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MEMORANDUM

DATE: August 2, 2011

TO: Groundfish Oversight Committee
Science and Statistical Committee

FROM: Groundfish Augmented Plan Development Team (APDT)

SUBJECT: **FY 2012 -2014 Acceptable Biological Catches (ABCs)**

Introduction

1. This memorandum provides an overview of the APDT's development of methods to determine ABCs for Northeast Multispecies stocks for the FY 2012 – 2014. Additional details are provided in the attachments. The analyses described were reviewed by the APDT during conference calls identified in attachment (a).

2. The analyses performed by the APDT are intended to aid in the setting of groundfish ABCs for the period FY 2012 – 2014. For most groundfish stocks[1], assessments have not been updated since the GARM III assessments completed in 2008 (terminal year of 2007). For those stocks with an analytic assessment, the APDT was tasked by the Council's Executive Committee to compare projections based on the last assessment to available survey data to determine if stock conditions differ from the projections. This was to evaluate whether the ABCs from those projections were appropriate catch levels.

3. The APDT briefed the SSC on its planned approach at the June, 2011 SSC meeting. In broad terms, the initial process involved two steps: first, evaluate whether the resource surveys are a reliable indicator of stock size, and second, evaluate whether projections perform reliably for the period necessary to set the ABCs – that is, five to seven years.

[1] Attachment (b) lists the groundfish stocks and identifies the date of the most recent assessment for each stock. This table also provides information on stock status and recent ABCs and catches.

The APDT reported in June that a regression of survey index on stock size did not provide a reliable predictor of future stock size. The SSC agreed with this conclusion and recommended against pursuing this concept. Nevertheless, there was interest in additional examinations to see if there was useful information in the surveys. The SSC also agreed in concept with the APDT's planned approach for investigating the performance of mid-term projections. The SSC provided suggestions to the APDT for additional analytic work (attachment (c)). The SSC also recommended the APDT pursue alternatives to the projections should they be determined to be unreliable, and forwarded a specific recommendation for an adjustment to ABCs based on trends in the survey (attachment (d), reflecting further APDT development of the proposed approach).

4. As described below, the APDT concluded that ABCs based on mid-term projections (5-7 years) are unreliable and may not achieve mortality objectives. These ABCs tend to be biased high. Several adjustments to projection assumptions were explored to determine if they would improve the performance of the projections but none resulted in significant improvements. The proposed survey-based adjustment to the ABCs was also examined; the APDT does not believe the survey-adjustment method performs well for all stocks and recommends it not be used. The APDT suggests two alternative approaches for setting ABCs that are a combination of a model and data-based approach.

Projection Analyses

5. The performance of projections for ten stocks was examined through simulations. For this exercise, GARM III estimates of stock size and fishing mortality were considered "the truth." Using GARM III data and model formulation, the assessment was run for a series of terminal years T (2000 through 2006), and each model was bootstrapped 1,000 times. Based on each terminal year, projections were performed inputting actual catch and using GARM III assumptions[2] to get estimates of stock size and fishing mortality for each year from T+1 through 2007. These estimates of stock size and fishing mortality based on actual catch were then compared to the true GARM III estimates to determine the relative difference. This process was repeated for all bootstrap iterations to get a distribution of results.

6. After the initial runs were performed, adjustments to projection conditions were examined to determine if they would improve projection performance. This approach attempted to identify which factors were responsible for the differences between projected and "true"/realized values. The approach used was to substitute the "true" value (the value from GARM III) for an assumption before re-running the analysis. Five adjustments were made, for a total of six versions of the analyses (see Table 1):

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[2]. As an example, if GARM III projection inputs assumed weights-at-age were the most recent five year average, the projection used the most recent five years up to the terminal year of the assessment, not the GARM III weights (which were for a later period).

a. No true values used: GARM III assumptions, actual catches input into projection. (This is the way projections are typically performed).

b. All true values used: true weights, selectivity, maturity, numbers at age (NAA) in year T+1, true recruitment, true F (rather than catch). (This tests the performance of the projection model/software).

c. True recruitment, true catch, all other assumptions match GARM III. (This tests whether the recruitment assumption drives differences between the projected and true values).

d. True NAA in year T+1, actual catches, all other assumptions match GARM III. (This tests whether the estimate of NAA drives differences between the projected and true values).

e. All true projected values except true NAA in year T+I, true F

f. All true projected values except true NAA in year T+1, actual catches

Table 1 – Projection analyses scenarios

	true wgts	true maturity	true selectivity	true NAA(T+1)	true recruitment	true F	observed catch
no.true	N	N	N	N	N	N	Y
all.true	Y	Y	Y	Y	Y	Y	N
true.recr	N	N	N	N	Y	N	Y
true.N	N	N	N	Y	N	N	Y
all.true.not.N	Y	Y	Y	N	Y	Y	N
all.true.not.N.not.F	Y	Y	Y	N	Y	N	Y

7. The results of the analyses are summarized for each stock in an attached spreadsheet (see attachment (e)). The differences between projected and true stock size and fishing mortality were small when all true values were used, confirming that the projection calculations are correct.

a. When GARM III assumptions are used (the no.true scenario), the projection does not perform well for most stocks beyond one or two years. Across all stocks, the average of the median deviation for SSB in years 5-7 of the projection is an over-estimate of 162%; deviations of over 100% occur for six of the ten stocks.

b. Using true recruitment marginally improved performance of the projections compared to the GARM III assumptions. In some cases this changed the direction of the deviation in years 5 -7, and it reduced the largest deviation observed. The average of the median deviations in years 5 – 7 remained over 100%.

c. Using the true numbers at age (NAA) in year N+1 seemed to make the most difference in the performance of the projection, particularly in years 1 – 3. There was some improvement in years 5 – 7 as well, with the average of the median deviations reduced to 77 percent.

8. After reviewing theses results, the APDT considered whether adjusting the NAA in year T+1 was an appropriate way to modify the projection assumptions in order to improve their performance. This would require a way to accurately determine what the adjustment should be. The APDT was unable to identify how this could be done. As an alternative, the analyses were rerun using various fixed levels (10%/20%/30%/40%) of an adjustment applied across all ages. Results are in attachment (f). No single value could be indentified that worked for all stocks. One difficulty with examining this approach was that in some cases the reduction in NAA was large enough that the realized catches were infeasible – they were larger than the stock size.

9. Next the APDT investigated whether an ABC adjustment factor could be developed from an examination of the past performance of the projections in the simulation model. For each stock and assessment terminal year, a projection was performed that input the actual catch in the first four years of the projection and the GARM III true F in the subsequent years. This gives a projected catch at the realized F, which was compared to the realized catches. The actual catches exceeded the projected catches at the realized F for all stocks except GB cod. The average difference ranged from -1 percent (GB cod) to 794 percent (SNE/MA yellowtail flounder). Results are summarized in attachment (g).

Survey Analyses

10. At is June meeting the SSC recommended the APDT consider a survey-based approach to adjusting ABCs should projections prove unreliable (primarily due to the time elapsed between the terminal year of the assessment and the years for the catch projections). The underlying concept is that the trend in the surveys is used to adjust the 2011 ABC and that value is used as the ABC for 2012 – 2014. A detailed description of the approach is provided in attachment (d). Note that the approach uses two different formulas based on whether a stock is in a rebuilding program or not. If a stock is not in a rebuilding program, the first formula adjusts the ABC based on the change in the surveys. If the stock is in a rebuilding program, the ABC is adjusted by the difference between the average annual change in the surveys and the projected average annual change in the ABC over a similar period.

11. Three different analytic approaches were used. The first was an extension of the simulation model used to analyze projections and was used to examine the first adjustment formula in the survey based approach. Each stock/year model was used to

project forward for four years. The change in the surveys over a three-year period was determined, and the resulting 'slope' was used to adjust the catches in the remaining years of the horizon. For all stocks except SNE/MA winter flounder and SNE/MA yellowtail flounder the adjustment was positive, would have increased catches, and would have exacerbated increased fishing mortality. The results will be described in a presentation that will be provided to the SSC.

12. The next two approaches compared the changes in the surveys to the changes in the biomass, and are described in attachment (h). The first analysis compared the change in the survey between three years to the changes in biomass between the same three years. This examined whether survey trends are similar to biomass trends, and looked for agreement between the direction and magnitude of the trends. For about half the stocks, the number of times the direction of the change in the survey matched the matched the direction of the change in biomass was statistically significant. The magnitude of the differences between the two changes varied by stock. The second approach examined the change in the survey and the change in the biomass in a way more similar to the proposed survey adjustment method. The change in the survey (for example, between years 2007 and 2010) is used to adjust the ABC in subsequent years (for example, between 2011 and 2014). So in this analysis the change in the survey over a three-year period was compared to the change in biomass in the following period. The results were slightly better than the first analysis. For just over half the stocks the number of times the direction of the change in the survey matched the matched the direction of the change in biomass was statistically significant. The magnitude of the differences still varied among the stocks but seemed to be slightly reduced.

Discussion/Recommendations

13. Because of the results of the analyses, the APDT reached the following conclusions about both the model-based use of projections to set ABCs and the proposed use of the change in surveys to modify ABCs.

a. It is not appropriate to use medium-term projections to set the groundfish ABCs for FY 2012 – FY 2014. If they are used, it is likely that the ABCs will be set too high and mortality targets will be exceeded.

b. In the time available the APDT could not identify changes to the projection assumptions that would consistently improved the performance of the projections. The adjustment most likely to improve the projections would be to adjust the NAA in year T+1, but no method could be developed and tested to determine the magnitude of such an adjustment.

c. The proposed survey-based adjustment assumes the 2011 ABC is accurate. The analyses showed that for many stocks the survey did not correctly predict the direction of the change in biomass (and resulting adjustment to the ABC).

This method also appears sensitive to the methods used to calculate the change in surveys (i.e. time period for averaging the surveys, etc.). For this reason the proposed survey based method is not recommended for use.

14. The APDT developed two alternative ad hoc approaches for setting ABCs.

a. Use the calculated FY 2012 ABC for FY 2012 – 2014 (without rerunning the projection with actual catches for the period 2008 – 2010). This ABC is a five year projection from the terminal year for stocks assessed in GARM III. While the projection analyses suggest there is considerable uncertainty whether this ABC would be accurate, recent catches have been less than the ABCs for most stocks and many survey indices are increasing. This suggests that using the 2012 ABC for the next three years may be a reasonable compromise between updating the projections with recent catches (which would lead to increased ABCs) and other ad hoc approaches.

b. Use a combined projection and survey based approach. Determine the change in the survey from 2007 to 2010. This would be calculated as the difference between the three year average of 2005/2006/2007 and comparing it to the three year average of 2008/2009/2010.

    1) If the change is positive, use the maximum of the FY 2010 or the FY 2012 ABC (without rerunning the projection with updated catches) for FY 2012 – 2014.

    2) If the change is negative, use the minimum of the FY 2010 or the FY 2012 ABC for FY 2012 – 2014.

    3) As an alternative if the change is negative, use the minimum of the CY 2010 catch, FY 2010 ABC, or FY 2012 ABC as the ABC for FY 2012 – 2014.

    4) In all cases, consider available additional information to determine if a deviation from this approach is needed. An example would be to consider the TRAC assessments for EGB cod and haddock, which provide information on part of these stocks.

15. Whichever ABC approach is adopted, overfishing limits (OFLs) that correspond to the ABC will be used. If 2010 catch is used as a result of adopting paragraph 14.b(3), the OFL for the lowest ABC will be used.

16. An ad hoc approach the SSC may consider using is some percentage of recent realized catches. The APDT cautions that recent regulatory and market conditions may have influenced recent catches and as a result such an approach may unnecessarily constrain the industry.

Other Stocks

16. Pollock was assessed in 2010; ABCs were set for FY 2011 – 2014 and do not need to be adjusted.

17. The three winter flounder stocks were assessed in 2011 (summary document attached).

a. GB winter flounder uses an analytic assessment, ABCs will be set using short-term projections and the default ABC control rules.

b. SNEMA winter flounder uses an analytic assessment. The stock is overfished and cannot rebuild by the end of the rebuilding period (2014). This is the same condition observed in 2009. ABCs for 2010 – 2011 were based on an assumption about unavoidable fishing mortality. The APDT will develop ABCs using short-term projections and a similar rationale.

c. The GOM winter flounder assessment relies on a swept-area biomass estimate, similar to an approach presented to the SSC last fall. There is no biomass target determined by the June 2011 assessment, but there is an overfishing definition. The APDT will use this information to develop ABCs for this stock.

18. GB yellowtail flounder was assessed by the Transboundary Resource Assessment Committee (TRAC) in 2011. The stock is overfished and cannot rebuild by 2016, the ending date of the rebuilding program. The Council will develop a revised rebuilding program as authorized by passage of the International Fishery Agreement Clarification Act. The Transboundery Management Guidance Committee will meet in early September to develop a catch recommendation. Subsequent to this meeting, the SSC will make an ABC recommendation that is binding on the U.S.

19. Ocean pout and the two windowpane flounder stocks are assessed using index-based assessments. Under FW 44 the FY 2010 – 2011 ABCs were set by applying 75 percent of the FMSY proxy to the most recent estimate of stock size. A similar approach will be followed.

20. Atlantic wolffish ABC will be set as 75 percent of FMSY applied to the most recent estimate of exploitable biomass. This will likely be the same ABC as set for FY 2010 and 2011 as the biomass estimate has not been updated.

Attachments

a. Conference call dates and participation
b. Northeast multispecies stock status, assessment dates, and recent catches sand ABCs
c. June, 2011 SSC recommendations for developing methods to set multispecies ABCs for FY 2012 – 2014 (Council staff notes)
d. Survey-based adjustment method
e. Summary tables of projection performance analyses
f. Summary of performance of projections after modifying numbers at age in year T+1 by various fixed factors
g. Differences between realized catches and projected catches at the realized fishing mortality rate
h. Analysis of survey based adjustment approach
i. Background information: charts of multispecies survey trends

Attachment (a)
Groundfish APDT Conference Call Participation

Table 2 - APDT conference call participation

Name	Organization	July 6, 2011	July 13, 2011	July 28. 2011
Tom Nies	NEFMC	X	X	X
Anne Hawkins	NEFMC	X	X	X
Tom Warren	NERO	X	X	X
Sara Heil	NERO	X		X
Doug Christel	NERO			X
Melissa Vasquez	NERO	X		
Dan Caless	NERO			
Chris Legault	NEFSC	X		X
Liz Brooks	NEFSC	X	X	X
Michael Palmer	NEFSC		X	X
Jessica Blaylock	NEFSC	X	X	X
Paul Nitschke	NEFSC	X	X	
Chad Demarest	NEFSC	X	X	
Steve Correia	MA DMF	X	X	X
Kohl Kanwit	ME DMR	X		X
Steve Cadrin	UMASSD	X		X
Sally Roman	UMASSD	X		X

Attachment (b)

Table 3 – Overview of groundfish stock status, recent ABCs, and recent catches

		Status (terminal year)		ABC (mt) (FY)			Total Catch (CY)		
Stock	**Terminal Year**	*Overfished?*	*Overfishing?*	*2010*	*2011*	*2012*	*2008*	*2009*	*2010*
GOM Cod	2007	N	Y	8,530	9,012	9,018	7,606	8,652	8,968
GB Cod	2007	Y	Y	3,800	4,766	5,364	5,243	4,711	3,874
GOM Haddock	2007	N	N	1,265	1,206	1,013	1,166	1,045	627*
GB Haddock	2007	N	N	44,903	34,244	29,016	6,207	5,477	9300
Redfish	2007	N	N	7,586	8,356	9,224	1,373	1,667	1,852
Pollock	2009	N	N	19,800	16,900	15,400	11,370	8,735	
White Hake	2007	Y	Y	2,832	3,295	3,638	1,911	2,375	2,219
CC/GOM YTF	2007	Y	Y	863	1,041	1,159	727	608	
GB YTF	2010	Y	Y	1,200	1,099	1,222	1,276	1,779	
SNE/MA YTF	2007	Y	Y	493	687	1,003	504	457	
GOM Winter Fl	2010	?	N	238	238	238	402	326	
GB Winter Fl	2010	N	N	2,052	2,224	2,543	963	1,685	
SNE/MA Winter Fl	2010	Y	N	644	897	1,198	1,432	654	
Witch Fl	2007	Y	Y	944	1,369	1,639	1,071	1,060	849
Plaice	2007	N	N	3,156	3,444	3,632	1,358	1,773	1,777
N. Window Fl	2007	Y	Y	169	169	169	378	440	236
S. Window Fl	2007	N	Y	237	237	237	328	477	564
Pout	2007	Y	N	271	271	271	127	168	127
Halibut	2007	Y	N	71	78	85	96	123	62
Wolffish	2007	Y	?	83	83	83	60	44	

All catch data are preliminary. Greyed-out values are currently being updated but should be similar to actual values

* This number does not include recreational catch

Attachment (c)

June. 2011 SSC Recommendations for Multispecies ABC Process Analyses

(prepared from Council staff notes)

1. Regression analyses: The survey/biomass regressions were discussed at length. There were some concerns expressed about using linear regression when the two variables are not truly independent (at least in the opinion of some at the meeting). Rather than try to report the entire discussion, the final take home points seemed to be:
    a. The regression analysis - at least as done to date - does not appear to hold any promise for developing an accurate predictor of stock size. The SSC sees little utility in pursuing this. Prior to reaching this conclusion there were some suggestions on how to modify the analyses but I'm assuming that this is unnecessary given their final comment that they saw little reason to pursue this.
    b. There may be useful information that can be gleaned from the survey. The SSC suggested a number of ideas; I'm not sure how many of these are feasible but will list as many as I was able to write down.
        i. Develop a recruitment index from the surveys for each stock. If recent survey age data is available use that for recent years (for example, it may be available for GB haddock, GB cod, and GB YTF since these stocks are assessed at TRAC each year). Since recent age data may not be available in all cases, use length as the basis estimating age and get an index. If recruit indices are too variable consider combining young ages.
        ii. Examine survey age distribution and compare it to projected age distribution.
        iii. Examine survey and see if there are indications of strong (or weak) year classes that might influence catch advice.
        iv. Examine survey trends (i.e. similar to approach suggested by Steve Cadrin and Steve Correia)
2. Projections: Continue projection work and attempt to identify causes for deviations from realized stock size.
    a. Insert realized recruitment into projections and see how they perform.
    b. Continue with plans to investigate effects of recruitment, WAA, selectivity, etc. on projection accuracy.
    c. Use additional survey analyses (see above) to help guide projections.
3. Other ideas: Should the determination be made that the projections are not reliable and should not be used for catch advice, a few ideas were suggested at the meeting:
    a. Adjust ABC based on relative changes in survey – as suggested by Steve Cadrin. There were some technical points raised about this approach that need to be discussed.
    b. Use the 2012 ABCs that are currently specified and take more time to address this issue, and reset ABCs next year for 2013 – 2015. I don't know if this is a realistic choice.
    c. Base ABCs on a percentage of recent ABC or catch.
    d. Hold ABCs constant at the last value specified.
    e. Do new assessments (this surfaced repeatedly in spite of attempts to point out this was unrealistic given the time available and competing priorities).

Attachment (d)

Survey-based Alternative Method for Deriving Acceptable Biological Catch (ABC) for Groundfish Stocks for 2012-2014

The method specified for deriving 2012-2014 ABC recommendations are 2012-2014 stock projections (as specified in Amendment 16 of the management plan). However, if survey trends do not support the expectations from 2008-2011 stock biomass projections, alternative approaches should be considered. One alternative would be based on status quo catch recommendations as modified by proportional survey trends. The approach assumes that the 2011 ABC was appropriate for short-term management objectives (i.e., rebuilding or avoiding overfishing) and that surveys accurately represent stock trends. As recommended in September 2009, methods to derive groundfish ABCs were conditional on four groupings: 1) 75% F_{MSY} for stocks that are rebuilt or for which $F_{rebuild}>75\%F_{MSY}$; 2) $F_{rebuild}$; 3) incidental bycatch allowance; or 4) index-based proxies. Methods 3 and 4 can be applied for 2012-2014 using available information, but methods 1 and 2 require the use of at least 7-year stock projections. If the SSC determines that 7-year projections are not a reliable basis for catch advice, we propose an alternative basis for ABC recommendations for groups 1 and 2:

Method 1 – Rebuilt Stocks

1) $$ABC_{2012-14} = ABC_{2011} + x\%$$

…where *x%* is the annual proportional change in stock biomass indicated by surveys during 2008-2011. If *x%* is positive, ABCs increase; if *x%* is negative, ABCs decrease. The value of *x%* is derived as the change in 3-year average survey biomass indices since GARMIII, expressed as an annual proportion:

2) $$\textit{fall surveys } x\%_i = \frac{I_{2009-10} - I_{2002-07}}{I_{2002-07}} \cdot \frac{1}{8}$$

3) $$\textit{spring surveys } x\%_i = \frac{I_{2009-10} - I_{2002-07}}{I_{2002-07}} \cdot \frac{1}{8}$$

… for each survey *i*, and

4) $$x\% = \frac{\sum_i x\%_i}{n_i}$$

… where *n* is the number of surveys.
This method would apply to Georges Bank haddock, Gulf of Maine haddock, and redfish. Note that pollock ABCs can be based on short-term projections from the SAW50 assessment.

Method 2 – Rebuilding Stocks

5) $$ABC_{2012-14} = ABC_{2011} + (x\% - y\%)$$

...where $y\%$ is the annual expected change in projected catch when fishing at $F_{rebuild}$. If $x\%$-$y\%$ is positive, ABCs increase; if $x\%$-$y\%$ is negative, *ABC*s decrease. The value of $y\%$ is derived as the change in projected catch from 2008 to 2011 assuming $F_{rebuild}$:

6) $$y\% = \frac{\hat{Y}_{2011} - \hat{Y}_{2008}}{\hat{Y}_{2008}} \cdot \frac{1}{3}$$

This method would apply to Georges Bank cod, Gulf of Maine cod, Cape Cod yellowtail flounder, American plaice, witch flounder, southern New England yellowtail flounder and white hake. Note that Georges Bank and SNE/MA winter flounder ABC can be based on short-term projections from SAW52, and Georges Bank yellowtail flounder ABC can be based on the 2011 TRAC assessment.

