

**Susitna-Watana Hydroelectric Project
(FERC No. 14241)**

**Salmon Escapement Study
Study Plan Section 9.7**

**Errata to
Study Completion Report (November 9, 2015)**

Prepared for

Alaska Energy Authority



Prepared by

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**SUPPLEMENTAL INFORMATION (AND ERRATA) TO NOVEMBER 9, 2015
STUDY COMPLETION REPORT**

1. INTRODUCTION

During ongoing quality control of AEA data bases, AEA noted inconsistencies in numbers of fish and tag detections and an inconsistency in one of the aerial survey counts between the 2014 Study Completion Report (SCR) and the Study 9.7 QC3 data base. Revisions were made as described in this errata to accurately reflect the data that was collected and to correct the presentation of the data in the SCR filed November 9, 2015. The nature of these errors was such that they were errors only in presentation of the data in the 2014 report. The tagging numbers within the QC3 data set have been confirmed as accurate; thus, these revisions should have no material effect on the analysis of radio-tagged salmon that is presented in the SCR.

SCR Reference	Description
Sections 4.1.3 (p. 6); 5.1 (p. 30); 5.1.1.1 (p. 31); 5.1.1.2 (p. 30); Table 5.1.1 (p.94); Appendix A, Tables A-1 and A-2 (Appendix A, p. 1)	The numbers of radio tagged salmon in 2013 and 2014 were revised after submission of the SCR. Revised text appears in bold for SCR Sections 4.1.3; 5.1; 5.1.1.1; 5.1.1.2; and accompanying Tables F-1, and Appendix A Tables A-1 and A-2 are provided below.

4.1 Objective 1: Capture, radio-tag, and track adults of five species of Pacific salmon in the Middle and Upper Susitna River in proportion to their abundance. Capture and tag Chinook, Coho, and Pink salmon in the Lower Susitna and Yentna rivers.

4.1.3. Tagging Goals

Recent (2012 and 2013) and historical (1981–1985) fishwheel catches, effectiveness, and salmon run timing guided tag application rates over the season.

As stated in RSP Section 9.7.4.1, the goal for Chinook Salmon in the Lower River was to radio-tag 300 fish per fishwheel; numbers tagged were **257** salmon from the west bank fishwheel, and **270** from the east bank fishwheel (Table A-1; Figure A-6). The goal for gillnetting was 100 Chinook Salmon, and 129 salmon were actually radio-tagged. For Coho Salmon at the Lower River site, the goal was to radio-tag 300 fish per fishwheel; numbers tagged were 337 Coho Salmon from the west bank fishwheel, and 303 fish from the east bank fishwheel (Table A-1; Figure A-6). The difference between the goals and actual radio-tagging was the result of re-apportioning radio tags in season according to catches. The number of Pink Salmon tagged was

similar to the tagging goal of 100 fish per fishwheel, with **107** radio-tagged from the west bank fishwheel, and 92 from the east bank fishwheel (Table A-1; Figure A-6).

The radio-tagging goals for the Yentna River (RM 6) fishwheels were 100 fish per fishwheel; numbers tagged were 95 salmon from the north bank fishwheel, and 95 from the south bank fishwheel (Table A-2; Figure A-7). The goal for gillnetting was 100 Chinook Salmon; and **105** salmon were radio-tagged. Occasionally low catches in both fishwheels led to re-apportioning the radio tags in-season.

5.1. Objective 1: Capture, radio-tag, and track adults of five species of Pacific Salmon in the Middle and Upper Susitna River in proportion to their abundance. Capture and tag Chinook, Coho, and Pink salmon in the Lower Susitna and Yentna rivers.

A total of **9,661** adult salmon of five species were radio-tagged during this three-year study. Table 5.1-1 presents the number of tags implanted and tagged fish tracked for each species in each year of the study. While the tagged species were consistent each year in the Middle River, they varied each year in the Lower River (Table 5.1-1) in order to assist ADF&G with fulfilling statewide objectives regarding escapement to the Susitna River Basin.

The size of fish radio-tagged ranged from 28 cm (11.0 in) to 110 cm (43.3 in.) mid-eye to tail fork length (METF). Since fishwheels were the primary capture method and have the potential for biased catch based on size, several analyses for size-selective capture and tagging were conducted. When size-selective capture was detected adjustments were made as detailed below. During each study year, tracking began with the first tags implanted in the Lower River and continued through October or November. Detailed results related to fish capture, tagging, and tracking in 2014 are presented below and in Appendices A, B, and C.

