for seasonal density comparisons;
- Conduct general habitat surveys in portions of the stream with potential for salmonid use to quantify habitat conditions and identify limiting factors (This task has been deferred);
- Conduct steelhead and bull trout spawning surveys to determine spawning timing and distribution, and to establish an index of relative abundance; and
- Collect tissue samples from bull trout and steelhead for genetic analyses.

Methods

Study Area

The study area encompasses the greater Walla Walla River basin in Washington State (Figure 1). The Walla Walla River, the Touchet River, and Mill Creek are the major rivers within the basin.

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 and contacted in person or by telephone. For convenience, public land was utilized whenever possible. Study sites were distributed to comprehensively cover the study area (Appendix A), and 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. River miles were determined by measuring the distance between the confluence of each stream and 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.

Snorkeling sites were designed to extend and compliment the area surveyed by electrofishing. Sites were located using the same randomization process used for establishing electrofishing sites.

Habitat Assessment

Stream Flows

Stream discharge was measured using two methods. Manual flow measurements were taken 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 Quattro Pro© spreadsheets. The second method involved the use of continuous flow data loggers (Unidata America, Model KB/DSP 128K). The monitors were placed at two sites on the Walla Walla River, one site on Yellowhawk Creek, one site on East Little Walla Walla, one site on lower Mill Creek, and one site on the lower Touchet River (Appendix A, Figure 2). WDFW contracted with the Washington Department of Ecology (WDOE) to maintain the monitors and collect the data. Manual flow measurements were taken approximately every two weeks by WDFW near each of the flow monitors to correlate the discharge and stage readings recorded by the monitors. An index site was a location where discharge measurements were taken approximately every two weeks, compared to periodic flow sites where flow measurements were taken occasionally (Appendix A, Figure 2).

Stream Temperatures

We used three 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 Walla Walla River basin (Appendix A, Figure 3). WDFW maintained the temperature monitors and downloaded the data using an Optic Stowaway Shuttle®. Temperature data was 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 C). The third method involved the use of continuous flow and temperature data loggers (Unidata America, Model KB/DSP 128K). The monitors collect both stream discharge (water stage (based on pressure)) and temperature data every 15 seconds and stores the data every four hours as averages for discharge and minimum, maximum, and mean temperatures. The monitors were used to collect temperatures as a substitute for the stowaway temperature loggers at their respective sites (Appendix A, Figure 3). The accuracy of field thermometers and data loggers was evaluated using a laboratory calibrated thermometer (Kessler Instruments).

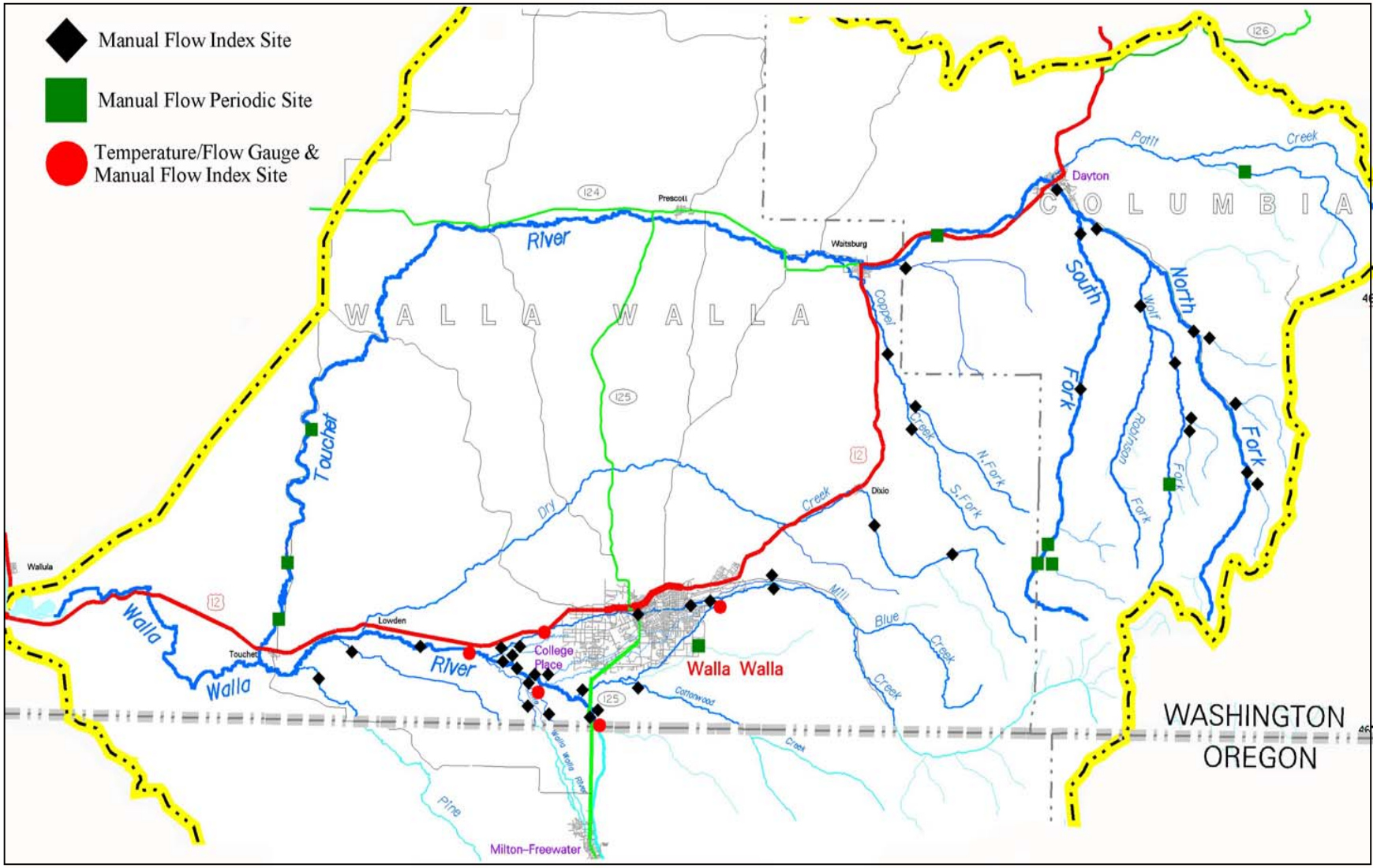

Figure 2. Relative locations of WDFW flow monitoring sites in the Walla Walla basin, 2002.

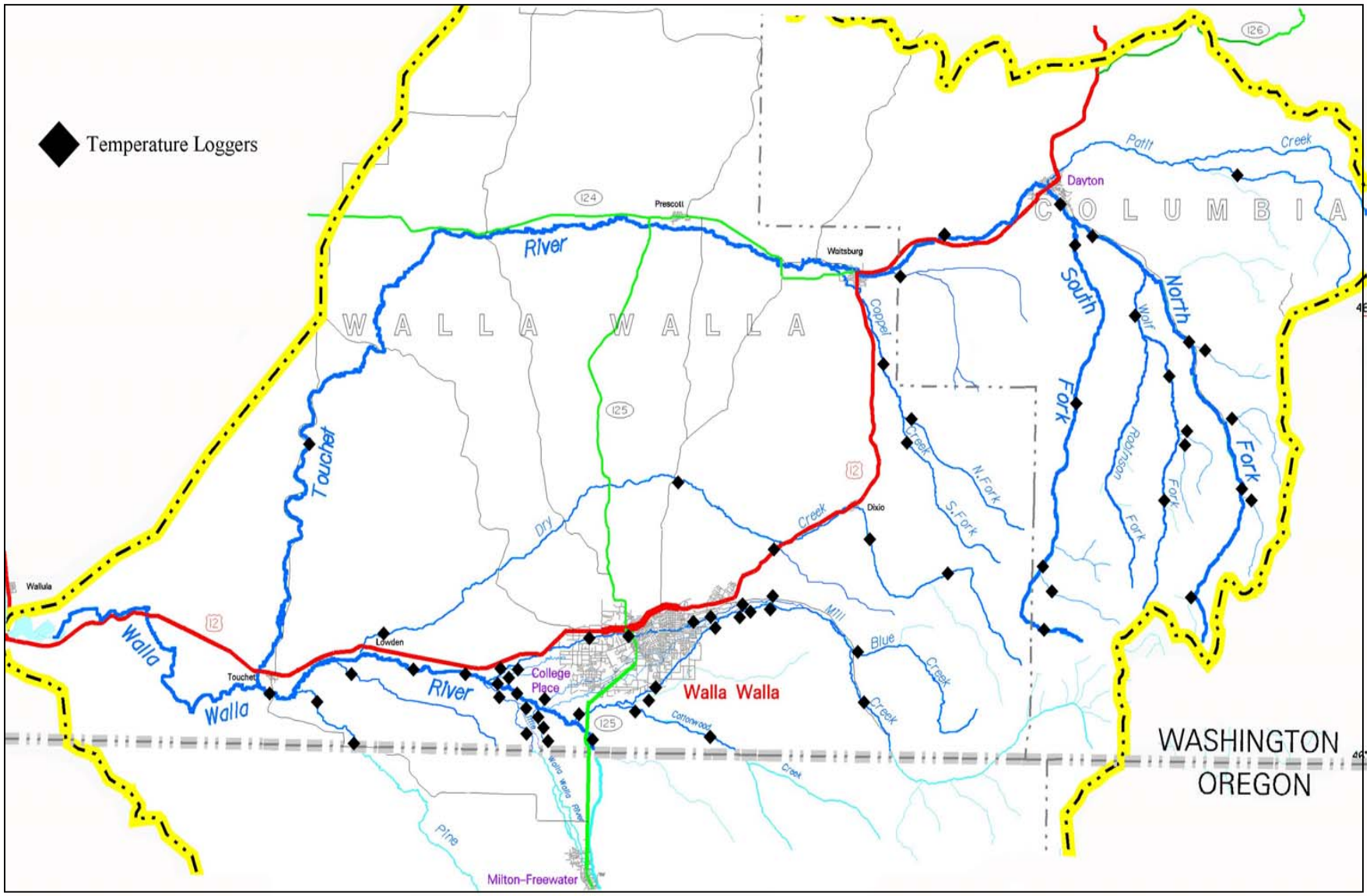

Figure 3. Relative locations of WDFW temperature logger sites in the Walla Walla basin, 2002.

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 to coordinate habitat rehabilitation efforts. The activity of two major irrigation diversion structures, Hofer Dam on the Touchet River, and Burlingame Diversion on the Walla Walla River, were also noted throughout the season.

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 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.

Fish Stock Assessment

Distribution and Abundance

Electrofishing

A Smith-Root Model 11A or 12B electrofishing backpack unit was used to collect fish so we could calculate densities at various study sites in the Walla Walla basin (Figures 4 and 5). We used pulsed DC (direct current) between 300 and 600 volts. Sites were delimited by block nets spanning the channel, usually placed approximately 30 to 50 meters apart. Block nets prevented fish from entering or leaving the site, so that 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 water clarity. 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 placed in buckets until they could be sampled for lengths and weights. 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). These age class delineations were checked against ages determined from reading fish scales that were collected from several of the stream reaches in the past. Age class groupings were specific for each stream or stream reach.

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

Area sampled was determined by multiplying site length by the average of four or more site width measurements. A brief description of the riparian, bank stability, substrate, pools/riffle ratio, and the presence of large organic debris (LOD) was recorded for each site (not done at SRL sites in the Touchet River).

Fish identification 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 (not done at SRL sites in the Touchet River). Non–salmonid species were assigned a relative abundance ranking value based on general observations made during electrofishing (Table 1).

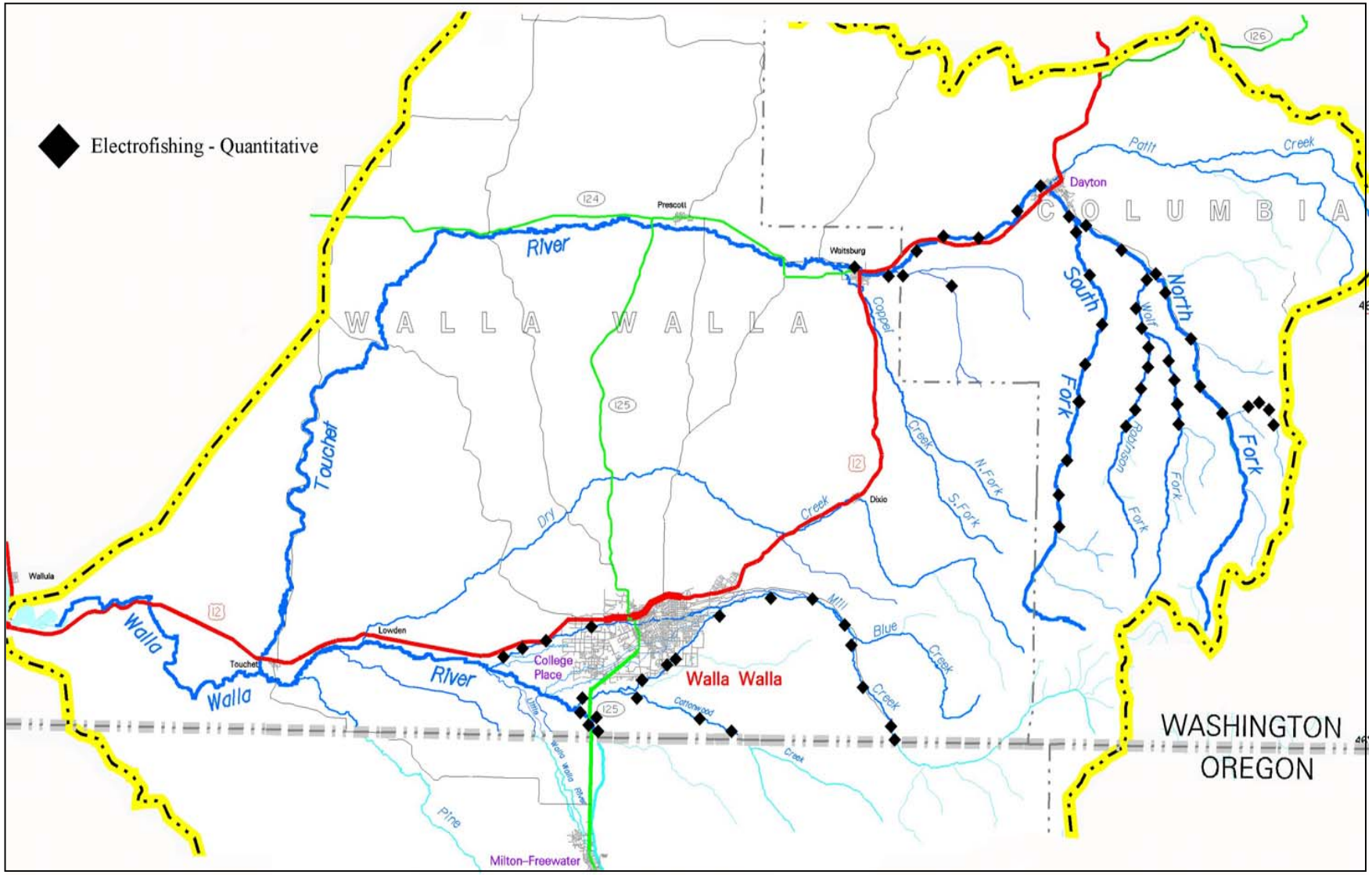

Figure 4. Relative locations of WDFW quantitative electrofishing sites in the Walla Walla basin, 2002.

Relative abundance for non–salmonid species were treated semi–quantitatively. For each species at each site, a relative abundance was determined. The relative abundance was assigned a corresponding ranking value (Table 1). Ranked values were averaged to determine a relative abundance for each species per designated reach. 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**

We also conducted "qualitative" electrofishing surveys in several sites in the study area (Appendix D, Figure 5). These surveys enabled us to cover large areas relatively quickly as they did not entail the use of block nets or repeat passes. We electrofished while moving upstream and capturing fish to determine species presence, size of fish (age class), and their relative abundance. We also noted the presence or general abundance of non–salmonids. This method supplemented our intensive "quantitative" electrofishing surveys to provide a more complete view of fish distribution and abundance.

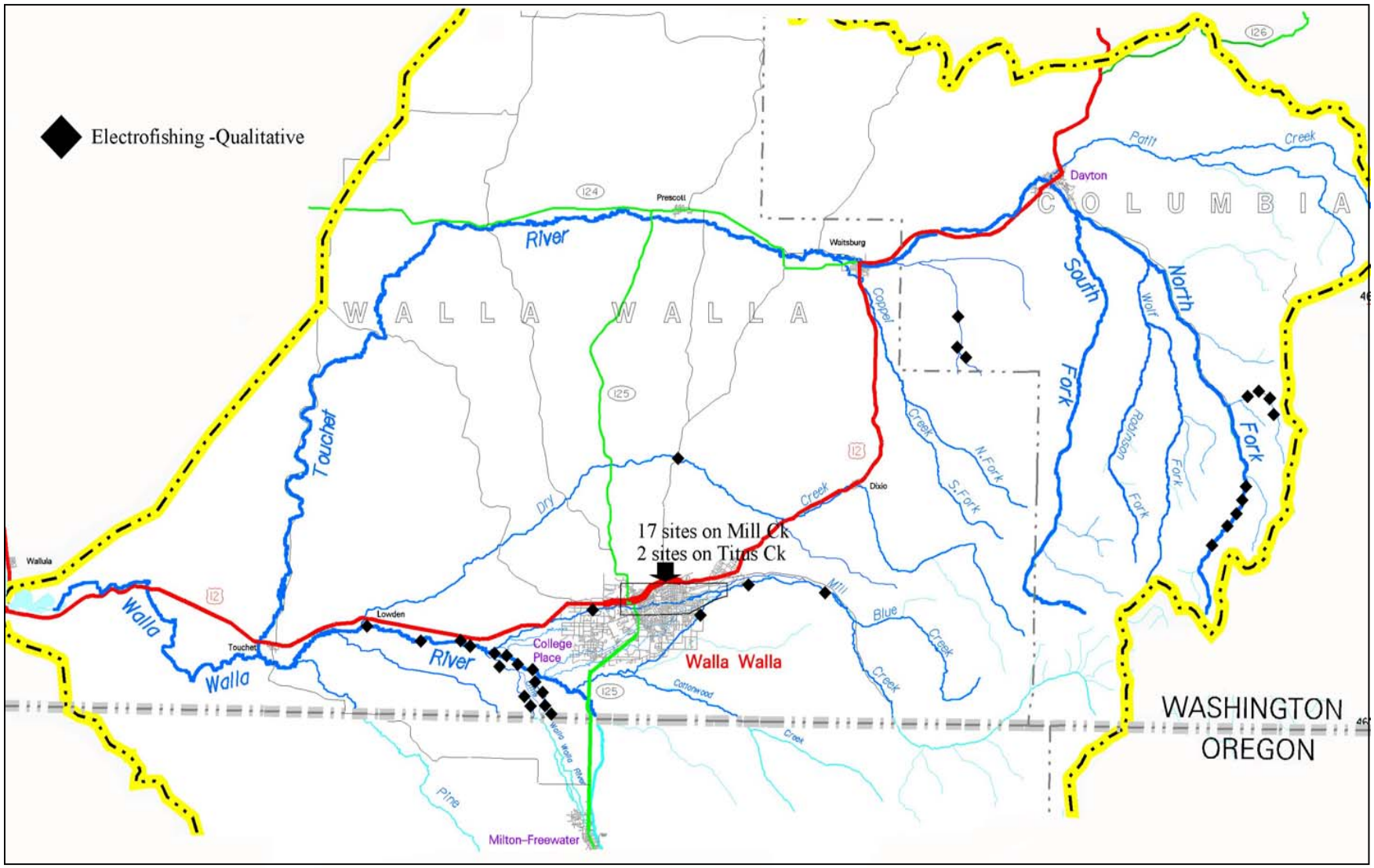

Figure 5. Relative locations of WDFW qualitative electrofishing sites in the Walla Walla basin, 2002.

Spawning Surveys

Spawning surveys were conducted in the same manner for both steelhead and bull trout. Surveyors generally walked downstream and visually identified spawning fish and/or redds (nests). Redds were usually readily identified, 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.

Genetic Sampling

Sampling of salmonid tissues was undertaken by WDFW personnel for later genetic analyses. Fin clips or opercle punches were obtained from adult steelhead, juvenile rainbow trout/steelhead, and bull trout. 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 bull trout and wild steelhead in the Walla Walla River basin.

Results and Discussion

Habitat Assessment

Stream Flows

The number and distribution of stream flow (discharge) and water temperature measurements by WDFW were substantially reduced in 2002. This was to enable the Washington Department of Ecology (WDOE) to collect data at many of our usual sites for a Total Maximum Daily Load (TMDL) study in the Walla Walla Basin.

Stream flows in the Walla Walla River basin follow a fundamental pattern initiated by a rapid decline in discharge in late June, followed by low summer flows and increased discharge in the fall and winter. However, in 2002, increased discharge in the fall wasn't seen due to lack of precipitation throughout the basin. The reduced flows in late June generally represent the end of the spring runoff, activation of water diversions for agricultural irrigation, and the usual lack of summer precipitation in the basin. The recharge in the fall is usually generated because of fall precipitation and after most water diversions are discontinued or reduced. However, sites in proximity to major irrigation facilities exhibited more erratic stream flow patterns (Appendix B). Irrigation withdrawals included pumps, "push–up"dams for gravity diversions and irrigation district dams and canals.

Stream flows seen at two continuous flow monitor sites on the Walla Walla River show very different results (Figure 6 and 7). The monitor at the Washington/Oregon stateline was very stable after spring runoff, generally between 10 to 20 cfs (Figure 6), while the monitor at Detour Rd. was much more erratic, between 10 and 85 cfs (Figure 7). The Yellowhawk Creek monitor was also very erratic, but it is located just below the diversions from Mill Creek (Figure 8). East Little Walla Walla was relatively constant, between 5 and 15 cfs, throughout the time the monitor was in place (Figure 9). Lower Mill Creek had a very constant flow but it was also very low, generally between 5 and 10 cfs (Figure 10). The monitor in the lower Touchet River (Figure 11) shows stable summer flows with little increase in the fall. The data for this graph may be less reliable, due to the fact that the regression was based off of four points and only one was after mid July.

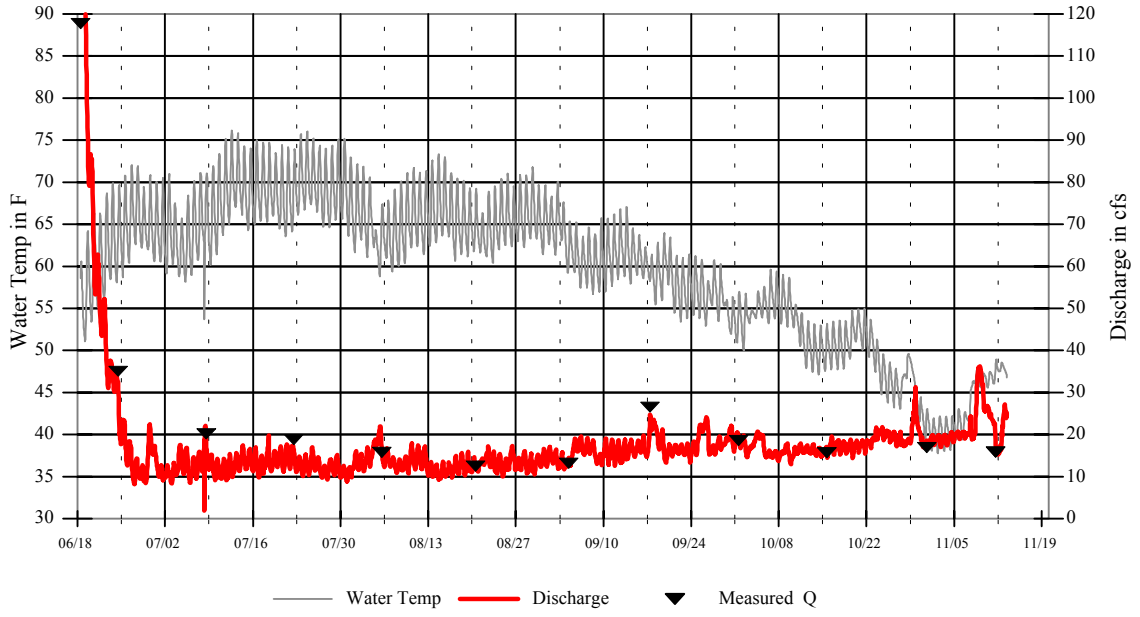

Figure 6. Walla Walla River stream discharge (CFS) and daily maximum water temperatures (F) every four hours, just below the Washington/Oregon stateline (WW-1), 2002. (Measured Q = manual stream discharge measurement)

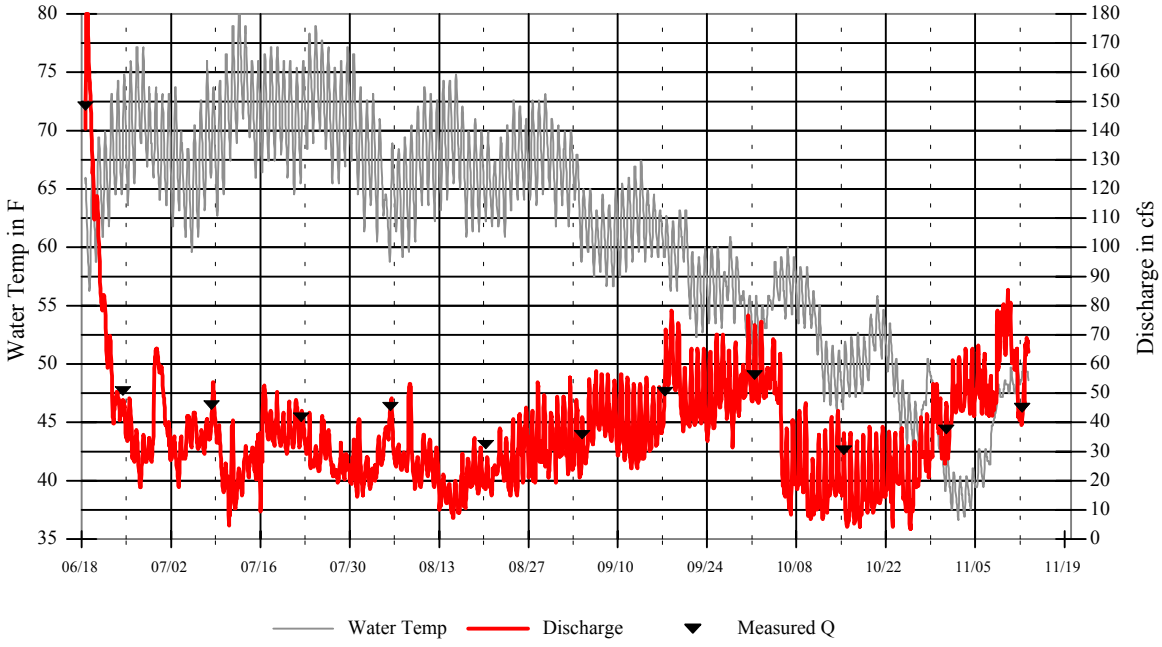

Figure 7. Walla Walla River stream discharge (CFS) and daily maximum water temperatures (F) every four hours, above Detour Rd. (WW-11), 2002. (Measured Q = manual stream discharge measurement)

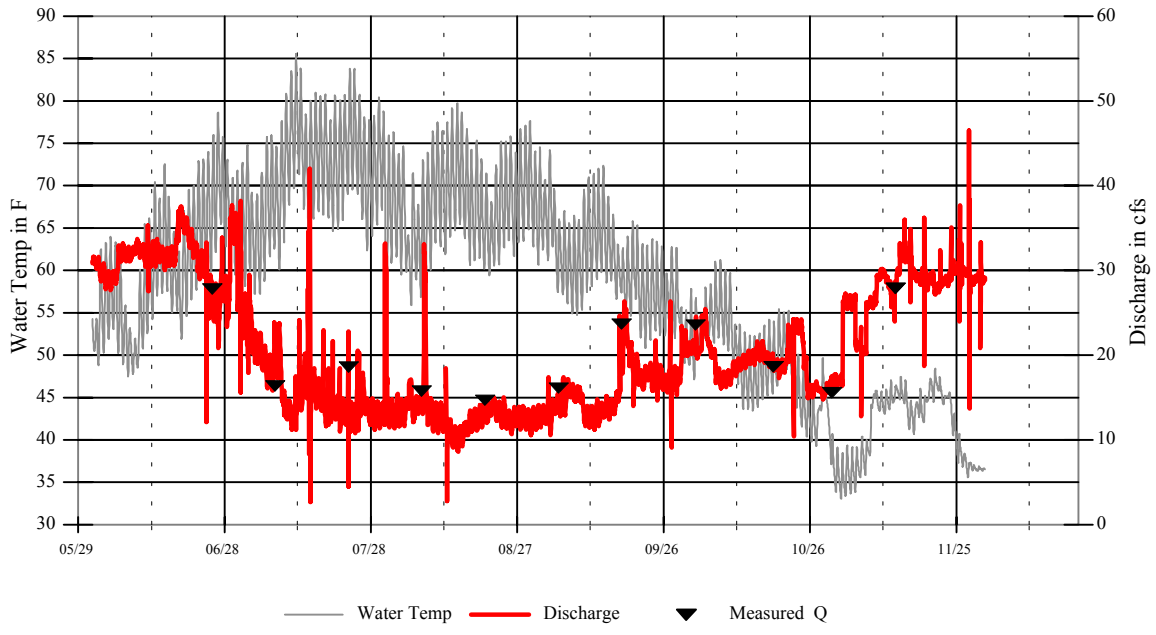

Figure 8. Yellowhawk Creek stream discharge (CFS) and daily maximum water temperatures (F) every four hours, below Yellowhawk diversion (YC-1), 2002 . (Measured Q = manual stream discharge measurement)

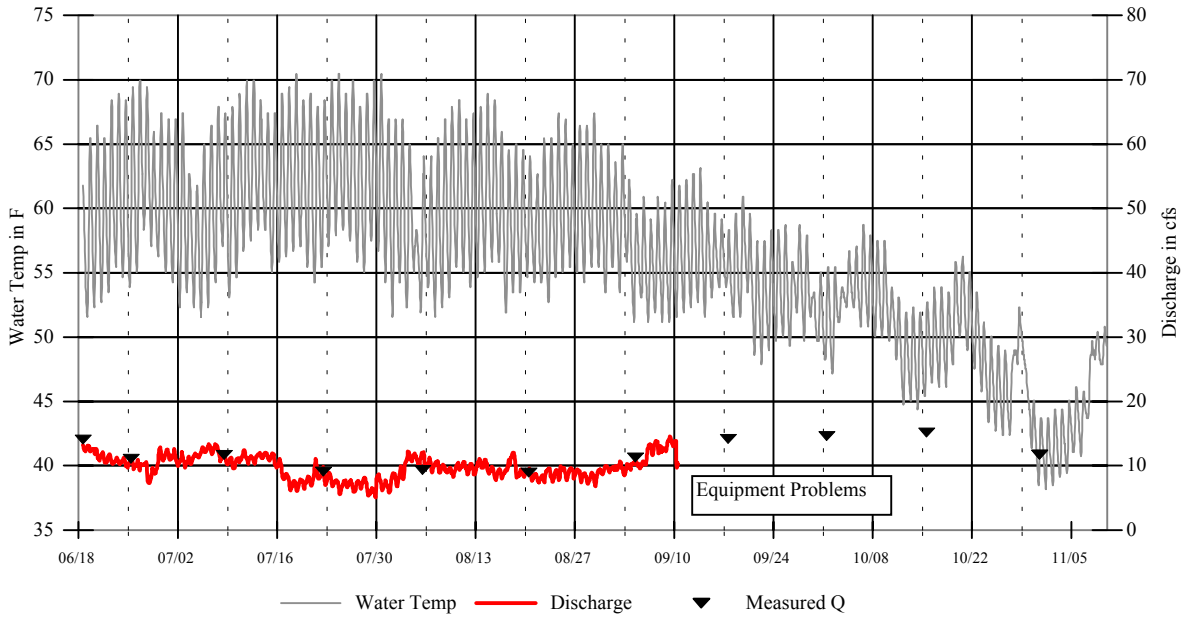

Figure 9. East Little Walla Walla River stream discharge (CFS) and daily maximum water temperatures (F) every four hours, 0.2 miles above mouth (ELW-6), 2002. (Measured Q = manual stream discharge measurement)

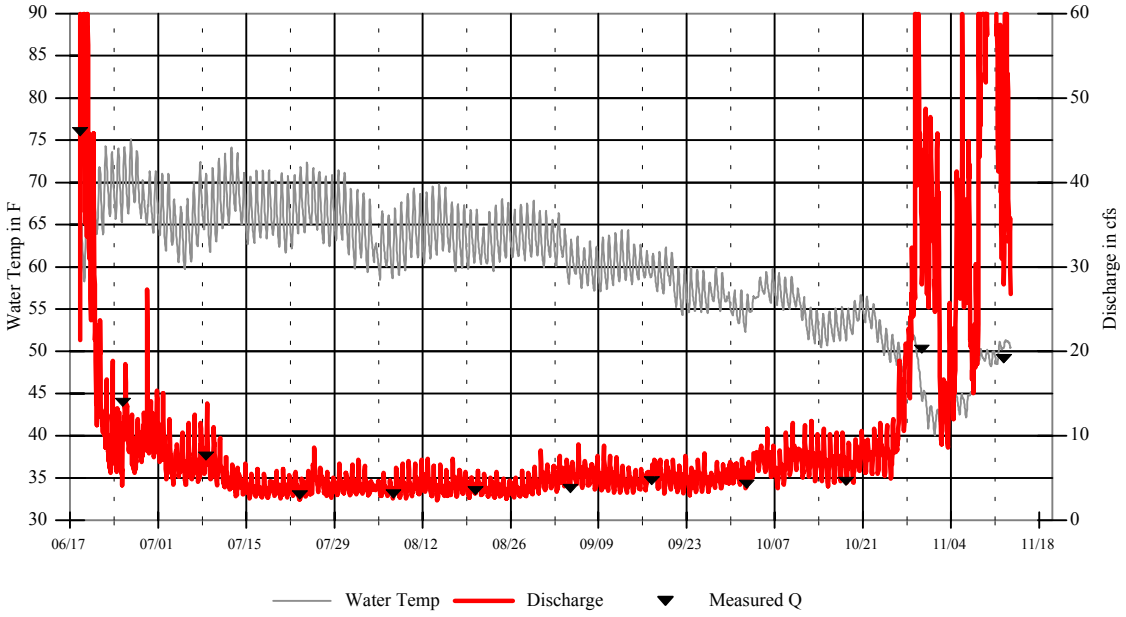

Figure 10. Mill Creek stream discharge (CFS) and daily maximum water temperatures (F) every four hours, below Wallula Rd. bridge (MC-36), 2002. (Measured Q = manual stream discharge measurement)

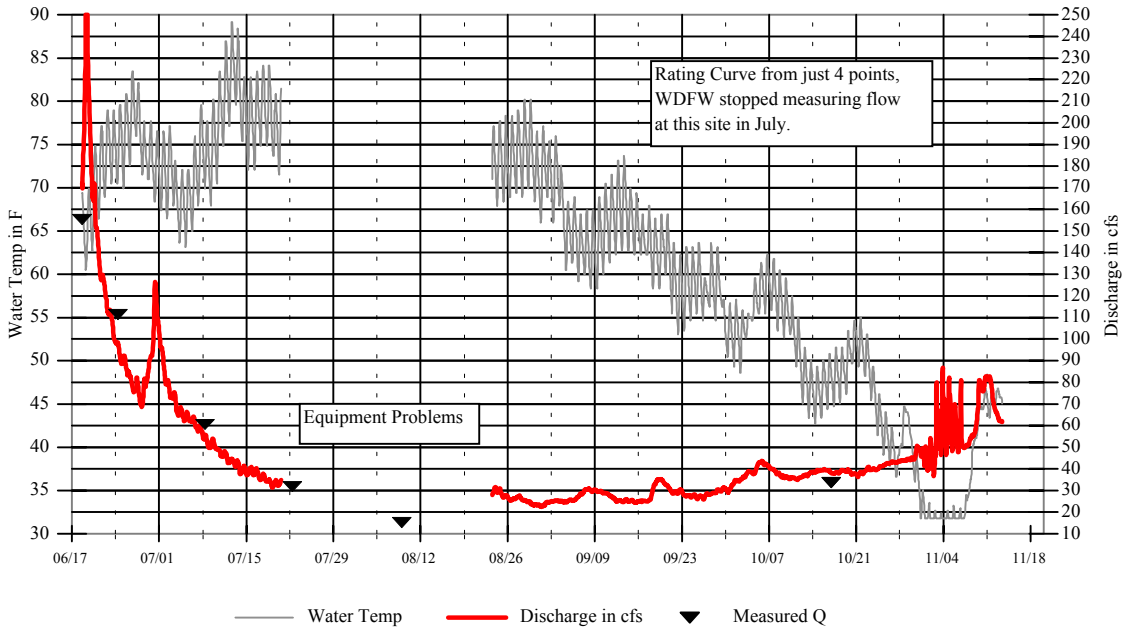

Figure 11. Touchet River stream discharge (CFS) and daily maximum water temperatures (F) every four hours, above Hofer Dam (TR-13), 2002. (Measured Q = manual stream discharge measurement)

Walla Walla Settlement Agreement

In 2000, under a settlement agreement with the U.S. Fish and Wildlife Service (USFWS), irrigation districts in Oregon maintained a minimum instream flow of 13 cfs at Nursery Bridge in Milton Freewater, OR. The minimum instream flow at Nursery Bridge was increased to 18 cfs in 2001, and then increased again to 25 in 2002. Nursery Bridge is approximately four miles upstream of the Washington/Oregon state line. The additional water, in 2000, made an immediate impact in Oregon by considerably reducing the historic dewatered area from Nursery Bridge downstream to below Tumalum Bridge, near the stateline. With the additional water available in 2001 the Walla Walla River saw continuous overland flow from Nursery Bridge to the Washington/Oregon stateline for the first time in decades. Manual stream flow measurements taken at Pepper Rd. bridge (just below the Washington/Oregon State line) showed little or no increase in stream flows until July-September 2001 when flows increased 300 - 400% over summer flows documented the previous three years. In 2002 manual flows at Pepper Rd. bridge again showed increases of 110-185% from July through September (Table 2). The mean manual flow measurements show that between mid-July and the first of October stream flows were; between 3.06 and 3.26 cfs in 1998, from 2.7 to 3.7 cfs in 1999, 3.8 to 5.0 cfs in 2000, 12 to13.6 cfs in 2001, and 12.4 to 27.5 cfs in 2002 (Appendix F, Table 2). Also, under the auspices of the settlement agreement, Gardena Farms Irrigation District(ID), in Washington, maintained at least a 10 cfs streamflow past Burlingame Dam (just above Mojonnier Rd.) during the spring, early summer, and fall irrigation season of 2000. In 2001 this 10 cfs was increased to 14 cfs, and then increased again to 18 cfs in 2002. Flows have shown a general increase from 1999 to 2001 at continuous flow monitoring sites near Mojonnier and Detour roads (Table 3), especially in July and August, but this was not consistent in 2002. Manual flow measurements show consistent increases in August and September (Table 2).

Table 2. Mean streamflow in cfs (standard deviation, number of samples) measured manually in the Walla Walla River, 1998-2002.

