

## UPDATE: 2016 WCVI Run Reconstruction Project

### Report on progress toward implementation of the 2016 NEF Project: Terminal Abundance of WCVI Chinook Salmon

#### BACKGROUND

- At the direction of the Northern Fund Committee, performance criteria were set out for the project, "Terminal Abundance of WCVI Chinook Salmon". Release of 60% of the Pacific Salmon Commission's Contribution (\$154,200.00 CDN) to Fisheries and Oceans Canada for the project is contingent on the achievement these criteria.
- The primary activities of this project are increasing the size and improving the representation of terminal fishery and escapement stock and age composition samples in order to improve the precision of WCVI terminal stock and fishery assessment. As such, performance criteria set objectives related to sample targets.
- This memo provides an update on the implementation of the project in 2016 and an evaluation of the sampling rates versus the performance criteria. It does not provide an update on actual results or analysis as samples collected from 2016 fisheries and escapement are still being processed.

#### PERFORMANCE CRITERIA

##### Recreational Fishery Sample Targets

Recreational Fishery Sampling Area	Target Sample Size			Total	Cells
	July	August	September		
Areas 21-22 (Nitinat-San Juan)	150	200	opportunistic	400	2
Area 23 (Barkley Sound)	300	300	200	800	3
Area 24 (Clayoquot)	Throughout the season			100	1
Area 25 (Nootka)	300	300	100	700	3
Area 26 (Kyuquot)	150	150	-	300	2
Area 27 (Quatsino)	200	200	opportunistic	400	2
<b>Total</b>				<b>2700</b>	<b>13</b>

*Notes:*

*Sampling Areas include corridor Areas, e.g. Area 23 includes Area 123*

*Sampling of fisheries is required to be representative of the overall fishery catch*

*September creel surveys are not carried out in Areas 25 & 26 and the only samples are from Guides*

## Commercial Fishery Sample Targets

Commercial Fishery Sampling Area	Target Sample Size			Total	Cells
	July	August	September		
Area 23 (Barkley Sound)	100 per opening	-	-	200 – 400	2-4
Area 25 (Nootka)	100 per opening	-	-	200-400	2-4
<b>Total (anticipated)</b>				<b>400-800</b>	<b>4-8</b>

Notes:

Area 23 - Anticipate 2-4 gillnet openings per season, 90-95% of catch from Robertson Ck Hatchery

Area 25 - Anticipate 2-4 gillnet openings per season, 90-95% of catch from Conuma R. Hatchery

<b>(A) Performance Criteria for Recreational and Commercial Fishery Sampling</b>	
1	Sampling occurs in each cell, with achieved sampling of at least 75% of target sample size or at least 5% of estimated recreational catch. Criteria must be met for 75% of cells.
2	Conduct analysis of 2015 samples to evaluate whether guide only samples are representative of the recreational fishery, and report by Nov 10, 2016.

## Escapement Sample Targets

Escapement Sampling	Target
Area 25	<b>Improve Precision</b> Add 1-2 surveys to Burman, Leiner, Tahsis, and Conuma
	<b>Add to Escapement Program</b> Gold River or alternative to escapement assessment program

<b>(B) Performance Criteria for Escapement Sampling</b>	
1	Demonstration that 1-2 surveys were added to the Burman, Leiner, Tahsis and Conuma escapement assessment program in 2016 beyond the normative swim survey methodology.
2	Demonstration that Gold River or an alternative is added to the Burman, Leiner, Tahsis and Conuma escapement assessment program in 2016.

## **Brooks Peninsula Test Fishery**

Brooks Peninsula Test Fishery	Target Sample Size		
	July	August	September
Implement Test Fishery	Maximum 200 samples/wk		-

*Notes:*

*Anticipate early July start, 6-8 week duration, 2 vessels fishing 2 days per week  
Maximum 200 samples per week, and maximum 1000 samples total  
Samples to be distributed over duration of the season*

<b>(C) Performance Criteria for Brooks Peninsula Test Fishery</b>	
1	<b>Brooks test fishery takes place during at least four weeks.</b>
2	<b>At least 500 Chinook are sampled from the test fishery across the season.</b>

## **Sampling Protocol**

<b>(D) Sampling Protocol for all fisheries and escapement sampling</b>
Adipose intact and adipose missing Chinook will both be fully sampled - Otolith and DNA samples are not required for chinook identified by cwt - DNA samples are not required for chinook identified by otolith

