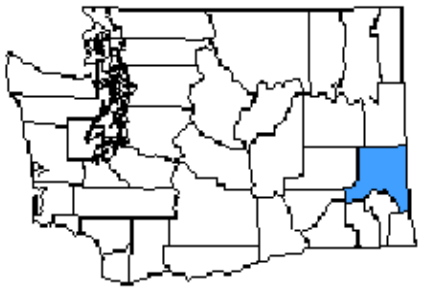
Brief Assessment of Salmonids and Stream Habitat Conditions in Snake River Tributaries of Whitman County, Washington

July 2003-June 2004 - Final Report



By

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

For

Whitman Conservation District - Colfax, Washington
Contract # 33032452

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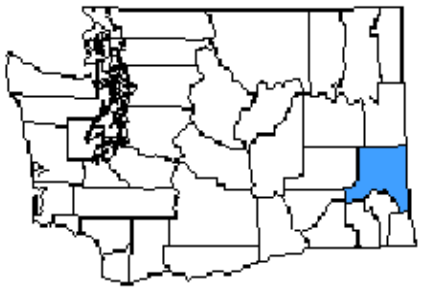

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Acknowledgments

Funding and equipment for this study was provided by Whitman Conservation District and the Washington Department of Fish and Wildlife. This study would not have been possible without those contributions.

We appreciate the assistance of Kimberly Morse and the Whitman Conservation District.

We would like to extend thanks to the following WDFW personnel who contributed their efforts in collecting, entering, and summarizing data: Chris Fulton, Derek Gloyn, Justin Steinhoff, Joe Zelinski, Rob Martin, Steve Jeffers, and Larabee Miller.

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

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Introduction

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

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

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

From July of 2003 to June of 2004, the WDFW Fish Management office in Dayton, WA, continued a monitoring project to investigate fish populations and habitat in two Snake River tributaries (Penawawa and Alkali Flat Creeks) in Whitman county (Figure 1), in cooperation with the Whitman Conservation District. This project was to continue the monitoring efforts that began in 2001 and extended through June of 2003 (Mendel et al, 2004), and followed the same methods reported in that study. The objectives of this project were to perform baseline monitoring of salmonid populations and their habitats by 1) monitoring water temperature and stream discharge throughout the spring, summer and fall (Figure 2 and 3), 2) conducting spawning surveys to determine spawn timing, distribution and relative abundance, and 3) conducting electrofishing surveys to determine relative abundance and distribution of juvenile steelhead or resident redband trout (Figures 4 and 5). We also collected some genetic samples from steelhead in these streams.

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

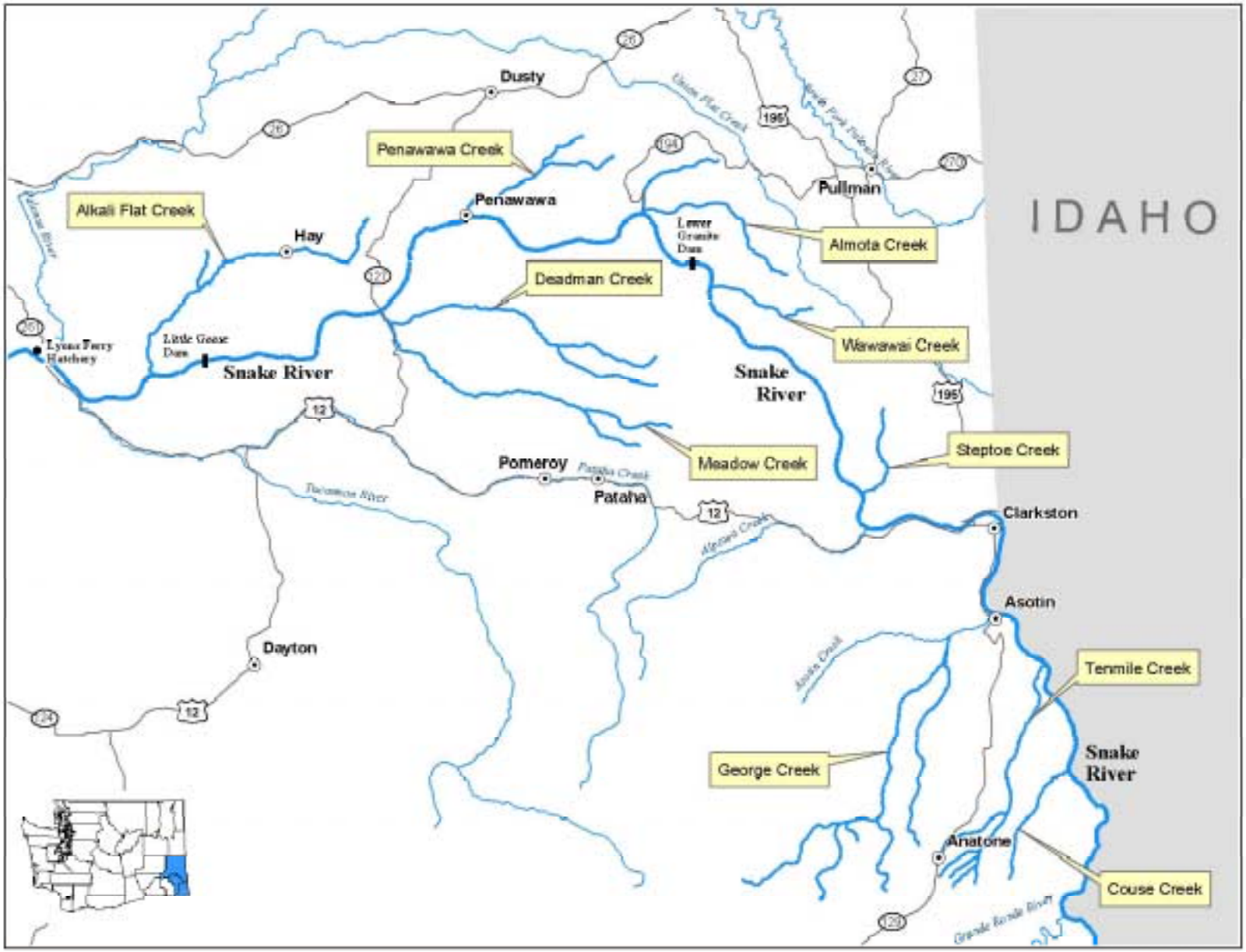

Dusty
Penawawa Creek
Penawawa
Alkali Flat Creek
Hay
Deadman Creek
Lyons Ferry Hatchery
Little Goose Dam
Snake River
Lower Granite Dam
Almota Creek
Wawawai Creek
Snake River
IDAHO
Pullman
Meadow Creek
Steptoe Creek
Pomeroy
Pataha
Clarkston
Asotin
Dayton
Tenmile Creek
George Creek
Snake River
Anatone
Couse Creek

