YAKAMA NATION – YAKIMA KLICKITAT FISHERIES PROJECT

P.O. BOX 151 TOPPENISH, WA 98948 509-865-5121 FAX: 509-865-6293

LOWER YAKIMA RIVER SUPPLEMENTATION AND RESEARCH PROJECT ANNUAL REPORT

January 2016 to December 2017

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Prepared by Yakama Nation

Bill Fiander, YKFP Biologist

Joe Blodgett, YKFP Biologist

Yakima/Klickitat Fisheries Project

Melvin Sampson, Policy Advisor/Project Coordinator

Andre L'Heureux, BPA COTR

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Introduction

The Lower Yakima River Supplementation Complex (LYRSC) has been working to increase the coho and Fall Chinook salmon with use of local broodstock populations and acclimation of out of basin pre-smolts. Fish from Columbia River hatcheries are annually acclimated in strategic areas and local adult returns are trapped to use as broodstock. The long-term goal is to phase the out of basin transfers out in favor of the local stock once the populations and facilities will allow.

The Yakama Nation (YN) have used coho from lower Columbia River hatcheries to supplement Yakima River coho populations in order to further natural production and harvest goals identified in the Yakama Nation's Coho Salmon Species Plan for the Yakima River Basin" (CSSP). In addition, the YN will implement an experimental in-basin broodstock collection program to utilize natural returns of hatchery adults to improve the probability of success for the initial phase of coho restoration feasibility studies in the Yakima River basin.

Selected habitats and acclimation pond sites in the Yakima River basin have been identified for the potential reprogramming of adult and/or juvenile coho from appropriate lower river hatcheries. It is expected that when these fish return as adults they will spawn naturally in areas close to where they are released with the resulting production rearing in suitable production areas identified in the CSSP for about 17 months prior to outmigration. Similarly, juvenile releases would rear for up to one year in suitable production areas then return after ocean migration to these same areas to spawn. Pre-smolts would be acclimated for one month in low cost ponds previously identified or those utilized in studies from prior years. Marion Drain was constructed to return irrigation overflow and groundwater seepage to the Yakima River from agricultural lands located on the Yakama Reservation. It has large component of high quality groundwater influence along with irrigation overflow.

The Yakima River mainstem fall Chinook are located in the lower portion of the Yakima River. The majority of spawning occurs from Zillah to the river mouth. This stock has been supplemented with out-of-basin upriver bright stock for several years. John Day Mitigation upriver bright fall Chinook from Little White Salmon National Fish Hatchery have been planted annually each spring since 1983. Since 1994 the fall Chinook has been acclimated at the Prosser Hatchery site. The Prosser Tribal Hatchery allows the Yakama Nation to use locally adapted broodstock from the Yakima River. The Prosser Adult Trap at Prosser Dam and the Chandler Canal were utilized to collect broodstock from the Yakima River stock. The adults were transported to the Prosser Hatchery for holding and spawning, followed by incubation and early rearing.

Marion Drain/Yakima River experimental supplementation work was conducted by the YN in coordination with the Washington Department of Fish and Wildlife (WDFW) through the YKFP management framework. This Marion Drain/Yakima River supplementation scheme with a strong

monitoring/evaluation component should greatly enhance fall Chinook restoration in the Yakima basin.

A summer Chinook reintroduction program was also started. Green eggs are brought in from Wells Hatchery and spawned at Marion Drain Hatchery. These eggs are held in an egg-isolation unit at Marion Drain Hatchery. When these eggs are determined to be virus free these eggs are taken into the incubation room. When these eggs hatch the juveniles are reared at Marion Drain Hatchery until they are taken to an acclimation pond (Nelson Springs, Wapatox, and Roza Dam) acclimated and released.

Fish Production

Fish Production at the Lower Yakima Rivers Supplementation & Research Facilities

Prosser and Marion Drain Hatcheries January 2016 – December 2017

Brood Stock	**Number**	**Fish size at release or time of report fish/lb.**	**Rearing Release Strategy**
2104 Yakama Coho	537,200	12-16 fish per pound	Spawned Reared and released 339,000 from Prosser Hatchery. 198,00 from acclimation sites
2015 Yakama Coho	249,123	14-17 fish per pound	Spawned and reared at Prosser Hatchery. Acclimated and released at acclimation sites.
2016 Yakama Coho	205,000	35 fish per pound	Spawned and being reared at Prosser Hatchery for 2018 release
2017 Yakama Coho	760,000	Eggs	Spawned and being reared at Prosser Hatchery for 2019 release
2015 Yakama Fall Chinook	474,609	95-110 fish per pound	Spawned reared and released from Prosser Hatchery
2016 Yakama Fall Chinook	422,000	90-100 fish per pound	Spawned reared and released from Prosser Hatchery
2017 Yakama Fall Chinook	350,000	eggs	Spawned at Prosser Hatchery
2015 Wells Summer Chinook		110 fish per pound	Green eggs from wells reared at Marion Drain released at acclimation sites.
2016 Wells Summer Chinook	170,000	90-105 fish per pound	Green eggs from Wells Hatchery reared at Marion Drain and released at acclimation sites.
2017 Wells Summer Chinook	80,000	Eggs	Green eggs from Wells Hatchery incubated at Marion Drain Hatchery.

Coho

The coho production for the Yakima Basin consists of taking local brood from the Prosser Dam adult trap. The fish are held at Prosser Hatchery until ripe and spawned, incubated and reared

the initial year on site. The yearling fish are then transported to one of the acclimation sites listed below for additional rearing and release. There was also a parr plant in mid-July. The following is a list of the coho production released as smolts, parr, and red counts.

Coho smolt releases 2016

Site	**Number of Smolts**
Prosser	267,630
Lost Creek	74,220
Mobile Acclimation	37,930
Stiles	74,460

Coho smolt releases 2017

Site	**Number of Smolts**
Prosser	*250,00

- Low brood year 2015 returns – didn't get normal number of eggs, maximize adult returns by releasing smolts lower in the system.

