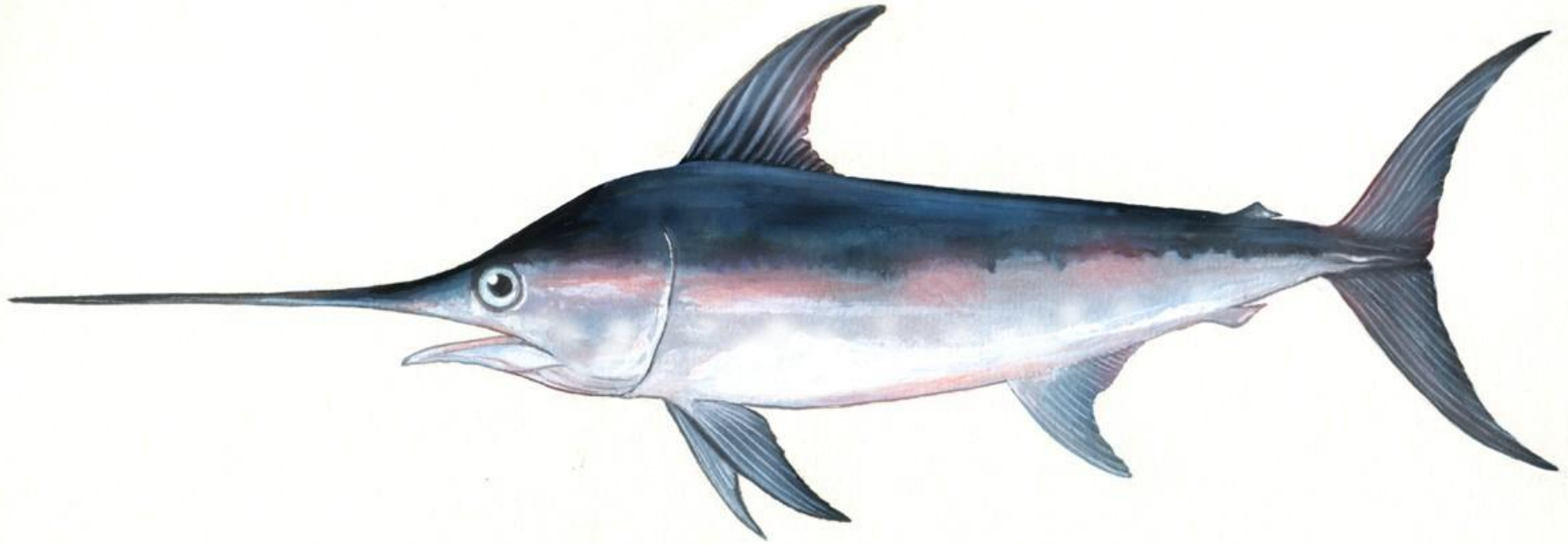# Rebuilding International Fisheries – The Examples of Swordfish in the North and South Atlantic

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(Chairman, Standing Committee on Research and Statistics (SCRS) of ICCAT)
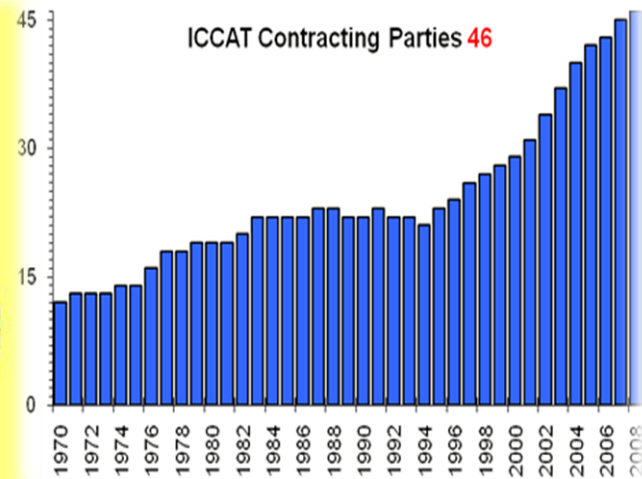
Fisheries and Oceans Canada   Pêches et Océans Canada

1. Introduction to ICCAT -- the Regional Fisheries Management Organization (RFMO) responsible for management of swordfish in the Atlantic.

   a) Benchmarks for successful management – MSY based.
   b) How advice is conveyed from Science (SCRS) to decision-makers.

2. The ICCAT assessment process and the "report card" for stocks within its purview.

3. Swordfish – Atlantic overview, the value of the catch and method of assessment.

4. Stock status of swordfish.

5. History of management actions taken, and the response of the population.

6. Swordfish success story -- biological resilience or good management?

7. Future challenges for management.
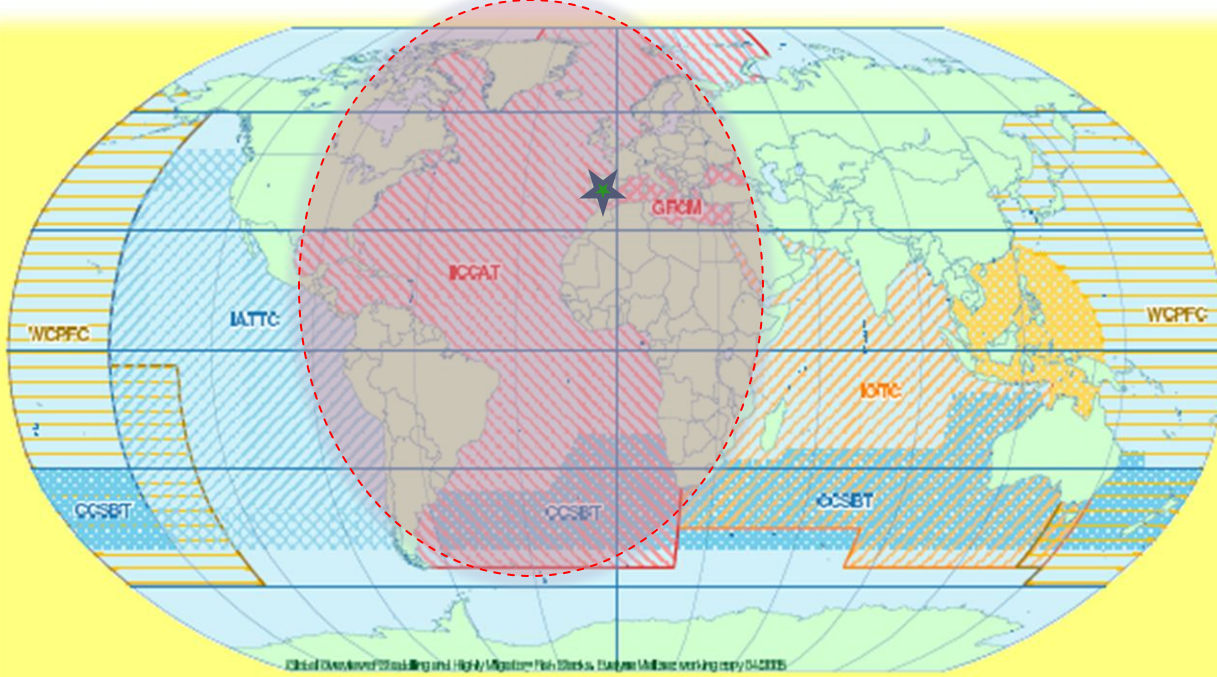
Global Overview - Highly Migratory Fish Stocks (Tuna and Tuna-Like)

Evelyne Meltzer, 2005. Global Overview of Straddling and Highly Migratory Fish Stocks, http://www.dfo-mpo.gc.ca/fgc-cgp/documents/meltzer_e.htm

ICCAT is one of 5 Tuna Regional Fishery Management Organizations. The Secretariat is in Madrid. ICCAT is responsible for conduct of research and management of fisheries for Atlantic tunas and tuna-like species.

•About 30 species are of direct concern to ICCAT; major species include :

•Skipjack, yellowfin, bigeye, bluefin, albacore, swordfish blue and white marlin, sailfish and others.

•Pelagic sharks and bycatch species such as seabirds have been recently added

•Number of contracting parties increasing rapidly, now 48.

▸ *1. Introduction to ICCAT*

1. Introduction to ICCAT (cont)

- The Convention establishing ICCAT was:
  - Signed in Rio de Janeiro, 1966
  - Entered into force in 1969
  - Amended in 1984 and 1992

- Objective:

  Maintain populations at levels which will permit the maximum sustainable catch for food and other purposes.