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

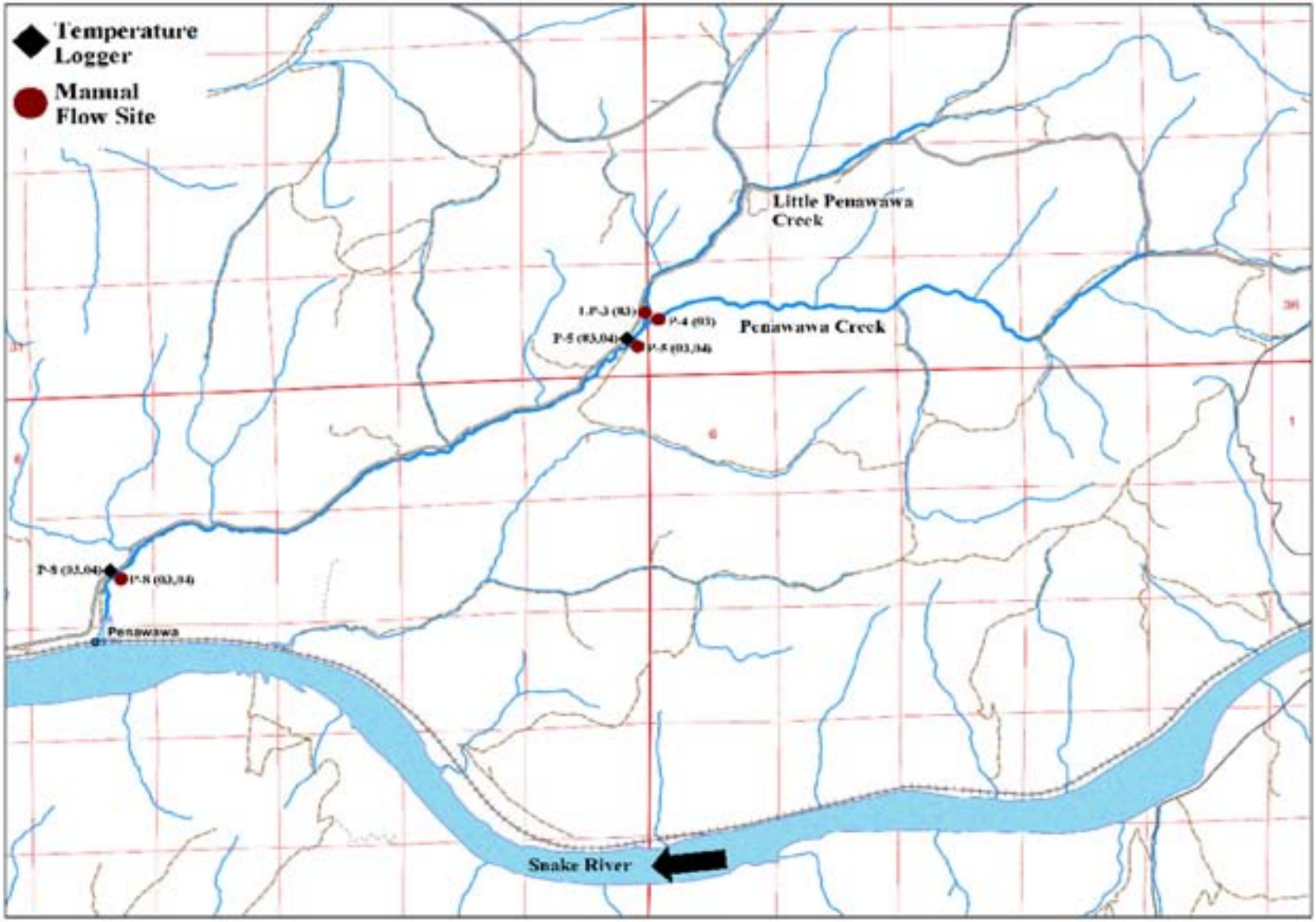


Figure 2. Relative locations of temperature loggers and manual flow sites in Penawawa and Little Penawawa Ck (sample year

indicated in parentheses).

