LAKE CHELAN FISHERY FORUM
2016 ANNUAL WORK PLAN

LICENSE ARTICLE 404
SETTLEMENT AGREEMENT CHAPTER 6

FINAL

LAKE CHELAN HYDROELECTRIC PROJECT
FERC Project No. 637

April 1, 2016

Developed by the
National Park Service, USDA Forest Service, and
Washington Department of Fish and Wildlife
in coordination with, and adopted by, Chelan PUD

TABLE OF CONTENTS

List of Tables

List of Figures

SECTION 1: INTRODUCTION

On November 6, 2007, Public Utility District No. 1 of Chelan County (Chelan PUD) filed the Lake Chelan Fishery Plan (LCFP) pursuant to Article 404 of the Federal Energy Regulatory Commission Order on Offer of Settlement and Issuing New License dated November 6, 2006 for the Lake Chelan Hydroelectric Project. This report satisfies Article 404 requirements for annual reporting of activities associated with the following:

1. Tributary Barrier Removal
2. Fish Stocking
3. Entrainment Sampling
4. Monitoring and Evaluation Program

The Federal Energy Regulatory Commission (FERC) approved the LCFP on December 4, 2007. A component of the Lake Chelan Settlement Agreement (SA) and Lake Chelan Fishery Plan is for the National Park Service (NPS), USDA Forest Service (USFS), and Washington Department of Fish and Wildlife (WDFW) to develop and adopt an annual work plan describing monitoring and evaluation measures in Lake Chelan to be implemented in the upcoming year and a report on activities completed the previous year.

It is a requirement of Chelan PUD's Lake Chelan license to make available $20,000 each year, plus an additional $20,000 in matching funds, to be used for implementing measures contained in the annual Lake Chelan Fish Monitoring and Evaluation Plan.

This annual work plan, developed in coordination with Chelan PUD and adopted by the NPS, USDA Forest Service, and WDFW, describes the methods and schedule used to demonstrate compliance with efforts to restore and enhance, where feasible, native fisheries in Lake Chelan and its tributaries, and to support the lake's recreational fishery.

The goals of the LCFP are to: 1) provide guidance for the management of the fishery resources in Lake Chelan; 2) protect native fish populations while maintaining a healthy recreational sport fishery in Lake Chelan; and 3) develop a monitoring and evaluation program to assess the efficacy of management actions.

The primary Lake Chelan Fishery Forum (LCFF) management objectives are to:

1. Emphasize restoration/enhancement of native species, where feasible;
2. Support the recreational sport fishery;
3. Manage the lake elevation to enhance tributary production and recreation;
4. Determine compatibility of management actions with potential future bull trout re-introduction;
5. Develop a monitoring and evaluation program that provides flexibility for future changes in both implementation and the monitoring and evaluation program;
6. Monitor and address entrainment of fish from Lake Chelan into the Project intake.

SECTION 2: POTENTIAL AND PAST MONITORING AND EVALUATION MEASURES

The following list of monitoring and evaluation measures includes potential future monitoring projects, monitoring projects that have been implemented and completed, and monitoring projects that have been implemented and are ongoing. Result summaries are reported briefly for past implemented projects. All projects are evaluated annually by the LCFF. Specific measures to be implemented in 2016 are described in Section 3.

2.1 Kokanee Creel Surveys

WDFW conducts annual kokanee creel surveys designed to monitor and determine the contribution of kokanee to the sport fishery. The main purpose of the survey is to: 1) determine the relative composition of kokanee as it relates to age and origin (naturally produced or hatchery released) contributing to the sport fishery; and 2) determine if kokanee continue to be a preferred species to pursue and catch. These surveys will be conducted beginning in March at the earliest and will conclude the end of June if catch and effort warrant doing so.

Creel survey methods:

Periodic effort counts i.e. (boat counts), and roving on–lake angler interviews were used beginning in April and continuing until mid-June in an effort to temporally target the traditional time of year when anglers fish for kokanee. Effort and angler interviews took place in the lower Lake Chelan Basin from Wapato Point on down to the City of Chelan. Both effort counts and the angler interviews were scheduled on a stratified random basis. Strata included weekdays, weekends, A.M. (0700 –1400 hours) and P.M. (1400 – 1100 hours) time periods. At least two randomly chosen weekdays and one non-random weekend day, alternating between Saturday and Sunday, were sampled per week. Effort counts consisted of counting the number of boats observed. Angler interviews were designed to collect information on individual angler effort (hours fished), fish caught and kept (or released), fish length, scales samples for age analysis and all fin clips or other identifying marks were recorded.

2015 survey results; Safety Harbor down-lake to Chelan:

WDFW conducted creel surveys using a random stratified approach from April through June of 2015. We interviewed 381 anglers that fished for a total of 2,174 hours (Table 1). We estimated that 8,630 anglers fished for 41,449 hours and caught a total of 9,496 kokanee. The kokanee catch was comprised entirely of naturally produced fish (Figure 1; Table 2). Overall kokanee catch per unit effort (CPUE) was 0.23, which was up from that of 2014 (0.17), while overall fish size was smaller in 2015 (Figure 1; Table 2).

Table 1: 2015 Lake Chelan Creel Survey Angler Data

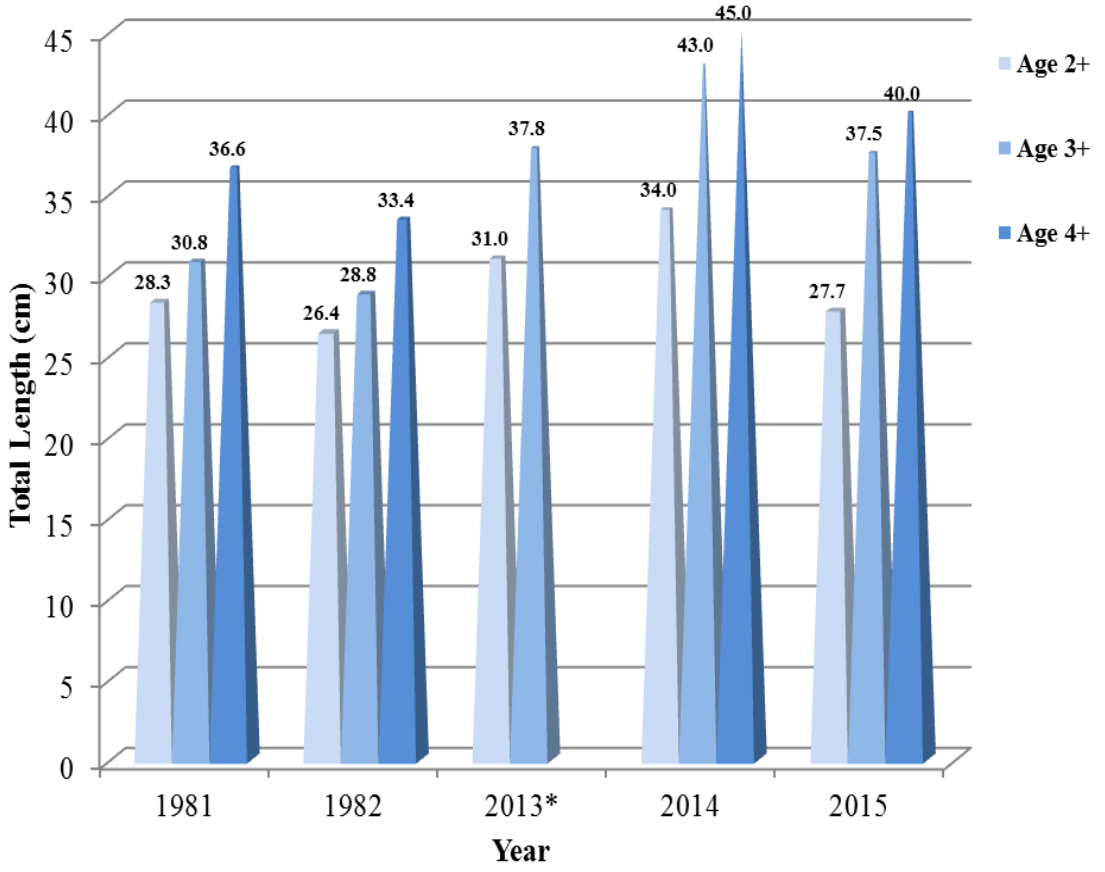
Sample Data	April	May	June	Total
Angler Sample Rate:	5.02%	2.93%	5.89%	4.41%
Total Anglers Interviewed:	176	96	109	381
Total Fishing Hours Sampled:	1,022	593	559	2,174
Mean Hours per Trip:	5.81	6.18	5.13	5.71

Table 2: Comparison of Lake Chelan Kokanee Creel Survey Results 2014-2015.

Estimated Results (2014)	April	May	June	Total
Effort (hrs):	17,262	19,309	14,652	51,223
Angler Trips:	3,378	4,116	2,441	9,935
Wild kokanee Caught:	1,914	3,939	2,584	8,437
Hatchery kokanee Caught:	46	54	24	124
kokanee CPUE:	0.11	0.21	0.18	0.17
Total 2014 kokanee Catch:	***1,960***	***3,993***	***2,608***	***8,561***
Estimated Results (2015)	**April**	**May**	**June**	**Total**
Effort (hrs):	16,213	16,305	8,931	41,449
Angler Trips:	3,506	3,273	1,851	8,630
Wild kokanee Caught:	3,093	4,189	2,214	9,496
Hatchery kokanee Caught:	0	0	0	0
kokanee CPUE:	0.19	0.26	0.25	0.23
Total 2015 kokanee Catch:	***3,093***	***4,189***	***2,214***	***9,496***

Of all kokanee harvested, 47%, 50% and 3% were of age 2+, 3+ and 4+ respectively. Overall, average length (Total Length) at age was somewhat less than in 2014, but on par with that of 2013 with 2+, 3+ and 4+ age classes being 27.7, 37.5, and 40.0 centimeters respectively (Figure 1).

In comparison with average length at age data collected during creel surveys by Brown in 1981 and 1982, kokanee have on average been larger during the last three years (2013-2015) (Figure 1). The kokanee population in 1981 may have been at an all-time low (est. harvest of just 446 fish) due to the apparent "kokanee crash," with the population in 1982 presumably being in recovery (est. harvest of 5,295 fish) (Brown 1984). Assuming the kokanee population has not recently been in a state of "crash" and forage base has not increased considerably. It is interesting to note that harvest in recent years is yielding somewhat larger fish than that of the early 80s.



* Age 4+ fish were not documented during the 2013 creel surveys presumably due to a relatively small sample size,

Figure 1. A comparison of kokanee average length at age data for harvested fish during Lake Chelan creel surveys.

Anglers from Chelan (58.1%) and King (16.3%) counties made up the largest portion of those surveyed. Other angler origins ranged from 0.3 - 11.3%, including one angler from Canada (Figure 2).

