

# **EXTENDING HAKE ASSESSMENTS TO INCLUDE BOTH SA AND NAMIBIA**

## **WHAT'S NEEDED?**

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# OUTLINE

- I.** The current assessment approach in SA and the data used
- II.** What further issues arise when extending to include Namibia?
- III.** An example from the North Pacific
- IV.** What information do we or will we have that we will need to use?
- V.** The next steps

# I. The current assessment approach in SA and the data used

- **Method** – Statistical Catch-at-Length assessing *M. paradoxus* and *M. capensis* simultaneously
- **Stock structure** – Both species single stocks
- **Movement** – Implicit; modeled by area-specific selectivities (“areas as fleets” approach)
- **Data used** – Catch; CPUE; Surveys; Survey and Catch CAL; ALKs

## II. What further issues arise when extending to include Namibia?

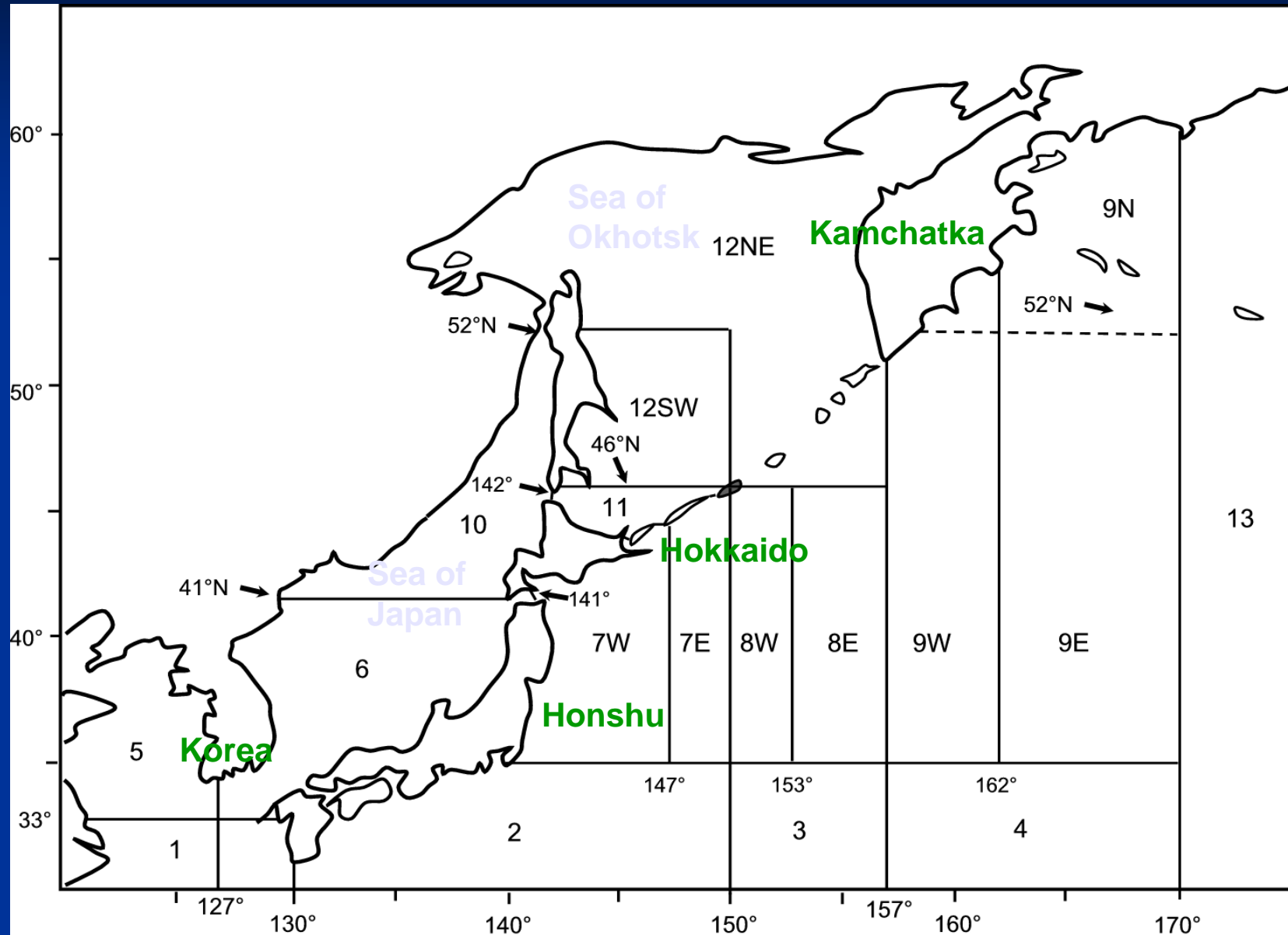
- **Method** – Unchanged (for baseline)
- **Stock structure** – Possibility of multiple stocks of each species, with times/areas of overlap
- **Movement** – Will need to be explicitly modeled, at least to some extent
- **Further data/information needed** – Genetics for stock structure; GeoPop for movement , .....

