

**Nez Perce Tribe Nacó'x (Chinook salmon) and Héeyey (Steelhead)
Adult Escapement and Spawning Ground Survey
2011 Summary Report**



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Prepared by:

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Lapwai, ID 83540

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INTRODUCTION

This document summarizes adult spring, summer, and fall Nacó'x (Chinook salmon) and Héeyey (steelhead) population estimates and spawning ground survey information collected on streams surveyed by the Nez Perce Tribe (NPT) Department of Fisheries Resources Management (DFRM) during 2011, and includes passive integrated transponder (PIT) array information collected by the Integrated Status and Effectiveness Monitoring Project (ISEMP), in coordination with NPT DFRM and Quantitative Consultants Inc. (QCI). 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 (Beasley et al. 2008). 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 Nacó'x (Chinook salmon) and adult Héeyey (steelhead) escapement estimates are presented from multiple streams located in the Clearwater, Salmon, Grande Ronde, and Imnaha river subbasins. Age 3 fish confirmed to be returning from the ocean are considered adults for this report. Spring, summer, and fall Nacó'x (Chinook salmon) redd count and carcass data is presented from multiple streams surveyed in the Clearwater, Salmon, Grande Ronde, and Imnaha river subbasins.. Index area (trend), extensive area, and supplemental area redd count information are presented.

DESCRIPTION OF STUDY AREA

Study streams surveyed in the Clearwater, Salmon, Grande Ronde, and Imnaha river subbasins are presented in Appendix Figures 1-3. Streams surveyed as part of the Integrated Status and Effectiveness Monitoring Project (ISEMP), in coordination with NPT DFRM and QCI are presented in Appendix Figure 4. Individual streams surveyed and locations of surveyed areas are presented below.

Clearwater Basin

Adult spring Nacó'x (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 5) and one in Newsome Creek (rkm 0), a tributary to the South Fork Clearwater River (Appendix Figure 6). In addition to escapement monitoring, the three weirs may be operated to collect broodstock for the Nez Perce Tribal Hatchery (NPTH) program. To supplement broodstock collection, The adult fish ladder at the NPTH is operated for broodstock collection of both adult spring and fall Nacó'x (Chinook salmon)(Appendix Figure 1).

Multiple stream locations were sampled within the Clearwater River subbasin during spring Nacó'x (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 5), Newsome Creek, (Appendix Figure 6) 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 7), 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 8). Both streams are tributaries to the Lochsa River. The NPTH M&E project conducted aerial fall Nacó'x (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 9). In addition to aerial surveys, one ground count survey was conducted on the lower Potlatch River.

Lower Snake River

Fall Chinook were surveyed for the second year in Alpowa Creek, WA on the ground from the confluence to Lower Granite Reservoir up to the Hwy 12 Bridge (approx 0.4 km).

Salmon River Basin

Adult spring and summer Nacó'x (Chinook salmon) escapement is monitored at three sites within the South Fork Salmon River; Lake Creek, 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 natural origin adult salmon escapement. An adult salmon underwater video monitoring site is also located in Lake Creek (Appendix Figure 10) approximately 100 m upstream from the mouth of Lake Creek as part of the ISS 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 11), to assess adult salmon escapement and collect broodstock for the supplementation program. The ISEMP project in coordination with NPT DFRM and QCI estimate Nacó'x (Chinook salmon) and Héeyey (steelhead) escapement upstream of the PIT tag arrays located in the South Fork Salmon, Middle Fork Salmon, and upper Salmon rivers. The PIT tag arrays are located as close the mouth of the streams as possible but in some cases there may be spawning below the arrays and thus, the provided estimates of escapement will only account for fish above the PIT arrays (Appendix Figure 4).

Multiple stream locations were sampled within the Salmon River subbasin for Nacó'x (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 10, 11 and 13). 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 11). 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 14 and 15). The JCAPE and LSRCP project also conducted multiple pass ground surveys in the East Fork South Fork Salmon River and two of its tributaries (Sugar and Meadow creeks) (Appendix Figure 12). The Fall Chinook Acclimation Project (FCAP) M&E staff conducted aerial fall Nacó'x (Chinook salmon) redd count surveys in the mainstem Salmon River from the mouth up to French Creek (Appendix Figure 16). One extended survey was added this year to look for fall Chinook redds from French Creek up to the S.F. Salmon River and the lower S.F. Salmon River from the mouth up to the Reed Ranch.

Grande Ronde River Basin

Adult spring and summer Nacó'x (Chinook salmon) escapement was monitored at one site in the Lostine River. The Grande Ronde Supplementation: Lostine River Operation and Maintenance Project employed a panel weir, located in the Lostine River at rkm 1.4 (Appendix Figure 17), to quantify adult salmon escapement to the tributary and for collection of broodstock for the supplementation program.

Multiple adult spring and summer Nacó'x̄ (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 in a cooperative effort with co managers conducted index area and extensive area surveys in the Lostine River (Appendix Figure 17). The FCAP M&E staff collected aerial fall Nacó'x̄ (Chinook salmon) redd count survey information in the mainstem Grande Ronde River from the mouth up to the bridge just above Troy (Appendix Figure 18).

Two adult Héeyey (steelhead) projects monitored escapement in Joseph Creek and Lostine River. Joseph Creek project utilized a floating weir and Lostine River utilized a more permanent panel weir to quantify natural and hatchery origin adult steelhead escapement.

The ISEMP project in coordination with NPT DFRM and QCI estimate Héeyey (steelhead) escapement upstream of the PIT tag array located in Joseph Creek. The PIT tag arrays are located as close the mouth of the streams as possible but in some cases there may be spawning below the arrays and thus, the provided estimates of escapement will only account for fish above the PIT arrays (Appendix Figure 4).

Imnaha River Basin

Multiple adult Héeyey (steelhead) projects monitored escapement in three tributaries in the Imnaha River (Horse, Mahogany, and Gumboot creeks) (Appendix Figure 3). These streams utilized a floating and picket style weirs to quantify natural and hatchery origin adult steelhead escapement.

The ISEMP project in coordination with NPT DFRM and QCI estimate Nacó'x̄ (Chinook salmon) and Héeyey (steelhead) escapement upstream of the PIT tag array in the Imnaha River. The PIT tag arrays are located as close the mouth of the streams as possible but in some cases there may be spawning below the arrays and thus, the provided estimates of escapement will only account for fish above the PIT arrays (Appendix Figure 4).

Aerial fall Nacó'x̄ (Chinook salmon) redd count surveys were conducted in the mainstem Imnaha River from the mouth up to rkm 19.5 at the town of Imnaha (Appendix Figure 18).

Table 1. Returning (to the target stream) spring/summer and fall Chinook, Nacó'x (Chinook salmon), K'ally (coho salmon), and Héeyey (steelhead) adults trapped, number of fish removed (broodstock collected, etc.), estimated escapement and percent hatchery fish above weirs, and total tributary escapement for streams monitored by the Nez Perce Tribe during 2011 (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 Unique Fish Trapped	Number of Fish		Estimated Escapement Above Weir (95% C.I.)	Percent Hatchery Above Weir	Total Tributary Escapement	Percent Hatchery for Total Tributary
		Removed (broodstock, euthanized, outplanted, distributed, harvest)					
<u>Spring/Summer Nacó'x (Chinook salmon)</u>							
Clearwater River							
Lolo Creek	306	177		479 (386-626)	71.2	656	79.0
Newsome Cr.	174	67		154 (138-180)	66.7	221	76.7
NPTH Ladder	1332	1332		N/A	N/A	N/A	N/A
Salmon River							
Johnson Cr.	934	225		866 (831-902)	44.2	1,148	49.4
Secesh River	N/A	N/A		S/A	N/A	S/A	N/A
Lake Creek	N/A	N/A		255 (217-294)	N/A	255	N/A
Grande Ronde R.							
Lostine River	464	314		4,090 (N/A)	82.9	4,922	82.0
<u>Fall Nacó'x (Chinook salmon)</u>							
Clearwater River							
NPTH Ladder	192	192		N/A	N/A	N/A	N/A
<u>Héeyey (steelhead)</u>							
Grande Ronde River							
Joseph Creek	324	4		1,774 (993-2,547) ¹	2.8	N/A	N/A
Lostine River	241	0		266 (209-323)	0.4	N/A	N/A
Imnaha River							
Horse Cr.	147	0		233 (185-281)	4.7	N/A	N/A
Mahogany Creek	7	0		7	0.0		
Gumboot Creek	1	0		N/A	N/A	N/A	N/A

¹Estimate for Joseph Creek is based on 15 recaptures. Trap had significant down time and this estimate violated multiple assumptions of the mark-recapture population estimator.

Table 2. Adult spring and summer Nacó'x̄ (Chinook salmon) escapement to Lolo Creek, Newsome Creek, Johnson Creek, Secesh River, Lake Creek, and the Lostine River from 2007 to 2011. 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
2007	138	53	438	307	90	614
2008	287	150	738	925	318 ¹	2,041
2009	248	215	929	1,147	391	3,572
2010	160	249	1,181	1,199	508	5,451
2011	656	221	1,148	S/A	255	4,922

¹ Estimate generated from a fish per redd value of 2.01 and 158 redds.

Table 3. Adult spring and fall Nacó'x̄ (Chinook salmon) swim-in returns and volunteers to the Nez Perce Tribe Hatchery (NPTH) ladder from 2007 to 2011 (N/A = Not applicable).

Year	Spring Chinook ¹	Fall Chinook ²
2007	161	180
2008	196	362
2009	338	324
2010	813	0
2011	1332	192

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

² The NPTH adult ladder was not opened for fall Chinook in 2010 as all broodstock was hauled from Lower Granite Dam.

Table 4. Adult Héeyey (steelhead) escapement to Lightning Creek, Cow Creek, and Horse Creek in the Imnaha River subbasin and Lostine River and Joseph Creek in the Grande Ronde subbasin from 2007 to 2011. Escapement information is total escapement above the weir site.

Year	Mahogany Creek	Lightning Creek	Cow Creek	Horse Creek	Joseph Creek	Lostine River
2007	N/A	93	39	N/A	N/A	N/A
2008	N/A	N/A	N/A	114	N/A	N/A
2009	N/A	N/A	N/A	185	N/A	N/A
2010	N/A	N/A	N/A	376	N/A	N/A
2011	7 ¹	N/A	N/A	233	1,774 ²	266

¹Estimate for Joseph Creek is based on 15 recaptures. Trap had significant down time and this estimate violated multiple assumptions of the mark-recapture population estimator.

²Total fish trapped and does not constitute an escapement, first year of project and weir did not operate throughout the run.

Table 5. Natural adult spring and summer Nacó'x (Chinook salmon) PIT tag array escapement estimates, coefficient of variation, and 95% confidence intervals for streams in the South Fork Salmon, Middle Fork, upper Salmon, and Grande Ronde/Imnaha Major Population Groups (MPG), monitored by the Nez Perce Tribe and Quantitative Consultants Inc. during 2011. Estimates of escapement are made above the PIT arrays which in many cases are not total tributary escapements.

Major Population Group	Population	PIT Tag Escapement Estimate	Coefficient of Variation	95% Confidence Interval
Grande Ronde/Imnaha South Fork Salmon	Imnaha	2,421	6.3%	<u>+297</u>
	Mainstem	3,318	6.5%	<u>+423</u>
	Secesh	779	2.2%	<u>+34</u>
	East Fork	652	0.2%	<u>+3</u>
Middle Fork Upper Salmon	Big Creek	449	18.1%	<u>+159</u>
	Valley Creek	460	8.9%	<u>+80</u>
	Lemhi	337	16.2%	<u>+107</u>

Table 6. Natural adult Héeyey (steelhead) escapement PIT tag array efficiency, escapement estimates, and 95% confidence intervals for streams in the Salmon River, Clearwater River, Grande Ronde River, and Imnaha River Major Population Groups, monitored by the Nez Perce Tribe and Quantitative Consultants Inc. during 2010-2011. Estimates of escapement are made above the PIT arrays which in many cases are not total tributary escapements.

Major Population Group	Population	Subpopulation	PIT Tag Escapement Estimate	Coefficient of Variation	95% Confidence Interval
Grande Ronde Imnaha River	Joseph		1,627	1.4%	<u>±45</u>
	Imnaha		3,298	1.5%	<u>±97</u>
Salmon River	Imnaha	Cow Creek	147	1.4%	<u>±4</u>
	Imnaha	Big Sheep Creek	765	2.2%	<u>±33</u>
	South Fork	Mainstem	2,540	1.9%	<u>±93</u>
	South Fork	Secesh	397	3.1%	<u>±24</u>
	Middle Fork	Big Creek	687	1.6%	<u>±22</u>
	Upper Salmon Lemhi River	Valley Creek	232 428	1.5% 1.7%	<u>±7</u> <u>±14</u>

Table 7. Adult spring and summer Nacó'x (Chinook salmon) PIT tag array escapement estimates for streams in the South Fork Salmon, Middle Fork, Upper Salmon, and Grande Ronde/Imnaha Major Population Groups, monitored by the Nez Perce Tribe and Quantitative Consultants Inc. during 2010-2011. Estimates of escapement are made above the PIT arrays which in many cases are not total tributary escapements.

Year	South Fork Salmon	Secesh River ₁	East Fork South Fork ₁	Big Creek	Valley Creek	Lemhi River	Imnaha River
2010	4,671	1,308	1,026	285	235	262	N/A
2011	3,318	779	652	449	460	337	2,421

₁Tributary to the South Fork Salmon River and is counted in the total for the South Fork Salmon River.

