North Pacific Fisheries Commission

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Japanese Flying Squid 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.

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Japanese flying squid (Winter-spawning stock)

Japanese flying squid is widely distributed around Japan, and this stock is hatched in the East China Sea in winter, migrates northward through the Pacific Ocean, and then migrates southward to the spawning ground in autumn and winter. A fishing year (April to March of the following year) is applied to the stock assessment on this stock.

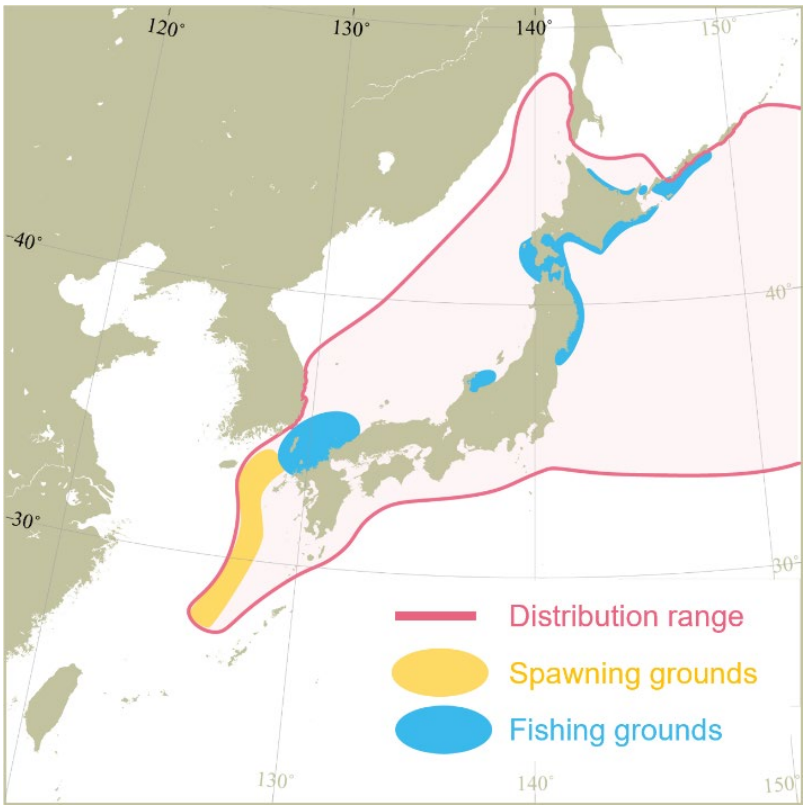

Figure 1 Distribution

This stock is distributed widely along the coast of Japan, but the main fishing grounds in Japan are formed in the Pacific Ocean. Spawning grounds are mainly formed in the East China Sea in winter.

