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FISHERIES RESEARCH INSTITUTE
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AN ANNOTATED BIBLIOGRAPHY OF FISHERIES RESEARCH INSTITUTE STUDIES AT CHIGNIK, ALASKA

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ANNUAL REPORT

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INTRODUCTION

The University of Washington (UW) Fisheries Research Institute (FRI) was founded in 1947 under the direction of W.F. Thompson with funding by Alaska salmon processors. A field research program began in Bristol Bay, but by the mid-1950s FRI was conducting projects in most of the major Alaska salmon fisheries, including the Chignik lake system, which produces the largest sockeye salmon (*Oncorhynchus nerka*) runs on the south side of the Alaska Peninsula. In 1955, Dr. Thompson sent John Roos and Fred Thorsteinson to Chignik to establish a campsite and begin a research program that has continued to the present.

Management of the commercial fishery by the Bureau of Commercial Fisheries (until 1959) and the Alaska Department of Fish and Game has included enumeration of the catch and escapement (weir count) and aerial surveys of salmon spawning grounds. Some research on the Chignik fishery and most of the research conducted in the lake system has been done by FRI.

W.F. Thompson was the first supervisor (principal investigator) for FRI's Chignik project. He was followed by W.F. Royce in 1959, R.L. Burgner about 1965, and D.E. Rogers in 1985. The Chignik project leaders have been responsible for conducting field work, data analyses, and most of the report generation. Beginning with John Roos, these biologists were Dave Narver, Mike Dahlberg, Duane Phinney, Bill Parr, John Wells, Scott Marshall, Steve Parker, and most recently, Greg Ruggerone. The field crews at Chignik commonly included the project leader, who was often an FRI graduate student, and 2–3 student assistants.

Funding for FRI's Chignik research came initially from two salmon processors: Wards Cove Packing and Alaska Packers Association. Their support was soon joined by voluntary contributions from some Chignik fishermen and by recent contributions from Aleutian Dragon Fisheries and Chignik Pride Fisheries. For the past few years, industry funding has come exclusively from the Chignik Regional Aquaculture Association while federal funding, which began in the 1960s, has come from the National Marine Fisheries Service (Anadromous Fish Projects).

All papers listed in this bibliography are on file at FRI. A few references were not included because they were dittos or manuscripts (MS) that were not located in our search. Abbreviations for various report and publication series are as follows:

FRI-UW	Denotes the FRI report series that was begun in 1973 and which includes the majority of technical reports for Chignik Lakes research from 1973 to the present.
Contr. (Contribution)	The contribution series was begun as a way to indicate that a manuscript (e.g., report, journal article, book chapter, etc.) had undergone peer review prior to being published.
Circ. (Circular)	Technical reports can take substantial time between contract completion and final submittal of the report. The circular series was originally created as a means to facilitate more rapid dissemination of information for salmon fishery managers, who could not wait for the contract annual or final reports to have access to specific data (i.e., in the same way that "Notes" are used in journals to shorten the publishing process for topical material).

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ANNOTATED BIBLIOGRAPHY OF CHIGNIK, ALASKA

Noerenberg, W. 1955. Chignik migration study—red salmon—1948-1949. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 5 p.

Tagging, recovery, sockeye adults

A summary of tagging experiments 1922-48 east and west of Chignik.

Thorsteinson, F. 1955. Stream surveys in the Alaska Peninsula area. Univ. Washington School of Fisheries, Fish. Res. Inst., Circ. 79. 45 p.

Stream surveys, Pink adults, chum adults, sockeye adults, spawning grounds, surveys

Stream surveys on the Alaska Peninsula during 1955.

Thorsteinson, F. 1956. Red salmon tagging experiments at Chignik, Alaska. Univ. Washington School of Fisheries, Fish. Res. Inst., Circ. 83. 11 p.

Tagging, recovery, sockeye adults

Describes two tagging experiments in 1949 and 1952. Conducted on sockeye adults by FRI.

Roos, J. 1957. Report on Chignik adult red salmon studies, 1955-1956. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 58 p.

History, fishery , age compositions, size compositions, sockeye adults

A history of the fishery. Age and size composition of sockeye adults, 1955-56.

Calkins, T. 1958. Report on Chignik adult red salmon studies, 1957. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 35 p.

Sex ratio, size composition, age composition, age-length relationships, catch, escapement

Basic information about the 1957 sockeye salmon run.

Roos, J. 1958. A report on the red salmon smolt studies carried out at Chignik in 1957. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 10 p.

Physical characteristics, sockeye smolt migrations, scale pattern analysis, length distributions, size compositions, fyke nets

Chignik Lake outlet surface water temperatures and stream gauge heights (1955-56). Contour of the outlet with current velocities and direction of flow. Distribution of fyke net catches at the outlet and sizes of the smolts. Scale patterns of smolts. A description of fyke net methods.

Roos, J. 1958. Forecast of Chignik red salmon for 1959. Univ. Washington School of Fisheries, Fish. Res. Inst., Circ. 97. 2 p.

Forecast, sockeye adults, management

The Chignik sockeye salmon forecast for 1959.

Roos, J. 1958. Observations on the young red salmon in Chignik and Black lakes during the summer of 1956. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 6 p.

Length distributions, size compositions, scale pattern analysis

Sizes of juvenile sockeye in Chignik and Black Lakes. Scale patterns in the sockeye juveniles.

Roos, J., T. Calkins. 1958. A progress report on the Chignik red salmon studies. Univ. Washington School of Fisheries, Fish. Res. Inst., Circ. 92. 36 p.

Abundance, age composition, size composition, sockeye smolts, sockeye adults, forecasts

The enumeration and age analysis of sockeye smolts and the age and size of returning adults. Catch and escapement 1889-1957. Forecast methods used in 1958.

Thorsteinson, F., J. Roos. 1958. A report of studies on red salmon smolts carried out at Chignik in 1955 and 1956. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 22 p.

