

**A very weak state of the Oyashio in recent years:
Changes in the distribution of fisheries resources and
fishing ground**

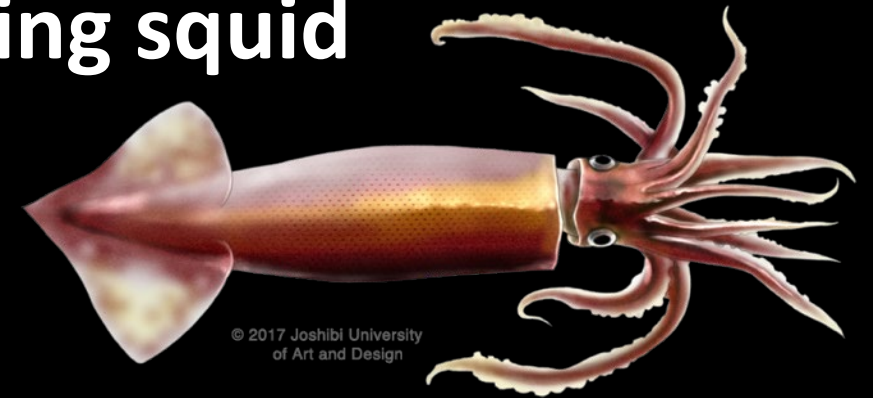


Shiroh Yonezaki
Socio-Ecological Systems Division
Fisheries Resources Institute (FRI), FRA