Table 8. Natural adult Héeyey (steelhead) escapement PIT tag array escapement estimates for streams in the Salmon River, Clearwater River, Grande Ronde River, and Imnaha River Major Population Groups, monitored by the Nez Perce Tribe and Quantitative Consultants Inc. during 2010-2011. Estimates of escapement are made above the PIT arrays which in many cases are not total tributary escapements.

Year	South Fork Salmon	Secesh River ₁	Big Creek	Valley Creek	Lemhi River	Joseph Creek	Imnaha River	Cow Creek ₂	Big Sheep Creek ₂
2009-2010	1,497	298	753	237	630	N/A	N/A	N/A	N/A
2010-2011	2,540	397	687	232	428	1,627	3,298	147	765

₁Tributary to the South Fork Salmon River and is counted in the total for the South Fork Salmon River.

₂ Tributary to the Imnaha River and is counted in the total for the Imnaha River.

Table 9. Spring/summer Nacó'x (Chinook salmon) spawning ground index area and extensive area redd count surveys conducted by the Nez Perce Tribe Department of Fisheries Resources Management during 2011 (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)	82	3	8	1	90
	Yoosa Creek	50	2	N/A	N/A	50
	Musselshell Creek	N/A	N/A	0	1	0
	Eldorado Creek	0	3	0	0	0
	Newsome Creek	67	3	3	1	70
	SF Clearwater River ²	0	0	N/A	N/A	0
	Meadow Creek	N/A	N/A	0	1	0
	Meadow Creek (Selway)	5	1 ^{1,3}	N/A	N/A	5 ^{1,3}
	Fishing Creek (Squaw Cr)	5	3	N/A	N/A	5
	Legendary Bear Creek (Papoose Cr)	35	3	1	3	36
Salmon River	Slate Creek	8	3	6	3	14
	Secesh River (excluding trib.'s)	159	3	10	3	169
	Lake Creek	115	3	19	3	134
	Summit Creek	N/A	N/A	36	3	36
	Grouse Creek	N/A	N/A	49	3	49
	Lick Creek	N/A	N/A	3	1	3
	Upper Mainstem South Fork Salmon River	539 ³	4-5	N/A	N/A	539 ³
Johnson Creek (excluding trib.'s)	166	5	28	1-5	194	

Subbasin	Stream	Index Area Redd Count	Number of Passes (Index)	Extensive Area Redd Count	Number of Passes (Extensive)	Total Number of Redds
	Burnt Log Creek	N/A	N/A	41	5	42
	East Fork South Fork Salmon River	N/A	N/A	87 ⁴	2-3	87 ⁴
	Sugar Creek	N/A	N/A	10 ⁴	3	10 ⁴
	Meadow Creek	N/A	N/A	102 ⁴	2	89 ⁴
	Big Creek	77	3	12 ²	2	89
Grande Ronde River	Lostine River	495	5-6	196	3-4	691

¹ Aerial survey.

² Does not represent comprehensive coverage of entire spawning distribution.

³ Entire index not surveyed.

⁴ Excess general production (AD clipped) adult fish from the South Fork Salmon River were outplanted into the East Fork South Fork Salmon River drainage. Four hundred and fifty nine adults (including 26 transport mortalities) were outplanted into Meadow Creek and may therefore have an effect on the number of redds compared to previous years.

Table 10. Fall Nacó'x (Chinook salmon) spawning aerial (except as noted) redd count surveys conducted by the Nez Perce Tribe Department of Fisheries Resources Management during 2011 (NS = not surveyed).

Subbasin	Stream	Number of Passes	Total Number of Redds
Clearwater River	Clearwater River – mainstem below North Fork Clearwater River	4	1,557
	Clearwater River – mainstem above North Fork Clearwater River	4	17
	North Fork Clearwater River	4	3
	South Fork Clearwater River	3	31
	Selway River	3	8
	Potlatch River (aerial/ground count)	4	2
	Middle Fork Clearwater River	3	3
Salmon River	Salmon River – mainstem	2	60
Grande Ronde River	Grande Ronde River - mainstem	3	154
Innaha River	Innaha River – mainstem	2	24
Snake River	Alpowa Creek (ground count)	2	0

Table 11. Natural adult Héeyey (steelhead) redd counts conducted by the Nez Perce Tribe Department of Fisheries Resources Management during 2011.

Subbasin	Stream	Number of Passes (Extensive)	Total Number of Redds
Innaha River	Gumboot Creek	1	15
	North Fork Gumboot Creek	1	4
	Mahogany Creek	1	2

Table 12. Spring/summer Nacó'x (Chinook salmon) spawning ground survey carcass recovery information from all sections (includes all available within the stream collected by the Nez Perce Tribe Department of Fisheries Resources Management during 2011 (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	86	60.4	23.2
	Yoosa Creek	46	91.3	4.3
	Musselshell Creek	0	0	0
	Eldorado Creek	0	0	0
	Newsome Creek	63	66.6	15.8
	SF Clearwater River	0	0	0
	Meadow Creek	0	0	0
	Meadow Creek (Selway)	0	0	0
	Fishing Creek (Squaw Cr)	3	66.7	66.7
	Legendary Bear Creek (Papoose Cr)	6	83.3	83.3
Salmon River	Slate Creek	1	100.0	100.0
	Secesh River (excluding trib.'s)	195	6.2	6.2
	Lake Creek	77	0	0
	Summit Creek	17	5.9	5.9
	Grouse Creek	40	2.5	2.5
	Lick Creek	2	100.0	100.0
	Upper Mainstem South Fork Salmon	401	25.1	NA
	Johnson Creek (excluding trib.'s)	332	41.6	4.8
	Burnt Log Creek	10	50.0	10.0
	Big Creek	23	4.3	4.3
	East Fork South Fork Salmon River	35	40.0 ²	40.0 ²
	Sugar Creek	3	0 ²	0 ²
	Meadow Creek	47	100 ²	100 ²
Grande Ronde R.	Lostine River	1,484	83.9	S/A

¹ Defined as the percentage of all hatchery fish which strayed into the study stream from out of the population.

² Excess general production (AD clipped) adult fish from the South Fork Salmon River were outplanted into the East Fork South Fork Salmon River drainage. Four hundred fifty nine adults (including 26 transport mortalities) were outplanted into Meadow Creek thus making the reporting of these numbers not comparable with the intent of this table.

Table 13. Fall Nacó'x (Chinook salmon) spawning ground survey carcass recovery information collected by the Nez Perce Tribe Department of Fisheries Resources Management during 2011.

Subbasin	Stream	Number of Carcasses	Total Hatchery Composition ¹ (%)	Out of Population Strays ² (%)
Clearwater River ²	Clearwater River – mainstem	439	38.7	0.5
	Clearwater River – above North Fork	0	0	0
	South Fork Clearwater	3	100	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
Snake River	Alpowa Creek	0	0	0

¹ From coded wire tags, ad-clips. Scales have not been analyzed at the time of this report.

² Defined as the percentage of all fish which strayed into the study stream from out of the Snake Basin ESU.

Table 14. Total number of spring and summer Nacó'x (Chinook salmon) redds, index area and extensive area, observed in Clearwater River tributary streams from 2007 to 2011 (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)	O'Hara Creek	Meadow Creek (Selway)	Lower Selway River ¹	Fishing Creek (Squaw Cr.)	Legendary Bear Creek (Papoose Cr.)
2007	14	2	3	0	0	N/S	8	1	0	1
2008	102	22	7	N/S	39	10	29	14	38	40
2009	48	15	4	0	0	N/S	12	8	7	32
2010	48	46	0	0	0	N/S	5	16	14	28
2011	140	70	N/S	N/S	0	3	5	N/S	5	36

¹ Does not represent comprehensive coverage of entire spawning distribution.

Table 15. Total number of spring and summer Nacó'x (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 2007 to 2011 (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	East Fork South Fork Salmon River	Upper South Fork Salmon River ¹	Big Creek ²	Lostine River
2007	0	83	74	N/A	259	25	104
2008	10	384	224	5	487 ³	44	293
2009	8	425	253	149 ⁴	341	84	258
2010	23	562	398	212 ⁴	748	60	696
2011	14	391	235	199 ⁴	539	89	691

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.

⁴ - Excess general production (AD clipped) adult fish from the South Fork Salmon River were outplanted into the East Fork South Fork Salmon River drainage. Four hundred fifty nine adults (including 26 transport mortalities) were outplanted into Meadow Creek and may therefore have an effect on the number of redds compared to previous years.

Table 16. . Total number of fall Nacó'x (Chinook salmon) redds observed in the Clearwater River and tributaries, Salmon River, Grande Ronde River, and Imnaha River from 2007 to 2011. 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
2007	711	7	0	0	0	0	0	18	81 ²	17 ¹
2008	919	22	0	3	0	16	5	14	186 ²	68
2009	1,142	42	1	12	0	0	1	34	101	36
2010	1,579 ¹	53	8	2	0	281	1	8 ¹	263	132
2011	1557	17	3	31	3	2	8	60	154	24

¹ 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.

References

Beasley, C.A., B.A. Berejikian, R. W. Carmichael, D.E. Fast, P.F. Galbreath, M.J. Ford, J.A. Hesse, L.L. McDonald, A.R. Murdoch, C.M. Peven, and D.A. Venditti. 2008. Recommendations for broad scale monitoring to evaluate the effects of hatchery supplementation on the fitness of natural salmon and steelhead populations. Final report of the Ad Hoc Supplementation Monitoring and Evaluation Workgroup (AHSWG).

Appendix

Appendix Table 1. Description of **redd count index areas (trend areas)** surveyed for spring/summer Nacó'x (Chinook salmon) and fall Nacó'x (Chinook salmon) during 2010.

Stream	Type of Count	GPS Location & Description
Lolo Creek	Ground	GPM Snorkel Site 0 sign to mouth of Yoosa Creek GPS Coordinates N 46.28029 W 115.77329 to N 46.39251 W 115.68398
Yoosa Creek	Ground	Mouth of Yoosa to mouth of Camp Creek GPS Coordinates N 46.39251 W 115.68398 to N 46.39702 W 115.64738
Eldorado Creek	Ground	Mouth of Eldorado Creek to old weir site GPS Coordinates N 46.29473 W 115.75077 to N 46.28572 W 115.72031
Newsome Creek	Ground	Mouth of Newsome Creek to Glory Hole GPS Coordinates N 45.82865 W 115.61534 to N 45.92752 W 115.64008
S.F. Clearwater River	Ground	Mouth of Leggett Creek to mouth of Newsome Creek GPS Coordinates N 45.82664 W 115.62705 to N 45.82865 W 115.61534
Meadow Creek (Selway)	Aerial	Mouth of Meadow Creek to Fourmile Creek GPS Coordinates N 46.04537 W 115.29637 to N 45.72618 W 115.16726
Fishing Creek	Ground	Mouth of Fishing Creek to 1 st culvert above the confluence of West Fork GPS coordinates N 46.49227 ⁰⁰ W 114.85765 to N 46.54126 W 114.86246
Legendary Bear Creek	Ground	Mouth of Legendary Bear Creek to confluence of East and West Fork GPS Coordinates N 46.51148 W 114.76134 to N 46.53504 W 114.76608
Slate Creek	Ground	Mouth of Willow Creek to USFS 329 footbridge across Little Slate GPS coordinates N 45.637852 W 116.110359 to N 45.600529 W 116.067946
Secesh River	Ground	Alex Creek to Grouse Jct. Bridge GPS coordinates N 45.202162 W 115.815679 to N 45.267267 W 115.845103
Lake Creek	Ground	Mouth of Lake Creek to confluence of Willow Creek GPS Coordinates N 45.256376 W 115.897122 to N 45.330665 W 115.949875
Upper Mainstem South Fork Salmon River ¹	Ground	South Fork Salmon River weir to Dime Creek GPS Coordinates N 44.66674 W 115.70307 to N 44.70261 W 115.70035
Upper Mainstem South Fork Salmon River ¹	Ground	Dime Creek to Unknown tributary above Goat Creek GPS Coordinates N 44.70261 W 115.70035 to N 44.74028 W 115.68915
Upper Mainstem South Fork Salmon River ¹	Ground	Blackmare Creek to lower end of Poverty Flat GPS Coordinates N 44.82299 W 115.70444 to N 44.83201 W 115.70416
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 44.891977 W 115.49791 to N 44.852551 W 115.509123
Big Creek	Ground	Logan Creek to Jacobs Ladder Creek GPS Coordinates N 45.11824 W 115.32011 to N 45.08166 W 115.33877
Clearwater River (lower)	Aerial (fall Chinook)	Potlatch Mill to North Fork Clearwater River Confluence GPS Coordinates N 46.432608 W 116.971406 to N 46.502350 W 116.329547
Clearwater River (upper)	Aerial (fall Chinook)	North Fork Clearwater confluence to South Fork Clearwater confluence GPS Coordinates N 46.502350 W 116.329547 to N 46.144906 W 115.992267
North Fork Clearwater R.	Aerial (fall Chinook)	Mouth of North Fork to just below Dworshak Dam GPS Coordinates N 46.502350 W 116.329547 to N 46.511231 W 116.301886
South Fork Clearwater R.	Aerial (fall Chinook)	Mouth of South Fork Clearwater to town of Harpster GPS Coordinates N 46.144906 W 115.982267 to N 45.985208 W 115.965931
Middle Fork Clearwater R.	Aerial (fall Chinook)	South Fork Clearwater River to Selway River confluence GPS Coordinates N 46.145689 W 115.981936 to N 46.141122 W 115.597686
Selway River	Aerial (fall Chinook)	Mouth of Selway River to Selway Falls GPS Coordinates N 46.141122 W 115.597686 to N 46.053361 W 115.308931
Grande Ronde River	Aerial (fall Chinook)	Mouth of Grande Ronde River to Wildcat Bridge above town of Troy GPS Coordinates N 46.079917 W 116.980372 to N 45.898842 W 117.483081
Lostine River	Ground	Six Mile Bridge to Lostine River Ranch Bridge GPS Coordinates N 45.43897 W 117.42633 to N 45.40825 W 117.42809
Imnaha River	Aerial (fall Chinook)	Mouth of Imnaha River to town of Imnaha GPS Coordinates N 45.816897 W 116.764564 to N 45.559842 W 116.833906
Salmon River	Aerial (fall Chinook)	Mouth of Salmon River to French Creek above town of Riggins GPS Coordinates N 45.856253 W 116.793825 to N 45.403617 W 116.098461

1-Not entire index area surveyed.

