

Memorandum

To: Files and Distribution List

Date: March 14, 2005

From: **Colleen Harvey Arrison**
Northern California-North Coast Region
Department of Fish and Game

Subject: 2004 Deer Creek Spring-run and Fall-run Chinook Salmon Survey Results

Adult Spring-run Chinook Holding and Spawning Surveys

On 3 August 2004, Deer Creek, Tehama County, was snorkel surveyed to count adult spring-run Chinook salmon. The survey reaches extended from Upper Deer Creek Falls downstream to Trail 2E17, a distance of 22 miles (Figure 1). **A total of 804 spring-run Chinook salmon was observed** (Table 1).

Table 1. Deer Creek 2004 adult salmon and redd counts in Deer Creek.

Section	Holding Survey		Spawning Survey	
	# of salmon	% of total	# of redds	% of total
Upper Falls to Potato Patch	114	14	36	9
Potato Patch to Hwy-32 Bridge	19	2	11	3
Hwy-32 Bridge to Lower Falls	4	1	98	25
Lower Falls to A-Line	151	19		
A-Line to Wilson Cove	75	9	48	12
Wilson Cove to Polk Springs	141	18	71	18
Polk Springs to Murphy Trail	178	22	33	9
Murphy Trail to Ponderosa Way	112	14	96	24
Ponderosa Way to Trail 2E17	10	1	1	<1
Trail 2E17 to Dillon Cove	not surveyed	0	0	0
Totals	804	100	394	100

This year's surveys were terminated at Trail 2E17 due to the low numbers of salmon observed in the previous 3 mile reach. This year 98% of the salmon were holding upstream of Ponderosa Way at elevations greater than 1700 ft. Since the same reaches are surveyed at the same time each year, this count provides an index of run size. Snorkel counts are not expanded to a population estimate. In order to minimize harassment and stress to holding salmon, only one survey is conducted during the summer holding period.

On 7- 9 October 2004, Lassen National Forest (LNF) Fisheries personnel completed a spawning survey of the same reaches that were snorkeled to count redds, live salmon and carcasses and record spawning distribution of spring-run Chinook. During the October spawning surveys, the same reaches were surveyed as the August holding surveys. **A total of 394 redds were counted** (Table 1). In addition, 25 partial, or "practice" redds and 36 carcasses were counted. A total of 87 salmon were observed still on redds. An aerial redd survey on 27 September, from Ponderosa Way to the Steel Tower Transmission Lines confirmed only one redd below Ponderosa Bridge.

The ratio of holding salmon to redds in Deer Creek in 2004 was 2.0, or each redd counted represents 2 fish in the population. Since spawning surveys were initiated in 1997, salmon to

redd ratios have ranged from 1.7 to 2.5, with an 8-year average of 2.0. In Mill Creek, where water clarity prohibits reliable snorkel counts, redd surveys are used to estimate salmon populations. Redd counts are expanded by a multiplier of two, assuming that each female builds one redd and there is a 1:1 sex ratio in the population. The previous 8 years of data on Deer Creek (assuming holding salmon are being counted consistently) suggests that expanding redd counts by a multiplier of 2 is an alternative method of estimating population levels in creeks where snorkel counts or carcass counts are not feasible.

In addition to adult salmon counts, the Department also monitors juvenile salmon emigration and collects stream flow and water temperature data at locations in the watershed critical to adult and juvenile salmon survival. The results from this spring-run Chinook life history monitoring are reported in a separate annual Broodyear Report

During the 13 years on record where snorkel counts have consistently been used, spring-run salmon counts on Deer Creek have ranged from a high of 2,185 fish in 2002 to a low of 209 fish in 1992 (Table 2). The average count over this time period is 1,140 salmon. Between 1940 and 1964, an average of 2,200 spring-run salmon was counted annually using fish ladder counts and carcass surveys. This year's count of 804 salmon represents a decrease from the 2001 cohort of 1,622 fish and an increase from the 637 cohort of 637 fish. Although, since the age structure (percentage of 2-, 3-, and 4-year-olds) of salmon returning to Deer Creek is not known, caution should be used when speculating the replacement rate of this years run. Due to the difficulty in separating grilse-sized fish in pools with numerous salmon, grilse are included in the adult counts.

This year's survey included participants from the Department of Fish and Game (CDFG), Lassen National Forest (LNF), Sierra Pacific Industries (SPI), NOAA Fisheries (NOAA), Department of Water Resources (DWR) and Fish and Wildlife Service (FWS). The first prize winner of this year's "Deer Creek Salmon Guess Contest," held during the pre-snorkel camp out, was Kurt Sable with a guess of 869 salmon. Kurt won the coveted "Deer Creek Spring Run 2004" custom ball-cap. Thank you to all who volunteered their time to participate in the year's annual Deer Creek salmon count.