Coho Parr Releases 2016

Site	**Number of Parr**
Little Naches	3,018
South Fork Cowiche Creek	3,003
Rattlesnake Creek	3,002
Lake Cle Elum	3,000
Big Creek	3,025
Wilson Creek	1,500
Mercer Creek Above	1,500
Mercer Creek Below	1,500
Mainstem Naches	3,000

Coho Parr Releases 2017

Site	**Number of Parr**
Little Naches	3,000
S.F. Cowiche Creek	3,000
Ahtanum Creek	3,000
Mainstem Yakima	3,000
Swauk Creek	3,000
Reecer Creek	3,000
Wilson Creek	3,000

Coho redd Counts 1998-2017

	Yakima River	Naches River	Tributaries	Total
1998	53	6	193	252
1999	104		62	166
2000	142	137	67	346
2001	27	95	25	147
2002	4	23	16	43
2003	32	56	55	143
2004	33	87	150	270
2005	57	72	153	282
2006	44	76	187	307
2007	63	87	195	345
2008	49	60	242	351
2009	229	281	485	995
2010	75	276	327	678
2011	82	243	196	521
2012	148	228	172	548
2013	45	69	67	181
2014	576	86	485	1,157
2015	13	0	59	72
2016	37	27	54	118
2017	92	36	177	305

Lower Yakima River Fall Chinook

The fall Chinook production for the Yakima Basin consists of taking local brood from the Yakima River either from the adult trap at Prosser Dam, the denil at Prosser Hatchery or capturing adults that fall back into Chandler Canal. The fish are held at Prosser Hatchery until ripe and then they are spawned. The eggs are incubated until hatched and then reared on site. The Chinook are reared under accelerated growth regimes by not chilling the well water in the incubation stage. This is done to increase the size in efforts to get the smolts out sooner, by being able to mark the larger fish sooner.

Yakima Basin Fall/Summer Chinook Redd Counts 2000-2017

	Yakima River	Naches River	Marion Drain	Total
2000	29*			29
2001	71*		35	106
2002	740		56	796
2003	2065	11	86	2162
2004	574	2	100	676
2005	352	0	56	408
2006	400	0	60	460
2007	329	0	67	396
2008	243	0	46	289
2009	288	0	70	358
2010	326	0	59	385
2011	393	1	59	453
2012	276	1	54	331
2013	485	61	74	620
2014	434	49	75	558
2015	1,282	16	160	1,458
2016	149	17	50	216
2017	233	12	33	278

*Redd count for below Prosser Dam only.

Blank entry is NO DATA AVAILABLE

Fish Culture

The wide array of multiple species and brood years reared at the Lower Yakima River facilities requires a wide range of fish culture activities during the year. Regular duties included: feeding fish, cleaning ponds and screens, monitoring water quality, monthly samples, brood stock collection, weekly examination for adult ripeness, spawning and egg incubation, fry ponding, facility maintenance and minor repairs to the hatchery

Coho

The coho are part of the YKFP reintroduction study. Since acclimation of Lower Columbia River stocks increased the adult population in the Yakima Basin, local brood is now being evaluated to determine the effectiveness for future supplementation. Prosser Hatchery (PH) is used for the local broodstock program. The adults can be captured on either the right bank of Prosser Dam or the hatchery effluent denil trap. They are then held in one of the rearing ponds at PH. Eggs were incubated in chilled well water ranging from 38° – 57° F. This year fry were placed in the upper and lower raceways for initial feeding then transferred to the new raceways for tagging and rearing. Pre-smolts were then trucked to acclimation sites for final rearing and release. The coho acclimation ponds are described below.

Lost Creek Pond

Located in the Upper Naches River near Cliffdell, consists of two ponds adjacent to the Naches River. Prior to putting fish in the ponds, algae and other debris is removed. A seine net is pulled through the ponds and all debris hauled away from the site. The ponds are divided into two separate rearing areas by placing a screen in the ladder structure between the ponds.

Stiles Pond

Located near the town of Gleed on private property about ½ mile from the Naches River. Prior to using the ponds the ditch needed to have weeds removed and minor cleaning of the ponds. The pond was excavated into two rearing ponds. Screens were placed at the head of the upper pond, between the two ponds and at an irrigation diversion.

Boone Pond

The site was selected for coho supplementation work because of its location in the watershed, proximity to the main stem Yakima River and large source of cool, clean water. The existing large pond gives us the rare opportunity to control flows and monitor out-migration of coho smolts at existing structures. The location is in an area that is suitable to accommodate high numbers of spawning adult coho salmon. In addition to the ponds benefits for coho production, the property also hosts outstanding habitat features. The pond had restoration done to it 6 year ago. Dozens of logs and stumps were placed into the pond, many willows and pine trees were also planted. The land owners are very large supporters of the Yakama Nation and its Fisheries Program. The Boone property offers the coho program an excellent chance at successful coho acclimation and future coho recovery in the upper Yakima River. Boone has not been used the last few years, but may be used in future acclimation.

Holmes Pond

Located near Ellensburg, the site was selected for coho supplementation work because of its location in the watershed, proximity to the main stem Yakima River and large source of cool, clean water. The existing ponds give us the rare opportunity to control flows and monitor out-migration of coho smolts at existing structures. The location is in an area that is suitable to accommodate high numbers of spawning adult coho salmon. In addition to the properties benefits for coho production, the property also host outstanding habitat features. A side channel of the Yakima

flows through 2,400' of the property, entering the river only 400; below the downstream property boundary. Wetlands and riparian habitat are also featured. The property also includes a large, senior water right that could be placed in the Yakima Basin Water Trust. At present the water is used for irrigation to support livestock grazing. The instantaneous water right, now adjudicated and in trust, is 3.31 cubic feet per second.

