Sea-Run Cutthroat Trout: Biology, Management, and Future Conservation
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Distribution of Mature Sea-Run Cutthroat Trout Overwintering in Auke Lake and Lake Eva In Southeastern Alaska

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Extended abstract.—One of the primary goals of the Division of Sport Fish in the Alaska Department of Fish and Game is conservation of wild fish stocks. Populations of coastal cutthroat trout are vulnerable to overfishing and loss of habitat. The Trout Research Project was established to identify and evaluate the status of cutthroat trout populations in this region.

Limited life-history information is available for sea-run cutthroat trout in Alaska. Research indicates that coastal cutthroat trout in Alaska rear in fresh water for 3 to 4 years before their first saltwater migration (Jones 1976). Spawning usually takes place from late March through May, and the young rear in small streams and tributaries. They do not migrate far out to sea like salmon and steelhead trout, but prefer inshore waters and are reluctant to cross large open stretches (Trotter 1989).

Studies on two sea-run stocks of cutthroat trout were conducted in the spring of 1994 and 1995. Radio telemetry was used to track movements and determine the spawning distribution of cutthroat trout that overwintered in Auke Lake (1994) and Lake Eva (1995).

Auke Lake is approximately 18 km north of Juneau by road (Figure 1). It is the second largest lake on the Juneau road system and supports wild stocks of sockeye, coho, pink, and chum salmon, cutthroat trout, and Dolly Varden. Data on sea-run cutthroat trout were collected at the Auke Creek weir, located on the lake's outlet stream. The Auke Creek weir is a research facility jointly operated by the National Marine Fisheries Service, the Alaska Department of Fish and Game, and the University of Alaska Southeast.

Lake Eva is approximately 40 km northeast of Sitka on Baranof Island and is accessible only by boat or aircraft (Figure 2). It supports stocks of sockeye, coho, pink, and chum salmon, cutthroat trout, steelhead, and Dolly Varden. Data on sea-run cutthroat trout were collected at a weir across the lake's outlet stream.

The goal of these research projects was to investigate the life history, range, and migration patterns of sea-run cutthroat trout to permit improved management of this fishery in southeastern Alaska.

Methods

Radio telemetry was used to track the movements of sea-run cutthroat trout emigrating from mixed-stock overwintering lakes to spawning streams. Weirs at both research sites captured all downstream-migrating cutthroat trout. Radio transmitters were placed in the stomachs of a systematic sample of healthy, mature cutthroat trout > 300 mm fork length from May through June. Each tag weighed 5.0 g, approximately 2% of the body weight of a 300 mm fish; 2% of body weight is a recommended maximum weight for esophageal tagging (Winter 1983).

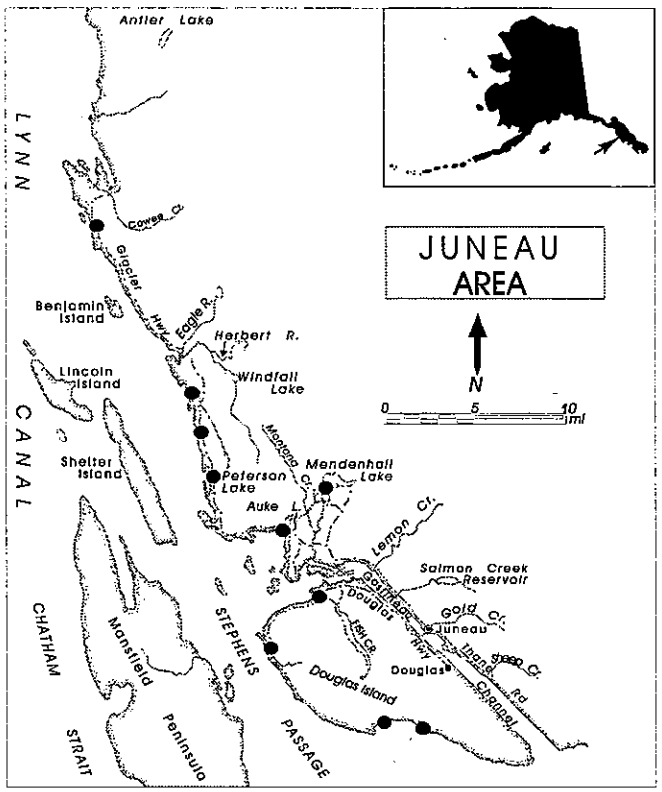

Figure 1.—Spawning distribution of fish overwintering in Auke Lake. Dots represent streams where tagged fish were located.

Radio tags transmitted signals in the 150 and 152 mHz range. Each transmitter was approximately 0.95 cm in diameter and 2.5 cm long, with a 25-cm transmitting antenna that protruded from the mouth of the fish. Each radio-tagged fish was also marked with a uniquely numbered green colored Floy (T-anchor) tag, which was used to help identify fish in natal streams. Every cutthroat trout not given a transmitter was tagged with a uniquely numbered tag (visual implant tags [VI] at Auke Lake and Floy tags at Lake Eva). A total of 31 fish were tagged at Auke Creek from the total emigration of 431 cutthroat trout. Fifty seven fish out of 2,562 emigrants were radio-tagged at Lake Eva.