Alternative forms of this proposed method could involve:

a) Application of method 1 to all stocks
b) Application of method 2 to all stocks
c) Variable ABCs from 2012 to 2014 based on relative survey trends (e.g., 10% increase each year if $x\%$=0.1)

Attachment (e)

12-Jul-11

description of cases

all.true	the true value for all projected values were used (true weights, true selectivity, true maturity, true NAA in year T+1, true recruitment)
no.true	no true values used (GARM3 assumptions for weights, selectivity, maturity, recruitment), retro.BSN for NAA in year T+1, realized catches projected
true.recr	true recruitment used in projections, realized catches projected, all other assumptions match GARM3
true.N	true NAA in T+1 used, realized catches projected, all other assumptions match GARM3
all.true.not.N	all true projected values used EXCEPT true NAA in year T+1, realized catches projected
all.true.not.N.not.F	all true projected values used EXCEPT not true NAA in year T+1 and not true F, realized catches projected

	true wgts	true maturity	true selectivity	true NAA(T+1)	true recruitment	true F	observed catch
all.true	Y	Y	Y	Y	Y	Y	N
no.true	N	N	N	N	N	N	Y
true.recr	N	N	N	N	Y	N	Y
true.N	N	N	N	Y	N	N	Y
all.true.not.N	Y	Y	Y	N	Y	Y	N
all.true.not.N.not.F	Y	Y	Y	N	Y	N	Y

color coding

cell value is [-0.25, 0.25]
cell value is [-0.5, -0.25)
cell value is (0.25, 0.5]
cell value is < -0.5
cell value is > 0.5

Attachment (e)

all.true.ssb

X	X1yr	X2yr	X3yr	X4yr	X5yr	X6yr	X7yr
Stock.percentile	**1yr**	**2yrs**	**3yrs**	**4yrs**	**5yrs**	**6yrs**	**7yrs**
amerplaice.0.05	*0.000*	*0.016*	*0.022*	*0.028*	*0.029*	*0.031*	*0.028*
amerplaice.median	**0.000**	**0.016**	**0.022**	**0.028**	**0.029**	**0.031**	**0.028**
amerplaice.0.95	*0.000*	*0.016*	*0.022*	*0.028*	*0.029*	*0.031*	*0.028*
gbcod.0.05	*0.000*	*0.002*	*0.003*	*0.004*	*0.003*	*0.003*	*0.003*
gbcod.median	**0.000**	**0.002**	**0.003**	**0.004**	**0.003**	**0.003**	**0.003**
gbcod.0.95	*0.000*	*0.002*	*0.003*	*0.004*	*0.003*	*0.003*	*0.003*
gbwinter.0.05	*0.000*	*0.030*	*-0.023*	*-0.023*	*-0.025*	*-0.030*	*-0.032*
gbwinter.median	**0.000**	**0.030**	**-0.023**	**-0.023**	**-0.025**	**-0.030**	**-0.032**
gbwinter.0.95	*0.000*	*0.030*	*-0.023*	*-0.023*	*-0.025*	*-0.030*	*-0.032*
gbytail.0.05	*0.000*	*0.010*	*0.005*	*0.007*	*0.007*	*0.007*	*0.007*
gbytail.median	**0.000**	**0.010**	**0.005**	**0.007**	**0.007**	**0.007**	**0.007**
gbytail.0.95	*0.000*	*0.010*	*0.005*	*0.007*	*0.007*	*0.007*	*0.007*
gmcod.0.05	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gmcod.median	**0.000**	**0.001**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gmcod.0.95	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gmhoddock.0.05	*0.000*	*-0.073*	*-0.049*	*-0.045*	*-0.041*	*-0.041*	*-0.046*
gmhaddock.median	**0.000**	**-0.073**	**-0.049**	**-0.045**	**-0.041**	**-0.041**	**-0.046**
gmhoddock.0.95	*0.000*	*-0.073*	*-0.049*	*-0.045*	*-0.041*	*-0.041*	*-0.046*
gmwinter.0.05	*0.000*	*0.020*	*0.010*	*0.012*	*0.012*	*0.012*	*0.012*
gmwinter.median	**0.000**	**0.020**	**0.010**	**0.012**	**0.012**	**0.012**	**0.012**
gmwinter.0.95	*0.000*	*0.020*	*0.010*	*0.012*	*0.012*	*0.012*	*0.012*
snewinter.0.05	*0.000*	*0.044*	*0.037*	*0.046*	*0.043*	*0.043*	*0.043*
snewinter.median	**0.000**	**0.044**	**0.037**	**0.046**	**0.043**	**0.043**	**0.043**
snewinter.0.95	*0.000*	*0.044*	*0.037*	*0.046*	*0.043*	*0.043*	*0.043*
sneytail.0.05	*0.000*	*0.011*	*0.009*	*0.016*	*0.015*	*0.015*	*0.015*
sneytail.median	**0.000**	**0.011**	**0.009**	**0.016**	**0.015**	**0.015**	**0.015**
sneytail.0.95	*0.000*	*0.011*	*0.009*	*0.016*	*0.015*	*0.015*	*0.015*
witch.0.05	*0.000*	*0.045*	*0.067*	*0.078*	*0.082*	*0.078*	*0.079*
witch.median	**0.000**	**0.045**	**0.067**	**0.078**	**0.082**	**0.078**	**0.079**
witch.0.95	*0.000*	*0.045*	*0.067*	*0.078*	*0.082*	*0.078*	*0.079*

Attachment (e)

no.true.ssb

X	X1yr	X2yr	X3yr	X4yr	X5yr	X6yr	X7yr
Stock.percentile	**1yr**	**2yrs**	**3yrs**	**4yrs**	**5yrs**	**6yrs**	**7yrs**
amerplaice.0.05	-0.012	0.037	0.195	0.449	0.494	0.265	0.500
amerplaice.median	**0.120**	**0.187**	**0.383**	**0.688**	**0.765**	**0.535**	**0.852**
amerplaice.0.95	0.253	0.358	0.632	0.989	1.133	0.842	1.264
gbcod.0.05	0.193	0.418	0.934	-0.326	0.327	-1.000	-1.000
gbcod.median	**0.581**	**1.060**	**2.017**	**0.090**	**0.944**	**-0.258**	**-0.148**
gbcod.0.95	1.185	2.074	4.257	0.579	1.604	0.616	1.018
gbwinter.0.05	-0.305	-0.022	0.255	-0.619	-1.000	-1.000	-1.000
gbwinter.median	**-0.007**	**0.411**	**1.146**	**-0.014**	**0.211**	**0.034**	**-1.000**
gbwinter.0.95	0.436	1.114	3.027	0.692	1.195	1.429	0.789
gbytail.0.05	-0.021	-0.404	1.130	-0.424	0.771	1.409	1.370
gbytail.median	**0.355**	**-0.158**	**1.588**	**0.469**	**2.068**	**2.922**	**2.981**
gbytail.0.95	0.889	0.133	2.255	1.799	3.943	4.941	5.131
gmcod.0.05	-0.178	-0.425	0.237	-0.206	0.487	-0.353	0.101
gmcod.median	**0.061**	**-0.173**	**0.754**	**0.085**	**1.065**	**0.107**	**0.582**
gmcod.0.95	0.388	0.185	1.805	0.563	1.975	0.861	1.333
gmhaddock.0.05	-0.258	-0.217	-0.212	0.382	0.495	1.951	0.941
gmhaddock.median	**0.081**	**0.230**	**0.252**	**1.173**	**1.477**	**3.652**	**2.468**
gmhaddock.0.95	0.499	0.775	0.911	2.306	2.816	6.540	4.666
gmwinter.0.05	0.027	0.405	0.509	0.447	0.973	1.235	1.384
gmwinter.median	**0.230**	**0.710**	**0.921**	**0.871**	**1.648**	**2.238**	**2.587**
gmwinter.0.95	0.473	1.101	1.457	1.382	2.716	3.701	4.318
snewinter.0.05	-0.047	-0.063	-0.095	-0.039	0.317	0.240	0.266
snewinter.median	**0.166**	**0.204**	**0.207**	**0.366**	**1.048**	**1.200**	**1.223**
snewinter.0.95	0.395	0.523	0.568	0.720	1.674	2.085	2.136
sneytail.0.05	-0.089	-0.174	-0.209	0.232	-0.442	-0.207	0.161
sneytail.median	**0.431**	**0.563**	**0.010**	**0.815**	**0.661**	**2.063**	**4.523**
sneytail.0.95	1.172	1.973	1.795	5.240	8.386	11.073	14.181
witch.0.05	0.008	0.336	1.491	1.876	3.190	3.984	1.110
witch.median	**0.367**	**0.841**	**2.434**	**3.051**	**4.834**	**6.066**	**2.802**
witch.0.95	0.802	1.526	3.470	4.523	6.712	8.666	5.002

Attachment (e)

true.recr.ssb

X	X1yr	X2yr	X3yr	X4yr	X5yr	X6yr	X7yr
Stock.percentile	**1yr**	**2yrs**	**3yrs**	**4yrs**	**5yrs**	**6yrs**	**7yrs**
amerplaice.0.05	-0.012	0.037	0.195	0.454	0.536	0.303	0.576
amerplaice.median	**0.120**	**0.187**	**0.383**	**0.692**	**0.804**	**0.522**	**0.846**
amerplaice.0.95	0.253	0.358	0.632	0.993	1.154	0.776	1.164
gbcod.0.05	*0.193*	*0.418*	*0.948*	*-0.409*	*0.653*	*-1.000*	*-1.000*
gbcod.median	**0.581**	**1.060**	**2.028**	**-0.122**	**1.022**	**-0.543**	**-1.000**
gbcod.0.95	*1.185*	*2.071*	*4.234*	*0.252*	*1.458*	*0.002*	*0.087*
gbwinter.0.05	*-0.305*	*-0.019*	*0.181*	*-0.848*	*-1.000*	*-1.000*	*-1.000*
gbwinter.median	**-0.007**	**0.413**	**1.079**	**-0.470**	**-0.484**	**-1.000**	**-1.000**
gbwinter.0.95	*0.436*	*1.116*	*2.927*	*0.122*	*0.312*	*0.283*	*-0.765*
gbytail.0.05	*-0.021*	*-0.404*	*1.508*	*0.085*	*0.743*	*1.018*	*0.655*
gbytail.median	**0.355**	**-0.158**	**1.903**	**0.563**	**1.495**	**1.759**	**1.354**
gbytail.0.95	*0.889*	*0.133*	*2.432*	*1.217*	*2.511*	*2.753*	*2.316*
gmcod.0.05	*-0.178*	*-0.427*	*0.326*	*-0.063*	*0.807*	*-0.171*	*0.101*
gmcod.median	**0.061**	**-0.175**	**0.848**	**0.184**	**1.292**	**0.106**	**0.582**
gmcod.0.95	*0.388*	*0.184*	*1.900*	*0.601*	*2.087*	*0.476*	*1.333*
gmhaddock.0.05	*-0.258*	*-0.217*	*-0.212*	*0.383*	*0.417*	*2.273*	*1.081*
gmhaddock.median	**0.081**	**0.230**	**0.252**	**1.172**	**1.355**	**3.914**	**2.435**
gmhaddock.0.95	*0.499*	*0.775*	*0.911*	*2.295*	*2.598*	*6.734*	*4.511*
gmwinter.0.05	*0.027*	*0.405*	*0.503*	*0.387*	*0.917*	*0.925*	*0.763*
gmwinter.median	**0.230**	**0.710**	**0.916**	**0.778**	**1.445**	**1.588**	**1.455**
gmwinter.0.95	*0.473*	*1.101*	*1.451*	*1.255*	*2.010*	*2.350*	*2.239*
snewinter.0.05	*-0.047*	*-0.064*	*-0.104*	*0.039*	*0.370*	*-0.275*	*-1.000*
snewinter.median	**0.166**	**0.204**	**0.199**	**0.227**	**0.629**	**0.072**	**-0.609**
snewinter.0.95	*0.395*	*0.523*	*0.562*	*0.438*	*0.921*	*0.495*	*-0.297*
sneytail.0.05	*-0.089*	*-0.175*	*0.018*	*1.050*	*0.263*	*0.159*	*0.116*
sneytail.median	**0.431**	**0.562**	**0.137**	**1.241**	**0.436**	**0.398**	**0.397**
sneytail.0.95	*1.172*	*1.973*	*0.320*	*1.584*	*0.697*	*0.725*	*0.724*
witch.0.05	*0.008*	*0.364*	*1.480*	*1.746*	*2.831*	*3.505*	*0.773*
witch.median	**0.367**	**0.866**	**2.442**	**2.918**	**4.439**	**5.559**	**2.294**
witch.0.95	*0.802*	*1.546*	*3.474*	*4.382*	*6.320*	*8.081*	*4.414*

Attachment (e)

true.n.ssb

X	X1yr	X2yr	X3yr	X4yr	X5yr	X6yr	X7yr
Stock.percentile	**1yr**	**2yrs**	**3yrs**	**4yrs**	**5yrs**	**6yrs**	**7yrs**
amerplaice.0.05	-0.058	-0.045	0.001	0.052	0.020	0.119	-0.017
amerplaice.median	**-0.058**	**-0.045**	**0.002**	**0.054**	**0.047**	**0.198**	**0.263**
amerplaice.0.95	-0.058	-0.045	0.002	0.063	0.131	0.386	0.427
gbcod.0.05	0.040	0.066	0.043	0.120	-0.392	0.052	0.429
gbcod.median	**0.040**	**0.069**	**0.092**	**0.263**	**-0.007**	**0.700**	**1.084**
gbcod.0.95	0.040	0.074	0.170	0.704	0.675	1.059	1.484
gbwinter.0.05	0.046	0.059	-0.112	-0.047	-0.360	-0.660	-1.000
gbwinter.median	**0.046**	**0.062**	**-0.030**	**0.109**	**0.031**	**0.117**	**0.351**
gbwinter.0.95	0.046	0.070	0.084	0.603	0.611	0.476	1.023
gbytail.0.05	0.100	0.186	-0.307	-0.166	0.069	0.191	-0.499
gbytail.median	**0.100**	**0.186**	**-0.252**	**0.169**	**0.705**	**1.085**	**1.646**
gbytail.0.95	0.100	0.186	-0.127	1.591	2.701	2.567	2.681
gmcod.0.05	-0.178	-0.179	-0.275	-0.274	-0.541	-0.412	-0.531
gmcod.median	**-0.178**	**-0.177**	**-0.260**	**-0.237**	**-0.389**	**-0.044**	**-0.122**
gmcod.0.95	-0.178	-0.171	-0.226	0.218	-0.025	0.610	0.509
gmhaddock.0.05	0.172	0.200	0.379	0.521	0.678	0.320	0.371
gmhaddock.median	**0.172**	**0.200**	**0.379**	**0.526**	**0.734**	**0.654**	**0.864**
gmhaddock.0.95	0.172	0.200	0.380	0.594	1.072	1.184	1.322
gmwinter.0.05	-0.020	-0.037	-0.120	-0.177	-0.437	-0.124	-0.072
gmwinter.median	**-0.020**	**-0.037**	**-0.116**	**-0.120**	**-0.137**	**0.369**	**1.089**
gmwinter.0.95	-0.020	-0.037	-0.104	0.181	0.921	1.279	1.605
snewinter.0.05	0.036	0.089	0.091	-0.119	-0.546	0.423	0.218
snewinter.median	**0.036**	**0.089**	**0.099**	**0.213**	**0.209**	**1.018**	**1.769**
snewinter.0.95	0.036	0.089	0.104	0.579	0.887	1.438	2.188
sneytail.0.05	0.072	0.147	-0.086	-0.573	-0.515	-0.270	0.607
sneytail.median	**0.072**	**0.147**	**0.014**	**-0.098**	**0.946**	**2.265**	**4.247**
sneytail.0.95	0.072	0.147	1.384	5.124	7.940	10.993	10.822
witch.0.05	-0.001	0.009	0.022	0.181	0.423	0.676	0.246
witch.median	**-0.001**	**0.020**	**0.069**	**0.239**	**0.706**	**1.200**	**1.413**
witch.0.95	-0.001	0.034	0.104	0.392	1.025	1.444	1.585

Attachment (e)

all.treu.not.n.ssb

X	X1yr	X2yr	X3yr	X4yr	X5yr	X6yr	X7yr
Stock.percentile	**1yr**	**2yrs**	**3yrs**	**4yrs**	**5yrs**	**6yrs**	**7yrs**
amerplaice.0.05	*0.043*	*0.078*	*0.156*	*0.238*	*0.222*	*-0.027*	*0.107*
amerplaice.median	**0.178**	**0.223**	**0.323**	**0.427**	**0.397**	**0.051**	**0.197**
amerplaice.0.95	*0.321*	*0.386*	*0.551*	*0.661*	*0.645*	*0.144*	*0.312*
gbcod.0.05	*0.137*	*0.225*	*0.492*	*-0.464*	*0.245*	*-0.081*	*0.014*
gbcod.median	**0.496**	**0.717**	**1.280**	**-0.394**	**0.278**	**-0.069**	**0.020**
gbcod.0.95	*1.052*	*1.499*	*2.913*	*-0.296*	*0.330*	*-0.050*	*0.029*
gbwinter.0.05	*-0.321*	*-0.014*	*0.194*	*-0.352*	*-0.079*	*-0.105*	*-0.082*
gbwinter.median	**-0.046**	**0.337**	**0.795**	**-0.230**	**-0.001**	**-0.055**	**-0.072**
gbwinter.0.95	*0.352*	*0.939*	*2.234*	*0.046*	*0.142*	*0.077*	*-0.058*
gbytail.0.05	*-0.107*	*-0.472*	*0.703*	*0.058*	*0.014*	*0.006*	*0.007*
gbytail.median	**0.218**	**-0.339**	**0.780**	**0.092**	**0.037**	**0.011**	**0.009**
gbytail.0.95	*0.686*	*-0.177*	*0.886*	*0.142*	*0.068*	*0.018*	*0.013*
gmcod.0.05	*-0.023*	*-0.336*	*0.629*	*-0.111*	*0.257*	*-0.039*	*0.025*
gmcod.median	**0.266**	**-0.067**	**1.153**	**-0.037**	**0.362**	**-0.023**	**0.047**
gmcod.0.95	*0.667*	*0.345*	*2.306*	*0.112*	*0.550*	*-0.002*	*0.083*
gmhaddock.0.05	*-0.334*	*-0.329*	*-0.366*	*-0.127*	*-0.242*	*0.570*	*-0.031*
gmhaddock.median	**-0.063**	**-0.051**	**-0.136**	**0.192**	**0.063**	**1.151**	**0.281**
gmhaddock.0.95	*0.273*	*0.352*	*0.210*	*0.788*	*0.489*	*2.508*	*0.752*
gmwinter.0.05	*0.043*	*0.371*	*0.437*	*0.107*	*0.283*	*0.073*	*0.031*
gmwinter.median	**0.241**	**0.641**	**0.771**	**0.267**	**0.365**	**0.116**	**0.054**
gmwinter.0.95	*0.478*	*0.976*	*1.217*	*0.483*	*0.462*	*0.167*	*0.084*
snewinter.0.05	*-0.073*	*-0.047*	*-0.073*	*0.051*	*0.152*	*0.042*	*0.026*
snewinter.median	**0.117**	**0.128**	**0.083**	**0.082**	**0.173**	**0.061**	**0.030**
snewinter.0.95	*0.319*	*0.333*	*0.287*	*0.117*	*0.198*	*0.082*	*0.034*
sneytail.0.05	*-0.146*	*-0.281*	*-0.102*	*0.291*	*0.016*	*0.012*	*0.007*
sneytail.median	**0.318**	**0.321**	**-0.064**	**0.329**	**0.026**	**0.019**	**0.009**
sneytail.0.95	*0.992*	*1.498*	*-0.005*	*0.403*	*0.041*	*0.032*	*0.013*
witch.0.05	*0.024*	*0.254*	*0.567*	*0.307*	*0.367*	*0.407*	*0.112*
witch.median	**0.375**	**0.582**	**0.915**	**0.593**	**0.642**	**0.673**	**0.203**
witch.0.95	*0.804*	*1.021*	*1.312*	*0.934*	*0.986*	*1.024*	*0.322*

Attachment (e)

all.true.not.n.not.f.ssb

X	X1yr	X2yr	X3yr	X4yr	X5yr	X6yr	X7yr
Stock.percentile	**1yr**	**2yrs**	**3yrs**	**4yrs**	**5yrs**	**6yrs**	**7yrs**
amerplaice.0.05	*0.044*	*0.089*	*0.209*	*0.401*	*0.432*	*0.103*	*0.273*
amerplaice.median	**0.180**	**0.248**	**0.399**	**0.633**	**0.680**	**0.281**	**0.476**
amerplaice.0.95	*0.325*	*0.427*	*0.656*	*0.923*	*1.013*	*0.483*	*0.722*
gbcod.0.05	*0.143*	*0.332*	*0.769*	*-0.516*	*0.412*	*-1.000*	*-1.000*
gbcod.median	**0.522**	**0.940**	**1.789**	**-0.259**	**0.737**	**-1.000**	**-1.000**
gbcod.0.95	*1.108*	*1.912*	*3.884*	*0.071*	*1.116*	*-0.312*	*-0.332*
gbwinter.0.05	*-0.336*	*-0.050*	*0.195*	*-0.783*	*-0.809*	*-1.000*	*-1.000*
gbwinter.median	**-0.049**	**0.368**	**1.075**	**-0.375**	**-0.075**	**-0.277**	**-1.000**
gbwinter.0.95	*0.371*	*1.038*	*2.877*	*0.259*	*0.762*	*1.006*	*-0.052*
gbytail.0.05	*-0.108*	*-0.498*	*1.160*	*-0.215*	*0.390*	*0.809*	*0.613*
gbytail.median	**0.236**	**-0.273**	**1.534**	**0.242**	**1.138**	**1.569**	**1.335**
gbytail.0.95	*0.716*	*-0.005*	*2.037*	*0.884*	*2.158*	*2.577*	*2.337*
gmcod.0.05	*-0.019*	*-0.335*	*0.714*	*-0.024*	*0.811*	*-0.091*	*0.209*
gmcod.median	**0.280**	**-0.030**	**1.306**	**0.198**	**1.225**	**0.130**	**0.571**
gmcod.0.95	*0.690*	*0.424*	*2.568*	*0.583*	*1.918*	*0.419*	*1.118*
gmhaddock.0.05	*-0.362*	*-0.405*	*-0.491*	*-0.142*	*-0.230*	*0.815*	*-0.001*
gmhaddock.median	**-0.070**	**-0.052**	**-0.141**	**0.402**	**0.391**	**1.850**	**0.782**
gmhaddock.0.95	*0.290*	*0.394*	*0.359*	*1.222*	*1.182*	*3.812*	*1.959*
gmwinter.0.05	*0.049*	*0.486*	*0.685*	*0.688*	*1.348*	*1.336*	*1.153*
gmwinter.median	**0.258**	**0.809**	**1.141**	**1.147**	**1.978**	**2.105**	**2.030**
gmwinter.0.95	*0.508*	*1.221*	*1.726*	*1.698*	*2.658*	*3.014*	*3.036*
snewinter.0.05	*-0.080*	*-0.107*	*-0.156*	*0.001*	*0.494*	*-0.144*	*-0.847*
snewinter.median	**0.127**	**0.148**	**0.136**	**0.215**	**0.803**	**0.271**	**-0.509**
snewinter.0.95	*0.350*	*0.451*	*0.479*	*0.450*	*1.152*	*0.775*	*-0.113*
sneytail.0.05	*-0.150*	*-0.263*	*-0.161*	*0.670*	*-0.048*	*-0.091*	*-0.039*
sneytail.median	**0.335**	**0.400**	**-0.041**	**0.866**	**0.119**	**0.143**	**0.227**
sneytail.0.95	*1.028*	*1.668*	*0.135*	*1.218*	*0.371*	*0.466*	*0.546*
witch.0.05	*0.025*	*0.357*	*1.518*	*1.770*	*2.530*	*2.664*	*0.046*
witch.median	**0.390**	**0.869**	**2.489**	**2.933**	**4.072**	**4.501**	**1.233**
witch.0.95	*0.837*	*1.561*	*3.537*	*4.404*	*5.866*	*6.726*	*2.992*