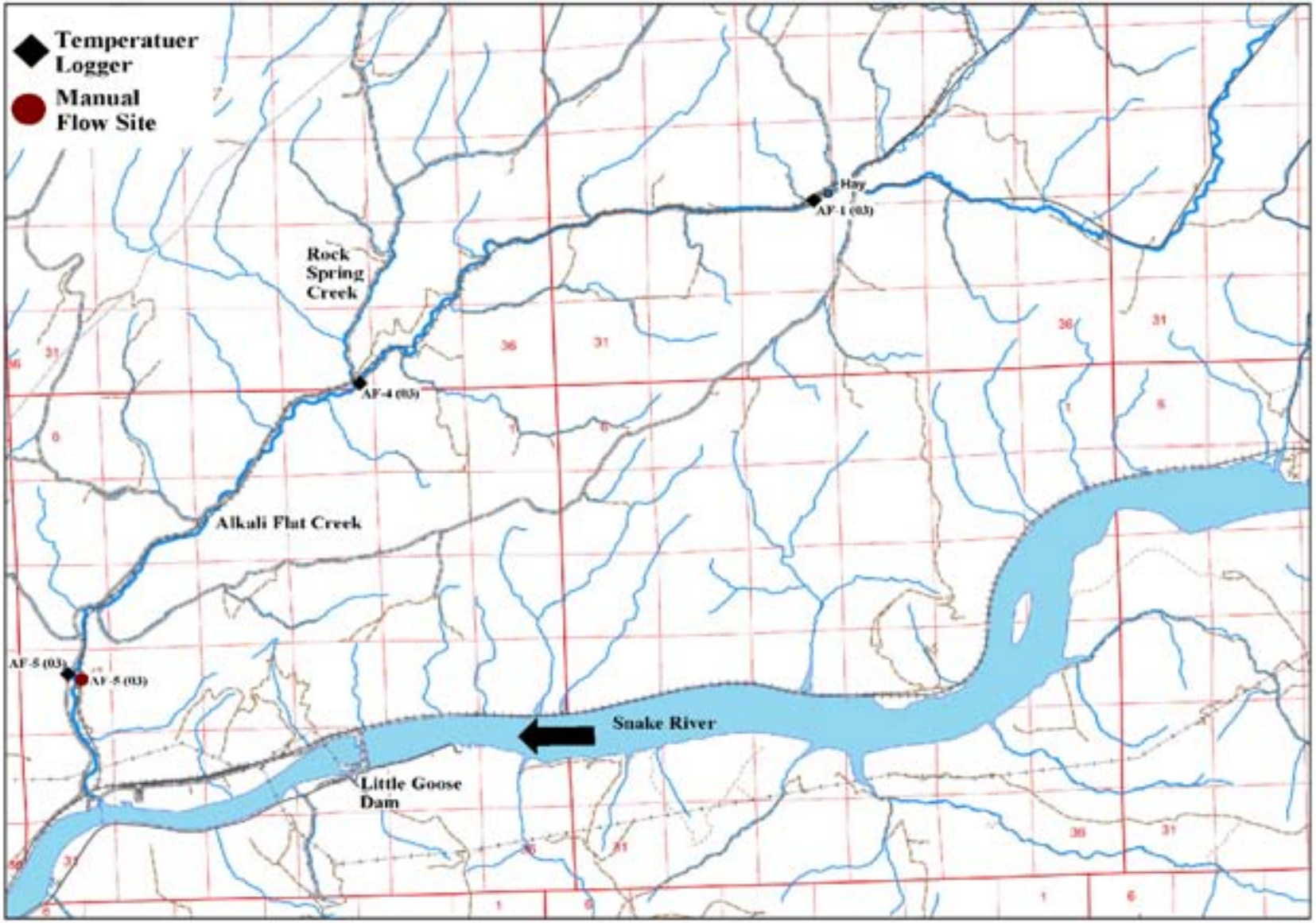


Figure 3. Relative locations of temperature loggers and manual flow sites in Alkali Flat Ck. and Rock Spring Gulch (sample year indicated in parentheses).

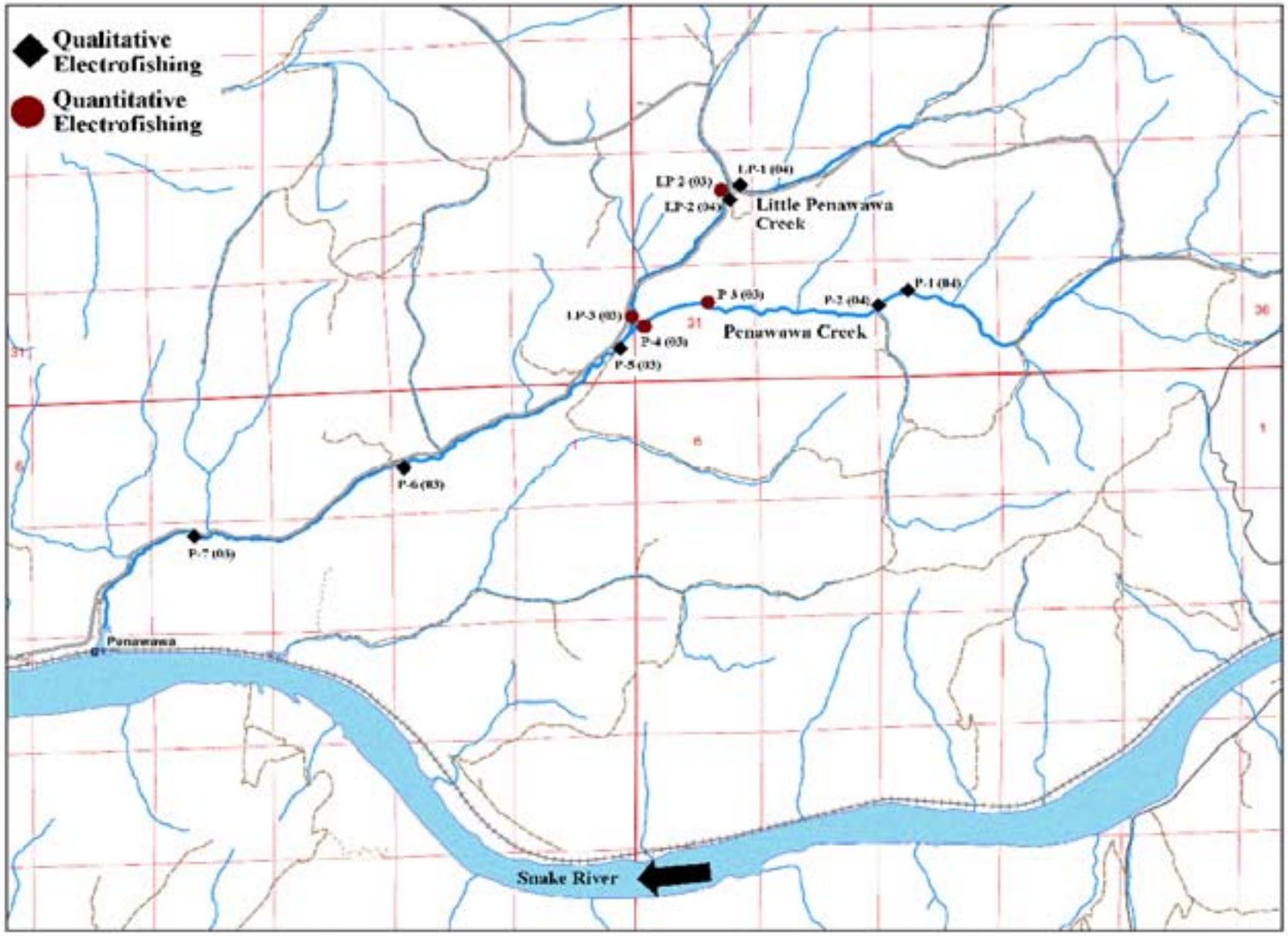

Qualitative Electrofishing
Quantitative Electrofishing
LP 2 (03)
LP-1 (04)
LP-2 (04)
Little Penawawa Creek
P 3 (03)
P-2 (04)
P-1 (04)
LP-3 (03)
P-4 (03)
Penawawa Creek
P-5 (03)
P-6 (03)
P-7 (03)
Penawawa
Snake River

Figure 4. Relative locations of electrofishing sites in Penawawa and Little Penawawa Ck (sample year indicated in parentheses).

