Nez Perce Tribe Chinook Salmon and Steelhead Adult Escapement and Spawning Ground 2007 Summary Report

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INTRODUCTION

This document summarizes adult spring, summer, and fall Chinook salmon and steelhead population estimates and spawning ground survey information collected on streams surveyed by the Nez Perce Tribe Department of Fisheries Resources Management (DFRM) during 2007. The purpose of this document is to provide resource assessment information to co-managers on a timely basis. Data collection is conducted under multiple contracts with specific project objectives and study designs. Methods have been standardized to assure accurate characterization of basic performance measures. The reader is directed to project specific annual reports for a detailed description of methods used for calculation of performance measures.

Adult spring and summer Chinook salmon escapement estimates are presented from six streams where adult monitoring sites are located. Adult steelhead escapement information is presented from two streams located in the Imnaha River subbasin. Spring, summer, and fall Chinook salmon redd count and carcass data is presented from multiple streams surveyed in the Clearwater River, Salmon River, Grande Ronde River, and Imnaha River subbasins. Index area (trend), extensive area, and supplemental area redd count information is presented.

DESCRIPTION OF STUDY AREA

Study streams surveyed in the Clearwater River, Salmon River, Grande Ronde River, and Imnaha River subbasins are presented in Appendix Figures 1-3. Individual streams surveyed and locations of surveyed areas are presented below.

Adult spring Chinook salmon escapement is monitored at three sites in the Clearwater River subbasin located in north central Idaho; two picket weirs are operated in Lolo Creek (rkm 21 and rkm 51), a tributary to the Clearwater River (Appendix Figure 4) and one in Newsome Creek (rkm 0), a tributary to the South Fork Clearwater River (Appendix Figure 5). In addition to escapement monitoring, the three weirs are operated to collect broodstock for the Nez Perce Tribal Hatchery (NPTH) program. To supplement broodstock collection, the adult fish ladder at the NPTH site (Appendix Figure 1) is also operated to collect adult spring Chinook salmon and fall Chinook salmon.

Multiple stream locations were sampled within the Clearwater River subbasin during spring Chinook salmon spawning ground surveys by three different projects within the DFRM Research Division. The streams monitored for the NPTH spring Chinook Monitoring and Evaluation (M&E) project are Lolo Creek, Yoosa Creek, Musselshell Creek, and Eldorado Creek (Appendix Figure 4), Newsome Creek (Appendix Figure 5), Mill Creek and Meadow Creek, tributaries to the South Fork Clearwater River (Appendix Figure 1), Meadow Creek, a tributary to the Selway River (Appendix Figure 6), and the lower Selway River (Appendix Figure 1). The Salmon Supplementation Studies in Idaho Rivers (ISS) project studied two streams in the Clearwater River subbasin; Fishing Creek and Legendary Bear Creek (Appendix Figure 7). Both streams are tributaries to the Lochsa River. The NPTH M&E project conducted aerial fall Chinook salmon redd count surveys in the Clearwater River subbasin in the mainstem Clearwater River, lower Potlatch River, North Fork Clearwater River, Middle Fork Clearwater River, and lower sections of the South Fork Clearwater River and Selway River (Appendix Figure 8).

Adult spring and summer Chinook salmon escapement is monitored at three sites within the South Fork Salmon River; upper mainstem South Fork Salmon River, the Secesh River, and in Johnson

Creek. All three streams are located in west central Idaho (Appendix Figures 9 and 10) and are tributaries to the South Fork Salmon River. The Chinook Salmon Adult Abundance Monitoring project uses a dual frequency identification sonar (DIDSON) monitoring site in the Secesh River at rkm 30, to quantify wild adult salmon escapement. An adult salmon underwater video monitoring site is also located in Lake Creek (Appendix Figure 9) approximately 100 m upstream from the mouth of Lake Creek as part of this project. The Johnson Creek Artificial Propagation and Enhancement project (JCAPE) employs a temporary picket style weir, located in Johnson Creek at rkm 8.2 (Appendix Figure 10), to assess adult abundance and collect broodstock for the supplementation program.

Multiple stream locations were sampled within the Salmon River subbasin for Chinook salmon spawning ground surveys. The ISS project studied three streams within the Salmon River drainage; the Secesh River which is a tributary of the South Fork Salmon River and Lake Creek which is a tributary of the Secesh River, and Slate Creek, a tributary of the mainstem Salmon River (Appendix Figures 9 and 11). The JCAPE project conducted multiple pass ground index area and extensive area redd count surveys in Johnson Creek and one of its tributaries (Burntlog Creek) (Appendix Figure 10). The Lower Snake River Compensation Plan (LSRCP) Monitoring and Evaluation (M&E) project conducted multiple pass surveys in the upper mainstem South Fork Salmon River below the adult weir and in the Middle Fork Salmon River on Big Creek (Appendix Figures 12 and 13). The Fall Chinook Acclimation Project (FCAP) M&E stafff conducted aerial fall Chinook salmon redd count surveys in the mainstem Salmon River from the mouth up to French Creek (Appendix Figure 14).

Adult spring and summer Chinook salmon escapement was monitored at one site in the Lostine River. The Grande Ronde Supplementation: Lostine River Monitoring and Evaluation project employed a panel weir, located in the Lostine River at rkm 1.4 (Appendix Figure 15), to quantify adult salmon escapement to the tributary and for collection of broodstock for the supplementation program.

Multiple adult spring and summer Chinook salmon redd count surveys were conducted within the Grande Ronde River subbasin in the Lostine River. The Grande Ronde Supplementation: Lostine River Monitoring and Evaluation project conducted index area and extensive area surveys in the Lostine River (Appendix Figure 15). The FCAP M&E staff collected aerial fall Chinook salmon redd count survey information in the mainstem Grande Ronde River from the mouth up to rkm 52.7 (Wildcat Creek Bridge) just past the town of Troy. In 2006, the survey area was extended up the Grande Ronde River to the Wallowa River, the lower Wallowa River to the mouth of the Minam River, and the lower Wenaha River from the mouth to rkm 17.5 (Appendix Figure 16).

The FCAP M&E staff conducted aerial fall Chinook salmon redd count surveys in the mainstem Imnaha River from the mouth up to rkm 19.5 at the town of Imnaha (Appendix Figure 16). The LSRCP project monitored adult steelhead escapment in two tributaries in the lower Imnaha River (Cow Creek and Lightning Creek) (Appendix Figure 3).

Table 1. Returning (to the target stream) spring/summer Chinook, fall Chinook, and steelhead adults trapped, broodstock collected, estimated escapement and percent hatchery fish above weirs, and total tributary escapement for streams monitored by the Nez Perce Tribe during 2007 (N/A = Not applicable, S/A = Still being analyzed). Total tributary escapement is escapement to the entire stream prior to broodstock take, harvest, and expanded for redds located below weirs.

Stream	Number Trapped	Number Kept for Broodstock	Estimated Escapement Above Weir (95% C.I.)	Percent Hatchery Above Weir	Total Tributary Escapement
Spring/Summer Chinook Salmon					
Clearwater River					
Lolo Creek	60	60	29 (N/A)	0.0	89
Newsome Cr.	53	41	11 (5-22)	50.0	64
NPTH Ladder	161	65	N/A	N/A	N/A
Salmon River					
Johnson Cr.	380	52	336[1] (323-350)	67.6[1]	429[1]
Secesh River	N/A	N/A	S/A	N/A	S/A
Lake Creek	N/A	N/A	S/A	S/A	S/A
Grande Ronde R.					
Lostine River	637	122	394 (census)	50.0	656
Fall Chinook Salmon					
Clearwater River					
NPTH Ladder	2174	177	N/A	N/A	N/A
Steelhead					
Imnaha River					
Lightning Cr.	66	N/A	93 (71-115)	7.6	N/A
Cow Cr.	32	N/A	39 (27-51)	9.7	N/A

1 Excludes two male Johnson Creek supplementation fish that strayed to the South Fork Salmon River adult facility and were trucked back to Johnson Creek and released above the adult weir.

Table 2. Adult spring and summer Chinook salmon escapement to Lolo Creek, Newsome Creek, Johnson Creek, Secesh River, Lake Creek, and the Lostine River from 2003 to 2007. Escapement information is total tributary escapement to the entire stream prior to broodstock take (S/A = Still being analyzed).

Year	Lolo Creek	Newsome Creek	Johnson Creek	Secesh River	Lake Creek	Lostine River
2003	672	466	871	1,172	480	1,090
2004	583	164	403	928	397	1,555
2005	178	67	223	344	137	964
2006	135	94	228	212	84	689
2007	89	64	426	S/A	S/A	656

Table 3. Adult spring and fall Chinook salmon swim-in returns and volunteers to the Nez Perce Tribe Hatchery (NPTH) ladder from 2003 to 2007 (N/A = Not applicable).

Year	Spring Chinook[1]	Fall Chinook
2003	N/A	181
2004	87	724
2005	12	167
2006	51	138
2007	161	2174

[1] Outplanted adults returned to the Clearwater River were not marked, thus total return numbers may be high.

Table 4. Adult steelhead escapement to Lightning Creek and Cow Creek in the Imnaha River subbasin from 2003 to 2007. Escapement information is total escapement above the weir site.

Year	Lightning Creek	Cow Creek
2003	220	104
2004	119	128
2005	70	88
2006	95	27
2007	93	39

Table 5. Spring/summer Chinook salmon spawning ground index area and extensive area redd count surveys conducted by the Nez Perce Tribe Department of Fisheries Resources Management during 2007 (N/A = Not applicable). Redd counts are ground counts unless otherwise noted. Number of extensive passes included the range of passes because in many cases extensive area surveys encompass multiple sections and not all sections are surveyed equal number of times.

Subbasin	Stream	Index Area Redd Count	Number of Passes (Index)	Extensive Area Redd Count	Number of Passes (Extensive)	Total Number of Redds
Clearwater River	Lolo Creek (excluding trib.'s)	13	3	1	1	14
	Yoosa Creek	0	3	N/A	N/A	0
	Musselshell Creek	N/A	N/A	0	1	0
	Eldorado Creek	0	3	0	1	0
	Newsome Creek	2	3	0	1	2
	SF Clearwater River	3	3	N/A	N/A	3
	Mill Creek	N/A	N/A	0	1	0
	Meadow Creek	N/A	N/A	0	1	0
	Meadow Creek (Selway)	8[1]	1	N/A	N/A	8
	Lower Selway River	N/A	N/A	1[1,2]	1	1[1,2]
	Fishing Creek (Squaw Cr)[3]	0	3	N/A	N/A	0
	Legendary Bear Creek (Papoose Cr)	1	3	0	3	1
Salmon River	Slate Creek	0	2	0	1-2	0
	Secesh River (excluding trib.'s)	38	3	2	1	40
	Lake Creek	31	3	0	3	31
	Summit Creek	N/A	N/A	2	3	2
	Grouse Creek	N/A	N/A	10	2	10
	Lick Creek	N/A	N/A	0	1	0

Subbasin	Stream	Index Area Redd Count	Number of Passes (Index)	Extensive Area Redd Count	Number of Passes (Extensive)	Total Number of Redds
	Upper Mainstem South Fork Salmon	259[4]	1-3	N/A	N/A	259[4]
	Johnson Creek (excluding trib.'s)	63	10	9	2-11	72
	Burnt Log Creek	N/A	N/A	2	8	2
	Big Creek	18	3	7[2]	3	25
Grande Ronde River	Lostine River	30	4	74	1-4	104

[1] Aerial survey.
[2] Does not represent comprehensive coverage of entire spawning distribution.
[3] Index area represents all available salmon spawning habitat.
[4] Entire index not surveyed.

Table 6. Fall Chinook salmon spawning aerial redd count surveys conducted by the Nez Perce Tribe Department of Fisheries Resources Management during 2007.

