# Blue Seafood Guide Assessment Report

*Japanese jack mackerel, Tsushima Warm Current stock*

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(Image from Kazkian.com)

## Introduction to the BSG Assessment Methodology

The Blue Seafood Guide (BSG) methodology is primarily based on the Rapid Assessment tool co-developed by Ocean Outcomes (O2), World Wildlife Fund US, and the Sustainable Fisheries Partnership. The tool uses Marine Stewardship Council (MSC) performance indicators, with incorporation of some concepts from the Monterey Bay Aquarium Seafood Watch (MBA SFW) Fisheries Standard. The methodology has also been adapted to account for general characteristics of the existing Japanese fisheries management system. Specifically, deficiencies in information (e.g. monitoring of other species caught in a fishery) and management components (e.g. harvest control rules) that are systemic will be mentioned in the assessment, but not necessarily considered in the BSG species selection process.

To be included in the BSG, the stock/species must not receive a red score for any of the indicators that are considered.

# Executive summary

In Japan, Japanese jack mackerel are managed as two stocks: Pacific Ocean and Tsushima Warm Current stocks. We focus on the Tsushima stock here. As of 2018, the FRA stock assessment determined that the stock was at medium level and showing an increasing trend during the most recent five years. In addition, an MSY-based stock assessment suggested that the stock was slightly below MSY in 2015. Overall, the stock does not appear to be significantly depleted, nor is abundance at a high level. However, it should be noted that this is a lower trophic level (LTL) species, and management should consider when evaluating stock status and potential ecosystem effects. Harvests are managed through total allowable catch (TAC).

The main fishing gear used, purse seine, is unlikely to contact or have significant negative impacts on bottom habitat. Trophic relationships involving jack mackerel are broadly understood, although ecosystem impacts of associated fisheries do not appear to have been studied in detail. Fishing levels do not appear to be high enough to disrupt key ecosystem elements.

Since about 2006 the Tsushima jack mackerel stock has been in a recovery plan, which aims to reduce fishing mortality on juvenile fish via the following measures: 1) medium-to-large purse seiners have to quickly shift their fishing grounds when catches included a high proportion of juveniles, and 2) small-to-medium purse seiners have fixed non-fishing days and a limited number days to land catches. In addition, jack mackerel stocks are managed by TAC at the national level, which constitutes an objective consistent with the precautionary approach.

## BSG qualification outcome

Japanese jack mackerel (Tsushima Warm Current stock) qualifies for inclusion in the BSG.

## Scoring summary

| Principle | Component | PI # | Performance Indicator | Scoring category |
|---|---|---|---|---|
| 1 | Outcome | 1.1.1 | Stock status outcome | |
| | | 1.1.2 | Stock rebuilding outcome | Not considered |
| | Management | 1.2.1 | Harvest Strategy | |
| | | 1.2.2 | Harvest control rules | Not considered |
| | | 1.2.3 | Information and monitoring | |
| | | 1.2.4 | Assessment of stock status | |
| 2 | Other species | 2.2.3 | Other species information | Not considered |

| | | | | |
|---|---|---|---|---|
| | | 2.2.1 | Other species outcome | Not considered |
| | | 2.2.2 | Other species management | Not considered |
| | ETP species | 2.3.3 | ETP species information | Not considered |
| | | 2.3.1 | ETP species outcome | Not considered |
| | | 2.3.2 | ETP species management | Not considered |
| | Habitats | 2.4.3 | Habitats information | |
| | | 2.4.1 | Habitats outcome | |
| | | 2.4.2 | Habitats management | |
| | Ecosystem | 2.5.3 | Ecosystem information | |
| | | 2.5.1 | Ecosystem outcome | |
| | | 2.5.2 | Ecosystem management | |
| 3 | Governance & policy | 3.1.1 | Legal and customary framework | |
| | | 3.1.2 | Consultation, roles and responsibilities | |
| | | 3.1.3 | Long term objectives | |
| | Fishery specific management system | 3.2.1 | Fishery-specific objectives | |
| | | 3.2.2 | Decision-making processes | |
| | | 3.2.3 | Compliance and enforcement | |
| | | 3.2.4 | Management performance evaluation | |

