



New England Fishery Management Council

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John Pappalardo, *Chairman* | Paul J. Howard, *Executive Director*

MEMORANDUM

DATE: February 27, 2009
TO: NEFMC Scientific and Statistical Committee
FROM: Paul Howard
SUBJECT: **Initial Monkfish Report and Terms of Reference**

Terms of Reference for the March 17th SSC Review of the Initial Report of the Monkfish PDT on Amendment 5

1. Review and provide guidance on the PDT's approach to setting reference points outlined in the report, including MSY, OFL, ABC and ACL. In particular, the Council seeks SSC input on consideration of scientific uncertainty in setting the ABC and ACL.
2. Review and provide guidance on the use of proactive and reactive accountability measures (Section 3.5 of the Report). In particular, the Council seeks SSC input on consideration of management uncertainty in setting the AMs.
 - a. Proactive AMs – The Council is considering use of Annual Catch Targets (ACT) and Target Total Allowable Landings (TTAL) as proactive AMs. The Council seeks input from the SSC concerning the two methods for establishing ACTs proposed by the PDT that utilize different approaches for considering management uncertainty.
 - b. Reactive AMs - Council could include in-season actions to be taken to prevent the ACL from being exceeded, and/or post-season actions in the event of an ACL overage. The Council seeks SSC input on what types of reactive AMs would be appropriate for consideration.

The Council seeks SSC input on the use of these two options as reactive AMs, in consideration of how monkfish is caught incidentally in a wide range of fisheries, which makes real-time monitoring of total catch difficult.

3. The Council seeks the SSC's guidance on an appropriate and reasonable range of assessment results that could be used to address the issue of the timing of the assessment. Since the terminal year of the last stock assessment was 2006, since short-term projections are not technically feasible, and since another assessment is scheduled for mid-2010, about the time the Council will be submitting Amendment 5, it is considering adopting a set of control rules for establishing the values associated with the various reference points and catch targets that will automatically update when the assessment is completed. This will require the Council to provide the public with a range of likely values that it will analyze in the Draft Environmental Impact Statement.

Introduction to the Report

The Council has initiated Amendment 5 to the Monkfish Fishery Management Plan (FMP) and is scheduled to approve the final range of alternatives that will be analyzed in Monkfish Amendment 5 at the June 2009 Council meeting. The amendment has two primary purposes: 1) to bring the Monkfish FMP into compliance with the re-authorized Magnuson-Stevens Conservation and Management Act (MSRA) requiring that each fishery use annual catch limits (ACLs) to prevent overfishing, including measures to ensure accountability; and, 2) to set specifications, likely multi-year specifications for the catch targets which will be the basis for setting management measures. These two purposes are closely related, as the actions taken to address the first purpose will provide the foundation on which specifications and management measures will be designed. The Council has also agreed that, once the development of measures to address the primary purposes is complete, it may consider modifying the management strategy to include ITQs and/or sectors. Regardless of whether the Council continues with days-at-sea and trip limits for the directed monkfish fishery, or whether it adopts the alternative management approaches, the specifications of catch targets will be the same.

Attached is the Initial Report of the Monkfish Plan Development Team (PDT) on alternatives and recommendations for biological and management reference points to bring the FMP into compliance with the MSRA and National Standard 1 Guidelines. The Council requests that you review this preliminary report in accordance with the terms of reference outlined below. Based on your guidance and recommendations, the PDT will complete its analysis and provide you with a second report to be the basis of your recommendations to the Council for alternatives to be taken to public hearings and analyzed in the Draft Environmental Impact Statement. The Council will again seek your advice prior to making its final decision on proposed actions at its April 2010 meeting. A timeline for Amendment 5 is provided below.

Attachments

1. Initial Report of the Monkfish PDT to the NEFMC's Scientific and Statistical Committee
2. Haring, P., and Maguire, J.J., 2008. The monkfish fishery and its management in the northeastern USA. In: ICES Journal of Marine Science. 65: 1370-1379.
3. Northeast Data Poor Stocks Working Group. 2007. Monkfish Assessment Summary for 2007. Northeast Fisheries Science Center Reference Document 07-13.
4. Richards, R.A., Nitschke, P. C., and Sosebee, K. A.. 2008. Population biology of monkfish *Lophius Americanus*. In: ICES Journal of Marine Science. 65: 1291 - 1305.

MILESTONES		DATES
1.	Staff begins work on amendment	JAN 2009
2.	Scoping meetings	MAR 2009
3.	AP, Committee develop alternatives for Council consideration	APR-MAY 2009
4.	Council approves alternatives for analysis in DEIS	JUN 2009
5.	PDT prepares Draft Amendment /DEIS	JUL- OCT 2009
6.	Council approves Draft Amendment/DEIS and selects preferred alternatives	NOV 2009
7.	Public hearings	JAN/FEB 2010
8.	AP, Committee review public comment, analysis, recommends final measures	FEB-MAR 2010
9.	Council approves final amendment measures	APR 2010
10.	Staff/PDT drafts Final EIS, RIR, IRFA, etc.	May 2010
11.	Council approves final document	June 2010
12.	Staff submits draft final to RO	July 2010
13.	Staff submits final final amendment to NMFS, begin formal review	AUG 2010
14.	Implementation	MAY 2011

Table 1 Monkfish Amendment 5 Development Timeline

Monkfish FMP Magnuson-Stevens Act Compliance

*Initial PDT Report to the
Scientific and Statistical Committee
on Proposed Biological and
Management Reference Points*

March 17, 2009

Discussion Outline

- Management Plan Summary
- Monkfish Stock Status
- Amendment 5 Purpose and Timeline
- Plan Development Team (PDT)
Recommendations on Biological and
Management Reference Points
- Council requests for SSC guidance and
recommendations