Subbasin	Stream	Total Number of Redds	Number of Passes
Clearwater River	Clearwater River – mainstem below North Fork Clearwater River	711	8
	Clearwater River – mainstem above North Fork Clearwater River	7	2
	North Fork Clearwater River	0	8
	South Fork Clearwater River	0	1
	Selway River	0	1
	Potlatch River	0	2
	Middle Fork Clearwater River	0	1
Salmon River	Salmon River – mainstem	18	5
Grande Ronde River	Grande Ronde River - mainstem	80	8
	Wallowa River	0	1
	Wenaha River	1	1
Imnaha River	Imnaha River – mainstem	17	6

Table 7. Spring/summer Chinook salmon spawning ground survey carcass recovery information from all survey sections (includes all available within the stream collected by the Nez Perce Tribe Department of Fisheries Resources Management during 2007 (S/A = Still being analyzed).

Subbasin	Stream	Number of Known Origin Carcasses	Total Hatchery Composition of Known Origin Carcasses (%)	Out of Population Strays[1] (%)
Clearwater River	Lolo Creek	15	6.7	0
	Yoosa Creek	0	0	0
	Musselshell Creek	0	0	0
	Eldorado Creek	0	0	0
	Newsome Creek	3	66.7	0
	SF Clearwater River	3	33.3	0
	Mill Creek	0	0	0
	Meadow Creek	0	0	0
	Meadow Creek (Selway)	0	0	0
	Lower Selway River	0	0	0
	Fishing Creek (Squaw Cr)	1	0	0
	Legendary Bear Creek (Papoose Cr)	1	0	0
Salmon River	Slate Creek	0	0	0
	Secesh River (excluding trib.'s)[2]	48	10.4	0
	Lake Creek	34	0	0
	Summit Creek	1	0	0
	Grouse Creek[2]	8	37.5	0
	Upper Mainstem South Fork Salmon	62	67.7	1.6
	Johnson Creek (excluding trib.'s)	118	57.6[3]	0
	Burnt Log Creek	0	0	0
	Big Creek	2	0	0
Grande Ronde R.	Lostine River[2]	77	66.2	S/A

[1] Defined as the percentage of all hatchery fish which strayed into the study stream from out of the population. Includes out-of-population within the major population group (MPG) strays, out-of-MPG strays from within the Evolutionary Significant Unit (ESU), and out-of-ESU strays.
[2] Hatchery percentages calculated by including unknown origin fish in carcass total (ISS cooperator agreement).
[3] Number was corrected from two known origin fish from weir data.

Table 8. Fall Chinook salmon spawning ground survey carcass recovery information collected by the Nez Perce Tribe Department of Fisheries Resources Management during 2007.

Subbasin	Stream	Number of Carcasses	Total Hatchery Composition (%)	Out of Population Strays[1] (%)
Clearwater River[2]	Clearwater River – mainstem	77	47.3[3]	0
	Clearwater River – above North Fork	0	0	0
	South Fork Clearwater	0	0	0
	North Fork Clearwater	0	0	0
	Lower Selway River	0	0	0
	Potlatch River	0	0	0
	Middle Fork Clearwater River	0	0	0
Salmon River	Salmon River – mainstem	0	0	0
Grande Ronde R.	Grande Ronde River – mainstem	0	0	0
	Wallowa River	0	0	0
	Wenaha River	0	0	0
Imnaha River	Imnaha River – mainstem	0	0	0

[1]Defined as the percentage of all hatchery fish which strayed into the study stream from out of the population. Includes out-of-population within the major population group (MPG) strays, out-of-MPG strays from within the Evolutionary Significant Unit (ESU), and out-of-ESU strays.
[2]High water events and turbid conditions hindered carcass recovery.
[3]From coded wire tags, ad-clips, and scale readings.

Table 9. Total number of spring and summer Chinook salmon redds, index area and extensive area, observed in Clearwater River tributary streams from 2003 to 2007 (includes tributary streams). N/S = not surveyed. The reader is directed to individual year annual reports for a description of stream kilometers surveyed.

Year	Lolo Creek	Newsome Creek	South Fork Clearwater[1]	Mill Creek	Meadow Creek (SF Clearwater)	Meadow Creek (Selway)	Lower Selway River[1]	Fishing Creek (Squaw Cr.)	Legendary Bear Creek (Papoose Cr.)
2003	69	69	16	3	0	9	6	9	21
2004	157	36	5	N/S	0	70	60	21	59
2005	45	7	4	N/S	0	18	2	2	8
2006	9	4	19	0	0	52	14	7	8
2007	14	2	3	0	0	8	1	0	1

[1] Does not represent comprehensive coverage of entire spawning distribution.

Table 10. Total number of spring and summer Chinook salmon redds, index area and extensive area, observed in Salmon River tributary streams and the Lostine River in the Grande Ronde River subbasin from 2003 to 2007 (includes tributary streams). The reader is directed to individual year annual reports for a description of stream kilometers surveyed.

Year	Slate Creek	Secesh River	Johnson Creek	Upper South Fork Salmon River[1]	Big Creek[2]	Lostine River
2003	12	589	363	380	78	194
2004	7	396	129	715[3]	49	189
2005	2	205	55	376	21	148
2006	3	75	38	274[3]	15	111
2007	0	83	74	259	25	104

[1] - Redd count numbers represent supplemental area counts, not inclusive of all potential spawning areas.
[2] - Redd count numbers represent index area and supplemental area counts, not inclusive of all potential spawning areas.
[3] - Unknown tributary above Goat Creek to ¾ mile below Goat Creek section not surveyed.

Table 11. Total number of fall Chinook salmon redds observed in the Clearwater River and tributaries, Salmon River, Grande Ronde River, and Imnaha River from 2003 to 2007. The reader is directed to individual year annual reports for a description of stream kilometers surveyed.

Year	Clearwater River Mainstem below North Fork	Clearwater River Mainstem above North Fork	North Fork Clearwater River	South Fork Clearwater River	Middle Fork Clearwater River	Potlatch River	Lower Selway River	Salmon River Mainstem	Grande Ronde River Mainstem	Imnaha River Mainstem
2003	544	19	8	0	0	1	0	18	93	43
2004	592	36	2	0	0	1	0	21	162	35
2005	433	54	0	0	0	0	0	27	129	36
2006[1]	251	6	0	0	0	0	0	9	42[2]	36
2007	711	7	0	0	0	0	0	18	81[3]	17[1]

[1]Clearwater, Salmon, Grande Ronde, and Imnaha redd surveys were not a total count due to high water events, turbid conditions, and inclement weather.
[2]Includes one redd observed in the Wenaha River, one redd observed in the upper Grande Ronde, and no redds in the Wallowa River (extensive areas surveyed in 2006 and 2007 only).
[3]Includes one redd observed in the Wenaha River.

Appendix

Appendix Table 12. Description of redd count index areas (trend areas) surveyed for spring/summer Chinook and fall Chinook salmon during 2007.

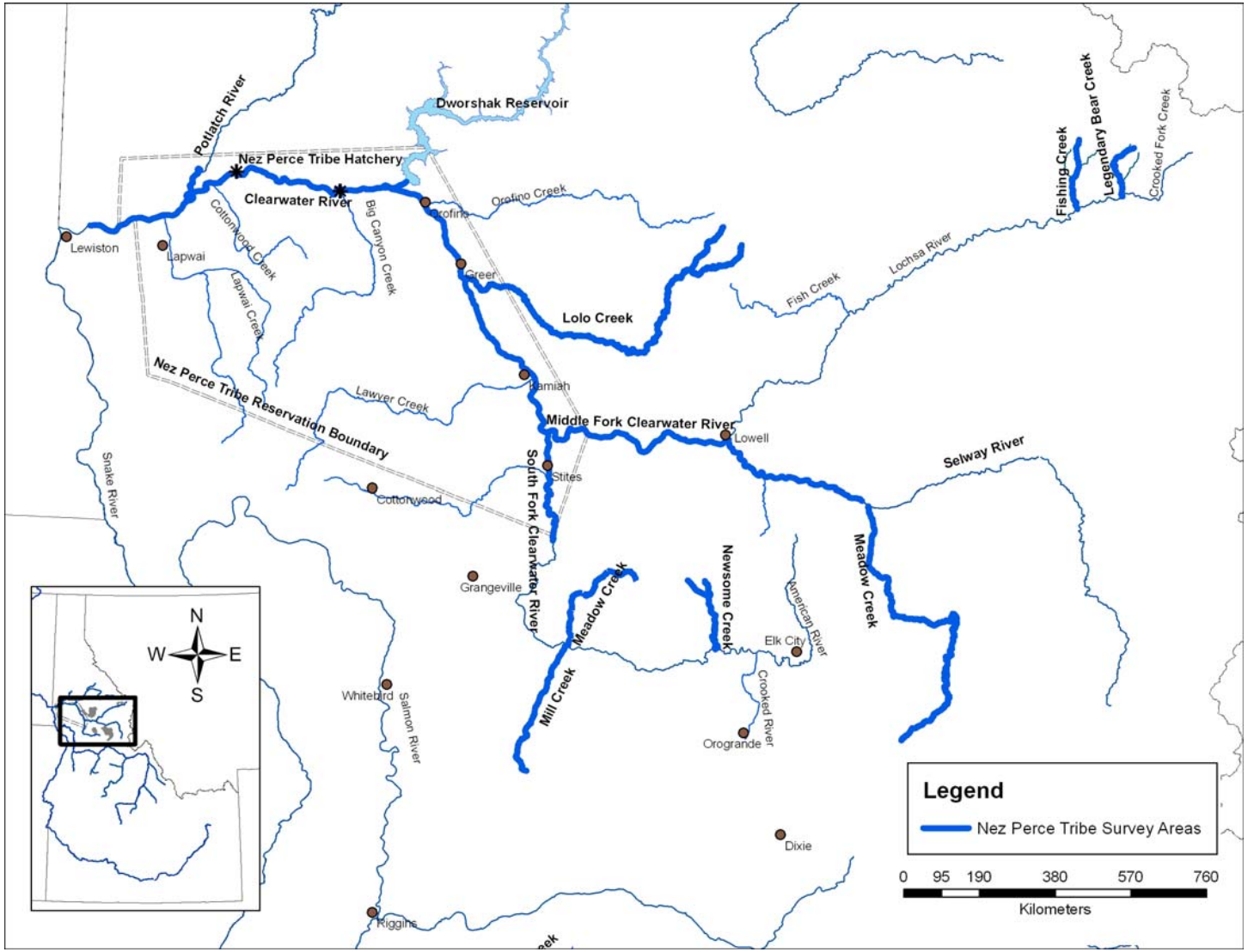
Stream	Type of Count	GPS Location & Description
Lolo Creek	Ground	Pheasant Camp sign to mouth of Yoosa Creek
GPS Coordinates N 46.28882º W 115.75987º to N 46.39251º W 115.68398º		
Yoosa Creek	Ground	Mouth of Yoosa to mouth of Camp Creek
GPS Coordinates N 46.39251º W 115.68398º to N 46.39702º W 115.64738º		
Eldorado Creek	Ground	Mouth of Eldorado Creek to old weir site
GPS Coordinates N 46.29473º W 115.75077º to N 46.28572º W 115.72031º		
Newsome Creek	Ground	Mouth of Newsome Creek to Glory Hole
GPS Coordinates N 45.82865º W 115.61534º to N 45.92752º W 115.64008º		
S.F. Clearwater River	Ground	Mouth of Leggett Creek to mouth of Newsome Creek
GPS Coordinates N 45.82664º W 115.62705º to N 45.82865º W 115.61534º		
GPS Coordinates N 46.04537º W 115.29637º to N 46.00880º W 115.28159º		
Meadow Creek (Selway)	Aerial	Mouth of Meadow Creek to Fourmile Creek
GPS Coordinates N 46.04537º W 115.29637º to N 45.72618º W 115.16726º		
Fishing Creek	Ground	Mouth of Fishing Creek confluence of West Fork
GPS coordinates N46º29'30" W114º51'50" to N46º32'30" W114º51'55"		
Legendary Bear Creek	Ground	Mouth of Legendary Bear Creek to confluence of East and West Fork
GPS Coordinates N46º30'45' W114º45'58" to N46º32'5" W114º45'55"		
Slate Creek	Ground	Mouth of Willow Creek to Forest Route 221
GPS coordinates N45º38'5.8" W116º6'3.1" to N45º36'15" W116º3'45"		
Secesh River	Ground	Alex Creek to confluence of Pia Creek
GPS coordinates N45º12'7.3" W115º45'53.2" to N45º16'1.7" W115º50'42.1"		
Lake Creek	Ground	Mouth of Lake Creek to confluence of Willow Creek
GPS Coordinates N45°15.231' W115°53.451' to N45°19.543' W115°56.99'		
Upper Mainstem South Fork Salmon River[1]	Ground	South Fork Salmon River weir to Dime Creek
GPS Coordinates N44.66674 W115.70307 to N44.70261 W115.70035		
Upper Mainstem South Fork Salmon River[1]	Ground	Dime Creek to Unknown tributary above Goat Creek
GPS Coordinates N44.70261 W115.70035 to N44.74028 W115.68915		
Upper Mainstem South Fork Salmon River[1]	Ground	Unknown tributary above Goat Creek to ¾ mile below Goat Creek
GPS Coordinates N44.74031 W115.68915 to N44.76523 W115.68338		
Upper Mainstem South Fork Salmon River[1]	Ground	Blackmare Creek to lower end of Poverty Flat
GPS Coordinates N44.82299 W115.70444 to N44.83201 W115.70416		
Upper Mainstem South Fork Salmon River[1]	Ground	Lodgepole Campground to Phoebe Creek Bridge
GPS Coordinates N44.86579 W115.69653 to N44.89900 W115.71597		
Johnson Creek	Ground	Top of Deadhorse Rapids to Mouth of Moose Creek
GPS Coordinates N 44.891977º W 115.49791º to N 44.852551º W 115.509123º		
Big Creek	Ground	Logan Creek to Jacobs Ladder Creek
GPS Coordinates N45.11824 W115.32011 to N45.08166 W115.33877		
Clearwater River (lower)	Aerial (fall Chinook)	Potlatch Mill to North Fork Clearwater River Confluence
GPS Coordinates N46.432608° W116.971406° to N46.502350° W116.329547°		
Clearwater River (upper)	Aerial (fall Chinook)	North Fork Clearwater confluence to South Fork Clearwater confluence
GPS Coordinates N46.502350° W116.329547° to N46.144906° W115.992267°		
North Fork Clearwater R.	Aerial (fall Chinook)	Mouth of North Fork to just below Dworshak Dam
GPS Coordinates N46.502350° W116.329547° to N46.511231° W116.301886°		
South Fork Clearwater R.	Aerial (fall Chinook)	Mouth of South Fork Clearwater to town of Harpster
GPS Coordinates N46.144906° W115.982267° to N45.985208° W115.965931°		
Middle Fork Clearwater R.	Aerial (fall Chinook)	South Fork Clearwater River confluence to Selway River confluence
GPS Coordinates N46.145689° W115.981936° to N46.141122° W115.597686°		
Selway River	Aerial (fall Chinook)	Mouth of Selway River to Selway Falls
GPS Coordinates N46.141122° W115.597686° to N46.053361° W115.308931°		
Grande Ronde River	Aerial (fall Chinook)	Mouth of Grande Ronde River to Wildcat Bridge above town of Troy
GPS Coordinates N46.079917° W116.980372° to N45.898842° W117.483081°		
Lostine River	Ground	Six Mile Bridge to Lostine River Ranch Bridge
GPS Coordinates N45.43897° W117.42633 to N45.40825° W11742809°		
Imnaha River	Aerial (fall Chinook)	Mouth of Imnaha River to town of Imnaha
GPS Coordinates N45.816897° W116.764564° to N45.559842° W116.833906°		
Salmon River	Aerial (fall Chinook)	Mouth of Salmon River to French Creek above town of Riggins
GPS Coordinates N45.856253° W116.793825° to N45.403617° W116.098461°		

