
Western Pacific Bottomfish and Groundfish Fisheries



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Unit 17

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INTRODUCTION

The Western Pacific bottomfish fishery geographically encompasses the Main Hawaiian Islands (MHI), the Northwestern Hawaiian Islands (NWHI), Guam, the Commonwealth of the Northern Mariana Islands (CMNI), and American Samoa. In contrast, North Pacific (pelagic) armorhead are harvested from the summits and upper slopes of a series of submerged seamounts along the southern Emperor–northern Hawaiian Ridge. This chain of seamounts is located just west of the International Date Line and extends to the northernmost portion of the NWHI.

The Guam, CNMI, American Samoa, and MHI bottomfish fisheries employ relatively small vessels on 1-day trips close to port; either part-time or sport fishermen take much of the catch. In

contrast, bottomfishes in the NWHI are fished by full-time fishermen on relatively large vessels that range far from port on trips of up to 21 days. Fishermen use the handlining technique in which a single weighted line with several baited hooks is raised and lowered with a powered reel. The bottomfish fisheries are managed jointly by the Western Pacific Fishery Management Council (WPFMC) and territorial, commonwealth, or state authorities.

The commercial seamount fishery for armorhead was started by bottom-trawl vessels of the former Soviet Union in 1968. During 1969, Japanese trawlers entered this fishery, and by 1972 the catch per unit of effort (CPUE; based on Japanese data) peaked at 54 metric tons (t) per hour (Figure 17-1). The United States has never been a participant in this fishery. By the end of 1975, the two foreign fleets had harvested a combined

Photo above:
NWHI bottomfish awaiting
sale at the Honolulu fish
auction.

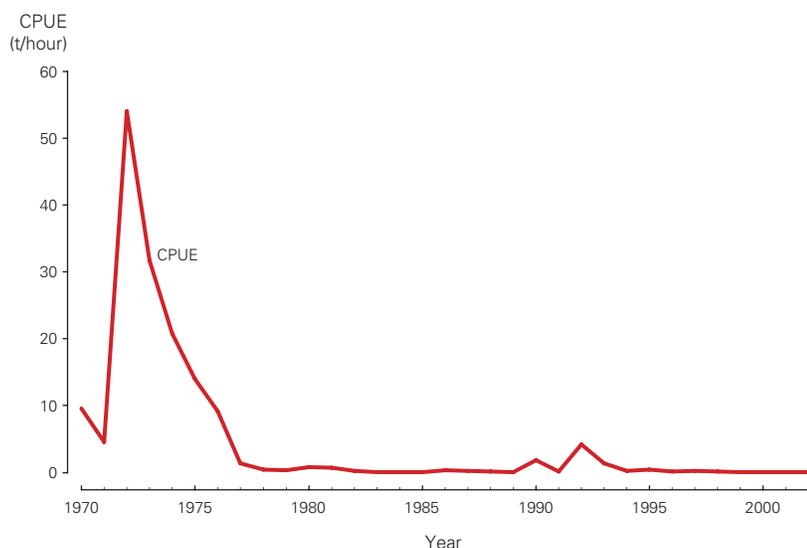


Figure 17-1
Catch per unit of effort (CPUE) in metric tons (t) per hour for North Pacific armorhead taken by the Japanese trawl fishery, 1970-2002.

cumulative total of 1 million t of North Pacific armorhead. Facing a steady decline in CPUE after 1972, the former Soviet fleet left the fishery after 1975. The combined catch index for all seamounts has remained depressed since the late 1970's. The inclusion in 1977 of the southernmost seamounts (Hancock Seamounts) into the U.S. Exclusive Economic Zone (EEZ) allowed for a small portion of the fishery to be managed in a limited way. A preliminary Fishery Management Plan (FMP) was

developed that year and provided for limited foreign harvesting at the Hancock Seamounts under a permit system during 1978–84. However, catches remained low, and all fishing ceased after 1984. Under the FMP for the Bottomfish and Seamount Groundfish Fisheries of the Western Pacific Region, a 6-year fishing moratorium was imposed on the Hancock Seamounts in 1986. The moratorium was extended for three additional 6-year periods, the latest starting in 2004 and ending in 2010.

