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GENETIC STOCK IDENTIFICATION OF JUVENILE CHINOOK AND COHO SALMON IN THE NORTHERN CALIFORNIA CURRENT

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PROJECT SUMMARY

One of the core hypotheses of the Northeast Pacific GLOBEC project is that events in coastal regions during the early stages of migration and maturation largely influence the survivals of chinook and coho salmon. To test this hypothesis, juvenile salmon are being sampled at several nearshore localities in the Northern California Current in related GLOBEC projects to study feeding ecology and growth. Chinook and coho salmon express complex life history patterns, and this variability can influence the interactions between coastal variability and juvenile salmon survival. Collections of juveniles in coastal waters generally include individuals from a heterogeneous mix of populations with, often genetically influenced, life-history differences that affect growth and migration. An understanding of the vital features of juveniles in coastal waters requires the identification of the life-history types being studied. One approach is to use Genetic Stock Identification (GSI) to identify the populations of origin.

We are analyzing samples of juvenile chinook and coho (when available in sufficient numbers) salmon for genetic variability and to provide estimates of population origin with proven GSI methods. Characterization of the space-time variability in stock compositions is used to describe shifts in abundances and differences in migration patterns of genetically distinct populations. Annual patterns of variability are used to understand the relationship between environmental fluctuations and juvenile salmon abundance.

1) Key major objectives to our proposed study (from proposal):

(1) to provide estimates of population origin, and life-history type, to refine estimates of growth and survival being made in other studies.

(2) Search for seasonal and annual patterns of variability in the juvenile ocean migration of naturally spawned fish.

2) Papers or presentations that discuss the above objectives (in parentheses):

Presentations:

Teel, D., J. Myers, D. Van Doornik, and L. Weitkamp. "Genetic Identification of Juvenile Salmon." GLOBEC NEP PI/SI Meeting, Corvallis, OR, November 2000. (2)

Teel, D. "Use of allozymes to estimate origins of ocean-caught juvenile chinook salmon." Salmon Ocean Ecology Meeting, Nanaimo, B.C., January 2001. (2)

Brodeur, R.D., J.P. Fisher, D.J. Teel, J.P. Noskov, R.L. Emmett, and E. Casillas. "Distribution, growth, condition, origin and associations of juvenile salmonids in the Northern California Current." PICES Annual meeting, Victoria, BC, October 2001. (1,2)

Teel, D., P. Crane, C. Guthrie, and A. Marshall. "Chinook Salmon Pacific Rim Allozyme Database: Current Applications to Oceanic Mixtures." Coastwide Salmonid Genetics Meeting Bodega Bay, CA, October 2001. (2)

Teel, D., J. Myers, D. Van Doornik, and L. Weitkamp "Genetic Stock Identification of Juvenile Chinook Salmon in the Northern California Current." GLOBEC NEP SI Meeting, Seattle, WA, November 2001. Poster presentation. (2)

Brodeur, R.D., E. Casillas, J. Fisher, T. Miller, J. Noskov, and D. Teel "Distribution, growth, origin, trophic and species associations of juvenile salmonids in the northern California Current." Salmon Ocean Ecology Meeting, Santa Cruz, CA, January 2002. (1,2)

Teel, D., D. Van Doornik, and D. Kuligowski. "Genetic mixed stock analysis of juvenile coho salmon off Oregon and Washington." Salmon Ocean Ecology Meeting, Santa Cruz, CA, January 2002. (2)

Weitkamp, L."Evaluating the Performance of Juvenile Chinook and Coho Salmon in Marine Waters of Southeast Alaska." Salmon Ocean Ecology Meeting, Santa Cruz, CA, January 2002. (1)

Brodeur, R.D., E. Casillas, J. Fisher, T. Miller, R. Emmett, and D. Teel. "Distribution, growth, origin, trophic and species associations of juvenile salmonids in the northern California Current." ASLO/AGU Ocean Sciences Meeting, Honolulu, HI, February 2002. (1,2)

Jacobson, K., R. Baldwin, and D. Teel. "Migration of Juvenile Salmonids in the California Current System: What Trematode Infections and Fish Populations Genetics Tell Us." 10th International Congress of Parasitology, Vancouver, B.C., August 2002. (1,2)

Teel, D., D. Van Doornik, and D. Kuligowski. "Genetic mixed stock analysis of juvenile chinook salmon off Oregon and Washington." Salmon Ocean Ecology Meeting, Newport, OR, February 2003. (2)