FMP Summary

- Limited entry program adopted 1999
- Two management areas
- Close ties to scallop and multispecies fisheries – DAS linkage
- Directed fishery: Managed by trip limits and DAS
- Incidental fishery possession limits to minimize bycatch

Current FMP measures

- Framework 4 implemented 2007
- Set 3-yr. target TACs (5,000 mt North and 5,100 mt South) as basis for calculating DAS and trip limits
- Incidental catch takes precedence – subtracted from TAC before calculation of trip limits and DAS
- First monkfish trip limits and DAS reductions in North
- TAC extendable beyond 2010 if no new action is taken

Monkfish Stock Status

- Most recently assessed in 2007 Data Poor Stocks Working Group (DPWG)
- New biomass reference points based on length-tuned model (SCALE), and updated estimates of F_{max} based on yield-per-recruit analysis with revised estimate of natural mortality ($M=0.30$)
- *Both stock components are rebuilt and overfishing not occurring*
- “Results accompanied by substantial uncertainty ...need to be viewed with caution.”

Stock Status Summary

	North	South	Comment
F_{threshold} (MFMT)	0.31	0.40	F _{MSY} proxy based on F _{max}
F_{current} (2006)	0.09	0.12	Not updated for 2007, 2008
B_{target}	92,200 mt	122,500 mt	B _{MSY} proxy
B_{current} (2006)	118,700 mt	135,500 mt	Not updated for 2007, 2008
B_{threshold} (MSST)	65,200 mt	96,400 mt	

Amendment 5 – Purpose and Timeline

- Primary purpose: establish ACLs, AMs and other reference points to comply with MSRA and NS1 Guidelines
- Set TTAC/DAS/trip limit specifications to replace expiring Framework 4 specs
- Consider adopting ITQ and/or sector mgmt. programs, time permitting
- DEIS approval: Nov. 2009; Approve final measures: April, 2010; Submit final document: June, 2010; Effective: May, 2011

PDT Report/Recommendations

MSY

- MSY: long-term ave. catch based on $F_{\text{threshold}} \times B_{\text{target}}$
- $F_{\text{threshold}} = F_{\text{max}}$, proxy for F_{msy}
- $B_{\text{target}} =$ average biomass during 1980 – 2006 estimated from the SCALE model, proxy for B_{msy}
- **$MSY = F/Z \cdot (1 - e^{-z}) \cdot B$**
- Assuming same mean wts. in stock and catch:
MSY=21,397 mt (N) and 35,239 mt (S)

OFL

- OFL: annual catch based on $F_{\text{threshold}} \times B_{\text{current}}$
- May fluctuate above/below MSY depending on stock size
- B_{current} (2006) above B_{target} (DPWG 2007)
- **$OFL = F/Z \cdot (1 - e^{-z}) \cdot B_{\text{current}}$**
- Assuming same mean wts. in stock and catch:
 $OFL = 27,546$ mt (N) and $38,979$ mt (S)

ABC

- Accounts for scientific uncertainty in estimate of OFL and other scientific uncertainty
- **PDT recommends $ABC < OFL$ & $ABC \leq MSY$** due to high degree of uncertainty in assessment
- Scientific uncertainty includes historical catch, growth, longevity, M, and other information; new assessment model; survey variability; and more.
- Council seeks SSC guidance on a quantitative method for evaluating scientific uncertainty in setting ABC

ACLs

- Level of annual catch that serves as the basis for invoking AMs and to prevent exceeding the OFL
- May be set annually or on a multi-year basis
- Cannot exceed the OFL
- **PDT recommends that ACLs = ABC**, as there is no technical basis for setting it below ABC.

AMs

- Purpose is to prevent or respond to exceeding ACLs
- AMs take into account management uncertainty
- PDT proposes “proactive” AMs to prevent exceeding ACLs, and “reactive” AMs if ACL is exceeded

Sources of Management Uncertainty

- Violation of the assumptions in the analytical model used to set management measures (e.g. DAS/trip limits) or allocation schemes (ITQs, sectors), such as, effort patterns, DAS usage rates, catch rates, active/inactive permits, gear used, illegal activity, and more
- Impact of fuel costs and market trends also contribute to management uncertainty
- Inability to predict the effect of management changes in groundfish and other fisheries with an incidental catch of monkfish

Proactive AMs

- ACT that would be the basis for setting management measures (either DAS/trip limits, or allocations of ITQ or sector shares) after accounting for incidental catch in other (non-directed) fisheries and discards
- If discards are not well monitored, estimated discards would be subtracted from ACT to set TTAL as basis for management measures
- PDT offers two alternative methods for setting ACTs: “bottom up” and “top down”
- Would not trigger mgmt. action if exceeded or not reached, but if either occurs, the cause would be determined, and appropriate adjustment to mgmt. measures could be taken through regulatory action or specifications process
- Provides a buffer against approaching ACL

Top Down ACT Method

- Reduce value of ACL by some amount to account for management uncertainty
- If possible, quantitative measures of uncertainty should be used, otherwise, a subjective, precautionary amount would be applied to ensure ACL is not reached.
- E.G., if $ACL=10,000$ mt, and management uncertainty valued at 30%, $ACT=7,000$ mt

Bottom Up ACT Method

- Use current landings targets, add in estimates of discards, and, if stock is rebuilt and overfishing is not occurring, apply an incremental increase based on a subjective, precautionary approach
- E.G., Current North TTAL=5,000 mt, incremental increase of 20%=6,000 mt, discard ratio (d/k) = 0.081=486 mt, ACT=6,486 mt.

