



North Pacific Fisheries Commission

NPFC-2026-COM10-IP03

Submitted by Japan

Japan Blue Mackerel Stock Assessment

Abstract

Japan is sharing four domestic stock assessments - blue mackerel (IP03), chub mackerel (IP04), Japanese flying squid (IP05), and Japanese sardine (IP06) for information sharing purpose.

Blue mackerel (Pacific stock)

Blue mackerel are widely distributed around Japan, and this stock is the group distributed in the Pacific Ocean. A fishing year starting in July and ending in June of the following year is applied to the stock assessment.

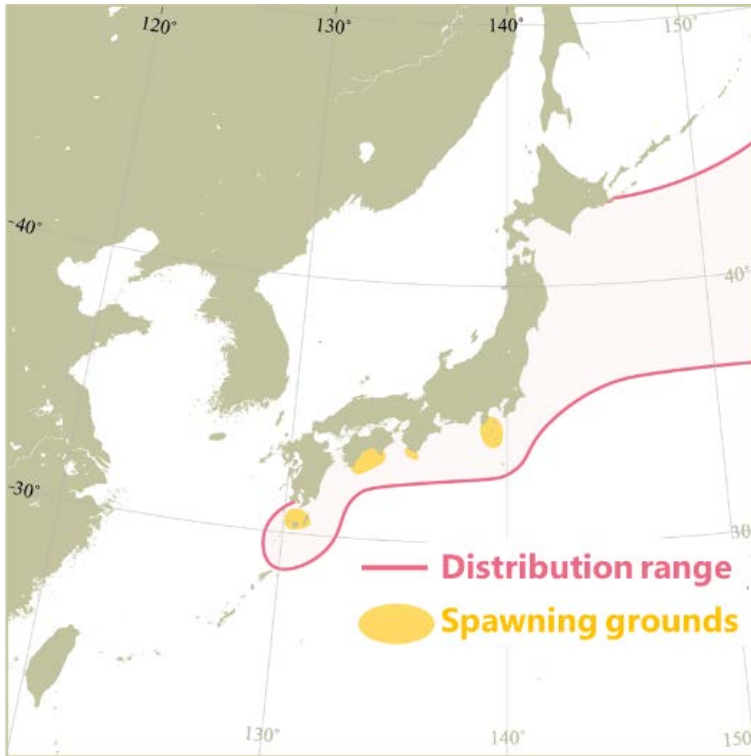


Figure 1 Distribution

The center of distribution is on the Pacific side of Japan. Spawning grounds are formed in the area around the Kuroshio Current on the southern coast of Japan.

