

Atlantic Herring Operational Update Assessment 2015

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NEFMC SSC Meeting

May 20, 2015

Revere, MA

Outline

Revisit 2012 benchmark (SAW 54)

Operational Update

Input data

Likelihood issue

Results/Diagnostics

Stock status

Sensitivities

Summary and Conclusions

Revisit 2012 Benchmark

Used ASAP

Some model characteristics:

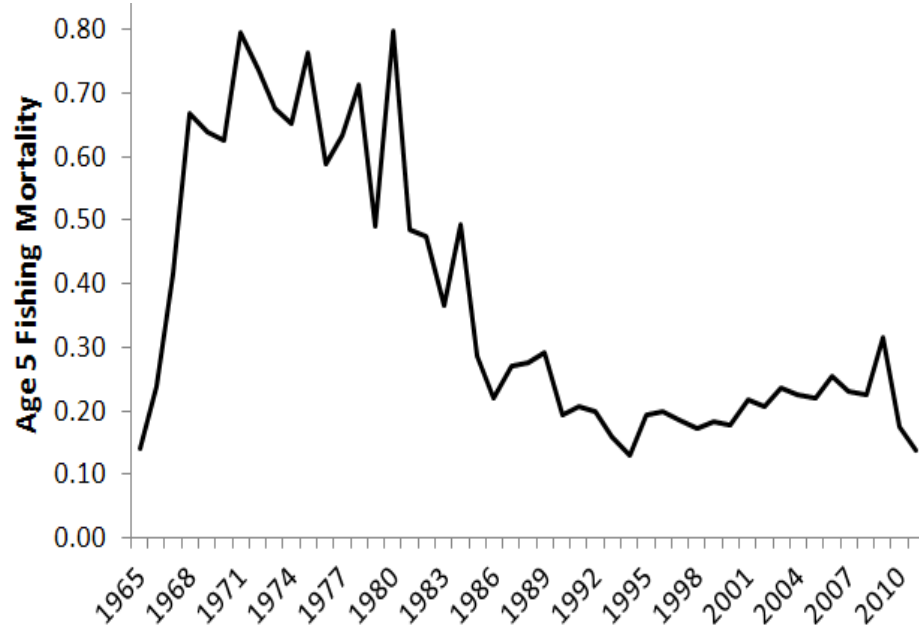
$M_{a,y}$

50% increase in M during 1996-2011

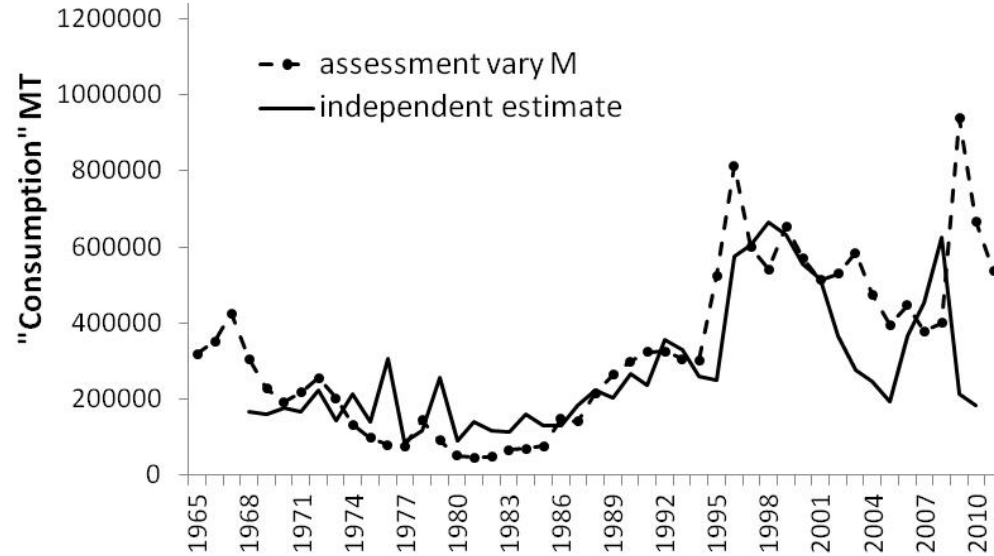
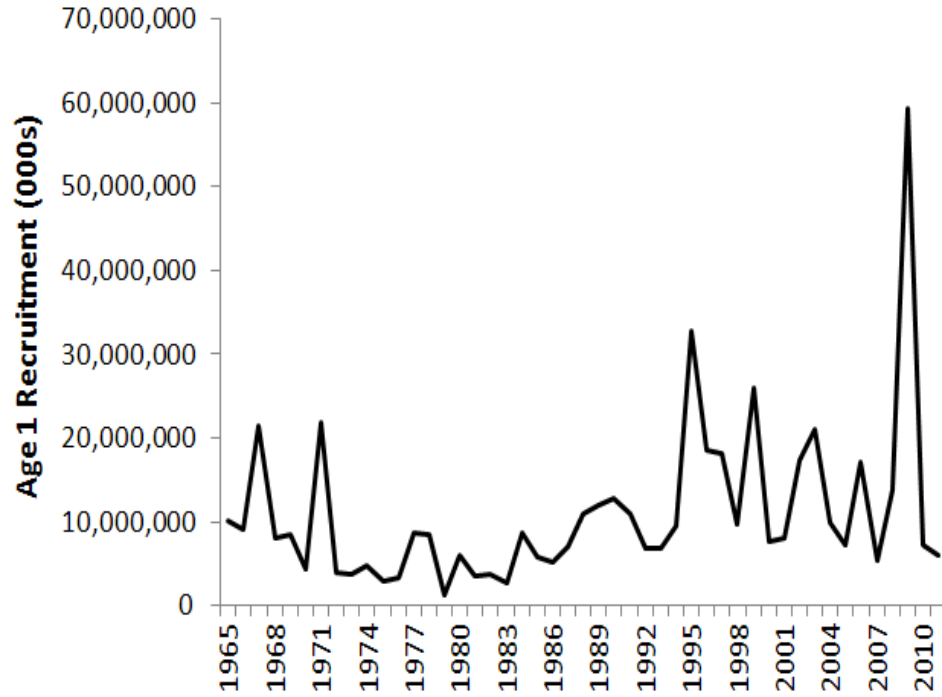
Two gears: Fixed and Mobile