Topics

- **Decrease in catch of Japanese flying squid**

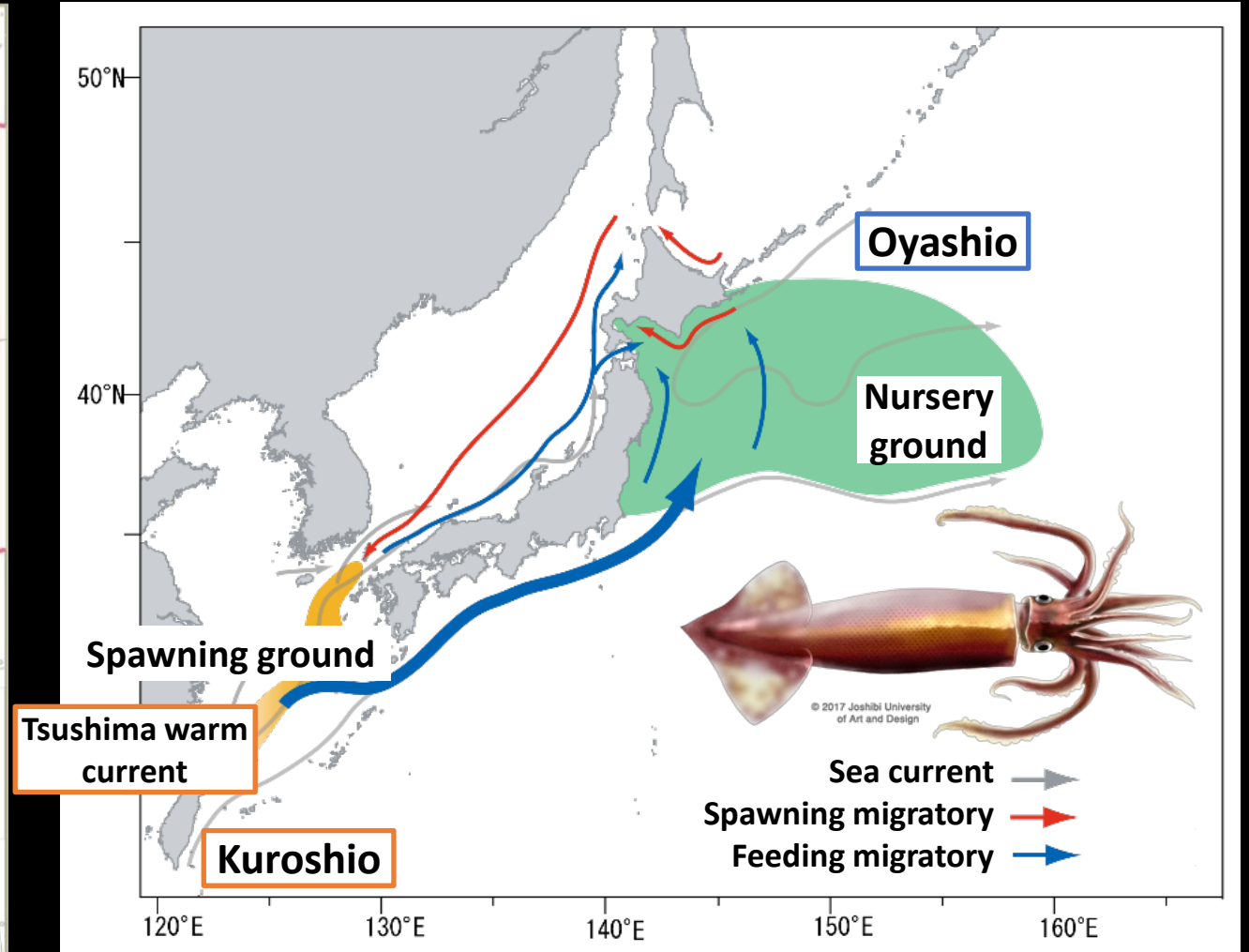
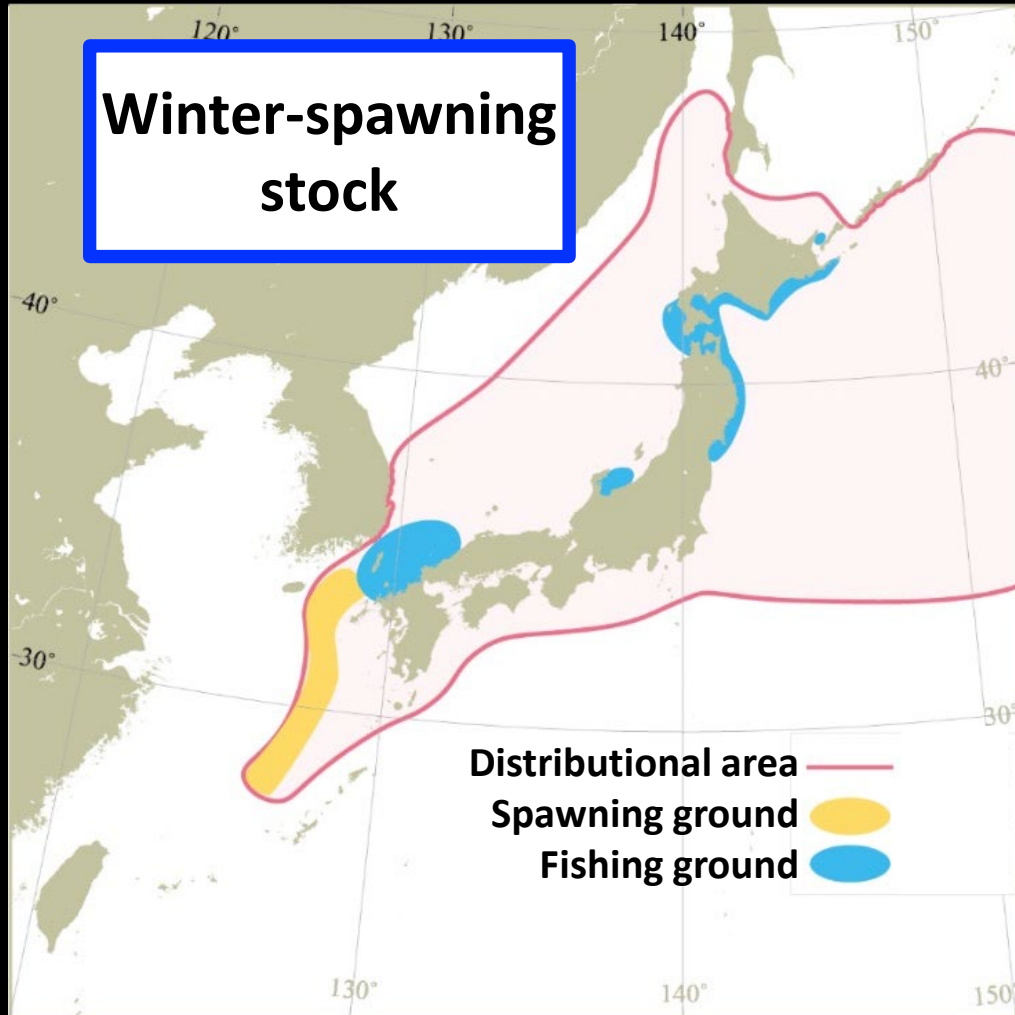