	Stateline	Pepper Rd.	Above Hwy. 125	Mojonnier Rd.	Swegel Rd.	Detour Rd.	McDonald Rd.[c]
1998[a]							
July		3.16[b]		32.77 (3.285, 2)	23.53 (14.303, 3)		4.51 (0.415, 2)
August		3.26 (0.165, 2)		25.46 (0.315, 2)	24.44 (2.780, 2)		3.98 (3.980, 2)
September		3.06 (0.265, 2)		31.66 (3.355, 2)	31.42 (5.865, 2)		13.64 (3.670, 2)
October		3.04 (0.180)		7.78 (5.945, 2)	14.38 (6.055, 2)		
1999							
June		44.2 (34.300, 2)		128.53 (122.602, 3)	126.73 (118.189, 3)	180.40 (163.515, 3)	
July		3.7 (1.400, 2)		20.60 (5.100, 2)	20.60 (3.100, 2)	23.00 (3.800,2)	6.73[b]
August		3.1[b]		23.80 (1.200, 2)	24.25 (0.650, 2)	31.6 (1.000,2)	10.25 (1.150, 2)
September		2.7 (0.000, 2)		23.90 (2.200, 2)	28.95 (2.350, 2)	32.20 (3.200,2)	13.30 (1.200, 2)
October		2.65 (0.050, 2)		18.30 (9.659, 3)	20.4[b]	31.8[b]	15.8[b]
2000							
June		42.4 (36.900, 2)		57.55 (47.050,2)	42.9[b]	97.20 (74.500, 2)	36.6[b]
July		3.8 (0.200, 2)		29.30 (12.900,2)	22.2[b]	32.05 (6.450, 2)	5.9[b]
August		4.1[b]		31.05 (1.150,2)	32.90 (3.800,2)	33.70 (4.400, 2)	14.40 (3.400, 2)
September				48.35 (0.650,2)	55.55 (0.750,2)	57.45 (2.450, 2)	37.65 (3.350, 2)
October		52.35 (28.650, 2)		54.95 (38.450,2)	60.40 (36.700,2)	84.95 (43.250, 2)	69.75 (42.450, 2)

[a] No data collected in June in 1998
[b] Only one sample during the month, so no mean or standard deviation were calculated.
[c] Mean CFS (SD, N) was only collected at McKay Rd. (0.6 miles above the mouth of Pine Ck.) in 1998 and was; July–3.8 (N/A), August–0.00 (N/A), September–8.82 (6.395, 2), and October–4.20 (3.435, 2).

Table 2. Mean streamflow in cfs (standard deviation, number of samples) measured manually in the Walla Walla River, 1998-2002.

	Stateline	Pepper Rd.	Above Hwy. 125	Mojonnier Rd.	Swegel Rd.	Detour Rd.	McDonald Rd.[c]
2001							
June		18.9 (6.253, 3)	22.93 (6.650, 2)	31.96 (0.735, 2)	27.30 (0.655, 2)	40.53 (6.425, 2)	23.12 (4.495, 2)
July	10.92 (2.637, 3)	12.22 (2.303, 5)	11.88 (2.590, 5)	39.79 (8.501, 6)	40.96 (5.553, 3)	49.63 (7.910, 3)	19.67 (2.165, 2)
August	13.90 (0.015, 2)	13.65 (1.140, 2)	13.13 (0.210, 2)	48.84 (2.420, 2)	41.55 (0.970, 2)	42.33 (1.220, 2)	19.97 (3.740, 2)
September	12.86 (0.070, 2)	12.00 (0.870, 2)	12.22 (0.930, 2)	41.28 (4.200, 2)	44.38 (1.425, 2)	44.27 (0.020, 2)	19.50 (1.765, 2)
October	41.46 (20.205, 5)	53.13 (21.872, 4)	42.01 (20.404, 5)	41.96 (18.481, 5)	42.06 (9.682, 3)	52.85 (15.140, 5)	39.93 (11.585, 3)
2002							
June		36.7[b]	35.4[b]	30.1[b]	34.3[b]	99.6 (48.800, 2)	20.4[b]
July	19.5 (0.700, 2)	18.8 (2.250, 2)	18.2 (3.050,2)	42.8 (1.100, 2)	43.8 (2.650, 2)	43.9 (2.050, 2)	18.4 (1.100, 2)
August	14.2 (1.650, 2)	15.1 (2.650, 2)	14.4 (1.900, 2)	40.3 (2.200, 2)	38.9 (6.500, 2)	39.2 (6.750, 2)	14.4 (4.500, 2)
September	19.9 (6.700, 2)	21.8 (5.700, 2)	20.6 (6.400, 2)	51.3 (10.550, 2)	42.9 (7.750, 2)	43.3 (7.350, 2)	23.6 (7.350, 2)
October	17.1 (1.190, 3)	16.2 (1.815, 3)	17.3 (1.584, 3)	32.8 (17.833, 3)	34.3 (14.604, 3)	41.5 (10.870, 3)	24.0 (6.594, 3)

[a] No data collected in June in 1998
[b] Only one sample during the month, so no mean or standard deviation were calculated.

Table 3. Mean monthly streamflow (cfs) and standard deviation from continuous flow monitors at Mojonnier Rd. and Detour Rd. in the Walla Walla River, and just above the mouth in Yellowhawk Ck. 1999-2002.

	1999		2000		2001		2002	
	Mean Flow	Standard Deviation	Mean Flow	Standard Deviation	Mean Flow	Standard Deviation	Mean Flow	Standard Deviation
Walla Walla River								
Mojonnier Rd.								
June (20th-30th)	14.55	6.979	46.33	33.203	26.45	7.094	See WDOE TMDL data	
July	16.52	5.156	20.63	4.270	36.91	9.335		
August	18.97	4.608	26.40	1.925	40.88	5.206		
September	24.14	3.131	51.73	9.259	43.50	8.350		
October	20.84	14.011	24.71[a]	14.075[a]	29.37	13.222		
November (1st-14th)	11.23	5.038	58.44	42.236	18.93	4.513		
Detour Rd.								
June (20th-30th)	35.49	13.353	69.05	41.052	45.70	10.362	51.75	22.947
July	24.73	3.447	30.77	3.028	41.72	4.159	31.00	6.433
August	26.18	5.855	31.12	1.575	38.12	3.601	26.09	6.729
September	29.14	2.762	53.57[a]	9.922	43.16	8.530	44.37	8.041
October	32.65	11.349	52.48[a]	21.484[a]	43.33	12.052	27.35	13.092
November (1st-14th)	26.93	6.417	96.89	57.287	46.82	9.649	55.62	8.792

[a] At least one measurement for the month was removed as an outlier.

Table 3. (Cont.) Mean monthly streamflow (cfs) and standard deviation from continuous flow monitors at Mojonnier Rd. and Detour Rd. in the Walla Walla River, and Just above the mouth in Yellowhawk Ck. 1999-2002.

	1999		2000		2001		2002	
	Mean Flow	Standard Deviation	Mean Flow	Standard Deviation	Mean Flow	Standard Deviation	Mean Flow	Standard Deviation
Yellowhawk Creek								
Just above mouth								
June (20^{th}-30^{th})			44.20	3.274	26.53	0.893	See WDOE TMDL data	
July			28.05	5.754	23.87	1.905		
August			17.66	1.962	18.58	4.687		
September			28.56[a]	4.589	13.75	1.606		
October			50.51	9.115	19.97	3.484		
November (1^{st}-14^{th})			56.07	9.347	21.80	3.213		

[a] At least one measurement for the month was removed as an outlier.

Stream Temperatures

Water temperatures in 2002 were similar to water temperatures in 2001 throughout the Walla Walla basin (Appendix C). Sites where maximum water temperatures were less than or equal to 65 F during summer months were generally located in tributaries associated with the Blue mountains; NF Touchet (NFT-1 and 7), Spangler Ck (SC-1), Lewis Ck (LC-9), Wolf Fork (WF-1, 5), Whitney Ck (WH-1), Coates Creek (C-1), Green Fork (GF-1), and Burnt Fork (BF-3). Maximum daily temperatures at some instream monitoring sites routinely exceeded temperatures that can be lethal for salmonids (75-84 F, Bjornn and Reiser 1991). This generally occurred during mid–summer, when the photo–period is long and evening cooling is brief. Sites with maximum water temperatures greater than 75 F included the Washington state portion of the Walla Walla River (WW-2, 6, 9, 10, 12, 14), Yellowhawk Creek (YC-1, 6), Caldwell Creek (CD-1), Garrison Creek (GC-2), Blue Creek (BC-1), most of Mill Creek (MC-12, 13, 14, 18, 23, 32, 34, 38), Dry Creek (DRC-1, 3, 4), Mud Creek (MDC-1), Pine Creek (PC-1 and 2), West Little Walla Walla (WLW-1, 3), Cottonwood Creek (CWC-2), Titus Creek (TC-1), Walsh Creek (WAC-1), Lower North Fork Touchet (NFT-15), Touchet River (TR-2, 7, 13), Lower South Fork Touchet (SFT-10), South Fork Patit Creek (SFP-1), and the mainstem of Coppei Creek (CO-1). Sites in the mid and lower Touchet and Walla Walla rivers frequently had daily maximum temperatures that were high enough (above 68 F) to inhibit migration of adults and young, and to sharply reduce survival of embryos and fry (Bjornn and Reiser 1991, Figures 6 and 7, Appendix C). However, at night, temperatures would usually decrease to within reasonable physiological limits for steelhead/rainbow trout (<65-70 F).

Walla Walla Settlement Agreement

Increases in streamflow did not consistently improve water temperatures during summer months from 1998 through 2002 (Table 4). We documented little or no change in temperatures at Pepper Br. even though stream flows increased several fold in 2001 and 2002 compared to previous years. We documented some decreases in mean and maximum temperatures in August and September at Mojonnier Rd. from 1998-2001, but temperatures were higher in 2002 than in 2001 at this site. Average and maximum temperatures at Swegle Rd. and Detour Rd. have shown no consistent changes (Table 4).

Table 4. Average and mean maximum temperatures (F and standard deviation) from temperature monitors at Pepper Rd., Mojonnier Rd., Swegle Rd., and Detour Rd. in the Walla Walla River, 1998-2002 (listed from upstream to downstream).

	1998		1999		2000		2001		2002	
	Average Temp. (SD)	Mean Max. Temp. (SD)	Average Temp. (SD)	Mean Max. Temp. (SD)	Average Temp. (SD)	Mean Max. Temp. (SD)	Average Temp. (SD)	Mean Max. Temp. (SD)	Average Temp. (SD)	Mean Max. Temp. (SD)
Pepper Rd.										
April							46.38 (2.957)	50.26 (3.929)		
May					54.40 (3.425)	57.56 (4.264)	53.72 (4.877)	59.32 (6.177)		
June			59.19 (3.861)	65.04 (5.361)	58.71 (4.539)	64.22 (5.636)	60.62 (2.773)	66.15 (4.209)		
July			66.68 (2.592)	73.92 (3.276)	67.14 (1.960)	73.16 (2.191)	66.25 (2.047)	71.99 (3.466)	69.67 (1.228)	74.76 (0.795)
August			68.03 (2.280)	73.40 (3.042)	66.68 (2.273)	71.88 (2.576)	66.76 (1.659)	72.07 (2.213)	65.35 (1.206)	70.41 (1.878)
September			60.68 (1.999)	64.84 (2.564)	60.36 (2.604)	63.74 (2.923)	61.37 (2.329)	65.12 (2.754)	59.74 (2.747)	63.32 (3.225)
October			53.21 (2.560)	55.64 (2.810)	51.20 (2.496)	53.64 (2.755)	51.53 (2.592)	53.79 (3.193)	50.81 (3.832)	53.31 (4.178)
Mojonnier Rd.										
April							47.34 (3.079)	50.71 (3.875)		
May					55.91 (3.019)	59.34 (3.631)	54.63 (4.440)	59.03 (4.955)		
June			62.81 (2.304)	68.64 (2.666)	59.46 (4.156)	64.22 (4.759)	60.03 (3.184)	63.71 (4.382)	62.16 (2.812)	66.28 (2.915)
July	71.97 (2.056)	78.23 (2.669)	66.82 (3.177)	74.78 (3.445)	66.76 (2.500)	72.35 (3.086)	66.70 (2.591)	71.83 (3.660)	68.21 (2.769)	73.25 (3.059)
August	69.72 (0.646)	75.17 (2.589)	68.28 (2.947)	74.77 (3.313)	65.52 (2.951)	70.97 (3.132)	67.16 (2.259)	71.66 (2.170)	65.40 (1.526)	70.57 (1.991)
September	64.63 (6.673)	71.21 (3.004)	59.28 (2.698)	64.61 (2.951)	58.19 (3.330)	61.21 (3.647)	60.72 (2.411)	64.56 (2.956)	59.41 (2.934)	62.80 (3.416)
October	49.61 (2.681)	51.48 (2.987)	51.52 (2.730)	54.48 (2.983)	51.87 (2.249)	53.76 (2.422)	51.98 (2.021)	53.73 (2.580)	50.31 (4.211)	52.72 (4.392)

[a] Temps were not collected at Pepper Rd. or Detour Rd. due to lack of time and resources available in the first year of the project. The 1998 data was collected on continuous temp and flow monitors which took reading every 15 seconds and stores the every four hours as averages.

Table 4. (Cont.) Average and mean maximum temperatures (F and standard deviation) from temperature monitors at Pepper Rd., Mojonnier Rd., Swegle Rd., and Detour Rd. in the Walla Walla River, 1998-2002 (listed from upstream to downstream).

	1998		1999		2000		2001		2002	
	Average Temp (SD)	Mean Max Temp (SD)	Average Temp (SD)	Mean Max Temp (SD)	Average Temp (SD)	Mean Max Temp (SD)	Average Temp (SD)	Mean Max Temp (SD)	Average Temp. (SD)	Mean Max. Temp. (SD)
Swegle Rd.										
April			50.32 (1.757)	53.91 (2.753)			47.80 (3.364)	51.40 (4.204)		
May			52.54 (2.683)	55.99 (2.880)	57.74 (3.885)	61.060 (4.218)	54.57 (4.022)	58.79 (4.114)		
June	69.22 (2.199)	75.46 (4.256)	62.38 (4.929)	67.95 (5.792)	61.31 (5.058)	66.12 (5.831)	61.80 (4.547)	66.33 (5.501)	66.00 (3.409)	70.75 (3.719)
July	73.41 (2.032)	79.61 (2.289)	68.83 (2.865)	75.13 (3.132)	69.18 (2.227)	74.45 (2.252)	68.22 (2.796)	72.73 (3.543)	69.79 (2.709)	74.53 (2.650)
August	71.09 (2.990)	76.23 (3.351)	69.70 (3.282)	74.68 (3.675)	67.59 (3.077)	71.44 (3.434)	68.23 (2.352)	72.68 (2.699)	66.33 (1.533)	70.05 (1.705)
September	64.23 (3.978)	68.20 (4.469)	59.90 (2.739)	64.00 (3.170)	59.36 (3.578)	62.23 (3.818)	60.51 (2.408)	64.36 (2.814)	60.16 (3.019)	62.40 (3.166)
October	52.97 (3.580)	55.98 (3.789)	51.41 (2.868)	54.19 (2.793)	51.83 (2.758)	53.94 (2.900)	50.62 (2.503)	53.64 (2.823)	51.95 (3.018)	53.16 (3.196)
Detour Rd.										
April							48.18 (3.503)	51.62 (4.283)		
May					59.03 (3.414)	62.56 (3.619)	57.19 (5.919)	62.53 (7.637)		
June			66.12 (2.327)	71.53 (2.920)	62.38 (4.910)	66.97 (5.875)	63.70 (3.295)	68.79 (4.409)	66.44 (3.379)	71.44 (4.067)
July			69.22 (2.783)	75.73 (2.803)	69.76 (2.148)	75.60 (2.270)	68.84 (2.925)	73.89 (3.836)	70.77 (2.720)	76.16 (2.703)
August			70.18 (3.047)	75.36 (3.424)	68.13 (3.142)	72.57 (3.442)	68.61 (2.335)	73.12 (2.760)	67.36 (1.727)	71.96 (2.039)
September			60.27 (2.632)	64.18 (3.036)	59.89 (3.595)	62.79 (3.801)	61.81 (2.600)	64.86 (2.865)	60.57 (3.292)	63.67 (3.656)
October			51.71 (2.814)	54.32 (2.743)	52.91 (2.448)	54.79 (2.612)	52.45 (2.296)	54.48 (2.851)	50.98 (4.229)	53.49 (4.416)

[a] Temps were not collected at Pepper Rd. or Detour Rd. due to lack of time and resources available in the first year of the project. The 1998 data was collected on continuous temp and flow monitors which took reading every 15 seconds and stores the every four hours as averages.

Limiting Factor Identification

Extensive and intensive surveys of habitat conditions to identify limiting factors were deferred because of lack of adequate staff time. However, a number of barriers or impediments to salmonid passage and rearing have been identified by this project since 1998. A portion of those barriers were physical (e.g. structures or dewatered streambeds) that physically blocked salmonid movement, others were physiological barriers (e.g. temperature, sediment, lack of pools, etc.). Physiological barriers and impediments to salmonid passage and rearing were extensive in terms of stream miles affected. The primary physiological factor affecting fish in the Walla Walla River basin was water temperature. Temperature possibly represents the most critical physiological barrier to salmonids, particularly for passage or rearing. Seasonal temperature related barriers for salmonids generally occur in lower areas of the Touchet River, Mill Creek, and the Walla Walla Rivers and their tributaries. Stream reaches with mean water temperatures exceeding 75 F during the summer are associated with low densities of salmonids (Mendel et. al.,1999). Most of the salmonids in these marginal thermal areas are age 0+ rainbow/steelhead trout. We have documented temperatures of 70ºF or higher in many lower mainstem reaches and in some tributaries during summer as might be expected, but also in mid to late May and June and again in early September when they may affect migration of salmonids. These temperatures likely adversely affect migrating juvenile salmonids and adult steelhead in spring, and adult steelhead returning in September. Turbidity, sedimentation, lack of pools and cover, and other habitat factors, may also present challenges to migrating, breeding and rearing salmonids.

Fish Stock Assessment

Distribution and Abundance

Densities of five salmonid species were calculated from quantitative electrofishing sites in the Walla Walla Basin (Tables 5, and 6). Adult rainbow trout (200 mm or 8 in) densities represent wild or unknown origin trout unless noted. Identified salmonid species included: mountain whitefish, brown trout, bull trout, chinook salmon and rainbow/steelhead trout.

Rainbow/steelhead trout represent the most common salmonid found in the Walla Walla Basin. Age 0+ rainbow/steelhead densities are typically higher than for older age classes for most sites. Age 1+ rainbow/steelhead trout predominated in the following sites; Lewis Creek (LC-2,7) and Mill Creek (MC-4,10). Large or "legal sized" (8 in.) rainbow trout were found in very low densities throughout the basin. The numbers of age 0+ steelhead found in the mainstem Walla Walla River suggests that spawning is commonly occurring within the Washington portion of the river.

Other salmonid species had a limited distribution (Tables 5 and 6, Appendix D). Bull trout distribution was greatest in the North Fork and Wolf Fork of the Touchet River. Low densities of bull trout were found in Lewis Creek, the Touchet River, and in Mill Ck. Mountain whitefish were uncommon, and they were found in low densities at only a few sites in the Walla Walla River (WW-2,6), East Little Walla Walla River (ELW-1), Mill Creek (MC-10,11), North Fork Touchet (NFT-12), and the Touchet River (TR-11). Brown trout were found in low densities (but included some very large individuals) in the North Fork Touchet (NFT-12,13,16) and the Touchet River (TR-1,3,4,9,10) around Dayton. Juvenile (age 0+) brown trout production appeared to be limited in 2002, and this age class was only seen at very low densities. Juvenile chinook salmon were found in low densities at a few sites in the Walla Walla River (WW-1,2), Mill Creek below Bennington Lake Diversion Dam (MC11,15,24,25,29,30), the Touchet River (TR-4), the South Fork Touchet River (SFT-11), and the Robinson Fork (RF-5). Higher densities of juvenile chinook were seen in several sites in upper Mill Creek (MC-1,2,4,5,6,7,8,10) and the Wolf Fork (WF-2,3,4,6,7). The higher densities in Mill Creek, and the densities in the Walla Walla River are associated with the outplanting of adult spring chinook in late summer of 2001. These fish were released by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and allowed to spawn freely in the upper portion of Mill Creek, and the Walla Walla River. The higher densities in the Wolf Fork were produced by an unusually large return of adult spring chinook to the Touchet River System in 2001 (Mendel et. al, 2002).

Electrofishing

Densities of rainbow/steelhead trout ranged from 0 to 125.6 fish per 100 m^2 at sampled sites (Tables 6 and 7). Sub–yearling (age 0+) trout were the most abundant age class at sites in the mainstem and lower reaches. While this was true in both the Touchet and Walla Walla basins there is a notable difference in the densities of sub-yearling (age 0+) rainbow/steelhead between the two basins. The Touchet River and it's tributaries had densities between 0.0 and 88.8 fish per 100 m^2, with the majority over 30 fish per 100 m^2 (Table 5 and 6). The Walla Walla and it's tributaries had densities from 0.6 to 46.0 fish per 100 m^2, with all but four of these under 30 fish per 100 m^2 (Table 5). Yearling (age 1+) rainbow/steelhead were most abundant in tributaries and upper mainstem reaches, with densities usually between 0.5 and 52.7 fish per 100 m^2 (Tables 5 and 6). Adult (200 mm or 8 in) rainbow/steelhead were found in lower densities ranging from 0 to 2.2 fish per 100 m^2. Densities of bull trout ranged from 0 to 3.1 fish per 100 m^2 with yearlings (age 1+) being in the highest densities. Mountain whitefish were found in sub-yearling and adult age classes (0+, and 8 in) in the basin, but densities were low ranging from 0 to 0.9 fish per 100 m^2 (Table 5 and 6). Low densities of brown trout were found in the Touchet River and some of its major tributaries around Dayton. Brown trout were found in all age classes (0+, 1+, and 8 in), with densities from 0 to 0.6 fish per 100 m^2. Densities of sub-yearling chinook ranged from 0 to 16.8 fish per 100 m^2 with the highest densities occurring in Mill Creek. Juvenile chinook were also found in sites on the Wolf Fork, Robinson Fork, South Fork Touchet, Touchet River, and Walla Walla River (Tables 5 and 6). Chinook were only found in the lowest site (within 0.5 miles of the mouth) in the Robinson Fork and the South Fork Touchet, and were in very low densities. Chinook densities and distribution would suggest that spawning did not occur there but that the fish moved into these areas for rearing.

Table 5. Densities of salmonids from electrofishing sites in the Walla Walla Basin, summer 2002. Sites are listed in order from upstream to downstream.

					Densities (#/100 m²)							
					rainbow/steelhead							
Stream Reach / Site Name	Date (mm/dd)	Site Length (m)	Mean Width (m)	Area (m²)	Age/Size 0+	Age/Size 1+	Age/Size 8 in	Total	Other Species[a]	Age/Size 0+	Age/Size 1+	Age/Size 8 in
Lewis Creek												
LC-2	07/12	30.0	3.24	97.2	0.0	7.2[b]	0.0	7.20	BT	1.0	3.1	0.0
LC-4	07/12	30.0	2.43	72.9	16.5	2.8	0.0	19.3				
LC-6	07/15	30.0	2.98	89.4	12.3	11.2	0.0	23.5				
LC-7	07/15	30.0	3.20	96.0	8.3	17.7	0.0	26.0	BT	0.0	1.0	0.0
Whiskey Creek												
WC-4	07/11	30.0	2.42	72.6	97.8	0.0	0.0	97.8				
WC-5	07/11	30.0	3.60	108.0	16.7[b]	0.0	0.0	16.7				
Walla Walla River												
WW-1	07/18	38.0	5.92	225.0	6.7	1.3	0.0	8.0	WCH	0.4	0.0	0.0
WW-2	08/08	30.0	7.76	232.8	11.6[b]	1.7	0.0	13.3	WCH	1.7	0.0	0.0
									MTW	0.9	0.0	0.0
WW-3	08/08	30.0	12.68	380.4	2.1	0.0	0.0	2.1				
WW-4	07/16	30.0	5.52	165.6	0.6	0.0	0.0	0.6				
Yellowhawk Creek												
YC-1	08/12	25.0	6.12	153.0	0.7	0.0	0.0	0.7				
YC-3	08/21	51.0	3.90	198.9	7.0[b]	3.5[b]	0.0	10.5				
YC-4	08/21	27.0	3.96	106.9	19.6	15.0	0.0	34.6				
YC-5	08/21	29.0	4.60	133.4	10.5	1.5	0.0	12.0				
YC-6	08/12	30.0	5.60	168.0	1.2	0.6	0.0	1.8				
Cottonwood Creek												
CWC-1	06/27	30.0	3.26	97.8	46.0	2.0	0.0	48.0				
CWC-2	06/27	30.0	2.42	72.6	22.0	4.1	0.0	26.1				
CWC-4	06/27	40.0	2.00	80.0	43.8	0.0	0.0	43.8				
Mill Creek												
MC-1	07/29	30.0	11.88	356.4	11.5	4.8	0.0	16.3	WCH	2.2	0.0	0.0
MC-1	09/25	30.0	12.34	370.2	7.6[b]	2.4	0.0	10.0	WCH	0.3	0.0	0.0
MC-2	08/08	30.0	9.72	291.6	30.9	8.2	0.0	39.1	BT	0.0	1.0	0.0
									WCH	16.8	0.0	0.0
MC-4	07/25	30.0	11.32	339.6	5.9	10.6	0.9	17.4	BT	0.0	0.0	0.6
									WCH	9.7	0.3	0.0
MC-5	08/01	30.0	8.46	253.8	5.1	3.6	0.0	8.7	WCH	2.8	0.0	0.0
MC-6	07/29	30.0	8.42	252.6	24.2[b]	7.9	1.2	33.3	WCH	5.9	0.0	0.0
MC-6	09/25	30.0	8.48	254.4	27.1[b]	8.7	1.2	37.0	BT	0.0	0.0	0.4
									WCH	4.7	0.0	0.0
MC-8	07/25	30.0	11.42	342.6	10.2	3.2	1.8	15.2	WCH	4.4	0.0	0.0
MC-10	07/29	30.0	8.06	241.8	2.9	12.4[b]	0.0	15.3	WCH	1.2	0.0	0.0
									MTW	1.2	0.0	0.0
MC-10	09/25	30.0	7.74	232.2	7.3	9.0	0.0	16.3	WCH	4.3	0.0	0.0
									MTW	0.4	0.0	0.0
MC-34	07/23	30.0	7.24	217.2	4.6	0.5	0.5	5.6				
MC-35	07/24	30.0	7.12	213.6	11.2	0.0	0.0	11.2				
MC-37	07/23	35.0	2.18	76.3	44.6	1.3	0.0	45.9				
MC-38	07/23	30.0	3.34	100.2	10.0	0.0	0.0	10.0				

[a] BT=bull trout, WCH=wild chinook, MTW=mountain whitefish

[b] Calculated using the sum of the passes, due to poor reduction between successive passes.

Table 6. Densities of salmonids from sites electrofished by Snake River Lab personnel in the Touchet River and its tributaries, summer 2002. Sites are listed in order from upstream to downstream (Also, see Bumgarner et al. 2003).

					Densities (#/100 m^2)								
					rainbow/steelhead								
Stream Reach	Date	Site Length	Mean Width	Area	Age/Size						Age/Size		
Site Name	(mm/dd	(m)	(m)	(m^2)	0+	1+	8 in	Hat[a]	Total	Other Species[b]	0+	1+	8 in
North Fork Touchet													
NFT-8	08/26	50.0	6.04	302.0	37.8	15.6	0.3	0.0	53.7				
NFT-9	08/26	50.0	6.82	341.0	53.1	19.1	0.3	0.3	72.8				
NFT-11	08/27	50.0	8.36	418.0	56.7	12.2	0.0	0.2	69.1				
NFT-12	08/10	50.0	6.02	301.0	45.5	12.3	0.0	0.3	58.1	BT	0.0	0.3	0.0
										MTW	0.0	0.0	0.3
										BRT	0.0	0.3	0.3
NFT-13	08/10	50.0	8.20	410.0	88.8	13.9	0.0	2.4	105.1	BRT	0.5	0.0	0.0
NFT-14	07/29	50.0	8.72	436.0	19.7	8.9	0.2	6.0	34.8	BT	0.0	0.0	0.2
NFT-16	07/17	50.0	9.98	499.0	34.5	2.4	0.0	1.0	37.9	BRT	0.2	0.0	0.0
Wolf Fork													
WF-2	08/20	50.0	6.90	345.0	54.5	11.6	0.0	0.6	66.7	WCH	6.4	0.0	0.0
										BT	0.0	0.6	0.0
WF-3	08/20	50.0	7.34	367.0	35.4	6.0	0.0	0.0	41.4	WCH	3.8	0.0	0.0
										BT	0.0	0.0	0.3
WF-4	8/20	50.0	8.62	431.0	47.3	9.3	0.0	0.0	56.6	WCH	6.0	0.0	0.0
WF-6	8/19	50.0	7.84	392.0	42.9	7.7	0.0	0.3	50.9	WCH	3.1	0.0	0.0
										BT	0.0	0.3	0.0
WF-7	08/19	50.0	8.04	402.0	44.5	6.5	0.3	0.3	51.6	WCH	0.8	0.0	0.0
										BT	0.0	0.0	1.0
WF-9	08/19	50.0	11.20	560.0	30.7	2.5	0.0	0.0	33.2				
WF-10	08/19	50.0	10.74	537.0	48.2	2.8	0.0	0.4	51.4	WCH	1.1	0.0	0.0
Robinson Fork													
RF-1	08/20	50.0	4.16	208.0	46.2	7.7	0.0	0.0	53.9				
RF-2	08/20	50.0	4.14	207.0	34.3	24.2	1.5	0.0	60.0				
RF-3	08/20	50.0	4.30	215.0	22.8	16.3	0.0	0.0	39.1				
RF-4	08/20	50.0	4.28	214.0	28.5	7.9	0.0	0.0	36.4				
RF-5	08/20	65.0	4.82	313.3	76.6	14.0	0.0	0.0	90.6	WCH	0.3	0.0	0.0
South Fork Touchet													
SFT-3	08/21	50.0	3.68	184.0	70.7	52.7	2.2	0.0	125.6				
SFT-4	08/21	50.0	5.48	274.0	66.8	10.2	0.0	0.0	77.0				
SFT-5	08/21	50.0	5.68	284.0	75.4	16.2	0.4	0.4	92.4				
SFT-6	07/24	50.0	6.10	305.0	51.5	3.3	0.0	0.0	54.8				
SFT-7	07/24	50.0	6.18	309.0	40.8	0.7	0.0	0.0	41.5				
SFT-8	07/24	50.0	6.70	335.0	48.4	1.8	0.0	0.0	50.2				
SFT-9	07/24	50.0	8.26	413.0	37.8	1.9	0.0	0.0	39.7				
SFT-11	07/17	50.0	6.36	318.0	35.2	6.0	0.3	4.1	45.6	WCH	0.3	0.0	0.0

[a] Total of hatchery and endemic hatchery stocks.
[b] BT=bull trout, WCH=wild chinook, MTW=mountain whitefish
[c] Calculated using the sum of the passes, due to poor reduction between successive passes.

Table 6. (Cont.) Densities of Salmonids from sites electrofished by Snake River Lab personnel in the Touchet River and its tributaries, summer 2002. Sites are listed in order from upstream to downstream (Also, see Bumgarner et al. 2003).

					Densities (#/100 m^2)								
					rainbow/steelhead								
Stream Reach	Date	Site Length	Mean Width	Area	Age/Size						Age/Size		
Site Name	(mm/dd	(m)	(m)	(m^2)	0+	1+	8 in	Hat[a]	Total	Other Species[b]	0+	1+	8 in
Touchet River													
TR-1	07/17	50.0	10.92	546.0	30.2	0.7	0.0	1.1	32.0	BT	0.0	0.2	0.0
										BRT	0.2	0.0	0.0
TR-4	07/16	50.0	17.12	856.0	11.7	0.9	0.0	0.9	13.5	WCH	0.1	0.0	0.0
										BRT	0.6	0.1	0.0
TR-5	07/16	50.0	8.94	447.0	17.0	3.6	0.0	1.6	22.2	BRT	0.0	0.2	0.0
TR-6	07/15	50.0	14.9	745.0	8.5	0.1	0.0	0.0	8.6				
TR-8	07/10	50.0	11.78	589.0	32.6	0.3	0.0	0.0	32.9				
TR-9	07/10	50.0	15.80	790.0	10.0	0.0	0.0	0.6	10.6	BRT	0.3	0.0	0.0
TR-10	07/09	50.0	13.08	654.0	6.9	0.3	0.0	0.2	7.4	BRT	0.3	0.0	0.0
TR-11	07/09	50.0	14.24	712.0	16.3	0.3	0.0	0.3	16.9	MTW	0.1	0.0	0.0

[a] Total of hatchery and endemic hatchery stocks.
[b] BT=bull trout, WCH=wild chinook, MTW=mountain whitefish
[c] Calculated using the sum of the passes, due to poor reduction between successive passes.

Walla Walla Settlement Agreement

Increased flows and/or decreased temperatures may have resulted in increased rainbow/steelhead densities between the Washington/Oregon Stateline and Mojonnier Rd. (Burlingame). While densities in 2002 decreased slightly from 2001 they are still considerably higher than before the settlement agreement increased flows. Densities below Mojonnier Rd. have not shown consistent increases since the settlement agreement was implemented (Table 7).

Table 7. Comparison of summer rainbow/steelhead densities (fish/100 m^2) in the Walla Walla River between the Stateline and Lowden from 1998 through 2002.

Year/ Reach	Mean Density (#/100 m^2)	Standard Deviation	# of sites	Densities per Site (fish/100 m^2)	Other Salmonids Present
1998					
Stateline to just below Burlingame	0.3333	0.3215	3	0.7,0.1,0.2	none
down to McDonald Rd.	0.4	N/A	1	0.4	none
1999					
Stateline to just below Burlingame	3.6714	5.1068	7	1.8,1.4,2.8,0.5,15. 1.0,0.3	chinook & whitefish
down to McDonald Rd.	3.4500	2.3193	6	6.5,1.6,5.5,1.7,4.4,1. 0	none
down to Lowden Gardena Rd.	0	N/A	1	0[b]	none
2000					
Stateline to just below Burlingame	4.0000	7.2596	4	2.4,4.5,14.5,17.1	whitefish
down to McDonald Rd.	1.5	2.213	2	3.0,0,+1 qual[a]	none
down to Lowden Gardena Rd.	0	N/A	1	0[b]	none
2001					
Stateline to just below Burlingame	7.633	6.4488	9	15.9,15.7,5.2,2.5,6.8, 15.5,6.1,0.9,0.1	chinook & whitefish
down to McDonald Rd.	0.4667	0.6429	3	1.2,0,0.2,+3 qual[a]	none
down to Lowden Gardena Rd.	0.0	0.0	2	0,0	none
2002					
Stateline to just below Burlingame	6.000	5.0413	4	8.0, 13.3, 2.1, 0.6	chinook & whitefish

[a] Plus qualitative sites with rainbow/steelhead.
[b] High densities (31.4 to 101 fish/100 m^2) existed in June and the first couple days of July for mainly Age 0+ rainbow/steelhead.

Non–Salmonid Species Abundance and Distribution

Speckled dace (*Rhinichthys osculus*) and sculpins (*Cottus spp.*) were the most common non–salmonids found at most of our sampling sites (Appendix E). Speckled dace generally did not exist at upper sites where water temperatures were relatively cool. Longnose dace (*Rhinichthys cataractae*) was observed during electrofishing in Mill Creek, Yellowhawk Creek, North Fork Touchet, Wolf Fork, South Fork Touchet, and the mainstem Touchet River. Sculpin are found throughout the basin except in the lower sections of the mainstem Walla Walla and Touchet rivers and in cold headwater sites. Northern pikeminnow and chiselmouth (*Acrocheilus alutaceus*) are distributed in lower sections of tributaries and mainstem rivers. Tailed frogs/tadpoles (*Ascaphus truei*) were found only in upper sites in cold, clean water. During our efforts we have generally found bull trout where tailed frogs were present, but we have also found tailed frogs in headwater areas where bull trout are not present.

Spawning Surveys

Steelhead

Steelhead spawning surveys were conducted on several streams in the Walla Walla basin in 2002 between March and late May (Table 8 and 9). Spawning surveys were conducted by both Fish Management personnel and Snake River Lab personnel. Surveys for both crews were delayed or limited due to high stream flows that could have erased redds that had been previously constructed. Our crews from Fish Management were also delayed due to a hiring freeze that delayed bringing people on in the spring, and also by increases in landowner contacts. New information available through Walla Walla County doubled some of our lists for landowner contacts. Steelhead surveys overall in the Walla Walla Basin were very incomplete (low number and distributions of surveys) as compared to previous years (Mendel et. al. 2000, 2001, 2002).

Fish Management personnel surveyed four streams in the Walla Walla River system (Table 9), while WDFW personnel from the Snake River Lab (in Dayton) surveyed the North Fork, Wolf Fork, and South Fork of the Touchet River system (table 8, also see Bumgarner et al. 2003). Over four miles of Cottonwood Creek was surveyed and no redds or fish were observed. The East Little Walla Walla was surveyed for 1.4 miles and no redds were found. The West Little Walla Walla was also surveyed for 2.9 miles with nothing found. Upper Mill Creek from the stateline down to Bennington Lake diversion was surveyed two times and only one redd and one dead fish were observed. The lower 2.7 miles of Mill Creek was also surveyed two times and no redds or fish were observed. Surveys in the North Fork, Wolf Fork, Robinson Fork, and South Fork Touchet Rivers were conducted by WDFW personnel from the Snake River Lab, Dayton. They found 10 redds (1.9 redds/mile) in the North Fork Touchet, 19 redds (4.2 redds/mile) in the Wolf Fork, and 30 redds (3.8 redds/mile) in the South Fork Touchet River (Table 8).

Table 8. Steelhead spawning survey summary for some of the tributaries of the Touchet River (surveys done by personnel from the Snake River Lab), 2002.

Reach/ date	Survey	Stream section[a]	Miles	Redds	Redds per mile	Fish Observed	
NF Touchet River						**Live**	**Dead**
4/5	1	(A) River mile 7.3 to river mile 4.1	3.2	10	3.1	0	0
4/5	1	(B) River mile 2.1 to river mile 0.0	2.1	0	0	0	0
		Total	**5.3**	**10**	**1.9**	**0**	**0**
Wolf Fk							
4/4	1	(C) River mile 7.3 to river mile 2.8	4.5	8	1.8	0	0
4/24	2	(C) River mile 7.3 to river mile 2.8	4.5	11	2.4	0	0
		Total	**4.5**	**19**	**4.2**	**0**	**0**
SF Touchet River							
3/28	1	(D) River mile 8.4 to river mile 1.4	8.0	3	0.4	0	0
4/4	2	(D) River mile 8.4 to river mile 1.4	8.0	20	2.5	0	0
4/23	3	(D) River mile 8.4 to river mile 1.4	8.0	7	0.9	0	0
		Total	**8.0**	**30**	**3.8**	**0**	**0**

[a] A: 0.3 miles below Jim Ck to Wolf Fk Rd bridge, B: Vernon Lane bridge to mouth of the SF Touchet River, C: Mouth of Coates Ck to mouth of the Robinson Fk., D: Camp Nancy Lee bridge to Harting Grade bridge

Table 9. Steelhead spawning survey summary for some of the tributaries of the Walla Walla River, 2002.