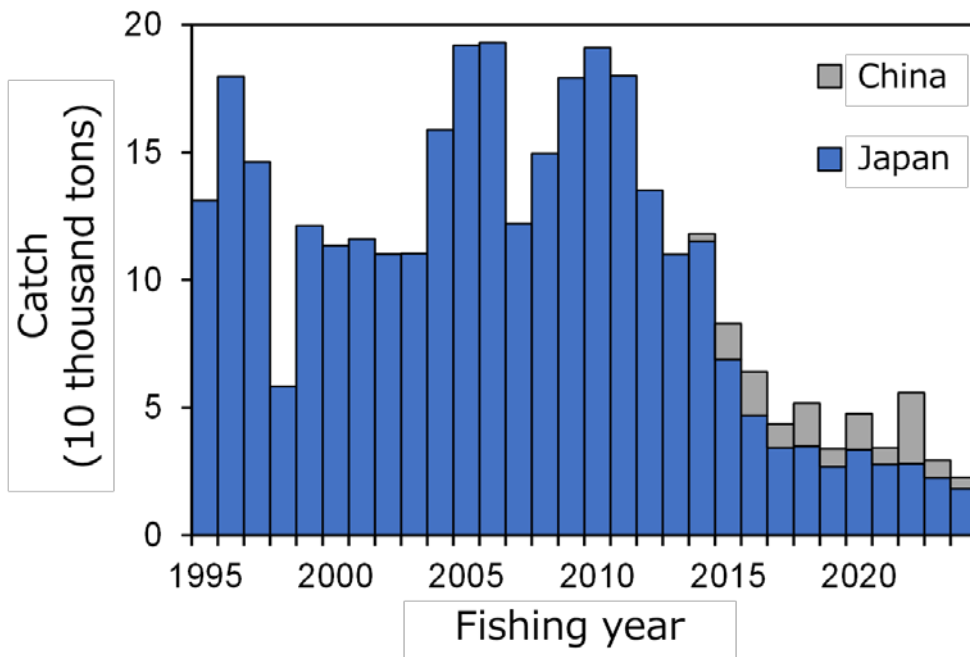


Figure 2 Total catch

Japanese catch remained at a high level during the 2005–2011 fishing years, while it showed a downward trend after the 2011 fishing year, reaching 18 thousand tons in the 2024 fishing year. Chinese catch data are available after the 2013 fishing year. The total catch for the terminal year was 23 thousand tons, including 4 thousand tons from the Chinese fleet.

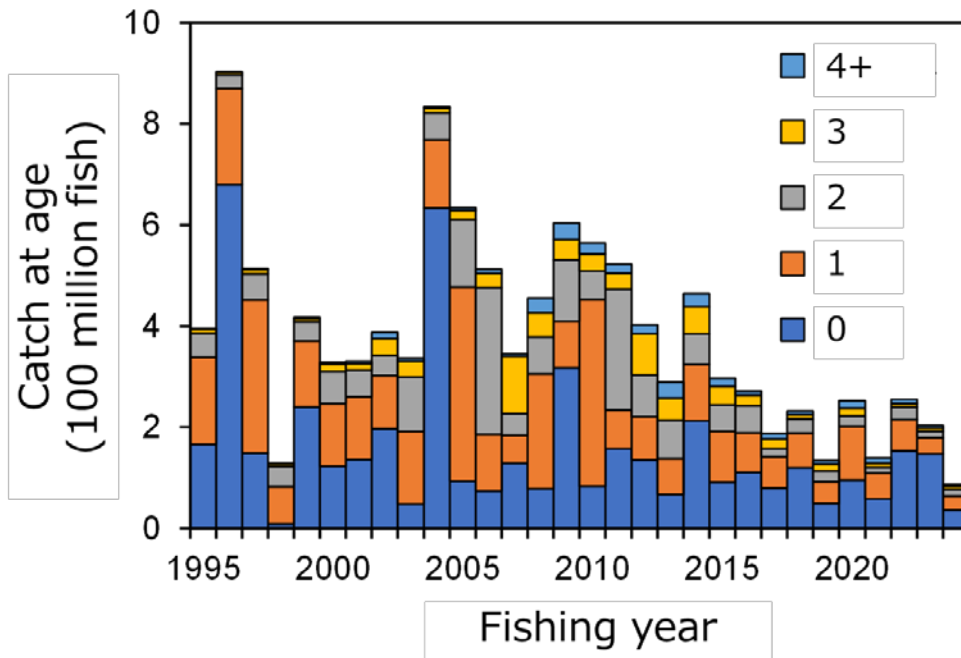


Figure 3 Catch at age

Age-1 and age-2 fish account for most of the catch, with annual fluctuations throughout the period. Following years of larger recruitment of age-0 fish, higher catches of age-0 and age-1 fish were subsequently recorded.

