

Idaho Power Company
Fish Mitigation Program
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Early History

In 1955 the Federal Power Commission (FPC), granted a license to Idaho Power Company to build Brownlee, Oxbow and Hells Canyon Dams. Article 35 of the license stipulated that measures would be taken by Idaho Power to conserve the fishery resources of the Middle Snake River.

A three year evaluation project concluded that early efforts to transport anadromous fish around the three dam complex were unsuccessful. The transportation program was discontinued in 1963 when the FPC ordered Idaho Power to begin the task of relocating runs of both spring chinook and summer steelhead from the Snake River to the Salmon River drainage. To complete this requirement, Idaho Power constructed four hatcheries; Oxbow (1961), Rapid River (1964), Niagara Springs (1966), and Pahsimeroi (1967).

Present Day Operations

In 1976, the Fish and Wildlife agencies of the Northwest filed a petition with the FPC requesting additional mitigation for fish lost as a result of the construction of the Hells Canyon complex. A settlement agreement was reached in 1980 detailing the Company's mitigation requirements. Forming the basis of our hatchery operations today, these requirements include providing facilities necessary to produce 4 million spring chinook smolts, 1 million fall chinook smolts, and 400,000 pounds of steelhead smolts. It is important to note that these requirements are in terms of smolts produced and not adults returned. A summary of specific hatchery operations are as follows;

Rapid River Hatchery: Production of 3 million spring chinook smolts annually with up to 1 million being released into the Snake River below Hells Canyon Dam.

Niagara Springs Hatchery: Production of 400,000 pounds of steelhead smolts annually with half being released into the Pahsimeroi River and half being released into the Snake River below Hells Canyon Dam.

Pahsimeroi Hatchery: Production of 1 million summer chinook smolts annually. Trapping and spawning of sufficient steelhead trout to provide Niagara Springs with the necessary number of eggs to meet their production requirements.

Oxbow Hatchery: Trap and spawn sufficient steelhead trout to provide Niagara Springs with the necessary number of eggs to meet their production requirements. Trap spring chinook salmon and transfer them to Rapid River Hatchery. Oxbow will also be required to rear 1 million fall chinook smolts when eggs become available from Lyons Ferry Hatchery.

Rapid River Spring Chinook Program

Broodstock for this program were trapped at Hells Canyon Dam each year from 1964 through 1969. Since that time no other stocks have been used at Rapid River and the hatchery has relied solely upon hatchery escapement to meet annual production needs. Spawning practices have evolved from the exclusion of jacks in the spawning population, to the random use of jacks in a 1:1 ratio of males and females. Over time run timing, spawn timing, age composition, and length frequency of adults have remained fairly constant.

With the exception of 1982 and 1986, smolt production at Rapid River Hatchery has closely approximated established goals each year since 1970. Releases of less than 1 million smolts into the Snake River are a result of agency management decisions, and do not reflect a failure of the hatchery program to meet production requirements.

Adult returns have fluctuated dramatically but have shown a general trend of declining smolt to adult survival rates. Despite this trend, the Rapid River spring chinook program must still be labeled as successful from the standpoint of providing an egg source for the establishment of numerous other hatchery programs, and the ability to provide limited sport and tribal harvest in Idaho.

Limitations to the program include poor smolt to adult survival (specifically poor smolt survival to Lower Granite Pool), and fish health problems (stress induced losses from BKD and EIBS). Stress associated with current CWT marking techniques may be exaggerating these problems significantly and creating difficulty in data interpretation.

Niagara Springs Steelhead Program

In 1966, when Niagara Springs Hatchery began rearing steelhead trout, they were "breaking new ground." It was the first attempt at transplanting steelhead from one site (Hells Canyon); rearing them at 57-58°; and releasing them into another site (Pahsimeroi River). Eggs were shipped from Hells Canyon until 1969, when 850 adults returned to the adult collection facility on the Pahsimeroi River. Not much was known about raising steelhead trout in these early years and the low-bid rainbow diet (vitaminized sawdust), lack of domestication and disease impeded growth. Size variation was high and the fish were graded 3 or 4 times per year for the first 10-12 years. Fish health improved and growth increased after grading was stopped. In 1973, IPN was detected in the fish and they were all buried and replaced with fingerlings from Dworshak Hatchery.

In spite of mortality, production goals in pounds were met from the beginning. From 1967-79, production from Niagara Springs averaged 201,000 lbs. From 1980-84, production averaged 297,000 lbs., and from 1985-90 it averaged 392,000 lbs. Barring catastrophe or reduction in water quantity, the goals should be met for the foreseeable future.

Steelhead releases into the Snake River have been increasing since 1980 and have averaged 198,000 lbs. over the last five years. Rack returns have also increased, but inadequate numbers have been marked to assess complete adult returns. In the last five years, Oregon anglers have caught an average of 510 fish from the Snake River and Idaho anglers have averaged 893 fish upstream of the Salmon River.

Smolt releases into the Salmon River have averaged 204,000 lbs. Since 1979, after 3-4 generations of domestication, adult return rates have increased. The best adult returns (2.71% and 1.94%) correlate with the good water years of 1982 and 1984 respectively. Between 1967 and 1986, there were about 165,000 steelhead harvested from the Salmon River, of which 82,000 were produced by the Idaho Power program.

Difficulties in raising steelhead smolts to 7/lb in the early years was due to the lack of domestication, diet, and rearing time. The current goal of 4-5/lb is being reached every year.

In the early years, half of the fish spawned after May 1 and late eggs had little chance of growing to smolt size by the following April. Subsequently, because of the one-year rearing cycle, all fish spawn before May. Fish also now arrive earlier.

Steelhead age structure has changed from 80-90% to 50-60% one-ocean at return. This may be due to heritability of the earliest maturing fish which are primarily two-ocean and have a longer rearing time.

In the last 20 years, fishing effort in the Salmon River has increased 6-7 times. Exploitation of steelhead raised by Idaho Power has increased from 47-62% and has averaged 57%.

Much of Idaho's knowledge of "A" steelhead came from evaluation of fish released into the Pahsimeroi River. These include:

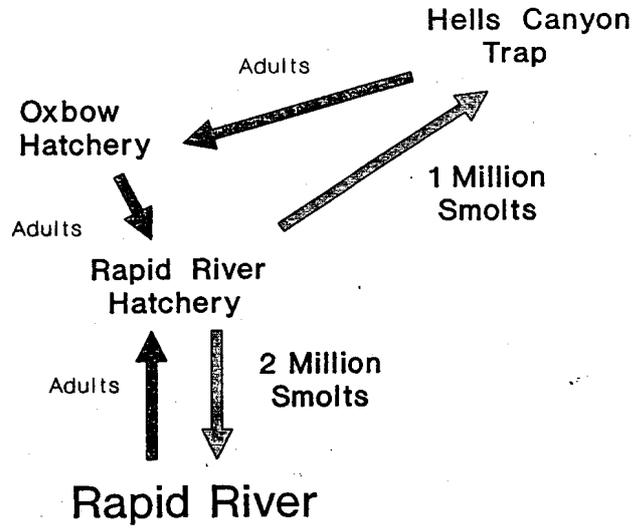
- Smolt timing and what makes a smolt
- Size at release - 210-220 mm mean (4-5/lb.)
- Rearing time - two-year rearing only returned half as well
- Acclimation ponds - not necessary
- 3.5 miles from mouth - adequate for homing
- Can be played and released successfully
- Adults hauled out return to the hatchery unless ripe when released.