## Basic fishery information

| | |
|---|---|
| Target species scientific name and common name | Japanese jack mackerel (*Trachurus japonicus*), マアジ |
| Fishery location and season | The Tsushima stock is caught in coastal areas in the Japan Sea, around Tsushima Island, and the East |

| | |
|---|---|
| | China Sea. The Pacific stock is caught in the Sea of Hyuga, Bungo Channel, Kii Channel, Sea of Kumano, and Sagami Bay (Fig. 1).<br><br>Fisheries can operate year-round, but the main season is spring through autumn. |
| Gear type(s) | About 80% of Japan's total catch is from purse seines (*maki-ami*, 巻網), so we focus on that gear type here. |
| Catch quantity (weight) | Based on simulation models, the estimated landings of Japanese jack mackerel from Japanese fisheries was 118,000 t for the Tsushima stock, averaged from 2012 to 2016. |
| Management authorities | Fishery cooperative associations, prefectural governments, Fisheries Agency of Japan |

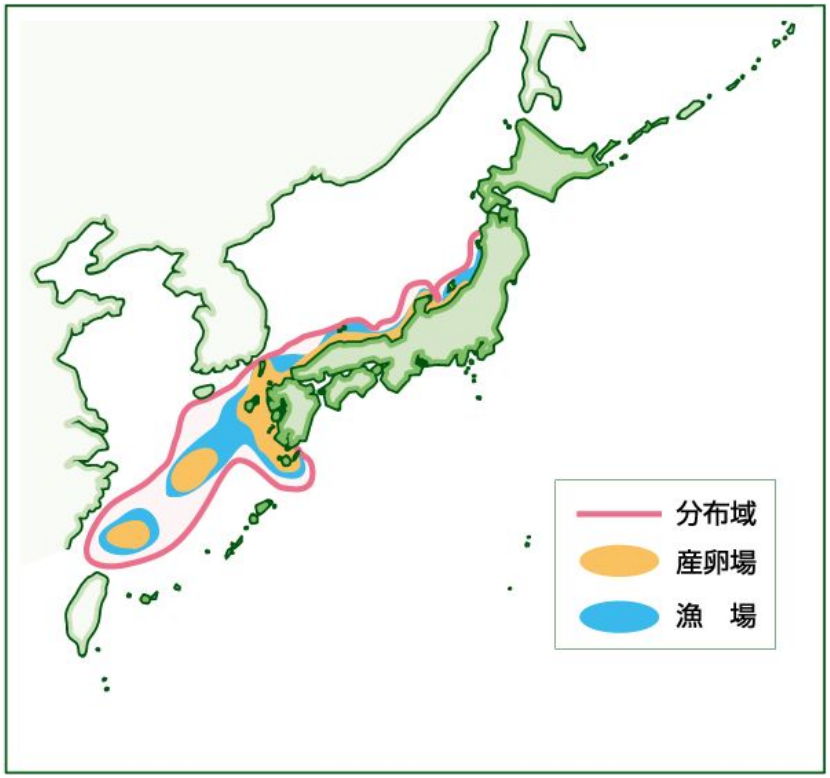


Figure 1. Distribution of the Tsushima stock of Japanese jack mackerel, shown in pink. Spawning grounds are shown in orange, and the fishing grounds are shown in blue. Image from http://abchan.fra.go.jp/digests2018/html/2018_04.html

## Description of the fishery

Japanese jack mackerel have relatively high value in the Japanese market and are an important domestic seafood. There is some aquaculture production of this species (836 mt produced in 2014), although the quantity is small compared to the wild capture harvest (estimated catch of 107,000 t for the Tsushima stock in 2016). Two stocks of Japanese jack mackerel are harvested by Japanese fisheries: the Pacific Ocean stock and the Tsushima Warm Current stock. South Korean fisheries also harvest jack mackerel from these stocks, on the order of 20,000 t per year, while China harvests 20,000 to 40,000 t per year (Yoda et al. 2017).