Estimated SR curve

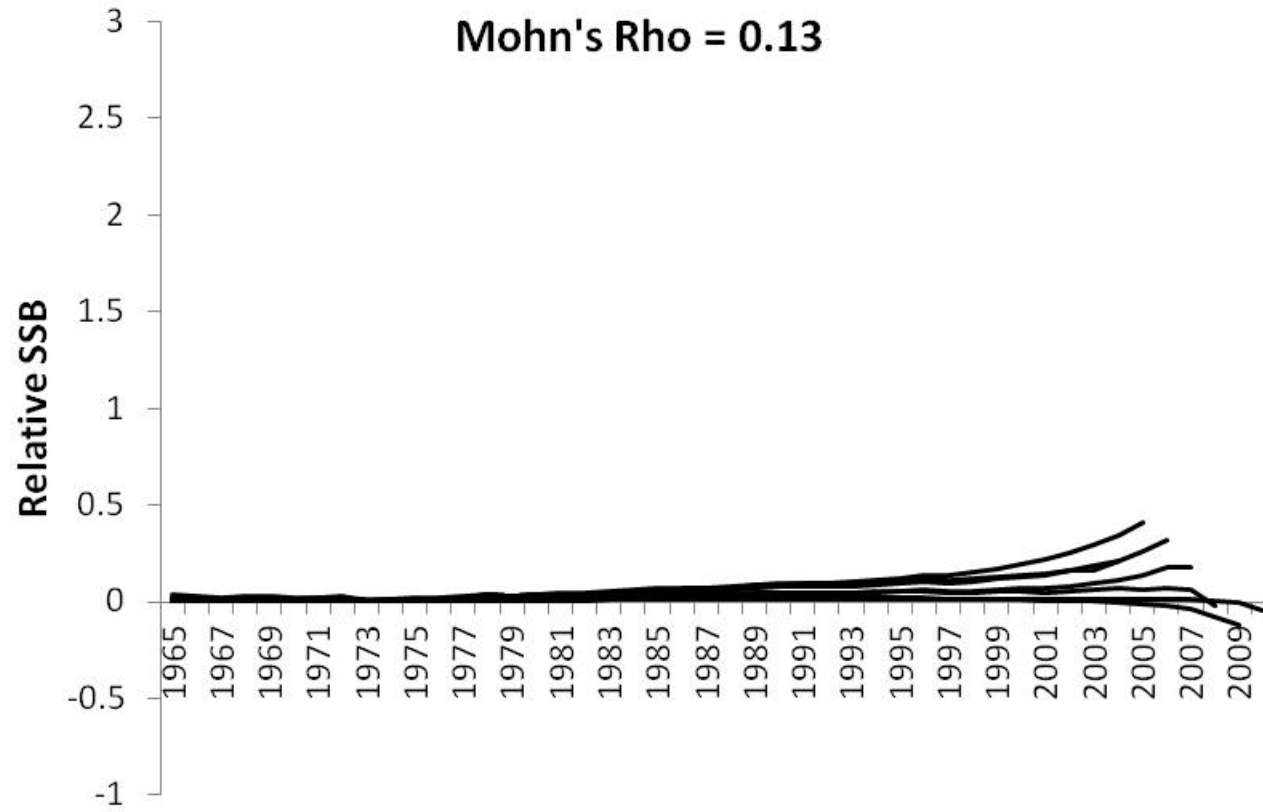
Revisit 2012 Benchmark



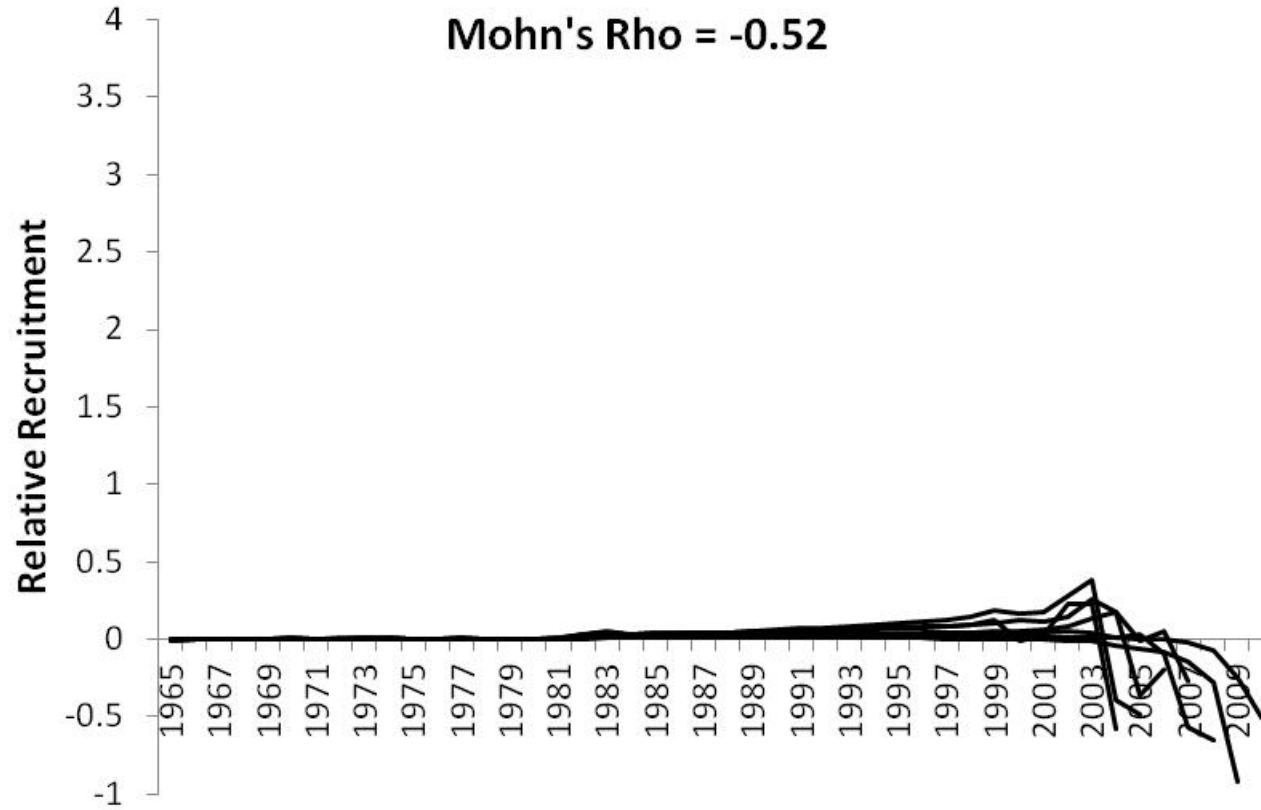
Revisit 2012 Benchmark



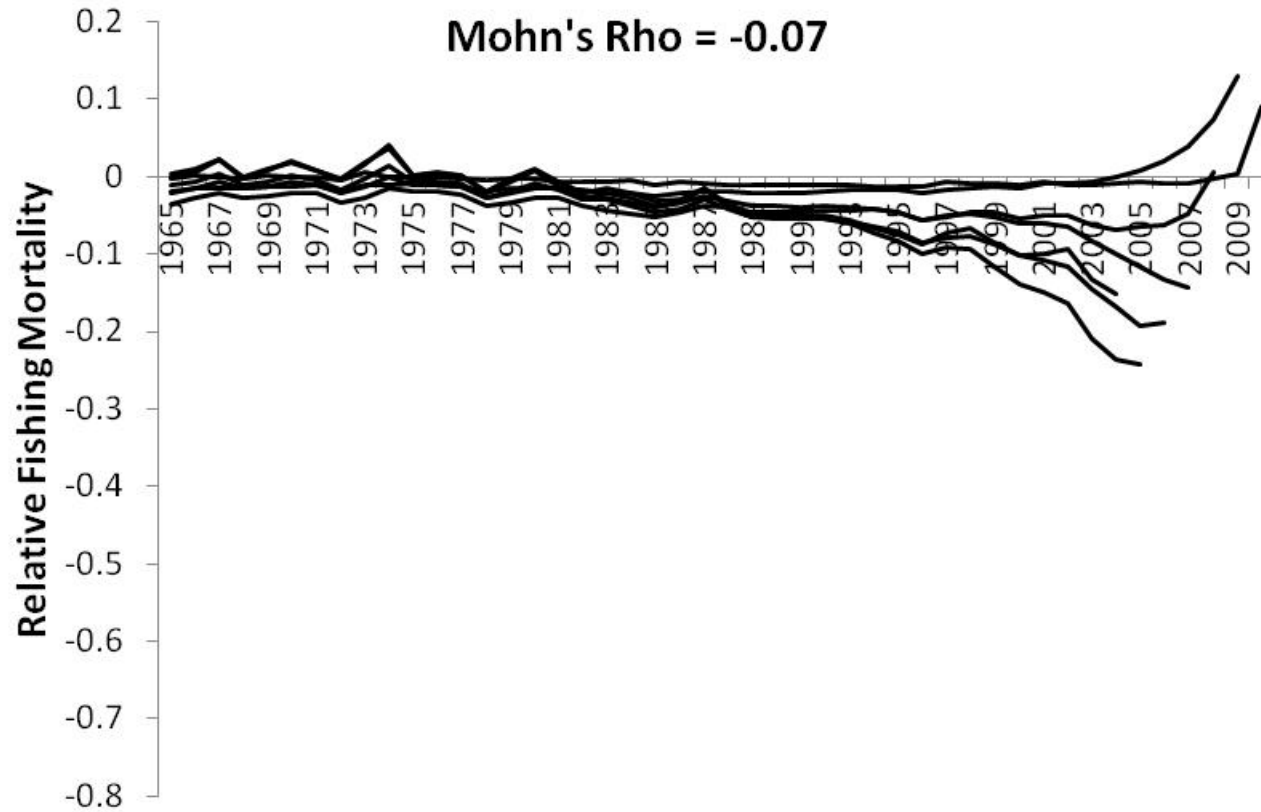
Revisit 2012 Benchmark



Revisit 2012 Benchmark



Revisit 2012 Benchmark



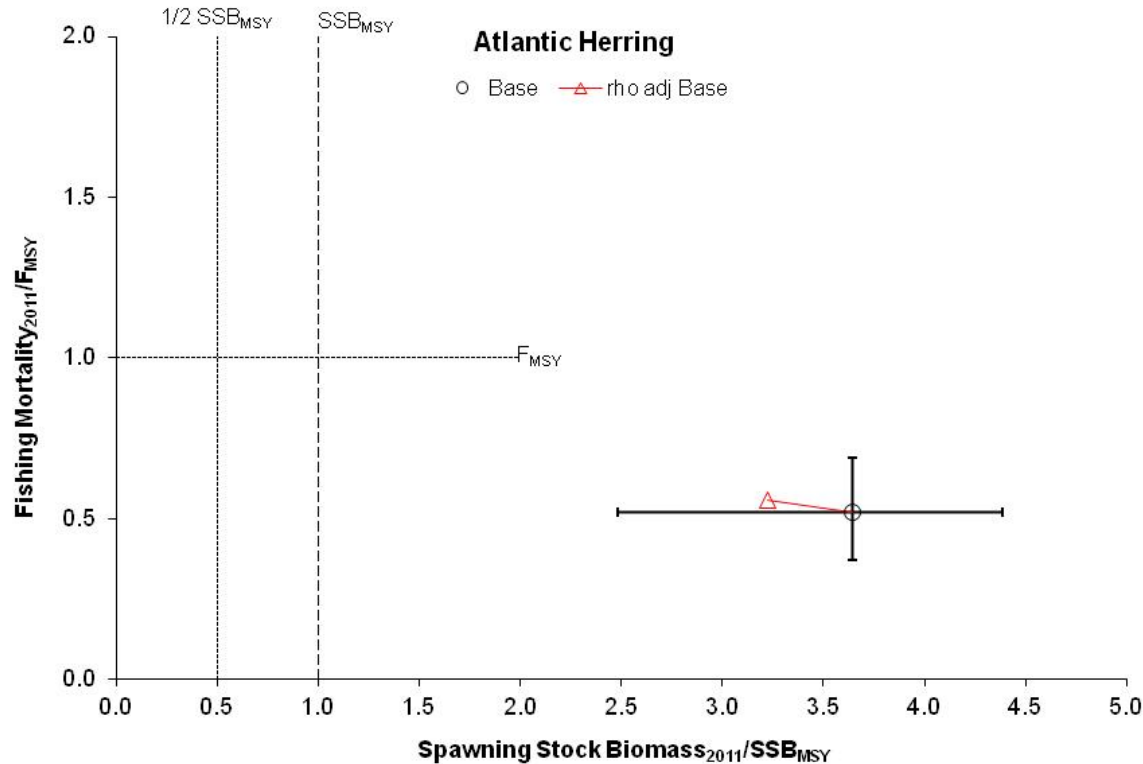
