

Response to ISRP Comments  
Statistical Support for Salmonid Survival Studies  
University of Washington  
BPA Project No. 198910700

ISRP Preliminary Comments

- a. A response is needed to identify methodology for monitoring and evaluation.
  - The annual proposals to the Bonneville Power Administration (BPA) have identified tasks and subtasks. Performance of the project is measured, in part, on the timely and on-budget completion of these work elements. The performance of the project is also measured by the continued use of the software developed by this project by resource agencies. Performance is also measured by the number of technical reports produced by resource agencies that used the statistical software products developed by the project.
  
- b. Have the products produced in the past benefited the fish?
  - The answer to the question depends upon whether a person believes the fisheries resources are best served by decisions based on political policy or scientific information. If the answer is scientific information, then this project has produced products that are extremely beneficial. This project was instrumental in establishing PIT-tag survival studies in the Columbia Basin, and since then, this project has fostered the quantitative use of radio-tag and acoustic-tag studies for smolt migration to establish benchmarks for salmon recovery and assess the multitude of mitigation activities at dams. These methods will also be used to assess whether recovery standards established in the Reasonable and Prudent Alternative (RPA) have been met.
    - A simple example illustrates the benefits of correct statistical interpretation of tagging data. A Snake River hatchery in the mid-90s released PIT-tagged smolts in the early, middle, and late stages of the spring outmigration. Using relative recoveries (i.e., ratio of recovery to release numbers) at Lower Granite Dam, it was concluded that earlier releases survived better. However, when the data were properly analyzed to separate out the survival process from the detection process, the trend was reversed. The relative recovery ratios were confounded with changes in detection processes associated with spill patterns at the dam. Had the hatchery manager misinterpreted the data for lack of proper analysis, rearing strategies would have been opposite of what could have benefited the fish. The fish benefit from management based on the best available information. This project strives to insure accurate and precise information is extracted from the tens of millions of dollars spent on tagging studies each year in the Basin.

- c. How many client hours have been logged in the past?
- If it is the wish of the ISRP, we could begin exact logs of time in client support. During the last calendar year of 2001, total man-hours in support of clients is estimated as follows:
 

|                                     |         |
|-------------------------------------|---------|
| – Sample size calculations          | 148 hrs |
| – Design of studies                 | 125 hrs |
| – Project proposal reviews          | 90 hrs  |
| – Inseason study support            | 60 hrs  |
| – Software instruction              | 165 hrs |
| – Adapting software to user needs   | 82 hrs  |
| – Analyses for interagency meetings | 112 hrs |
| – Review technical reports          | 96 hrs  |
| – Review client analyses            | 32 hrs  |
| Total                               | 910 hrs |
- d. Is there evidence of client satisfaction?
- The fact that the National Marine Fisheries Service (NMFS) has used SURPH software developed by the UW since 1993 and still continues to use it for all of their survival analyses is a good indication of continued client satisfaction. Add to this, the many other agencies (see response to e) that continue to use this and other statistical software developed by the UW. Finally, the many technical reports with UW staff as coauthors is another indicator of client satisfaction.
- e. Who uses the products produced and how beneficial are they to users?
- Among the many users in the Columbia Basin include the following:
    - NMFS Northwest Fisheries Science Center uses Program SURPH for all of their PIT-tag analyses.
    - The three mid-Columbia PUDs of Grant, Chelan, and Douglas counties use Program SURPH for PIT-tag analyses and Program USER for radio-tag and acoustic-tag studies. This includes studies at Wells, Rocky Reach, Rock Island, Wanapum, and Priest Rapids dams.
    - The USGS Cook Lab uses programs USER and SURPH for their smolt radio-tag studies at John Day, The Dalles, and Bonneville dams.
    - The US Army Corps of Engineers (USACE) uses Design 3D and 2D to allocate hydrophones for acoustic-tag studies at Lower Granite Dam.
    - RMC/Normandeau uses UW software to analyze all of their balloon-tag survival studies throughout the Basin.
    - Battelle Pacific Northwest National Laboratory uses Program SURPH to analyze the subyearling PIT-tag studies they conduct.
    - The Nez Perce tribe uses Program SURPH for analyses of their hatchery PIT-tag studies.