Table 1. Estimated landings (in t) of the Tsushima stock of Japanese jack mackerel, separated by country. Data available at http://abchan.fra.go.jp/digests2017/index.html

| Year | Japan | S. Korea | Total |
|---|---|---|---|
| 2007 | 125 | 19 | 144 |
| 2008 | 127 | 23 | 150 |
| 2009 | 136 | 22 | 158 |
| 2010 | 129 | 19 | 148 |
| 2011 | 138 | 19 | 157 |
| 2012 | 109 | 17 | 126 |
| 2013 | 121 | 15 | 136 |
| 2014 | 121 | 24 | 145 |
| 2015 | 132 | 43 | 175 |
| 2016 | 107 | 22 | 128 |

## Unit of Assessment(s)

The Unit of Assessment is Japanese jack mackerel from the Tsushima Warm Current stock caught by purse seine.

# Status of target stock(s) - Principle 1

The Fisheries Research and Education Agency of Japan (FRA) evaluates stock status (low, medium, or high) relative to reference points for spawning stock biomass (SSB) that are not linked to MSY. Specifically, the total range of past SSB estimates is divided into thirds, and the third that the most recent estimate falls into determines the status. Status is also determined in part by the limit reference point $B_{limit}$ (aka $B_{lim}$), which is defined as an SSB level below which

favorable recruitment cannot be expected, based on historical recruitment data (Yoda et al. 2014). If the SSB is below $B_{lim}$, stock status is rated as low.

Fishing effort in Japan is largely regulated through input controls (Makino 2011). For Japanese jack mackerel, effort is managed by regulating the number of vessels that can fish, and some prefectures or fishery cooperatives implement fishery openings and closures. In terms of output controls, catches are managed through total allowable catch (TAC).

## Stock status outcome (1.1.1)

| | |
|---|---|
| Scoring category | Yellow |

Rationale:
The Tsushima jack mackerel stock was determined to have medium status in 2016 because the spawning stock biomass (SSB) estimate in 2016 exceeded the $B_{limit}$ (150,000 t) but did not reach historically high levels (Fig. 2, Yoda et al. 2017). The trend in estimated abundance for the past five years (2012 to 2016) was considered to be increasing (Yoda et al. 2017). There is no target reference point (TRP) for this stock. Broadly speaking, stock abundance appears to be relatively stable in recent years albeit with a sharp drop in abundance during the early 2000s (Fig. 3). As of 2018, stock status remained at medium.

