

## Habitat, age, and diet of a forage fish in southeastern Alaska: Pacific sandfish (*Trichodon trichodon*)

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Forage fish are an important part of Alaska's marine ecosystems and coastal areas. Forage fish are a critical food source for numerous groundfish, marine mammals, and seabirds (Wespestad<sup>1</sup>; Allen and Smith, 1988; Paul et al., 1997; Yang and Nelson, 2000; Mecklenburg et al., 2002). Little is known, however, about the life history characteristics or habitat of many forage fish species in Alaska, including Pacific sandfish (*Trichodon trichodon*; Fig. 1). Only two articles have been published on the life history characteristics of Pacific sandfish in Alaska. Paul et al. (1997) investigated size-weight-age profiles, size at maturity, and fecundity of Pacific sandfish in the northern Gulf of Alaska, and Bailey et al. (1983) examined size and diet of juvenile (<55 mm fork length [FL]) Pacific sandfish in southeastern Alaska. Some Pacific sandfish catch data are also available for the Bering Sea, Prince William Sound, and southeastern Alaska (Isakson et al., 1971; Orsi and Landingham, 1985; Allen and Smith, 1988; Brodeur and

Livingston, 1988; Sturdevant et al.<sup>2</sup>, Orsi et al., 2000). Pacific sandfish burrow into sand, usually at depths shallower than 150 m, and can reach a maximum size of about 300 mm (Marliave, 1980; Mecklenburg et al., 2002).

Pacific sandfish are commonly found in nearshore waters of the southeastern Bering Sea and Gulf of Alaska. There is no commercial fishery for Pacific sandfish in Alaska, but sailfin sandfish (*Arctoscopus japonicus*) are commercially fished and cultured in Japan and Korea (Okiyama, 1990). In particular, information is scarce on the biology and habitat of Pacific sandfish, especially for southeastern Alaska. Shoreline development and global climate change (e.g., increased water temperature and sea level) may adversely affect Pacific sandfish populations because of the relatively specialized nearshore spawning sites and one-year incubation period of this species (Marliave, 1980).

<sup>2</sup> Sturdevant, M. V., T. M. Willette, S. C. Jewett, E. Debevec, L. B. Hulbert, and A. L. J. Brase. 1999. Forage fish diet overlap, 1994–1996. APEX Project: Alaska predator ecosystem experiment in Prince William Sound and the Gulf of Alaska, 103 p. *Exxon Valdez Oil Spill Restoration Project Final Report (Restoration Project 98163C)*, Auke Bay Laboratory, National Marine Fisheries Service, 11305 Glacier Highway, Juneau, Alaska.

The focus of our study was to provide new information on the general biology of a little known forage fish species. Objectives were to determine habitat preference, age, size, and diet of Pacific sandfish. To accomplish this, from 2001 to 2004, we captured Pacific sandfish with a beach seine in July and March and with a mid-water trawl in May near The Brothers Islands in southeastern Alaska.

### Materials and methods

#### Fish capture and habitat

Pacific sandfish were captured with a beach seine at The Brothers Islands in southeastern Alaska (Fig. 2). We seined 10 sites in summer (July 2001–2003) and in winter (March 2002–2004) in a variety of near-shore habitat types (Table 1). Habitats sampled included steep bedrock outcroppings, rocky bottoms with understory kelps (e.g., *Laminaria*), eelgrass (*Zostera marina*), and sand beaches. We used a 37-m variable-mesh beach seine that tapered from 5 m wide at the center to 1 m wide at the ends. Outer panels were each 10 m of 32-mm stretch mesh, intermediate panels were each 4 m of 6-mm square mesh, and the bunt was 9 m of 3.2-mm square mesh. We set the seine as a “round haul” by holding one end on the beach, backing around in a skiff with the other end to the beach about 18 m from the starting point, and pulling the seine onto shore. The seine had a lead line and a float line so that the bottom contacted the substratum and the top floated on the surface. All seine sites were sampled during daylight and within two hours of low tide (range +1.0 to –1.5 m below mean lower low water). After retrieval of the net, the entire catch was sorted, identified to species, counted, and a subsample was measured for length.

Manuscript submitted 16 May 2005  
to the Scientific Editor's Office.

Manuscript approved for publication  
1 December 2005 by the Scientific Editor.  
Fish. Bull. 104:631–637 (2006).

<sup>1</sup> Wespestad, V. G. 1987. Population dynamics of Pacific herring (*Clupea pallasii*), capelin (*Mallotus villosus*), and other coastal pelagic fishes in the eastern Bering Sea. In *Forage fishes of the southeastern Bering Sea*; proceedings of a conference, November 1986, Anchorage, AK, p. 55–60. U.S. Dep. Interior, Minerals Management Service, OCS Study MMS 87-0017.











