FISH & HABITAT
RELATIONSHIPS

Biomark ®
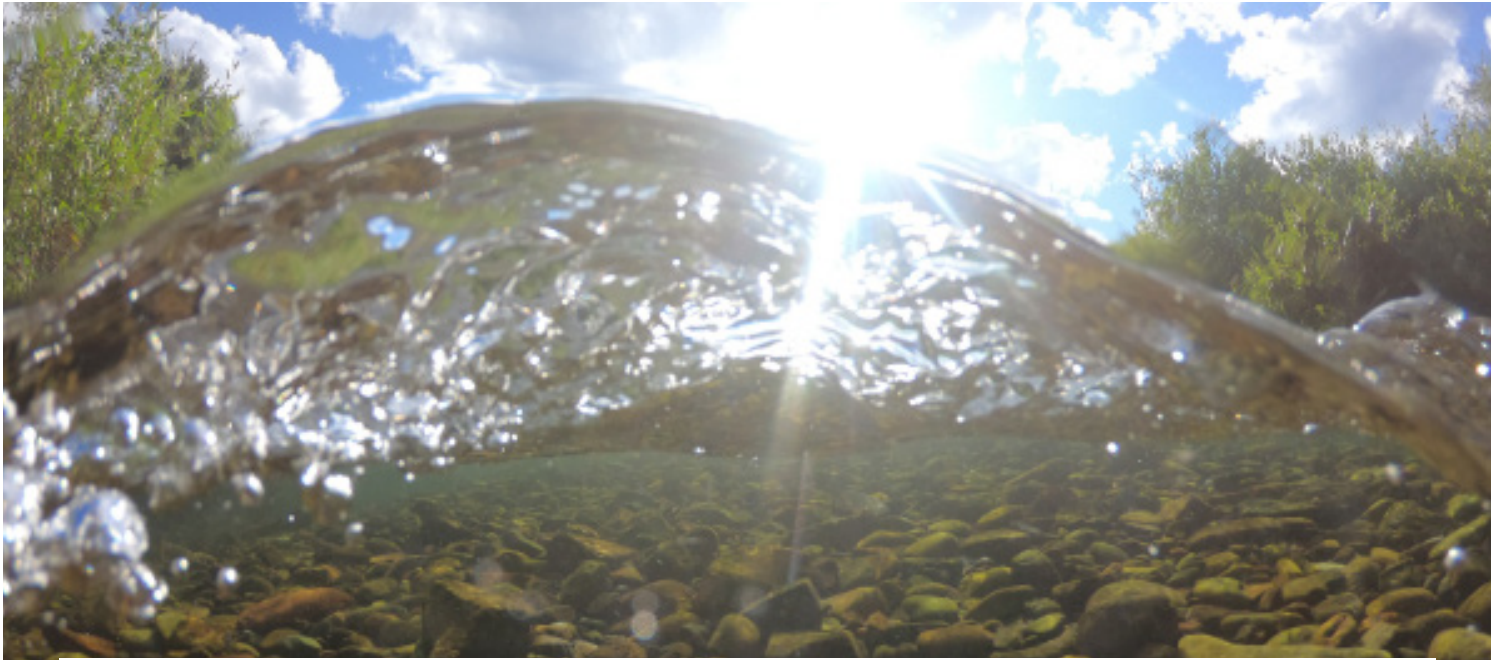
ON-THE-GROUND HABITAT SAMPLING

PAIRED TO REMOTELY SENSED DATA

AND FISH ABUNDANCE & PREFERENCE

Understanding what features comprise high quality habitat is critical to endangered species recovery. Ecological datasets often incorporate nonlinear relationships, correlated variables, and substantial noise: all of which make establishing the relationship between species and their habitat challenging. Biomark researchers have developed advanced analytical tools that pair abundance and habitat characteristics to define these elusive relationships. Leveraging a suite of modeling techniques such as habitat suitability (HSI), habitat preference, and quantile random forest (QRF) allow for a comprehensive approach to evaluating habitat quantity and quality for endangered Chinook salmon and steelhead throughout the Columbia River Basin. This approach can generate near real-time estimates of carrying capacity by species and life stage, providing actionable information for habitat restoration and recovery planning.