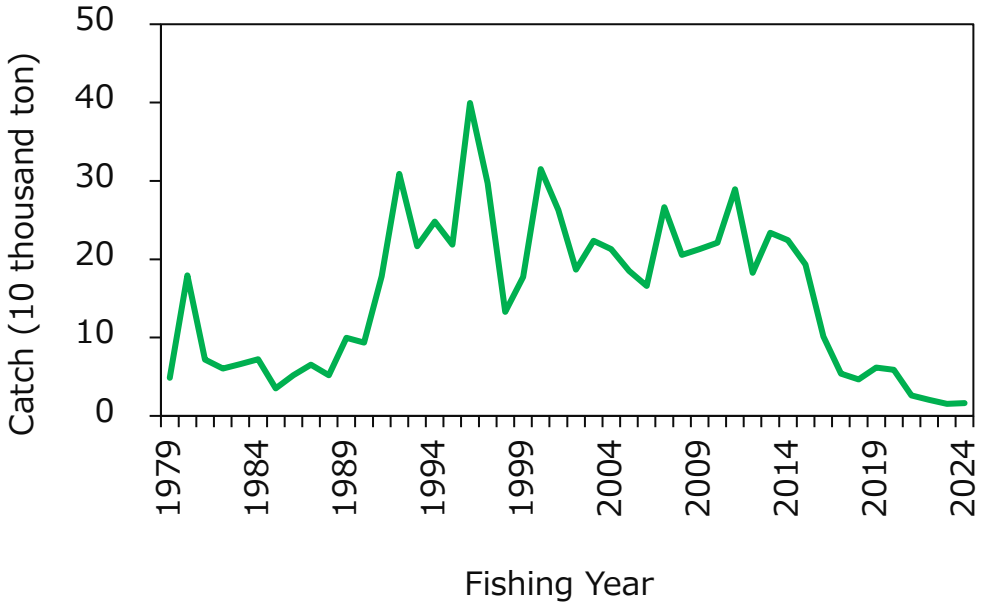

Figure 2 Trends in catch

Catch remained at a low level in the 1980s and began to increase since the 1989 fishing year, reaching approximately 400 thousand tons in the 1996 fishing year. Thereafter, the catch remained relatively stable, but has declined significantly since the 2016 fishing year, with a catch of 16,334 tons in the 2024 fishing year with the following composition: Japan, 14,228 tons; South Korea; 2,106 tons; Russia and China, no catch.

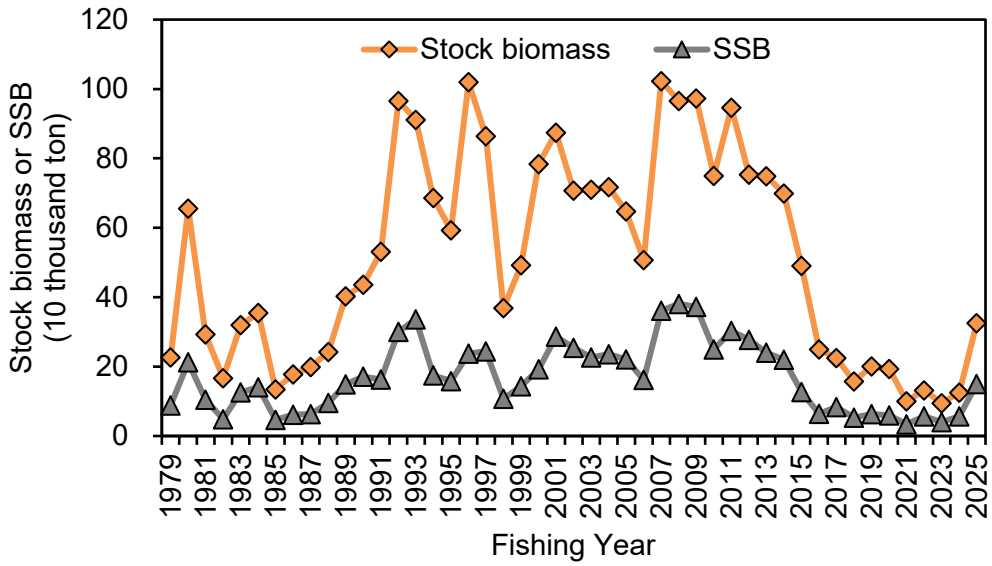

Figure 3: Stock biomass and spawning stock biomass

The stock biomass had generally varied between 500 thousand and 1,000 thousand tons since the 1990 fishing year, but began to decline significantly since the 2015 fishing year. Thereafter, the stock biomass remained at a low level until increasing in the 2025 fishing year, when it was estimated to be 32.5 thousand tons. The spawning stock biomass (SSB) has been flat for the last five years (2019-2024 fishing years) and was 57 thousand tons in the 2024 fishing year. The biomass and SSB for the 2025 fishing year are provisional.

