

Initial Study Report Meeting

Study 9.14 *Genetic Baseline* *Study for Selected* *Fish Species*

October 15, 2014

Prepared by
Chris Habicht and Andy Barclay
Gene Conservation Lab
Alaska Department of Fish and Game



Study 9.14 Objectives

- **Develop a repository of genetic samples** for target **resident fish** species captured within the Lower, Middle, and Upper Susitna River drainage
- **Contribute to the development of genetic baselines** for chum, coho, pink, and sockeye **salmon** spawning in the Middle and Upper Susitna River drainage
- **Characterize the genetic population structure of Chinook salmon** from Upper Cook Inlet, with emphasis on spawning aggregates in the Middle and Upper Susitna River
- **Examine the genetic variation among Chinook salmon populations** from the Susitna River drainage, with emphasis on Middle and Upper River populations, **for mixed-stock analyses (MSA)**
- If sufficient genetic variation is found for MSA, **estimate the annual percent of juvenile Chinook salmon in selected Lower River habitats** that originated in the Middle and Upper Susitna River in 2013 and 2014 (Figure 2-1)

Study 9.14 Components

- Sample Collection (ISR Part A, Section 4.1; pg 3)
- Tissue Storage (ISR Part A, Section 4.2; pg 7)
- Laboratory Analysis (ISR Part A, Section 4.3; pg 8)
- Data Retrieval and Quality Control (ISR Part A, Section 4.4; pg 8)

Study 9.14 Variances

- There were no variances from the collection, storage and analysis methods described in the Study Plan; however, full access to all of the sampling sites was not available in 2013.
 - Access was not available to collect Chinook salmon samples in tributaries flowing through Cook Inlet Regional Working Group (CIRWG) lands above or near Devils Canyon (Cheechako, Devil, Fog, Tsusena and Watana creeks) in 2013.
 - Lack of land access prevented sampling of coho salmon from Portage and Prairie creeks, and reduced sampling effort for sockeye salmon in Prairie Creek (Genetics IP Section 4.2; see ISR Section 4.5).

Study 9.14 Summary of Results in ISR (ISR Study 9.14, Part A – Section 5)

- Sample Collections (through Sept. 15, 2013)
 - Adult Chinook salmon collections
 - Sites: 50 surveyed, 27 sampled: 1,131 fish (2 above Devils Canyon)
 - Other adult salmon collections
 - Sites: 85 surveyed, 26 sampled: 295 sockeye, 641 chum, 68 coho, and 1,041 pink salmon sampled
 - Juvenile Chinook salmon collections
 - Above Devils Canyon: 103 fish
 - Lower River collections: 8 fish – one habitat type
 - Other species collections (opportunistic)
 - 20 species from 6 strata listed
 - 1,255 fish collected, 9 species/strata complete
 - Pacific salmon coordination with other studies
 - Salmon Escapement Study (9.7)
 - Indian River weir 25 fish
 - Radio-tagged fish: 609 Chinook, 771 other Pacific salmon
 - ADF&G fish wheels: no fish delivered

Study 9.14 Summary of Results in ISR (ISR Study 9.14, Part A – Section 5)

Continued...

- Collection trip documentation: GCL database
- Tissue Storage: GCL archive
- Laboratory Analysis: ongoing
- Data Retrieval and Quality Control: ongoing

Study 9.14 Summary of Results in ISR

(ISR Study 9.14, Part B, 2014 Implementation Plan)

- Met with FWS and NMFS March 12, 2014
 - Refine statistical analyses after distribution and size of samples is known.
 - Increase number of markers screened for Chinook salmon from 96 SNPs to 190 SNPs and 12 uSATs.
 - Exclude related juveniles from statistical analysis.
- Revised draft to Final 2014 Implementation Plan (filed with ISR 9.14, Part B, Attachment 1)
 - Reviewed and addressed written comments by USFWS and NMFS (summarized in Table 8 of IP).

