

Post season report on: **Short Term Mortality Estimates of Adult Chinook Salmon released from 6" Drift GN in the freshwater areas of the Nisqually River**

**2020**

**Introduction**

The purpose of the research was to determine short-term mortality on adult Chinook using 6 inch gill drift net.

The 2020 research was planned to start August 1 but did not start until 9/22 due to several factors that should be remedied for the 2021 research season. Receiving approval from NMFS and the Nisqually Fish Commission took longer than expected. When granted permission to start the project, wildfire smoke and air quality didn't allow research to take place for an additional week. Covid 19 also presented a challenge that will hopefully be mitigated in the upcoming field season through vaccine availability.

Prior to starting the research, the treaty fishery in the Nisqually River performed very poorly raising concerns about meeting hatchery rack objectives by the Nisqually Fish Commission as well as tribal natural resource management staff. The 2020 research plan was scheduled for up to 5 days of test fishing and an encounter of 450 Chinook. Because of these concerns the Nisqually Fish Commission approved a test regulation for only 1 day of sampling per week and a total of 100 Chinook for season. The research project was stopped 10/6/20 when Chinook encounters dropped off and Coho encounters started to pick up, consistent with past commercial fishery timing data.

**Methods**

Two drift locations and associated holding sites were used upstream of the I-5 bridge with no snags with good rocky substrate for holding fish in live bags reducing "silting out" when boat came to rest. Drift times averaged 115 seconds (90-140 sec range) and all drifts were concluded under 5 minutes. We held the Chinook for 24+ hours in live bags tethered to an anchored line from shore and a weight in the river, perpendicular to flow. We only had 10 live bags which restricted catch per day to 10 Chinook (see field drawing). The samplers consisted of two Nisqually Natural Resource's technicians/fishers and one Nisqually Biologist on shore, adhering to research protocol and recording data.

At the beginning of the sampling day water chemistry and weather conditions were recorded to assure research was within water temperature guidelines set forth in research proposal. Research could not continue if water temperature exceeded 20 degrees Celsius. The time was documented at end of drift and Chinook were secured in live bags to make sure 24+ hour release. The fishers drifted the 6 inch GN as they would during a commercial fishery in the Nisqually with the exception of, after navigating boat to shore downstream of holding site, the net was pulled completely out of boat and into the water to work up encountered salmon. This technique has been used with much success during the Tangle Net/Change in Ration in recent years. Pulling the net out of the boat allows the fish to experience less trauma in the water as opposed to being out of the water thrashing in a hard boat tangled in a net. The perceived drawback to this method is possible loss of catch; however to date, no target species has been lost.

When Chinook or other salmonids were gilled, the net was cut. On the sampling day, when the fish were caught, the individual fish condition was documented as follows: 1 (vigorous), 2 (vigorous and bleeding),

3 (lethargic), 4 (lethargic and bleeding), or 5 (no visible movement or apparent ventilation). Each fish was sampled for length, sex, and mark status. The time and individual fish condition was documented again upon release after 24+ hours.

## Results

The research results were very exciting particularly to our Nisqually Fishers who saw the potential to harvest hatchery Chinook while release and/or not encountering non-target species. Of the 21 Adult Chinook caught and released, all were released in condition 1 indicating that the immediate and short term mortality was 0%. There were two that bled upon catch and only one gilled small hatchery fish (67cm) that needed to be cut from net but was released in condition 1 after 24 hours. Water temperatures never reached the critical 20 degrees Celsius during the sampling period. Results in Table 1 and Table 2 summary.

There were few other non-target species encountered but all were released alive upon capture. No trout were encountered or any other animal species (see Table 3.)