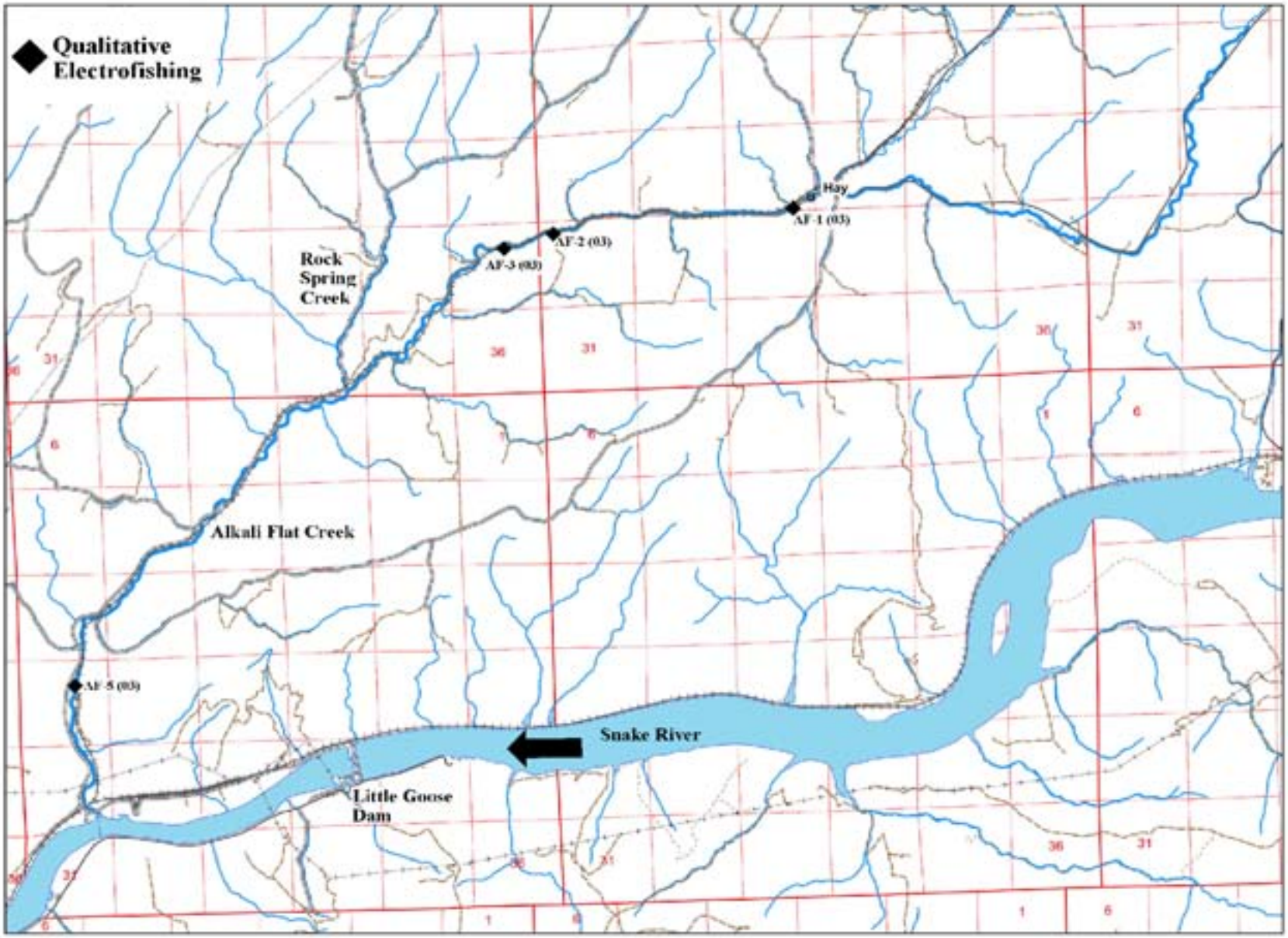

Qualitative Electrofishing
Hay
AF-1 (03)
AF-2 (03)
AF-3 (03)
Rock Spring Creek
Alkali Flat Creek
AF-5 (03)
Snake River
Little Goose Dam

Figure 5. Relative locations of electrofishing sites in Alkali Flat Ck. and Rock Spring Gulch (sample year indicated in parentheses).

Results and Discussion

Individual Site Selection

These two 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 information provided by the Conservation District. Landowners were then contacted in person, by telephone, or by mail for authorization to access the streams. We attempted to distribute study sites comprehensively over most of the study streams, or areas where data was not collected in the previous study (Figures 2-5, Appendix A), but we were denied access to some portions of the stream. Sites are listed and identified in order from upstream to downstream.

Habitat Assessment

Stream Flows

Stream discharge measurements were only taken periodically throughout the study (Appendix B). Most of the stream flows were taken while we were conducting other work in the area (spawning surveys, electrofishing surveys, or checking temperature monitors) to provide a general idea of water availability during spawning and rearing during spring, summer and fall. Stream discharge in Alkali Flat Ck and Penawawa Ck were very low between July and August of 2003, with no measurements over 1.0 cfs. In 2004, spring and early summer discharge measurements in Penawawa Ck were between 1.5 and 3.8 cfs just below the forks, and between 3.1 and 7.0 cfs approximately 0.6 miles above the mouth.

Stream Temperatures

Water temperatures from 2003 extend back to the middle of April for both of the study streams because these monitors were not downloaded until July of 2003 so the data did not appear in the previous report. Temperatures in both streams follow a trend of cold spring temperatures that rise consistently until the middle of July when they plateau at summer highs. They remain at summer highs until late August or early September when they descend toward winter lows. Summer temperatures at all our locations in 2003 on these two streams reached temperatures that can be lethal for salmonids (75-84°F, Bjornn and Reiser 1991). This generally occurred during mid-summer, when photoperiod is long and evening cooling is brief. In late June 2004, temperatures in Penawawa Ck were just below 75ºF, but we expect them to exceed 75ºF during the summer months. However, at night, temperatures normally decreased to within reasonable physiological limits for steelhead/rainbow trout (≤65-70°F, Appendix C).

Fish Stock Assessment

Distribution and Abundance

Electrofishing surveys in 2003 and 2004 were conducted to determine fish use in the study streams. Densities of rainbow/steelhead trout were calculated on four quantitative electrofishing sites (two on Penawawa Ck and two on Little Penawawa Ck) in 2003 (Table 1). Several other qualitative sites were done to quickly assess distribution and relative abundance of different fish species (Table 2). Rainbow/steelhead trout distribution was limited at most sites in both 2003 and 2004 (Table 1 and 2). Age 0+ rainbow/steelhead were generally found in the highest densities, followed by age 1+, and then adult (≥8 in). Age 1+ fish predominated at one site on Alkali Flat Creek (AF-2). Adult rainbow/steelhead were rarely seen during electrofishing and were generally in low densities when found, although they did predominate at one site on Penawawa Creek (P-5). No other salmonids were observed at any other sites. We noted the relative abundance of non-salmonid species at each site (Appendix D).

