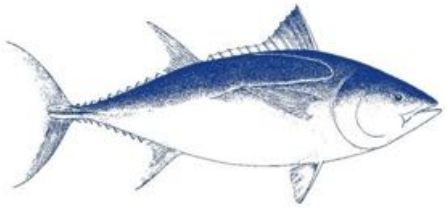
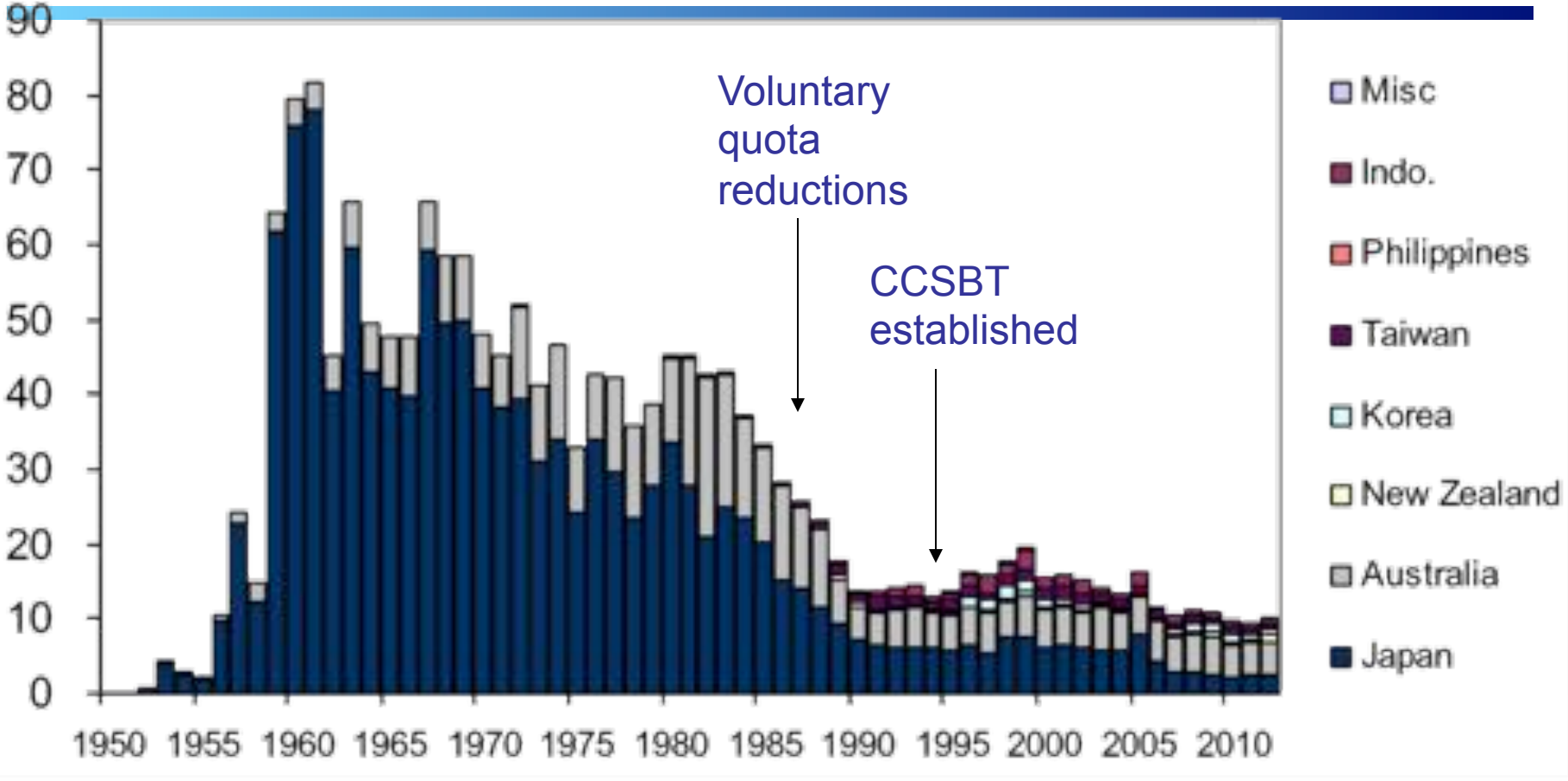
MSE for the southern bluefin tuna (SBT)