## II. An example from elsewhere

- **Minke whales in the North West Pacific**

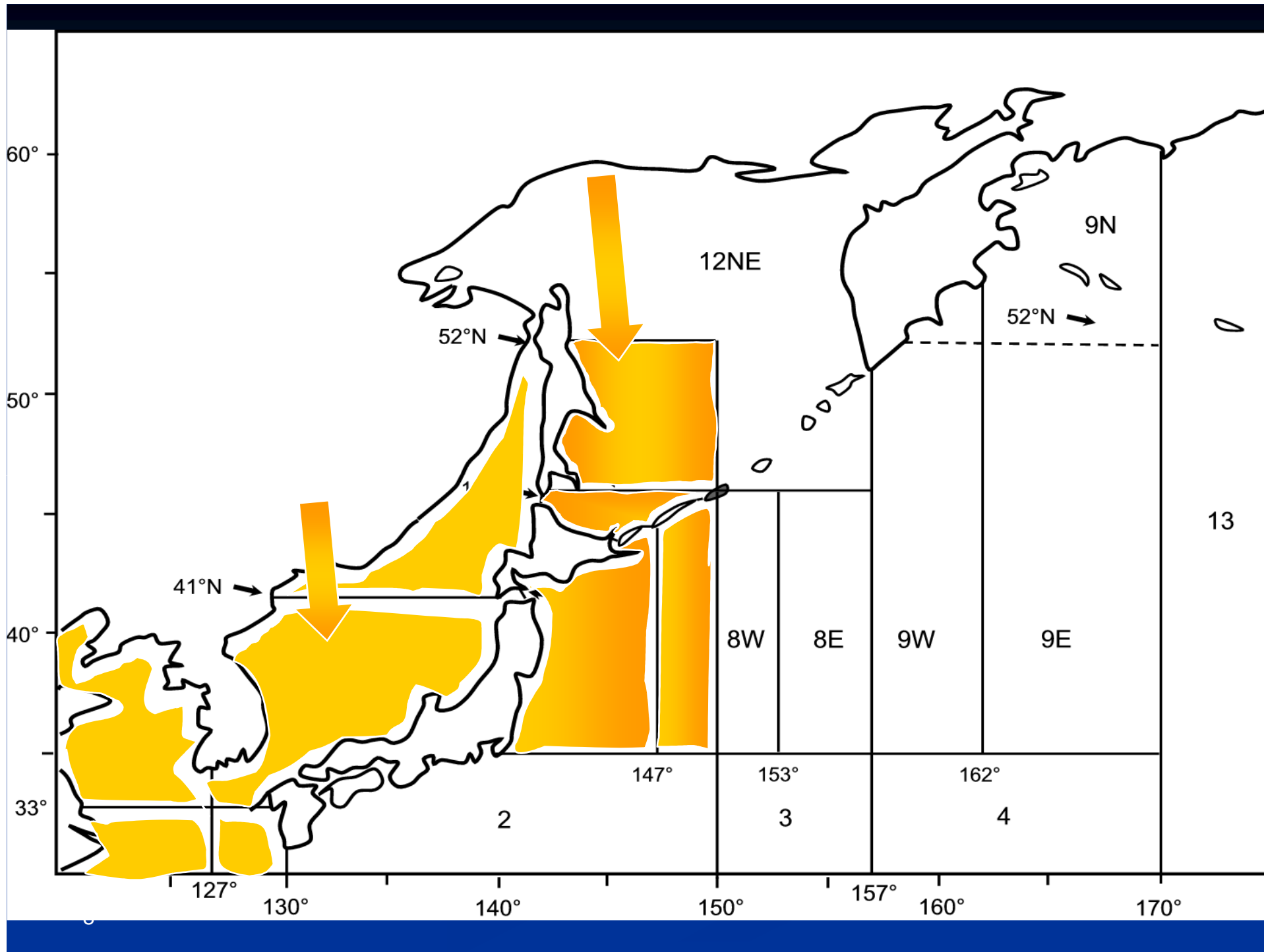
(probably the most complex such model yet developed)

