UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Fisheries Science Center
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F/NWC1

September 11, 2006

Roger Thomas
PFMC Council Member At-Large
Golden Gate Fishermen's Association
PO Box 40
Sausalito, CA 94966-0040

Dear Mr. Thomas,

I am writing to thank you for your assistance in collecting coho salmon samples from California fisheries and to provide you with our initial results. The enclosed report contains preliminary results and conclusions based on the 55 samples that we received from you in July. The preliminary results indicate that the samples originated primarily from Oregon Coastal populations, with smaller contributions from the Columbia River and Washington Coastal populations. These results will be reanalyzed by the NMFS science centers on the west coast in developing improved coho salmon population baselines in the future (please see the joint report for details).

If you have questions regarding this report, please direct them to Michael Ford (206 860 5612).

Sincerely,

John E. Stein

John Stein
Deputy Director

cc. Bill Hogarth
Bob Lohn
Don McIsaac (for distribution to PFMC members)
Marija Vojkovich, CDFG
Randy Fisher, PSMFC
Rod Mcinnis

Preliminary genetic analyses of San Francisco area coho salmon samples

NOAA National Marine Fisheries Service
Northwest and Southwest Fisheries Science Centers[1]

September 12, 2006

This report presents the preliminary results of a genetic analysis of coho salmon that were caught in a Chinook salmon fishery in marine areas near San Francisco, California. Dried fin tissue samples that had been removed from the fish were provided to us for the analysis. We analyzed 55 coho salmon samples for variation at 11 microsatellite DNA loci. The observed genotypes were compared to a database of allele frequencies to estimate the stock composition of the mixture, and to estimate the region of origin for each of the samples. The baseline database consisted of microsatellite allele frequencies for 84 coho salmon populations ranging from Southern British Columbia to Northern California. The populations were grouped into 6 major geographic regions - south British Columbia, Puget Sound, Washington coast, Columbia River, north/central Oregon coast, and south Oregon/north California coast. Detailed information on the microsatellite DNA loci, baseline dataset, and genetic stock identification methods are available in Van Doornik et al. (in press).

Our initial analysis revealed that one of the samples was a Chinook salmon, so it was excluded from further analyses. The mixture proportion estimates show that a majority of the coho salmon originated from the north/central Oregon coast (Table 1). Other contributing regions included the Columbia River, the Washington coast and south British Columbia, but note that the south British Columbia estimate is within one standard deviation of zero.

Individual assignment estimates indicate that 38 of the fish originated from the north/central Oregon coast, 10 from the Columbia River, 5 from the Washington coast, and 1 from south British Columbia (Table 2). The one fish that did assign to south British Columbia had a low *P* value associated with the assignment (0.466).

These results provide evidence that the samples are largely comprised of coho salmon from Oregon coastal and Columbia River Basin sources. Evidence of the southern movements from these stocks have been shown previously for both juvenile (Brodeur et al. 2004) and adult coho salmon (Weitkamp and Neely 2002). Weitkamp and Neely (2002) analyzed coded-wire tagged recoveries from coastal fisheries and reported that fish from nearly all of the Oregon coast and Columbia River populations they examined were caught in the southern-most marine locations they studied, including San Francisco Bay.

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[1] This report was primarily authored by David Teel and Don Van Doornik of the NWFSC's Conservation Biology Division. Questions regarding the report should be directed to the Conservation Biology Division Director, Michael Ford (mike.ford@noaa.gov).

The coho salmon encountered in the San Francisco area fisheries where these samples originated are generally a mixture of adipose clipped and unclipped fish. In 2005, nearly 12.5 million ad-clipped juveniles were released from Columbia River hatcheries and another 420,000 from Oregon coastal facilities[2]. In contrast, only 26,000 ad-clipped coho salmon were reported released in California, all from the Warm Springs Hatchery. Therefore, most clipped fish presumably originate from Coastal Oregon and Columbia River hatchery populations. The adipose status of the individual fish we analyzed was not provided, and the samples we analyzed may not have been a random sample of the coho salmon encountered (Roger Thomas, personal communication). In future analyses, it will be useful to record the adipose fin status of all genetic samples.

