

BROODSTOCK ACQUISITION AND RELEASE SITES FOR HATCHERIES PRODUCING
PINK SALMON IN PRINCE WILLIAM SOUND

by

Christopher Habicht
Ellen M. Simpson
James E. Seeb

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ABSTRACT

The first hatchery to release pink salmon in Prince William Sound (PWS) was Armin F. Koernig hatchery in 1976. Over the past ten years, 70% of fish returning to PWS as adults are of hatchery origin. The even-year broodstock that accounts for 47% of the fish released, mostly in western PWS, was started primarily with fish from eastern PWS at Duck River. Subsequent broodstock collection methods at these hatcheries and wild fish migration patterns have likely resulted in making this broodstock a mixed-lineage stock. The rest of the even-year broodstocks, used in northern and eastern PWS, came originally from local sources and are less likely to have been infused with wild fish because of their location and broodstock collection methods. Original odd-year broodstock were collected from local sources at all hatcheries, but broodstock collection methods and location of western PWS hatcheries have likely produced mixed-lineage stocks.

INTRODUCTION

In 1974, the Alaska legislature passed a bill allowing for private, nonprofit hatcheries to enhance salmon production. As a result of this bill, the Prince William Sound Aquaculture Corporation (PWSAC), the Valdez Fisheries Development Association (VFDA), and Nerka Incorporated organized and started hatchery operations in PWS. In addition, the Alaska Department of Fish and Game constructed and operated two hatcheries that have subsequently been contracted to PWSAC. The first releases of pink salmon into Prince William Sound (PWS) began in 1976 from the Armin F. Koernig Hatchery. At about the same time, pink salmon were released on the southern end of the Kenai Peninsula in 1975 (Halibut Cove) and 1976 (Halibut Cove and Tutka Lagoon; Roys 1977). Before 1975, the closest release site to PWS of hatchery-raised pink salmon was at the Kitoi Hatchery on Kodiak Island (Blackett 1974; Roppel 1982). In all, six hatcheries have released pink salmon into the sound. Over the past ten years, hatchery-produced pink salmon make up 70% of the pink salmon returning to PWS (Morstad et al. 1998).

Concerns over the effect of hatchery fish on wild populations coupled with findings of genetic differentiation of pink salmon populations from around the sound (Seeb et al. 1999) have raised questions about the origin of broodstocks used by hatcheries, the techniques used by the hatcheries to acquire broodstock and the release sites used by these hatcheries. This information was not available from one source, so the purpose of this report was to consolidate this information for quick reference.

METHODS

All private nonprofit hatcheries in Alaska are required by statute (AS 16.10.470) to submit to ADF&G an annual report detailing their activities of the past year. This information includes, but is not limited to, broodstock source and number of eggs taken for broodstock. These data were summarized (M. McNair personal communication, ADF&G, Juneau) and we verified numbers, broodstock collection locations and methods with the paper copies of the annual reports if they existed. Often annual reports are accompanied by a narrative report with information and observations that cannot be captured by a database alone. This is especially true of the earlier reports. Information was also verified with department and private nonprofit hatchery operators.

RESULTS AND DISCUSSION

Armin F. Koernig Hatchery - PWSAC

Armin F. Koernig Hatchery (AFK) was the first hatchery to incubate pink salmon in PWS. Even-year seed stock for AFK, which is in the southwest region of the sound, came primarily from Duck River in 1976 (13.0 million eggs), which is in the east region, with a few from Larson Creek (<10 thousand eggs), the location of the hatchery. In 1978, brood came from fish milling in front of the hatchery and placed into a brood holding area. In subsequent years (1980 onward) the fish were either allowed to pass behind the barrier seine through a small opening or were purse seined just outside the barrier seine and placed behind the barrier seine. From behind the barrier seine, fish voluntarily ascended a fish ladder into a brood tank. Recent CWT data indicate that some fish that ascended the fish ladder did not originate at the hatchery (D. Sharp personal communication, ADF&G, Cordova). Genetic data also support the hypothesis that these hatchery fish are a mixture of wild populations (Seeb et al. 1999).

Odd-year seed stock were primarily taken from Ewan Bay in 1975 (6.0 million eggs) which is 40 km to the north within the southwest region, with a few taken from Larson Creek (<10 thousand eggs), the site of the hatchery. In 1977, fish were seined in front of the hatchery and additional milt was collected from fish caught in Crab Bay, 5 km from the hatchery. In 1979 fish were seined in front of the hatchery and placed into the brood tank. In subsequent years the fish were collected in the same manner as the even-year. As with even-year fish, recent CWT data indicate that some fish that ascended the fish ladder did not originate at the hatchery (D. Sharp personal communication, ADF&G, Cordova).

