Informational Leaflet 24

FORECAST OF CHIGNIK RIVER RED SALMON RUN IN 1963

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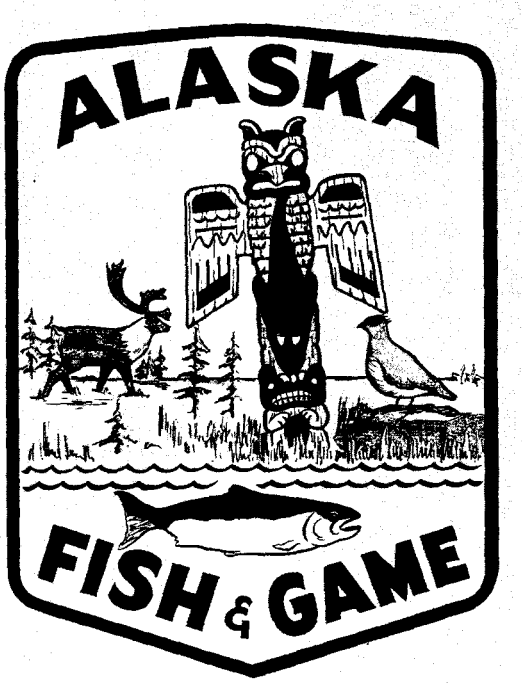
March 20, 1963



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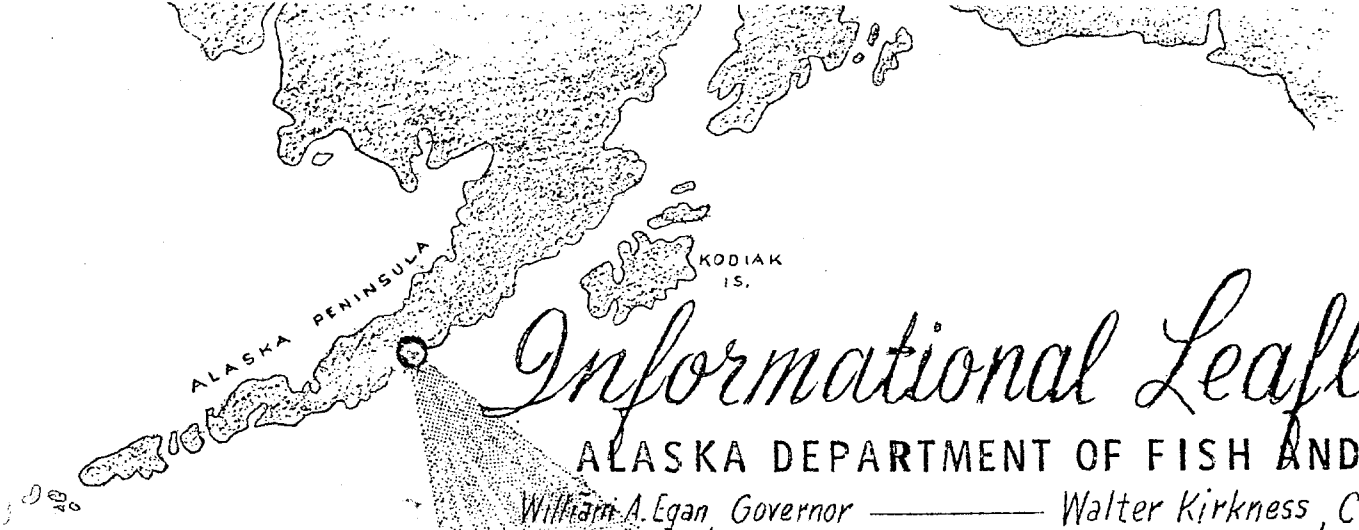

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ALASKA DEPARTMENT OF FISH AND GAME