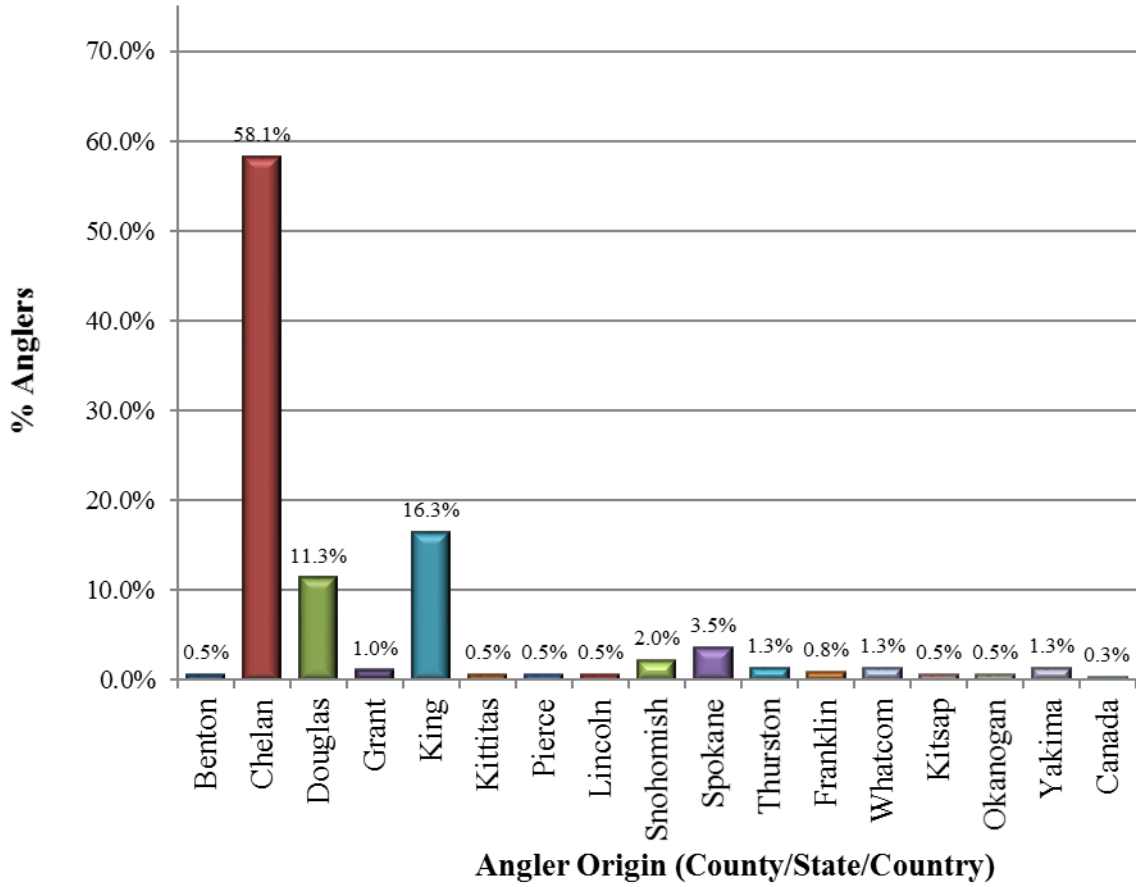


Figure 2. 2015 Angler County/State/Country of Origin (%)

2.2 Westslope Cutthroat Trout

The current ongoing and planned future fish management goal for Lake Chelan is to beneficially alter the abundance and composition of fish species in the lake. Multiple methods are in progress or will be used in the future to accomplish this goal, such as altered fishing regulations, a change in stocking practices, and removal of lake tributary alluvial barriers to spring spawning fish (LCFP 2007). The monitoring and evaluation efforts listed below are needed to determine the success of these fish enhancement efforts and to signal the possible need of adaptive changes.

The goal for westslope cutthroat trout (WCT) is to increase, significantly, the abundance of WCT in lake tributaries and the lake itself, for these fish to eventually replace themselves naturally, and for fish to contribute to the sport fishery. To reach this goal the following objectives must be met:

1) WCT hatched from eyed-egg or fry stocking in lake tributaries must survive to maturity, spawn and contribute to increased natural production.

2) A sufficient number of the catchable size WCT must escape harvest and recruit to the spawning run in order to substantially increase natural production.

3) The catchable size WCT must eventually replace the catchable size rainbow trout (RBT) in the sport fishery.

4) A majority of anglers fishing Lake Chelan need to accept the change in species.

To determine the results of the creel survey and spring spawning surveys a database must be constructed. Data will be analyzed and evaluated to determine if our efforts are meeting the above goal and objectives.

2.2.1 ***Lake Chelan Tributaries Spawning Monitoring and Evaluation, USFS***

Adfluvial WCT migrate from Lake Chelan to tributary streams during the spring to spawn (April-June). Due to low lake levels, large deposits of alluvial gravels at the mouths of tributaries, and other barriers to upstream fish passage (high water velocity, high gradient, low water depth), WCT are unable to reach spawning grounds until later in the summer (LCFP 2007) in certain tributaries. Removing these barriers, would allow WCT to access spawning grounds earlier in the spring and increase abundance and distribution of WCT within the adfluvial reaches of tributaries to Lake Chelan. Prior to removal of passage barriers, it was strongly recommended by Powers and Tanner (2008) that an evaluation of the current status of Lake Chelan WCT spawning populations be completed first. Therefore, beginning in 2009, spring spawning surveys were conducted by the USFS within the adfluvial zone of select tributary streams to Lake Chelan. Spawning surveys targeted WCT and RBT within the following tributaries: Bear, Big, Cascade, Four-mile, Lightning, Little Big, Riddle, Twenty-five Mile, First, Mitchell, Fish, Grade, Gold, Prince, Safety Harbor, Pyramid, Graham Harbor, Coyote, Castle, Deep Harbor and Lone Fir creeks.

Survey frequency was approximately one survey per stream per week. Water temperature data loggers were also deployed in surveyed streams from the first (April-May) survey and remained in place until late-September. Follow up snorkel and hook and line surveys were conducted in the fall within the adfluvial zone (approximately 100-250 meters) spawning reaches to further identify fish species within these tributary streams.

Lake Chelan tributaries spawning monitoring and evaluation results:

Results from the 2009-2011 Lake Chelan tributary trout spawning surveys and snorkel surveys are summarized in Tables 3 and 4.

Table 3. Westslope Cutthroat Trout Redds Observed in Lake Chelan Tributaries, 2009-2011

	Survey Dates		
Tributary	2009	2010	2011
Fish Creek	NS	2	0
Prince Creek	NS	0	NS
Bear Creek	NS	NS	0
Safety Harbor Creek	0	NS	0
Mitchell Creek	0	1	NS
Gold Creek	0	0	NS
Grade Creek	0	NS	NS

[a]NS=No survey

Table 4. Snorkel Survey Results for Lake Chelan Tributaries, 2009-2011

Tributary	Survey Dates	Survey Reach Length (m)	Fish [a] Species	Length of Fish (cm)			
				<3	3-10	10-20	>20
Fish Creek	2011	100	RBT	0	18	29	11
			WCT	0	1	1	0
			UNK	3	0	0	0
	2010	150	RBT	0	37	24	7
			WCT	0	48	31	11
			KOK	0	0	0	36
Prince Creek	2010	100	RBT	0	0	8	5
			WCT	0	20	5	5
			KOK	0	0	0	23
Bear Creek[b]	2011	100	RBT	0	2	1	0
			WCT	0	0	0	0
			UNK	0	0	0	0
Safety Harbor Creek	2011	150	RBT	0	7	8	9
			WCT	0	4	4	7
			UNK	7	0	0	0
	2009	50	RBT	5	35	19	4
			WCT	0	0	3	1
Grade Creek	2009	220	RBT	4	35	39	10
Gold Creek	2010	100	RBT	0	3	1	0
			WCT	0	3	3	0
			KOK	0	0	0	5
	2009	150	RBT	0	11	9	1
			WCT	0	0	3	0
Mitchell Creek	2010	100	RBT	0	0	2	0
			WCT	0	0	3	0
			KOK	0	0	0	1

[a]RBT=rainbow trout; WCT=westslope cutthroat trout; UNK=either RBT or WCT (too small to determine); KOK=kokanee

[b]The water level was too high to effectively conduct a snorkel survey for Bear Creek.

Since 2011, the USFS has been un-able to complete Lake Chelan tributary spawning ground surveys or fall snorkel surveys (only one snorkel survey was completed in 2012 on Fish Creek with 100 meters snorkeled and zero fish observed) due to changes in staffing which have caused challenges with logistics and timing of the surveys. Large

wildfires in the Lake Chelan Basin in 2013, 2014, and 2015 have also impeded the USFS ability to complete WCT surveys.

The USFS has not requested funding to continue these surveys for 2016. The USFS will focus on developing a new monitoring and evaluation proposal to bring to the LCFF in 2017.

2.2.2 ***Lake Chelan Tributary Estimates of Cutthroat and Rainbow Trout Abundance, WDFW***

In September of 2015, WDFW successfully sampled Fish, Prince, and Gold creeks (Tables 5 and 6). Information on adfluvial WCT and RBT population abundance, age class composition and other biological characteristics was collected. Due to inadequate lake transportation and forest fire restrictions, opportunistic investigations and surveys on Poison, Lightning, Little Big, Graham Harbor, Coyote, Deep Harbor, Lone Fir, Castle, Bear and Riddle Creeks as mentioned in the 2015 annual work plan, were not feasible.

Electro fishing techniques used in 2015 were similar to those described in Brown (1984). All trout were identified as rainbow, cutthroat or unknown. In addition, 15 age 1+ trout were identified as obvious rainbow/cutthroat hybrids; two from Fish Creek (91 and 169mm) and 13 from Prince Creek (98 – 170mm). These fish are in addition and not included in the population estimations. To be conservative unknown young of the year trout were treated as rainbow during population estimates. In 2015, 19 young of the year trout of unknown species origin were tissue sampled for future genetic analysis to provide some understanding of the current degree of hybridization between rainbow and WSCT.