AFK accounted for 18% of hatchery-produced pink salmon returning to the sound between 1988 and 1998. AFK stock has been used for broodstock at Main Bay and Wally Noerenberg hatcheries. As a result, fish derived from AFK stock contribute about half of the hatchery-produced pink salmon returning to the sound.

Perry Island Hatchery - Nerka Incorporated

Perry Island Hatchery (PI) released small numbers of pink salmon intermittently from 1977 to 1983. Even-year broodstock came from Hatchery Creek and Lambert Lagoon located along South Bay of Perry Island near where the hatchery is located. Odd-year fish came from Mink Creek, which is located on the mainland, 20 km southwest of the hatchery in the North region. The hatchery released a total of 284 thousand even-year fish from 1977 to 1983 and 250 thousand odd-year fish in 1980 into sites near the hatchery.

Cannery Creek Hatchery - ADF&G - PWSAC

Broodstock for fish released at Cannery Creek Hatchery (CC), which is located in the north region, came from Cannery Creek (the stream that feeds the hatchery) in 1978 and continues today. Fry from Cannery Creek broodstock were released at Derickson Bay off Eaglek Bay in 1984 (2.0 million) and 1985 (2.0 million) and at Schoppe Creek (318 thousand), Black Bear Creek (318 thousand), Dead Creek (159 thousand), Comeback Creek (159 thousand), Good Creek (447 thousand), and Bad Creek (449 thousand), which are all off Eaglek Bay, in 1983.

Fry from Jonah Creek (1.7 million; 1979) and AFK (7.0 million; 1980) brood, which hatched at CC, were released at Hobo Bay off Port Wells. AFK eggs were also incubated in CC and released in Main Bay in 1982 (33.7 million). This hatchery was built and operated by ADF&G until 1988 when it was contracted to PWSAC.

CC accounted for 25% of hatchery-produced pink salmon returning to the sound between 1988 and 1998.

Main Bay Hatchery - ADF&G - PWSAC

Main Bay Hatchery (MBH) released pink salmon from eggs collected in 1981 to 1988. Seed stock came from AFK in 1981, 1982, and 1988 and from CC in 1984 and 1985. Fish returning to MBH were used as broodstock in 1983 and 1986. This hatchery was built and operated by ADF&G until 1991 when it was contracted to PWSAC.

The total sum of all pink salmon returning to the sound that can be attributed to MBH incubation is small - just 0.7% of the average yearly contributions from all other hatcheries combined during the past 10 years.

Solomon Gulch Hatchery - VFDA

Solomon Gulch Hatchery (VFDA) seed broodstocks for both years were taken from streams within the Valdez Arm. In 1981, 9.98 million eggs were taken from Siwash Creek, about 5 km from the hatchery at the end of Valdez Arm. In 1982, 3.88 million eggs were taken from Vlasoff Creek and 4.53 million eggs from Gregorieff Creek that are both located in Jack Bay, about 25 km from the hatchery, just past the Valdez Narrows. In subsequent years, fish were seined into holding pens (to prevent their capture in the commercial fishery) then released so that they voluntarily ascend the fish ladder into the hatchery. VFDA accounted for 28% of hatchery-produced pink salmon returning to the sound between 1988 and 1998.

Wally Noerenberg Hatchery - PWSAC

Both brood years for Wally Noerenberg Hatchery (WNH) originated from AFK hatchery stock, but some returned to or passed through MBH, which is approximately 60 km north of AFK. For odd-year stock, 3 million eggs were taken from AFK stock returning to MBH in 1985, incubated to eyed stage at MBH and shipped to WNH. In addition, 39 million eggs were taken at AFK and incubated to eyed stage at AFK and shipped to WNH, and 12 million eggs were taken at AFK, incubated to eyed stage at MBH and shipped to WNH. In 1987, 207 million eggs were taken from fish returning to WNH and 19 million eggs were taken at AFK, incubated to eye at AFK, and shipped to WNH. For even-year stock, 79 million eggs were taken at AFK in 1986, incubated to eye at AFK and shipped to WNH. Also, in 1988, 152 million eggs were taken from fish returning to WNH and 29 million eggs were taken from fish at AFK, incubated to eye at AFK and shipped to WNH. From 1989 on, all brood fish were taken from fish in the vicinity of the hatchery.

Broodstock acquisition, once the stock was established, was similar to that used at AFK hatchery. Fish are either allowed to voluntarily pass behind the barrier seine through a closable opening (10% - 30% per year from 1988 to 1996, discontinued after 1996) or were purse seined just outside the barrier seine and placed behind the barrier seine. From 1988 to 1996 fish

voluntarily ascended a fish ladder into a brood holding area. From 1997 on, fish were lifted from the bay and placed into the brood tank using a fish auger.

WNH accounted for 29% of hatchery-produced pink salmon returning to the sound between 1988 and 1998.

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