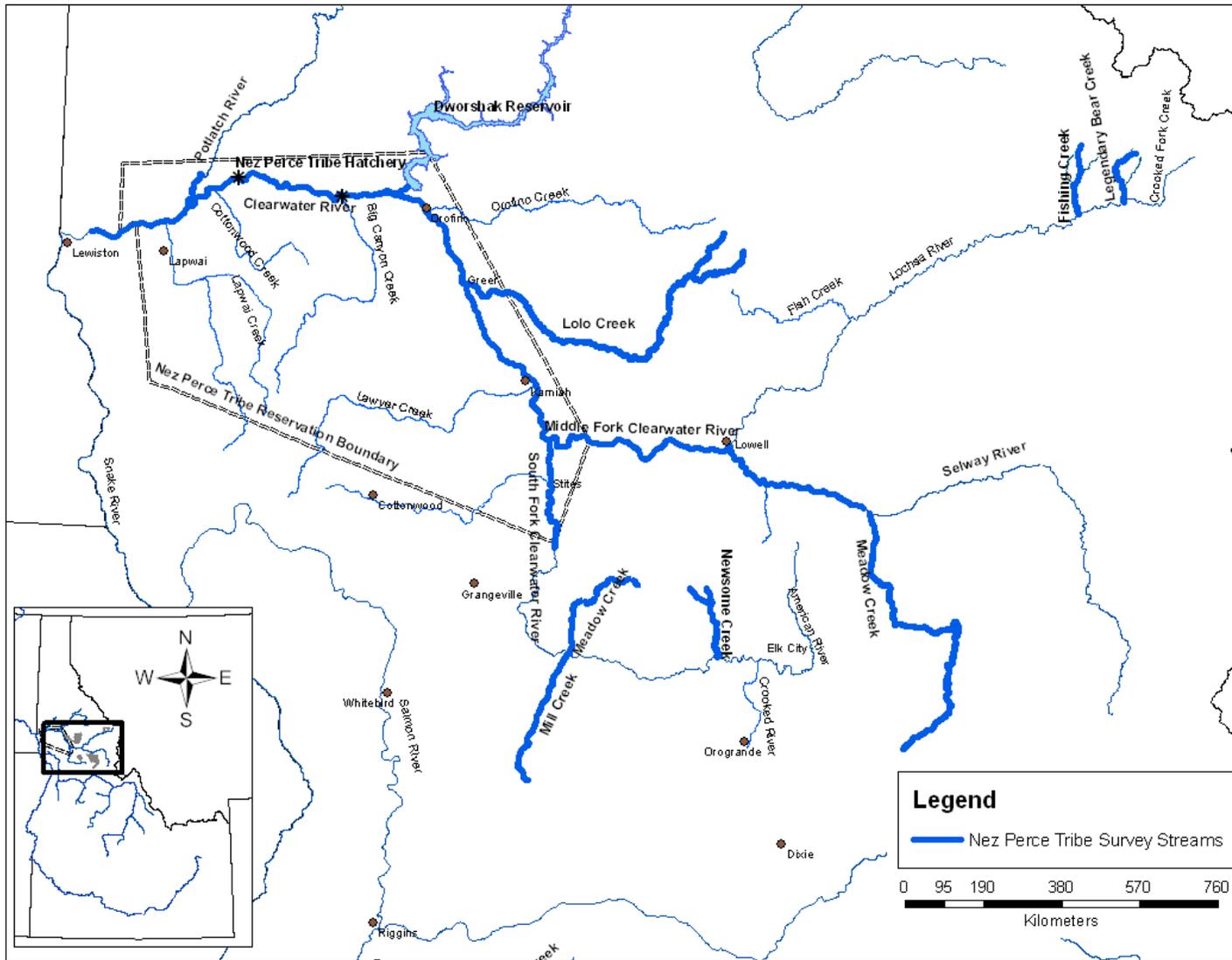
Appendix Table 2. Description of redd count **extensive areas** surveyed for spring/summer Nacó'x (Chinook salmon) and fall Nacó'x (Chinook salmon) during 2011.

Stream	Type of Count	GPS Location & Description
Lolo / Upper	Ground	Mouth of Yoosa Creek to Slide
		GPS Coordinates N 46.39251 W 115.68398 to N 46.39899 W 115.67646
Lolo / Rock Creek	Ground	Mouth of Rock Creek to GPM Snorkel Site 0
		GPS Coordinates N 46.27243 W 115.80407 to N 46.28029 W 115.77329
Lolo / Lower Weir Site	Aerial	1.6 km downstream of lower Lolo weir to Mouth of Rock Creek
		GPS Coordinates N 46.30293 W 115.98960 to N 46.28882 W 115.75987
Musselshell Creek	Ground	Mouth of Musselshell Creek to mouth of Gold Creek
		GPS Coordinates N 46.30966 W 115.75410 to N 46.36984 W 115.74089
Eldorado Creek	Ground	Old weir site to Dollar Creek bridge
		GPS Coordinates N 46.28572 W 115.72031 to N 46.29930 W 115.64601
Newsome / Radcliff Creek	Ground	Glory Hole to mouth of Radcliff Creek
		GPS Coordinates N 45.92752 W 115.64008 to N 45.95367 W 115.64610
Newsome / Pilot Creek	Ground	Lower 500 meters
		GPS Coordinates N 45.90722 W 115.63001 to N 45.90790 W 115.63541
Newsome / Baldy Creek	Ground	Lower 400 meters
		GPS Coordinates N 45.90779 W 115.63149 to N 45.90943 W 115.63403
Meadow Cr. (S.F. Clrwr R.)	Ground	McComas Meadows
		GPS Coordinates N 45.88533 W 115.92017 to N 45.90763 W 115.89977
Legendary Bear Creek	Ground	Confluence of East and West Fork to 1.0 km up West Fork
		GPS coordinates N 46.53504 W 114.76608 to N 46.545285 W 114.773681
Slate Creek	Ground	Forest Boundary to Mouth of Willow Creek
		GPS coordinates N 45.630544 W 116.203253 to N 45.637852 W 116.110359
Slate Creek / 6b	Ground	Trail 329 footbridge to old Rd 354G bridge location
		GPS coordinates N 45.60565 W 116.066129 to N 45.598146 W 116.06793
Secesh River	Ground	Grimmet Creek to confluence of Lake Creek and Summit Creek
		GPS coordinates N 45.155493 W 115.799853 to N 45.256376 W 115.897122
Lake Creek	Ground	Mouth of Willow Creek to confluence of Corduroy Creek
		GPS coordinates N 45.330665 W 115.949875 to N 45.366537 W 115.93857
Grouse Creek	Ground	Mouth upstream 3.0 km
		GPS coordinates N 45.265319 W 115.830516 to N 45.289131 W 115.835765
Summit Creek	Ground	Mouth to Pucker Point
		GPS coordinates N 45.256376 W 115.897122 to N 45.200303 W 115.954676
Lick Creek	Ground	Mouth Upstream
		GPS coordinates N 45.256944 W 115.944167 to N 45.066517 W 115.771083
Johnson Creek	Ground	Confluence to NPT Screw Trap
		GPS Coordinates N 44.962469 W 115.502462 to N 44.91763 W 115.483355
Johnson Creek	Ground	NPT Screw Trap to NPT Adult Weir
		GPS Coordinates N 44.91763 W 115.483355 to N 44.901166 W 115.488842
Johnson Creek	Ground	NPT Adult Weir to top of Deadhorse Rapids
		GPS Coordinates N 44.901166 W 115.488842 to N 44.891977 W 115.49791
Johnson Creek	Ground	Moose Creek to Burnt Log Creek
		GPS Coordinates N 44.852551 W 115.509123 to N 44.802991 W 115.518556
Johnson Creek	Ground	Burnt Log Creek to bottom of Whitehorse rapids
		GPS Coordinates N 44.802991 W 115.518556 to N 44.78617 W 115.52629
Johnson Creek	Ground	Old Burnt Log Trail Crossing to Landmark Bridge
		GPS Coordinates N 44.69737 W 115.545397 to N 44.652499 W 115.54237
Johnson Creek	Ground	Landmark Bridge to Swamp Creek
		GPS Coordinates N 44.652499 W 115.54237 to N 44.597181 W 115.524275
Burnt Log Creek	Ground	Confluence of Burnt Log Creek to East Fork Burnt Log Creek
		GPS Coordinates N 44.802991 W 115.518556 to N 44.73684 W 115.50140
East Fork South Fork Salmon River	Ground	Quartz Creek to Lower EFSFSR bridge
		GPS Coordinates N 44.9703 W 115.47824 to N 44.96215 W 115.45967
East Fork South Fork Salmon River	Ground	Lower EFSFSR bridge to Profile Creek
		GPS Coordinates N 44.96215 W 115.45967 to N 44.95742 W 115.42897
East Fork South Fork Salmon River	Ground	Profile Creek to Tamarack Creek
		GPS Coordinates N 44.95742 W 115.42897 to N 44.95958 W 115.39009
East Fork South Fork Salmon River	Ground	Tamarack Creek to Salt Creek
		GPS Coordinates N 44.95958 W 115.39009 to N 44.94946 W 115.35364

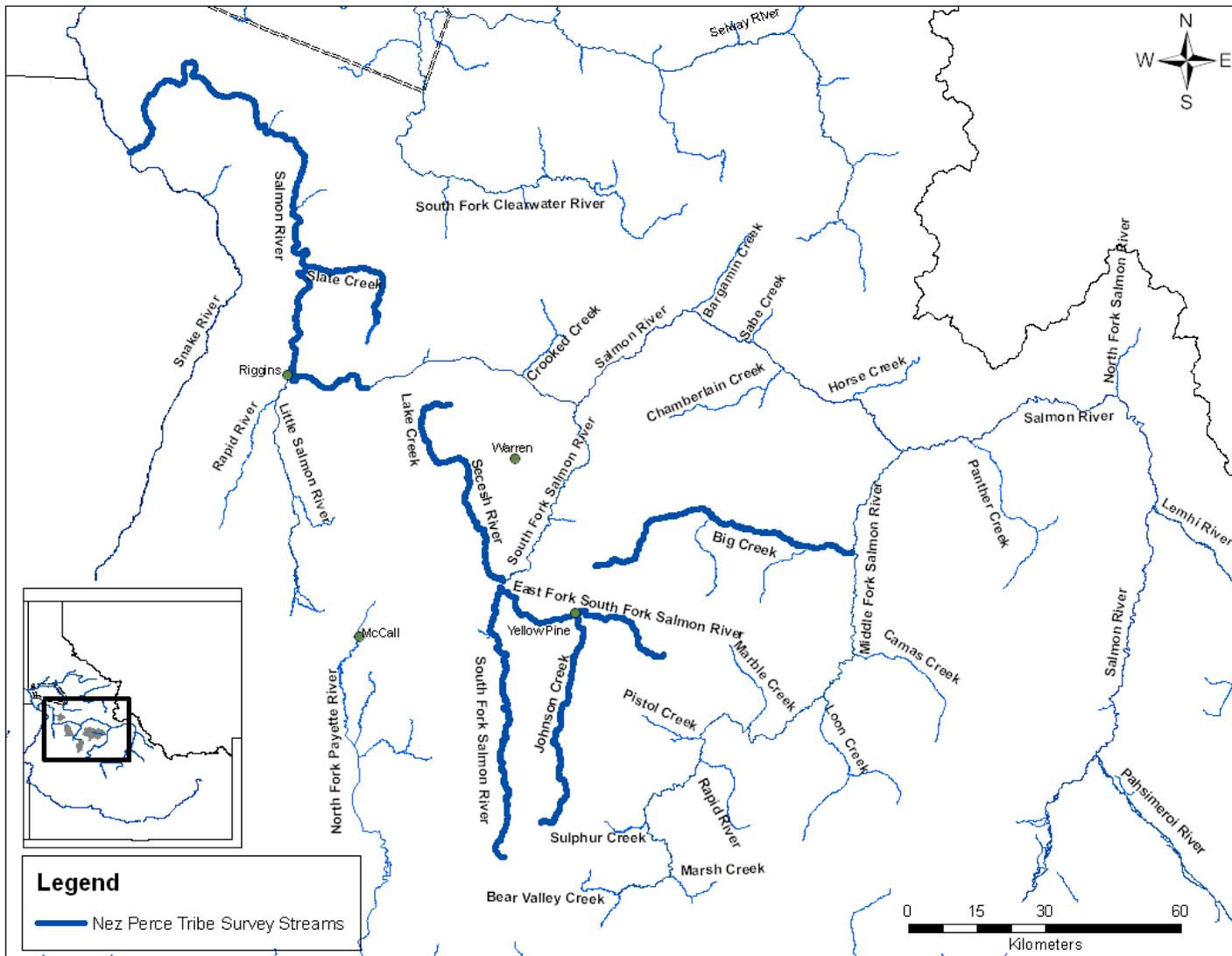
Stream	Type of Count	GPS Location & Description
East Fork South Fork Salmon River	Ground	Salt Creek to Sugar Creek
GPS Coordinates N 44.94946 W 115.35364 to N 44.93614 W 115.33794		
East Fork South Fork Salmon River	Ground	Fiddle Creek to 100 yards above Meadow Creek
GPS Coordinates N 44.92153 W 115.33131 to N 44.90215 W 115.32682		
Sugar Creek	Ground	Confluence to Cinnabar Creek
GPS coordinates N 44.93614 W 115.33794 to N 44.95235 to W 115.29353		
Meadow Creek	Ground	Confluence to tailings
GPS coordinates N 44.90225 W 115.32792 to N 44.89445 W 115.34129		
Big Creek	Ground	Confluence of Big and Smith creeks to confluence of Big and Logan creeks
GPS Coordinates N 45.15231 W 115.29751 to N 45.11824 W 115.32011		
Alpowa Creek	Ground (fall Chinook)	Mouth of Alpowa Creek to Rkm 0.4
GPS Coordinates N 46.4150333333 W 117.211938888 to N 46.4120888888 W 117.213391666		
Potlatch River	Ground (fall Chinook)	Mouth of Potlatch River to Rkm 7.0
GPS Coordinates N 46.474786 W 116.767264 to N 46.522561111 W 116.743897222		
Grande Ronde River (upper)	Aerial (fall Chinook)	Wildcat Bridge above Troy to mouth of Wallowa
GPS Coordinates N 45.898842 W 117.483081 to N 45.7254 W 117.7853556		
Lostine River	Ground	Confluence to Hwy 82
N 45.55216 W 117.49007 to N 45.49648 W 117.44029		
Lostine River	Ground	Trout Farm Bridge to Lostine River Ranch Bridge
N 45.46925 W 117.42517 to N 45.43897 W 117.42633		
Lostine River	Ground	Six Mile Bridge to Pole Bridge
N 45.40825 W 117.42809 to N 45.38668 W 117.42517		
Lostine River	Ground	Williamson to Walla Walla Campground
N 45.34184 W 117.41120 to N 45.30055 W 117.39697		
Lostine River	Ground	Bowman Trailhead to Turkey Flat
N 45.29335 W 117.39547 to N 45.27642 W 117.38981		