Pahsimeroi Spring/Summer Chinook Program

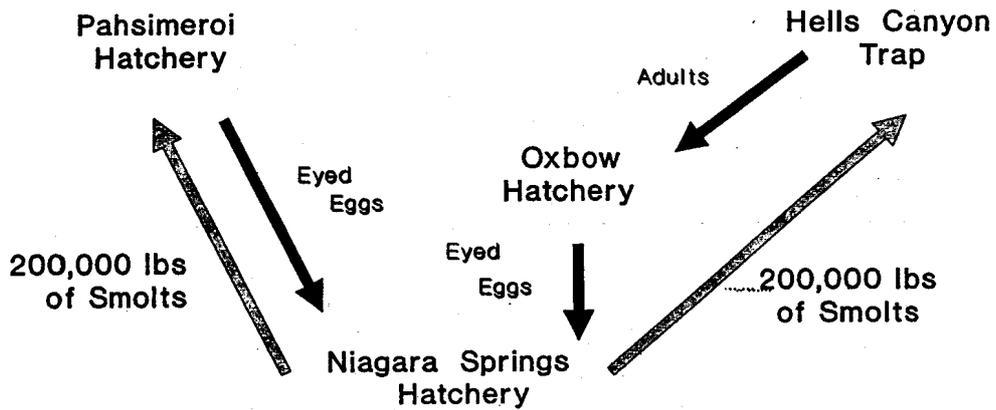
Historically, chinook salmon arrived at the Pahsimeroi trap in a bimodal pattern around August 15 and continued until early October. The native run may have been both spring and summer stock. When Rapid River stock was introduced, fish came back earlier. Since fall arrivals and South Fork Salmon River stock have been used, arrival time is returning to the original pattern.

Juvenile chinook are pond-reared with minimal handling and no marking. Smolts have been released at 15-24/lb. Both spring and summer stock fish have returned at 0.6%, which is comparable to the better return years at Rapid River.

IPC Spring Chinook Production Goals



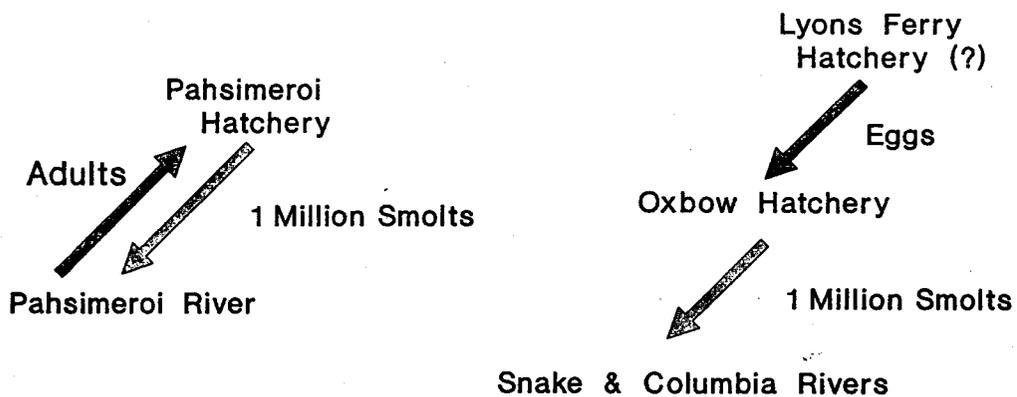
IPC Steelhead Production Goals



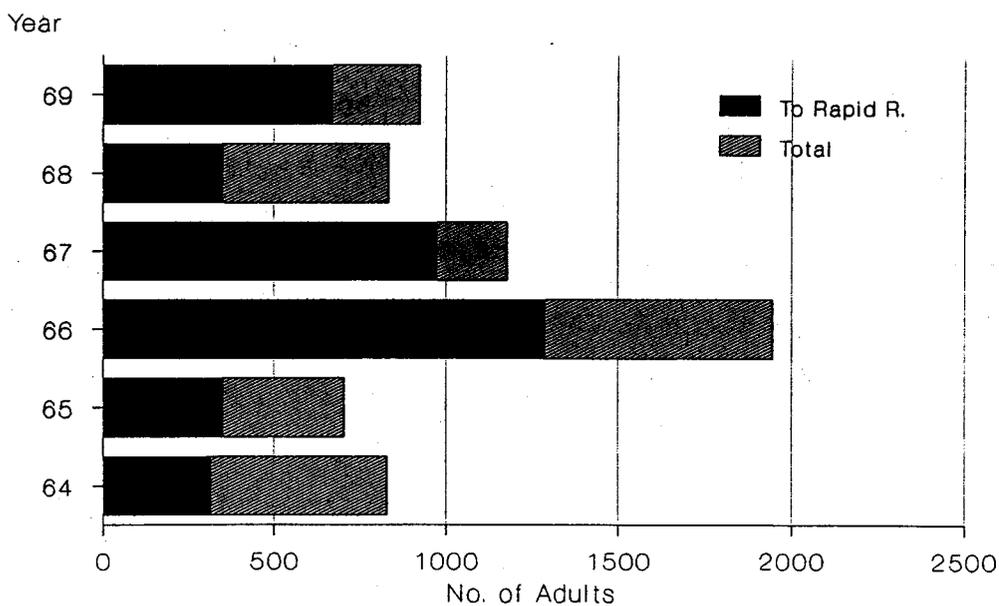
IPC Production Goals

Summer Chinook

Fall Chinook



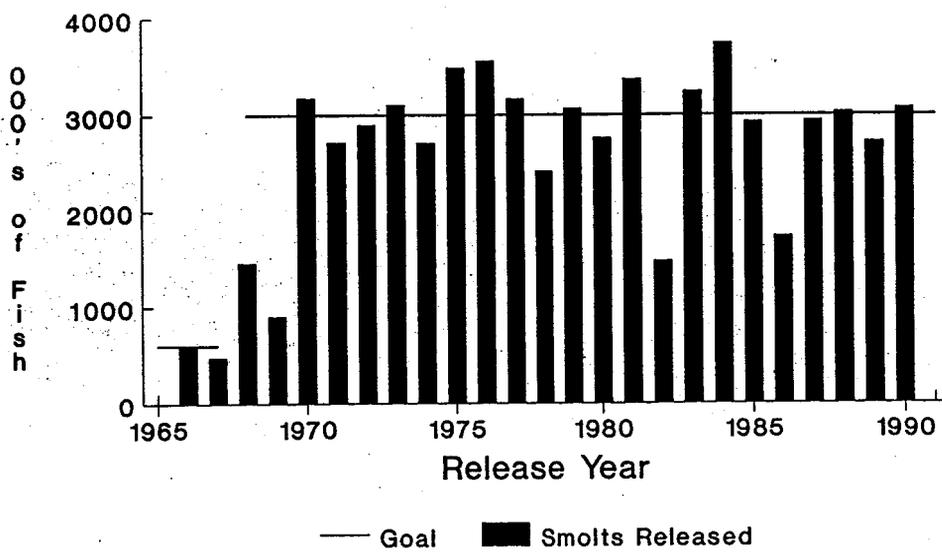
Rapid River Brood Chinook Trapped at Hells Canyon