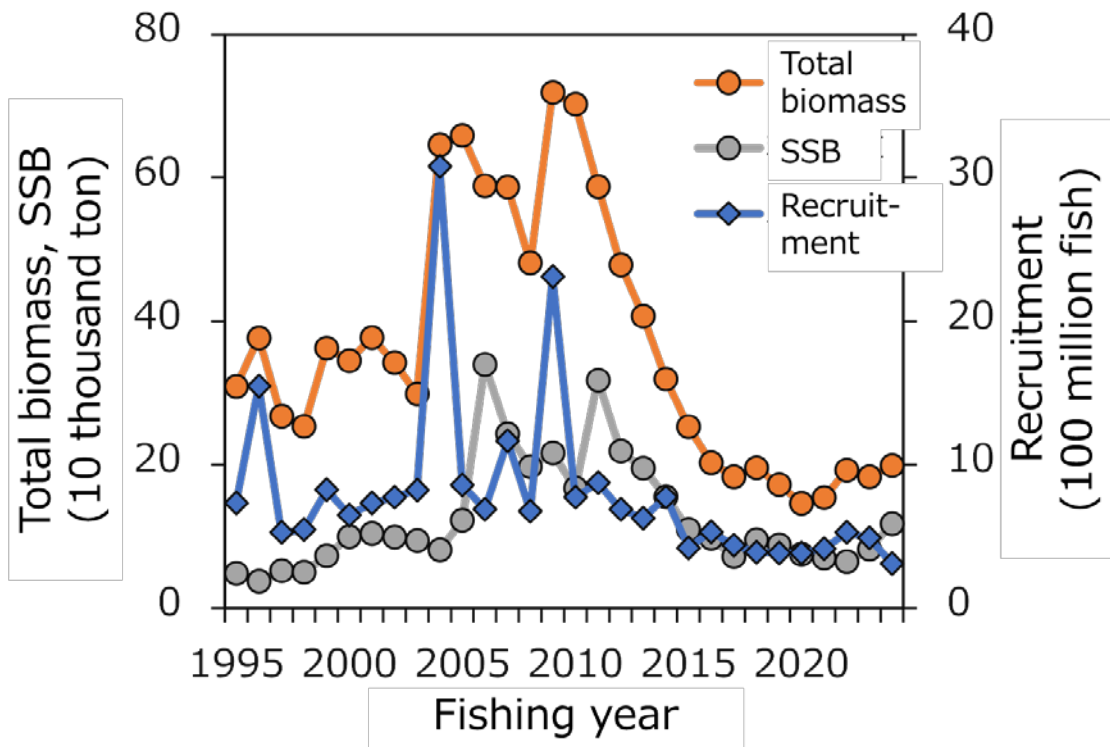


Figure 4 Trends in total biomass, spawning stock biomass (SSB), and recruitment
 The total biomass remained high during the 2004–2010 fishing years, whereas it declined sharply after the 2010 fishing year, recording 199 thousand tons in the 2024 fishing year. SSB showed a similar trend as the total biomass, with a decreasing trend over the most recent five years (2020–2024 fishing years), and was 118 thousand tons in the 2024 fishing year. Larger recruitment (numbers at age 0) was observed in the 1996, 2004, and 2009 fishing years, while it has been low since the 2015 fishing year. Recruitment for the terminal year was estimated at 310 million fish.