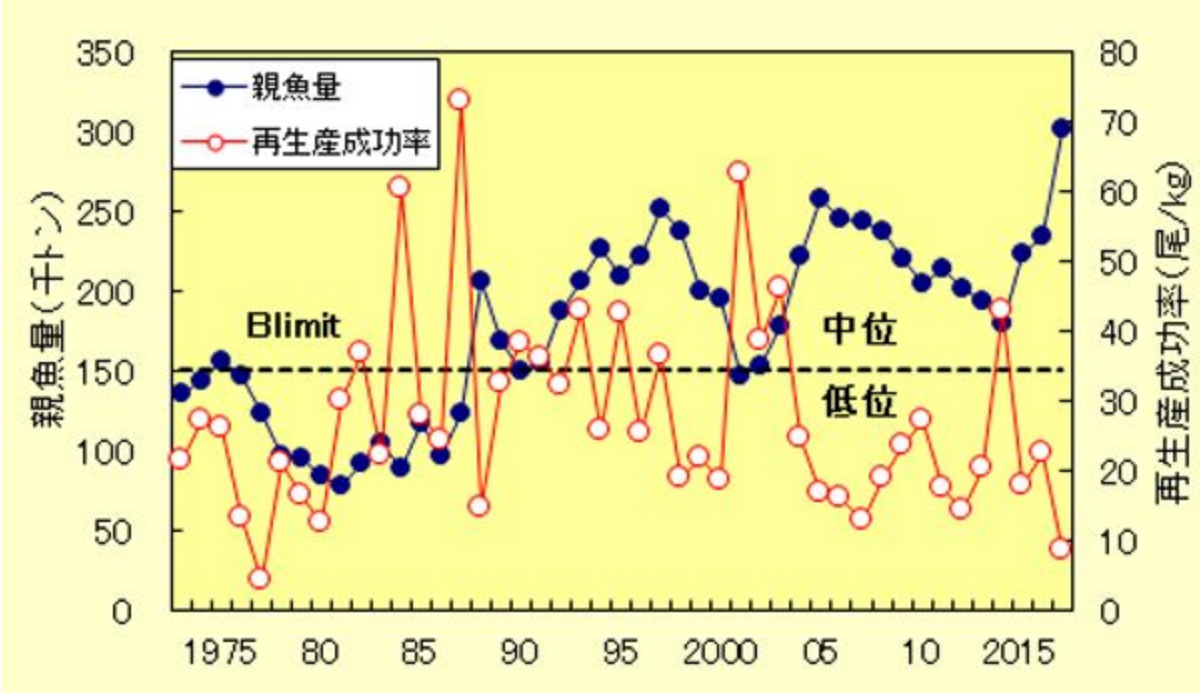


Figure 2. Estimated Tsushima Japanese jack mackerel spawning stock biomass (blue circles, in thousands of t) and recruitment success rate (white circles, number of offspring per kg SSB) over time. The dashed line indicates the threshold between medium and low status level. Figure from: http://abchan.fra.go.jp/digests2018/html/2018_04.html

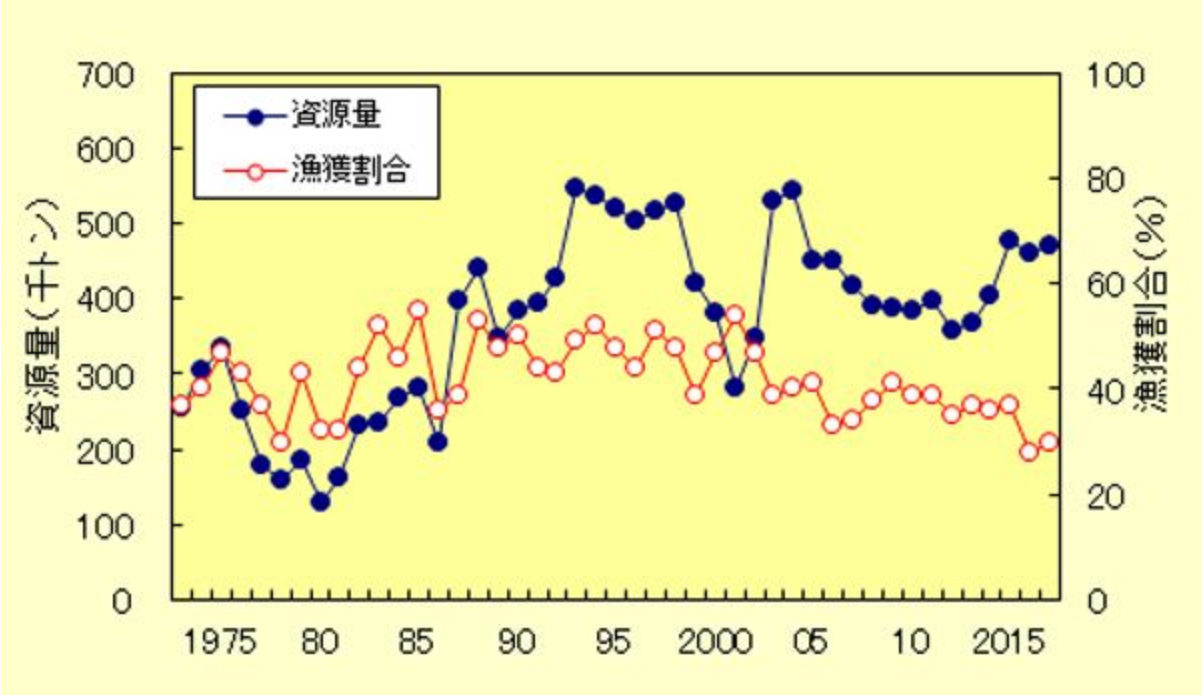


Figure 3. Estimated Tsushima Japanese jack mackerel biomass (blue circles, in thousands of t) and relative catch proportion (white circles, in percent) over time. Figure from: http://abchan.fra.go.jp/digests2018/html/2018_04.html

According to a preliminary, MSY-based assessment conducted in March 2016 for the Council for Promotion of Regulatory Policy Reform, the Tsushima stock of Japanese jack mackerel was slightly below a sustainable abundance level in 2015, with an $SSB_{2015}$ / $SSB_{MSY}$ ratio of 0.88.