Attachment (e)

12-Jul-11

description of cases

all.true	the true value for all projected values were used (true weights, true selectivity, true maturity, true NAA in year T+1, true recruitment)
no.true	no true values used (GARM3 assumptions for weights, selectivity, maturity, recruitment), retro.BSN for NAA in year T+1, realized catches projected
true.recr	true recruitment used in projections, realized catches projected, all other assumptions match GARM3
true.N	true NAA in T+1 used, realized catches projected, all other assumptions match GARM3
all.true.not.N	all true projected values used EXCEPT true NAA in year T+1, realized catches projected
all.true.not.N.not.F	all true projected values used EXCEPT not true NAA in year T+1 and not true F, realized catches projected

	true wgts	true maturity	true selectivity	true NAA(T+1)	true recruitment	true F	observed catch
all.true	Y	Y	Y	Y	Y	Y	N
no.true	N	N	N	N	N	N	Y
true.recr	N	N	N	N	Y	N	Y
true.N	N	N	N	Y	N	N	Y
all.true.not.N	Y	Y	Y	N	Y	Y	N
all.true.not.N.not.F	Y	Y	Y	N	Y	N	Y

color coding

cell value is [-0.25, 0.25]
cell value is [-0.5, -0.25)
cell value is (0.25, 0.5]
cell value is < -0.5
cell value is > 0.5

Attachment (e)

all.true.f

Stock.percentile	1yr	2yrs	3yrs	4yrs	5yrs	6yrs	7yrs
amerplaice.0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000
amerplaice.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
amerplaice.0.95	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gbcod.0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gbcod.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gbcod.0.95	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gbwinter.0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gbwinter.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gbwinter.0.95	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gbytail.0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gbytail.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gbytail.0.95	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gmcod.0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gmcod.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gmcod.0.95	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gmhaddock.0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gmhaddock.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gmhaddock.0.95	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gmwinter.0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000
gmwinter.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gmwinter.0.95	0.000	0.000	0.000	0.000	0.000	0.000	0.000
snewinter.0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000
snewinter.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
snewinter.0.95	0.000	0.000	0.000	0.000	0.000	0.000	0.000
sneytail.0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000
sneytail.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
sneytail.0.95	0.000	0.000	0.000	0.000	0.000	0.000	0.000
witch.0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000
witch.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
witch.0.95	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Attachment (e)

no.true.f

Stock.percentile	1yr	2yrs	3yrs	4yrs	5yrs	6yrs	7yrs
amerplaice.0.05	-0.416	-0.433	-0.473	-0.587	-0.592	-0.510	-0.631
amerplaice.median	**-0.345**	**-0.347**	**-0.383**	**-0.514**	**-0.500**	**-0.413**	**-0.551**
amerplaice.0.95	-0.255	-0.252	-0.286	-0.429	-0.399	-0.286	-0.447
gbcod.0.05	-0.496	-0.623	-0.778	-0.272	-0.601	-1.000	-1.000
gbcod.median	**-0.284**	**-0.422**	**-0.611**	**0.093**	**-0.453**	**0.358**	**-0.157**
gbcod.0.95	-0.022	-0.138	-0.381	0.911	-0.177	6.720	3.030
gbwinter.0.05	-0.528	-0.693	-0.859	-0.622	-1.000	-1.000	-1.000
gbwinter.median	**-0.287**	**-0.502**	**-0.709**	**-0.236**	**-0.549**	**-0.583**	**-1.000**
gbwinter.0.95	0.079	-0.209	-0.439	1.124	0.439	0.606	0.727
gbytail.0.05	-0.513	-0.365	-0.782	-0.737	-0.867	-0.889	-0.892
gbytail.median	**-0.341**	**-0.129**	**-0.724**	**-0.513**	**-0.785**	**-0.829**	**-0.830**
gbytail.0.95	-0.111	0.276	-0.660	0.307	-0.624	-0.720	-0.708
gmcod.0.05	-0.716	-0.752	-0.906	-0.826	-0.911	-0.856	-0.861
gmcod.median	**-0.616**	**-0.631**	**-0.836**	**-0.743**	**-0.867**	**-0.735**	**-0.801**
gmcod.0.95	-0.483	-0.447	-0.745	-0.647	-0.811	-0.520	-0.724
gmhaddock.0.05	-0.700	-0.763	-0.817	-0.895	-0.918	-0.961	-0.945
gmhaddock.median	**-0.573**	**-0.649**	**-0.714**	**-0.836**	**-0.871**	**-0.933**	**-0.909**
gmhaddock.0.95	-0.341	-0.426	-0.507	-0.732	-0.777	-0.891	-0.834
gmwinter.0.05	-0.443	-0.627	-0.646	-0.671	-0.768	-0.831	-0.871
gmwinter.median	**-0.332**	**-0.542**	**-0.549**	**-0.574**	**-0.690**	**-0.753**	**-0.807**
gmwinter.0.95	-0.191	-0.440	-0.426	-0.437	-0.579	-0.640	-0.708
snewinter.0.05	-0.578	-0.605	-0.650	-0.705	-0.797	-0.804	-0.823
snewinter.median	**-0.489**	**-0.495**	**-0.547**	**-0.626**	**-0.736**	**-0.727**	**-0.751**
snewinter.0.95	-0.368	-0.341	-0.401	-0.461	-0.599	-0.533	-0.585
sneytail.0.05	-0.817	-0.892	-0.845	-0.944	-0.965	-0.974	-0.979
sneytail.median	**-0.722**	**-0.793**	**-0.645**	**-0.828**	**-0.785**	**-0.873**	**-0.936**
sneytail.0.95	-0.569	-0.610	-0.544	-0.756	-0.373	-0.565	-0.713
witch.0.05	-0.619	-0.714	-0.830	-0.863	-0.893	-0.910	-0.837
witch.median	**-0.487**	**-0.598**	**-0.777**	**-0.811**	**-0.857**	**-0.875**	**-0.735**
witch.0.95	-0.277	-0.430	-0.686	-0.730	-0.798	-0.821	-0.486

Attachment (e)

true.recr.f

Stock.percentile	1yr	2yrs	3yrs	4yrs	5yrs	6yrs	7yrs
amerplaice.0.05	-0.416	-0.433	-0.473	-0.589	-0.594	-0.500	-0.618
amerplaice.median	**-0.345**	**-0.347**	**-0.383**	**-0.516**	**-0.505**	**-0.407**	**-0.550**
amerplaice.0.95	-0.255	-0.252	-0.287	-0.432	-0.407	-0.292	-0.467
gbcod.0.05	-0.496	-0.623	-0.778	-0.130	-0.591	-1.000	-1.000
gbcod.median	**-0.284**	**-0.422**	**-0.611**	**0.348**	**-0.489**	**0.695**	**-1.000**
gbcod.0.95	-0.022	-0.139	-0.384	1.280	-0.358	5.179	3.477
gbwinter.0.05	-0.528	-0.693	-0.858	-0.513	-1.000	-1.000	-1.000
gbwinter.median	**-0.287**	**-0.502**	**-0.705**	**0.420**	**-0.073**	**-1.000**	**-1.000**
gbwinter.0.95	0.079	-0.209	-0.422	5.671	5.478	7.906	1.417
gbytail.0.05	-0.513	-0.363	-0.793	-0.683	-0.815	-0.819	-0.789
gbytail.median	**-0.341**	**-0.127**	**-0.749**	**-0.526**	**-0.731**	**-0.745**	**-0.687**
gbytail.0.95	-0.111	0.272	-0.702	-0.271	-0.603	-0.635	-0.520
gmcod.0.05	-0.716	-0.752	-0.906	-0.825	-0.912	-0.790	-0.861
gmcod.median	**-0.616**	**-0.631**	**-0.838**	**-0.748**	**-0.877**	**-0.722**	**-0.801**
gmcod.0.95	-0.483	-0.447	-0.750	-0.668	-0.842	-0.627	-0.724
gmhaddock.0.05	-0.700	-0.763	-0.817	-0.895	-0.917	-0.962	-0.945
gmhaddock.median	**-0.573**	**-0.649**	**-0.714**	**-0.836**	**-0.870**	**-0.936**	**-0.909**
gmhaddock.0.95	-0.341	-0.426	-0.508	-0.732	-0.775	-0.898	-0.845
gmwinter.0.05	-0.443	-0.627	-0.645	-0.657	-0.738	-0.769	-0.783
gmwinter.median	**-0.332**	**-0.542**	**-0.546**	**-0.556**	**-0.670**	**-0.692**	**-0.710**
gmwinter.0.95	-0.191	-0.440	-0.421	-0.413	-0.565	-0.575	-0.591
snewinter.0.05	-0.578	-0.605	-0.627	-0.608	-0.697	-0.570	-1.000
snewinter.median	**-0.489**	**-0.495**	**-0.514**	**-0.548**	**-0.648**	**-0.417**	**0.156**
snewinter.0.95	-0.368	-0.340	-0.353	-0.476	-0.589	-0.167	0.738
sneytail.0.05	-0.817	-0.891	-0.726	-0.877	-0.791	-0.787	-0.782
sneytail.median	**-0.722**	**-0.793**	**-0.667**	**-0.855**	**-0.741**	**-0.716**	**-0.709**
sneytail.0.95	-0.569	-0.609	-0.615	-0.839	-0.693	-0.630	-0.599
witch.0.05	-0.619	-0.715	-0.830	-0.860	-0.889	-0.905	-0.827
witch.median	**-0.487**	**-0.598**	**-0.776**	**-0.807**	**-0.849**	**-0.869**	**-0.711**
witch.0.95	-0.277	-0.432	-0.685	-0.720	-0.784	-0.807	-0.437

true.n.f

Stock.percentile	1yr	2yrs	3yrs	4yrs	5yrs	6yrs	7yrs
amerplaice.0.05	-0.232	-0.189	-0.143	-0.194	-0.188	-0.325	-0.410
amerplaice.median	**-0.232**	**-0.189**	**-0.142**	**-0.190**	**-0.156**	**-0.245**	**-0.306**
amerplaice.0.95	-0.232	-0.189	-0.142	-0.189	-0.145	-0.212	-0.143
gbcod.0.05	0.132	0.215	0.114	-0.277	-0.318	-0.446	-0.554
gbcod.median	**0.132**	**0.217**	**0.168**	**-0.056**	**0.271**	**-0.320**	**-0.469**
gbcod.0.95	0.132	0.219	0.202	0.054	1.289	0.153	-0.135
gbwinter.0.05	-0.319	-0.387	-0.331	-0.559	-0.653	-0.572	-1.000
gbwinter.median	**-0.319**	**-0.387**	**-0.294**	**-0.346**	**-0.378**	**-0.421**	**-0.557**
gbwinter.0.95	-0.319	-0.386	-0.269	-0.246	0.145	2.185	2.091
gbytail.0.05	-0.184	-0.311	-0.148	-0.700	-0.818	-0.802	-0.807
gbytail.median	**-0.184**	**-0.309**	**-0.030**	**-0.362**	**-0.589**	**-0.655**	**-0.740**
gbytail.0.95	-0.184	-0.308	0.040	-0.119	-0.367	-0.395	0.749
gmcod.0.05	-0.475	-0.544	-0.608	-0.760	-0.701	-0.834	-0.824
gmcod.median	**-0.475**	**-0.544**	**-0.604**	**-0.650**	**-0.473**	**-0.708**	**-0.665**
gmcod.0.95	-0.475	-0.544	-0.603	-0.635	-0.252	-0.488	-0.224
gmhaddock.0.05	-0.603	-0.625	-0.719	-0.755	-0.793	-0.826	-0.867
gmhaddock.median	**-0.603**	**-0.625**	**-0.719**	**-0.752**	**-0.782**	**-0.782**	**-0.825**
gmhaddock.0.95	-0.603	-0.625	-0.719	-0.752	-0.780	-0.758	-0.770
gmwinter.0.05	-0.151	-0.162	-0.001	-0.171	-0.434	-0.654	-0.745
gmwinter.median	**-0.151**	**-0.160**	**0.027**	**0.088**	**0.196**	**-0.326**	**-0.653**
gmwinter.0.95	-0.151	-0.160	0.037	0.150	0.787	0.052	-0.225
snewinter.0.05	-0.430	-0.453	-0.548	-0.677	-0.726	-0.762	-0.851
snewinter.median	**-0.430**	**-0.453**	**-0.522**	**-0.589**	**-0.608**	**-0.705**	**-0.792**
snewinter.0.95	-0.430	-0.452	-0.479	-0.457	-0.127	-0.586	-0.589
sneytail.0.05	-0.625	-0.692	-0.818	-0.944	-0.965	-0.972	-0.971
sneytail.median	**-0.625**	**-0.690**	**-0.642**	**-0.528**	**-0.702**	**-0.865**	**-0.917**
sneytail.0.95	-0.625	-0.690	-0.614	-0.157	-0.330	-0.501	-0.751
witch.0.05	-0.283	-0.284	-0.250	-0.385	-0.545	-0.612	-0.615
witch.median	**-0.283**	**-0.283**	**-0.231**	**-0.327**	**-0.472**	**-0.559**	**-0.565**
witch.0.95	-0.283	-0.281	-0.213	-0.296	-0.381	-0.432	-0.110

all.true.not.n.f

Stock.percentile	1yr	2yrs	3yrs	4yrs	5yrs	6yrs	7yrs
amerplaice.0.05	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
amerplaice.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
amerplaice.0.95	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gbcod.0.05	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gbcod.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gbcod.0.95	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gbwinter.0.05	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gbwinter.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gbwinter.0.95	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gbytail.0.05	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gbytail.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gbytail.0.95	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gmcod.0.05	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gmcod.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gmcod.0.95	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gmhaddock.0.05	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gmhaddock.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gmhaddock.0.95	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gmwinter.0.05	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
gmwinter.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
gmwinter.0.95	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
snewinter.0.05	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
snewinter.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
snewinter.0.95	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
sneytail.0.05	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
sneytail.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
sneytail.0.95	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
witch.0.05	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
witch.median	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
witch.0.95	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*

Attachment (e)

all.true.not.n.not.f.F

Stock.percentile	1yr	2yrs	3yrs	4yrs	5yrs	6yrs	7yrs
amerplaice.0.05	-0.227	-0.262	-0.360	-0.439	-0.456	-0.208	-0.373
amerplaice.median	**-0.125**	**-0.149**	**-0.229**	**-0.317**	**-0.355**	**-0.111**	**-0.304**
amerplaice.0.95	-0.018	-0.021	-0.089	-0.189	-0.260	-0.001	-0.227
gbcod.0.05	-0.540	-0.660	-0.798	-0.022	-0.519	-1.000	-1.000
gbcod.median	**-0.357**	**-0.489**	**-0.647**	**0.420**	**-0.420**	**-1.000**	**-1.000**
gbcod.0.95	-0.141	-0.248	-0.444	1.129	-0.296	2.370	1.869
gbwinter.0.05	-0.294	-0.506	-0.764	-0.418	-0.562	-1.000	-1.000
gbwinter.median	**0.030**	**-0.223**	**-0.546**	**0.814**	**0.031**	**-0.007**	**-1.000**
gbwinter.0.95	0.577	0.255	-0.120	10.576	8.979	18.184	24.733
gbytail.0.05	-0.397	-0.260	-0.760	-0.585	-0.777	-0.805	-0.789
gbytail.median	**-0.185**	**0.076**	**-0.702**	**-0.277**	**-0.644**	**-0.715**	**-0.680**
gbytail.0.95	0.107	0.725	-0.638	0.474	-0.381	-0.564	-0.494
gmcod.0.05	-0.493	-0.489	-0.769	-0.683	-0.863	-0.437	-0.709
gmcod.median	**-0.319**	**-0.251**	**-0.599**	**-0.457**	**-0.783**	**-0.158**	**-0.556**
gmcod.0.95	-0.070	0.142	-0.348	-0.140	-0.690	0.360	-0.329
gmhaddock.0.05	-0.231	-0.288	-0.302	-0.582	-0.642	-0.816	-0.754
gmhaddock.median	**0.103**	**0.091**	**0.143**	**-0.315**	**-0.408**	**-0.686**	**-0.558**
gmhaddock.0.95	0.711	0.889	1.202	0.239	0.180	-0.456	-0.044
gmwinter.0.05	-0.353	-0.582	-0.645	-0.734	-0.802	-0.820	-0.818
gmwinter.median	**-0.216**	**-0.483**	**-0.556**	**-0.655**	**-0.751**	**-0.760**	**-0.750**
gmwinter.0.95	-0.052	-0.378	-0.436	-0.544	-0.671	-0.666	-0.630
snewinter.0.05	-0.254	-0.296	-0.304	-0.338	-0.592	-0.470	-0.168
snewinter.median	**-0.103**	**-0.102**	**-0.092**	**-0.191**	**-0.508**	**-0.242**	**0.971**
snewinter.0.95	0.105	0.166	0.240	0.000	-0.397	0.164	3.037
sneytail.0.05	-0.482	-0.652	-0.397	-0.809	-0.550	-0.615	-0.649
sneytail.median	**-0.262**	**-0.386**	**-0.073**	**-0.748**	**-0.269**	**-0.310**	**-0.424**
sneytail.0.95	0.098	0.062	0.349	-0.695	0.140	0.274	0.095
witch.0.05	-0.455	-0.565	-0.758	-0.789	-0.830	-0.843	-0.739
witch.median	**-0.258**	**-0.381**	**-0.679**	**-0.705**	**-0.769**	**-0.783**	**-0.554**
witch.0.95	0.048	-0.107	-0.553	-0.577	-0.662	-0.689	-0.074

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SSB

SSB Reults

"**rho**" is the proportional decrease imposed on NAA(T+1)

rho=0 means no decrease was imposed

this row reports the proportion of bootstrap projections that failed

color coding

cell value is [-0.25, 0.25]

cell value is [-0.5, -0.25)

cell value is (0.25, 0.5]

cell value is < -0.5

cell value is > 0.5

rho adjust	Stock.percentile	rho	1yr	2yrs	3yrs	4yrs	5yrs	6yrs	7yrs
	amerplaice.0.05	*0.000*	*-0.012*	*0.039*	*0.197*	*0.573*	*0.341*	*0.304*	*0.179*
0%	**amerplaice.median**	**0.000**	**0.120**	**0.189**	**0.394**	**1.061**	**0.715**	**0.783**	**0.530**
	amerplaice.0.95	*0.000*	*0.253*	*0.360*	*0.645*	*2.360*	*1.393*	*1.874*	*0.942*
	amerplaice.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	amerplaice.0.05	*0.100*	*-0.112*	*-0.075*	*0.057*	*0.385*	*0.167*	*0.126*	*-0.003*
10%	**amerplaice.median**	**0.100**	**0.006**	**0.060**	**0.235**	**0.824**	**0.506**	**0.565**	**0.327**
	amerplaice.0.95	*0.100*	*0.126*	*0.214*	*0.461*	*1.993*	*1.116*	*1.550*	*0.714*
	amerplaice.zero.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	amerplaice.0.05	*0.200*	*-0.213*	*-0.188*	*-0.082*	*0.197*	*-0.007*	*-0.052*	*-0.188*
20%	**amerplaice.median**	**0.200**	**-0.108**	**-0.068**	**0.076**	**0.587**	**0.296**	**0.345**	**0.122**
	amerplaice.0.95	*0.200*	*-0.001*	*0.068*	*0.277*	*1.626*	*0.838*	*1.229*	*0.489*
	amerplaice.zero.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	amerplaice.0.05	*0.300*	*-0.314*	*-0.302*	*-0.221*	*0.009*	*-0.181*	*-0.233*	*-0.380*
30%	**amerplaice.median**	**0.300**	**-0.221**	**-0.197**	**-0.083**	**0.350**	**0.087**	**0.126**	**-0.090**
	amerplaice.0.95	*0.300*	*-0.128*	*-0.077*	*0.093*	*1.259*	*0.561*	*0.906*	*0.260*
	amerplaice.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	amerplaice.0.05	*0.400*	*-0.414*	*-0.416*	*-0.360*	*-0.179*	*-0.356*	*-0.415*	*-0.583*
40%	**amerplaice.median**	**0.400**	**-0.335**	**-0.326**	**-0.242**	**0.113**	**-0.124**	**-0.096**	**-0.311**
	amerplaice.0.95	*0.400*	*-0.255*	*-0.223*	*-0.091*	*0.893*	*0.283*	*0.574*	*0.030*
	amerplaice.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*

	gbcod.0.05	*0.000*	*0.195*	*0.426*	*0.889*	*1.168*	*-0.260*	*-0.746*	*-0.643*
0%	**gbcod.median**	**0.000**	**0.584**	**1.108**	**2.114**	**2.981**	**0.518**	**-0.096**	**0.112**
	gbcod.0.95	*0.000*	*1.194*	*2.180*	*4.497*	*7.697*	*1.599*	*0.747*	*1.101*
	gbcod.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.134*	*0.429*
	gbcod.0.05	*0.100*	*0.070*	*0.252*	*0.653*	*0.902*	*-0.413*	*-0.794*	*-0.711*
10%	**gbcod.median**	**0.100**	**0.420**	**0.866**	**1.754**	**2.530**	**0.319**	**-0.221**	**-0.024**
	gbcod.0.95	*0.100*	*0.969*	*1.831*	*3.898*	*6.781*	*1.323*	*0.565*	*0.891*
	gbcod.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.322*	*0.644*
	gbcod.0.05	*0.200*	*-0.056*	*0.078*	*0.415*	*0.637*	*-0.562*	*-0.822*	*-0.733*
20%	**gbcod.median**	**0.200**	**0.256**	**0.624**	**1.392**	**2.084**	**0.123**	**-0.309**	**-0.103**
	gbcod.0.95	*0.200*	*0.744*	*1.482*	*3.300*	*5.873*	*1.054*	*0.443*	*0.689*
	gbcod.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.004*	*0.592*	*0.841*
	gbcod.0.05	*0.300*	*-0.183*	*-0.097*	*0.175*	*0.367*	*-0.695*	*-0.834*	*-0.778*
30%	**gbcod.median**	**0.300**	**0.091**	**0.382**	**1.032**	**1.644**	**-0.072**	**-0.334**	**-0.193**
	gbcod.0.95	*0.300*	*0.519*	*1.133*	*2.693*	*4.963*	*0.786*	*0.317*	*0.574*
	gbcod.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.025*	*0.848*	*0.956*
	gbcod.0.05	*0.400*	*-0.310*	*-0.273*	*-0.065*	*0.090*	*-0.802*	*-0.879*	*-0.841*
40%	**gbcod.median**	**0.400**	**-0.074**	**0.139**	**0.671**	**1.198**	**-0.257**	**-0.368**	**-0.012**
	gbcod.0.95	*0.400*	*0.293*	*0.784*	*2.087*	*4.037*	*0.481*	*0.149*	*0.436*
	gbcod.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.000*	*0.107*	*0.974*	*0.996*
	gbwinter.0.05	*0.000*	*-0.306*	*-0.175*	*0.331*	*-0.351*	*-0.389*	*-0.452*	*-0.614*
0%	**gbwinter.median**	**0.000**	**-0.007**	**0.281**	**1.311**	**0.264**	**0.475**	**0.549**	**0.119**
	gbwinter.0.95	*0.000*	*0.436*	*1.010*	*3.253*	*1.051*	*1.533*	*2.086*	*1.262*
	gbwinter.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.029*	*0.085*	*0.400*
	gbwinter.0.05	*0.100*	*-0.380*	*-0.280*	*0.148*	*-0.465*	*-0.520*	*-0.546*	*-0.677*
10%	**gbwinter.median**	**0.100**	**-0.111**	**0.130**	**1.033**	**0.093**	**0.234**	**0.291**	**-0.034**
	gbwinter.0.95	*0.100*	*0.289*	*0.787*	*2.779*	*0.817*	*1.209*	*1.710*	*0.991*
	gbwinter.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.010*	*0.084*	*0.200*	*0.599*
	gbwinter.0.05	*0.200*	*-0.454*	*-0.386*	*-0.034*	*-0.588*	*-0.615*	*-0.618*	*-0.682*
20%	**gbwinter.median**	**0.200**	**-0.215**	**-0.021**	**0.755**	**-0.068**	**0.028**	**0.092**	**-0.132**
	gbwinter.0.95	*0.200*	*0.141*	*0.563*	*2.299*	*0.596*	*0.906*	*1.292*	*0.784*
	gbwinter.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.032*	*0.212*	*0.385*	*0.797*
	gbwinter.0.05	*0.300*	*-0.529*	*-0.491*	*-0.220*	*-0.666*	*-0.652*	*-0.661*	*-0.705*
30%	**gbwinter.median**	**0.300**	**-0.319**	**-0.172**	**0.476**	**-0.215**	**-0.104**	**-0.039**	**-0.185**
	gbwinter.0.95	*0.300*	*-0.007*	*0.340*	*1.826*	*0.379*	*0.606*	*0.976*	*0.569*
	gbwinter.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.120*	*0.466*	*0.633*	*0.931*
	gbwinter.0.05	*0.400*	*-0.604*	*-0.598*	*-0.403*	*-0.746*	*-0.696*	*-0.654*	*-0.681*
40%	**gbwinter.median**	**0.400**	**-0.423**	**-0.323**	**0.196**	**-0.310**	**-0.206**	**-0.134**	**-0.201**
	gbwinter.0.95	*0.400*	*-0.155*	*0.117*	*1.354*	*0.196*	*0.418*	*0.738*	*0.299*
	gbwinter.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.344*	*0.761*	*0.848*	*0.987*