The Holmes property offers the coho program an excellent chance at successful coho acclimation and future coho recovery in the upper Yakima River.

Easton Department of Transportation Ponds

Old gravel pits used by D.O.T. which are near the town of Easton and adjacent to the Yakima River make up the uppermost acclimation site on the Yakima River. The water source is the Yakima River which flows through the ponds with additional seepage and reenters the river through an outlet channel.

Mobile Acclimation

Mobile acclimation sites are currently located on South Fork Cowiche Creek, Nelson Springs, and Rattlesnake Creek. Each vessel is 20 ft. long, 4 ft. deep and 5 ft. wide. They typically cycle 60-90 gallons of water per minute (gpm). The Cowiche site is operated off electricity with a backup generator. The Rattlesnake site is operated of a 17 KW generator and 1,000 gallon propane tank. The Cowiche site holds 20,000 smolts, where the Rattlesnake site holds a maximum of 10,000 coho smolts. Nelson Springs holds 20,000 coho smolts.

Parr Releases

Parr are released in late summer to assess over winter survival in 9 select tributaries. The parr are PIT tagged in mid-July and scatter planted in early August. Each tributary receives approximately 3,000 PIT tagged coho. Coho parr range from 79-90 mm in length. The fish then must over winter and migrate out the following spring.

Tributaries include, Big Creek, Reecer Creek, Wilson Creek, Hundley Pond, North Fork Little Naches, Little Naches, Nile Creek, Little Rattlesnake Creek and South Fork Cowiche Creek on the Naches River.

Prosser Tribal Hatchery

Coho Smolt Releases

In addition to mainstem acclimation and tributary releases coho are being released on station at the Prosser Tribal Hatchery. These releases were implemented to ensure that the coho brood is of Yakima River origin. Fish collected off the dam could be wild and or from Eagle Creek National Fish Hatchery.

Fall Chinook

Prosser Tribal Hatchery

The Prosser Tribal Hatchery was originally designed as a fall Chinook acclimation facility. It was constructed in 1994 using Mitchell Act funds. A site near the Chandler Fish Screen downstream of Prosser Dam was chosen as the acclimation site. The facility is located in S2, T2N and R24E, north of Prosser on the north bank of the Yakima River. Subsequent improvements expanded the facility's capabilities beyond acclimation to include those of a full hatchery which incorporated adult holding, egg incubation and rearing components. The facility uses surplus Yakima River water made available for operation of the Chandler Juvenile Facility. The water is diverted from the Chandler Canal to the juvenile facility. Surplus water is screened and diverted to the hatchery by gravity flow. During BOR canal maintenance the surface water is pumped to the head of the hatchery via an electric submersible pump. The fish are reared in large, low-density lined ponds and raceways. They are released through an open channel directly into the Yakima River. The outlet structures have screens to prevent premature fish release, dam boards to control the pond water level and are constructed so that the ponds can be completely drained. The Yakima River fall Chinook broodstock were collected from Chandler Canal. The canal was shut down for one day in October to allow Yakama Nation staff the opportunity to remove salmon trapped in the canal. Excess fish are returned to the river but some are held at Prosser Hatchery for broodstock. Additional broodstock are collected at the right bank steep pass trap at Prosser Dam and the steep pass trap in Prosser Hatchery effluent channel. Results of prior released indicated the accelerated growth produced higher adult return rates. The fall Chinook were volitionally released at strategic times directly from the PH facility. All fall Chinook, in and out of basin were acclimated and released from Prosser Hatchery Ponds. All summer Chinook were acclimated and released from Nelson Springs and Roza Dam acclimation raceways.

Marion Drain Hatchery

Marion Drain Hatchery has two large lined ponds, six raceways, an incubation room, an egg isolation trailer, water chiller, two pole buildings (used to hold fish hauling trucks, sensitive equipment, pumps, generators) a mechanical building, caretaker's house and the YKFP maintenance shop. Green eggs from Wells Hatchery summer Chinook were spawned at MDH and then were incubated and reared at Marion Drain Hatchery. The fish were trucked to Nelson Springs and Roza Dam acclimation raceways, for final acclimation and release

Fish Health

Pathologist from the U.S. Fish and Wildlife Service are under contract to monitor the fish health. They travel from the Lower Columbia River Fish Health Center at the Columbia River monthly to examine fish at all sites. They also take samples from the broodstock during spawning and do pre-release exams.

The following is the yearly fish health report submitted by Lower Columbia River Fish Health Center:

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Lower Columbia River Fish Health Center

201 Oklahoma Road

Willard, Washington 98605

FISH HEALTH SUMMARY

For

Lower Yakama River Supplementation and Research Program

January 1, 2016 to December 31, 2017

Coho Salmon

Yakima Coho Stock, Broodyear 2017 (BY17) at Prosser Hatchery

The coho adults were sampled for fish health on November 1st, 8th and 15th, 2017 (150 female sample total were collected – 18 x 5 fish pools of ovarian fluid collected for virus and 12 x 5 fish pools of kidney/spleen collected and split between virus, ELISA other and bacteriology). No virus was detected in sampling of the adults. *Psuedomonas* spp. was cultured. Clinical signs of *Ceratonova shasta* were detected in all observed fish at the time of spawning (opaque posterior intestine & pyloric ceca). *Renibacterium salmoninum* was not detected in the enzyme-linked immune-sorbent assay (ELISA). Migration temperatures were more optimal than in 2016 likely keeping the *C. shasta* infection in check.

Eggs collected from this broodstock have hatched, but have not been ponded. No fish health issues to date.

Smolts will be released in April 2018.

Eagle Creek Coho Stock, BY17, at Eagle Creek National Fish Hatchery (ECNFH)

The coho adults were sampled for fish health on October 25th, November 1st, 8th and 18th, 2017 (150 female sample total were collected – 18 x 5 fish pools of ovarian fluid collected for virus and 12 x 5 fish pools of kidney/spleen collected and split between virus, ELISA other and bacteriology). No virus detected. *Flavobacterium psychrophilum* (causative agent of BCWD) was detected in 4+/30 kidney samples.