# Western North Pacific



# Focus of MP implementation

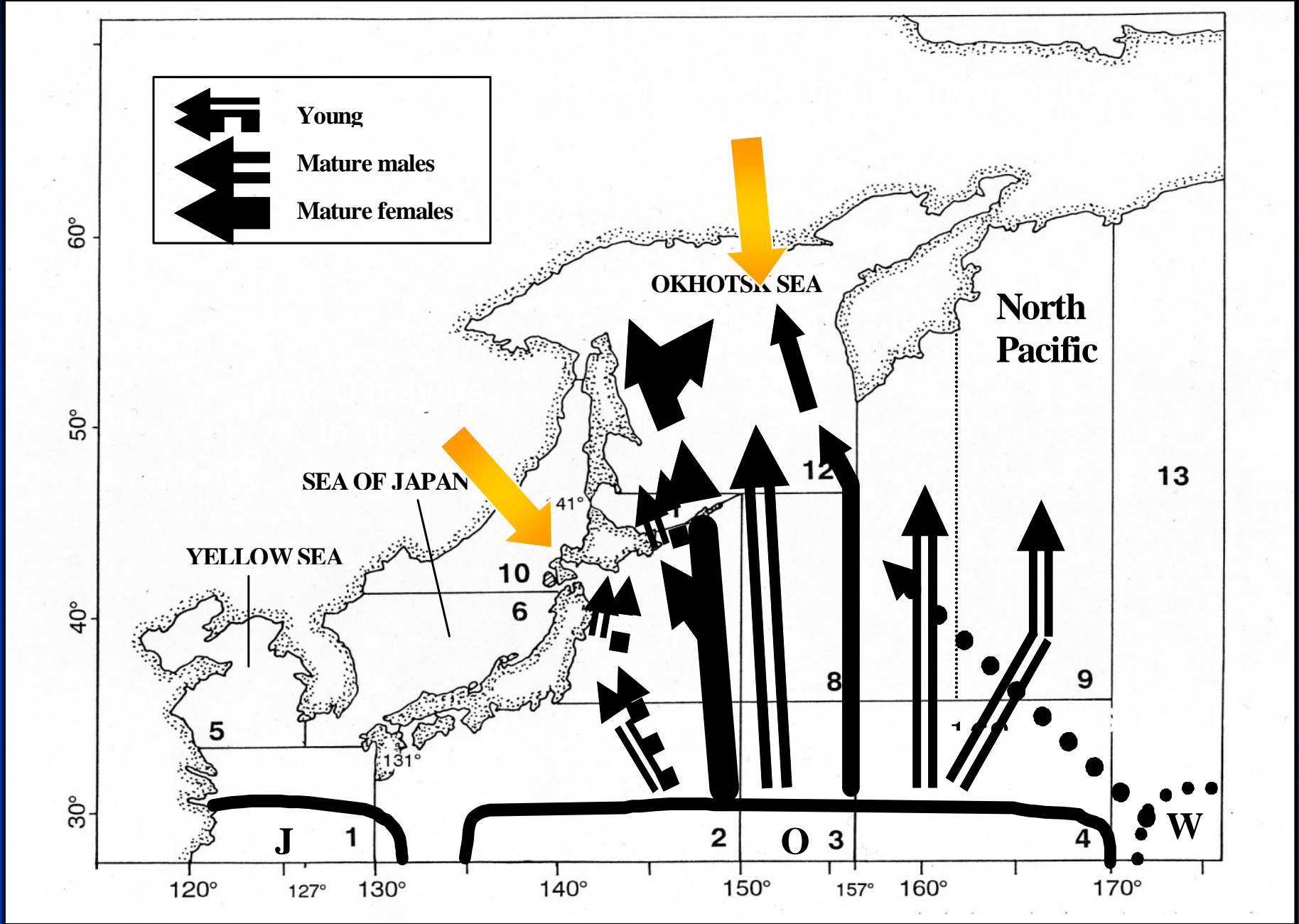
- Primary focus on **minke whales** on Pacific side of Japan
- All hypotheses included a separate J-stock - mainly west of Japan but with some mixing in some months in some sub-areas





