ELWHA RIVER – HGMP

SUMMER/FALL CHINOOK HATCHERY PROGRAM

ANNUAL REPORT

CALENDAR YEAR 2014

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INTRODUCTION

The Washington Department of Fish and Wildlife (WDFW) and the Lower Elwha Klallam Tribe (LEKT) have operated salmon and steelhead hatchery programs in the lower portion of the Elwha River watershed for decades (Figure 1). Artificial propagation of the Elwha River Chinook salmon population commenced in 1914, with consistent, annual fish releases supported by WDFW's Dungeness Hatchery beginning in 1953. Initial juvenile Chinook salmon releases from WDFW's Elwha Channel Hatchery site began in 1974 (WDFW 2012), and continue through the present. The hatchery programs were implemented to preserve genetic resources and to mitigate for impacts on fisheries caused by construction of the Elwha and Glines Canyon dams in 1910 and 1927, respectively, which resulted in the loss of access to 90% of the spawning and rearing areas of the river.

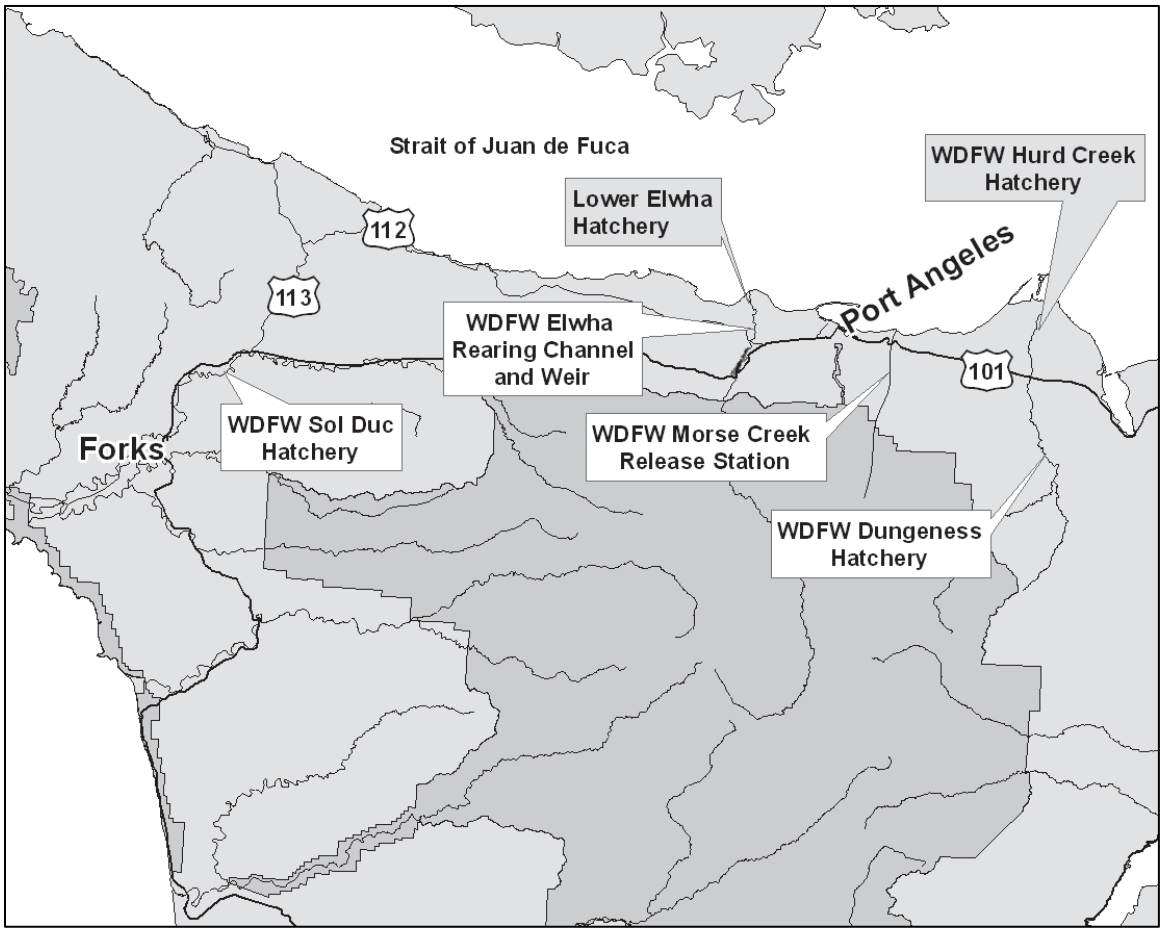

Figure 1. Hatchery facilities supporting the Elwha River Fish Restoration Plan.

The decline in Elwha River salmonid abundance resulting from dam placement and operation has severely affected the abundance and distribution of Elwha River salmon and steelhead. Hatchery programs were implemented by WDFW and the LEKT to partially replace lost natural salmon and steelhead abundances and maintain adult returns of the species to the Elwha River.

In 1992, Congress enacted Public Law 102-495, the Elwha River Ecosystem and Fisheries Restoration Act, funding the federal acquisition of the two dams and requiring a plan to achieve full restoration of the Elwha River ecosystem and fisheries.

Following the decision to remove the dams from the Elwha River, two anadromous salmonid species present in the basin were listed under the ESA: the Puget Sound Chinook salmon ESU (64 FR 14308, March 24, 1999) and the Puget Sound steelhead DPS (72 FR 26722, May 11, 2007). In response to the listing of Chinook salmon, WDFW and the Puget Sound tribes completed two resource management plans as the frameworks for 114 HGMPs, including HGMPs for the Elwha hatchery programs. The HGMPs described how each hatchery program would operate including effects on listed fish in the Puget Sound region.