5.1.1. Fish Capture and Fish Tagging

5.1.1.1. Lower River

In the Lower River, 2,048 Chinook Salmon (1,471 large, 577 small) were caught and **656** large Chinook Salmon were radio-tagged (Table A-1; Figure A-6, Figure A-9). The peak of Chinook Salmon catch in the fishwheels occurred on May 29 (111 fish) and CPUE for an individual fishwheel peaked at 5.6 Chinook Salmon per hour (west bank). Daily radio-tag deployment in the Lower River peaked at 39 Chinook Salmon on June 5. Seventy-seven percent (129) of large Chinook Salmon captured using gillnets in the Lower River were radio-tagged. Large Chinook Salmon captured in the Lower River averaged 67.6 cm [26.6 in] METF and small Chinook Salmon averaged 39.1 cm [15.4 in] METF (Table A-4).

A total of 1,513 Coho Salmon were captured in the Lower River in 2014, of which 640 were radio-tagged at the fishwheels. The peak catch occurred on August 3 (128 fish) and CPUE for an individual fishwheel peaked at 7.0 fish per hour (west bank). The daily number of radio tags deployed peaked on July 28 (71 tags).

Pink Salmon were the most abundant species captured in the Lower River (13,934 fish). Daily fishwheel catches peaked on July 20 (2,050 fish) and CPUE peaked at 130 fish per hour (west bank). A total of **199** Pink Salmon were radio-tagged, and the most tags deployed on a single day was 16 (July 24). Similar to Coho Salmon, Pink Salmon catches were consistently higher in the west bank fishwheel relative to the east bank fishwheel.

A total of 6,577 Chum and 853 Sockeye salmon were also captured in the Lower River in 2014.

5.1.1.2. Yentna River

Of the 3,025 Chinook Salmon (1,357 large, 1,668 small) captured at Yentna RM 6, the majority (87 percent) were captured in fishwheels and the remainder (13 percent) in gillnets (Table A-2). Daily catch peaked at 275 fish on June 4. The magnitude and timing of the peak CPUE for Chinook Salmon was very similar for the north and south bank fishwheels (Figure A-10). The average length of large Chinook Salmon captured at Yentna RM 6 (66.9 cm [26.3 in]) was similar to that of fish captured in the Lower River, while small Chinook Salmon at Yentna RM 6 averaged 34.9 cm (13.7 in) METF, which was 4.3 cm (1.7 in) less than at the Lower River. A total of 190 large Chinook Salmon were radio-tagged at the Yentna RM 6 fishwheels (Table A-2; Figure A-7), which was 7.3 percent of the total fishwheel catch. In the gillnetting at Yentna RM 6, **105** large Chinook Salmon were radio-tagged, which was 27 percent of the gillnet catch. Radio-tag deployment for Chinook Salmon at Yentna RM 6 peaked at 24 tags on June 2.

Of the 2,305 adult Chinook Salmon (1,375 large, 930 small) captured at Yentna RM 18, the majority (95 percent) were captured in fishwheels, and the remaining 5 percent in gillnets (Table A-2). Daily catch peaked at 171 fish on June 5. The magnitude and timing of the peak CPUE for Chinook Salmon was very similar for the north and south bank fishwheels (Figure A-10). At Yentna RM 18, large and small Chinook Salmon averaged 66.8 cm (22.3 in) and 37.0 cm (14.6 in) METF, respectively (Table A-4).

Table 5.1-1. Number of adult salmon radio-tagged in the Susitna River Basin from 2012 to 2014, by species, fish size, and tagging location.

Species (and Fish Size)		Tagging Location	2012	2013	2014	Total (All Years)
Chinook Salmon	large ^a	Lower Susitna	442	689	656	1,787
		Yentna River	-	693	295	988
		Middle Susitna	352	536	590	1,478
	small ^a	Middle Susitna	-	67	32	99
	Total			794	1,985	1,573
Chum Salmon		Lower Susitna	400	-	-	400
		Middle Susitna	279	201	200	680
	Total		679	201	200	1,080
Coho Salmon		Lower Susitna	399	596	640	1,635
		Middle Susitna	184	242	230	656
	Total		583	838	870	2,291
Pink Salmon		Lower Susitna	401	200	199	800
		Middle Susitna	230	200	201	631
	Total		631	400	400	1,431
Sockeye Salmon		Lower Susitna	100	-	-	100
		Middle Susitna	70	137	200	407
	Total		170	137	200	507
Total (All Species)		Lower Susitna	1,742	1,485	1,495	4,722
		Yentna River	-	693	295	988
		Middle Susitna	1,115	1,383	1,453	3,951
	Total (All Locations)		2,857	3,561	3,243	9,661

^a METF (mid-eye tail fork length), ≥50 cm for large Chinook Salmon; METF <50 cm for small Chinook Salmon

Table A-1. Number of salmon caught and radio-tagged at two fishwheel sites and from gillnets in the Lower Susitna River, PRM 33.4–34.2, 2014.