Revisit 2012 Benchmark

$F_{msy} = 0.27$

$SSB_{msy} = 157,000$ mt

$MSY = 53,000$ mt

2011 $SSB = 518,000$ mt and $F_5 = 0.14$



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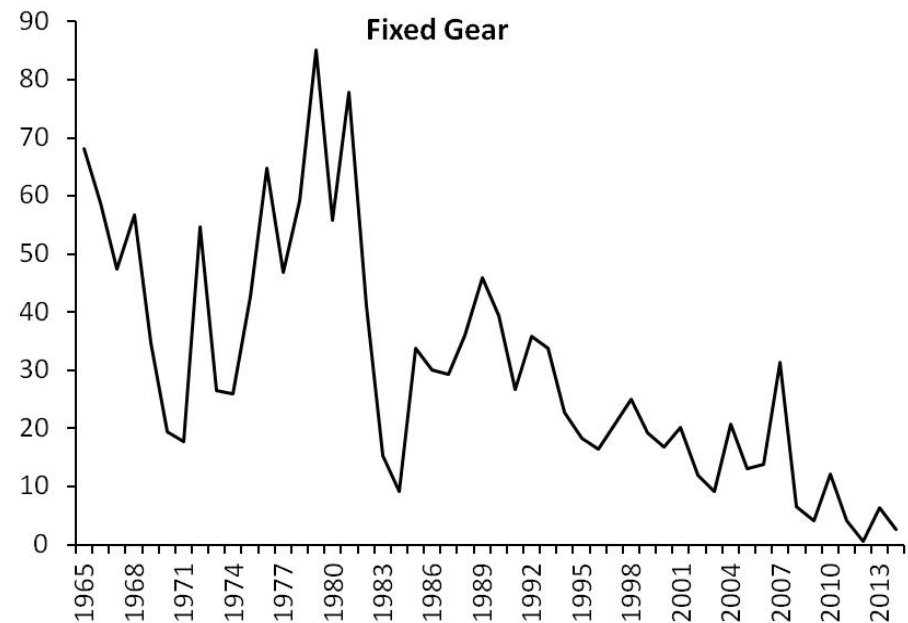
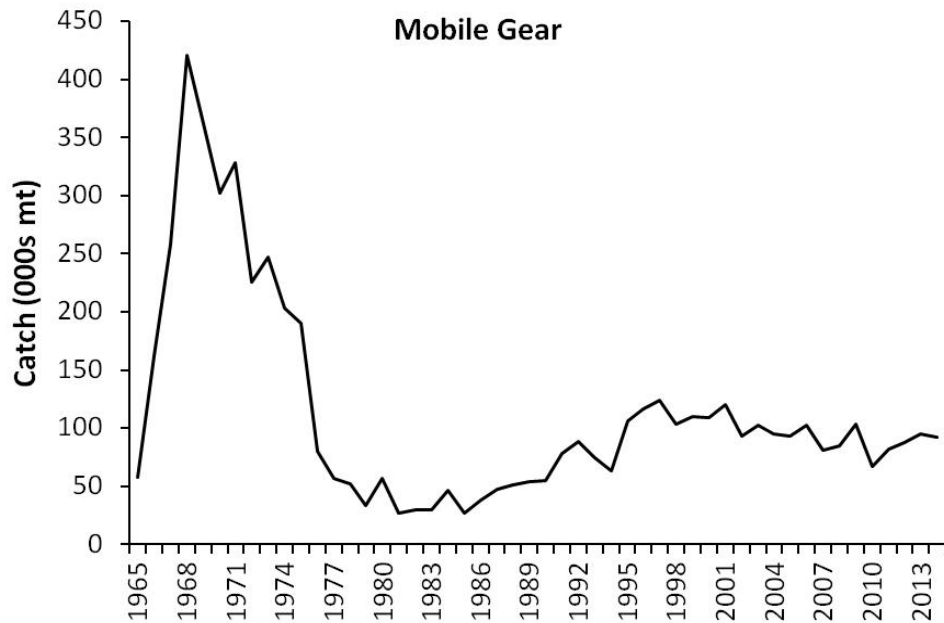
Sensitivities