## SAMPLE RESULTS

### Recreational Fishery Sampling Results

JULY - Chinook					
AREA (Corridor included)	Average Catch (2010-2015)	2016 Inseason Catch	2016 PSC Sample Target	2016 Samples Collected	Percent of Catch Sampled
Area 20/21 - Renfrew	2,060	925	150	60	6%
Area 23 - Barkley	4,160	1,130	300	101	9%
Area 24 - Clayoquot	940	549	27	81	15%
Area 25 - Nootka/Esperanza	8,380	4,543	300	615	14%
Area 26 - Kyuquot	480	336	150	318	95%
Area 27 - Quatsino	1,340	1,066	200	561	53%
<b>TOTAL</b>	<b>17,360</b>	<b>8,549</b>	<b>1,127</b>	<b>1,736</b>	<b>32%</b>

AUGUST - Chinook					
AREA (Corridor included)	Average Catch (2010-2015)	2016 Inseason Catch	2016 PSC Sample Target	2016 Samples Collected	Percent of Catch Sampled
Area 20/21 - Renfrew	2,423	6,377	150	130	2%
Area 23 - Barkley	1,546	8,123	300	394	5%
Area 24 - Clayoquot	2,343	126	6	67	53%
Area 25 - Nootka/Esperanza	1,159	2,297	300	263	11%
Area 26 - Kyuquot	4,847	1,017	150	593	58%
Area 27 - Quatsino	514	529	200	363	69%
<b>TOTAL</b>	<b>12,832</b>	<b>18,469</b>	<b>1,106</b>	<b>1,810</b>	<b>33%</b>

SEPTEMBER - Chinook					
AREA (Corridor included)	Average Catch (2010-2015)	2016 Inseason Catch	2016 PSC Sample Target	2016 Samples Collected	Percent of Catch Sampled
Area 20/21 - Renfrew	57	937	47	34	4%
Area 23 - Barkley	-	3,384	200	56	2%
Area 24 - Clayoquot	-	57	3	6	10%
Area 25 - Nootka/Esperanza	211	-	100	-	-
Area 26 - Kyuquot	208	-	-	26	-
Area 27 - Quatsino	-	-	-	6	-
<b>TOTAL</b>	<b>477</b>	<b>4,379</b>	<b>350</b>	<b>128</b>	<b>5%</b>

### Commercial Fishery Sampling Results

Fishing Location	Opening	Chinook Catch	PSC Sample Target	2016 Samples	Sample Rate
Alberni Inlet	84	184	100	50	27%
	92	297	100	50	17%
Tlupana Inlet	83	1,452	100	75	5%
	84	1,551	100	88	6%
	91	368	100	100	27%
Total		3,852	500	363	9%

### Escapement Sampling Results

Terminal Area	River	Normative Number of Surveys	Number of Surveys Planned 2016	Number of Surveys Executed 2016
Area 25	Conuma	3	9	5
	Burman	4 to 5	8	6
	Tahsis	5 to 5	10	7
	Leiner	6 to 5	9	7

Terminal Area	Population	Samples
Area 20/21 - Renfrew	Sooke	78
Area 23 Barkey Sound	Nahmint River	73
	Sarita River	514
Area 25 - Nootka Sound	Burman River	190
	Gold	310
	Leiner	110
	Tahsis	50
Total		1325

*Note: These biological sample totals are incomplete. They do not include an additional 3592 samples that were collected at hatchery sites and also in the Burman R. SEF project. There*

were also additional samples collected from WCVI indicator systems that are still being compiled.

**Brooks Peninsula Test Fishery**

<b>Fishery</b>	<b>Week</b>	<b>Statweek</b>	<b>Days Fished</b>	<b>Samples</b>
Test Troll	1	73	3	47
	2	74	4	109
	3	75	4	106
	4	81	3	92
	5	83	1	21
Open Troll	6/7	82/83		287
<b>Total</b>	<b>7</b>		<b>15</b>	<b>662</b>

## EVALUATION OF 2016 PROJECT IMPLEMENTATION

### Recreational Fishery

Recreational Fishery Sampling Area		Month				Cells	Criteria met
		July	August	September	Total		
Area 21-22 (Nitinat-San Juan)	Target	150	200	opp.	400	2	1
	Actual	<b>60</b>	<b>130</b>	<b>34</b>	<b>224</b>		
	Sample Rate	<b>6%</b>	<b>2%</b>	<b>4%</b>			
Area 23 (Barkley Sound)	Target	300	300	200	800	3	2
	Actual	<b>101</b>	<b>394</b>	<b>56</b>	<b>551</b>		
	Sample Rate	<b>9%</b>	<b>5%</b>	<b>2%</b>			
Area 24 (Clayquot)	Target	throughout the season			100	1	1
	Actual	<b>81</b>	<b>67</b>	<b>6</b>	<b>154</b>		
	Sample Rate	<b>15%</b>	<b>53%</b>	<b>10%</b>			
Area 25 (Nootka)	Target	300	300	100	700	3	2
	Actual	<b>615</b>	<b>263</b>	-	878		
	Sample Rate	<b>14%</b>	<b>11%</b>				
Area 26 (Kyuquot)	Target	150	150	-	300	2	2
	Actual	<b>318</b>	<b>593</b>	<b>26</b>	<b>937</b>		
	Sample Rate	<b>95%</b>	<b>58%</b>				
Area 27 (Quatsino)	Target	200	200	opp.	400	2	2
	Actual	<b>561</b>	<b>363</b>	<b>6</b>	<b>930</b>		
	Sample Rate	<b>53%</b>	<b>69%</b>				
<b>Target Total</b>		<b>1100</b>	<b>1150</b>	<b>300</b>	<b>2700</b>	<b>13</b>	<b>10</b>
<b>Actual Total</b>		<b>1655</b>	<b>1743</b>	<b>122</b>	<b>3520</b>		<b>77%</b>