Appendix Table 3. Description of redd count **extensive areas** surveyed for Adult Héeyey (steelhead) during 2011.

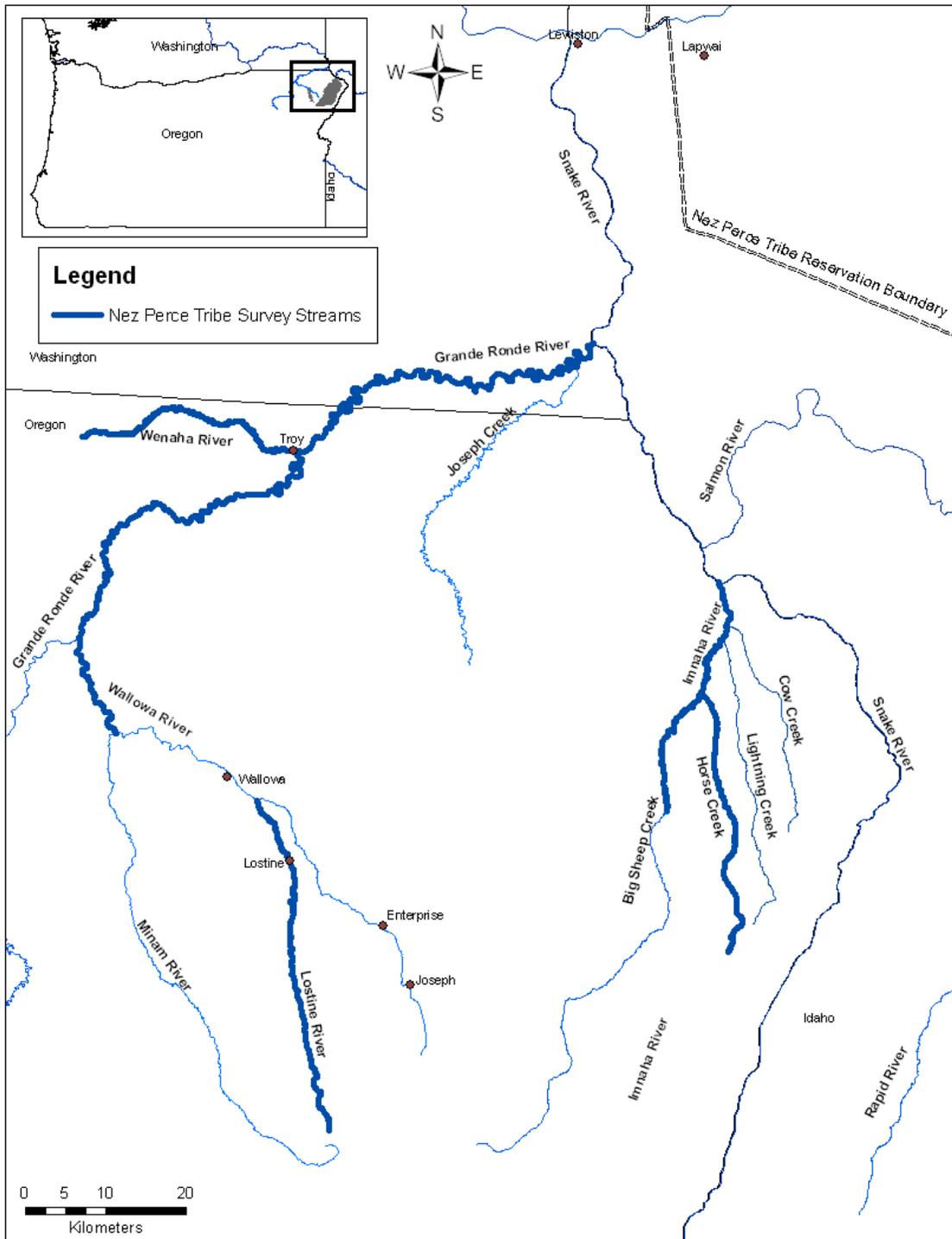
Stream	Type of Count	GPS Location & Description
Gumboot Creek	Ground	Mouth of Gumboot Creek to stream habitat sign.
GPS Coordinates N 45.180796 W 116.872508 to N 45.148517 W 116.960795		
N. Fk. Gumboot Creek	Ground	Mouth of N. Fk. Gumboot to Tributary split.
GPS Coordinates N 45.177125 W 116.882126 to N 45.186017 W 116.923100		
Mahogany Creek	Ground	Mouth of Mahogany Creek to tributary.
GPS Coordinates N 45.203549 W 116.867275 to N 45.202430 W 116.890970		



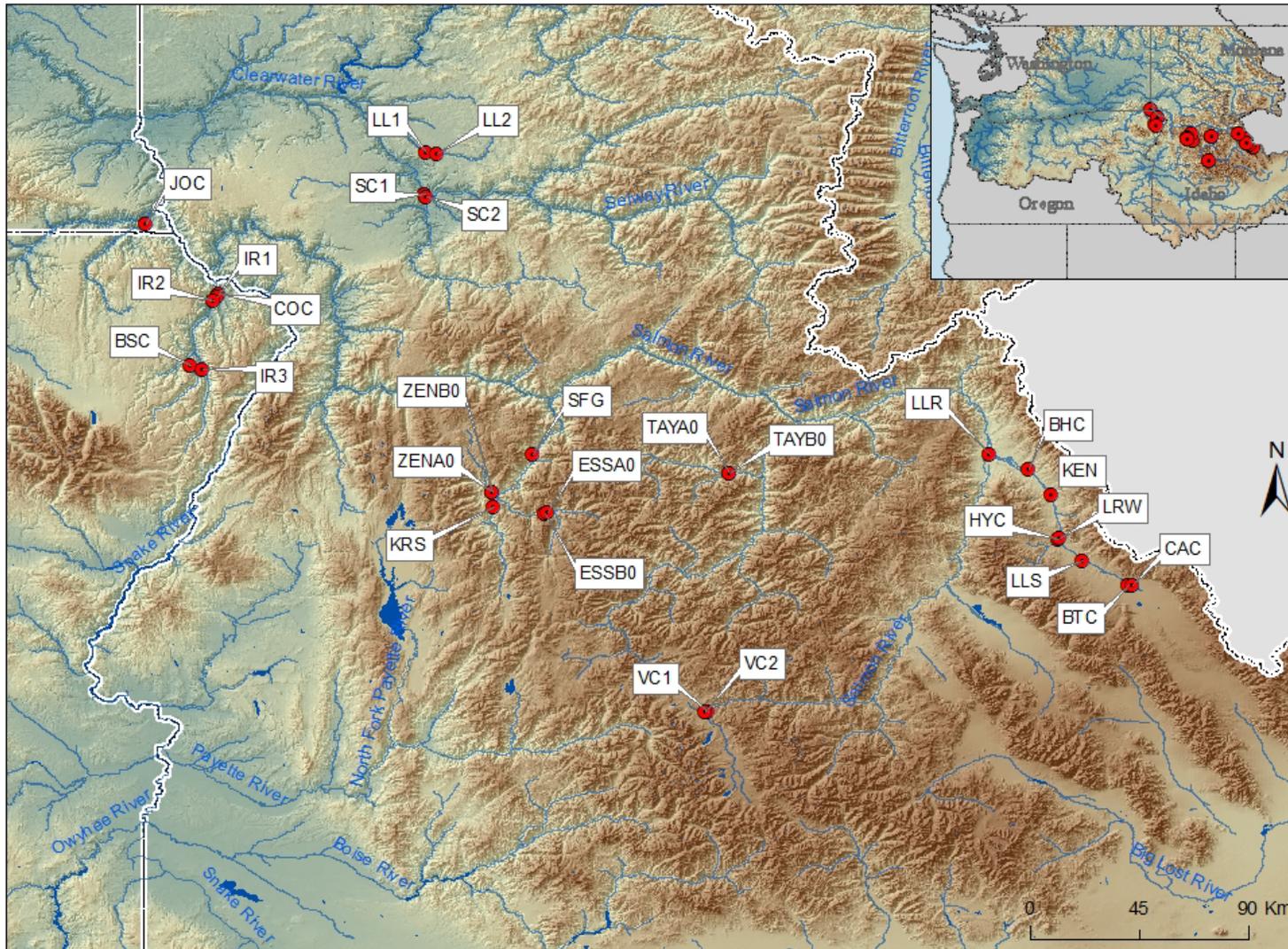
Appendix Figure 1. Overview map of research study streams indicating location within the Clearwater River subbasin. Spring and summer Nacó'x̣ (Chinook salmon) surveys occur in tributary streams, and fall Nacó'x̣ (Chinook salmon) surveys occur in mainstem river reaches.



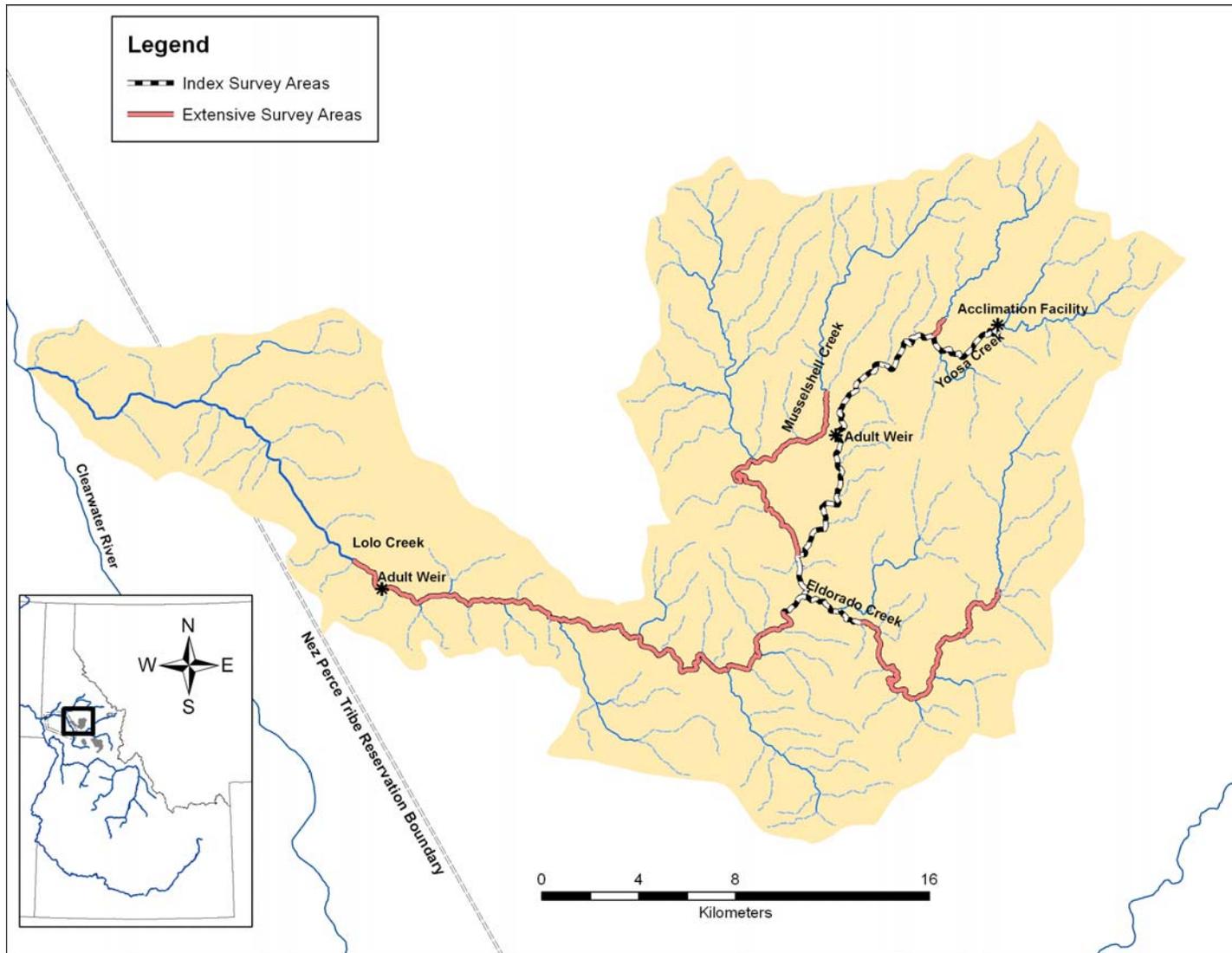
Appendix Figure 2. Overview map of research study streams indicating location within the Salmon River subbasin. Spring and summer Nacó'x (Chinook salmon) surveys occur in tributary streams, and fall Nacó'x (Chinook salmon) surveys occur in the lower Salmon River.



