

FY98**Project 91-051-00: Monitoring and Evaluation Statistical Support for Life Cycle Studies**

BPA Contact: Pat Poe

Contract Requirements:

This project contracts for analytical services performed under the direction of Dr. John Skalski of the University of Washington. The contract includes a subcontract with BioAnalysts for the technical services of Dr. Al Giorgi for support in statistical analysis of historical tagging data and statistical support to the region and to assure consistency with the latest context and understanding of the biology and for coordination with the Plan for Analyzing and Testing Hypotheses (PATH).

Project Focus:

This project addresses Council Program measures 5.0F.5 and 3.2F.2 of the present 1994 Northwest Power Planning Council's (NPPC) Fish and Wildlife Program and NMFS 1995-1998 BIOP RPA Sec. 13f. The purpose of this project is to provide statistical support and technical assistance to the monitoring and evaluation efforts of BPA and the Northwest fisheries community in their ongoing efforts to enhance and recover Columbia River salmonid stocks. This project contains tasks that provide support for BPA's own analyses and independent assessment capabilities and peer review which helps us to meet our internal assessment requirements. This project also provides statistical support and assistance to the Northwest fisheries community in the form of helping agency and Tribal scientists with the design and analysis of fish tagging studies.

Project Goals and Objectives:

1. Provide BPA and the Northwest fisheries community with independent state-of-the-art, high-quality statistical assistance and guidance on the design and analysis, and interpretation of fish tagging studies and other research to improve monitoring and evaluation capabilities and to maximum learning and understanding so that the "best available information" is accessible for timely independent assessments and can be used in decision making.
2. Provide consistency in the application of statistical methodologies and analyses across life cycle stages to assure comparability related to performance measures and assessment of results through time, to maximize learning and adaptive management opportunities, and to improve and maintain the ability to responsibly evaluate the success of implemented salmonid mitigation programs and identify future mitigation options.

3. Resolve statistical and data analysis issues so that management institutions can focus on management baselines and biological or resource issues rather than on data analysis uncertainties.

Rationale for Non-Discretionary Status:

As a Federal agency, BPA has certain intrinsic governmental responsibilities that may not be transferred to other entities or voided. Chief among these is preservation of the Federal agency's ability to independently make decisions that commit fiscal and material federal resources. Other responsibilities are statutory or contractual and can only be modified if the governing statute or contract is changed. Implementation of such responsibilities is embodied in certain internal and external contracted activities that BPA has identified as "non-discretionary".

The 1996-2001 Memorandum of Agreement addresses total fish and wildlife expenditures under the Endangered Species Act and the Power Act's Fish and Wildlife Program. BPA recognized that existence of non-discretionary activities required administrative accommodation between non-discretionary and total expenditures. Since 1997 the existence of non-discretionary projects has been brought to the attention of the Council and CBFWA during formal Council sessions and in informal discussions with Council and CBFWA staff prior to completion of the annual prioritization process. Project 91-051-00, *Monitoring and Evaluation Statistical Support for Life Cycle Studies,* is considered a "non-discretionary" project.

This contract provides analytical capabilities and analyses needed for fish mitigation and fish impact assessments required of BPA and other federal agencies for compliance with ESA, NEPA, and the NW Power Act. This contract provides critical information and analysis capabilities needed to help focus mitigation efforts to achieve positive fish recovery results with efficient use of limited mitigation funds on both a real-time and planning horizon basis. Much of the work performed by project 91-051-00 provides direct support for In-Season management decisions, ESA Biological Assessments and consultations, and indirect support to the Plan for Analyzing and Testing Hypotheses (PATH). BPA needs and uses the support provided by this project to accountably perform and preserve its ability to independently make decisions related to operations of the hydrosystem and commitment of fiscal and material federal resources for fish and wildlife mitigation programs.

This contract promotes information/technology transfer, institutional learning, and adaptive management by: (1) providing independent monitoring and evaluation statistical support to BPA and the fisheries community; (2) developing and making statistical models, design and analysis tools, software, and Internet-based tools available to all parties to improve monitoring and evaluation capabilities; (3) providing real-time Internet-based value added information products and data integration capabilities for use by NMFS, TMT, and other members of the fisheries community to assist in-season management of fish and river resources, for example, historical timing and real-time predictions on the status of smolt migrations for ESA stocks, NMFS Snake River and Mid-Columbia River ESUs, and other Columbia Basin fish populations; and (4) publishing results on the development and design of analysis tools, the analysis of historical and real-time tagging data and other information for use by the fisheries community, the NPPC and

expert scientific forums like the Independent Scientific Advisory Board (ISAB), the Independent Scientific Review Panel (ISRP) and PATH.