### Analysis of potential bias associated with guide-recovered samples

- 2015 samples were analyzed as required to determine to evaluate the effect of guide-recovered samples (i.e. if they are representative of the recreational fishery catch). This analysis was submitted to the PSC in mid-November, 2016.

## **Commercial Fishery**

<b>Fishing Location</b>	<b>Opening</b>	<b>Sample Target</b>	<b>2016 Samples</b>	<b>Sample Rate</b>	<b>Cells</b>	<b>Criteria met</b>
Alberni Inlet	84	100	50	27%	1	<b>1</b>
	92	100	50	17%	1	1
Tlupana Inlet	83	100	75	5%	1	1
	84	100	88	6%	1	1
	91	100	100	27%	1	1
<b>Total</b>		500	363	9%	5	<b>5 (100%)</b>

## **Escapement**

- Extreme precipitation during the spawning period resulted in less escapement surveys than planned. However, for index systems in Area 25 between 5 to 7 surveys were successfully conducted. During previous years with similar inclement conditions typically far fewer surveys are eventually conducted (2 to 3) because crew resources are required even for aborted survey days. Therefore, even though fewer surveys were implemented than planned a higher level of precision was maintained than under normative funding levels.
- A minimum of 1325 biological samples were collected from WCVI spawning populations. This total is incomplete because 2016 samples are still being compiled. In addition, there were 3592 samples collected from hatchery sites and the Burman R. SEF project. The biological samples indicators provide important information on i) the level of variation in the contribution of age classes to the terminal run and ii) the level of contribution of hatchery strays to WCVI spawning populations.

## **Brooks Peninsula Test Fishery**

- The test fishery operated for 5 weeks during 2016 (criterion 1 met). During this period 375 chinook were sampled. An additional 287 fish were sampled by the same vessel used for the test fishery area during the commercial opening in later August. Therefore the total number of samples collected from the Brooks Peninsula fishing area was 662 (criterion 2 met).

## **Sampling Protocol**

- The sampling protocol was followed as directed. That is, adipose intact and adipose missing fish were both fully sampled allowing for identification of stock of origin through DNA analysis for those fish were not identified by either CWT or otolith marks.



## CONCLUSION

- By our evaluation, the performance criteria for implementation of the 2016 NEF project, 'Terminal Abundance of WCVI Chinook Salmon', were met. The sampling and related performance criteria for the recreational, commercial and Brooks test fishery were all met and sample protocols were followed as directed.
- Two significant challenges in the implementation of the 2016 project were 1) the unusually low CPUE in the offshore troll fishery (both test and open commercial) and 2) extreme weather events during the spawning period which disrupted escapement surveys. The first challenge was met by extending the Brooks Peninsula area sampling program to the open commercial fishery using the test vessel. The second challenge resulted in fewer than planned escapement surveys. However, a higher level of precision was maintained than under normative funding levels.
- Overall, for the 2016 project approximately 5870 additional samples were collected from WCVI area terminal fisheries and escapement over samples that would normally be collected through existing programs.
- Although fewer samples overall were collected in 2015 (4344), the results have been compiled (see NEF 2015 report) and they are very informative. They provide important data to not only develop a more precise estimate of the WCVI terminal run size through standard run reconstruction methods but also to:
  - Test the use of distant fishery indices of terminal abundance using the sampling results of not only CWT recoveries, but also more abundant otolith marks;
  - Develop more precise estimates of the impact of WCVI terminal area fisheries on WCVI stocks (and also non-WCVI origin stocks), including size selectivity;
  - Develop a more precise estimate of the age composition of the WCVI terminal run;
  - Develop more precise estimates of the contribution of hatchery production to the WCVI terminal run;
  - Better understand the extend of hatchery straying among WCVI populations;
  - Evaluate biological differences in characteristics such as age and size among WCVI populations, including between hatchery and wild components.
- All of this information has potentially significant management implications ranging from improving forecasts and fishery impact assessments to the evaluation and mitigation of hatchery impacts on wild stocks.