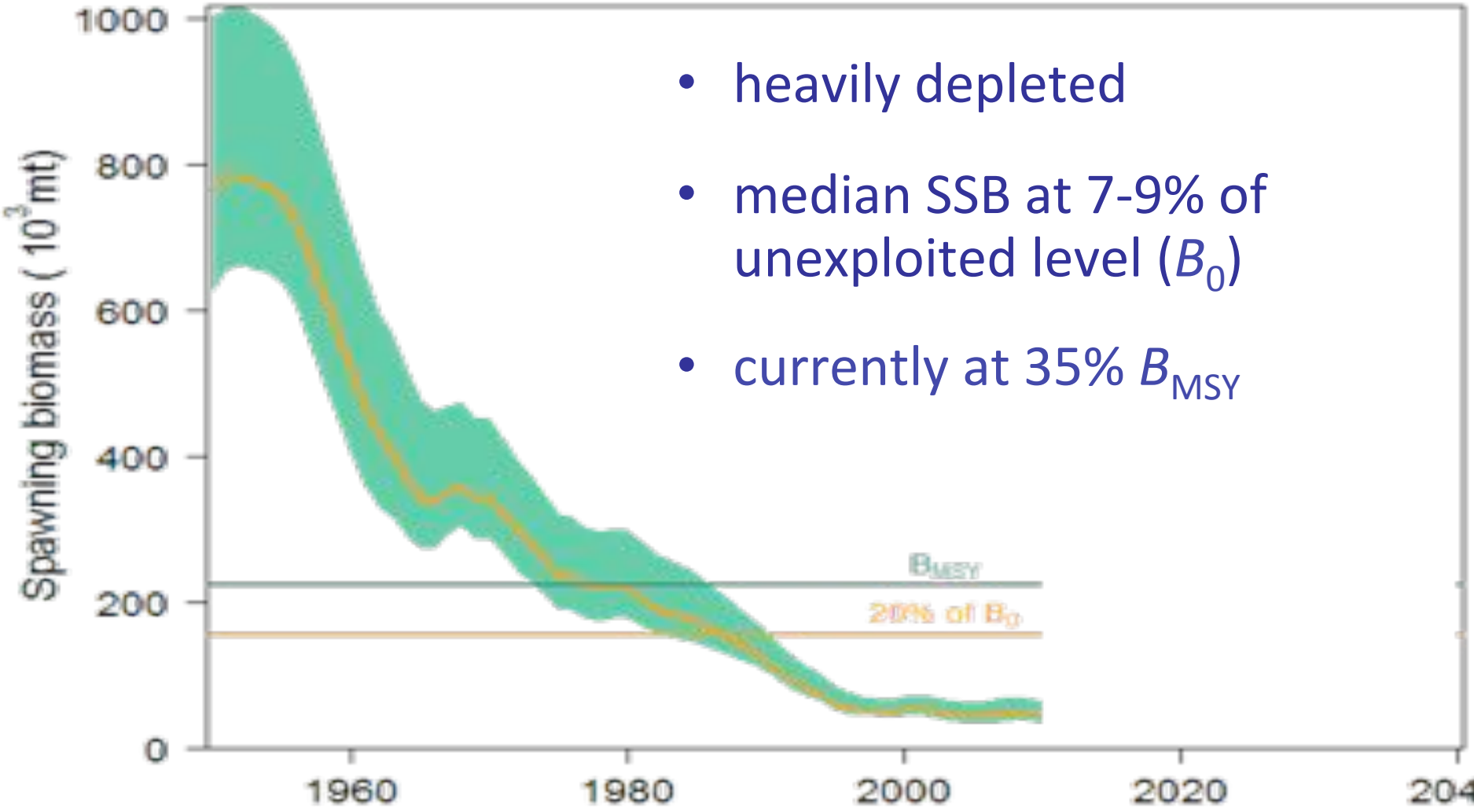


SBT reported catch by flag (in 1000 tonnes)



Heavily fished in the past, with the annual catch reaching 80,000 t in the early 1960s, now down to about 12,000 t.