1-Not entire index area surveyed.

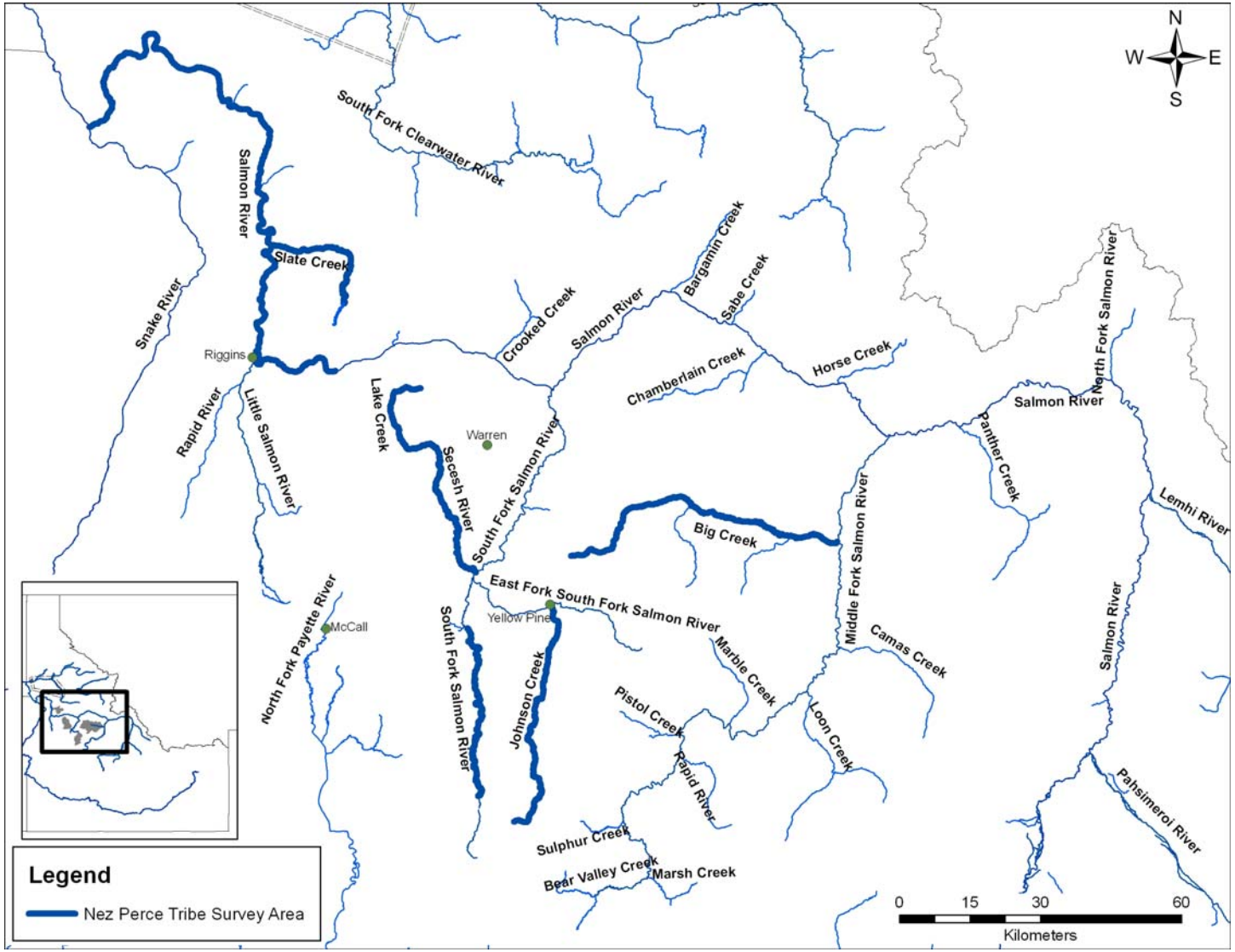
Appendix Table 13. Description of redd count extensive areas surveyed for spring/summer Chinook and fall Chinook salmon during 2007.

Stream	Type of Count	GPS Location & Description
Lolo / Upper	Ground	Mouth of Yoosa Creek to Slide
GPS Coordinates N 46.39251º W 115.68398º to N 46.39899º W 115.67646º		
Lolo / Rock Creek	Ground	Mouth of Rock Creek to Pheasant Camp sign
GPS Coordinates N 46.27243º W 115.80407º to N 46.28882º W 115.75987º		
Lolo / Lower Weir Site	Ground	1.6 km downstream of lower Lolo weir to Pheasant Camp
GPS Coordinates N 46.30293º W 115.98960º to N 46.28882º W 115.75987º		
Musselshell Creek	Ground	Mouth of Musselshell Creek to mouth of Gold Creek
GPS Coordinates N 46.30966º W 115.75410º to N 46.36984º W 115.74089º		
Eldorado Creek	Ground	Old weir site to Dollar Creek bridge
GPS Coordinates N 46.28572º W 115.72031º to N 46.29930º W 115.64601º		
Newsome / Radcliff Creek	Ground	Glory Hole to mouth of Radcliff Creek
GPS Coordinates N 45.92752º W 115.64008º to N 45.95367º W 115.64610º		
Newsome / Pilot Creek	Ground	Lower 500 meters
GPS Coordinates N 45.90722º W 115.63001º to N 45.90790º W 115.63541º		
Newsome / Baldy Creek	Ground	Lower 400 meters
GPS Coordinates N 45.90779º W 115.63149º to N 45.90943º W 115.63403º		
Mill Cr. (S.F. Clrwtr R.)	Ground	Mouth of Mill Creek to mouth of Markham Creek
GPS Coordinates N 45.82892º W 115.93556º to N 45.79521º W 115.95947º		
Meadow Cr. (S.F. Clrwtr R.)	Ground	McComas Meadows
GPS Coordinates N 45.88533º W 115.92017º to N 45.90763º W 115.89977º		
Lower Selway River	Aerial	Mouth of Selway River to mouth of Otter Creek
GPS Coordinates N 46.14078º W 115.59725º to N 46.05077º W 115.22524º		
Legendary Bear Creek	Ground	Mouth to 1.0 km up East Fork
GPS coordinates N46º30’45” W114º45’58” to N46º32’30” W114º45’10”		
Slate Creek	Ground	Forest Boundary to Junction Road 221
GPS coordinates N45º37’51.4” W116º12’7.2” to N45º36’15” W116º3’45”		
Secesh River	Ground	Grimmet Creek to confluence of Lake Creek and Summit Creek
GPS coordinates N45º9’33.998” W115º47’60.0” to N45º15’23.1” W115º53’45.1”		
Lake Creek	Ground	Mouth of Lake Creek to confluence of Corduroy Creek
GPS coordinates N45º15’23.1” W115º53’45.1” to N45º21’58.4” W115º56’14.9”		
Grouse Creek	Ground	Mouth upstream 3.0 km
GPS coordinates N45º15’55.99” W115º49’46.8” to N45º17’35.0” W115º50’17.0”		
Summit Creek	Gound	Mouth to Pucker Point
GPS coordinates N45º15’23.1” W115º53’45.1” to N45º12’1.2” W115º57’15.3”		
Johnson Creek / Section1	Ground	Confluence of Johnson Creek and East Fork South Fork to NPT Screw Trap
GPS Coordinates N 44.962469º W 115.502462º to N 44.91763º W 115.483355º		
Johnson Creek / Section 2	Ground	NPT Screw Trap to NPT Adult Weir
GPS Coordinates N 44.91763º W 115.483355º to N 44.901166º W 115.488842º		
Johnson Creek / Section 3	Ground	NPT Adult Weir to top of Deadhorse Rapids
GPS Coordinates N 44.901166º W 115.488842º to N 44.891977º W 115.49791º		
Johnson Creek / Section 5	Ground	Mouth of Moose Creek to Mouth of Burnt Log
GPS Coordinates N 44.852551º W 115.509123º to N 44.802991º W 115.518556º		
Johnson Creek/Section 6	Ground	Old Burnt Log Trail Crossing to Landmark Bridge
GPS Coordinates N 44.69737º W 115.545397º to N 44.652499º to W 115.54237º		
Johnson Creek/Section 7	Ground	Landmark Bridge to Swamp Creek
GPS Coordinates N 44.652499º to W 115.54237º to N 44.597181º to W 115.524275º		
Burnt Log Creek/Section 1a	Ground	Mouth of Burnt Log Creek to 1.1 km above mouth of Buck Creek
GPS Coordinates N 44.802991º W 115.518556º to N 44.780333º to W 115.520741º		
Big Creek	Ground	Smith Creek to Logan Creek
GPS Coordinates N45.15231 W115.29751 to N45.11824 W115.32011		
Potlatch River	Aerial (fall Chinook)	Mouth of Potlatch River to Rkm 4.5
GPS Coordinates N46.474786° W116.767264° to N46.519608° W116.740211°		
Grande Ronde River (upper)	Aerial (fall Chinook)	Wildcat Bridge above Troy to mouth of Wallowa
GPS Coordinates N45.898842° W117.483081° to N45.7254° W117.7853556°		
Lostine River	Ground	Confluence to Hwy 82
45.55216° W117.49007° to 45.49648° W117.44029°		
Lostine River	Ground	Trout Farm Bridge to Lostine River Ranch Bridge
45.46925° W 117.42517° to 45.43897° W 117.42633°		
Lostine River	Ground	Six Mile Bridge to Pole Bridge
45.40825° W 117.42809° to 45.38668° W 117.42517°		
Lostine River	Ground	Williamson to Walla Walla Campground
45.34184° W 117.41120° to 45.30055° W 117.39697°		