Species	Caught ¹ / Tagged	Radio Tag Target	Fishwheel		Gillnet	Total
			West Bank	East Bank		
Chinook Salmon	Caught	700	921	959	168	2,048
	Tagged ²		257	270	129	656
Chum Salmon	Caught	-	2,295	4,282	0	6,577
Coho Salmon	Caught	600	910	603	0	1,513
	Tagged		337	303	-	640
Pink Salmon	Caught	200	10,063	3,871	0	13,934
	Tagged		107	92	-	199
Sockeye Salmon	Caught	-	396	453	4	853
Total (All Species)	Caught		14,585	10,168	172	24,925
	Tagged		701	665	129	1,495

¹ Total caught includes all adult salmon regardless of size, as well as all recaptured fish

² Adult fish measuring 50 cm METF (mid-eye tail fork length) or greater

Table A-2. Number of Chinook Salmon caught and radio-tagged at fishwheel sites and in gillnets in the Yentna River (RM 6 and RM 18), 2014.

Location	Caught ¹ / Tagged	Radio Tag Target	Fishwheel		Gillnet	Total
			South	North		
Yentna River (RM 6)	Caught	300	1,213	1,413	399	3,025
	Tagged ²		95	95	105	295
Yentna River (RM 18)	Caught	-	East	West	122	2,305
			1,440	743		

¹ Total caught includes all adult salmon regardless of size, as well as all recaptured fish

² Adult fish measuring 50 cm METF (mid-eye tail fork length) or greater

SCR Reference	Description
Table 5.3-1 (p. 101)	The numbers of radio tagged salmon in 2014 were revised after submission of the SCR. Revised Table 5.3-1 is provided below.

Table 5.3-1. Number of salmon radio-tagged in the Lower and Middle Susitna River Segments, and the number of radio-tagged salmon that were detected at or above the Gateway Station, above each impediment, and above the proposed dam site, 2014.

Species & Tag Site	Radio Tags Applied	Detection Location				
		At or above Gateway (PRM 130.1)	Above Impediment 1 (PRM 155.2)	Above Impediment 2 (PPM 160.2)	Above Impediment 3 (PRM 164.8)	Above Dam Site (PRM 187.1)
Chinook Salmon						
Lower Susitna River	656	34	2	1	0	0
Yentna River	295	0	0	0	0	0
Middle Susitna River (large)	590	491	11	8	2	1
Middle Susitna River (small)	32	24	0	0	0	0
Total Tagged	1573	549	13	9	2	1
Chum Salmon						
Middle Susitna River	200	154	0	0	0	0
Coho Salmon						
Lower Susitna River	640	17	0	0	0	0
Middle Susitna River	230	170	0	0	0	0
Total Tagged	870	187	0	0	0	0
Pink Salmon						
Lower Susitna River	199	5	0	0	0	0
Middle Sustina River	201	164	0	0	0	0
Total Tagged	400	169	0	0	0	0
Sockeye Salmon						
Middle Susitna River	200	146	3	0	0	0

SCR Reference	Description
Table 5.3-5 (p. 108-109)	Peak counts and dates for aerial surveys for Chinook Salmon in 2012 and 2013 were revised after submission of the SCR. Revised Table 5.3-3 is provided below.

Table 5.3-5. Aerial Chinook Salmon spawning escapement surveys. Number of flights, and date and magnitude of peak counts per stream and survey year. The number of radio-tagged Chinook Salmon that were classified to each stream (see Table 5.2-1) is included for 2012-2014.