Teel, D., D. Van Doornik, and D. Kuligowski. "Genetic mixed stock analysis of juvenile chinook salmon in coastal areas of the Pacific Northwest." Annual Meeting of the Western Division American Fisheries Society, San Diego, CA, April 2003. (2)

Weitkamp, L. "Differences in early ocean ecology of chinook and coho salmon in SE Alaska: Possible cause for differential survival?" Annual Meeting of the Western Division American Fisheries Society, San Diego, CA, April 2003. (1)

Jacobson, K., D. Teel, and E. Casillas. "Metacercariae of Nanophyetus salmincola and Early Marine Survival of Juvenile Coho Salmon." 26th Annual AFS/FHS Meeting, Seattle, WA, July 2003. (1,2)

Jacobson, K., R. Baldwin, and D. Teel. "Parasite community composition: Insights on the ecology and migration of juvenile salmon." NPAFC Stock Identification Workshop, Honolulu, HI, November 2003. (1,2)

Teel, D. "Genetic Mixed Stock Analysis of Juvenile Chinook Salmon in Coastal Areas of Western North America." NPAFC Stock Identification Workshop, Honolulu, HI, November 2003. (2)

Teel, D., D. Van Doornik, and D. Kuligowski. "Genetic Mixed Stock Analysis of Juvenile Chinook Salmon In Coastal Areas of the Pacific Northwest." Abernathy Fish Technology Center Research Seminar, Longview, WA, March 2004. (2)

Weitkamp, L. "Ocean Conditions, Marine Survival, and Performance of Juvenile Chinook and Coho Salmon in Southeast Alaska." NWFSC Monster Seminar Jam, Seattle, WA, May 2004. (1)

Van Doornik, D., D. Teel, and D. Kuligowski. "Creation of a microsatellite baseline for southern coho salmon populations." Coastwide Salmonid Genetics Meeting, Newport OR, June 2004. Poster presentation. (2)

Sandell, T., K. Jabobson, D. Teel, and E. Casillas. "The Distribution and Prevalence of Bacterial Kidney Disease (*Renibacterium salmoninarum*) in Juvenile Chinook and Coho Salmon in the Northeast Pacific Ocean." PICES Annual Meeting, Honolulu, HI, October 2004. (1,2)

Publications:

Teel, D.J., D. M. Van Doornik, D.R. Kuligowski, and W. S. Grant. 2003. Genetic analysis of juvenile coho salmon (*Oncorhynchus kisutch*) off Oregon and Washington reveals few Columbia River wild fish. Fish. Bull. 101:640-652. (2)

Brodeur, R. D., J. P. Fisher, D. J. Teel, R. L. Emmett, E. Casillas, T. W. Miller. 2004. Juvenile salmonid distribution, growth, condition, origin, environmental and species associations in the Northern California Current. Fishery Bulletin, 102:25-46. (1,2)

Teel, D.J. 2004. Genetic mixed stock analysis of juvenile Chinook salmon in coastal areas of western North America. N. Pac. Anadr. Fish. Comm. Tech. Rep. 5: 47-48. (2)

Jacobson, K., R. Baldwin, and D. Teel. 2004. Parasite Community Composition: Insights on the Ecology and Migration of Juvenile Salmon. N. Pac. Anadr. Fish. Comm. Tech. Rep. 5: 49-51. (1,2)

Weitkamp, L. A. 2004. Ocean conditions, marine survival, and performance of juvenile chinook (Oncorhynchus tshawytscha) and coho (O. kisutch) salmon in Southeast Alaska. Ph.D. Dissertation, Univ. Wash., School of Aquatic and Fishery Sciences, Seattle, WA, 223 p. (1)

3) Online status of data.

At present, only baseline genetic (allozyme) data are available online (http://www.nwfsc.noaa.gov/publications/displayallinfo.cfm?docmetadataid=3555). By the end of 2005, stock composition estimates will be made available on a NWFSC server, with links from GLOBEC websites.

4) Papers to be submitted by the Fall of 2005.

Teel, D. J., D. M. Van Doornik, and D. R. Kuligowski. In prep. Genetic Analysis of Juvenile Chinook salmon in the Northern California Current. Target submission date: Spring 2005, Journal: Trans. Am. Fish. Soc. (2)

Van Doornik, D.M., D.J. Teel, and D.R. Kuligowski. In prep. Stock-specific Utilization of Columbia River Plume by Juvenile Coho Salmon (Oncorhynchus kisutch) Determined by Genetic Stock Identification. Target submission date: Spring 2005, Journal: Mol. Ecol.(2)