FOOD OF THE AMERICAN MERGANSER, (*Mergus merganser americanus*) IN BRITISH COLUMBIA

Paper No. 3

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IN TWO earlier papers, (*The Canadian Field-Naturalist*, 46:166-168, 1932, and 48:45-47, 1934), the results obtained from the analyses of 225 stomachs of the American Merganser taken in British Columbia were presented. Since the publication of these papers additional material, comprising 124 stomachs of which 103 contained food, has been studied and the data thus obtained are presented herewith.

As heretofore, officers of the Dominion Department of Fisheries have assisted in this investigation by donating specimens and grateful acknowledgement of their courtesy is extended. Thanks are due also to the Game Commission of British Columbia, to Dr. M. Y. Williams, Dr. C. H. Bastin and Mr. R. A. Cumming of Vancouver and to Mr. P. M. Martin, Langford, British Columbia, for similar co-operation.

The sculpin referred to frequently in the following summary is *Cottus asper* unless otherwise indicated.

Stomach Contents of 61 *Specimens from Vancouver Island Including Valdez Island.*

GOLDSTREAM

February 12, 1934 (1): Bones of several sculpins; jaw of Salmonidae fingerling, 1 polychaet jaw.

March 28, 1934 (1): 3 sculpins, 2 Salmonidae fry, 1 Salmonidae egg, probably steelhead, *Salmo gairdneri;* a number of earthworms.

COWICHAN RIVER

April 17, 1934 (3): No. 1—sculpin eggs, chief item; Salmonidae fry, probably spring salmon, *Oncorhynchus tschawytscha,* represented by 8 vertebral columns and 12+ jaws. No. 2—vertebral columns of 15 Salmonidae fry; fragments of sea lamprey, *Entosphenus tridentatus,* and sculpins. No. 3—several Salmonidae fry; at least 2 sculpins and a few sculpin eggs.

August 22, 1934 (7): All contained sculpins, the smallest number 2, the greatest 5; one contained a sea lamprey.

October 19, 1934 (2): Both contained Salmonidae fingerlings 15 and 12+; one a sea lamprey, 75 mm. in length.

December 1932-1933 (13): Chum Salmon eggs (*Oncorhynchus keta*) in various stages of decomposition formed the entire contents of 10 stomachs; one contained salmon eggs and a lesser amount of decomposed salmon flesh; in another bone fragments of herring, *Clupea pallasii,* and 2 pairs of polychaet jaws.

January 1934 (4): All contained chum salmon eggs and in one case decomposed salmon flesh.

COLE RIVER

October 18, 1933 (1): At least 6 small Salmonidae.

November 1, 1933 (2): Chum salmon eggs exclusively.

SOOKE LAKE AND SOOKE RIVER

November, December 1934 (5): Kokanees, *Oncorhynchus nerka kennerleyi,* apparently spent fish, in three stomachs; chum salmon eggs in two and a sculpin in one.

COURTENAY RIVER

April, 1934 (14): Ten stomachs contained a total of 20 sculpins; Salmonidae fry or fingerlings occured in two stomachs; insect fragments, chiefly caddis larvae in 7; a small Isopoda in one.

May 4, 1934 (1): Jaws of 6+ Salmonidae fry and insect fragments.

March 9, 1935 (4): Two specimens contained sculpins exclusively, 3 and 8; another 7 sculpins, the chief item; also caddis larvae in cases and crustaceans comprising Amphipoda and Mysidae; the fourth contained broken down salmon flesh, a few salmon eggs and decomposed salmon egg cases.

CAMPBELL RIVER

April 28, 1934 (2): No. 1—2 sculpins; 1 Salmonidae fingerling. No. 2—fragments of sculpin (chief item) and a Salmonidae fingerling.

May 25, 1932 (1): One sculpin 100 mm.; 1 stickleback, *Gasterosteus aculeatus,* 70 mm. and bones representing additional specimens of both fishes.

PORT HARDY

May 9, 1933 (2): One specimen contained 8 Salmonidae, probably spring salmon measuring from 40 to 60 mm.; the other, parts of small fishes including Salmonidae and fragments of Coleoptera.