Summary and Conclusions

Operational Update

Input Data

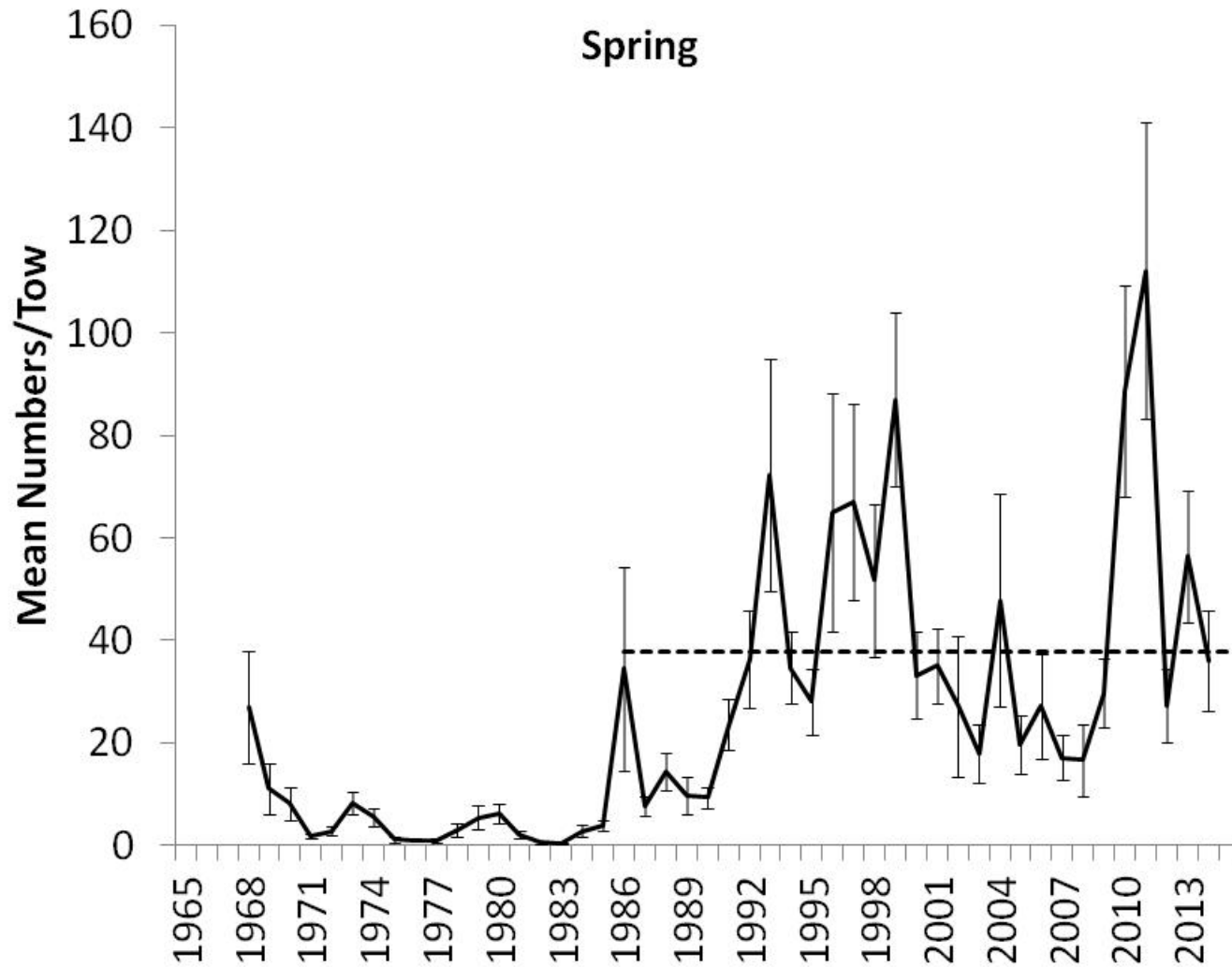
Mobile dominates recently; relatively stable ~20 years