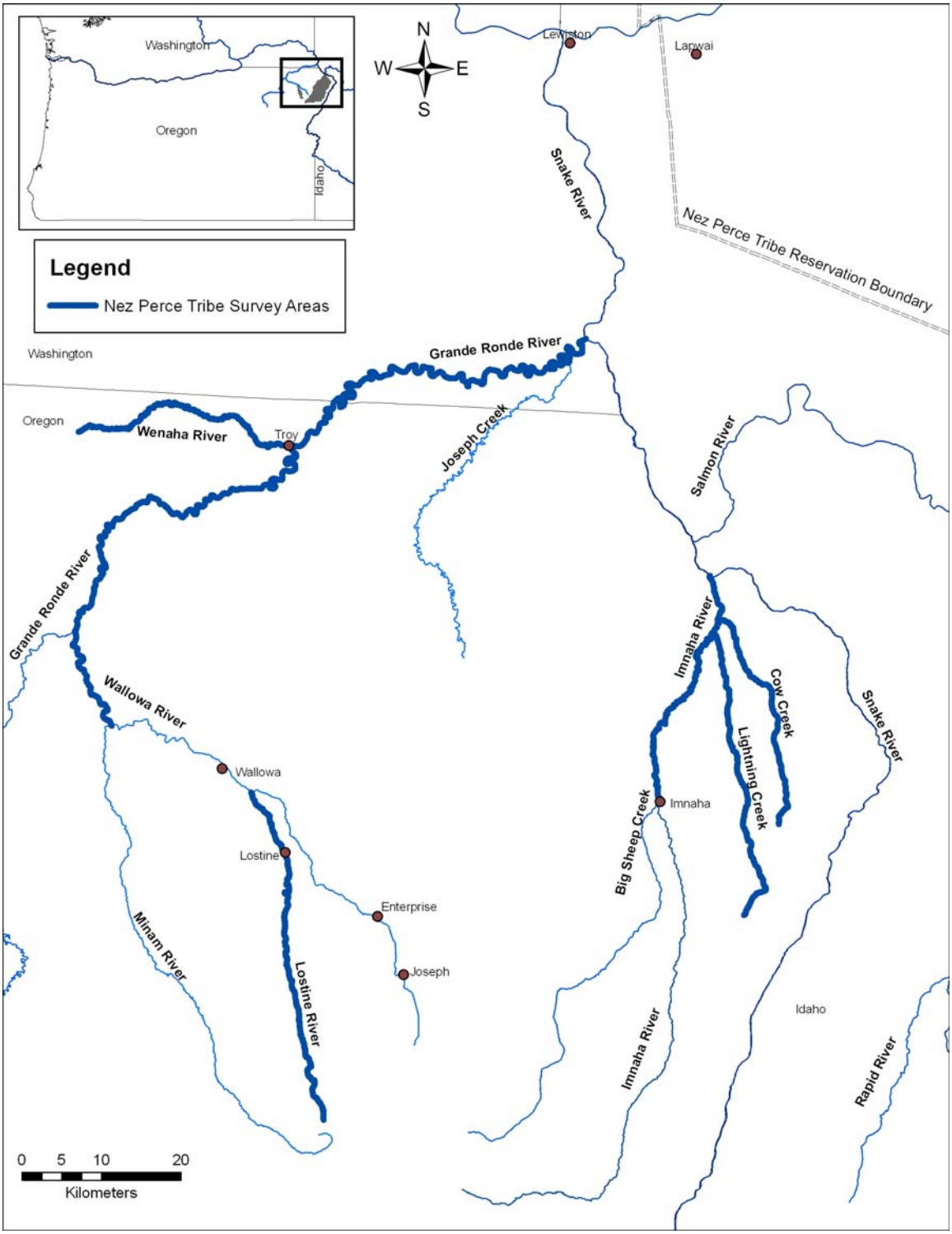
Appendix Table 13. (Cont.)		
Lostine River	Ground	Bowman Trailhead to Turkey Flat
45.29335° W 117.39547° to 45.27642° W 117.38981°		
Lostine River	Ground	French Campground to Arrow Campground
UTM:11 469572 (E) 5103245 (N), Nad 83 to UTM11: 469728 (E) 5012525 (N), Nad 83		
Wallowa River	Aerial (fall Chinook)	Mouth of Wallowa River to mouth of Minam River
GPS Coordinates N45.7254° W117.7853556° to N45.898842° W117.483081°		
Wenaha River	Aerial (fall Chinook)	Mouth of Wenaha River to River km 17.5
GPS Coordinates N45.94529167° W117.45111944° to N45.985774° W117.611025°		



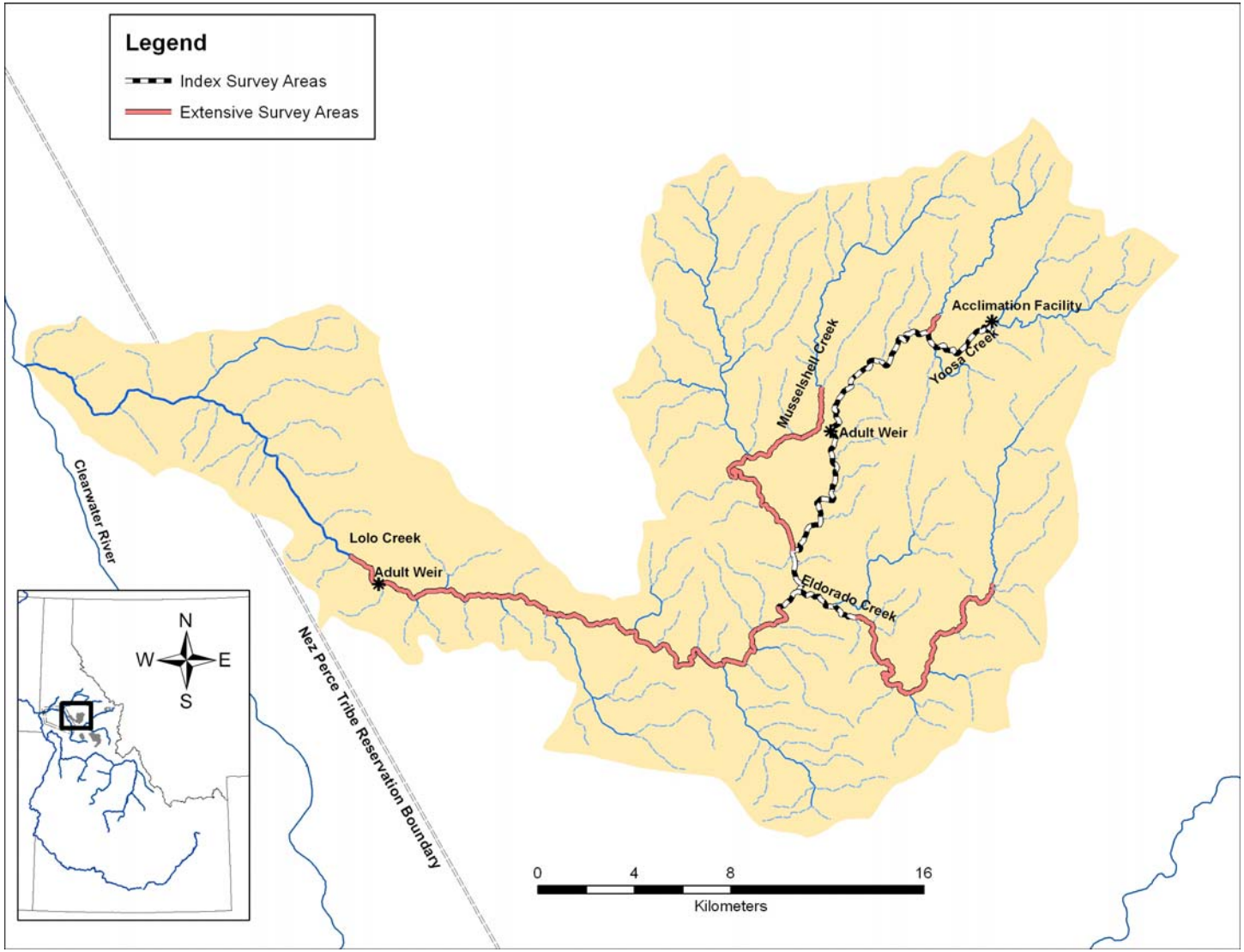
Appendix Figure 1. Overview map of research study streams indicating location within the Clearwater River subbasin. Spring and summer Chinook salmon surveys occur in tributary streams, and fall Chinook salmon surveys occur in mainstem river reaches.