FEATURED PROJECT

UPPER SALMON INTEGRATED REHABILITATION ASSESSMENT (IRA)

Biomark scientists conducted a five year study to assess habitat quality and availability for endangered Chinook salmon and steelhead in the Upper Salmon Subbasin. This project led to the development of the Drone Assisted Stream Habitat (DASH) protocol and refinement of a Quantile Random Forest (QRF) capacity model. These techniques were employed to assess habitat capacity in a time and cost efficient manner in order to identify limiting factors in the Upper Salmon Subbasin. The conclusion of this project led to an additional five years of habitat restoration design (Upper Salmon Subbasin Multiple Reach Assessment).

Biomark scientists have teamed with funding groups and partners including the Bureau of Reclamation, Idaho Office of Species Conservation, Rio ASE, Idaho Department of Fish and Game, Bonneville Power Administration, Trout Unlimited, and the Nature Conservancy to improve stream habitat restoration in the Upper Salmon Subbasin.

Biomark products, technology, and services used for this project:

- **QRF Capacity Model**
- **Habitat Suitability Model**
- **Temperature Suitability Model**
- **Habitat Preference Model**
- **DASH**
- **Radio Telemetry**

- **High Performance PIT Tags**
- **In-stream PIT Tag Detections Systems**
- **Inflatable Antennas**
- **Electronic Data Collection**
- **Electro-fishing**
- **Snorkel Surveys**
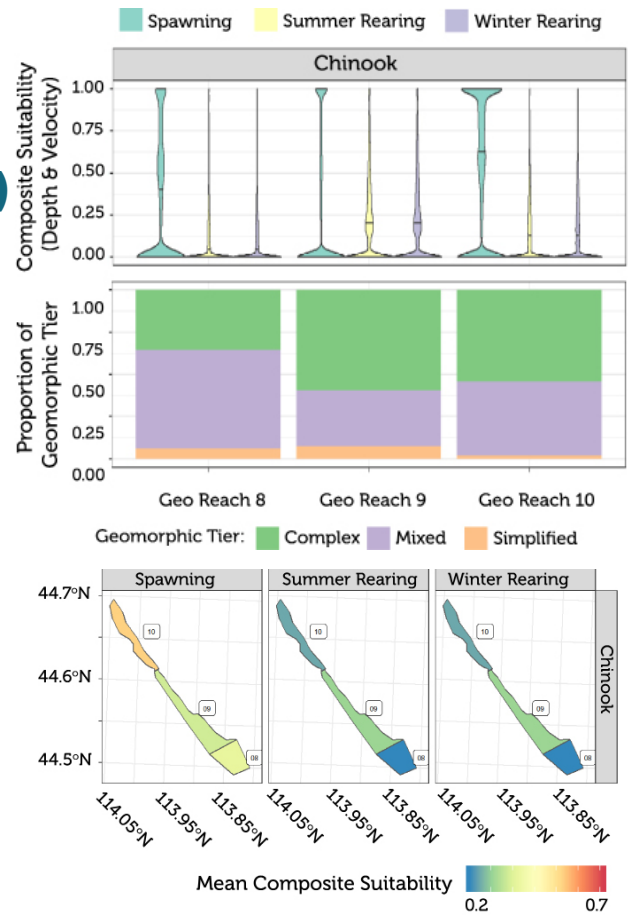
Life stage specific distribution of composite habitat suitability (depth and velocity) for Chinook salmon across geomorphic reaches of varying complexity in the Lower Pahsimeroi.

OTHER PROJECT APPLICATIONS

ELECTRONIC DATA COLLECTION

RADIO TELEMETRY

DRONE SURVEYS

Biomark®