William A. Egan, Governor ——— Walter Kirkness, Commissioner

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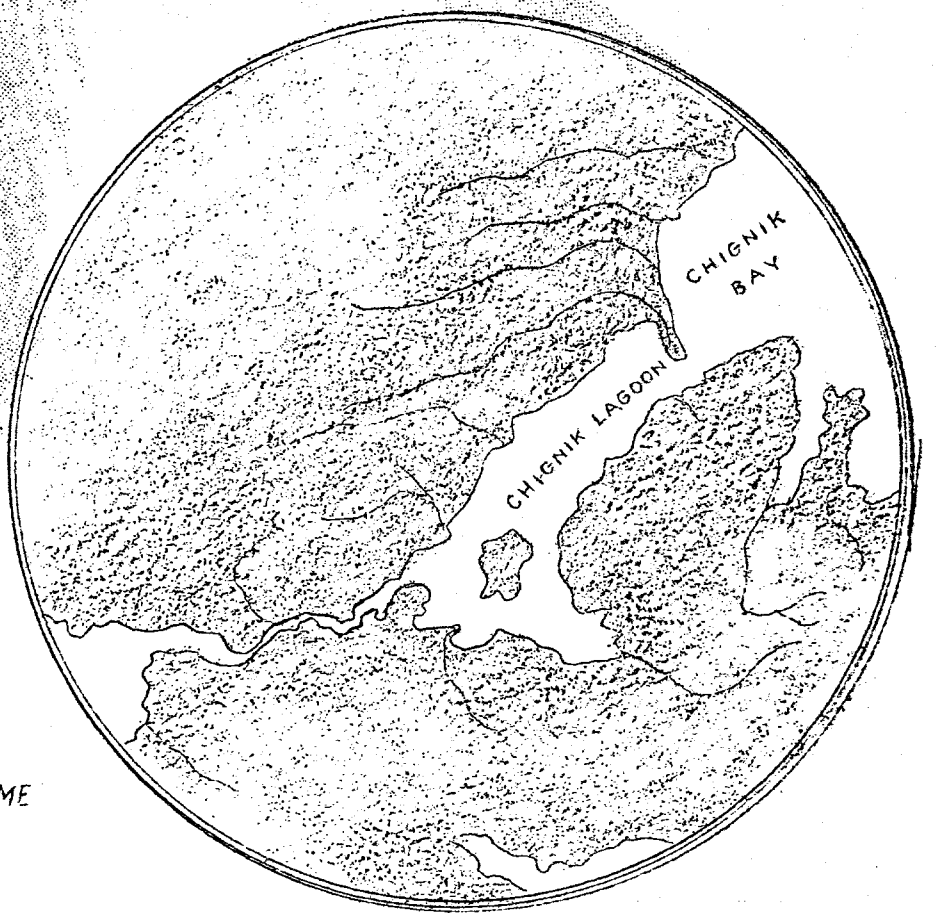

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INTRODUCTION

Forecasts of red salmon returning to Chignik River are of utmost importance to both the industry and management of this valuable fishery. The method of prediction outlined herein is based upon age composition of the adult run in 1962 and historical age and return relationships since 1955. This forecast is issued jointly by the Alaska Department of Fish and Game and the Fisheries Research Institute.

BACKGROUND

Chignik red salmon runs during the past ten years have ranged in size from 410,000 to 1,425,000 and averaged slightly over 800,000 annually. The Fisheries Research Institute first began predicting these runs in 1958 and were joined by the Alaska Department of Fish and Game in 1961 in an effort to consolidate the collection and evaluation of existing data in order to determine an accurate forecast as possible.

PREDICTION

The present method of prediction is based upon ocean age composition of the adult Chignik red salmon run. These runs are made up predominantly of fish which have spent three winters in the ocean (.3) along with a much smaller segment having spent two winters (.2) in the ocean. This ratio between .2 fish and fish of the same population returning a year later (.3) has been found to be relatively consistent at Chignik and forms the basis of our forecasts. A comparison of previous forecasts and actual returns are outlined in Table 1.

Table 1. Chignik forecasts, 1958-1962.

Year	Predicted Run	Actual Return	% Error
1958	621,000	646,000	4.0
1959	834,000	827,000	-0.8
1960	1,900,000	1,285,000	-32.4
1961	795,000	721,000	-9.3
1962	940,000	801,000	-15.0

In earlier Chignik forecasts the geometric mean of the ratio between age .2 fish of one year and age .3 fish in the following year was used for calculating the prediction. We now have enough pairs of points to use the more reliable regression analysis (Figure 1).

The data used to calculate the regression line equation are summarized in Table 2. The linear relationship is: $\hat{Y} = 342.706 + 6.219X$.