Eggs have hatched, but fry have not been ponded. No fish health issue to date.

Fish will be transferred in Jan/Feb2019 to acclimation sites.

Yakima Coho Stock, BY16, at Prosser Hatchery

Fish health samples were collected for broodstock on November 2nd and 9th, 2016 (150 ovarian fluid collected in 5 fish pools for virus; 150 kidney collected individually from females for ELISA with 30 subsampled for bacteria; and 60 kidney/spleen from males collected in 3 fish pools for virus). No virus was detected from any ovarian fluid or kidney and spleen samples. The causative agent for Furunculosis (*Aeromonas salmonicida*) was detected in 2+/30 samples (~7%). Gross signs of *C. shasta* infection were observed in all fish at the time of spawning and 10+/10 posterior intestines samples were positive microscopically. There were reports of high brood loss likely due to higher than optimal adult migration temperatures in the Columbia and Yakima Rivers and the high load of *C. shasta*.

Eggs incubated well resulting in a good hatch; however, around the time of 1st feeding a major short-term die-off of fry happened (50-60% in ~3 weeks). On March 3, 2017 fish health observed fry with lesions along the body and anal fins. Fifteen fry were collected with no virus or parasites found. An internal fungus "Phoma" was found in the swim bladder and esophagus and the causative agent of Bacterial Coldwater Disease (BCWD) *F. psychrophylum* was cultured from the kidney. The acute nature of the die-off points to "Phoma" as being the leading culprit with the bacterial finding secondary. "Phoma" is an environmental fungus that fry can experience at any stage of development, but can be devastating if fish are exposed to feed before they are ready to eat and the fungus will flourish on the undigested feed internally expanding into the esophagus and then into the swim bladder. There is no treatment for the internal fungal infection except to wait it out. Fry were not fed antibiotics.

Since the fry die-off fish have been healthy with a very few losses associated with chronic BCWD.

Smolts will be released in 2018.

Washougal Coho Stock, BY16, at Prosser Hatchery.

This stock was brought in as eyed eggs to make up for low egg numbers of the Yakima stock during spawning. Adults were spawned at Washougal Hatchery WDFW in the Fall 2016 and eggs were brought in after eye-up in January 2017.

Egg incubation and early rearing went well.

In October this stock was diagnosed with chronic Bacterial Kidney Disease (BKD) caused by *R. salmoninarum*. Mortality was low and it was decided to leave the fish on 56°F well water until release to reduce the effects of the disease. Mortality remains low and medicated feed has not been used.

Fish health sampling of the broodstock for these eggs was virology only done by Washington Dept. of Fish and Wildlife. No ELISA was run because there has not been BKD in this stock at Washougal for the last 5-10 years – including BY16 held at Washougal. The egg transfer was deemed low risk; however, if Prosser needs transfer Washougal Coho eggs in the future we recommend that eggs culled for *R. salmoninarum* based on ELISA optical density to avoid the spread of BKD.

Smolts will be released in 2018.

Little White Salmon (LWS) Coho Stock, BY16, at Prosser Hatchery

Eyed eggs from this stock were brought in to supplement poor in-basin Coho egg numbers. "Run of the River" adult coho that returned to LWSNFH were spawned in October/November 2016 and eggs incubated to eye-up at Willard NFH and sent eyed to Prosser in December 2016.

No fish health issue with this stock.

Smolts will be released in April 2018.

Eagle Creek Coho Stock, BY16, at ECNFH

Adult fish health samples were collected October 26th, November 2nd and 9th, 2016 (150 ovarian fluid collected in 5 fish pools for virus; 150 kidney collected individually from females for ELISA with 30 subsampled for bacteria; and 60 kidney/spleen from males collected in 3 fish pools for virus). No virus was detected. *Aeromonas salmonicida* and *C. shasta* were present.

Fish had low mortality due to BCWD throughout rearing at ECNFH.

Transfer of juveniles to acclimation sites will occur in February 2018.

Yakima Coho Stock, BY15, at Prosser Hatchery

Eggs were collected in October/November 2015 at Prosser. Egg incubation and growout was uneventful through 2016. Smolts were released in April 2017.

Eagle Creek Coho Stock, BY15, at ECNFH

Adult fish health samples were collected November 4th, 10th and 18th, 2015 (150 ovarian fluid collected in 5 fish pools for virus; 150 kidney collected individually from females for ELISA with 30 subsampled for bacteria; and 60 kidney/spleen from males collected in 3 fish pools for virus). No virus was detected. *Aeromonas salmonicida* and *C. shasta* were present.

On May 13, 2016 elevated mortality was diagnosed with BCWD and fish were treated with 15mg/kg of Aquaflor for 10 days. In the ensuing months fish continued to have low mortality from chronic BCWD at ECNFH. Fish were transferred to acclimation sites in the upper Yakima River basin in January 2017 and released in April 2017.

No fish health issues prior to release.

Yakima Coho Stock, BY14, at ECNFH

Fish had low mortality from chronic BCWD during holding at ECNFH. Fish were transferred to acclimation sites in the upper Yakima River basin in January 2016 and released in April 2016. No fish health issues prior to release.

No Eagle Creek Coho were transferred to Yakima basin acclimation sites because mission was met with Coho from Prosser.

Yakima Coho Stock, BY14, at Prosser Hatchery

No fish health issues prior to transfer to acclimation site and/or release in April 2016.

Yakima Coho Stock, BY14, at ECNFH

Eggs were collected, fertilized and incubated to eye-up at Prosser hatchery and sent eyed to ECNFH.

Fish had low mortality from chronic BCWD during holding in 2015 at ECNFH. Fish were transferred to acclimation sites in the upper Yakima River basin in January 2016 and released in April 2016.

No fish health issues prior to release.