- The Science component of ICCAT is known as the SCRS (Standing Committee for Research and Statistics.
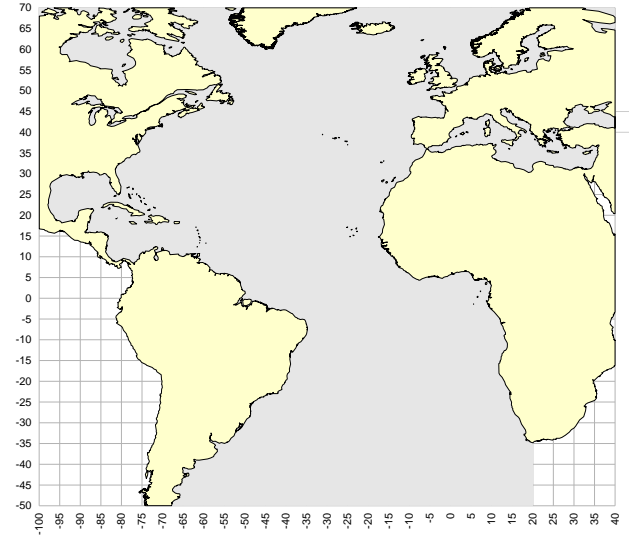
1a. Benchmarks for successful management and implementing rebuilding plans.

Many concepts about sustainability exist, and stocks are known to persist while supporting fishing at quite depressed levels. In the ICCAT Convention, the Management Objective is to maintain stocks at levels sufficient to produce MSY
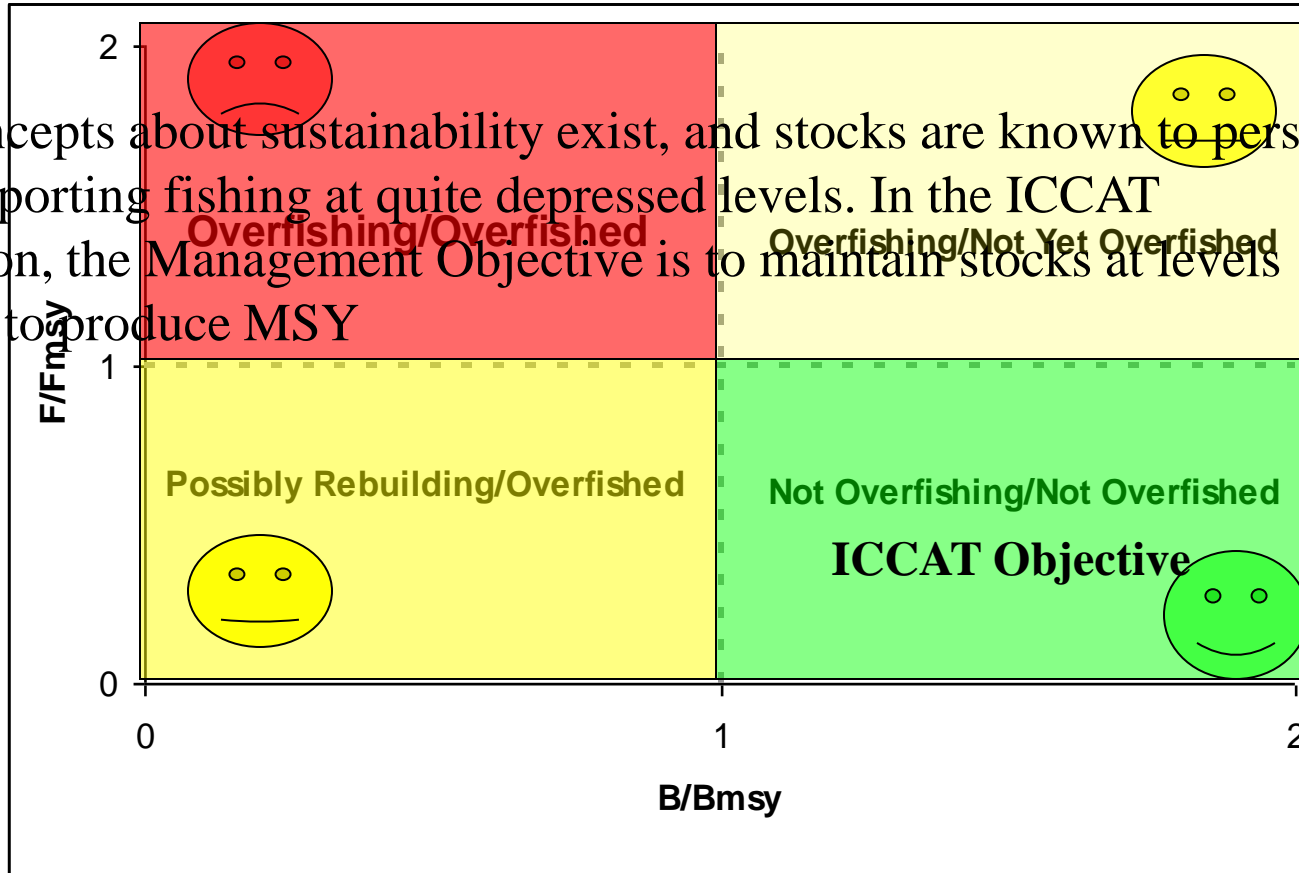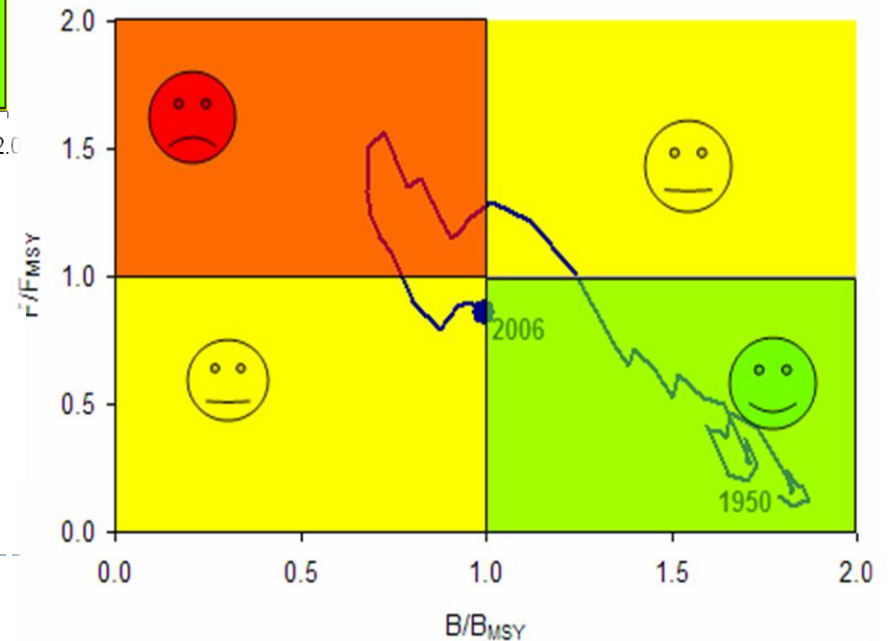

Thus, Sustainability in the ICCAT Convention context is to *"get green and be happy"*

1b. How Stock Status Advice is Communicated to ICCAT Commissioners
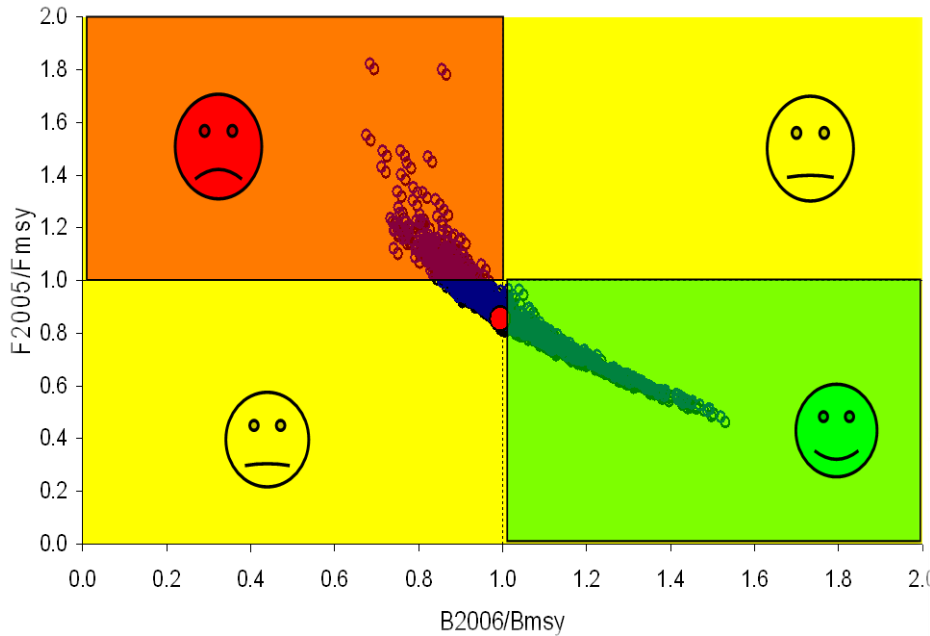
Phase plot showing current status (red point) and associated uncertainty

"Cobra Track" showing history of stock status

2. Stock Assessment Process within the SCRS

- Transparency: emphasized through participation & access; each member country may be represented; web site distribution of data, software, results & consensus advice.