Take associated with the collection of Chinook salmon adults for use as broodstock for the Elwha Channel Hatchery Chinook salmon program was previously exempted from ESA Section 9 take prohibitions by NMFS. Following consultation, NMFS issued an incidental take statement together with an ESA section 7 biological opinion to the NPS at the conclusion of a formal consultation for the “Elwha River Ecosystem and Fisheries Restoration Project”.

Role of Hatchery Production in Fish Restoration
WDFW and the LEKT submitted Hatchery and Genetic Management Plans (HGMPs) to NOAA Fisheries for artificial programs intended to assist the recovery of anadromous salmon and steelhead during the Preservation and Recolonization phases of recovery as defined by the Elwha Monitoring Group.

Hatchery production at the WDFW Elwha Hatchery is intended to support restoration of Chinook salmon species in the Elwha River, and to assist the LEKT restoration programs at the Lower Elwha Fish Hatchery. Fish production is directly linked to the biological response of salmon in the Elwha River during and following the removal of the Elwha and Glines Canyon dams. A biologically-oriented phased approach to restoration has been developed to guide hatchery actions and establish conservation goals for the House of Salmon. Phases of restoration include:

1. Preservation
2. Recolonization
3. Local adaptation
4. Full restoration

Each of these phases is governed by a number of measurable objectives that must be met for each species of fish to advance to a later level of restoration or retreat to an earlier level. Fish populations may move in either direction during the restoration process and all measureable objectives must be met in order to move to a later phase of recovery.

HATCHERY OPERATION

Data provided by WDFW Elwha Channel Hatchery staff

Fish Production Program Goals

Production goals for the Elwha Chinook program during the Preservation Phase are:

Age Class	Facility	Maximum Number	Size* (fpp)	Release Date	Location
Fingerling	Elwha Hatchery	2,500,000	80	June	Elwha River
	Morse Creek Hatchery	220,000		June	Morse Creek
Yearling	Elwha Hatchery	200,000	10	April	Elwha River
	Morse Creek Hatchery	100,000	10	April	Morse Creek

*** 80 fpp ~ 80 mm fork length**
10 fpp ~ 155 mm fork length

Specific locations of releases.

Primary:

Stream, river, or watercourse:	Elwha River (18.0272)
Release point:	RM 2.9
Major watershed:	Elwha River
Basin or Region:	Strait of Juan de Fuca

Auxiliary:

Stream, river, or watercourse:	Morse Creek (18.0185)
Release point:	RM 1.0
Major watershed:	Morse Creek
Basin or Region:	Strait of Juan de Fuca

I. BROODSTOCK COLLECTION

Elwha Hatchery Chinook

Adult Recovery and Disposition

A total of 1,480 adult Chinook and 3 jacks were received and held at the WDFW Elwha Rearing Channel for broodstock purposes. Chinook adults were netted and collected from the river 24 times in the reporting period. All broodstock were checked for marks and tags. The number of Chinook adults that were collected and transported to the WDFW Elwha Rearing Channel pond is as follows: 990 were netted from the river, 316 were collected at the Lower Elwha S'Klallam Hatchery, , and 174 returned to the WDFW Elwha Rearing Channel facility (Personal comm. Troy Tisdale, Elwha Hatchery).

Chinook Off-station received from seining

In-river seining operations netted 991 Chinook salmon. All Chinook were placed in holding bags, transferred to truck with holding tank, then transported to the adult pond at the Elwha Rearing Channel. Of the 991 collected, 552 were males, 438 females, and 1 jack. First collection occurred 23 June 2014 and continued until 5 September 2014.

Chinook received from the LEKT facility

A total 318 Chinook salmon entered the LEKT hatchery during the reporting period, including 316 adults (103 females and 213 males) and 2 jacks. All returning Chinook salmon were transported to the WDFW Elwha Rearing Channel adult holding pond for broodstocking.

Chinook entering Elwha Hatchery

Volunteer returns were collected as they entered the adult pond. The first chinook adults processed from the fish ladder into the pond was on August 29, 2014 with the final volunteers showing up on October 9, 2014. During the reporting period, 174 Chinook volunteered into the adult trap. Of these, 174 were adults (114 males, 60 females), and none were jacks.

Chinook Off-station received from weir

No chinook broodstock were trapped at a weir in 2014.

Mortalities

During the reporting period, there were 539 mortalities at the facility, including 172 females, 364 adult males, and 3 jack salmon.

Chinook returned to river

During the reporting period, no chinook from the Elwha facility were transported upstream or out-planted into tributaries of the watershed.

Morse Creek Hatchery Chinook

WDFW collected a total of 42 adult Chinook salmon (16 males, and 26 females) at the Morse Creek facility by netting and in-river trapping.

Other species entering the WDFW Elwha Channel facility during the reporting period included 94 coho salmon, 104 chum salmon, and 5 winter steelhead.

Coho: A total 94 coho entered the hatchery during the reporting period. The 47 females, 47 males, and no jacks were transported to upriver release sites to promote natural recolonization.

Chum: A total 104 chum salmon entered the hatchery during the reporting period. These fish were transported to the LEKT hatchery for spawning. All 104 adults (49 females and 55 males) were spawned, with a total 107,415 eggs taken for hatchery production.

Winter steelhead (WDFW): Five (5) early winter steelhead of early winter stock entered the WDFW hatchery during the reporting period, and were destroyed. No late winter steelhead (Elwha River stock) entered the WDFW hatchery during the reporting period.