- **Changes in Pacific saury distribution and fishing ground**

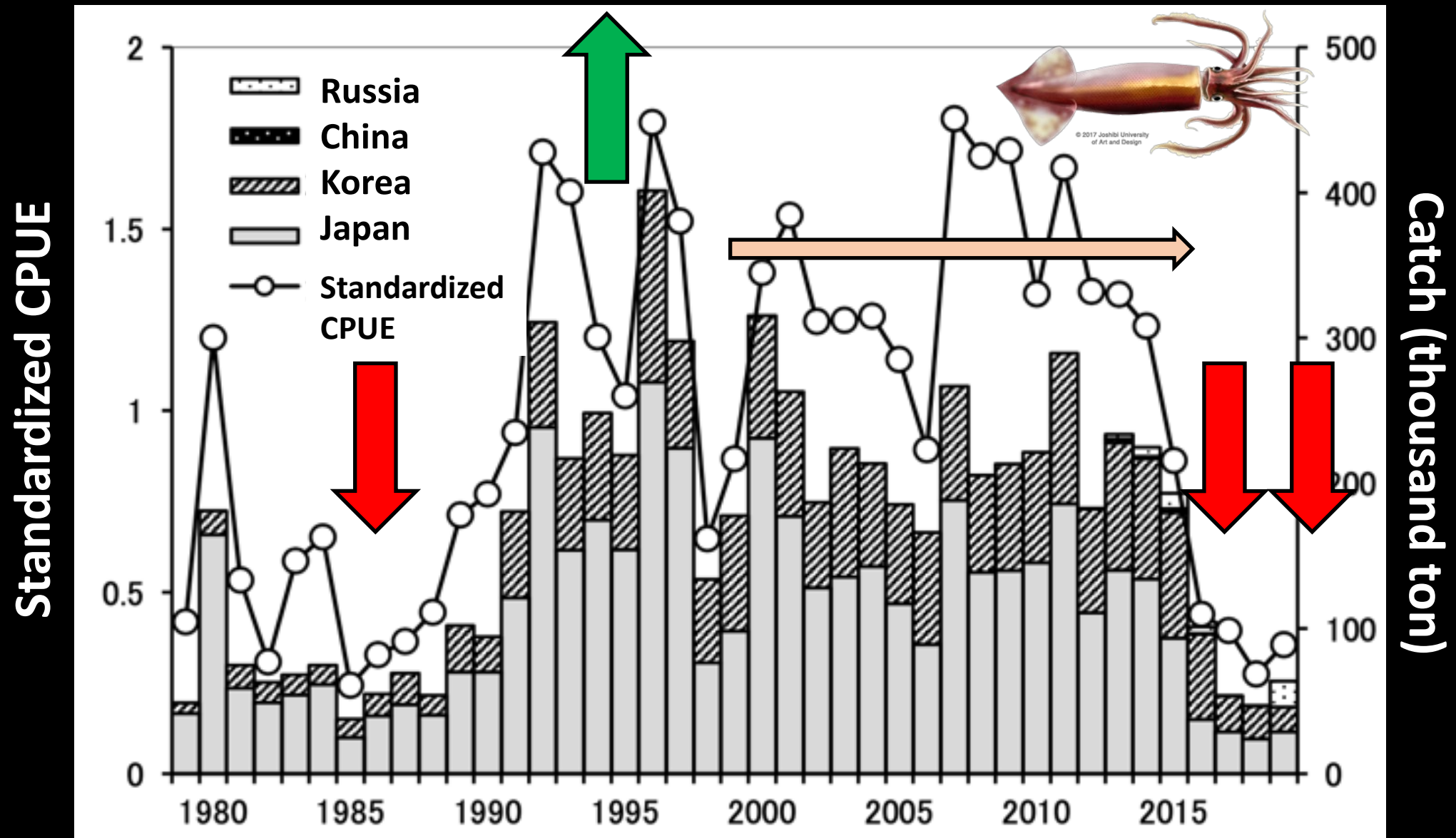


- **Future work**