2. *The Report Card for ICCAT Stocks*

| ICCAT Stock Status Report Card, 2008					
Stock	**F/FMSY**	**B/BMSY**	**Last/Next Assessment**	Most Likely	Possibly
BFT-E	>3	~.2	2008/2010		
BFT-W	1.3-2.2	.14-.6	2008/2010		
BUM	>1	<<1	2006/2010		
ALB-N	1.5 (1.3-1.7)	0.8 (0.68-0.97)	2007/2011		
SWO-M	1.3-2.9	0.3-0.9	2007/?		
WHM	Possibly ~>1	<<1	2006/2010		
SMA	Possibly ~>1	Likely<1	2004/2008		
YFT	0.85 (0.7-1.1)	0.95 (0.7-1.18)	2008/?		
BET	0.9 (0.7-1.2)	0.9 (0.85-1.07)	2007/2011		
SWO-N	0.9 (0.65-1.04)	0.97 (0.87-1.27)	2006/2009		
ALB-S	0.6 (0.47-0.9)	0.9 (0.71-1.16)	2007/2011		
SWO-S	Likely <1	Likely >1	2006/2009		
BSH	Likely<1	Likely>1	2004/2008		
SKJ-W	>1	<1	2008/?		
SKJ-E	>1	<1	2008/?		
SAI	?	?	2001/2009		
ALB-M	?	?	Never/?		
Other Sharks	?	?	2008		
Seabirds	?	?	2009		

3. Overview of Atlantic Swordfish in a Global Context

•Atlantic & Med swordfish production, although declining, is about half the world-wide production in recent years. Indian Ocean production is approaching Atl&Med
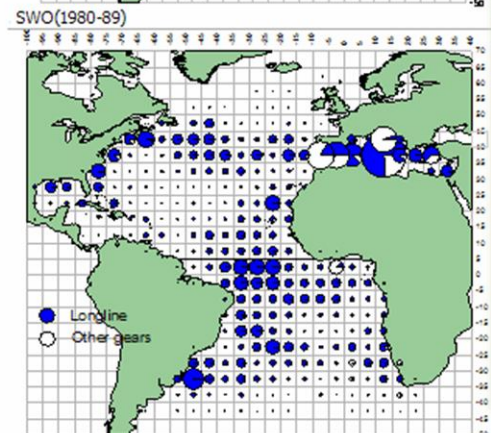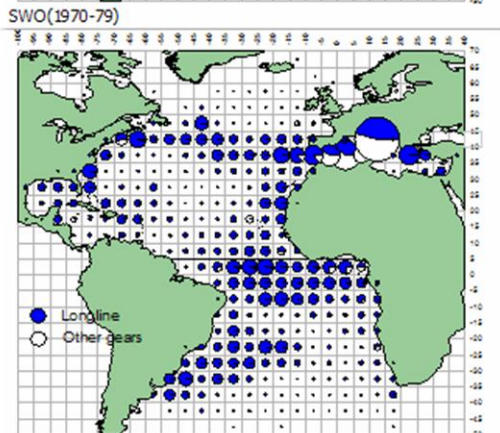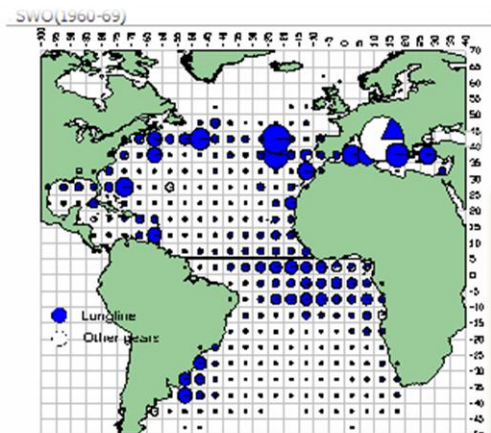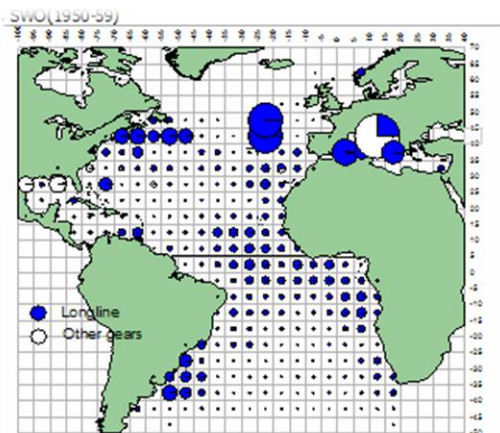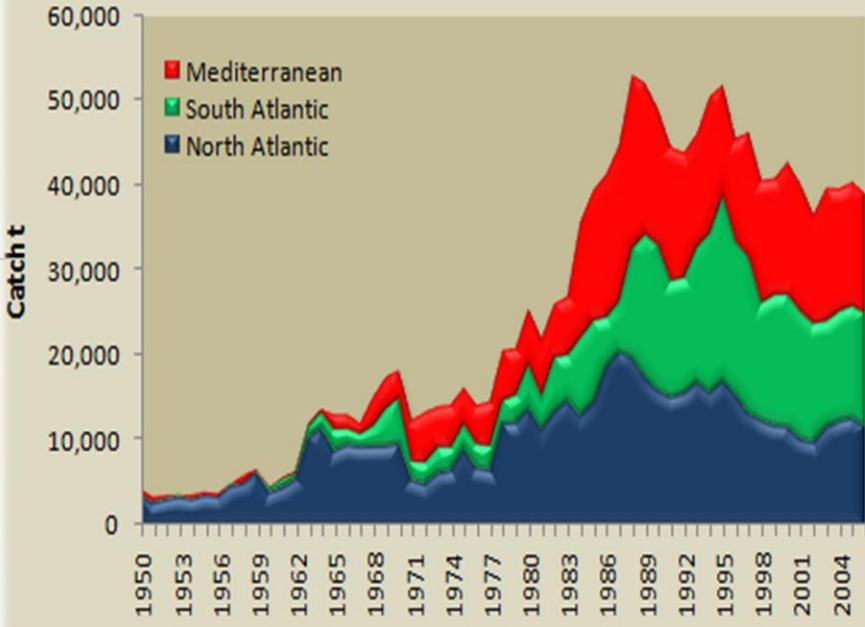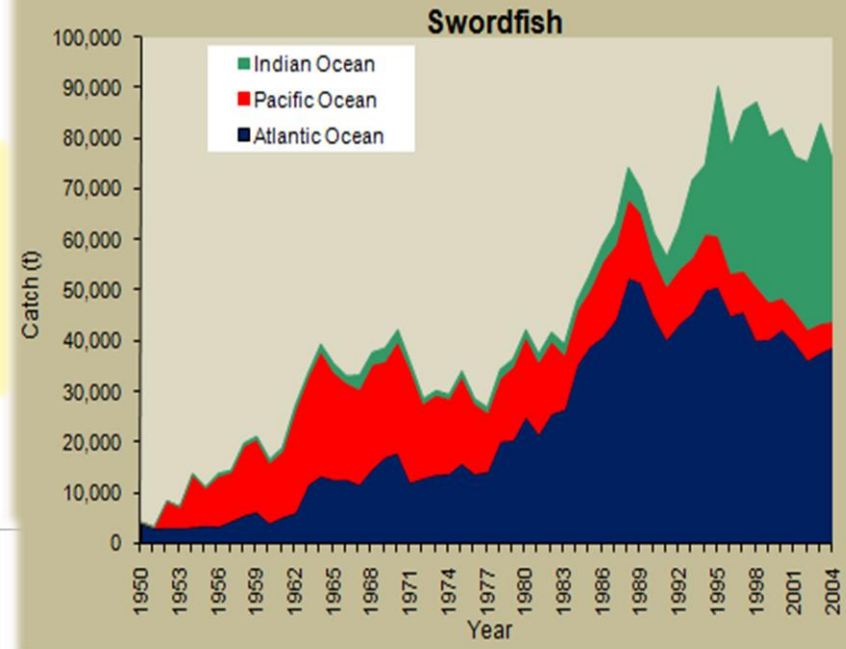
3. The Value of the Catch, North and South Atlantic (expressed in constant (2009) USD)
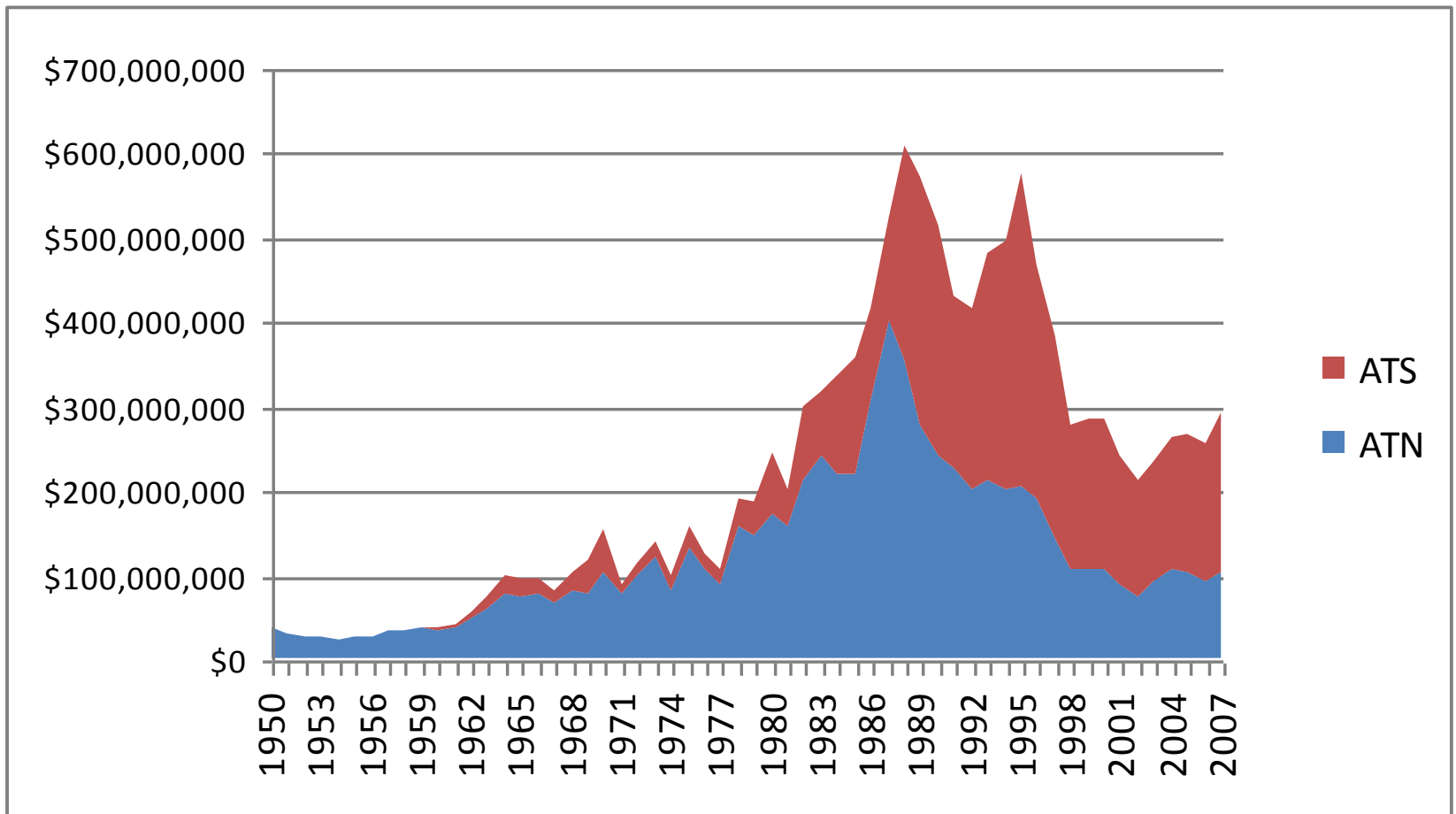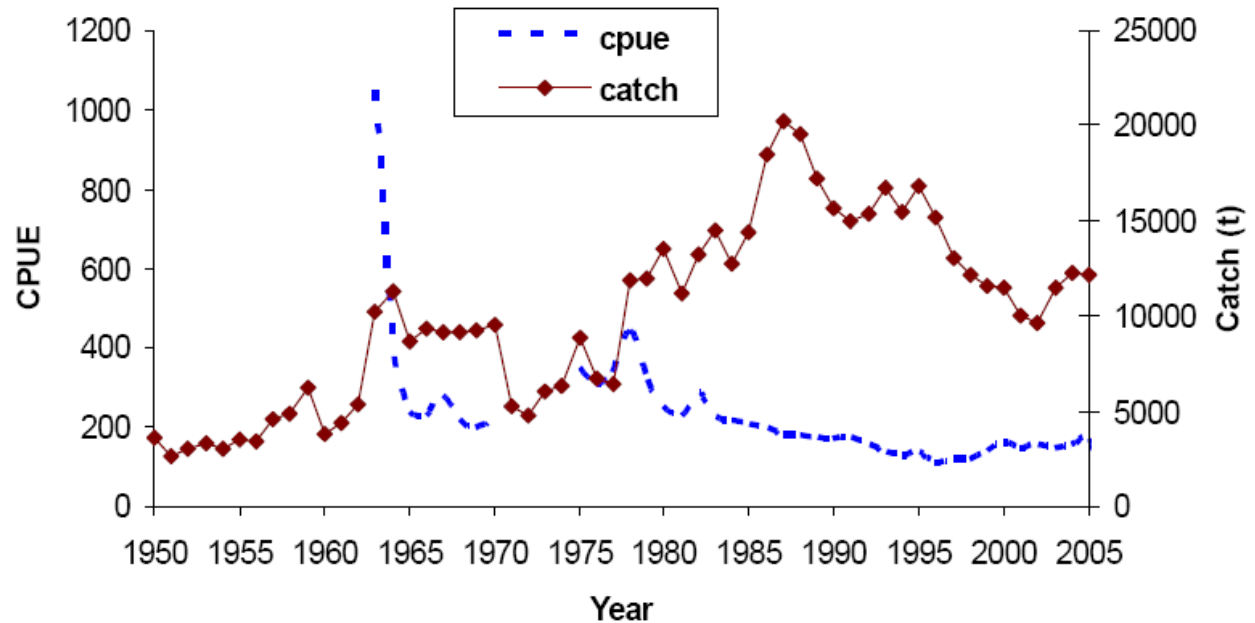
1. Relatively long data series.
   a) including catch data from 1950.
   b) Abundance indices from 1963 (combined from USA, Japan, Spain and Canada).