- The US Department of Energy uses survival software developed at the UW to analyze smolt survival studies in support of new turbine design efforts.

The users themselves may be best able to express the benefits of the software. However, that there are this many users, and some for as long as ten years, provides some indication of its utility. We have strived at the UW to make the software as user-friendly as possible while maintaining the quality and cutting-edge technology. In addition, we have strived to work with clients to anticipate and accommodate their needs on the quantitative issues that have evolved.

f. How available is the service and to whom?

- The services are available to anyone in the Columbia Basin who is conducting salmonid research in support of the Fish and Wildlife Program. We will provide consulting on study design, sample size calculations, and the analysis of tagging data. We will provide instruction on data analysis and interpretation as well as spot-check the analyses of other investigators. We will not, however provide complete data analysis. We will also provide technical reviews of proposed study designs and technical reports.

On a national- and international-level, we will supply software and its documentation. We will also respond to specific software issues that may be related to the performance of the programs.

g. What is the role of author in review of project proposals?

- At the request of BPA or the authors of a project proposal, this project will provide technical review of the proposed design and analysis of a tagging study. The review often involves comparing the study goals, study design, and proposed analyses for consistency. The review may also examine the proposed estimators, tests of hypotheses, and variance calculations for validity. The level of review depends on the nature of the request.

h. What is the means for providing statistical support to Council FWP-funded projects?

- The statistical support, as already described above, takes several forms:
  1. Technical review of proposed tagging studies funded by the Council.
  2. Providing state-of-the-art statistical software to properly analyze tagging studies funded by the Council.
  3. Providing one-on-one instructional support to tagging investigators in the Basin.
  4. Participating in interagency working groups on tagging studies. For instance, current effort include working on developing PIT-tag detection capabilities for the new Bonneville corner collector, evaluating adult PIT-tag detection capabilities at ladders, establishing tagging standards for USACE projects.

5. Developing new statistical models to address new quantitative issues and tagging technologies.
  6. Providing the statistical framework for measuring survival performance standards and recovery criteria listed in the RPAs.
  7. Providing the statistical tools to measure the success of mitigation activities in the hydrosystem focused on improving inriver survival of salmonids
- i. How are the services advertised to the region?
- The software packages are on the UW website, <http://www.cbr.washington.edu/analysis.html>, which receives over 2000 visits per day. In addition, the project has been around since the conception of PIT-tag survival studies in the Basin. Virtually all tagging investigators in the Basin know about the project from meetings, technical and peer-reviewed publications, and public presentations.
- j. There is inadequate detail on what the principal investigator will do . . . .
- Dr. Skalski has the following project responsibilities:
    1. Manage the program and staff, including review of the budget and task prioritization to meet changing sponsor needs.
    2. Develop the statistical theory and model construction for all new tag analyses and software.
    3. Provides peer-review of study designs and tag analyses and technical reports.
    4. Authors technical reports and papers prepared by this project.
    5. Represents the project at interagency working group meetings on tagging studies throughout the Basin.
    6. Provides the BPA with technical assistance on tagging issues and prioritizations.
- k. . . . [T]here should be a better description of indirect costs to the UW and direct costs for office space.
- On-campus indirect costs are 52% on all salaries and services. This project is located off-campus where the fixed indirect cost to the University is 26%. The indirect charge is applied to:
    - a. Salaries
    - b. Benefits
    - c. Non-office supplies such as software, books, etc.
    - d. Services, i.e., page charges, phone, internet access, etc.
    - e. Travel
    - f. Equipment under \$2000
 The indirect charge is not applied to:
    - a. Tuition/graduate operating fees
    - b. Lease
    - c. Equipment over \$2000

Because the project is located off-campus, office space is leased. The office lease is prorated by the number of personnel and time on the project. The combined office lease plus 26% indirect charge is less than what would be charged for the project on campus at the 52% indirect charge. The indirect charges are negotiated between the federal government and the University, and reviewed annually.