An important limitation of the present analysis is that the baseline data included only four populations from the southern Oregon/northern California coast group and none from sources immediately adjacent to the area of the fishery. If there are fish in the sample from geographic areas not represented in the baseline, these fish would be erroneously assigned to one of the populations in the baseline. The west coast NMFS Science Centers are currently working to develop a more complete microsatellite baseline for coho salmon which will allow an improved re-analysis of these and any additional fishery samples. Until then, the results presented here are preliminary and may not accurately portray the true composition of coho salmon in the area sampled.

Acknowledgements

We thank Roger Thomas for collection of the fishery tissue samples.

References

Brodeur, R. D., J. P. Fisher, D. J. Teel, R. L. Emmett, E. Casillas, and T. W. Miller. 2004. Juvenile salmonid distribution, growth, condition, origin, and environmental and species associations in the Northern California current. Fishery Bulletin 102:25-46.

Van Doornik, D.M., D.J. Teel, D.R. Kuligowski, C.A. Morgan, and E. Casillas. In press. Genetic analyses provide insight into the early ocean stock distribution and survival of juvenile coho salmon (*Oncorhynchus kisutch*) off the coasts of Washington and Oregon. North American Journal of Fisheries Management.

Weitkamp, L., and K. Neely. 2002. Coho salmon (*Oncorhynchus kisutch*) ocean migration patterns: insight from marine coded-wire tag recoveries. Canadian Journal of Fisheries and Aquatic Sciences 59:1100-1115.

[2] Source: the Pacific States Marine Fisheries Commission Regional Mark Processing Center: http://www.rmpc.org, accessed 8/11/2006

Table 1. Mixture proportion estimates and standard deviations of a sample of 54 coho salmon.

Region	Proportion	SD
South British Columbia	0.012	0.017
Puget Sound	0.000	0.019
WA Coast	0.091	0.047
Columbia River	0.195	0.047
North/Central OR Coast	0.702	0.060
South OR/North CA Coast	0.000	0.000

Table 2. Individual assignment estimates and probabilities for 54 coho salmon samples.

Fish ID	Region of Origin	*P*
51	South British Columbia	0.466
28	WA Coast	0.994
46	WA Coast	0.958
52	WA Coast	0.834
19	WA Coast	0.806
30	WA Coast	0.513
09	Columbia River	1.000
14	Columbia River	1.000
34	Columbia River	1.000
26	Columbia River	0.999
47	Columbia River	0.999
23	Columbia River	0.990
35	Columbia River	0.990
10	Columbia River	0.978
54	Columbia River	0.858
39	Columbia River	0.478
04	North/Central OR Coast	1.000
05	North/Central OR Coast	1.000
06	North/Central OR Coast	1.000
08	North/Central OR Coast	1.000
15	North/Central OR Coast	1.000
16	North/Central OR Coast	1.000
18	North/Central OR Coast	1.000
21	North/Central OR Coast	1.000
22	North/Central OR Coast	1.000
25	North/Central OR Coast	1.000
29	North/Central OR Coast	1.000
32	North/Central OR Coast	1.000
33	North/Central OR Coast	1.000
40	North/Central OR Coast	1.000
48	North/Central OR Coast	1.000
49	North/Central OR Coast	1.000
02	North/Central OR Coast	0.999
01	North/Central OR Coast	0.998
27	North/Central OR Coast	0.998

42	North/Central OR Coast	0.998
44	North/Central OR Coast	0.994
53	North/Central OR Coast	0.994
07	North/Central OR Coast	0.991
24	North/Central OR Coast	0.991
45	North/Central OR Coast	0.991
12	North/Central OR Coast	0.987
50	North/Central OR Coast	0.980
37	North/Central OR Coast	0.974
41	North/Central OR Coast	0.968
31	North/Central OR Coast	0.967
55	North/Central OR Coast	0.901
36	North/Central OR Coast	0.900
38	North/Central OR Coast	0.896
03	North/Central OR Coast	0.841
13	North/Central OR Coast	0.782
20	North/Central OR Coast	0.774
43	North/Central OR Coast	0.702
11	North/Central OR Coast	0.689