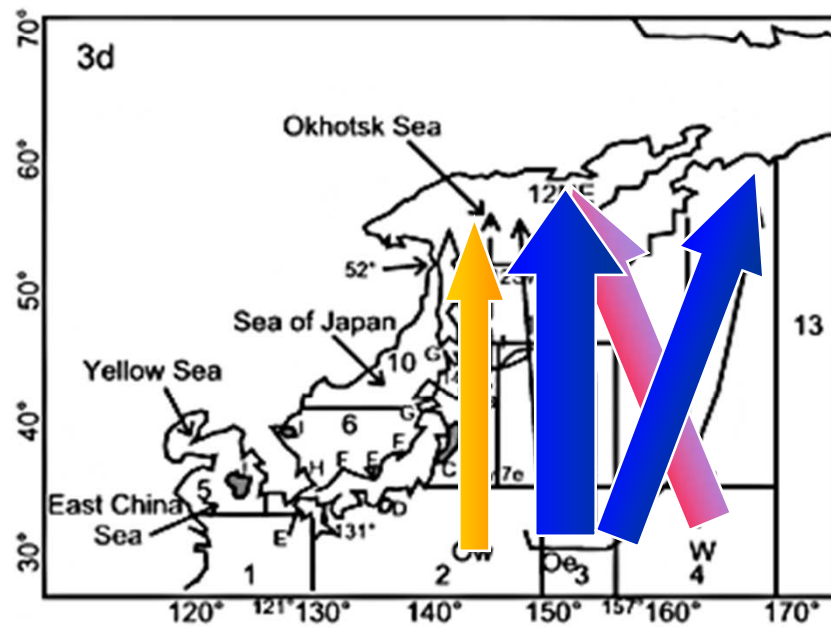
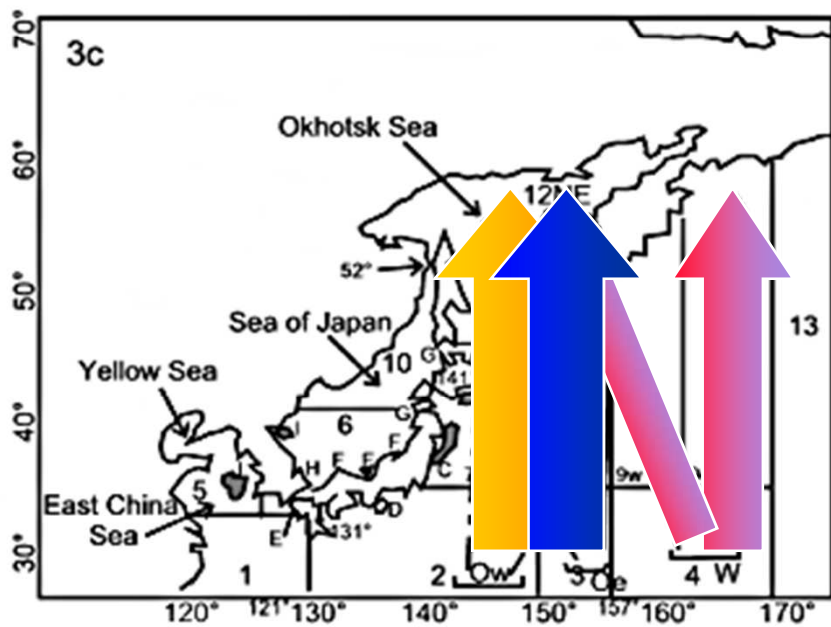
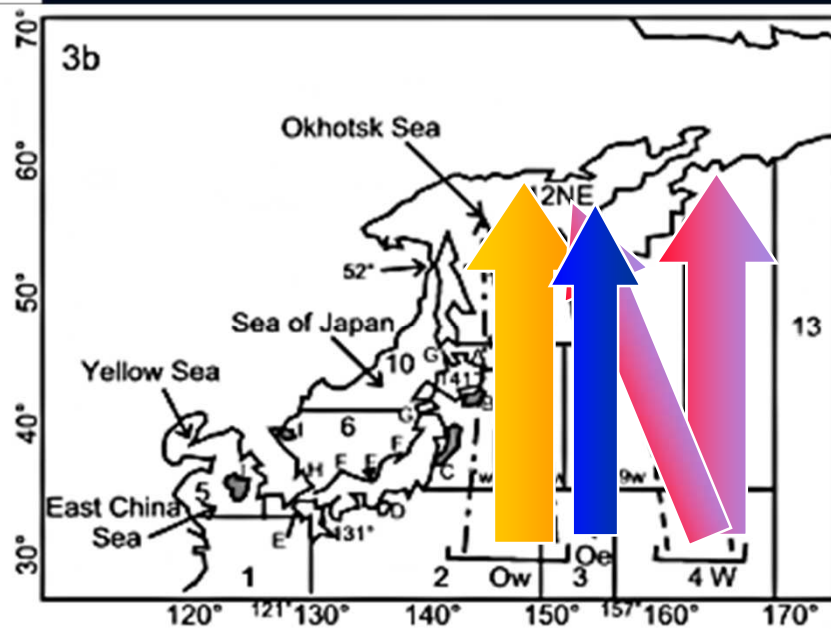
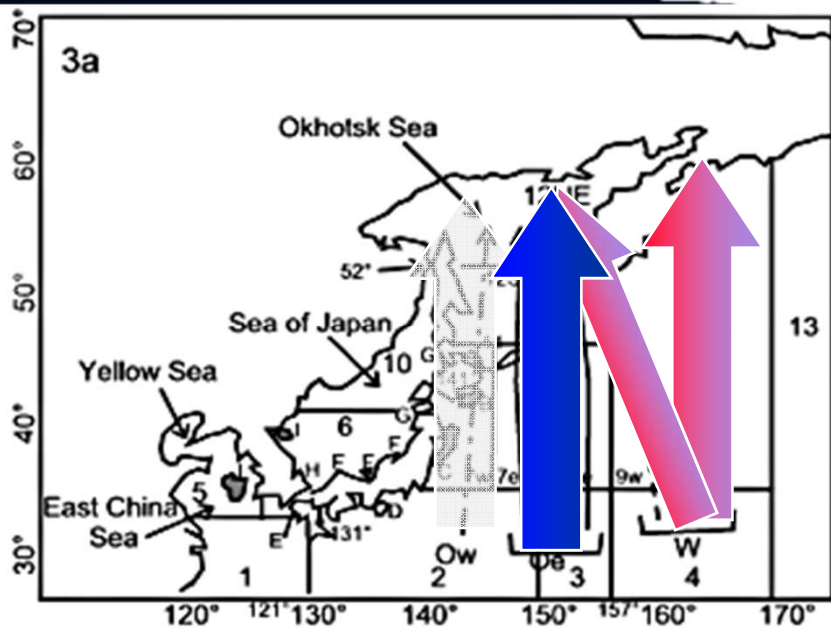
# Baseline Scenerios A and B