Reactive AMs

- Measures designed to mitigate or prevent exceeding ACL, would take effect automatically if the ACL is, or is projected to be exceeded
- Could include closure to all, or specific sources of monkfish fishing mortality, reductions in ACT (if used) or ACLs in a subsequent year or season, or other specified consequences
- Proactive AMs (e.g., ACT) may provide sufficient buffer so that Reactive AMs are not invoked
- No PDT recommendation at this time

Impact of Assessment Schedule

- Third triennial cooperative survey underway
- Stock assessment scheduled for mid-2010, coinciding with Amendment 5 submission
- Requires that process and control rules be adopted, and EIS to analyze a range of reasonable outcomes applying the process to new assessment results

SSC Terms of Reference

- Review and provide guidance on the PDT's approach to setting reference points, and input on consideration of scientific uncertainty
- Review and provide guidance on the use of proactive and reactive AMs, and input on consideration of mgmt. uncertainty
- Provide guidance on an appropriate and reasonable range of assessment results that could be used to address the issue of the timing of the assessment

Discussion Points/Questions

- Given the unquantifiable magnitude of uncertainty in the most recent assessment, and other scientific uncertainty, what would be an appropriate, precautionary percentage reduction from OFL to set ABC?
- Is it appropriate to set $ACL=ABC$, given that an ACT on which management measures are based would provide a sufficient buffer such that the ACL would not be reached?

Discussion Points/Questions #2

- Of the two approaches to setting ACT, does the SSC prefer one over the other, or should both approaches be retained in developing a range of alternatives for the EIS?
- Given the unquantifiable magnitude of management uncertainty, whether that be under the current system of DAS and trip limits, or under an ITQ or sector program, what would be an appropriate, precautionary percentage reduction from ACL to set ACT under the top-down method of calculating the ACT?

Discussion Points/Questions #3

- Given that the stocks are well above the biomass target based on the last assessment, what would be an appropriate, precautionary increase in catch target (ACT) under the bottom-up approach to setting ACT?
- Given the multi-year gap between stock assessments, is it appropriate to set specification of OFL, ABC, ACL and ACT for three years (or some other period), or should they be set annually? If annually, given that current methodology does not enable short-term projections, how should the specifications be set?

Monkfish Assessment Summary

- **Northeast “Data Poor” Stocks Working Group: Monkfish**
- **July 2007**

Review Panel Chairman:

**Dr. John Annala
(GMRI, Maine)**

Panelists :