II. SPAWNING

Total Brood Year 2014 egg collection for both the Elwha Rearing Channel and Morse Creek included the take of 3,330,081 green eggs.

Elwha Hatchery Trap

During the reporting period, spawning occurred 17 separate times between August 26, 2014 and October 10, 2014. Spawning consisted of 515 males, 429 females, 0 jacks, and 0 non-viable females, for a total 944 Elwha chinook used in the spawning program. A total 2,460,315 green eggs were taken.

Elwha River

Due to increased visibility on the river, Hatchery crew were also able to snag and gaff an additional 18 days for spawned and spawner adults during the period of August 8, through September 29. 2014. River spawning consisted of 77 males 140 females and 150 nonviable females. A total of 747,485 green eggs were taken.

Morse Creek Hatchery

Spawning occurred 5 times between 9 and 30 September 2014 at the Morse Creek facility. Spawning included 13 males and 21 females for a total 34 adult chinook used in the program. A total 122,281 green eggs were taken.

III. INCUBATION AND REARING

Brood 2014 green egg to eye-up survival data are as follows:
Elwha green egg to eye survival was 94.0 percent.
Morse Creek green egg to eye survival was 90.8 percent.

Elwha stock Chinook sub-yearlings are shipped at 600 fish per pound from Sol Duc Hatchery to Elwha Hatchery in February, and yearlings are shipped at 20 fish per pound from Hurd Creek in October. Survival for Elwha stock Chinook from ponding until planting in the Elwha River and Morse Creek are as follows:

	Ponded	Shipped	Planted	Loss	Percent Survival
BY 2012 Hurd to Elwha	202,850	201,300	201,074	1,776	99.12
BY 2012 Sol Duc To Morse	204,774	200,902	174,781	29,993	85.35
BY 2013 Sol Duc to Elwha	2,709,127	2,664,786	2,639,971	69,156	97.45
BY 2013 Hurd to Elwha	217,634	215,012	N\A	2,622	98.8
BY 2013 Hurd to Morse	52,316	51,700	N\A	616	98.82
BY 2013 Sol Duc to Morse	52,073	51,220	N\A	853	98.36
BY 2013 Sol Duc to Morse	232,190	228,388	197,865	4,067	98.25

Note: BY2013 Sol Duc to Morse -30,258 Fish adjustment after marking inventory

On Monday October 20, 2014, WDFW hatchery staff observed abnormally high loss in the BY 2013 Yearlings. Staff immediately notified their direct supervisor, who directed a change from surface to well water, shutting off the river water source. WDFW and LEKT pathologists were notified about the loss the same day. Pathologists responded on October 21, 2014 performing tests on the morbid fish with no definitive diagnosis concerning the high loss. Small signs of CWD (cold water disease) were present during testing. Hatchery personnel were instructed to treat the disease with medicated feed and salt. The loss was elevated for approximately 26 days with loss of 36,000 juveniles. The Elwha Channel facility remains on well water with normally-expected juvenile loss at present.

IV. MONITORING AND EVALUATION OF HATCHERY ENVIRONMENT

Fish Health Monitoring

All Juveniles were monitored by Bryan Quinton (WDFW Fish Health Specialist) as-needed during the reporting period.

No diseases were noted in adult Chinook salmon during reporting period.

Chemicals used during the reporting period include formalin (parasite-S) administered 58 times to adults for *Saprolegnia* fungal control. Draxxin® and Vetrimycin™ were injected into adult Chinook upon being placed for holding in the adult pond, used as a prophylactic.

V. WATER QUALITY MONITORING

Incoming water at the hatchery derives from two sources.

1. Well water is pathogen-free and not monitored.
2. Water from Elwha Water Facilities is operated and monitored by Veolia Water operators.

Elwha hatchery discharge results are monitored and reported per NPDES guidelines and are in compliance with NPDES guidelines under permit number WAG13-1043. Monitoring and reporting of effluent discharge results at Morse Creek have been in compliance with NPDES permit number WAG13-1013. During the reporting period no non-compliance events occurred.

VI. RELEASE OF CHINOOK

A total 2,639,971 (BY2013) Sub-yearling and 201,074 (BY 2012) yearling chinook were released from the Elwha Channel facility. Of these, 251,024 sub-yearlings were coded-wire tagged, Otolith-marked and adipose fin-clipped, as per the Biological Opinion. The remaining 2,388,947 zeroes were released with an otolith mark. The 201,074 yearlings released into the Elwha River were coded-wire tagged and some were otolith marked. A total 174,781 yearlings into Morse Creek were likewise coded-wire tagged and otolith marked (**Table 1**).

Table 1. Number of Elwha River Fall Chinook released into the Elwha River and Morse Creek (From WDFW Hatcheries Headquarters Database).

Age Class	Facility	Release Number	Size (fpp)	Release Date	Location	Mark
Fingerling	Elwha Hatchery	2,388,947	67.6	17 June	Elwha R.	OT
BY13	Elwha Hatchery	251,024	67.6	17 June	Elwha R.	AD+CWT. OT 63-66-73
Yearling	Elwha Hatchery	201,074	7.4	April	Elwha R.	CWT, OT 63-64-91
BY12	Morse Creek	174,781	9.3 – 11.0	April	Morse Cr.	CWT, OT 63-62-96

The sub-yearling Chinook were released from the rearing channel on May 31 without reported incident.

2015 Releases:

Elwha River sub-yearlings BY14

WDFW currently has the planned 2,500,000 otolith-marked sub-yearlings on-site, with a June 2015 release date planned per Brood Document. Of this number,

250,000 will be adipose fin-clipped and coded-wire Tagged as described in the HGMP.