**Table 1.** Chinook holding observations

Capture									Release			
Capture Date	Fish ID	Sex	Mark	CWT	Length	Condition	Time	Temp C	Release Date	Time	Temp C	Condition
9/22/2020	1	2	ad	Y	86	1	825	15	9/23/2020	827	15.4	1
9/22/2020	2	1	ad	N	77	1	825	15	9/23/2020	829	15.4	1
9/22/2020	3	1	UM	N	62	1	840	15	9/23/2020	842	15.4	1
9/22/2020	4	1	ad	N	73	1	840	15	9/23/2020	844	15.4	1
9/22/2020	5	1	UM	N	73	1	840	15	9/23/2020	845	15.4	1
9/22/2020	6	1	UM	N	83	1	855	15	9/23/2020	855	15.4	1
9/22/2020	7	1	ad	N	82	1	910	15	9/23/2020	910	15.4	1
9/22/2020	8	1	ad	N	67	2	910	15	9/23/2020	911	15.4	1
9/22/2020	9	2	ad	N	75	1	910	15	9/23/2020	913	15.4	1
9/22/2020	10	1	ad	N	90	1	925	15	9/23/2020	925	15.4	1
9/28/2020	1	1	UM	N	72	1	815	13.6	9/29/2020	856	13.3	1
9/28/2020	2	2	ad	N	85	1	815	13.6	9/29/2020	857	13.3	1
9/28/2020	3	2	ad	N	62	1	815	13.6	9/29/2020	858	13.3	1
9/28/2020	4	1	UM	N	92	1	815	13.6	9/29/2020	858	13.3	1
9/28/2020	5	2	ad	N	91	3	830	13.6	9/29/2020	859	13.3	1
9/28/2020	6	2	ad	N	86	1	850	13.6	9/29/2020	910	13.3	1
9/28/2020	7	1	ad	N	85	1	850	13.6	9/29/2020	911	13.3	1
9/28/2020	8	1	ad	N	70	1	850	13.6	9/29/2020	912	13.3	1
9/28/2020	9	2	ad	N	73	2	850	13.6	9/29/2020	912	13.3	1
9/28/2020	10	1	UM	N	90	1	910	13.6	9/29/2020	913	13.3	1
10/6/2020	1	2	ad	N	68	1	825	14.1	10/7/2020	825	14.1	1

**Table 2.** Summary

Date	Condition at Capture			Condition at Release
	1	2	3	1
9/22/2020	9	1	0	10
9/28/2020	8	1	1	10
10/6/2020	1	0	0	1

**Table 3.** Non target fish encountered

Date	Species	Count
9/22/2020	Coho	3
	Chinook Jack	1
	Chum	1
9/28/2020	Coho	32
	Chinook Jack	1
10/6/2020	Coho	10

### Discussion

The bulk of the Chinook run was missed due to starting research late and it was apparent that we would not be hitting our target of 450 Chinook. We concluded that it was still important to “get our feet wet” in order to get practice and work out kinks with holding and releasing prior to a Pink year. Approval for the 2021 research project from NMFS and the Nisqually Fish Commission needs to happen during the spring of 2021 during NOF/PFMC process. This will allow samplers the time to start early August to encounter 100 samples needed to estimate short-term mortality that will have a 95% confidence interval of no more than +/-10%. Sampling through September is paramount to observe and record the Pink timing and it’s interaction with the encountered Chinook.

In 2021 more live bags will be used and more nets will be hung in order to ensure to meet our sample target. Additional drifts will be explored with suitable holding locations to increase holding capacity.

Early indications of using Gill Net drift for selective Chinook fishing are positive. The Nisqually Fishers have been using Gill Nets for several thousand years due to the gear’s efficiency. Fishers were unhappy with the encounters of non-target fish in previous Tangle Net commercial fisheries conducted on the Nisqually River. Fishers that helped conduct this research seemed accepting of the gear as a tool for capturing target species, releasing ESA listed unmarked Chinook, and not encountering multiple other

species of fish as compared to Tangle Net. Gill Net does not catch small fish like the Tangle Net which allows fisher to concentrate on releasing ESA listed UM Chinook and harvesting hatchery Chinook. The mortality estimate of 0% from this research was very promising; however, the 2020 sample size is too small to be confident in results. Achieving 100 Chinook samples in a pink (2021) and a non-pink year (2022) are important to understand possible variation of Chinook mortality in the presents or absence of pink salmon.