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SSB

	gbytail.0.05	*0.000*	*-0.021*	*-0.443*	*0.202*	*-0.368*	*1.039*	*1.682*	*1.496*
0%	**gbytail.median**	**0.000**	**0.355**	**-0.180**	**0.693**	**0.575**	**2.379**	**3.237**	**3.137**
	gbytail.0.95	*0.000*	*0.889*	*0.128*	*1.386*	*1.917*	*4.280*	*5.295*	*5.321*
	gbytail.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gbytail.0.05	*0.100*	*-0.126*	*-0.530*	*0.026*	*-0.534*	*0.753*	*1.367*	*1.213*
10%	**gbytail.median**	**0.100**	**0.214**	**-0.293**	**0.477**	**0.259**	**2.025**	**2.877**	**2.825**
	gbytail.0.95	*0.100*	*0.695*	*-0.016*	*1.135*	*1.638*	*3.878*	*4.893*	*4.941*
	gbytail.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gbytail.0.05	*0.200*	*-0.231*	*-0.617*	*-0.160*	*-0.677*	*0.446*	*1.057*	*0.905*
20%	**gbytail.median**	**0.200**	**0.072**	**-0.407**	**0.259**	**-0.129**	**1.664**	**2.509**	**2.497**
	gbytail.0.95	*0.200*	*0.501*	*-0.161*	*0.883*	*1.368*	*3.477*	*4.473*	*4.566*
	gbytail.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.004*	*0.000*	*0.000*	*0.000*
	gbytail.0.05	*0.300*	*-0.336*	*-0.704*	*-0.377*	*-0.788*	*0.060*	*0.726*	*0.530*
30%	**gbytail.median**	**0.300**	**-0.070**	**-0.520**	**0.031**	**-0.413**	**1.290**	**2.133**	**2.160**
	gbytail.0.95	*0.300*	*0.307*	*-0.306*	*0.644*	*0.947*	*3.060*	*4.069*	*4.242*
	gbytail.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.044*	*0.000*	*0.000*	*0.002*
	gbytail.0.05	*0.400*	*-0.441*	*-0.790*	*-0.550*	*-0.844*	*-0.395*	*0.326*	*-0.267*
40%	**gbytail.median**	**0.400**	**-0.212**	**-0.634**	**-0.213**	**-0.568**	**0.876**	**1.741**	**1.746**
	gbytail.0.95	*0.400*	*0.113*	*-0.450*	*0.410*	*0.129*	*2.614*	*3.652*	*3.828*
	gbytail.zero.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.217*	*0.003*	*0.000*	*0.017*
	gmcod.0.05	*0.000*	*-0.178*	*-0.454*	*-0.280*	*-0.456*	*0.001*	*-0.434*	*-0.254*
0%	**gmcod.median**	**0.000**	**0.061**	**-0.202**	**0.240**	**-0.163**	**0.577**	**0.025**	**0.448**
	gmcod.0.95	*0.000*	*0.388*	*0.156*	*1.293*	*0.316*	*1.486*	*0.778*	*1.510*
	gmcod.zero.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmcod.0.05	*0.100*	*-0.263*	*-0.524*	*-0.379*	*-0.546*	*-0.142*	*-0.550*	*-0.398*
10%	**gmcod.median**	**0.100**	**-0.048**	**-0.296**	**0.088**	**-0.277**	**0.387**	**-0.108**	**0.259**
	gmcod.0.95	*0.100*	*0.247*	*0.026*	*1.036*	*0.167*	*1.226*	*0.627*	*1.302*
	gmcod.zero.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmcod.0.05	*0.200*	*-0.348*	*-0.594*	*-0.479*	*-0.639*	*-0.285*	*-0.655*	*-0.547*
20%	**gmcod.median**	**0.200**	**-0.157**	**-0.391**	**-0.063**	**-0.391**	**0.197**	**-0.245**	**0.064**
	gmcod.0.95	*0.200*	*0.106*	*-0.104*	*0.782*	*0.023*	*0.973*	*0.498*	*1.047*
	gmcod.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.003*
	gmcod.0.05	*0.300*	*-0.434*	*-0.664*	*-0.580*	*-0.728*	*-0.429*	*-0.762*	*-0.670*
30%	**gmcod.median**	**0.300**	**-0.266**	**-0.485**	**-0.214**	**-0.505**	**0.007**	**-0.378**	**-0.124**
	gmcod.0.95	*0.300*	*-0.036*	*-0.233*	*0.527*	*-0.116*	*0.725*	*0.358*	*0.833*
	gmcod.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.008*	*0.009*
	gmcod.0.05	*0.400*	*-0.519*	*-0.734*	*-0.681*	*-0.819*	*-0.573*	*-0.841*	*-0.770*
40%	**gmcod.median**	**0.400**	**-0.375**	**-0.580**	**-0.365**	**-0.617**	**-0.184**	**-0.498**	**-0.289**
	gmcod.0.95	*0.400*	*-0.178*	*-0.364*	*0.269*	*-0.236*	*0.482*	*0.217*	*0.592*
	gmcod.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.001*	*0.000*	*0.054*	*0.055*

	gmhaddock.0.05	*0.000*	*-0.258*	*-0.217*	*-0.212*	*0.382*	*0.495*	*1.951*	*0.941*
0%	**gmhaddock.median**	**0.000**	**0.081**	**0.230**	**0.252**	**1.173**	**1.477**	**3.652**	**2.468**
	gmhaddock.0.95	*0.000*	*0.499*	*0.775*	*0.911*	*2.306*	*2.816*	*6.540*	*4.666*
	gmhaddock.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmhaddock.0.05	*0.100*	*-0.340*	*-0.321*	*-0.341*	*0.176*	*0.276*	*1.582*	*0.681*
10%	**gmhaddock.median**	**0.100**	**-0.034**	**0.082**	**0.078**	**0.889**	**1.159**	**3.135**	**2.085**
	gmhaddock.0.95	*0.100*	*0.342*	*0.573*	*0.671*	*1.908*	*2.373*	*5.753*	*4.100*
	gmhaddock.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmhaddock.0.05	*0.200*	*-0.422*	*-0.425*	*-0.471*	*-0.028*	*0.051*	*1.217*	*0.419*
20%	**gmhaddock.median**	**0.200**	**-0.149**	**-0.066**	**-0.097**	**0.605**	**0.841**	**2.614**	**1.696**
	gmhaddock.0.95	*0.200*	*0.186*	*0.371*	*0.431*	*1.510*	*1.935*	*4.952*	*3.542*
	gmhaddock.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmhaddock.0.05	*0.300*	*-0.505*	*-0.531*	*-0.602*	*-0.234*	*-0.176*	*0.845*	*0.152*
30%	**gmhaddock.median**	**0.300**	**-0.265**	**-0.214**	**-0.273**	**0.320**	**0.522**	**2.090**	**1.300**
	gmhaddock.0.95	*0.300*	*0.029*	*0.169*	*0.190*	*1.113*	*1.498*	*4.167*	*2.991*
	gmhaddock.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmhaddock.0.05	*0.400*	*-0.589*	*-0.635*	*-0.739*	*-0.441*	*-0.406*	*0.474*	*-0.115*
40%	**gmhaddock.median**	**0.400**	**-0.381**	**-0.363**	**-0.449**	**0.036**	**0.202**	**1.566**	**0.913**
	gmhaddock.0.95	*0.400*	*-0.128*	*-0.034*	*-0.050*	*0.715*	*1.066*	*3.357*	*2.432*
	gmhaddock.zero.rel.pro.failed	*0.400*	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmwinter.0.05	*0.000*	*0.027*	*0.405*	*0.509*	*0.447*	*0.973*	*1.235*	*1.384*
0%	**gmwinter.median**	**0.000**	**0.230**	**0.710**	**0.921**	**0.871**	**1.648**	**2.238**	**2.587**
	gmwinter.0.95	*0.000*	*0.473*	*1.101*	*1.457*	*1.382*	*2.716*	*3.701*	*4.318*
	gmwinter.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmwinter.0.05	*0.100*	*-0.082*	*0.238*	*0.298*	*0.195*	*0.637*	*0.873*	*1.022*
10%	**gmwinter.median**	**0.100**	**0.101**	**0.512**	**0.669**	**0.578**	**1.260**	**1.811**	**2.177**
	gmwinter.0.95	*0.100*	*0.319*	*0.865*	*1.150*	*1.048*	*2.312*	*3.245*	*3.880*
	gmwinter.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmwinter.0.05	*0.200*	*-0.192*	*0.071*	*0.087*	*-0.058*	*0.301*	*0.506*	*0.643*
20%	**gmwinter.median**	**0.200**	**-0.029**	**0.315**	**0.416**	**0.287**	**0.874**	**1.387**	**1.756**
	gmwinter.0.95	*0.200*	*0.165*	*0.628*	*0.843*	*0.711*	*1.908*	*2.785*	*3.435*
	gmwinter.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmwinter.0.05	*0.300*	*-0.302*	*-0.096*	*-0.123*	*-0.309*	*-0.032*	*0.127*	*0.249*
30%	**gmwinter.median**	**0.300**	**-0.159**	**0.118**	**0.164**	**-0.003**	**0.490**	**0.954**	**1.320**
	gmwinter.0.95	*0.300*	*0.012*	*0.392*	*0.537*	*0.379*	*1.512*	*2.324*	*2.977*
	gmwinter.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmwinter.0.05	*0.400*	*-0.412*	*-0.264*	*-0.334*	*-0.556*	*-0.364*	*-0.249*	*-0.176*
40%	**gmwinter.median**	**0.400**	**-0.289**	**-0.079**	**-0.088**	**-0.291**	**0.109**	**0.515**	**0.867**
	gmwinter.0.95	*0.400*	*-0.142*	*0.155*	*0.230*	*0.055*	*1.117*	*1.857*	*2.492*
	gmwinter.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.001*

Attachment (f) ALL.stocks.ssb.summ.feasible.no

SSB

	snewinter.0.05	*0.000*	*-0.047*	*-0.063*	*-0.095*	*-0.039*	*0.317*	*0.240*	*0.268*
0%	**snewinter.median**	**0.000**	**0.166**	**0.204**	**0.207**	**0.366**	**1.048**	**1.200**	**1.223**
	snewinter.0.95	*0.000*	*0.395*	*0.523*	*0.568*	*0.720*	*1.674*	*2.085*	*2.136*
	snewinter.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	snewinter.0.05	*0.100*	*-0.153*	*-0.220*	*-0.288*	*-0.255*	*0.059*	*-0.018*	*0.052*
10%	**snewinter.median**	**0.100**	**0.038**	**0.020**	**-0.019**	**0.147**	**0.774**	**0.922**	**0.943**
	snewinter.0.95	*0.100*	*0.245*	*0.306*	*0.305*	*0.486*	*1.386*	*1.776*	*1.808*
	snewinter.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.024*
	snewinter.0.05	*0.200*	*-0.260*	*-0.379*	*-0.478*	*-0.462*	*-0.191*	*-0.263*	*-0.092*
20%	**snewinter.median**	**0.200**	**-0.090**	**-0.165**	**-0.243**	**-0.068**	**0.505**	**0.648**	**0.730**
	snewinter.0.95	*0.200*	*0.094*	*0.090*	*0.042*	*0.256*	*1.103*	*1.474*	*1.556*
	snewinter.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.261*
	snewinter.0.05	*0.300*	*-0.369*	*-0.540*	*-0.663*	*-0.661*	*-0.429*	*-0.455*	*-0.123*
30%	**snewinter.median**	**0.300**	**-0.219**	**-0.351**	**-0.465**	**-0.273**	**0.242**	**0.399**	**0.683**
	snewinter.0.95	*0.300*	*-0.057*	*-0.129*	*-0.219*	*0.034*	*0.821*	*1.181*	*1.436*
	snewinter.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.029*	*0.872*
	sneytail.0.05	*0.000*	*-0.089*	*-0.174*	*-0.209*	*0.232*	*-0.442*	*-0.207*	*0.161*
0%	**sneytail.median**	**0.000**	**0.431**	**0.563**	**0.010**	**0.815**	**0.661**	**2.064**	**4.523**
	sneytail.0.95	*0.000*	*1.172*	*1.973*	*1.795*	*5.240*	*8.386*	*11.073*	*14.181*
	sneytail.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	sneytail.0.05	*0.100*	*-0.185*	*-0.273*	*-0.307*	*0.091*	*-0.509*	*-0.291*	*0.083*
10%	**sneytail.median**	**0.100**	**0.283**	**0.391**	**-0.099**	**0.655**	**0.602**	**1.903**	**4.210**
	sneytail.0.95	*0.100*	*0.951*	*1.660*	*1.679*	*5.085*	*8.156*	*11.246*	*13.857*
	sneytail.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.001*
	sneytail.0.05	*0.200*	*-0.280*	*-0.371*	*-0.405*	*-0.051*	*-0.566*	*-0.363*	*-0.021*
20%	**sneytail.median**	**0.200**	**0.136**	**0.218**	**-0.208**	**0.496**	**0.528**	**1.871**	**4.013**
	sneytail.0.95	*0.200*	*0.729*	*1.346*	*1.566*	*4.930*	*8.163*	*11.100*	*13.545*
	sneytail.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.002*	*0.006*	*0.006*
	sneytail.0.05	*0.300*	*-0.376*	*-0.470*	*-0.503*	*-0.194*	*-0.630*	*-0.418*	*-0.115*
30%	**sneytail.median**	**0.300**	**-0.012**	**0.046**	**-0.317**	**0.337**	**0.504**	**1.713**	**3.883**
	sneytail.0.95	*0.300*	*0.508*	*1.033*	*1.447*	*4.772*	*8.218*	*11.031*	*14.003*
	sneytail.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.016*	*0.033*	*0.027*
	sneytail.0.05	*0.400*	*-0.472*	*-0.568*	*-0.602*	*-0.329*	*-0.677*	*-0.474*	*-0.172*
40%	**sneytail.median**	**0.400**	**-0.159**	**-0.126**	**-0.426**	**0.188**	**0.447**	**1.781**	**3.867**
	sneytail.0.95	*0.400*	*0.286*	*0.720*	*1.333*	*4.625*	*8.392*	*11.251*	*13.780*
	sneytail.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.002*	*0.110*	*0.125*	*0.130*

Attachment (f) ALL.stocks.ssb.summ.feasible.no

SSB

	witch.0.05	*0.000*	*0.008*	*0.336*	*1.491*	*1.876*	*3.190*	*3.984*	*1.110*
0%	**witch.median**	**0.000**	**0.367**	**0.841**	**2.434**	**3.051**	**4.834**	**6.066**	**2.802**
	witch.0.95	*0.000*	*0.802*	*1.526*	*3.470*	*4.523*	*6.712*	*8.666*	*5.002*
	witch.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	witch.0.05	*0.100*	*-0.099*	*0.151*	*1.120*	*1.385*	*2.496*	*3.140*	*0.457*
10%	**witch.median**	**0.100**	**0.225**	**0.604**	**1.968**	**2.443**	**3.976**	**5.023**	**2.021**
	witch.0.95	*0.100*	*0.616*	*1.221*	*2.901*	*3.764*	*5.667*	*7.375*	*4.052*
	witch.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	witch.0.05	*0.200*	*-0.206*	*-0.034*	*0.748*	*0.897*	*1.800*	*2.298*	*-0.185*
20%	**witch.median**	**0.200**	**0.082**	**0.368**	**1.502**	**1.837**	**3.120**	**3.984**	**1.227**
	witch.0.95	*0.200*	*0.431*	*0.915*	*2.332*	*3.014*	*4.630*	*6.082*	*3.077*
	witch.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*
	witch.0.05	*0.300*	*-0.313*	*-0.220*	*0.378*	*0.408*	*1.103*	*1.449*	*-0.661*
30%	**witch.median**	**0.300**	**-0.060**	**0.132**	**1.035**	**1.233**	**2.265**	**2.942**	**0.469**
	witch.0.95	*0.300*	*0.245*	*0.610*	*1.762*	*2.260*	*3.591*	*4.790*	*2.121*
	witch.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.023*
	witch.0.05	*0.400*	*-0.422*	*-0.406*	*0.009*	*-0.073*	*0.412*	*0.603*	*-0.869*
40%	**witch.median**	**0.400**	**-0.203**	**-0.105**	**0.571**	**0.630**	**1.416**	**1.903**	**-0.208**
	witch.0.95	*0.400*	*0.059*	*0.305*	*1.193*	*1.509*	*2.553*	*3.504*	*1.192*
	witch.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.156*

Attachmnet (f) ALL.stocks.F.summ.feasible.no.t
Mortality

F
"**rho**" is the proportional decrease imposed on NAA(T+1)
rho=0 means no decrease was imposed

this row reports the proportion of bootstrap projections that failed

color coding
cell value is [-0.25, 0.25]
cell value is [-0.5, -0.25)
cell value is (0.25, 0.5]
cell value is < -0.5
cell value is > 0.5

rho adjust	Stock.percentile	rho	1yr	2yrs	3yrs	4yrs	5yrs	6yrs	7yrs
	amerplaice.0.05	*0.000*	*-0.417*	*-0.434*	*-0.475*	*-0.677*	*-0.614*	*-0.696*	*-0.549*
0%	**amerplaice.median**	**0.000**	**-0.345**	**-0.350**	**-0.385**	**-0.566**	**-0.493**	**-0.500**	**-0.423**
	amerplaice.0.95	*0.000*	*-0.255*	*-0.255*	*-0.287*	*-0.465*	*-0.364*	*-0.307*	*-0.244*
	amerplaice.zero.rel.pro.failec	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	amerplaice.0.05	*0.100*	*-0.350*	*-0.365*	*-0.407*	*-0.635*	*-0.560*	*-0.654*	*-0.485*
10%	**amerplaice.median**	**0.100**	**-0.270**	**-0.270**	**-0.304**	**-0.507**	**-0.417**	**-0.422**	**-0.326**
	amerplaice.0.95	*0.100*	*-0.169*	*-0.161*	*-0.190*	*-0.390*	*-0.263*	*-0.185*	*-0.092*
	amerplaice.zero.rel.pro.failec	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	amerplaice.0.05	*0.200*	*-0.266*	*-0.276*	*-0.320*	*-0.582*	*-0.488*	*-0.600*	*-0.398*
20%	**amerplaice.median**	**0.200**	**-0.175**	**-0.166**	**-0.198**	**-0.430**	**-0.315**	**-0.316**	**-0.187**
	amerplaice.0.95	*0.200*	*-0.060*	*-0.040*	*-0.064*	*-0.289*	*-0.124*	*-0.007*	*0.143*
	amerplaice.zero.rel.pro.failec	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	amerplaice.0.05	*0.300*	*-0.157*	*-0.159*	*-0.201*	*-0.509*	*-0.389*	*-0.526*	*-0.274*
30%	**amerplaice.median**	**0.300**	**-0.052**	**-0.029**	**-0.053**	**-0.325**	**-0.170**	**-0.160**	**0.028**
	amerplaice.0.95	*0.300*	*0.081*	*0.122*	*0.110*	*-0.150*	*0.081*	*0.268*	*0.557*
	amerplaice.zero.rel.pro.failec	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	amerplaice.0.05	*0.400*	*-0.011*	*0.004*	*-0.034*	*-0.407*	*-0.243*	*-0.415*	*-0.087*
40%	**amerplaice.median**	**0.400**	**0.115**	**0.163**	**0.154**	**-0.171**	**0.053**	**0.085**	**0.427**
	amerplaice.0.95	*0.400*	*0.272*	*0.349*	*0.363*	*0.059*	*0.413*	*0.754*	*1.518*
	amerplaice.zero.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*
	gbcod.0.05	*0.000*	*-0.497*	*-0.627*	*-0.787*	*-0.877*	*-0.604*	*-0.325*	*-0.463*
0%	**gbcod.median**	**0.000**	**-0.284**	**-0.427**	**-0.620**	**-0.727**	**-0.265**	**0.470**	**0.141**
	gbcod.0.95	*0.000*	*-0.022*	*-0.143*	*-0.365*	*-0.487*	*0.731*	*7.063*	*3.962*
	gbcod.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.134*	*0.429*
	gbcod.0.05	*0.100*	*-0.437*	*-0.578*	*-0.760*	*-0.862*	*-0.547*	*-0.233*	*-0.395*
10%	**gbcod.median**	**0.100**	**-0.196**	**-0.347**	**-0.567**	**-0.689**	**-0.129**	**0.782**	**0.355**
	gbcod.0.95	*0.100*	*0.104*	*-0.010*	*-0.263*	*-0.405*	*1.357*	*9.899*	*5.613*
	gbcod.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.322*	*0.644*
	gbcod.0.05	*0.200*	*-0.360*	*-0.516*	*-0.725*	*-0.843*	*-0.478*	*-0.150*	*-0.304*
20%	**gbcod.median**	**0.200**	**-0.081**	**-0.241**	**-0.496**	**-0.641**	**0.066**	**1.094**	**0.497**
	gbcod.0.95	*0.200*	*0.268*	*0.172*	*-0.121*	*-0.293*	*2.553*	*12.182*	*6.410*
	gbcod.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.004*	*0.592*	*0.841*
	gbcod.0.05	*0.300*	*-0.258*	*-0.431*	*-0.677*	*-0.818*	*-0.380*	*-0.048*	*-0.262*
30%	**gbcod.median**	**0.300**	**0.071**	**-0.094**	**-0.397**	**-0.574**	**0.356**	**1.214**	**0.761**
	gbcod.0.95	*0.300*	*0.489*	*0.434*	*0.087*	*-0.129*	*4.854*	*13.712*	*8.447*
	gbcod.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.025*	*0.848*	*0.956*
	gbcod.0.05	*0.400*	*-0.118*	*-0.311*	*-0.610*	*-0.782*	*-0.221*	*0.110*	*-0.194*
40%	**gbcod.median**	**0.400**	**0.283**	**0.123**	**-0.250**	**-0.477**	**0.805**	**1.330**	**0.366**
	gbcod.0.95	*0.400*	*0.805*	*0.849*	*0.423*	*0.138*	*9.771*	*18.642*	*8.588*
	gbcod.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.000*	*0.107*	*0.974*	*0.996*