Table 5. Estimated 2015 Lake Chelan Tributary Rainbow Trout Density and Population Abundance

Tributary	Sample Site Est.		Site Area (M^2)	Rainbow Per (M^2)	Available[2] Area (M^2)	Estimate
	All RB	YOY[1]				
Fish	52[a]	20[a]	132.5	0.392	1,920	753
	(49-55)[3]	(17-25) [3]				
Gold	3	1	27.3	0.110	390	43
	(3-6)	ENP				
Prince	26	8	232.8	0.112	1,464	164
	(25-27)	(6-10)				

[a]Mean number of fish estimated.
[1]YOY = young of the year, as a subset of all rainbow
[2]Estimated total accessible square meters of habitat in the entire stream; calculated as the minimal accessible stream length (Brown 1980) x average stream width (Maitland 2015).
[3] (95% Confidence Interval)
ENP = Estimate not possible (all fish caught on first pass)

Table 6. Estimated 2015 Lake Chelan Tributary Cutthroat Trout Density and Population Abundance

Tributary	Sample Site Est.		Site Area (M^2)	Cutthroat Per (M^2)	Available[2] Area (M^2)	Estimate
	All CT	YOY[1]				
Fish	0	0	132.5	0.000	1,920	0
	NA	NA				
Gold	0	0	27.3	0.000	390	0
	NA	NA				
Prince	6[a]	1[a]	232.8	0.026	1,464	38
	(4 - 8)	ENP				

[a]Mean number of fish estimated.
[1]YOY = young of the year, as a subset of all cutthroat
[2]Estimated total accessible square meters of habitat in the entire stream; calculated as the minimal accessible stream length (Brown 1980) x average stream width (Maitland 2015).
[3] (95% Confidence Interval)
ENP = Estimate not possible (all fish caught on first pass)

Table 7. Estimated 2014 Lake Chelan Tributary Rainbow Trout Density and Population Abundance

Tributary	Sample Site Est.		Site Area (M^2)	Rainbow Per (M^2)	Available[2] Area (M^2)	Estimate
	All CT	YOY[1]				
First	2	0	73.2	0.027322	6,208	170
	(2 - 15.2)	ENP				
Safety Harbor	3	0	201.3	0.014903	1,356	20
	ENP	ENP				
Twenty-Five Mile	3	1	158.9	0.018880	12,288	232
	(3 - 6.1)	ENP				
Grade	0	0	54.3	0.000000	1,168	0
	ENP	ENP				
Mitchell	1	1	36.5	0.027397	1,686	46
	ENP	ENP				

[1]YOY = young of the year, as a subset of all rainbow
[2]Estimated total accessible square meters of habitat in the entire stream; calculated as the minimal accessible stream length (Brown 1980) x average stream width (Viola 2012).
[3](95% Confidence Interval)
ENP = Estimate not possible (all fish caught on first pass)

Table 8. Estimated 2014 Lake Chelan Tributary Cutthroat Trout Density and Population Abundance

Tributary	Sample Site Est.		Site Area (M^2)	Cutthroat Per (M^2)	Available[2] Area (M^2)	Estimate
	All CT	YOY[1]				
First	20	14	73.2	0.273224	6,208	1,696
	(15.6 – 24.4)	(14 - 16.2)				
Safety Harbor	60	39	201.3	0.298063	1,356	404
	(50.1 -69.9)	(33 - 51.3)				
Twenty-Five Mile	118	74	158.9	0.742605	12,288	9,125
	(108 - 123.9)	(69 - 81.7)				
Grade	24	17	54.3	0.441989	1,168	516
	(24 – 26.4)	(69 - 81.7)				
Mitchell	25	15	36.5	0.684932	1,686	1,155
	(24 - 26.2)	(15 - 15.9)				

[1]YOY = young of the year, as a subset of all rainbow
[2]Estimated total accessible square meters of habitat in the entire stream; calculated as the minimal accessible stream length (Brown 1980) x average stream width (Viola 2012).
[3](95% Confidence Interval)
ENP = Estimate not possible (all fish caught on first pass)

Table 9. Estimated 2013 Lake Chelan Tributary Rainbow Trout Density and Population Abundance

Tributary	Sample Site Est.		Site Area (M^2)	Rainbow Per (M^2)	Available[2] Area (M^2)	Estimate
	All RB	YOY[1]				
Pyramid	13.0[a]	6.0 [a]	54.9	0.237	1,056	250
	(13-14.9)[3]	(9-11.2) [3]				
Cascade	3.0	3.0	46.1	0.065	341	22
	(3-6.1)	(3-6.1)				
Four Mile	10.0	3.0	139.6	0.072	10,470	750
	(10-12.5)	(4-8.7)				
Big	1.0	0.0	65.6	0.015	234	4
	ENP	NA				

[a]Mean number of fish estimated.
[1]YOY = young of the year
[2]Estimated total accessible square meters of habitat in the entire stream; calculated as the minimal accessible stream length (Brown 1980) x average stream width (Viola 2012).
[3](95% Confidence Interval)
ENP = Estimate not possible (all fish caught on first pass)

Table 10. Estimated 2013 Lake Chelan Tributary Cutthroat Trout Density and Population Abundance

Tributary	Sample Site Est.		Site Area (M^2)	Cutthroat Per (M^2)	Available[2] Area (M^2)	Estimate
	All CT	YOY[1]				
Pyramid	0.0	0.0	54.9	0.000	1,056	0
	NA	NA				
Cascade	20.0[a]	1.0[a]	46.1	0.434	341	148
	ENP	ENP				
Four Mile	0.0	0.0	139.6	0.000	10,470	0
	NA	NA				
Big	4.0	0.0	65.6	0.061	234	14
	(4-4.7)[3]	NA				

[a]Mean number of fish estimated.
[1]YOY = young of the year
[2]Estimated total accessible square meters of habitat in the entire stream; calculated as the minimal accessible stream length (Brown 1980) x average stream width (Viola 2012).
[3](95% Confidence Interval)
ENP = Estimate not possible (all fish caught on first pass)

Results from data gathered for Fish Gold and Prince Creeks in 2012 and 2015 are compared to those conducted in 1982 by Brown (1984) in Table 3. Of the tributaries sampled in 2015, only Prince Creek showed an increase in the percentage of cutthroat compared to 1982 and 2012.

Table 11. A Comparison of Species Abundance and Composition 1982 vs. 2012 vs. 2015

Tributary	1982			2012*			2015		
	All	% RB	%CT	All	%RB	%CT	All	%RB	%CT
Fish	922	0.81	0.19	293	1.00	0.00	753	1.00	0.00
Gold	1,115	1.00	0.00	292	0.84	0.16	43	1.00	0.00
Prince	1,353	0.85	0.15	333	0.96	0.04	197	0.83	0.17

* 2012 population estimates for rainbow and cutthroat in all three tributaries have been adjusted down as a result of genetic analysis confirming the presence of hybrids. However, the proportions of rainbow versus cutthroat remain unchanged.

Results from data gathered in 2014, 2013 2012, and 2011 are compared to those conducted in 1982 by Brown (1984) Tables 12, 13, 14 and 15, respectively. The intent is to evaluate the effectiveness of recent management actions to increase WCT abundance.

Table 12. A Comparison of Species Abundance and Composition 1982 vs. 2014

Tributary	1982			2014		
	All Trout	% RB	%CT	All Trout	%RB	%CT
First	2,483	100%	0%	1,866	91%	9%
Safety Harbor	1,032	98.8%	1.2%	424	95%	5%
25 Mile	7,776	100%	0%	9,357	98%	2%
Grade	824	100%	0%	516	100%	0%
Mitchel	480	100%	0%	1,201	96%	4%

Table 13. A Comparison of Species Abundance and Composition 1982 vs 2013.

Tributary	1982			2013		
	All Trout	% RB	%CT	All Trout	%RB	%CT
Pyramid	522	98%	2%	250	100%	0%
Cascade	453	85%	15%	170	13%	87%
Big	236	99%	1%	18	22%	78%
Four Mile	431	90%	10%	750	100%	0%

Table 14. A Comparison of Species Abundance and Composition 1982 vs. 2012

Tributary	1982			2012		
	All Trout	% RB	%CT	All Trout	%RB	%CT
Fish	1,932	83%	17%	1,909	100%	0%
Gold	4,927	100%	0%	5,285	84%	16%
Prince	3,820	86%	14%	3,627	98%	2%

Table 15. A Comparison of Species Abundance and Composition 1982 vs. 2011

Tributary	1982			2011		
	All Trout	% RB	%CT	All Trout	%RB	%CT
First	2,856	100%	0%	1,949	62%	38%
25-Mile	6,144	100%	0%	2,580	100%	0%
Mitchell	607	100%	0%	455	93%	7%
Grade	572	100%	0%	292	80%	20%
Safety Harbor	1,153	99%	1%	231	71%	29%

Hybridization between rainbow and cutthroat has and is still occurring. Genetics results from 2012 indicate that an average of 44% (21 - 71%) of the fish sampled were cutthroat/rainbow hybrids. Therefore, young of the year trout identified during 2015 sampling as either rainbow or cutthroat may have actually been hybrids. However, most likely many of the fish sampled in 1982 were also hybrids. It is intuitive that this would be the case given the long period of time that both species have coexisted in the lake. Because of rainbow presence we may never completely reestablish pure strain cutthroat as the dominate species. Nevertheless, based on 2015 sampling we can say that we now have a modest increase in the proportion of cutthroat in Prince Creek when compared to that of 1982 and 2012. The intent is to evaluate the effectiveness of recent management actions to increase WCT abundance.

2.2.3 ***Stehekin River Side Channel Trout Spawning and Abundance Surveys, NPS***

As part of the effort to reestablish the native WCT in the Lake Chelan System, a series of monitoring surveys were implemented in the Stehekin River. These surveys included: 1) side channel spawning and abundance surveys, 2) mainstem spawning and abundance surveys, and 3) genetic analysis of newly emerged fry to determine parental lineage.

Spawning surveys for RBT and WCT were conducted by NPS staff from 2009-2011 in-selected Stehekin River side channel and tributary index reaches to evaluate progress towards restoration of adfluvial WCT. Another three-year sequence of spawning surveys was initiated in 2015 and will continue through 2016 and 2017. This second round of spawning surveys is intended to assess the results of supplemental stocking and/or natural recruitment.

A summary report of 2009-2011 results can be found in Anthony and Glesne 2012. No WCT were observed spawning in 2015, though numerous RBT were observed actively spawning and digging redds. Large adfluvial WCT were frequently observed in established index sites in August, September, and October though these fish were only observed holding, feeding, and not spawning (Figure 3). It remains to be seen when and where adfluvial WCT are spawning in the Stehekin River.

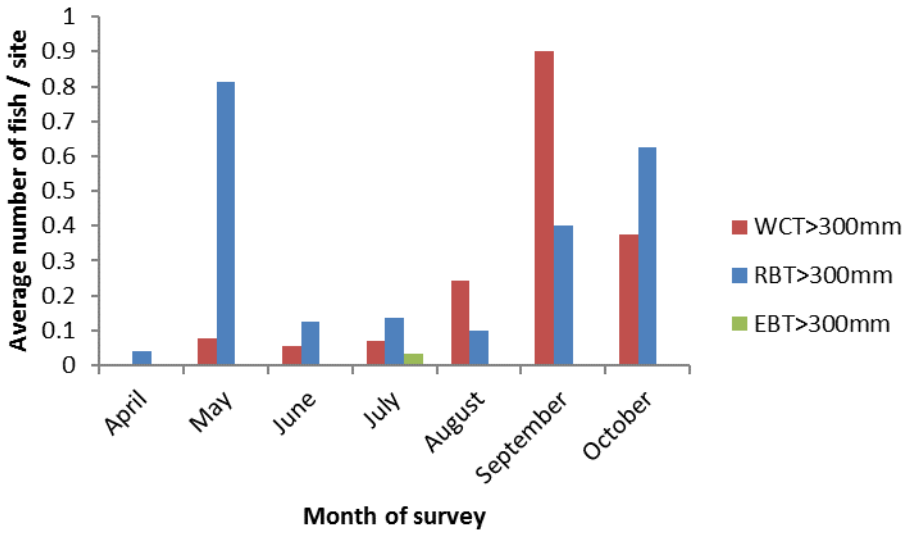


Figure 3. Total number of trout greater than 300 mm observed in core index sites by month; 2009-2011 and 2015

2.2.4 ***Stehekin River Mainstem Westslope Cutthroat and Rainbow Trout Surveys, NPS***

Surveys were conducted from 2012 to 2014 in the mainstem of the Stehekin River to assess management activities designed to increase the WCT population and reduce the population of non-native RBT. These surveys were discontinued after 2014, and below is a summary of results that have been reported in more detail in previous annual reports.