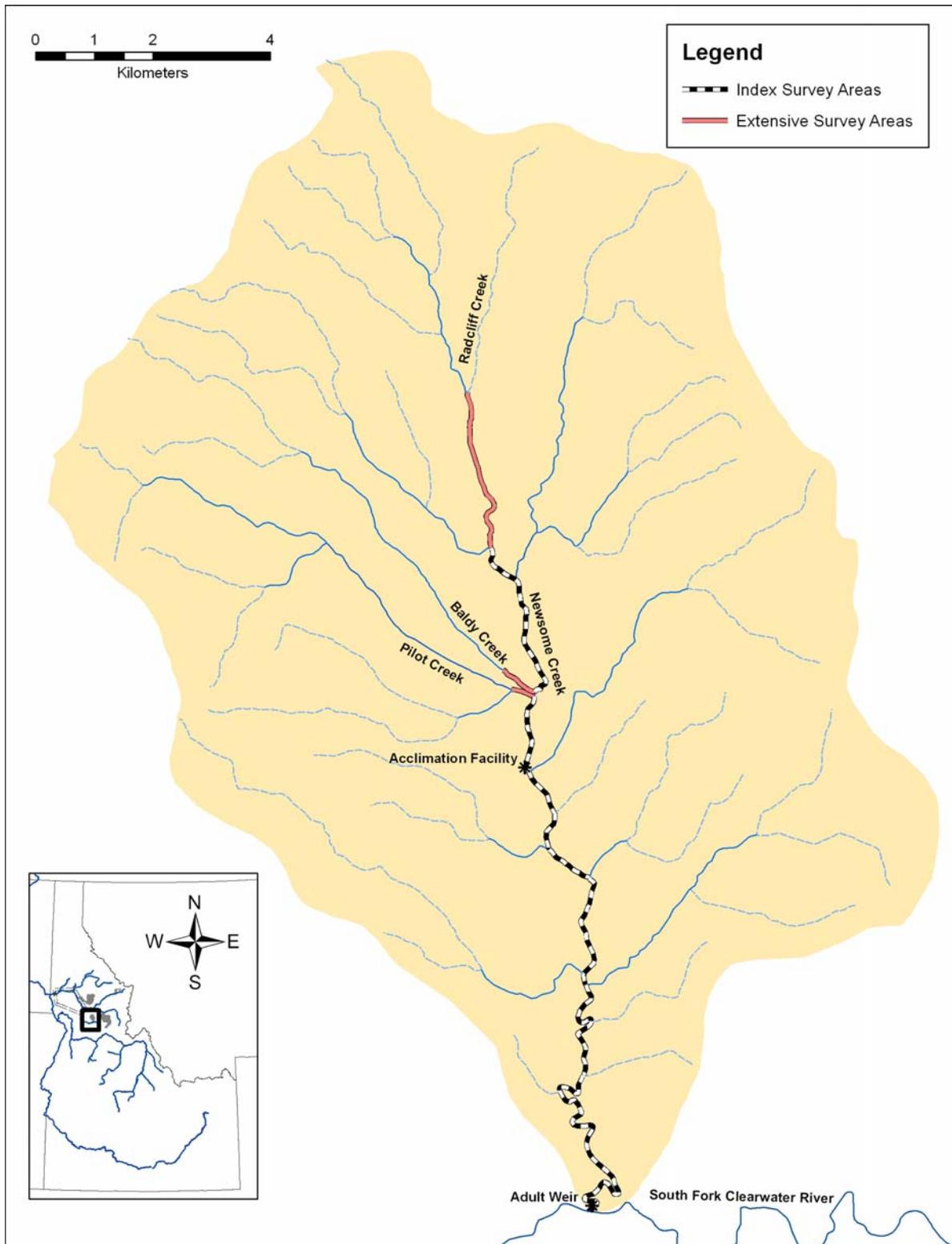
Appendix Figure 3. Overview map of research study streams indicating location within the Grande Ronde River and Imnaha River subbasin. Spring and summer Nacó’x̣ (Chinook salmon) surveys occur in tributary streams, fall Nacó’x̣ (Chinook salmon) surveys occur in lower mainstem river reaches, and Héeyey (steelhead) escapement monitoring occurs in Joseph Creek and the Imnaha River Basin.



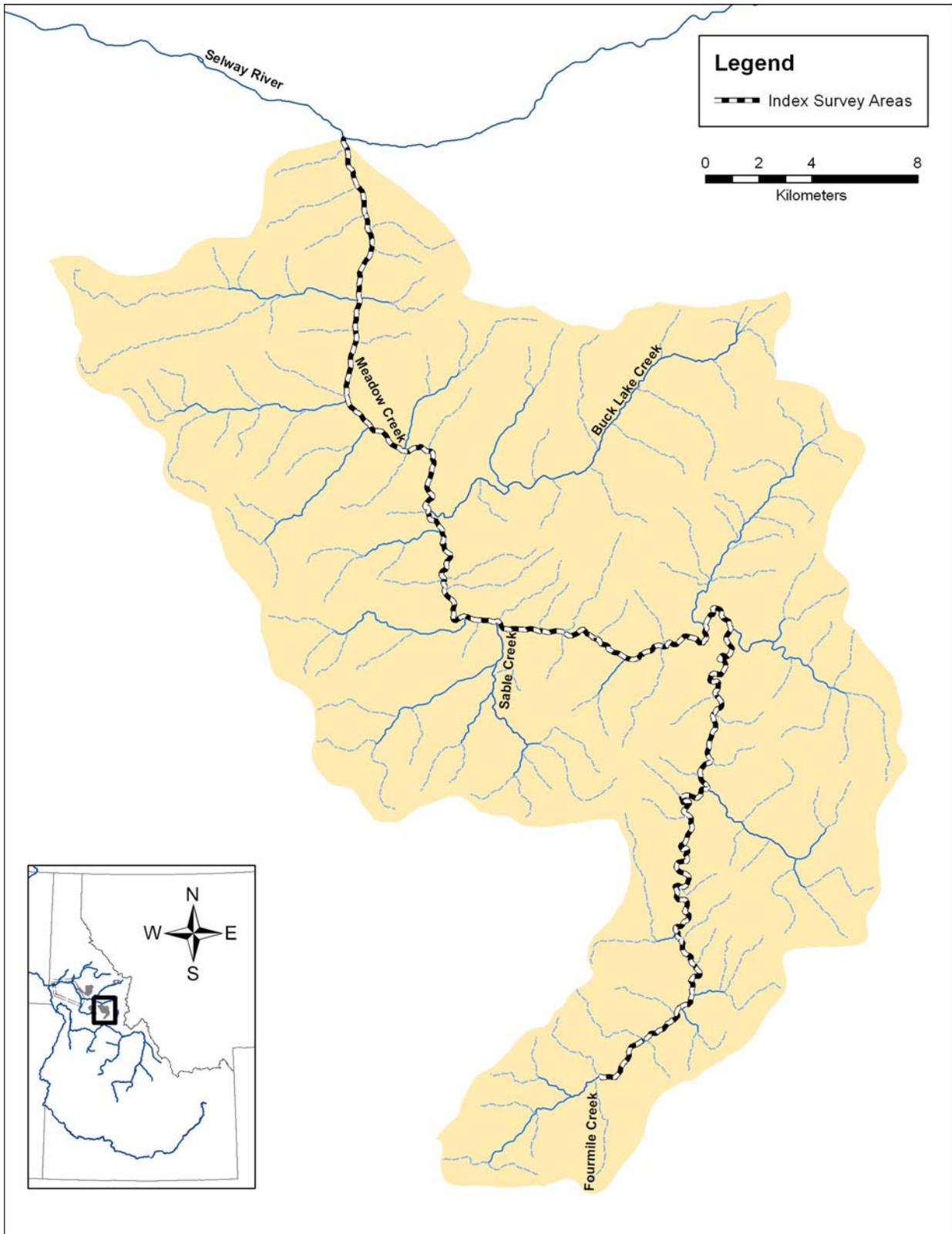
Appendix Figure 4. Relative location of the Salmon River Basin ISEMP PIT tag array locations by PTAGIS site code.



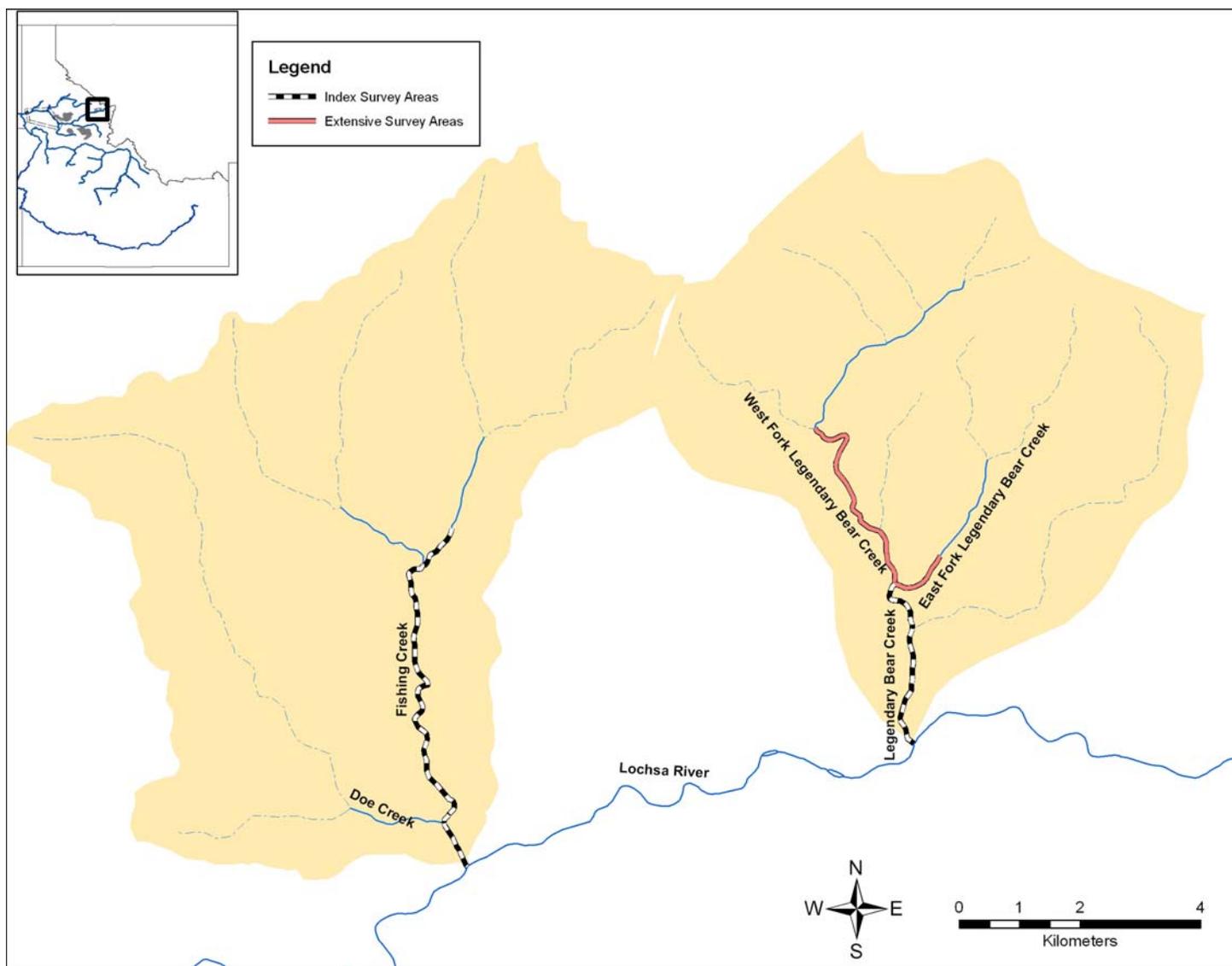
Appendix Figure 5. Tributary specific map indicating locations of index area and extensive area spring and summer Nacó'x (Chinook salmon) redd count surveys, and locations of adult weirs in Lolo Creek, Yoosa Creek, Musselshell Creek, and Eldorado Creek.