Based on all of the information above, stock status is likely above a limit reference point and may not be far off from MSY. However, it is important to mention that Japanese jack mackerel are low trophic level carnivores that consume planktonic crustaceans and small fish (Jiang et al. 2013), and they may need to be scored as a lower trophic level (LTL) species under the MSC standard. In this case it is not clear whether either the LRP ($B_{limit}$) or TRP ($SSB_{MSY}$) take the potential LTL status of jack mackerel into account. Thus we scored this indicator as yellow.

## Stock rebuilding outcome (1.1.2)

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|---|---|
| Scoring category | Not considered |

Rationale:
This indicator was not considered because in Japan, stock rebuilding plans are rare and generally implemented only on a voluntary basis. They are not automatically developed in response to changes in stock status. No rebuilding plan or measures have been developed for

the Tsushima jack mackerel, likely because a need has not been identified by the Japanese management system. Without rebuilding measures in place, this indicator scores red.

## Harvest strategy (1.2.1)

| | |
|---|---|
| Scoring category | Yellow |

Rationale:
As is typical with Japanese fisheries, harvest control rules (HCRs) are lacking. Information collected to support the harvest strategy includes stock structure, stock productivity, fishing vessel statistics, fleet composition, stock abundance, landings at major ports, catch reports from specific fisheries, monthly surveys of fish sizes at markets, surveys of juvenile fish distributions, and research conducted by the Japan Fisheries Agency and national research institutes (Yoda et al. 2017).

Since 1997, harvest of jack mackerel stocks has been managed by total allowable catch (TAC). The TAC is set using acceptable biological catch (ABC) estimates from stock assessments and taking socio-economic conditions into account. Despite the fact that separate ABCs are estimated for each jack mackerel stock, a single TAC is used for both stocks combined.[1] From 2011 to 2014, the TACs were roughly equivalent to the sum of the ABCs for the two stocks (JFA 2013). However, TACs are frequently set at high levels that exceed typical harvest volumes, and the ABC for the Pacific stock is much lower than the ABC for the Tsushima stock. This suggests a need for stock-specific TACs, especially if either or both stocks become depleted. Nevertheless, if applied appropriately, the harvest strategy could theoretically maintain stock biomass around a target reference point (TRP). All harvest strategy components required by the MSC standard, excluding HCRs, are present.

Gear specifications (e.g. minimum mesh size) and fishery closed seasons and areas are used to maintain productivity and manage fishing effort. The harvest strategy could theoretically maintain stock biomass around a target reference point (TRP).

## Harvest control rules (1.2.2)

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|---|---|
| Scoring category | Not considered |

Rationale:

Since harvest control rules are not currently used in Japanese fisheries management, this indicator is not considered. There are no official harvest control rules (HCRs) for Japanese jack

[1] http://www.jfa.maff.go.jp/j/suisin/s_tac/kanren/attach/pdf/index-49.pdf

mackerel stocks, although there is a single TAC for both stocks combined. It is uncertain whether exploitation will be reduced significantly in response to stock depletion.

### Information and monitoring (1.2.3)

| Scoring category | Green |
|---|---|

Rationale: A substantial amount of information is collected on jack mackerel fisheries due their economic importance. Information on biological characteristics, fishery removals, and fleet composition is collected (Yoda et al. 2017), and is generally sufficient to support the TAC-based harvest strategy.

### Assessment of stock status (1.2.4)

| Scoring category | Green |
|---|---|

Scientists at the Japan Fisheries Research and Education Agency (FRA) assess Japanese jack mackerel stocks annually. These assessments estimate biomass and determine stock status relative to reference points based on historical biomass estimates (Yoda et al. 2017). The assessments are reviewed internally and also externally by experts and officials (JFA and FRA 2015). The stock assessment determines an $ABC_{target}$ that is set at 80% of the $ABC_{limit}$ to account for uncertainty in estimation of ABC, but ABC is a recommendation rather than a binding catch limit. The assessment appears appropriate to the species and could be used to develop an HCR.

Stock assessment scientists use a widely accepted cohort analysis technique (Pope 1972) that uses catch at age data to estimate biomass in terms of numbers of fish at age. Catch data from Japan and South Korea were used in the 2017 assessment, but data on China's 2016 landings were unavailable and hence were not used, which contributed some uncertainty (Yoda et al. 2017).