Physical characteristics, sockeye smolts, sockeye smolt migrations, size compositions, scale pattern analysis, length distributions

Chignik Lake outlet stream gauge heights and surface water temperatures. Distribution of fyke net catches at the outlet and sizes of the smolts. Size compositions of the smolts. The amount of shrinkage in smolts stored approximately four months. Results of fishing a third fyke net along the south shore near the outlet of Chignik Lake.

Roos, J. 1958. Chignik lakes red salmon spawning survey—1956–1957. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 6 p.

Sockeye adults, spawning ground survey, aerial survey, stream survey

Results of two separate aerial surveys during 1956.

Roos, J. 1959. Feeding habits of the Dolly Varden, *Salvelinus malma* (Walbaum), at Chignik, Alaska. Trans. Amer. Fish. Soc. 88:253-260.

Fish food habits, Dolly Varden, *Salvelinus malma*

Describes food habits of 5,050 Dolly Varden captured during the summers of 1955 and 1956.

Roos, J. 1959. Red salmon tagging at Chignik Alaska during 1959. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 9 p.

Adult migrations, sockeye adults, stock separation, tagging

Describes tagging studies to determine the distribution of sockeye salmon adults on the spawning grounds.

Roos, J. 1959. Red salmon adult studies, 1958. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 5 p.

Sex ratio, age composition, size composition, catch, escapement

Basic information about the 1958 sockeye salmon run.

Roos, J. 1959. Report of adult red salmon studies at Chignik, 1959. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 10 p.

Escapement, age composition, size composition, sex ratio, catch, escapement

Basic information about the 1959 sockeye salmon run.

Roos, J. 1959. Red salmon smolt studies at Chignik, Alaska in 1959. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 17 p.

Physical characteristics, sockeye smolts, sockeye smolt migrations, size compositions

A summary of ice break-up dates in 1955-59. Chignik Lake outlet stream gauge heights. Timing and magnitude of the smolt migration. Sizes of the smolts and their age compositions.

Narver, D. 1960. Forecast of the Chignik salmon run, 1961. Univ. Washington School of Fisheries, Fish. Res. Inst., Circ. 129. 3 p.

Forecast, sockeye adults, management

The Chignik sockeye salmon forecast for 1961.

Roos, J. 1960. Red salmon studies - Chignik. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 77:7- 8.

Smolt index, Fyke net catches, tagging, scales, coho juveniles, sockeye fry, predation, hair seals

Year of migration (1956-59) and index value of sockeye smolts. Lengths, weights and ages.of sockeye smolt. Ocean ages of adult sockeye, 1955-59. Results of tagging adult sockeye and recoveries in lakes of origin. Scales show two Chignik races. Hair seal predation on sockeye adults. Juv. coho eat sockeye fry. Summary statement.

Roos, J. 1960. Predation of young coho salmon on sockeye salmon fry at Chignik, Alaska. Trans. Am. Fish. Soc. 89(4):377-378.

Fish food habits, predation, coho juveniles, sockeye fry

Describes the extent of predation of coho salmon juveniles on sockeye salmon fry in the Chignik lakes.

Narver, D. 1961. Chignik red salmon studies. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 116:21-23.

Tow net catches, spawning ground surveys, tagging, sockeye juvenile distribution, stream surveys, physical characteristics

Distribution of sockeye juveniles in Chignik lakes. Ecological conditions of Chignik lakes. Spawning ground surveys and scale sampling. Tagging of adult sockeye to determine time of entry to lakes.

Narver, D. 1962. Periodic reports, 1961-1962, on optimum escapement of salmon, Part 3: Study of basic productivity of Chignik Lakes. Univ. Washington School of Fisheries, Fish. Res. Inst. FRI-UW Ditto. 2 p.

Study summary

No data. Brief summary of 1962 work and data collection.

Narver, D. 1962. Chignik red salmon studies. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 139:12-13.

Optimum escapement, management, tow net, gill net, tagging, forecasts, growth, abundance, stock separation

Summarized growth and abundance indices for fish caught by townet in the Chignik lakes, 1961. Gill net catches in Chignik lake. Accuracy of forecasts 1958-61. Spawning time as related to time of entry. Summary data.

Narver, D. 1963. Chignik red salmon studies. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 147:19-21.

Carrying capacity, parent escapement, nursery lake studies, Chignik Lagoon, tow net, growth, abundance

The growth and abundance of resident fish in the Chignik Lakes. Chignik Lagoon as a rearing area. Summary statement.

Narver, D. 1963. Identification of adult red salmon groups by lacustrine scale measurement, time of entry, and spawning characteristics. Univ. Washington, M.S. thesis. 96 p.

Scale pattern analysis, stock separation, time-of-entry, management, scale formation

Stock separation of sockeye spawning groups through the use of scale pattern analysis, time-of entry, and temporal and spatial spawning habits. Has a detailed description of how scales develop.

Dahlberg, M., J. Lechner, D. Narver, J. Richardson. 1964. Forecast of the Chignik River red salmon run in 1964. ADF&G Informational Leaflet 38. 4 p.

Forecast, sockeye adults, management

Sockeye salmon forecast for 1964.

Dahlberg, M., D. Narver. 1964. Chignik management plan and Chignik scale sampling design. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW Ditto. 9 p.

Management, scale sampling design, scale pattern analysis

A management plan and scale sampling design for Chignik, 1964.

Narver, D., M. Dahlberg. 1964. Chignik sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 166:18-21.

Tagging, entry time, spawning location, Chignik Lagoon, tow net data

Townet catches of small fish in Black Lake 1961- 63. Chignik Lagoon as a secondary nursery area for smolts. Relationship between entry time and spawning location. Summary data, summary statement.

Dahlberg, M., J. Lechner. 1965. Forecast of the Chignik River red salmon run in 1965. ADF&G Informational Leaflet 50. 9 p.

Forecast, sockeye adults, management

Sockeye salmon forecast for 1965.

Narver, D. 1965. Chignik- a unique sockeye producing system. Univ. Washington School of Fisheries, Fish. Res. Inst., Circ. 233:31-36.

Management, sockeye adults, sockeye juveniles, forecasts

Why the Chignik fishery is easy to control. A long series of reliable data on the lakes. How the two lakes contrast. Unique characteristics of the Chignik system. A talk. No data.