2. The advice relies primarily on age-aggregated surplus production approaches, with a conventional age-structured virtual population analyses completed but used only in a supporting manner due to concerns with the adequacy of age determinations for this species.

4. Assessment Results – Current Status

| ATLANTIC SWORDFISH SUMMARY		
	North Atlantic	South Atlantic
MSY	14,133 t (12,800-14,790)[3]	~ 17,000t[5]
Current (2005) Yield	12,143 t	12,687 t
Replacement Yield	14,438 t	Not estimated
B_{2006}/B_{MSY}	0.99 (0.87 - 1.27)[4]	Likely > 1
F_{2005}/F_{MSY}	0.86 (0.65 - 1.04)[4]	Likely < 1
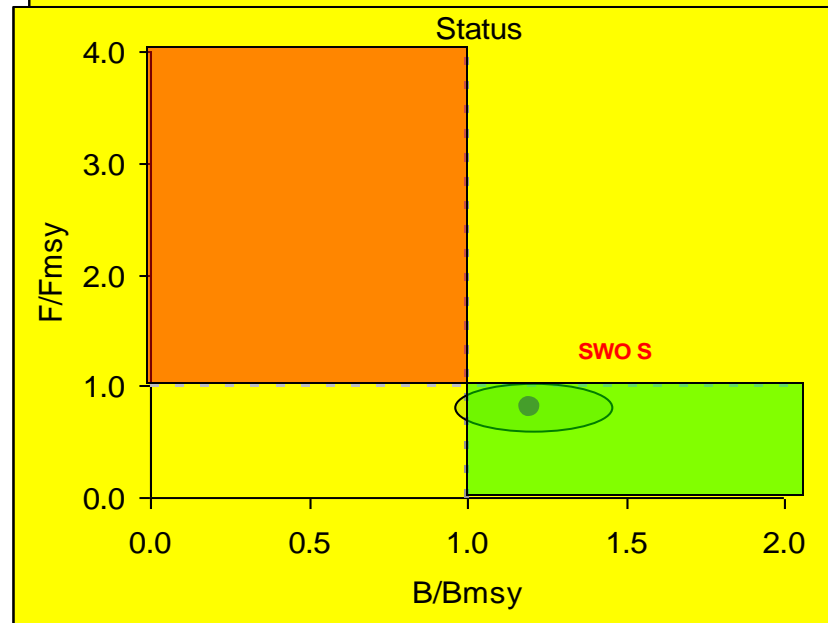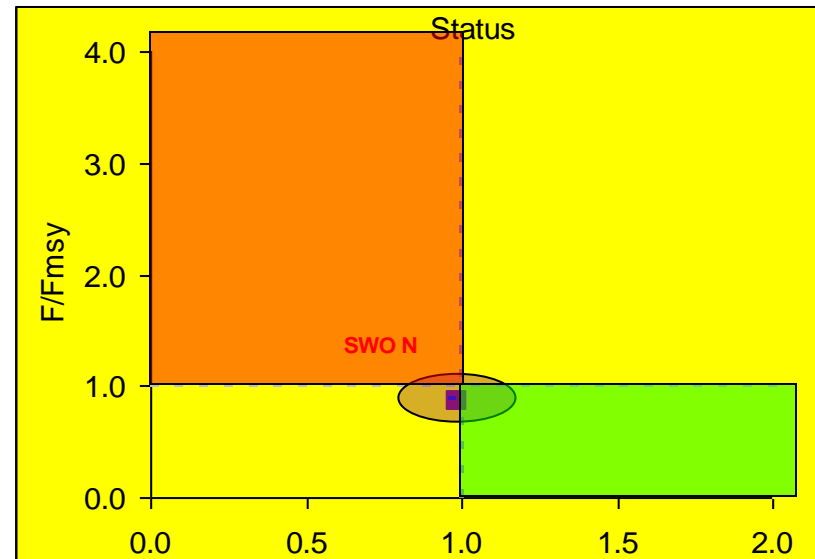
# 4. Assessment Results – Realized Catches Since the Last Assessment

➢ Increasingly stringent management actions taken for northern Atlantic swordfish have resulted in rebuilding the stock to a level likely consistent with the Convention Objective.