- Baseline A (based on hypothesis testing)
  - 3-stocks (J, O, W) [2 –n case of B]
  - W-stock sporadically in sub-area 9
  - O-stock may be in sub-area 10
  - Hypothetic breeding ground locations
  - Possible feeding migrations for ‘O’
  - Temporal mixing of O and J
  - Age – and sex- structure



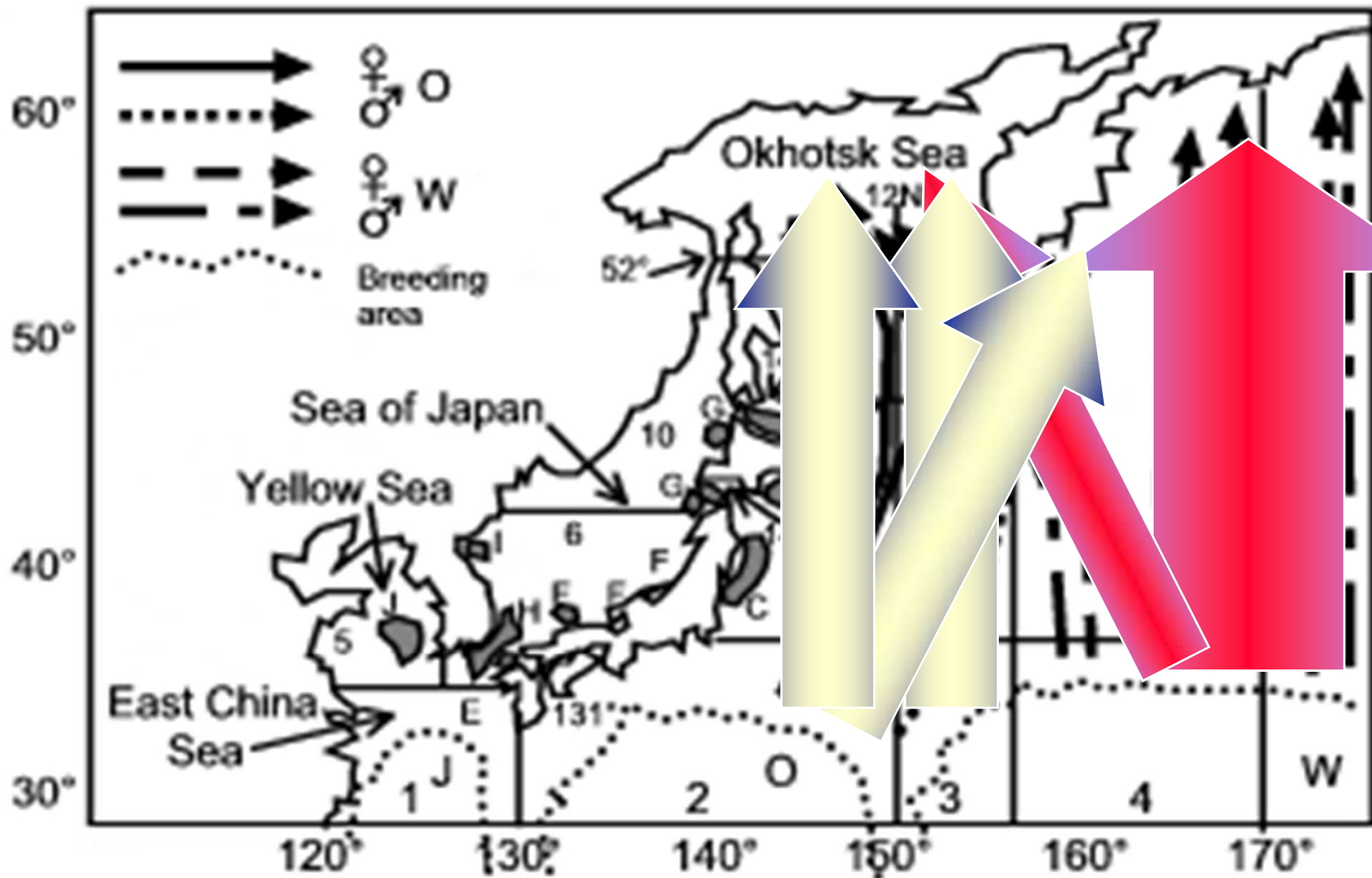
# Baseline Scenario C

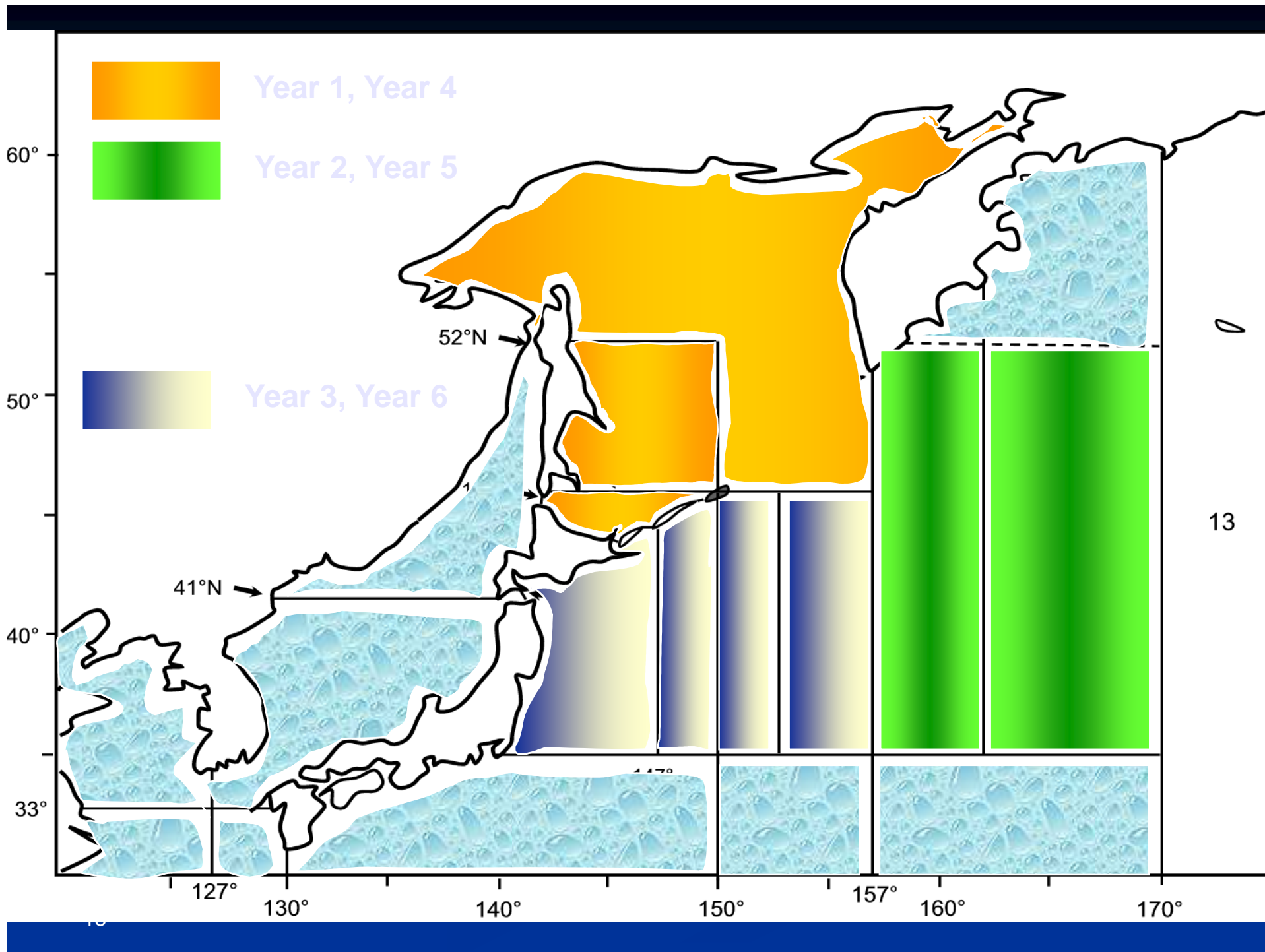
- Based on 'boundary rank' method
- 4 stocks, 3 to west of Japan
- 'preferred hypothesis' – no mixing with boundary at 147E and 158E
- Variants:
  - Ow/Oe boundary at 153E with mixing
  - Further intrusion of Oe into 9E
  - Some mixing of Ow and Oe in 7 and 8



# Baseline Scenario D

- Synthesis
- 3 stock hypothesis (J, O, W)
- O- and W- stocks mix across 147-162E
- O stocks dominate in west
- W stocks dominate in east