WHITLEYS LAGOON, ALBERT HEAD

January 27, 1935 (1): At least 4 sculpins, *Leptocottus armatus*, and a few scales of an unidentified fish.

VILLAGE BAY LAKE, VALDEZ ISLAND

October 18, 1934 (1): A large number of fresh water sponge spicules, Porifera, probably *Spongilla* sp. and bones of one or more sticklebacks.

Stomach Contents of 3 Specimens from Tlell River, Graham Island.

April 1, 1934 (2): Bones of at least 8 sculpins, *Myoxocephalus polyacanthocephalus* in one specimen and sculpin eggs exclusively in the second.

May 8, 1934 (1): At least 2 sculpins and 1 Salmonidae fry.

Stomach Contents of 24 Specimens from the Mainland Coast

CAPILANO RIVER

November 1933 (1): Fragments of decomposed salmon flesh and chum salmon eggs.

December 1933 (3): Decomposed chum salmon eggs and in one case broken down salmon flesh.

March 1933 (1): 2 sculpins and bones of several other small Cottidae.

FRASER RIVER NEAR MOUTH

January 11, 1933 (1): A sculpin measuring 175 mm., was lodged in the gullet of this specimen, the preopercular spines having penetrated the neck muscles. This sculpin in turn contained a smaller fish of the same species firmly wedged in the gullet. The merganser was found dead and it seems probable that the sculpin also had died in attempting to ingest a fish too large for its capacity and later was picked up by the merganser. Stomach of the merganser contained bones of at least 2 other sculpins and 2 sea lampreys measuring 30 and 50 mm. respectively.

SEYMOUR RIVER

July 13, 1933 (1): 2 sculpins, 70 and 85 mm., and bones of at least 2 other Cottidae.

PITT RIVER

December 9, 1933 (1): Nearly empty. Bone fragments of an unidentified fish.

SQUAMISH FLATS

November 1934 (1): Chum salmon eggs and decomposed salmon flesh in about equal proportions.

January 20, 1935 (1): 20 chum salmon eggs and a larger bulk of decomposed salmon flesh.

MATHIESON CHANNEL

August 25, 1933 (2): Six small Cottidae in each stomach and scales of a small perch, *Cymatogaster aggregatus* in one.

INGRAM CREEK

June 10, 1933 (1): Bones and eye lenses of at least 7 small marine fishes.

OWIKENO LAKE

May 24, 1933 (2): No. 1—24 Salmonidae fry, 2 sculpins, 1 stickleback. No. 2—vertebral columns 43 Salmonidae fry and caddis larvae in cases.

July 28, 1933 (3): No. 1—caddis larvae in cases and a few unidentified insect fragments. No. 2—6 Salmonidae fry, caddis larvae in cases and unidentified insect fragments. No. 3 — sticklebacks, several Salmonidae fry and fragments of an unidentified fish.

August 2, 1933 (5): These were all juvenals. Sculpins comprised the chief item in each case; caddis larvae also present in four and stickleback bones in one.

BELLA COOLA RIVER

April 10, 1934 (2): No. 1—decomposed fish flesh probably salmon; vertebrae of an unidentified fish and 1 stonefly. No. 2—decomposed salmon eggs exclusively.

Stomach Contents of 11 Specimens from Interior of British Columbia.

SALMON RIVER

September 1933 (1): 60+ seeds, *Cornus (occidentalis?)*, (chief item) and bones of 2 lake shiners, *Richardsonius balteatus.*

KOOTENAY LAKE

August 24, 1933 (1): Bones of 2 chub, *Mylocheilus caurinus.*

BIG SHEEP CREEK

December 1933 (1): At least 1 eastern speckled trout, *Salvelinus fontinalis.*

SOUCHIE CREEK

September 1934 (3): Small fishes exclusively comprising sculpins, small suckers, *Catostomus* sp., and small *Cyprinidae* either lake shiners or squawfish.

MABEL LAKE

August 27, 1934 (1): 3 sculpins measuring 65, 75 and 105 mm., and fragments of several other sculpins.

SKAHA LAKE

August 15, 1934 (1): 2 crawfish, *Potamobius* sp., (chief item); 1 sculpin and bones of 6 small *Cyprinidae* either lake shiners or squawfish.