Reach/ date	Survey	Stream section[a]	Miles	Redds	Redds per mile	Fish Observed	
Cottonwood Ck						**Live**	**Dead**
5/13	1	(A) River mile 5.5 to river mile 4.5	1.0	0	0	0	0
4/8	1	(B) River mile 4.5 to river mile 2.8	1.7	0	0	0	0
4/8	1	(C) River mile 2.8 to river mile 1.0	1.8	0	0	0	0
4/22	2	(B) River mile 4.5 to river mile 2.8	1.7	0	0	0	0
4/22	2	(C) River mile 2.8 to river mile 1.0	1.8	0	0	0	0
5/13	3	(B) River mile 4.5 to river mile 2.8	1.7	0	0	0	0
5/13	3	(C) River mile 2.8 to river mile 1.0	1.8	0	0	0	0
		Total	**4.5**	**0**	**0**	**0**	**0**
East Little Walla Walla							
5/3	1	(D) River mile 1.8 to river mile 1.7	0.1	0	0	0	0
5/3	1	(E) River mile 1.6 to river mile 1.3	0.3	0	0	0	0
5/3	1	(F) River mile 1.2 to river mile 0.9	0.3	0	0	0	0
5/3	1	(G) River mile 0.7 to river mile 0.0	0.7	0	0	0	0
		Total	**1.4**	**0**	**0**	**0**	**0**
West Little Walla Walla							
4/18	1	(H) River mile 5.6 to river mile 4.9	0.7	0	0	0	0
4/18	1	(I) River mile 4.7 to river mile 4.2	0.5	0	0	0	0
4/12	1	(J) River mile 3.4 to river mile 2.7	0.7	0	0	0	0
4/12	1	(K) River mile 2.6 to river mile 1.6	1.0	0	0	0	0
		Total	**2.9**	**0**	**0**	**0**	**0**
Mill Creek							
4/22	1	(L) River mile 21.7 to river mile 19.1	2.6	0	0	0	0
4/22	1	(M) River mile 19.1 to river mile 17.0	2.1	0	0	0	0
4/22	1	(N) River mile 16.8 to river mile 14.7	2.1	0	0	0	0
4/22	1	(O) River mile 14.7 to river mile 12.8	1.9	0	0	0	0
4/22	1	(P) River mile 12.8 to river mile 11.6	1.2	0	0	0	0
4/26	1	(Q) River mile 4.4 to river mile 1.7	2.7	0	0	0	0
4/26	1	(R) River mile 1.7 to river mile 0.0	1.7	0	0	0	0
5/13	2	(L) River mile 21.7 to river mile 19.1	2.6	0	0	0	0
5/13	2	(M) River mile 19.1 to river mile 17.0	2.1	1	0	0	0
5/13	2	(N) River mile 16.8 to river mile 14.7	2.1	0	0.5	0	0
5/13	2	(O) River mile 14.7 to river mile 12.8	1.9	0	0	0	1
5/13	2	(P) River mile 12.8 to river mile 11.6	1.2	0	0	0	0
5/14	2	(Q) River mile 4.4 to river mile 1.7	2.7	0	0	0	0
5/14	2	(R) River mile 1.7 to river mile 0.0	1.7	0	0	0	0
		Total	**14.3**	**1**	**0.1**	**0**	**1**

[a] A: Bridge at farmhouse to Hood Rd., B: Hood Rd. to Powerline Rd., C: Powerline Rd. to Braden Rd., D: RM 1.8 to RM 1.7, E: RM 1.6 to RM 1.3, F: RM 1.2 to RM 0.9, G: Springdale Rd. to Mouth of East Little Walla Walla, H: Stateline Rd. to RM 4.9 I: RM 4.7 to RM 4.3 J: Frog Hollow Rd. to RM 2.7 K: RM 2.6 to RM 1.6 L: Stateline to Wickersham Brg., M: Wickersham Brg. to RM 17.0, N: Blue Ck. to Seven Mile Rd., O: Seven Mile Rd. to Five Mile Rd., P: Five Mile Rd. to Bennington Lake Diversion, Q: Hussey St. to Last Chance Rd., R: Last Chance Rd to Mouth of Mill Ck.

Bull Trout

Bull trout spawning surveys were conducted in the upper Wolf Fork Touchet again in 2002 (Table 10). Water temperatures in the Wolf Fork during bull trout spawning season were generally in the low to mid 40's (F). A total of 92 redds and 75 fish were observed between river mile 7.5 and river mile 13.5. This is the second highest redd count recorded from 1990 through 2002, the only count higher was 93 redds seen in 1999 (Figure 12, Table 11).

Table 10. Bull trout spawning survey summary for the Wolf Fork, 2002.

Reach/ date	Survey	Stream section[a]	Miles	Redds	Redds per mile	Fish Observed	
Wolf Fork						**Live**	**Dead**
9/3	1	(A) River mile 13.5 to river mile 12.0	1.5	3	2.0	20	0
9/3	1	(B) River mile 12.0 to river mile 10.7	1.3	0	0	4	0
9/3	1	(C) River mile 10.7 to river mile 9.8	0.9	9	10.0	20	0
9/3	1	(D) River mile 9.8 to river mile 8.7	1.1	2	1.8	3	0
9/9	1	(E) River mile 8.7 to river mile 7.5	1.2	4	3.3	0	0
9/16	2	(A) River mile 13.5 to river mile 12.0	1.5	8	5.3	11	0
9/16	2	(B) River mile 12.0 to river mile 10.7	1.3	6	4.6	0	0
9/16	2	(C) River mile 10.7 to river mile 9.8	0.9	22	24.4	11	0
9/16	2	(D) River mile 9.8 to river mile 8.7	1.1	1	0.9	2	0
9/16	2	(E) River mile 8.7 to river mile 7.5	1.2	0	0	0	0
10/3	3	(A) River mile 13.5 to river mile 12.0	1.5	13	8.7	0	0
10/3	3	(B) River mile 12.0 to river mile 10.7	1.3	5	3.8	3	0
10/3	3	(C) River mile 10.7 to river mile 9.8	0.9	8	8.8	0	0
10/3	3	(D) River mile 9.8 to river mile 8.7	1.1	5	4.5	1	0
10/3	3	(E) River mile 8.7 to river mile 7.5	1.2	1	0.8	0	0
10/16	4	(A) River mile 13.5 to river mile 12.0	1.5	1	0.7	0	0
10/16	4	(B) River mile 12.0 to river mile 10.7	1.3	4	3.1	0	0
10/16	4	(C) River mile 10.7 to river mile 9.8	0.9	0	0	0	0
10/16	4	(D) River mile 9.8 to river mile 8.7	1.1	0	0	0	0
10/16	4	(E) River mile 8.7 to river mile 7.5	1.2	0	0	0	0
		Total	**6.0**	**92**	**15.3**	**75**	**0**

[a] A: RM 13.5 (2nd Meadow) to Forest Service Line, B: Forest Service Line to mouth of Tate Ck., C: Mouth of Tate Ck. to RM 9.8 (stream ford below Green Fly canyon) D: RM 9.8 (stream ford below Green Fly canyon) to old cabin, E: Old cabin to Whitney Ck.

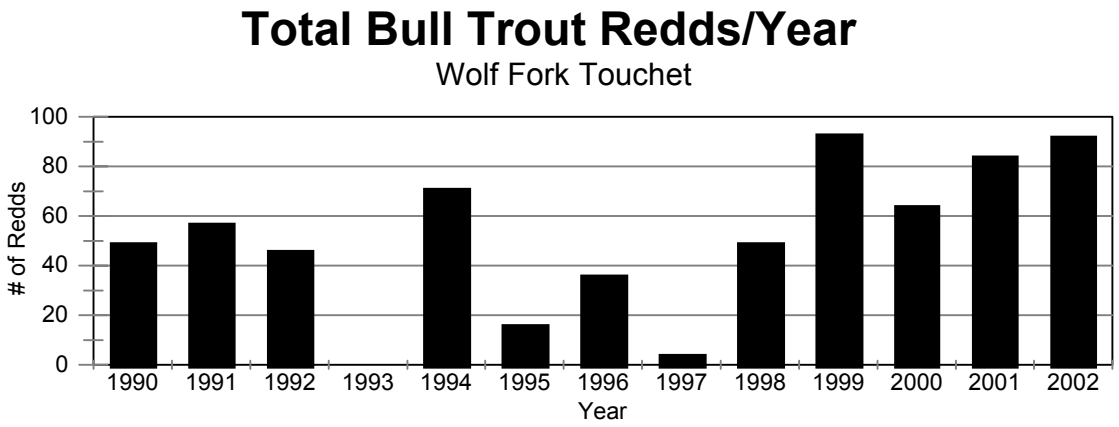

Figure 12. Bull trout redd counts for the Wolf Fork, 1990-2002.

Table 11. Bull trout spawning survey summary, redd count (number of times surveyed), for the Wolf Fork , 1990-2002.

	Reach Surveyed[a]						
	A	B	C	D	E	F	
Year	River Mile 13.5-12.0	River Mile 12.0-10.7	River Mile 10.7-9.8	River Mile 9.8-8.7	River Mile 8.7-7.5	River Mile 7.5-6.8	Total Redds
1990		18 (8)	31 (8)				49
1991		20 (5)	37 (5)				57
1992		46 (3)					46
1993[b]							0
1994		71(?)					71
1995		16(?)					16
1996		36(?)					36
1997[c]				4 (1)			4
1998	11 (3)	7 (3)	18 (3)	12 (3)	0 (3)		48
1999	32 (4)	14 (5)	34 (5)	11 (5)	2 (4)		93
2000	3 (3)	17 (4)	33 (4)	7 (4)	4 (3)		64
2001	15 (4)	19 (4)	36 (4)	11 (4)	2 (3)	1 (2)	84
2002	25 (4)	15 (4)	39 (4)	8 (4)	5 (4)		92

[a] A: RM 13.5 (2nd meadow) to Forest Service line, B: Forest Service Line to Mouth of Tate Ck., C: Mouth of Tate Ck to RM 9.8 (stream ford below Green Fly canyon), D: RM 9.8 (stream ford below Green Fly canyon) to Old cabin, E: Old cabin to Mouth of Whitney Ck., F: Mouth of Whitney Ck. to First bridge below yellow gate.
[b] No survey conducted.
[c] One survey conducted late in October and too far downstream.

In 2002, we also surveyed the upper South Fork Touchet and the Burnt Fork for bull trout. The Burnt Fork was surveyed from river mile 3.5 to the mouth. A total of 2 redds and 1 fish were found in this area giving an average of 0.6 redds/mile (Table 12); this is reduced from 4.6 redds/mile in 2001 (Mendel et. al, 2002). This was the lowest number of redds seen in the Burnt Fork since we began surveys there in 2000 (Figure 13). The South Fork Touchet was surveyed from the confluence of the Burnt Fork and Green Fork downstream 0.6 miles. No redds were seen in this section, but 1 fish was observed.

Table 12. Bull trout spawning survey summary for the South Fork Touchet and one of its tributaries, 2002.

Reach/ date	Survey	Stream section[a]	Miles	Redds	Redds per mile	Fish Observed	
South Fork Touchet						**Live**	**Dead**
9/13	1	(A) River mile 15.4 to river mile 14.8	0.6	0	0	0	0
9/13	1	(B) River mile 14.8 to river mile 14.2	0.6	0	0	0	0
10/17	2	(A) River mile 15.4 to river mile 14.8	0.6	0	0	0	0
10/17	2	(B) River mile 14.8 to river mile 14.2	0.6	0	0	1	0
		Total	**1.2**	**0**	**0**	**1**	**0**
Burnt Fork							
9/13	1	(C) River mile 3.5 to river mile 1.4	2.1	1	0.5	1	0
9/13	1	(D) River mile 1.4 to river mile 0.0	1.4	0	0	0	0
10/4	2	(C) River mile 3.5 to river mile 1.4	2.1	1	0.5	0	0
10/4	2	(D) River mile 1.4 to river mile 0.0	1.4	0	0	0	0
10/17	3	(C) River mile 3.5 to river mile 1.4	2.1	0	0	0	0
10/17	3	(D) River mile 1.4 to river mile 0.0	1.4	0	0	0	0
		Total	**3.5**	**2**	**0.6**	**1**	**0**

[a] A: Confluence of Burnt Fk. and Green Fk. to RM 14.8 (stream ford below cabin), B: RM 14.8 (stream ford below cabin) to mouth of Griffen Fk., C: Just above forks to RM 1.4 (just below FS line), D: RM 1.4 (just below FS line) to mouth of Burnt Fk

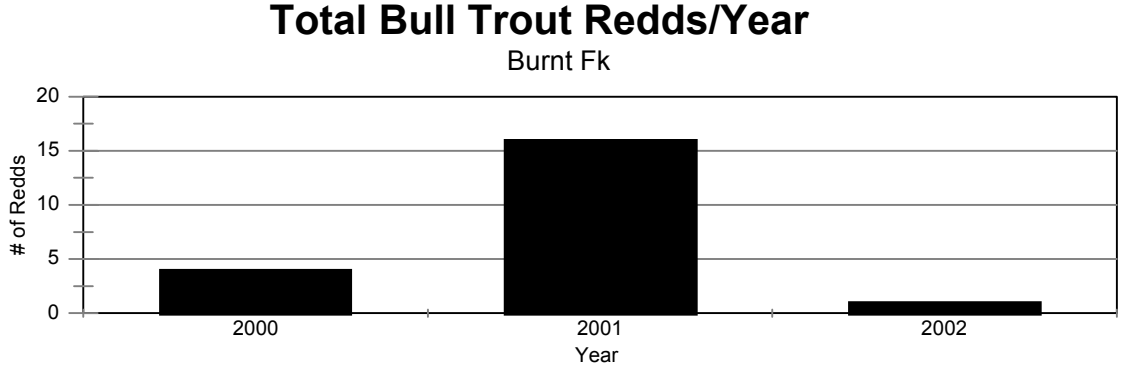

Figure 13. Bull trout redd counts for the Burnt Fork, 2000-2002

In the North Fork Touchet we found the lowest number of bull trout redds since 1996 (Figure 14, Table 14). While only 29 redds and 71 fish were observed during the surveys (Table 13). We also surveyed Lewis Creek, one of the tributaries to the North Fork Touchet, and found 2 redds and observed 2 fish.

Table 13. Bull trout spawning survey summary for the North Fork Touchet and one of its tributaries, 2002.

Reach/ date	Survey	Stream section[a]	Miles	Redds	Redds per mile	Fish Observed	
North Fork Touchet						**Live**	**Dead**
9/5	1	(A) River mile 16.6 to river mile 19.1	2.5	0	0	34	0
9/5	1	(B) River mile 14.0 to river mile 16.6	2.6	0	0	3	0
9/19	2	(A) River mile 16.6 to river mile 19.1	2.5	9	3.6	18	0
9/19	2	(B) River mile 14.0 to river mile 16.6	2.6	0	0	5	0
10/2	3	(A) River mile 16.6 to river mile 19.1	2.5	19	7.6	8	0
10/2	3	(B) River mile 14.0 to river mile 16.6	2.6	1	0.4	2	0
10/17	4	(A) River mile 16.6 to river mile 19.1	2.5	0	0	1	0
10/17	4	(B) River mile 14.0 to river mile 16.6	2.6	0	0	0	0
		Total	**5.1**	**29**	**5.7**	**71**	**0**
Lewis							
9/10	1	(C) River mile 2.1 to river mile 1.1	1.0	1	1.0	2	0
9/10	2	(D) River mile 1.1 to river mile 0.1	1.0	0	0	0	0
10/8	1	(C) River mile 2.1 to river mile 1.1	1.0	1	1.0	0	0
10/8	2	(D) River mile 1.1 to river mile 0.1	1.0	0	0	0	0
		Total	**2.0**	**2**	**1.0**	**2**	**0**

[a] A: Bluewood culvert to 2.5 miles below Bluewood culvert (just above first road culvert), B: 2.5 miles below Bluewood culvert (just above first road culvert) to stream ford below mouth of Spangler Ck., C: 1.0 miles above Forest Service Line to Forest Service Line, D: Forest Service Line to North Fork Touchet Rd.

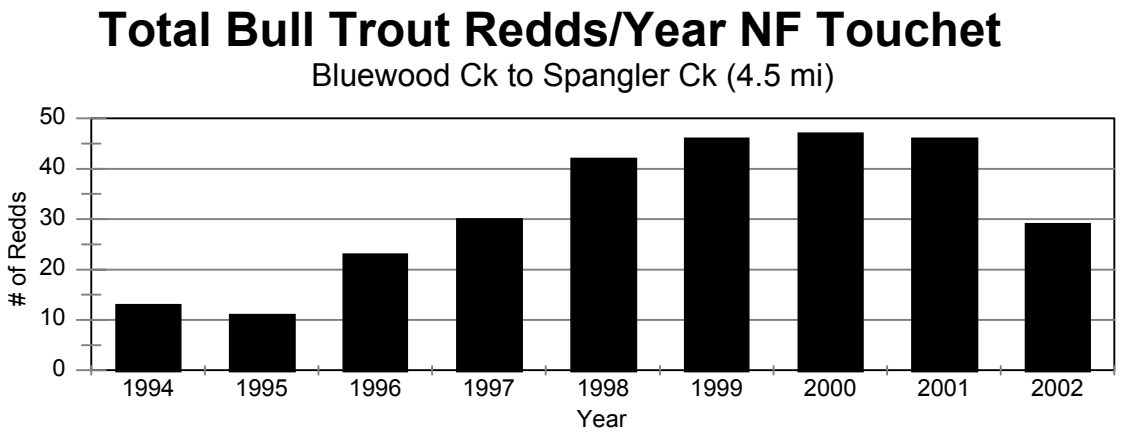

Figure 14. Bull trout redd counts for the North Fork Touchet, 1994-2002

Table 14. Bull trout spawning survey summary, redd count (number of times surveyed), for the North Fork Touchet River, 1994-2002.

	Reach Surveyed[a]		
	A	B	
Year	River Mile 19.1-16.6	River Mile 16.6-14.0	Total Redds
1994	10 (2)	3 (2)	13
1995	11 (2)	0 (1)	11
1996	21 (2)	2 (2)	23
1997	24 (2)	6 (1)	30
1998	24 (3)	18 (2)	42
1999	25 (2)	21 (2)	46
2000	47 (2)	0 (1)	47
2001	41(4)	5 (4)	46
2002	28 (4)	1 (4)	29

[a] A: Bluewood culvert to 2.5 miles below Bluewood culvert, B: 2.5 miles below Bluewood culvert to Stream ford below mouth of Spangler Ck.

Genetic Sampling and Analyses

Fin clips were collected from a total of 144 fish in the Walla Walla basin during the 2002 field season. One hundred and twelve of these samples from various species were taken at the Touchet River trap in Dayton (most taken by Snake River Lab (SRL) staff), and the other 32 were collected by Fish Management staff. The Touchet River trap is only partially effective as some fish can jump the dam. Of the 32 samples collected by Fish Management staff, 30 were from juvenile RBT's and 2 were from bull trout.

Snake River Lab staff sampled 187 steelhead at the Touchet River trap, and collected 95 DNA samples from steelhead. Specific details for steelhead sampled at the trap is in the Snake River Lab's 2002 annual report (Bumgarner et al. 2003).

Snake River Lab and Fish Management personnel sampled 23 bull trout at the Dayton trap (Appendix G). Two other bull trout were sampled by Fish Management during electrofishing surveys on Lewis Creek.

Five mountain whitefish were also collected at the Touchet River trap, but DNA samples were only collected from one fish (Appendix G).

All the genetic samples are currently being held at either the SRL or Fish Management offices in Dayton. They are being prepared for shipment to the WDFW Genetics Stock Identification Lab for DNA analysis.

Preliminary genetic analyses for steelhead samples previously collected and funded by this project and the SRL is reported in Bumgarner et al. 2003. The analyses confirmed genetic differences among various collections in the upper Walla Walla and the Touchet River, and between hatchery and wild fish. Results and conclusions were generally similar to those reported by the CTUIR (Contor et al. 2003).

Conclusions and Recommendations

Mainstem Walla Walla Settlement Agreement

Although the settlement agreement is meant to provide passage flows for bull trout, additional analyses that include local air temperatures, precipitation, snow pack, and irrigation use by other parties should be conducted to determine the full effects of increased bypass flows from the settlement agreement on stream flows, water temperatures, salmonid abundance and distribution in the Washington portion of the Walla Walla Basin, upstream of the confluence with the Touchet River. Summaries of our data indicate that stream flows in the upper portion of the settlement area in 2002 increased by 110 to 185% (Pepper Rd. bridge), but flows below that were inconsistent. While flows increased there was no consistent decrease in water temperature. We are still uncertain how much of these changes can be attributed strictly to the increased settlement flows as opposed to differences in weather, snow pack levels and other variables among years.

Spring Chinook Status

Chinook salmon have rarely been observed in the Walla Walla basin from the mid 1950s until about 1998 or 1999. The CTUIR continued the experimental reintroduction of spring chinook in upper Mill Creek and the upper Walla Walla River in 2002 by outplanting adults from Ringold Hatchery into the basin in August. High densities of juvenile chinook were seen in the Wolf Fork of the Touchet River due to a large return of adult spring chinook in 2001. Juvenile chinook were also seen in low densities in the upper portion of the Walla Walla River (in Washington), the lower Robinson Fork, the lower South Fork Touchet, and the mainstem Touchet River around Dayton.

Recommendations for Assessment Activities in 2003

a) Continue to monitor the mainstem Walla Walla River from the Stateline downstream to McDonald Bridge to document changes in stream temperatures, water flows, and salmonid densities and distribution with the addition of water under the settlement agreement.

b) Continue and emphasize monitoring of the Mill Creek flood channel, and other parts of Mill Creek, Titus Creek, Garrison and Yellowhawk creeks, to document seasonal changes in temperatures, flows, and fish distribution and abundance. Increase steelhead redd surveys and electrofishing surveys. Information is needed to guide management and restoration actions in the Mill Creek system (includes Titus, Garrison and Yellowhawk creeks).

c) Reevaluate the seasonal distribution and abundance of salmonids in Whiskey Creek now that passage has been restored in lower Whiskey Creek. Conduct steelhead spawning surveys and spring electrofishing, as well as summer surveys, to document seasonal use, distribution and relative abundance, as well as the presence or absence of available water.

d) Continue to emphasize monitoring of the Little Walla Walla system to document flows, temperatures, and salmonid use seasonally. This information is necessary to guide decisions and actions for managing this modified system.

e) Continue to evaluate bull trout use (densities and distribution) of Lewis Creek, as well as emergence timing in the North Fork and Wolf Fork of the Touchet River. Collect genetic samples from each of the Touchet River tributaries for a genetic comparison of these populations. Snorkel the Walla Walla River below the Stateline in spring to try and locate bull trout.

f) Select or develop a habitat survey protocol and begin conducting habitat inventory and assessment surveys. Detailed habitat assessment inventory data are lacking in nearly all portions of the Walla Walla Basin within Washington. This lack of information limits watershed and subbasin planning and restoration actions. Begin habitat inventory in one or more stream reaches in 2003, and evaluate its utility.

g) Continue to examine water temperatures and flows in May and June for possible effects on salmonid passage in the lower Walla Walla, lower Mill Creek, and the middle and lower Touchet River.

h) Increase genetic samples from adult steelhead in Mill and Yellowhawk creeks for comparison with the upper Walla Walla and the Touchet watershed.

i) Summarize bull trout spawning surveys for Mill Creek, South Fork Touchet River, Lewis Creek, etc. over all years available. Examine the number of counts and locations of counts by stream reach to determine comparability and utility.

j) Look for and document any new barriers (physical or physiological) to fish migrations in the Washington portion of the subbasin.

k) Resample for salmonid abundance and distribution below Dayton or Prescott in the Touchet River, and in the Walla Walla River from Detour to the mouth of the Touchet River. Document all species encountered.

l) Collect genetic samples from juvenile steelhead below the Stateline, and in Coppei Creek and compare with hatchery steelhead samples or samples from other areas in the Walla Walla Basin to try and determine whether primarily wild or hatchery steelhead are spawning in these areas.

m) Resample Coppei Creek for steelhead spawning and juvenile fish use as this has not been done for several years.

n) Increase fish sampling in middle and lower Dry Creek and its major tributaries (e.g. both Mud creeks).

o) Summarize all WDFW continuous flow data collected (e.g. Stateline and lower Mill Creek) over the years in tabular format for the annual report.

p) Increase scale sampling and summarize results of all scales collected over the years.

q) Continue to collect information regarding stream flows, temperatures and fish use in the South Fork of the Touchet River, as much of these data were not collected in the first couple of years of this study.

r) Begin to evaluate temperature and flow data for spring chinook habitat conditions in the Touchet River. This information will be used to evaluate possible spring chinook reintroduction in the Touchet River in the near future.

s) Expand sampling of Lewis and Spangler creeks to document bull trout distribution and relative abundance.

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Appendix A. Study Sites, 2002

Appendix A. Table 1. Touchet River and tributary study sites, 2002.

Stream	Site	RM[a]	Location	Sample Type[b]	Comments
NF Touchet	NFT-1	19.1	T7N,R40E,Sect 18,NW¼,SW¼	T[d]	~15 meters below Bluewood culvert
River	NFT-2	17.6	T7N,R40E,Sect 5,SE¼,SW¼	EL	~1.0 miles below Sno-Park
	NFT-3	16.0	T8N,R40E,Sect 33,SE¼,SW¼	EL	~2.0 miles above Spangler Ck turn
	NFT-4	15.6	T8N,R40E,Sect 33,SW¼,NE¼	EL	~1.5 miles above Spangler Ck turn
	NFT-5	15.0	T8N,R40E,Sect 28,SE¼,SE¼	EL	~1.0 miles above Spangler Ck turn
	NFT-6	14.5	T8N,R40E,Sect 28,SE¼,NE¼	EL	~0.5 miles above Spangler Ck turn
	NFT-7	14.0	T8N,R40E,Sect 21,SE¼,SE¼	T[d], F[c,d]	~0.2 miles below Spangler Ck mouth
	NFT-8	11.1	T8N,R40E,Sect 9, NW¼,NW¼	EQ[e]	20 meters above mile post 13 bridge
	NFT-9	9.3	T9N,R40E,Sect 31,SE¼,SE¼	EQ[e]	50 meters above mile post 11 bridge
	NFT-10	7.6	T9N,R40E,Sect 30,SW¼,NE¼	T[d], F[c,d]	~40ft below Jim Ck mouth
	NFT-11	7.5	T9N,R40E,Sect 30,SW¼,NE¼	EQ[e], F[c,d]	0.1 miles below Jim Ck mouth
	NFT-12	5.7	T9N,R39E,Sect 13,NW¼,SE¼	EQ[e]	100 meters above mile post 7
	NFT-13	4.3	T9N,R39E,Sect 11,NE¼,SE¼	EQ[e]	50 meters above Wolf Fork Rd. Bridge
	NFT-14	2.1	T9N,R39E,Sect 3, SE¼,NW¼	EQ[e]	100 meters above Vernon Ln. Bridge
	NFT-15	1.4	T9N,R39E,Sect 4,NW¼,NE¼	T[d], F[c,d]	Above Baileysburg
	NFT-16	0.1	T10N,R39E,Sect 32,NW¼,SE¼	EQ[e]	90ft above confluence of NF and SF
Spangler Ck	SC-1	0.2	T8N,R40E,Sect 27,NW¼,NW¼	T[d], F[c,d]	0.2 miles above Spangler Ck. mouth
Lewis Ck	LC-1	2.0	T8N,R40E,Sect 3,SE¼,SE¼	EL	1.1 miles above Forest Service line
	LC-2	2.0	T8N,R40E,Sect 3,SE¼,SE¼	EQ	1.1 miles above Forest Service line
	LC-3	1.4	T8N,R40E,Sect 3,NE¼,SW¼	EL	0.5 miles above Forest Service line
	LC-4	1.4	T8N,R40E,Sect 3,NE¼,SW¼	EQ	0.5 miles above Forest Service line
	LC-5	0.9	T8N,R40E,Sect 4,SE¼,SE¼	EL	0.2 miles below Forest Service line
	LC-6	0.9	T8N,R40E,Sect 4,SE¼,SE¼	EQ	0.2 miles below Forest Service line
	LC-7	0.5	T8N,R40E,Sect 9,NW¼,NE¼	EQ	0.4 miles above NF Touchet Rd brg
	LC-8	0.5	T8N,R40E,Sect 9,NW¼,NE¼	EL	0.4 miles above NF Touchet Rd brg
	LC-9	0.1	T8N,R40E,Sect 9,NW¼,NW¼	T[d], F[c,d]	~ 10ft above NF Touchet Rd brg
Jim Ck	JC-1	0.3	T9N,R40E,Sect 30,SE¼,NE¼	T[d], F[c,d]	~ 10ft below culvert on Jim Ck Rd
Wolf Fk	WF-1	9.8	T8N,R39E,Sect 25,SE¼,NE¼	T[d],F[c]	0.6mi below Green Fly Canyon
	WF-2	7.3	T8N,R40E,Sect 7,NW¼,SW¼	EQ[e]	20 meters below mouth of Coates Ck
	WF-3	6.6	T8N,R39E,Sect 1,SE¼,SE¼	EQ[e]	~1.2 miles below Coates Ck
	WF-4	5.4	T9N,R39E,Sect 36,NW¼,SE¼	EQ[e]	Fourth bridge on Wolf Fk Rd.
	WF-5	4.5	T9N,R39E,Sect 36,NW¼,NW¼	T[d], F[c,d]	~ 15ft below 3rd brg on Wolf Fk Rd
	WF-6	4.1	T9N,R39E,Sect 25,SW¼,SE¼	EQ[e]	2nd bridge on Wolf Fk Rd
	WF-7	2.7	T9N,R39E,Sect 23,SW¼,SE¼	EQ[e]	2.4 miles above 1st bridge on Wolf Fk Rd
	WF-8	1.8	T9N,R39E,Sect 23,NW¼,NW¼	T[d], F[c]	Directly below Holmberg Rd brg
	WF-9	1.3	T9N,R39E,Sect 14,NW¼,SW¼	EQ[e]	1.2 miles above 1st bride on Wolf Fk Rd
	WF-10	0.1	T9N,R39E,Sect 11,SW¼,NE¼	EQ[e]	Just above mouth
Whitney Ck	WH-1	0.3	T8N,R40E,Sect 7,NE¼,SW¼	T[d], F[c,d]	0.2 miles up Whitney Ck Rd
Coates Ck	C-1	0.1	T8N,R40E,Sect 7,NE¼,SW¼	T[d], F[c,d]	~100ft above Wolf Fk Rd

[a] River Mile
[b] EQ-Quantitative Electrofishing (density estimates); EL-Qualitative Electrofishing; T-Temperature; F-Flow; G-Flow Gauge
[c] Index discharge site
[d] Same as previous year
[e] Sites electrofished by Snake River Lab personnel

Appendix A. Table 1. (Continued) Touchet River and tributary study sites, 2002.

Stream	Site	RM[a]	Location	Sample Type[b]	Comments
Robinson	RF-1	4.7	T8N,R39E,Sect 15,SW¼,NE¼	EQ[e]	2.2 road miles above 1st bridge above gate
	RF-2	3.6	T8N,R39E,Sect 11,NW¼,NW¼	EQ[e]	1.2 road miles above 1st bridge above gate
	RF-3	2.4	T8N,R39E,Sect 2, NW¼,NE¼	EQ[e]	200 m above 1st bridge above gate
	RF-4	1.5	T9N,R39E,Sect 35,NE¼,SW¼	EQ[e]	50 m above second bridge
	RF-5	0.5	T9N,R39E,Sect 26,NW¼,SE¼	EQ[e]	150 m below first bridge
Green Fk	GF-1	2.1	T7N,R38E,Sect 13,SW¼,SE¼	T[d]	RM 2.1
	GF-2	0.0	T7N,R39E,Sect 7,NE¼,NW¼	F	~25 feet above the mouth
Burnt Fk	BF-1	1.3	T7N,R39E,Sect 8,SW¼,SW¼	T[d]	RM 1.3
	BF-2	0.0	T7N,R39E,Sect 7,NE¼,NW¼	F	~25 feet above the mouth
SF Touchet	SFT-1	15.2	T9N,R39E,Sect 6,SE¼,SW¼	T[d]	0.2 miles below Burnt Fk
River	SFT-2	14.8	T9N,R39E,Sect 6,SE¼,SW¼	F	0.6 miles below Burnt Fk
	SFT-3	14.1	T8N,R39E,Sect 31,SE¼,SE¼	EQ[e]	Below the mouth of the Griffen Fk
	SFT-4	12.4	T8N,R39E,Sect 30,SE¼,NE¼	EQ[e]	~2 miles below Griffen Fk mouth
	SFT-5	10.3	T8N,R39E,Sect 17,NE¼,SW¼	EQ[e]	~2 miles above gate
	SFT-6	8.4	T8N,R39E,Sect 5,NW¼,SE¼	T,F[c],EQ[e]	~50 ft above Camp Nancy Lee brg
	SFT-7	6.5	T9N,R39E,Sect 33,NW¼,NW¼	EQ[e]	~4 miles above Pettyjohn Rd Bridge
	SFT-8	4.6	T9N,R39E,Sect 21,SE¼,NE¼	EQ[e]	~2miles above Pettyjohn Rd Bridge
	SFT-9	2.4	T9N,R39E,Sect 9,NW¼,SW¼	EQ[e]	Below Pettyjohn Rd Bridge
	SFT-10	0.5	T8N,R39E,Sect 5,NW¼,NE¼	T[d],F[c,d]	Gephart Rd
	SFT-11	0.1	T10N,R39E,Sect 32,NW¼,SE¼	EQ[e]	20 meters above mouth
Touchet	TR-1	54.8	T10N,R39E,Sect 32,NE¼,SW¼	EQ[e]	25 meters below confluence of NF and SF
River	TR-2	53.8	T10N,R39E,Sect 30,SE¼,SE¼	T[d]	~20 ft below SRL Trap
	TR-3	53.5	T10N,R39E,Sect 30,NW¼,SE¼	F[c,d]	0.3 miles below SRL Trap
	TR-4	52.8	T10N,R38E,Sect 25,NE¼,NE¼	EQ[e]	Behind golf course
	TR-5	51.1	T10N,R38E,Sect 35,NE¼,SE¼	EQ[e]	Above Ward Rd.
	TR-6	49.6	T9N,R38E,Sect 3,SE¼,NW¼	EQ[e]	100 meters above Rose Gulch Rd. Bridge
	TR-7	48.4	T9N,R38E,Sect 4,SW¼,NW¼	T[d]	Behind Lewis and Clark State Park
	TR-8	48.0	T9N,R38E,Sect 5,SW¼,NE¼	F,EQ[e]	Hwy 12 brg downstream of L.C.S.P.
	TR-9	47.6	T9N,R38E,Sect 5,SE¼,NW¼	EQ[e]	RM 47.6
	TR-10	45.6	T9N,R37E,Sect 12,NW¼,SE¼	EQ[e]	RM 45.6
	TR-11	44.1	T9N,R37E,Sect 11,NW¼,SW¼	EQ[e]	50 meters above Main St brg in Waitsburg
	TR-12	11.4	T8N,R33E,Sect 23,NE¼,SW¼	F[d],T[d]	Below Simms Rd brg
	TR-13	4.6	T7N,R33E,Sect 15,NE¼,NE¼	F[d],G	Above Hofer Dam
	TR-14	1.5	T7N,R33E,Sect 27,NW¼,SE¼	F[d]	~90 feet above Cummins Rd brg
SF Patit Ck	SFP-1	2.1	T10N,R40E,Sect 21,NW¼,SW¼	T,F	~10ft above 2nd brg on SF Patit Rd
Whiskey Ck	WC-1	5.7	T9N,R38E,Sect 33,SE¼,NW¼	EL	~30ft up main trib on Whiskey Ck Rd
	WC-2	5.7	T9N,R38E,Sect 33,SE¼,NW¼	EL	~10ft below main trib on Whiskey Ck Rd
	WC-3	3.5	T9N,R38E,Sect 20,SE¼,NE¼	EL	2nd bridge on Whiskey Ck Rd
	WC-4	2.6	T9N,R38E,Sect 17,NW¼,SE¼	EQ	1st bridge on Whiskey Ck Rd
	WC-5	0.0	T9N,R37E,Sect 12,NE¼,SE¼	T[d],F,EQ	~ 20 feet above the mouth
SF Coppei	SFC-1	0.8	T8N,R38E,Sect 18,NW¼,NE¼	T,F[c,d]	~10ft above 2nd br on SF Coppei Rd
NF Coppei	NFC-1	0.1	T8N,R38E,Sect 7,NW¼,NW¼	T,F[c,d]	~ 20 feet above Forks brg
Coppei Ck	CO-1	4.6	T9N,R37E,Sect 25,SW¼,SE¼	T[d],F[c,d]	~ 40 feet above McCowan Rd brg

[a] River Mile
[b] EQ-Quantitative Electrofishing (density estimates); EL-Qualitative Electrofishing; T-Temperature; F-Flow; G-Flow Gauge
[c] Index discharge site
[d] Same as previous year
[e] Sites electrofished by Snake River Lab personnel

Appendix A. Table 2. Walla Walla River and tributary study sites, 2002.

Stream	Site	RM[a]	Location	Sample Type[b]	Comments
Walla Walla	WW-1	40.0	T6N,R35E,Sect 13,SW¼,NE¼	F[c],EQ,G	Stateline
River	WW-2	39.6	T6N,R35E,Sect 13,NE¼,NW¼	T,F[c],EQ	~ 30 meters above Pepper Rd brg
	WW-3	38.9	T6N,R35E,Sect 12,NW¼,SW¼	EQ,F[c]	0.7 miles below Pepper Rd
	WW-4	38.1	T6N,R35E,Sect 38,SE¼,NE¼	EQ	~ 15 ft above Yellowhawk Ck mouth
	WW-5	37.1	T6N,R35E,Sect 3,SW¼,SE¼	EL,F[c]	0.5 miles above Burlingame Diversion
	WW-6	36.5	T6N,R35E,Sect 39,NE¼,NW¼	EL,F[c],T	~ 60 meters below Mojonnier Rd
	WW-7	35.1	T6N,R35E,Sect 5,NE¼,NE¼	EL	Below Last Chance Rd
	WW-8	34.0	T7N,R35E,Sect 38,SE¼,SW¼	F[c],EL	~20 meters above Swegle Rd brg
	WW-9	34.0	T7N,R35E,Sect 38,SE¼,SW¼	T	~5 meters below Swegle Rd brg
	WW-10	33.3	T7N,R35E,Sect 31, east edge	T,G,F[c],EL	0.4 miles above Detour Rd brg
	WW-11	32.9	T7N,R35E,Sect 31, west edge	EL	Detour Rd bridge
	WW-12	29.4	T7N,R34E,Sect 34,NW¼,NW¼	EL,F[c],T	~50 meters above McDonald Rd brg
	WW-13	27.4-27.2	T7N,R34E,Sect 29, South½,SW¼	EL	Lowden Gardena brg to mouth of Dry Ck
	WW-14	22.8	T7NR33E,Sect 3,SE¼,NW¼	T	~ 15 feet below Touchet Gardena brg
Yellowhawk	YC-1	8.0	T7N,R36E,Sect 23,NE¼,NW¼	T,G,F[c],EQ	~ 25 meters below Diversion
Creek	YC-2	6.8	T7N,R36E,Sect 27,NW¼,NE¼	EL	Carl St.
	YC-3	5.4	T7N,R36E,Sect 33,NE¼,NW¼	EQ	~ 50 meters above Fern Ave
	YC-4	5.2	T7N,R36E,Sect 33,SW¼,NW¼	EQ	0.2 miles below Fern Ave
	YC-5	4.1	T7N,R36E,Sect 37,SE¼,NW¼	EQ	3rd and Yellowhawk St
	YC-6	0.1	T6N,R35E,Sect 38,NE¼,NE¼	EQ,T,F[c]	~ 30 meters above the mouth
Caldwell Ck	CD-1	0.2	T7N,R36E,Sect 37,SE¼,NW¼	T	Directly below 3rd Ave culvert
Russel Ck	RC-1	3.0	T7N,R36E,Sect 34,NE¼,NW¼	F	~ 15 feet below Depping Rd
	RC-2	0.2	T7N,R36E,Sect 37,SW¼,SW¼	T	Under Plaza Way Rd bridge
Cottonwood	CWC-1	5.3	T6N,R36E,Sect 11,SE¼,SE¼	EQ	1.0 miles above Hood Rd
	CWC-2	4.4	T6N,R36E,Sect 10,NE¼,SE¼	EQ,T	~10 feet below Hood Rd bridge
	CWC-3	0.9	T6N,R36E,Sect 6,NE¼,SE¼	T,F[c],	~10 feet below Braden Rd bridge
	CWC-4	0.9	T6N,R36E,Sect 6,NE¼,SE¼	EQ	~75 feet below Braden Rd bridge
East Little	ELW-1	0.5	T6N,R35E,Sect 14,NW¼	EL	0.5 miles up Big Spring Branch
Walla Walla	ELW-2	0.4	T6N,R35E,Sect 14,NW¼	T,F[c,d]	0.4 miles up Big Spring Branch
	ELW-3	0.3	T6N,R35E,Sect 11,SW¼	EL	0.3 miles up Big Spring Branch
	ELW-4	0.6	T6N,R35E,Sect 38,NW¼,SW¼	EL, T[d]	~60 meters below Springdale Rd
	ELW-5	0.4	T6N,R35E,Sect 38,SW¼,NW¼	EL	0.4 miles above mouth
	ELW-6	0.2	T6N,R35E,Sect 38,NE¼,NW¼	T,F[c],G	0.2 miles above mouth
Garrison Ck	GC-1	9.1	T7N,R36E,Sect 23,NE¼,NW¼	F[c,d]	~ 10 meters below Diversion
	GC-2	0.3	T6N,R35E,Sect 3,SW¼,NW¼	T,F[c,d]	~ 5 feet above Mission Rd
Mill Creek	MC-1	21.7	T6N,R38E,Sect 18,SW¼,NW¼	EQ	Stateline
	MC-2	20.4	T6N,R37E,Sect 12,NW¼,NE¼	EQ	1.3 miles below the stateline
	MC-3	19.1	T6N,R37E,Sect 2,NW¼,NE¼	T[d]	~ 40 meters above Wickersham bridge
	MC-4	19.1	T6N,R37E,Sect 2,NW¼,NE¼	EQ	~ 15 meters below Wickersham bridge
	MC-5	17.0	T7N,R37E,Sect 26,SW¼,NW¼	EQ	0.2 miles above the mouth of Blue Ck
	MC-6	16.4	T7N,R37E,Sect 22,SE¼,SE¼	EQ	0.4 miles below Blue Ck mouth
	MC-7	15.5	T7N,R37E,Sect 22,NW¼,NW¼	EL	0.8 miles Above Seven Mile brg
	MC-8	14.7	T7N,R37E,Sect 16,SE¼,SW¼	EQ	~30 meters below Seven Mile brg

[a] River Mile
[b] EQ-Quantitative Electrofishing (density estimates); EL-Qualitative Electrofishing; T-Temperature; F-Flow; G-Flow Gauge
[c] Index discharge site
[d] Same as previous year

Appendix A. Table 2. (Continued) Walla Walla River and tributary study sites, 2002.