SBT stock status



- heavily depleted
- median SSB at 7-9% of unexploited level (B_0)
- currently at 35% B_{MSY}

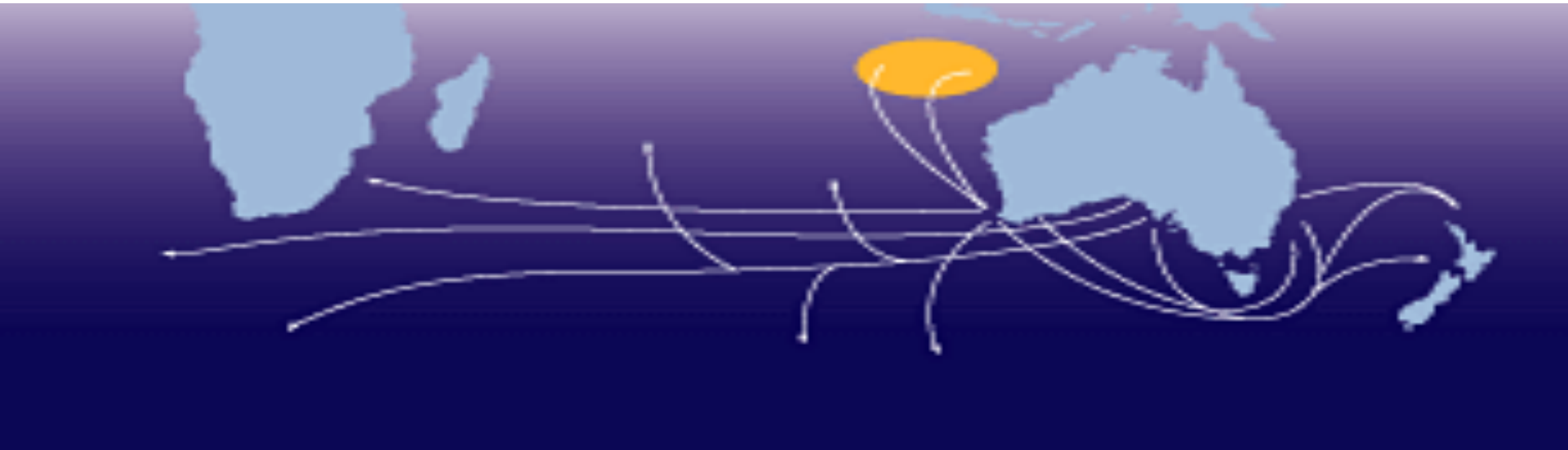
In 2001 CCSBT approved a multi-year plan for the Scientific Committee to design a rebuilding plan for SBT

Member country and external scientists designed simulation-testing protocols

Proposed and evaluated different candidate management procedures (strategies)

CCSBT convention objective

To ensure, through appropriate management, the conservation and optimum utilisation of southern bluefin tuna



Background

"Classical" stock assessment -> TAC approach failed

- Restructured scientific advisory process (2000)
  - ➢Independent chairs for SC
  - ➢Independent advisory panel

Task:

- ➢Develop Management Procedure
  i.e., a **harvest control rule (HCR)**

The task

- Define "operating models"
  - Incorporate uncertainty about the stock, dynamics and sampling
- Use to test candidate HCR
  - Proposed by member scientists

Find HCR that is robust to uncertainties, achieves rebuilding objectives and maintains a viable industry

The approach

- Annual workshops (4) with very clear terms of references and benchmarks
- All scientists used same code and agreed protocols for testing procedures
- Iterative consultative process
  - Informed stakeholders and
  - Got feedback about alternatives and priorities between conflicting objectives
- Candidate HCRs evaluated by agreed performance statistics

Step 1- Choice of operating models

Key axes of uncertainty

- Level of productivity (*steepness of SR*)
- Level of natural mortality
- Interpretation of CPUE

Currently an ensemble of 320 “models”

Translating convention objective to HCR Testing

- Managers define explicit goals/objectives
- Scientific Committee tasked to design a strategy (MP) to meet those goals/objectives