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Mortality

	gbwinter.0.05	*0.000*	*-0.528*	*-0.689*	*-0.864*	*-0.672*	*-0.782*	*-0.805*	*-0.732*
0%	**gbwinter.median**	**0.000**	**-0.287**	**-0.484**	**-0.724**	**-0.431**	**-0.612**	**-0.604**	**-0.405**
	gbwinter.0.95	*0.000*	*0.079*	*-0.152*	*-0.465*	*0.248*	*0.121*	*0.374*	*1.271*
	gbwinter.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.029*	*0.085*	*0.400*
	gbwinter.0.05	*0.100*	*-0.471*	*-0.648*	*-0.846*	*-0.624*	*-0.750*	*-0.779*	*-0.694*
10%	**gbwinter.median**	**0.100**	**-0.198**	**-0.409**	**-0.683**	**-0.317**	**-0.522**	**-0.517**	**-0.286**
	gbwinter.0.95	*0.100*	*0.222*	*-0.013*	*-0.362*	*0.649*	*0.530*	*0.805*	*2.041*
	gbwinter.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.010*	*0.084*	*0.200*	*0.599*
	gbwinter.0.05	*0.200*	*-0.399*	*-0.594*	*-0.822*	*-0.559*	*-0.708*	*-0.740*	*-0.654*
20%	**gbwinter.median**	**0.200**	**-0.083**	**-0.310**	**-0.626**	**-0.162**	**-0.400**	**-0.409**	**-0.180**
	gbwinter.0.95	*0.200*	*0.413*	*0.184*	*-0.212*	*1.389*	*1.067*	*1.281*	*2.085*
	gbwinter.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.032*	*0.212*	*0.385*	*0.797*
	gbwinter.0.05	*0.300*	*-0.303*	*-0.522*	*-0.790*	*-0.465*	*-0.645*	*-0.696*	*-0.602*
30%	**gbwinter.median**	**0.300**	**0.071**	**-0.169**	**-0.544**	**0.058**	**-0.287**	**-0.309**	**-0.118**
	gbwinter.0.95	*0.300*	*0.675*	*0.480*	*0.028*	*2.180*	*1.379*	*1.677*	*2.172*
	gbwinter.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.120*	*0.466*	*0.633*	*0.931*
	gbwinter.0.05	*0.400*	*-0.172*	*-0.417*	*-0.744*	*-0.356*	*-0.593*	*-0.654*	*-0.560*
40%	**gbwinter.median**	**0.400**	**0.288**	**0.044**	**-0.416**	**0.262**	**-0.175**	**-0.224**	**-0.088**
	gbwinter.0.95	*0.400*	*1.044*	*0.987*	*0.478*	*3.583*	*1.844*	*1.615*	*1.691*
	gbwinter.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.344*	*0.761*	*0.848*	*0.987*
	gbytail.0.05	*0.000*	*-0.514*	*-0.362*	*-0.709*	*-0.749*	*-0.876*	*-0.895*	*-0.895*
0%	**gbytail.median**	**0.000**	**-0.341**	**-0.110**	**-0.590**	**-0.550**	**-0.806**	**-0.843**	**-0.837**
	gbytail.0.95	*0.000*	*-0.111*	*0.346*	*-0.413*	*0.185*	*-0.676*	*-0.750*	*-0.724*
	gbytail.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gbytail.0.05	*0.100*	*-0.457*	*-0.267*	*-0.670*	*-0.720*	*-0.865*	*-0.888*	*-0.888*
10%	**gbytail.median**	**0.100**	**-0.263**	**0.038**	**-0.526**	**-0.429**	**-0.782**	**-0.827**	**-0.822**
	gbytail.0.95	*0.100*	*-0.002*	*0.607*	*-0.306*	*0.657*	*-0.619*	*-0.715*	*-0.683*
	gbytail.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gbytail.0.05	*0.200*	*-0.386*	*-0.137*	*-0.621*	*-0.682*	*-0.853*	*-0.879*	*-0.880*
20%	**gbytail.median**	**0.200**	**-0.163**	**0.249**	**-0.440**	**-0.151**	**-0.751**	**-0.807**	**-0.804**
	gbytail.0.95	*0.200*	*0.138*	*0.991*	*-0.143*	*1.497*	*-0.535*	*-0.667*	*-0.625*
	gbytail.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.004*	*0.000*	*0.000*	*0.000*
	gbytail.0.05	*0.300*	*-0.293*	*0.048*	*-0.553*	*-0.611*	*-0.837*	*-0.868*	*-0.871*
30%	**gbytail.median**	**0.300**	**-0.033**	**0.558**	**-0.309**	**0.317**	**-0.707**	**-0.782**	**-0.781**
	gbytail.0.95	*0.300*	*0.322*	*1.609*	*0.184*	*2.853*	*-0.353*	*-0.596*	*-0.522*
	gbytail.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.044*	*0.000*	*0.000*	*0.002*
	gbytail.0.05	*0.400*	*-0.166*	*0.340*	*-0.462*	*-0.348*	*-0.815*	*-0.855*	*-0.859*
40%	**gbytail.median**	**0.400**	**0.144**	**1.068**	**-0.071**	**0.867**	**-0.639**	**-0.747**	**-0.745**
	gbytail.0.95	*0.400*	*0.579*	*2.748*	*0.683*	*4.238*	*0.173*	*-0.460*	*0.061*
	gbytail.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.217*	*0.003*	*0.000*	*0.017*

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Mortality

	gmcod.0.05	*0.000*	*-0.716*	*-0.752*	*-0.893*	*-0.780*	*-0.890*	*-0.849*	*-0.881*
0%	**gmcod.median**	**0.000**	**-0.616**	**-0.630**	**-0.792**	**-0.629**	**-0.814**	**-0.711**	**-0.784**
	gmcod.0.95	*0.000*	*-0.483*	*-0.446*	*-0.616*	*-0.392*	*-0.688*	*-0.439*	*-0.574*
	gmcod.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmcod.0.05	*0.100*	*-0.682*	*-0.719*	*-0.879*	*-0.746*	*-0.877*	*-0.837*	*-0.872*
10%	**gmcod.median**	**0.100**	**-0.569**	**-0.576**	**-0.760**	**-0.560**	**-0.788**	**-0.669**	**-0.758**
	gmcod.0.95	*0.100*	*-0.417*	*-0.354*	*-0.545*	*-0.236*	*-0.633*	*-0.274*	*-0.476*
	gmcod.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmcod.0.05	*0.200*	*-0.639*	*-0.676*	*-0.860*	*-0.702*	*-0.862*	*-0.824*	*-0.859*
20%	**gmcod.median**	**0.200**	**-0.509**	**-0.502**	**-0.718**	**-0.458**	**-0.753**	**-0.609**	**-0.717**
	gmcod.0.95	*0.200*	*-0.332*	*-0.224*	*-0.441*	*0.022*	*-0.552*	*0.012*	*-0.281*
	gmcod.zero.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.003*
	gmcod.0.05	*0.300*	*-0.582*	*-0.616*	*-0.836*	*-0.638*	*-0.842*	*-0.810*	*-0.845*
30%	**gmcod.median**	**0.300**	**-0.429**	**-0.399**	**-0.658**	**-0.298**	**-0.703**	**-0.522**	**-0.660**
	gmcod.0.95	*0.300*	*-0.218*	*-0.029*	*-0.276*	*0.509*	*-0.428*	*0.665*	*0.048*
	gmcod.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.008*	*0.009*
	gmcod.0.05	*0.400*	*-0.504*	*-0.530*	*-0.800*	*-0.551*	*-0.816*	*-0.789*	*-0.828*
40%	**gmcod.median**	**0.400**	**-0.317**	**-0.240**	**-0.565**	**-0.006**	**-0.629**	**-0.387**	**-0.581**
	gmcod.0.95	*0.400*	*-0.057*	*0.295*	*0.029*	*1.881*	*-0.189*	*2.197*	*0.751*
	gmcod.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.001*	*0.000*	*0.054*	*0.055*
	gmhaddock.0.05	*0.000*	*-0.700*	*-0.763*	*-0.817*	*-0.895*	*-0.918*	*-0.961*	*-0.945*
0%	**gmhaddock.median**	**0.000**	**-0.573**	**-0.649**	**-0.714**	**-0.836**	**-0.871**	**-0.933**	**-0.909**
	gmhaddock.0.95	*0.000*	*-0.341*	*-0.426*	*-0.507*	*-0.732*	*-0.777*	*-0.891*	*-0.834*
	gmhaddock.zero.rel.pro.faile	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmhaddock.0.05	*0.100*	*-0.662*	*-0.730*	*-0.788*	*-0.879*	*-0.906*	*-0.956*	*-0.939*
10%	**gmhaddock.median**	**0.100**	**-0.518**	**-0.595**	**-0.663**	**-0.809**	**-0.851**	**-0.924**	**-0.897**
	gmhaddock.0.95	*0.100*	*-0.251*	*-0.321*	*-0.392*	*-0.679*	*-0.731*	*-0.874*	*-0.806*
	gmhaddock.zero.rel.pro.faile	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmhaddock.0.05	*0.200*	*-0.615*	*-0.687*	*-0.749*	*-0.859*	*-0.890*	*-0.950*	*-0.931*
20%	**gmhaddock.median**	**0.200**	**-0.447**	**-0.522**	**-0.589**	**-0.772**	**-0.822**	**-0.912**	**-0.881**
	gmhaddock.0.95	*0.200*	*-0.131*	*-0.169*	*-0.203*	*-0.599*	*-0.663*	*-0.851*	*-0.766*
	gmhaddock.zero.rel.pro.faile	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmhaddock.0.05	*0.300*	*-0.551*	*-0.627*	*-0.693*	*-0.830*	*-0.868*	*-0.942*	*-0.920*
30%	**gmhaddock.median**	**0.300**	**-0.350**	**-0.417**	**-0.473**	**-0.717**	**-0.779**	**-0.896**	**-0.860**
	gmhaddock.0.95	*0.300*	*0.037*	*0.064*	*0.145*	*-0.466*	*-0.548*	*-0.818*	*-0.707*
	gmhaddock.zero.rel.pro.faile	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmhaddock.0.05	*0.400*	*-0.462*	*-0.539*	*-0.604*	*-0.787*	*-0.835*	*-0.930*	*-0.906*
40%	**gmhaddock.median**	**0.400**	**-0.212**	**-0.252**	**-0.264**	**-0.625**	**-0.709**	**-0.872**	**-0.828**
	gmhaddock.0.95	*0.400*	*0.282*	*0.505*	*1.073*	*-0.200*	*-0.316*	*-0.766*	*-0.601*
	gmhaddock.zero.rel.pro.faile	*0.400*	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*

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Mortality

	gmwinter.0.05	*0.000*	*-0.443*	*-0.627*	*-0.646*	*-0.671*	*-0.768*	*-0.831*	*-0.871*
0%	**gmwinter.median**	**0.000**	**-0.332**	**-0.542**	**-0.549**	**-0.574**	**-0.690**	**-0.753**	**-0.807**
	gmwinter.0.95	*0.000*	*-0.191*	*-0.440*	*-0.426*	*-0.437*	*-0.579*	*-0.640*	*-0.708*
	gmwinter.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmwinter.0.05	*0.100*	*-0.376*	*-0.578*	*-0.592*	*-0.612*	*-0.733*	*-0.811*	*-0.859*
10%	**gmwinter.median**	**0.100**	**-0.249**	**-0.480**	**-0.476**	**-0.488**	**-0.630**	**-0.711**	**-0.782**
	gmwinter.0.95	*0.100*	*-0.088*	*-0.360*	*-0.324*	*-0.303*	*-0.479*	*-0.558*	*-0.653*
	gmwinter.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmwinter.0.05	*0.200*	*-0.289*	*-0.514*	*-0.520*	*-0.528*	*-0.685*	*-0.786*	*-0.845*
20%	**gmwinter.median**	**0.200**	**-0.143**	**-0.398**	**-0.375**	**-0.358**	**-0.541**	**-0.651**	**-0.748**
	gmwinter.0.95	*0.200*	*0.044*	*-0.255*	*-0.181*	*-0.087*	*-0.317*	*-0.427*	*-0.573*
	gmwinter.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmwinter.0.05	*0.300*	*-0.174*	*-0.427*	*-0.417*	*-0.397*	*-0.618*	*-0.751*	*-0.827*
30%	**gmwinter.median**	**0.300**	**-0.001**	**-0.285**	**-0.226**	**-0.142**	**-0.394**	**-0.559**	**-0.699**
	gmwinter.0.95	*0.300*	*0.221*	*-0.106*	*0.038*	*0.307*	*-0.016*	*-0.191*	*-0.431*
	gmwinter.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	gmwinter.0.05	*0.400*	*-0.014*	*-0.303*	*-0.258*	*-0.173*	*-0.517*	*-0.702*	*-0.802*
40%	**gmwinter.median**	**0.400**	**0.196**	**-0.122**	**0.011**	**0.275**	**-0.116**	**-0.402**	**-0.621**
	gmwinter.0.95	*0.400*	*0.472*	*0.114*	*0.413*	*1.218*	*0.690*	*0.356*	*-0.109*
	gmwinter.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.001*
	snewinter.0.05	*0.000*	*-0.578*	*-0.605*	*-0.650*	*-0.705*	*-0.797*	*-0.804*	*-0.823*
0%	**snewinter.median**	**0.000**	**-0.489**	**-0.495**	**-0.547**	**-0.626**	**-0.736**	**-0.727**	**-0.751**
	snewinter.0.95	*0.000*	*-0.368*	*-0.341*	*-0.401*	*-0.461*	*-0.599*	*-0.533*	*-0.585*
	snewinter.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	snewinter.0.05	*0.100*	*-0.523*	*-0.535*	*-0.584*	*-0.666*	*-0.776*	*-0.784*	*-0.801*
10%	**snewinter.median**	**0.100**	**-0.419**	**-0.396**	**-0.452**	**-0.566**	**-0.702**	**-0.692**	**-0.719**
	snewinter.0.95	*0.100*	*-0.278*	*-0.192*	*-0.251*	*-0.331*	*-0.519*	*-0.430*	*-0.517*
	snewinter.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.024*
	snewinter.0.05	*0.200*	*-0.450*	*-0.435*	*-0.489*	*-0.618*	*-0.750*	*-0.759*	*-0.784*
20%	**snewinter.median**	**0.200**	**-0.327**	**-0.248**	**-0.308**	**-0.485**	**-0.658**	**-0.648**	**-0.690**
	snewinter.0.95	*0.200*	*-0.158*	*0.043*	*-0.006*	*-0.128*	*-0.400*	*-0.274*	*-0.456*
	snewinter.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.261*
	snewinter.0.05	*0.300*	*-0.352*	*-0.282*	*-0.342*	*-0.556*	*-0.719*	*-0.730*	*-0.774*
30%	**snewinter.median**	**0.300**	**-0.201**	**-0.005**	**-0.069**	**-0.374**	**-0.599**	**-0.591**	**-0.680**
	snewinter.0.95	*0.300*	*0.010*	*0.473*	*0.460*	*0.228*	*-0.212*	*-0.081*	*-0.433*
	snewinter.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.029*	*0.872*

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Mortality

	sneytail.0.05	*0.000*	*-0.817*	*-0.892*	*-0.845*	*-0.944*	*-0.965*	*-0.974*	*-0.979*
0%	**sneytail.median**	**0.000**	**-0.722**	**-0.793**	**-0.645**	**-0.828**	**-0.785**	**-0.873**	**-0.936**
	sneytail.0.95	*0.000*	*-0.569*	*-0.610*	*-0.544*	*-0.756*	*-0.373*	*-0.565*	*-0.713*
	sneytail.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	sneytail.0.05	*0.100*	*-0.797*	*-0.879*	*-0.836*	*-0.942*	*-0.964*	*-0.974*	*-0.979*
10%	**sneytail.median**	**0.100**	**-0.690**	**-0.767**	**-0.598**	**-0.809**	**-0.774**	**-0.868**	**-0.930**
	sneytail.0.95	*0.100*	*-0.518*	*-0.556*	*-0.477*	*-0.723*	*-0.274*	*-0.503*	*-0.686*
	sneytail.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.001*
	sneytail.0.05	*0.200*	*-0.770*	*-0.862*	*-0.826*	*-0.940*	*-0.964*	*-0.974*	*-0.978*
20%	**sneytail.median**	**0.200**	**-0.649**	**-0.734**	**-0.536**	**-0.785**	**-0.759**	**-0.864**	**-0.926**
	sneytail.0.95	*0.200*	*-0.452*	*-0.485*	*-0.386*	*-0.679*	*-0.151*	*-0.432*	*-0.644*
	sneytail.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.002*	*0.006*	*0.006*
	sneytail.0.05	*0.300*	*-0.736*	*-0.841*	*-0.815*	*-0.938*	*-0.965*	*-0.974*	*-0.979*
30%	**sneytail.median**	**0.300**	**-0.596**	**-0.690**	**-0.453**	**-0.755**	**-0.751**	**-0.852**	**-0.924**
	sneytail.0.95	*0.300*	*-0.366*	*-0.387*	*-0.256*	*-0.617*	*0.040*	*-0.358*	*-0.600*
	sneytail.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.016*	*0.033*	*0.027*
	sneytail.0.05	*0.400*	*-0.691*	*-0.812*	*-0.802*	*-0.936*	*-0.965*	*-0.974*	*-0.979*
40%	**sneytail.median**	**0.400**	**-0.524**	**-0.628**	**-0.333**	**-0.717**	**-0.738**	**-0.855**	**-0.924**
	sneytail.0.95	*0.400*	*-0.249*	*-0.243*	*-0.058*	*-0.527*	*0.261*	*-0.266*	*-0.566*
	sneytail.zero.rel.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.002*	*0.110*	*0.125*	*0.130*
	witch.0.05	*0.000*	*-0.619*	*-0.714*	*-0.830*	*-0.863*	*-0.893*	*-0.910*	*-0.837*
0%	**witch.median**	**0.000**	**-0.487**	**-0.598**	**-0.777**	**-0.811**	**-0.857**	**-0.875**	**-0.735**
	witch.0.95	*0.000*	*-0.277*	*-0.430*	*-0.686*	*-0.730*	*-0.798*	*-0.821*	*-0.486*
	witch.zero.rel.pro.failed	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	witch.0.05	*0.100*	*-0.573*	*-0.673*	*-0.805*	*-0.840*	*-0.876*	*-0.896*	*-0.802*
10%	**witch.median**	**0.100**	**-0.422**	**-0.533**	**-0.740**	**-0.776**	**-0.832**	**-0.853**	**-0.655**
	witch.0.95	*0.100*	*-0.182*	*-0.327*	*-0.627*	*-0.669*	*-0.756*	*-0.782*	*-0.183*
	witch.zero.rel.pro.failed	*0.100*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
	witch.0.05	*0.200*	*-0.513*	*-0.617*	*-0.770*	*-0.809*	*-0.852*	*-0.876*	*-0.750*
20%	**witch.median**	**0.200**	**-0.339**	**-0.445**	**-0.689**	**-0.725**	**-0.795**	**-0.821**	**-0.508**
	witch.0.95	*0.200*	*-0.058*	*-0.180*	*-0.541*	*-0.576*	*-0.691*	*-0.721*	*0.739*
	witch.zero.rel.pro.failed	*0.200*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*
	witch.0.05	*0.300*	*-0.435*	*-0.538*	*-0.720*	*-0.762*	*-0.817*	*-0.847*	*-0.662*
30%	**witch.median**	**0.300**	**-0.228**	**-0.315**	**-0.612**	**-0.645**	**-0.737**	**-0.770**	**-0.169**
	witch.0.95	*0.300*	*0.111*	*0.048*	*-0.404*	*-0.411*	*-0.577*	*-0.615*	*4.263*
	witch.zero.rel.pro.failed	*0.300*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.023*
	witch.0.05	*0.400*	*-0.327*	*-0.419*	*-0.642*	*-0.685*	*-0.759*	*-0.800*	*-0.483*
40%	**witch.median**	**0.400**	**-0.072**	**-0.107**	**-0.486**	**-0.498**	**-0.634**	**-0.679**	**0.874**
	witch.0.95	*0.400*	*0.356*	*0.454*	*-0.153*	*-0.042*	*-0.340*	*-0.378*	*13.854*
	witch.zero.pro.failed	*0.400*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.156*

Attachment (g)

Stock	Min	Mean	Max
amerplaice	0.44	1.03	1.63
gbcod	-0.28	-0.01	0.31
gbwinter	-0.37	0.52	1.36
gbytail	0.99	3.91	8.63
gmcod	0.98	1.99	3.37
gmhaddock	2.80	4.96	7.82
gmwinter	1.94	2.68	4.35
snewinter	1.03	1.46	1.89
sneytail	4.27	7.94	11.39
witch	0.94	2.91	5.19

These values summarize the range and mean of the 6 calculated medians of Relative Error between the GARM3 catches and the F-projected catches.