➢ Recent catches have been below TAC and are thought to have promoted some additional improvement in stock condition. This will be further evaluated in 2009.

NSWO Catch compared to TAC
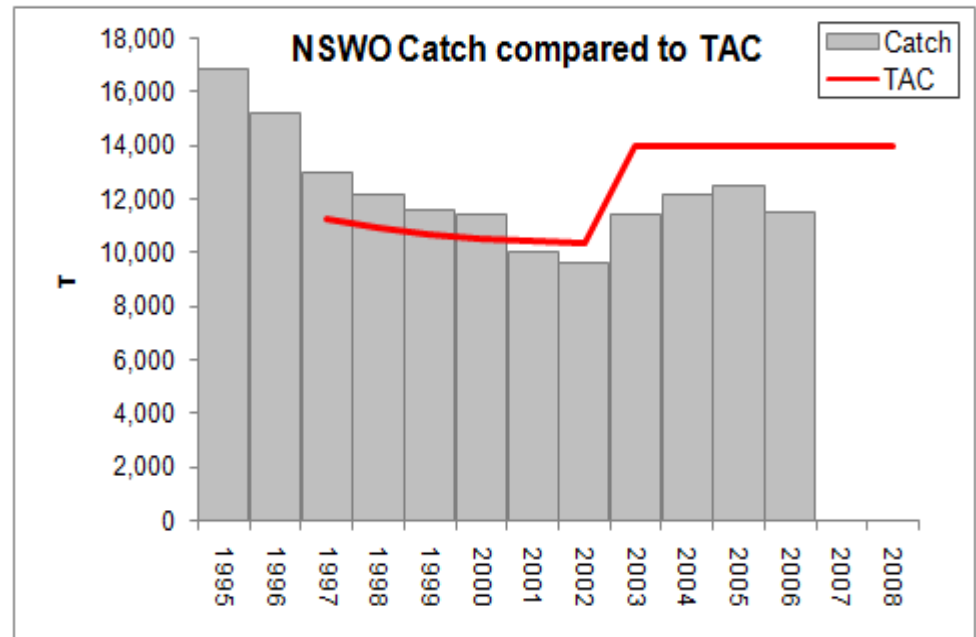
4. Assessment Results – The History of Rebuilding
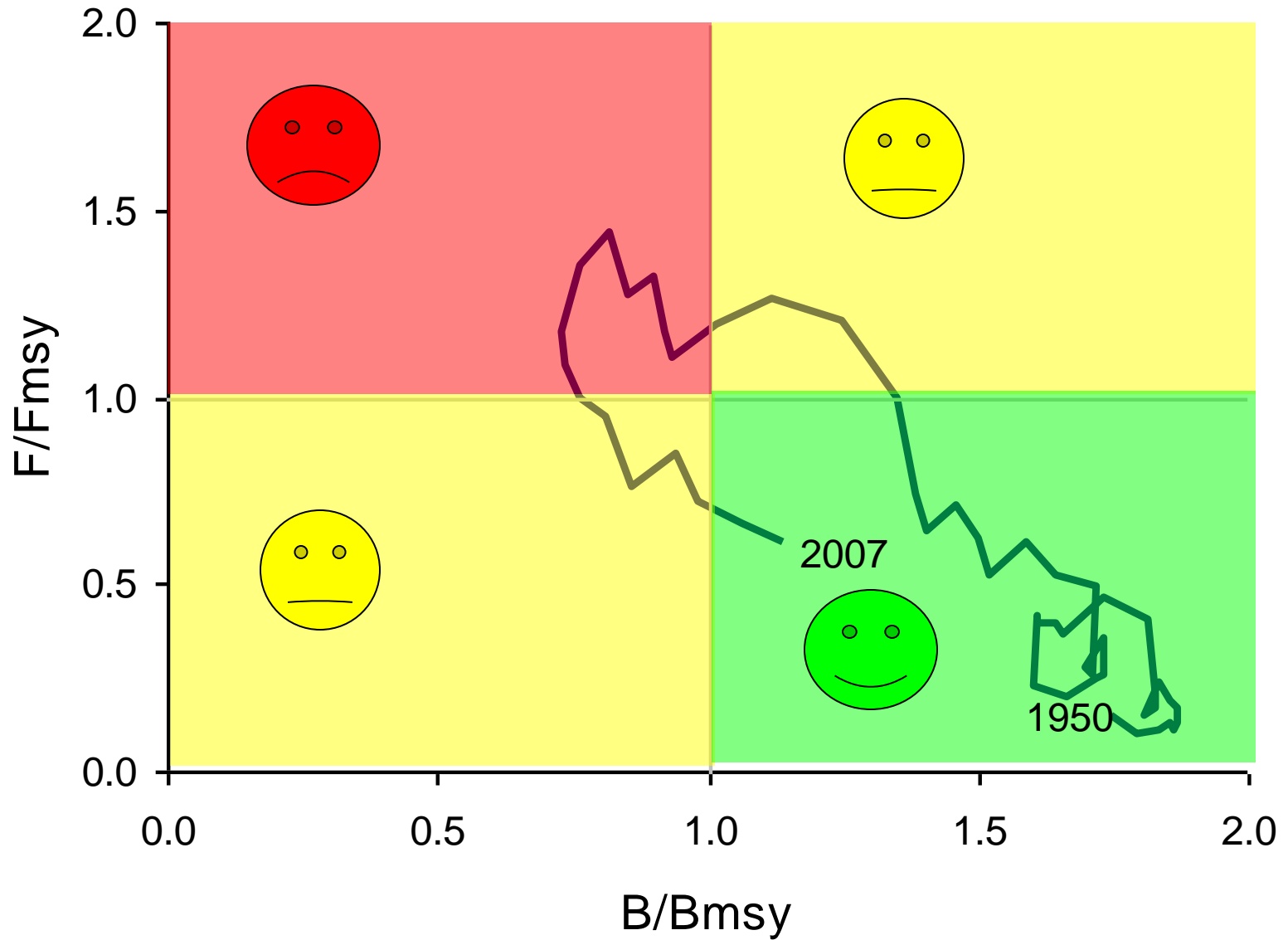
5. The Population Response to Management Actions.

Minimum Size

Small increase in TAC, Close Areas

? ? ?