Operational Update

Input Data

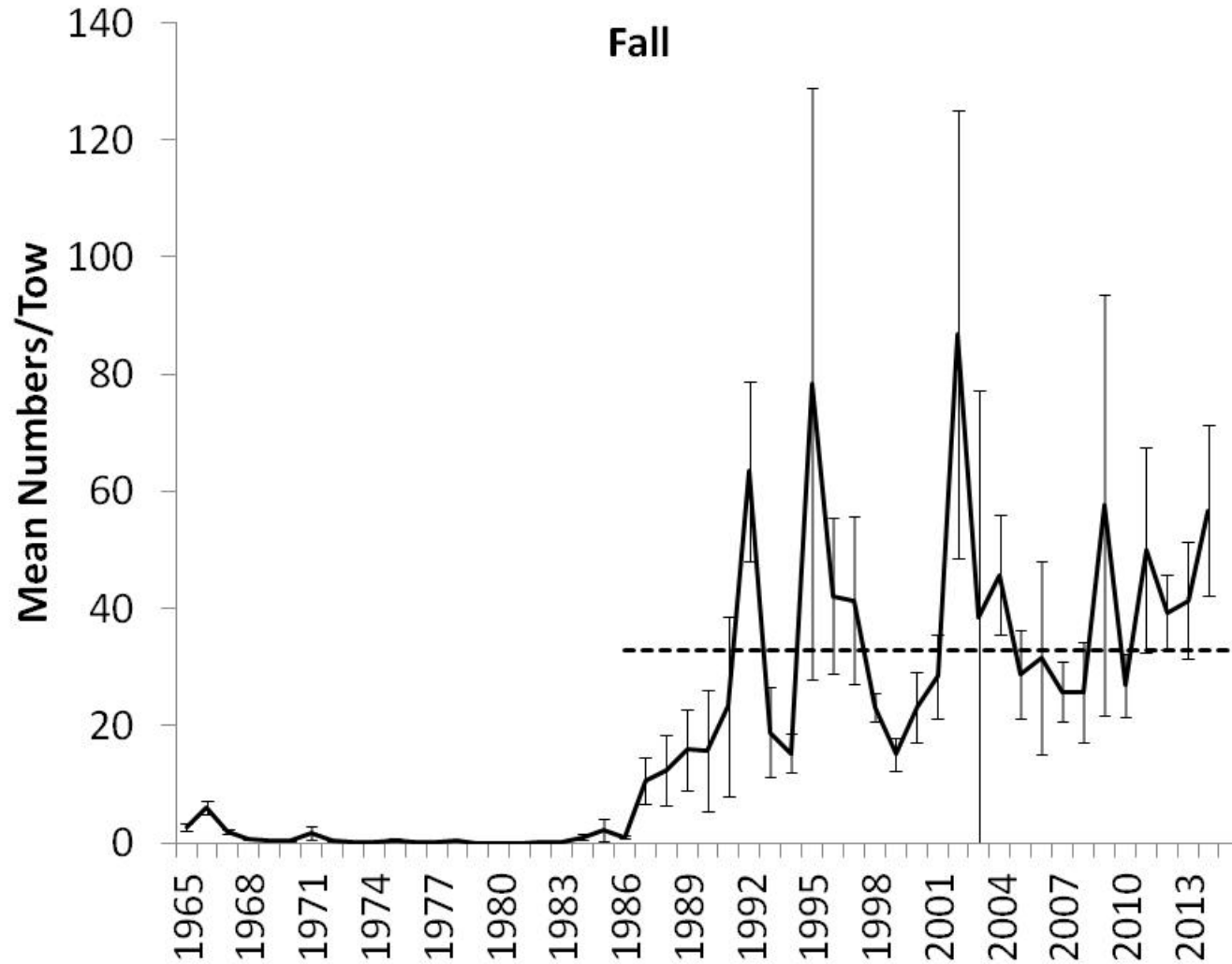
Stable and average or better recently



Operational Update

Input Data

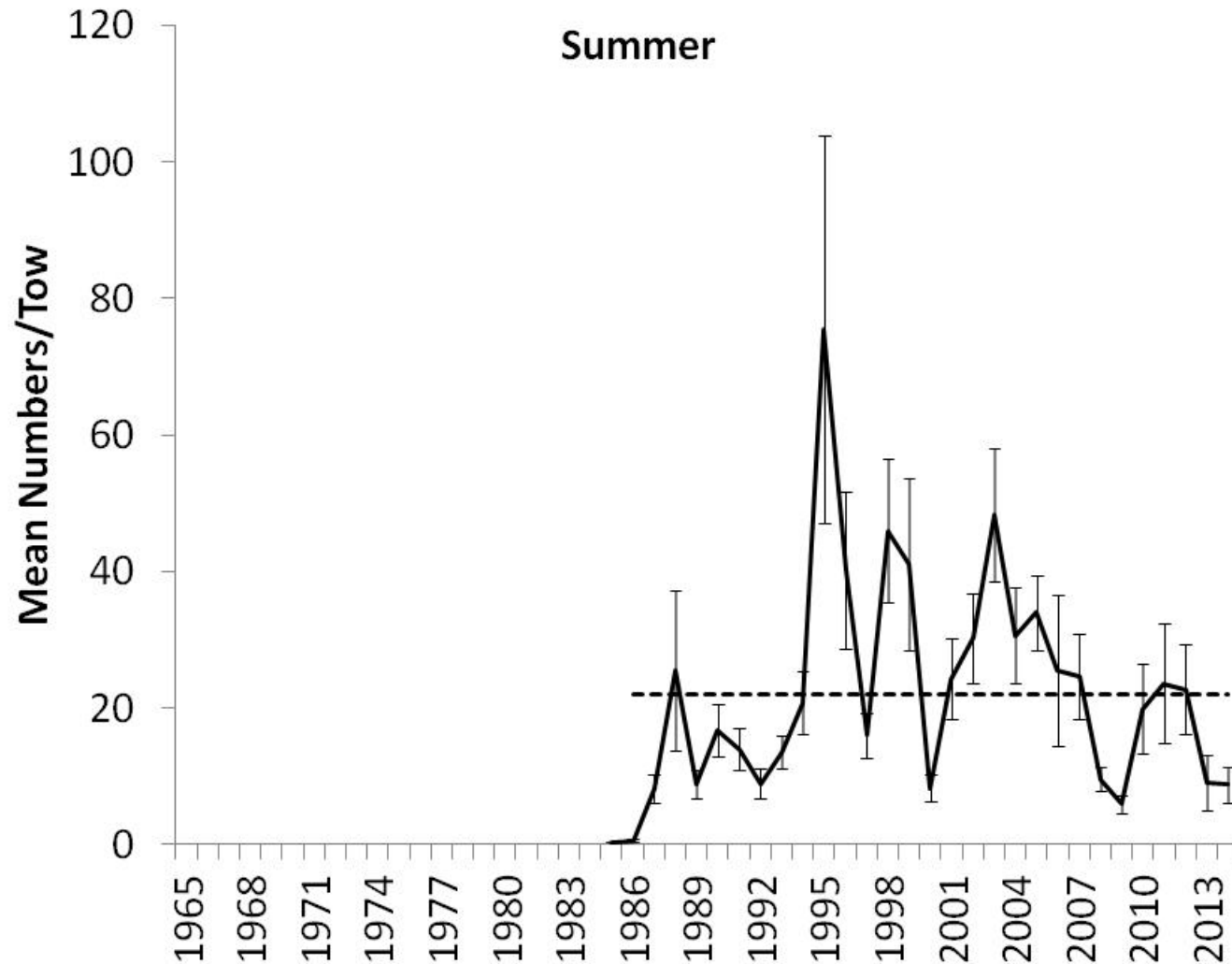
Stable and average or better recently



Operational Update

Input Data

Average or below recently



Operational Update

Likelihood Issue

Recruitment assumed lognormally distributed:

$$-\ln(L) = n_{rec} \frac{\ln(2\pi)}{2} + \sum_{Y_f}^{Y_l} \ln(\widehat{R}_y) + n_{rec} \ln(\sigma) + \frac{1}{2} \sum_{Y_f}^{Y_l} \frac{(\ln(\widehat{R}_y) - \ln(\overline{R}_y))^2}{\sigma^2}$$

Sum of “observations”, but these are parameters

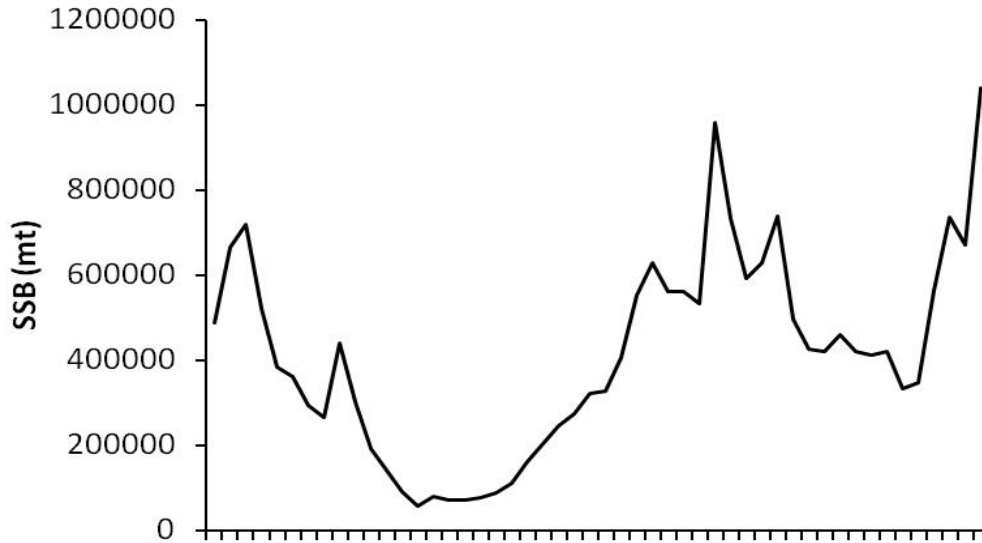
Model improves fit by reducing scale of recruits

Fixed for update

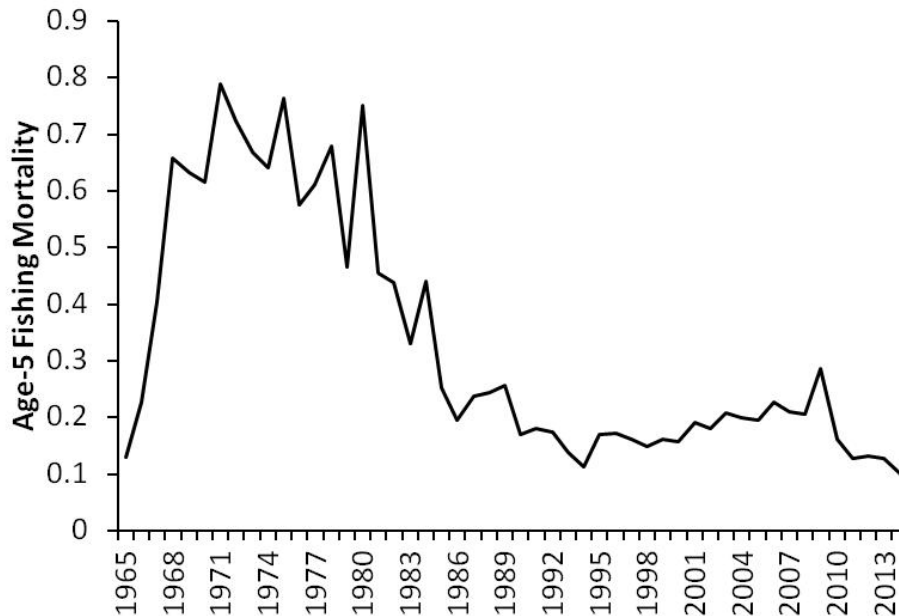
Diagnostic issues present regardless of issue

fix amplifies issues (e.g., retro worsens)