Spawning surveys were conducted on Alkali Flat Ck and Penawawa Ck in 2004. Due to access problems only one walk was done in each stream, and in Alkali Flat Ck only a small section was surveyed. Lower Penawawa Ck had redd counts of 6.7 redds per mile, but this is the only area that redds or fish were observed (Table 3).

Electrofishing

Quantitative Electrofishing

Four quantitative electrofishing sites were surveyed in the summer of 2003, two on Penawawa Ck and two on Little Penawawa Ck. Rainbow/steelhead trout were only found at one site and had a density of 2.0 fish per 100 m^2 (Table 1). Sub-yearling (age 0+) trout were the only age class seen in these surveys with a density of 2.0 fish per 100 m^2, yearling (age 1+) and adult (≥8 in) rainbow/steelhead trout were not found at any of the sites (Table 1).

Table 1. Densities of salmonids from quantitative electrofishing sites in Whitman County, 2003-2004.

					Densities (#/100m^2)			
					rainbow/steelhead			
Stream Reach	**Date**	**Site Length**	**Mean Width**	**Area**	**Age/Size**			
Site Name		**(m)**	**(m)**	**(m^2)**	**0+**	**1+**	**≥8 in**	**Total**
Penawawa Ck								
P-1	08/26/03	30	0.6	19.2	0.0	0.0	0.0	0.0
P-2	08/26/03	30	0.8	53.4	0.0	0.0	0.0	0.0
Little Penawawa Ck								
LP-1	08/26/03	30	0.8	23.4	0.0	0.0	0.0	0.0
LP-2	08/26/03	30	0.6	19.2	2.0[a]	0.0	0.0	2.0

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

Qualitative Electrofishing

Qualitative electrofishing surveys were conducted in the summer of 2003 and the late spring/early summer of 2004. Qualitative electrofishing was completed at five sites on Penawawa Ck, two sites on Little Penawawa Ck, and four sites on Alkali Flat Ck (Table 2). While the data from these surveys have little statistical value, it helps to quickly assess the distribution of fish in each stream.

Table 2. Relative abundance of fish from qualitative electrofishing sites in Whitman County, 2003-2004.

Stream	Site #	Date	Site Length (m)	Avg. Width (m)	Relative Abundance[a]	Comments
Penawawa Ck	P-1	06/22/04	25	0.5	No fish found. CF-present	Moderate intensity survey
	P-2	06/22/04	25	0.4	No fish found. CF-present	Moderate intensity survey
	P-5	08/26/03	135		One Adult RBT (206mm) found. SD-abundant, BLS-uncommon	Moderate intensity survey
	P-6	08/26/03	60		One 0+ RBT (85mm) and one 1+RBT (111mm) found. BLS-common, SD-uncommon	Moderate intensity survey
	P-7	08/26/03	30		30 0+ RBT (57-96mm) and 6 1+ RBT (120-160mm) found. SD-common, BLS-rare	Moderate intensity survey
Little Penawawa Ck	LP-1	06/22/04	20	0.5	No fish found.	Moderate intensity survey
	LP-2	06/22/04	20	0.5	No fish found.	Moderate intensity survey
Alkali Flat Ck	AF-1	09/08/03	100	4.3	No fish found.	Moderate intensity survey
	AF-2	09/08/03	30	2.3	One 1+ RBT (191mm) found. PS-common	Moderate intensity survey
	AF-3	09/08/03	100	0.9	No fish found.	Moderate intensity survey
	AF-4	09/08/03	62	3.2	No salmonids found. BLS-uncommon, SMB-rare.	Moderate intensity survey

[a] RBT=rainbow trout, SD=speckled dace, BLS=bridgelip suckers, PS-pumpkinseed, SMB=smallmouth bass, CF-crayfish. Rare=≤3, Uncommon=4-10, Common=11-100, and Abundant=≥101

Steelhead Spawning Surveys

Spawning surveys were conducted in Alkali Flat Ck and Penawawa Ck in 2004. The surveys covered a total of 6.5 miles on Penawawa Ck and Alkali Flat Ck. Both of the areas were walked only once, because of land access issues.

Penawawa Ck was surveyed for 5.4 miles in 2004, with sixteen redds, 40 live adult steelhead, and three dead adult steelhead observed. From the fish that were observed we were able to sample 16 adult steelhead (Figures 6 and 7) of which eight wild males, two wild females, one hatchery male, four hatchery females, and one was unknown. The total redds per mile was 3.0, but this is a little misleading since all the redds were found in the lower section, where the redds per mile was 6.7. A large number of beaver dams were seen in the lower section of Penawawa Ck. and we assume that there was one that was impassable between the two survey sections. Alkali Flat Ck was surveyed for 1.9 miles in 2004, but no redds or fish were observed (Table 3).

Table 3. Steelhead spawning survey summary for Whitman County, 2004.

Reach/Date	Survey	Stream Section[a]	Surveyed Miles	Redds	Redds per mile	Steelhead Observed	
Penawawa Ck						Live	Dead
04/29/04	1	River mile 6.2 to river mile 3.2 (A)	3.0	0	0.0	0	0
04/29/04	1	River mile 2.8 to river mile 0.4 (B)	2.4	16	6.7	40	3
		Total	**5.4**	**16**	**3.0**	**40**	**3**
Alkali Flat Ck							
04/30/04	1	River mile 1.9 to river mile 0.8 (C)	1.9	0	0.0	0	0
		Total	**1.9**	**0**	**0.0**	**0**	**0**

[a] A: Forks to RM 3.2, B: RM 2.8 to 0.4 miles above mouth, C: Second bridge to white pickets 0.8 miles below second bridge

Figure 6. Wild adult steelhead found in Penawawa Ck. on 4/29/04.

Figure 7. Hatchery adult steelhead found in Penawawa Ck. on 4/29/04. Note the misshapen body, due to some sort of damage to the spine of the fish.

Genetic Sampling

Fin clips were collected from a total of 32 fish in the study area in 2003 and 2004. Sixteen of these samples were taken from adult steelhead during spawning walks, and the other sixteen samples were collected during electrofishing surveys.