B/Bmsy

F/Fmsy
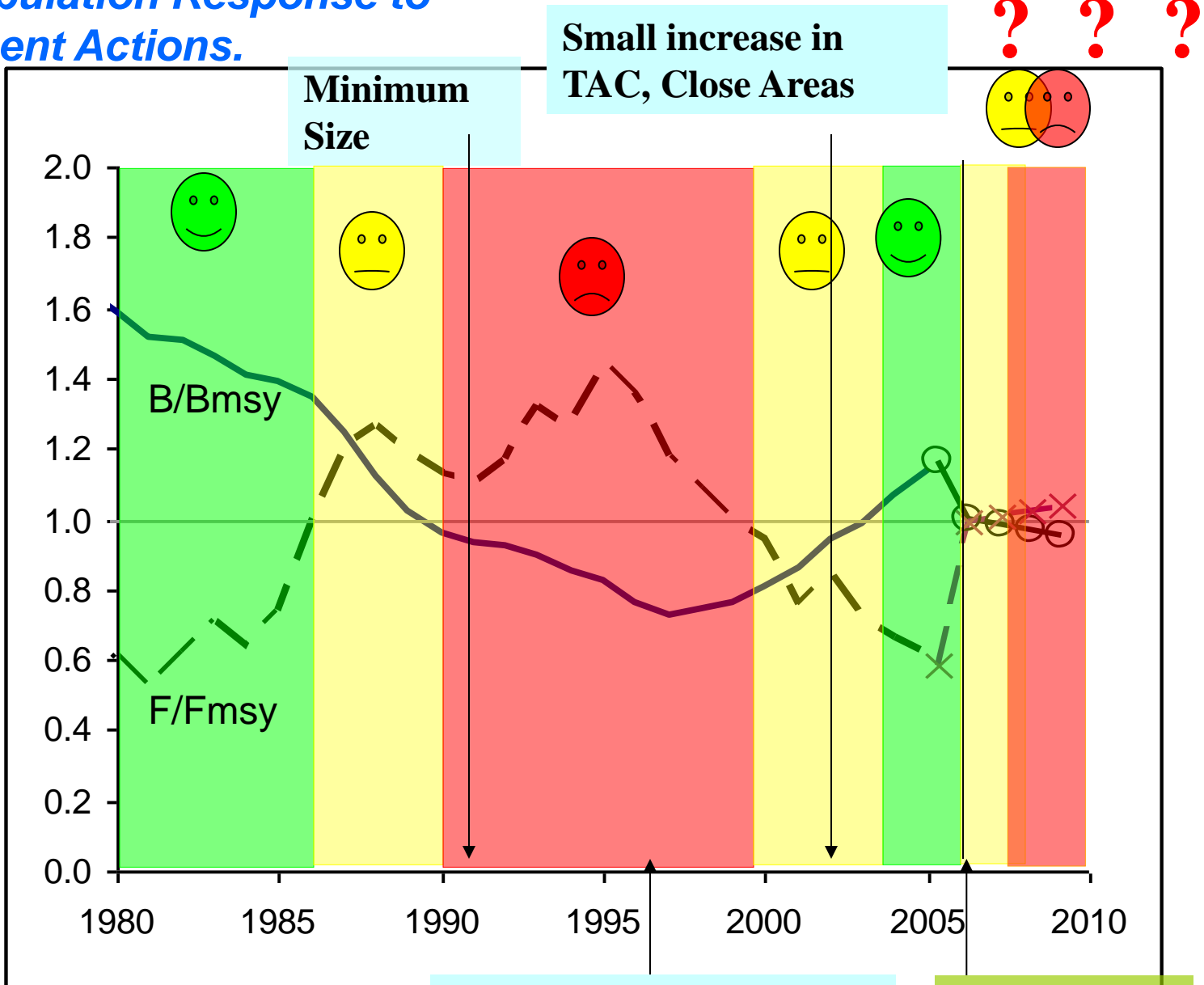
Reduced TAC, Close Seasons, Reduce Effort; Rebuild by 2010

15,300 t Projection [06-02]

➢ Yes!

  √ Growth of individual fish is rapid compared with many other large marine fish species, particularly at early ages.

    ▪ Contributes to observed relatively high "intrinsic rate of population growth"

  √ Comparatively widespread populations.

  √ Extended spawning season, with many different spawning areas.

  √ Relatively young age at maturity.

➢ These factors promote a quick and positive response to rebuilding actions, especially when compared with other large pelagic stocks such as bluefin tuna.

➢ These biological factors probably facilitated management actions to rebuild the stock.

➤ The Commission has established potential catches in 2007 and 2008 that could exceed the science advice. This did not occur in 2007, not yet known for 2008.

➤ If the potential catches were fully realized according to the allocation key, then the rebuilding efforts could be reversed.
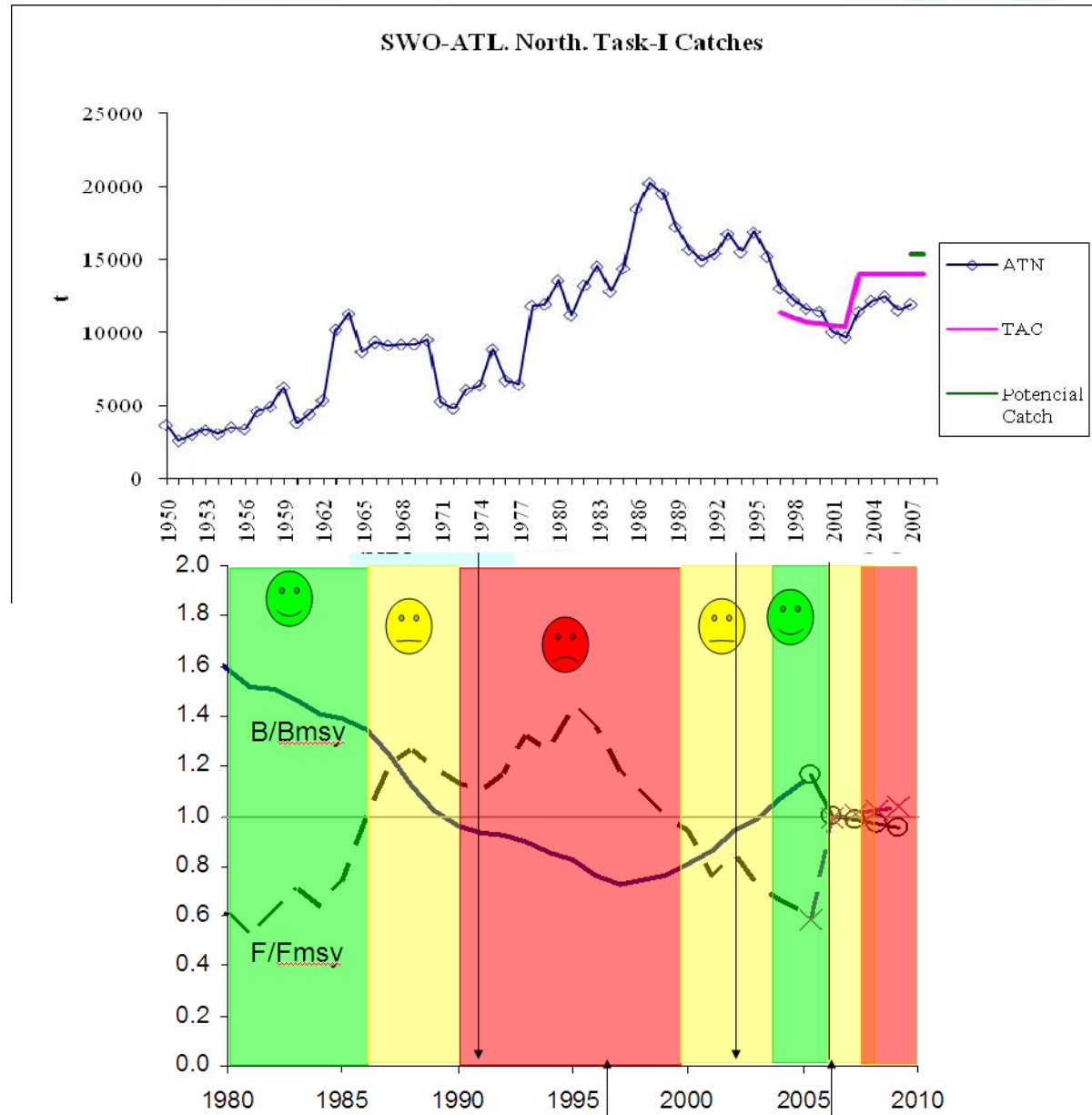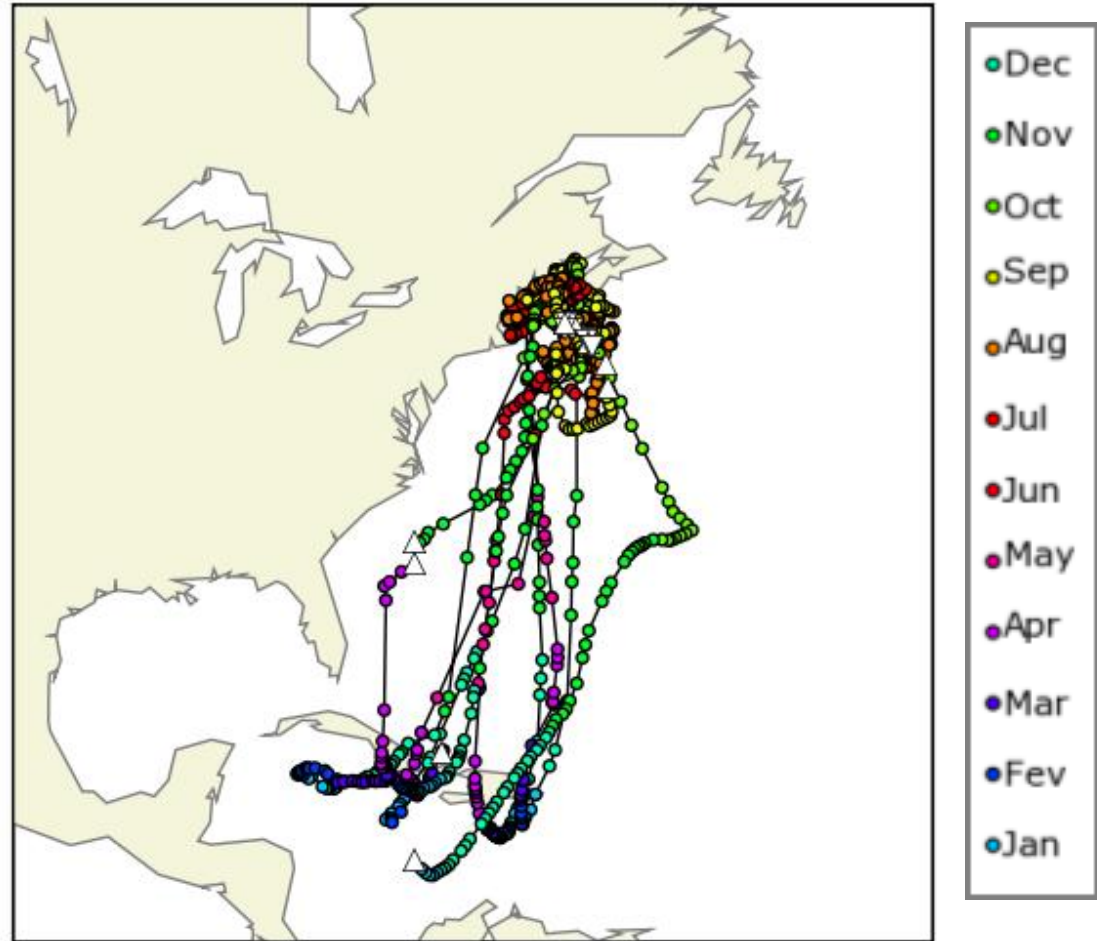