Operational Update

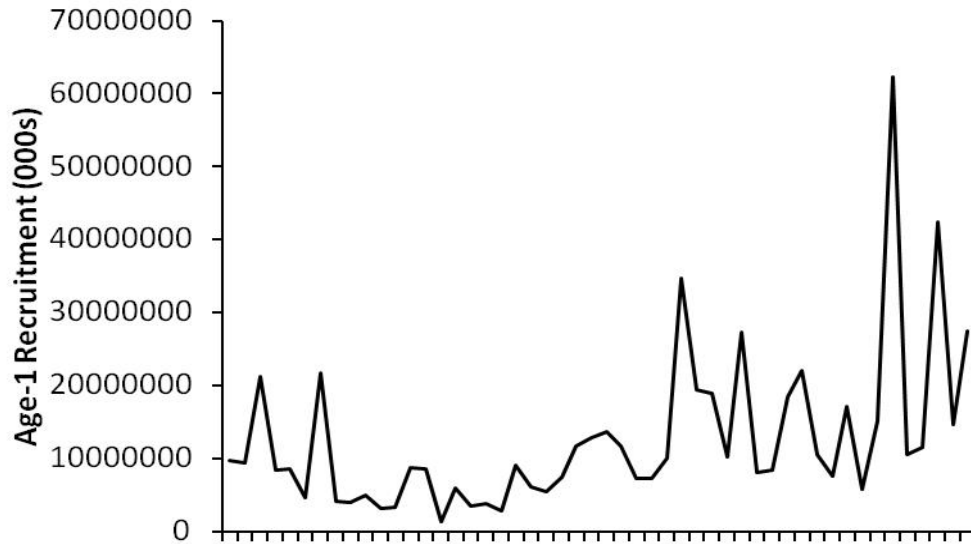


Highest SSB as 2008 cohort is fully mature and 2011 cohort partially mature

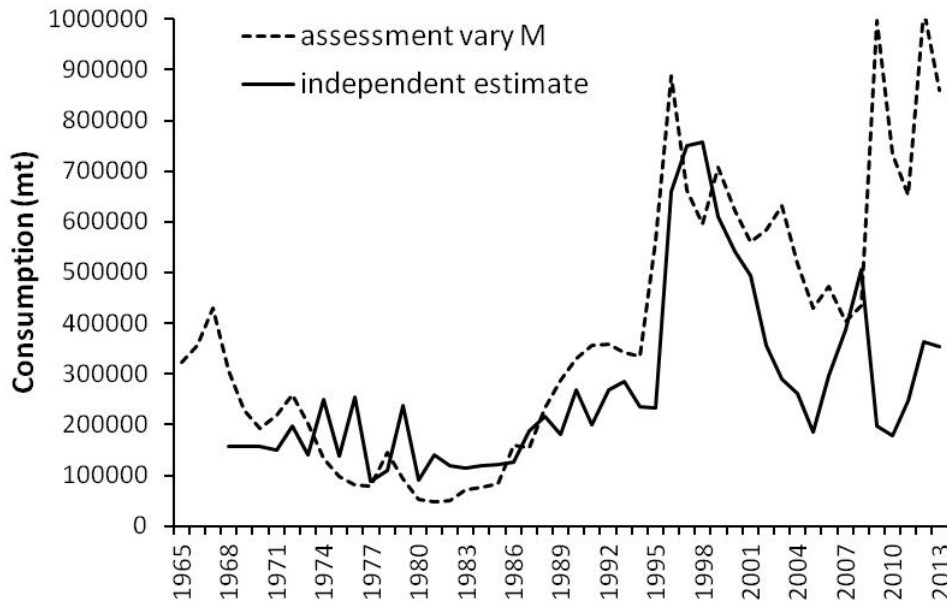


Lowest F

Operational Update

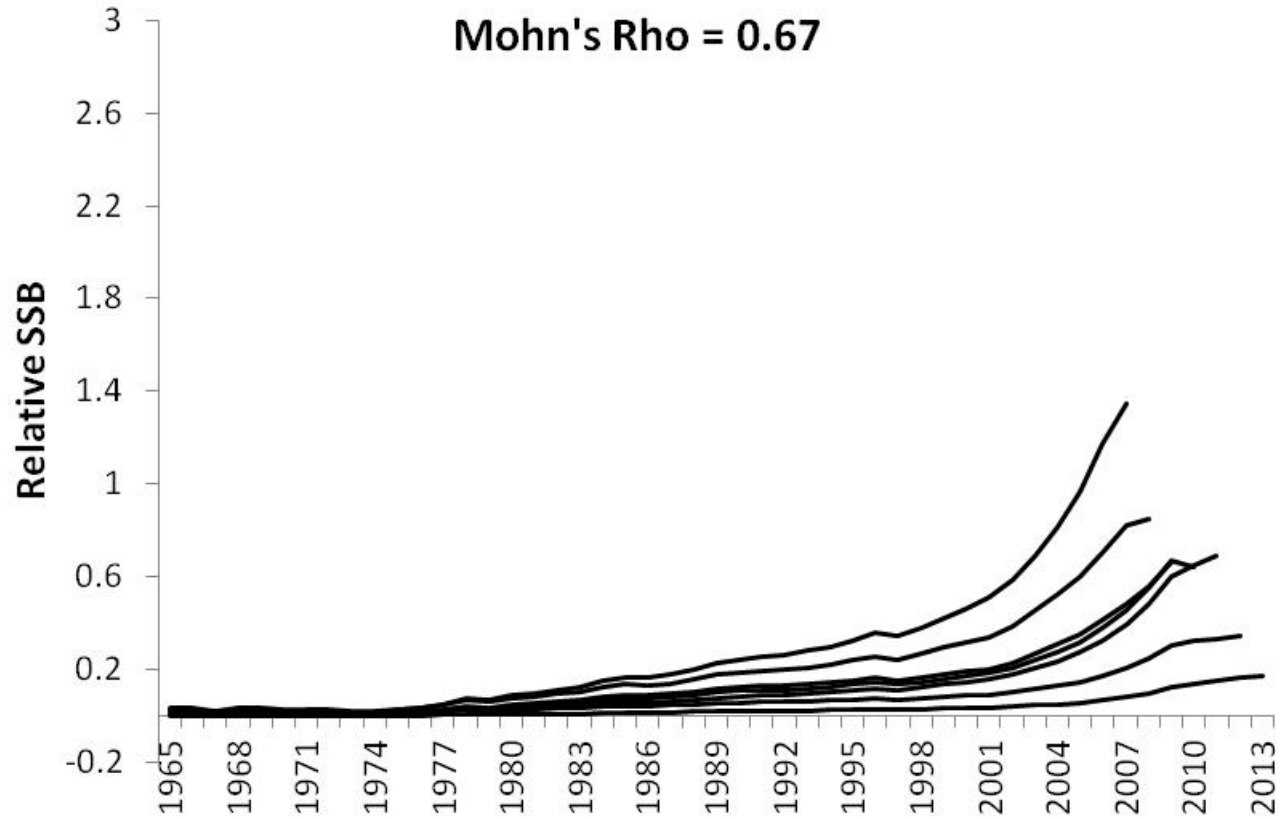


2008 cohort highest, 2011 second

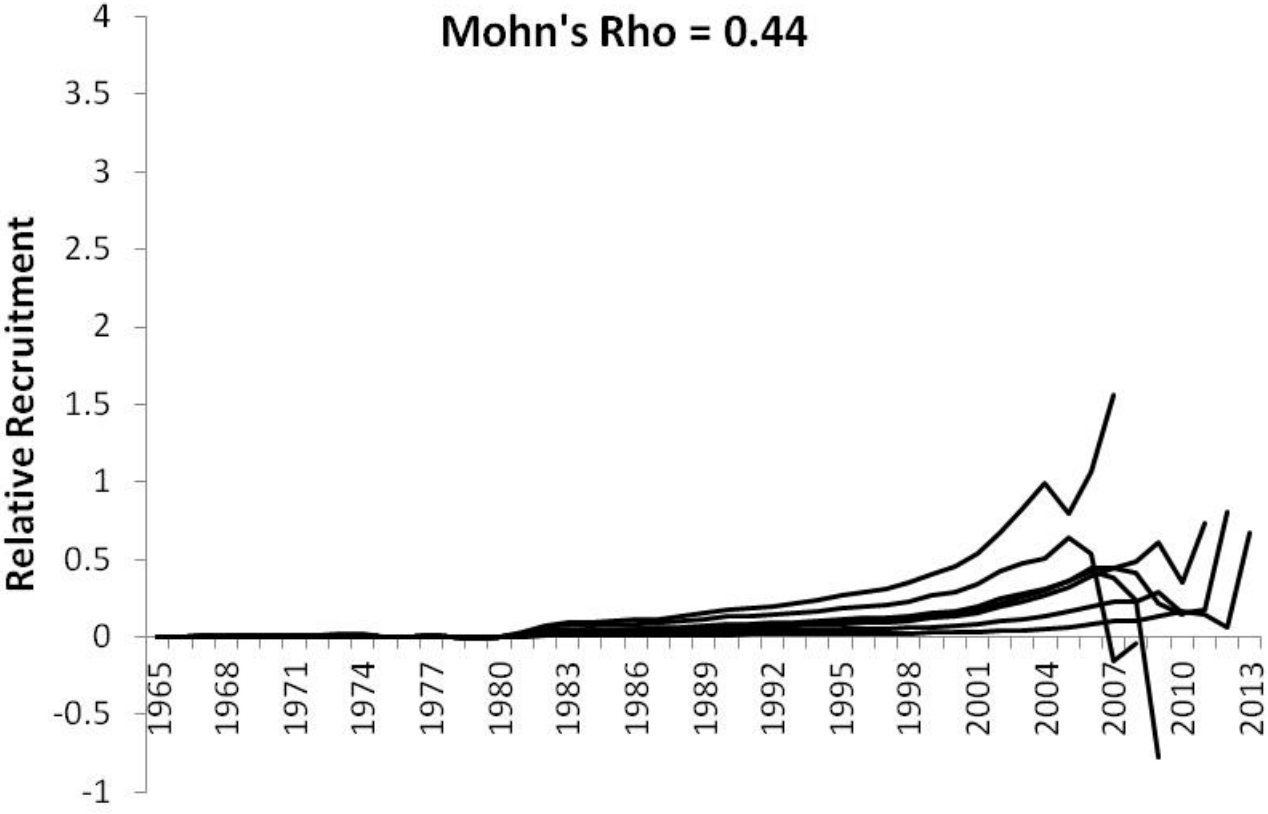


Implied and estimated consumption diverging

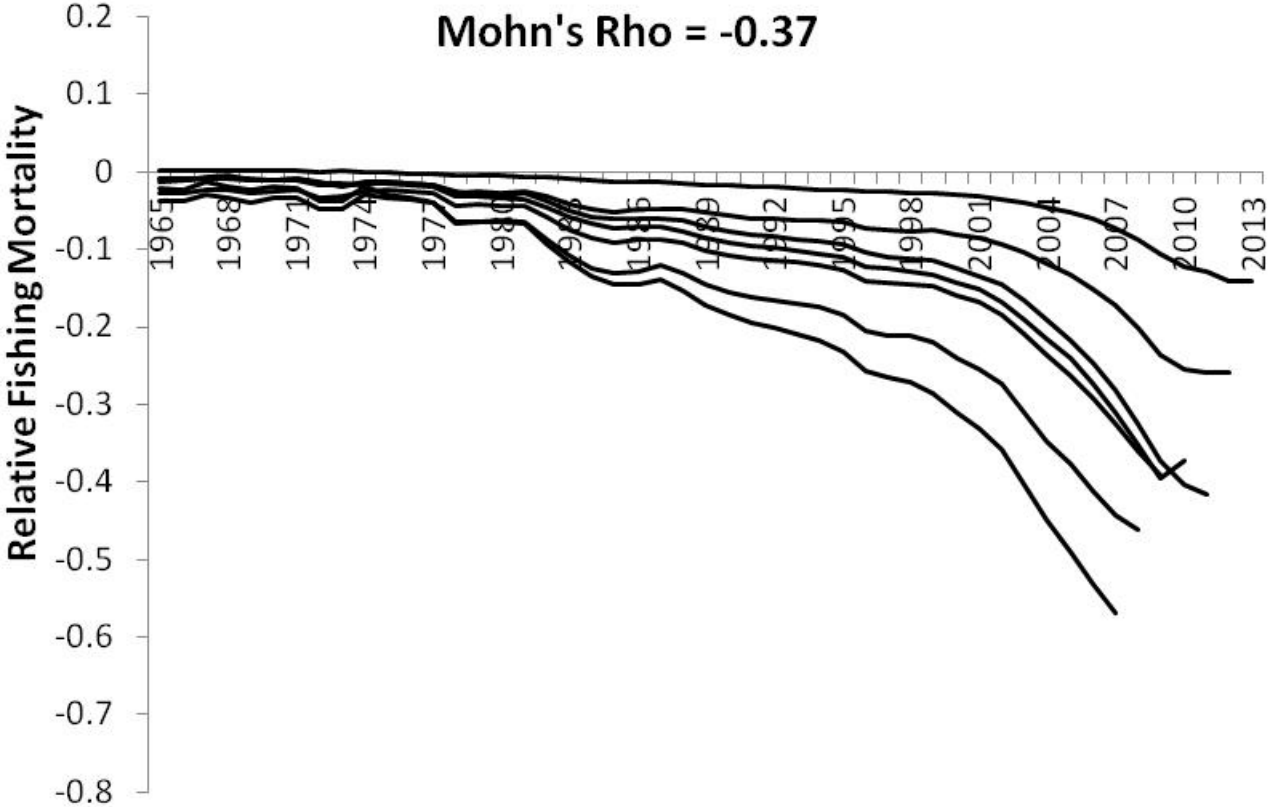
Operational Update



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Operational Update

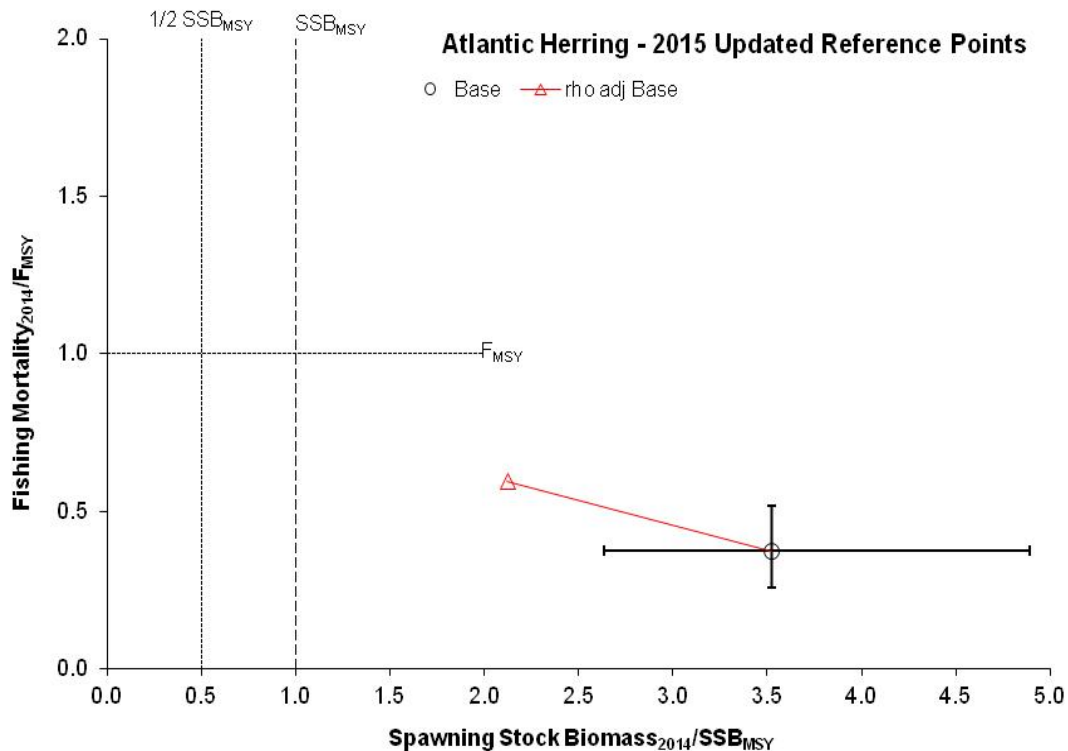
$F_{msy} = 0.24$

$SSB_{msy} = 311,145$ mt

$MSY = 77,247$ mt

2014 $SSB = 1,041,500$ mt and $F_5 = 0.10$

Retro adjusted: $SSB = 622,991$ mt and $F_5 = 0.16$



Sensitivities

Major structural assumption time varying M

resolved retrospective in 2012

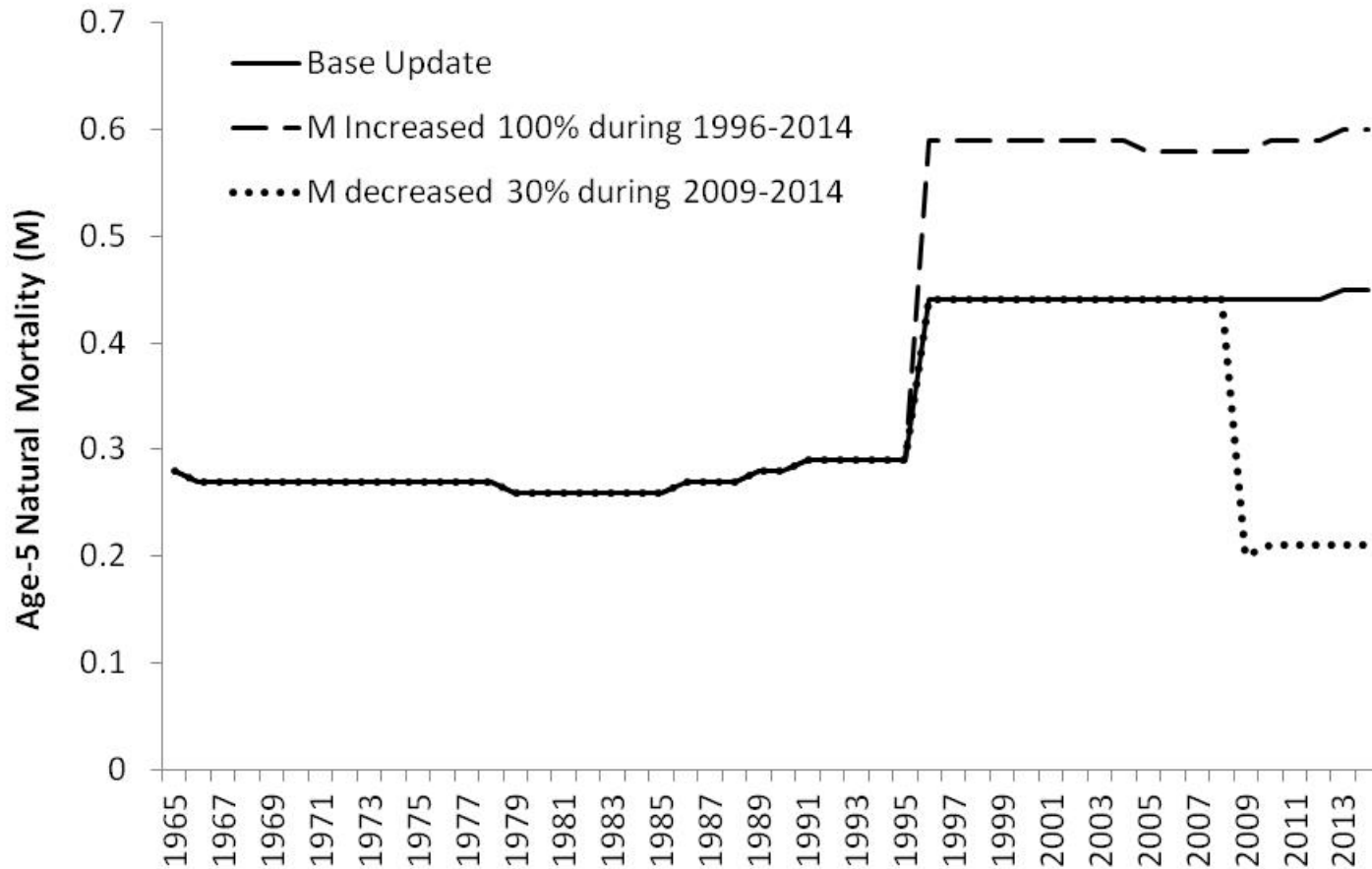
consistency with scale of empirical estimates

2 sensitivities focused on these diagnostics

1) increase M 100% 1996-2014 to reduce retro

2) decrease M 30% 2009-2014 to match estimates

Natural Mortality in Sensitivities



Sensitivities

Major structural assumption time varying M

resolved retrospective in 2012