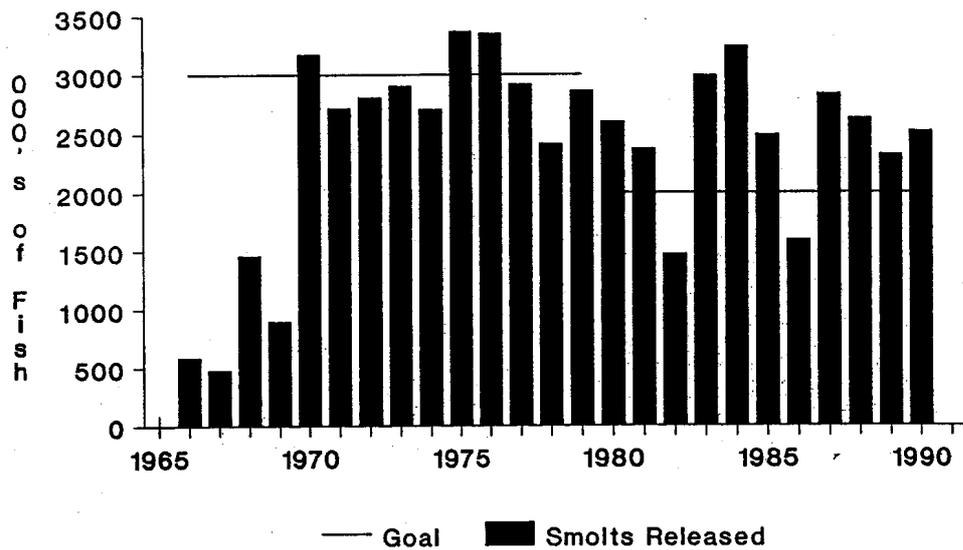
Rapid River Spring Chinook

Arrival:	May through July
Spawn:	Mid-Aug. through Mid-Sept.
Age:	Mostly 4
Size:	3 Yrs 17.4 - 22.4 in.
	4 Yrs 25.9 - 29.1 in.
	5 Yrs 32.9 - 34.8 in.

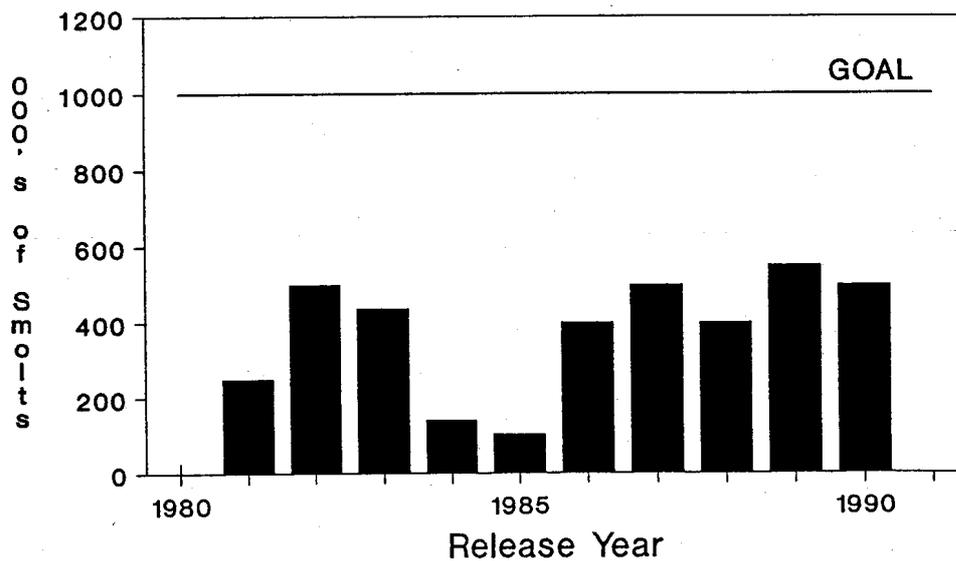
Chinook Smolt Production Rapid River Hatchery



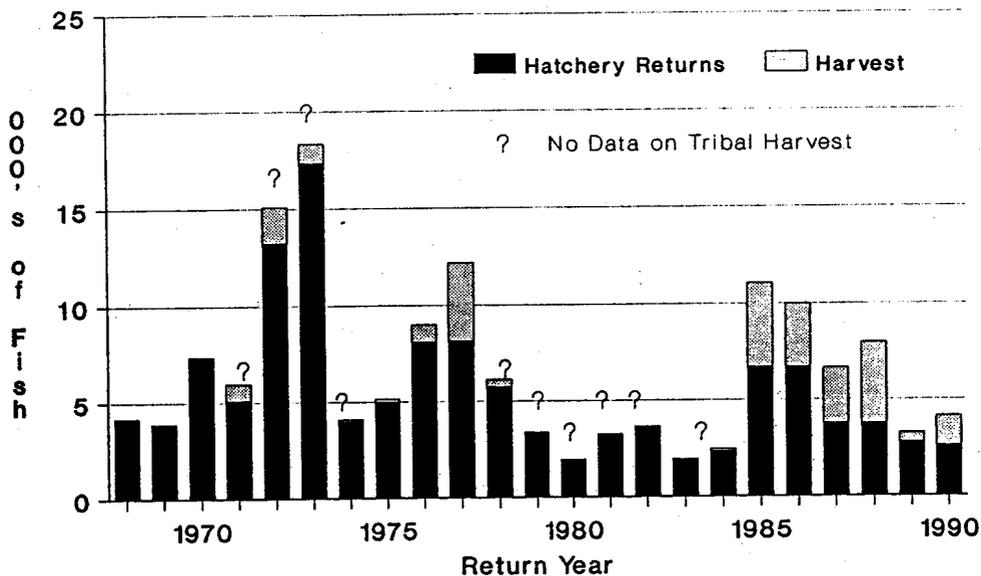
Spring Chinook Releases Rapid River Hatchery