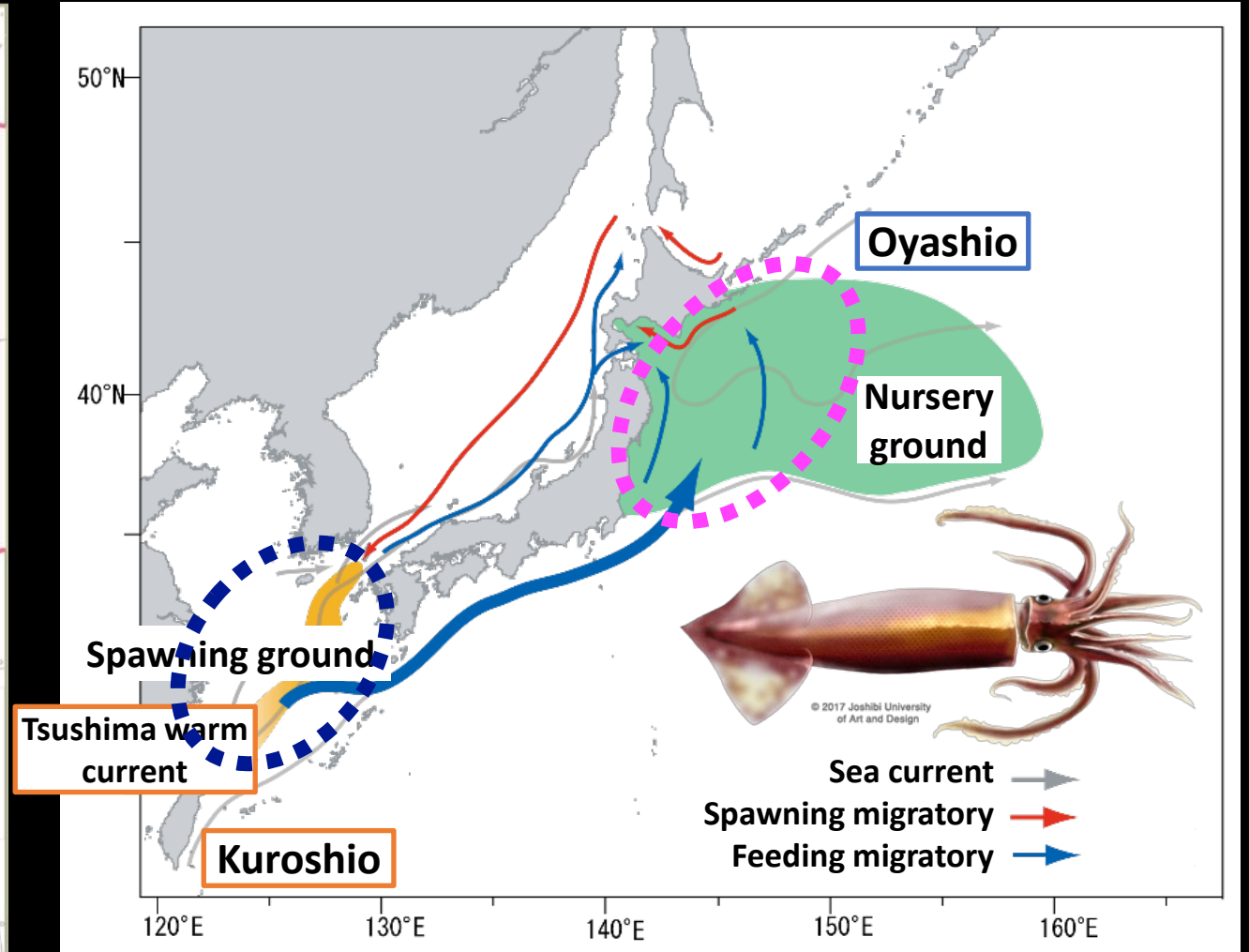
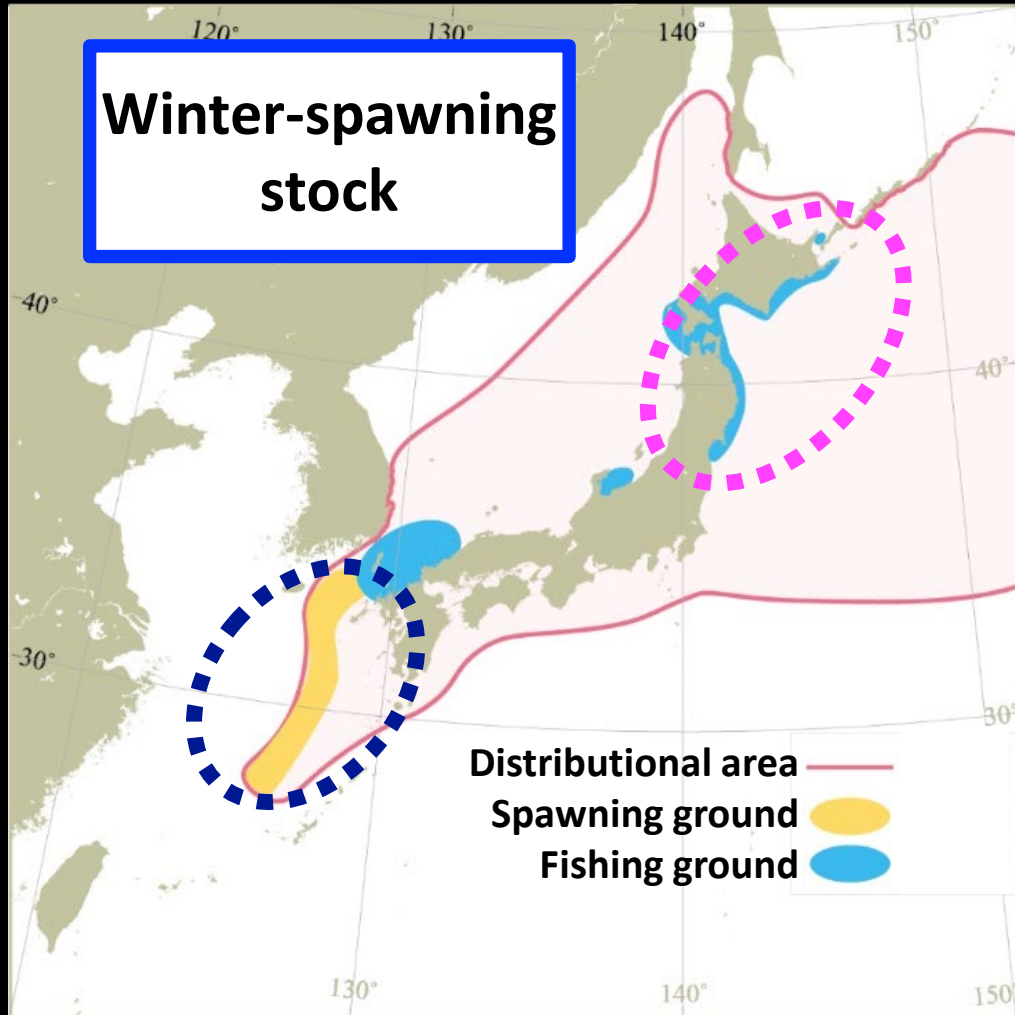
Decrease in catch of Japanese flying squid