consistency with scale of empirical estimates

2 sensitivities focused on these diagnostics

1) increase M 100% 1996-2014 to reduce retro

2) decrease M 30% 2009-2014 to match estimates

Reducing retro worsens consumption match, while

matching consumption worsens retro

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Base update has moderate retro and consistency
with consumption deteriorates

These diagnostics and other uncertainties insufficient
to reject update, but use retro adjustment

Panel took comfort in:

Stock status robust

Signs of \geq average recruitment

“Empirical” information show similar trends to
update

Questions and Comments?

Projections

	Harvest Scenario		
	F_{MSY}		
Result	2016	2017	2018
F	0.24	0.24	0.24
80%CI	-	-	-
Median Catch mt	138,000	113,000	107,000
80%CI	95,000-208,000	81,000-166,000	74,000-162,000
Median SSB mt	536,000	440,000	412,000
80%CI	354,000-880,000	312,000-669,000	282,000-631,000
Prob SSB<($SSB_{MSY}/2$)	0.00	0.00	0.00
Prob $F > F_{MSY}$	-	-	-
	$0.75F_{MSY}$		
F	0.18	0.18	0.18
80%CI	-	-	-
Median Catch mt	106,000	90,000	88,000
80%CI	73,000-159,000	65,000-132,000	61,000-132,000
