Science, Service, Stewardship

A brief summary of the Gulf of Maine cod assessment

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GOM Cod Stakeholder Meeting

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Disclaimer

- Preliminary results
  - Peer review not complete
    - Do not expect large changes
- Focus is on findings, not numbers or equations
- Not here to review science, rather to explore options for moving forward

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Process

Preparatory Meetings:

- Industry-Science Meeting – August 16, 2011
- Data Meeting – September 7-9, 2011
- Model Meeting – October 17-21, 2011
  - Lead scientist: Michael Palmer
  - Chair of these meetings: Liz Brooks
  - Participants from NEFSC, NERO, Academia, Industry (including hired consultant)

Peer Review (SARC 53): November 29-December 2, 2011

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Changes from Last Assessment

- Three more years of data (2008-2010)
- Stock weights at age changed:
  - Added recreational discards to catch
  - Estimated commercial discards at age directly
  - Discards include smaller fish, so weights and therefore biomass are lower than estimated in 2007
- Different model (VPA to ASAP): both give similar results, but ASAP takes better account of uncertainties in data such as survey indices

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Are the new data responsible for the change in status?

Yes

Surveys generally declined while catches increased from 2008 to 2010

The 2005 year class, which was thought to be strong in the previous assessment, entered the fishery and did not appear strong in either the catch or subsequent surveys

The old (VPA) and new (ASAP) models produce similar estimates of SSB and F over the entire time series

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How was the change of survey vessel to the Bigelow included?

- One of the largest calibration experiments in the world was conducted in 2008 for Albatross and Bigelow
- Bigelow caught more cod per tow than Albatross IV
  - Different ratio depending on length
- Length specific calibration factors for cod estimated and peer reviewed through TRAC process
- Only impacts 2009-2010 NEFSC surveys, but calibration allows these new observations to be related to previous observations

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Did changing the stock weights result in the status change to overfished?

No

Both the assessment results and reference points would adjust to the change in stock weights, so status is not impacted

The new stock weights are more realistic than previous ones because they do not artificially increase when minimum size regulations increase

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Why did commercial discards change?

Previous assessment made assumption that discards were driven by trip limits, while this assessment uses observations of discarded fish size

When discards and landings have same size composition, can simply increase landings at age to account for discards – done in GARM III

When discards are smaller fish than landings, as due to minimum size regulations, better to estimate discards at age separately from landings at age – done in this assessment

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Why are all discarded cod assumed to die?

- Working group examined a number of studies on discard mortality for a range of gears
- These studies demonstrated that not all discarded fish survive, even under the best conditions
- No single study tested every discard mortality factor
- Could not quantify the discard mortality rate
- Decision made to assume 100% mortality for modeling purposes
- Sensitivity analysis resulted in lower SSB and F (amount varied by year) but no change to overall perception of stock or current status

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Result of Changes

Last assessment: not overfished, but overfishing

- Strong 2005 year class
- Stock expected to rebuild by 2014

This assessment: overfished and overfishing

- SSB about one fifth SSBmsy, F about 5 times Fmsy
- 2005 year class not strong
- Cannot rebuild by 2014 even if F=0
- Results robust to wide range of sensitivity runs

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Is the spring survey more than 100% efficient?

No

An artifact of the survey area greater than the catch area

- Catchability estimate about half when smaller survey area used (SSB and F did not change)

When survey in Bigelow units and assumed 80% efficient, model estimates generally within confidence intervals

Historically, estimated biomass has been consistent through numerous assessments

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How can CPUE be increasing?

- Concentration of population in western Gulf of Maine allows fishery catch rates to remain high even though population at low abundance
- Fishery has also concentrated in western Gulf of Maine
- CPUE trends indicative of localized abundance where fleet is operating, not indicative of stock as a whole
- Raw CPUE for gillnets and otter trawls has shown increasing trends over the past five years

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How can biomass increase in recent years when F is so high?

- The recent increase is just part of the variability at low stock size due to changes in recruitment and F
- SSB has fluctuated between 8,000 and 15,000 mt for the past decade
- F has been more than 3 times greater than the reference point during this entire period
- Recruitment has ranged from 1.7 to 9.0 million age-1 fish during this period

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How can catch be almost the same as spawning stock biomass?

F is high

Population has not crashed because there remains a portion of the population that is not caught (due to selectivity of the gears) that can contribute to next year's catch and SSB

SSB is a measure of mature biomass, not total biomass

Total biomass is nearly double SSB

Reductions in F are expected to allow more fish to grow to older ages, eventually leading to an increase in catch and larger population abundance

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Is poor stock status due only to high 2010 recreational catch?

No

Sensitivity run with reduced 2010 recreational catch did not change overall findings of stock assessment

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What are potential 2012 catches?

Cannot rebuild by 2014 even when F=0

Assume 2011 catch = 2010 catch (11,392 mt)

Recruitment as suggested by Peer Review Panel

If fish at overfishing limit (F40% = 0.20)

2012 Catch = 1,313 mt

If fish at 75%F40%

2012 Catch = 1,001 mt

(These 2012 catch values were not reviewed during SARC – Preliminary and for demonstration purposes only)

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Summary

- Preliminary results awaiting Peer Review report
- Bad news for Gulf of Maine cod and associated fisheries
- Stock is much lower and F is much higher than targets
- Cannot rebuild by 2014 even under F=0
- Large reduction in catch will be required to end overfishing