## Ecosystem impacts - Principle 2

Japanese jack mackerel are primarily caught by purse seine, which also catch other species such as Japanese sardines (*Sardinops melanostictus*), Japanese anchovy (*Engraulis japonicus*), chub and blue mackerel (*Scomber japonicus and S. australasicus*), and amberjacks (MAFF 2015). Catch composition is highly dependent on fishing location and practices.

Although MAFF compiles national-level catch statistics separated by fishing gear, there are no catch composition data for fishing vessels that are specifically targeting Japanese jack mackerel. Japanese fishers are not required to keep records on discards or bycatch, although

they typically record catches of commercially important species. Bait is not used in purse seine fisheries and does not need to be considered here.

## Other species information (2.2.3)

| | |
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| Scoring category | Not considered |

Rationale: Due to the lack of bycatch monitoring, including fishery-specific data on other species caught and retained, insufficient information is collected to inform bycatch management and determine the fishery's risk to these other species.

## Other species outcome (2.2.1)

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|---|---|
| Scoring category | Not considered |

Rationale:
This indicator is not considered due to lack of information.

## Other species management (2.2.2)

| | |
|---|---|
| Scoring category | Not considered |

Rationale:
This indicator is not considered due to lack of information.

## ETP species information (2.3.3)

| | |
|---|---|
| Scoring category | Not considered |

Rationale: This indicator is not considered due to lack of information. There is no standardized monitoring of bycatch species in Japanese fisheries (Fukutake et al. 2014), and fishers do not usually record data on encounters with ETP species. Qualitative information about ETP species mortality resulting from the assessed fishery is not available.

## ETP species outcome (2.3.1)

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|---|---|
| Scoring category | Not considered |

Rationale:

This indicator is not considered due to lack of information. However, we used the SFW Unknown Bycatch Matrix information to preliminarily consider likely impacts on turtles, seabirds, and sharks from purse seines in the North Pacific or Northwest Pacific Ocean. Level of concern regarding fishing mortality is marked by the following colors: high concern = red, medium concern = yellow, and low concern = green. Highest impacts receive a score of 1, and lowest impacts receive a score of 5. For benthic invertebrates, finfish, forage fish, and corals, impacts were not determined by region, and SFW did not assign concern categories.

Based on the information in the matrices, impacts on sea turtles, marine mammals, seabirds, and sharks are expected to be low concern (Table 2). Thus the ETP species outcome indicator receives a preliminary green score. If monitoring information or evidence can show that impacts on these potential ETP species are minimal, the score can be better confirmed.

Table 2. Impacts of purse seines based on the Monterey Bay Aquarium SFW Unknown Bycatch Matrices.

| Bycatch susceptibility category | Region | Score and level of concern |
|---|---|---|
| Sea turtle | North Pacific | 4 |
| Marine mammal | Northwest Pacific | 3.5 |
| Seabird | Northwest Pacific | 4 |
| Shark | Northwest Pacific | 3.5 |
| Benthic invertebrates | N/a | 5 |
| Finfish | N/a | 4 |
| Forage fish | N/a | 3 |
| Corals and other biogenic habitats | N/a | 5 |

## ETP species management (2.3.2)

| | |
|---|---|
| Scoring category | Not considered |

Rationale: Since no information is available on the specific ETP species that may be affected, we could not score this indicator.

Japan has a Red Data Book identifying ETP species found within the country. In terms of national legislation, there is a Law for the Conservation of Endangered Species of Wild Fauna

and Flora (Law No. 75) that aims to conserve endangered species and contribute to conservation of the natural environment (Ministry of the Environment 2016a). There is also a Wildlife Protection and Hunting Law (Law No. 32) that protects birds and mammals by establishing wildlife protection areas (Ministry of the Environment 2016b).

## Habitats information (2.4.3)

| | |
|---|---|
| Scoring category | Yellow |

Rationale: Japanese jack mackerel is a pelagic species, and the primary gear type used to target the mackerel (purse seines) is unlikely to contact the sea bottom and directly impact marine habitat (FAO 2001). Thus the types and distribution of commonly encountered habitats and the nature of gear impacts upon those habitats is broadly understood. However, data are not adequate for verifying efficacy of habitat management measures and determining fishery risks to habitat.