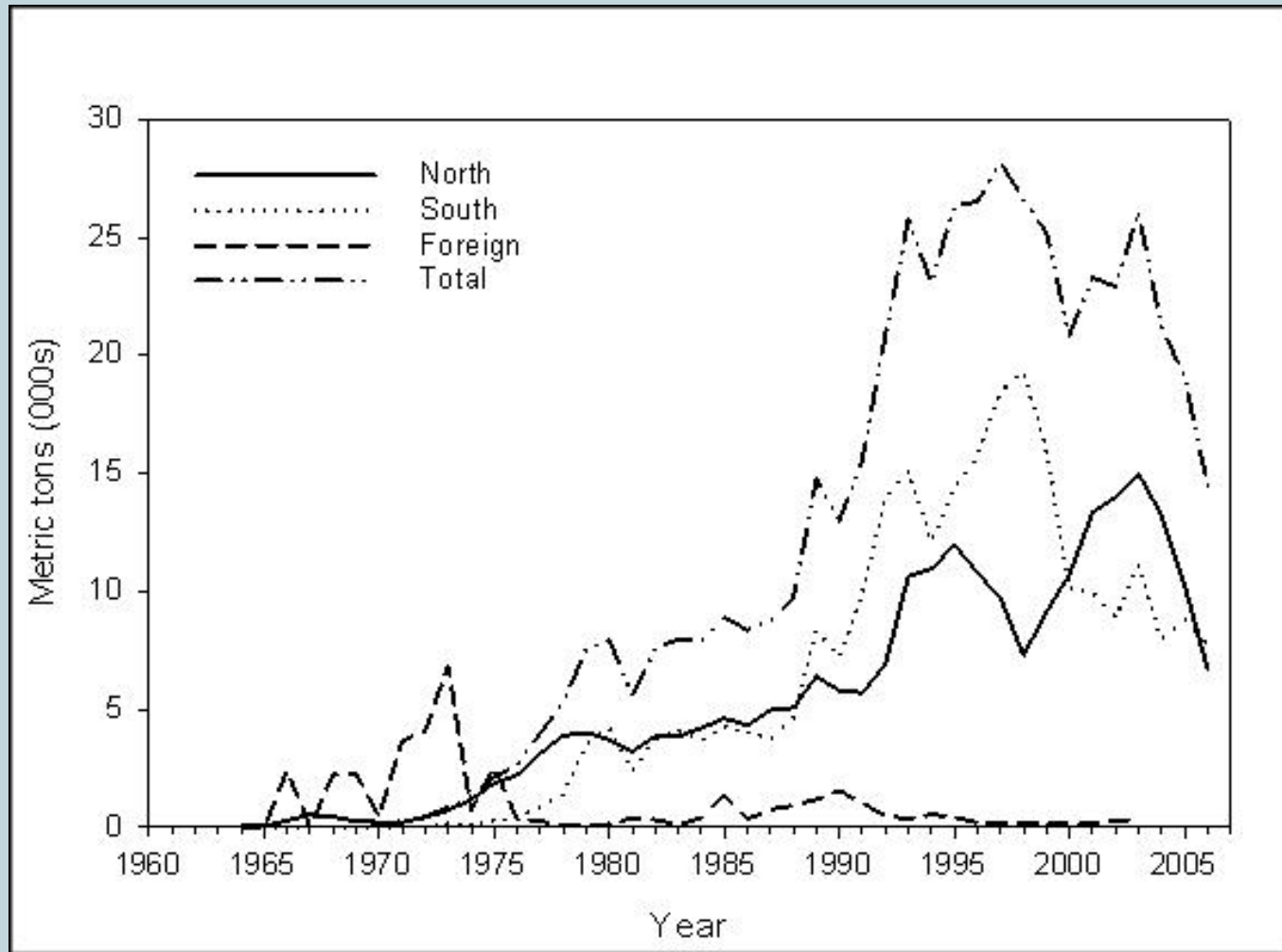
**Dr. Robert Mohn
(BIO, Canada)**

**Mr. Rafael Duarte
(PNRI, Portugal)**

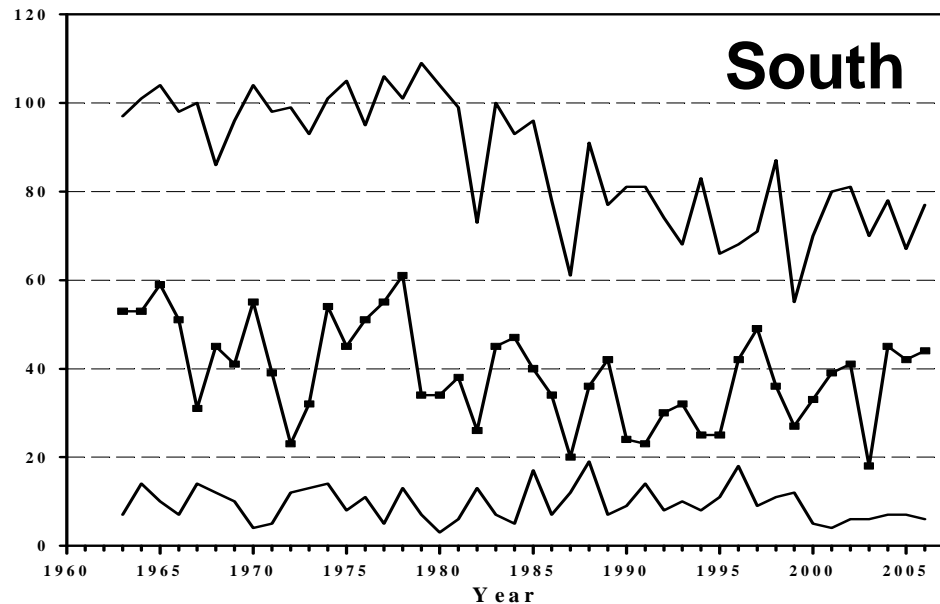
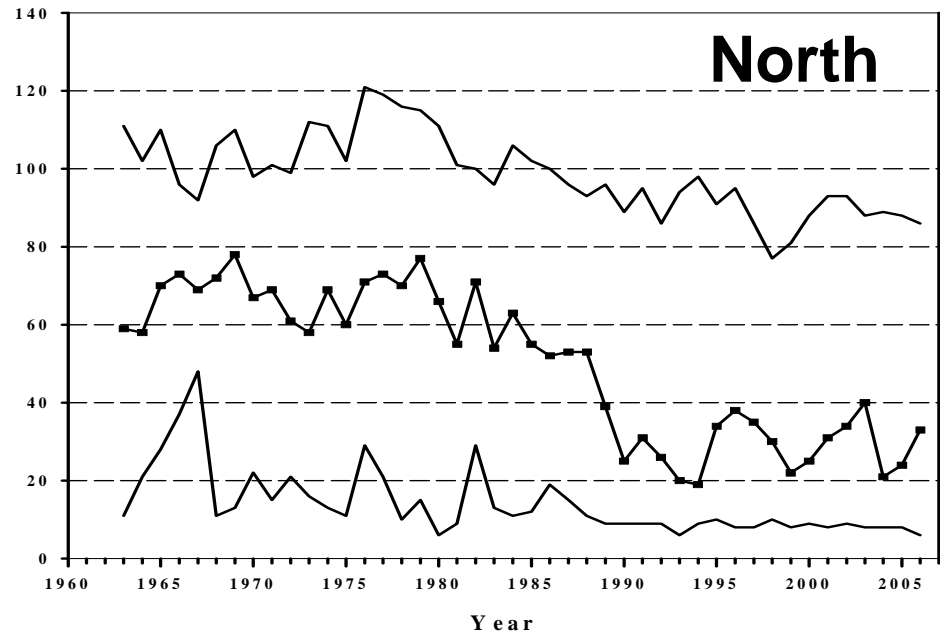
Terms of Reference

- Characterize commercial catch, effort, discards
- Evaluate relative abundance indices
- Incorporate cooperative monkfish surveys
- Estimate F , B , SSB and uncertainty
- Update / redefine BRPs
- Evaluate stock status re. old and new BRPs
- Compute TALs
- Evaluate mgmt efficacy and Probability of rebuilding by 2010)
- Review research and make recommendations