Stream Name	1982			1983			1984			1985			2012			2013			2014					
	#Flights	Date of Peak Count	Peak Count	#Flights	Date of Peak Count	Peak Count	#Flights	Date of Peak Count	Peak Count	#Flights	Date of Peak Count	Peak Count	#Flights	Date of Peak Count	Peak Count	Radio Tagged Fish	#Flights	Date of Peak Count	Peak Count	Radio Tagged Fish	#Flights	Date of Peak Count	Peak Count	Radio Tagged Fish
<i>Impediment 1 PRM 155.1</i>																								
Cheechako Creek	9	8/6	16	2	8/1	25	7	8/1	29	11	7/24	18	4	7/30	5	6	5	7/25	40	6	6	7/19	16	3
<i>Impediment 2 PRM 160.1</i>																								
Chinook Creek	5	8/6	15	2	8/1	8	7	8/1	15	11	8/23	1	4	8/5	4	3	5	7/25	2	1	6	7/19,7/25	5	0
<i>Impediment 3 PRM 164.7</i>																								
Devil Creek	5	-	0	1	8/1	1	6	-	0	11		0	4	8/5	7	1	5	7/25	25	1	6	8/6	10	0
Fog Creek	0			0			4	7/21	2	3		0	4	7/30	2	0	5	8/8,8/15	2	0	6	7/31	3	0
Unnamed 184 (Bear Creek)	0			0			4	-	0	3		0	4	-	0	0	5	-	0	0	6	-	0	0
Tsusena Creek	0			0			4	-	0	3		0	4	-	0	0	5	8/8	4	1	6	-	0	0
<i>Watana Dam PRM 1871</i>																								
Deadman Creek	0			0			3	-	0				4	-	0	0	5	-	0	0	6	-	0	0
Watana Creek	0			0			2	-	0				4	-	0	0	5	-	0	0	6	-	0	0
Kosina Creek	0			0			0						4	8/6	16	6	5	7/26	3	0	6	-	0	0
Jay Creek	0			0			0						4	-	0	0	5	-	0	0	6	-	0	0
Goose Creek	0			0			0						4	-	0	0	5	-	0	0	6	-	0	0
Oshetna River	0			0			0						4	-	0	0	5	-	0	0	5	-	0	0

SCR Reference	Description
Section 5.3.1(p. 53); Table F-1 (Appendix F, p.1)	The dates for first live and last live for Chinook Salmon that moved above impediment 3 in 2013 and 2014 were revised after submission of the SCR. Revised Table F-1 is provided below with clarifying footnotes.

Table F-1. Summary of migration and spawning behavior for radio-tagged Chinook Salmon after they passed Impediment 3, 2012–2014.

Tag Number	Capture Date	Length (cm)	Sex	Spawning Area	Spawning Period ²			Explorations Before Spawning			Downstream After Spawning			Total Live Days ¹
					First Live	Last Live	Days	Max Upstream Location	Max Upstream Distance	Days	Max Downstream Location	Max Downstream Distance	Days	
2012														
27	22 Jun	78 TL	Undetermined	Chinook Creek	28 Jul	5 Aug	8	Kosina Creek Mouth	80	11	Curry	60	8	26
52	25 Jun	89 TL	Undetermined	Kosina Creek	20 Jul	9 Aug	20	-	-	-	-	-	-	28
94	29 Jun	81 TL	Undetermined	Devil Creek	23 Jul	5 Aug	13	Fog Creek	30	4	Cheechako	19	12	31
104	29 Jun	66 TL	Undetermined	Portage Creek	24 Jul	30 Jul	6	Above Devil Creek	30	10	-	-	-	10
113	30 Jun	84 TL	Undetermined	Kosina Creek	26 Jul	7 Aug	12	-	-	-	-	-	-	19
219	2 Jul	73 TL	Male	Kosina Creek	23 Jul	26 Jul	3	Above Kosina Creek	30	1	-	-	-	7
246	3 Jul	85 TL	Female	Kosina Creek	23 Jul	26 Jul	3	-	-	-	-	-	-	6
257	3 Jul	89 TL	Female	Portage Creek	30 Jul	17 Aug	18	Devil Creek	24	13	-	-	-	28
266	4 Jul	101 TL	Male	Portage Creek	24 Jul	6 Aug	13	Near Fog Creek	44	15	-	-	-	19
359	6 Jul	93 TL	Male	Portage Creek	6 Aug	11 Aug	5	Kosina Creek	93	26	-	-	-	25
5005	26 May	-	Undetermined	Kosina Creek	23 Jul	31 Jul	8	-	-	-	Portage	103	16	30
5019	28 May	87 METF	Undetermined	Kosina Creek	23 Jul	11 Aug	19	-	-	-	-	-	-	24
2013														
241	21 Jun	64 METF	Undetermined	Unknown	-	-	-	Near Susitna River headwaters	-	-	Below Talkeetna	-	-	45
272	23 Jun	64 METF	Undetermined	Devil Creek	30 Jul	11 Aug	12	-	-	-	-	-	-	12
395	26 Jun	65 METF	Undetermined	Tsusena Creek	22 Jul	31 Jul	9	near Deadman Creek	6.5	1	Tsusena Creek	0	0	19
2014														
537	4 Jul	80 METF	Male	Unknown	-	-	-	Just Above Impediment 3	-	-	-	-	-	36
787	11 Jul	78 METF	Undetermined	Kosina Creek	2 Aug	12 Aug	10	Oshetna River	40	5	-	-	-	20*