Elwha River yearlings BY13
WDFW currently has the planned 200,000 yearlings on-site, with a scheduled April 2015 release of otolith-marked and coded-wire tagged fish.

Morse Creek yearlings BY13
WDFW currently has the planned 100,000 yearlings on-site, with a scheduled April 2015 release of otolith-marked and coded-wire tagged fish. This will be the last brood year released at this facility.

IN-RIVER MONITORING

These data were provided by WDFW Biologist Randy Cooper.

National Park Service, Lower Elwha S'Klallam Tribe, National Marine Fisheries Service, and Washington Department of Fish and Wildlife personnel conducted an Elwha River Chinook spawner survey on September 17, 2014 from below Glines Powerhouse at RM 13.3 to near the mouth at RM 0.2. Three tributaries upstream of the lower dam outflow were also surveyed. Surveyors counted and mapped visible redd locations in 13.1 miles of the main stem river, 0.45 miles of Hughes Creek, 1.2 miles of Little River, and 1.2 miles of Indian Creek. Live males, live females, live jacks, and live fish with sex not determined were counted along with the total number of carcasses A grand total of 1,270 visible redds in the mainstem river from Glines to the mouth plus 39 visible redds in the tributaries were counted. A total of 1,390 live adult Chinook and 400 dead Chinook were observed during the survey (**Table 2**).

Table 2. Number of Chinook redds, live adults, carcasses, and live jacks observed during an Elwha River Chinook spawner survey at numerous sections conducted on September 17, 2014 from downstream of Glines Powerhouse at river mile 13.3 to river mouth.

Section	# of Redds	# Live Males	#Live Females	# Live Unknown Sex	# Male Carcasses	# Female Carcasses	# Carcasses of Unknown Sex	# Live Jacks
Above Glines Powerhouse	1							
Glines Powerhouse to Top of Altaire Canyon	241	0	0	257	0	0	57	0
Top of Altaire Canyon to Altaire Bridge	29	0	0	23	0	0	19	0
Altaire Bridge (right bank to split) to Griff Creek (right channel)	32	0	0	19	0	0	9	0
Griff Creek to Rabbit Hole (right channel)	59	0	0	48	0	0	24	0
Altaire Bridge (left bank) to Ranger Station (left channel)	31	18	22	10	7	4	1	0
Ranger Station to Rabbit Hole (left channel)	23	9	12	5	20	4	1	0
Rabbit Hole to Fisherman's Corner	69	43	29	14	35	16	5	0
Fisherman's Corner to Park Boundary	55	25	7	58	24	7	18	0
Park Boundary to McDonald Bridge Gage	82	36	22	148	25	2	22	0
McDonald Bridge Gage to A-Frame	17	2	1	24	7	4	6	0
A-Frame to 101 Bridge	35	3	2	73	2	0	10	0
Highway 101 Bridge to Gooseneck	57	0	0	62	0	0	26	0
Gooseneck to Elwha Dam	42	0	0	61	0	0	40	0
Hughes Creek (0-0.6rm)	12	3	5	0	0	3	0	0
Little River (0-1.0rm)	1	0	0	0	0	0	0	0
Indian Creek (0-1.2rm)	26	0	0	89	0	0	0	0
Elwha Dam to Highway 112 Bridge	50	0	0	10	not counted	not counted	not counted	0
Highway 112 Bridge to Weir Site	125	0	0	65	not counted	not counted	not counted	0
Weir Site to Elwha River Road Bridge	25	0	0	33	not counted	not counted	not counted	0
Elwha River Road Bridge to Sisson's Riffle	14	0	0	36	not counted	not counted	not counted	0
Sisson's Riffle to Spruce Hole	83	0	0	87	not counted	not counted	not counted	0
Hunt Side Channel	47	0	0	14	0	0	2	0
Right Main Stem to Mouth	154	0	0	0	0	0	0	0

Section	# of Redds	# Live Male	# Live Female	# Live Unknown	# Male Carcasses	# Female Carcasses	# Carcasses of Unknown Sex	# Live Jacks
Mainstem (Glines to Mouth)	1270	136	95	1062	120	37	240	0
Tributaries (Hughes, Little, Indian)	39	3	5	89	0	3	0	0

The estimated total return to the Elwha River was 4,360 which consisted of 1,847 adult Chinook (956 males plus 891) collected for broodstock plus 2,513 natural spawning adults in the river (**Table 3**). Denton et al. (2014) estimated a total Chinook return of 4,360 (4,050 – 4,685; 95% C.I.) using SONAR. The number of natural Chinook spawners in the river was estimated by subtracting the total number of adult broodstock from the estimated total return from the SONAR total return estimate (4,360 - 1,847 = 2,513).

Table 3. Estimated Elwha River Chinook terminal run size for 2014 based on redd counts from natural spawners and number of broodstock collected from the Elwha River weir, netted in the main stem river, Lower Elwha S'Klallam Hatchery, and returns to the WDFW Elwha Rearing Channel.