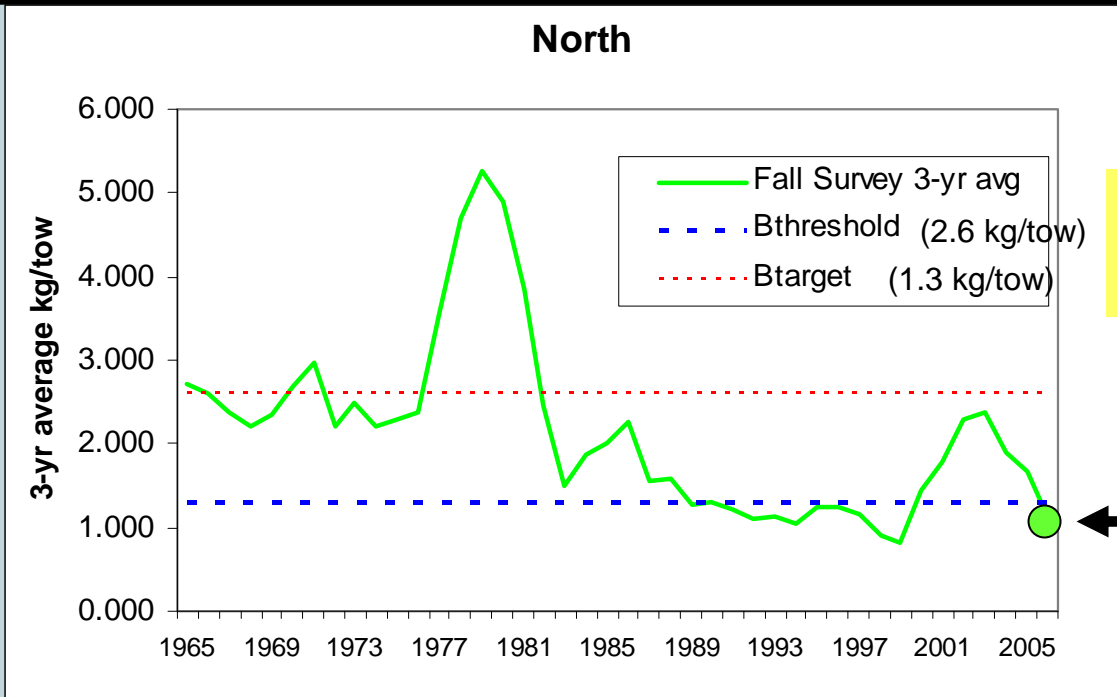
Monkfish – Commercial Landings (1964-2006):



Monkfish – Survey Trends in Body Length (min, median, max)

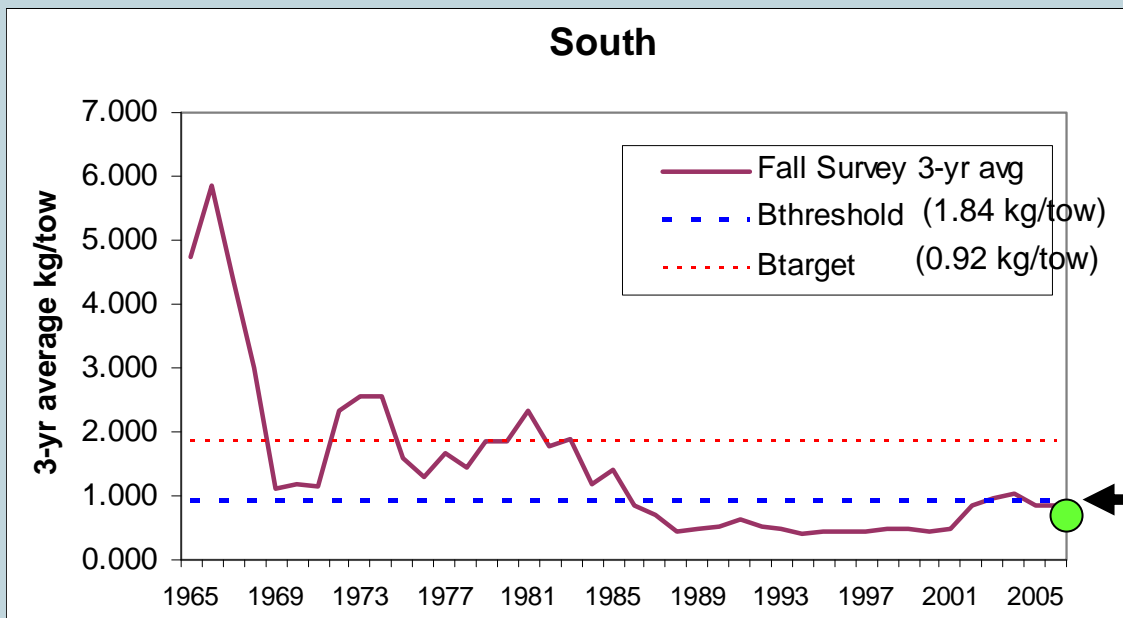


Monkfish – NEFSC Fall Survey Indices, Stock Status :



Status based on Pre-DPWG Definition

Overfished (1.1 kg/tow)

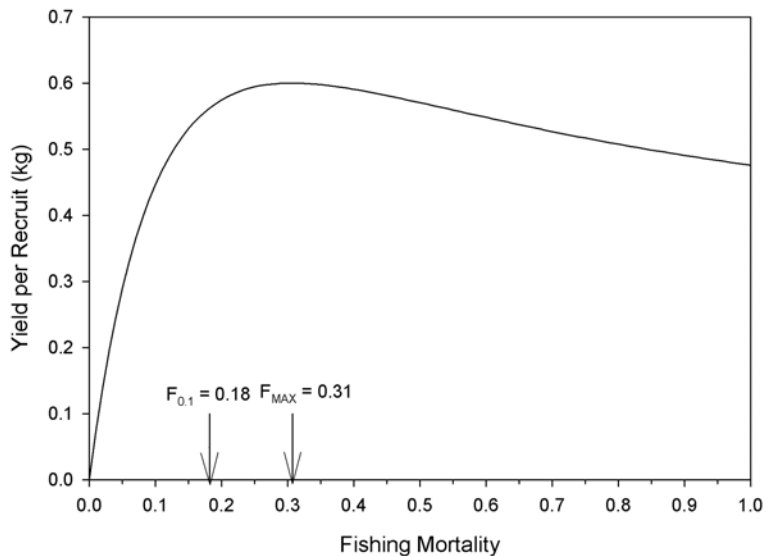


Overfished (0.87 kg/tow)