What managers and industry wanted

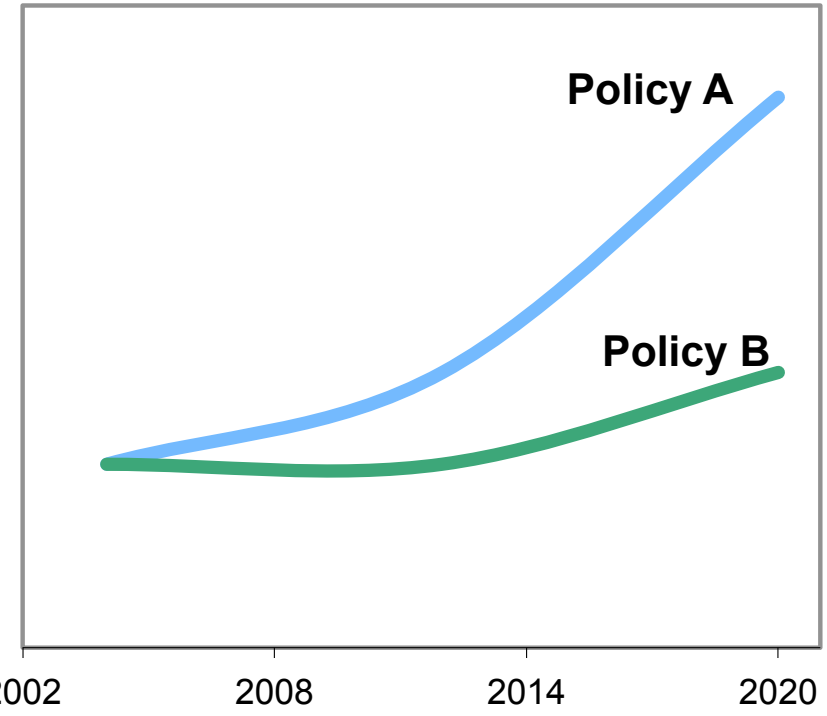
- Rebuild the stock to 1980 levels by 2020
- Reduce short-term risks to the stock
- Hold catches at current levels or higher if the stock increases
- Reduce year-to-year variability in catches