It appears that spring- and fall-run salmon remained both temporally and spatially isolated in Deer Creek in 2004. Although no spring-run spawning surveys were made after 9 October it is assumed that spawning was completed prior to fall run entering Deer Creek after 20 October. Although a few salmon were sighted by hunters below Hobson's camp, 98% of the spring-run population were holding upstream of Ponderosa Way. Hobson's camp is 15 miles downstream and an 1100 feet elevation drop from Ponderosa way.

Adult fall-run Chinook Spawning Surveys

On 20 October, 2004 a rain event increased the fish attraction flow in lower Deer Creek to 149 cfs, allowing fall-run Chinook to migrate into Deer Creek. Post-diversion flows ranged between 57 cfs and 276 cfs during the October thru December fall run spawning season. Five surveys were completed from 28 October and 22 November between the USGS gage, upstream of the upper diversion dam, downstream to the Southern Pacific Railroad crossing below Highway 99 Bridge. (Anecdotally, biologists were told that a few fall-run salmon were observed upstream of the USGS gage.) In these surveys a total of 131 carcasses and 149 redds was counted, Table 2.

Section	Date	Carcasses	Redds
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Hwy 99 to RR trestle (data from CH ₂ M Hill)	10/28/04	ns	6
Leininger Bridge to Hwy 99	11/8/04, 11/17/04	58	82
RST to Leininger Bridge	11/15/04	57	41
USGS gage to RST	11/22/04	16	20
Totals		131	149

Too few marked carcasses were recovered to estimate the spawning population using traditional mark-recapture techniques. If redd counts are expanded as explained previously, assuming each redd represents one male and one female spawner, **at least 300 fall-run Chinook salmon spawned in Deer Creek in 2004.** The sex composition of carcasses encountered on the survey was 53% male adults, 10% male grilse, 36% female adults and 1% female grilse. Four of the carcasses encountered were ad-clipped for Coded-Wire-Tags (CWT's). CWT recoveries were made from Coleman National Fish Hatchery and Feather River Hatchery releases. Since only a small fraction of each hatcheries production receives a CWT, a large percentage of fall-run Chinook returning to Deer Creek may be strays from one of the five salmon hatcheries in the California's Central Valley. Spawning surveys for fall-run Chinook in Deer Creek are not routinely made, either due to lack of fish or lack of personnel to count fish. Unless a significant rain event occurs in October, flows are too low to attract salmon. Since 1990 only 5 surveys have been completed for fall-run Chinook in Deer Creek. Population estimates in these previous 15 years have ranged from 0 to 1,203 salmon.

Attachments

FIGURE 1. Deer Creek Spring-run Salmon Survey Reaches, August 2004.