The analytical and information support services provided by this contract will continue to be needed in the future to help meet the continuing demands for better analytical measurement and assessment tools to improve monitoring and evaluation capabilities and the information available for both in-season management of fish and river resources and decision making related to fish mitigation programs. The specific analytical support activities required each year will change to meet the needs of BPA and the Northwest fisheries community in their ongoing efforts to enhance and recover Columbia River Basin salmon runs.

FY98 Accomplishments:

1. Providing predictions of the run-timing of wild yearling and subyearling chinook and sockeye smolt to Lower Granite Dam in-season to the fisheries community and the Technical Management Team (TMT) throughout the 1998 migration season. Daily predictions and supporting data posted on the World Wide Web for public access. Program RealTime, a sophisticated pattern recognition and weighted regression algorithm is used to analyze PIT-tag and passage indices in real-time. The program provides estimates of "percent passage to date" and "days to a specified passage percentile." This program also provides valid confidence interval estimates of all predictions using nonparametric bootstrap methods. In 1998, this program is linked to a Columbia River Salmon Passage (CRiSP) model to extend predictions to Little Goose, Lower Monumental, Ice Harbor, and McNary Dams.
2. Provides statistical support for the design and analytical methods to be used in the PSMFC and WDFW project entitled, "Monitoring pinniped predation on the threatened or endangered salmonids in Washington." This project is being coordinated with similar research efforts by ODFW, CFG, and NMFS. This effort is part of the technical outreach to the Northwest fisheries community.
3. Analyzed historical salmonid smolt radiotelemetry data from the Columbia River to help develop new statistical methods to extract improved information on pool, dam and route-specific (e.g., turbine, spillway, bypass) survival and passage rate efficiencies. Fallout from this investigation will be new study designs and analyses of smolt radiotelemetry studies by spring of 1999.
4. Completed three-year investigation of ocean survival rates of Washington coho stocks based on 17 years of CWT tag returns. Study found strong survival relationship between the first six months of ocean survival of coho and summer ocean temperatures and upwelling. Survival operated under a narrow band of optimal conditions. Thesis entitled "Analyzing adult return data to assess ocean effects and salmon survival relationships" is now being written up as a scientific publication for peer review.

5. Accumulations of historic PIT-tag, hydroacoustic, balloon-tag, and radiotelemetry studies in the Snake River have been assembled to investigate partitioning reach survival into pool and dam components. Preliminary investigations strongly suggest that recent studies are consistent in characterizing smolt survival, fish guidance efficiency, and spill effectiveness through Lower Granite Dam across the diverse methods and data sets. Results of this analysis are lending credibility and assurance to recent Snake River investigations and information on relative contributions of the pool and dam to overall smolt mortality.
6. In FY98 a title change was made to better characterize and/or more clearly delineate the role and services project 91-051-00 currently provides to both BPA and the Northwest fisheries community. In addition to a title change, two report series were adopted to better characterize the products of this project in the context of the Council's Program (i.e. monitoring and evaluation statistical support). The two report series are:
Series #1 - The Design and Analysis of Salmonid Tagging Studies in the Columbia Basin
Series #2 - Monitoring and Evaluation of Smolt Migration in the Columbia Basin

So far in 1998 the following technical reports have been completed and made available to the fisheries community:

Newman, K. 1998. Estimating salmonid survival with combined PIT-CWT tagging. Volume II in the BPA Technical Report Series, the Design and Analysis of Salmonid Tagging Studies in the Columbia Basin. Technical Report (DOE/BP-35885-11) to BPA, Project 91-051-00, Contract 87-BI-35885.

Newman, K. 1998. Experiment designs and statistical models to estimate the effect of transportation on survival of Columbia River system salmonids. Volume III in the BPA Columbia Basin. Technical Report (DOE/BP-35885-11a) to BPA, Project 91-051-00, Contract 87-BI-35885.

Townsend, R. L., J. R. Skalski, and D. Yasuda. 1998. Evaluation of the 1995 predictions of the run timing of wild migrant subyearling chinook in the Snake River Basin using program RealTime. Volume I in the BPA Technical Report Series, Monitoring and Evaluation of Smolt Migration in the Columbia Basin. Technical Report (DOE/BP-35885-12) to BPA, Project 91-051-00, Contract 87-BI-35885.

Townsend, R. L., J. R. Skalski, and D. Yasuda. 1998. Evaluation of the 1996 predictions of the run timing of wild migrant subyearling chinook in the Snake River Basin using program RealTime. Volume II in the BPA Technical Report Series, Monitoring and Evaluation of Smolt Migration in the Columbia Basin. Technical Report (DOE/BP-91572-2) to BPA, Project 91-051-00, Contract 96-BI-91572.