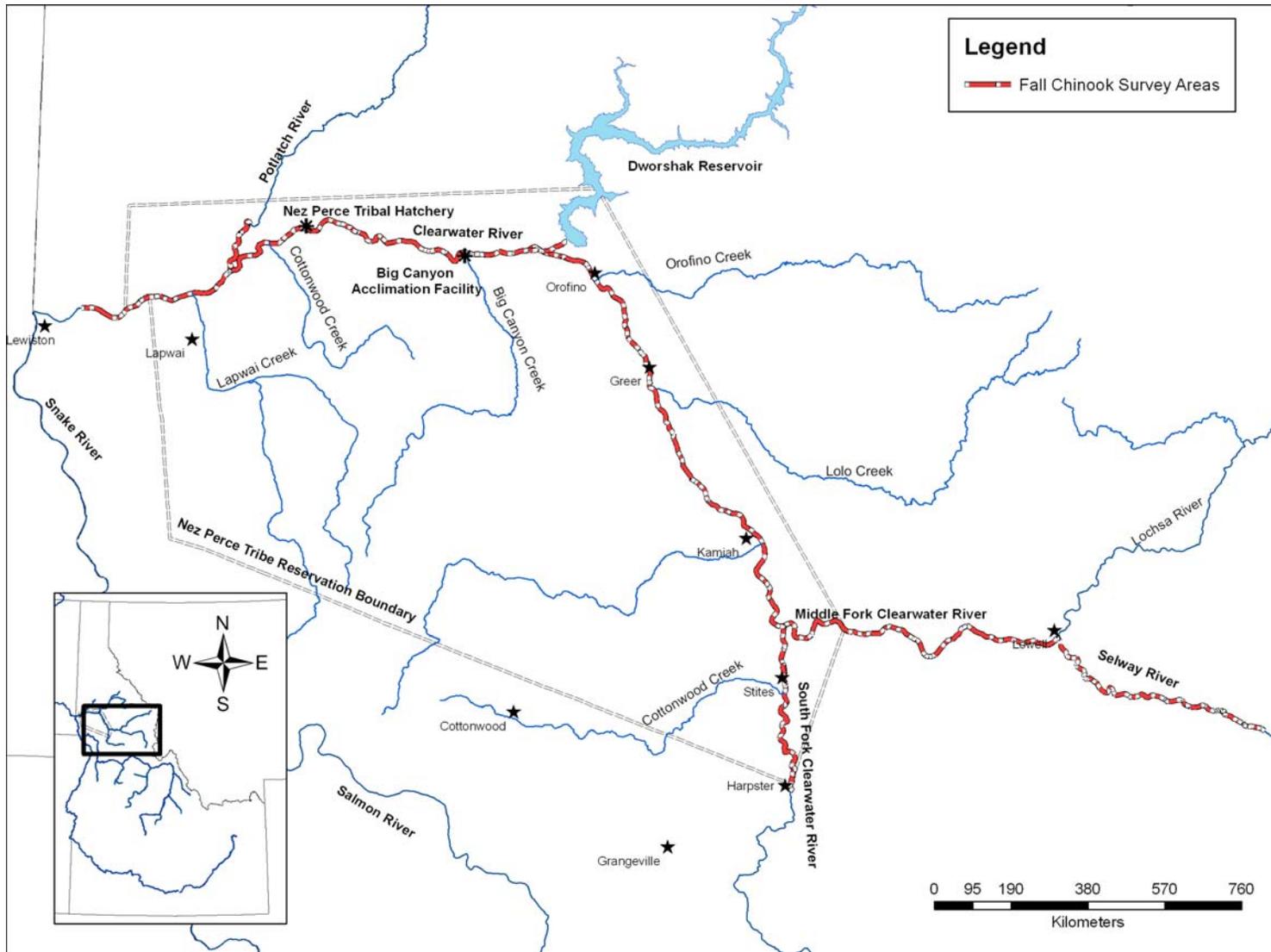
Appendix Figure 6. Tributary specific map indicating locations of index area and extensive area spring and summer Nacó'x (Chinook salmon) redd count surveys, and location of the adult weir in Newsome Creek.



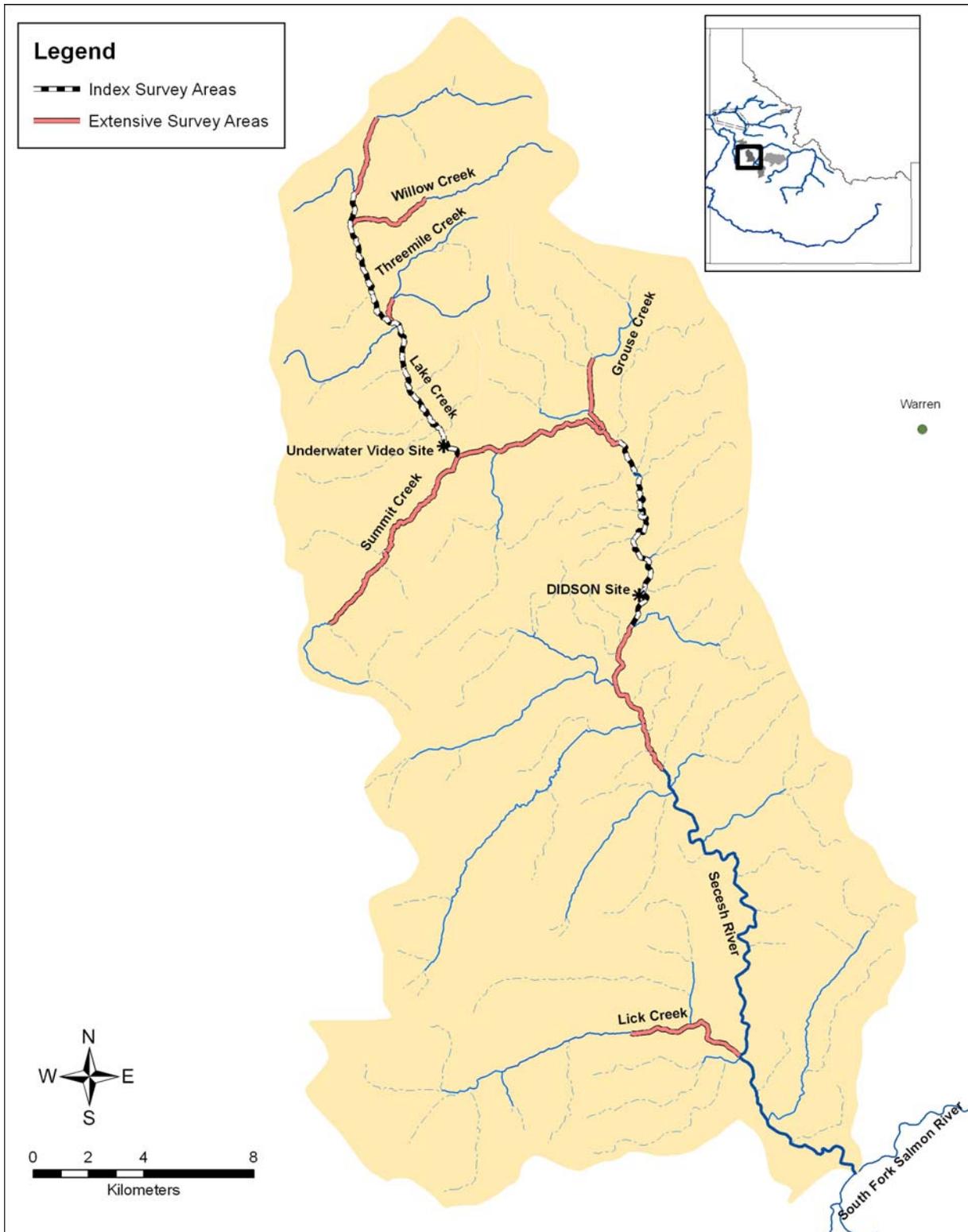
Appendix Figure 7. Tributary specific map indicating locations of index area spring and summer Nacó'x (Chinook salmon) redd count surveys in Meadow Creek (Selway River).



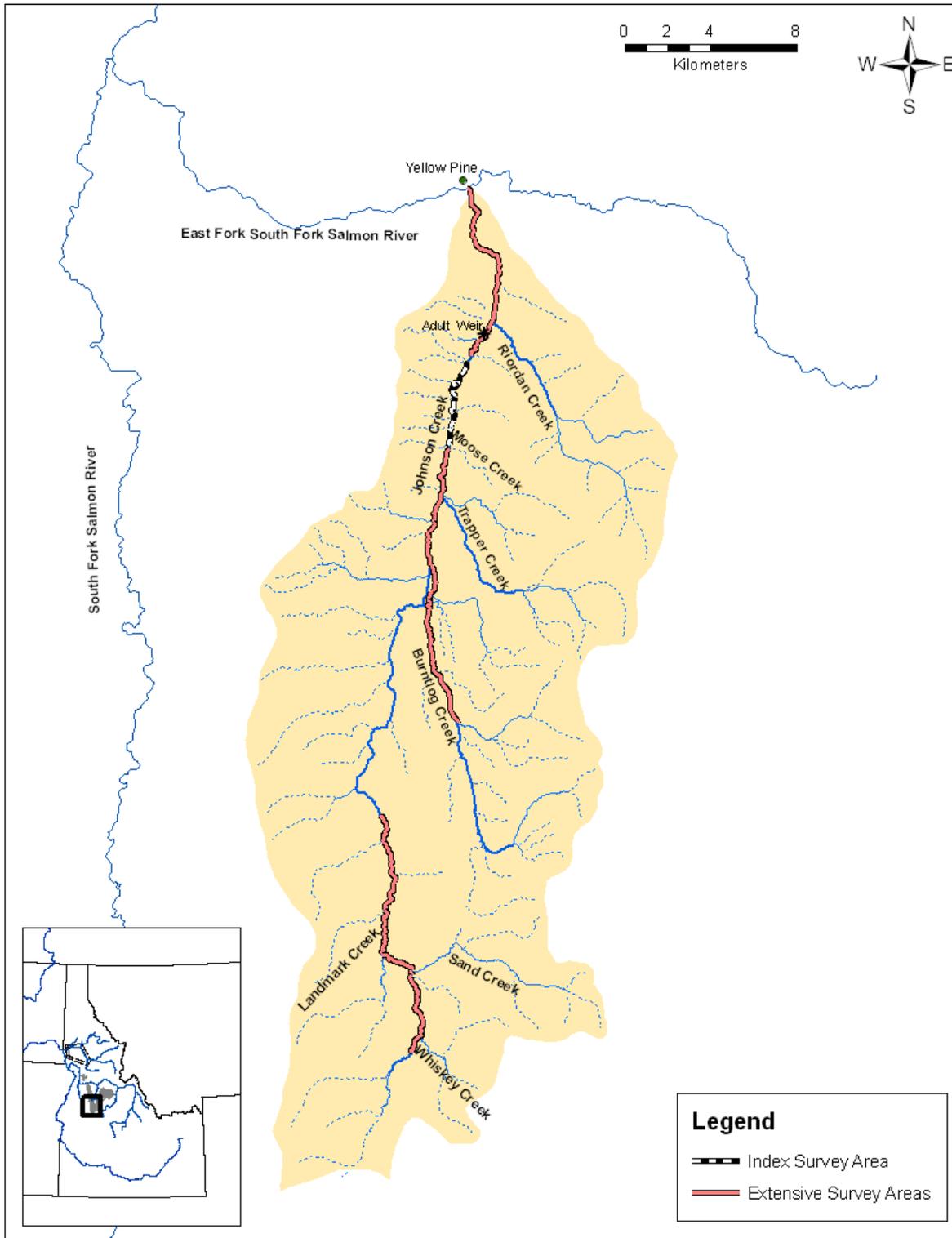
Appendix Figure 8. Tributary specific map indicating locations of index area and extensive area spring and summer Nacó'x (Chinook salmon) redd count surveys in Fishing Creek and Legendary Bear Creek.