All of the samples of adult steelhead were collected in Penawawa Ck. Samples were collected from both wild and hatchery fish in the following proportion, eight wild males, two wild females, one hatchery male, four hatchery females, and one was unknown. All of the hatchery fish had at least an adipose (ad) fin clip, while one hatchery male also had a top caudal clip, and one hatchery female also had a left ventral (lv) clip. The snout of the female with the ad/lv clip was collected, which should have had a coded wire tag, but no wire was found.

All 16 of the juvenile fish sampled were collected during electrofishing surveys in 2003. Fifteen of the samples were collected in Penawawa Ck, and one in Alkali Flat Ck. Genetic analyses may be completed in the future.

Closing Comments

The information incorporated in this report is intended to supplement information included in Mendel et al. (2004). Data presented in this report should be considered incomplete without including data from Mendel et al. (2004), and should not be used alone to understand or determine fish distribution, abundance or habitat conditions in Penawawa and Alkali Flat creeks.

Further spawning surveys would have been conducted in 2004, but access was denied above the first bridge in Alkali Flat Ck. Access was also denied by a landowner in lower Penawawa Ck.

We also tried to gain access to Alkali Flat Ck above the town of Hay to conduct fish sampling for species presence and abundance, but access was denied in several areas so this was also not done.

Literature Cited

Bjornn, T. and D. Reiser, 1991. Habitat Requirements of Salmonids in Streams. In Influences of Forest and Rangeland on Salmonid Fishes and their Habitats. W. Meehan (editor). Am. Fish. Soc. Special Pub. 19.

Mendel, G., J. Trump, C. Fulton, and M. Gembala. 2004. Brief Assessment of Salmonids and Their Stream Habitat Conditions in Snake River Tributaries of Asotin, Whitman and Garfield Counties in Washington. Report to the Salmon Recovery Funding Board. IAC Contract #00-1696N. 158 pages.

Appendix A. Study Sites, 2003-2004

Appendix A. Study site locations for Whitman County, 2003-2004.

Stream Reach	Year	Site#	RM[a]	Location (within sect. is listed as smallest qtr. sect. of qtr. sect.)	Sample Type[b]	GPS Coordinates[c]		Comments
						North	West	
Penawawa Creek	2003	P-3	6.9	T15N,R42E,Sect 31,SW¼,NE¼	EQ	46 44.799	117 34.557	~0.6 miles above mouth of Little Penawawa Ck
	2003	P-4	6.3	T15N,R42E,Sect 31,SW¼,NW¼	EQ,F	46 44.660	117 35.358	Just above mouth of Little Penawawa Ck
	2003	P-5	6.0	T15N,R41E,Sect 36,NE¼,SE¼	EL,T[d],F[d]	46 44.520	117 35.518	Getz-AE-Seavers Rd bridge
	2003	P-6	3.6	T14N,R41E,Sect 2,SW¼,NW¼	EL	46 43.702	117 37.881	~0.3 miles below Streevy Rd.
	2003	P-7	1.6	T14N,R41E,Sect 9,NW¼,NE¼	EL	46 43.175	117 40.054	~0.4 miles below Getz-AE-Seavers Rd bridge
	2003	P-8	0.6	T14N,R41E,Sect 8,NW¼,SE¼	F[d],T[d]			~0.6 miles above railroad tracks at mouth
	2004	P-1	8.7	T15N,R42E,Sect 33,NW¼,NW¼	EL	46 44.744	117 32.810	1.2 miles below Long Hollow Rd
	2004	P-1	8.3	T15N,R42E,Sect 32,SE¼,NE¼	EL	46 44.869	117 32.508	1.5 miles below Long Hollow Rd
	2004	P-5	6.0	T15N,R41E,Sect 36,NE¼,SE¼	T[d],F[d]	46 44.520	117 35.518	Getz-AE-Seavers Rd bridge
	2004	P-8	0.6	T14N,R41E,Sect 8,NW¼,SE¼	F[d],T[d]			~0.6 miles above railroad tracks at mouth
Little Penawawa Ck	2003	LP-2	1.7	T15N,R42E,Sect 30,SE¼,NE¼	EQ	46 45.715	117 34.272	Just below culvert at forks
	2003	LP-3	0.1	T15N,R41E,Sect 36,NE¼,SE¼	EQ,F[d]	46 44.822	117 35.367	0.1 miles above mouth
	2004	LP-1	1.7	T15N,R42E,Sect30, SE¼,NE¼	EL	46 45.704	117 34.319	Just above culvert at Forks
	2004	LP-2	1.7	T15N,R42E,Sect 30,SE¼,NE¼	EL	46 45.715	117 34.272	Just below culvert at Forks
Alkali Flat Ck	2003	AF-1	12.9	T14N,R39E,Sect 21,SE¼,SE¼	EL[d],T[d]			~90 meters below bridge in Hay, WA
	2003	AF-2	10.1	T14N,R39E,Sect 30,NW¼,NW¼	EL	46 40.469	117 58.530	~2.8 miles below bridge in Hay, WA
	2003	AF-3	9.7	T14N,R38E,Sect 25,NE¼,NW¼	EL	46 40.354	117 59.245	~3.2 miles below bridge in Hay, WA
	2003	AF-4	6.4	T14N,R38E,Sect 34,SE¼,SE¼	T[d]			Mouth of Rock Spring Gulch
	2003	AF-5	1.0	T13N,R38E,Sect 19,NE¼,SW¼	EL,F,T			1.0 miles below second bridge