SWO-ATL. North. Task-I Catches

➤ The practice of ICCAT is to treat MSY reference points as targets. Even with no overfishing, periodic excursions below MSY levels can be expected from time to time (ie. as recruitment fluctuates). Fishing at exploitation rates less than F_{MSY} can result in substantial benefits.

➤ Recent work of the SCRS has suggested that for comparatively small reductions of yield, large gains in population biomass stability would ensue – leading to less frequent excursions out of the "green zone".

Table 4.2 Expected cost in equilibrium yield and benefit in terms of SSB safety margin for setting target fishing mortality rate at 75% of $F_{MSY\ proxy.}$

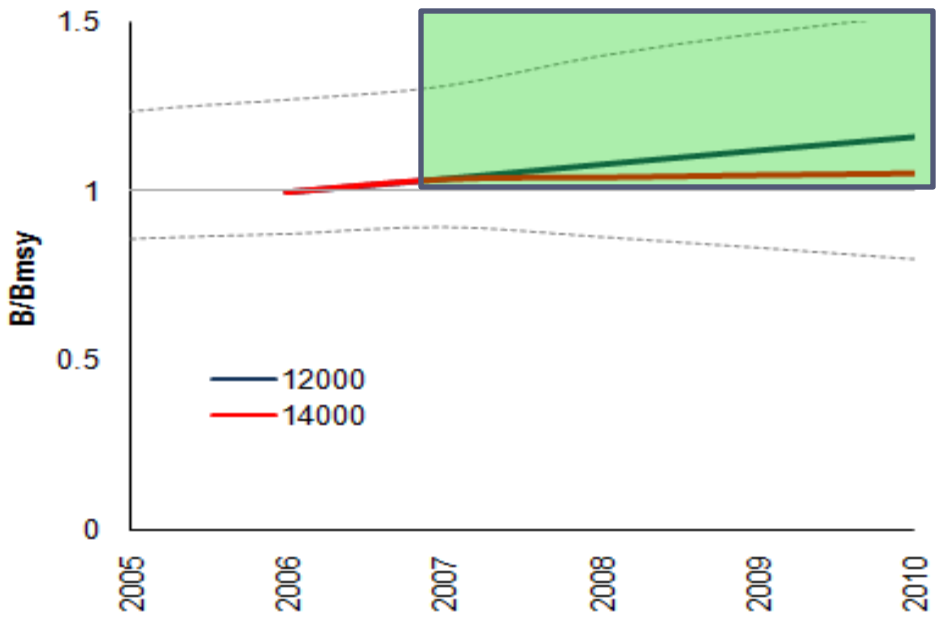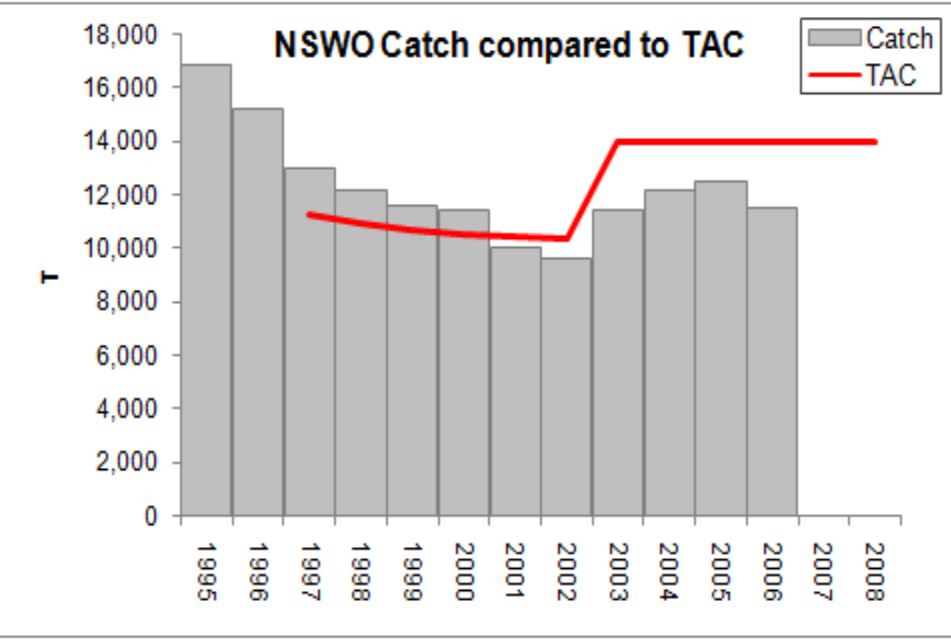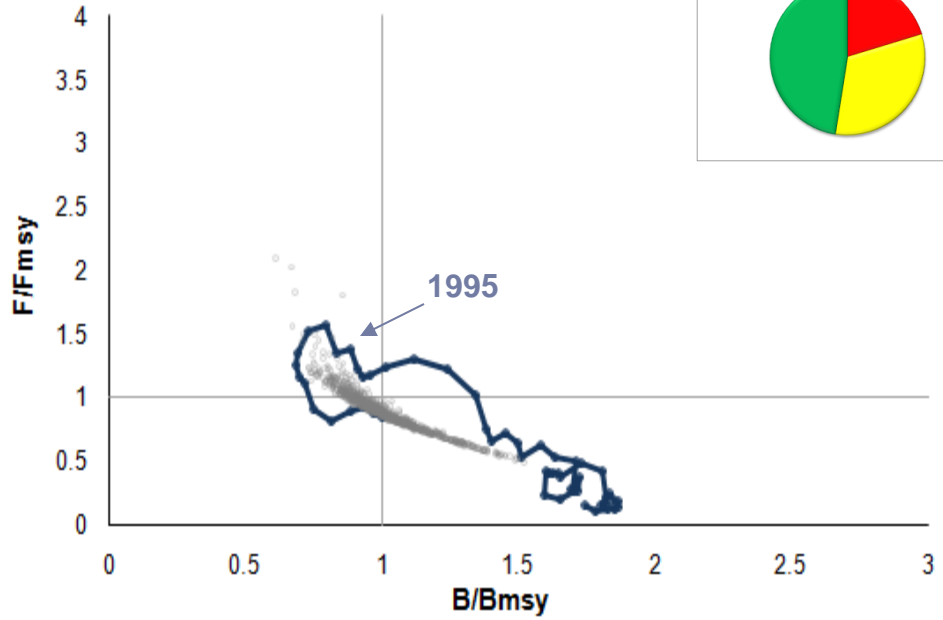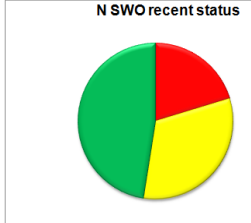|	Fishing at .75*F_{MSY} Proxy	
Species	Gain in SSB	Loss in Yield
YFT	42%	2%
BET	57%	2%
N-SWO	53%	2%
W-BFT-R70+	38%	2%
E-BFT-R90+	26%	1%
N-ALB	70%	2%
E-BFT-R70+	26%	1%
W-BFT-R76+	37%	2%

➢ Satellite archival tagging results have indicated that there is population complexity and structure at a smaller scale than the ICCAT management units.

➢ For example, releases of swordfish off Georges Bank show affinity for the Caribbean Sea during the time of spawning, only one of several known spawning areas, and a well defined north-south movement.

➢ These population components may require a higher resolution approach to management to ensure that individual components are not overexploited.

Thanks for your attention!