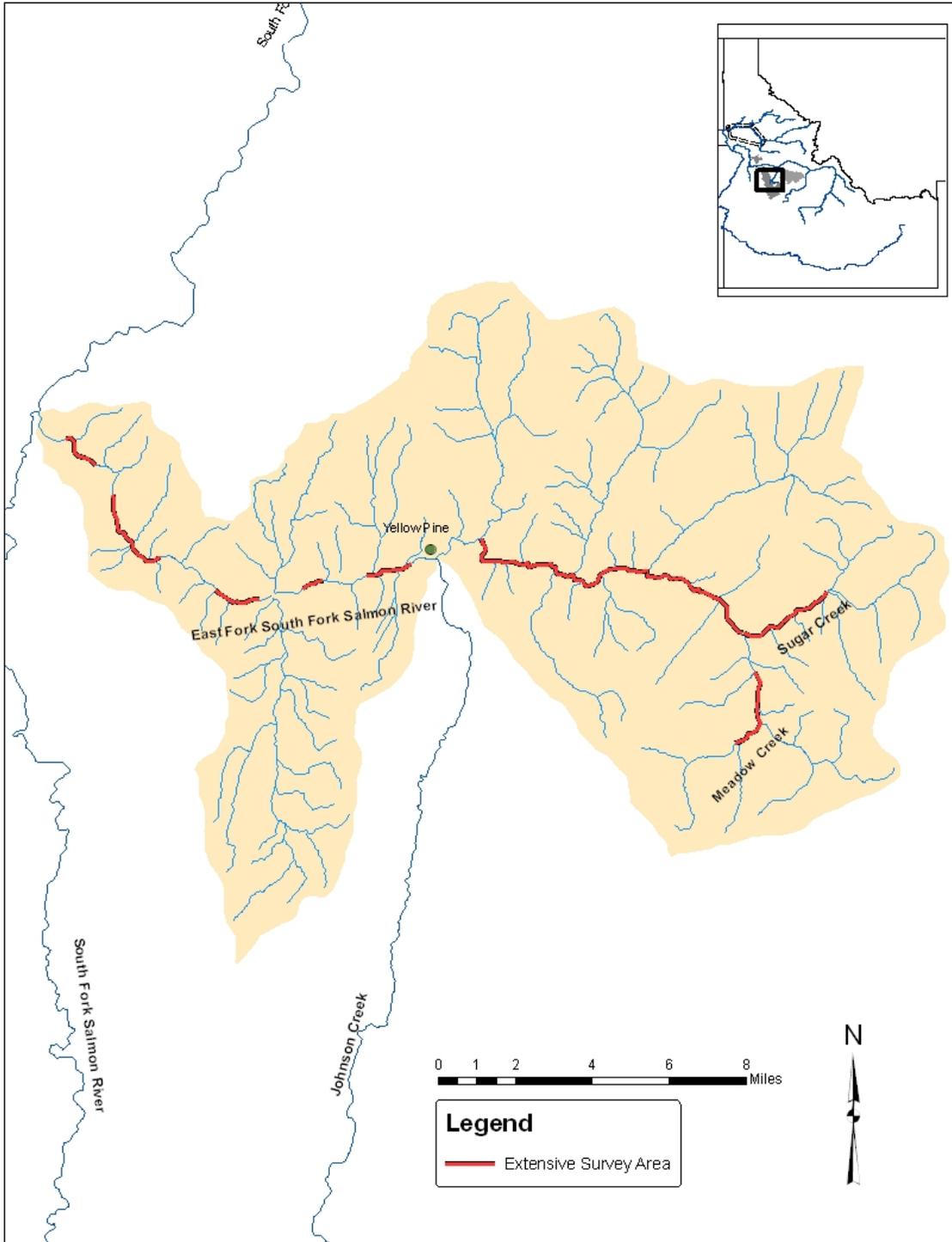
Appendix Figure 9. Tributary specific map indicating locations of fall Nacó'x (Chinook salmon) redd count surveys in the mainstem Clearwater River, lower Potlatch River, North Fork Clearwater River, Middle Fork Clearwater River, and lower sections of the South Fork Clearwater River and Selway River.



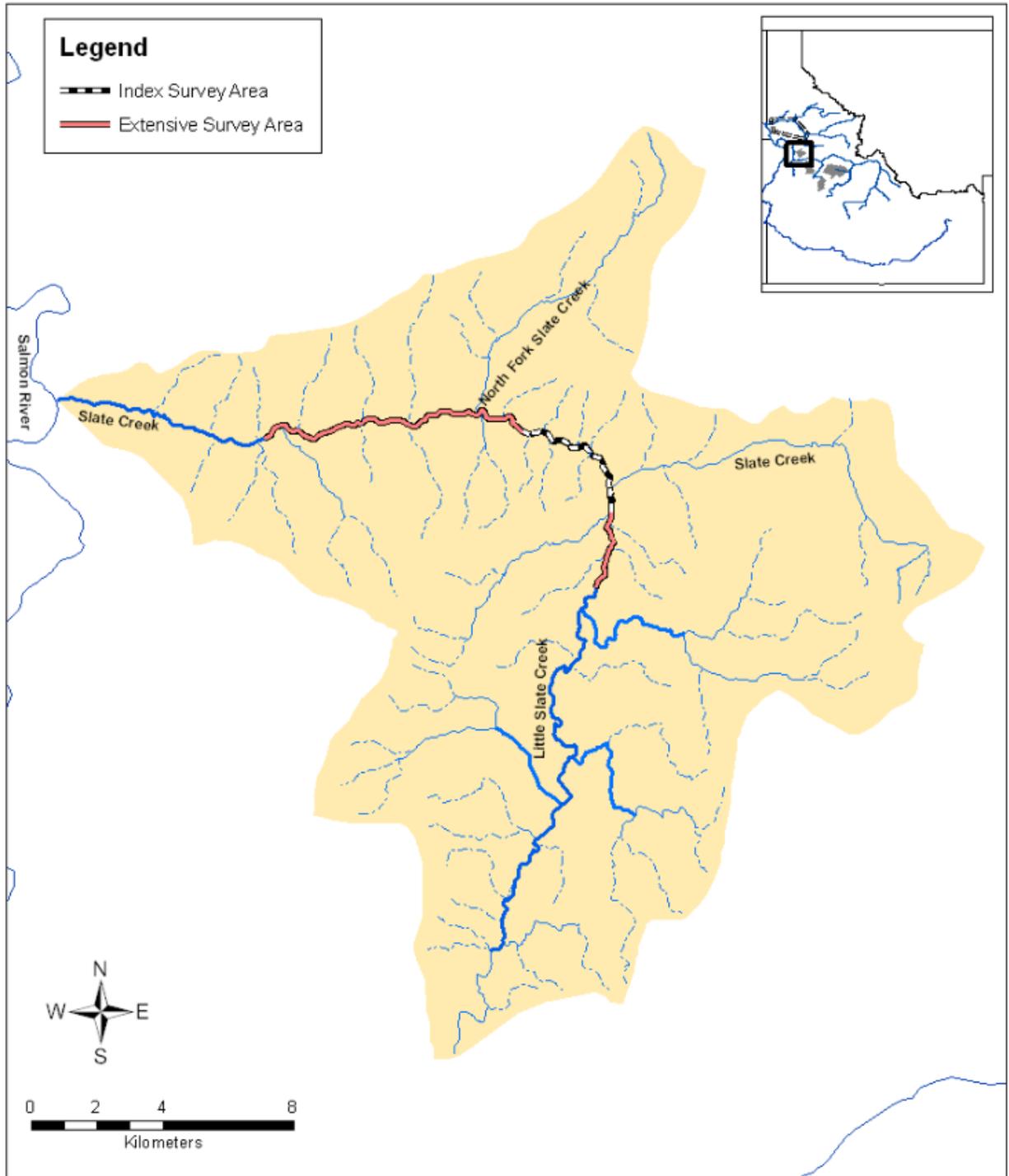
Appendix Figure 10. Tributary specific map indicating locations of index area and extensive area spring and summer Nacó'x (Chinook salmon) redd count surveys, and locations of DIDSON and underwater video adult escapement monitoring sites in the Secesh River.



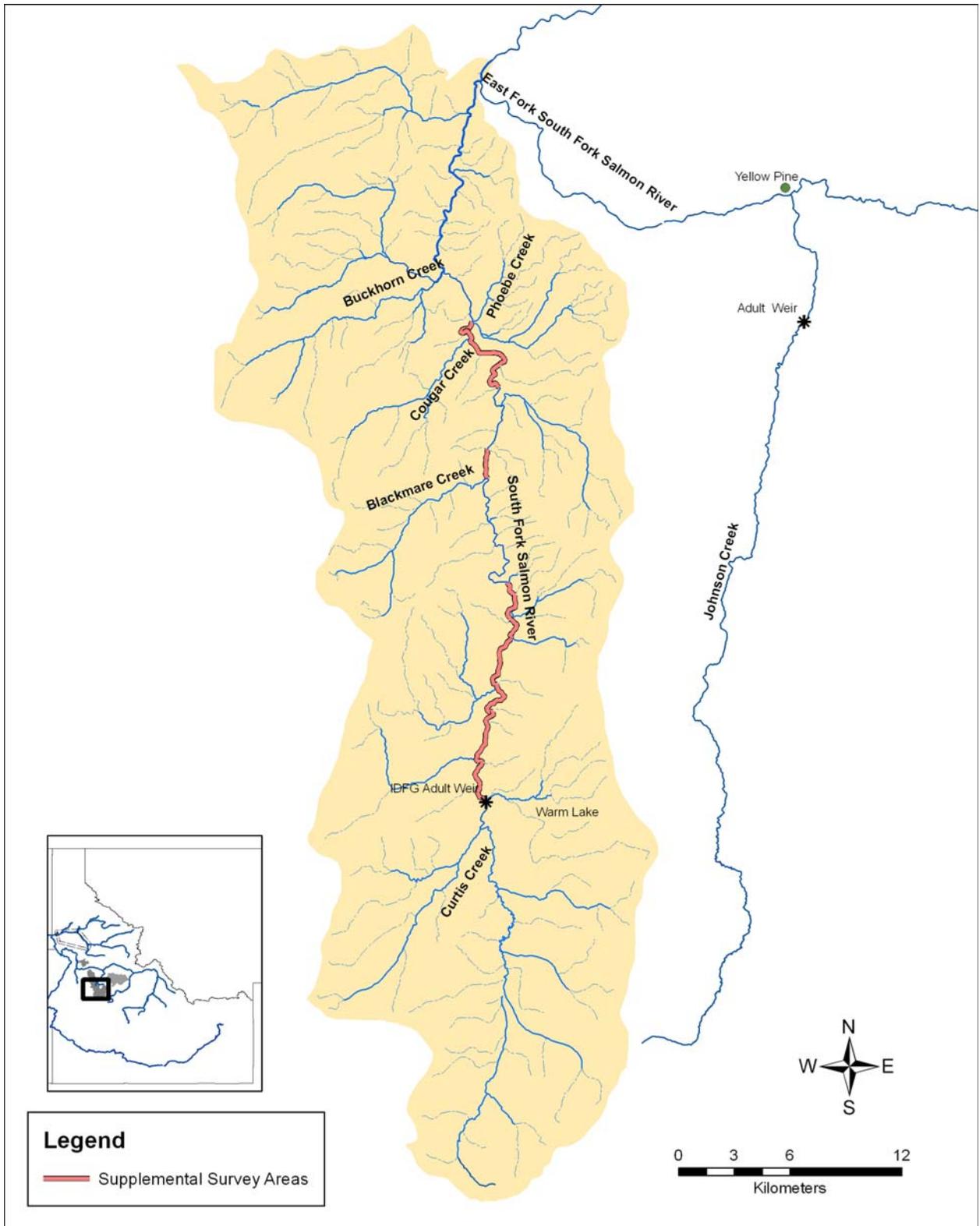
Appendix Figure 11. Tributary specific map indicating locations of index area and extensive area spring and summer Nacó’x (Chinook salmon) redd count surveys, and location of the adult weir on Johnson Creek.



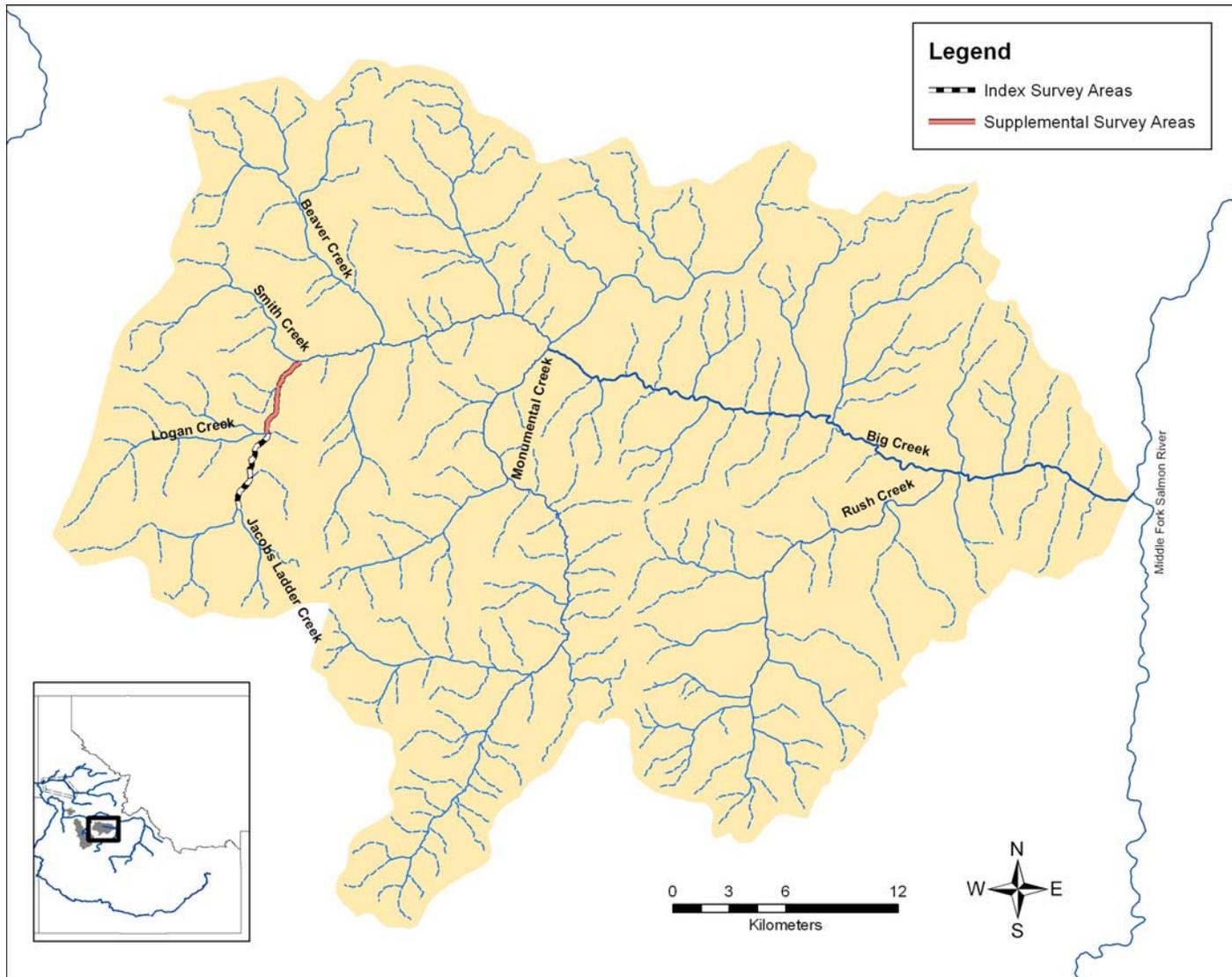
Appendix Figure 12. Tributary specific map indicating locations extensive area spring and summer Nacó'x (Chinook salmon) redd count surveys in the East Fork South Fork Salmon River. Remove lower east fork south fork salmon.