Study 9.14 Summary of Results in ISR ***(ISR Study 9.14, Part B, 2014 Implementation Plan)***

- 2014 focus on Chinook salmon in Middle and Upper Susitna River
 - **Priority is genetic population structure of Chinook salmon and examining the genetic variation among Chinook salmon populations for mixed-stock analysis.**
 - **Opportunistic sampling for a genetic repository of target resident fish species and collection of data for genetic baselines for chum, coho, pink, and sockeye salmon spawning in the Middle and Upper Susitna River drainage**
 - **If sufficient genetic variation exists for MSA, estimate the annual percent of juvenile Chinook salmon in selected *Middle River* habitats that originated in the *Middle and Upper Susitna River* in 2013 and 2014**
- 2015 similar to 2013

Study 9.14 Summary of Results since ISR

- Increased representation of Chinook salmon sampled within and above Devils Canyon (DV) from 12 to 102 adults and 138 to 264 juveniles:
 - Adults:
 - 2014 ISR: Kosina Creek 12 fish
 - Post-ISR (additional 2014): Fog 12; Devil 1; Chinook 7; Cheechako 57 fish
 - From radio tagging project (2013 and 2014): Kosina 1; Tsusena 1; Devil 1; Chinook 1; Cheechako 9 fish
 - Juveniles:
 - 2014 ISR: Oshetna River 32; Kosina Creek 106 fish
 - Post-ISR (additional 2013 and 2014): Oshetna River 28; Kosina Creek 68; Mainstem above Devils Canyon 17; Chinook Creek 6; Cheechako 7 fish
- Increased representation of Chinook salmon sampled from Upper Cook Inlet from 20 to 28 sites:
 - 2014 ISR: 1,131 fish collected in 2013 from 27 sites
 - 20 sites >100 fish (including archived)
 - Post ISR: 826 fish collected in 2014 from 24 sites,
 - 28 sites >100 fish (including archived)

Study 9.14 Summary of Results since ISR

Number of Chinook salmon samples collected to date.

Collection Area	Reported in ISR		Post-ISR *		Total
	Adults	Juveniles	Adults	Juveniles	
Susitna Upper River	12	138	1	109	260
Susitna Middle River- Devils Canyon to Upper	0	0	89	17	106
Susitna Middle River downstream of Devils Canyon	237	0**	159	153	549
Other Upper Cook Inlet Sites	4,483	8	704	0	5,195

*1 adult and approximately 122 additional juvenile samples pending delivery to ADF&G from FDA team.

**FDA ISR reported that 48 juveniles were delivered to ADF&G but they arrived after September 15, 2013, so they are counted in the Post-ISR numbers.

AEA Proposed Modifications to Study 9.14 in ISR (ISR Study 9.14, Part C – Section 7.1.2)

- AEA is not planning any modifications to the approved Study Plan. However, specific details regarding the sampling and analytical methods have been updated in the 2014 Implementation Plan based on the 2013 study season and consultation with NMFS and USFWS.

Current Status of Study 9.14

1. Sample Collections (through Sept. 15, 2014)

a) Adult Chinook salmon

- Exceeded expected sample sizes at 13 of 29 strata
- Progress on 4 additional strata
- 28 sites ready for baseline (>100 fish)
- Exceeded expected sample sizes within/above Devils Canyon

b) Other adult salmon (opportunistic in 2014)

- Met or exceeded targets at 4 of 15 species/drainage strata
- At least one full collection completed in 10 strata

c) Juvenile Chinook salmon

- Exceeded expected sample sizes within/above Devils Canyon
- Did not capture Lower River fish in multiple habitat types (opportunistic in 2014)

d) Other species collections (opportunistic)

- Exceeded goals for 13 of the 120 species/strata
- Progress made for 10 of the 20 species

Current Status of Study 9.14

Continued...

2. Collection trip documentation: GCL database
3. Tissue Storage: GCL archive ongoing and on schedule
4. Laboratory Analysis: ongoing and on schedule
5. Data Retrieval and Quality Control: ongoing and on schedule
6. Statistical analyses:
 - a) Baseline for MSA: Waiting for laboratory analysis
 - b) Testing among hypotheses for Chinook salmon spawning above Devils Canyon: Wait to fine-tune statistical analyses in collaboration with USFWS and NMFS.

Steps to Complete Study 9.14 (ISR Study 9.14, Part C – Section 7.1)

AEA is planning the following activities for 2014:

- Collect juvenile and adult Chinook salmon from above Devils Canyon
- Collect adult Chinook salmon from upper Cook Inlet tributaries
- Opportunistically collect other salmon and resident species from the Susitna River
- Genotype Chinook salmon for Single Nucleotide Polymorphisms (SNPs) and microsatellites (μ SATs)

AEA is planning the following activities for 2015:

- Statistically analyze genetic structure of Chinook salmon
- Examine potential for mixed-stock analysis of Chinook salmon within Susitna River

Licensing Participants Proposed Modifications to Study 9.14?

- Agencies
- CIRWG members and Ahtna
- Public