ELWHA CHINOOK TRS ESTIMATE - 2014					
Number of natural adult spawners in the river = SONAR count minus broodstock collections	**2,513**	**adults**			
Number of Chinook gaffed / netted/ gillnetted in river and spawned on site =		**367**	(77 males + 140 females + No jacks+150 NVF)	Plus 150 Non-viable females NVF	
Number of Chinook netted /seined in river downstream of weir and taken to WDFW Channel =		**990**	(552 males + 438 females + 1 jacks)	991 with jacks	
Number of Chinook transported from LEK Hatchery to WDFW Elwha Channel =		**316**	213 males + 103 females + 2 jacks)	318 with jacks	
Number transported from Elwha River weir to WDFW Elwha Channel =		**0**	Discontinued weir operation in 2014		
Number of Elwha Channel Trap Returns (Volunteers) =		**174**	(114 males + 60 females + 0 jacks)	174 total-no jacks	
Number of Chinook transported from weir, LEK hatchery, netted to WDFW Elwha Channel =	**1,847**	**adults**	**956**	**males**	
			891	**females includes NVF**	
			1,847	**Plus 3 jacks**	
Terminal Run Size (includes Chinook collected for broodstock, returns to hatcheries, and estimated number of natural spawners in river	**4,360**		**2,464**	**males**	
			1,896	**females**	
			4,360	**Total**	
Sonar Adult Count (Denton estimate)-used for 2014 forecast estimate	**4,050**	**4,360**	**4,685**	final (jacks not included)	

Table 4 summarizes the number of males, females, and total adult Chinook sampled for scales and coded-wire tags (CWTs) in 2014. Carcasses were sampled from late August through early October from Glines Powerhouse to the mouth and from broodstock collected for the WDFW Elwha Hatchery facility. A total of 391 males and 337 females for a total of 728 were aged. An additional 44 carcasses were sampled but the ages could not be determined. Chinook were sampled by the following methods: carcass surveys by foot and raft from the mainstem river, broodstock collected from the river by seining and netting (Net), and fish returning to the Lower Elwha Hatchery (LEKT) and the WDFW Elwha Hatchery (Volunteers). No samples were taken from fish collected by hatchery staff and spawned on site in the mainstem river. The male Chinook age composition from the carcass samples consisted of 1.3% age-2, 39.4% age-3, 49.6% age-4, and 9.7% age-5. The female Chinook age composition consisted of 0.0% age-2, 4.2% age-3, 65.6% age-4, and 30.3% age-5.

Table. 4: Summary of the Elwha Chinook carcasses sampled for scales and coded-wire tags (CWTs) during RY2014, by sex and age.

Male Elwha Chinook 2014						
Sampling method	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**	**Prop.**
Carcass-foot survey	0	39	52	17	108	0.2762
Carcass- float survey	0	7	19	1	27	0.0691
Netted -spawned on site	0	0	0	0	0	0.0000
LEKT	2	24	23	2	51	0.1304
Net	1	57	86	17	161	0.4118
Volunteer	2	27	14	1	44	0.1125
Total	5	154	194	38	391	1.0000
Prop.	0.0128	0.3939	0.4962	0.0972	1.0000	
Female Elwha Chinook 2014						
Sampling method	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**	**Prop.**
Carcass-foot survey	0	6	61	33	100	0.2967
Carcass- float survey	0	1	14	8	23	0.0682
Netted -spawned on site	0	0	0	0	0	0.0000
LEKT	0	3	29	12	44	0.1306
Net	0	2	85	45	132	0.3917
Volunteer	0	2	32	4	38	0.1128
Total	0	14	221	102	337	1.0000
Prop.	0.0000	0.0415	0.6558	0.3027	1.0000	
Total Elwha Chinook 2014						
Sampling method	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**	**Prop.**
Carcass-foot survey	0	45	113	50	208	0.2857
Carcass- float survey	0	8	33	9	50	0.0687
Netted -spawned on site	0	0	0	0	0	0.0000
LEKT	2	27	52	14	95	0.1305
Net	1	59	171	62	293	0.4025
Volunteer	2	29	46	5	82	0.1126
Total	5	168	415	140	728	1.0000
Prop.	0.0069	0.2308	0.5701	0.1923	1.0000	

Table 5 summarizes the number of males, females, and total adult Chinook sampled for scales and coded-wire tags (CWTs). A total 772 Chinook were sampled for scales, CWTs, and checked for external marks (missing adipose fin). The coded-wire tags have not been decoded at the time of this report. All samples except for 18 females and 26 males were aged from scale analysis. Of the 728 total Chinook samples that could be aged, 54 (7.4%) were CWT and 674 (92.6%) were untagged. An additional 5 males were detected with a CWT but their age could not be determined from scales. The 674 untagged and unmarked fish could be either hatchery origin (otolith marked) or natural origin (no otolith mark). Thirty-two of the 391 (8.2%) males sampled and 22 of the 337 (6.6%) females were detected with a CWT.

Table 5. Summary of the Elwha Chinook sampled for scales and coded-wire tags (CWTs) during RY 2014, by sex, age and sampling method.