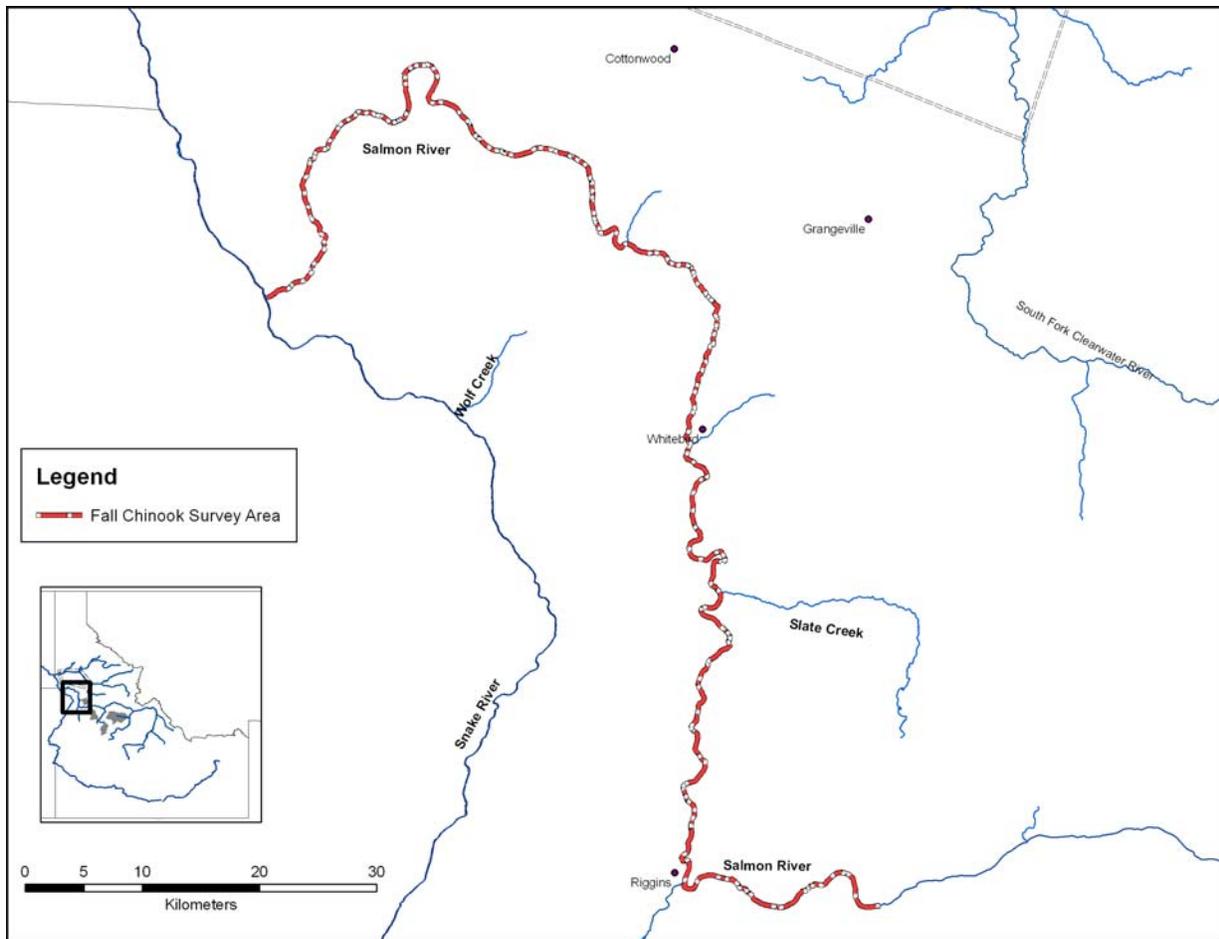
Appendix Figure 13. Tributary specific map indicating locations of index area and extensive area spring and summer Nacó'x (Chinook salmon) redd count surveys in Slate Creek.



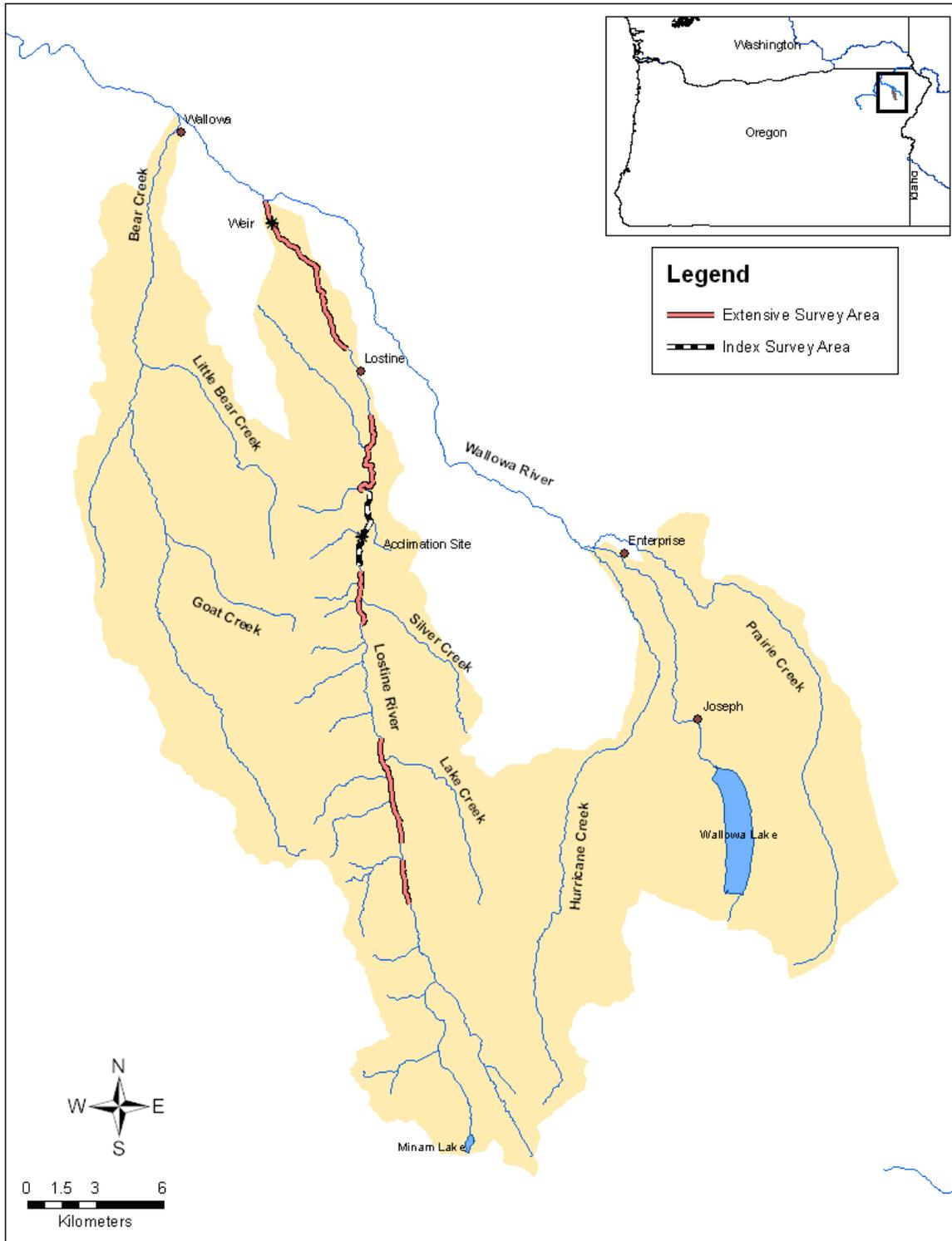
Appendix Figure 14. Tributary specific map indicating locations of supplemental area spring and summer Nacó'x (Chinook salmon) redd count surveys in the upper mainstem South Fork Salmon River below the adult weir.



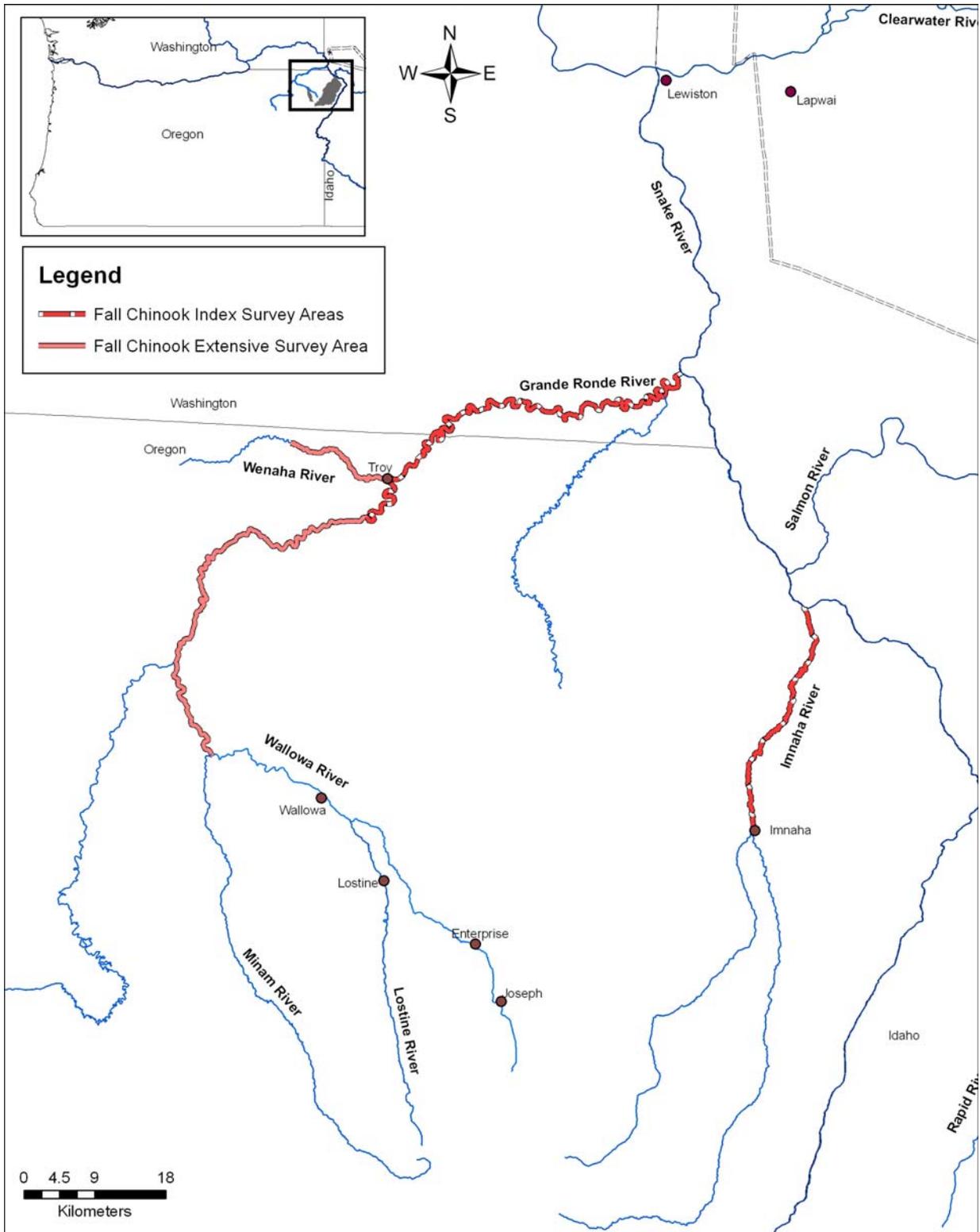
Appendix Figure 15. Tributary specific map indicating locations of index area and supplemental area spring and summer Nacó'x (Chinook salmon) redd count surveys in upper Big Creek.



Appendix Figure 16. Tributary specific map indicating locations of fall Nacó'x (Chinook salmon) redd count surveys in the lower mainstem Salmon River. In 2011 French Creek to mouth of South Fork Salmon and up the South Fork Salmon to the Reed Ranch were surveyed.



Appendix Figure 17. Tributary specific map indicating locations of index area and extensive area spring and summer Nacó'x (Chinook salmon) redd count surveys, and the location of the adult weir in the Lostine River.



Appendix Figure 18. Tributary specific map indicating locations of fall Nacó'x (Chinook salmon) redd count surveys in the lower mainstem Grande Ronde River and lower Imnaha River. Wenaha River and upper Grande Ronde River not surveyed in 2011.