SPECIES AND STATUS

Bottomfishes

In Hawaii, the bottomfish species fished include several snappers (ehu, onaga, opakapaka, and uku), jacks (ulua and butaguchi), and a grouper (hapu'upu'u). In the more tropical waters of Guam, CNMI, and American Samoa, the fishes include a more diverse assortment of species within the same families as in Hawaii, as well as several species of emperors. These species are found on rock and coral bottoms at depths of 50–400 m. Catch weight, size, and fishing effort data are collected for each species in the five areas. However, the sampling programs vary in scope between the areas. About 90% of the total catch is taken in Hawaii, with the majority

Table 17-1
Productivity in metric tons (t) and status of western Pacific bottomfish and groundfish fisheries resources.

Species/stock	Recent average yield (RAY) ¹	Current yield (CY)	Sustainable yield (MSY)	Stock level relative to B_{MSY}	Harvest rate	Stock status
Bottomfish						
Hawaiian Islands total	274	287	368	Below	Not overfishing	Not overfished
Main Hawaiian Islands ²	159	69	164	Below		
Mau Zone, NWHI ^{2,3}	47	46	46	Near		
Ho'omaluu Zone, NWHI ^{2,3}	68	172	158	Near		
American Samoa	22	34	34	Above	Not overfishing	Not overfished
Guam	15	25	25	Near	Not overfishing	Not overfished
CNMI ⁴	6	78	78	Above	Not overfishing	Not overfished
Seamount Groundfish⁵						
Alfonsino ²	0	0	Unknown	Unknown	Unknown	Overfished
North Pacific armorhead ²	0	0	2,123	Unknown		
Raftfish ²	0	0	Unknown	Unknown		
Total	317	424	2,628			

¹2002–04 average for Hawaii and 2003–05 average for other island areas.

²Harvest rate and stock status are not available for this stock.

³Northwestern Hawaiian Islands.

⁴Commonwealth of the Northern Mariana Islands.

⁵A fishing moratorium on seamount groundfish has been in effect within the U.S. EEZ since 1986.

of the catch taken in the MHI as compared to the NWHI (Figure 17-2). Data on recent average, current, and maximum sustainable yields for the five areas are in Table 17-1.

The most recent stock assessment for American Samoa, Guam, and CNMI bottomfish resources used catch and effort data collected through 2005 in a risk-based, Bayesian, state-space surplus production model. Although CPUE data were not particularly informative about the ratio of initial biomass to carrying capacity and, therefore, maximum sustainable yield (MSY), the set of credible models for each island group provided a consistent evaluation of current bottomfish status. In all cases the risk of overfishing and overfished status conditions was very low.

The status of Hawaiian bottomfish resources is based on a surplus production model applied to commercial bottomfish data collected through 2004. This assessment indicates that Hawaiian bottomfish stocks are not overfished, but are experiencing overfishing. A closer look at biomass and harvest metrics for the three fishing zones in the Hawaiian Islands suggests that fishing in the MHI is the major source of excess harvest and that biomass in this zone is well below that necessary to produce MSY. Biomass and harvest metrics for both NWHI zones, on the other hand, suggest no cause for concern in these areas. Based on the results of this assessment, management measures including a summer closed season and an annual catch limit were established for the MHI in 2007. The next assessment of Hawaiian bottomfish resources is scheduled for late 2008.

North Pacific (Pelagic) Armorhead

The seamount groundfish fishery has targeted just one species: the North Pacific (pelagic) armorhead. Since 1976, Japanese trawlers fishing the seamounts in international waters beyond the Hancock Seamounts have almost exclusively conducted this fishery. The fishing grounds comprising the Hancock Seamounts represent less than 5% of the total fishing grounds. The maximum sustainable yield (Table 17-1) is 2,123 t, but recovery to these former levels has not yet occurred.

Standardized stock assessments were conducted during 1985–93. Research cruises were focused on