Stream	Site	RM[a]	Location	Sample Type[b]	Comments
Mill Ck	MC-9	12.8	T7N,R37E,Sect 18,NW¼,SE¼	T,F[c]	Under Five Mile brg
(Cont.)	MC-10	12.8	T7N,R37E,Sect 18,NW¼,SE¼	EQ[d]	~30 meters below Five Mile brg
	MC-11	11.4	T7N,R36E,Sec 13,Lower½,Donation	EL	~70 meters below Bennington Lake Dam
	MC-12	11.3	T7N,R36E,Sec 13,Lower½,Donation	T[d]	~45 meters above cold return
	MC-13	11.3	T7N,R36E,Sec 13,Lower½,Donation	T[d]	In the cold return
	MC-14	11.3	T7N,R36E,Sec 13,Lower½,Donation	T[d]	~45 meters below cold return
	MC-15	10.5	T7N,R36E,Sect 23,NW¼,NE¼	EL	~60 meters above the Yellowhawk Div.
	MC-16	10.4	T7N,R36E,Sect 23,NE¼,NW¼	EL	~30 meters below the Yellowhawk Div.
	MC-17	10.3	T7N,R36E,Sect 23, NW¼,NW¼	EL	Titus Ck outlet
	MC-18	10.0	T7N,R36E,Sect 22,NE¼,NE¼	EL,T[d]	First weir above Tausick Way brg
	MC-19	9.7	T7N,R36E,Sect 22,NE¼,NE¼	EL	0.3 miles below Tausick Way brg
	MC-20	9.3	T7N,R36E,Sect 22,SE¼,NW¼	EL	0.4 miles above Wilbur Ave
	MC-21	9.0	T7N,R36E,Sect 22,NW¼,SW¼	EL	First weir above Wilbur Ave
	MC-22	8.5	T7N,R36E,Sect 21,NW¼,SE¼	EL	Directly behind Edison School
	MC-23	8.4	T7N,R36E,Sect 21,NW¼,SE¼	F[d],T[d],EL	~15 meters above Roosevelt St
	MC-24	7.9	T7N,R36E,Sect 21,NW¼,SW¼	EL	Clinton St. bridge
	MC-25	7.6	T7N,R36E,Sect 20,NE¼,SE¼	EL	Otis St bridge upstream
	MC-26	7.6	T7N,R36E,Sect 20,NE¼,SE¼	EL	Otis St bridge downstream
	MC-27	7.3	T7N,R36E,Sect 20,NW¼,SE¼	EL	Spokane St bridge upstream
	MC-28	7.2	T7N,R36E,Sect 20,SW¼,SE¼	EL	Colville St to Spokane St
	MC-29	7.0	T7N,R36E,Sect 20,SW¼,SW¼	EL	4th Ave. bridge
	MC-30	6.7	T7N,R36E,Sect 19,SE¼,SE¼	EL,F[d]	9th Ave bridge
	MC-31	6.6	T7N,R36E,Sect 19,SE¼,SE¼	EL	~30 meters below 9th Ave
	MC-32	6.6	T7N,R36E,Sect 19,SE¼,SE¼	T[c,d]	~ 60 meters below 9th Ave
	MC-33	4.8	T7N,R35E,Sect 24,SW¼,SW¼	EL	2 weirs above Gose St up 3 weirs
	MC-34	4.7	T7N,R35E,Sect 23,SE¼,SE¼	EQ[d],T[d]	~10 feet below Gose St
	MC-35	2.7	T7N,R35E,Sect 28,NE¼,SE¼	EQ[d]	~20 meters above Wallula Rd brg
	MC-36	2.7	T7N,R35E,Sect 28,NE¼,SE¼	F[c],G	~20 meters below Wallula Rd brg
	MC-37	1.5	T7N,R35E,Sect 32,NE¼,NE¼	EQ[d]	0.2 miles below Last Chance Rd
	MC-38	0.4	T7N,R35E,Sect 38,SE¼,NW¼	EQ,T,F	~20 meters below Swegle Rd brg
Blue Ck	BLC-1	0.2	T7N,R37E,Sect 26,SE¼,NW¼	T[d]	Under Mill Ck Rd bridge
Titus Ck	TC-1	2.6	T7N,R37E,Sect 18,NW¼,SE¼	T[d],F[c]	~10 feet above Five Mile Rd
	TC-2	0.2	T7N,R36E,Sect 23,NE¼,NW¼	EL	Behind WWCC nursing building
	TC-3	0.1	T7N,R36E,Sect 23,NE¼,NW¼	EL	Footbridge at WWCC
Cold Ck	CC-1	0.6	T7N,R35E,Sect 22,NE¼,NE¼	T[d],F[c,d]	~30 meters below Last Chance Rd
Doan Ck	DNC-1	0.9	T7N,R35E,Sect 38, east edge	T[d],F[c,d]	0.4 miles below Last Chance Rd
West Little	WLW-1	4.5	T6N,R35E,Sect 9,NE¼,SW¼	T[d],F[c,d],EL	0.5 miles up Valley Chapel Rd
Walla Walla	WLW-2	3.4	T6N,R35E,Sect 5,SE¼,SE¼	EL	Frog Hollow Rd downstream
	WLW-3	0.8	T6N,R35E,Sect 37, north edge	T[d]	~5 feet above Swegle Rd
	WLW-4	0.5	T7N,R35E,Sect 38,SE¼,SW¼	EL	WDFW property
Walsh Ck	WAC-1	1.2	T6N,R35E,Sect 9,NW¼	T,F[c]	~20 feet above Valley Chapel Rd culvert

[a] River Mile
[b] EQ-Quantitative Electrofishing (density estimates); EL-Qualitative Electrofishing; T-Temperature; F-Flow; G-Flow Gauge
[c] Index discharge site
[d] Same as previous year

Appendix A. Table 2. (Continued) Walla Walla River and tributary study sites, 2002.

Stream	Site	RM[a]	Location	Sample Type[b]	Comments
NF Dry Ck	NFD-1	0.2	T7N,R38E,Sect 8,NW¼,SE¼	T[d],F[c,d]	.25 miles up Scott Rd
Dry Ck	DRC-1	27.3	T8N,R37E,Sect 35,NW¼,NE¼	T[d],F[c,d]	0.5 miles up Biscuit Ridge Rd
	DRC-2	20.7	T8N,R36,Sect 35,NE¼,NE¼	EL	Middle Waitsburg Rd bridge
	DRC-3	17.4	T7N,R36E,Sect 21,SW¼,NE¼	T[d]	~40 meters above Lower Waitsburg Rd
	DRC-4	3.4	T7N,R34E,Sect 22,SE¼,NE¼	T[d]	~ 20 meters below Talbott Rd brg
Spring Ck	SC-1	0.2	T7N,R37E,Sect 5,SW¼,NW¼	T[d]	~ 10 ft below Hwy 12 brg
Mud Ck	MDC-1	0.5	T7N,R34E,Sect 31,NW¼,SW¼	T[d],F[c,d]	~5 ft above Barney Rd brg
Pine Ck	PC-1	4.8	T6N,R34E,Sect 17,SE¼,NW¼	T[d]	~10 ft below Stateline Rd brg
	PC-2	1.3	T6N,R33E,Sect 1,SW¼,NW¼	T[d],F[c,d]	Directly under Sand Pit Rd brg

[a] River Mile
[b] EQ-Quantitative Electrofishing (density estimates); EL-Qualitative Electrofishing; T-Temperature; F-Flow; G-Flow Gauge
[c] Index discharge site
[d] Same as previous year

Appendix B. Discharge Data, 2002

Appendix B. Table 1. Manual discharge (cfs) measurements 2002.

Stream	Site	Date	CFS	Temp (F)	Time	Comments
Spangler Ck	SC-1	5/22	**19.9**	40.0	10:45	0.2 miles up Spangler Creek
		6/12	**12.5**	41.0	08:30	
		6/26	**8.0**	49.0	10:10	
		7/9	**5.1**	46.0	09:05	
		7/22	**3.0**	54.0	12:22	
		8/6	**3.0**	48.0	12:00	
		8/19	**3.0**	52.0	10:50	
		9/5	**2.1**	51.0	13:00	
		9/18	**2.0**	48.0	09:30	
		9/30	**2.5**	44.0	09:50	
		10/14	**1.4**	38.0	10:25	
		11/1	**2.0**	30.0	14:15	
NF Touchet R	NFT-7	5/22	**67.8**	40.0	11:05	0.2 miles below mouth of Spangler Creek
		6/12	**41.5**	42.0	08:45	
		6/26	**22.7**	49.0	10:20	
		7/9	**14.2**	48.0	09:26	
		7/22	**9.9**	60.0	12:49	
		8/6	**6.7**	49.0	12:20	
		8/19	**7.1**	53.0	11:05	
		9/5	**5.8**	53.0	13:10	
		9/18	**4.9**	49.0	09:40	
		9/30	**5.1**	46.0	10:08	
		10/14	**4.4**	40.0	10:36	
		11/1	**4.7**	32.0	14:30	
Lewis Creek	LC-9	5/22	**13.3**	44.0	11:45	~10 feet above N. Fork Touchet Rd
		6/12	**9.0**	46.0	09:00	
		6/26	**6.8**	53.0	10:30	
		7/9	**6.5**	50.0	09:46	
		7/22	**4.1**	65.0	13:42	
		8/6	**4.8**	50.0	12:55	
		8/19	**5.2**	53.0	11:20	
		9/5	**4.3**	53.0	13:30	
		9/18	**5.0**	49.0	09:55	
		9/30	**5.2**	48.0	10:25	
		10/14	**4.6**	44.0	10:50	
		11/1	**4.8**	38.0	14:00	
Jim Creek	JC-1	5/22	**3.0**	49.0	12:10	~10 feet below culvert on Jim Ck Rd
		6/12	**2.2**	51.0	09:20	
		6/26	**1.6**	61.0	10:50	
		7/9	**1.4**	57.0	10:02	
		7/23	**1.1**	64.0	10:14	
		8/6	**1.3**	55.0	13:15	
		8/19	**0.9**	59.0	11:30	
		9/5	**0.8**	56.0	12:30	
		9/18	**0.9**	54.0	10:05	
		9:30	**1.0**	49.0	10:44	
		10/14	**0.8**	43.0	11:04	
		11/1	**1.0**	33.0	13:45	

Appendix B. Table 1. Manual discharge (cfs) measurements 2002.

Stream	Site	Date	CFS	Temp (F)	Time	Comments
NF Touchet R	NFT-11	5/22	**114.7**	46.0	12:30	~40 feet below Jim Ck Mouth
		6/12	**67.0**	48.0	09:35	
		6/26	**43.2**	58.0	11:00	
		7/9	**28.6**	57.0	10:32	
		7/23	**38.7**	55.0	10:44	
		8/6	**24.7**	55.0	13:40	
		8/19	**20.7**	61.0	11:45	
		9/5	**21.1**	56.0	12:10	
		9/18	**21.5**	54.0	10:20	
		9/30	**20.9**	51.0	11:00	
		10/14	**19.7**	47.0	11:17	
		11/1	**21.6**	39.0	13:37	
Wolf Fork	WF-1	5/23	**47.6**	41.0	11:00	0.6 miles below Green Fly Canyon
Whitney Creek	WH-1	5/23	**13.8**	43.0	11:40	0.2 mi up Whitney Creek
		6/12	**8.2**	47.0	10:05	
		6/26	**5.8**	54.0	11:30	
		7/9	**5.5**	50.0	10:50	
		7/22	**4.0**	62.0	15:01	
		8/6	**3.5**	50.0	14:30	
		8/19	**3.3**	55.0	12:10	
		9/5	**3.2**	52.0	10:45	
		9/18	**3.1**	50.0	10:40	
		9/30	**2.6**	48.0	11:37	
		10/14	**2.4**	45.0	11:46	
		11/1	**2.7**	40.0	12:36	
Coates Creek	C-1	5/23	**9.0**	43.0	12:00	~100 feet above Wolf Fork Rd
		6/12	**4.9**	47.0	10:20	
		6/26	**3.4**	56.0	11:45	
		7/9	**2.6**	52.0	11:16	
		7/22	**3.2**	61.0	14:45	
		8/6	**2.0**	51.0	15:00	
		8/19	**1.8**	55.0	12:20	
		9/5	**2.0**	52.0	10:57	
		9/18	**1.9**	51.0	10:55	
		9/30	**2.0**	47.0	11:50	
		10/14	**1.9**	43.0	11:57	
		11/1	**1.8**	36.0	12:22	
Wolf Fork	WF-5	5/23	**82.4**	45.0	12:30	~15 feet below 3rd bridge on Wolf Fk Rd
		6/12	**55.1**	48.0	10:40	
		6/26	**38.9**	57.0	12:00	
		7/9	**32.6**	55.0	11:31	
		7/22	**25.1**	66.0	15:25	
		8/6	**24.9**	53.0	15:45	
		8/19	**24.6**	57.0	12:35	
		9/5	**25.6**	51.0	11:15	
		9/18	**28.7**	51.0	11:15	
		9/30	**23.5**	48.0	12:10	
		10/14	**24.3**	46.0	12:15	
		11/1	**24.2**	38.0	12:08	

Appendix B. Table 1. Manual discharge (cfs) measurements 2002.

Stream	Site	Date	CFS	Temp (F)	Time	Comments
Wolf Fork	WF-8	5/23	**97.3**	46.0	13:00	Holmberg Rd Bridge
		6/12	**65.1**	52.0	10:55	
		6/26	**45.4**	62.0	12:15	
		7/9	**38.0**	65.0	11:50	
		7/22	**24.5**	65.0	14:20	
		8/6	**25.8**	55.0	16:10	
		8/19	**25.9**	61.0	12:55	
		9/5	**22.8**	55.0	11:40	
		9/18	**26.7**	55.0	11:30	
		9/30	**24.4**	52.0	12:30	
		10/14	**24.2**	47.0	12:34	
		11/1	**23.3**	38.0	11:53	
NF Touchet R	NFT-15	5/22	**206.7**	51.0	14:10	Above Baileysburg
		6/12	**126.5**	55.0	11:15	
		6/26	**82.5**	67.0	12:30	
		7/9	**60.0**	65.0	12:14	
		7/23	**41.6**	71.0	12:32	
		8/6	**43.7**	61.0	16:30	
		8/19	**45.8**	66.0	13:10	
		9/5	**49.8**	58.0	10:15	
		9/18	**51.3**	59.0	11:45	
		9/30	**49.3**	57.0	12:53	
		10/14	**43.9**	48.0	12:52	
		11/1	**47.3**	38.0	11:30	
Green Fork	GF-2	10/17	**0.2**	45.0	13:06	~ 25 feet above mouth
Burnt Fork	BF-2	10/17	**1.2**	44.0	13:17	~ 25 feet above mouth
SF Touchet R	SFT-2	10/17	**1.5**	43.0	13:29	RM 14.8
SF Touchet R	SFT-6	5/22	**60.7**	50.0	14:40	~ 50 feet above Camp Nancy Lee brg
		6/12	**36.4**	56.0	11:40	
		6/26	**19.1**	68.0	12:55	
		7/9	**11.9**	65.0	11:40	
		7/22	**5.8**	73.0	16:15	
		8/6	**5.9**	62.0	16:58	
		8/19	**4.6**	70.0	13:35	
		9/5	**4.0**	61.0	09:30	
		9/18	**5.3**	65.0	12:10	
		9/30	**4.8**	61.0	13:52	
		10/14	**3.8**	55.0	13:18	
		11/1	**5.2**	42.0	11:03	
SF Touchet R	SFT-10	5/23	**57.3**	52.0	13:30	Gephart Rd
		6/12	**35.1**	60.0	12:00	
		6/26	**17.5**	72.0	13:15	
		7/9	**8.9**	68.0	12:15	
		7/22	**4.4**	76.0	17:00	
		8/6	**3.2**	62.0	17:25	
		8/19	**1.9**	72.0	14:00	
		9/5	**2.2**	64.0	10:00	
		9/18	**3.9**	63.0	12:30	
		9/30	**3.2**	59.0	13:52	
		10/14	**2.8**	55.0	13:42	
		11/1	**3.9**	38.0	10:40	

Appendix B. Table 1. Manual discharge (cfs) measurements 2002.

Stream	Site	Date	CFS	Temp (F)	Time	Comments
Touchet River	TR-3	6/12	**130.6**	65.0	16:10	Football field in Dayton
		6/26	**88.8**	70.0	13:35	
		7/9	**69.1**	66.0	12:45	
		7/22	**45.7**	76.0	17:05	
		8/6	**44.8**	61.0	17:30	
		8/19	**40.4**	69.0	14:20	
		9/5	**47.4**	63.0	14:10	
		9/18	**47.4**	60.0	12:50	
		9/30	**44.8**	57.0	14:15	
		10/14	**45.4**	52.0	14:15	
		11/1	**46.7**	36.0	10:23	
		11/13	**66.5**	46.0	08:20	
SF Patit Creek	SFP-1	5/23	**6.4**	47.0	09:05	2nd bridge
		6/26	**0.7**	63.0	09:15	
		7/22	**NM**[a]	N/A	N/A	Dry--Not measurable 7/22 to 11-1
Touchet River	TR-8	9/18	**46.8**	56.0	08:30	Highway 12 below Lewis and Clark
		9/30	**48.3**	58.0	14:40	State Park
Whiskey Creek	W-5	5/23	**4.3**	56.0	14:30	Above mouth
		6/13	**1.6**	60.0	11:00	
		6/26	**0.9**	68.0	14:00	
		7/9	**0.5**	59.0	10:45	
		7/23	**NM**[a]	69.0	13:51	No measurable flow
		8/6	**0.1**	55.0	10:20	
		8/19	**NM**[a]	64.0	16:15	No measurable flow 8-19 through 11-1
SF Coppei	SFC-1	5/30	**3.4**	60.0	14:30	Above Walker Rd bridge
		6/10	**5.0**	57.0	14:25	
		6/25	**1.7**	67.0	13:30	
		7/9	**1.3**	59.0	09:45	
		7/22	**0.8**	64.0	10:10	
		8/6	**1.0**	56.0	09:30	
		8/19	**0.9**	66.0	15:30	
		9/4	**1.1**	62.0	13:45	
		9/17	**1.5**	56.0	14:05	
		10/2	**1.7**	48.0	09:39	
		10/14	**1.5**	44.0	09:05	
		11/1	**1.1**	32.0	09:05	
		11/13	**2.2**	47.0	09:13	
NF Coppei	NFC-1	5/30	**2.9**	60.0	15:00	Forks bridge
		6/10	**3.0**	57.0	14:30	
		6/25	**1.5**	66.0	13:45	
		7/9	**0.9**	59.0	10:00	
		7/22	**1.2**	63.0	10:37	
		8/6	**1.5**	57.0	09:05	
		8/19	**0.8**	65.0	15:45	
		9/4	**0.8**	60.0	14:00	
		9/17	**1.5**	57.0	14:12	
		10/2	**1.3**	46.0	09:24	
		10/14	**1.3**	44.0	09:16	
		11/1	**1.7**	31.0	09:22	
		11/13	**1.6**	47.0	09:00	

[a] Not measurable

Appendix B. Table 1. Manual discharge (cfs) measurements 2002.

Stream	Site	Date	CFS	Temp (F)	Time	Comments
Coppei Ck	MC-1	6/10	**8.9**	61.0	14:55	Above McCowan Rd. bridge
		6/25	**2.8**	72.0	14:00	
		7/9	**1.8**	61.0	10:20	
		7/22	**1.5**	64.0	10:30	
		8/6	**1.0**	56.0	09:50	
		8/19	**1.2**	71.0	16:00	
		9/4	**1.2**	65.0	14:20	
		9/17	**2.2**	58.0	14:30	
		10/2	**1.9**	46.0	09:05	
		10/14	**2.2**	44.0	09:30	
		11/1	**N/M**[a]	30.0	09:30	Not measurable---froze over with ice
		11/13	**3.4**	46.0	08:48	
Touchet River	TR-12	6/24	**109.1**	69.0	09:00	Below Simms Road Bridge
		7/8	**59.7**	71.0	08:45	
		7/22	**35.5**	70.0	09:10	
Touchet River	TR-13	6/18	**155.3**	69.0	15:20	Above Hofer Dam
		6/24	**111.5**	71.0	09:40	
		7/8	**60.6**	71.0	08:59	
		7/22	**32.0**	73.0	09:40	
Touchet River	TR-14	7/8	**43.2**	71.0	09:30	Above Cummins Rd. bridge
		7/22	**14.6**	73.0	09:55	
		10/31	**34.5**	33.0	09:23	
Walla Walla R	WW-1	6/18	**117.8**	59.0	12:20	Stateline
		6/24	**35.1**	69.0	13:05	
		7/8	**20.2**	69.0	13:43	
		7/22	**18.8**	71.0	13:35	
		8/5	**15.8**	65.0	15:10	
		8/20	**12.5**	71.0	15:00	
		9/4	**13.2**	64.0	10:35	
		9/17	**26.6**	59.0	10:51	
		10/1	**18.6**	57.0	14:00	
		10/15	**15.7**	54.0	15:02	
		10/31	**16.9**	43.0	13.08	
		11/12	**15.9**	49.0	11:30	
Walla Walla R	WW-2	6/24	**36.7**	70.0	12:50	Above Pepper Rd Bridge
		7/8	**21.0**	70.0	13:30	
		7/22	**16.5**	71.0	13:20	
		8/5	**17.7**	66.0	14:50	
		8/20	**12.4**	71.0	14:40	
		9/4	**16.1**	63.0	10:20	
		9/17	**27.5**	59.0	10:35	
		10/1	**17.4**	58.0	13:40	
		10/15	**13.6**	55.0	14:45	
		10/31	**17.5**	43.0	12:53	
		11/12	**15.5**	49.0	11:12	
Walla Walla R	WW-3	6/24	**35.4**	70.0	13:20	0.4 mi above Hwy 125
		7/8	**21.2**	70.0	13:58	
		7/22	**15.1**	72.0	13:50	
		8/5	**16.3**	66.0	15:30	
		8/20	**12.5**	71.0	15:20	

[a] Not measurable

Appendix B. Table 1. (Continued) Manual discharge (cfs) measurements 2002.

Stream	Site	Date	CFS	Temp (F)	Time	Comments
Walla Walla R	WW-3	9/4	**14.2**	63.0	10:55	0.4 mi above Hwy 125
(Cont.)		9/17	**27.0**	59.0	11:20	
		10/1	**19.5**	58.0	14:20	
		10/15	**16.0**	55.0	15:15	
		10/31	**16.3**	43.0	13:24	
		11/12	**16.4**	49.0	11:45	
Yellowhawk Ck	YC-1	5/28	**33.9**	57.0	11:50	Below Diversion
		6/25	**27.8**	70.0	12:40	
		7/8	**16.4**	65.0	10:00	
		7/23	**18.6**	71.0	10:20	
		8/7	**15.8**	64.0	09:55	
		8/20	**14.7**	62.0	09:05	
		9/4	**16.1**	61.0	09:40	
		9/17	**23.7**	58.0	08:58	
		10/2	**23.6**	54.0	11:40	
		10/18	**18.7**	50.0	10:33	
		10/30	**15.6**	40.0	11:54	
		11/12	**27.9**	48.0	13:45	
Russell Creek	RC-1	6/25	**1.4**	59.0	12:10	Above Depping Rd.
		7/8	**N/M**[a]	N/A	N/A	No measurable flow 7-8 to 11-12
Cottonwood Ck	CWC-3	4/22	**29.1**	58.0	13:52	Braden Road
		5/13	**12.3**	62.0	13:16	
		5/29	**11.5**	62.0	10:45	
		6/10	**6.9**	60.0	13:30	
		6/25	**1.0**	62.0	13:40	
		7/8	**0.3**	59.0	13:45	
		8/7	**0.2**	59.0	13:15	
		8/20	**N/M**[a]	63.0	14:10	Surface flow only 8-20 to 9-4
		9/17	**N/M**[a]	N/A	N/A	Dry 9-17 to 11-12
Yellowhawk Ck	YC-6	6/25	**35.9**	64.0	10:35	Above mouth
		7/8	**21.5**	66.0	12:10	
		7/23	**30.3**	72.0	13:55	
		8/7	**14.7**	64.0	13:00	
		8/20	**13.5**	64.0	10:14	
		9/4	**14.9**	62.0	11:15	
		9/17	**20.5**	60.0	10:17	
		10/2	**21.3**	53.0	13:54	
		10/18	**18.0**	47.0	08:46	
		10/30	**10.5**	39.0	10:30	
		11/12	**30.0**	50.0	10:55	
Walla Walla R	WW-5	6/24	**81.0**	70.0	12:30	Above Burlingame Diversion
		7/8	**61.6**	68.0	13:17	
		7/22	**41.0**	70.0	13:05	
		8/5	**36.3**	65.0	14:20	
		8/20	**36.6**	67.0	12:55	
		9/4	**39.5**	62.0	11:35	
		9/17	**52.2**	59.0	10:01	
		10/1	**50.8**	57.0	13:20	
		10/15	**49.1**	53.0	14:27	
		10/31	**40.2**	41.0	12:35	
		11/13	**85.3**	50.0	10:40	

[a] Not Measurable

Appendix B. Table 1. (Continued) Manual discharge (cfs) measurements 2002.

Stream	Site	Date	CFS	Temp (F)	Time	Comments
East Little	ELW-2	5/3	**11.6**	51.0	11:15	At river fork
Walla Walla		5/28	**11.1**	62.0	14:35	
		6/11	**10.7**	59.0	12:20	
		6/25	**9.9**	56.0	10:15	
		7/8	**10.3**	61.0	11:15	
		7/22	**7.0**	60.0	12:22	
		8/5	**7.0**	59.0	13:00	
		8/20	**9.7**	59.0	11:15	
		9/4	**8.6**	58.0	12:00	
		9/17	**10.9**	53.0	13:54	
		10/1	**11.3**	54.0	12:15	
		10/15	**11.6**	53.0	13:33	
		10/31	**8.1**	45.0	11:42	
		11/12	**6.8**	51.0	10:40	
East Little	ELW-6	6/11	**16.5**	59.0	12:07	0.2 miles above the mouth
Walla Walla		6/18	**14.1**	61.0	16:25	
		6/25	**11.2**	58.0	10:30	
		7/8	**11.7**	62.0	11:32	
		7/22	**9.1**	62.0	12:30	
		8/5	**9.4**	60.0	13:20	
		8/20	**9.0**	61.0	12:05	
		9/4	**11.3**	59.0	12:20	
		9/17	**14.2**	59.0	14:15	
		10/1	**14.7**	54.0	12:35	
		10/15	**15.2**	53.0	13:48	
		10/31	**11.8**	43.0	12:00	
		11/12	**9.6**	52.0	10:24	
Walla Walla R	WW-6	6/24	**30.1**	70.0	12:10	Below Mojonnier Rd.
		7/8	**41.7**	68.0	12:01	
		7/22	**43.9**	70.0	12:50	
		8/5	**42.5**	65.0	14:00	
		8/20	**38.1**	67.0	12:30	
		9/4	**40.7**	64.0	12:40	
		9/17	**61.8**	61.0	13:10	
		10/1	**57.9**	56.0	13:00	
		10/15	**22.7**	51.0	14:04	
		10/31	**17.9**	41.0	12:15	
		11/12	**23.7**	50.0	10:03	
Garrison Ck	GC-1	5/28	**1.4**	56.0	11:40	Below Diversion
		6/25	**5.9**	69.0	12:30	
		7/8	**2.5**	65.0	09:40	
		7/23	**3.4**	71.0	10:12	
		8/7	**2.2**	64.0	10:05	
		8/20	**2.3**	62.0	08:50	
		9/4	**2.4**	61.0	09:30	
		9/17	**3.7**	58.0	08:48	
		10/2	**3.3**	64.0	11:32	
		10/18	**2.5**	50.0	10:21	
		10/30	**1.7**	40.0	11:44	
		11/12	**2.8**	48.0	13:30	

Appendix B. Table 1. (Continued) Manual discharge (cfs) measurements 2002.

Stream	Site	Date	CFS	Temp (F)	Time	Comments
Garrison Ck	GC-2	5/30	**3.4**	64.0	12:30	Mojonnier Rd
		6/10	**3.7**	59.0	12:30	
		6/25	**1.7**	67.0	10:40	
		7/8	**1.3**	68.0	13:00	
		7/23	**N/M**[a]	68.0	11:47	No measurable flow from 7-23 to 10-30
Walla Walla R	WW-8	6/24	**34.3**	69.0	11:20	Swegle Rd Bridge
		7/8	**41.1**	71.0	13:35	
		7/22	**46.4**	69.0	11:40	
		8/5	**45.4**	62.0	11:40	
		8/20	**32.4**	66.0	10:00	
		9/4	**35.1**	62.0	10:30	
		9/17	**50.6**	61.0	11:35	
		10/1	**54.8**	54.0	10:45	
		10/15	**26.5**	49.0	11:23	
		10/31	**21.7**	39.0	10:48	
		11/13	**39.4**	51.0	12:12	
Mill Creek	MC-9	4/22	**196.6**	48.0	11:30	Below Five Mile Rd Bridge
		5/13	**127.8**	54.0	12:19	
		5/28	**185.1**	55.0	11:02	
		6/11	**89.1**	53.0	09:45	
		6/25	**50.7**	67.0	13:10	
		7/8	**29.4**	63.0	10:30	
		7/23	**27.2**	66.0	09:25	
		8/7	**26.5**	60.0	09:10	
		8/20	**23.3**	61.0	08:40	
		9/4	**24.6**	58.0	09:05	
		9/17	**26.6**	59.0	13:15	
		10/2	**34.1**	52.0	10:45	
		10/18	**25.7**	50.0	10:56	
		10/30	**38.0**	41.0	12:12	
		11/12	**50.8**	48.0	14:50	
Titus Creek	TC-1	5/28	**4.0**	54.0	11:15	Five Mile Rd
		6/25	**2.2**	65.0	13:00	
		7/8	**2.7**	62.0	10:45	
		7/23	**2.2**	64.0	09:10	
		8/7	**1.9**	58.0	09:30	
		8/20	**3.1**	59.0	08:30	
		9/4	**3.2**	58.0	08:55	
		9/17	**3.2**	59.0	13:23	
		10/2	**3.2**	50.0	11:03	
		10/18	**3.1**	49.0	11:09	
		10/30	**2.8**	39.0	12:20	
		11/12	**1.7**	48.0	14:35	
Mill Creek	MC-23	6/11	**38.7**	60.0	10:25	Above Roosevelt St.
		6/25	**11.4**	77.0	11:40	
		7/8	**2.5**	75.0	11:15	
		8/7	**1.2**	67.0	10:30	
		9/4	**N/M**[a]	N/A	10:15	No measurable flow----Dry 9-4 to 10-18
		10/30	**16.0**	37.0	11:18	
		11/12	**7.6**	49.0	12:57	

[a] Not Measurable

Appendix B. Table 1. (Continued) Manual discharge (cfs) measurements 2002.

Stream	Site	Date	CFS	Temp (F)	Time	Comments
Mill Creek	MC-30	6/11	**49.3**	60.0	10:47	9th Ave
		6/25	**18.1**	69.0	11:20	
		7/8	**4.6**	68.0	11:40	
		7/23	**2.9**	68.0	10:50	
		8/7	**2.5**	64.0	10:50	
		8/20	**3.9**	63.0	09:31	
		9/4	**2.5**	66.0	12:40	
		9/17	**3.6**	61.0	09:20	
		10/2	**3.0**	60.0	13:30	
		10/18	**2.5**	54.0	09:10	
		10/30	**17.0**	38.0	10:55	
		11/12	**13.6**	49.0	12:15	
Mill Creek	MC-36	6/11	**56.7**	62.0	11:30	Below Wallula Rd. Bridge
		6/18	**46.0**	64.0	13:15	
		6/25	**14.0**	68.0	09:30	
		7/8	**7.6**	69.0	14:30	
		7/23	**3.0**	67.0	11:28	
		8/7	**3.1**	65.0	11:15	
		8/20	**3.5**	63.0	09:50	
		9/4	**3.8**	64.0	12:15	
		9/17	**4.7**	59.0	09:40	
		10/2	**4.3**	58.0	12:58	
		10/18	**4.6**	53.0	08:12	
		10/30	**20.3**	46.0	10:07	
		11/12	**19.2**	52.0	09:40	
Cold Creek	CC-1	5/28	**2.2**	64.0	12:50	Below Last Chance Rd.
		6/10	**1.0**	57.0	12:20	
		6/24	**1.6**	67.0	11:55	
		7/8	**0.5**	65.0	13:15	
		7/22	**0.4**	62.0	11:50	
		8/7	**0.3**	58.0	12:20	
		8/20	**0.3**	61.0	10:35	
		9/4	**0.4**	55.0	11:15	
		9/17	**0.6**	59.0	12:45	
		10/1	**0.5**	50.0	11:25	
		10/15	**0.9**	47.0	12:00	
		10/31	**1.8**	39.0	11:00	
		11/13	**N/M**[a]	N/A	N/A	Creek flooded into grasses
Mill Creek	MC-38	5/28	**151.6**	62.0	13:15	Below Swegle Rd. Bridge
		6/11	**52.4**	63.0	11:51	
		6/25	**12.1**	68.0	09:45	
		7/8	**7.1**	72.0	14:15	
		7/23	**0.4**	76.0	11:40	
		8/7	**0.1**	71.0	11:30	
		8/20	**0.3**	70.0	10:20	
		9/4	**0.7**	68.0	10:40	
		9/17	**1.1**	66.0	11:53	
		10/2	**1.3**	61.0	13:16	
		10/18	**3.2**	50.0	07:54	
		10/30	**19.2**	45.0	09:28	
		11/12	**22.0**	52.0	09:22	

[a] Not Measurable

Appendix B. Table 1. (Continued) Manual discharge (cfs) measurements 2002.

Stream	Site	Date	CFS	Temp (F)	Time	Comments
Doan Creek	DNC-1	5/28	**2.0**	64.0	13:30	Whitman Mission
		6/10	**1.6**	57.0	12:00	
		6/24	**1.0**	67.0	11:35	
		7/8	**0.7**	66.0	13:55	
		7/22	**0.5**	63.0	11:15	
		8/7	**0.5**	64.0	11:53	
		8/20	**0.4**	61.0	09:35	
		9/4	**0.3**	60.0	11:00	
		9/17	**0.2**	61.0	12:13	
		10/1	**0.1**	53.0	11:05	
		10/15	**0.5**	48.0	11:40	
		10/30	**0.5**	42.0	09:05	
		11/13	**0.7**	52.0	11:50	
West Little Walla Walla	WLW-1	5/28	**3.5**	64.0	14:00	0.6 mi. up Valley Chapel Rd.
		6/10	**3.0**	59.0	13:05	
		6/25	**1.0**	63.0	10:00	
		7/8	**1.6**	66.0	11:02	
		7/22	**0.4**	69.0	12:05	
		8/5	**0.8**	62.0	12:25	
		8/20	**0.1**	65.0	11:00	
		9/4	**0.4**	62.0	11:40	
		9/17	**1.2**	62.0	13:30	
		10/1	**1.8**	54.0	11:50	
		10/15	**2.5**	50.0	13:17	
		10/31	**1.2**	41.0	11:27	
		11/13	**2.0**	53.0	11:13	
Walsh Creek	WAC-1	5/29	**1.9**	64.0	10:10	Valley Chapel Rd.
		6/10	**1.7**	64.0	13:00	
		6/25	**1.1**	69.0	09:55	
		7/8	**1.1**	69.0	10:50	
		7/22	**0.6**	73.0	12:00	
		8/5	**0.8**	64.0	12:00	
		8/20	**0.1**	66.0	10:45	
		9/4	**0.7**	62.0	11:30	
		9/17	**N/M**[a]	63.0	13:18	
		10/1	**0.6**	56.0	11:40	
		10/15	**0.5**	52.0	12:12	
		10/31	**0.7**	40.0	11:17	
		11/13	**0.8**	51.0	10:55	
Walla Walla R	WW-10	6/18	**148.4**	65.0	13:50	Above Detour Rd. Bridge
		6/24	**50.8**	69.0	11:00	
		7/8	**45.9**	69.0	10:40	
		7/22	**41.8**	69.0	10:55	
		8/5	**45.9**	64.0	11:20	
		8/20	**32.4**	66.0	09:15	
		9/4	**35.9**	61.0	10:10	
		9/17	**50.6**	61.0	11:05	
		10/1	**56.3**	53.0	10:20	
		10/15	**30.5**	50.0	11:04	
		10/31	**37.7**	41.0	10:30	
		11/12	**45.0**	50.0	09:05	

[a] Not Measurable

Appendix B. Table 1. (Continued) Manual discharge (cfs) measurements 2002.