## Habitats outcome (2.4.1)

| | |
|---|---|
| Scoring category | Green |

Rationale: Based on the nature of purse seines and their operation in upper water layers to catch pelagic mackerel, these fisheries are highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm. They are also highly unlikely to impact VME habitats.

## Habitats management (2.4.2)

| | |
|---|---|
| Scoring category | Yellow |

The gear type and operations of purse seine fisheries for mackerel constitute an operational strategy for managing impacts on encountered habitats. Fishing takes place in deep water with gear that is used at the ocean surface and does not contact the sea bottom. Knowledge about this gear type provides an objective basis for confidence that the fisheries do not harm encountered habitats (FAO 2001). However, the effectiveness of the strategy has not been tested, and there is no quantitative evidence that the operational strategy is being implemented successfully.

## Ecosystem information (2.5.3)

| | |
|---|---|
| Scoring category | Yellow |

Rationale: Trophic relationships involving Japanese jack mackerel are broadly understood, but ecosystem impacts of mackerel fisheries do not appear to have been studied in detail. Jack mackerel consume krill and zooplankton and are preyed upon by piscivores such as amberjacks (Tanaka et al. 2006). MSC considers mackerels lower trophic level (LTL) species by default.

## Ecosystem outcome (2.5.1)

| Scoring category | Yellow |
|---|---|

Rationale: Japanese jack mackerel are an LTL species, and fisheries harvest large quantities of the mackerel. However, they are a productive species, and estimated abundances have appeared stable in recent years (Figs. 1 and 2). Thus fisheries appear unlikely to disrupt key ecosystem elements to a point where there would be serious or irreversible harm.

There is some aquaculture production of jack mackerel, typically involving collection of wild fry or juveniles for sea ranching (Kagoshima Fisheries Technology Development Center 2015). Negative impacts from aquaculture may include pollution, removal of juveniles from wild populations, reduction of bait fish populations, disease transmission to wild fish, and environmental pollution from net pen production. Individuals that escape from net pens may also interbreed with wild fish and affect the genetic structure of wild populations. Currently these types of impacts are not sufficiently investigated and considered by management (Makino 2011). However, aquaculture production is limited compared to wild capture, with MAFF reporting production of only 836 mt of adult jack mackerel in 2014.

## Ecosystem management (2.5.2)

| Scoring category | Yellow |
|---|---|

Rationale: The Japanese fisheries management system focuses primarily on target species and currently lacks an ecosystem-based approach, although some policy documents, such as the Fisheries Policy of 2001, state that ecosystems should be conserved (Makino 2011). Jack mackerel harvests are not managed to minimize negative ecosystem impacts, but stock assessments do include estimates of ABC that could potentially be used to manage impacts.

The 2011 Japan Ministry of the Environment document titled ‘Marine life diversity conservation strategy’ (海洋生物多様性保全戦略) suggests a general movement toward policies that protect marine diversity and promote the sustainable use of marine resources (Fukutake et al. 2014). Relevant management measures include implementation of Marine Protected Areas (see Makino 2013). Conservation policy strategies are established by the Marine Diversity Conservation Specialist Investigative Commission (海洋生物多様性保全戦略専門家検討会), which holds meetings and receives public comments.

# Management - Principle 3

Japan's fisheries are managed on multiple levels. The national management body is the Fisheries Agency of Japan (JFA) within the Ministry of Agriculture, Forestry, and Fisheries (MAFF). Prefectural governments administer fishing rights and licenses within their jurisdictions (Makino 2011). At a smaller scale, fisheries are managed by fishery cooperative associations, whose membership consists of fishermen and small fishing companies. These cooperatives tend to be defined by region, target species, and/or gear type. Management is coordinated among all these levels, generally with the JFA and prefectural governments issuing regulations and the fishery cooperatives implementing those regulations (McIlwain 2013). In Japan there is an emphasis on resource users actively contributing to management of their own fisheries, and fishery cooperatives have considerable influence in determining operational rules (e.g. gear restrictions) and setting fishery openings and closures (Uchida and Watanabe 2008, Makino 2011).