Upriver Bright (URB) – Fall Chinook Salmon

Yakima Stock URB Chinook, BY17, Prosser Hatchery

The URB adults were sampled for fish health on November 1st, 8th and 15th, 2017 (150 female sample total were collected – 18 x 5 fish pools of ovarian fluid collected for virus and 12 x 5 fish pools of kidney/spleen collected and split between virus, ELISA other and bacteriology). No pathogens of concern were detected.

Eggs collected from this broodstock have hatched, but have not been ponded. No fish health issues to date.

Stock will be released in May 2018.

LWS Stock URB Chinook, BY17, Prosser Hatchery

Adults collection for fish health occurred on November 2nd, 13th, 2017 (150 female sample total were collected – 18 x 5 fish pools of ovarian fluid collected for virus and 12 x 5 fish pools of kidney/spleen collected and split between virus, ELISA other and bacteriology). Infectious Hematopoietic Virus (IHNV) was detected in 10% of the tissue samples and 61% in ovarian fluid. No other pathogens of concern were detected.

Eggs collected from this broodstock have hatched, but have not been ponded. No fish health issues to date.

Stock will be transferred in April and released in May 2018.

Yakima Stock URB Chinook, BY16, Prosser Hatchery

Collection of the broodstock fish health samples occurred on October 26th and November 2nd, 2016 (150 ovarian fluid collected in 5 fish pools for virus; 150 kidney collected individually from females for ELISA with 30 subsampled for bacteria; and 60 kidney/spleen from males collected in 3 fish pools for virus). No pathogens of concern were detected.

No fish health issues with this brood year during growout prior to release in May 2017.

LWS Stock URB Chinook, BY16, Prosser Hatchery

Collection of the broodstock fish health samples occurred on October 25th and 31st, 2016 (150 ovarian fluid collected in 5 fish pools for virus; 150 kidney collected individually from females for ELISA with 30 subsampled for bacteria; and 60 kidney/spleen from males collected in 3 fish pools for virus). Tissue and ovarian fluid levels of IHNV were 75% and 90% respectively. No other pathogens of concern were detected.

Eggs incubation went well. For the second year fry had minor issue with "Phoma" and *F. psychrophylum* was detected secondarily. The problem was greatly reduced from last year (see BY15) with changes made prior to egg incubation. All issues were resolved prior to marking and transfer to Prosser in April 2017.

No fish health issues with this brood year prior to release in May 2017.

URB Chinook Stock from Bonneville Hatchery Oregon Department of Fish and Wildlife (ODFW), BY16

Eggs were collected for these fish in October 2016, incubated, hatched and grew to yearlings at Bonneville Hatchery prior to transfer to Prosser in January 2018.

For this brood year fish health visited Bonneville a month prior to release to observe raceways of yearling URBs that will be transferred to Prosser as well as collect a 60 fish inspection. Another trip to Bonneville occurred just prior shipment of URBs to assess fish health. On both occasions, while at Bonneville, fish had low mortality, but were both precocious and had clinical BKD; very little fungus was seen. The inspection was negative for virus and culturable bacteria, but 30+/30 kidney smears were positive for *Renbacterium salmoninarum.*

Yearlings were transferred to Prosser in late January 2018 with about a 1% transfer loss. To date precocious fish have been dying as well as the population suffering chronic loss due to BKD. These fish are located in acclimation pond 1.

Bonneville yearling URBs will be released in April 2018.

Note: URBs smolt as subyearlings around May of the same year they hatch, fish held as yearlings go through another smolting event around October. Once smolted these fish crave salt water and are in a constant state of stress for as long as they are held in freshwater. Being stressed this way will provide opportunistic pathogens a foothold to create chronic and acute problems. Yearling Fall Chinook, such as these, also will have higher precocious male percentage (5 - 10%) than normal (0 - 1%). Precocious males usually die and can be carriers and sources of fish pathogens. Usually as a result of the constant state of stress these URBs can experience a 1-5% transfer loss when shipped from location to another. From a culture standpoint at Prosser, the rearing units the yearling URBs go into will have to be thoroughly disinfected before the LWS subyearling URBs are received on station. For all of these reasons (increased susceptibility to disease, increased workload, and altered physiology) fish health does not recommend Prosser hold yearling Fall Chinook under current culture conditions.

Yakima Stock URB Chinook, BY15, Prosser Hatchery

Egg incubation and early rearing of fry were uneventful. In April 2016 Amoebic Gill Disease (AGD) was causing an epizootic and fish were treated with Peroxaid (hydrogen peroxide) to reduce mortality below epizootic conditions prior to release in May. An otter was found dead in the cleaning diversion pipe. Otters can be carrier of amoeba. That combined with the stress of a predator likely caused this outbreak of AGD.

Smolts were released in May 2016.

LWS Stock URB Chinook, BY15, Prosser Hatchery

Adult fish health samples were collected October 19th, 27th and November 9th, 2015 (150 ovarian fluid collected in 5 fish pools for virus; 150 kidney collected individually from females for ELISA with 30 subsampled for bacteria; and 60 kidney/spleen from males collected in 3 fish pools for virus). Infectious Hematopoietic Necrosis Virus was detected in 25% of the male tissue samples and 30% of the female ovarian fluid. No other pathogens of concern were detected.

The hatchery purchased Redzone Egg Boxes and incubated a portion of the eggs in this unit the rest were incubated in Heath trays. The egg boxes were loaded slightly on the heavy side and some egg loss occurred. Concurrently, some flow issue occurred affecting the Heath trays causing the fry gulp at the air likely ingesting a fungus. There was chronic loss of fry due to “Phoma” after ponding. All issue were resolved by the time the fish were marked in February/March and transferred to Prosser in March 2016.

A very low infection of AGD was also found in this group prior release in May 2016. No treatment was recommended.