Pilot work conducted in 2011 identified eight channel-spanning pools in the lower 7 km of the Stehekin River and six of these pools were selected for continued surveys that were conducted from 2012 to 2014. These pools were selected based on the safety of conducting snorkel surveys under anticipated flow conditions.

Snorkel surveys were conducted by teams of two, with one surveyor counting fish and one surveyor on the channel bank timing the snorkel pass and recording data. Fish were tallied into length groups of less than 150 mm, 150–299 mm, 300–449 mm, and ≥450 mm. Each pool was snorkeled three times and the number of fish observed by species and pass duration was recorded. Of the three snorkel passes, the maximum fish count for each species was compared by the date the survey was conducted (Figure 4).

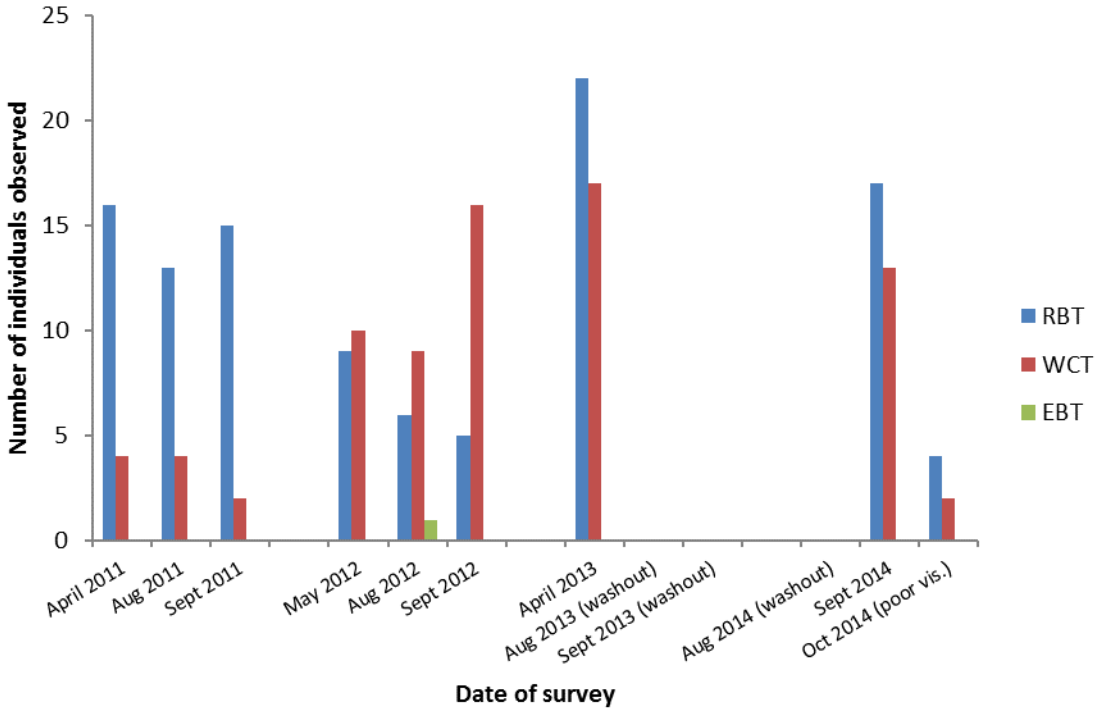


Figure 4. Maximum count of greater than 150 mm trout observed within six mainstem pool index sites, 2011 – 2014

In 2012 - 2014, North Cascades National Park Biologists conducted exploratory snorkel surveys on two reaches of mainstem riffle habitat to assess the possibility of including this habitat in long term monitoring for WCT presence (Table 16). NPS biologists found

that while inclusion of these mainstem riffle sites in late summer abundance surveys may be worthwhile, mainstem riffle surveys would be difficult to perform under flows greater than 2000 cfs and thus not feasible during much of the spring spawning season. These exploratory surveys will be discontinued in 2015.

Table 16. Number of greater than six inch fish observed and size classes within two mainstem riffle sites, 2012-2014

		Number of fish observed								
		Westslope Cutthroat Trout			Rainbow Trout			Kokanee		
Survey Date	Site Name	150-299mm	300-449mm	≥450mm	150-299mm	300-449mm	≥450mm	150-299mm	300-449mm	≥450mm
8/20/2012	Harlequin Bridge	0	0	0	0	0	0	2	0	0
9/25/2012	Blackberry	0	0	0	0	0	0	97	0	0
4/25/2013	Harlequin Bridge	0	3	0	0	2	0	0	0	0
4/26/2013	Blackberry	0	0	0	0	2	1	0	0	0
9/18/2013	Harlequin Bridge	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]
9/18/2013	Blackberry	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]
9/16/2014	Harlequin Bridge	0	1	0	0	1	0	0	0	0
9/16/2014	Blackberry	0	0	0	1	0	0	0	0	0
10/8/2014	Harlequin Bridge	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]
10/8/2014	Blackberry	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]

1 - Due to high river turbidity surveys were not completed on these dates.

Genetic analysis of newly emerged trout fry, NPS

From 2011-2015 young-of-year trout fry were collected for genetic analysis to provide definitive species information about successful trout spawning in index reaches. Species composition of these samples is useful for determining RBT and WCT spawner use of the index reaches, and the occurrence of hybridization. A sample of 25 fry was collected from each of four index reaches in 2011-2015 and genetic analyses of the samples was completed by Carl Ostberg (USGS Western Fisheries Research Center) following methods in Ostberg and Rodriguez (2006). Results from sampling efforts indicated that the vast majority of the newly emerged fry were RBT, and hybridization rates ranged from 0% to 40% in the channels surveyed (Figure 5). In 2013, eleven fry samples from index site i5 were identified as genetically pure WCT. However, this collection was inadvertently made just days after WDFW stocked WCT fry into the subject reach, so it is highly likely that the sampled fish were WCT of hatchery origin.

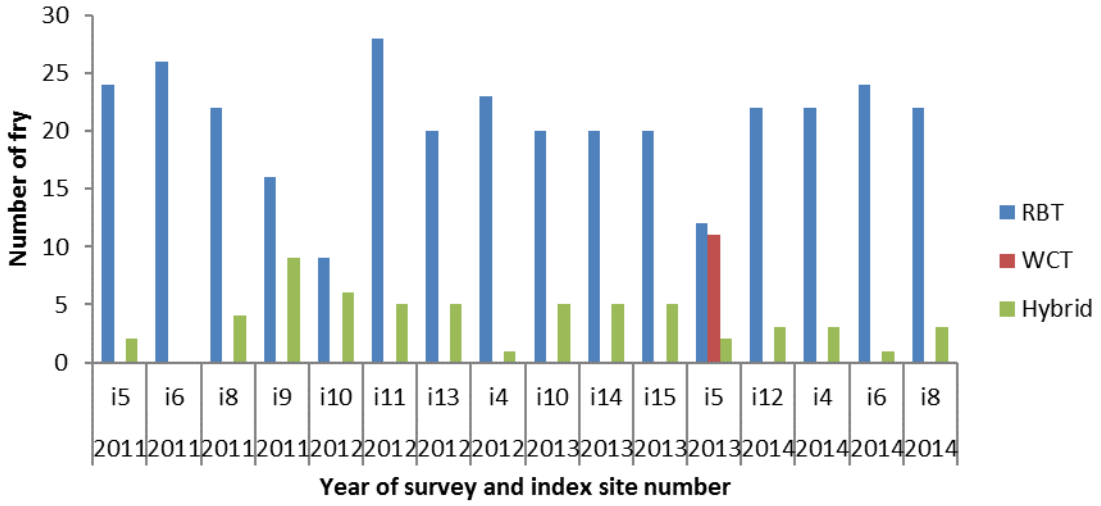


Figure 5. Genetic Assignment of newly emerged fry from Stehekin River side channel index sites; 2011-2014

2.2.5 Monitor Frequency of Non-Native Rainbow Trout Genetic Introgression in Native Westslope Cutthroat Trout in the Stehekin River, NPS

In 2001, 2002 and 2010 fish tissue samples were collected at Stehekin River locations distributed throughout the drainage to monitor the level and frequency of hybridization between non-native RBT and native WCT. Results indicate that there has not been any significant change in the frequency of WCT, RBT, and hybrids between 2002 and 2010 at any of the locations sampled. It is recommended that we continue to monitor genetic introgression every five to ten years to evaluate the status and progress towards WCT restoration in the watershed.

2.3 Kokanee

Kokanee are the most sought after fish in Lake Chelan (Brown 1984; DES 2000a). Maintaining a popular kokanee sport fishery in Lake Chelan is a high priority; to achieve a successful kokanee sport fishery, kokanee should be managed to maintain their abundance at a mean size acceptable to anglers, but at a level of abundance that does not substantially hinder efforts to restore native species.

Goals and objectives for Lake Chelan are to: 1) produce consistently good fishing; and 2) maintain an abundance of kokanee at a level that does not substantially hinder our efforts to restore native species.

2.3.1 *Fall Index Stream Kokanee Spawning Surveys, CPUD*

Chelan PUD has conducted annual Lake Chelan spawning ground surveys for kokanee and land-locked Chinook salmon since 1984. The purpose of these surveys is to document the annual trends of kokanee spawning populations within the Lake Chelan drainage (Stone and Fielder 2004). Two tributaries of the Stehekin River, Company Creek and Blackberry Creek, have been used as index reaches since 1984 because a majority of kokanee production from the Stehekin originates from in these tributaries. Additional tributaries to Lake Chelan that have been included in the annual kokanee

spawning ground surveys are: Mitchell, Gold, Grade, Safety Harbor, Prince, Fish, First, and Twenty-five Mile creeks.

Prior to 2013, surveys had been conducted approximately twice monthly between August 31 and October 31 due to availability of survey crews. Crews conduct surveys by walking in or along the streams and counting all live kokanee. Tally counters are used to keep track of fish numbers. Large masses of kokanee are estimated in some pools located in Company and Blackberry creeks (Stone and Fielder 2004). kokanee spawning ground surveys were conducted in 2015 by Chelan PUD and NPS due to limited availability of Chelan PUD staff. Chelan PUD staff will coordinate with NPS staff to ensure that kokanee spawning surveys can be conducted in 2016 to the greatest extent practicable.

Results of kokanee spawning ground surveys prior to 2013 can be found in Keesee and Keller 2013). This document can be found on the Chelan PUD Lake Chelan License Implementation webpage under Projects, Monitoring and Evaluation Activities.

Preliminary results of the 2015 kokanee spawning ground surveys are as follows:

- Company Creek: 14,775 (peak count: 6,661 kokanee on 10/5/2015)
- Blackberry Creek: 87 (peak count: 58 kokanee on 10/13/2015)
- Fish Creek: 7 (peak count: 6 kokanee on 9/21/2015)
- Prince Creek: 26 (peak count: 22 kokanee on 10/5/2015)
- No fish were observed in either 25-Mile or First creeks in 2015

The 2015 Lake Chelan Kokanee Spawning Ground Surveys report is in preparation.