Decrease in catch of Japanese flying squid



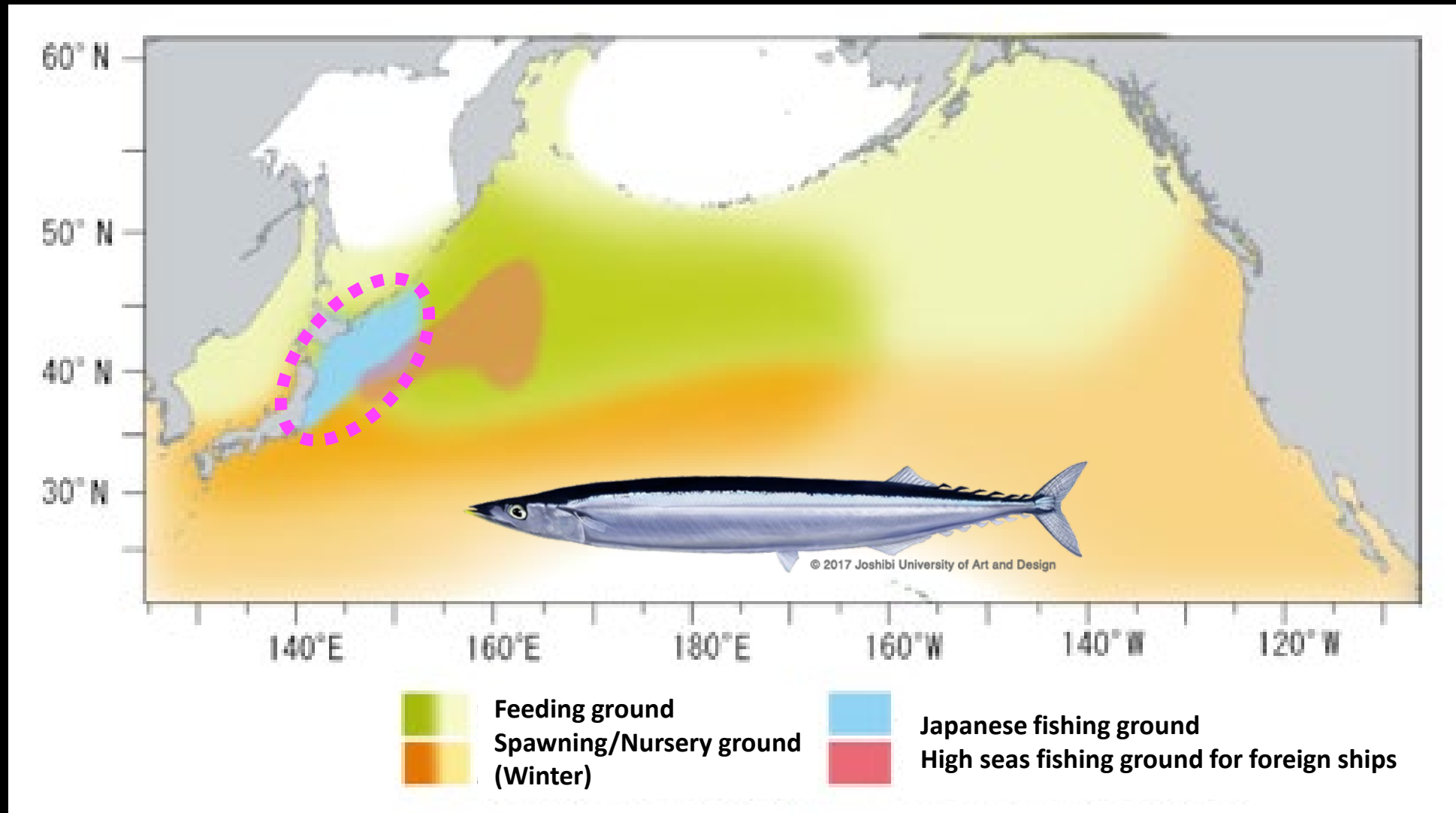
Decrease in catch of Japanese flying squid



