Physical and biological criteria for region identification around Japan

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Ocean currents
Zooplankton communities around Japan

200 < subarctic, subtropic-neritic, subtropic-oceanic
200 > subarctic, subtropic-neritic, subtropic-oceanic
200 < tropic-oceanic, subtropic-neritic, subtropic-oceanic
200 > meso- & bathy-pelagic
200 < subarctic, subtropic-neritic, subtropic-oceanic
200 > meso- & bathy-pelagic
200 < tropic-oceanic, subtropic-neritic, subtropic-oceanic
200 > meso- & bathy-pelagic
200 < tropic-neritic, subtropic-neritic, subarctic
200 > meso- & bathy-pelagic
Distribution of sardine

- Pacific Ocean Stock
- Tsushima Current Stock
- Spawning ground

sardine
Distribution of chub mackerel

Feeding area

Pacific Ocean Stock

Tsushima Current Stock

Fishing ground

Chub mackerel
Distribution of jack mackerel

Pacific Ocean Stock

Tsushima Current Stock

Jack mackerel
Japanese common squid

Distribution of Japanese common squid

Winter spawning stock
Autumn spawning stock

Japanese common squid
Transported trace of giant jellyfish *Nemopilema nomurai*
Distribution of walleye pollack around Japan

Walleye pollack
Dominant fisheries resources in the East China Sea

- Yellow croaker
- Hairtail
- Pike eel
- Croaker
- Lizardfish
- Swordtip squid
- Cuttlefish
- Japanese butterfish
- Croaker
- Hairtail
Yearly catch by Japanese pair trawler in East China Sea

- Yellow sea bream
- Yellow croaker
- Hairtail
- Squids
- Swordtip squid
- Others
Walleye pollack

Atka mackerel

deep sea smelt

Snow crab

Sailfin sandfish

Pink shrimp

Korean flounder

Flathead flounder

Pointhead flounder
Fisheries management (1)

Input control:
In Japan, fishing effort is restricted by license system and open access is prohibited except small scale line fishing.

Fisheries resources management in Japan has been basically left to fishermen themselves, who were licensed by government or local government.

So self-management or mutual regulation has been the traditional style in Japan’s fisheries.
Fishery management (2)

**self-imposed fisheries management system**

In recent years, more scientific self-imposed fisheries management system has been introduced in coastal fisheries.

Local government assists the management from scientific point of view.
Sailfin sandfish fishery in Akita prefecture.

- ban on fishing for 3 years
- stock enhancement
- preparation of seaweed bed for spawning

Yearly catch in tons

Ban on fishing
Sand eel fishery in Ise Bay

- Protect spawning fish through preservation of habitat of estivation.
- Protect larvae and juvenile by establishing a closed season.
- Ensure the proper escapement of sand eel before estivation by closing fishery.
Effects of fisheries management in Ise Bay sand eel fishery

<table>
<thead>
<tr>
<th></th>
<th>catch (ton)</th>
<th>gross earnings (billion yen)</th>
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</thead>
<tbody>
<tr>
<td>Average of ten years before management started</td>
<td>6717</td>
<td>13.2</td>
</tr>
<tr>
<td>Average of ten years after management started</td>
<td>8854</td>
<td>16.5</td>
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</tbody>
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Mie Prefectural Fisheries Research Institutes
Fisheries management (3) TAC

- Jack mackerel
- Japanese common squid
- Snow crab
- Japanese saury
- Walleye pollock
- Sardine
- Chub mackerel
- Spotted mackerel
- Snow crab
TAC for a fish

Licensed by the Minister:
- fishery
- fishery

Licensed by Governors:
- prefecture
- prefecture
Warm current pelagic ecosystem

Jack mackerel, Japanese common squid, sardine, chub mackerel and spotted mackerel

BRP for each fish is decided mainly based on its spawner-recruitment relationship in recent years and ABC is calculated using each BRP.

Fisheries management by TAC in Japan is established aiming at species by species and ecosystem-based fisheries management have not been introduced for those off-shore resources.
Even though fisheries management is conducted species by species, we should take the viewpoint of ecosystem. It is suggested that the carrying capacity exist in warm current pelagic ecosystem around Japan and it is impossible to attain all fishes their high stock level by single species approach.

We should accept the reality of the natural stock fluctuation and the replacement of dominant species and have to introduce the management policy that the dominant species will permit to exploit with relatively high fishing rate, while critical species should be operated prudently not to exceed allowable catch at each phase.