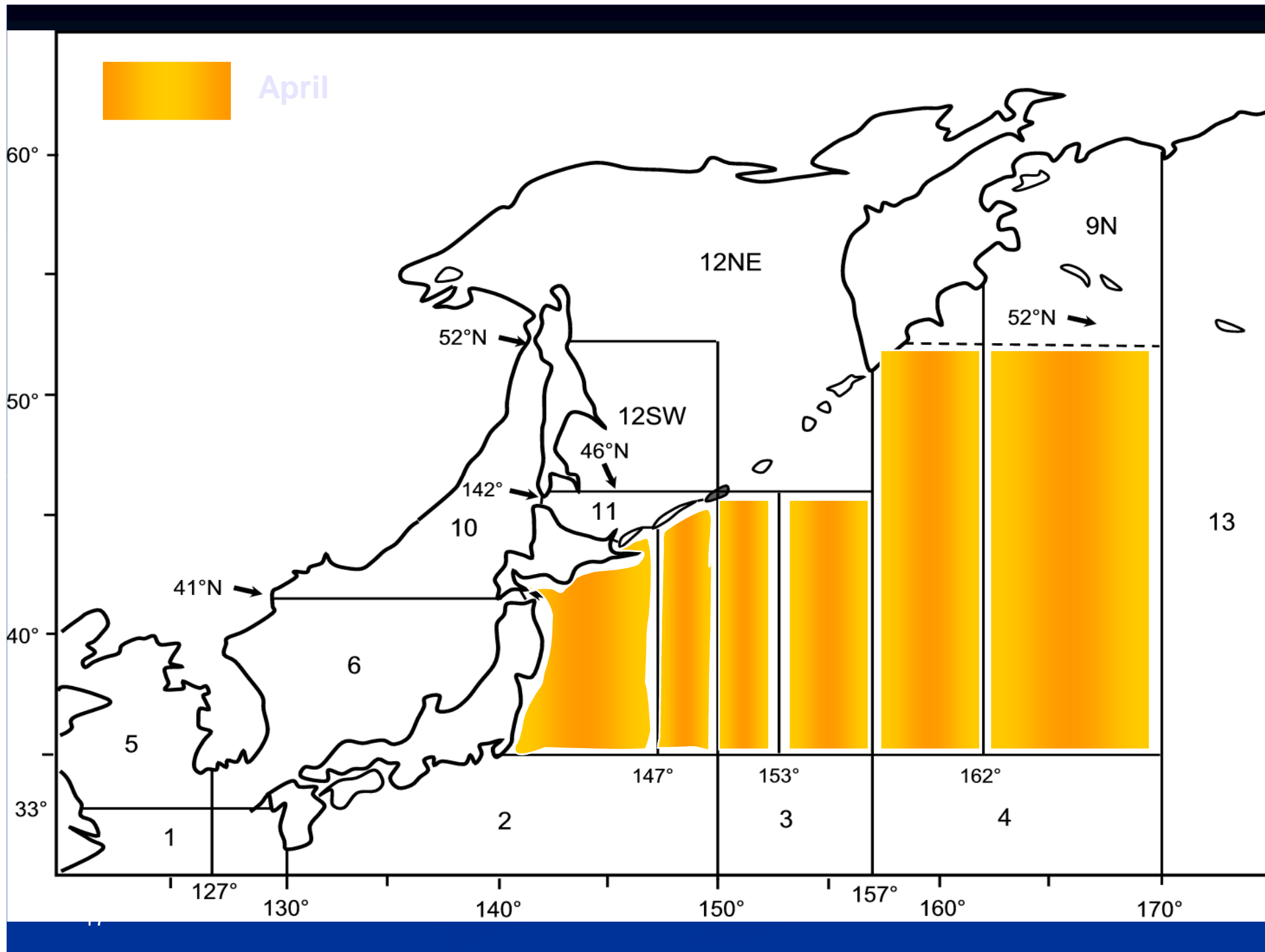
## ■ Catch mixing matrix

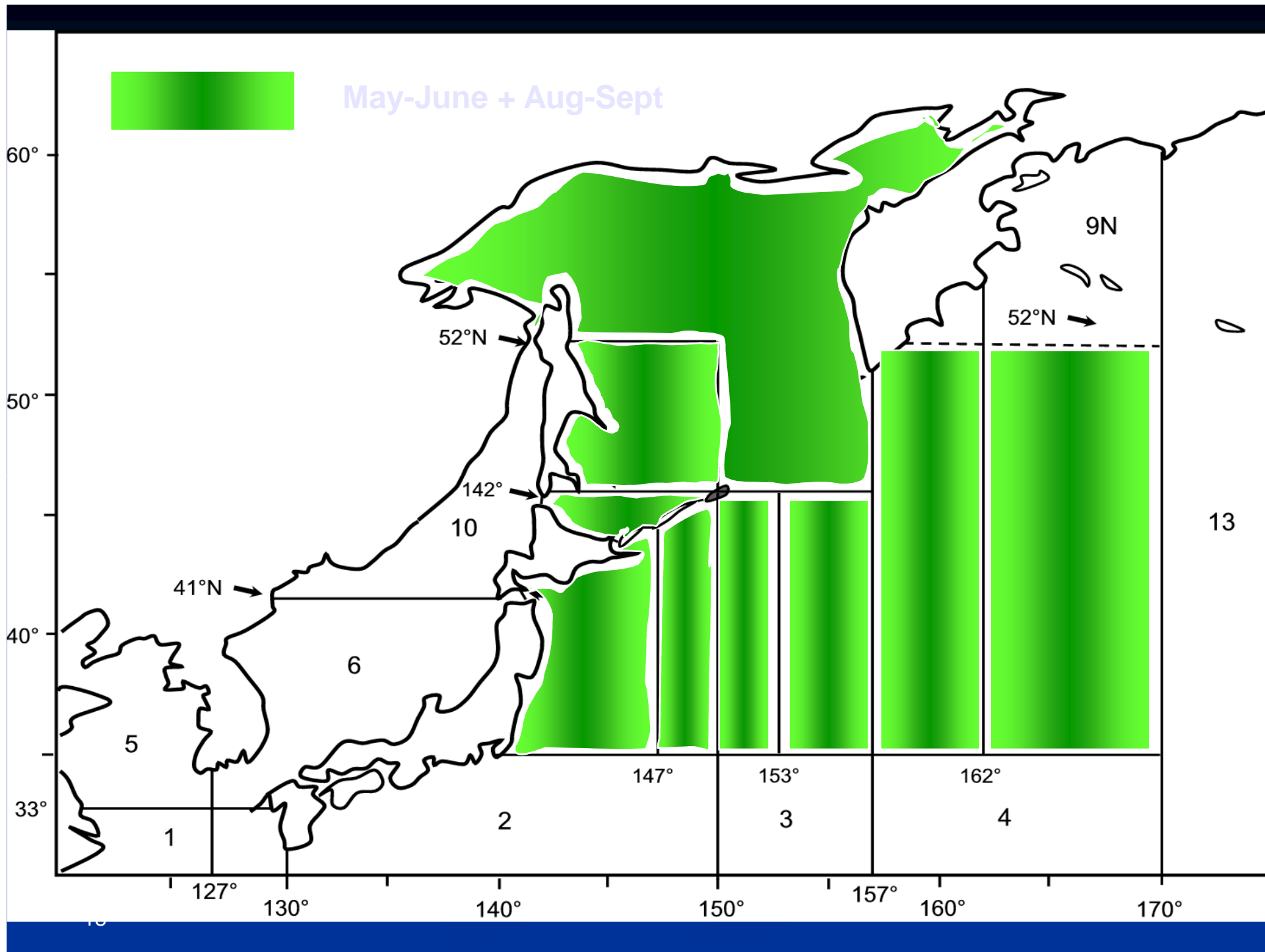
- Specifies the fraction of each stock in each sub-area each month by age and sex
- Juveniles; Males 10+; Females 10+

## ➤ Conditioning

- **Select values for the operating models so that they adequately**
- **(1) mimic the data and**
- **(2) the dynamics of the scenario**
- **In the context of evaluating performance**







# TRIALS

- 4 baseline, 1% and 4% MSYR, J-stock at 30%K

## Sensitivity

- J-stock depletion, 15-70%
- MSYR 1-4%
- Various levels of mixing and intrusion
- Various assumptions of bycatch (Japan and Korea)

# KEY LESSONS FOR THE HAKE CASE

- **Many stock structure models arguably compatible with the data**

Exclusions were difficult to reach agreement upon

- **All of these different models needed to be fitted to the data**

Complex and time consuming assessments

- **How did non-standard further data reduce the number of possibilities?**

Genetics informed on the relative proportions of different stocks in a sub-area at different times of the year

# Relative Plausibilities of Scenarios

- Is it plausible to agree on plausibility?

# IV. What information do we or will we have that we will need to use?

- **Genetics**

  - Number of stocks per species and overlap proportions

- **GeoPop**

  - Alternative movement hypotheses (surveys, CPUE)

- **Spawning patterns in time and space**

  - Inform on both stock numbers and on movement

- **Morphometrics, parasites, ageing**

  - Probably less likely to provide definitive input

## V. The next steps

- **This meeting**

Initial development of alternative stock structure and movement scenarios

- **Meeting re modeling (Copenhagen late May)**

How to implement scenarios in assessment models

- **November biologists meeting (Cape Town)**

Refine scenarios given final genetics results

- **International stock assessment workshop**

**(Cape Town 1-5 December)** Finalise on scenarios and how to fit assessments models to them

**Thankyou for your attention**

**With thanks to Greg Donovan (IWC) for  
minke whale slides**