Narver, D. Dahlberg, M. 1965. Estuarine food of Dolly Varden at Chignik, Alaska. Trans. Am. Fish. Soc. 94(4):405-408.

Fish food habits, Dolly Varden, estuarine, Chignik Lagoon, *Salvelinus malma*

The food habits of Dolly Varden in Chignik Lagoon.

Narver, D., M. Dahlberg. 1965. Chignik Lakes sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 184:19-22.

Carrying capacity, escapement, sockeye, management, tagging

Tow net catch data 1961-64. Tagging experiment data 1962-64.

Anonymous. 1966. Chignik sockeye. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 212:14-16.

Returning adult studies, nursery lake studies, Chignik Lagoon, fluorescent marking

Studies of entry pattern of each spawning stock of sockeye . Distribution, abundance and origin of sockeye juveniles in Chignik River. Catches in Chignik Lagoon. Description of fluorescent dye marking of juvenile sockeye.

Dahlberg, M. 1966. Length frequency analysis, IBM 7090/1094, FORTRAN 2 or FORTRAN 4. Trans. Am. Fish. Soc. 95(3):331.

Length-frequency analysis, IBM, FORTRAN 2, FORTRAN 4

Describes a program that smoothes length-frequency data and other data grouped similarly, by the technique of moving averages.

Dahlberg, M., J. Lechner. 1966. Forecast of the Chignik sockeye salmon run in 1966. ADF&G Information Leaflet 90. 9 p.

Forecast, Sockeye adults, management

Sockeye salmon forecast for 1966.

Iverson, R. 1966. Biology of juvenile sockeye salmon resident in Chignik River, Alaska. Oregon State Univ., M.S. thesis. 72 p.

Chignik River, sockeye juveniles, abundance, food habits, lengths, distribution

Includes a physical and biological description of Chignik River, beach seine catches and length freq. analysis of sockeye juveniles in Chignik River for 1963-64; plus underwater observations of sockeye juv. and other species. Scale measurements of juv. and adults. A description of upstream and downstream movements of juv. sockeye.

Food habits of juv. from the upper river vs. those from the lower river. Speculates on origins of juveniles in the river.

Narver, D. 1966. Pelagial ecology and carrying capacity of sockeye salmon in the Chignik lakes, Alaska. Univ. Washington, Ph.D. thesis. 348 p.

Pelagial ecology, carrying capacity, sockeye juveniles, scale analysis, lengths, limnology, management

The determination of the carrying capacity of the Chignik Lakes using weather, limnology, sockeye scales and tow net data. Describes four phenotypes of threespine sticklebacks. Catch-escapement data for 1927-64.

Narver, D. 1966. A prototype kokanee spawning channel. The Progr. Fish.-Cult. 28 (3):183-184.

Spawning channel, kokanee, Washington

Describes a small, prototype spawning channel for kokanee that was built in eastern Washington.

Narver, D. 1966. Sockeye salmon production in the Chignik lakes. Univ. Washington School of Fisheries, Fish. Res. Inst., Circ. 66-11:19-24.

Sockeye adults, management, carrying capacity, optimum escapement, Black Lake

How to increase production of sockeye from Black Lake. A talk. Summary graphs.

Narver, D., M. Dahlberg, W. Royce. 1966. Comments on the sockeye escapement at Chignik . Univ. Washington School of Fisheries, Fish. Res. Inst., Ditto. 2 p.

Management, sockeye adults, escapement

A summary of thinking on escapement policies for the Chignik lakes through Feb. 1966.

Phinney, D. 1966. Mass-marking small fish with fluorescent pigment by means of compressed air. Univ. Washington School of Fisheries, Fish. Res. Inst., Circ. 66-6. 4 p.

Fluorescent marking, salmon juveniles, tagging and recapture

This paper deals with the technique of marking salmon juveniles with fluorescent pigment.

Dahlberg, M., D. Phinney. 1967. The use of adipose fin pigmentation for distinguishing between juvenile chinook and coho salmon in Alaska. J. Fish. Res. Bd. Can. 24 (1):209-210.

Adipose fin pigmentation, chinook juveniles, coho juveniles, salmon identification

Identifying chinook and coho juveniles from pigmentation of the adipose fin.

Dahlberg, M., D. Phinney. 1967. Studies of mature sockeye salmon at Chignik, 1966. Univ. Washington School of Fisheries, Fish. Res. Inst., Circ. 67-7. 41 p.

Time of entry curve, age composition, length frequency, sockeye adults, length-weight relationships, potential egg deposition

All for 1966: Release recapture data. Time of entry curve. Age composition of the sockeye run, length frequencies of returns and length-weight relationships. Potential egg deposition.

Phinney, D., M. Dahlberg. 1967. Chignik lakes sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 240:10-11.

Sockeye adults, length-weight relationships, nursery lake studies, young fish studies fluorescent dye marking

Analysis of length-weight relationships of Chignik sockeye. Summary of Narver's Ph.D. thesis on pelagic ecology and carrying capacity of Chignik lakes. Fluorescent marking.

Phinney, D., J. Lechner. 1967. Forecast of the Chignik sockeye salmon run in 1967. ADF&G Information Leaflet 97. 9 p.

Forecasts, sockeye adults, nursery lake studies, management

Total early and late runs of sockeye adults, 1955-66. Relative % error of Chignik forecasts 1958-66. The size of sockeye runs to the Chignik system (early and late) 1955-66. Tow net catches of sockeye juveniles 1961-66.

Phinney, D., D. Miller, M. Dahlberg. 1967. Mass-marking of young salmonids with fluorescent pigment. Trans. Am. Fish. Soc. 96(2):157-162.

Fluorescent marking, salmonid juveniles

A description a marking technique using fluorescent dyes.

Dahlberg, M. 1968. Analysis of the dynamics of sockeye salmon returns to the Chignik lakes, Alaska. Univ. Washington, Ph.D. thesis. 337 p.