## Legal and/or customary framework (3.1.1)

| Scoring category | Green |
|---|---|

Rationale: Fisheries governance in Japan is supported by an effective national legal system with binding procedures governing cooperation with other parties, and the system is capable of delivering management outcomes consistent with 1) management of the stock to a sustainable level and 2) minimising impacts on other species, habitats, and wider ecosystem components. The legal system aims to guarantee justice and transparency in administrative management, and there is a clear decision-making process for determining fishery measures and dealing with disputes as they arise (Fukutake et al. 2014). The system has a mechanism to observe the legal rights of people dependent on fishing for food or livelihood.

The Fisheries Law of 1949 outlines a framework for managing fisheries via fishery rights and licenses that are controlled by the government (Makino 2011).

## Consultation, roles, and responsibilities (3.1.2)

| Scoring category | Green |
|---|---|

Rationale: Functions, roles, and responsibilities are clearly defined and understood in the national management framework. The Japanese Fisheries Policy Council has a key role in seeking and accepting relevant information from stakeholders, which may then be incorporated into management measures. The JFA regularly offers opportunities for stakeholders, including fishing industry members, to participate in public consultation processes (Fukutake et al. 2014).

Additionally, the JFA supports economic incentives for sustainable fishing by providing some degree of compensation for income loss resulting from management measures (Makino 2011).

## Long term objectives (3.1.3)

| Scoring category | Green |
|---|---|

Rationale: The Fisheries Basic Act (2001) describes the overarching framework for fisheries management in Japan. Chapter 1, Article 2 states a requirement to manage fisheries resources to ensure their sustainable use as a component of marine ecosystems, following the recommendations of UN Convention on the Law of the Sea (UNCLOS). The Law of Conservation and Management of Marine Living Resources states the need to protect surrounding ecosystems and habitats. Thus long term objectives consistent with the precautionary approach and appropriate management of target stocks and ecosystem impacts are explicit within management policy.

## Fishery-specific objectives (3.2.1)

| Scoring category | Yellow |
|---|---|

The Tsushima jack mackerel stock was included in a recovery plan that was implemented from 2009 to 2011. The plan aimed to reduce fishing mortality on juvenile fish via the following measures: 1) medium-to-large purse seiners had to quickly shift their fishing grounds when catches included a high proportion of juveniles, and 2) small-to-medium purse seiners had fixed non-fishing days and a limited number days to land catches (Yoda et al. 2014). Implementation of these measures has continued since 2012 under the current management framework.

In addition, jack mackerel stocks are managed by TAC at the national level, which constitutes an objective consistent with the precautionary approach. However, the management objectives driving fishery rules and management guidelines are usually not explicitly described, especially those relating to management of ecosystem impacts.

## Decision-making processes (3.2.2)

| Scoring category | Yellow |
|---|---|

Status of the fishery and fish stocks are reviewed at least once per year. These reflect the existence of decision-making processes that result in measures for achieving fishery-specific objectives, and suggest that the processes respond to monitoring and evaluation results. Some information on the fishery's performance is available in materials posted on the FRA and MAFF websites. There is no indication that management authorities or fishers repeatedly violate

regulations necessary for sustainability of the fishery. However, it is not apparent that decision-making processes employ a precautionary approach.

### Compliance and enforcement (3.2.3)

| Scoring category | Yellow |
|---|---|

Fishing effort appears to be primarily regulated through permits and limited entry to the fishery. The JFA and Japan Coast Guard engage in some enforcement activities such as checking fishing logbooks and permits, and clear provisions exist for penalizing individuals or parties who violate fishery regulations (Clarke 2007). Thus MCS mechanisms exist and are implemented. These mechanisms are expected to be reasonably effective, and there are no reports of systematic non-compliance. More information on application of sanctions and evidence of compliance would be needed to score this indicator green.

### Monitoring and management performance evaluation (3.2.4)

| Scoring category | Yellow |
|---|---|

Key components of the fishery-specific management system include monitoring and evaluation of stock status, management of ecosystem impacts (e.g. catches of other species and habitat issues), and performance of the compliance and enforcement system. Stock assessments are regularly evaluated and subject to internal review, but it is not clear whether the other components are regularly evaluated and adapted.

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