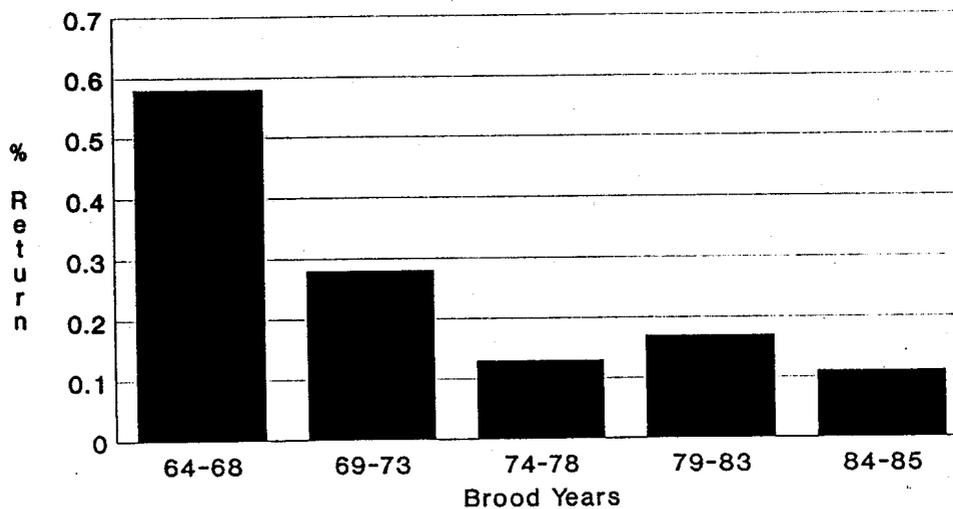
Spring Chinook Releases Hells Canyon



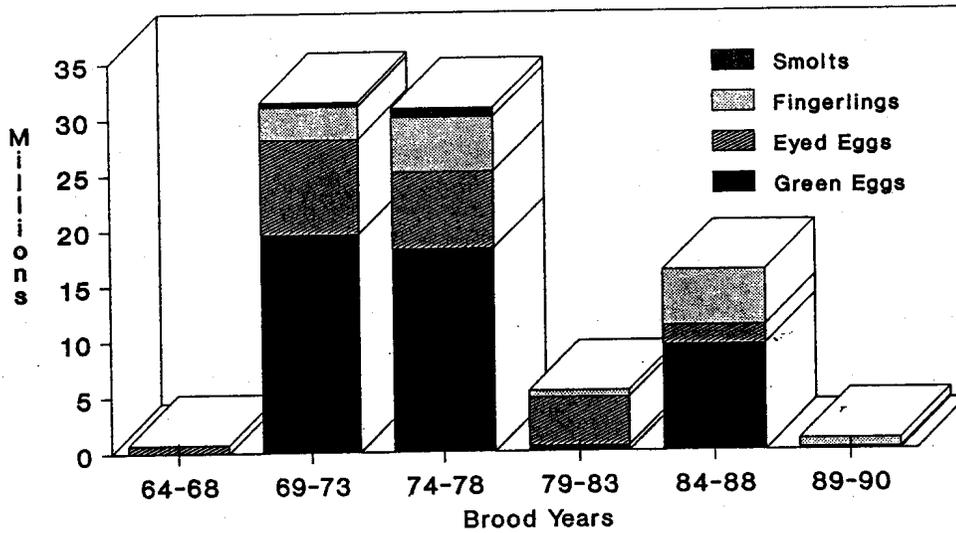
Total Return of Chinook Salmon Rapid River Hatchery



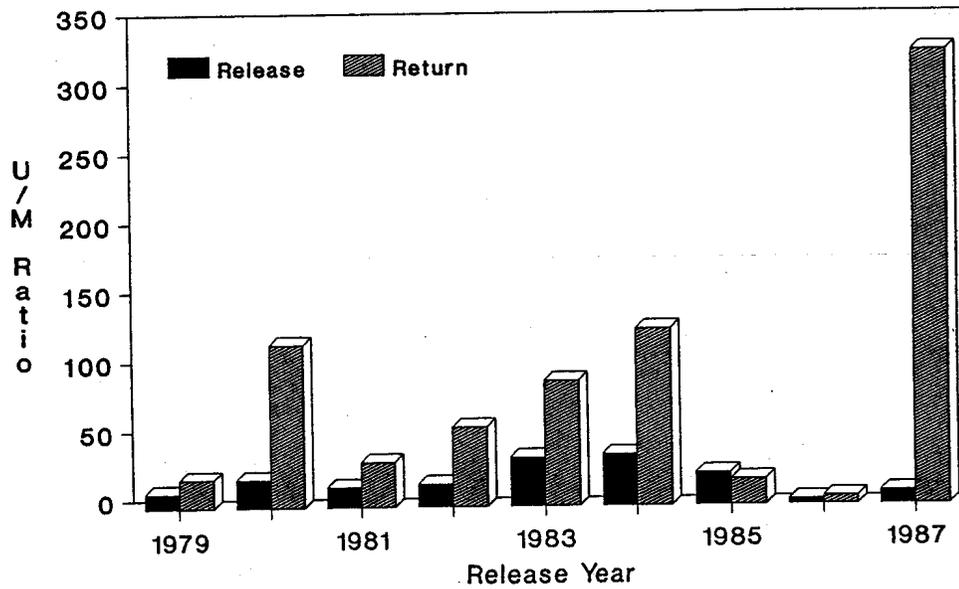
Rapid River Spring Chinook Smolt-Adult Return Rate 5-Year Averages



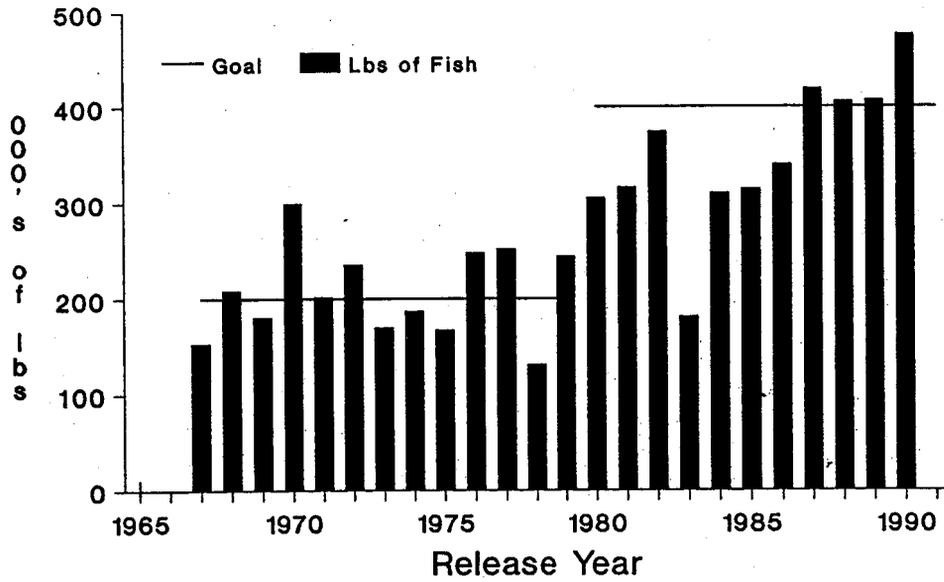
Excess Salmon Production Rapid River Hatchery 5-Year Totals



