

Sand-hiding Behavior in Young White Hake

WHILE skin diving off a sand beach at Prince Edward Island National Park, P.E.I., on 16 and 17 of July 1959, I observed a peculiar habit of young white hake, *Urophycis tenuis* (Mitchill). The hake lay on their sides in the sand with their heads projecting (Figure 1). The

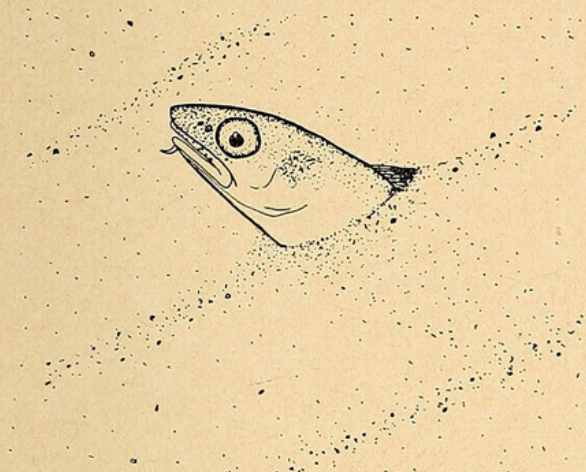


FIGURE 1. White hake buried in sand.

head was turned slightly towards the vertical and was not completely on its side. When closely approached the hake withdrew from the sand and fled. About six specimens, three to four inches long, were observed to behave in this manner. The water was about three feet deep. As the water was clear, the characteristics of the fish could be ascertained and even the barbel could be seen. Positive identification was made by seining and examining specimens.

This peculiar behavior not only hides the hake from its predators but also conceals it from its prey. Similar behavior is recorded for the families Labridae and Serranidae and is thought to have led to the evolution of the asymmetrical Pleuronectiformes (Norman, J. R. A systematic monograph of the flatfishes. Vol. 1. British Museum Natural History, 1934, p. 9).

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14 December 1959

The Twospine Stickleback *Gasterosteus wheatlandi* new to the Canadian Fresh-water Fish Fauna

A SPECIMEN of the twospine stickleback, *Gasterosteus wheatlandi* Putnam, was caught in fresh water inside the mouth of Jaquet River, Restigouche County, New Brunswick. Although the species is known from marine and brackish waters from southern Newfoundland to Massachusetts it has not been reported from fresh water.

While collecting for the National Museum of Canada I set a minnow trap in a pool of Jaquet River above the beach where it enters Chaleur Bay. The freshness of the water was verified by taste. This set, overnight from July 12 to 13, yielded a ripe male *Gasterosteus wheatlandi*, now catalogued as NMC59-276 in the National Museum. On the evening the trap was set 22 ripe female and males were caught in Chaleur Bay just at the mouth of the river in brackish water.

That this species should be found in fresh water is not surprising since all members of the family Gasterosteidae except *Spinachia spinachia* (Linnaeus) of Europe have been reported in fresh water. Marine species commonly enter less saline waters to spawn.

The paucity of records of *G. wheatlandi* and the previous failure to record it from fresh water may be due to confusion of specimens with the better-known threespine stickleback *G. aculeatus* Linnaeus. *G. wheatlandi* may be distinguished by the following characters: possession of prominent cusps at the base of the pelvic spine; the lack of plates on the posterior part of the body and absence of a keel on the side of the caudal peduncle; the presence of two rays in the pelvic fin; lower numbers of gill rakers, dorsal and anal rays; a deeper body and a shorter caudal peduncle.

The following data were taken from the specimen: standard length 30.0 mm;

length of caudal peduncle 12 times in standard length; depth of body 4 times in standard length; 10 dorsal and 8 anal rays (counting all elements); 10 pectoral rays; 12 principal caudal rays; 15 gill

rakers (long and slender); 2 ventral rays; and 6 lateral plates.

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13 October 1959

REVIEWS

Wildlife Conservation

By IRA N. GABRIELSON. Second Edition. New York, Macmillan, 1959. 244 p. \$5.50.

Published in 1941 when Dr. Gabrielson was director of the United States Fish and Wildlife Service, the earlier edition of this book was one of the first to bring to public attention the many problems to be solved in order to ensure continuing availability of wildlife resources. Dr. Gabrielson has put into simple language the relations between soil, water, forests and wildlife that are so thoroughly interwoven that any change in one vitally affects all the others.

In the 18 years between the two editions, wildlife research and management have developed rapidly and the whole concept of wildlife conservation has become a more widely accepted part of our way of life. In revising the book, Dr. Gabrielson, now president of the Wildlife Management Institute, has drawn upon his familiarity with modern developments to bring the book up to date where necessary. He has been careful at the same time not to alter those basic ideas and philosophies which gave the first edition its impact.

To the original 16 chapters, with themes ranging from "Soil and Wildlife," through "Relationship between Forestry and Wildlife" and "Rare and Vanishing Species" to "Wildlife Refugees and their Place in Conservation," he has added a new chapter, "Wildlife on Agricultural Lands." That chapter records an expanding interest in wildlife species that can live on properly managed agricultural land. They are increasing in importance to hunters and nature lovers because of the easy access to their habitat.

The continued presence of those species in useful numbers is threatened by extensive use of chemical insecticides and herbicides and by the use of farming methods that destroy wildlife habitat. Much research is needed to ensure survival of useful populations of wildlife on agricultural lands.

The 32 excellent photographs and 23 of the 24 line drawings of the first edition are retained, some of the latter revised to include up-to-date information on distribution of waterfowl species and location of waterfowl and other game refuges.

Throughout the book Dr. Gabrielson has retained a clarity of expression and idea that will help newcomers to grasp the fundamentals of conservation. A measure of his deep understanding of the whole field of wildlife conservation is demonstrated in the final chapter, "Surmounting the Obstacles to Conservation." His concept of those obstacles 18 years ago has required no revision.

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Rainbow Trout in Mexico and California

By PAUL R. NEEDHAM and RICHARD GARD. Berkeley, University of California Press, 1959. 108 p. \$2.50 (Univ. Calif. Publ. Zool. Vol. 67, No. 1)

This paper throws welcome light on the taxonomy of an interesting and puzzling group of fishes: the rainbow trout.

Populations of rainbow trout from many geographic areas exhibit such divergent characters that "over 15 separate and distinct species" have been described including migratory and non-migratory forms.

This paper presents the results of the comparison of 42 characters of 306 speci-



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