Attachment (h)
Analysis of Survey-Based Method for Deriving Acceptable Biological Catch (ABC) for Groundfish Stocks for 2012-2014

Introduction

The proposed alternative method for deriving ABCs for groundfish stocks for 2012-2014 is based on two explicit assumptions:

1. The 2011 ABC was appropriate for short-term objectives
2. Surveys accurately represent stock trends

The following analyses focus on assumption (2).

A third implicit assumption is that ABCs change in the same direction and magnitude as changes in stock size. This was previously examined using GARM III projected ABCs and stock size and is generally valid for groundfish stocks.

Methods

Analysis (1) (spreadsheet sasquatch_eval,xls)

The first analysis compared GARM lll estimated biomass trends (both January 1 and mean biomass available) to NMFS spring and fall bottom trawl survey trends.

Consistent with the proposed ABC approach, an average annual change in biomass was calculated as:

(biomass year 4 – biomass year 1) / (biomass year 1) / 3

This was calculated over the entire available time series. In effect, a sliding window was used to calculate an annual average change in biomass over consecutive four year time periods. The calculation was performed for both January 1 and mean biomass, as these were deemed most consistent with the survey index.

For each survey, a three-year lagged average of the survey weight/tow was first calculated. For each survey, an average annual change in the survey index was calculated in the same manner as the change in biomass:

(3 yr survey average year 4 – 3 yr survey average yr 1) / (survey average yr 1) / 3

The resulting annual change for each survey was then averaged to get one value for each year.

The combined survey average annual change was compared to the biomass annual average change for each year to get a difference between the two. This was done in the same manner as the projection analyses performed by the APDT:

(biomass average annual change – combined survey average annual change)

A positive value indicates the survey change is under-estimating the relative biomass change as compared to the assessment. Over time, this would lead to the survey under-estimating biomass and as a result the ABC. A negative value indicates the survey over-estimates the biomass change. Over time, this would lead to an over-estimate of the biomass change and as a result an over-estimate of the correct ABC..

Once a value was determined for each year, the results were summarized over the entire time series. The average difference, median, 5th, and 95th percentiles were calculated and are shown in Table 4. In addition, these values were plotted in Figure 1.

In addition, the results were examined to determine how often the direction of change (positive or negative) indicated by the survey matched the direction of change from the assessment biomass. Direction was modeled as a binomial distribution with two choices (positive or negative), each with an equal probability. The number of times the direction matched was examined to determine if it was statistically different from a null hypothesis that the distribution was random.

Analysis 2 (spreadsheet sasquatch_second_test)

Analysis (1) tests whether the survey trends match the biomass trends. But the application of the proposed ABC method does not quite match the way that analysis was performed. The proposed application can be described most easily using the figure below.

Each survey is averaged over two three year periods, and then the average annual difference is calculated from those two surveys. The relative change in the ABC is calculated over a similar period. The two are compared to get an adjustment to the ABC that is applied to the ABC (2011 in this example) and then the ABC is held constant until 2014.

Year	3 yr avg	Survey Difference	ABC	ABC Difference	Adjustment
2005					
2006					
2007	average of 1 -3				
2008					
2009					
2010	average of 4 - 6				
2011					
2012					
2013					
2014					

The question this second analysis investigates is how often does the relative change in the survey match the change in biomass in the following four years (that is, the years the ABC adjustment would be made). The analysis was performed similarly to the first analysis. The main difference is that each survey period with an average annual change is compared to the average annual change in biomass for the following four years. For example, the average annual change in the survey for the years 1984 to 1987 is compared to the annual average change in biomass for years 1984 to 1988, 1984 to 1989, 1984 to 1990, and 1984 to 1991. Each survey year thus has four comparisons made so there are more observations four times as many observations as there are survey time periods. At the end of the time series, comparisons were only made if all four can be made (the last year analyzed is the survey period that ends seven years before the end of the time series).

Results for this second analysis are shown in Table 5 and Figure 2.

Discussion

The first analysis (Table 4, Figure 1) shows that for most stocks the median difference between biomass and survey annual average change is near 0 (+/- 5%), with the exception of GOM haddock where the survey tends to over-estimate stock size over time. For half the stocks the survey change direction matches the biomass change direction more often than would be expected by chance. The differences between the survey and biomass trends are large enough that if the survey is used to adjust ABCs significant errors could occur. The results of the second analysis are similar, but there is a slight improvement in how often the survey trend matches the biomass trend.

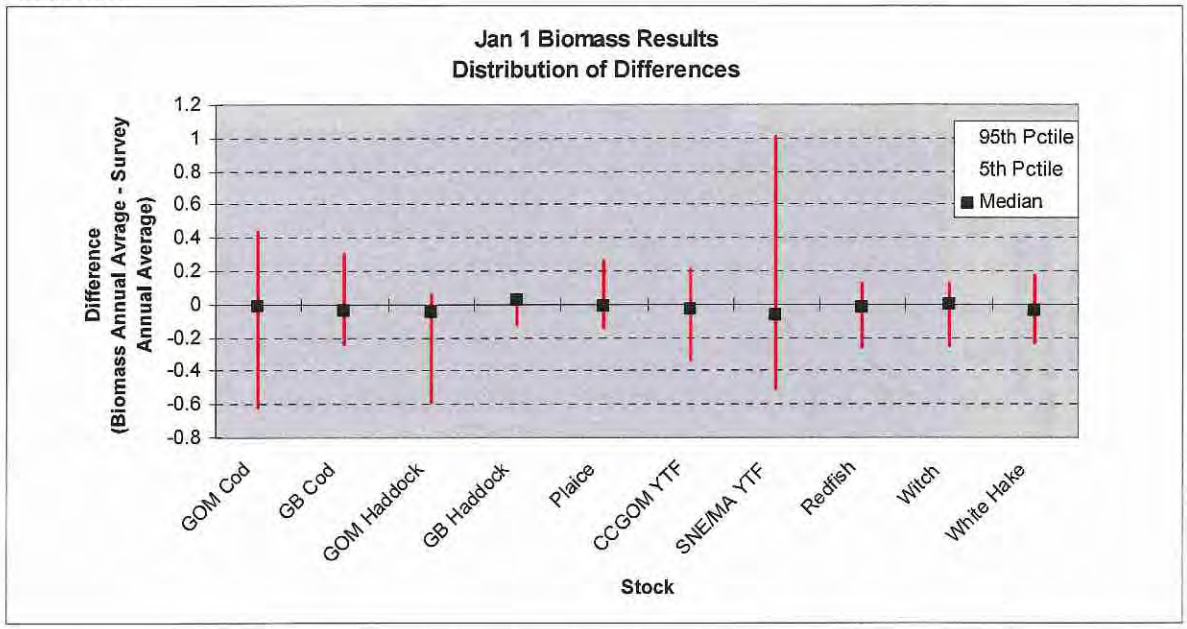
Table 4 – Results of first analysis of proposed survey method for setting ABCs. A negative value indicates the survey is over-estimating biomass. See text for details.

	Biomass Jan 1					Mean Biomass				
	95th Pctile	5th Pctile	Median	Average	Sign Significance	95th Pctile	5th Pctile	Median	Average	Sign Significance
GOM Cod	0.44	-0.62	-0.01	0		0.55	-0.68	0	0	
GB Cod	0.3	-0.24	-0.04	-0.03		0.22	-0.28	-0.03	-0.03	
GOM Haddock	0.06	-0.59	-0.05	-0.12	**	0.26	-0.53	-0.08	-0.12	**
GB Haddock	0.06	-0.12	0.03	0.03	**	0.26	-0.24	-0.01	0.01	**
Plaice	0.26	-0.14	-0.01	0.02		0.31	-0.14	0.01	0.03	
CCGOM YTF	0.21	-0.33	-0.03	-0.04	**	0.28	-0.32	-0.05	-0.04	
SNE/MA YTF	1.01	-0.51	-0.07	0.02		1.13	-0.55	-0.04	0.03	*
Redfish	0.13	-0.26	-0.02	-0.05	**					
Witch	0.13	-0.25	0	-0.02	*	0.16	-0.25	0	-0.02	*
White Hake	0.17	-0.23	-0.04	-0.02						

Table 5 – Results of second analysis of proposed survey method for setting ABCs. See text for details.

	Biomass Jan 1					Mean Biomass				
	95th Pctile	5th Pctile	Median	Average	Sign Significance	95th Pctile	5th Pctile	Median	Average	Sign Significance
GOM Cod	0.24	-0.66	0	-0.08	**	0.25	-0.69	0	-0.07	*
GB Cod	0.16	-0.24	-0.02	-0.05		0.17	-0.22	-0.02	-0.03	
GOM Haddock	0.49	-0.8	-0.02	-0.07	**	0.6	-0.83	-0.02	-0.07	**
GB Haddock	0.27	-0.33	0.07	0.00	**	0.39	-0.35	0.08	0.02	**
Plaice	0.18	-0.14	-0.02	-0.01		0.18	-0.13	-0.04	-0.01	
CCGOM YTF	0.09	-0.52	-0.04	-0.11	**	0.13	-0.54	-0.04	-0.13	
SNE/MA YTF	0.49	-0.7	-0.05	-0.08		0.52	-0.71	-0.05	-0.09	
Redfish	0.3	-0.19	0	0.02	**					
Witch	0.17	-0.31	0.02	-0.01	**	0.18	-0.31	0.01	-0.01	**
White Hake	0.13	-0.31	-0.02	-0.05	**					

Figure 1 – Difference between average annual change in biomass and annual average change in survey for Analysis (1)



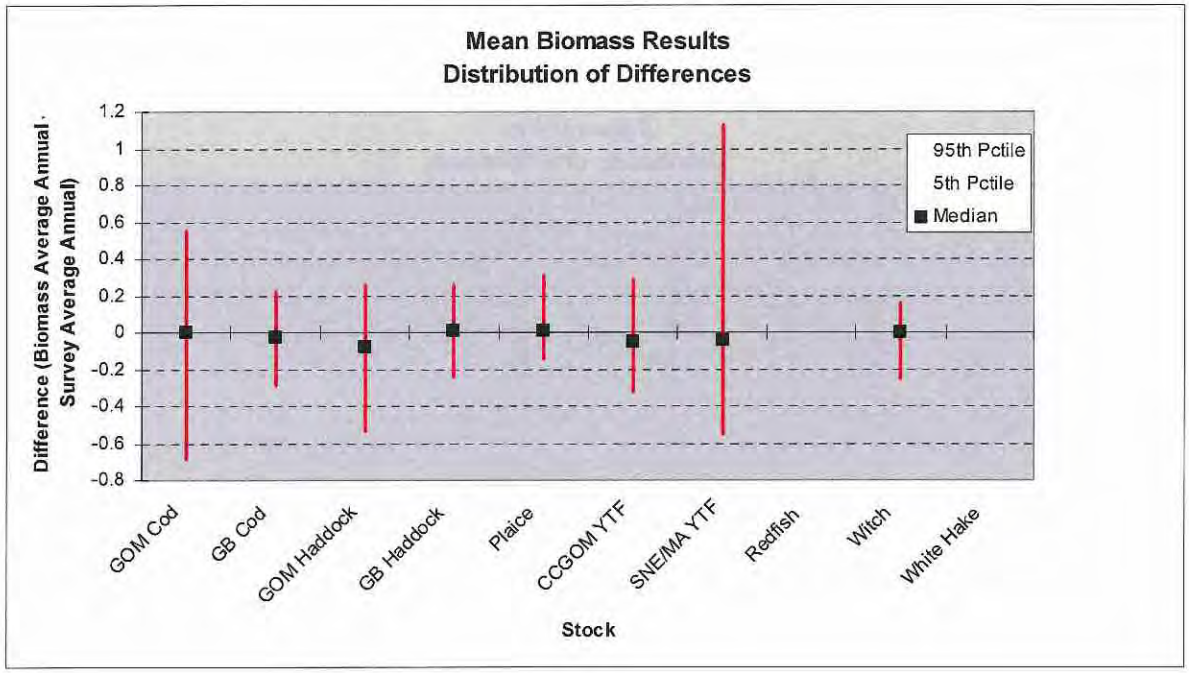
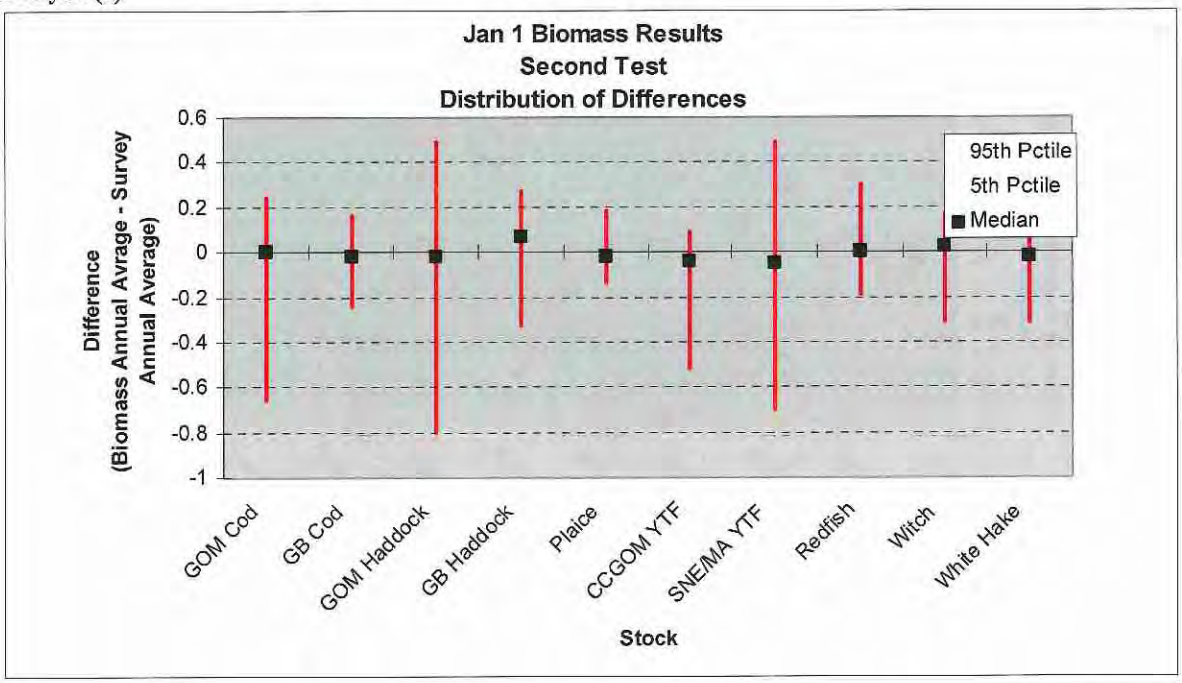
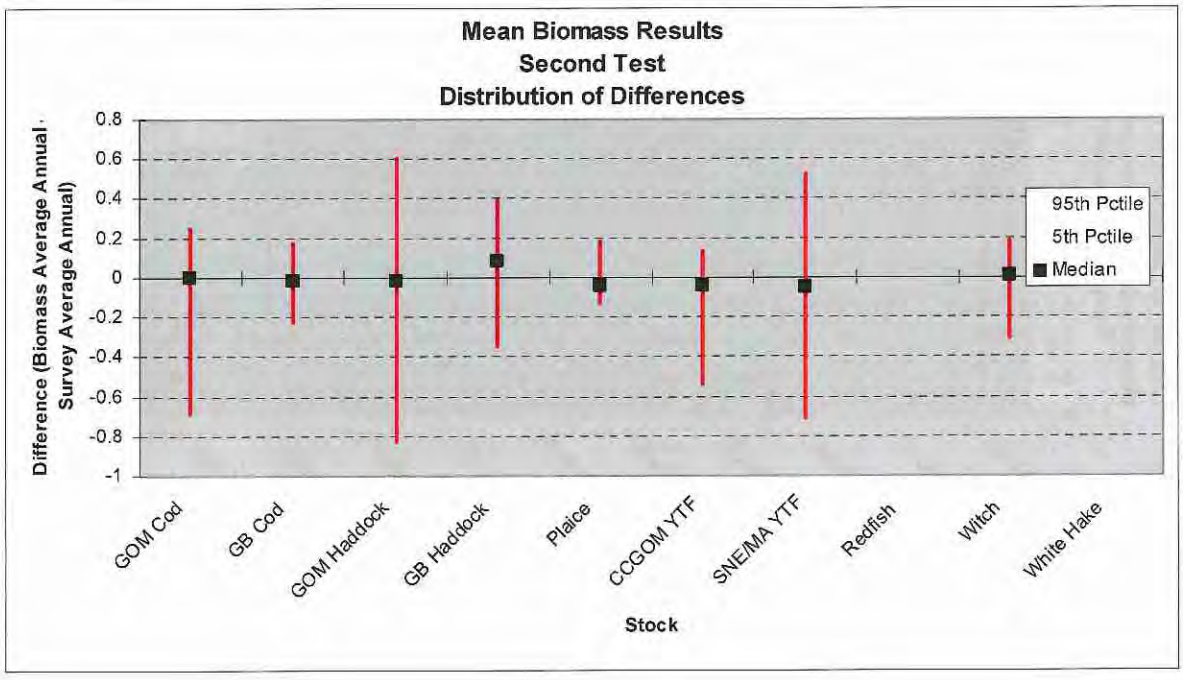


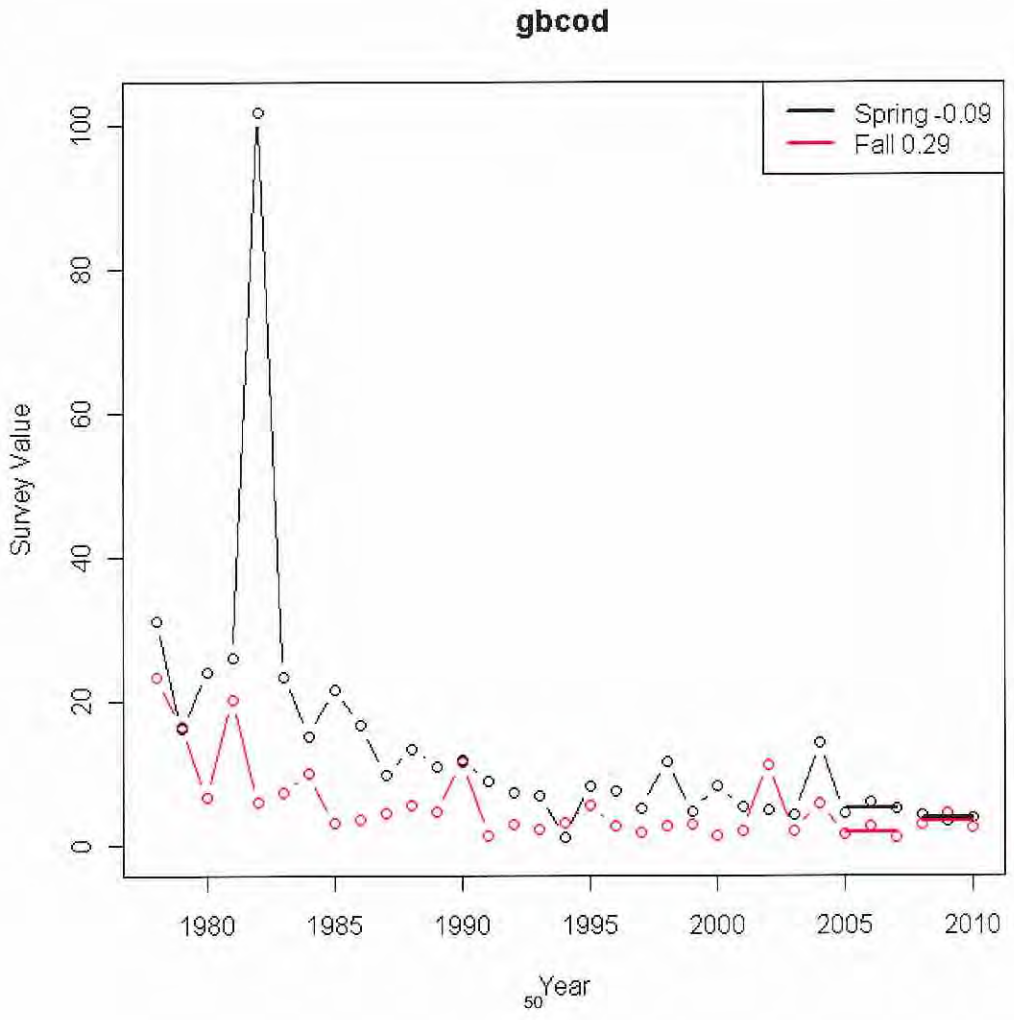
Figure 2 - Difference between average annual change in biomass and annual average change in survey for Analysis (2)