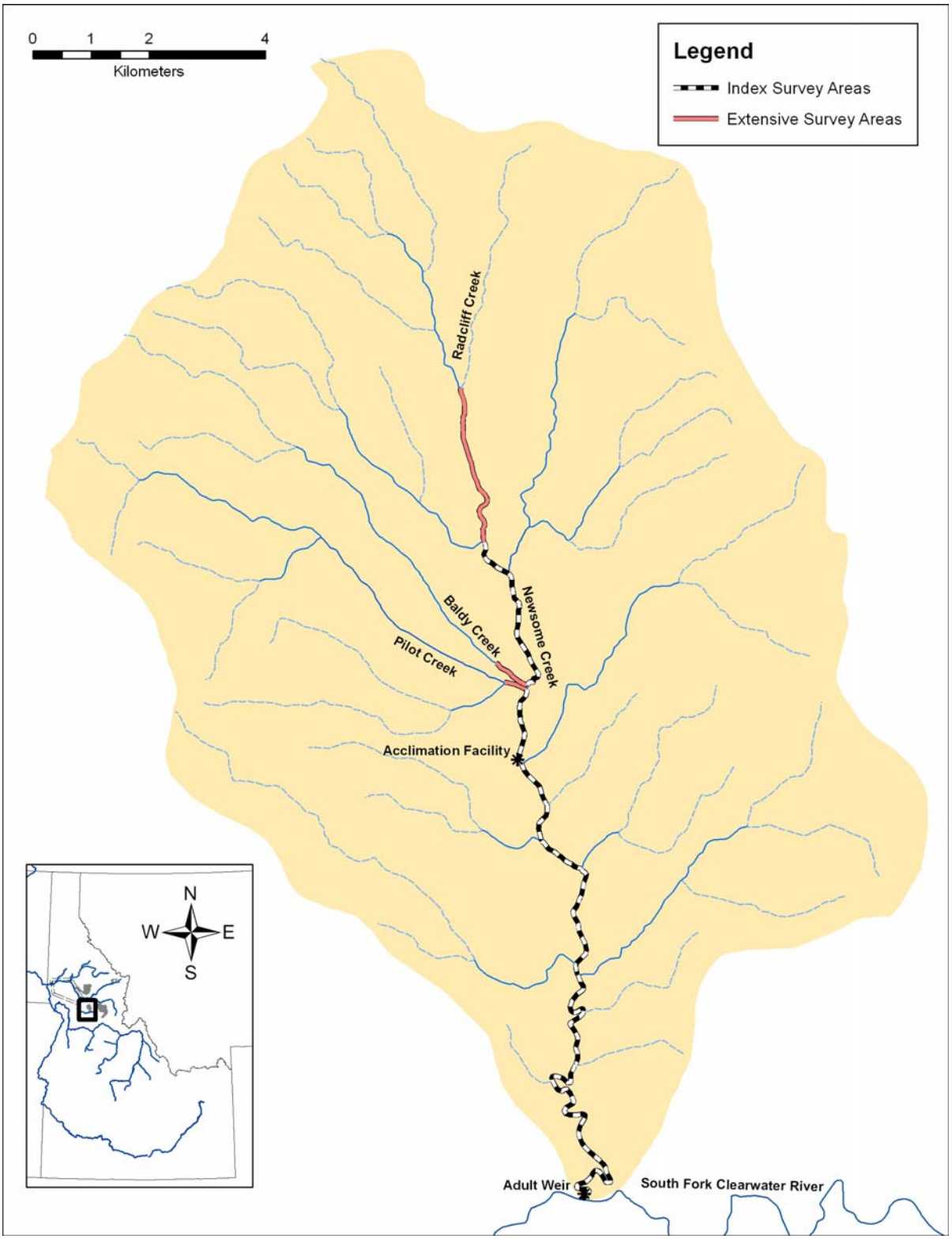
Appendix Figure 2. Overview map of research study streams indicating location within the Salmon River subbasin. Spring and summer Chinook salmon surveys occur in tributary streams, and fall Chinook salmon surveys occur in the lower Salmon River.



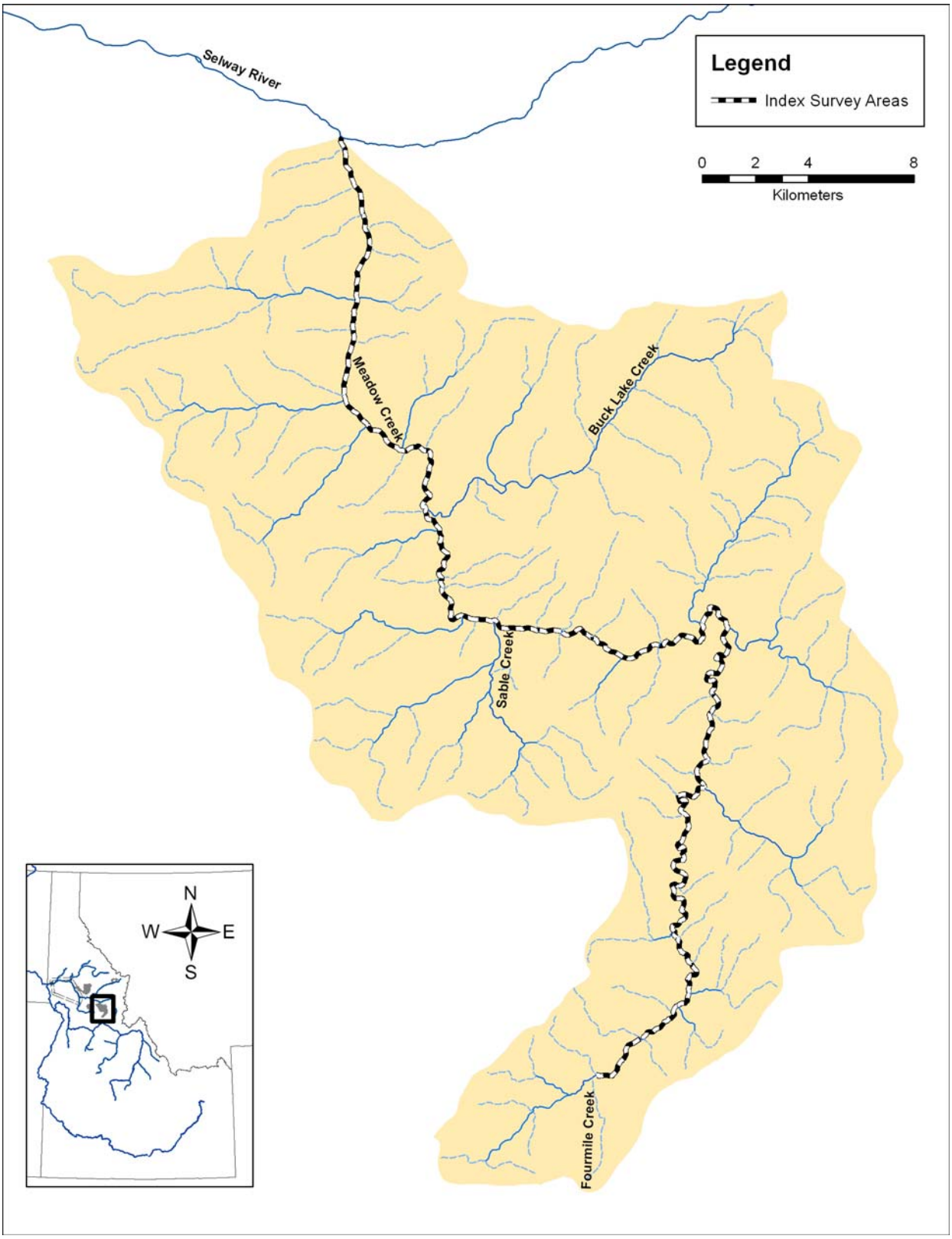
Appendix Figure 3. Overview map of research study streams indicating location within the Grande Ronde River and Imnaha River subbasin. Spring and summer Chinook salmon surveys occur in tributary streams, fall Chinook salmon surveys occur in lower mainstem river reaches, and steelhead escapement monitoring occurs in Cow Creek and Lightning Creek in the Imnaha River.



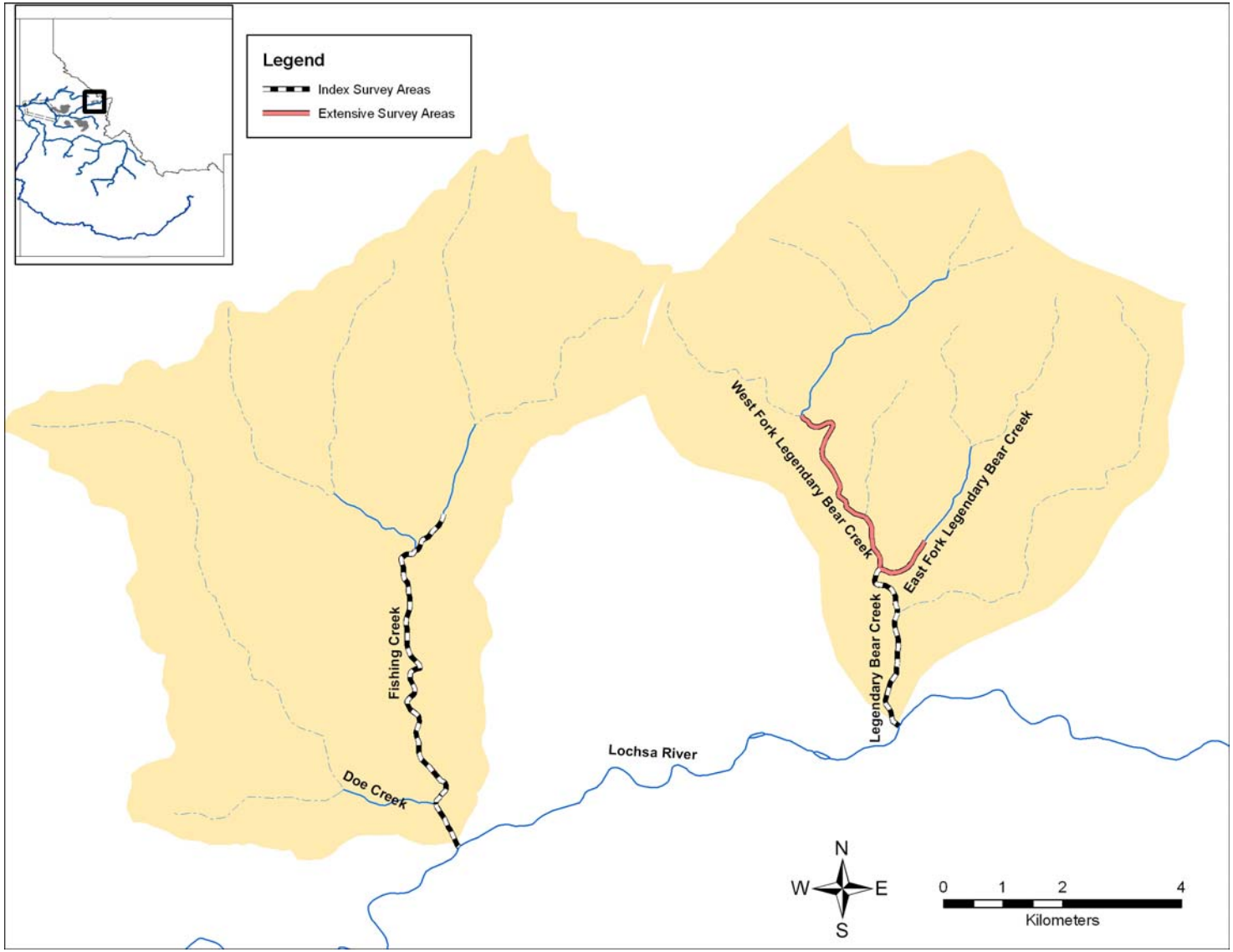
Appendix Figure 4. Tributary specific map indicating locations of index area and extensive area spring and summer Chinook salmon redd count surveys, and locations of adult weirs in Lolo Creek, Yoosa Creek, Musselshell Creek, and Eldorado Creek.