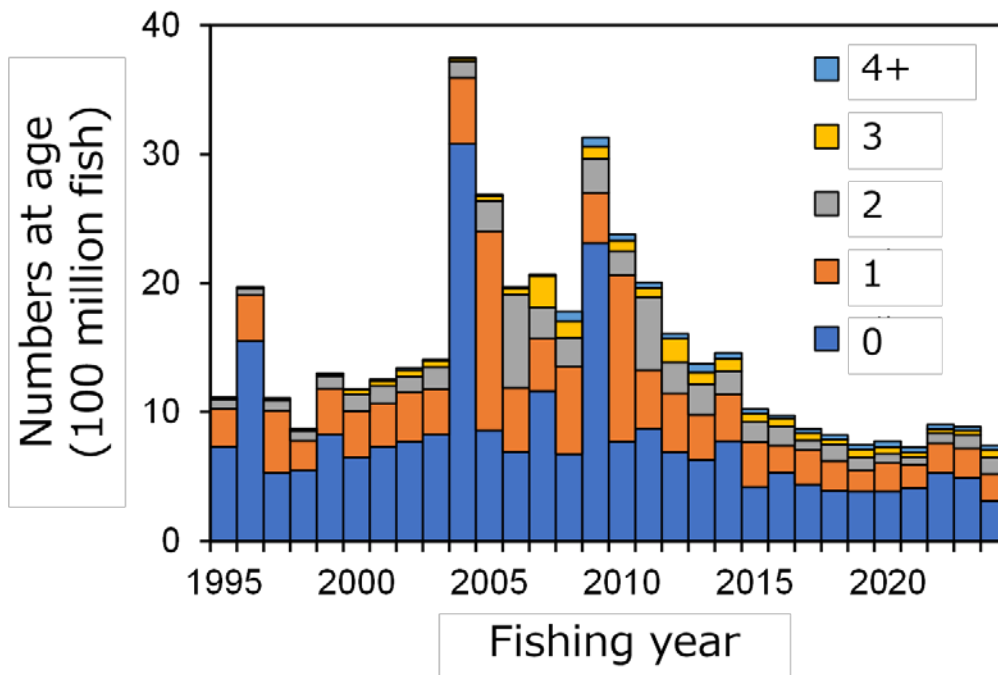


Figure 5 Numbers at age
Age-0 and age-1 fish dominated the total numbers-at-age throughout the period, with a small proportion of fish aged 2 and older.

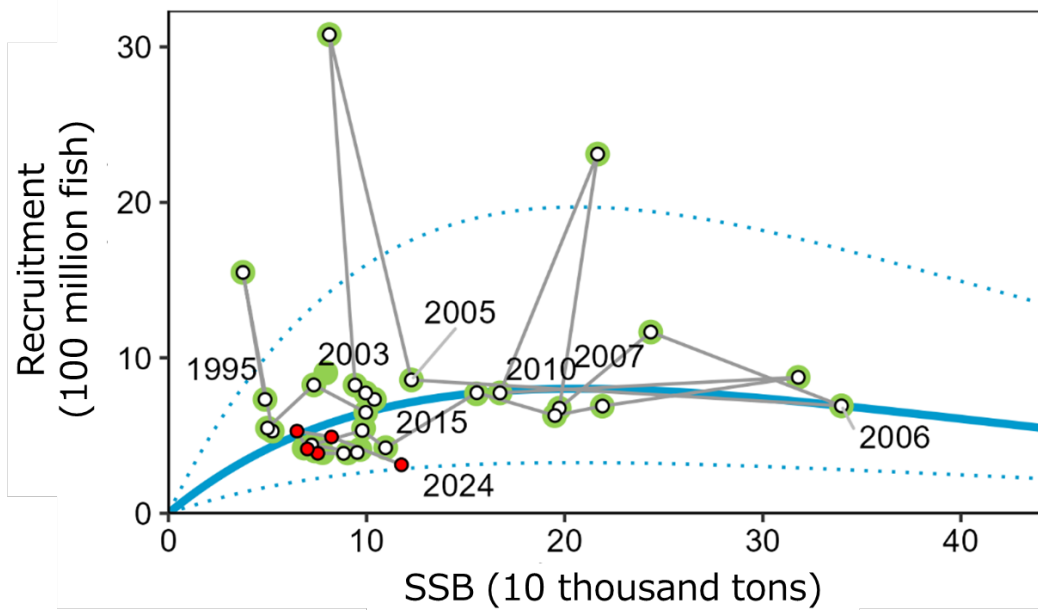


Figure 6 Spawning biomass-recruitment biomass
Ricker model (blue bold line) was applied to stock–recruitment relationship (white circles) for the 1995–2022 fishing years. The blue dotted line in the figure is the range estimated to contain 90% of the observed SSB and recruitment. White and red circles indicate plots of recruitment against SSB for the 1995–2019 and the recent five fishing years, respectively.