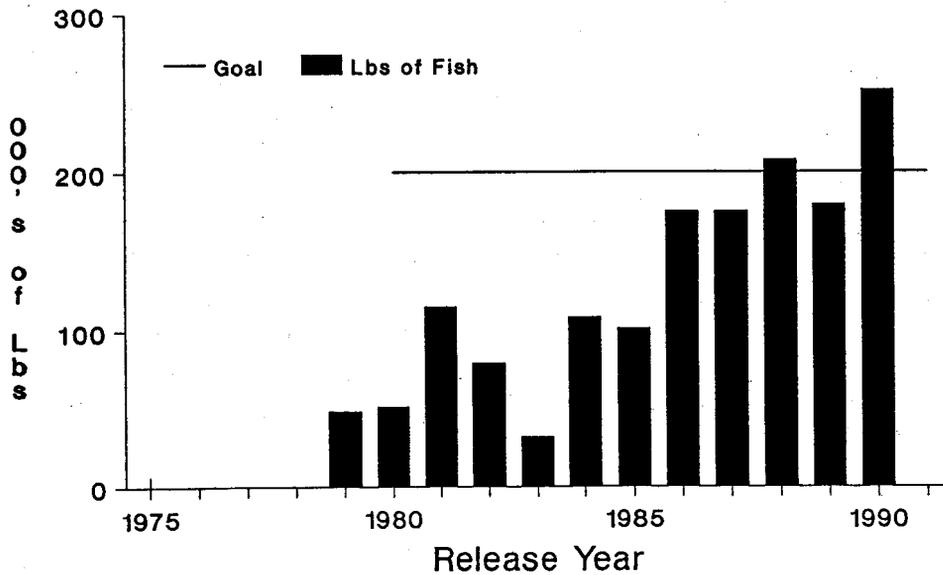
Rapid River Chinook Unmarked/CWT Ratios



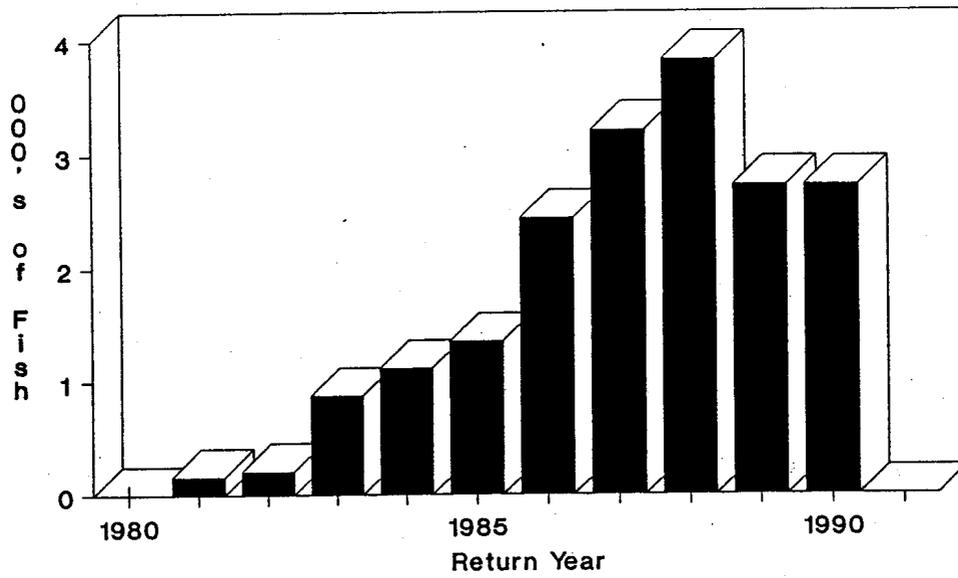
Steelhead Production Niagara Springs Hatchery



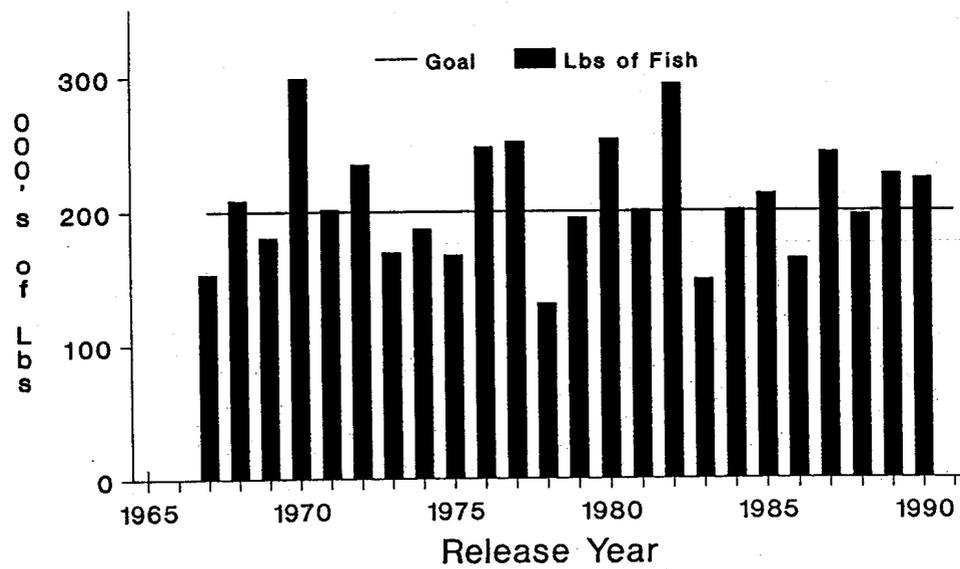
IPC Steelhead Releases Snake River



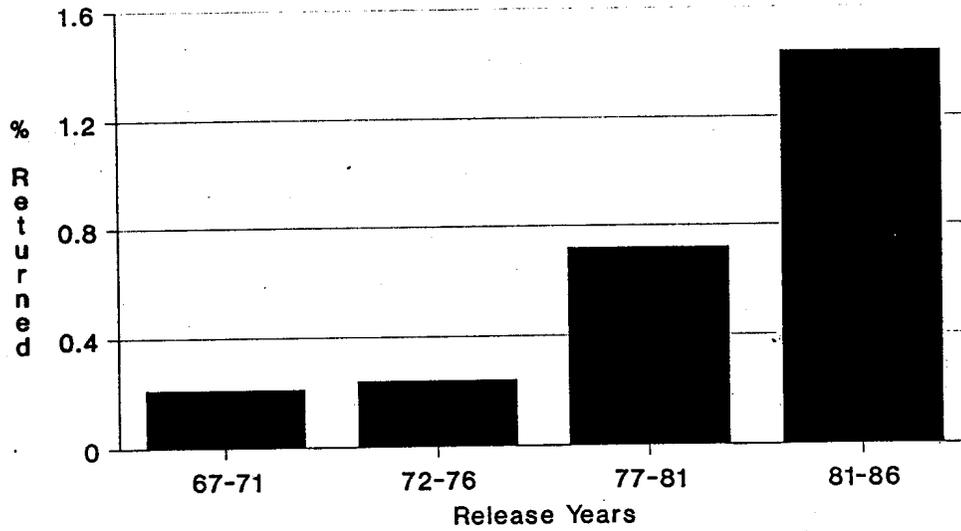
Adult Steelhead Returns Hells Canyon Trap