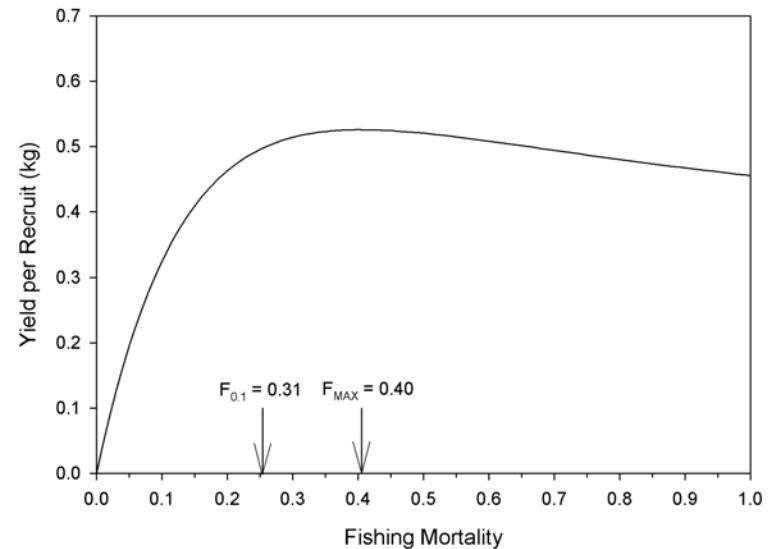
DPWG Assessment

- Updated Yield-per-Recruit
 - Age-based (avoid growth model)
 - Assumes $M=0.3$ (vs. 0.2 in past)
 - Area-specific (selectivity)

North



South



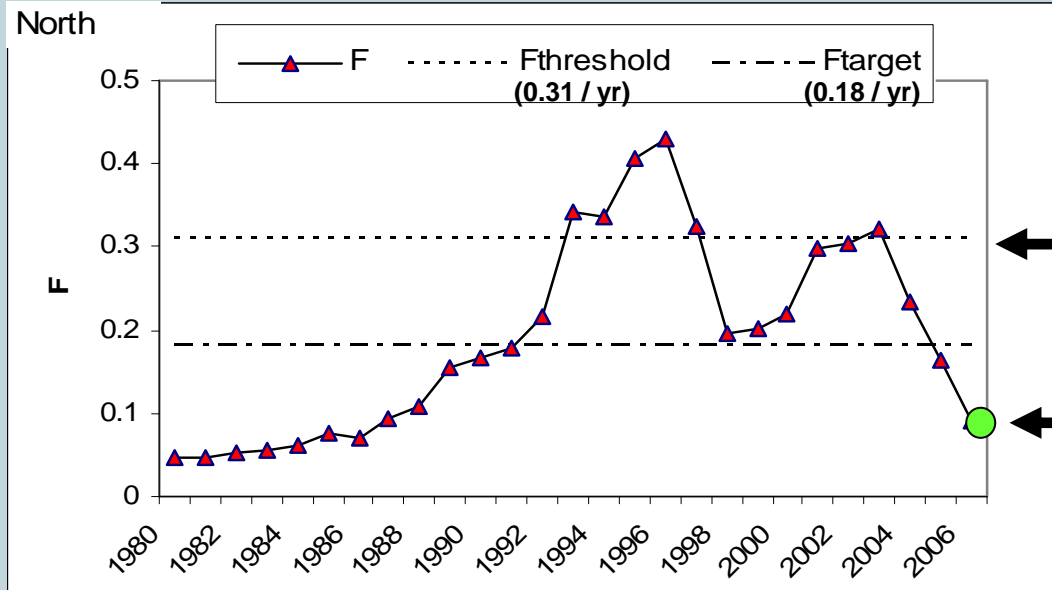
DPWG Assessment

- New Assessment Model “SCALE” – Statistical Catch-At-Length
- Accepted with strong caveats

Strengths	Weaknesses
Integrates data: surveys, catch, length composition, growth, recruitment patterns	New and relatively untested model
Estimates absolute biomass and abundance	Many inputs highly uncertain (growth, catch history, natural mortality, longevity)
	Short time frame (1980-2006 vs. 1963-2006)