Table 1 Reference points, estimated values and total catch

Maximum sustainable yield (MSY)-based reference points are applied to this stock. SSB achieving MSY (SSB_{msy}) was estimated at 167 thousand tons and was established as the target reference point (TRP). The limit reference point (LRP), corresponding to the SSB that yields 10% of MSY, was estimated at 54 thousand tons. The fishing closure threshold (SSB_{ban}) was estimated at 7 thousand tons. SSB for the 2024 fishing year was estimated at 118 thousand tons. MSY was estimated at 72 thousand tons. The total catch in the 2023 fishing year was 23 thousand tons.

TRP	LRP	SSB _{ban}	SSB in 2024	MSY	Total catch in 2024
167 thousand tons	54 thousand tons	7 thousand tons	118 thousand tons	72 thousand tons	23 thousand tons

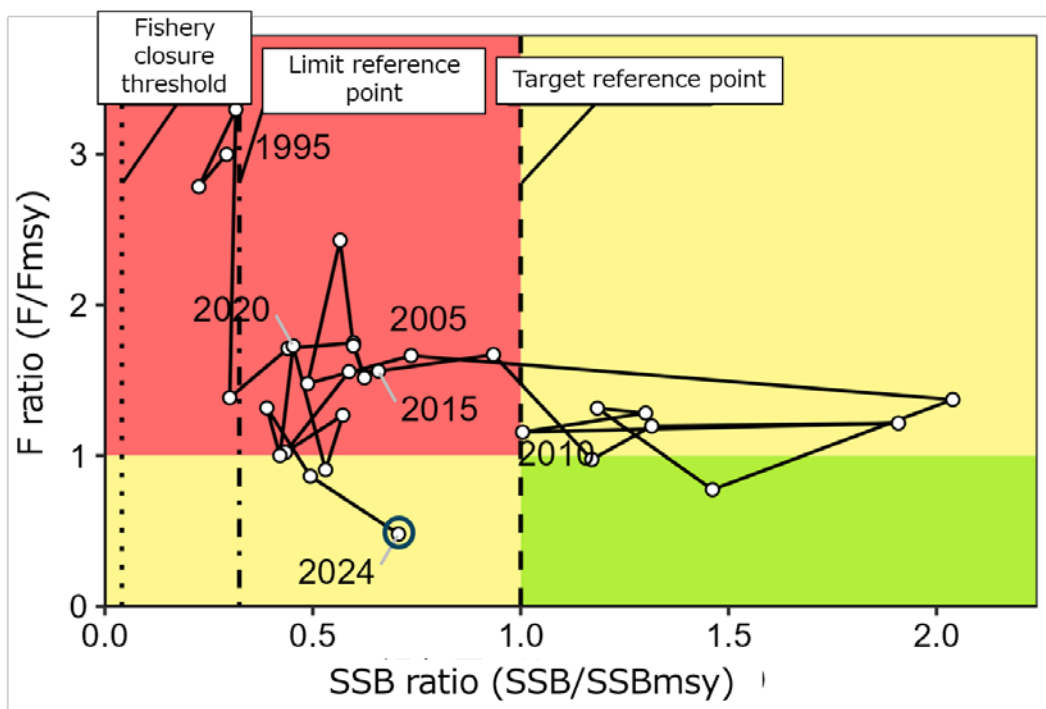


Figure 7 Kobe plot

The SSB was above SSB_{msy} during the 2006–2013 fishing years, while it was below SSB_{msy} before and after this period. The SSB ratio (SSB/SSB_{msy}) was 0.71 in the terminal year. Fishing mortality (F) was below F_{msy}, corresponding to the fishing mortality required to sustain SSB_{msy}, in years other than the 2007, 2013, 2019, 2021, 2023, and 2024 fishing years.