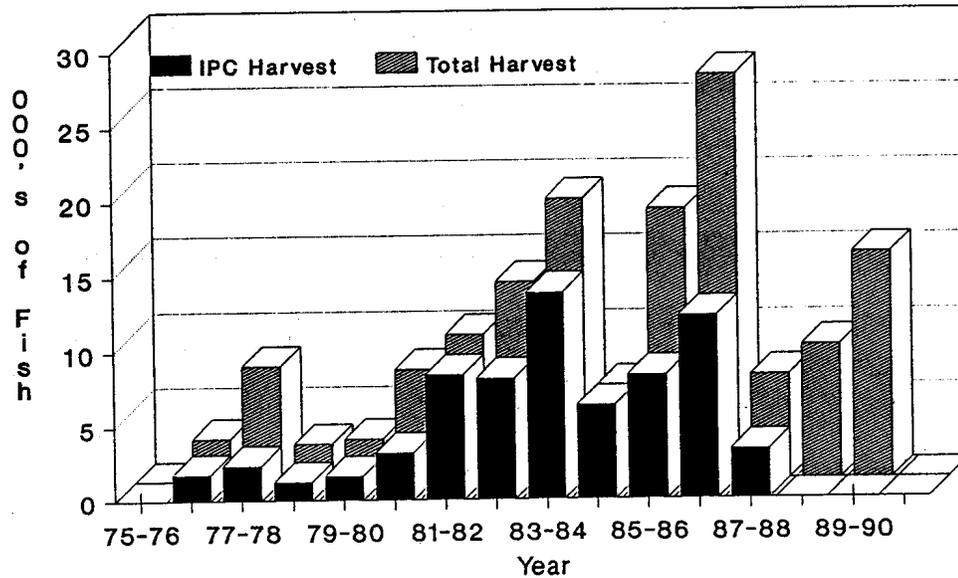
IPC Steelhead Releases Salmon River



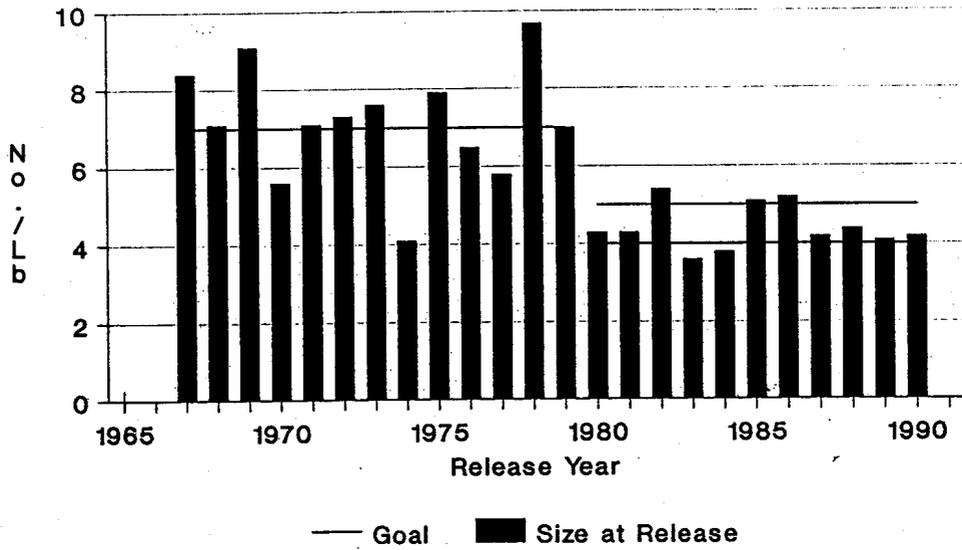
Pahsimeroi River Steelhead Smolt-Adult Return Rate 5-Year Averages