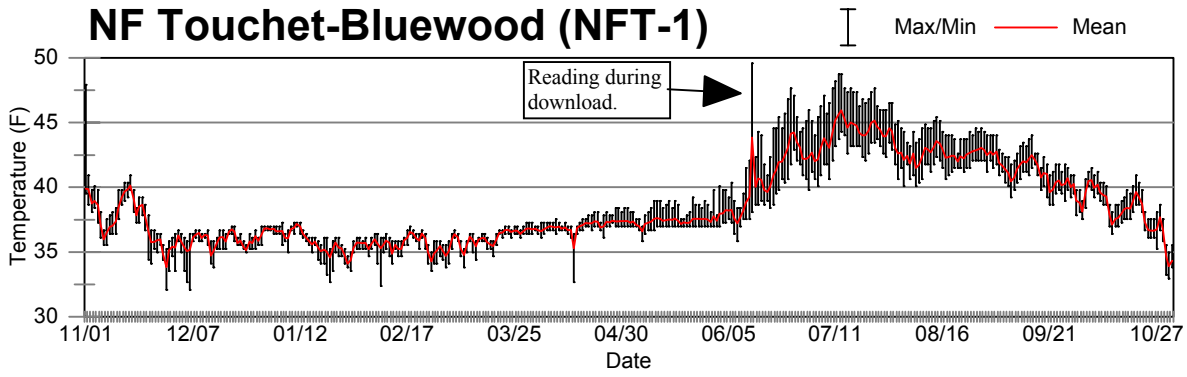
Stream	Site	Date	CFS	Temp (F)	Time	Comments
Walla Walla R	WW-11	6/24	**20.4**	70.0	10:35	Above McDonald Rd. Bridge
		7/8	**19.5**	72.0	10:20	
		7/22	**17.3**	73.0	10:40	
		8/5	**18.9**	67.0	10:50	
		8/20	**9.9**	68.0	08:40	
		9/4	**16.2**	65.0	09:45	
		9/17	**30.9**	63.0	10:34	
		10/1	**33.3**	55.0	09:48	
		10/15	**20.3**	53.0	10:40	
		10/31	**18.5**	41.0	10:11	
		11/13	**46.9**	52.0	12:42	
NF Dry Creek	NFD-1	5/29	**7.6**	55.0	12:10	0.4 mi. up Scott Rd.
		6/11	**3.5**	59.0	13:45	
		6/24	**2.2**	66.0	15:00	
		7/9	**1.1**	54.0	09:00	
		7/22	**0.7**	64.0	15:20	
		8/7	**0.7**	60.0	15:25	
		8/19	**0.9**	61.0	15:00	
		9/4	**1.0**	58.0	14:30	
		9/17	**1.2**	57.0	15:05	
		10/2	**1.1**	47.0	10:05	
		10/18	**1.2**	46.0	11:43	
		10/30	**1.0**	40.0	12:45	
		11/13	**1.5**	48.0	09:35	
Dry Creek	DRC-1	5/29	**14.2**	60.0	12:30	0.5 mi. up Biscuit Ridge Rd.
		6/11	**10.0**	64.0	14:10	
		6/24	**3.6**	72.0	15:20	
		7/9	**1.9**	58.0	09:25	
		7/22	**0.6**	73.0	15:45	
		8/7	**1.5**	68.0	15:50	
		8/19	**1.0**	69.0	15:20	
		9/4	**1.1**	64.0	14:50	
		9/17	**1.7**	62.0	15:30	
		10/2	**2.2**	47.0	10:25	
		10/18	**1.7**	47.0	12:04	
		10/30	**2.3**	38.0	13:15	
		11/13	**4.1**	48.0	09:56	
Mud Creek	MDC-1	5/30	**12.2**	62.0	10:30	Barney Rd. Bridge
		6/10	**4.9**	61.0	10:55	
		6/24	**5.5**	71.0	10:20	
		7/8	**1.7**	71.0	10:03	
		7/22	**3.4**	69.0	10:25	
		8/5	**1.8**	61.0	10:30	
		8/20	**2.4**	65.0	08:15	
		9/4	**1.4**	58.0	09:30	
		9/17	**2.9**	63.0	10:05	
		10/1	**1.6**	48.0	09:20	
		10/15	**2.9**	42.0	10:15	
		10/31	**4.1**	32.0	09:55	
		11/13	**2.3**	51.0	13:00	

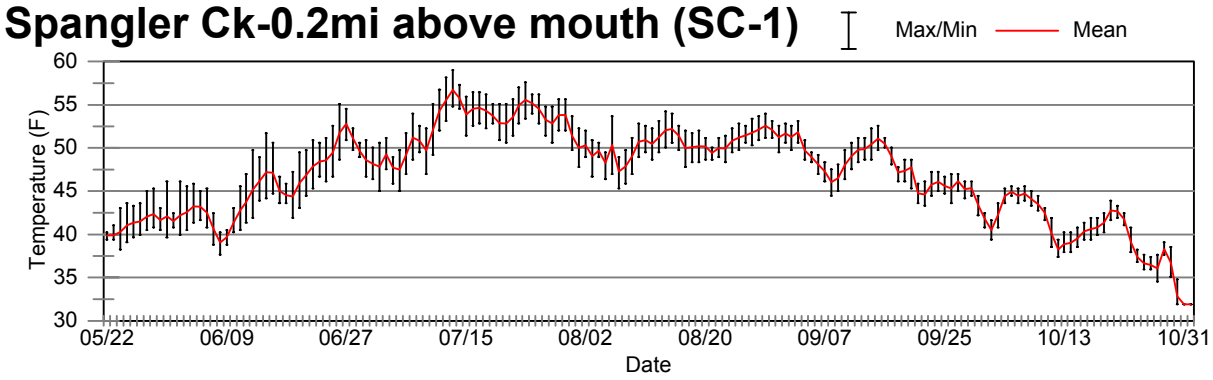
Appendix B. Table 1. (Continued) Manual discharge (cfs) measurements 2002.

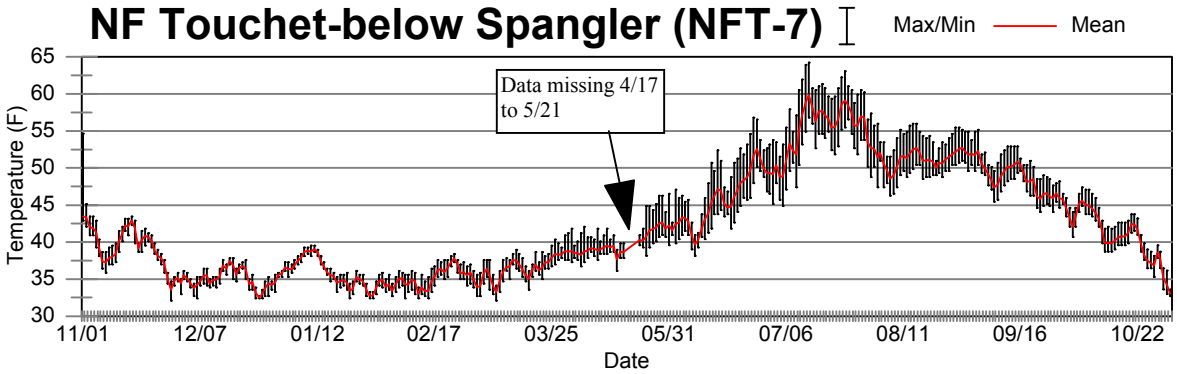
Stream	Site	Date	CFS	Temp (F)	Time	Comments
Pine Creek	PC-2	5/30	**5.2**	67.0	11:00	
		6/10	**10.4**	57.0	10:45	
		6/24	**4.8**	71.0	10:10	
		7/8	**0.5**	69.0	09:53	
		7/22	**0.1**	69.0	10:15	
		8/5	**N/M**[a]	62.0	10:15	Not measurable from 8-5 to 10-1
		10/15	**6.4**	47.0	10:03	
		10/31	**0.6**	33.0	09:43	
		11/13	**0.4**	50.0	13:15	

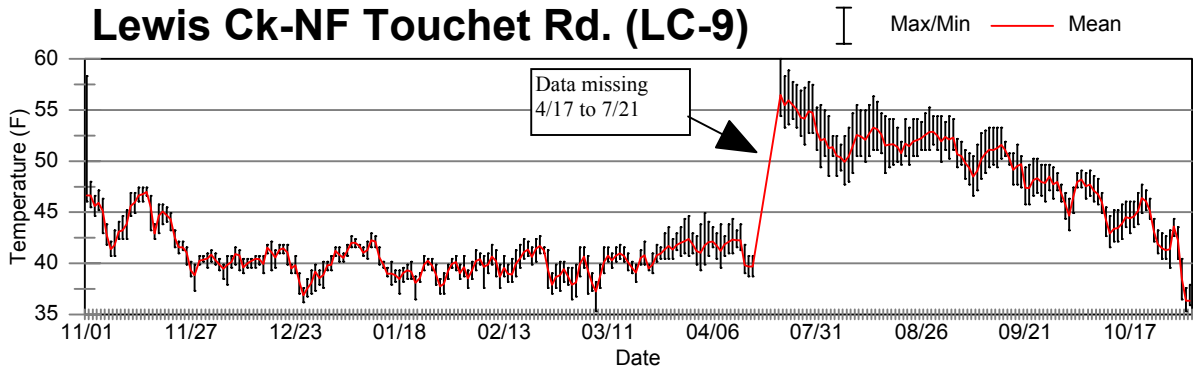
[a] Not Measurable

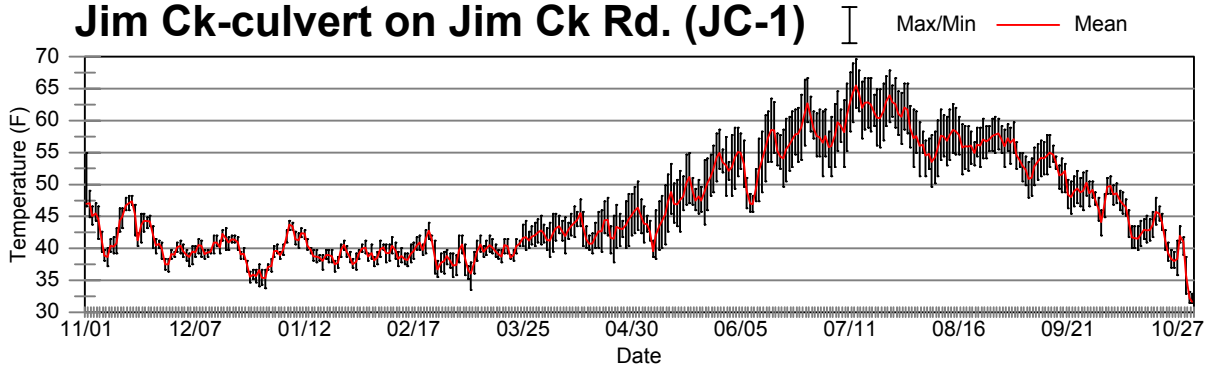
Appendix C - Stream Temperature Graphs (F), 2002

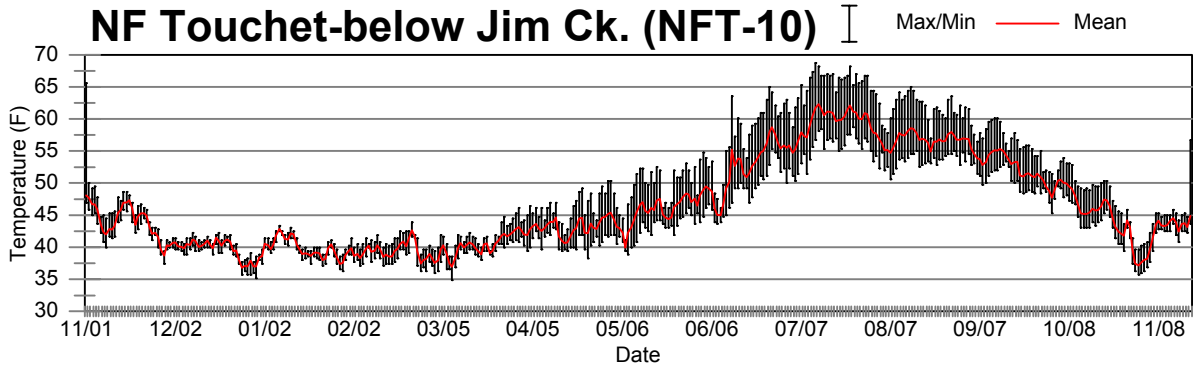

NF Touchet-Bluewood (NFT-1)
Max/Min
Mean
Reading during download.
Temperature (F)
50
45
40
35
30
11/01
12/07
01/12
02/17
03/25
04/30
06/05
07/11
08/16
09/21
10/27
Date

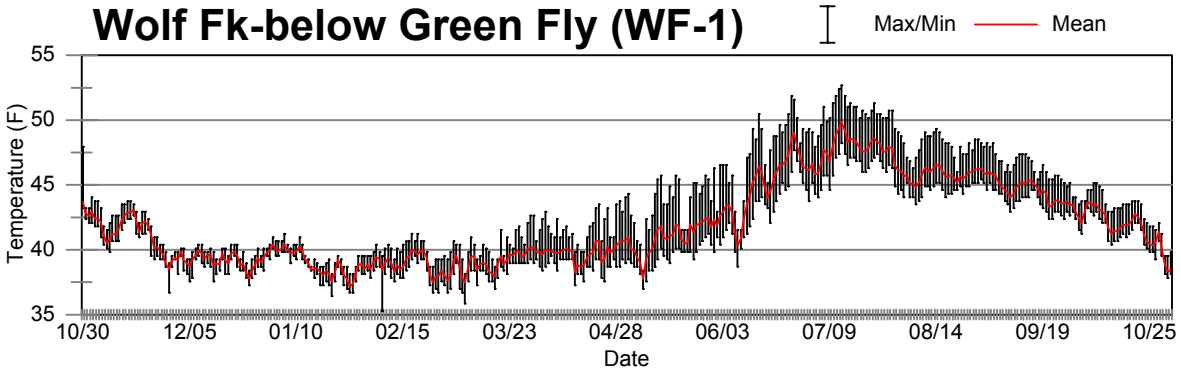

Spangler Ck-0.2mi above mouth (SC-1)
Max/Min
Mean
Temperature (F)
60
55
50
45
40
35
30
05/22
06/09
06/27
07/15
08/02
08/20
09/07
09/25
10/13
10/31
Date

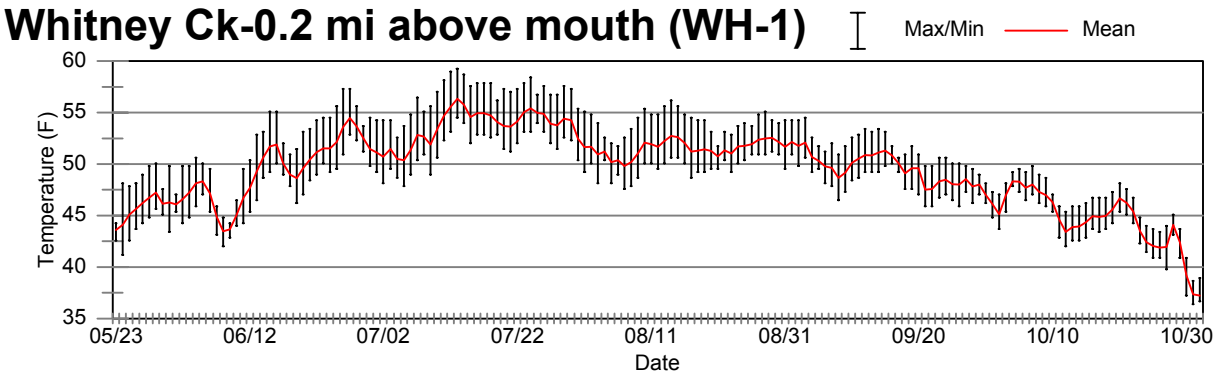

NF Touchet-below Spangler (NFT-7)
Max/Min
Mean
Data missing 4/17 to 5/21
Temperature (F)
65
60
55
50
45
40
35
30
11/01
12/07
01/12
02/17
03/25
05/31
07/06
08/11
09/16
10/22
Date

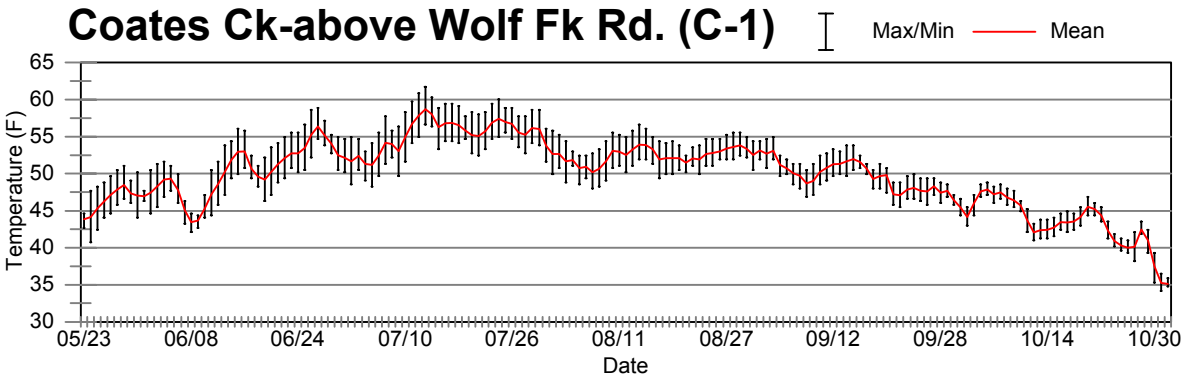

Lewis Ck-NF Touchet Rd. (LC-9)
Max/Min
Mean
Data missing
4/17 to 7/21
Temperature (F)
60
55
50
45
40
35
11/01
11/27
12/23
01/18
02/13
03/11
04/06
07/31
08/26
09/21
10/17
Date

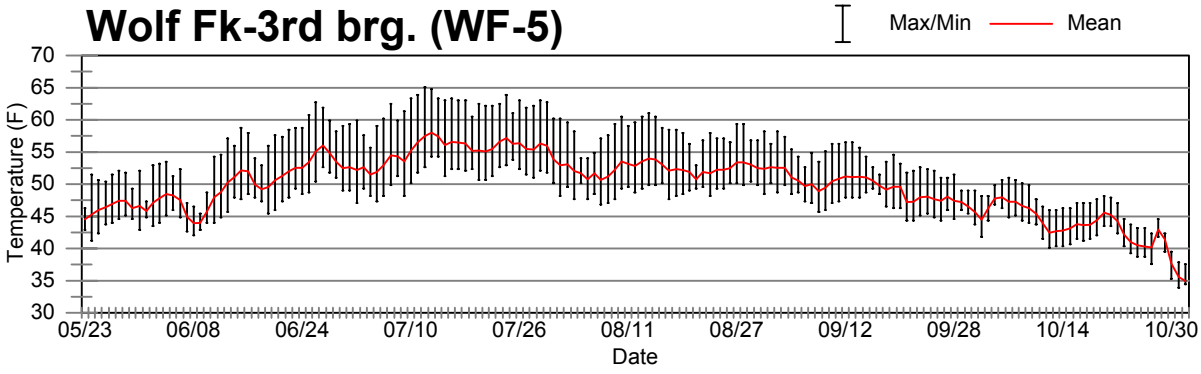

Jim Ck-culvert on Jim Ck Rd. (JC-1)
Max/Min
Mean
Temperature (F)
70
65
60
55
50
45
40
35
30
11/01
12/07
01/12
02/17
03/25
04/30
06/05
07/11
08/16
09/21
10/27
Date

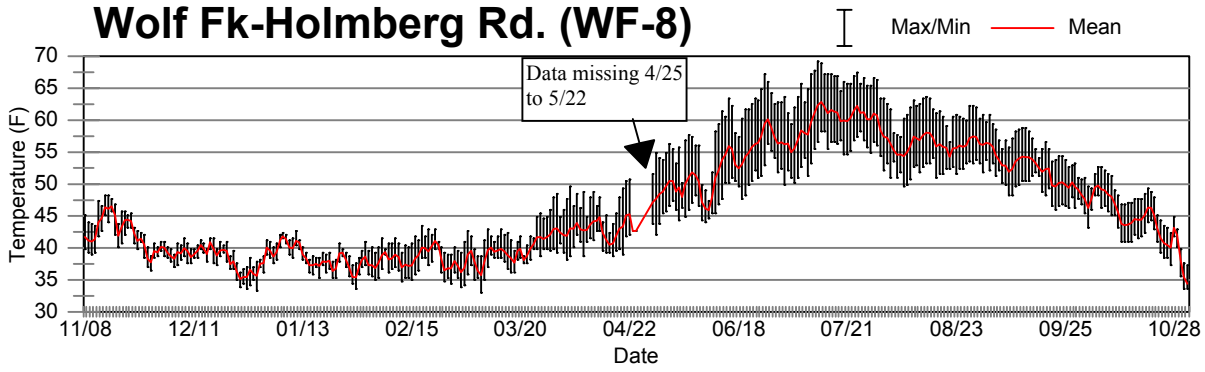

NF Touchet-below Jim Ck. (NFT-10)
Max/Min
Mean
Temperature (F)
70
65
60
55
50
45
40
35
30
11/01
12/02
01/02
02/02
03/05
04/05
05/06
06/06
07/07
08/07
09/07
10/08
11/08
Date

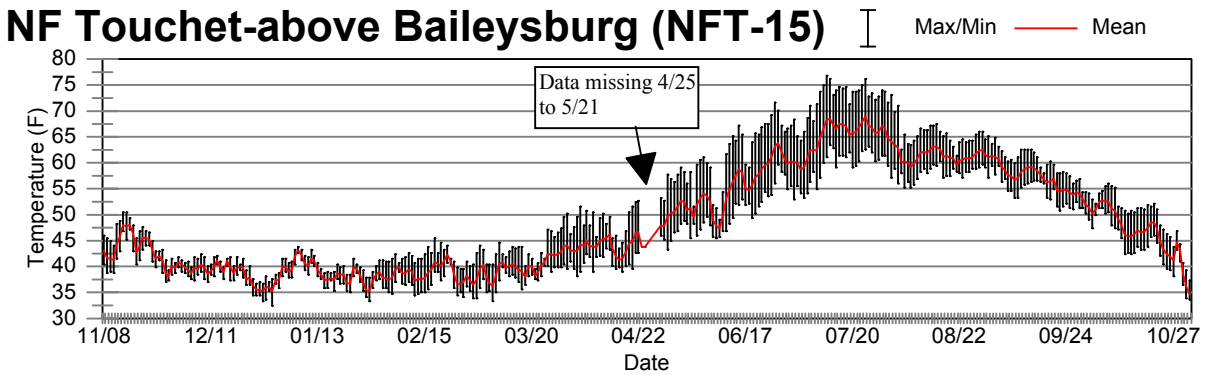

Wolf Fk-below Green Fly (WF-1)
Max/Min
Mean
Temperature (F)
55
50
45
40
35
10/30
12/05
01/10
02/15
03/23
04/28
06/03
07/09
08/14
09/19
10/25
Date

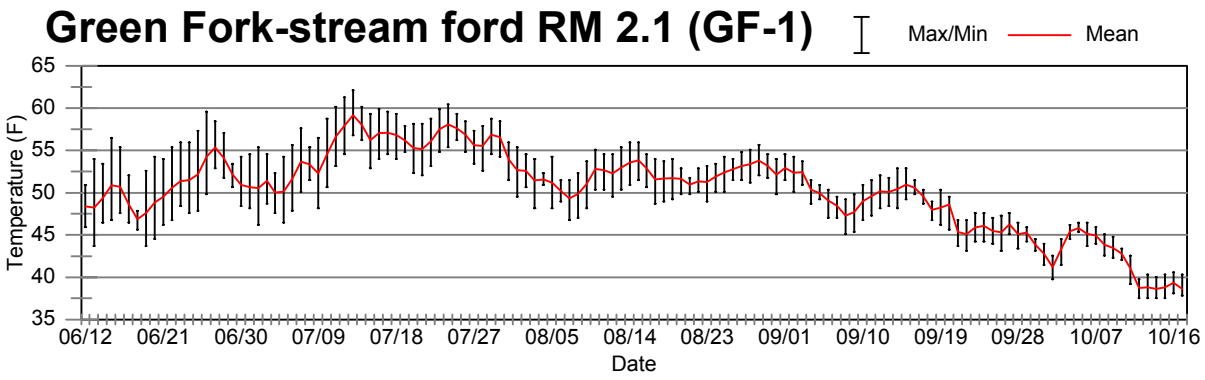

Whitney Ck-0.2 mi above mouth (WH-1)
Max/Min
Mean
Temperature (F)
60
55
50
45
40
35
05/23
06/12
07/02
07/22
08/11
08/31
09/20
10/10
10/30
Date

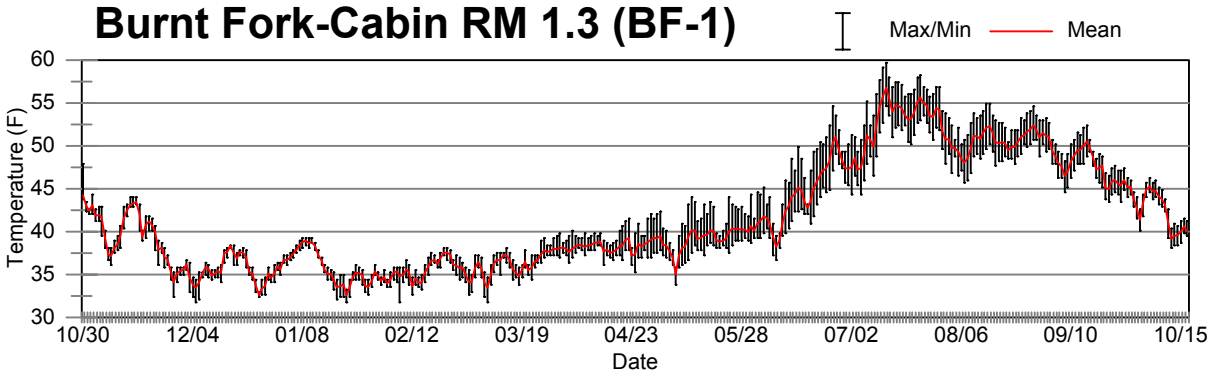

Coates Ck-above Wolf Fk Rd. (C-1)
Max/Min
Mean
Temperature (F)
65
60
55
50
45
40
35
30
05/23
06/08
06/24
07/10
07/26
08/11
08/27
09/12
09/28
10/14
10/30
Date

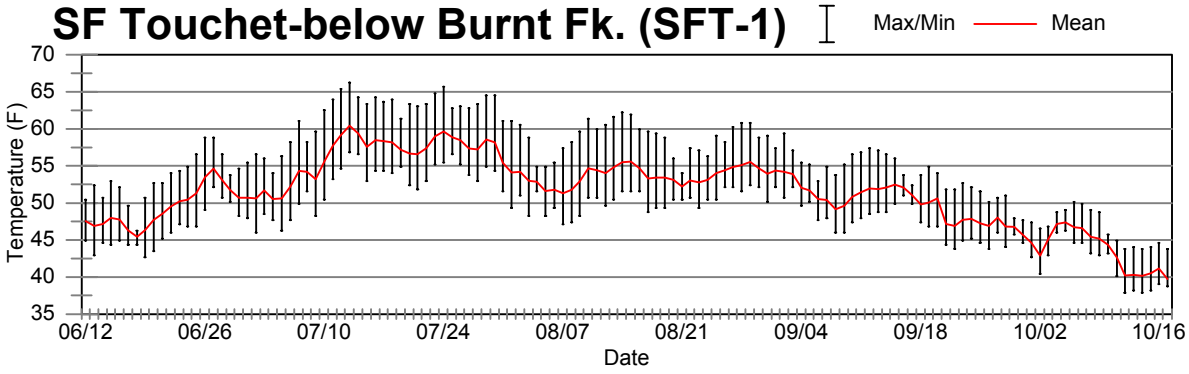

Wolf Fk-3rd brg. (WF-5)
Max/Min
Mean
Temperature (F)
70
65
60
55
50
45
40
35
30
05/23
06/08
06/24
07/10
07/26
08/11
08/27
09/12
09/28
10/14
10/30
Date

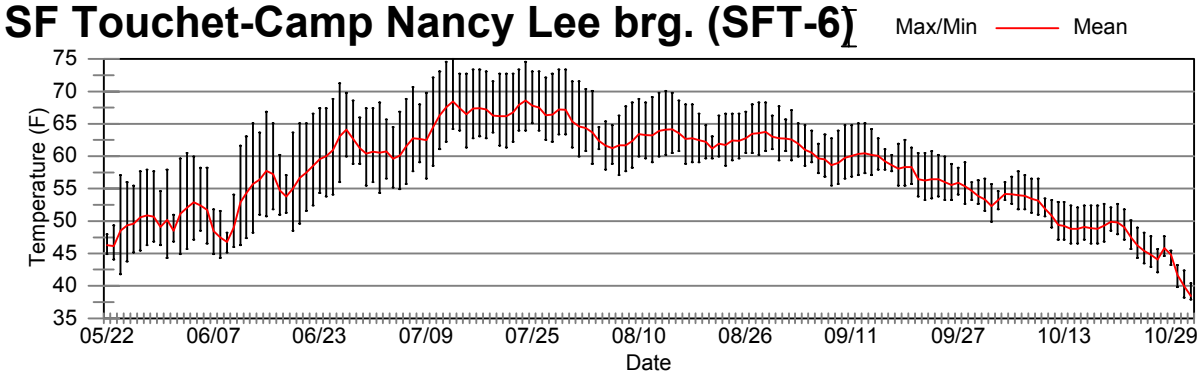

Wolf Fk-Holmberg Rd. (WF-8)
Max/Min
Mean
Data missing 4/25 to 5/22
Temperature (F)
70
65
60
55
50
45
40
35
30
11/08
12/11
01/13
02/15
03/20
04/22
06/18
07/21
08/23
09/25
10/28
Date

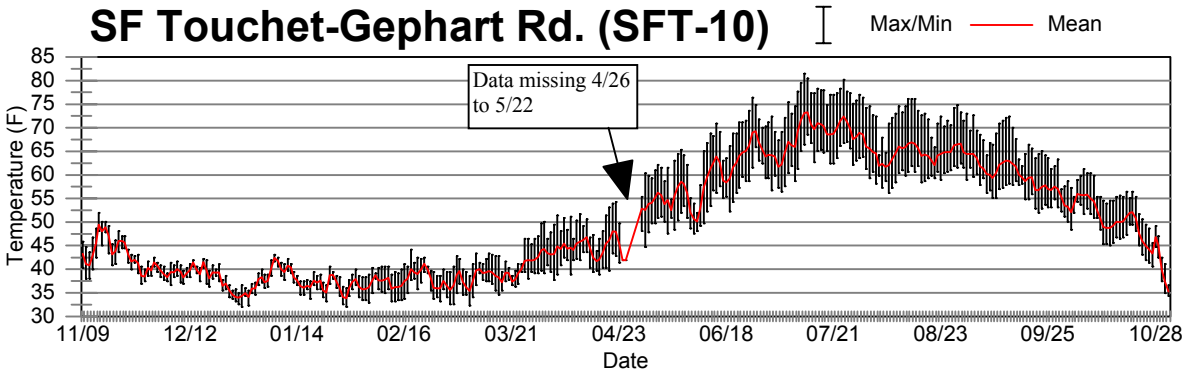

NF Touchet-above Baileysburg (NFT-15)
Max/Min
Mean
Data missing 4/25 to 5/21
Temperature (F)
80
75
70
65
60
55
50
45
40
35
30
11/08
12/11
01/13
02/15
03/20
04/22
06/17
07/20
08/22
09/24
10/27
Date

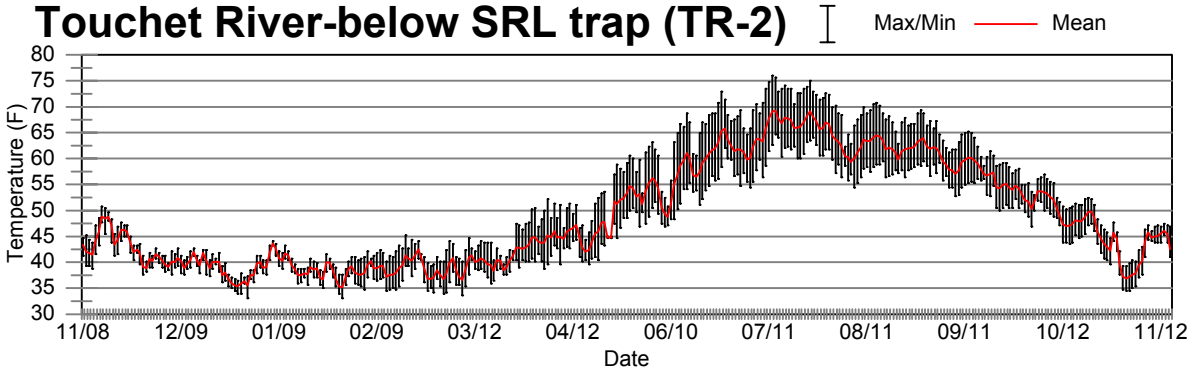

Green Fork-stream ford RM 2.1 (GF-1)
Max/Min
Mean
Temperature (F)
65
60
55
50
45
40
35
06/12
06/21
06/30
07/09
07/18
07/27
08/05
08/14
08/23
09/01
09/10
09/19
09/28
10/07
10/16
Date

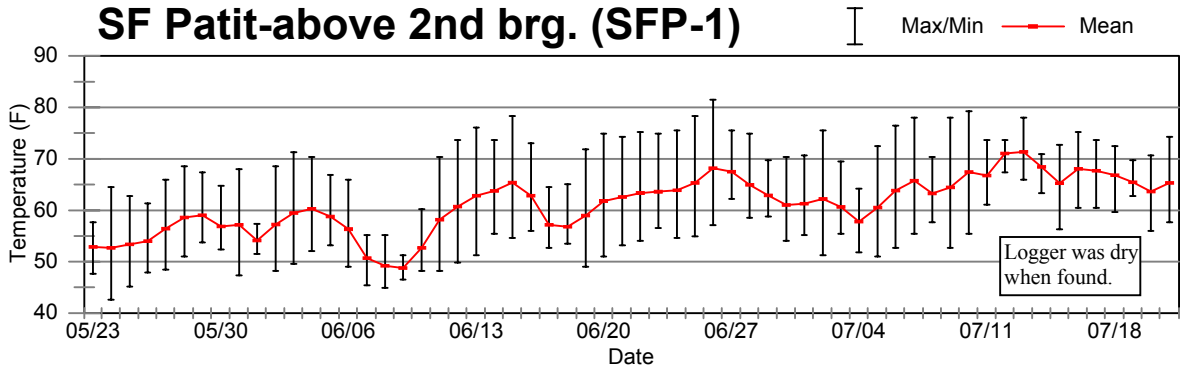

Burnt Fork-Cabin RM 1.3 (BF-1)
Max/Min
Mean
Temperature (F)
60
55
50
45
40
35
30
10/30
12/04
01/08
02/12
03/19
04/23
05/28
07/02
08/06
09/10
10/15
Date

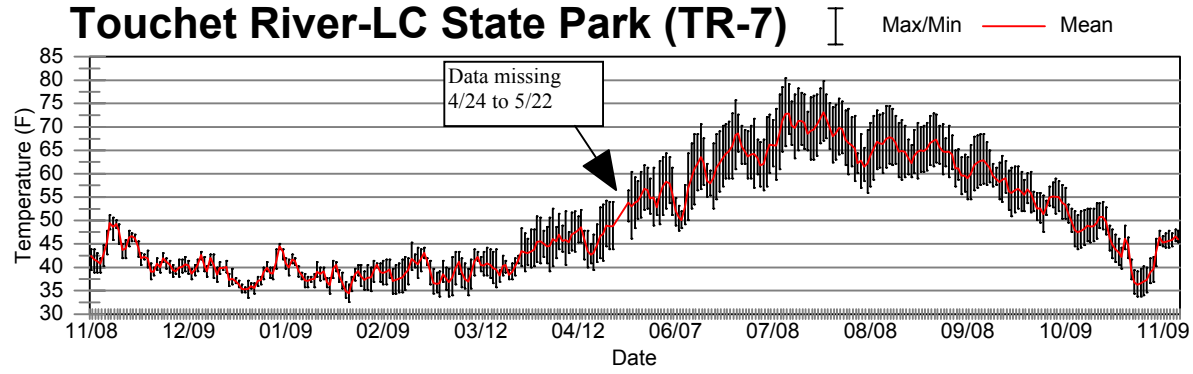

SF Touchet-below Burnt Fk. (SFT-1)
Max/Min
Mean
Temperature (F)
70
65
60
55
50
45
40
35
06/12
06/26
07/10
07/24
08/07
08/21
09/04
09/18
10/02
10/16
Date

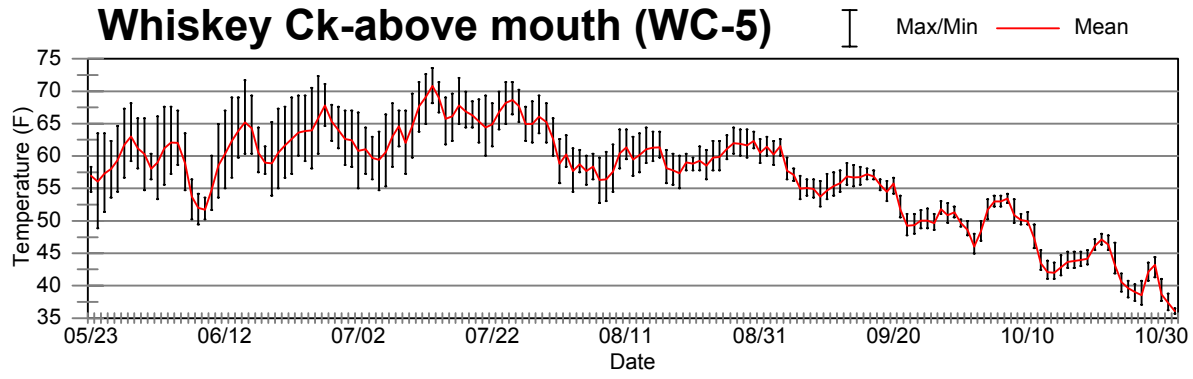

SF Touchet-Camp Nancy Lee brg. (SFT-6)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
35
05/22
06/07
06/23
07/09
07/25
08/10
08/26
09/11
09/27
10/13
10/29
Date


SF Touchet-Gephart Rd. (SFT-10)
Max/Min
Mean
Data missing 4/26 to 5/22
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
30
11/09
12/12
01/14
02/16
03/21
04/23
06/18
07/21
08/23
09/25
10/28
Date

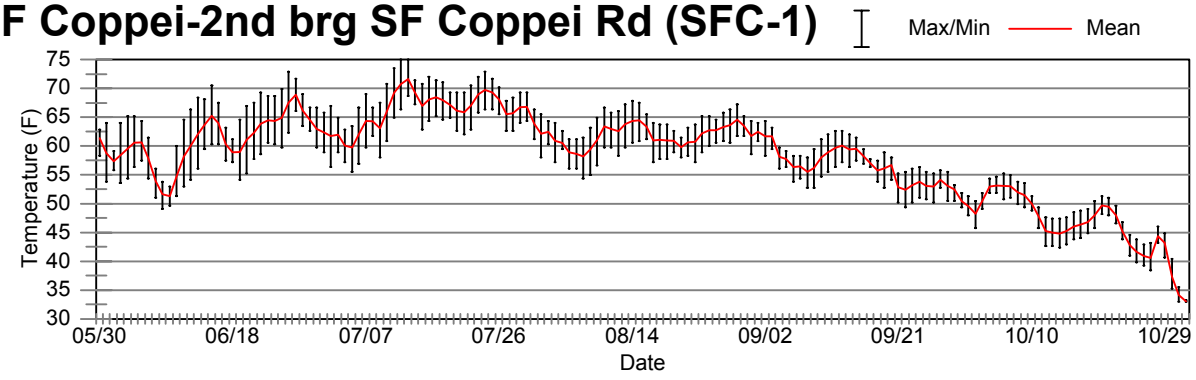

Touchet River-below SRL trap (TR-2)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
30
11/08
12/09
01/09
02/09
03/12
04/12
06/10
07/11
08/11
09/11
10/12
11/12
Date


SF Patit-above 2nd brg. (SFP-1)
Max/Min
Mean
Temperature (F)
90
80
70
60
50
40
05/23
05/30
06/06
06/13
06/20
06/27
07/04
07/11
07/18
Date
Logger was dry when found.