URB Chinook Stock from Bonneville Hatchery ODFW, BY15

Eggs were collected for these fish in October 2015, incubated, hatched and grew to yearlings a Bonneville Hatchery prior to transfer to Prosser in January 2017. See note from BY16.

After transfer it was found out that these yearlings had chronic BCWD, severe fungus on tail and fins as well as precocious males.

This stock suffered chronic loss due to the above until release in April 2017.

Summer Chinook Salmon

Wells Hatchery Stock, Summer Chinook, BY17, at Marion Drain

Adults fish health samples were collected at Well Hatchery (Grant County PUD) on November 1st and 8th, 2017. Twenty-eight samples were negative for virus. Renibacterium salmoninarum, causative agent of BKD, was observed clinically in one adult and RsELISA were high (above 0.2 optical density or OD). *Aeromonas salmonicida*, causative agent of Furunculosis, was also cultured from 71% of the pooled samples.

Several problems at the Wells coincided for low adult survival and low egg numbers: change in management, high holding temperature and disease.

Gametes were brought to Marion Drain and handled as described in BY15.

Problems at Wells describe above resulted in low eye-up.

The eggs have hatched, but fish are still in incubators. Fish health will keep an eye on this stock as they may be susceptible to pathogens due to adult stress level and disease.

Wells Hatchery Stock, Summer Chinook, BY16, at Prosser

Samples collected from 106 female adults, spawned on Oct. 19th and 25th, 2013 at Wells Hatchery WDFW, were negative for virus (0+/106). *Renibacterium salmoninarum*, causative agent of BKD, was non-detected in the females (106). The eggs for the 106 females were identified according to the female's fish health number and transferred to Prosser Hatchery where they were fertilized, water-hardened and eyed in quarantine (isolated from other stocks, effluent contained to prevent contamination) on chilled well water until fish health results were completed.

Egg incubation and fry rearing to subyearling stage were completed at Prosser.

No fish health issues occurred prior to transfer to acclimation.

Wells Hatchery Stock, Summer Chinook, BY15, at Marion Drain

On October 21st, 2015 adult sample collection at Well Hatchery WDFW consisted of 85 individual female ovarian fluid (for virus) and kidney (for ELISA and other bacterial culture) samples. Brood year was negative for virus and not detected for RsELISA.

Gametes were collected at Wells and transferred separately on ice to Marion Drain where fertilization, water hardening, eye-up, hatch and early rearing occurred. Eggs were incubated individually until eye-up representing one female. A female would be culled if the virus was positive for that individual.

No fish health issues occurred prior to transfer to acclimation.

Vehicle Maintenance

Ten GSA vehicles were leased for this project. Two vehicles were used by the tribal biologists for site visits and traveling to meetings. Three other vehicles were assigned to the Maintenance Technicians to transport tools and supplies to work sites. Four vehicles were used by the Fish Culturist for two hatcheries and various acclimation ponds. One large flatbed used to haul the fish transporting tank. Regular oil changes and maintenance was performed under the GSA contract**.**

Maintenance

Three full time Maintenance Technicians (time split within YKFP - 1 dedicated mainly to Prosser Hatchery) take care of the repairs, maintenance, and fabrication needed for the YKFP programs. The facilities that they maintain are: Prosser Hatchery, Marion Drain Hatchery, all fall Chinook and coho acclimation sites, Cle Elum Spring Chinook Hatchery, Spring Chinook acclimation sites (Easton, Jack Creek and Clark Flats). They also work with the following M&E Biologists, where they repair, do regular maintenance and/or fabricate items as needed: Coho M&E, Fall Chinook M&E, and Spring Chinook M&E, and Klickitat M&E Biologists, and the Habitat Biologists. The YKFP Maintenance Shop is located at Marion Drain Hatchery.

Training

Training for the Fish Culturists and Maintenance Technicians this year has been mainly on the job training. The following shows the training that personnel were sent to: the lead Bookkeeper attended Native American Purchasing Conference in Santa Fe NM in 2017; three Fish Culturists added the Northwest Fish Culture Conference in Centralia, WA in December of 2016.

Meetings and Tours

Regular meetings for the staff include the monthly policy group and bi-monthly fishery staff meetings. The staff also meets with members of STAC to update and coordinate fish rearing objectives. The Benton Conservation District, the Yakima Conservation Corps, and the Yakama Nation Head Starts schedule tours for schools to visit the Prosser Hatchery to get an understanding of what is being done in the Yakima River for salmon enhancement. Following is a list of the tours this past year:

2016 Tours

2/27/2016 – Sunnyside Boy Scouts: 10 kids, 2 adults; 3/30/2016 – Grandview McClure Elementary: 40 5th graders; 4/2/2016 – Heritage University: 30 students; 4/20/2016 – Prosser Business Leaders: 6 adults; 4/27/2016 – Mt. Hood College: 15 students; 5/4/2016 – Yakama Nation Toppenish Head Start: 12 students, Administrative staff 8 adults; 5/5/2016 – Harrah Elementary: K – 6th 32 students, 4 adults; 5/6/2016 – Harrah Elementary: 5th & 6th grade 40 students, 5 adults; 5/9/2016 – Yakama Nation Wapato Head Start: 16 students, 8 adults; 5/9/2016 – Yakama Nation White Swan Head Start: 16 students, 4 adults; 5/10/2016 – Yakama Nation Wapato Head Start: 16 students, 6 adults; 5/11/2016 - Yakama Nation Wapato Head

Start: 11 students, 11 adults; 5/12/2016 - Yakama Nation Wapato Head Start: 26 students, 17 adults; 5/13/2016 – Sunnyside Christian 4th grade: 22 students, 10th grade 14 students, 12 adults; 5/24/2016 – Pioneer Elementary 1st grade: 180 students, 12 adults; 5/26/2016 - Pioneer Elementary 3rd grade: 150 students, 12 adults; 6/3/2016 - Wapato Middle School 6th-8th grades: 18 students, 5 adults; 6/7/2016 – Wapato Middle School 8th grade: 51 students, 4 adults; 6/8/2016 – Toppenish Middle School 6th grade: 275 students, 10 adults.