Attachment (i)
Survey Indices

- Following charts show the NEFSC spring and fall bottom trawl survey results for groundfish stocks. Standardize weight/tow values are plotted after applying appropriate calibration factors
- The three-year lagged average for 2007 and 2010 are plotted as horizontal lines
- Figures in the upper right are the annual average change between the three year averages


gbcod
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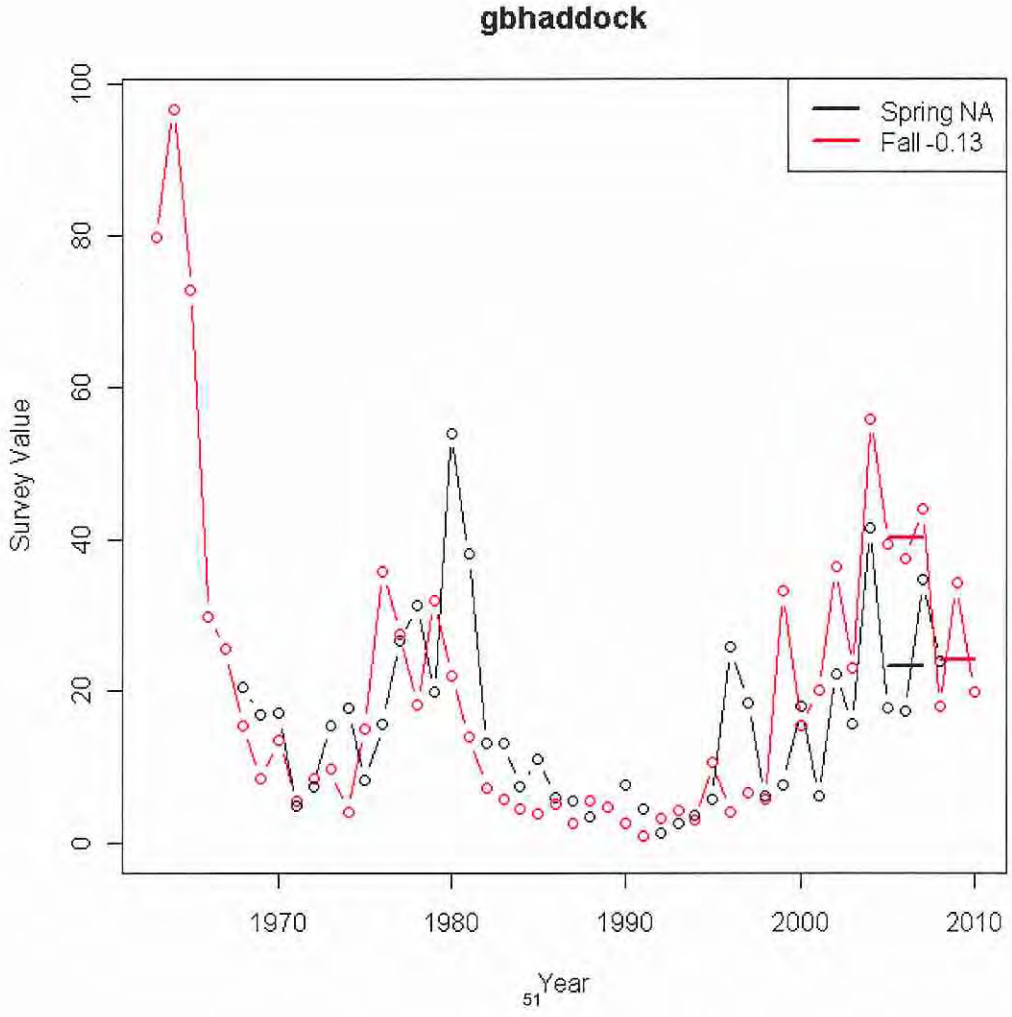
Fall 0.29
Survey Value
0
20
40
60
80
100
1980
1985
1990
1995
2000
2005
2010
Year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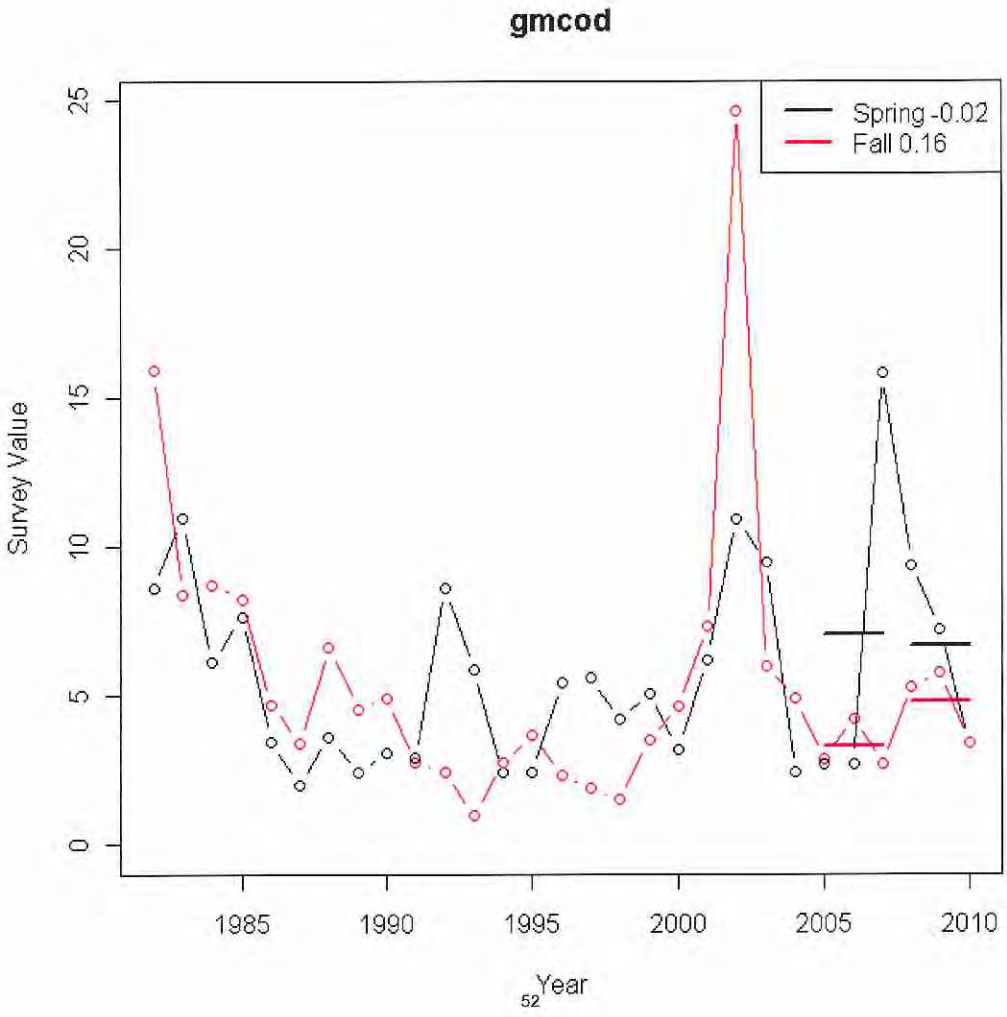
Fall -0.13
Survey Value
0
20
40
60
80
100
1970
1980
1990
2000
2010
Year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Spring -0.02
Fall 0.16
Survey Value
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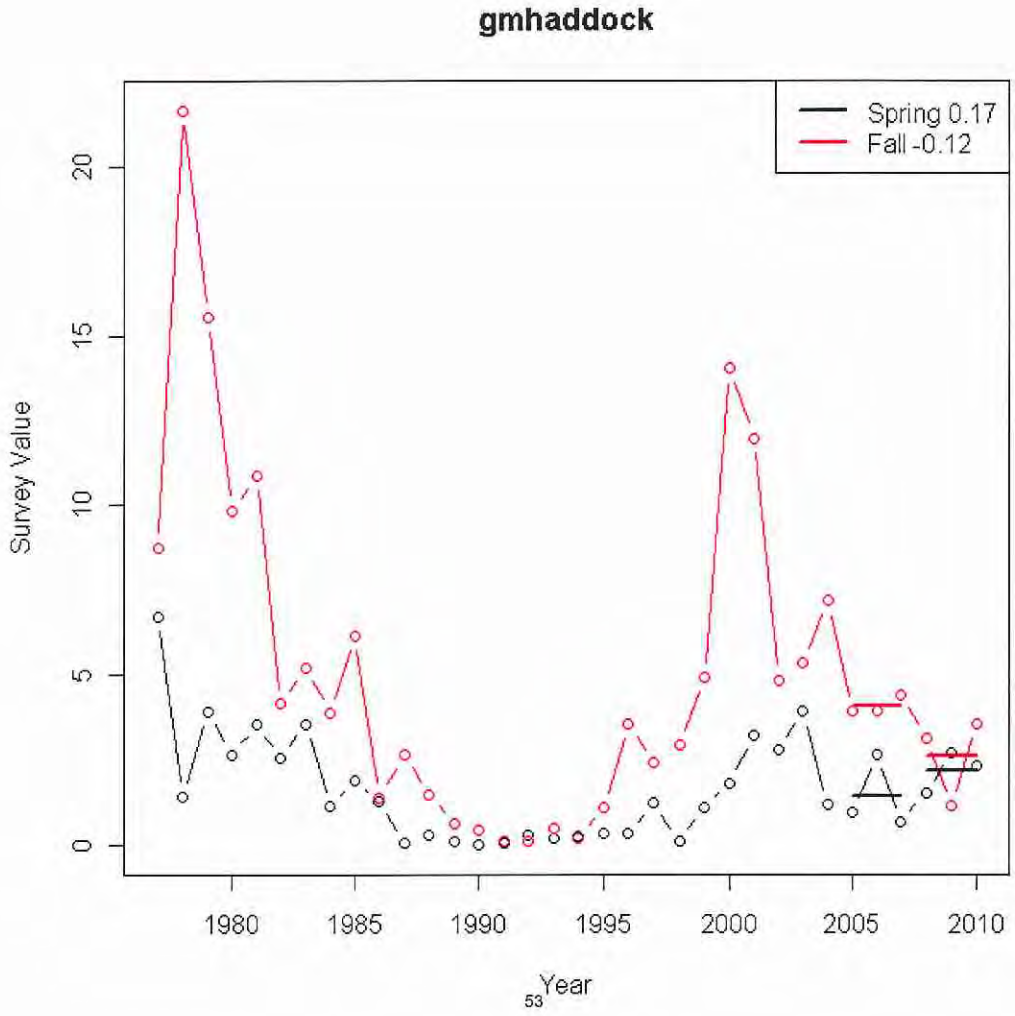
5
10
15
20
25
1985
1990
1995
2000
2005
2010
Year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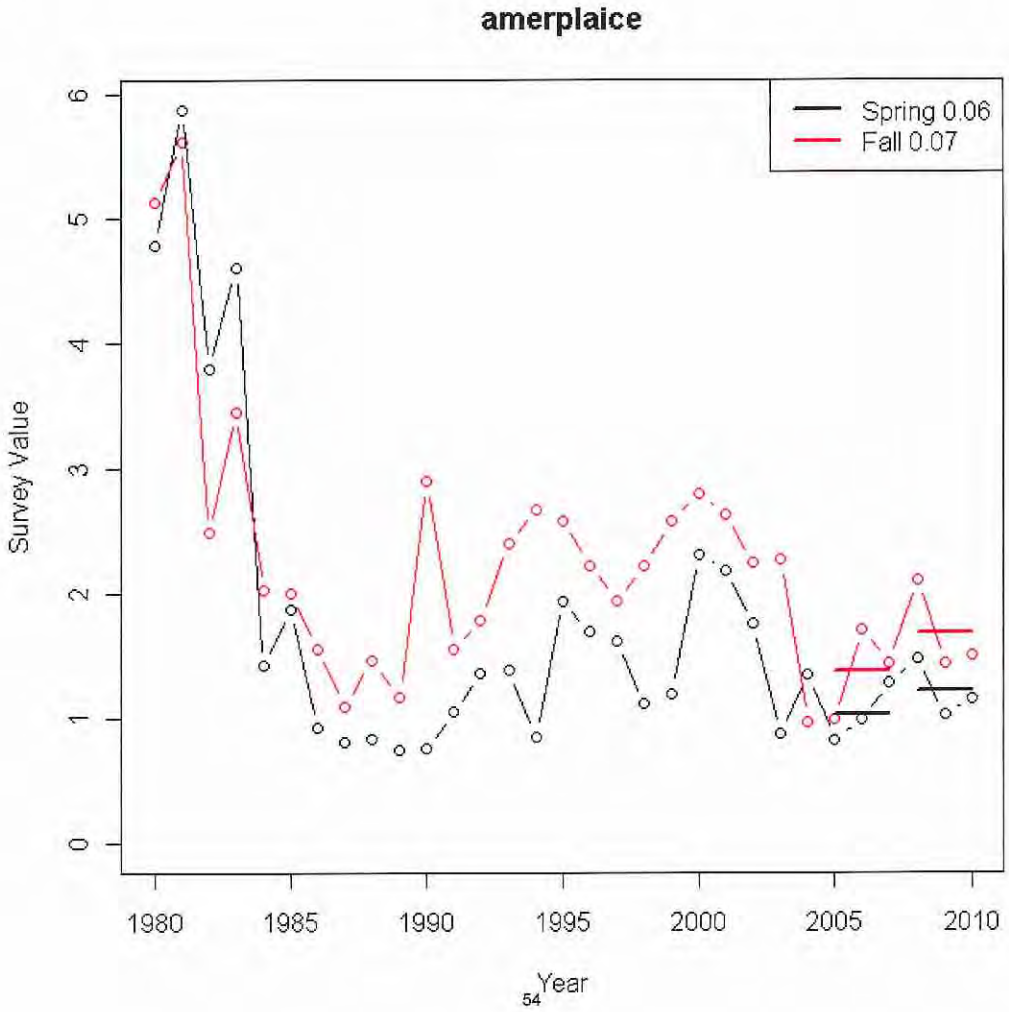
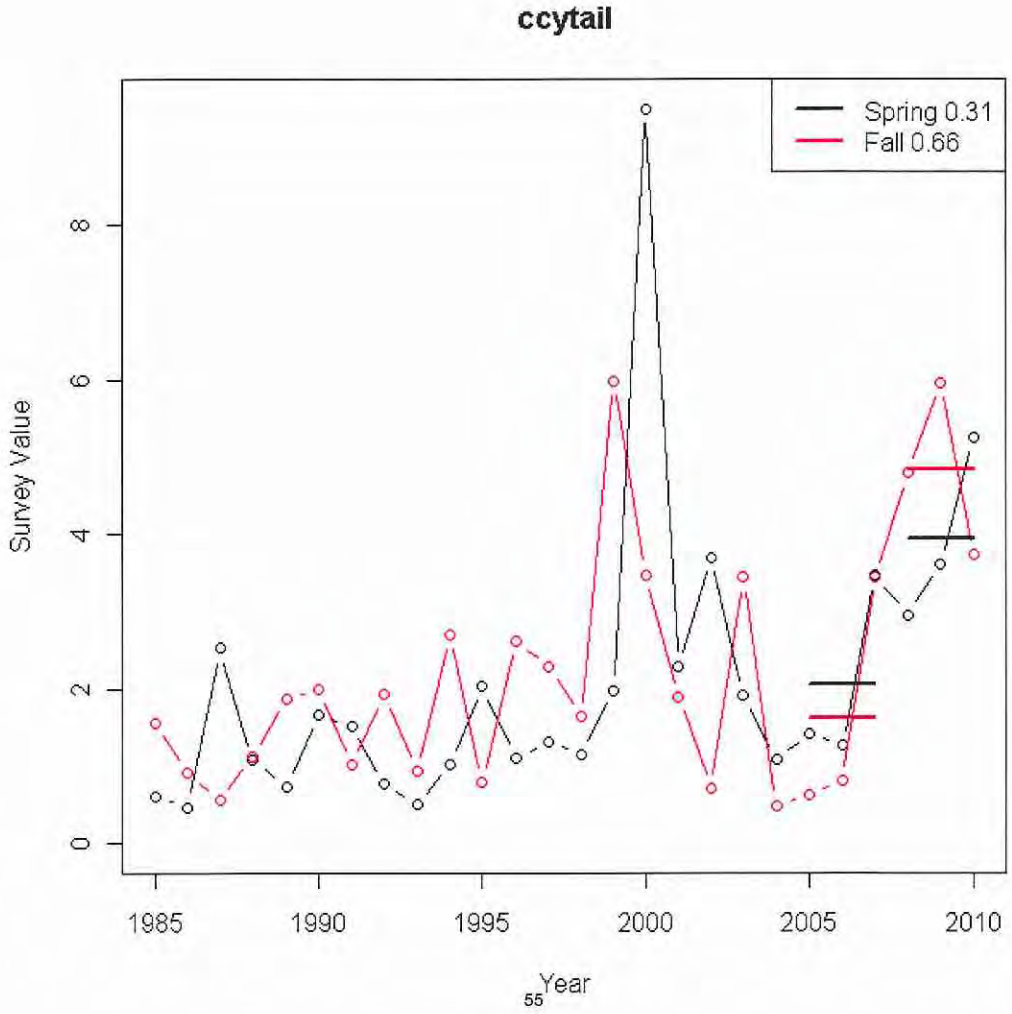
10
15
20
1980
1985
1990
1995
2000
2005
2010
Year