OKANAGAN LAKE

September 11, 1934 (1): Bones of 2 small suckers, *Catostomus* sp., and small *Cyprinidae*.

OKANAGAN RIVER

September 1934 (2): No. 1—1 sculpin, 4 small *Cyprinidae* and fragments of several crawfish. No. 2—2 crawfish and 1 small sucker.

Food Items Tabulated

Sixty-one specimens from Vancouver Island, including Valdez Island, collected in January, February, April, May, August, October, November and December.

Food Items	No. of Times Found
Salmonidae (Salmo and Oncorhynchus fry and fingerlings)	15
Kokanee—*Oncorhynchus nerka kennerleyi*	3
Decomposed salmon flesh	4
Salmon eggs (chiefly chum salmon, *Oncorhynchus keta*)	21
Herring—*Clupea pallasii*	1
Stickleback—*Gasterosteus aculeatus*	2
Sculpins—*Cottus asper*	24
—*Leptocottus armatus*	1
—*Cottidae* not identified	3
Sculpin eggs—*Cottus asper*	2
Unidentified fish remains	2
Sea lamprey—*Entosphenus tridentatus*	2
Crustaceans—Isopoda, Amphipoda	3
Caddis—Trichoptera (larvae)	6
Fly — Diptera (larva)	1
Beetle—Coleoptera (adult)	3
Aquatic insects—fragments not identified	3
Fresh water sponge—Porifera	1
Earthworm—Oligochaeta	1
Annelid worm—Polychaeta	2

Three Specimens from Tlell River, Queen Charlotte Islands, collected in April and May

Food Items	No. of Times Found
Salmonidae — fry	1
Sculpin—*Cottus asper*	1
—*Myoxocephalus polyacanthocephalus*	1
Sculpin eggs	1

Twenty-five Specimens from the Mainland Coast, collected in January, March, April, May, June, July, August, November and December.

Food Items	No. of Times Found
Salmonidae (Oncorhynchus fry)	5
Salmon eggs chiefly chum salmon—*Oncorhynchus keta*	6
Decomposed salmon flesh	6
Sculpin—*Cottus asper*	8
Cottidae not identified	2
Stickleback—*Gasterosteus aculeatus*	3
Perch—*Cymatogaster aggregatus*	1
Unidentified fish remains	4
Sea lamprey—*Entosphenus tridentatus*	1
Caddis—Trichoptera (larvae)	6
Stone fly—*Perla* sp. (adult)	1

Eleven Specimens from the Interior of Britisn Columbia collected in August, September and December.

Food Items	No. of Times Found
Eastern speckled trout—*Salvelinus fontinalis*	1
Sculpin—*Cottus asper*	5
Sucker—*Catostomus* sp.	4
Lake shiner—*Richardsonius balteatus*	1
Cyprinidae—not identified	6
Chub—*Mylocheilus caurinus*	1
Crawfish—*Potamobius* sp.	4
Dogwood—*Cornus (occidentalis?)* fruits	1

In paper No. 2 of this series it was stated that in order to obtain a comprehensive picture of the food chain culminating in the American Merganser, it would be necessary to consider the foods of some of the fish which enter into the food of the duck. Considerable progress has been made in this direction and in a following paper, data concerning the foods of squawfish, whitefish, stickleback, sculpin and ling will be presented.

THE BEAVER OF THE RIDING MOUNTAIN, MANITOBA

AN ECOLOGICAL STUDY AND COMMENTARY

By H. U. GREEN

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FEEDING HABITS AND FOOD SUPPLY

A close study of the beavers' feeding habits reveals that in the spring, summer and autumn they consume a measure of food during the periods of the day they are abroad. On many occasions adult beavers, singly and in pairs, were noticed conveying mouthfuls of succulent plant stems from the edge of the ponds to the lodge, which they either left to float on the water nearby or carried within. Quite often they were observed eating favoured vegetation growing at the water's edge, but nearly always a supply was taken away for future consumption after immediate hunger was satisfied.

As the beavers were never seen actually on land, except between dusk and early dawn I do not think that food plants growing on the