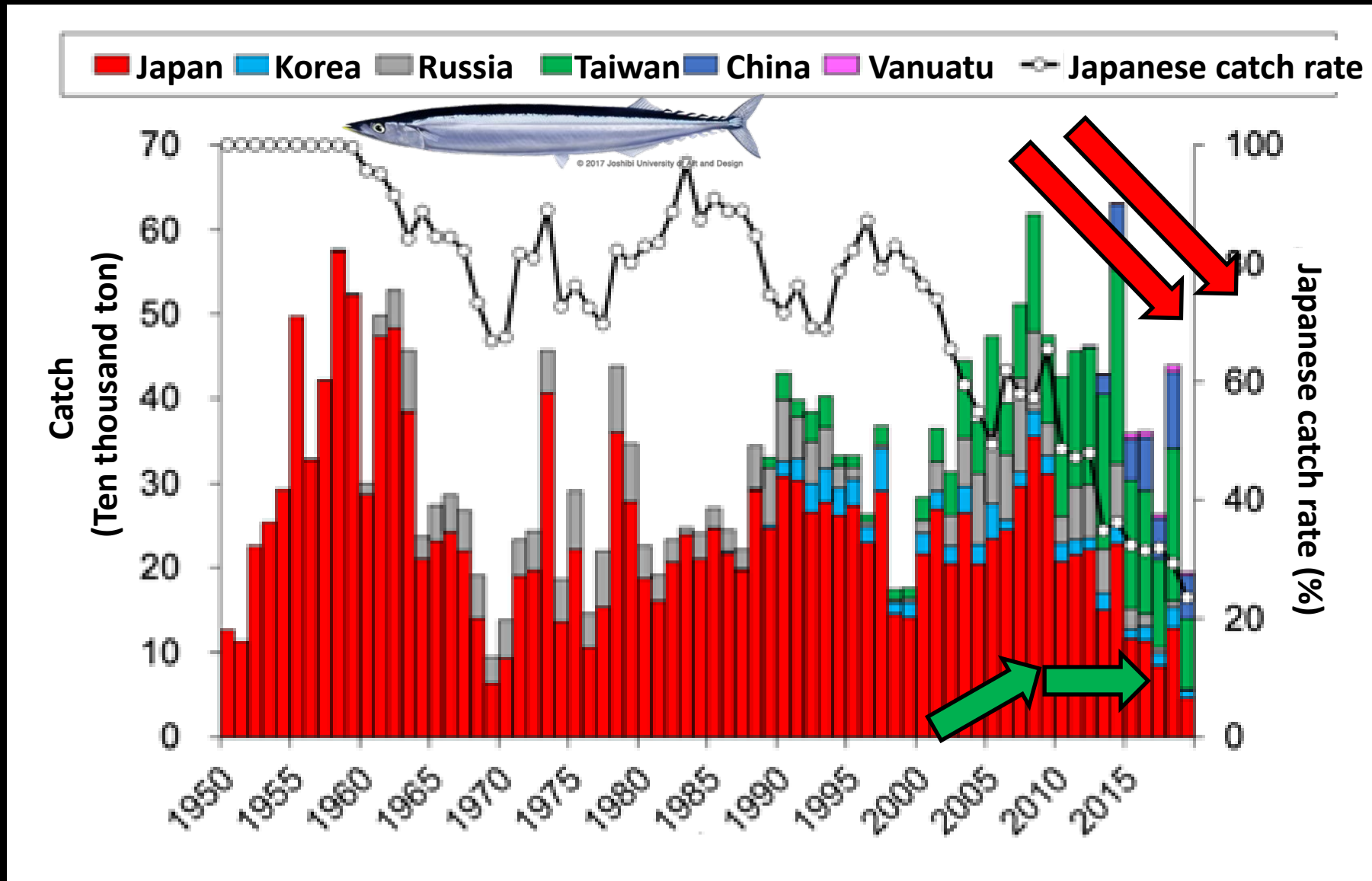
- **Decrease in catch of Japanese flying squid**
- **Rapid water temperature jump in the spawning area**
- **International common understanding of resource trends**
- **AND Securing spawning biomass**