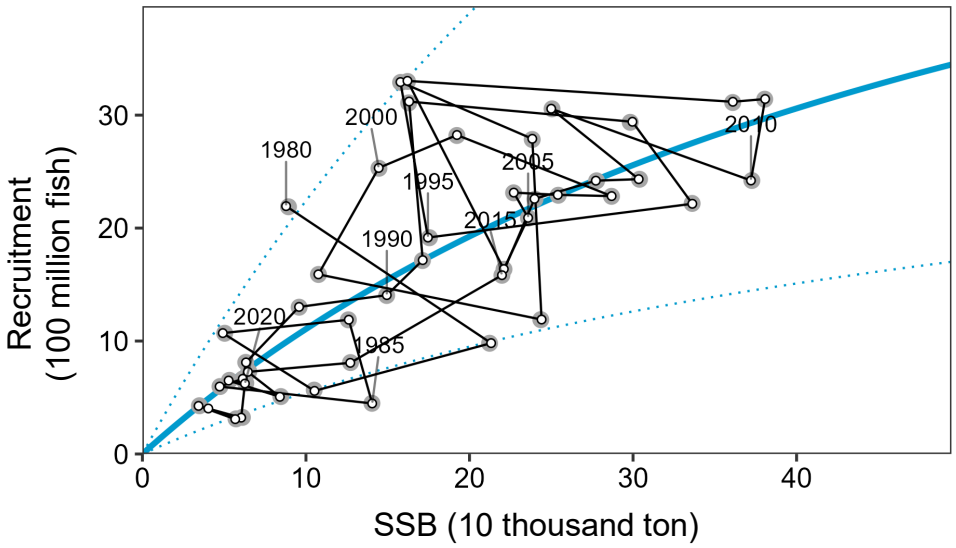

Figure 4: Stock-recruitment relationship

A Beverton-Holt type stock-recruitment relationship (blue thick line) was applied to spawning stock biomass for the 1979-2023 fishing year and recruitment for the 1980-2024 fishing year (biomass of survivors which go through the fishing year corresponds to spawning stock biomass, and recruitment is the number of fish in the following year).The blue dotted line in the figure is the range estimated to contain 90% of the observed SSB and recruitment.

Table 1 Reference points, estimated values and catch

Maximum sustainable yield (MSY) was estimated at 144 thousand tons. The target reference point (TRP) was estimated at 255 thousand tons. The limit reference point (LRP), corresponding to SSB yielding 10% of MSY, was estimated at 145 thousand tons. The fishery closure threshold (SSBban) was estimated at 16 thousand tons. The 2024 SSB were estimated at 57 thousand tons. The total catch in 2024 was 16 thousand tons.

TRP	LRP	SSBban	SSB in 2024	MSY	Total catch in 2024
255 thousand t	145 thousand t	16 thousand t	57 thousand t	144 thousand t	16 thousand t

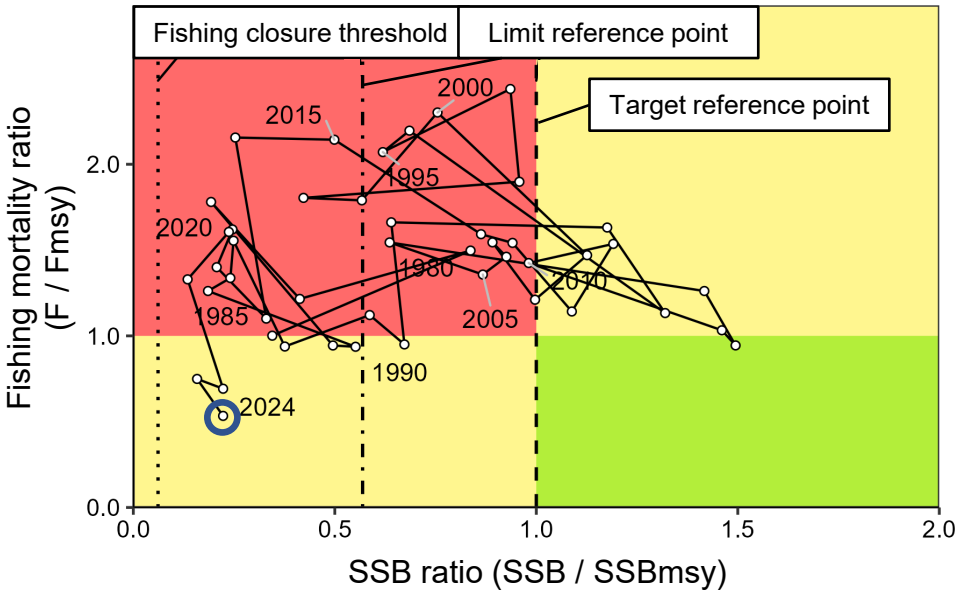

Figure 5: Kobe plot

SSB has been below SSB realizing MSY (SSBmsy) since the 2013 fishing year. Fishing mortality (F) was above Fmsy, corresponding to fishing mortality sustaining SSBmsy, in many years since the 1980 fishing year. In the 2024 fishing year, SSB was below LRP but above the ban level, and F was below Fmsy.