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

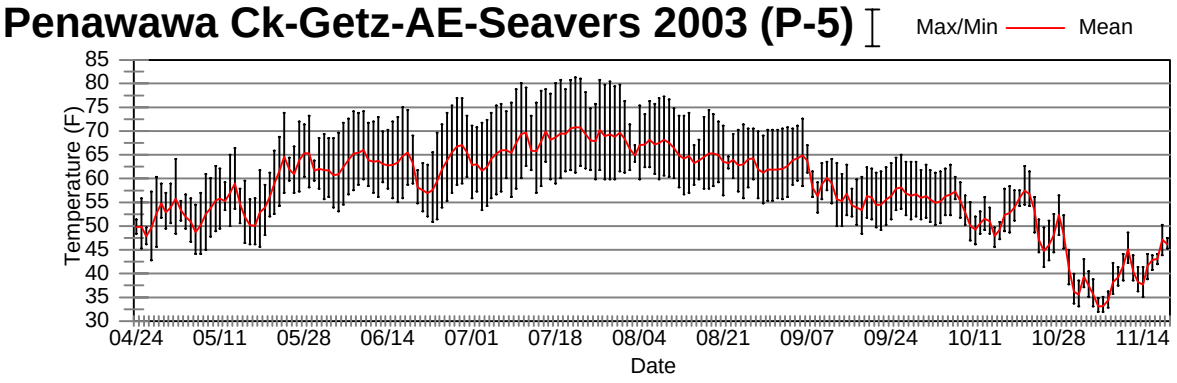
Appendix B. Discharge Data, 2003-2004

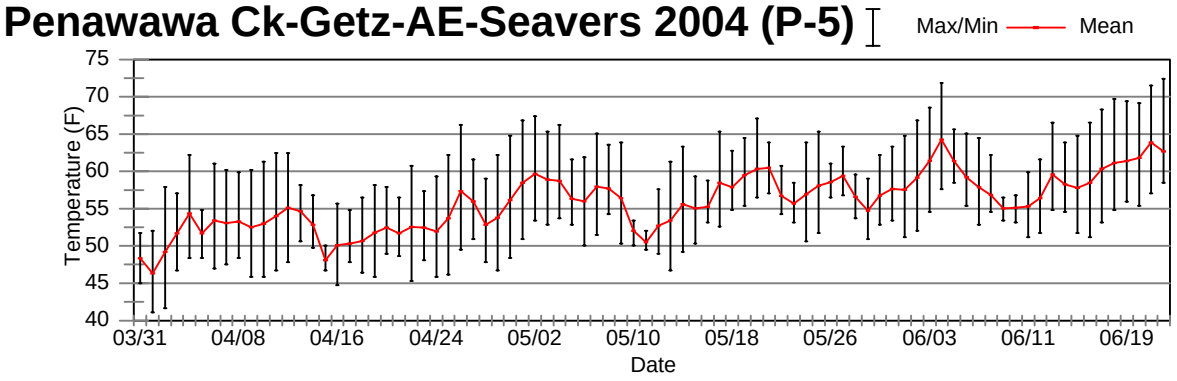
Appendix B. Manual discharge (cfs) measurements for Whitman County, July 2003-June 2004.

Stream	Site	Date	CFS	Width (M)	Temp (ºF)	Time	Comments
Penawawa Ck	P-4	08/26/03	0.2	1.8	68.0	12:08	Above forks
Penawawa Ck	P-5	07/08/03	1.0	1.8	70.0	12:15	Getz-AE-Seavers Rd
		08/26/03	0.7	2.2	69.0	13:25	
Penawawa Ck	P-5	03/31/04	3.8	2.1	49.0	15:22	Getz-AE-Seavers Rd
		05/21/04	2.8	2.8	59.0	10:04	
		06/22/04	1.5	2.0	70.0	14:20	
Penawawa Ck	P-8	07/08/03	3.2	1.3	69.0	12:35	Lower Rd
		08/26/03	1.2	1.3	68.0	15:30	
Penawawa Ck	P-8	03/31/04	7.0	1.1	50.0	15:50	Lower Rd
		05/21/04	6.1	1.4	59.0	10:30	
		06/22/04	3.05	1.3	72.0	14:44	
Little Penawawa Ck	LP-2	08/26/03	0.4	2.1	64.0	12:30	Above forks
Alkali Flat Ck	AF-1	07/08/03	0.6	1.3	65.0	10:40	Bridge in Hay, WA
		09/08/03	N/A[a]	2.2	58.0	12:00	
Alkali Flat Ck	AF-4	09/08/03	N/A[a]	3.2	64.0	10:00	Above first bridge

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

Appendix C. Stream Temperature Graphs (°F), 2003-2004


Penawawa Ck-Getz-AE-Seavers 2003 (P-5)
Max/Min
Mean
Temperature (F)
85
80
75
70
65
60
55
50
45
40
35
30
04/24
05/11
05/28
06/14
07/01
07/18
08/04
08/21
09/07
09/24
10/11
10/28
11/14
Date