Management, catch, escapement, spawner return relationships, forecast, age composition

Includes historical records of catch and escapement. Determination of age compositions of the runs. Estimating spawner return relationships of each stock. Determination of the best means of forecasting the Chignik runs. Attempts to identify reasons for the decline in abundance of Chignik sockeye. Proposes management strategies.

Dahlberg, M., D. Phinney. 1968. A microprojector for use in scale studies. The Progr. Fish-Cult. 30(2):118-119.

Microprojector, scales

Describes a microprojector used in reading fish scales.

Dahlberg, M., D. Phinney, J. Lechner. 1968. Forecast of the Chignik sockeye salmon run in 1968. ADF&G Information Leaflet 115. 14 p.

Forecast, sockeye adults, time of entry curve, management

Describes forecast methods used in 1968 and gives the 1968 forecast.

Narver, D. 1968. Notes on the isopod *Mesidota entomon* in Chignik lakes, Alaska. J. Fish. Res. Bd. Canada 25(1):157-167.

Isopod, behavior, distribution, life history, *Mesidota entomon*

The behavior, distribution and life history of the abundant isopod in the Chignik lakes.

Phinney, D. 1968. Distribution, abundance, and growth of post-smolt sockeye in Chignik Lagoon, Alaska. Univ. Washington, M.S. thesis. 159 p.

Chignik Lagoon, abundance growth, sockeye post-smolts, hydrology.

Comparison of relative growth rates of post smolt sockeye in Chignik Lagoon, 1963-65 and 1967. Determination of mean total amount of growth of posts-smolts in the lagoon from studies of scales of returning adults. Examination of beach seines and tow net data to determine the length of their stay. Summarized hydrological data from the lagoon.

Phinney, D., R. Burgner. 1968. Optimum escapement studies of Chignik sockeye salmon. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW Project AFC-13. 7 p.

Fish abundance, sockeye, juveniles, age composition, sockeye adults, nursery lake studies, forecast

A summary report . No data.

Phinney, D., M. Dahlberg. 1968. Chignik lakes sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 280:10-12.

Fish species composition, Chignik Lagoon, hierarchy of associations

The fish species of Chignik Lagoon and their hierarchy of associations. Summary statement.

Phinney, D., M. Dahlberg. 1968. Western range extension of the surf smelt, *Hypomesus pretiosus pretiosus*. J. Fish. Res. Bd. Canada 25(1):203-204.

surf smelt, range extension

A range extension of surf smelt into Chignik Lagoon.

Burgner, R., C. DiConstanzo, R. Ellis, G. Harry, W. Hartman, O. Kerns, O. Mathisen, W. Royce. 1969. Biological studies and estimates of optimum escapements of sockeye salmon in major river systems in southwestern Alaska. U.S. Fish Wildl. Serv., Fish. Bull. 67(2):405-459.

Optimum escapement, management, sockeye adults, carrying capacity, limnology

Comparison of limnology of mainland versus peninsula sockeye producing lake systems. Productivity measurements and salmon production. The capacity of the spawning ground. Capacity of the rearing areas.

Narver, D. 1969. Phenotypic variation in threespine sticklebacks of the Chignik River system, Alaska. J. Fish. Res. Bd. Canada 26(2):405- 412.

Phenotypic variation, threespine sticklebacks

Describes 4 phenotypes of threespine sticklebacks in Chignik lake system. Describes life history of the estuarine phenotypes.

Parr, W., R. Burgner. 1969. Optimum escapement studies of Chignik sockeye salmon. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW MS. 3 p.

Forecasts, food habits

A summary statement on work done in 1968. No data.

Parr, W., P. Pederson. 1969. Forecast of the sockeye salmon run to Chignik in 1969. Univ. Washington School of Fisheries, Fish. Res. Inst., Circ. 69-16. 40 p.

Time of entry curves, age composition, potential egg deposition, fish lengths, sockeye adults, length weight relationships

How the time of entry curves are erected. Time of entry for 1962-68. Length frequencies of 1968 returns and length-weight relationships, 1966-68. Potential egg deposition, 1968.

Phinney, D., J. Lechner. 1969. Studies of adult Chignik sockeye salmon in 1967. ADF&G Information Leaflet 130. 43 p.

Time of entry, age composition, catch, escapement, length frequency, potential egg deposition, length-weight relationships, management

A collection of information on which to base the management of the two stocks (Black and Chignik Lakes) in 1967.

Phinney, D., S. Mathews. 1969. Field test of fluorescent pigment marking and fin clipping of coho salmon. J. Fish Res. Bd. Canada 26(2):1619-1624.

Fluorescent marking, fin clipping, coho fry, marking

The comparison in survival of fluorescent dye marked coho fry, fin clipped fry and un-marked fry. Controlled experiment.

Phinney, D., W. Parr. 1969. Chignik lakes sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 300:19-21.

Chignik Lagoon, smolt out-migration, nursery area, fish abundance

The pattern of sockeye smolt out-migration through Chignik Lagoon. Relative abundance of fish by species in the Chignik lakes. Summary statement.

Narver, D. 1970. Birds of the Chignik River drainage, Alaska. The Condor 72(1):102-105.

Birds, field records

A listing of bird species found in the Chignik lakes watershed.

Parr, W., R. Burgner. 1970. Optimum escapement studies of Chignik sockeye salmon. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW Project AFC-17. 17 p.

Nursery lake studies, food habits, sockeye adults, sockeye juveniles, management, forecasts, age composition, time of entry

Juvenile sockeye abundance indices 1961-69. Fyke net catches Black R. 1969. Food consumed by sockeye fry and three lake resident species in Black Lake, 1968-69. Relationships between abundance and growth rate of sockeye juveniles. Age composition of sockeye adults in 1969. Time of entry curves.

Parr, W., R. Burgner. 1970. Chignik lakes sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 320:10-11.

Fish food habits, sockeye juveniles, zooplankton abundance, competitor species

Food habits of juvenile sockeye and competitor species. Abundance of zooplankton in Chignik Lake. A summary statement. Some data.