N SWO recent status

NSWO Catch compared to TAC

B/Bmsy

1995

F/Fmsy

Catch
TAC

12000
14000

Increasingly stringent Management Actions taken for NSWO resulted in rebuilding the stock to a level likely consistent with the Convention Objective. Recent catches have been below TAC and are thought to have promoted some additional improvement in stock condition. This will be further evaluated in 2009.

3. Conservation and Management Measures

Number of regulations
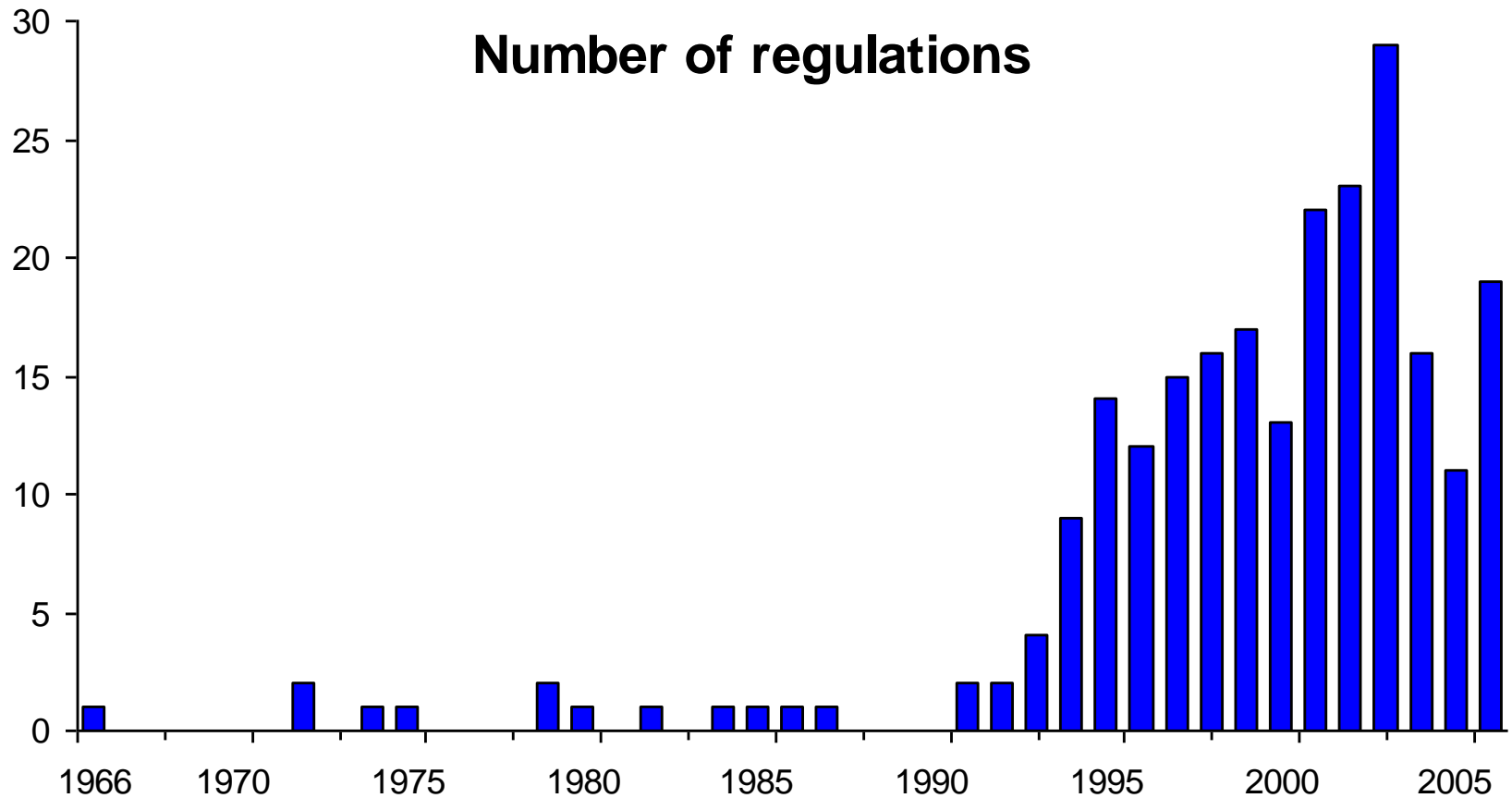
3. Conservation and Management Measures

RECOMMENDATIONS AND RESOLUTIONS IN FORCE (2006)
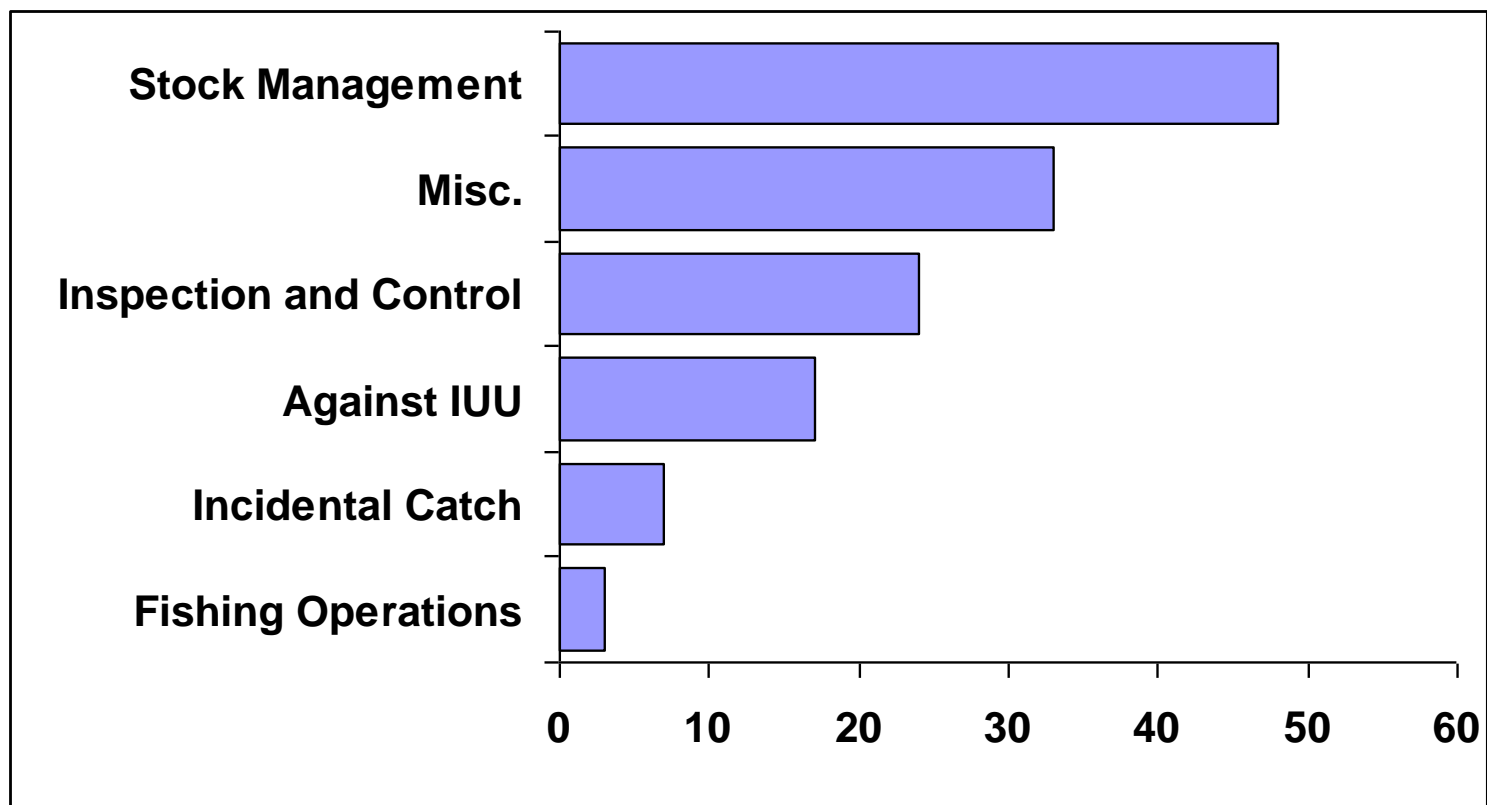
(arbitrary classification; many measures cover different topics)

3. Conservation and Management Measures

Stock	TAC / Limits	Effort	Size	Area/ Season	Gear	Data Reporting
BFT E+M	✔		✔	✔	✔	✔
BFT W	✔		✔	✔		✔
BET	✔	✔		✔		✔
BUM	✔		✔			✔
WHM	✔		✔			✔
SWO N	✔		✔			✔
ALB N	✔	✔				
SWO S	✔		✔			
SWO M				✔	✔	
YFT		✔				
ALB S	✔					
ALB M					✔	
SHK						✔
SKJ						
SAI						