Evaluating trade-offs needed for informed decisions

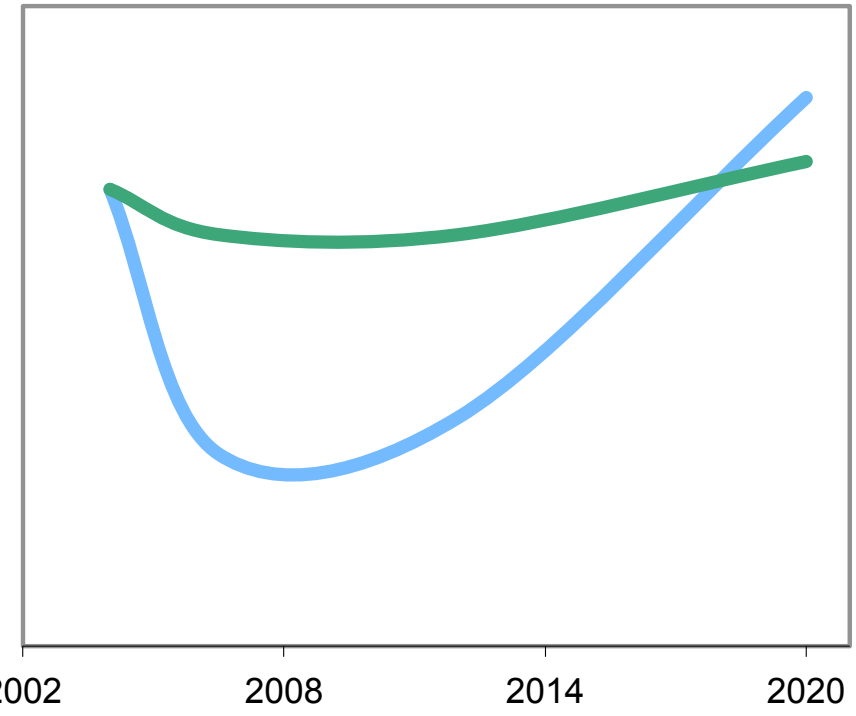
Primary trade-off

Between rebuilding rate and average catch

Spawning biomass



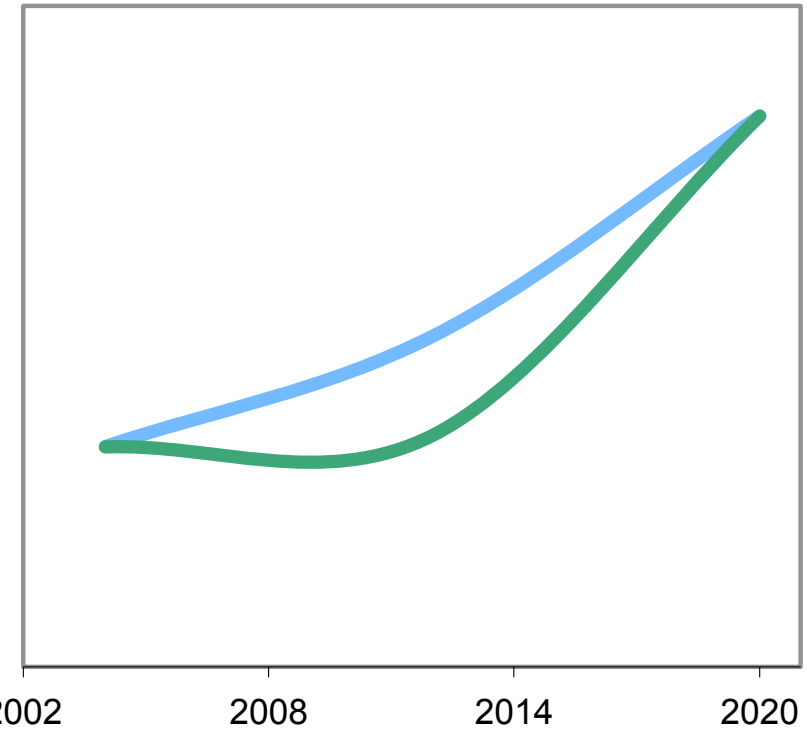
Catch