Male Elwha Chinook 2014	Age-2	Age-3	Age-4	Age-5	Total
Sampling method	**#CWT/#sampled**	**#CWT/ #sampled**	**#CWT/#sampled**	**#CWT/#sampled**	**#CWT/#sampled**
Carcass-foot survey	0	0/39	1/52	0/17	1/108
Carcass- float survey	0	0/7	0/19	0/1	0/27
Netted -spawned on site	0	0	0	0	0
LEKT	2/2	1/24	5/23	1/ 2	9/51
Net	1/1	1/57	12/86	5/17	19/161
Volunteer	1/2	1/27	1/14	0/1	3/44
Total CWT /Total sampled	4/5	3/154	19/194	6/38	32/391
Prop. of sampled by age w/CWT	0.800	0.020	0.098	0.158	
Prop. of total sampled w/CWT	0.010	0.008	0.049	0.015	0.082
Female Elwha Chinook 2014	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**
Sampling method	**#CWT/#sampled**	**#CWT/ #sampled**	**#CWT/#sampled**	**#CWT/#sampled**	**#CWT/#sampled**
Carcass-foot survey	0	0/6	0/61	0/33	0/100
Carcass- float survey	0	0/1	0/14	0/8	0/23
Netted -spawned on site	0	0	0	0	0
LEKT	0	0/3	0/29	6/12	6/44
Net	0	1/ 2	5/85	8/45	14/132
Volunteer	0	0/2	2/32	0/4	2/38
Total CWT /Total sampled	0	1/14	7/221	14/102	22/337
Prop. of sampled by age w/CWT	0.00	0.071	0.032	0.138	
Prop. of total sampled w/CWT	0.00	0.003	0.021	0.042	0.066
Total Elwha Chinook 2014	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**
Sampling method	**#CWT/#sampled**	**#CWT/ #sampled**	**#CWT/#sampled**	**#CWT/#sampled**	**#CWT/#sampled**
Carcass-foot survey	0	0/45	1/113	0/50	1/208
Carcass- float survey	0	0/8	0/33	0/9	0/50
Netted -spawned on site	0	0	0	0	0
LEKT	2/2	1/27	5/52	7/14	15/95
Net	1/1	2/59	17/171	13/62	33/293
Volunteer	1/2	1/29	3/46	0/5	5/82
Total CWT /Total sampled	4/5	4/168	26/415	20/140	54/728
Prop. of sampled by age w/CWT	0.800	0.023	0.062	0.142	
Prop. of total sampled w/CWT	0.006	0.006	0.036	0.027	0.074

One age-2 male and one age-4 female were adipose fin-clipped and tagged (CWT), one female (age unknown) had a possible adipose fin-clip, and one male (age unknown) was adipose and untagged.

Table 6 summarizes the expanded number of males, females, and total adult Chinook, by age class, based on the entire population. The age estimates were calculated by multiplying the age proportions to the total natural spawners in the river, broodstock collected from the river by seining and netting (Net), and fish returning to the Lower Elwha Hatchery (LEKT) and the WDFW Elwha Hatchery (Volunteers). The percentages for ages-2, -3, -4, and -5 males were 0.70%, 33.6%, 51.4%, and 11.3%, respectively.

The percentages for ages-3, -4, and -5 females were 5.4%, 61.1%, and 33.5%, respectively.

Table 6. Summary of expanded number of Elwha Chinook males and females in RY2014, by age class, based on the entire population.

Male Elwha Chinook 2014	Age-2	Age-3	Age-4	Age-5	Total
Carcass survey	0	436	581	190	1206
Float survey	0	78	212	11	302
Netted -spawned on site	0	24	46	7	77
LEKT	8	100	96	8	213
Net	3	195	295	58	552
Volunteer	5	70	36	3	114
Total	17	903	1266	278	2464
Prop. of total M sampled w/CWT	0.007	0.336	0.514	0.113	1.000
Female Elwha Chinook 2014	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**
Carcass survey	0	49	498	270	817
Float survey	0	8	114	65	188
Netted -spawned on site	0	15	177	98	290
LEKT	0	6	63	34	103
Net	0	19	267	152	438
Volunteer	0	4	40	16	60
Total	0	102	1158	636	1896
Prop. of total F sampled w/CWT	0.000	0.054	0.611	0.335	1.000
Total Elwha Chinook 2014	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**
Carcass survey	0	485	1079	460	2023
Float survey	0	86	327	77	490
Netted -spawned on site	0	39	222	106	367
LEKT	8	106	159	42	316
Net	3	214	561	211	990
Volunteer	5	74	76	19	174
Total	17	1005	2424	914	4360
Prop. of total sampled w/CWT	0.004	0.231	0.555	0.210	1.000

Table 7 summarizes the expanded number of males, females, and total adult Chinook, by age class, based on the entire population of Chinook. The estimate was calculated by multiplying the age proportions of zeros that returned as adults from the samples to the total number of Chinook from the sampling methods previously described. The percentages for ages-2, -3, -4, and -5 males were 0.10%, 38.2%, 50.8%, and 10.9%, respectively. The percentages for ages-2, -3, -4, and -5 females were 0.0%, 0.50%, 62.5%, and 32.5%, respectively.

Table 7. Summary of the expanded number of males, females, and total Elwha adult Chinook in RY 2014, by age class, based on the entire population of Chinook.

Male Elwha Chinook 2014					
Sampling method	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**
Carcass-foot survey	0	436	570	190	1195
Carcass- float survey	0	78	212	11	302
Netted -spawned on site	0	24	45	7	76
LEKT	0	96	75	4	175
Net	0	192	254	41	487
Volunteer	3	67	34	3	106
Total CWT	3	893	1189	256	2342
Prop. of total M sampled w/CWT	0.001	0.382	0.508	0.109	1.000
Female Elwha Chinook 2014					
Sampling method	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**
Carcass-foot survey	0	49	498	270	817
Carcass- float survey	0	8	114	65	188
Netted -spawned on site	0	15	177	98	290
LEKT	0	6	63	17	86
Net	0	10	251	125	386
Volunteer	0	4	37	16	58
Total . CWT	0	92	1140	592	1824
Prop. of total F sampled w/CWT	0.000	0.050	0.625	0.325	1.000
Total Elwha Chinook 2014					
Sampling method	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**
Carcass-foot survey	0	485	1068	460	2012
Carcass- float survey	0	86	327	77	490
Netted -spawned on site	0	39	222	106	366
LEKT	0	102	138	21	261
Net	0	202	505	166	873
Volunteer	3	71	71	19	164
Total . CWT	3	985	2330	848	4166
Prop. of total sampled w/CWT	0.001	0.236	0.559	0.204	1.000

Table 8 summarizes number of males, females, and total adult Chinook, by age class, based on the entire population of yearling Chinook that returned as adults. The estimate was calculated by multiplying the age proportions of yearlings that returned as adults from the samples to the total number of Chinook from the sampling methods previously described. The percentages for ages-2, -3, -4, and -5 males were 1.15%, 8.2%, 62.3%, and 17.2%, respectively. The percentages for ages-2, -3, -4, and -5 females were 0.00%, 13.9%, 50.0%, and 33.5%, respectively.