A De Havilland DHC–2 aircraft was used to track radio-tagged fish from their overwintering site to spawning streams. Whenever possible, as transmitters were located in streams, foot surveys were conducted to locate tagged fish. Signs of spawning (fish or redds) were recorded and regurgitated tags recovered. Migration patterns were mapped to show the ex-

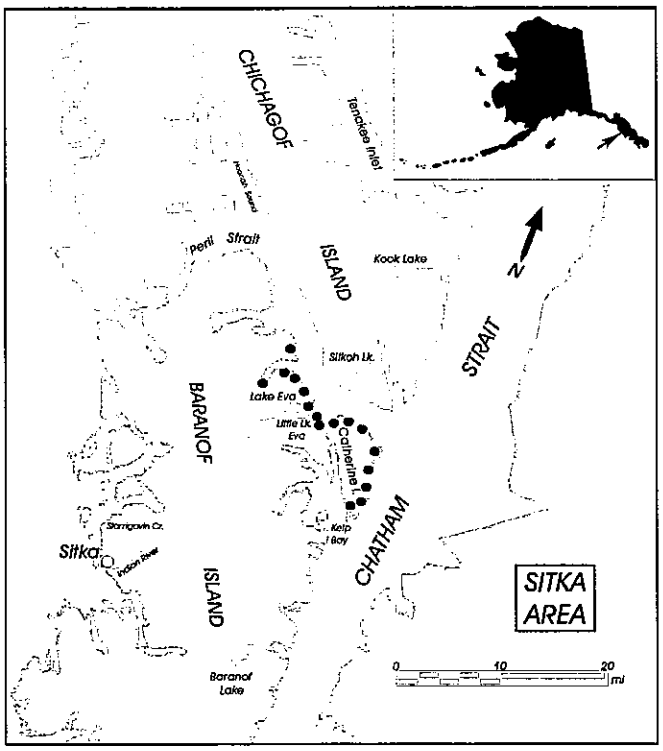

Figure 2.—Spawning distribution of fish overwintering in Lake Eva. Dots represent streams where tagged fish were located.

tent and location of spawning streams near overwintering sites.

Results

Our research provided several insights into the life history of sea-run cutthroat trout in southeastern Alaska. In both studies, sea-run cutthroat trout were found to disperse both directions along the shoreline from mixed-stock overwintering lakes to access coastal streams for spawning. Not all fish left the overwintering systems; some remained and probably spawned in the outlet stream in both locations.

In the Auke Lake study, cutthroat trout were tracked into 10 streams along the Juneau roadside, including one fish that remained in Auke Creek (Figure 1). At Lake Eva, fish were tracked into 17 streams, and eight of the fish remained in the outlet stream at Lake Eva (Figure 2). Four regurgitated tags were recovered in the lower stream at Lake Eva and replaced on newly outmigrating fish from May 20 to June 10. Those fish stayed in the lower stream at Lake Eva. Eleven regurgitated tags were recovered in various locations in the Auke Lake study and were replaced on subsequently emigrating fish, which all left the system.

Cutthroat trout traveled a maximum of 52 shoreline km from Auke Lake and 24 km from Lake Eva to spawning streams. Mature fish appeared to travel quickly through salt water, averaging 1.5 km/day and 2.7 km/day in the Auke Lake and Lake Eva studies, respectively. Their travel followed a nearshore, intertidal route; none of the fish in either study was located in a stream across large, open stretches of water. Our radio tracking included checking freshwater systems across Stephens Passage in the Auke Lake study and across Peril Strait in the Lake Eva study. In both studies, it would have been closer for fish to travel to streams across the straits than to access distant streams along the shoreline. However, neither study showed fish crossing these larger open waterways; they used only streams they could access by following the shoreline.

In both studies, some individual fish were tracked into more than one stream system (Figures 1 and 2). Radio tags could be detected only in fresh water, not in salt water. In the Lake Eva study, 18 cutthroat trout (32%) were tracked into more than one freshwater stream system. Two fish (4%) were observed in three different stream systems; no information on which system was used for spawning is available. In the study at Auke Lake one fish was observed in two different systems.

Many cutthroat trout at both locations used very small tributaries and headwater habitat. Mature fish were tracked into the upper reaches of streams to areas where stream width, in some of the systems, was no greater than 7 to 8 cm. The small-stream and headwater habitat is utilized by spawning adults as well as younger, rearing fish after hatching.

We have indication that there may not be complete fidelity to the overwintering site. Two fish from the Auke Lake tagging in 1994 were recovered in 1995, but they had not overwintered in Auke Lake. One was captured in Peterson Creek going upstream and the other was caught by a shoreline fisherman. Both these fish must have overwintered somewhere other than Auke Lake, because they were not seen at the weir at Auke Creek in the spring of 1995.

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