

SPECIALISTS IN IDENTIFICATION SOLUTIONS



Biomark

ESTIMATING MOVEMENT AND SURVIVAL



STUDY DESIGN



IN-STREAM PIT TAG DETECTION



TELEMETRY

The movement of animals is a fundamental and captivating component of life. Analyzing animal movement is also perhaps one of the most challenging aspects of ecology. Variations in physiological, behavioral, and environmental drivers affect individuals differently and lead to perplexing data. Biomark was founded to provide researchers technology to more accurately and efficiently observe animal movement. The Applied Biological Services division of Biomark has over 65 years of combined experience in tracking, analyzing, and predicting animal behavior, movement, and survival. In collaboration with research and management organizations, Biomark researchers have developed a suite of movement and survival study tools ranging from population level analyses down to individual physiology. By using this multi-scale approach, population level models incorporate individual behavior to produce robust, integrative analyses. Biomark leverages a team of in-house biometricians, data scientists, ecohydrologists, geneticists, physiologists, and telemetry experts to evaluate a complement of factors in all stages of the scientific process.

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FEATURED PROJECT

Winter Movement and Distribution of Juvenile Chinook Salmon in the Lemhi and Mainstem Salmon River

Hydropower, hatcheries, harvest, and habitat (the four H's of salmon recovery) are commonly referenced factors that affect the status and productivity of threatened salmonid species in the Columbia River Basin. Previous work by Biomark researchers and collaborators evaluated habitat availability and demonstrated that over-wintering habitat is a limiting factor for juvenile Chinook salmon. In order to better understand fine-scale fish movement, habitat selection, and survival, Biomark researchers employed both fixed site and mobile radio telemetry to track Chinook juveniles during winter months. This study characterizes preferable overwintering habitat in high-density areas while revealing reaches of high mortality in downstream migration. These data can be used to prioritize potential sites and inform restoration design based on habitat metrics correlated with high survival.

Biomark researchers collaborated with funding groups and partners including the Idaho Office of Species Conservation, Bureau of Reclamation, National Oceanic and Atmospheric Administration, and Idaho Fish and Game in designing a robust study using advanced sampling and analytical tools to provide actionable data to fisheries managers.

Biomark products and services used for this project:

- Radio Telemetry
- Cormack-Jolly-Seber Modeling
- Detection Probability Analysis
- Movement Visualization
- Power Analysis
- High Performance PIT Tags
- HPR Plus Portable Antenna
- Inflatable Antenna



Snapshot of the temporospatial distribution of juvenile Chinook during winter months at two time steps.



Techniques include roving and fixed site telemetry, CJS modeling, habitat assessments, and movement visualization.

OTHER PROJECT APPLICATIONS



HABITAT DATA COLLECTION



MARK-RECAPTURE ANALYSIS



FISH SAMPLING & SURGERY