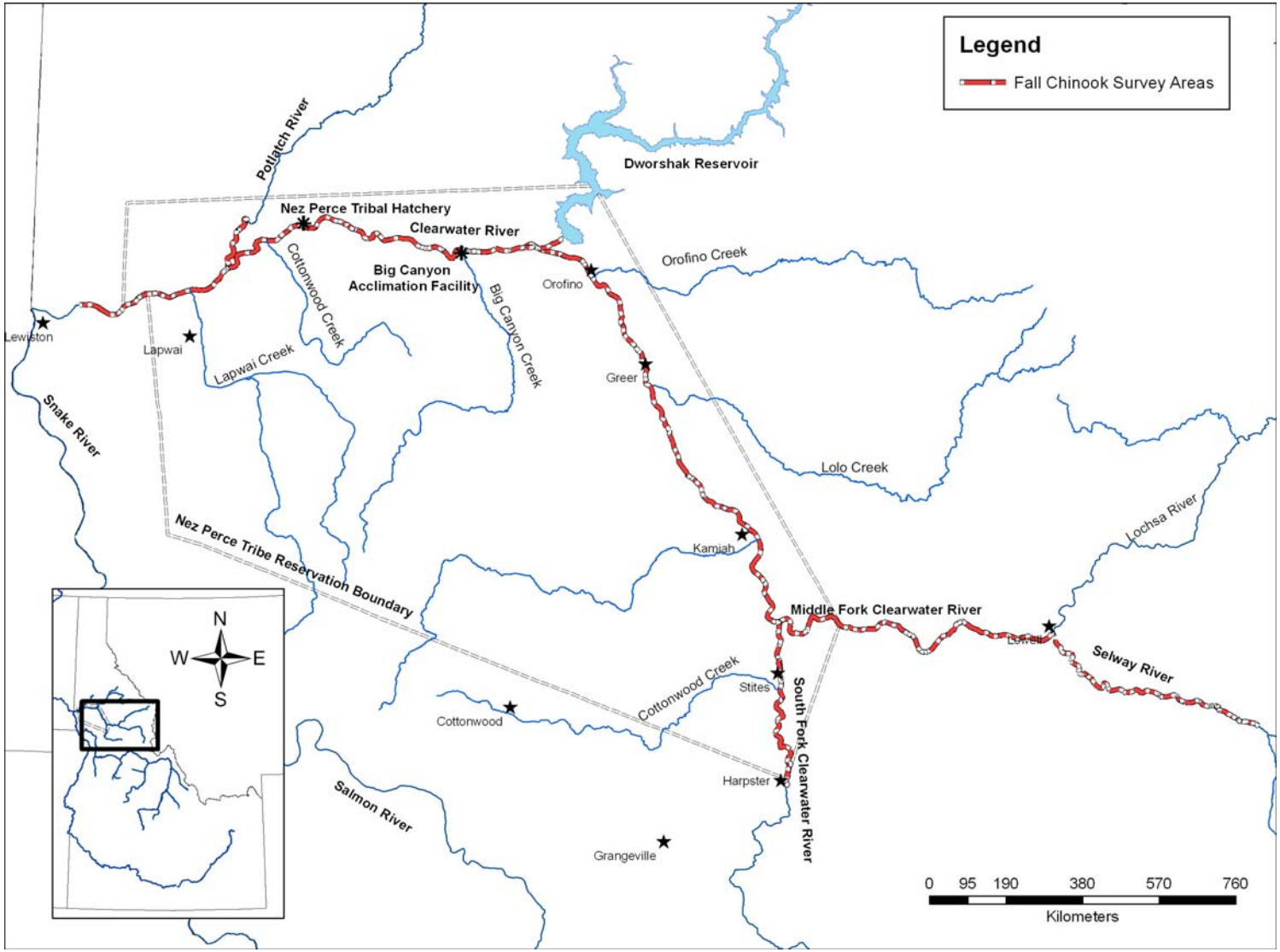
Appendix Figure 5. Tributary specific map indicating locations of index area and extensive area spring and summer Chinook salmon redd count surveys, and location of the adult weir in Newsome Creek.



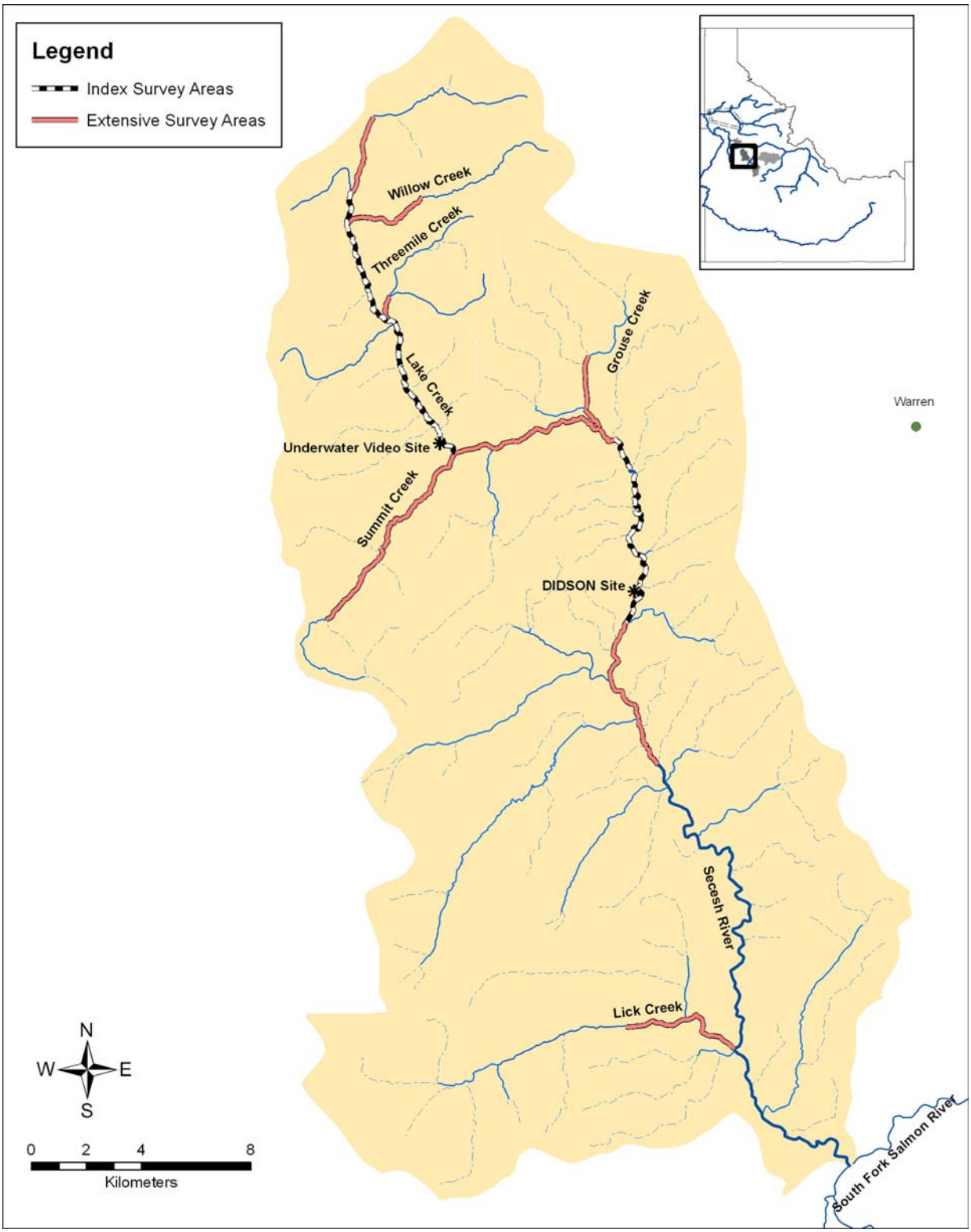
Appendix Figure 6. Tributary specific map indicating locations of index area spring and summer Chinook salmon redd count surveys in Meadow Creek (Selway River).



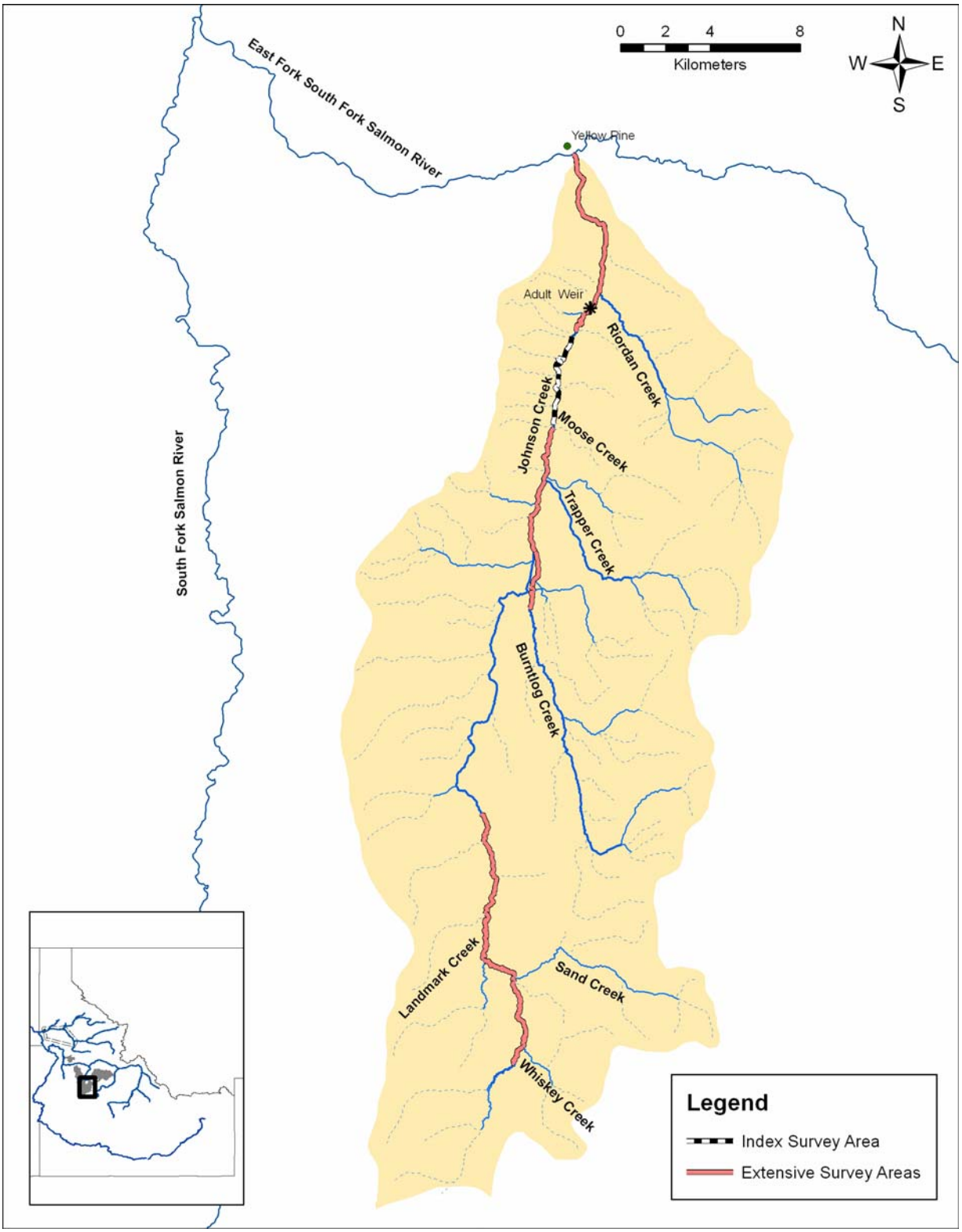
Appendix Figure 7. Tributary specific map indicating locations of index area and extensive area spring and summer Chinook salmon redd count surveys in Fishing Creek and Legendary Bear Creek.