Phinney, D. 1970. Spawning ground catalog of the Chignik River system, Alaska. U.S. Fish Wildl. Serv. Data Rep. 41. 147 p.

Spawning ground catalog, sockeye adults

A description of the spawning grounds and their sockeye salmon runs.

Parr, W., R. Burgner. 1971. Chignik lakes sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 340:10-11.

Growth rate, fish abundance, sockeye fry, resident fish, food habits

Growth rate of sockeye fry vs. abundance of sockeye fry. Food habits of sockeye juveniles and three resident fish species.

Wells, J., W. Parr. 1971. Studies of adult sockeye salmon at Chignik, Alaska. Univ. Washington School of Fisheries, Fish. Res. Inst., Circ. 71-7. 61 p.

Time of entry curves, age composition, potential egg deposition, fish lengths, sockeye adults, length weight relationships

How time of entry curves were calculated for 1969. Age composition for 1969 and 1970 runs. Length frequency of 1969 and 1970 returns and length-weight relationships for 1967-70. Potential egg deposition for 1969 and 1970.

Wells, J., W. Parr, R. Burgner. 1971. Optimum escapement studies of Chignik sockeye salmon. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW Report AFC-34. 17 p.

Nursery lake studies, age composition, late season spawning, forecasts

Juvenile sockeye abundance indices, 1970. Stomach sample analysis of juv. sockeye and resident fish. Fyke net catches, Black R. 1970. Age composition data from sockeye salmon adults. Late season field trip to observe spawning sockeye and coho. Forecast studies.

Hartman, W. Burgner, R. L. 1972. Limnology and fish ecology of sockeye salmon lakes of the world. J. Fish Res. Board Canada 29(6):699-715.

Limnology, fish ecology, sockeye juveniles, eutrophication

Includes a physical and biological description of the Chignik lake system and other selected sockeye systems. Discusses the likelihood of biogenic eutrophication in these systems and the differential use of nursery areas by sockeye juveniles. Includes other topics relating to the biology of sockeye salmon nursery lakes, such as interrelationships between sockeye salmon and resident fish.

Parr, W. 1972. Interactions between sockeye salmon and lake resident fish in the Chignik lakes, Alaska. Univ. Washington, M.S. thesis. 103 p.

Fish food habits, growth rates, abundance, competition

Fish abundance indices in Black and Chignik lakes, 1961-70. Mean lengths and growth rates of sockeye and resident fish. Average temperatures for Cold Bay and Chignik, 1961-70. Average amount of food per stomach in sockeye and resident fish. Abundance of zooplankton in Chignik Lake 1968-70.

Phinney, D. 1972. Occurrence of the Bering Poacher and the Pacific staghorn sculpin near Chignik, Alaska. J. Fish. Res. Bd. Canada 29(1):107-108.

Bering poacher, *Occella dodacaedron*, Pacific staghorn sculpin, *Leptocottus armatus*, range extension

Range extension for the Bering Poacher and the Pacific Staghorn Sculpin taken at Chignik.

Wells, J., R. Tomokiyo. 1972. Chignik sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW Cont. 355:16-17.

Food habits, sockeye juveniles, ninespine stickleback, threespine stickleback

Summary of a M.S. thesis on food habits of sockeye fry and lake resident fish. No data.

Burgner, R., S. Marshall. 1973. Chignik sockeye salmon studies. In *Research in Fisheries*. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 375:16-17.

Young fish studies, time of entry curves, predation.

A summary statement. Shows a time of entry curve for 1962-69.

Dahlberg, M. 1973. Stock-and-recruitment relationships and optimum escapements of sockeye salmon stocks of the Chignik Lakes, Alaska. Cons. int. Explor. Mer, Rapports et Proce-Verbaux. 164:98-105.

Optimum escapement, stock and recruitment relationships, spawner return relationships, management

Estimating optimum escapement to the Chignik lakes using spawner return relationships. Observed and estimated spawners and returns 1922-60. The use of Ricker's model and other models.

Wells, J., R. Burgner. 1973. Annual Progress Report-Optimum escapement studies of Chignik sockeye salmon. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-7302. 21 p.

Nursery lake studies, fish abundance, fish size, fish ages, fish food habits, Dolly Varden, coho adults, forecasts

Final report (7/71-6/72) Nursery lake and young fish studies. Life history studies of Dolly Varden and coho salmon. Late season spawning ground studies. Assistance to ADF&G in forecasting.

Burgner, R., J. Dawson, S. Marshall. 1974. Final Report—Chignik sockeye studies. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-7405. 27 p.

Age composition, fish abundance, fish size, sockeye juveniles

Percent of age groups as determined by time of entry curves and spawning ground samples. Black River fyke net catches, 1973. Townet catches, Vertical fish density profiles, 1973. Length frequencies of juvenile sockeye in Chignik Lake, 1973.

Burgner, R., S. Marshall. 1974. Chignik sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 390. 17 p.

Size, abundance, distribution, forecast

Summary statement of work during the 1973 field season. No data.

Burgner, R., S. Marshall. 1974. Final Report—Optimum escapement studies of Chignik sockeye salmon. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-7401. 91 p.

Spawner return relationships, forecasts, age, growth, abundance, distribution, food habits, predation

A final report: study ways to improve the forecast. Do a systematic collection on age, growth, abundance and distribution of sockeye juveniles. Complete a study on food habits of sockeye juveniles and competitors. Report on a study of predation on juvenile sockeye by Dolly Varden char and coho salmon.

Burgner, R. Marshall, S. 1975. Chignik sockeye salmon studies. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 415. 15 p.

Management, pre-smolt migrations

Summary of thinking on what steps should be taken to increase the sockeye run. Reasons for pre-smolt migration out of Black Lake. Proposed a small dam at the outlet of Black Lake. No data.

Marshall, S., R. Burgner. 1975. Annual Report—Chignik sockeye studies. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-7512. 28 p.

Management, sockeye adult size, sockeye juvenile abundance, scale pattern analysis, threespine stickleback

Reports on research during 1975: study of circulus formation on sockeye juveniles, determination of the feasibility of sampling sockeye adults at Black River, testing the use of tow-nets in determining abundance of sockeye juveniles and collecting information on threespine sticklebacks.