* Motion sensor malfunctioned. Mortality date is approximate.

¹ Total days the fish was alive after passing Impediment 3 (accounts for the 1 day that tags must be motionless before going into mortality mode).

² First Live = first live detection in spawning area, Last Live = when the fish exits the spawning area OR when the tag is recorded in mortality mode in the spawning area.

Notes: Distances are in kilometers (1 km = 0.62 mi), METF: mid-eye fork length, TL: total length

SCR Reference	Description
Appendix F: Figure F-3 (Appendix F – p. 4), Figure F-5 (Appendix F – Page 6), Figure F-14 (Appendix F – P. 15), Figure F-15 (Appendix F – P. 16)	Tracking history maps for some individuals did not present all detection data in the tracking database and/or misrepresented locations that were subsequently removed during spatial review and database quality assurance/quality control. Revised Figures F-3, F-5, F-14, and F-15 are provided below.

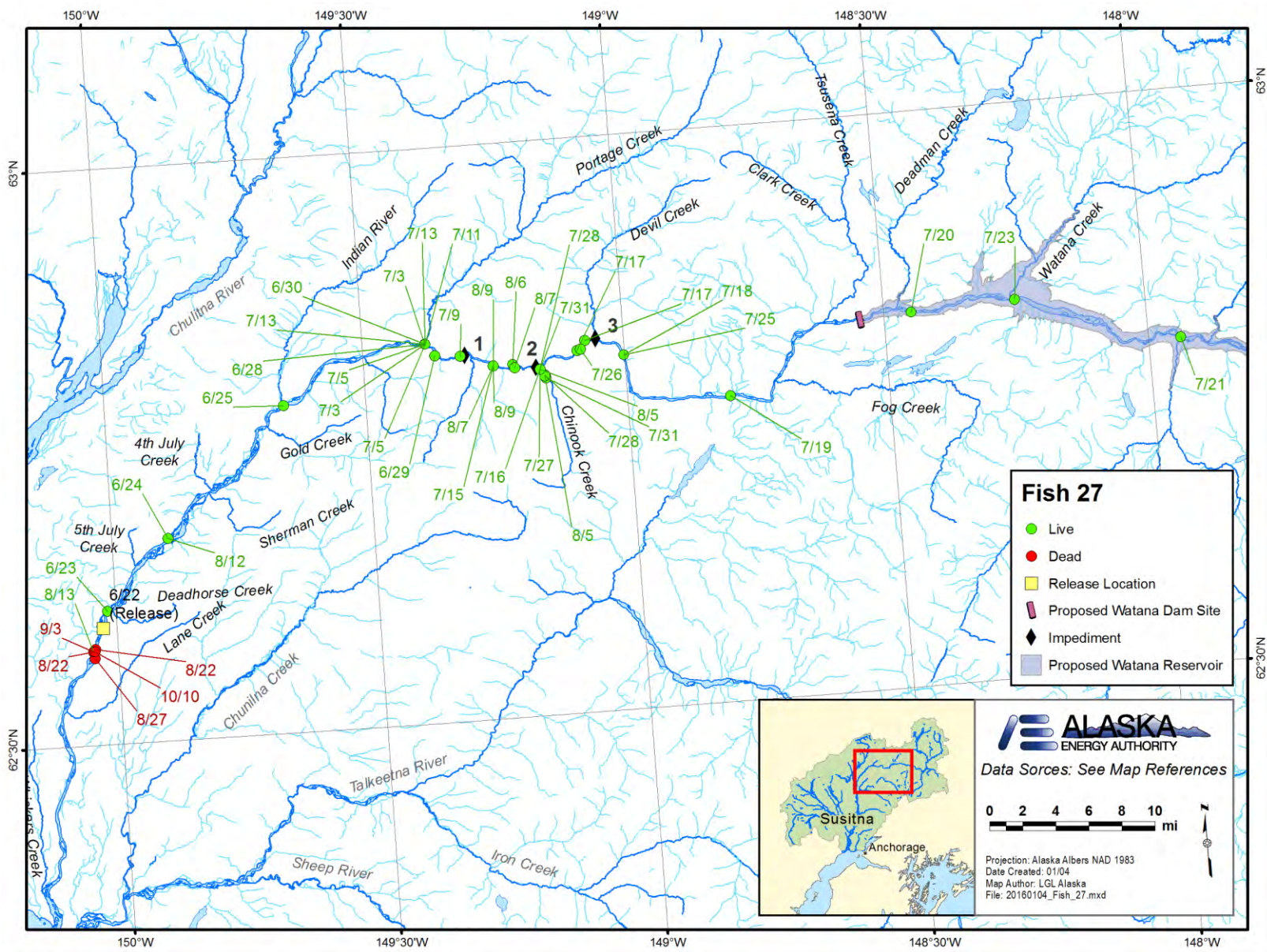


Figure F-1. Tracking history of a radio-tagged Chinook Salmon (tag #27) that was detected above Impediment 3, 2012.