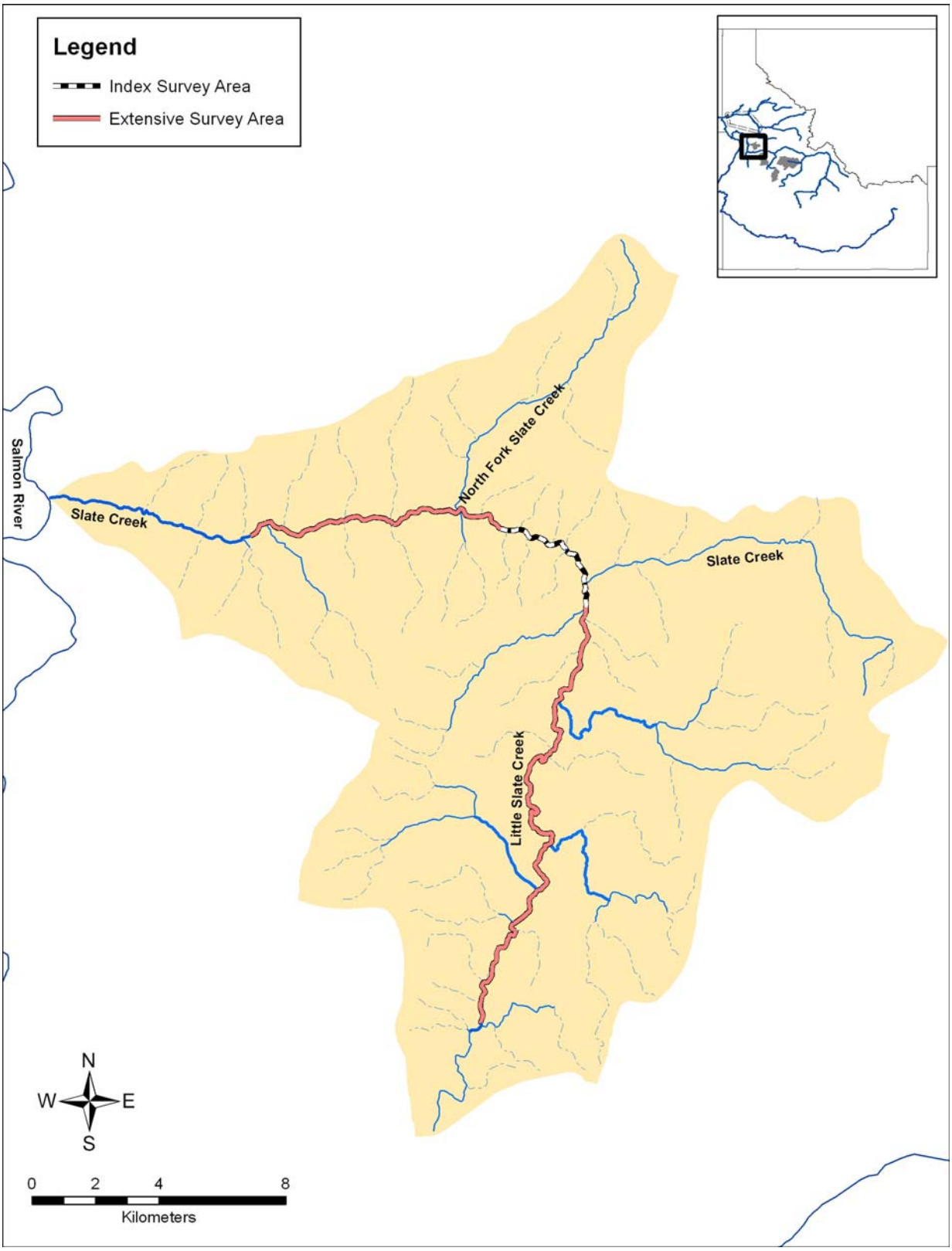
Appendix Figure 8. Tributary specific map indicating locations of fall Chinook salmon redd count surveys in the mainstem Clearwater River, lower Potlatch River, North Fork Clearwater River, Middle Fork Clearwater River, and lower sections of the South Fork Clearwater River and Selway River.



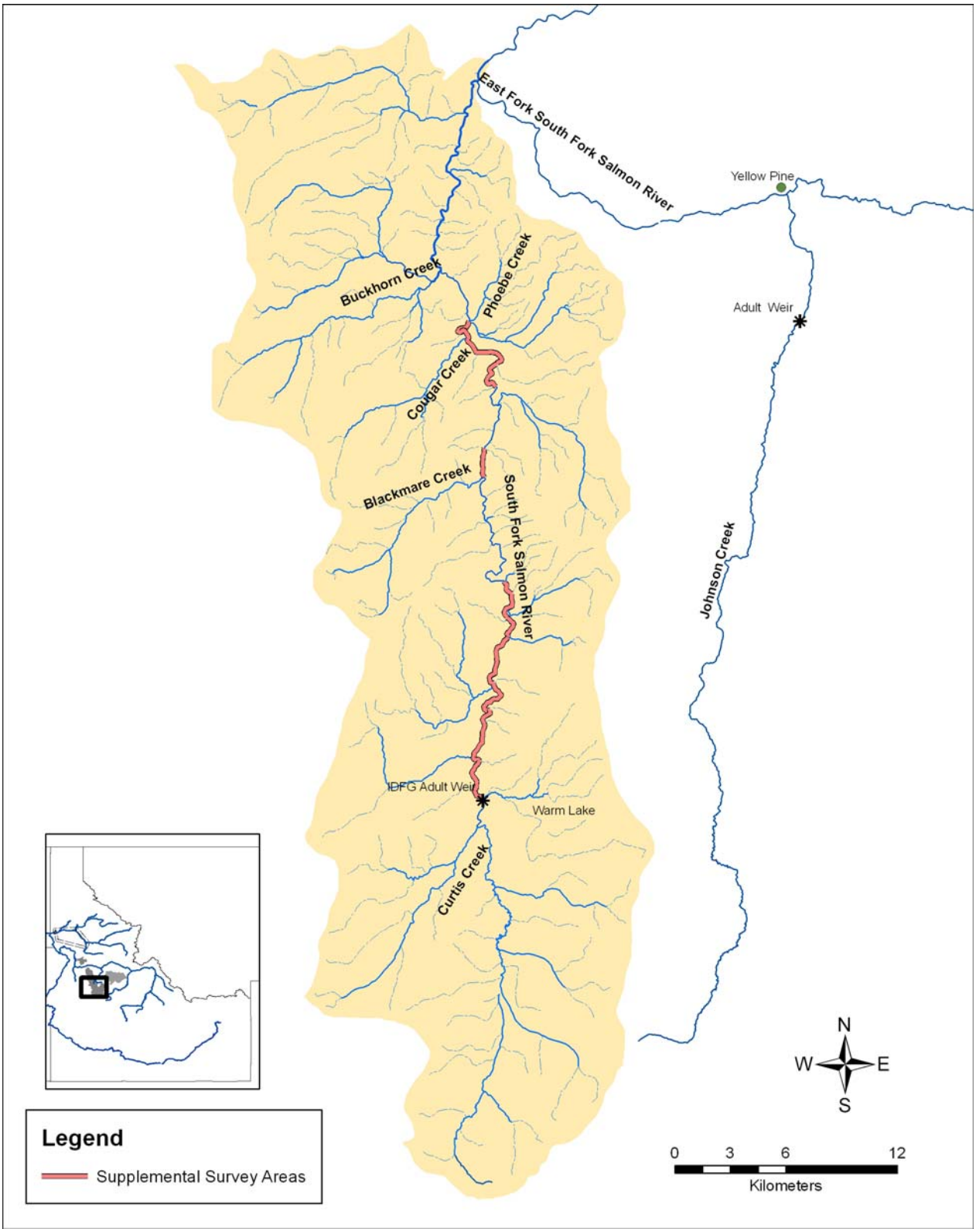
Appendix Figure 9. Tributary specific map indicating locations of index area and extensive area spring and summer Chinook salmon redd count surveys, and locations of DIDSON and underwater video adult escapement monitoring sites in the Secesh River.



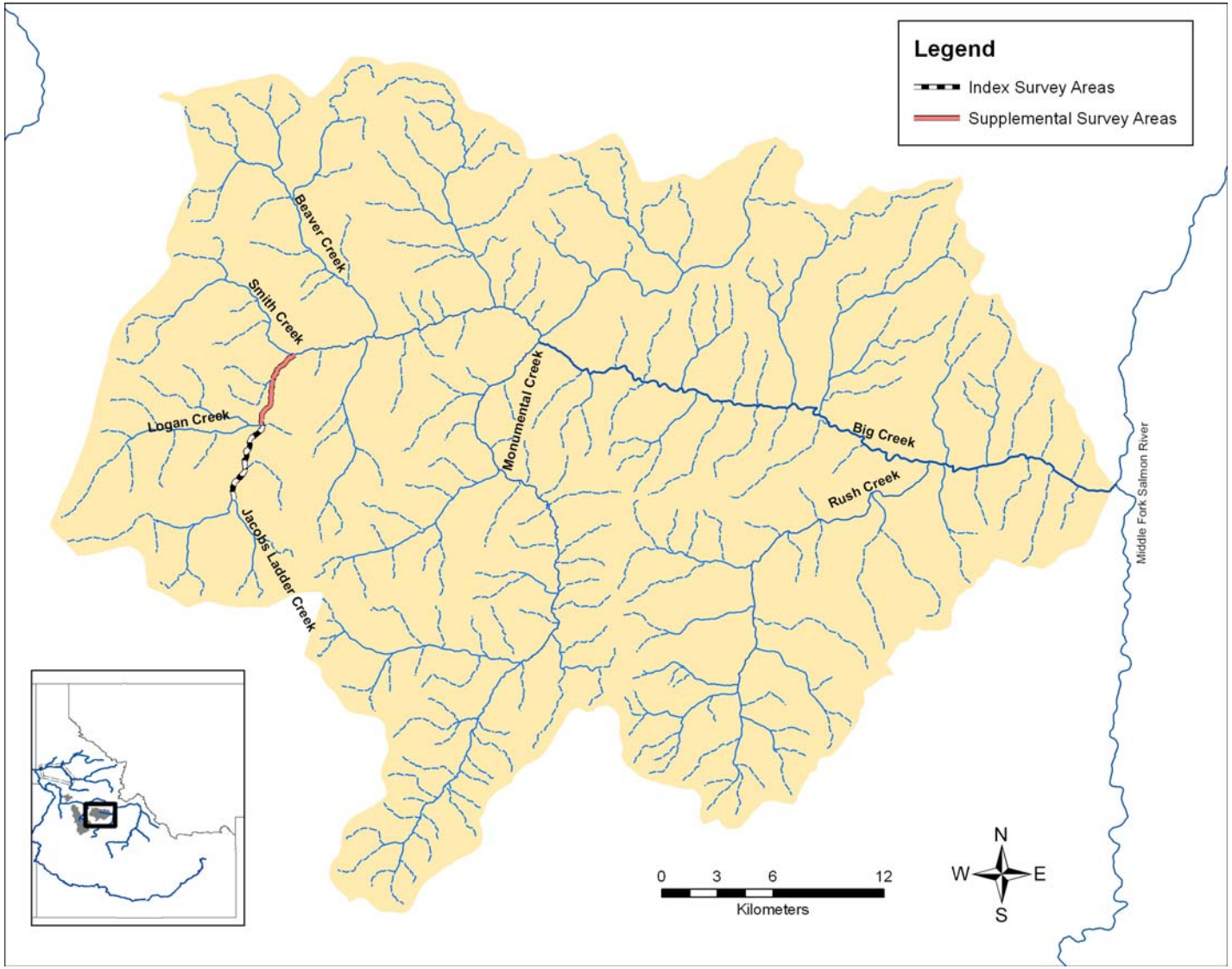
Appendix Figure 10. Tributary specific map indicating locations of index area and extensive area spring and summer Chinook salmon redd count surveys, and location of the adult weir on Johnson Creek.