Burgner, R., S. Marshall. 1976. Chignik sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 444. 14 p.

Scale pattern analysis, management

A summary statement of completed work in scale pattern analysis and of proposed work. No data.

Burgner, R. S. Marshall. 1977. Chignik sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 460:13.

Management, scale pattern analysis, acoustics

A summary statement of work done in 1976. No data.

Marshall, S. 1977. Factors relating to the decline in abundance of Chignik sockeye salmon. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW MS. 43 p.

Proposed studies, abundance, sockeye, run strength

Studies proposed for rehabilitating Chignik sockeye runs.

Marshall, S. 1977. Final Report—Chignik sockeye studies. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-7733. 156 p.

Acoustics, fish abundance, scale pattern analysis, management

Counts of sockeye as determined by acoustic methods, 1976. Weir counts, 1976. Scale pattern analysis of Chignik stocks includes a photographic atlas, catches of sockeye 1895-76. Factors relating to decline in abundance of sockeye.

Burgner, R., S. Marshall. 1978. Chignik sockeye salmon studies,. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 480:17-18.

Sockeye adults, catches, sockeye juveniles, bioassay, fertilization experiment

Catches of sockeye, 1889-77. Results of a bioassay with increasing ratios of nitrogen to phosphorus as measured by chlorophyll a production. A summary.

Marshall, S. 1978. Lacustrine scale patterns of sockeye salmon of the Chignik Lakes, Alaska. Univ. Washington, M.S. thesis. 137 p.

Scale pattern analysis, sockeye, juveniles, scale atlas

Length frequencies of sockeye juveniles taken from 1974 and 1975. Characteristics of scales from juvenile sockeye. Contains a photographic atlas of scales.

Burgner, R., S. Marshall. 1979. Chignik sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW Contr. 500. 19 p.

Daily otolith growth, sockeye juveniles

A summary of work conducted in 1978 on daily growth bands on otoliths of sockeye juveniles. No data.

Dahlberg, M. 1979. History of the fishery and summary statistics of the sockeye salmon, *Oncorhynchus nerka*, runs to the Chignik Lakes, Alaska, 1888-1966. NOAA Tech. Rept. NMFS SSRF 735. 16 p.

History, fishery, sockeye, management

Data includes catch, escapement, age, sex ratio, run timing, distribution and travel time of adult sockeye salmon

Marshall, S., S. Parker. 1979. Final Report (supplement)—Chignik sockeye studies. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-7902. 18 p.

Daily otolith growth, sockeye fry

Details of a laboratory experiment examining daily growth bands in sockeye salmon fry.

Burgner, R., S. Marshall. 1980. Chignik sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 515:16-17.

Time of entry curves, scale pattern analysis, management, daily otolith growth

Summary statement of work done in 1979.

Marshall, S., S. Parker, R. Burgner. 1980. Annual report—Chignik sockeye studies. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-8005. 54 p.

Time of entry curves, fish abundance, age composition, sockeye adults, management

Includes catch, escapement, daily run of sockeye by principal stock in 1978 by time of entry. Characteristics of scales of Chignik sockeye. Classification accuracy as a function of scale variables used. Catch escapement return by nursery lake as determined by T-O-E curves. Age composition as determined by 2 different methods

Burgner, R., S. Parker. 1981. Chignik sockeye salmon studies. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 555. 13 p.

Linear discriminant functions, management, scale pattern analysis, stock separation

Summary of studies on stock separation in 1980 and of planned studies in 1981. No data.

Conrad, R., R. Burgner. 1981. Chignik sockeye stock separation studies. Univ. Washington School of Fisheries, Fish. Res. Inst., MS. 25 p.

Sockeye adults, stock separation, management, linear discriminant analysis, scale pattern analysis

Examples of different programs used to separate Chignik stocks.

Parker, S., R. Burgner. 1981. Annual report—Chignik sockeye studies. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-8129. 52 p.

Stock separation, time of entry curve, scale pattern analysis, management, discriminant function analysis, sockeye adults

Presents stock separation methodology developed for in-season use in 1981. Estimates number of fish of each stock in the daily catch by age group using time of entry curves and discriminant function analysis.

Burgner, R., R. Conrad. 1982. Chignik sockeye salmon studies. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 575. 6 p.

Time-of-entry curve, scale pattern analysis, linear discrimination analysis, stock separation

Summary statement on use of scale pattern analysis to separate Chignik stocks. No data.

Conrad, R. 1982. Annual report-Separation of the 1981 Chignik sockeye salmon stocks by scale patterns and a linear discriminate function. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-8203. 38 p.

Sockeye adults, stock separation, linear discriminant analysis, scale pattern analysis, fish abundance, age composition

Age and stock compositions, 1981. Daily sockeye adult escapement and catch in Chignik Lagoon, Black Lake and Chignik Lake, 1981.

Marshall, S., S. Parker. 1982. Stock Identification in the micro-structure of sockeye salmon otoliths. Can. J. Fish. Aquat. Sci. 39(4): 542-547.

Otolith, sockeye, environment, daily rings

The effect of environment on ring formation in juvenile salmon otoliths.

Conrad, R. 1983. Management applications of scale pattern analysis methods for sockeye salmon runs to Chignik, Alaska. Univ. Washington, M.S. thesis. 232 p.

Management, scale pattern analysis, sockeye adults, linear discriminant functions, stock separation

A study to determine if the two Chignik stocks of sockeye can identified by scale characteristics.

Conrad, R., S. Parker, D. Rogers. 1983. Chignik Lakes Research. *In* Research in Fisheries, Annual Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 612:6-7.

Time of entry curve, linear discriminant function analysis, stock separation, management, scale pattern analysis

Summary of stock separation studies conducted in Chignik lakes through 1982. No data.

Parker, S., D. Rogers. 1984. Annual report -Chignik sockeye studies: Adult forecasts, late season spawning escapement and coho biology. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-8402. 82 p.