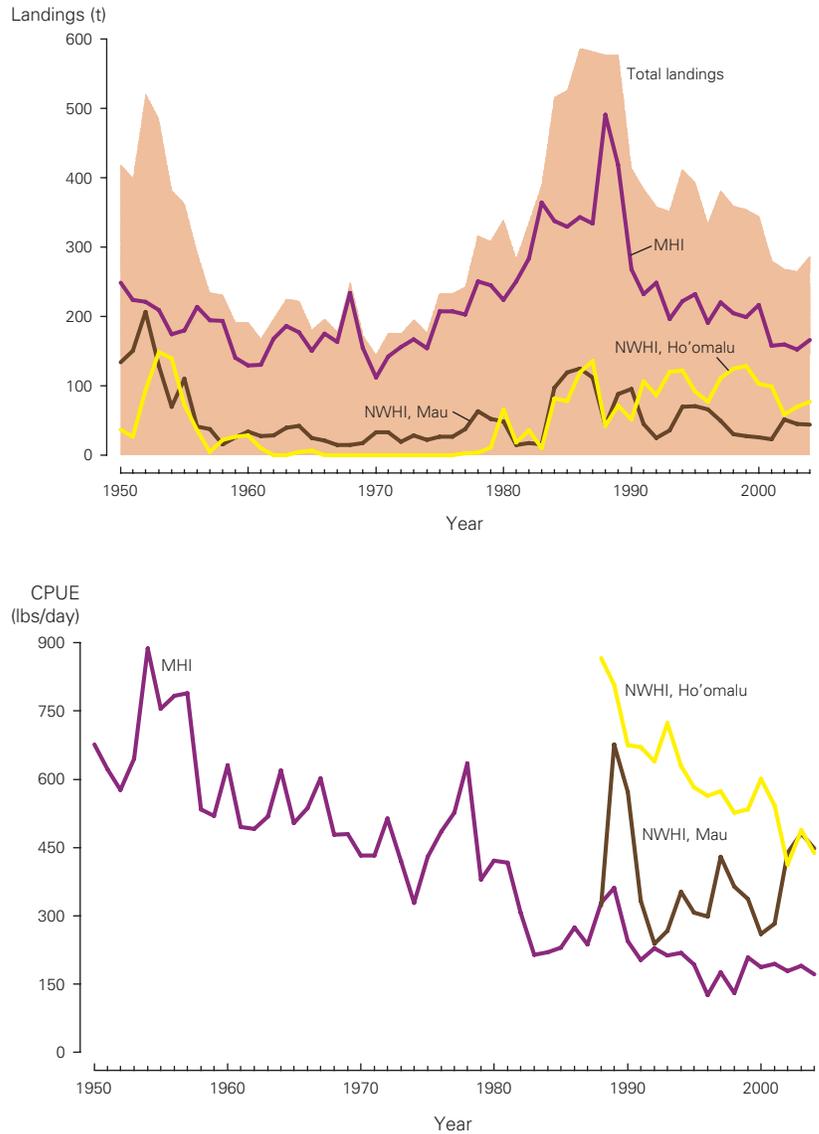


Figure 17-2

Bottomfish landings in metric tons (t; top) and catch per unit of effort (CPUE; bottom) in pounds per day, 1950–2004.

Southeast Hancock Seamount, and the armorhead stock was sampled with bottom longlines and calibrated against Japanese trawling effort. Catch rates vary but have not shown the increases expected after the fishing moratorium was implemented (Figure 17-3). Furthermore, the increase in the 1992 seamount-wide CPUE (Figure 17-1) caused by high recruitment was apparently short-lived, as CPUE declined appreciably in 1993 and thereafter. Closure of only the small U.S. EEZ portion of the armorhead's demersal habitat may not be sufficient to allow population recovery because these seamounts remain the only part of the fishery currently under management.

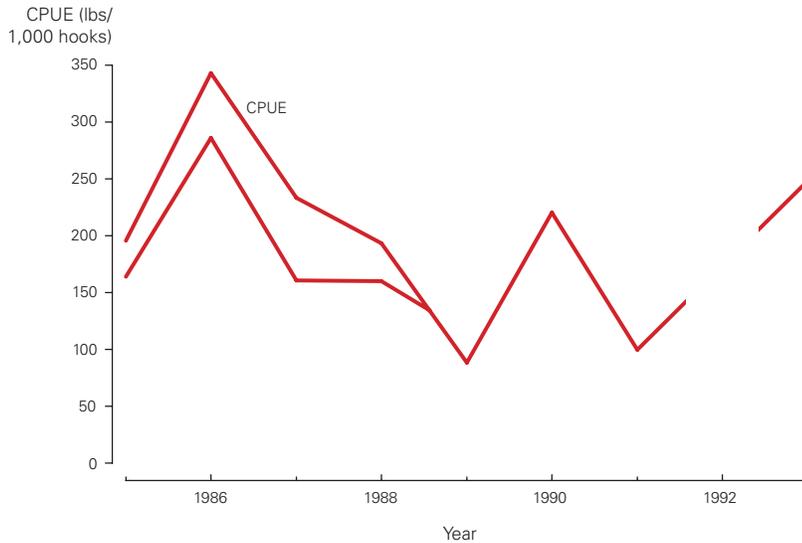


Figure 17-3
Catch per unit of effort (CPUE) in pounds per 1,000 hooks for North Pacific armorhead from bottom longline sampling during research cruises, 1985–1993. Biannual samples were taken from 1985–88, and annual samples thereafter. No samples were taken in 1992.