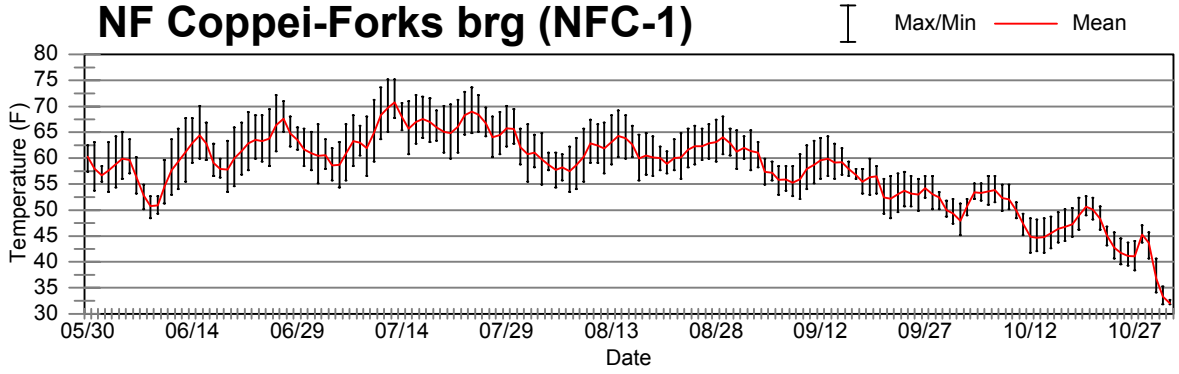

Touchet River-LC State Park (TR-7)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
30
11/08
12/09
01/09
02/09
03/12
04/12
06/07
07/08
08/08
09/08
10/09
11/09
Date
Data missing 4/24 to 5/22


Whiskey Ck-above mouth (WC-5)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
35
05/23
06/12
07/02
07/22
08/11
08/31
09/20
10/10
10/30
Date

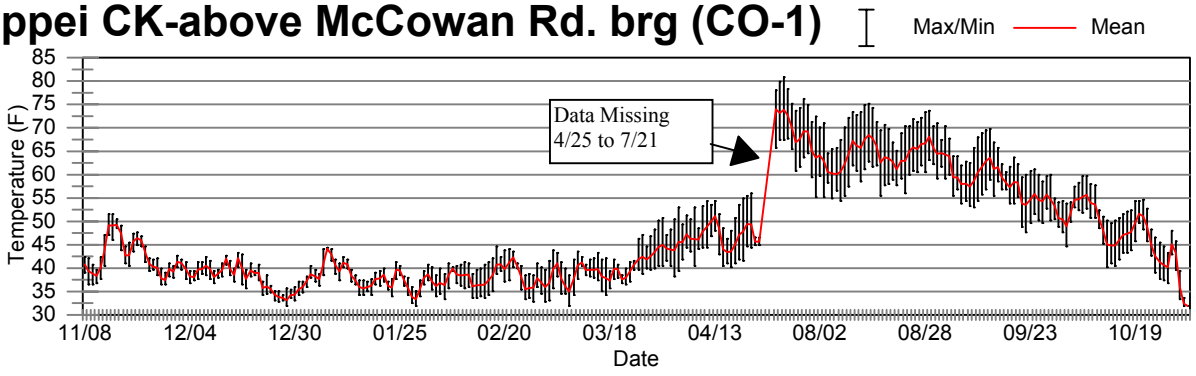
SF Coppei-2nd brg SF Coppei Rd (SFC-1)

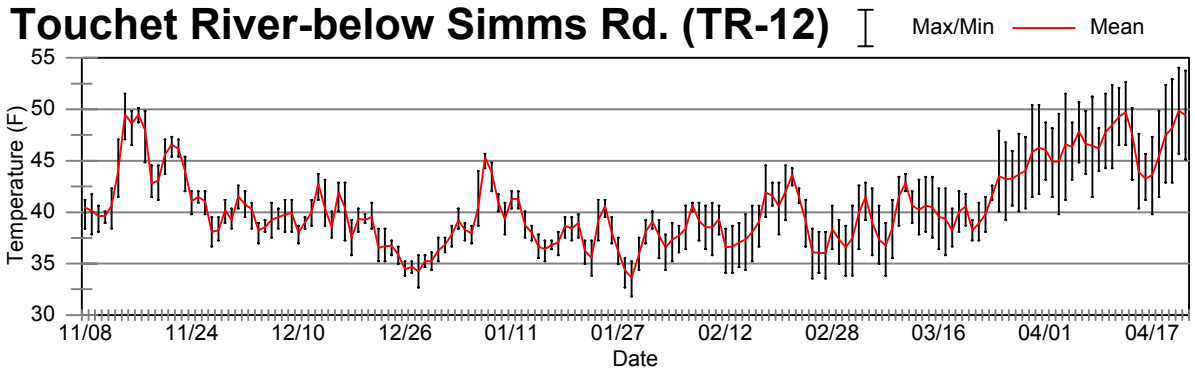


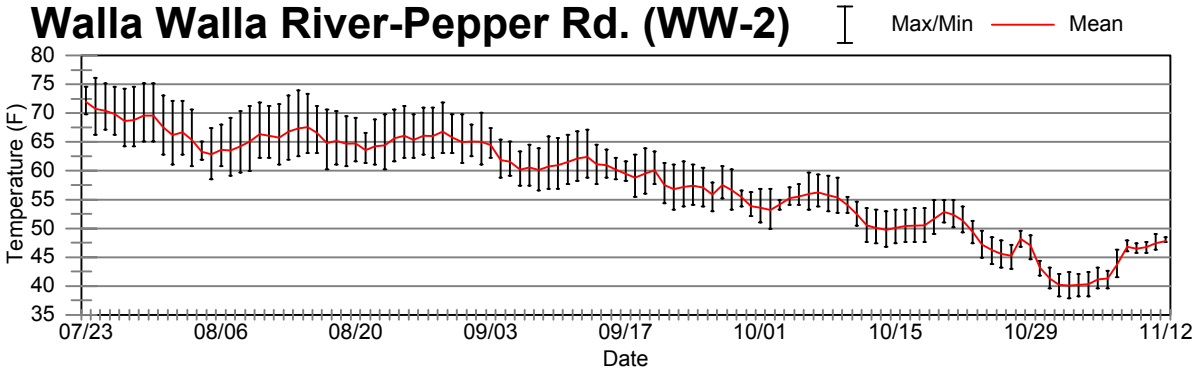
NF Coppei-Forks brg (NFC-1)

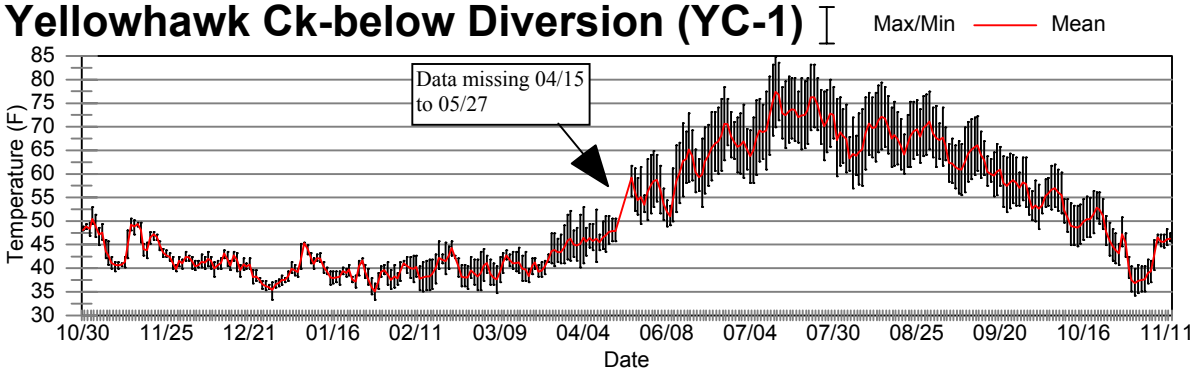


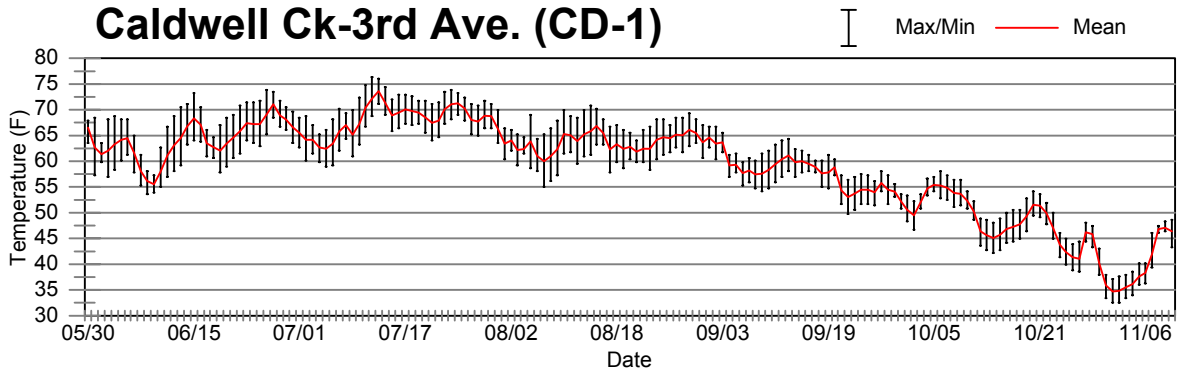
Coppei CK-above McCowan Rd. brg (CO-1)

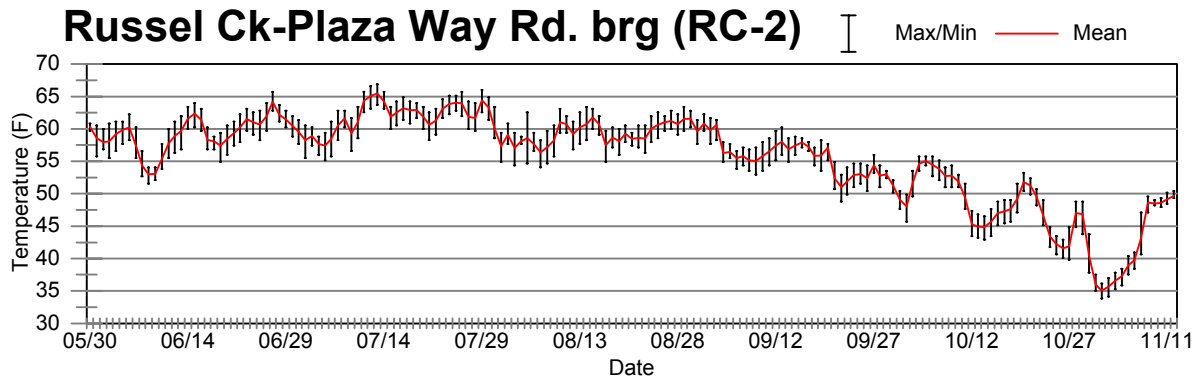


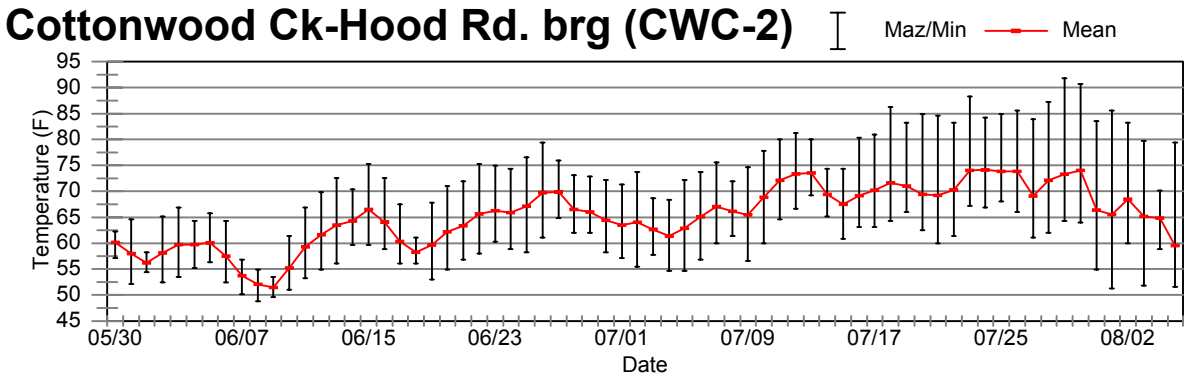

Touchet River-below Simms Rd. (TR-12)
Max/Min
Mean
Temperature (F)
55
50
45
40
35
30
11/08
11/24
12/10
12/26
01/11
01/27
02/12
02/28
03/16
04/01
04/17
Date

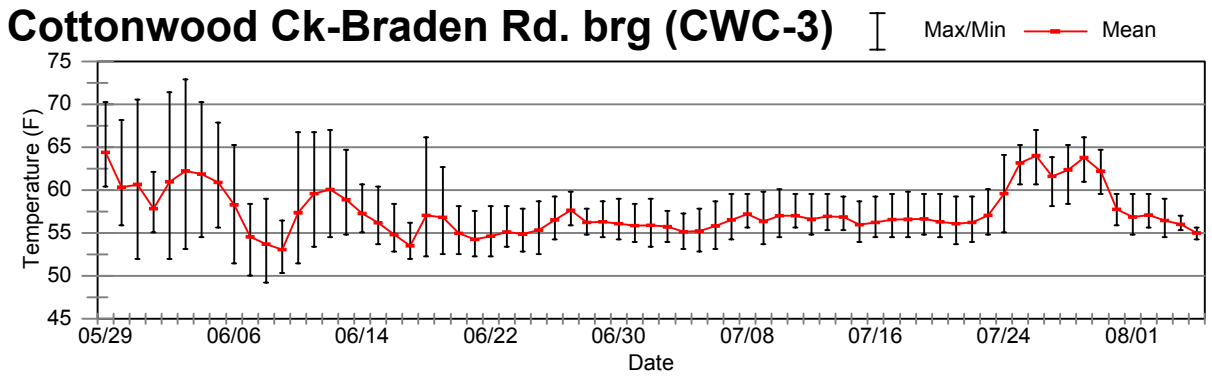

Walla Walla River-Pepper Rd. (WW-2)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
07/23
08/06
08/20
09/03
09/17
10/01
10/15
10/29
11/12
Date

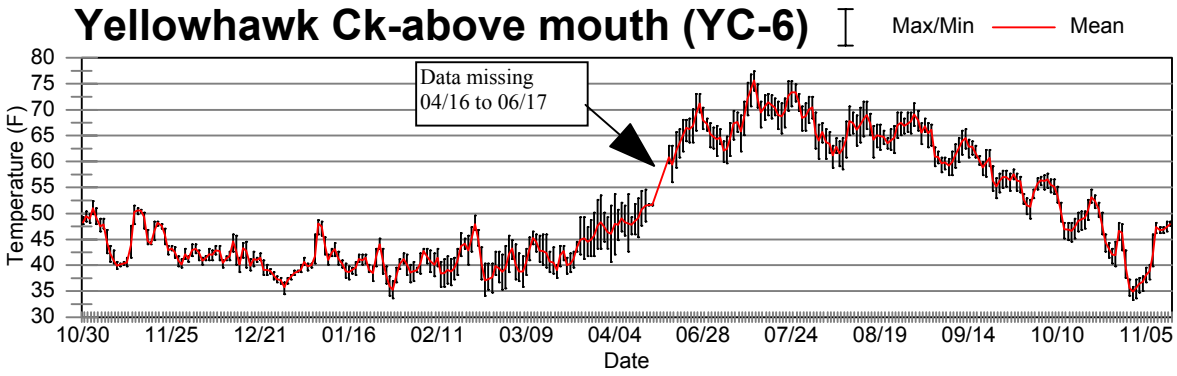

Yellowhawk Ck-below Diversion (YC-1)
Max/Min
Mean
Data missing 04/15
to 05/27
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
30
10/30
11/25
12/21
01/16
02/11
03/09
04/04
06/08
07/04
07/30
08/25
09/20
10/16
11/11
Date

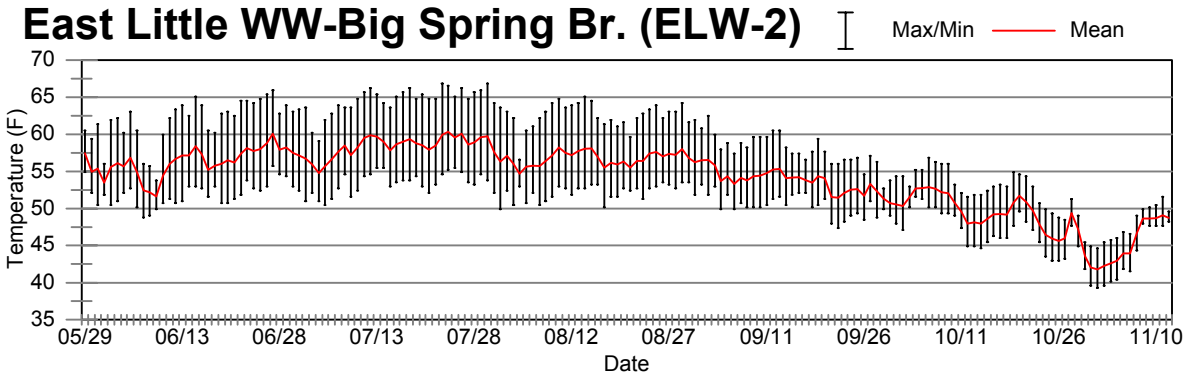

Caldwell Ck-3rd Ave. (CD-1)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
30
05/30
06/15
07/01
07/17
08/02
08/18
09/03
09/19
10/05
10/21
11/06
Date

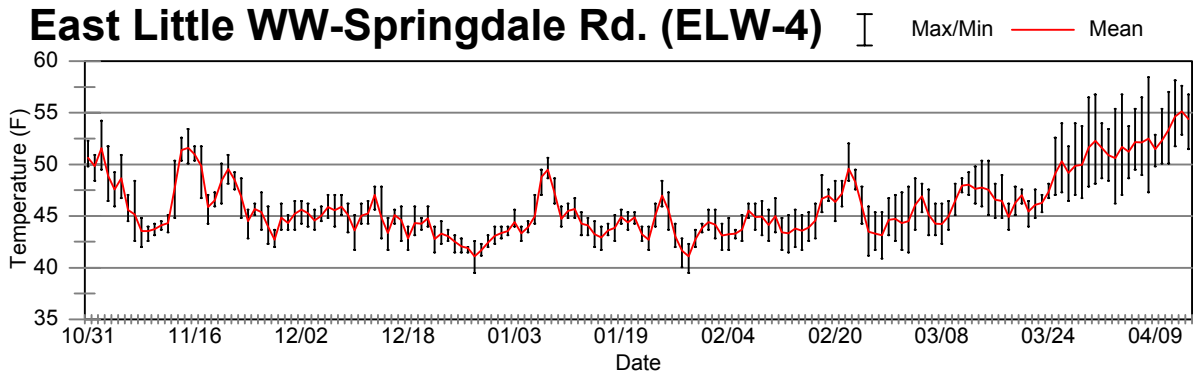

Russel Ck-Plaza Way Rd. brg (RC-2)
Max/Min
Mean
Temperature (F)
70
65
60
55
50
45
40
35
30
05/30
06/14
06/29
07/14
07/29
08/13
08/28
09/12
09/27
10/12
10/27
11/11
Date

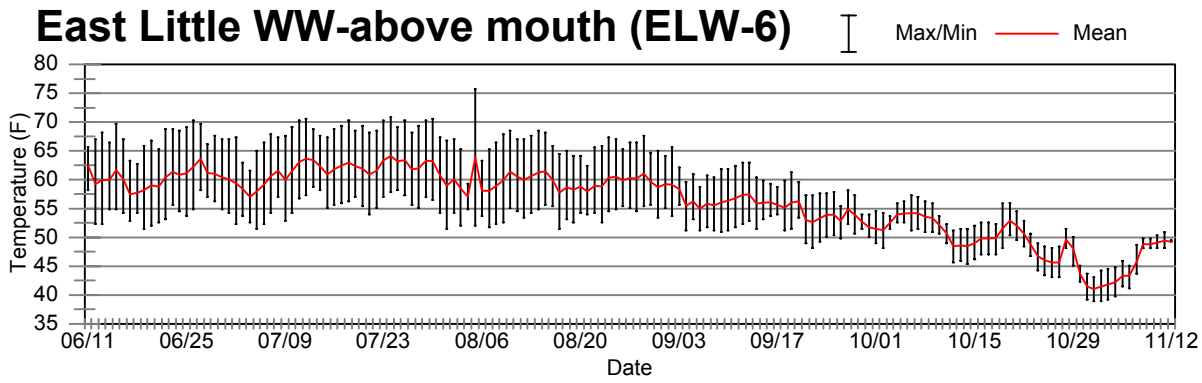

Cottonwood Ck-Hood Rd. brg (CWC-2)
Maz/Min
Mean
Temperature (F)
95
90
85
80
75
70
65
60
55
50
45
05/30
06/07
06/15
06/23
07/01
07/09
07/17
07/25
08/02
Date

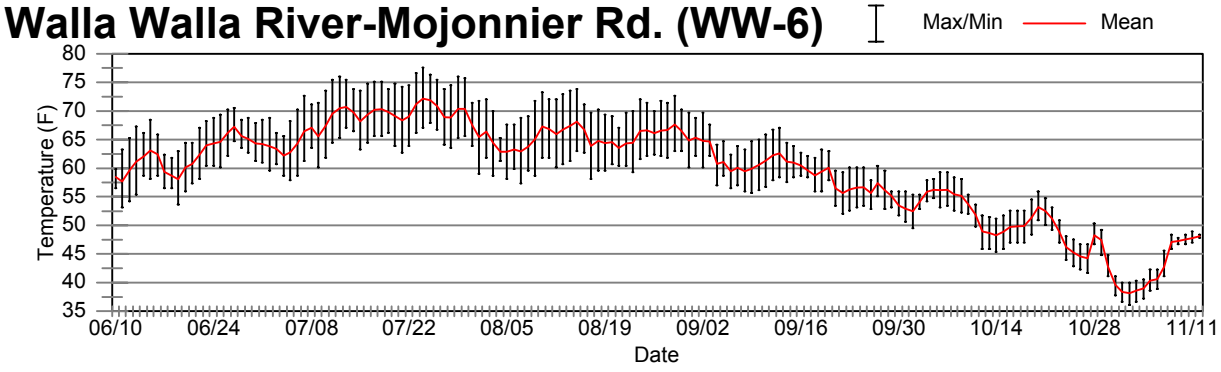

Cottonwood Ck-Braden Rd. brg (CWC-3)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
05/29
06/06
06/14
06/22
06/30
07/08
07/16
07/24
08/01
Date

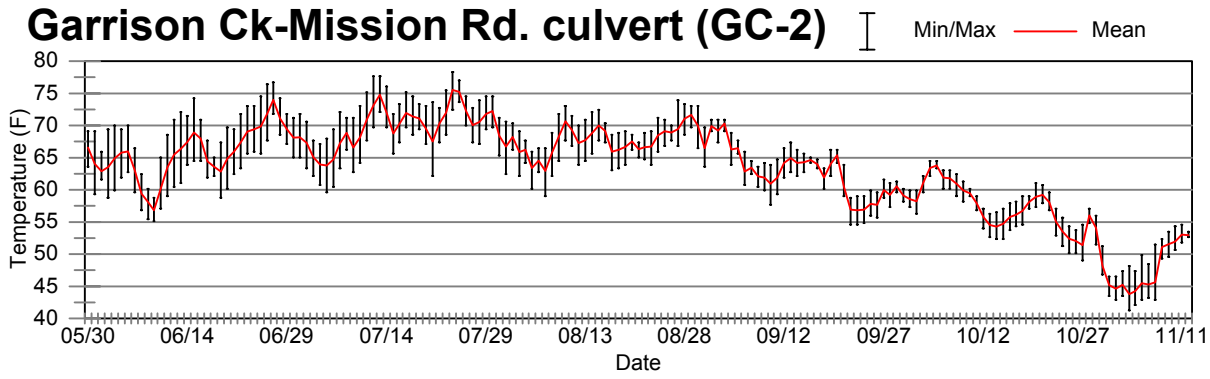

Yellowhawk Ck-above mouth (YC-6)
Max/Min
Mean
Data missing
04/16 to 06/17
Temperature (F)
80
75
70
65
60
55
50
45
40
35
30
10/30
11/25
12/21
01/16
02/11
03/09
04/04
06/28
07/24
08/19
09/14
10/10
11/05
Date

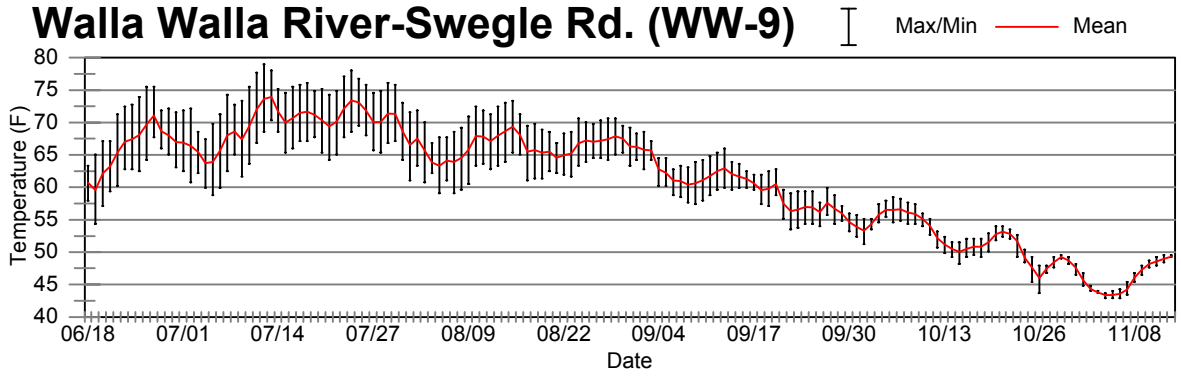

East Little WW-Big Spring Br. (ELW-2)
Max/Min
Mean
Temperature (F)
70
65
60
55
50
45
40
35
05/29
06/13
06/28
07/13
07/28
08/12
08/27
09/11
09/26
10/11
10/26
11/10
Date

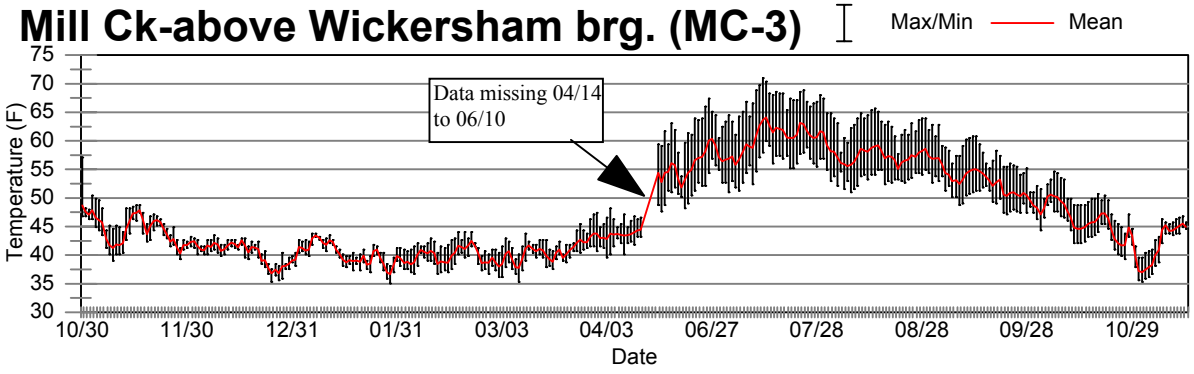

East Little WW-Springdale Rd. (ELW-4)
Max/Min
Mean
Temperature (F)
60
55
50
45
40
35
10/31
11/16
12/02
12/18
01/03
01/19
02/04
02/20
03/08
03/24
04/09
Date

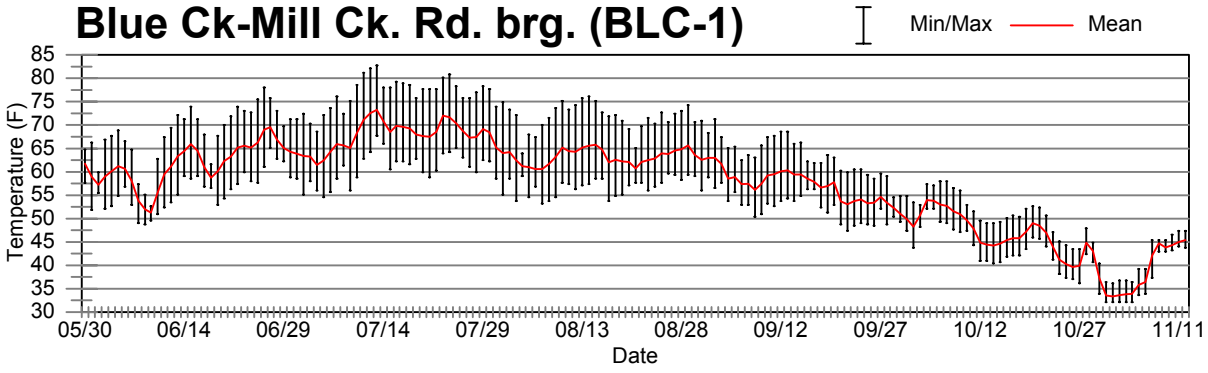

East Little WW-above mouth (ELW-6)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
06/11
06/25
07/09
07/23
08/06
08/20
09/03
09/17
10/01
10/15
10/29
11/12
Date

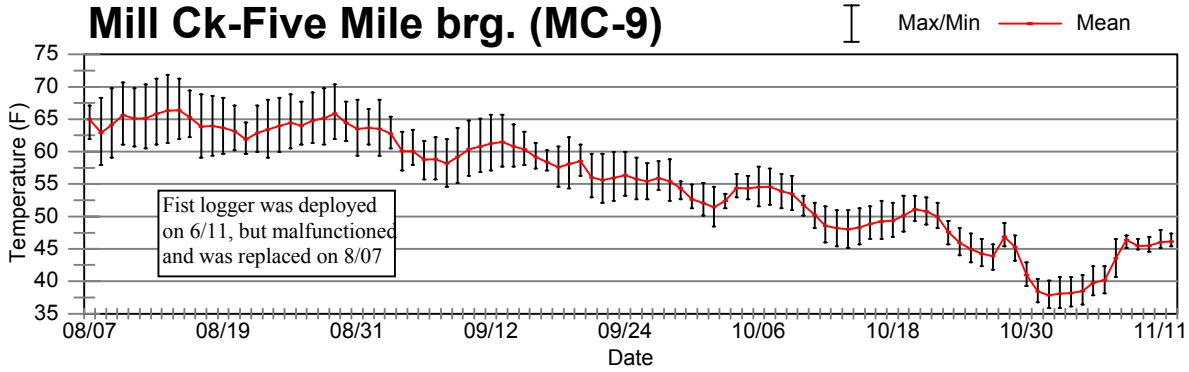

Walla Walla River-Mojonnier Rd. (WW-6)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
06/10
06/24
07/08
07/22
08/05
08/19
09/02
09/16
09/30
10/14
10/28
11/11
Date

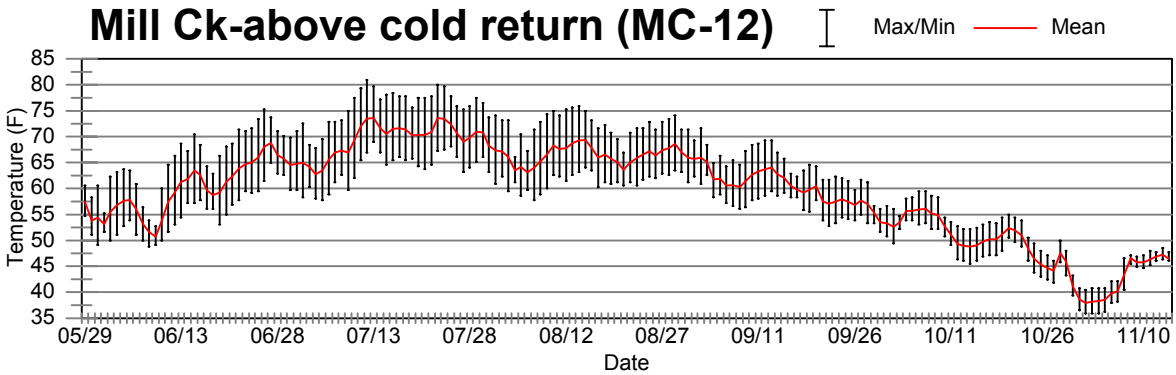

Garrison Ck-Mission Rd. culvert (GC-2)
Min/Max
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
05/30
06/14
06/29
07/14
07/29
08/13
08/28
09/12
09/27
10/12
10/27
11/11
Date

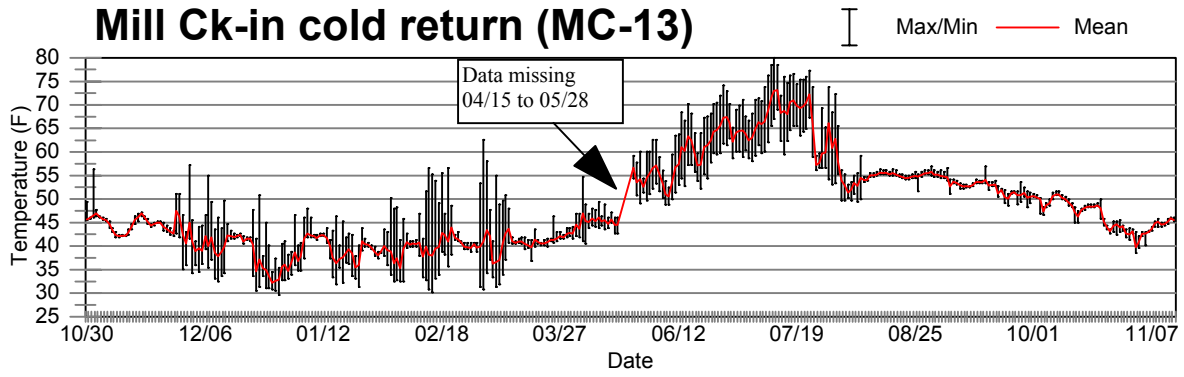

Walla Walla River-Swegle Rd. (WW-9)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
06/18
07/01
07/14
07/27
08/09
08/22
09/04
09/17
09/30
10/13
10/26
11/08
Date

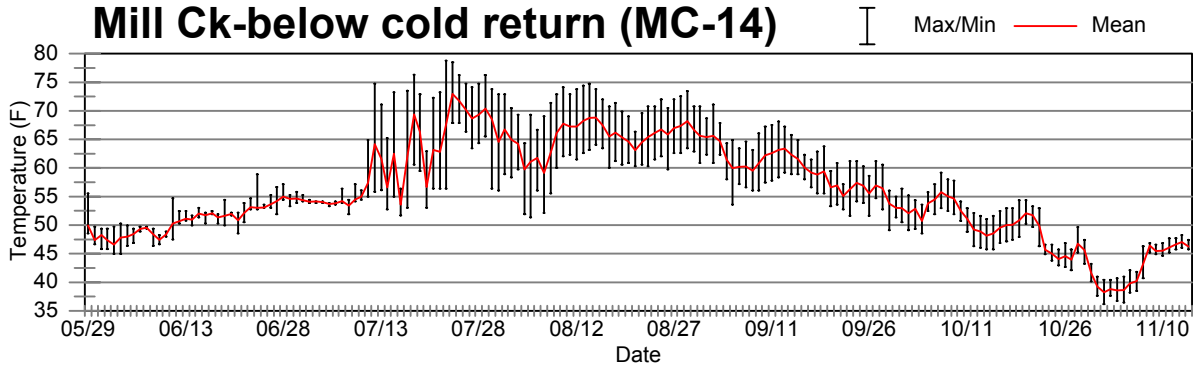

Mill Ck-above Wickersham brg. (MC-3)
Max/Min
Mean
Data missing 04/14 to 06/10
Temperature (F)
75
70
65
60
55
50
45
40
35
30
10/30
11/30
12/31
01/31
03/03
04/03
06/27
07/28
08/28
09/28
10/29
Date

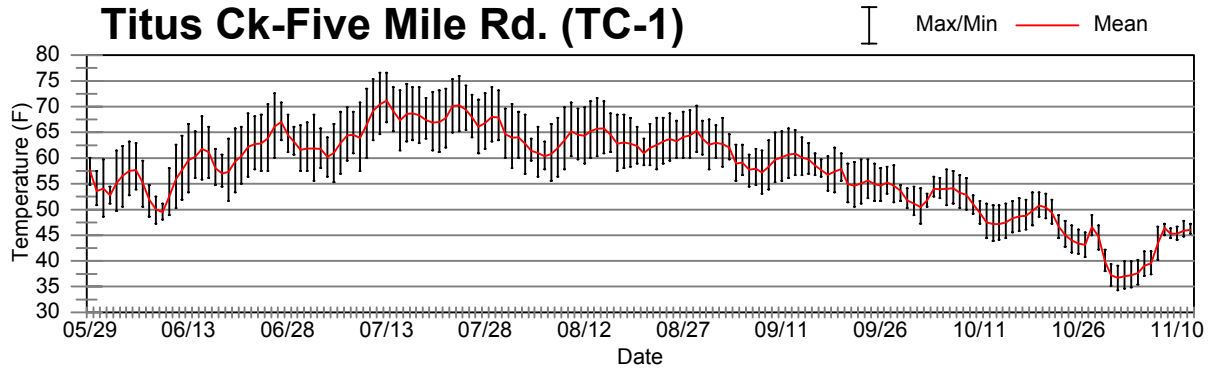

Blue Ck-Mill Ck. Rd. brg. (BLC-1)
Min/Max
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
30
05/30
06/14
06/29
07/14
07/29
08/13
08/28
09/12
09/27
10/12
10/27
11/11
Date

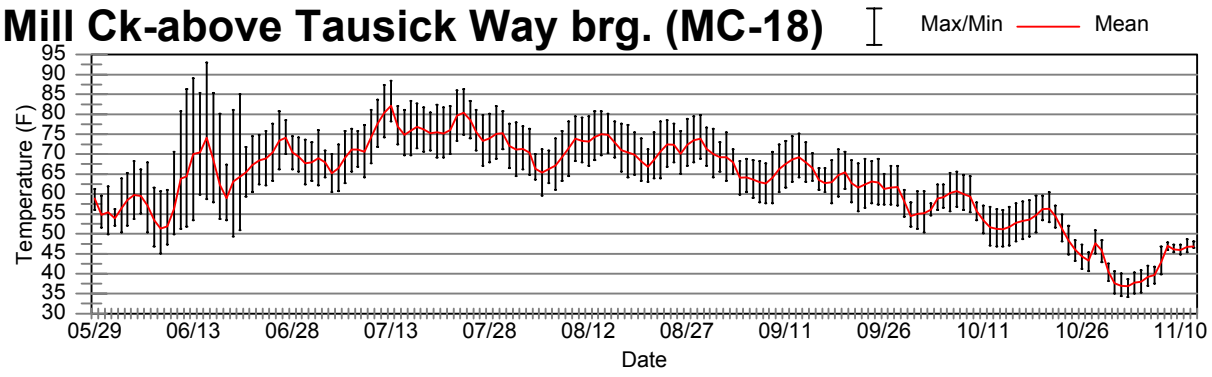

Mill Ck-Five Mile brg. (MC-9)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
35
Fist logger was deployed
on 6/11, but malfunctioned
and was replaced on 8/07
08/07
08/19
08/31
09/12
09/24
10/06
10/18
10/30
11/11
Date