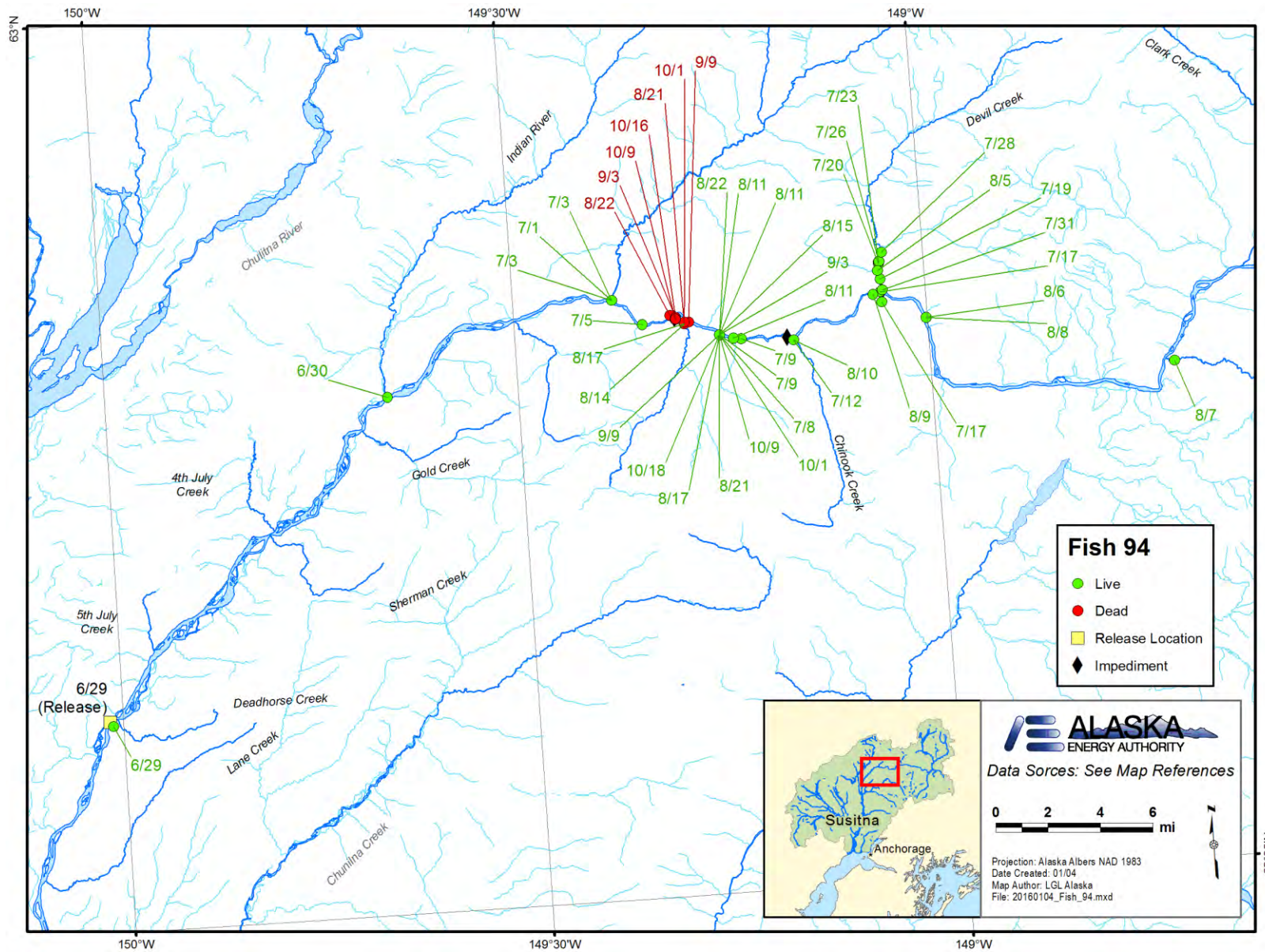


Figure F-2. Tracking history of a radio-tagged Chinook Salmon (tag #94) that was detected above Impediment 3, 2012.