Kokanee spawning ground surveys will be conducted by NPS and WDFW staff in 2016 and into the foreseeable future. Chelan PUD no longer has staff available to conduct these surveys. The inability of Chelan PUD to conduct kokanee spawning ground surveys was discussed during the December 10, 2015 LCFF meeting. The Forum agreed that continuing the surveys was very important to Lake Chelan fisheries management. Forum representatives from the NPS and WDFW agreed to support continuing the surveys and proposed budgets in sections 3.2.5 and 3.2.8, respectively, to conduct kokanee spawning ground surveys in 2016.

2.3.2 ***Mainstem Stehekin River and Side Channel Kokanee Spawning Escapement Surveys, NPS***

Annual kokanee spawning surveys have been conducted by CPUD on index reaches of Lake Chelan tributaries since 1983 (Fielder 2000; Stone and Fielder 2004). However, there is significant kokanee production emanating from the mainstem and side channel habitat of the Stehekin River that is not being assessed using current survey methods (DES 2000a). North Cascades National Park Service (NOCA) personnel conducted expanded kokanee spawning surveys in 2000, 2010, and 2015 on all fish accessible side channels in the lower 16 km of the Stehekin River (Table 17).

Table 17. Amount of side channel habitat assessed, habitat suitable for kokanee spawning and migration, and number of fish sample segments in the Stehekin River expanded kokanee spawning surveys; 2000, 2010 and 2015.

Year of Survey	Habitat Assessed (km)	Suitable Habitat (km)	Habitat Selected for Survey (km)	Percent of Suitable Habitat Surveyed (%)	Number of Fish Sample Segments
2000	22.8	19.8	7.2	36.4	17
2010	14.9	9.6	3.4	35.4	16
2015	19.4	16.9	3.8	22.5	15

In 2010 and 2015, the mainstem Stehekin River was also surveyed for spawning kokanee. The river was partitioned into thirty-two 500 m reaches eight of which were considered poor kokanee habitat as the river channel is deeply incised and substrate consists of large cobbles and boulders. These reaches were identified in a 2007 NOCA large woody debris survey as "transport zones". Of the remaining 24 reaches, in 2010 12 were randomly selected for sampling, and seven were selected in 2015. All randomly selected mainstem and side channel reaches were sampled four times between August 30 and October 15 in 2010 and five times between September 1 and October 28 in 2015.

Extrapolation of spawner survey counts to all suitable mainstem and all suitable side channel habitat was determined using the Area-Under-the-Curve Method (Beidler and Nickelson 1980). The 2015 escapement estimate was 32,620 kokanee, only 17% of the 2010 escapement estimate of 195,463 fish (Figure 4).

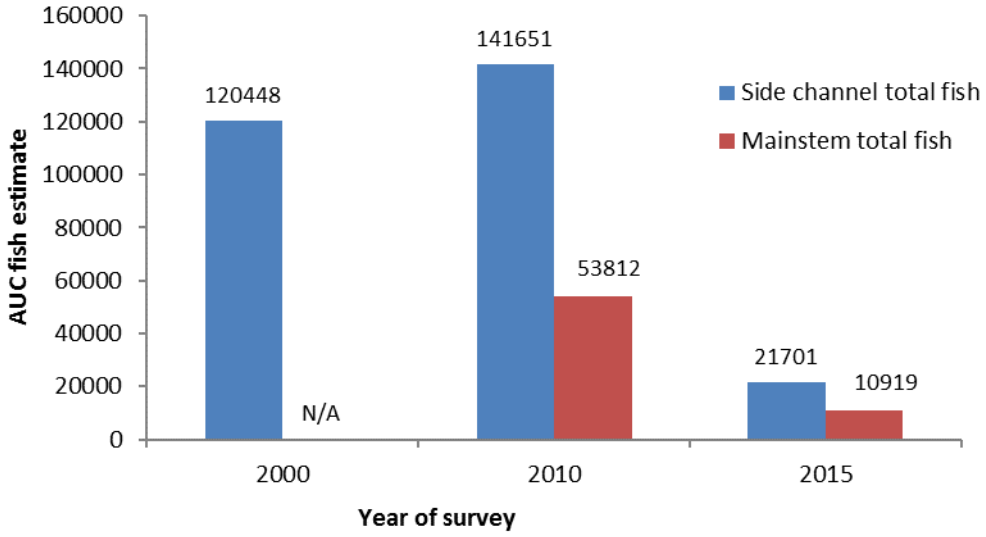


Figure 6. Kokanee escapement estimates for side channel and mainstem habitat in the Stehekin River; 2000, 2010 and 2015

A detailed report incorporating the results from the 2000 and 2010 expanded kokanee escapement surveys is contained in Anthony and Glesne 2013. A report incorporating the 2015 results is currently in progress and will be available in spring 2016. Replication of

this survey is recommended at five-year intervals, with the next survey in 2020. Results will be used to calibrate estimates of annual Chelan PUD index reach escapement to total basin escapement and to evaluate changes in habitat and spawner distribution in the study area.

2.3.3 ***Kokanee Stocking Monitoring and Evaluation, WDFW***

WDFW will clip adipose fins on all kokanee reared and released into Lake Chelan as part of the fish stocking program. Fin clipped kokanee will provide important information regarding the contribution of hatchery-reared kokanee to the sport fishery (especially their survival) as identified through creel surveys versus natural production. The cost of fin-clipping hatchery produced kokanee is estimated to be $6,200 annually.

2.4 Burbot

The LCFF believes that monitoring burbot population dynamics should be an important component to the monitoring and evaluation program. However, methods for assessing the burbot population in Lake Chelan need to be developed. Developing these methods will be a future task for the LCFF.

2.5 Smallmouth and Largemouth Bass

The LCFF believes that monitoring smallmouth and largemouth bass population dynamics should be an important component to the monitoring and evaluation program. However, methods for assessing the bass population in Lake Chelan need to be developed. Developing these methods will be a future task for the LCFF. In 2013, the NPS documented the presence of largemouth bass in the Lucerne Basin of Lake Chelan with photographic evidence of a specimen caught off Purple Point dock. In 2014, WDFW staff observed one adult largemouth bass swimming near one of the public docks at Stehekin.

2.6 Bull Trout

The LCFF believes that the monitoring of any future population and/or individual occurrences of bull trout in Lake Chelan should be an important component to the monitoring and evaluation program. Monitoring of this species at this time should include documentation of incidental occurrences during associated fish monitoring and evaluation program activities. Standard metric measurements, physical condition, photographs, and location of fish within Lake Chelan during these occurrences should be documented and provided to the LCFF for review.

The USFWS prepared the paper entitled "What Happened to bull trout in Lake Chelan? An Examination of the Historical Evidence" (Nelson 2012). The intent of the document was to conduct a "…rigorous examination of the factors that may have lead to the demise of bull trout" prior to considering any reintroduction of bull trout into the Lake Chelan basin. This is a very important management document that should be included by reference into the AWP.

2.7 Tributary Barrier Confirmation and Removal Planning

Tributary barriers identified in the Tributary Barrier Analysis report (DES 2000b) will be reassessed for depth, velocity, and gradient and re-prioritized if necessary. Two methodologies that may be used are: 1) using the Forest Practices Board Emergency Rule and "Oregon Method" used in the 2000 report; or 2) developing a more simplistic method based on the principles of the 2000 methodology to use as a more rapid assessment tool. The USDA Forest Service supports the latter option.

As tributary barriers are documented as either remaining or eliminated, the LCFF will update the tributary barrier removal priority list included in the 2000 report. Once the tributary barrier removal priority list is updated, the LCFF will work with Chelan PUD to implement Lake Chelan Settlement Agreement License Article 6(c) for tributary barrier removal work, such as investigating barrier removal methods, stream channel rehabilitation design at tributary mouths, contractor selection to conduct work, etc. Actual on-the-ground tributary barrier removal efforts will commence in early 2011, depending upon runoff volume and associated lake elevation.

Tributary barrier removal efforts were scheduled originally to begin in 2009. However, the schedule was revised due to delay in selecting a design contractor; need by the design contractor to view tributary mouths in 2009 to observe barriers present and discuss with the consulting team and LCFF potential preliminary design features; time required to secure necessary permits; and time required to secure a construction contractor.

The LCFF conducted a boat tour of tributary mouths in March 2008, touring both the north and south shores from Twenty-five Mile Creek up lake to Fish Creek. During the tour, LCFF members took numerous photographs of the tributary mouths to initiate photo-documentation of existing tributary mouth conditions and barriers to upstream fish passage. Photographs were posted on the Chelan PUD Lake Chelan Implementation Website. After the conclusion of the tour, Forum members reached consensus that virtually all tributaries observed had barriers, either water depth, water velocity, or gradient, to upstream fish passage at the lake elevation of approximately 1083.0 feet that occurred during the site visit.

The LCFF met again on June 17, 2008 to review Statements of Qualifications (SOQs) submitted by potential tributary barrier removal design consultants, select a consultant, and proceed with implementing the Tributary Barrier Removal Project (TBRP). A design consultant, the Fairbanks Environmental Team, was selected by consensus of the LCFF.

The LCFF reviewed pertinent information regarding watershed conditions of tributaries to Lake Chelan, such as the USDA Forest Service Regional Assistance Teams (RATs) assessment report, USDA Forest Service Lake Chelan Basin fire map of areas burned since 1998, and tributary mouth photographs taken in March 2008. Based on this information, the priority tributaries selected by the LCFF at the June 17, 2008 meeting were Safety Harbor, Mitchell, Grade, and Gold creeks.

However, even with the selection of priority tributaries, the LCFF members discussed proceeding cautiously with tributary barrier removal efforts due to the following considerations:

1. Based on the data illustrated by the Lake Chelan basin fire map and recommendations from the RATs, significant watershed instability has been documented in most tributaries to Lake Chelan due to recent fires. The instability of the upper watersheds will likely result in high bedload movements for a number of years during high runoff events, which may thwart barrier removal and stream reconfiguration efforts until the watersheds have time to stabilize to a greater extent;

2. The RATs also recommended giving the new lake level operating regime more time to be in affect that may allow tributaries to carve out alluvial deposits on their own due to high flow events occurring when the lake level will lower than historical elevations during major high runoff events, particularly in the fall and winter; and

3. Allow the WDFW WCT restoration program additional time to increase tributary WCT populations, thereby producing more spawning age adults that could contribute to natural reproduction in the tributaries.

Efforts to implement barrier removal in Lake Chelan tributaries in 2011 included the following:

1. Chelan PUD staff planned to have the Lake Chelan elevation in 2011 at or below 1086 feet (MSL) by no later than mid-February and remain below 1086 feet through March and, potentially, into early April in order to conduct construction activities in-the-dry.

2. Barrier removal and stream reconstruction activities were conducted in Mitchell and Gold creeks, simultaneously, beginning the week of February 7, 2011 and completed on February 24, 2011.

3. Photographs were taken of Prince, Fish, and Safety Harbor creek mouths on May 25, 2011 at Lake Chelan elevation 1087.48. The intent of the photographs was to document that no barriers to upstream fish passage were present. Presence of barriers to upstream fish passage in these creeks had been documented in previous years. The plausible explanation for these creeks ability to “repair themselves” is that the lake level operation contained in the new license draws the lake down sooner in the fall. The drawdown allowed the energy of the streams during winter freshets to scour out sediment at the tributary mouths to prevent formation of barriers to upstream adult fish passage, No further mechanical treatment is planned for any Lake Chelan tributary at this time. Monitoring will continue in future years to document passage ability for trout between elevations 1086 ft. and 1100 ft.