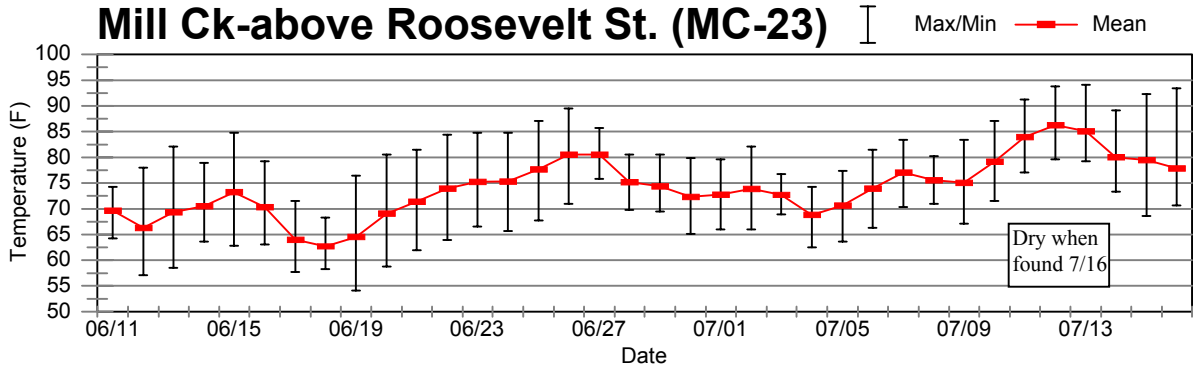

Mill Ck-above cold return (MC-12)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
05/29
06/13
06/28
07/13
07/28
08/12
08/27
09/11
09/26
10/11
10/26
11/10
Date

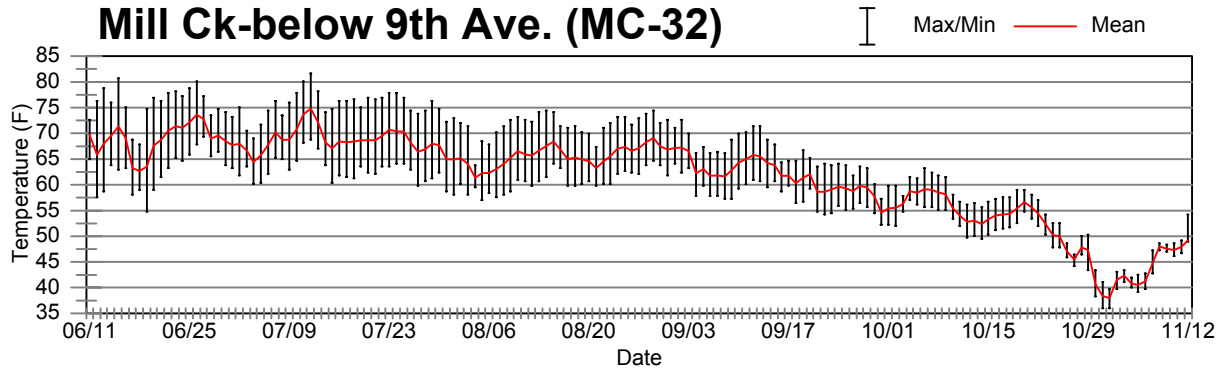

Mill Ck-in cold return (MC-13)
Max/Min
Mean
Data missing
04/15 to 05/28
Temperature (F)
80
75
70
65
60
55
50
45
40
35
30
25
10/30
12/06
01/12
02/18
03/27
06/12
07/19
08/25
10/01
11/07
Date

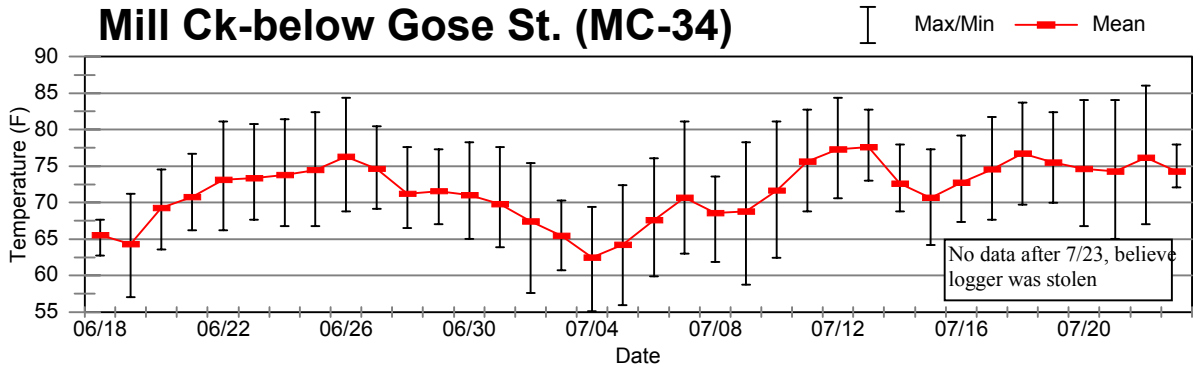

Mill Ck-below cold return (MC-14)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
05/29
06/13
06/28
07/13
07/28
08/12
08/27
09/11
09/26
10/11
10/26
11/10
Date

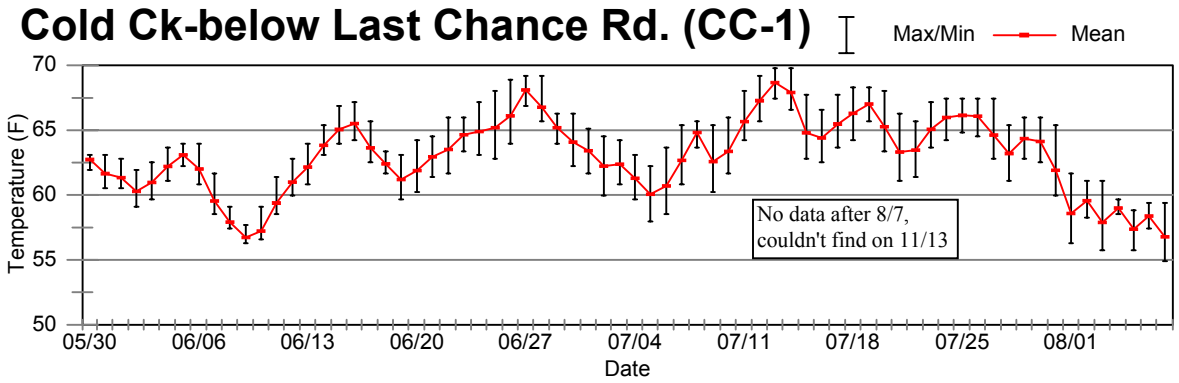

Titus Ck-Five Mile Rd. (TC-1)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
30
05/29
06/13
06/28
07/13
07/28
08/12
08/27
09/11
09/26
10/11
10/26
11/10
Date

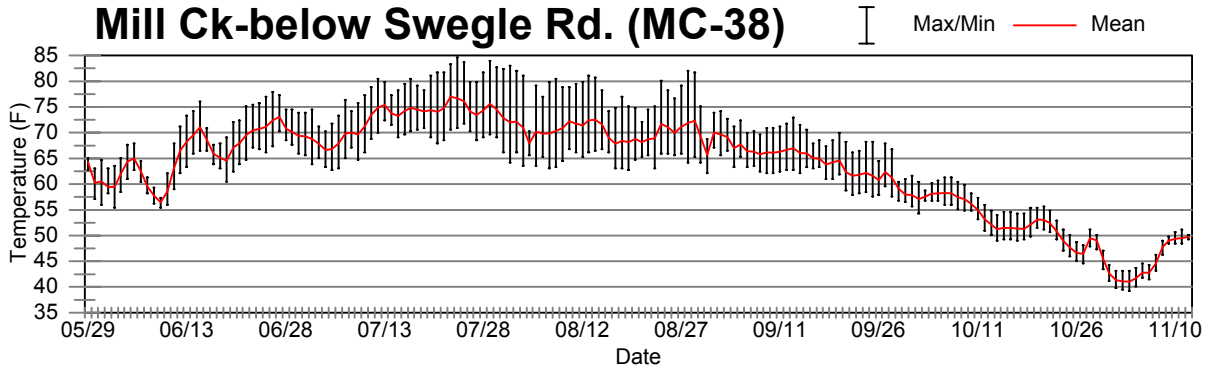

Mill Ck-above Tausick Way brg. (MC-18)
Max/Min
Mean
Temperature (F)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
05/29
06/13
06/28
07/13
07/28
08/12
08/27
09/11
09/26
10/11
10/26
11/10
Date

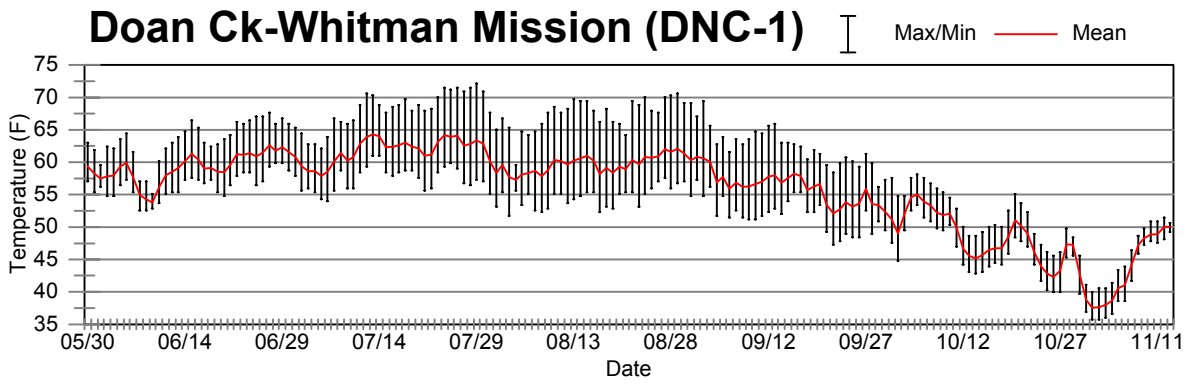

Mill Ck-above Roosevelt St. (MC-23)
Max/Min
Mean
Temperature (F)
100
95
90
85
80
75
70
65
60
55
50
Dry when found 7/16
06/11
06/15
06/19
06/23
06/27
07/01
07/05
07/09
07/13
Date

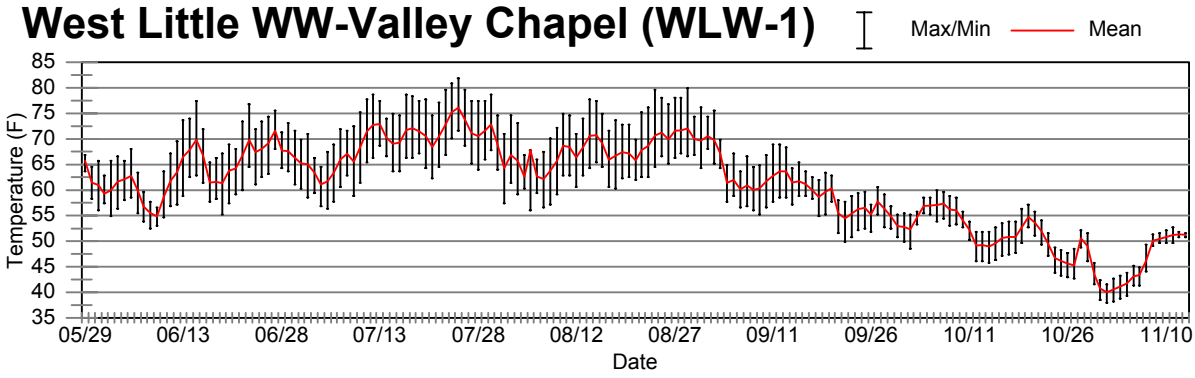

Mill Ck-below 9th Ave. (MC-32)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
06/11
06/25
07/09
07/23
08/06
08/20
09/03
09/17
10/01
10/15
10/29
11/12
Date

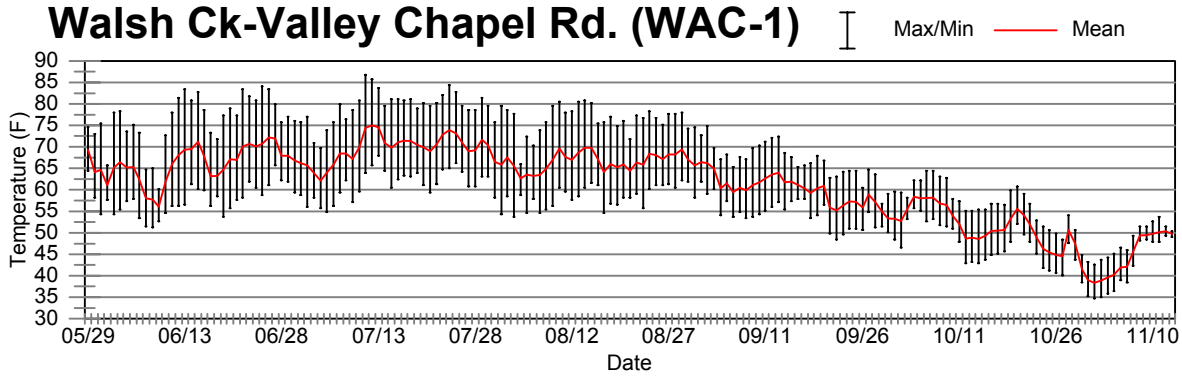

Mill Ck-below Gose St. (MC-34)
Max/Min
Mean
Temperature (F)
90
85
80
75
70
65
60
55
06/18
06/22
06/26
06/30
07/04
07/08
07/12
07/16
07/20
Date
No data after 7/23, believe logger was stolen

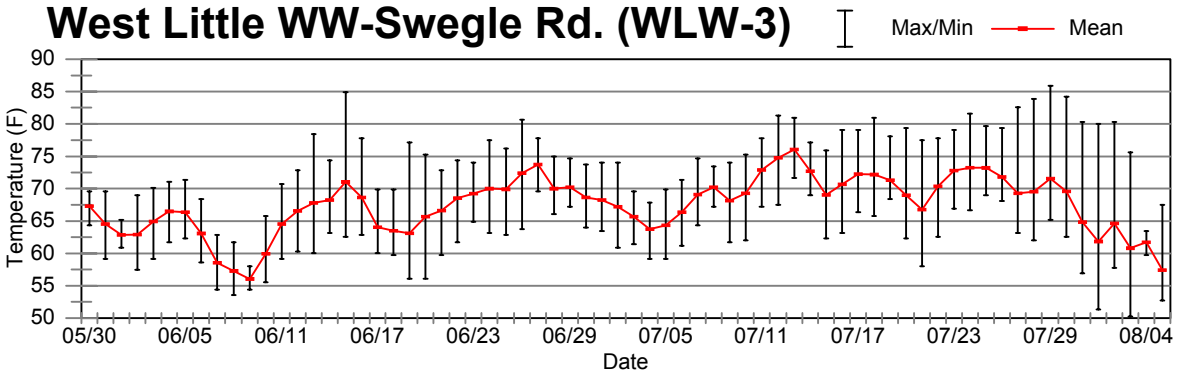

Cold Ck-below Last Chance Rd. (CC-1)
Max/Min
Mean
Temperature (F)
70
65
60
55
50
05/30
06/06
06/13
06/20
06/27
07/04
07/11
07/18
07/25
08/01
Date
No data after 8/7, couldn't find on 11/13

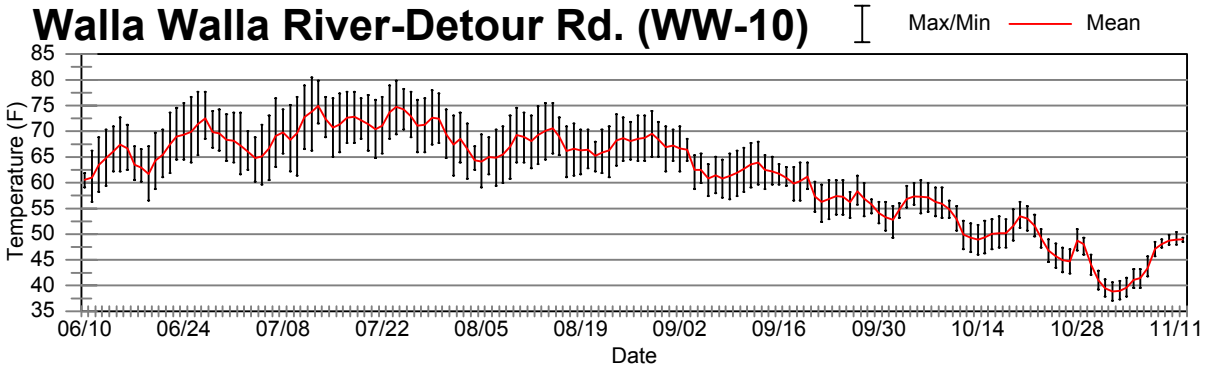

Mill Ck-below Swegle Rd. (MC-38)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
05/29
06/13
06/28
07/13
07/28
08/12
08/27
09/11
09/26
10/11
10/26
11/10
Date

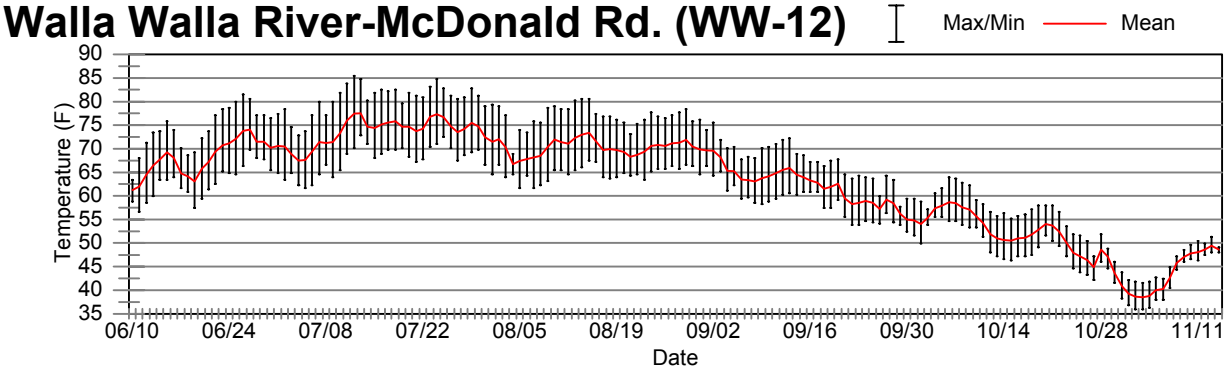

Doan Ck-Whitman Mission (DNC-1)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
35
05/30
06/14
06/29
07/14
07/29
08/13
08/28
09/12
09/27
10/12
10/27
11/11
Date

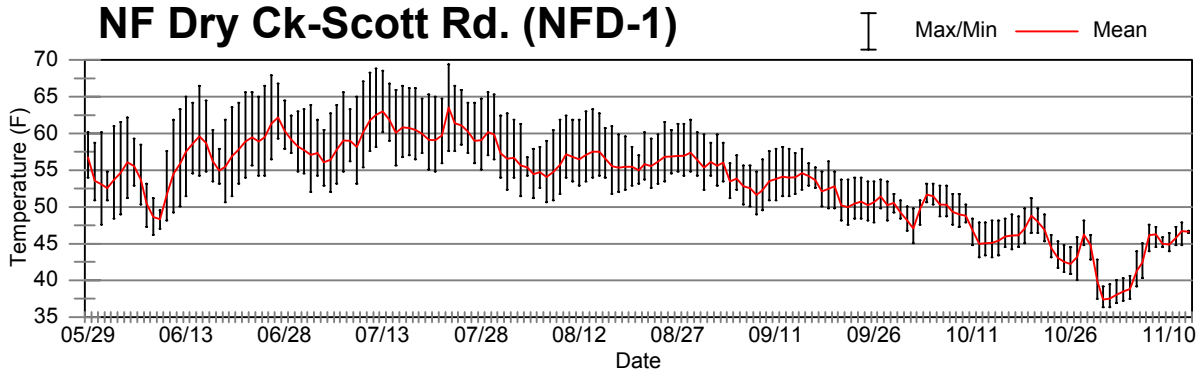

West Little WW-Valley Chapel (WLW-1)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
05/29
06/13
06/28
07/13
07/28
08/12
08/27
09/11
09/26
10/11
10/26
11/10
Date

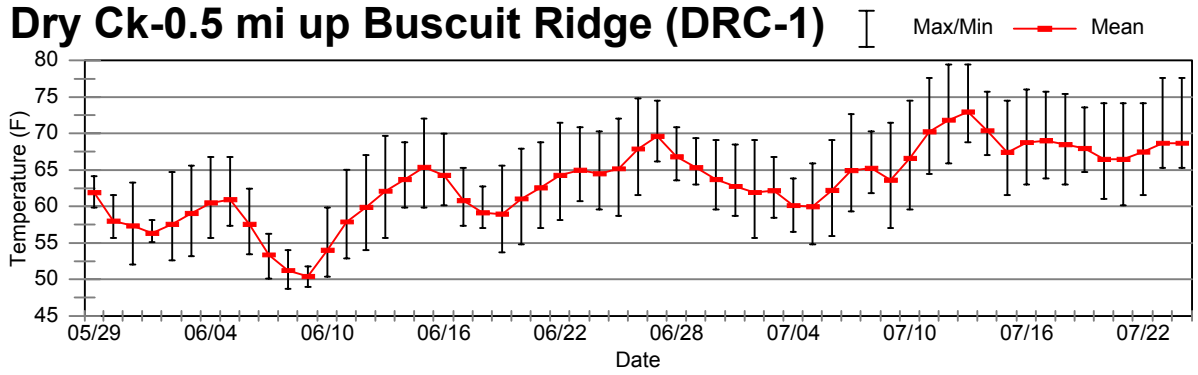

Walsh Ck-Valley Chapel Rd. (WAC-1)
Max/Min
Mean
Temperature (F)
90
85
80
75
70
65
60
55
50
45
40
35
30
05/29
06/13
06/28
07/13
07/28
08/12
08/27
09/11
09/26
10/11
10/26
11/10
Date

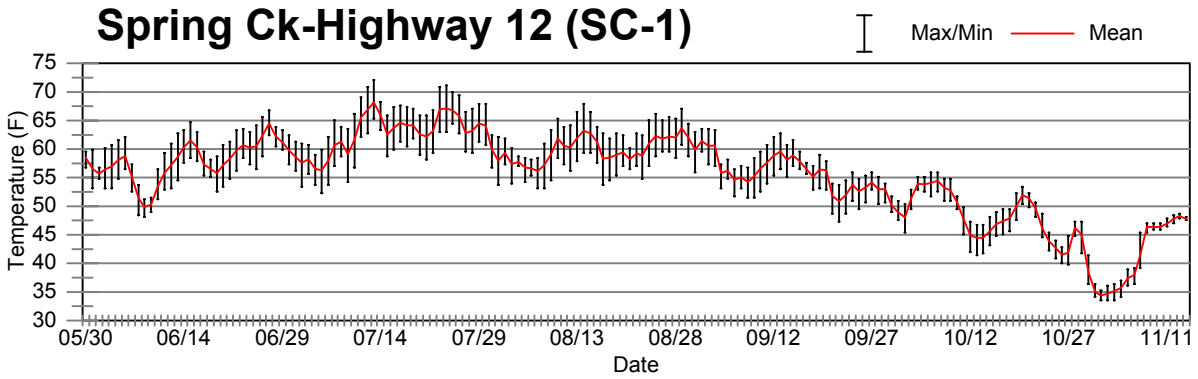

West Little WW-Swegle Rd. (WLW-3)
Max/Min
Mean
Temperature (F)
90
85
80
75
70
65
60
55
50
05/30
06/05
06/11
06/17
06/23
06/29
07/05
07/11
07/17
07/23
07/29
08/04
Date

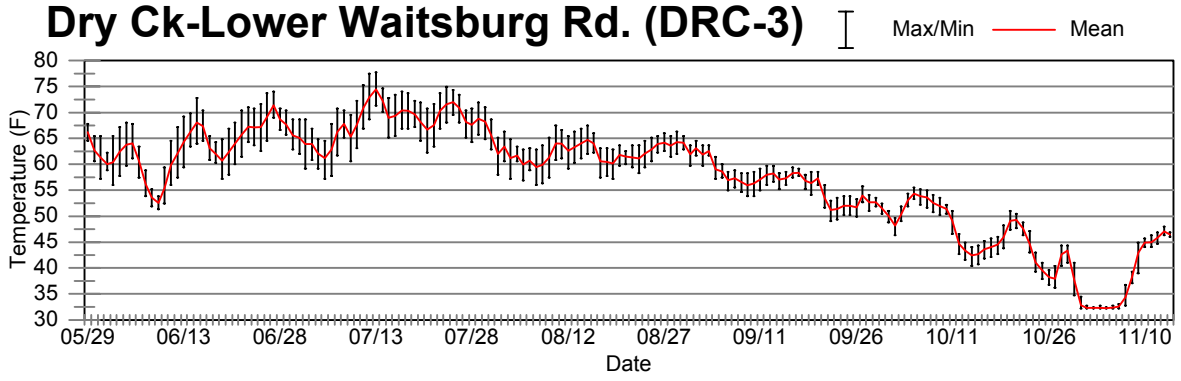

Walla Walla River-Detour Rd. (WW-10)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
06/10
06/24
07/08
07/22
08/05
08/19
09/02
09/16
09/30
10/14
10/28
11/11
Date

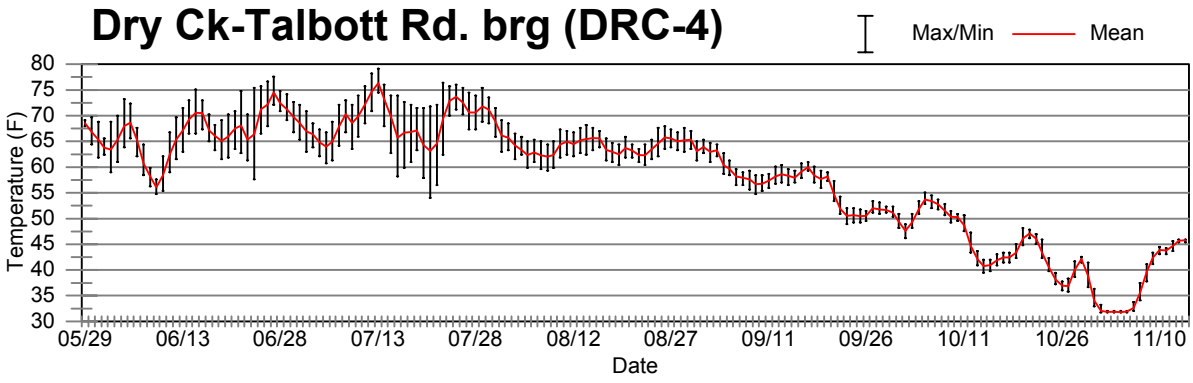

Walla Walla River-McDonald Rd. (WW-12)
Max/Min
Mean
Temperature (F)
90
85
80
75
70
65
60
55
50
45
40
35
06/10
06/24
07/08
07/22
08/05
08/19
09/02
09/16
09/30
10/14
10/28
11/11
Date

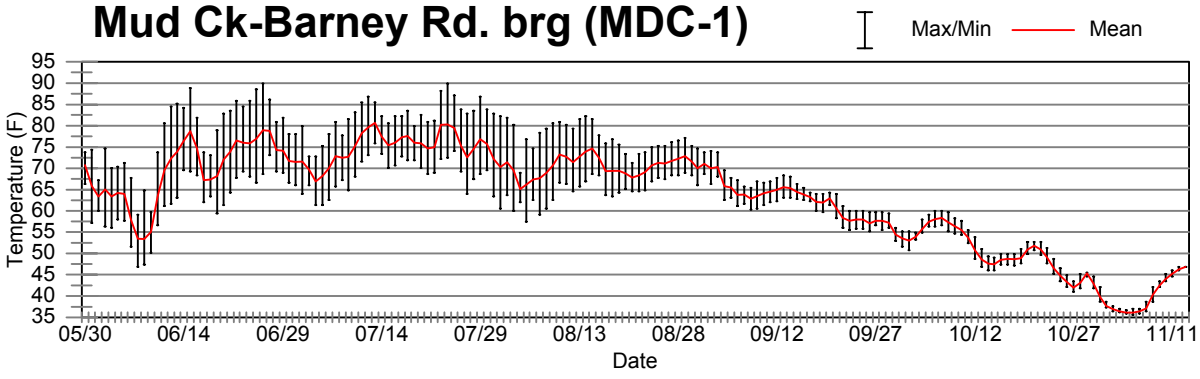

NF Dry Ck-Scott Rd. (NFD-1)
Max/Min
Mean
Temperature (F)
70
65
60
55
50
45
40
35
05/29
06/13
06/28
07/13
07/28
08/12
08/27
09/11
09/26
10/11
10/26
11/10
Date

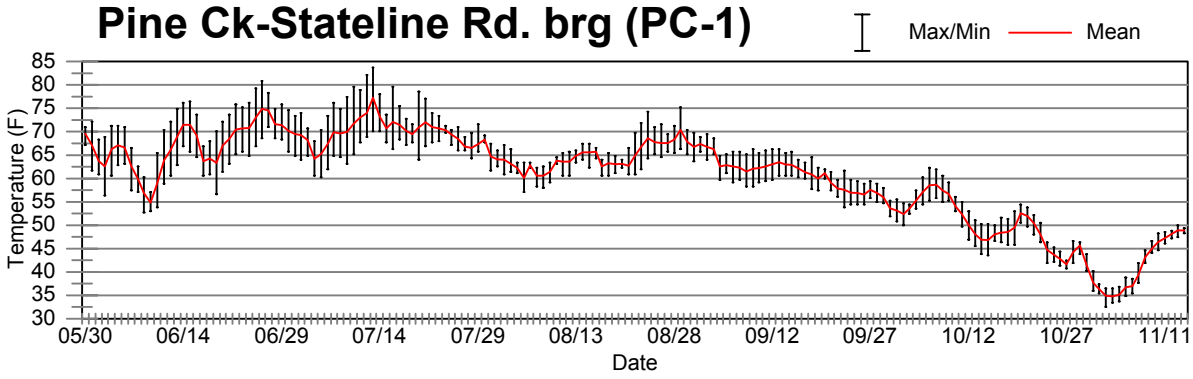

Dry Ck-0.5 mi up Buscuit Ridge (DRC-1)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
05/29
06/04
06/10
06/16
06/22
06/28
07/04
07/10
07/16
07/22
Date

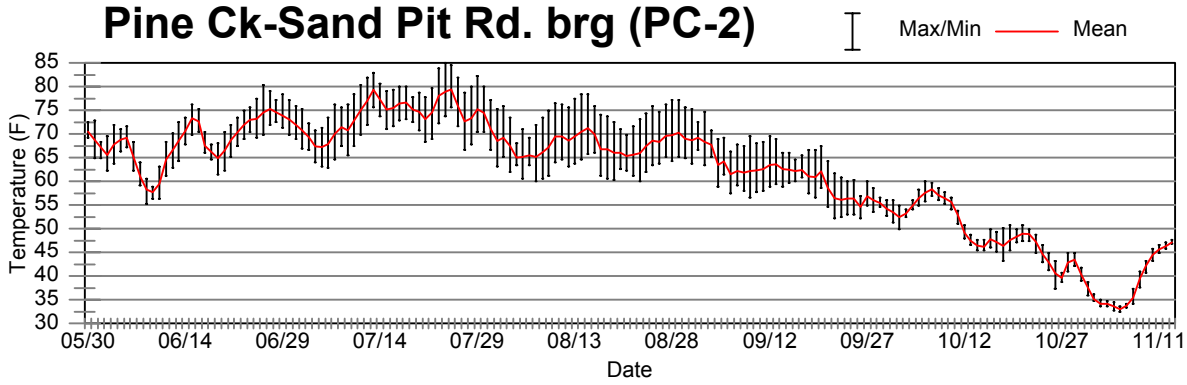

Spring Ck-Highway 12 (SC-1)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
35
30
05/30
06/14
06/29
07/14
07/29
08/13
08/28
09/12
09/27
10/12
10/27
11/11
Date

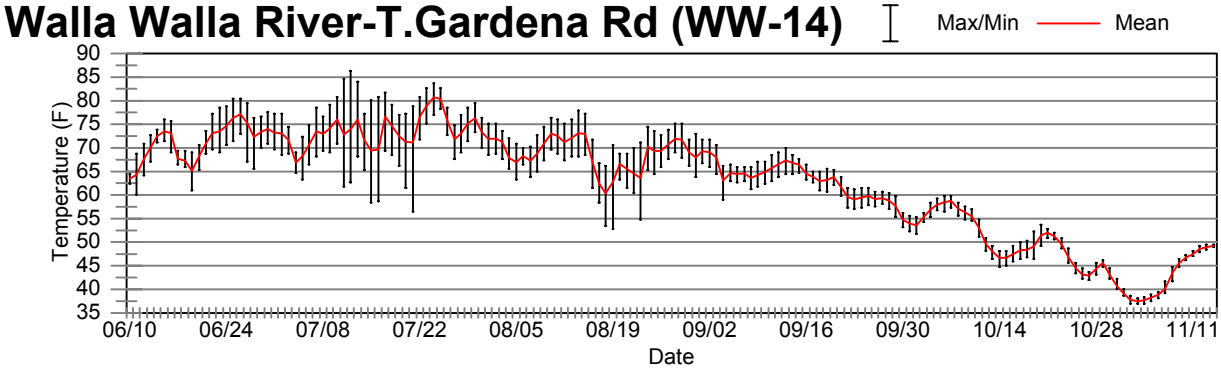

Dry Ck-Lower Waitsburg Rd. (DRC-3)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
30
05/29
06/13
06/28
07/13
07/28
08/12
08/27
09/11
09/26
10/11
10/26
11/10
Date


Dry Ck-Talbott Rd. brg (DRC-4)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
30
05/29
06/13
06/28
07/13
07/28
08/12
08/27
09/11
09/26
10/11
10/26
11/10
Date


Mud Ck-Barney Rd. brg (MDC-1)
Max/Min
Mean
Temperature (F)
95
90
85
80
75
70
65
60
55
50
45
40
35
05/30
06/14
06/29
07/14
07/29
08/13
08/28
09/12
09/27
10/12
10/27
11/11
Date


Pine Ck-Stateline Rd. brg (PC-1)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
30
05/30
06/14
06/29
07/14
07/29
08/13
08/28
09/12
09/27
10/12
10/27
11/11
Date


Pine Ck-Sand Pit Rd. brg (PC-2)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
30
05/30
06/14
06/29
07/14
07/29
08/13
08/28
09/12
09/27
10/12
10/27
11/11
Date


Walla Walla River-T.Gardena Rd (WW-14)
Max/Min
Mean
Temperature (F)
90
85
80
75
70
65
60
55
50
45
40
35
06/10
06/24
07/08
07/22
08/05
08/19
09/02
09/16
09/30
10/14
10/28
11/11
Date

List of Lost /Stolen Loggers 2002

Cold Creek @ Last Chance Rd. (CC-1)

Dropped logger on 05/30
Collected data from 05/30 to 08/07 (have graph of this data)
Couldn't find on 11/13

Mill Creek @ Gose St. Bridge

Dropped logger on 6/18
Collected data from 6/18 to 7/23 (have graph of this data)
Went to download and pull for the season on 11/12, case was found broken on the bank, logger was not found.

Appendix D. Qualitative Electrofishing, 2002

Appendix D. Table 1. Relative abundance of fish from qualitative electrofishing in the Walla Walla River basin, 2002.

Stream	Site#	Date	Approx Site Length (m)	Relative Abundance*	Comments
NF Touchet River	NFT-2 1.0 mi below sno-park	8/20	32	Two 0+ BT's (47 & 51mm), Four 1+ BT's (90-150mm), One adult BT found.	Heavy intensity survey, looking for juvenile BT.
	NFT-2 1.0 mi below sno-park	9/18	32	Six 1+ RBT's, one 0+BT (46mm), 15 1+ BT's, 1 adult BT found.	Heavy intensity survey, looking for juvenile BT.
	NFT-3 2.0 mi above Spangler Ck turn	8/20	53	11 0+ RBT's (38-60mm), 11 1+ RBT's (82-181mm), three 1+ RBT's (123-158mm) found. SCP and TF-common	Heavy intensity survey, looking for juvenile BT.
	NFT-4 1.5 mi above Spangler Ck turn	8/20	63	Eight 0+ RBT's (35-41mm), 12 1+ RBT's (79-189mm), one 1+ BT(175 mm), 1 adult BT found. SCP-uncommon, TF-rare	Heavy intensity survey, looking for juvenile BT.
	NFT-5 1.0 mi above Spangler Ck turn	8/20	35	19 0+ RBT's (33-53mm), 18 1+ RBT's (68-195mm) found. SCP and TF-common	Heavy intensity survey, looking for juvenile BT.
	NFT-6 0.5 mi above Spangler Ck turn	8/20	45	44 0+ RBT's (17-65mm), 16 1+ RBT's (78-186mm), found. SCP and TF-common	Heavy intensity survey, looking for juvenile BT.
Lewis Ck	LC-1 1.1 miles above FS line	7/12	60	Six 1+ RBT's (53-195 mm), one 1+ BT (100 mm), one adult BT (201 mm) found.	Heavy intensity survey
	LC-3 0.5 miles above FS line	7/12	28	Four 0+ RBT's (27-31 mm), two 1+ RBT's (100 and 107 mm) found. SCP-common	Moderate intensity survey
	LC-5 0.2 miles below FS line	7/15	40	Five 0+ RBT's (26-32 mm), five 1+ RBT's (101-175 mm), one adult RBT (209 mm) found. SCP-common	Moderate intensity survey
	LC-8 0.4 miles above NF Touchet Rd	7/15	40	Two 0+ RBT's (28 and 40 mm), ten 1+ RBT's (69-186 mm) found. SCP-common	Moderate intensity survey
Whiskey Ck	WC-1 main trib on Whiskey Ck Rd	7/11	27	No salmonids found. SD-abundant	Heavy intensity survey Very little water
	WC-2 ~10ft below main trib on Whiskey Ck Rd	7/11	35	No salmonids found. SD-abundant	Heavy intensity survey Pools only with no overland flow
	WC-3 2nd brg on Whiskey Ck Rd	7/11	58	Three 0+ RBT's (52-58 mm) found. SCP, SD-common	Heavy intensity survey Very little water

Appendix D. Table 1. (Continued) Relative abundance of fish from qualitative electrofishing in the Walla Walla River basin, 2002.

