Science, Service, Stewardship

Northeast Salmon Team (NEST) Factsheet Collection

TELEMETRY

Telemetry is used to track smolts and understand bottlenecks they face during migration.

> "Telemetry is a tool we use to monitor smolts as they migrate through rivers, estuaries, and nearshore marine environments on their way to sea."

As Atlantic salmon smolts migrate from freshwater rivers into marine environments, they encounter new predators, tides and saltwater. In order to survive, they must modify their behavior to avoid predators and undergo significant physiological changes.

Ultrasonic telemetry is an assessment tool NEST uses to monitor Atlantic salmon smolts as they migrate through rivers, estuaries, and the nearshore marine environment on their way to the Gulf of Maine. Tracking out-migrating smolts lends insight into 1) where and when mortality occurs, 2) what migration routes are used, timing and duration, and 3) how well smolts of different origins (hatchery vs. wild) perform.

VR2 ultrasonic telemetry receiver

TELEMETRY, IN FOCUS

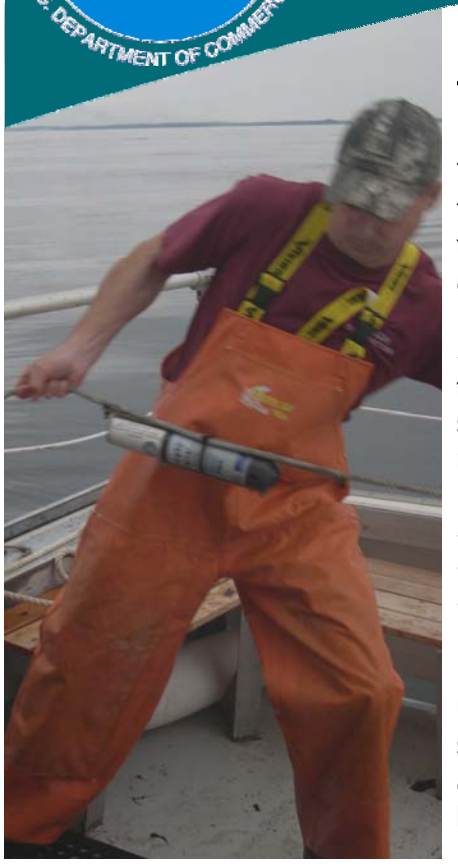
A network of fixed location receivers are deployed throughout the migration corridor in "arrays" (single units or series) that cover cross-sections of the lower river system, estuary and bay.

Each year, a sample of smolts from Maine's rivers and federal conservation hatcheries are surgically tagged with Vemco ultrasonic transmitters, or "pingers". Hatchery-reared smolts are released according to documented periods of migration for their river while naturally-reared smolts are captured, tagged, and generally released shortly after surgery.

Pingers transmit a signal that receivers decode and date/time-stamp when tagged individuals pass within its detection range. Some types of pingers are capable of transmitting depth data to the receivers. NEST can use this data to identify the depth at which smolts migrate, providing critical information about vertical migration paths.

a "pinger"

Below, a smolt receives a pinger prior to release.



Above: biologist Graham Goulette retrieves a VR2 receiver from the Penobscot Bay array. After retrieval, data collected by the VR2 is downloaded and analyzed.

Tracking smolts since 1997 to inform research & recovery:

Telemetry was used to study smolt behavior and mortality in the Narraguagus River system from 1997-2005. As a result of this research, NEST employed telemetry in 2004 and 2005 to track migrating smolts and assess the degree to which double-crested cormorants affected survival.

Since its original work on the Narraguagus River, NEST has expanded its telemetry studies to include the Penobscot, Pleasant and Dennys Rivers. The program has also grown in scope to include assessments of rearing and stocking strategies and their effect on smolt migration.

Since 2005, NEST has conducted telemetry studies in the Penobscot River to compare:

- the behavior of smolts that have been reared under natural vs. hatchery conditions
- the timing and location of stocking with respect to success of migrating smolts

NEST has also been cooperating with researchers at the U.S. Geological Survey and the University of Maine to study populations and behavior of striped bass, sturgeon, and other sea-run fishes. Additional telemetry units have been deployed in numerous coastal rivers, as well as in the Gulf of Maine on GOMOOS (the Gulf of Maine Ocean Observing System) buoys.

Smolts come in contact with cormorants and other new predators as they make their way into the marine environment.

The Northeast Salmon Team (NEST) is comprised of Northeast Regional Office (NER) managers and Northeast Fisheries Science Center (NEC) scientists. NER administers NOAA's Programs in the Northeastern United States to manage living marine resources for optimum use while NEC is the research arm of NOAA Fisheries in the region that plans, develops, and manages a multidisciplinary program of basic and applied research. Please visit the NEST website at: http://www.nefsc.noaa.gov/salmon/