Penawawa Ck-Getz-AE-Seavers 2004 (P-5)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
03/31
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04/24
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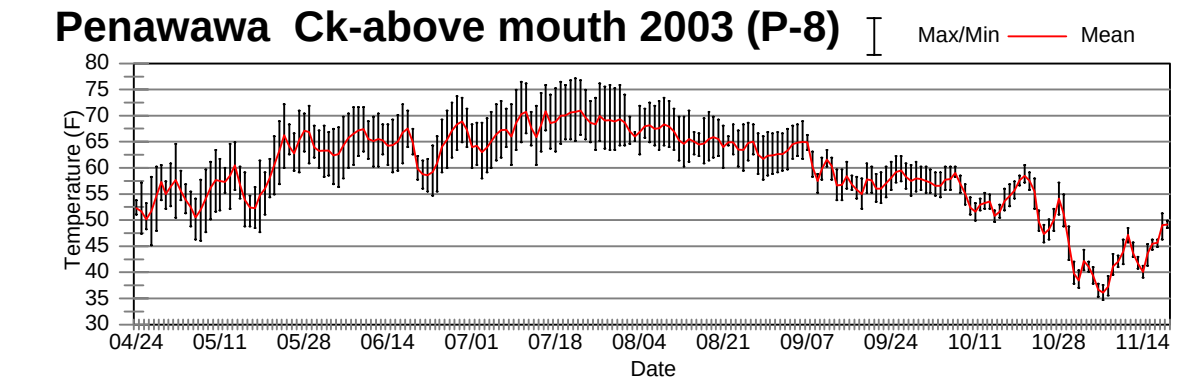
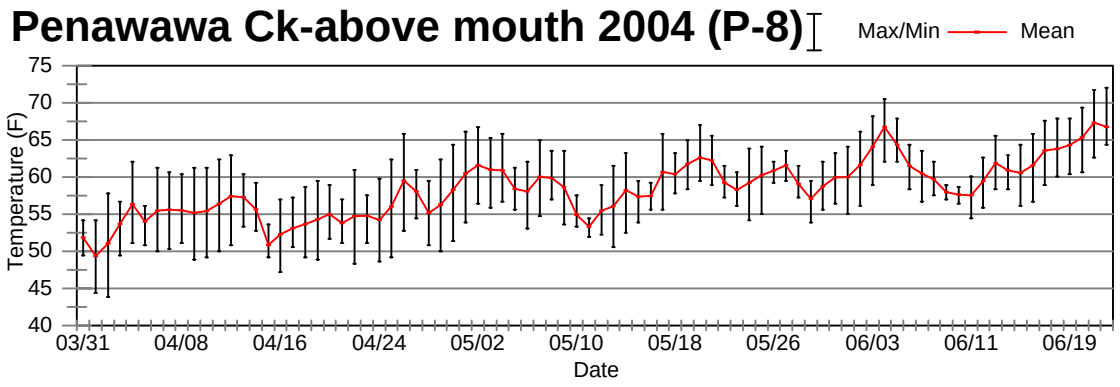
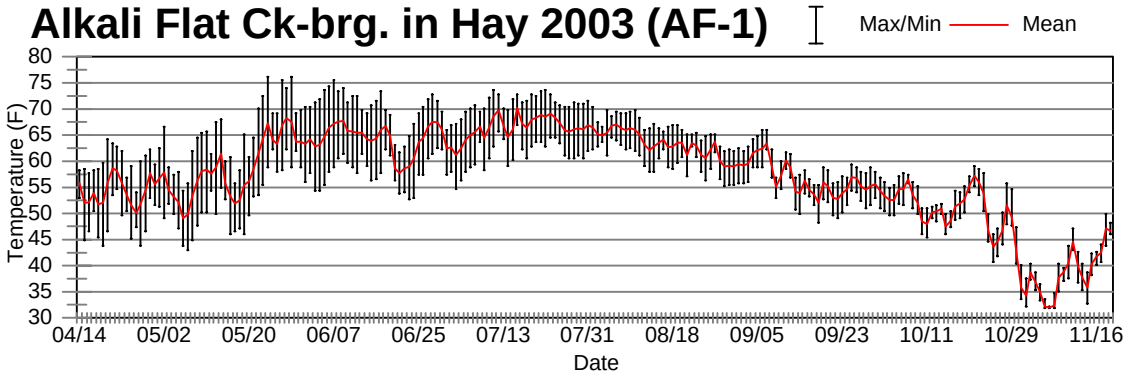
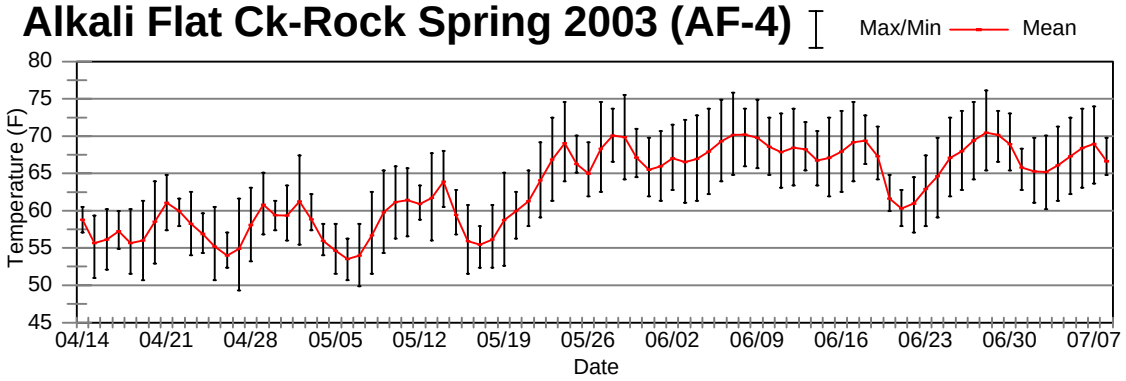
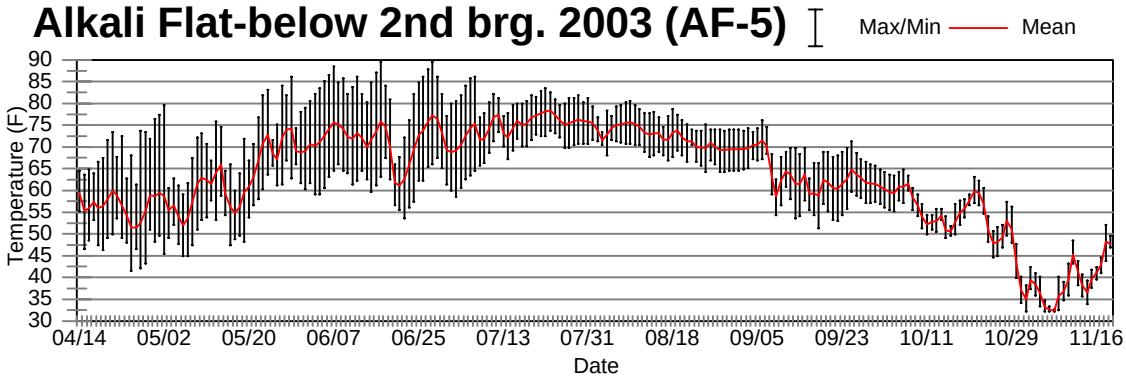
05/18
05/26
06/03
06/11
06/19
Date


Penawawa Ck-above mouth 2003 (P-8)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
30
04/24
05/11
05/28
06/14
07/01
07/18
08/04
08/21
09/07
09/24
10/11
10/28
11/14
Date


Penawawa Ck-above mouth 2004 (P-8)
Max/Min
Mean
Temperature (F)
75
70
65
60
55
50
45
40
03/31
04/08
04/16
04/24
05/02
05/10
05/18
05/26
06/03
06/11
06/19
Date


Alkali Flat Ck-brg. in Hay 2003 (AF-1)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
40
35
30
04/14
05/02
05/20
06/07
06/25
07/13
07/31
08/18
09/05
09/23
10/11
10/29
11/16
Date


Alkali Flat Ck-Rock Spring 2003 (AF-4)
Max/Min
Mean
Temperature (F)
80
75
70
65
60
55
50
45
04/14
04/21
04/28
05/05
05/12
05/19
05/26
06/02
06/09
06/16
06/23
06/30
07/07
Date


Alkali Flat-below 2nd brg. 2003 (AF-5)
Max/Min
Mean
Temperature (F)
90
85
80
75
70
65
60
55
50
45
40
35
30
04/14
05/02
05/20
06/07
06/25
07/13
07/31
08/18
09/05
09/23
10/11
10/29
11/16
Date

Appendix D. Relative Abundance of Non-Salmonids, 2003-2004

Appendix D. Relative Abundance of Non-salmonids from electrofishing sites, 2003 and 2004.

	Penawawa Ck	Little Penawawa Ck	Alkali Flat Ck
Cyprinidae Speckled dace *Rhinichthys osculus*	3	1	0
Catostomidae Bridgelip suckers *Catostomus columbianus*	1	0	1
Centrarchidae Smallmouth Bass *Micropterus dolomieu*	0	0	1
Pumpkinseed *Lepomis gibbosus*	0	0	2
Crayfish[a] *Pacifastacus spp.*	P	P	0

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