Table 8. CWT expanded +Yearlings

Male Elwha Chinook 2014	Age-2	Age-3	Age-4	Age-5	Total
Carcass-foot survey	0	0	11	0	11
Carcass- float survey	0	0	0	0	0
Netted -spawned on site	0	0	1	0	1
LEKT	8	4	21	4	38
Net	3	3	41	17	65
Volunteer	3	3	3	0	8
Total CWT	14	10	77	21	122
Prop. of total M sampled w/CWT	0.115	0.082	0.631	0.172	1.000
Female Elwha Chinook 2014	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**
Carcass-foot survey	0	0	0	0	0
Carcass- float survey	0	0	0	0	0
Netted -spawned on site	0	0	0	0	0
LEKT	0	0	0	17	17
Net	0	10	16	27	52
Volunteer	0	0	2	0	2
Total . CWT	0	10	18	44	72
Prop. of total F sampled w/CWT	0.000	0.139	0.500	0.6111	1.000
Total Elwha Chinook 2014	**Age-2**	**Age-3**	**Age-4**	**Age-5**	**Total**
Carcass-foot survey	0	0	11	0	11
Carcass- float survey	0	0	0	0	0
Netted -spawned on site	0	0	1	0	1
LEKT	8	4	21	21	55
Net	3	13	57	44	117
Volunteer	3	3	5	0	10
Total . CWT	14	20	95	65	194
Prop. of total sampled w/CWT	0.072	0.103	0.490	0.335	1.000

For the 2014 return year, a total of 4,163 Elwha Chinook were estimated to have originated from fingerling releases and 180 originated from yearling releases for a total of 4,343. An additional 17 age-2 jacks were estimated to have returned. The total number of fingerling returns in the table includes any potential natural origin fish. The final numbers in this table are subject to change until the 2014 otolith and CWT analysis has been completed. Of the estimated 4,163 adult returns from fingerling releases, 23.7% (985) were age-3; 56.0% (2,330) were age-4; and 20.4% (848) were age-5. Of the estimated 180 adult returns from yearling releases, 11.1% (20) were age-3; 52.8% (95) were age-4 and 36.1% (65) were age-5. There were no age-6 adult returns from the fingerling and yearling release groups (**Table 9**).

Table 9. Summary of the Elwha Chinook adult returns, by age class, from the hatchery fingerling and yearling release groups for return years 2006 through 2014.

Return Year	Total Age	Brood year	Returns from Fingerling Releases	Age %	Returns from Yearling Releases	Age	Total	Age %
2006	3	2003	183	0.0964	0	0.0000	183	0.0948
2006	4	2002	829	0.4368	33	1.0000	862	0.4464
2006	5	2001	870	0.4584	0	0.0000	870	0.4505
2006	6	2000	16	0.0084	0	0.0000	16	0.0083
2006	**Totals**		**1,898**	**1.0000**	**33**	**1.0000**	**1,931**	**1.0000**
2007	3	2004	234	0.2175	17	0.2429	251	0.2190
2007	4	2003	727	0.6757	53	0.7571	780	0.6806
2007	5	2002	105	0.0976	0	0.0000	105	0.0916
2007	6	2001	10	0.0093	0	0.0000	10	0.0087
2007	**Totals**		**1,076**	**1.0000**	**70**	**1.0000**	**1,146**	**1.0000**
2008	3	2005	795	0.7092	0	0.0000	795	0.6895
2008	4	2004	262	0.2337	21	0.6563	283	0.2454
2008	5	2003	64	0.0571	11	0.3438	75	0.0650
2008	6	2002	0	0.0000	0	0.0000	0	0.0000
2008	Totals		1,121	1.0000	32	1.0000	1,153	1.0000
2009	3	2006	109	0.0499	8	1.0000	117	0.0534
2009	4	2005	2,052	0.9396	0	0.0000	2,052	0.9361
2009	5	2004	23	0.0105	0	0.0000	23	0.0105
2009	6	2003	0	0.0000	0	0.0000	0	0.0000
2009	**Totals**		**2,184**	**1.0000**	**8**	**1.0000**	**2,192**	**1.0000**
2010	3	2007	529	0.4222	0	0.0000	529	0.4136
2010	4	2006	118	0.0942	21	0.8077	139	0.1087
2010	5	2005	606	0.4836	5	0.1923	611	0.4777
2010	6	2004	0	0.0000	0	0.0000	0	0.0000
2010	**Totals**		**1,253**	**1.0000**	**26**	**1.0000**	**1,279**	**1.0000**
2011	3	2008	792	0.4602	105	0.7343	897	0.4812
2011	4	2007	913	0.5305	24	0.1678	937	0.5027
2011	5	2006	16	0.0093	14	0.0979	30	0.0161
2011	6	2005	0	0.0000	0	0.0000	0	0.0000
2011	**Totals**		**1,721**	**1.0000**	**143**	**1.0000**	**1,864**	**1.0000**
2012	3	2009	985	0.4937	43	0.2240	1,028	0.4701
2012	4	2008	933	0.4677	144	0.7500	1,077	0.4925
2012	5	2007	77	0.0386	5	0.0260	82	0.0375
2012	6	2006	0	0.0000	0	0.0000	0	0.0000
2012	**Totals**		**1,995**	**1.0000**	**192**	**1.0000**	**2,187**	**1.0000**
2013	3	2010	1,089	0.2645	347	0.2491	1,436	0.2606
2013	4	2009	2,967	0.7207	924	0.6633	3,891	0.7062
2013	5	2008	61	0.0148	122	0.0876	183	0.0332
2013	6	2007	0	0.0000	0	0.0000	0	0.0000
2013	**Totals**		**4,117**	**1.0000**	**1,393**	**1.0000**	**5,510**	**1.0000**
2014	3	2011	985	0.2366	20	0.1111	1,005	0.2314
2014	4	2010	2,330	0.5597	95	0.5278	2,425	0.5584
2014	5	2009	848	0.2037	65	0.3611	913	0.2102
2014	6	2008	0	0.0000	0	0.0000	0	0.0000
2014	**Totals**		**4,163**	**1.0000**	**180**	**1.0000**	**4,343**	**1.0000**