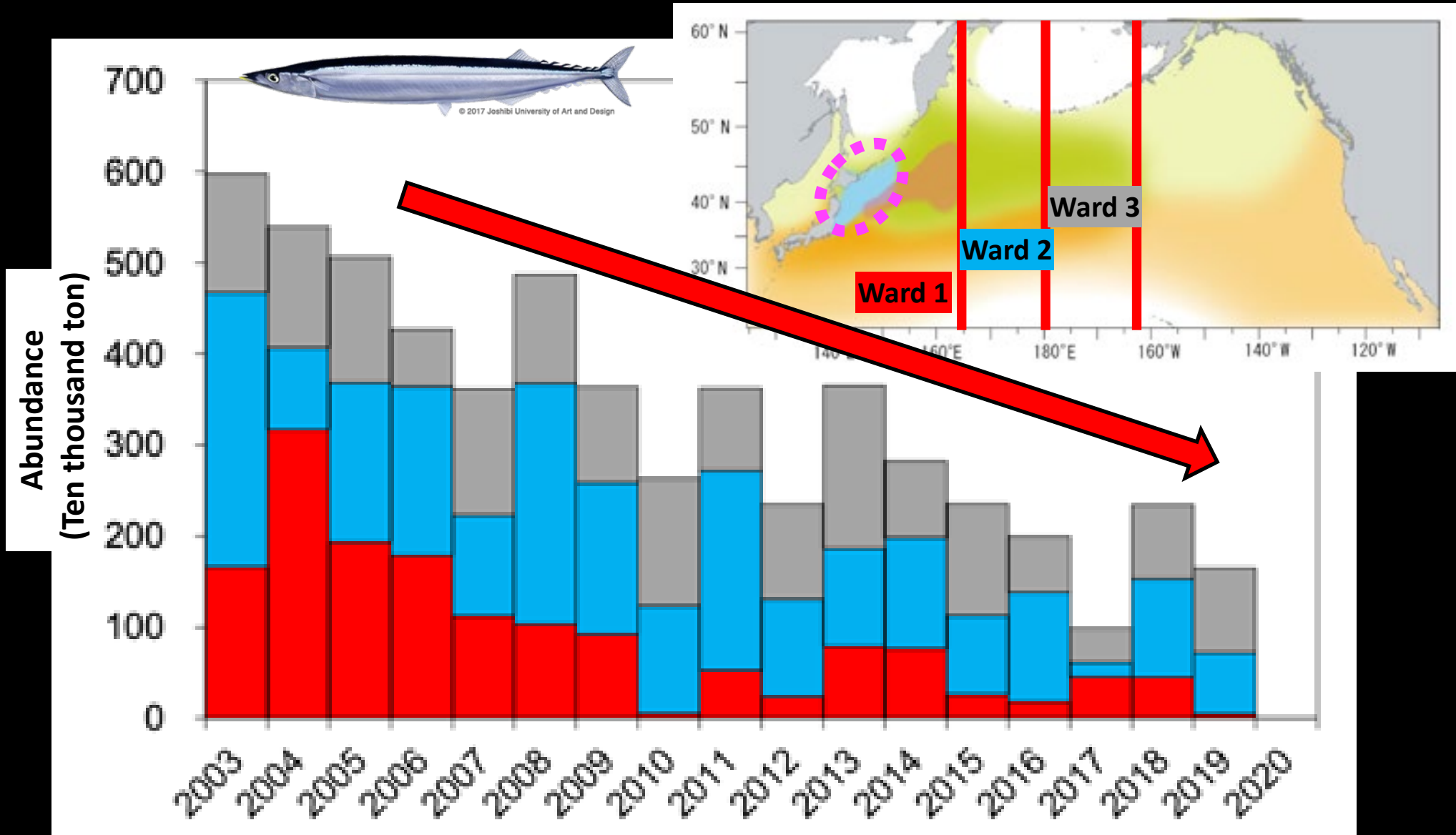
■ Changes in Pacific saury distribution and fishing ground