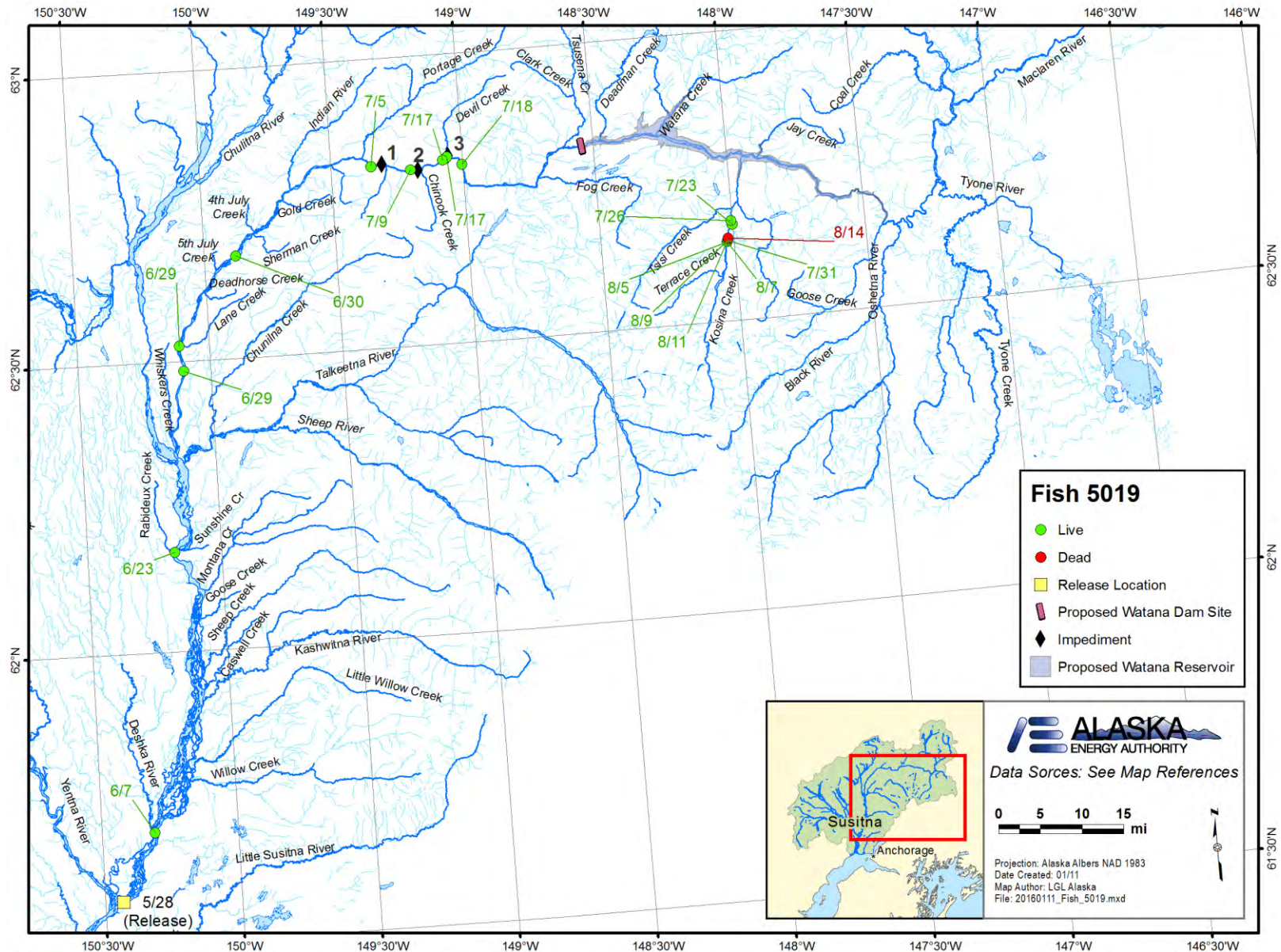


Figure F-3. Tracking history of a radio-tagged Chinook Salmon (tag #5019) that was detected above Impediment 3, 2012.

