



Forage Fish Management

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Forage Fish Species in the North Pacific

Forage fish are species whose primary ecosystem role is as prey, serving a critical link between lower and upper trophic levels as a food source for many marine mammal, seabird, and fish species. For the Federally managed fisheries off Alaska, forage fish are generally considered to be low trophic level species throughout their life cycle and are an important food source for species at higher trophic levels.

The “forage fish species” category¹ in the Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) FMPs includes species in the following taxonomic groups:

- Osmeridae family (eulachon, capelin, and other smelts)
- Myctophidae family (lanternfishes)
- Bathylagidae (deep-sea smelts)
- Ammodytidae family (Pacific sandlance)
- Trichodontidae family (Pacific sand fish)
- Pholidae family (gunnels)
- Stichaeidae family (pricklebacks, warbonnets, eel blennys, cockscombs, shannys)
- Gonostomatidae family (bristlemouths, lightfishes and anglemouths)
- Order Euphausiacea (krill)
- Order Oegopsida (squids)
- Order Scorpaeniformes (sculpins)
- Macrouridae family (grenadiers)

Management of Forage Fish

The “forage fish species” category within the BSAI and GOA groundfish FMPs exists to manage these species in a manner that prevents the development of a Federal commercial directed fishery for forage fish. Forage fish species are classified as “Ecosystem Component” species, which includes species or species groups that are not: 1) targeted for harvest; 2) likely to become overfished or subjected to overfishing; and 3) generally retained for sale or personal use. In addition to forage fish species, Ecosystem Component species also include grenadiers and squids. Annual catch limits are not established for these species, but catches are closely controlled and monitored.

Management measures for forage fish in the BSAI and GOA Groundfish fisheries are established in Federal regulations at [50 CFR 679.20](#). Directed fishing for “forage fish species”, grenadiers, and squids is prohibited. Catches are limited by the maximum amount a vessel can retain relative to the weight of retained target species, such as Pacific cod, pollock, and flatfish. These maximum retainable amounts, as a percentage of retained catch, are established for each species group: 2% for forage fish species, 8% for grenadiers, and 20% for squids and sculpins.² The sale, barter, trade, or processing of forage fish,

¹ Prior to 1998, forage fishes were either managed as part of the Other Species group (nontarget species caught incidentally in commercial fisheries) or were classified as “nonspecified” in the FMP, with no conservation measures. In 1998, BSAI Amendment 36/GOA Amendment 39 created a separate forage fish category, with conservation measures that included a ban on directed fishing. Beginning in 2011, members of this forage fish group are considered “ecosystem component” species.

² The maximum retainable amounts were established to eliminate directed fishing for these species and to accommodate existing levels of retention that were believed to be sustainable.

grenadiers, sculpins and squids is prohibited, except any retained catch of these species not exceeding the maximum retainable amount may be processed into fishmeal. Catches of forage fish, grenadiers, and squids are recorded by observers, electronic monitoring, and industry reports and monitored during the season to ensure compliance with maximum retainable amount limits. Rulemaking in 2021 will provide for limited processing and sale of incidentally caught sculpins and squid.

Other Species that Serve as Forage (at some point in their life cycle)

Virtually every species of fish and invertebrate in the North Pacific is preyed upon during some phase of their life cycle, particularly in the larval and juvenile stages. Many of these are groundfish species subject to target fisheries on adult fish. These species undergo regular assessments to estimate stock size, and the fisheries are managed to maintain stock sizes at or above the population levels that produce maximum sustainable yield. As such, the abundance of juveniles to serve as prey remains high and the abundance is monitored and managed using a conservative, ecosystem approach to management.

Data and Monitoring

Several efforts exist to assess forage fish abundance in the North Pacific. The NOAA Fisheries Alaska Fisheries Science Center prepares a report on the status of forage species on a biennial basis which is presented to the Groundfish Plan Teams, the Scientific and Statistical Committee, and the Council (even years for the [GOA](#), odd years for the [BSAI](#)). This status report is not intended as a formal stock assessment, although forage populations are analyzed if data are available. The two main objectives of the report are to 1) investigate trends in the abundance and distribution of forage populations, and 2) describe interactions between federal fisheries and species that make up the forage base (i.e. to monitor potential impacts of bycatch). The report also includes survey biomass estimates and total catch estimates for smelts, shrimps, herring, squids, krill, and other forage species. The NOAA Fisheries Alaska Regional Office also produces a weekly report of forage fish catch in the groundfish fisheries using landings and observer data (see <https://www.fisheries.noaa.gov/alaska/commercial-fishing/fisheries-catch-and-landings-reports>). The Council and its Scientific and Statistical Committee also receive a separate [Ecosystem Status Report](#), which includes indirect indicators of forage species abundance and prey availability, such as seabird breeding success and groundfish predator diets.

Forage fish abundance data in the North Pacific is primarily collected by the NOAA Fisheries Alaska Fisheries Science Center trawl and acoustic surveys (see the [NMFS Alaska Research Surveys](#) page). Although not all of these surveys are designed to sample forage fish, many provide data on forage fish as it is available:

- Summer juvenile pollock and forage fish survey- annual midwater trawl and oceanographic surveys conducted to examine distribution, abundance, size, diet, and density of juvenile walleye pollock, Pacific cod, sablefish and forage fishes. Surveys occur in the southeastern Bering Sea slope and shelf and western GOA on alternating years.
- Annual winter and summer pollock acoustic-trawl surveys in the Bering Sea and GOA provide data on krill and other forage fish species
- Annual bottom trawl surveys provide an abundance index for many fish and invertebrate species, and groundfish stomachs are examined for prey composition and diet analysis.
- Bering Arctic Subarctic Integrated Surveys (BASIS) combine surface trawl and midwater acoustics to collect indices on fish size, relative abundance, energetic status, distribution, and diet. Information on the distribution and abundance of forage fish species allows scientists to

understand how forage fish population dynamics affect the food chain to apex predators and harvested fish populations that prey on forage fish.

- Seabird-Derived Forage Fish Indicators from Middleton Island (GOA): prey relative occurrence in regurgitated food samples from nesting black-legged kittiwakes and the percent biomass of capelin from rhinoceros auklet chick diets.