Efforts to monitor the presence of barriers to upstream fish passage in Lake Chelan tributaries in 2014 and 2015 included photo-documentation of existing conditions at the mouths of First, Twenty-five Mile, Gold, Mitchell, Safety Harbor, Fish, and Prince creeks in March during lake drawdown. Mechanical treatment was employed at Gold and Mitchell creeks in 2011. Monitoring trips in 2014 and 2015 verified that access from Lake Chelan to spawning habitat was maintained in all creeks surveyed. Photographs of tributary mouths can be found in Tributary Barriers Photographs, 2008-2016 (Chelan PUD 2016).

2.8 Entrainment Investigation

As stated previously in his document, License Article 404 *Lake Chelan Fishery Plan* of the Lake Chelan license requires Chelan PUD to conduct entrainment sampling "…to determine the potential for entrainment of adult WCT at the project intakes." Specific elements for the Entrainment Investigation are described in the Lake Chelan Comprehensive Plan, section 4.6.4 of Chapter 6 Lake Chelan Comprehensive Fishery Management Plan. An excerpt from section 4.6.4 *Entrainment* is as follows:

> Chelan PUD shall conduct no more than 140 days of entrainment sampling over 4 sampling years, using the same methodology used during the 2000 and 2001 field seasons, or another methodology of comparable cost recommended by the LCFF, and approved by WDFW, USFWS, and WDOE. Upon request of WDFW, Chelan PUD shall develop a sampling plan in consultation with USFWS, WDOE, and the LCFF, subject to approval by WDFW. The plan shall specify the sampling years and the allocation of sampling days among such years. The first sampling year shall be not be prior to year seven of the effective date of the New License, and the last sampling year shall be no later than year 35 of the effective date of the New License. The purpose of the sampling is to determine if significant numbers of adult spawnable age/size adfluvial WCT are entering the power tunnel entrance.

Article 404 of the license includes a requirement for Chelan PUD to develop and file for approval with FERC within one year of issuance of the license a Lake Chelan Fishery Plan that includes measures to address Tributary Barrier Removal, a Fish Stocking Plan, and an Entrainment Sampling Plan. The Lake Chelan Fishery Plan, developed in consultation with the LCFF, was approved by FERC on December 4, 2007. The Entrainment Sampling plan is section 4.2.5 of the Lake Chelan Fishery Plan. Study methods used to investigate entrainment during relicensing baseline studies (DES 2001) were hook-and-line, Oneida trap, gillnet, and video. These same methods, or other methods recommended by the LCFF will be employed for future entrainment investigations. Stated in Article 404 of the license is the following reporting requirement:

> Annual results of any entrainment sampling shall be compiled in a final report and filed with the commission no later than March 1 of the subsequent year. The report shall also contain any recommendations for continued sampling, or other studies to evaluate entrainment of cutthroat trout.

Year 7 of the effective date of the license was 2013. However, discussions for conducting an Entrainment Investigation have not occurred yet within the LCFF, primarily due to monitoring and evaluation results indicating that actions taken to date, such as altering fishing regulations, changing fish stocking practices, and removing lake tributary barriers to spring spawning fish (see section 2.2), have not demonstrated a significant increase in the WCT abundance in the lake. Likely, the LCFF will continue discussions in 2015 regarding when entrainment sampling may occur and preferred methodologies to be used for the investigation.

The LCFF met on December 10, 2015. An item that was not on the agenda but was brought up during the meeting was the entrainment investigation. After some discussion, Forum members agreed to postpone the entrainment investigation until such time as more Westslope cutthroat trout were documented to be present in the area near the penstock intake to provide a more representative investigation. At the meeting, Forum members requested that the entrainment investigation be included on future agendas for further discussion.

SECTION 3: MEASURES TO BE IMPLEMENTED IN 2016

The following addresses Tributary Barriers, Fish Stocking, and the Monitoring and Evaluation Program measures that will be implemented in 2016.

3.1 Fish Stocking

Article 6(d) and Section 4.6.3 of Chapter 6 of the Comprehensive Plan requires Chelan PUD to make available to the WDFW sufficient funding to rear annually the following resident fish at the Chelan Hatchery for stocking in Lake Chelan:

1. Approximately 5,000 pounds of salmonid fingerlings (for example: 500,000 fish at 100 fish/lb, presently kokanee).
2. Approximately 33,000 pounds of catchable-sized salmonids (for example: approximately 100,000 fish at 3 fish/lb, presently WCT and triploid RBT, if necessary.

Planned and actual fish stocking rates for 2011-2015 are shown in Tables 18 - 27 below (Cory Morrison, WDFW, pers. com.). Planned fish stocking for 2016 is outlined in Table 28 (Cory Morrison, WDFW, pers. com.).

Table 18. 2011 Fish Stocking Plan

Location	Species	Stock	Number	No. Fish/lb	Stocking date
Lake Chelan Tributaries					
Four Mile Creek	Cutthroat	Twin LK	10,000	Eyed eggs	June
Cascade Creek	Cutthroat	Twin LK	5,000	Fry	June or July
Bear Creek	Cutthroat	Twin LK	3,000	Fry	June or July
Big Creek	Cutthroat	Twin LK	2,000	Fry	June or July
Lake Chelan	Cutthroat	Twin LK	100,000	15	March
		ad clipped	(80%)		
	Kokanee	Lake Chelan	80,000	80	Mid-May
	Triploid Rainbows	Spokane	1,000	0.4	May - September
	Triploid Rainbows	Spokane	50,000	2.5	August-September
Mill Creek	Cutthroat	Twin LK	3,000	Fry	June or July
	Triploid Chinook[1]	summer	50,000	100	March

1– The triploid Chinook program is not funded by Chelan PUD

Table 19. 2011 Actual Fish Stocking

Location	Species	Stock	Number	No. Fish/lb	Stocking date
Lake Chelan Tributaries					
First Creek	Cutthroat	Twin LK	26,899	Fry	Early September
Lake Chelan	Cutthroat	Twin LK	137,224	Fry	Late September
	Cutthroat	Twin LK	51,949	15	April
		ad clipped	(80%)		
	Kokanee	Lake Chelan	0	N/A	N/A
	Triploid Rainbow	Spokane	1,686	0.4	May - September
	Triploid Rainbow	Spokane	46,829	3.4	August - September
	Triploid Chinook[1]	Summer	22,000	100	March

1– The triploid Chinook salmon program is not funded by Chelan PUD

Table 20. 2012 Fish Stocking Plan

Location	Species	Stock	Number	No. Fish/lb	Stocking Date
Lake Chelan Tributaries					
Twenty Five Mile Creek	Cutthroat	Twin LK	29,091	Fry	June or July
First Creek	Cutthroat	Twin LK	14,545	Fry	June or July
Grade Creek	Cutthroat	Twin LK	3,636	Fry	June or July
Safety Harbor Creek	Cutthroat	Twin LK	2,727	Fry	June or July
Company Creek	Cutthroat	Twin LK	78,750	Fry	June or July
Blackberry Creek	Cutthroat	Twin LK	81,900	Fry	June or July
Lake Chelan	Cutthroat	Twin LK	50,000	15	March
		ad clipped (80%)			
	Kokanee	Lake Chelan	80,000	80	Mid May
	Triploid Rainbow	Spokane	1,000	0.5	May - September
	Triploid Rainbow	Spokane	50,000	2.5	August - September
Mill Creek	Cutthroat	Twin LK	3,000	Fry	June or July
	Triploid Chinook[1]	summer	50,000	100	March

1– The triploid Chinook program is not funded by Chelan PUD

Table 21. 2012 Actual Fish Stocking

Location	Species	Stock	Number	No. Fish/lb	Stocking Date
Lake Chelan Tributaries					
Twenty Five Mile Creek	Cutthroat	Twin LK	29,000	Fry	August
Twenty Five Mile Creek	Cutthroat	Twin LK	7,803	10	June
First Creek	Cutthroat	Twin LK	15,000	Fry	August
Grade Creek	Cutthroat	Twin LK	3,000	Fry	September
Safety Harbor Creek	Cutthroat	Twin LK	3,500	Fry	September
Company Creek	Cutthroat	Twin LK	17,500	Fry	September
Blackberry Creek	Cutthroat	Twin LK	0	Fry	
Lake Chelan	Cutthroat	Twin LK	72,980	15	April
		ad clipped (80%)			
	Cutthroat	Twin LK	1,000	Fry	September
	Kokanee	Lake Chelan	27,200	100	Mid May
	Triploid Rainbow	Spokane	1,898	0.8	October
	Triploid Rainbow	Spokane	39,339	2.5	August - September
Mill Creek	Triploid Chinook[1]	summer	38,940	100	March

1– The triploid Chinook program is not funded by Chelan PUD

Table 22. 2013 Fish Stocking Plan

Location	Species	Stock	Number	No. Fish/lb	Stocking Date
Lake Chelan Tributaries					
Twenty Five Mile Creek	Cutthroat	Twin LK	29,000	Fry	June – August
First Creek	Cutthroat	Twin LK	14,700	Fry	June – August
Grade Creek	Cutthroat	Twin LK	2,700	Fry	June – August
Safety Harbor Creek	Cutthroat	Twin LK	3,200	Fry	June – August
Mitchell Creek	Cutthroat	Twin LK	4,000	Fry	June – August
Fish Creek	Cutthroat	Twin LK	6,000	Fry	June – August
Gold Creek	Cutthroat	Twin LK	1,200	Fry	June – August
Prince Creek	Cutthroat	Twin LK	4,700	Fry	June – August
Company Creek	Cutthroat	Twin LK	30,000	Fry	June – August
Blackberry Creek	Cutthroat	Twin LK	30,000	Fry	June – August
Lake Chelan	Cutthroat	Twin LK	15,000	15	March
		Ad-clipped (80%)			
	Kokanee	Lake Chelan	0		
	Triploid Rainbow	Spokane	1,000	0.5	May - September
	Triploid Rainbow	Spokane	50,000	2.5	August - September
Mill Creek	Triploid Chinook[1]	summer	50,000	100	March

1– The triploid Chinook program is not funded by Chelan PUD

Table 23. 2013 Actual Fish Stocking

Location	Species	Stock	Number	No. Fish/lb	Stocking Date
Lake Chelan Tributaries					
Twenty Five Mile Creek	Cutthroat	Twin LK	29,000	Fry	August – September
First Creek	Cutthroat	Twin LK	19,000	Fry	August – September
Lake Chelan	Cutthroat	Twin LK	2,700	Fry	August – September
Safety Harbor Creek	Cutthroat	Twin LK	3,200	Fry	August – September
Mitchell Creek	Cutthroat	Twin LK	4,000	Fry	August – September
Fish Creek	Cutthroat	Twin LK	6,000	Fry	August – September
Gold Creek	Cutthroat	Twin LK	1,200	Fry	August – September
Prince Creek	Cutthroat	Twin LK	4,700	Fry	August – September
Company Creek	Cutthroat	Twin LK	30,000	Fry	August – September
Stehekin River	Cutthroat	Twin LK	30,000	Fry	August – September
Lake Chelan	Cutthroat	Twin LK	16,953	13 – 9.5	April
		Ad-clipped (80%)			
	Kokanee	Lake Chelan	0		
	Triploid Rainbow	Spokane	2,338	0.5	May – July
	Triploid Rainbow	Spokane	69,993	2.5	September - October