2017 Tours

4/13/2017 – Heritage University: 12 students; 4/26/2017 – Mt. Hood College: 18 students; 5/4/2017 – Toppenish Middle School 6th grade: 148 students, 7 adults; 5/11/2017 – Wapato Elementary 4th grade: 100 students, 4 adults; 5/16/2017 – Pioneer Elementary 1st grade: 132 students, 15 adults; 5/18/2017 - Sunnyside Christian 4th grade – 15 students, 10th grade – 18 students, 10 adults; 5/18/2017 – Northwest School of Seattle 10th grade: 60 students, 10 adults; 5/23/2017 – Grandview Elementary 4th-5th grades: 45 students, 3 adults; 5/24/2017 – Pioneer Elementary 3rd grade: 140 students, 7 adults; 5/27/2017 – family of 10 from Sunnyside; 5/31/2017 – Wapato Middle School 8th grade: 58 students, 4 adults; 10/14/2017 – Pack 635 Boy Scouts: 5 scouts, 1 adult; 11/15/2017 – Prosser Heights Elementary 5th grade: 80 students, 8 adults; 11/29/2017 – Prosser Heights Elementary 5th grade: 100 students, 9 adults.

Personnel

The project employees: two full time Fish Biologists; two Administrative Personnel; one Fish Culturist V (Lead Foreman), five Fish Culturist II's; three Fish Culturist II (split between LYRSRC, the Tribal account, and the Steelhead Kelt Reconditioning Contract); two seasonal/temporary Fish Culturist II and three Maintenance Technicians (split within the YKFP program). Since there is no housing on station at Prosser, the facility has personnel on duty 24 hours every day. Two full time Fish Culturist II are night shift and one is scheduled swing shift. Marion Drain has one house on station where a Maintenance Technician resides as the caretaker for the Hatchery and YKFP maintenance shop.

Annual DOE Report

The following letter to DOE serves as the report for January 1 – December 31, 2016.

January 23, 2017

Department of Ecology
Central Regional Office
1250 W Alder Street
Union Gap Wa 98903

RE: Annual Summary of Chemical Usage for 2016

To whom it may Concern

The following is in compliance for the general NPDES permit coverage for upland fin fish hatchery and rearing for the Yakama Nation at Prosser Hatchery.

Facility Sampling Plan

As per the waste discharge general permit it is required to submit a facility sampling plan. The Yakama Nation Fisheries staff and the Department of Ecology staff established appropriate areas to take grab samples of the effluent from Prosser Hatchery. The areas selected were recommended by the DOE as preferred areas to ensure the entire hatchery effluent be sampled. Three lined ponds are used from March to June with an average flow of 1800 gpm. 16 raceways were used with a range of 150 -450 gpm. Also 10 small fiberglass tanks were used to start fry with inflow of 150 gpm in Feb and March. Flow rate is available in each rearing tank with electromagnetic flow meters. Exact amounts can be instantly obtained and monitored with the existing system. Samples are taken at the point of the river return channel to collect all water discharged from the hatchery. The inflow is sampled at the head end of the settling basin. An effluent pollution pond is used to settle water during cleaning of rearing areas was used and any discharged water can be sampled via a pipe to discharge ditch.

The water supplied to the facility is surface water from Chandler canal. The water is gravity fed from the canal to the hatchery at a rat up to 15 cfs. Surface water is used from January to July and from October to December as long as the Bureau of Reclamation is operating the canal. Three ground water wells are also used with the capacity of 3200 gpm. The wells are used all year and are the only source from June through October. The water supply is regulated to meet the biological demands of the fish reared and is adjusted by mixing surface and ground water depending on water temperatures.

Solid Waste Management Plan:

A waste management plan has been implemented at the Prosser Hatchery to ensure solids waste is handled according to the permit. A list follows addressing the issues in the permit. Sand silt and other debris collected and removed from the facility is transported to a vacant area and spread across land used by the U.S. Bureau of Reclamation for dumping silt. The area is above Chandler Canal and well out of reach of flooding. This area is also used to spread the accumulated settled solids when the rearing ponds and settling basins are cleaned. The solids are allowed to dry in the ponds then hauled to the

vacant land and spread over the ground. Fish mortalities in the hatchery including eggs, fry and juvenile salmon are placed in sealed containers and disposed of at the landfill. Fish mortalities due to fish kills are rare but if they occur the fish are collected and stored in a freezer. Once the mortalities are all collected and cause of death is determined the fish are taken to local landfills for disposal. Mortalities from adults used for broodstock are eviscerated, heated and frozen to kill all pathogens then placed in appropriate streams for added nutrients. All blood from spawning is washed down to an area in the hatchery and spread over the ground. Limited blood is removed since the fish are killed and spawned without bleeding the carcass. Floating debris that collects on the screens are broomed daily. If a large amount of debris is collected it is placed in bins to be hauled to landfills.

Pollution Prevention Plan:

A plan has been implemented to prevent releasing pollutants to the river system. The following list addresses the concerns for the permit. Fish are placed on strict growth programs dictating amounts to be fed daily. Fish are given rations throughout the day and only fed to satiation to ensure all food is consumed. If the fish reach satiation the feeding is stopped and the remaining feed is fed later in the day. While the fish ae reared in the raceways it is necessary to clean the floors to the raceways. The raceway floors are vacuumed bi-weekly to ensure safe rearing conditions and to prevent buildup of solid waste. The large rearing ponds are cleaned bi-monthly with the vacuum system. A two-inch trash pump is used to vacuum the rearing containers. The waste is pumped to the settling basin designed to settle solids and preventing river water pollution. The vacuum picks up the waste and limits the disturbance of the waste to allow for thorough pond cleaning. At times it is necessary to crowd fish for broodstock selection, tagging of juveniles or reducing densities by moving fish to additional rearing areas. Prior to any type of activity the raceways are vacuumed. If the water level is lowered standpipes are pulled out to reduce the water level the standpipes divert the effluent water to the settling basin so the disturbed water is settled in the basin. Fish at the Prosser Hatchery are either produced for release directly from the facility or hatched and reared until release time the transported to acclimation facilities. Fish release directly from site volitionally released by pulling screens at rearing tank outlets and allowing them to swim over dam boards. If fish need to be pushed out more boards are pulled to reduce water levels. Fish transported to off station acclimation ponds are forced to the head of tanks with crowding devices and lifted into trucks with the use of a six-inch fish pump.