SALMON RIVER STEELHEAD HARVEST



Pahsimeroi River Steelhead Average No./Lb

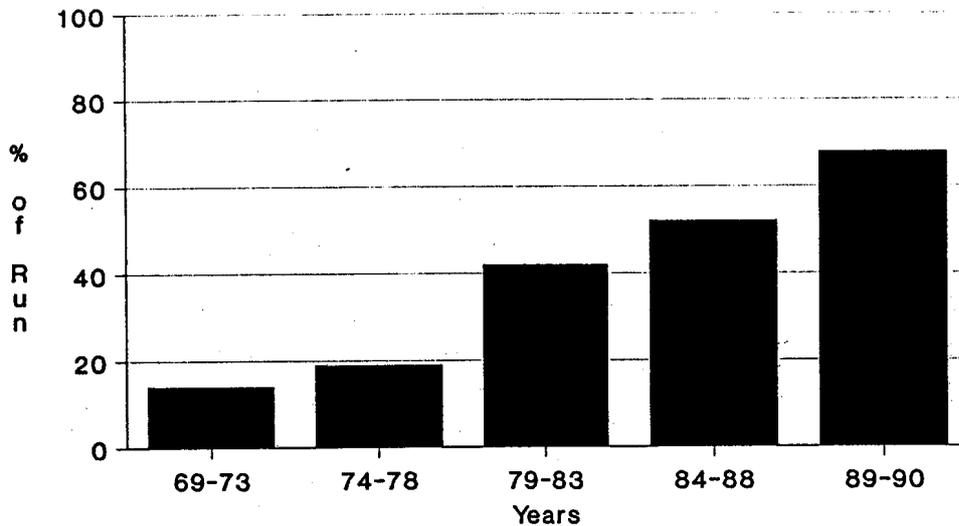


Pahsimeroi River Steelhead Spawning Before May 1

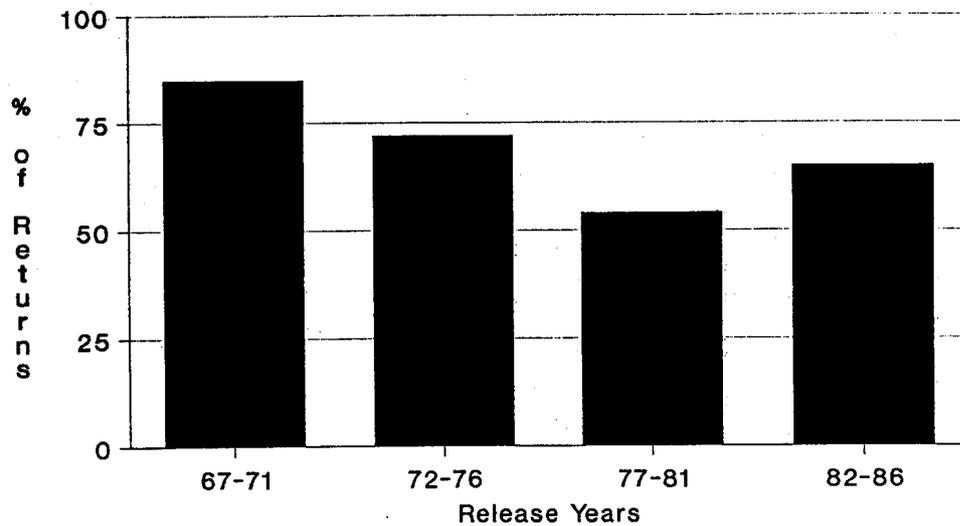
1960's & 70's
50%

1980's
100%

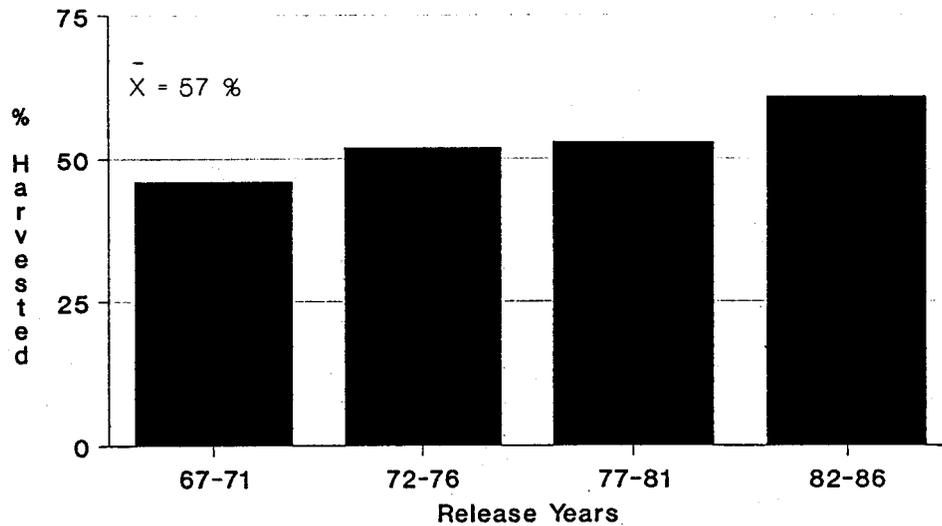
Steelhead Arrival by March 31 Pahsimeroi Hatchery 5-Year Averages



Pahsimeroi River Steelhead Returns I-Ocean Age Component 5-Year Averages



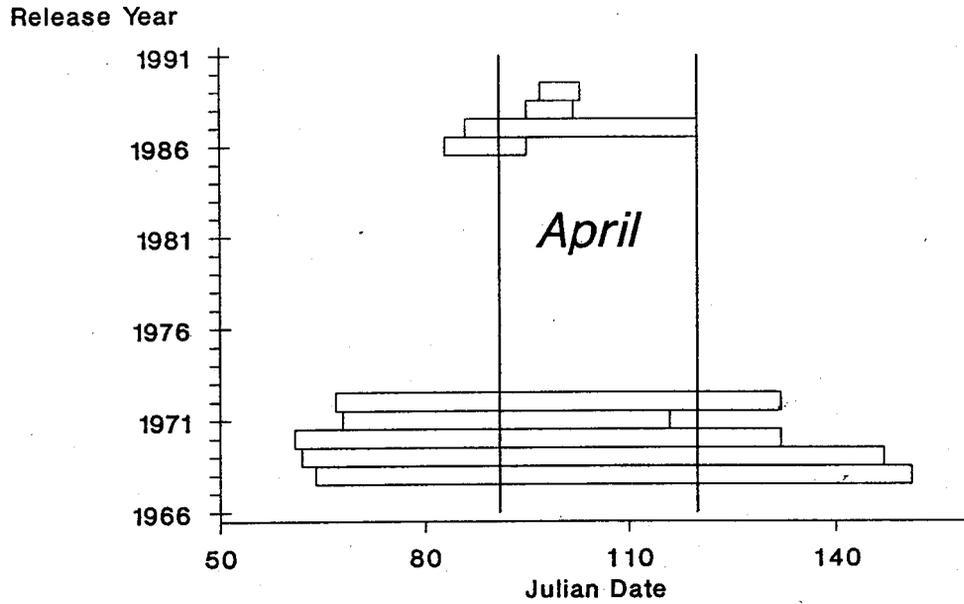
Pahsimeroi River Steelhead Exploitation Rates 5-Year Averages



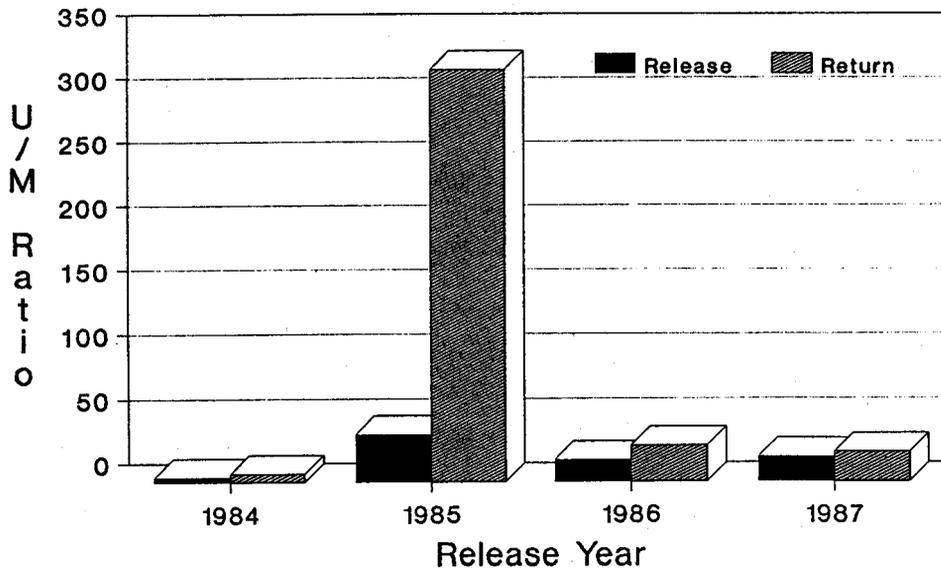
IPC Steelhead Research

- Smolt Timing
- Release Size
- Release Sites
- Rearing Time
- Harvest Rate
- Hook and Release
- Adult Hauling
- Non-Migrants
- Release Timing
- Early Diet
- Vibrio