Northern Monkfish: Biomass, Fishing Mortality and Stock Status

F

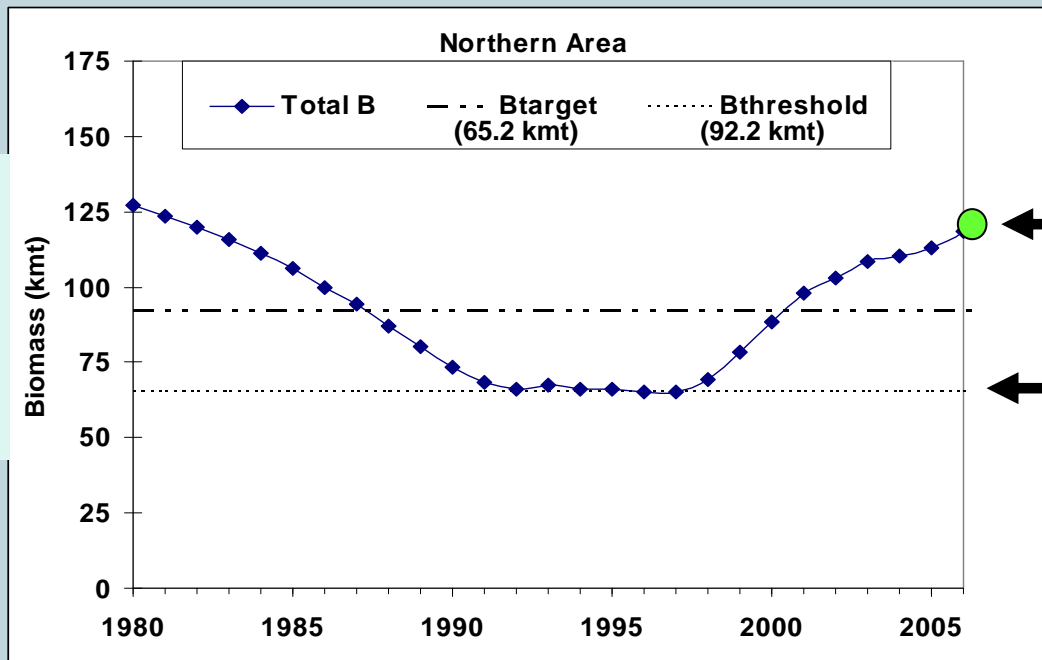


DPWG SCALE
model results

F threshold

Not Overfishing
($F_{2006} = 0.09$)

Biomass

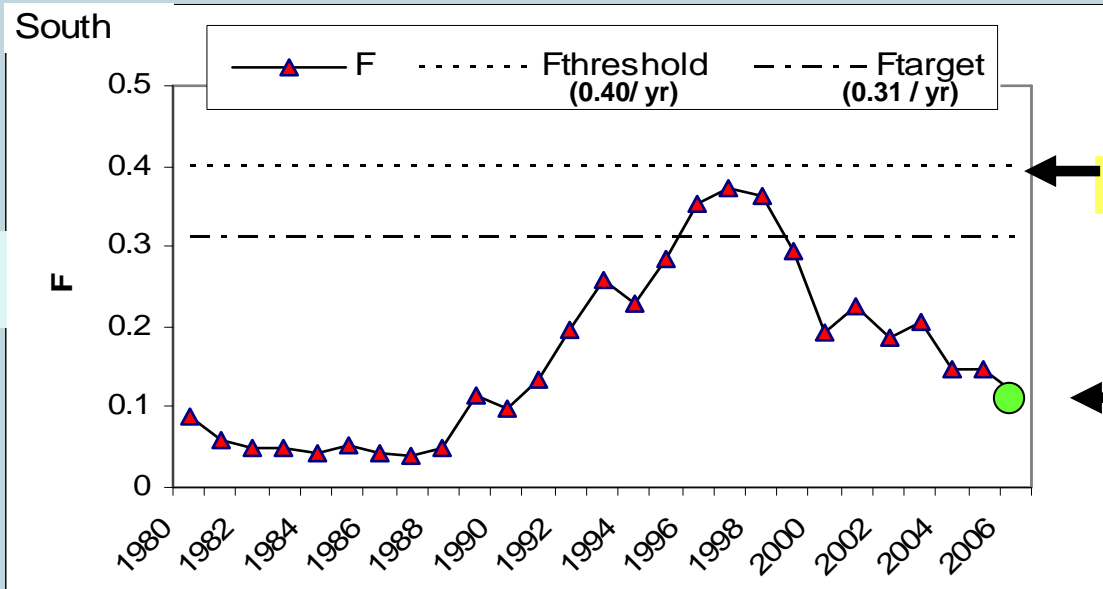


Not Overfished
 $B_{2006} = 118.7$ kmt)

B threshold

Southern Monkfish: Biomass, Fishing Mortality and Stock Status

F

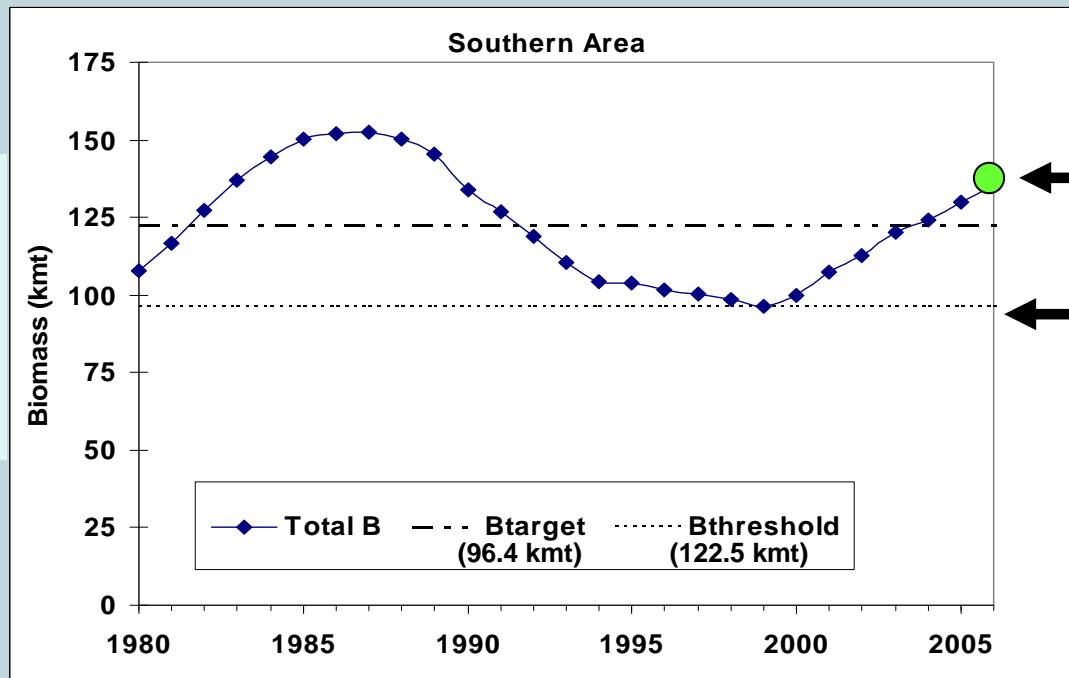


DPWG SCALE
model results

F threshold

Not Overfishing
($F_{2006}=0.12$)

Biomass



Not Overfished
 $B_{2006}=135.5$ kmt)

B threshold

Assessment Uncertainty:

1. “Monkfish is a data-poor species, and there are significant uncertainties associated with the assessment results. This should be considered when developing management measures.”