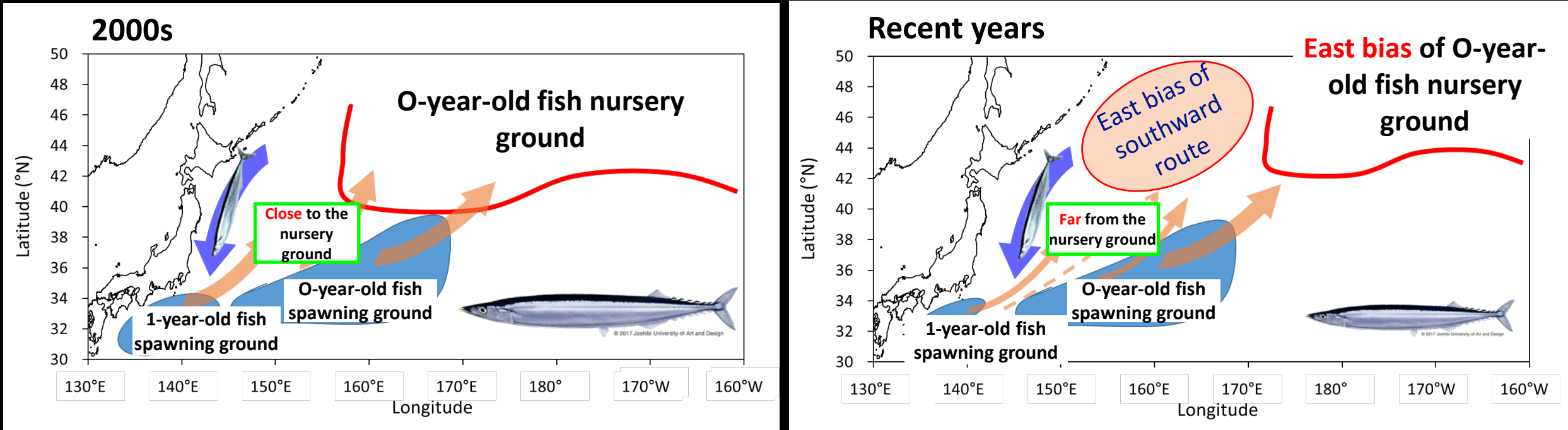
Changes in Pacific saury distribution and fishing ground



Changes in Pacific saury distribution and fishing ground



Changes in Pacific saury distribution and fishing ground



➤ Japanese fishing grounds are offshore, resulting in reduced recent Japanese catches. . .

■ Changes in Pacific saury distribution and fishing ground

□ East bias of spawning migration due to weakening of the Oyashio Current

□ Appropriate resource management based on international cooperation



□ AND **Securing spawning biomass**



□ Future work

- Response of fish stocks to climate change**
- Impact of fishery resources on fishing activities**
- Marine ecosystem response to climate change**

■ Future work

□ Response of fish stocks to climate change

- **Monitoring of ecological response**

Precautionary approach

□ Impact of fishery resources on fishing activities

- **Implementation of stock assessment considering uncertainty**

Fundamental approach

□ Marine ecosystem response to climate change

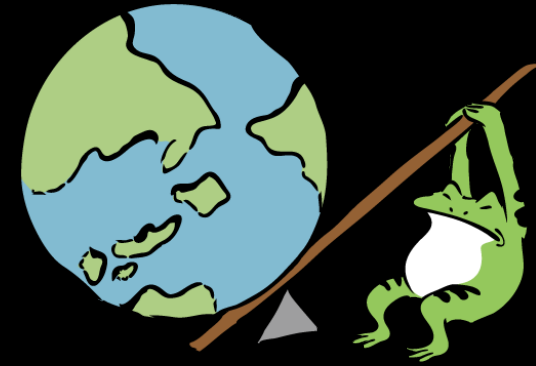
- **Multi-species management to make fishing sustainable**

EBFM approach



SUSTAINABLE
DEVELOPMENT

GOALS



■ Future work

□ Response of fish stocks to climate change

- **Monitoring of ecological response**

Precautionary approach

□ Impact of fishery resources on fishing activities

- **Implementation of stock assessment considering uncertainty**

Fundamental approach

□ Marine ecosystem response to climate change

- **Multi-species management to make fishing sustainable**

EBFM approach

- Understanding and cooperating with governments, fishermen, and consumers through simple and compelling outreach activities



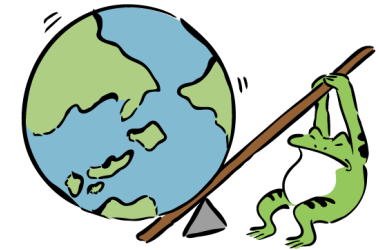
■ Climate change response project for sustainable fishing

- ✓ Understanding the environment that affects **recruitments**
- ✓ Consideration of the environment for **reproduction** relations

Environmentally-informed forecast

- ✓ Presentation of future **forecast map of fish resources** based on climate change forecast scenario

Easy-to-understand and appealing outreach for people



2021
2030 United Nations Decade
of Ocean Science
for Sustainable Development