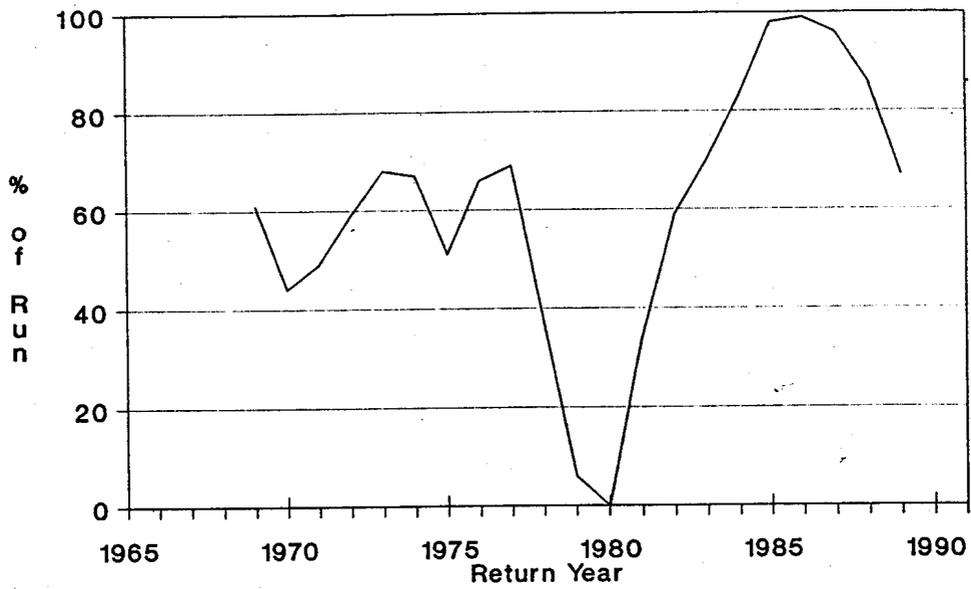
Steelhead Release Time Pahsimeroi Hatchery



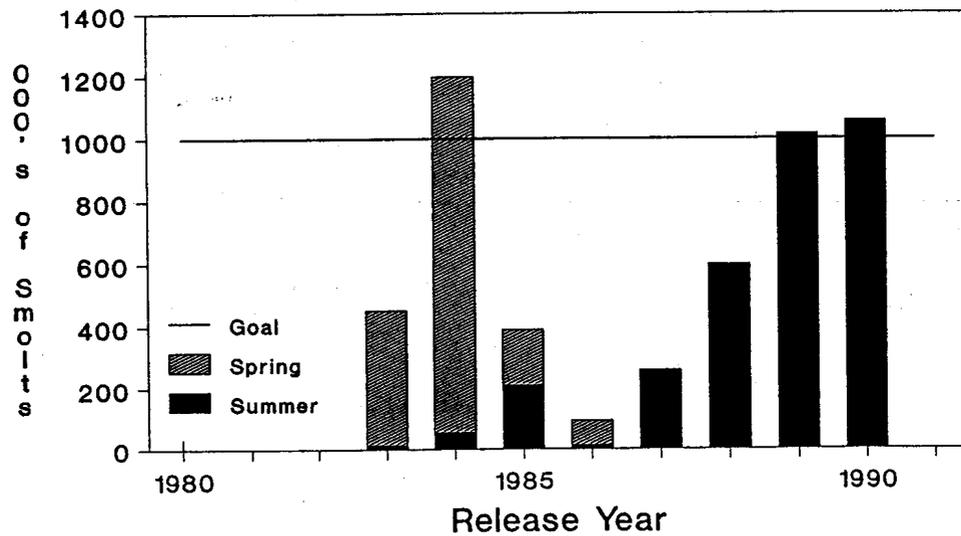
Pahsimeroi Hatchery Steelhead Unmarked/CWT Ratios



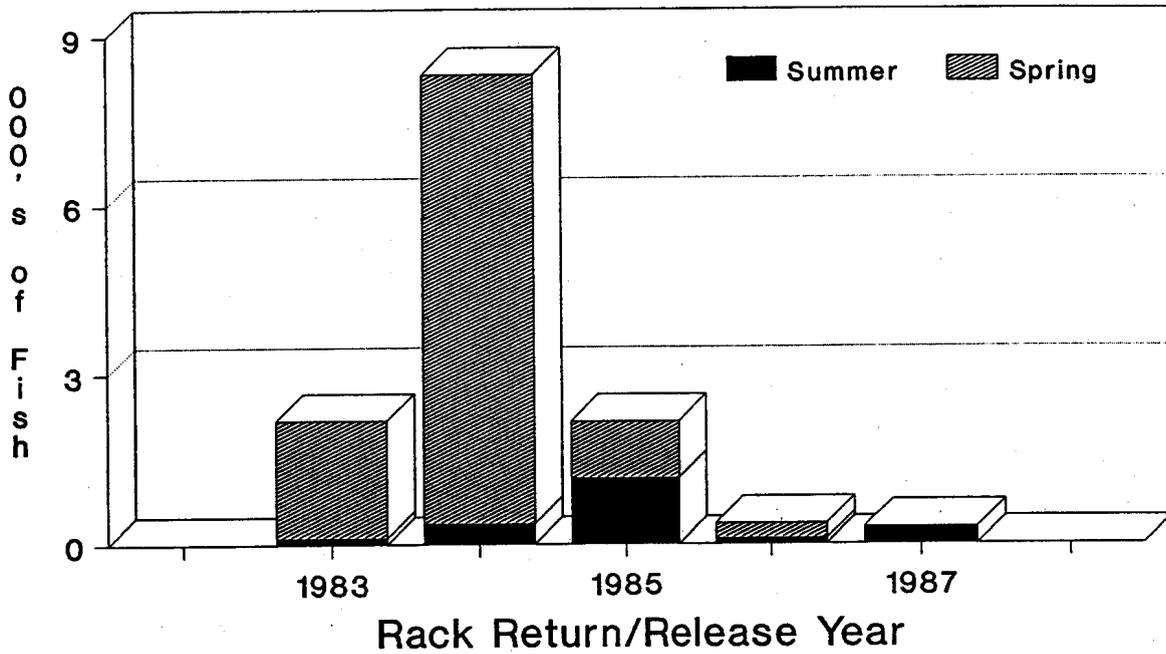
Adult Chinook Trapped by August 15 Pahsimeroi Hatchery



Chinook Salmon Releases Pahsimeroi Hatchery Spring & Summer Chinook



Chinook Salmon Returns Pahsimeroi Hatchery Summer & Spring Chinook



Chinook Return Rates Pahsimeroi Hatchery Spring & Summer Chinook