Median SSB mt	560,000	477,000	456,000
80%CI	369,000-914,000	337,000-721,000	314,000-695,000
Prob SSB<($SSB_{MSY}/2$)	0.00	0.00	0.00
Prob $F > F_{MSY}$	-	-	-

Projections

	Status Quo ABC (114,000mt)		
Median F	0.19	0.24	0.26
80%CI	0.13-0.30	0.15-0.37	0.15-0.44
Catch mt	114,000	114,000	114,000
80%CI	-	-	-
Median SSB mt	555,000	454,000	421,000
80%CI	341,000-940,000	279,000-756,000	232,000-732,000
Prob SSB<(SSB _{MSY} /2)	0.00	0.00	0.02
Prob F>F _{MSY}	0.27	0.47	0.54
	F_{MSY} with 2011 year class reduced to average		
F	0.24	0.24	0.24
80%CI	-	-	-
Median Catch mt	111,000	98,000	96,000
80%CI	74,000-176,000	70,000-149,000	65,000-149,000
Median SSB mt	446,000	392,000	370,000
80%CI	282,000-785,000	275,000-613,000	250,000-575,000
Prob SSB<(SSB _{MSY} /2)	0.00	0.00	0.00
Prob F>F _{MSY}	-	-	-

Projections

	Constant Catch that Produces Prob $F > F_{MSY} = 0.50$ in 2018		
Median F	0.19	0.23	0.25
80%CI	0.13-0.29	0.15-0.36	0.15-0.42
Catch mt	111,000	111,000	111,000
80%CI	-	-	-
Median SSB mt	557,000	458,000	427,000
80%CI	343,000-942,000	283,000-760,000	237,000-738,000
Prob $SSB < (SSB_{MSY}/2)$	0.00	0.00	0.02
Prob $F > F_{MSY}$	0.23	0.43	0.50