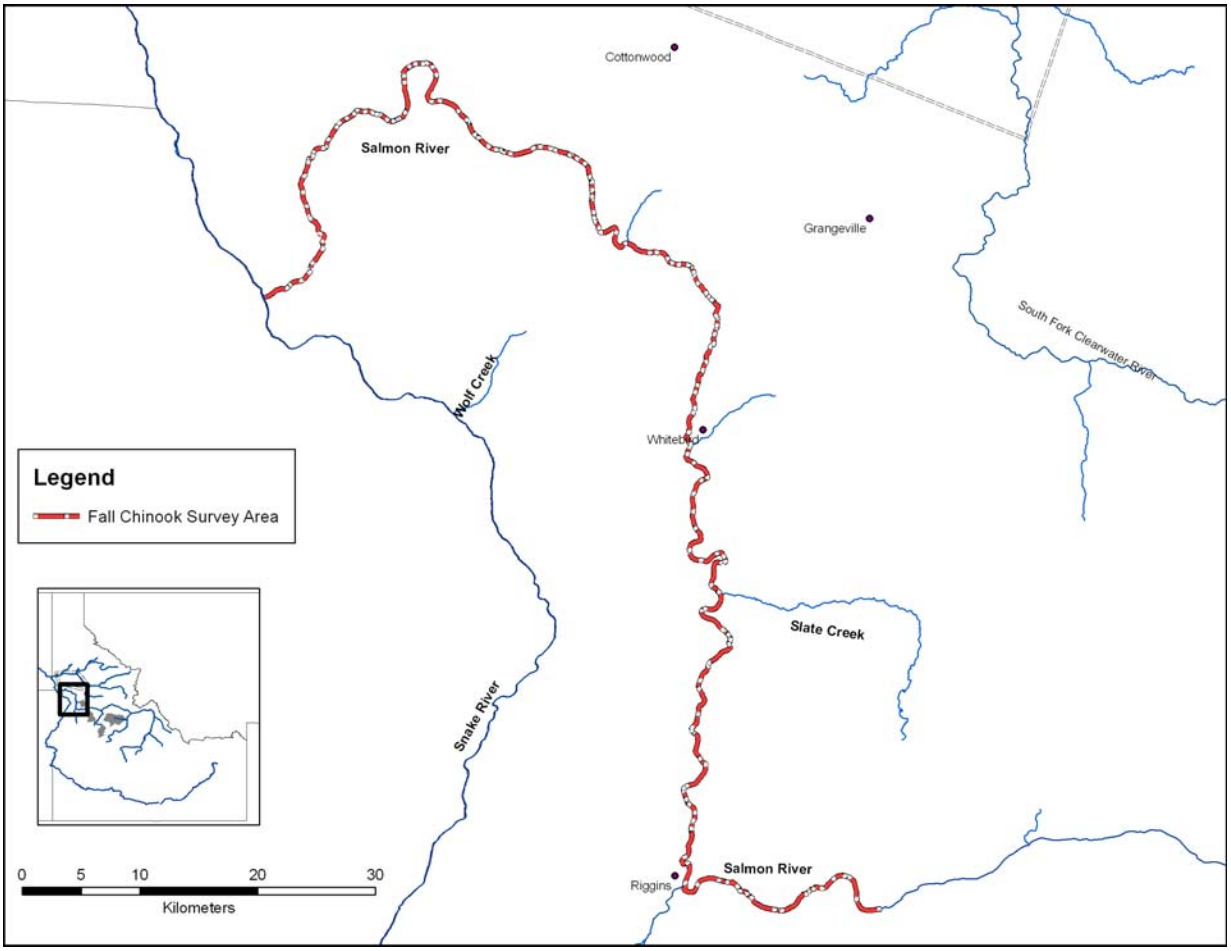
Appendix Figure 11. Tributary specific map indicating locations of index area and extensive area spring and summer Chinook salmon redd count surveys in Slate Creek.



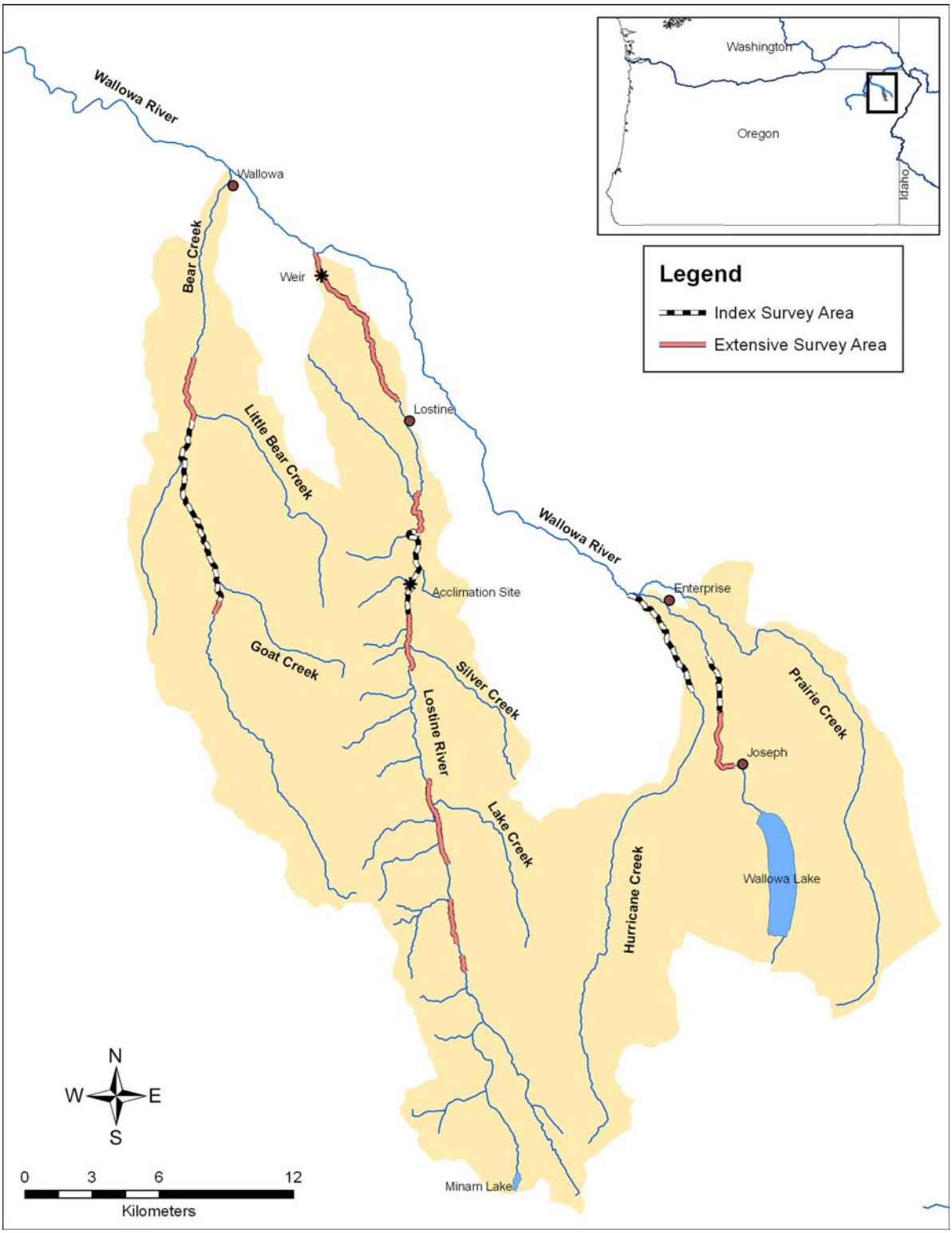
Appendix Figure 12. Tributary specific map indicating locations of supplemental area spring and summer Chinook salmon redd count surveys in the upper mainstem South Fork Salmon River below the adult weir.



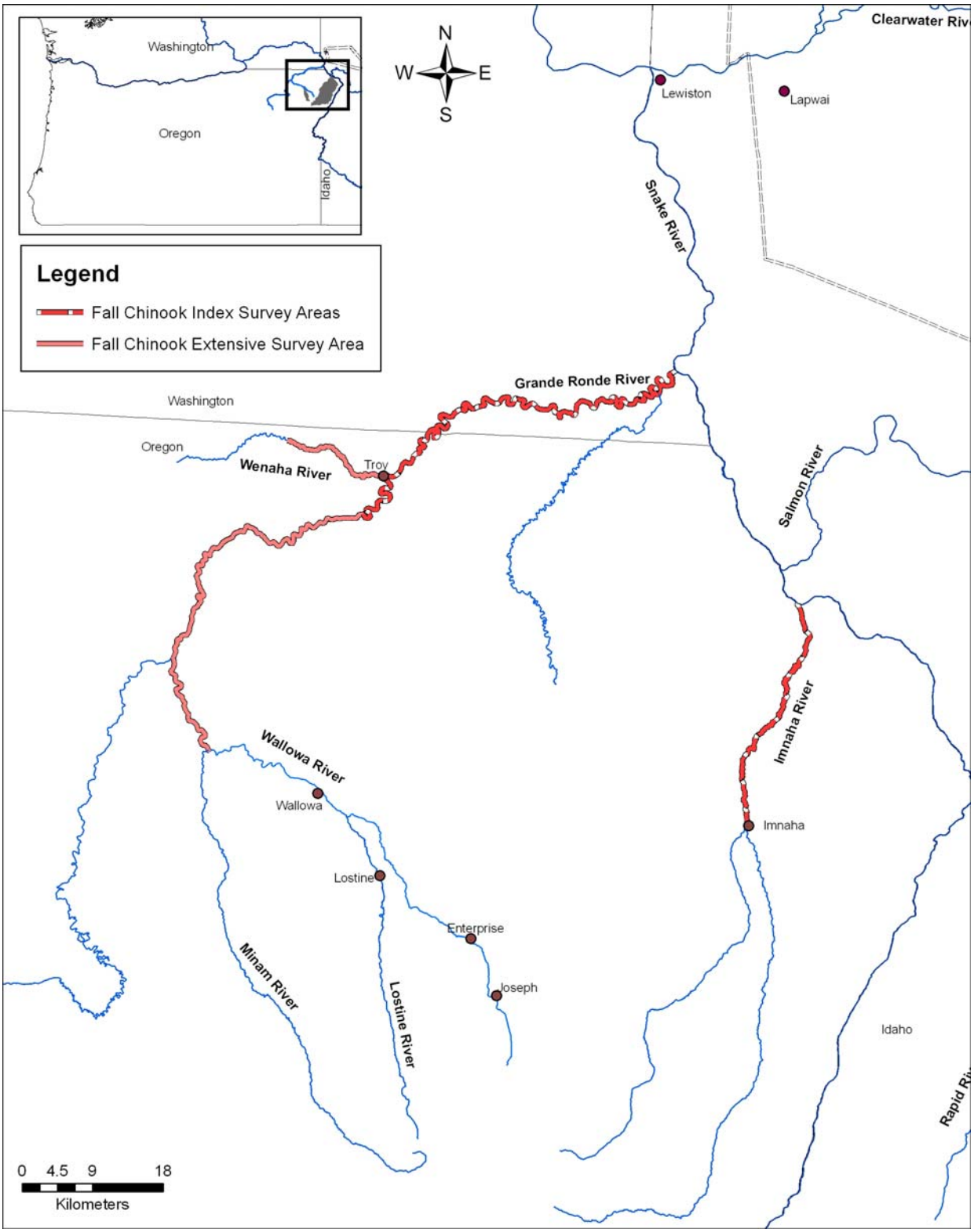
Appendix Figure 13. Tributary specific map indicating locations of index area and supplemental area spring and summer Chinook salmon redd count surveys in upper Big Creek.



Appendix Figure 14. Tributary specific map indicating locations of fall Chinook salmon redd count surveys in the lower mainstem Salmon River.



Appendix Figure 15. Tributary specific map indicating locations of index area and extensive area spring and summer Chinook salmon redd count surveys, and the location of the adult weir in the Lostine River.



Appendix Figure 16. Tributary specific map indicating locations of fall Chinook salmon redd count surveys in the lower mainstem Grande Ronde River and lower Imnaha River.