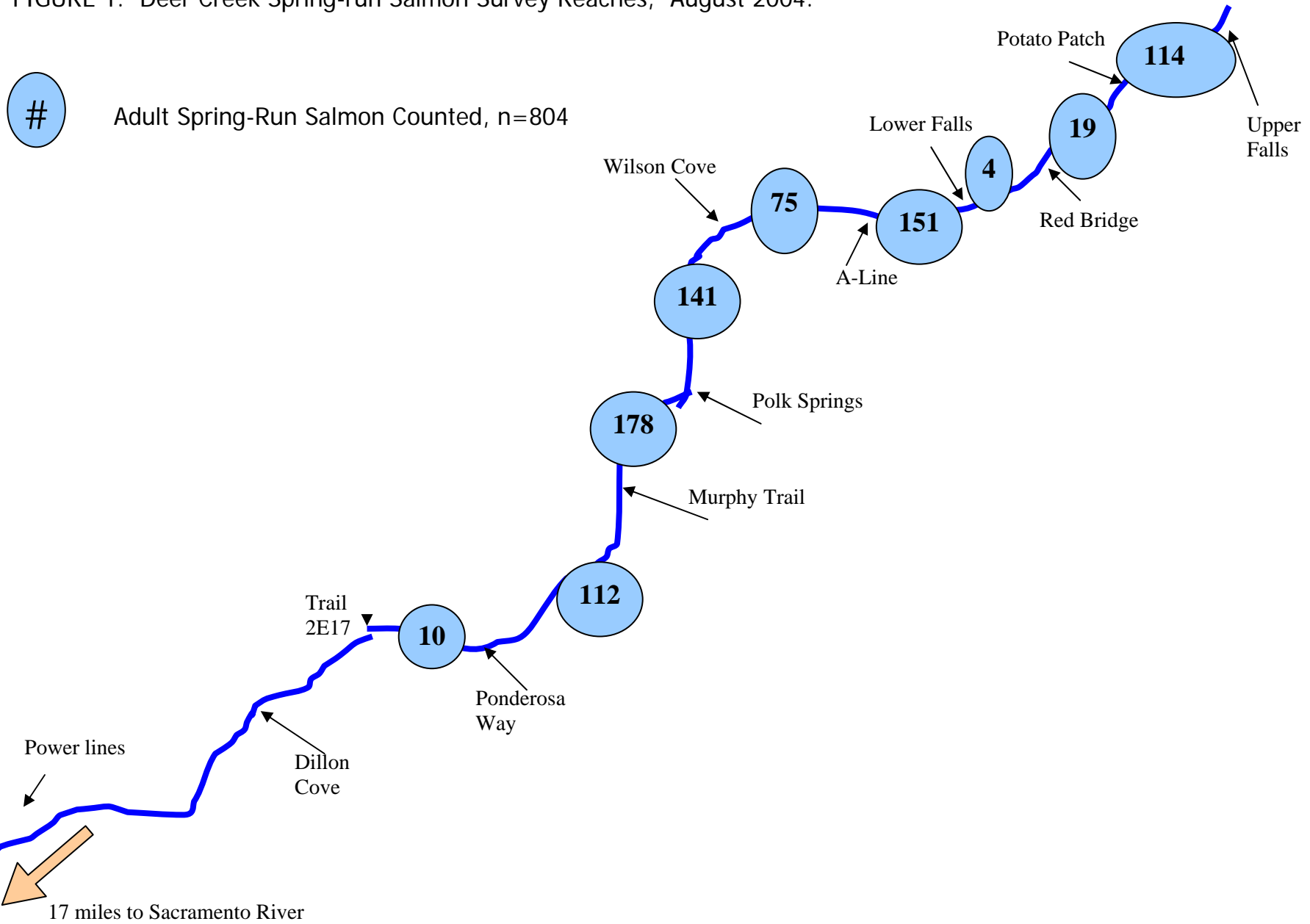


TABLE 2. Holding and Spawning Distribution of Spring-Run Chinook salmon in Deer Creek, 1992-2004

Section	elevation	1992	1993	1994	1995	1996	1997		1998		1999		2000		2001		2002		2003		2004	
		hold	hold	hold	hold	hold	hold	redds	hold	redds	hold	redds	hold	redds	hold	redds	hold	redds	hold	redds	hold	redds
Upper Falls to Potato Patch	3600'	12	35	100	267	67	102	63	14	1	114	126	34	26	204	80	311	128	283	135	114	36
Potato Patch to Hwy-32		5	17	31	67	44	19	30	11	5	91	100	45	19	131	70	78	90	198	56	19	11
Hwy 32 to Lower Falls		7	4	4	37	12	9	14	4	27	28	72	7	13	59	24	52	35	35	25	4	} 98
Lower Falls to A-Line	3000'	65	54	215	225	170	153	94	93	38	241	95	151	34	357	140	492	217	389	163	151	
A-Line to Wilson Cove		13	35	2	134	67	22	7	98	31	167	396	76	48	149	104	160	57	405	189	75	48
Wilson Cove to Polk Springs	2700'	51	4	69	124	88	26	1	182	35	158	188	96	43	346	45	451	167	647	195	141	71
Polk Springs to Murphy Trail		21	51	56	219	102	59	26	270	59	247	150	92	36	303	107	350	82	393	154	178	33
Murphy Trail to Ponderosa Way	2000'	35	59	8	177	58	74	40	615	373	355	167	135	37	34	132	183	174	320	141	112	96
Ponderosa Way to Trail 2E17	1700'	ns	ns	ns	45	6	2	0	476	119	106	100	1	ns	37	2	107		77	29	10	1
Trail 2E17 to Dillon Cove	1500'	ns	ns	ns	ns	ns	ns	ns	116	105	50	103	0	ns	2	11	1	72	12	ns	ns	ns
Totals		209	259	485	1,295	614	466	275	1,879	793	1,591	1,495	637	256	1,622	715	2,185	1,022	2,759	1,087	804	394
redd:holding fish ratio								1.7		2.4		1.1		2.5		2.3		2.1		2.5		2.0

List of Participants in 2004 Deer Creek Snorkel Survey

<u>Date</u>	<u>Section</u>	<u>Participants</u>
8/3	Upper Falls to Potato Patch	Matt Stodacher-LNF Jennifer Robinson-LNF
8/3	Potato Patch to Hwy-32	Aric Lester-DWR Mike Berry-DFG
8/3	Hwy-32 to A-Line Bridge	Julie Kelley-SPI Naseem Alston-FWS Matt Johnson-DFG
8/3	A-Line Bridge to Wilson Cove	Lael Will-FWS Mike Spiker-DFG
8/3	Wilson Cove to Polk Springs	Ken Roby-LNF Howard Brown-NOAA Kurt Sable-LNF
8/3	Polk Springs to Murphy Trail	Matt Galli-DFG Colleen Harvey Arrison-DFG
8/3	Murphy Trail to Ponderosa Way	Chris Mayes-LNF Bobette Jones-LNF
8/3	Ponderosa Way to Trail 2E17	Jake Alliman-LNF Florie Consalati-LNF Susie Elkier-LNF

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