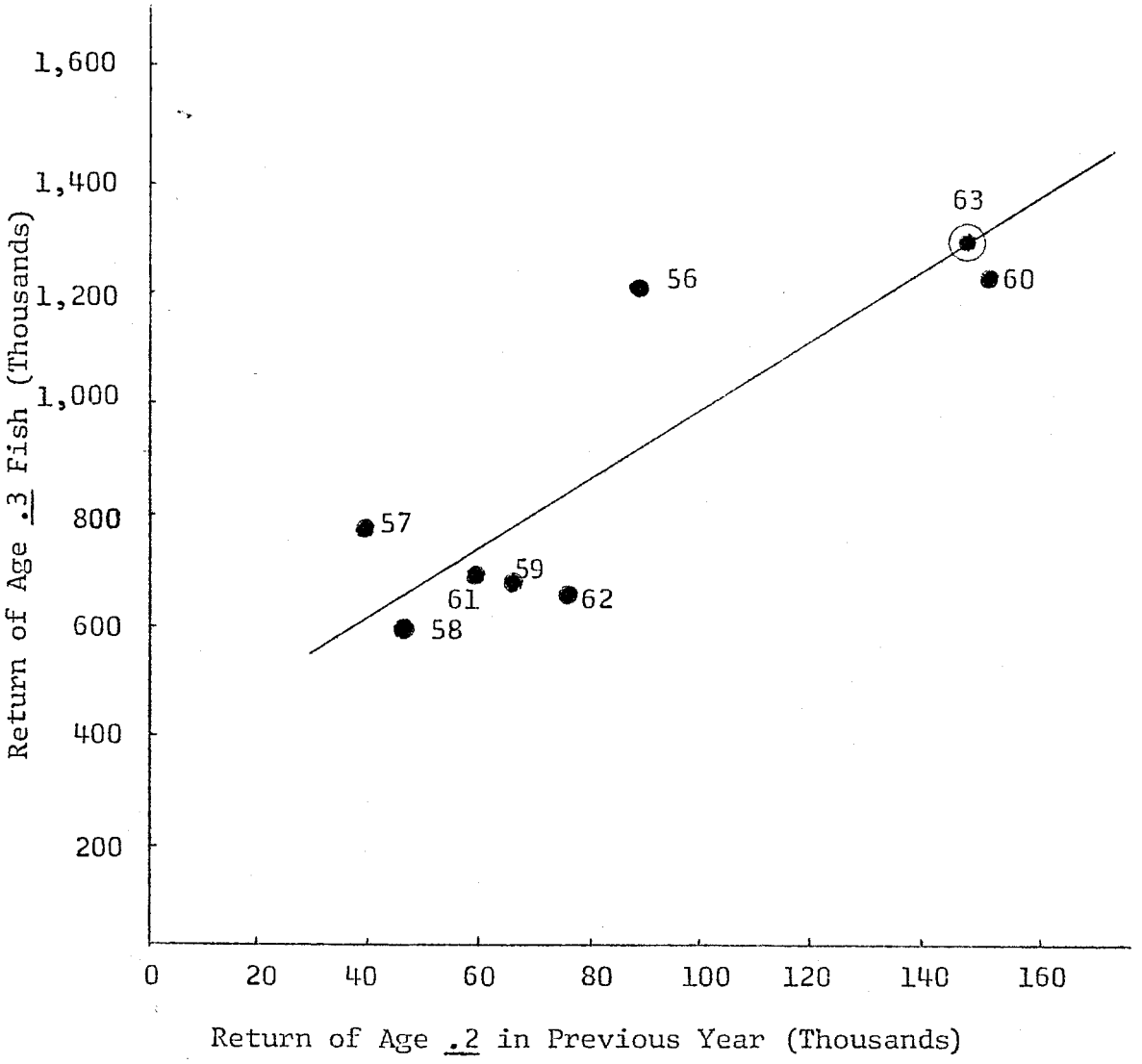

Figure 1. Regression of Age .3 on Age .2 fish.

Table 2. Summary of Chignik prediction data.

Return of Age .2 Fish		Return of Age .3 Fish	
92,000	(1955)	1,241,000	(1956)
42,000	(1956)	733,000	(1957)
47,000	(1957)	571,000	(1958)
63,000	(1958)	640,000	(1959)
152,000	(1959)	1,217,000	(1960)
60,000	(1960)	642,000	(1961)
74,000	(1961)	651,000	(1962)
148,000	(1962)	-------	(1963)

A return of 148,000 age .2 fish in 1962 was calculated from analysis of the 1962 run. With this information in the regression equation a 1963 .3 return of 1,263,000 fish is estimated. The most probable total run in 1963 is obtained by adding the mean return of age .2 fish to the calculated 1963 return of age .3 fish.

Age .3 (1963)	Age .2 (Mean)	1963 Forecast
1,263,000	85,000	1,348,000

DISCUSSION

Sources of error in the forecast method used at Chignik include variations in ocean survival, sampling error, and error in escapement enumeration. Any one of these could cause sizable deviation from the 1963 prediction.

Another source of error is the possible catches of Chignik red salmon not included in the actual Chignik catch data. Limited tagging conducted by the Department in the Stepovak Bay area in 1961 indicated that the catches taken here consisted largely of Chignik fish. Red salmon which are being taken in increasing numbers at Cape Kumlik near Aniakchak Bay are also suspected as being bound for the Chignik system. The extent of this incidental harvest is outlined in Table 3.

Table 3. Possible incidental harvest of Chignik red salmon.

	1958	1959	1960	1961	1962
Chignik total run	646,000	827,000	1,285,000	721,000	801,000
Stepovak Bay catch[1] (Island-Fox Bay set net fishery)	13,000	47,000	97,000	65,000	22,000
Cape Kumlik catch[1]	Neg.	Neg.	13,000	17,000	47,000

[1] Not landed at Chignik.

Just what percentage of these stocks are actually bound for Chignik is still unknown. The Cape Kumlik fishery has just developed during the past few years and may continue to increase. There is some relationship suggested, however, between magnitude of the Chignik run and the Stepovak Bay catch where fishing has been fairly constant since 1958.