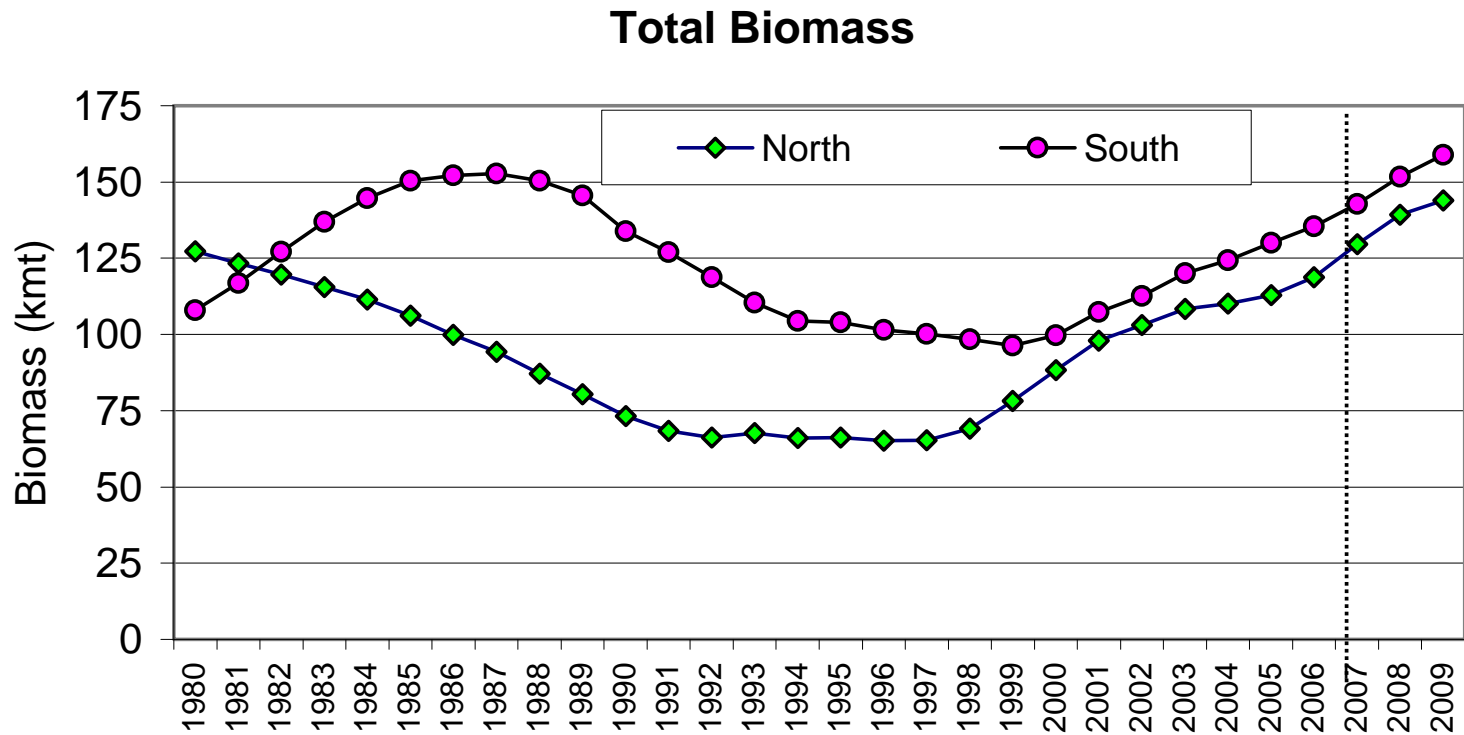
2. “Landings on the order of 5,000 mt in each management area (roughly the proposed TACs in FMP Framework Adjustment 4) are unlikely to result in a change in stock status, and should allow monkfish resources in both regions to increase.”

Uncertainty (cont.)

3.

“The SCALE model used for assessment could only be applied to the period from 1980 to the present. Monkfish biomass indices in NEFSC surveys were approximately twice as high prior to 1980 than after this time. As such, the productivity of the resource may be higher than reflected in this assessment and thus, the possibility of attaining higher biomass levels in the future should not be discounted. Reconsideration of the newly proposed biomass reference points might thus be justified in the future.”

Monkfish Projection



Projection of total biomass to 2009 based on the Statistical Catch-At-Length (SCALE) model in the northern and southern management regions. Assuming TACs of ~5kmt per region. **“Further work is needed to develop a complete forecasting approach.”**

Monkfish – Reviewer Comments:

1. SCALE model is good because it links all sources of info (previously treated separately). This is the preferred model.

2. Panel is concerned because results are very dependent on the value assumed for natural mortality rate.

3. Panel is concerned over lack of fit of the model to the adult length.

4. Using the revised BRPs and SCALE model, monkfish are not overfished and overfishing is not occurring.

5. Full projections were not done, and the projections do not have estimates of uncertainty.

Monkfish – Reviewer Recommendations :

- 1. Next time, see if a 2-sex model would work, taking into account their different growth rates.**
- 2. Continue work on aging.**
- 3. Continue work on estimation of natural mortality rate (M).**
- 4. Consider using larger length classes in the SCALE model.**
- 5. The existing (current) BRPs should not be used, and should be replaced by the redefined BRPs.**