Stream	Site#	Date	Approx Site Length (m)	Relative Abundance*	Comments
Walla Walla River	WW-5 0.5 mi above Burlingame Div.	7/17	84.5	Seven 0+ RBT's (60-76 mm), three 1+ RBT's (147-157 mm) found. NPM, SD, RSS, BLS abundant, SCP-common	Moderate intensity survey, tissue samples taken for DOE.
	WW-6 ~60 meters below Mojonnier Rd	7/17	123	Seven 0+ RBT's (50-80 mm), one 1+ WF (94 mm) found. RSS, SD, SCP-abundant NPM, BLS-common, GC-rare	Moderate intensity survey, tissue samples taken for DOE.
	WW-7 below Last Chance Rd	7/17	74	Five 0+ RBT's (52-75 mm), one 0+ WCH (90 mm) found. SD-abundant, BLS, RSS, SCP, NPM-common	Moderate intensity survey, tissue samples taken for DOE.
	WW-8 ~20m above Swegle Rd brg	7/18	34	One 0+ WCH (108 mm) NPM, SD, RSS-common SMB, GC-rare	Moderate intensity survey, tissue samples taken for DOE.
	WW-10 0.4mi above Detour Rd brg	7/17	133	Seven 0+ RBT's (48-76 mm), one 1+ RBT (190 mm), one adult RBT (271 mm) found. RSS-abundant, NPM, SCP, SD, BLS-common, GC-rare	Moderate intensity survey, tissue samples taken for DOE.
	WW-11 Detour Rd Brg (salvage)	8/15	65	Five 0+ RBT's (83-89 mm), one 0+ WCH (65 mm) found. NPM, SCP, SD, RSS, BLS, CMO-abundant, SMB-common LPY-rare	Heavy intensity survey, removing fish for bridge project.
	WW-12 ~50m above McDonald Rd brg	7/18	173	Five adult RBT's (202-278 mm) NPM, SD, RSS-abundant BLS-common, SMB-rare	Moderate intensity survey, tissue samples taken for DOE.
	WW-13 Lowden Gardena brg to mouth of Dry Ck	7/18	200	No salmonids found SD, RSS-abundant, BLS, NPM-common, SMB-rare	Moderate intensity survey, tissue samples taken for DOE.
Yellowhawk	YC-2 Carl St.	8/21	33	Eight 0+ RBT's (47-65 mm), SCP, SD-abundant, RSS, LPY-uncommon, LND-rare	Heavy intensity survey, lost bottom net after pass 1
East Little Walla Walla	ELW-1 0.5 miles up Big Spring Branch	6/28	100	Seven 0+ RBT's (43-53 mm), four 1+ RBT's (148-167 mm), two 0+ WCH (86 and 98 mm) found. SCP-abundant, SD-common, RSS-uncommon	Heavy intensity survey

Appendix D. Table 1. (Continued) Relative abundance of fish from qualitative electrofishing in the Walla Walla River basin, 2002.

Stream	Site#	Date	Approx Site Length (m)	Relative Abundance*	Comments
East Little Walla Walla (Continued)	ELW-1 0.5 miles up Big Spring Branch	8/12	80	Eight 0+ RBT's (55-85 mm), three 1+ RBT's (159-169 mm), one adult RBT (250 mm), two 1+ BT (186 and 195 mm) found. SCP, SD-common, RSS-rare	Heavy intensity survey
	ELW-3 0.3 miles up Big Spring Branch	6/28	30	One 0+ RBT (56 mm) found. SCP, SD-common	Heavy intensity survey, bottom net fell after pass 1
	ELW-3 0.3 miles up Big Spring Branch	8/12	25	One 0+ RBT (79 mm), one 1+ RBT (149 mm) found. SD, SCP-common, RSS, LPY-rare	Moderate intensity survey
	ELW-5 ~60m below Springdale Rd	6/28	30	No salmonids found. SCP-abundant, SD-common CMO-rare	Heavy intensity survey
	ELW-6 0.4 miles above the mouth	6/27	25	Two 0+ RBT's (52 and 72 mm), one 1+ RBT (132 mm), two 0+ WCH (76 and 79 mm) found. SD, RSS, BLS-common	Heavy intensity survey, bottom net fell after pass 1
	ELW-6 0.4 miles above the mouth	8/12	25	One 0+ RBT (81 mm) found. RSS-abundant, SCP, SD-common NPM-uncommon	Moderate intensity survey
Mill Ck	MC-7 0.8 miles above Seven Mile brg	8/1	30	Three 0+ RBT's (56-65 mm), nine 1+ RBT's (122-165 mm), eight 0+ WCH (57-105 mm) found. SCP, SD-abundant, LND, SD common, RSS-uncommon	Heavy intensity survey, anode broke during pass 1
	MC-11 ~70 meters below Bennington Lake Dam	6/20	57	Thirteen 1+ RBT's (130-192 mm), six adult RBT's (210-255 mm), one 1+ BT (154 mm), one adult BT (208 mm) found. NPM, SD, RSS, BLS-abundant, SC-common	Moderate intensity survey
	MC-11 ~70 meters below Bennington Lake Dam	7/16	53	Five 0+ RBT's (35-63 mm), five 1+ RBT's (163-177 mm), one adult RBT (275 mm), one 0+ WCH (67 mm) found. SCP-abundant BLS, RSS, NPM-common, LPY-rare	Moderate intensity survey
	MC-11 ~70 meters below Bennington Lake Dam	8/20	57	Eleven 0+ RBT's (51-103 mm), nine 1+ RBT's (138-187 mm), two adult RBT's (225 and 238 mm) found. SCP, SD-abundant RSS, BLS-common	Moderate intensity survey

Appendix D. Table 1. (Continued) Relative abundance of fish from qualitative electrofishing in the Walla Walla River basin, 2002.

Stream	Site#	Date	Approx Site Length (m)	Relative Abundance*	Comments
Mill Ck (Continued)	MC-11 ~70 meters below Bennington Lake Dam	9/26	57	21 0+ RBT's (63-110 mm), eleven 1+ RBT's (125-171 mm), five adult RBT's (201-268 mm), one 1+ WCH (121 mm), one 1+ BT (162 mm) found. SCP-abundant SD, RSS, BLS-uncommon, LND-rare	Moderate intensity survey
	MC-15 ~60m above the Yellowhawk Diversion	6/20	52	Three 1+ RBT's (147-190 mm), six adult RBT's (210-350 mm), one 0+ WCH (95 mm) found. BLS, RSS, SD-abundant, SCP, NPM-common, LND-rare	Moderate intensity survey
	MC-15 ~60m above the Yellowhawk Diversion	7/16	52	No salmonids found. NPM, SD, SCP, RSS, BLS-abundant LPY-rare	Moderate intensity survey
	MC-15 ~60m above the Yellowhawk Diversion	8/20	52	No salmonids found. SCP, SD, RSS, BLS-abundant	Moderate intensity survey
	MC-15 ~60m above the Yellowhawk Diversion	9/26	52	One 0+ RBT (71 mm) found. SCP, RSS, BLS-abundant	Moderate intensity survey
	MC-16 ~30m below the Yellowhawk Diversion	6/20	57	One 1+ RBT (174 mm), two adult RBT's (202 and 292 mm) found. NPM, SD, BLS, RSS-abundant	Moderate intensity survey
	MC-16 ~30m below the Yellowhawk Diversion	7/16	57	Five dead adult RBT's found in stream. BLS-abundant, RSS, SD, NPM-common, SCP-rare	Moderate intensity survey, no lengths taken on dead fish
	MC-16 ~30m below the Yellowhawk Diversion	8/20	57	No salmonids found. BLS, SD-abundant, RSS-common, NPM-rare	Moderate intensity survey
	MC-16 ~30m below the Yellowhawk Diversion	9/26	57	No salmonids found. SD, RSS, BLS-abundant	Moderate intensity survey No overland flow
	MC-17 Titus Ck outlet	8-20	53	No salmonids found. SCP, SD, RSS, BLS-abundant	Moderate intensity survey
	MC-18 1st weir above Tausick Way brg	6/20	28	Two 1+ RBT's (185 and 195 mm), three adult RBT's (232-295 mm) found. SD, RSS, NPM, BLS-abundant, LND-uncommon	Moderate intensity survey

Appendix D. Table 1. (Continued) Relative abundance of fish from qualitative electrofishing in the Walla Walla River basin, 2002.

Stream	Site#	Date	Approx Site Length (m)	Relative Abundance*	Comments
Mill Ck (Continued)	MC-18 1st weir above Tausick Way brg	7/16	28	No salmonids found. NPM, SD, RSS, BLS-abundant, SCP-uncommon	Moderate intensity survey
	MC-18 1st weir above Tausick Way brg	8/20	28	No salmonids found. SD, BLS-abundant, RSS-common SCP, NPM-rare	Moderate intensity survey
	MC-18 1st weir above Tausick Way brg	9/26	28	No salmonids found. SD, RSS, BLS-abundant, SCP-rare NPM-common	Moderate intensity survey
	MC-19 0.3mi below Tausick Way brg	8/20	56	No salmonids found. SD, BLS-abundant, RSS-common	Moderate intensity survey
	MC-19 0.3mi below Tausick Way brg	9/26	55	No salmonids found. SD, RSS BLS-abundant	Moderate intensity survey
	MC-20 0.4mi above Wilbur Ave brg	8/20	78	No salmonids found. SD, BLS-abundant, RSS-uncommon	Moderate intensity survey
	MC-20 0.4mi above Wilbur Ave brg	9/26	78	No fish found.	Dry streambed
	MC-21 1st weir above Wilbur Ave brg	8/20	56	No salmonids found. SD-abundant, RSS-uncommon	Moderate intensity survey heavy algae and dense grass
	MC-22 Behind Edison School	6/20	92	Two adult RBT's (213 and 215 mm) found. SD-abundant RSS, BLS, NPM-common	Heavy intensity survey
	MC-22 Behind Edison School	7/16	53	No salmonids found. SD-abundant, NPM, RSS-common	Heavy intensity survey almost dry
	MC-22 Behind Edison School	9/26	92	No fish found.	Dry streambed
	MC-23 ~15m above Roosevelt St brg	6/20	40	One 1+ RBT (195 mm), one adult RBT (220 mm) found. NPM-uncommon	Heavy intensity survey
	MC-23 ~15m above Roosevelt St brg	9/26	40	No fish found.	Dry streambed
	MC-24 Clinton St. brg	6/20	85	One adult RBT (228 mm) found. NPM-uncommon, BLS-rare	Heavy intensity survey

Appendix D. Table 1. (Continued) Relative abundance of fish from qualitative electrofishing in the Walla Walla River basin, 2002.

Stream	Site#	Date	Approx Site Length (m)	Relative Abundance*	Comments
Mill Ck (Continued)	MC-24 Clinton St. brg	7/16	72	Eight 0+ RBT's (44-70 mm), two adult RBT's (208 and 212 mm), one 0+ WCH (101 mm) found. SD, RSS-common	Moderate intensity survey
	MC-24 Clinton St. brg	7/24	72	Five 0+ RBT's (56-74 mm), one adult RBT (209 mm) found. SD-common, BLS-uncommon	Moderate intensity survey
	MC-24 Clinton St. brg	9/26	85	One 0+ RBT (97 mm), one 1+ RBT (135 mm), one 1+ WCH (124 mm) found. SD, BLS-uncommon, RSS-common	Moderate intensity survey heavy algae
	MC-25 Otis St brg upstream	7/16	55.6	Three 0+ RBT's (58-63 mm), four adult RBT's (230-268 mm), one 0+ WCH (94 mm) found. SD, RSS-common, NPM-uncommon, BLS-rare	Heavy intensity survey found all fish in pool created by blockage across weir
	MC-25 Otis St brg upstream	7/24	55.6 SD-rare	One 0+ RBT (65 mm) found. blockage was removed	Moderate intensity survey since survey on 7/16
	MC-25 Otis St brg upstream	9/26	56	No salmonids found. RSS-uncommon, SD, BLS-rare	Moderate intensity survey
	MC-26 Otis St brg downstream	7/16	55.6	Two 0+ RBT's (64 and 67 mm), one adult RBT (247 mm) found. SD-common	Moderate intensity survey
	MC-26 Otis St brg downstream	9/26	56	No salmonids found. BLS-uncommon, SD, RSS-rare	Moderate intensity survey
	MC-27 Spokane St upstream	7/16	28	One 1+ RBT (155 mm), five adult RBT's (217-296 mm). SD, RSS, BLS-common	Moderate intensity survey found all fish in pool created by blockage across weir
	MC-27 Spokane St upstream	7/24	28	One 0+ RBT (70 mm), one 1+ RBT (149 mm), two adult RBT's (209 and 253 mm) found. SD, RSS-uncommon	Moderate intensity survey found all fish in pool created by blockage across weir
	MC-27 Spokane St upstream	9/26	28	Three 0+ RBT's (105-110 mm), three 1+ RBT's (129-181 mm) found. RSS-common, SD-uncommon, SCP, BLS-rare	Heavy intensity survey found all fish in pool created by blockage across weir

Appendix D. Table 1. (Continued) Relative abundance of fish from qualitative electrofishing in the Walla Walla River basin, 2002.

Stream	Site#	Date	Approx Site Length (m)	Relative Abundance*	Comments
Mill Ck (Continued)	MC-28 Colville St to Spokane St	6/20	98	One adult RBT (228 mm) found. NPM, BLS-common	Heavy intensity survey
	MC-28 Colville St to Spokane St	7/16	98	One 1+ RBT (190 mm), one adult RBT (284 mm) found. SD, RSS, BLS-common	Moderate intensity survey
	MC-28 Colville St to Spokane St	9/26	98	Two 1+ RBT's (118 and 121 mm) found. BLS, RSS, SD-uncommon, SCP-rare	Heavy intensity survey
	MC-29 4th Ave brg upstream	6/20	110	One adult RBT (205 mm), one 0+ WCH (94 mm) found. NPM, RSS, BLS-common	Heavy intensity survey
	MC-29 4th Ave brg upstream	7/16	110	Three 0+ RBT's (54-60 mm), one 0+ WCH (98 mm) found. SD-common, RSS-uncommon	Moderate intensity survey
	MC-29 4th Ave brg upstream	7/24	110	Two 0+ RBT's (73 and 75 mm) found. RSS-common, BLS, SD-uncommon	Moderate intensity survey
	MC-29 4th Ave brg upstream	9/26	110	One 0+ WCH (101 mm) found. RSS-abundant, BLS, SD-common SCP-rare	Heavy intensity survey
	MC-30 9th Ave brg	6/20	105.8	Three 1+ RBT's (188-193 mm), one adult RBT (206 mm) found. NPM, BLS-common	Heavy intensity survey
	MC-30 9th Ave brg	7/16	106	One 1+ RBT (195 mm), six adult RBT's (221-241 mm) five 0+ WCH (92-109 mm) found. SD-common, LYP-rare	Moderate intensity survey
	MC-30 9th Ave brg	7/24	105.8	One 0+ RBT (64 mm), one 1+ RBT (195 mm), three adult RBT's (215-268 mm), three 0+ WCH (95-105 mm) found. RSS, SD-common, BLS-uncommon, SCP-rare	Moderate intensity survey
	MC-30 9th Ave brg	9-26	106	Nine 1+ RBT's (121-172 mm), one adult RBT (230 mm) found. RSS-common, SD, NPM-rare	Heavy intensity survey

Appendix D. Table 1. (Continued) Relative abundance of fish from qualitative electrofishing in the Walla Walla River basin, 2002.

Stream	Site#	Date	Approx Site Length (m)	Relative Abundance*	Comments
Mill Ck (Continued)	MC-31 30m below 9th Ave brg	7/16	27.6	Two 1+ RBT's (162-194 mm), two adult RBT's (231 and 244 mm) found. SD, BLS, NPM-abundant, RSS-common	Heavy intensity survey
	MC-33 Weirs 3-5 above Gose St	6/20	53	Two 1+ RBT's (192 and 198 mm), one adult RBT (267 mm) found. SD-abundant, RSS, BLS, NPM-common, SCP-uncommon	Moderate intensity survey
	MC-33 Weirs 3-5 above Gose St	7/16	53	No salmonids found. RSS, BLS-abundant, SD, NPM-common	Moderate intensity survey
Titus Ck	TC-2 behind nursing bldg. at WWCC	8/21	38	One 0+ RBT (94 mm), one 1+ RBT (136 mm) found. SCP, RSS-uncommon, SD-rare	Moderate intensity survey
	TC-3 Footbridge at WWCC	.8/21	15	One 1+ RBT (147 mm) found. SD, SCP-common, RSS-uncommon	Moderate intensity survey heavy siltation, difficult to survey
West Little Walla Walla	WLW-1 0.6mi up Valley Chapel Rd	6/28	100	One 1+ RBT (115 mm) found. SD, RSS-abundant, BLS-common SCP-rare	Heavy intensity survey
	WLW-1 0.6mi up Valley Chapel Rd	8/12	70	No salmonids found. SCP, SD, RSS-abundant	Moderate intensity survey
	WLW-2 Frog Hollow Rd downstream	6/28	100	No salmonids found. SD-uncommon	Moderate intensity survey
	WLW-4 WDFW property	6/28	40	No salmonids found. SD-common	Light intensity survey dense overhanging grasses
Dry Ck	DRC-2 Middle Waitsburg Rd brg	8/16	55	Eight 0+ RBT's (28-80 mm), four 1+ RBT's (125-158 mm) NPM, SD, RSS, BLS-common CMO-uncommon	Heavy intensity survey removing fish for bridge project

Appendix E. Relative Abundance of Non–Salmonids, 2002

Appendix E. Table 1. Relative Abundance of Non-salmonids in the Touchet River Basin 2002.

Species	NF Touchet Lewis Ck	NF Touchet Lewis Ck	Lewis Ck	Wolf Fk Robinson Fk	Wolf Fk Robinson Fk	Robinson Fork	South Fork Touchet	Touchet River	Whiskey Ck
Petromyzontidae Lamprey	1	3	0	1	2	1	2	1	0
Cyprinidae Speckled dace *Rhinichthys osculus*	1	2	0	2	2	1	3	4	4
Longnose dace *Rhinichthys cataractae*	1	1	0	1	1	0	2	2	0
Redside shiner *Richardsonius balteatus*	0	0	0	0	0	0	0	2	0
Northern pikeminnow *Ptychocheilus oregonesis*	0	0	0	0	0	0	0	1	0
Catostomidae Suckers[a] *Catostomus sp.*	0	0	0	0	0	0	0	1	0
Cottidae Sculpin[a] *Cottus sp.*	3	4	3	4	4	3	4	3	3
Tailed Frogs *Ascaphus truei*	2	0	0	0	0	0	0	0	0
Crayfish[a] *Pacifastacus sp.*	0	0	P	0	0	0	0	0	0

P = present,

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

Appendix E. Table 2.	Relative Abundance of Non-salmonids in the Walla Walla River Basin 2002.								
Species	Walla Walla River	Yellowhawk Creek	Cottonwood Creek	East Little Walla Walla	Mill Ck Bennington Diversion	Mill Ck Bennington Diversion	Titus Creek	West Little Walla Walla	Dry Ck
Petromyzontidae Lamprey larvae	1	2	0	1	2	1	0	0	0
Cyprinidae Speckled dace *Rhinichthys osculus*	4	3	3	3	3	4	2	4	3
Longnose dace Rhinichthys cataractae	0	1	0	0	2	1	0	0	0
Chiselmouth *Acroheilus alutaceus*	1	0	0	1	0	0	0	0	2
Redside shiner *Richardsonius balteatus*	4	2	0	2	1	3	2	3	3
Northern pikeminnow *Ptychocheilus oregonesis*	3	1	0	1	0	3	0	0	3
Carp *Cyprinus carpio*	1	0	0	0	0	0	0	0	0
Catostomidae Suckers[a] *Catostomus sp.*	3	1	3	2	1	3	0	2	3
Centrarchidae Smallmouth Bass *Micropterus dolomieu*	1	0	0	0	0	0	0	0	0
Cottidae Sculpin[a] *Cottus sp.*	3	3	3	3	4	2	3	3	0
Crayfish[a] *Pacifastacus sp.*	0	P	0	0	P	P	0	0	0

P = present,

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

Table 2. Categories of relative abundance.

Category	Count	Ranking Value
Absent	0	0
Rare	1-3	1
Uncommon	4-10	2
Common	11-100	3
Abundant	100+	4

Appendix F. Manual Flow Summary for the Walla Walla River, 1998-2002

Table 1. Manual flow summary (average monthly CFS and standard deviation) from June through September, 1998-2002, on the Walla Walla River at Stateline, Pepper Rd., 0.4 mi above hyw. 125, Mojonnier Rd., Swegel Rd., Detour Rd., McDonald Rd., and Mckay Rd.

	1998		1999		2000		2001		2002	
	Day	CFS	Day	CFS	Day	CFS	Day	CFS	Day	CFS
Stateline[a]										
July							17	14.59	8	20.2
							24	8.5	22	18.8
							31	9.68		
Average Monthly CFS (Standard Deviation)								10.92 (2.637)		19.5 (0.700)
August							7	13.91	5	15.8
							20	13.88	20	12.5
Average Monthly CFS (Standard Deviation)								13.90 (0.015)		14.2 (1.650)
September							4	12.79	4	13.2
							17	12.93	17	26.6
Average Monthly CFS (Standard Deviation)								12.86 (0.070)		19.9 (6.700)
October							2	23.35	1	18.6
							8	18.91	15	15.7
							16	36.88	31	16.9
							23	55.16		
							31	73.02		
Average Monthly CFS (Standard Deviation)								41.46 (20.205)		17.1 (1.190)
Pepper Rd.										
June			14	78.5	20	79.3	12	27.13	24	36.7
			30	9.9	29	5.5	21	11.98		
							26	17.60		
Average Monthly CFS (Standard Deviation)				44.2 (34.300)		42.4 (36.900)		18.9 (6.253)		N/A[b]
July	27	3.16	13	5.1	11	3.6	5	13.65	8	21.0
			28	2.3	20	4.0	11	14.45	22	16.5
							17	14.16		
							24	9.19		
							31	9.66		
Average Monthly CFS (Standard Deviation)		N/A[b]		3.7 (1.400)		3.8 (0.200)		12.22 (2.303)		18.8 (2.250)

[a] No data was collected in June at these sites.
[b] N/A- only one measurement was taken during the month so no average or standard deviation was calculated.

Table 1. (Cont.) Manual flow summary (average monthly CFS and standard deviation) from June through September, 1998-2002, on the Walla Walla River at Stateline, Pepper Rd., 0.4 mi above hyw. 125, Mojonnier Rd., Swegel Rd., Detour Rd., McDonald Rd., and Mckay Rd.

	1998		1999		2000		2001		2002	
	Day	CFS	Day	CFS	Day	CFS	Day	CFS	Day	CFS
Pepper Rd. (Cont.)										
August	03	3.42	10	3.1	7	4.1	7	12.51	5	17.7
	17	3.09					20	14.79	20	12.4
Average Monthly CFS (Standard Deviation)		3.26 (0.165)		N/A[b]		N/A[b]		13.65 (1.140)		15.1 (2.650)
September	01	2.79	15	2.7			4	11.13	4	16.1
	16	3.32	28	2.7			17	12.87	17	27.5
Average Monthly CFS (Standard Deviation)		3.06 (0.265)		2.7 (0.000)				12.00 (0.870)		21.8 (5.700)
October	16	2.86	5	2.6	4	81.0	2	26.00	1	17.4
	28	3.22	13	2.7	19	23.7	16	39.08	15	13.6
							23	65.61	31	17.5
							31	81.84		
Average Monthly CFS (Standard Deviation)		3.04 (0.180)		2.65 (0.050)		52.35 (28.650)		53.13 (21.872)		16.2 (1.815)
0.4 mi above hwy. 125										
June							12	29.58	24	35.4
							26	16.28		
Average Monthly CFS (Standard Deviation)								22.93 (6.650)		N/A[b]
July							5	13.74	8	21.2
							11	14.62	22	15.1
							17	13.35		
							24	7.86		
							31	9.82		
Average Monthly CFS (Standard Deviation)								11.88 (2.590)		18.2 (3.050)
August							7	13.34	5	16.3
							20	12.92	20	12.5
Average Monthly CFS (Standard Deviation)								13.13 (0.210)		14.4 (1.900)
September							4	11.29	4	14.2
							17	13.15	17	27.0
Average Monthly CFS (Standard Deviation)								12.22 (0.930)		20.6 (6.400)

[a] No data was collected in June at these sites.
[b] N/A- only one measurement was taken during the month so no average or standard deviation was calculated.

Table 1. (Cont.) Manual flow summary (average monthly CFS and standard deviation) from June through September, 1998-2002, on the Walla Walla River at Stateline, Pepper Rd., 0.4 mi above hyw. 125, Mojonnier Rd., Swegel Rd., Detour Rd., McDonald Rd., and Mckay Rd.

	1998		1999		2000		2001		2002	
	Day	CFS	Day	CFS	Day	CFS	Day	CFS	Day	CFS
0.4 mi above hwy. 125 (Cont.)										
October							2	22.06	1	19.5
							8	19.42	15	16.0
							16	37.47	31	16.3
							23	60.90		
							31	70.22		
Average Monthly CFS (Standard Deviation)								42.01 (20.404)		17.3 (1.584)
Mojonnier Rd.										
June			1	296.0	20	104.6	12	32.69	24	30.1
			9	83.7	29	10.5	26	31.22		
			30	5.9						
Average Monthly CFS (Standard Deviation)				128.53 (122.602)		57.55 (47.050)		31.96 (0.735		N/A[b]
July	9	29.48	13	15.5	11	16.4	5	24.26	8	41.7
	20	36.05	28	25.7	20	42.2	10	43.28	22	43.9
							11	49.88		
							17	45.24		
							24	33.42		
							31	42.65		
Average Monthly CFS (Standard Deviation)		32.77 (3.285)		20.60 (5.100)		29.30 (12.900)		39.79 (8.501)		42.8 (1.100)
August	3	25.77	10	22.6	7	29.9	7	46.42	5	42.5
	17	25.14	23	25.0	21	32.2	20	51.26	20	38.1
Average Monthly CFS (Standard Deviation)		25.46 (0.315)		23.80 (1.200)		31.05 (1.150)		48.84 (2.420)		40.3 (2.200)
September	1	28.30	15	21.7	5	49.0	4	45.48	4	40.7
	16	35.01	28	26.1	18	47.7	17	37.08	17	61.8
Average Monthly CFS (Standard Deviation)		31.655 (3.355)		23.90 (2.200)		48.35 (0.650)		41.28 (4.200)		51.3 (10.550)
October	16	1.83	5	31.4	4	93.4	2	40.86	1	57.9
	28	13.72	13	15.1	19	16.5	8	25.97	15	22.7
			18	8.4			16	18.58	31	17.9
							23	55.64		
							31	68.74		
Average Monthly CFS (Standard Deviation)		7.78 (5.945)		18.30 (9.659)		54.95 (38.450)		41.96 (18.481)		32.8 (17.833)

[a] No data was collected in June at these sites.
[b] N/A- only one measurement was taken during the month so no average or standard deviation was calculated.

Table 1. (Cont.) Manual flow summary (average monthly CFS and standard deviation) from June through September, 1998-2002, on the Walla Walla River at Stateline, Pepper Rd., 0.4 mi above hyw. 125, Mojonnier Rd., Swegel Rd., Detour Rd., McDonald Rd., and Mckay Rd.

	1998		1999		2000		2001		2002	
	Day	CFS	Day	CFS	Day	CFS	Day	CFS	Day	CFS
Swegel Rd.										
June			1 9 30	287.6 85.6 7.0	26	42.9	11 27	27.95 26.64	24	34.3
Average Monthly CFS (Standard Deviation)				126.73 (118.189)		N/A[b]		27.30 (0.655)		N/A[b]
July	2 9 20	3.43 31.65 35.52	13 28	17.5 23.7	11	22.2	10 24 31	43.74 33.21 45.93	8 22	41.1 46.4
Average Monthly CFS (Standard Deviation)		23.53 (14.303)		20.60 (3.100)		N/A[b]		40.96 (5.553)		43.8 (2.650)
August	3 17	27.22 21.66	10 23	23.6 24.9	7 21	29.1 36.7	6 20	40.58 42.52	5 20	45.4 32.4
Average Monthly CFS (Standard Deviation)		24.44 (2.780)		24.25 (0.650)		32.90 (3.800)		41.55 (0.970)		38.9 (6.800)
September	1 16	25.55 37.28	15 28	26.6 31.3	5 18	54.8 56.3	4 17	42.95 45.80	4 17	35.1 50.6
Average Monthly CFS (Standard Deviation)		31.42 (5.865)		28.95 (2.350)		55.55 (0.750)		44.38 (1.425)		42.9 (7.750)
October	16 26	8.32 20.43	13	20.4	4 19	97.1 23.7	1 16 31	49.81 28.41 47.96	1 15 31	54.8 26.5 21.7
Average Monthly CFS (Standard Deviation)		14.38 (6.055)		N/A[b]		60.40 (36.700)		42.06 (9.682)		34.3 (14.604)
Detour Rd.										
June			1 9 30	403.4 121.9 15.9	20 29	171.7 22.7	11 27	34.10 46.95	18 24	148.4 50.8
Average Monthly CFS (Standard Deviation)				180.40 (163.515)		97.20 (74.500)		40.53 (6.425)		99.6 (48.800)
July			13 28	19.2 26.8	10 20	25.6 38.5	10 24 31	57.32 38.75 52.82	8 22	45.9 41.8
Average Monthly CFS (Standard Deviation)				23.00 (3.800)		32.05 (6.450)		49.63 (7.910)		43.9 (2.050)

[a] No data was collected in June at these sites.
[b] N/A- only one measurement was taken during the month so no average or standard deviation was calculated.

Table 1. (Cont.) Manual flow summary (average monthly CFS and standard deviation) from June through September, 1998-2002, on the Walla Walla River at Stateline, Pepper Rd., 0.4 mi above hyw. 125, Mojonnier Rd., Swegel Rd., Detour Rd., McDonald Rd., and Mckay Rd.

	1998		1999		2000		2001		2002	
	Day	CFS	Day	CFS	Day	CFS	Day	CFS	Day	CFS
Detour Rd. (Cont.)										
August			10 24	30.6 32.6	7 21	29.3 38.1	6 20	43.55 41.11	5 20	45.9 32.4
Average Monthly CFS (Standard Deviation)				31.6 (1.000)		33.70 (4.400)		42.33 (1.220)		39.2 (6.750)
September			15 28	29.0 35.4	5 18	55.0 59.9	4 17	44.29 44.25	4 17	35.9 50.6
Average Monthly CFS (Standard Deviation)				32.20 (3.200)		57.45 (2.450)		44.27 (0.020)		43.3 (7.350)
October			13	31.8	4 19	128.2 41.7	1 8 16 23 31	54.34 35.71 35.43 69.66 69.10	1 15 31	56.3 30.5 37.7
Average Monthly CFS (Standard Deviation)				N/A[b]		84.95 (43.250)		52.85 (15.140)		41.5 (10.870)
McDonald Rd.										
June					26	36.6	11 27	18.62 27.61	24	20.4
Average Monthly CFS (Standard Deviation)						N/A[b]		23.12 (4.495)		N/A[b]
July	9 20	4.09 4.92	13	6.73	10	5.9	10 23	17.50 21.83	8 22	19.5 17.3
Average Monthly CFS (Standard Deviation)		4.51 (0.415)		N/A[b]		N/A[b]		19.67 (2.165)		18.4 (1.100)
August	3 17	0.00 7.96	10 23	9.1 11.4	7 21	11.0 17.8	6 20	23.71 16.23	5 20	18.9 9.9
Average Monthly CFS (Standard Deviation)		3.98 (3.98)		10.25 (1.150)		14.40 (3.400)		19.97 (3.740)		14.4 (4.500)
September	1 17	9.97 17.31	15 28	12.1 14.5	5 18	34.3 41.0	4 17	17.73 21.26	4 17	16.2 30.9
Average Monthly CFS (Standard Deviation)		13.64 (3.670)		13.3 (1.200)		37.65 (3.350)		19.50 (1.765)		23.6 (7.350)

[a] No data was collected in June at these sites.
[b] N/A- only one measurement was taken during the month so no average or standard deviation was calculated.

Table 1. (Cont.) Manual flow summary (average monthly CFS and standard deviation) from June through September, 1998-2002, on the Walla Walla River at Stateline, Pepper Rd., 0.4 mi above hyw. 125, Mojonnier Rd., Swegel Rd., Detour Rd., McDonald Rd., and Mckay Rd.

	1998		1999		2000		2001		2002	
	Day	CFS	Day	CFS	Day	CFS	Day	CFS	Day	CFS
McDonald Rd. (Cont.)										
October			13	15.8	4	112.2	1	38.2	1	33.3
					19	27.3	16	26.68	15	20.3
							31	54.9	31	18.5
Average Monthly CFS (Standard Deviation)				N/A[b]		69.75 (42.450)		39.93 (11.585)		24.0 (6.594)
McKay Rd.[a]										
July	27	3.80								
Average Monthly CFS (Standard Deviation)		N/A[b]								
August	17	0.00								
Average Monthly CFS (Standard Deviation)		N/A[b]								
September	1	2.42								
	28	15.21								
Average Monthly CFS (Standard Deviation)		8.82 (6.395)								
October	16	0.76								
	28	7.63								
Average Monthly CFS (Standard Deviation)		4.20 (3.435)								

[a] No data was collected in June at these sites.
[b] N/A- only one measurement was taken during the month so no average or standard deviation was calculated.

Appendix G. Touchet River Trap Data, 2002

Appendix G. Table 1. Touchet River trap data for bull trout (collected by personnel from the Snake River Lab), 2002.

Date	Origin	Length (cm)	Weight (g)	DNA #	Scale #	Pit Tag #	Fish # or Radio Tag	Passed, Kept, Mort	Comments
04/02	W	32.0						Passed	
04/09	W	34.0						Passed	
04/09	W	35.0						Passed	
05/01	W	34.0	350	BT02-	TOU1-1	1BF0F634AC	None	Passed	
05/09	W	33.0	380	BT02-	TOU1-2	1BF0EDC5F6	0/121	Passed	
05/10	W	37.0	560	BT02-	TOU1-4			Mort	Trap Mort
05/10	W	50.0	1225		TOU1-3	1BF11B9E12	0/100	Passed	Radio tag in fish, tagged in 2001
05/13	W	38.0	550	BT02-	TOU1-5	1BF11E9FFD	0/119	Passed	
05/14	W	36.0	540	BT02-	TOU1-6	1BF0ED614A	0/123	Passed	
05/17	W	38.0	600	BT02-	TOU2-2	1BF11ABB66	0/122	Passed	
05/17	W	51.0	1400	BT02-	TOU2-1	1BF0ED5E5F	0/108	Passed	
05/20	W	34.8	470	BT02-	TOU3-1	1BF123980C	0/120	Passed	
05/22	W	32.0	400	BT02-	TOU3-3	1BF11EA809		Passed	
05/25	W	24.0	130	BT02-				Passed	
05/30	W	35.0	480	BT02-	TOU3-4	1BF11ABC04	0/115	Passed	
05/31	W	37.2	540	BT02-	TOU3-6	1BF11AC1B6	0/117	Passed	
05/31	W	27.0	340	BT02-	TOU3-5	1BF11EBE01		Passed	
06/02	W	34.0	440	BT02-	TOU3-8		0/116	Passed	
06/02	W	27.0	180	BT02-	TOU3-7			Passed	
06/05	W	33.5	420	BT02-	TOU3-9			Passed	
06/12	W	38.0				1BF11E9DC4		Passed	
06/13	W	31.0				1BF123A317		Passed	

Appendix G. Table 2. Touchet River trap data for mountain whitefish and other salmonids[a] (collected by personnel from the Snake River Lab), 2001.

Date	Origin	Length (cm)	DNA #	Scale #	Passed, Kept, Mort
04/23	W	28.0			Passed
04/23	W	33.5			Passed
04/30	W	29.0			Passed
05/22	W	32.0	TO09	TOU3-2	Passed
05/22	W	28.0			Passed

[a] Steelhead data will appear in the SRL's 2002 annual report. No brown trout or spring chinook were sampled in 2002.

Appendix H. Overstory Density Measurements for the North and South Forks of the Touchet River, 2002

Overstory Density Measurements on the North Fork Touchet, taken with a densiometer 9-24-02.					
Stream Location	**Upstream reading**	**Left bank reading**	**Downstream reading**	**Right bank reading**	**Average of measurements**
NF Touchet-Bluewood (NFT-1)					
at logger	61.52%	57.36%	56.32%	75.04%	62.56%
up 100ft[a]	100%	100%	100%	100%	100%
up 200ft	87.52%	76.08%	81.28%	90.64%	83.88%
up 300ft	83.36%	91.68%	85.44%	79.20%	84.92%
NF Touchet-below Spangler Ck. (NFT-7)					
at logger	66.72%	50.08%	43.84%	81.28%	60.48%
up 100ft	27.20%	7.44%	78.16%	77.12%	47.48%
up 200ft	49.04%	66.72%	13.68%	23.04%	38.12%
up 300ft	64.64%	10.56%	37.60%	90.64%	50.86%
NF Touchet-below Jim Ck. (NFT-10)					
at logger	67.76%	31.36%	18.88%	48.00%	41.50%
up 100ft	33.44%	55.28%	3.28%	0.16%	23.04%
up 200ft	17.84%	66.72%	28.24%	4.32%	29.28%
up 300ft	28.24%	42.80%	8.48%	2.24%	20.44%
NF Touchet-above Baileysburg (NFT-15)					
at logger	25.12%	39.68%	16.80%	59.44%	35.26%
up 100ft	94.8%	66.72%	5.36%	14.72%	45.40%
up 200ft	0.0%	58.40%	34.48%	6.40%	24.82%
up 300ft	1.20%	7.44%	0.0%	8.48%	4.28%

[a] Measurement fell inside culvert that provides 100% shade.

Overstory Density Measurements on the South Fork Touchet, taken with a densiometer 9-13-02.					
Stream Location	**Upstream reading**	**Left bank reading**	**Downstream reading**	**Right bank reading**	**Average of measurements**
Green Fork (GF-1)					
at logger	18.88%	49.04%	37.60%	49.04%	38.64%
up 100ft	94.8%	92.72%	54.24%	83.38%	81.28%
up 200ft	100%	100%	97.92%	100%	99.48%
up 300ft	98.96%	97.92%	70.88%	98.96%	91.68%
Burnt Fork (BF-1)					
at logger	97.92%	97.92%	100%	98.96%	98.70%
up 100ft	71.92%	70.88%	97.92%	96.88%	84.40%
up 200ft	60.48%	97.92%	89.60%	64.64%	78.16%
up 300ft	83.36%	98.96%	97.92%	97.92%	94.54%
SF Touchet-below Burnt Fork (SFT-1)					
at logger	98.96%	95.84%	77.12%	80.24%	88.04%
up 100ft	63.60%	56.32%	93.76%	84.4%	74.52%
up 200ft	57.36%	67.76%	72.96%	75.04%	68.28%
up 300ft	87.52%	69.84%	56.32%	97.92%	77.90%
SF Touchet-above CNL brg. (SFT-6)					
at logger[a]	100%	100%	100%	100%	100%
up 100ft	58.40%	17.84%	41.76%	28.24%	36.56%
up 200ft	20.96%	20.96%	8.48%	58.40%	27.20%
up 300ft	35.52%	16.80%	33.44%	85.44%	42.80%
SF Touchet-Gephart Rd. (SFT-10)					
at logger	100%	100%	100%	83.36%	95.84%
up 100ft	52.16%	17.84%	86.48%	88.56%	61.26%
up 200ft	23.04%	18.88%	2.24%	59.44%	25.90%
up 300ft	40.72%	14.72%	38.64%	67.76%	40.46%

[a] Logger is located under a bridge that provides 100% shade.

Appendix I. Data Unintentionally Omitted from 2001 Annual Report.

Data unintentionally omitted from 2001 annual report.

Garrison Creek @ Yellowhawk Diversion (GC-1 from 2001 report)

This site was listed as a quantitative electrofishing site (EQ) in Appendix A on pg. 65, and should have been listed as a qualitative electrofishing site (EL).

It also should have been listed in Appendix D (on ~ pg. 111) with the following information:

- Stream–Garrison Creek
- Site #–GC-1
- Date–8/23
- Approx Site Length (m)–30
- Relative Abundance–One 1+ RBT (160 mm) found. Sculpin and redside shinners-common, lamprey-uncommon, and speckled dace-rare
- Comments–High intensity survey was quantitative, but changed to a qualitative after 1st pass due to low numbers of fish.