

## **Estimation of Coho Salmon Abundance and Spawning Distribution in the Unalakleet River 2004 – 2006, 05-501 Final**

Escapement in the Unalakleet River drainage is indexed annually with a counting tower that has been in operation for several years on the North River, a large tributary. A 3-year investigation was initiated in 2004 to describe the extent to which the North River tower counts index escapement of coho salmon into the entire Unalakleet River drainage. This report describes results from 2006, the third year of the study, and compares results from all three years.

In 2006, 307 coho salmon were captured with beach seines in the lower portion of the Unalakleet River and fitted with esophageal radio tags and their final spawning destinations were determined using stationary receiving stations and aerial tracking techniques. Coho salmon were sampled for age, sex, and length data above the North River counting tower and in the Unalakleet River above the North River confluence. Two sample mark-recapture techniques were used to estimate total drainage abundance.

A population abundance estimate of 116,965 coho salmon (SE = 27,502; 95% credibility interval of 80,440 to 206,200) was generated for the entire Unalakleet River drainage, and 9,679 (8% of total drainage estimate) were counted past the North River tower. Nearly all sampled coho salmon were age-2.1 or -1.1 and similar proportions of both ages were observed in the North and Unalakleet rivers throughout the run. Coho salmon sampled in the North River were smaller, on average, than those sampled in the Unalakleet River, and the run timing pattern of North River coho salmon was similar to the pattern for those returning to other parts of the drainage.

Coho salmon migrated into all tributaries of the drainage. The largest concentration of fish migrated to the stretch of the Unalakleet River between the Chirokey River and the North Fork Unalakleet River and those fish tended to have later run timing. Estimated proportions of coho salmon migrating to various portions of the drainage were 0.083 (SE = 0.019) to the North River, 0.684 (SE = 0.032) to the main stem of the Unalakleet River below the North Fork, and 0.233 (SE=0.032) to the upper Unalakleet and its tributaries including 0.044 (SE = 0.012) to the Chirokey River, 0.028 (SE = 0.012) to the Old Woman River, 0.016 (SE = 0.008) to the North Fork, and 0.726 (SE = 0.031) through the Federal Wild and Scenic portion of the river. An approximate estimate of abundance for coho salmon entering the Wild and Scenic portion of the river was 84,928 (SE = 25,270).

Although the proportion of coho salmon migrating past the North River tower in 2006 was significantly less than in 2004 (15%, Joy et al. 2005) and 2005 (14%, Joy and Reed 2006) the proportions were reasonably consistent over the three years of the study. This along with similar age composition and run timing between fish bound for the Unalakleet and the North River suggested the North River tower provides a reasonable and cost-effective index for coho escapement into the Unalakleet River drainage.

**Citation:** Joy, P. and D. J. Reed. 2007. Estimation of Coho Salmon Abundance and Spawning Distribution in the Unalakleet River, 2004-2006. U. S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries Resource Monitoring Program, Final Report (Study No. 05-501). Alaska Department of Fish and Game, Fishery Data Series No. 07-048, Anchorage.