Forecast, abundance sockeye adults, coho adults, coho juveniles, early life history

Sockeye salmon forecast studies; estimation of late season sockeye escapement; status of coho information base; includes dynamics of adult returns and early life history.

Conrad, R., G. Ruggerone. 1985. Stock composition of the 1984 sockeye salmon run to the Chignik Lakes estimated using scale patterns and linear discrimination functions. ADF&G Technical Data Report No. 151. 43 p.

Stock composition, sockeye adults, scale patterns, linear discriminant functions, catch, escapement

Separation of 1984 Chignik lake and Black Lake sockeye adults based on measurements of their lacustrine period of growth. Includes daily and cumulative return of sockeye to Black Lake and Chignik Lake 1984.

Parker, S., G. Ruggerone, D. Rogers. 1985. Chignik lakes research. *In* Research in Fisheries, Biennial Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 670:5-6.

Sockeye adults, coho adults, coho juveniles, sockeye juveniles, predation, forecast

A summary of planned studies. Pre-season forecast of sockeye. Fishery statistics on coho, and juvenile coho predation on sockeye fry.

Parker, S. 1986. Forecasting abundance and timing of sockeye salmon migrations to Chignik, Alaska. Univ. Washington, M.S. thesis. 147 p.

Forecasting, management, fish abundance, timing, sockeye

Includes distributions of daily abundance, proportions of daily abundance and cumulative abundance within and across years of Chignik Lake stocks (1978-83).

Parker, S., D. Rogers. 1986. Annual Report -Chignik sockeye studies (83-84). Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-8614. 126 p.

Management, sockeye adults, catch, escapement, modeling

Developing an intra-season forecast model using data from 1978-83. See Steven S. Parker (1986), M.S. thesis.

Ruggerone, G., D. Rogers. 1986. Annual Report-Chignik sockeye studies: Aerial survey of spawning coho salmon along the southern Alaska Peninsula. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-8607. 43 p.

Coho spawners, distribution, abundance, stock identification, sockeye adults, forecast

Aerial survey results of coho spawners, 1984. Post season stock identification of 1984 sockeye run. Analysis of 1985 sockeye run and 1986 forecast of sockeye salmon.

Marshall, S., D. Bernard, R. Conrad, O. Cross, D. McBride, A. McGregor, S. McPherson, G. Oliver, S. Sharr, B. Van Alen. 1987. Application of scale pattern analysis to management of Alaska's sockeye salmon (*Oncorhynchus nerka*) fisheries. Can. Spec. Publ. Fish. Aquat. Sci. 96. 307-326.

Forecasting, management, fish abundance, timing, sockeye

Includes distribution of daily abundance, proportions of daily abundance and cumulative abundance within and across years for Chignik Lake stocks (1978-83).

Rogers, D., G. Ruggerone. 1987. Chignik research. *In* Research in Fisheries, Biennial Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 736. 2 p.

Coho, predation, juvenile sockeye, food habits

Summary statement about juvenile coho predation on sockeye juveniles.

Ruggerone, G., D. Rogers. 1988. Chignik salmon studies.-Gastric evacuation rate and daily ration of juvenile coho salmon. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-8810. 27 p.

Gastric evacuation rates, daily ration, juvenile coho, diel foraging, sockeye fry, food habits

Summary of regression analysis for each juvenile coho stomach evacuation model, comparison of daily meals at two sites, and comparison of evacuation of single and multiple meals by juvenile coho.

Rogers, D., G. Ruggerone. 1989. Chignik lakes salmon studies. *In* Research in Fisheries, Biennial Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 803. 3 p.

Juvenile coho, sockeye fry, fish food habits

Short summary statement of research through 1987.

Ruggerone, G. 1989. Gastric evacuation rates and daily ration of piscivorous coho salmon (*Oncorhynchus kisutch*). Walbaum. J. Fish. Biol. 34:451-463.

Gastric evacuation rates, daily ration, coho juveniles, sockeye fry, temperature, food habits

Rate of decay of sockeye fry consumed by coho at 4 temps. Time to reach 90% evacuation by temp. Total prey weight consumed by coho and comparison of daily meal, daily ration and number of fry consumed by coho at two areas in 1986 and 1987.

Ruggerone, G. 1989. Gastric evacuation of single and multiple meals by piscivorous coho salmon (*Oncorhynchus kisutch*). Env. Biol. Fish. 26:143-147.

Gastric evacuation rates, daily ration, coho juveniles, sockeye fry, food habits

The data suggest that the stomach evacuation model based on single meals is adequate for estimating evacuation of prey consumed by continuously feeding coho juveniles.

Ruggerone, G. 1989. Coho salmon predation on juvenile sockeye salmon in the Chignik lakes, Alaska. Univ. Washington, Ph.D. thesis. 151 p.

Predation, coho, sockeye, stickleback, population dynamics, gastric evacuation rates, anti-predation tactics, food habits

Includes data on coho predation on sockeye fry , beach seine catches, role of sticklebacks in protecting sockeye fry from predation, migratory timing of coho smolts, escapement run size of coho (1973-88) and numbers of adult sockeye returning to Chignik lakes (1961-85) by brood year and age group.

Ruggerone, G., D. Rogers. 1989. Chignik salmon studies. Consumption of sockeye salmon fry by juvenile coho salmon in the Chignik Lakes, Alaska: implications for management. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-8914. 40 p.

Fish food habits, sockeye fry, juvenile coho, management, predation

Juvenile coho catch statistics (1985-87), numbers of sockeye fry consumed by juvenile coho (1985-87).

Ruggerone, G., R. Denman. 1990. Hydrological characterization of lower Alec River and Black Lake near Chignik, Alaska. Progress Report to the Chignik Seiners Association. Univ. Washington School of Fisheries, Fish. Res. Inst. 10 p.

Black River, Alec River, hydrology, enhancement, dam

Includes description of a dam proposed to increase water flow from Alec River to Black Lake.

Ruggerone, G., D. Helton, D. Rogers. 1990. Potential factors influencing the large annual fluctuations of adult sockeye salmon returning to Black Lake, Alaska. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-9117. 17 p.