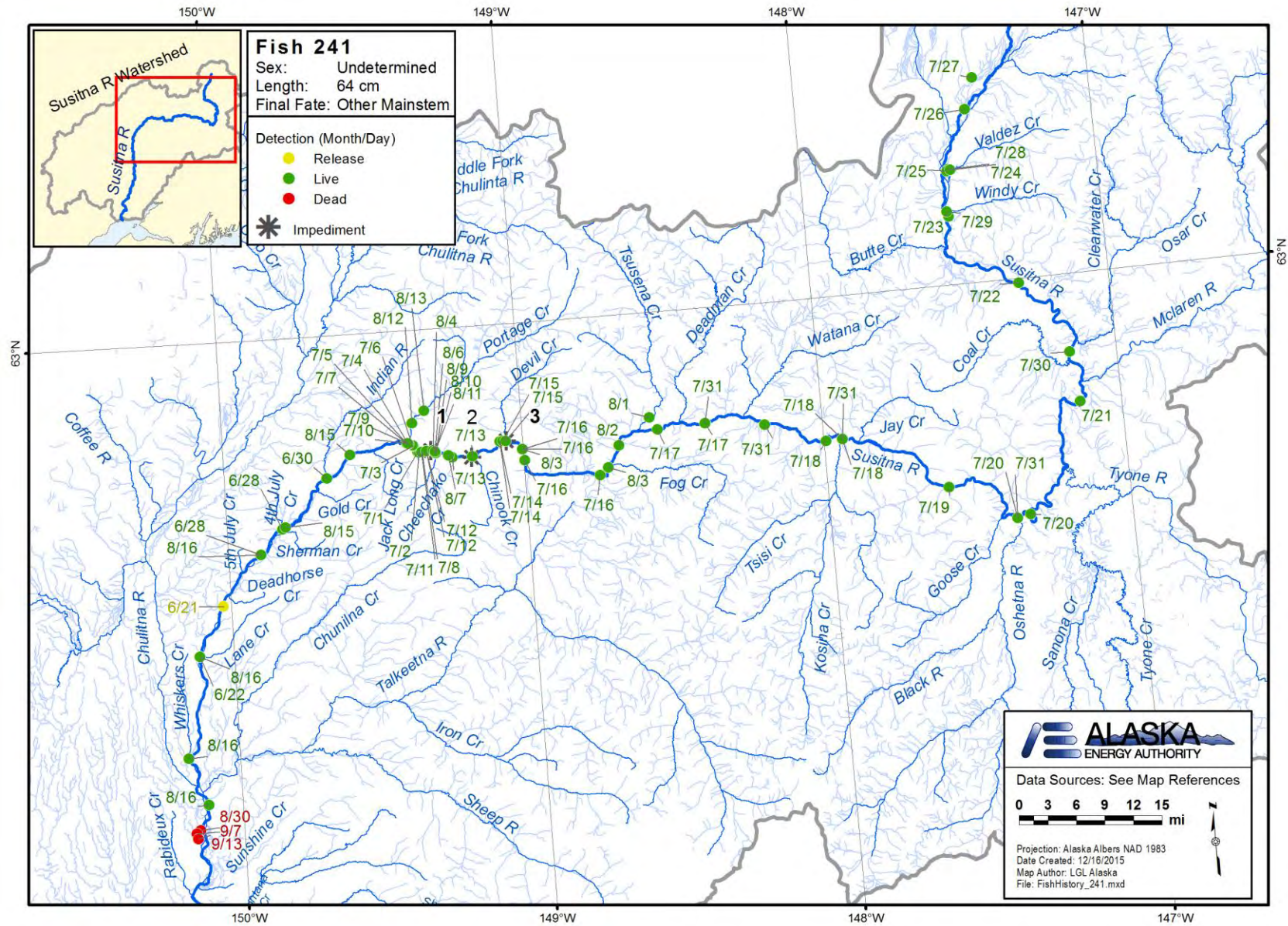


Figure F-4. Tracking history of a radio-tagged Chinook Salmon (tag #241) that was detected above Impediment 3, 2013.