Some chemicals are used throughout the year to control disease, Hydrogen Peroxide, Formalin and Iodine solution. The hydrogen peroxide or formalin is 37% active formaldehyde use to reduce risk of external parasites. For adult salmon it is dripped in at a rate of 1 part per 6,000 of the inflow for one hour. It is also dripped over fertilized eggs at 1 part per 600 water inflow for 15 minutes. These amounts are standard hatchery practice and are at the lowest effective rate. The Iodine solution is used to disinfect tools and rearing equipment to prevent the spread of pathogens. All tools disinfected are rinsed prior to use and the iodine is discarded by spreading it over the hatchery lot. Chemicals are stored in a designated room in the containers they are shipped in. The barrels of formalin are stored in the room on spill containment pallets. The hatchery is equipped with spill containment box, which has the containment and absorbing tools used if a spill occurs. Oil and hazardous materials such as diesel

fuel are stored in manufactured containers designed for fuel storage. If diesel equipment is required local vendors are used to deliver the fuel as needed. The rearing raceways have walls above ground and the three pods have berms completely surrounding them, which prevents storm water runoff from entering them. The effluent-settling basin is at the lowest elevation and has a berm above it to reduce storm water runoff.

If there are specific questions or concerns feel free to contact me.

Joe Blodgett

Fisheries Biologist

Yakama Nation Fisheries

Annual DOE Report

The following letter to DOE serves as the report for January 1 – December 31, 2017

June 29, 20188

Department of Ecology
Central Regional Office
1250 W Alder Street
Union Gap Wa 98903

RE: Annual Summary of Chemical Usage for 2017

To whom it may concern

The Yakama Nation Prosser Hatchery is required to submit an annual summary of all chemicals used at the fish rearing facility. Chemicals are required at times to ensure safe rearing conditions for the fish. Any chemical used at the fish rearing facility is produced for the specific use and an accepted method in fish culture. Four chemicals used the past year include; Tricane Methanesulfonate (MS222), Argentine (Iodine solution), Hydrogen Peroxide and Paracide F (Formaline solution).

The MS-222 is used for fish culture to anesthetize the fish for easy handling and reduce stress. The chemical is used when fish must be handled for adult broodstock or juvenile monitoring at a rate of 20-mg. /liter. A total of 800 grams of this chemical was used in 2016. The MS-222 is diluted with water in closed container such as a storage box or fish tote and discarded into the ground after every use.

The Iodine solution is used to disinfect equipment to prevent spread of disease. The iodine solution is used to rinse any tool or outer wear that comes in contact with the hatchery water source. The iodine is also mixed to a solution of

1 part to 100 parts water and salmon eggs are disinfected. Argent chemicals inc. supplies the solution with a brand name Argentyne. Also Western Chemicals produces a similar product with the brand name Wescodine. A total of 30 gallons was used over the year. The iodine solution is rinsed off prior to use and unused iodine is discarded in the gravel parking area. The eggs are placed in a bath for ten minutes and the excess solution is poured on the floor and diluted.

Hydrogen Peroxide was prescribed to the fall Chinook salmon yearling to help with an external parasite infected the rearing area. A bath with 250 parts per million was administered for one hour on four occasions to help fight the infection. A total of 300 gallons were used for the year.

The Parricide F is 37% formaldehyde solution used to treat eggs and fish from external parasites. The formaline is dripped in the eggs at a rate of 1 part per 600 parts of inflowing water for 15 minutes five days each week during egg incubation period. It is dripped in tanks holding adult coho salmon at a rate of 1part per 6000 parts of inflowing water for one hour five days per week during adult holding period. A total of 75 gallons were used the past year.

The chemicals used were purchased through Argent Chemical Lab in Redmond WA and western Chemicals. The Products are manufactured specifically for these purposes. Feel free to contact me with any questions (509) 945-5899.

Feel free to contact me with any concerns or questions. Thank you.

Sincerely,

Joe Blodgett
Yakama Nation Fish Biologi

New Additions or Modifications to Prosser & Marion Drain Hatcheries January 2016 – December 2017

- New chilling unit installed at Prosser Hatchery – 100 ton unit that will deliver required amount of chilled water and does not leak.
- Improved adult holding circular at the swim-in circular at the Prosser Hatchery denil trap by – placing boulders around and under it for improved stability; put up jump fence so fish cannot jump out of trap; and a cover to keep the fish calmer.
- Purchased a new trailer for transporting adults at Prosser Hatchery. Added a tote with air blower and air stones.
- Improved adult holding raceway – put privacy slats in fence to keep fish calmer.
- Installed several new lawn areas – removed weeds and rocks, leveled ground, brought in fill dirt, and laid sod –for esthetic value and also for dust abatement.
- Improved river pump station – installed tee to hook-up diesel pump for emergency use; raised the electric pump (river pump) with ecology blocks to protect from floodwaters.
- Repaired (one) and built (two) new pond feeding scaffolds.
- Repaired some and replaced raceway liners and pond liners (Fish Health recommendations – tears and creases can harbor pathogens).
- Installed deck, covered deck, and installed access door to the alarm central room in the pole building.
- Installed flow meters on all wells (3).
- Purchased a new ATV for transporting materials, feed, and fish throughout the hatchery.