Winter studies, Physical characteristics, fish food habits, zooplankton abundance, chlorophyll density

Data includes: Physical characteristics of Black Lake, Black River, Alec River, and Chignik Lake during Feb. 1990. Food habits of sockeye, coho, chinook and Dolly Varden in Chignik Lake, Feb. 1990.

Ruggerone, G. 1991. Partial xanthism in an adult chum salmon (*Oncorhynchus keta*) near Chignik Alaska. California Fish and Game. 77:55-56.

Xanthism, chum

Description of a partial-xanthic adult chum salmon.

Ruggerone, G. 1991. Chignik salmon studies (89-90): Evidence for morphological and behavioral responses by juvenile sockeye salmon to size-biased predation. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-9107. 18 p.

Juvenile coho, sockeye fry, population dynamics, food habits, predation

Lengths of coho and consumed sockeye fry prey, sockeye prey size vs. size of sockeye fry caught in beach seines.

Ruggerone, G., D. Helton, D. Rogers. 1991. Chignik sockeye salmon studies, 1989-1990. *In* Research in Fisheries, Biennial Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 842. 5 p.

Black Lake, sockeye, annual fluctuations, management, escapement, winter studies

Short summary of Chignik studies, 1989-90.

Ruggerone, G. 1992. Chignik salmon studies-winter ecology of sockeye salmon in the Chignik Lakes, Alaska. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-9214. 31 p.

Winter studies, environmental variability, fish abundance, oxygen tolerance, fish food habits, zooplankton abundance

Physical characteristics of the Chignik Lakes during the winter 1992. Oxygen tolerance. Food habits of juvenile coho and sockeye. Catches of juvenile salmon and lake resident fish.

Ruggerone, G. 1992. Predation on sockeye salmon by fish and wildlife in Alaska. Canadian MS Rep. Fish. and Aquat. Sci. 2150:20-21.

Coho juveniles, sockeye fry, smolts, predation, sockeye adults, abundance and distribution

Summary of predation on sockeye salmon fry, smolts, and adults by coho, char and bears respectively. Discusses relationship between number of sockeye spawners and coho abundance.

Ruggerone, G. 1992. Threespine stickleback aggregations create a potential predation refuge for sockeye salmon fry. Can. J. Zool. 70(5):1052-1056.

Threespine sticklebacks, anti-predator tactics, sockeye fry

In controlled experiments, the presence of threespine stickleback may reduce predation by coho salmon on sockeye fry.

Ruggerone, G., C. Harvey, D. Rogers. 1992. Chignik salmon studies (91-92)—Investigations of salmon populations, hydrology, and limnology of the Chignik Lakes, Alaska. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-9211. 30 p.

Hydrology, limnology, management, Alec River, sockeye

Primarily a summary of the hydrology of the Chignik lakes, 1990-91.

Ruggerone, G. Rogers, D. 1992. Predation on sockeye fry by juvenile coho salmon in the Chignik Lakes, Alaska: Implications for salmon management. N. Am. J. Fish. Manag. 12. 87-102.

Predation, sockeye fry, coho juveniles, management

Estimates the consumption of sockeye fry by juvenile coho in Chignik Lake. Few coho juveniles were captured in Black Lake. Study suggests that coho predation has reduced the sockeye returns to Chignik.

Bumgarner, J. 1993. Long-term trends in the growth of sockeye salmon from the Chignik Lakes, Alaska. Univ. Washington, M.S. thesis. 86 p.

Sockeye, management, growth, scales

Uses of scales to determine long-term trends in the growth of sockeye.

Ruggerone, G. 1993. Winter investigations of salmon in the Chignik Lakes, Alaska, during 1993. Natural Resources Consultants. 41 p.

Winter studies, environmental variability, fish abundance, limnology, Alec River

Data includes air and water temps., dissolved oxygen, water level and other physical characters. Catch rates of fry traps during winter of 1992-93.

Ruggerone, G., J. Bumgarner, C. Harvey. 1993. Chignik Lakes salmon research. *In* Research in Fisheries, Biennial Report of the School of Fisheries. Univ. Washington School of Fisheries, Fish. Res. Inst., Contr. 882.

Hydrology, fry and smolt migrations, resident fish migrations, winter studies

Summary statement of research on Chignik Lakes since 1990. No data tables or figures.

Ruggerone, G., C. Harvey,, J R Bumgarner, D. Rogers. 1993. Chignik salmon studies. Investigations of salmon populations, hydrology and limnology of the Chignik Lakes, Alaska, during 1992. Univ. Washington School of Fisheries, Fish. Res. Inst., FRI-UW-9302. 70 p.

Sockeye, limnology, hydrology, fry and smolt migrations, sockeye growth, fish abundance

Data on limnology, lake level, abundance, growth and migrations of sockeye juvenile and smolts and resident fish, fry emergence rates (1986-92).

Denman, R., G. Ruggerone. 1994. Effects of beaver colonization on the hydrology and spawning habitat of sockeye salmon in the Chignik Lakes, Alaska. Natural Resources Consultants. 56 p.

Hydrology, spawning habitat, sockeye adults, beavers

Hydrological characteristics of Chignik Lakes, effects of beavers on those basins.

Harvey, C. 1994. Upstream migration of fishes in Black River, Chignik Lakes, Alaska. Univ. Washington M.S. thesis. 154 p.

Migrations, Black River, Chiaktuck Creek, fry and smolt migrations, resident fish migrations, rheotaxis

Data on catches by species. Stomach contents of Dolly Varden.

Ruggerone, G. 1994. Investigations of salmon populations, hydrology, and limnology of the Chignik Lakes, Alaska during 1993. Natural Resources Consultants. 111 p.

Hydrology, limnology, fry and smolt migrations, fish food habits, fish abundance, otoliths, Alec River, leeches

Catches and abundance estimates of sockeye fry and other species, number of sockeye fry with leech wounds, sockeye smolt catch data (1960-74), food habits of juv. sockeye, fry emergence rates (1986-93), weather data (1993), brood table (1966-88).