Table 24. 2014 Fish Stocking Plan

Location	Species	Stock	Number	No. Fish/lb	Stocking Date
Lake Chelan Tributaries					
Fish Creek	Cutthroat	Twin LK	6,000	Fry	July – August
Gold Creek	Cutthroat	Twin LK	1,300	Fry	July – August
Prince Creek	Cutthroat	Twin LK	4,700	Fry	July – August
Cascade Creek	Cutthroat	Twin LK	600	Fry	July – August
Four Mile Creek	Cutthroat	Twin LK	2,100	Fry	July – August
Big Creek	Cutthroat	Twin LK	700	Fry	July – August
Pyramid Creek	Cutthroat	Twin LK	2,300	Fry	July – August
Company Creek	Cutthroat	Twin LK	30,000	Fry	July – August
Blackberry Creek	Cutthroat	Twin LK	30,000	Fry	July – August
Lake Chelan	Cutthroat	Twin LK	50,000+	2.5	July - August
		Ad-Clipped (80%)			
	Kokanee	Lake Chelan	70,000	<100	May
	Triploid Rainbow	Spokane	50,000	2.5	August - September
	Triploid Rainbow	Spokane	2,000	0.5	May - September

Table 25. 2014 Actual Fish Stocking

Location	Species	Stock	Number	No. Fish/lb	Stocking Date
Lake Chelan Tributaries					
Fish Creek	Cutthroat	Twin LK	6,000	426	August
Gold Creek	Cutthroat	Twin LK	1,300	557	August
Prince Creek	Cutthroat	Twin LK	4,700	557	August
Cascade Creek	Cutthroat	Twin LK	600	426	August
Four Mile Creek	Cutthroat	Twin LK	2,100	426	August
Big Creek	Cutthroat	Twin LK	700	557	August
Pyramid Creek	Cutthroat	Twin LK	2,300	557	August
Company Creek	Cutthroat	Twin LK	30,000	402	August
Blackberry Creek	Cutthroat	Twin LK	30,000	426	August
Chelan River			2,000	242	October
Lake Chelan	Cutthroat	Twin LK	47,483	3.5	June
		Ad-Clipped (80%)			
	Kokanee	Lake Chelan	70,177	85	May
	Triploid Rainbow	Spokane	728	0.2-0.25	June
	Triploid Rainbow	Spokane	38,846	~2.5	October - November

Table 26. 2015 Fish Stocking Plan

Location	Species	Stock	Number	No. Fish/lb	Stocking Date
Lake Chelan Tributaries					
Twenty Five Mile Creek	Cutthroat	Twin LK	29,000	Fry	July - August
First Creek	Cutthroat	Twin LK	14,700	Fry	July - August
Mitchel Creek	Cutthroat	Twin LK	4,000	Fry	July - August
Grade Creek	Cutthroat	Twin LK	2,700	Fry	July - August
Safety Harbor Creek	Cutthroat	Twin LK	3,200	Fry	July - August
Cascade Creek	Cutthroat	Twin LK	6,00	Fry	July - August
Four Mile Creek	Cutthroat	Twin LK	2,100	Fry	July - August
Big Creek	Cutthroat	Twin LK	700	Fry	July - August
Pyramid Creek	Cutthroat	Twin LK	2,300	Fry	July - August
Company Creek	Cutthroat	Twin LK	30,000	Fry	July - August
Blackberry Creek	Cutthroat	Twin LK	30,000	Fry	July - August
Lake Chelan	Cutthroat	Twin LK	85,000	3.0	July - August
		Ad-clipped (80%)			
	Kokanee	Lake Chelan	80,000	<100	May
	Triploid Rainbow	Spokane	TBD	2.5	August - September
	Triploid Rainbow	Spokane	1,000	0.5	May - September

Table 27. 2015 Actual Fish Stocking

Location	Species	Stock	Number	No. Fish/lb	Stocking Date
Lake Chelan Tributaries					
Twenty Five Mile Creek[1]	Cutthroat	Twin LK	20,000	Fry	July - August
First Creek[1]	Cutthroat	Twin LK	14,000	Fry	July - August
Mitchell Creek	Cutthroat	Twin LK	4,000	Fry	July - August
Grade Creek[1]	Cutthroat	Twin LK	2,000	Fry	July - August
Safety Harbor Creek[1]	Cutthroat	Twin LK	3,000	Fry	July - August
Cascade Creek	Cutthroat	Twin LK	6,00	Fry	July - August
Four Mile Creek[1]	Cutthroat	Twin LK	2,000	Fry	July - August
Big Creek	Cutthroat	Twin LK	700	Fry	July - August
Pyramid Creek[2]	Cutthroat	Twin LK	0	Fry	July - August
Company Creek	Cutthroat	Twin LK	30,000	Fry	July - August
Blackberry Creek[2]	Cutthroat	Twin LK	0	Fry	July - August
Lake Chelan	Cutthroat	Twin LK	103,310	2.9	July - August
		Ad-clipped (80%)			
	Kokanee	Lake Chelan	80,227	<100	May
	Triploid Rainbow	Spokane	0	2.5	August - September
	Triploid Rainbow	Spokane	0	0.5	May - September

[1] Original planned numbers to be stocked were reduced due to a shortage in the overall WCT program.

[2] Fish stocking did not occur for select tributaries due to fire or drought conditions.

Table 28. 2016 Fish Stocking Plan

Location	Species	Stock	Number	No. Fish/lb	Stocking Date
Lake Chelan Tributaries					
Twenty Five Mile Creek	Cutthroat	Twin LK	29,000	Fry	July - August
First Creek	Cutthroat	Twin LK	14,700	Fry	July - August
Mitchell Creek	Cutthroat	Twin LK	4,000	Fry	July - August
Grade Creek	Cutthroat	Twin LK	2,700	Fry	July - August
Safety Harbor Creek	Cutthroat	Twin LK	3,200	Fry	July - August
Fish Creek	Cutthroat	Twin LK	6,000	Fry	July - August
Gold Creek	Cutthroat	Twin LK	1,300	Fry	July - August
Prince Creek	Cutthroat	Twin LK	4,700	Fry	July - August
Company Creek	Cutthroat	Twin LK	30,000	Fry	July - August
Blackberry Creek	Cutthroat	Twin LK	30,000	Fry	July - August
Lake Chelan	Cutthroat	Twin LK	105,000	3.0	July - August
		Ad-clipped (80%)			
	Kokanee	Lake Chelan	38,000	<100	May
	Triploid Rainbow[1]	Spokane	TBD	2.5	August - September
	Triploid Rainbow[1]	Spokane	TBD	0.5	May - September

1 – Triploid rainbow trout will be stocked only if the full requirement of 33,000 pounds cannot be met by Westslope cutthroat trout only.

A significant note for 2015 for actual fish stocked into Lake Chelan was 103,310 WCT at 2.93 fish per pound (FPP). This was just the second time that WCT of approximate catchable size were successfully stocked into the lake for recreational fishing. As outlined previously in this document, WCT have been very difficult to rear to catchable size due to eggs originating from wild stock and being much more difficult to culture (more susceptible to disease, reduced growth rates, avoidance/fright behavior, etc.) than more domesticated stocks, such as RBT. However, WDFW and Chelan PUD coordinated alternative rearing practices and facilities for WCT, and were able to produce WCT to catchable size and stock them into Lake Chelan for the first time in 2014. As a result of this success, the programmatic shift was once again pursued and successfully implemented with an even larger group of fish in 2015. This program, in addition to refinements as more is learned regarding culturing wild-origin WCT, will be continued into the future with the goal of producing the entire license stocking production requirement of trout to be WCT and reducing the stocking of triploid RBT, to the greatest extent practicable.

The plan for 2016 is to meet the catchable-sized trout license requirement (33,000 lbs. at 3 fpp) through stocking all WCT. However, as shown in table 28, some triploid RBT are being reared at the Chelan Hatchery as “back-up” in the event that the full requirement cannot be met by stocking all WCT. The triploid RBT will be stocked only if the full requirement cannot be met by WCT. Otherwise, these RBT will be stocked in other local area lakes.

3.2 Monitoring and Evaluation Program

3.2.1 ***Lake Chelan Comprehensive Creel Survey, WDFW***

Comprehensive creel surveys began in 2010 and will be completed every third year after the initial survey year; therefore WDFW will once again conduct this comprehensive survey in 2016. WDFW will attempt to conduct this survey throughout the entire lake in an effort to capture a more accurate accounting of the actual catch potential produced by the lake.

Table 29. 2016 Creel Survey Estimated Budget and Schedule:

Year	Task	Total $	Requested $ (LC06b1)	Requested Chelan PUD Matching $ (LC06b2)	WDFW Matching $
2016	Conduct a comprehensive Creel survey every other week April 1 – October 15. *Two crew members required when boat operation is needed.	$25,250		$12,625	$12,625
	Data Mtg. and Reporting.	$3,000		$1,500	$1,500
	Boat and Vehicle Operating Costs.	$9,300	$9,300		
	Fish age/origin determination	$1,000		$500	$500
	Supplies and Equipment	$200	$200		
	Estimated Totals	$38,750	$9,500	$14,625	$14,625

3.2.2 ***Lake Chelan Tributaries Spawning Monitoring and Evaluation, USFS***

For various reasons during the past four years (2012-2015), the Forest Service has been unable to complete the WCT spawning ground and snorkel surveys (reduction in staffing, wildfires, budget, etc.). In years when WCT spawning ground surveys were able to be completed by the USFS (2009-2011), a limited number of potential redds were identified (3 redds). Therefore, due to the limited number of WCT redds observed and the difficulties the USFS has had completing the surveys, the USFS is not requesting money to continue these surveys in 2016. The USFS will focus on developing a new proposal to bring to the LCFF in 2017.

Table 30. USFS Estimated Lake Chelan Tributaries Spawning Monitoring and Evaluation Budget and Schedule

Year	Task	Total $	Requested $ (LC06b1)	Requested PUD Matching $ (LC06b2)	USFS Matching $
2016	Develop New Proposal	$0	$0	$0	$0
	2016 Estimated Totals	**$0**	**$0**	**$0**	**$0**

3.2.3 *Lake Chelan Tributary Estimates of Juvenile Westslope Cutthroat and Rainbow Trout Abundance, WDFW*

Since 2011, WDFW has conducted annual fish abundance surveys on select lake tributaries on a three-year rotational basis. These surveys are conducted to obtain information on adfluvial WCT and RBT population abundance, age class composition and other biological characteristics.

The main tributaries to be surveyed include First, Twenty-five Mile, Railroad, Mitchell, Fish, Grade, Gold, Prince, Big, Four Mile, Cascade, Pyramid, and Safety Harbor Creeks.