Seamount groundfish stocks within the U.S. EEZ have not been assessed since 1993; however, more recent data for adjacent areas outside of the EEZ suggest that these stocks remain overfished. Although poaching in this remote area is possible, it is assumed that harvest has not occurred within the EEZ since the 1986 moratorium. Even if true, however, overfishing on the stock as a whole could be occurring, with harvest applied to seamounts outside the EEZ. Data on current harvest rates for these outside areas are not available, so harvest status remains unknown.

ISSUES

Scientific Advice and Adequacy of Assessments

Adequacy of the biological and catch data collected is a primary management concern for the Western Pacific bottomfish fishery. For example, the reproductive biology of many of the important species in Guam, CNMI, and American Samoa is unknown, and spawning stock biomass cannot be computed.

Transboundary Stocks and Management Jurisdictions

The primary issue for the armorhead seamount fishery is how to implement some form of

management on an international basis to provide conditions more conducive for stock recovery. The recruitment event of 1992 and subsequent stock decline (probably from overfishing) reinforce the need for some form of management if this fishery is to recover to early 1970's levels.

Management Concerns

NMFS determined that overfishing of the bottomfish species complex was occurring within the Hawaiian Archipelago, with the primary problem being excess fishing mortality in the MHI. The WPFMC was notified by NMFS of this overfishing determination in May 2005. A stock assessment completed by the Pacific Islands Fisheries Science Center in 2006 concluded that the required reduction in fishing mortality based on 2004 data would be 24%. In addition, a phase-out of the bottomfish fishery by 2011 in the NWHI was mandated through the Presidential designation of the Papahānaumokuākea Marine National Monument.¹ This may be significant because the bottomfish are assessed as a stock complex combining the MHI and the NWHI, and because larval transport may allow for one area to serve as a source of recruitment to other areas such that management actions in one area may affect fish stocks in the other. This permanent closure will also result in the elimination of one of the major sources of locally caught bottomfish for use in local markets and restaurants. After the NWHI closure, experienced NWHI commercial bottomfish vessel operators will either begin fishing in the MHI or discontinue fishing for bottomfish.

To end bottomfish overfishing, the WPFMC supports a stepped approach by first controlling fishing mortality in 2007 and 2008 through the use of seasonal closures in all sectors of the MHI bottomfish fishery, in conjunction with a total allowable catch (TAC) limit in the commercial sector and bag limits for the non-commercial sector. In 2009 and beyond, a single fleetwide TAC would be applied to both the commercial and non-commercial sectors. Adaptive management would be utilized to address new information or significant changes in the fishery or fishery conditions.

¹Federal Register 36443, 26 June 2006.

Progress

Researchers continue to identify nursery habitat for juvenile snappers and groupers in Hawaii, and age and growth curves have been extended to include early juvenile stages. Improvements have been made in the collection of more complete catch-and-effort data from the NWHI fishery. Fishery discard patterns and interactions with sharks and protected species have also been examined.

Improvements will be made to the state's MHI bottomfish commercial data collection program. Major changes will require fishermen to report on a per-trip basis instead of on a monthly catch report and to provide GPS position recording. NMFS will implement a MHI recreational bottomfish permit and reporting program to capture catch and effort data from this sector of the fishery.

Recent international consultations have begun on the establishment of new mechanisms for the management of high-seas bottom fisheries by vessels operating in the northwestern Pacific Ocean. Representatives from Japan, the Republic of Korea, the Russian Federation, and the United States have met to continue efforts toward establishing interim management measures that would include the bottom fishery for North Pacific armorhead. Cooperative exchanges of fishery data with scientific colleagues in Japan have provided annual commercial catch data by seamount through 2002. Biological data of importance for future management considerations indicate that armorhead undergo a pelagic phase of 2 or more years prior to recruitment into the fishery and that the seamount populations comprise a single stock. Recent analysis of otolith increment width patterns among recruits sampled across years of high to low recruitment at the Hancock Seamounts suggests that in low recruitment years, recruits are larger at settlement and deposit narrower growth increments on their otoliths during the first year of the pelagic phase.

FOR FURTHER READING

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Gindai seen off of southwestern Molokai from the submersible *Pisces IV* at a depth of about 200 m.

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