1/ Numbers in table subject to change based upon otolith analysis to determine origin (hatchery or natural).

For the 2003 to 2008 brood years, the hatchery fingerling return rates have ranged from 0.009% to 0.193% and averaged 0.075%, and the yearling return rates have ranged from 0.004% to 0.185% and averaged 0.042%. The number of fingerling releases for these brood years ranged from 926,000 to 2,984,000 and the number of yearling releases ranged from 140,900 to 340,946. The preliminary fingerling and yearling return

estimates for the 2008 brood year releases are 0.158% and 0.514%, respectively. This preliminary estimate is based on the age-3, -4 and -5 adult returns from the 2009 brood year. The age-6 returns will not be available until fall 2015.

The number of age-6 hatchery returns has been zero since the 2003 brood year. The total number of fingerling returns in the table includes any potential natural origin fish. The final numbers in the table are subject to change until the 2015 otolith analysis has been completed (**Table 10**).

Table 10. Summary of the number of adult Elwha Chinook returns, by age class, and the percent return from hatchery fingerling and hatchery yearling release groups for brood years 2003 through 2011. 1/

Brood year	No. Fingerling releases (BY+1)	Age	Returns from Fingerling Releases	Fingerling percent return	No. Yearling releases (BY+2)	Returns from Yearling Releases	Yearling percent return
2003		3	183	0.00613		0	0.00000
2003		4	727	0.02436		53	0.01666
2003		5	64	0.00214		11	0.00346
2003		6	0	0.00000		0	0.00000
2003	**2,984,000**	**Totals**	**974**	**0.03264**	**318,150**	**64**	**0.02012**
2004		3	234	0.00851		17	0.00974
2004		4	262	0.00953		21	0.01203
2004		5	23	0.00084		0	0.00000
2004		6	0	0.00000		0	0.00000
2004	**2,750,000**	**Totals**	**519**	**0.01887**	**174,500**	**38**	**0.02178**
2005		3	795	0.02689		0	0.00000
2005		4	2,052	0.06939		0	0.00000
2005		5	606	0.02049		5	0.00355
2005		6	0	0.00000		0	0.00000
2005	**2,957,000**	**Totals**	**3,453**	**0.11677**	**140,900**	**5**	**0.00355**
2006		3	109	0.00417		8	0.00289
2006		4	118	0.00451		21	0.00758
2006		5	16	0.00061		14	0.00506
2006		6	0	0.00000		0	0.00000
2006	**2,614,000**	**Totals**	**243**	**0.00930**	**276,950**	**43**	**0.01553**
2007		3	529	0.02832		0	0.00000
2007		4	913	0.04888		24	0.00704
2007		5	77	0.00412		5	0.00147
2007		6	0	0.00000		0	0.00000
2007	**1,868,000**	**Totals**	**1,519**	**0.08132**	**340,946**	**29**	**0.00851**
2008		3	792	0.08553		105	0.05223
2008		4	933	0.10076		144	0.07164
2008		5	61	0.00659		122	0.06069
2008		6	0	0.00000		0	0.00000
2008	**926,000**	**Totals**	**1,786**	**0.19287**	**201,017**	**371**	**0.18456**
2009		3	985	0.03232		43	0.02141
2009		4	2,967	0.09735		924	0.46010
2009		5	848	0.02782		65	0.03237
2009		6	TBD	TBD		TBD	TBD
2009	**3,047,730**	**Totals**			**200,824**		
2010		3	1,089	0.08807		347	0.16299
2010		4	2,330	0.18843		95	0.04462
2010		5	TBD	TBD		TBD	TBD
2010		6	TBD	TBD		TBD	TBD
2010	**1,236,562**	**Totals**			**212,900**		
2011		3	985	0.06460		20	0.01017
2011		4	TBD	TBD		TBD	TBD
2011		5	TBD	TBD		TBD	TBD
2011		6	TBD	TBD		TBD	TBD
2011	**1,524,769**	**Totals**			**196,575**		

1/ Numbers in table subject to change based upon otolith analysis to determine origin (hatchery or natural).

A total of 556 DNA samples were collected from the Chinook in 2014 for genetic analysis.

ANALYSIS OF CONTRIBUTION TO FISHERIES AND ESCAPEMENT

Harvest rate impacts are not available for this release. There is no update from the data presented in the November 2012 Hatchery and Genetic Management Plan.

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