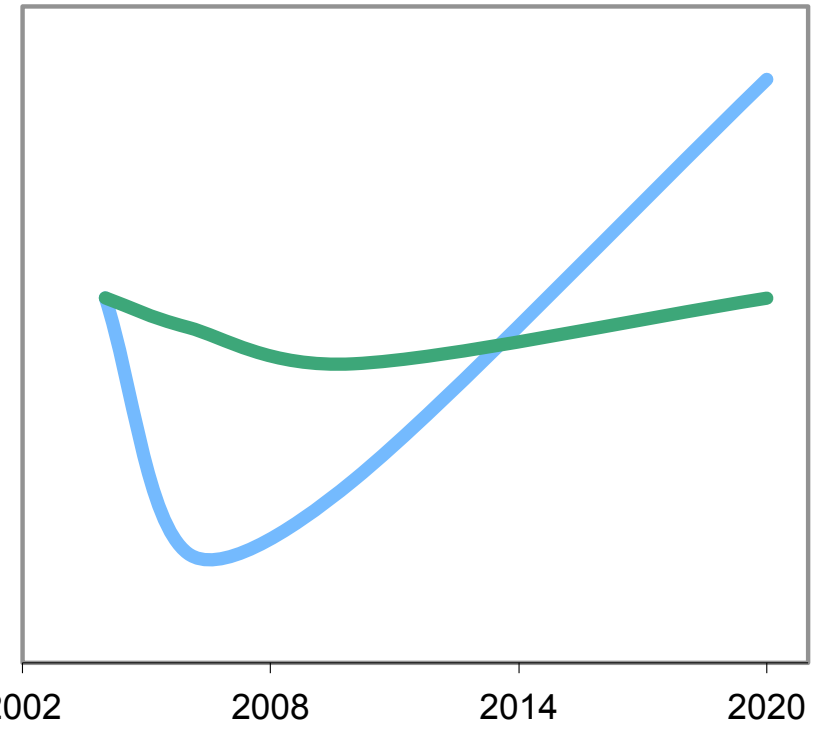
Secondary trade-off

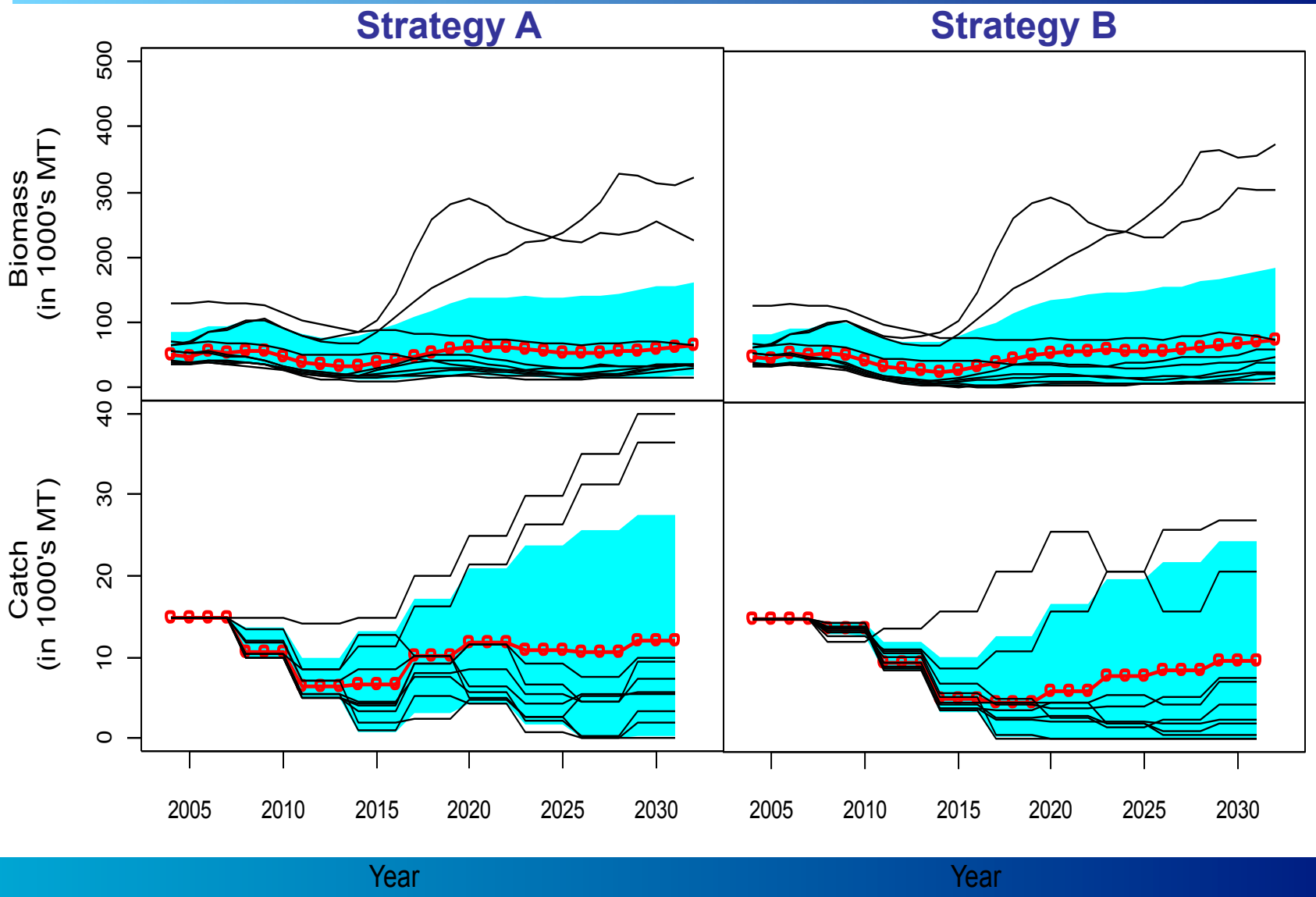
Candidate HCR “tuning”
Achieve same rebuilding (in median terms)
trade-offs between short-term catch stability and risks examined