WDFW surveyed Pyramid, Cascade, Big, and Four Mile Creeks beginning in 2013, thus these tributaries will once again be sampled in 2016 as per the three-year rotational agreement. In addition to, and as time and employee availability and funding allows, the following creeks may also be investigated and surveyed if feasible; Poison, Lightning, Little Big, Graham Harbor, Coyote, Deep Harbor, Lone Fir, Castle, Bear and Riddle Creeks. If surveys are successful for any of the aforementioned tributaries, they will then fall into the three-year rotation. Surveys on these creeks have not been conducted since 1982 and so may serve as additional comparative information.

Table 31. 2016 WDFW Budget and Schedule

Year	Task	Total $	Requested $ (LC06b1)	Requested PUD Matching $ (LC06b2)	WDFW Matching $
2016	Conduct tributary surveys in September & October	$20,800		$10,400	$10,400
	Data Mtg. and Reporting.	$3,800		$1,900	$1,900
	Boat and Vehicle Operating Costs	$1,650	$1,650		
	Supplies and Equipment	$650	$650		
	Estimated Totals	$26,900	$2,300	$12,300	$12,300

3.2.4 *Stehekin River Cutthroat Trout Spawning, Abundance and Genetic Surveys, NPS*

North Cascades National Park personnel will conduct five to six trout spawning surveys in the spring and early summer of 2016, and will conduct two additional snorkel surveys of index sites in late summer/early fall to monitor trout abundances. Fry DNA will be collected from four index reaches to examine parental lineage and hybrid status.

Table 32. Estimated 2016 NPS Budget and Schedule: Westslope Cutthroat Trout work

Schedule	Task	Total $	Requested $ (LC06b1)	Requested PUD Matching $ (LC06b2)	NPS Matching $
May-Aug	Conduct five to six trout spawning surveys at 8 side channel index sites (1-GS/9 Ecologist and 1-GS/6 Bio Tech for a total of 52 person-days)	$8,856	$4,456	$2,200	$2,200
Aug-Oct	Conduct two snorkel surveys (Aug/Sept) in 8 side-channel/trib. index reaches (1–GS/9 Ecologist and 1-GS/6 Bio Tech for total of 8 person-days)	$1,876	$876	$500	$500
Aug-Oct	Collect cutthroat/rainbow young-of-year for genetic analysis in four side channel reaches (1–GS/9 Ecologist and 1-GS/6 Bio Tech for total of 4 person-days)	$1,007	$407	$300	$300
Oct-Dec	USGS WFRC Lab analyses, Data Mgt. and Reporting (100 samples @ $54/sample including Overhead)	$5,400	$2,400	$1,500	$1,500
Nov-Dec	Data Mgt. and Reporting (1-GS/6 Bio Tech for 8 days, 1-GS/9 Ecol. for 8 days)	$3,836		$1,918	$1,918
May-Oct	Travel (Ferry and per diem)	$2,475	$2,475		
	Vehicle (1.75 months @ $800/month)	$1,400	$1,400		
	Supplies	$600	$600		
	2016 Estimated Totals:	$25,450	$12,614	$6,418	$6,418

3.2.5 ***Assist CPUD with Kokanee Spawning Surveys at Stehekin River Index Sites, NPS***

An annual assessment of spawning kokanee has been conducted on index sites established in Lake Chelan tributaries by the Chelan County PUD since 1983 (Fielder 2000). Chelan County PUD has asked for assistance from WDFW and the NPS in conducting these surveys in 2016. The NPS is proposing to conduct kokanee surveys on the Blackberry and Company Creek Chelan PUD index sites on five to six occasions as outlined below.

Table 333. NPS Budget and Schedule: Chelan PUD Stehekin kokanee Index

Schedule	Task	Total $	Requested $ (LC06b1)	Requested PUD Matching $ (LC06b2)	NPS Matching $
Aug-Oct	Conduct five to six kokanee spawning surveys at CPUD Stehekin River index sites (1-GS/9 Ecologist for 3 days, and 1-GS/6 Bio Tech for 9 days)	$3,614	$3,614		
Nov-Dec	Data Mgt. and Reporting (1-GS/6 Biotech for 4 days, 1-GS/9 Ecol. for 4 days)	$1,983	$1,983		
May-Oct	Travel (Ferry and per diem)	$225	$225		
	Vehicle (1.0 months @ $800/month)	$800	$800		
	Supplies	$640	$640		
	2016 Estimated Totals:	$7,262	$7,262	$0	$0

3.2.6 ***Assist CPUD with Lake Chelan Tributary Kokanee Spawning Surveys, WDFW***

Chelan PUD has historically conducted kokanee spawning ground surveys on eight additional tributaries aside from the Stehekin River drainage surveys. These tributaries consist of: Fish, Prince, Safety Harbor, 25-Mile, First, Grade, Gold and Mitchell Creeks. An ongoing long-term annual assessment of kokanee spawner counts has been used to evaluate trends in abundance from a set of subjectively selected index reaches of tributaries to Lake Chelan (Fielder 2000; Stone and Fielder 2004). The intent of this survey is to develop an estimate of the total escapement of kokanee spawners in these tributaries, and to track changes in distribution of spawners (see Section 2.2.7). Due to reduced personnel availability within the Chelan PUD, these spawning ground surveys will tentatively be conducted by WDFW beginning in 2016.

Table 344. Estimated Budget and Schedule

Year	Task	Total $	Requested $ (LC06b1)	Requested $ LC06b2	WDFW Matching $
2016	Conduct Kokanee Spawning Ground Surveys On Eight Tributaries, Sep-Oct.	$6,000		$3,000	$3,000
	Vehicle/Boat Operating Costs	$1,800	$1,800		
	Sampling Supplies	$200	$200		
	Estimated Totals	$8,000	$2,000	$3,000	$3,000

3.2.7 ***Kokanee Creel Survey, WDFW***

WDFW will conduct annual kokanee creel surveys designed to monitor and determine the contribution of kokanee to the sport fishery. The main purpose of the survey is to: 1) determine the relative composition of kokanee as it relates to age and origin (naturally produced or hatchery released) contributing to the sport fishery; and 2) determine if kokanee continue to be a preferred species to pursue and catch. WDFW plans to begin conducting these surveys in April and will conclude sometime in June.

Table 355. WDFW Estimated Kokanee Creel Survey Budget and Schedule

Year	Task	Total $	Requested $ (LC06b1)	Requested $ LC06b2	WDFW Matching $
2016	Conduct kokanee Creel Surveys	$20,000		$10,000	$10,000
	Data Management	$2,000		$1,000	$1,000
	Vehicle Operating Costs	$1,200	$1,200		
	Sampling Supplies	$200	$200		
	Estimated Totals	$23,400	$1,400	$11,000	$11,000

3.2.8 ***Kokanee Stocking Monitoring and Evaluation, WDFW***

When it is determined that kokanee should be stocked back into Lake Chelan, WDFW will clip adipose fins on all kokanee reared and released into the lake as part of the fish stocking program. Fin clipped kokanee will provide important information regarding the contribution of hatchery-reared kokanee to the sport fishery (especially their survival) as identified through creel surveys versus natural production. The cost of fin-clipping hatchery produced kokanee is estimated to be $6,200 annually.

Estimated Budget and Schedule: $6,200 for fin clipping kokanee in 2016.

3.2.9 ***Bull trout presence survey using eDNA, NPS***

This is a joint project working with the USFS Rocky Mountain Research Station and National Genomics Center for Wildlife and Fish Conservation to survey the entire potential bull trout habitat in the Stehekin watershed using eDNA. Approximately 145 samples will be collected across the Stehekin Watershed during low flow periods from August to October by NPS staff following protocols developed by the USFS Rocky Mountain Research Station (Carim 2015). Equipment and supplies for collecting the samples will be provided by the Rocky Mountain Research Station and the genetic analysis and reporting will be completed by the National Genomics Center. Each sample typically costs $50; however, this project would be part of a larger survey of the Columbia Watershed and the USFS will be cost sharing 50% of each sample and providing all of the equipment and supplies needed to collect the samples.

Table 366. Estimated 2016 NPS Budget and Schedule: Bull Trout eDNA

Schedule	Task	Total $	Requested $ (LC06b1)	Requested PUD Matching $ (LC06b2)	NPS/USFS Matching $
Aug-Oct	Collect Field Samples from n=145 sites (NPS, GS-09 & GS-05, 32 person-days)	$8,474	$3,834	$2,320	$2,320
Nov-Apr	USFS National Genomic Center eDNA Sample Analysis (n=145), Data Mgt. and Reporting	$7,250	$2,250	$2,500	$2,500
Aug-Oct	Travel (Ferry and per diem)	$980	$980		
Sept-Oct	Vehicle (1 month @ $900/month)	$800			$800
Sept-Oct	Equipment &Supplies	$1,400			$1,400
	2016 Estimated Totals	$18,904	$7,064	$4,820	$7,020

3.2.10 ***Tributary Barrier Confirmation and Removal***

Tributaries to Lake Chelan will be monitored by site visits and photo monitoring in 2016 by the CPUD to ensure that connectivity to the lake and upstream migration access to spring spawning WCT is maintained. Photographs of tributary mouths (First, 25-Mile, Gold, Mitchell, Grade, Safety Harbor, Railroad, Fish and Prince creeks) will be taken in late March when the lake elevation is near its' lowest point to document tributary mouth upstream passage conditions. On-the-ground reconnaissance may be conducted to ascertain the type and extent of the passage barrier if photo monitoring indicates the presence of a passage barrier (water depth, water velocity, gradient). Photo documentation of tributary mouth conditions for 2016 will be included in the Tributary Barriers Photographs, 2008-2016 report (Chelan PUD 2016).

Table 377. Summary of 2016 LCFP Expenditures

Measure	Estimated M&E Cost	Amount to be provided by Chelan PUD	Agency Cost-share	Task
Lake Chelan Comprehensive Creel Surveys (WDFW)	$38,750	$24,125	$14,625	Section 3.2.1
Lake Chelan Tributaries Spawning Monitoring and Evaluation (USFS)	$0	$0	$0	Section 3.2.2
Lake Chelan Tributary Estimates of Juvenile Westslope Cutthroat and Rainbow Trout Abundance (WDFW)	$26,900	$14,600	$12,300	Section 3.2.3
Stehekin River Cutthroat Trout Spawning, Abundance and Genetic Surveys (NPS)	$25,450	$19,032	$6,418	Section 3.2.4
Assist CPUD with Kokanee Spawning Surveys at Stehekin River Index Sites (NPS)	$7,262	$7,262	$0	Section 3.2.5
Assist CPUD with Lake Chelan Tributary Kokanee Spawning Surveys (WDFW)	$8,000	$5,000	$3,000	Section 3.2.6
Kokanee Creel Survey (WDFW)	$23,400	$12,400	$11,000	Section 3.2.7
Kokanee Stocking Monitoring and Evaluation – Fin Clipping (WDFW)	$6,200	$6,200	$0	Section 3.2.8
Bull Trout Presence Survey using eDNA (NPS)	$18,904	$11,884	$4,820	Section 3.2.9
Total M&E Survey Costs	$154,866	$100,503	$52,163	
Tributary Barriers			N/A	Section 3.2.10
Fish Stocking	$30,000	$30,000	N/A	Section 3.1
TOTAL	$184,866	$130,503	$82,163	

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