Introduction

- The importance of estuaries in salmonid early life history has been debated, with most research focusing on large estuaries that remain open to the ocean all year. Smaller estuaries, many of which are closed seasonally by sandbars, have received little study.
- The small estuaries along the California coast may be important rearing areas for steelhead (Onchorhynchus mykiss) and coho salmon (O. kisutch).
- We report preliminary findings on steelhead growth in four small estuaries that empty into the Monterey Bay National Marine Sanctuary (Gazos Creek, Scott Creek, Soquel Creek and Aptos Creek).
- PIT tags were used to identify individual juvenile steelhead. Fish were sampled in each estuary by seining approximately once a month throughout most of 2003 and 2004.
- Results show very different growth rates among the estuaries.
- Small archival temperature loggers were deployed to explore steelhead temperature preferences and habitat utilization within the estuary. These data can be incorporated into future restoration and enhancement plans.

Materials and Methods

Juvenile steelhead were studied in four small coastal streams: Gazos, Scott, Soquel and Aptos Creeks (see figure). Fish were collected in the estuary/lagoon by seining approximately every month starting May 2003 through 2004. Upon capture fish were anesthetized, then weight and fork length were measured. PIT tags were implanted into the peritoneal cavity of fish larger than 65mm so that growth of individuals could be monitored over time. Scale and tissue samples were also collected for future aging and DNA analysis.

Once Scott Creek lagoon closed to the ocean, archival temperature loggers (iBimin, Alpha Mach Inc., Mont St-Hilaire, Canada) were attached to the epaxial musculature of 17 fish larger than 170mm (227 ± 49mm, mean ± SD) using t-bar anchors from Floy tags. These loggers were programmed to record temperature every minute or every 5 minutes. Due to limited memory, the loggers recorded snap-shots of only a day or a week in the life of the fish. Four functional tags were recovered from Scott Creek. All of these had been programmed to record temperatures every 5 minutes for one week. Concurrently, environmental data were collected in Scott Creek from stationary YSI multi-sensor data loggers and a floating archival temperature sensor (Stowaway TiDII, Onset, Bourne, MA). Temperature data from the logger on the fish were compared to environmental data from the lagoon.

SUMMARY

- Temperature loggers deployed on juvenile steelhead show that they spend most of their time in the lower range of the temperatures available to them. They spend little to no time in the warmest waters.
- Steelhead growth rates are highly variable but are in general very fast in the small estuaries studied. Creek temperature cannot explain the changes in growth rate across time.

STEELHEAD GROWTH AND AGE CLASS USE OF ESTUARY

Frequency plots of steelhead fork length show different patterns of age classes present in each lagoon (data shown for 2004).
- May: Soquel Creek has no YOY.
- July: One age class dominates Scott and Soquel, while there are (at least) two in Gazos and Aptos.
- October: Fish have grown and larger fish have moved down to the lagoon from upstream.