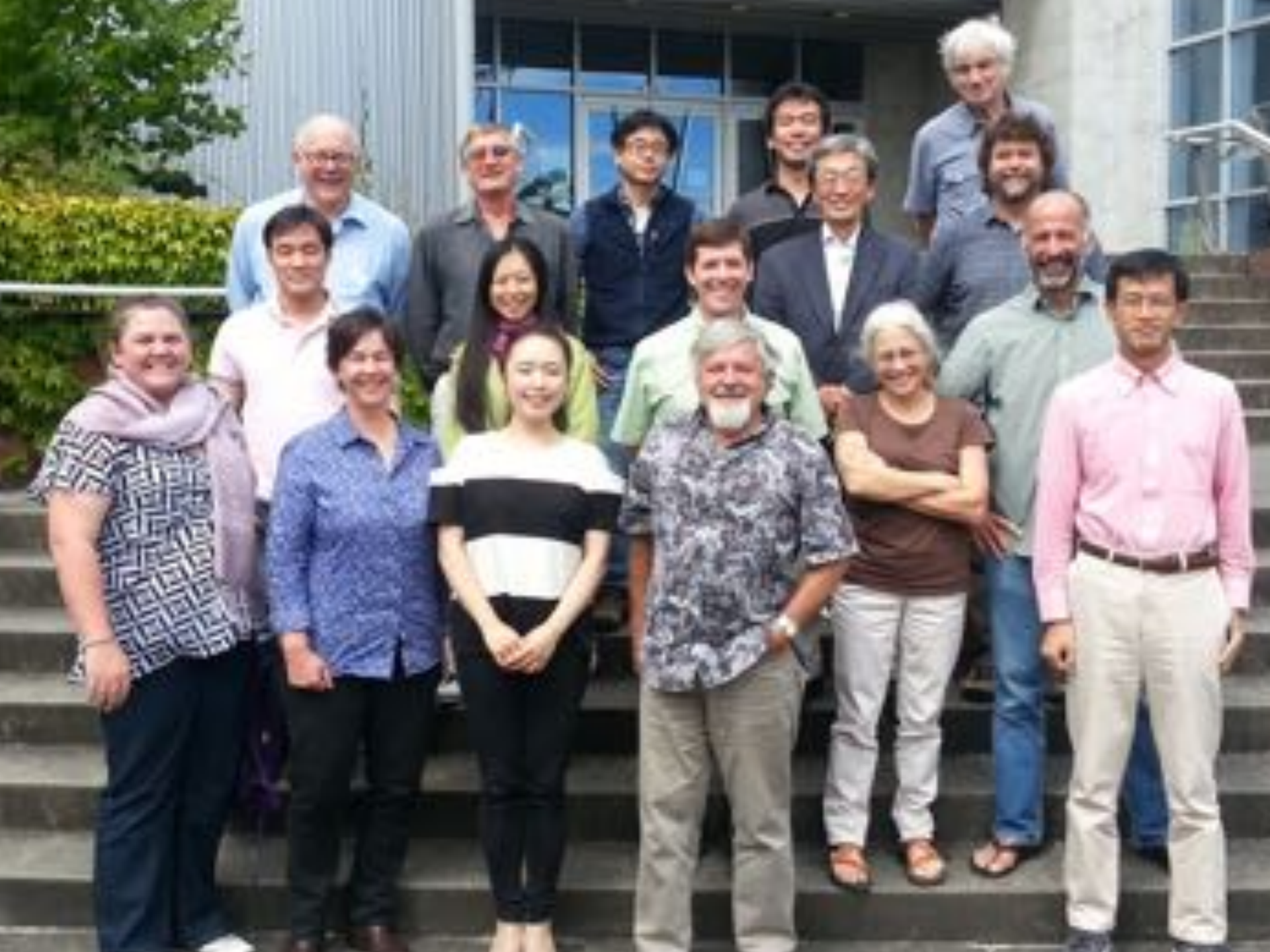
Spawning biomass



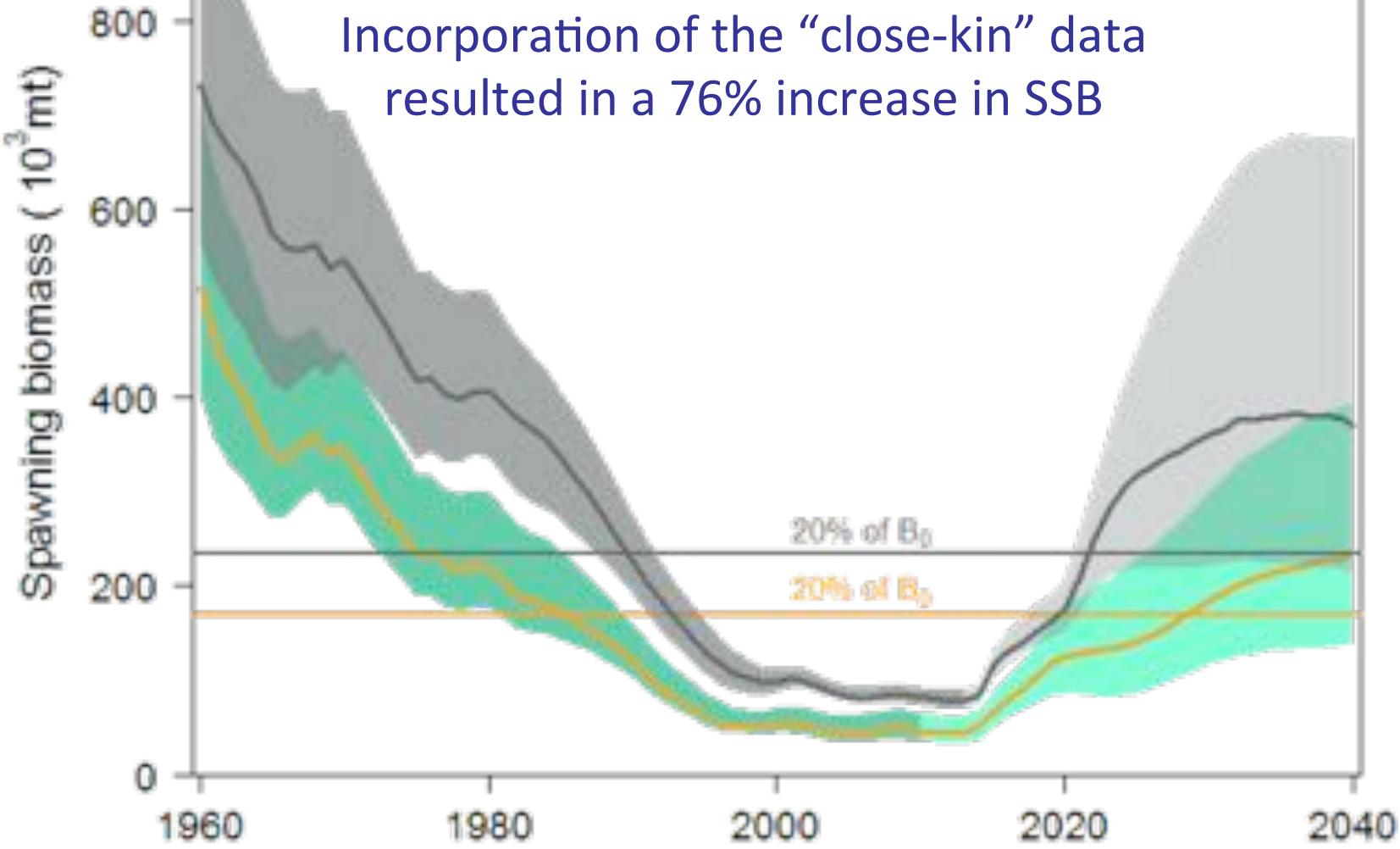
Catch




Strategy A
Strategy B
Biomass
(in 1000's MT)
Catch
(in 1000's MT)
0
100
200
300
400
500
10
20
30
40
2005
2010
2015
2020
2025
2030
Year
Year



Incorporation of the “close-kin” data resulted in a 76% increase in SSB



A major change in the stock assessment did not lead to a change in the recommended MP

Summary of CCSBT MSE

- Changed focus of scientific process **from** endless debates on abundance estimates and TACs **to** discussion of the testing protocols used for developing effective decision rules

- Testing of alternative decision rules transparent to all members

- Valuable exchanges between industry, managers and scientists

Communication key