amerplaice
Spring 0.06
Fall 0.07
Survey Value
0
1
2
3
4
5
6
1980
1985
1990
1995
2000
2005
2010
Year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Spring 0.31
Fall 0.66
Survey Value
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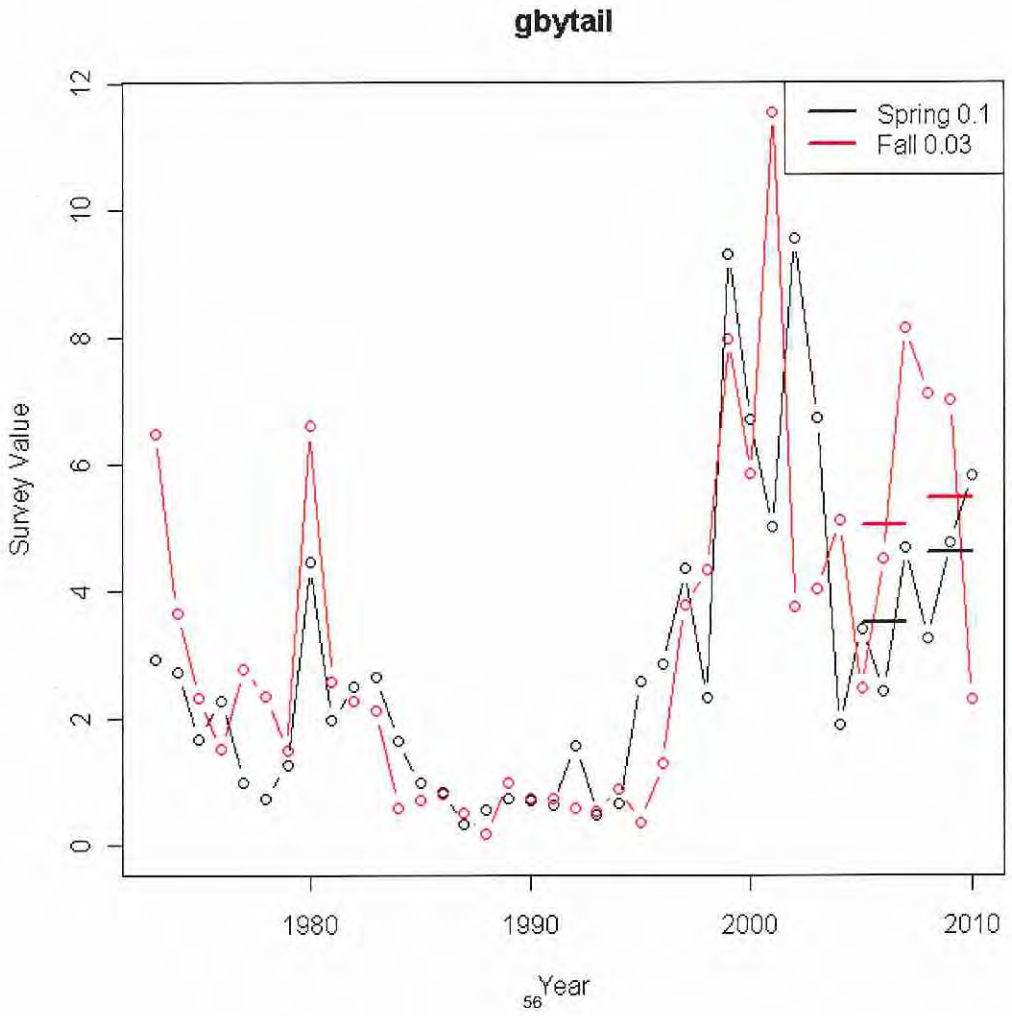
2
4
6
8
1985
1990
1995
2000
2005
2010
Year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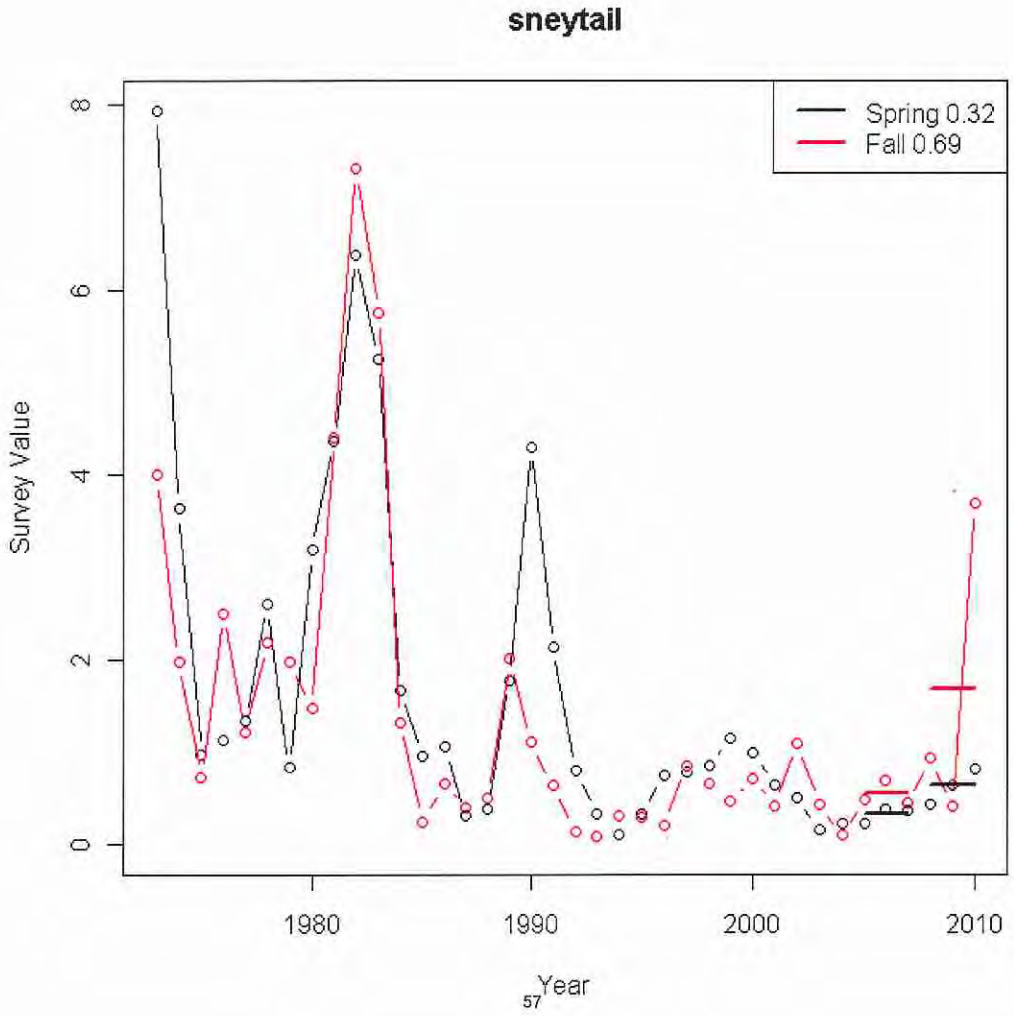
2
4
6
8
10
12
1980
1990
2000
2010
Year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Fall 0.69
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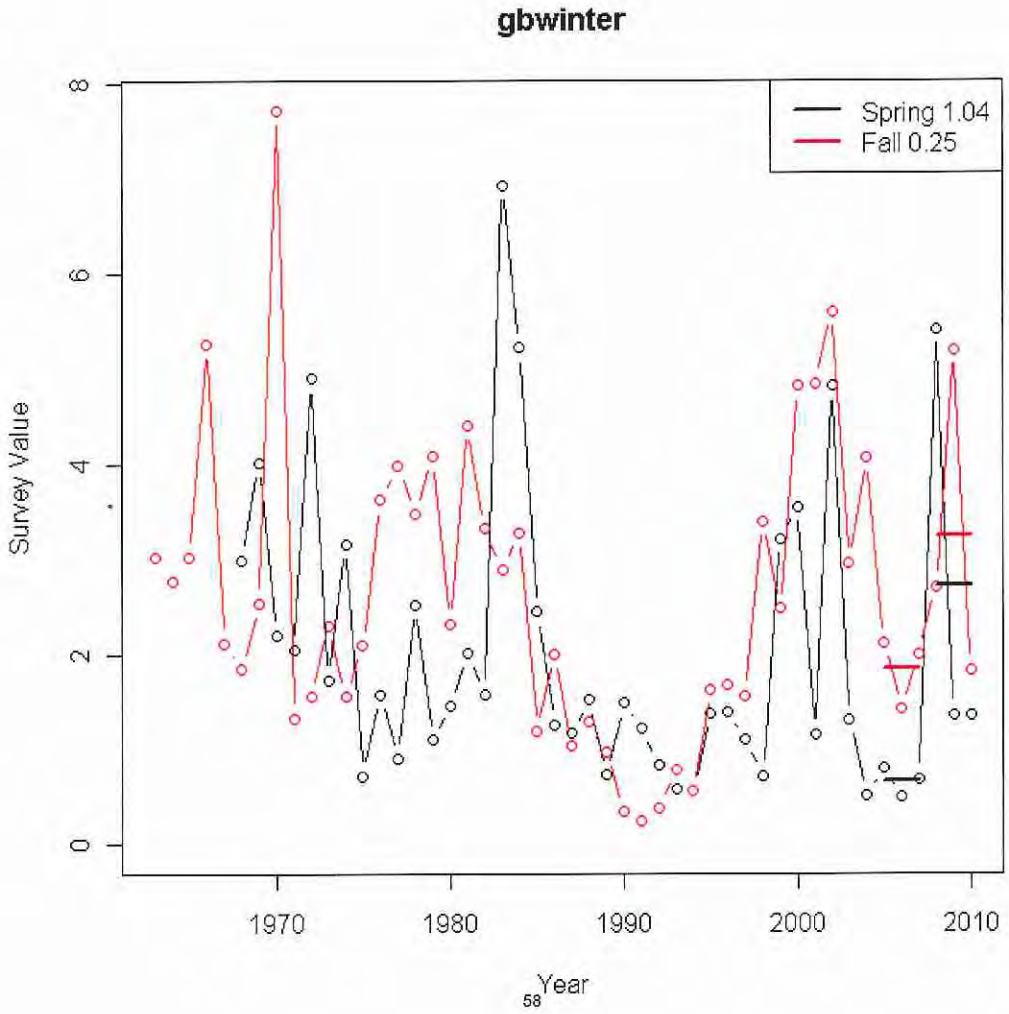
4
6
8
1980
1990
2000
2010
Year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Fall 0.25
Survey Value
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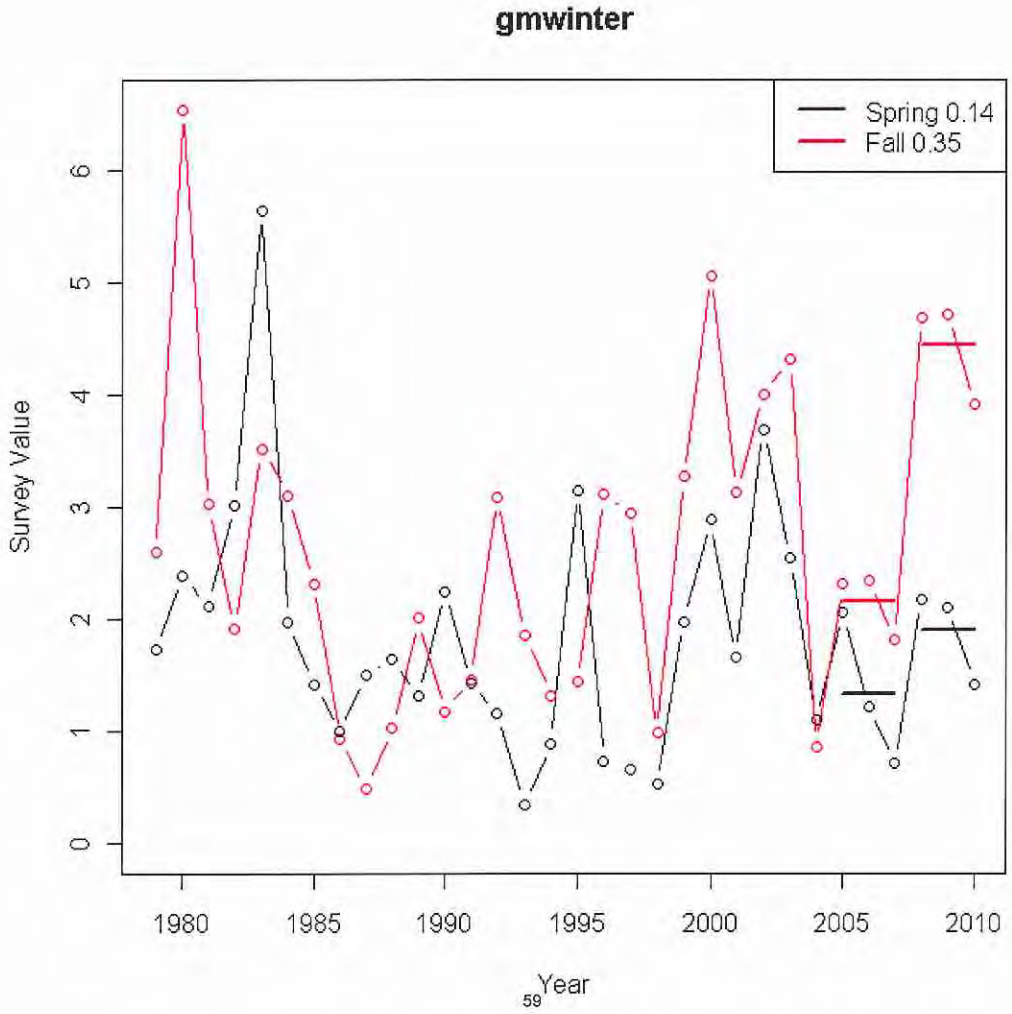
2
4
6
8
1970
1980
1990
2000
2010
Year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Survey Value
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1980
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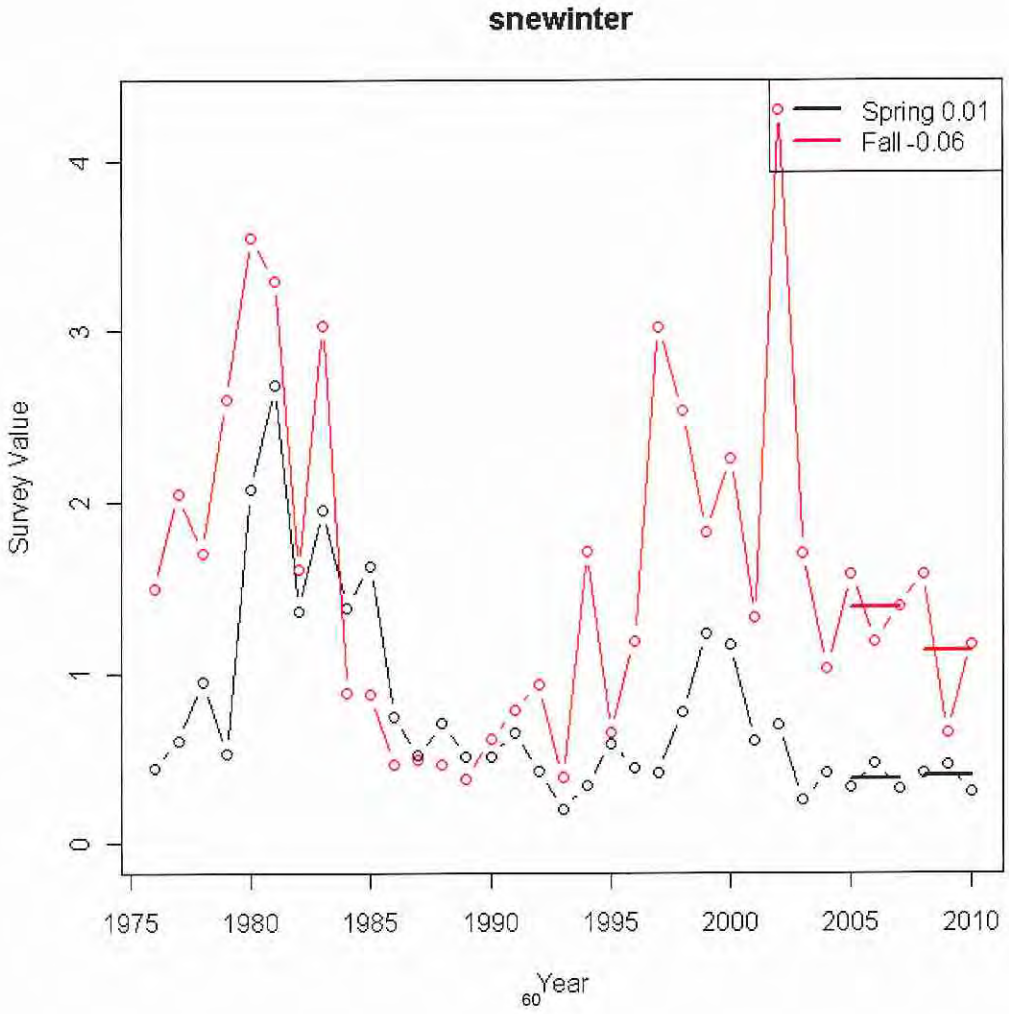
2000
2005
2010
Year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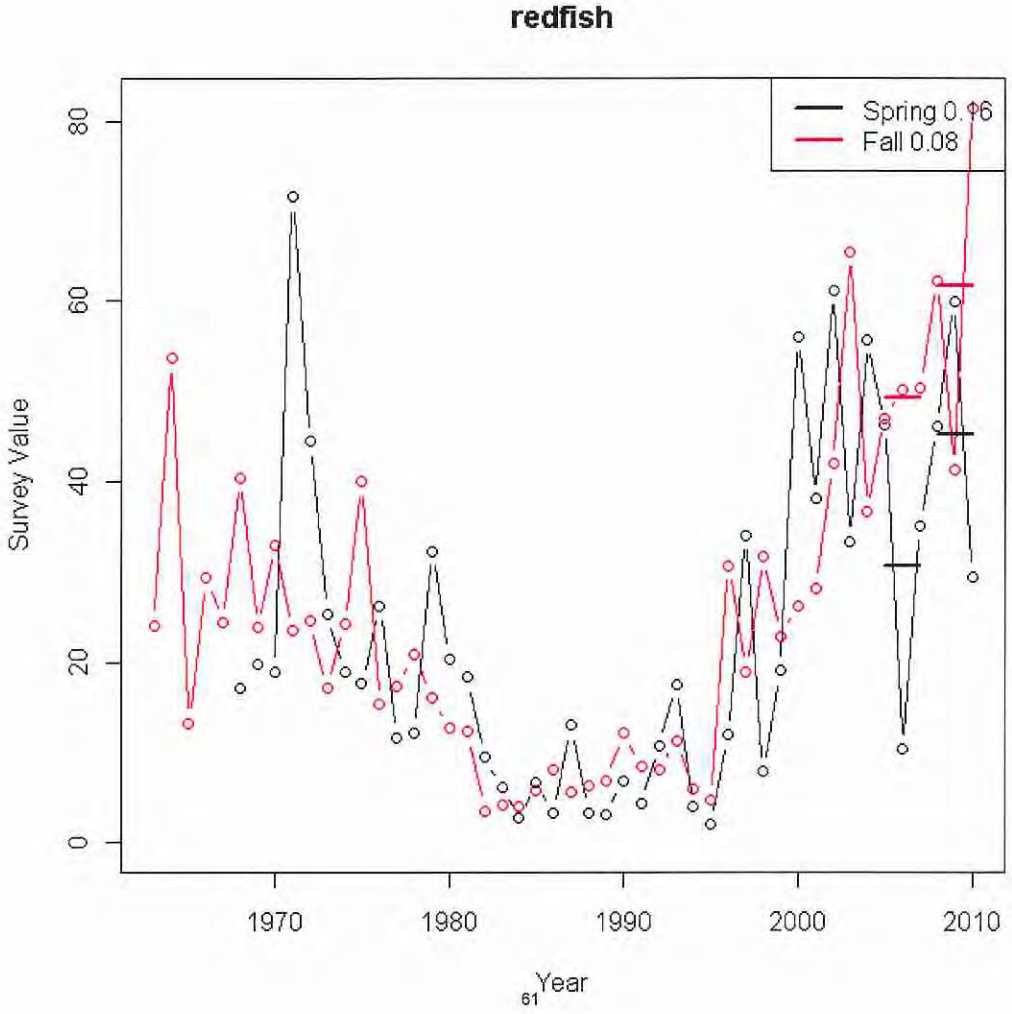
2
3
4
1975
1980
1985
1990
1995
2000
2005
2010
Year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Fall 0.08
Survey Value
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20
40
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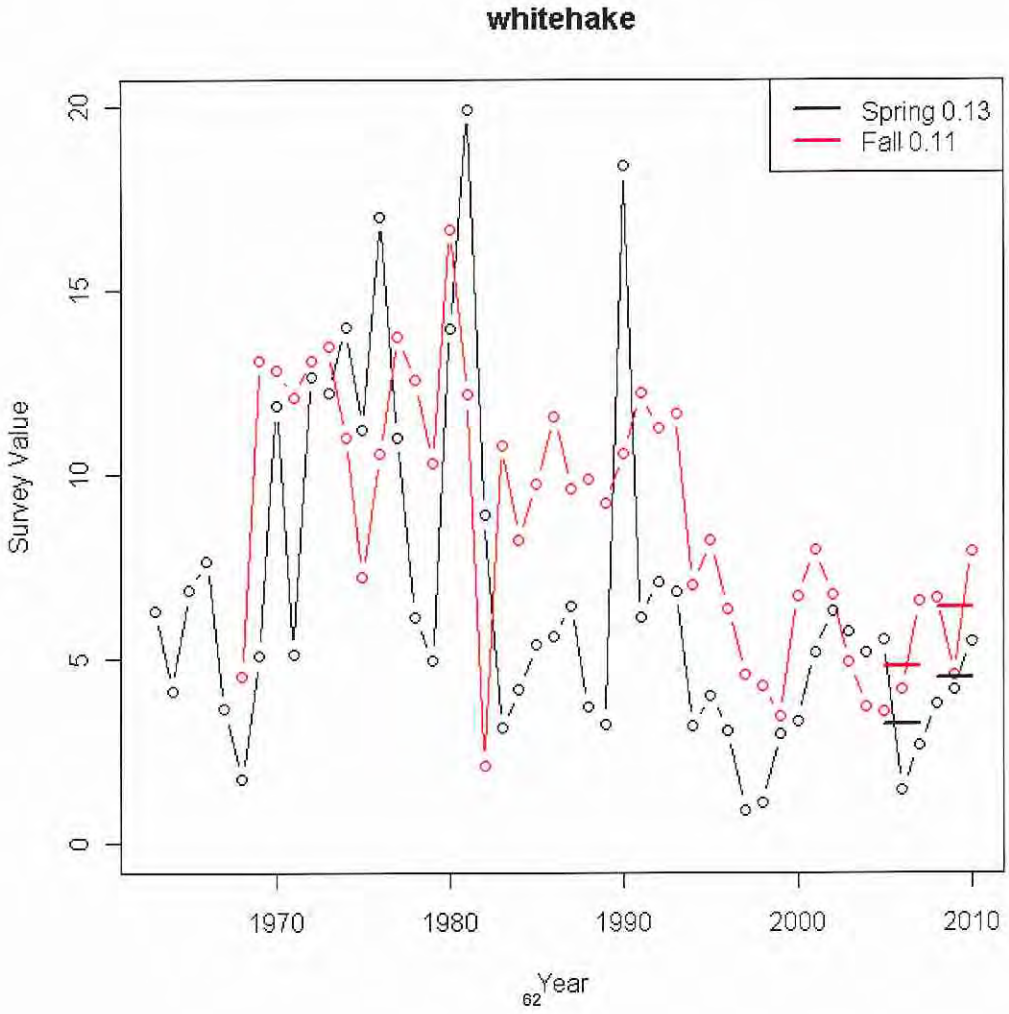
80
1970
1980
1990
2000
2010
Year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Fall 0.11
Survey Value
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5
10
15
20
1970
1980
1990
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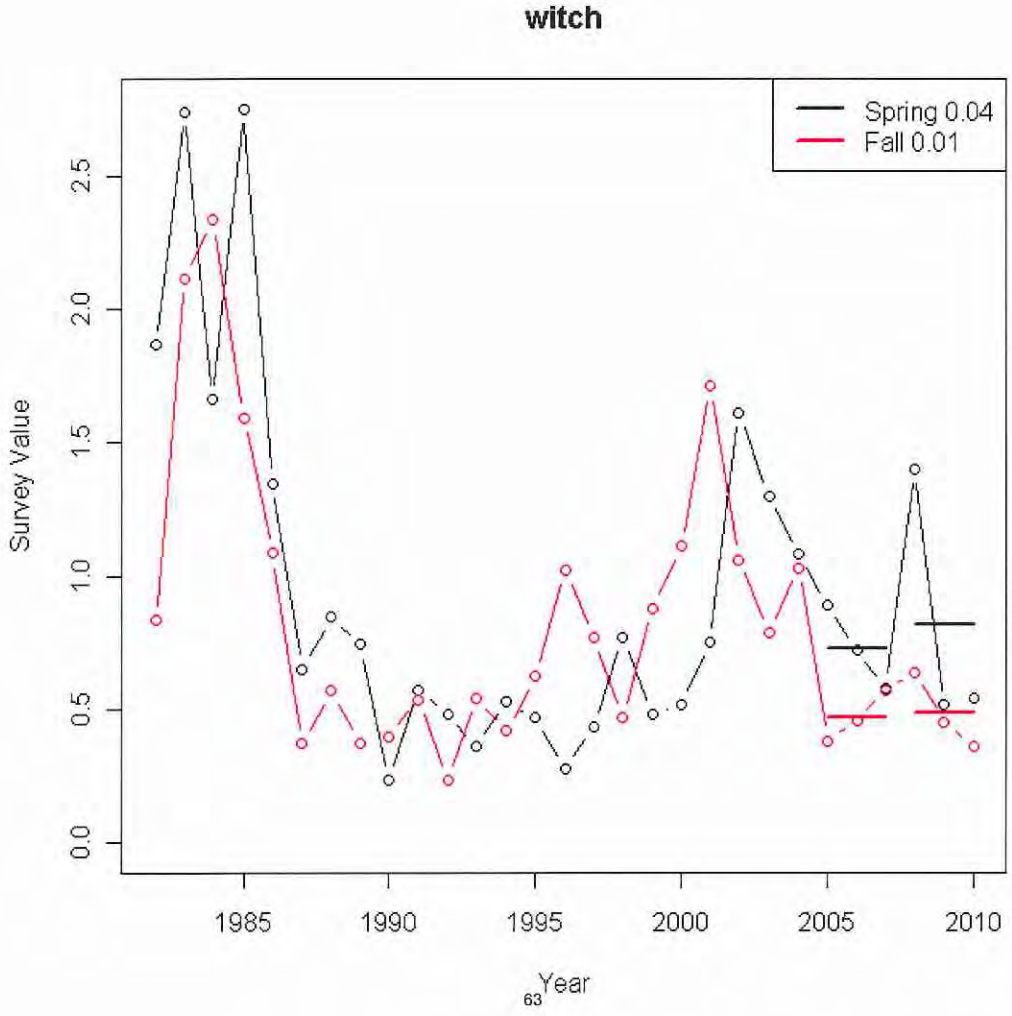
2010
Year


witch
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Fall 0.01
Survey Value
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1.5
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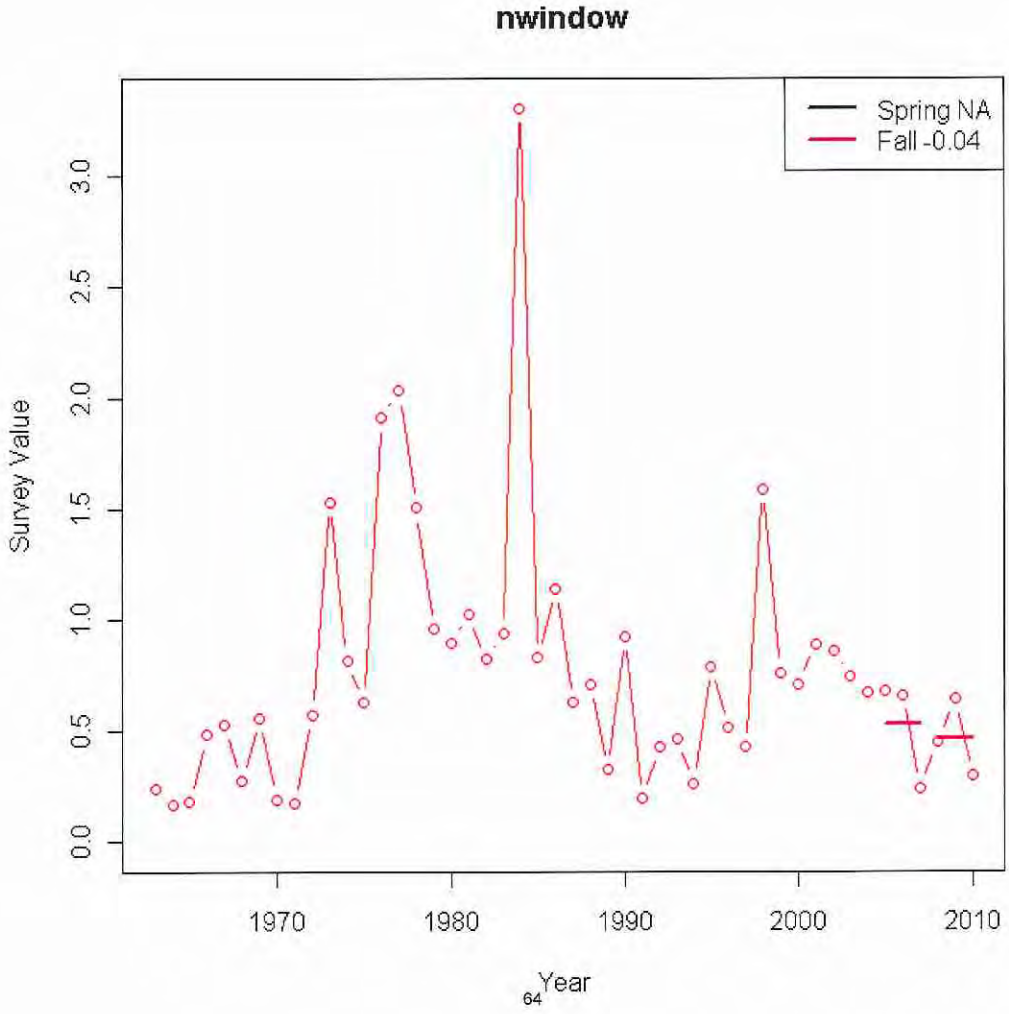
1990
1995
2000
2005
2010
Year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Fall -0.04
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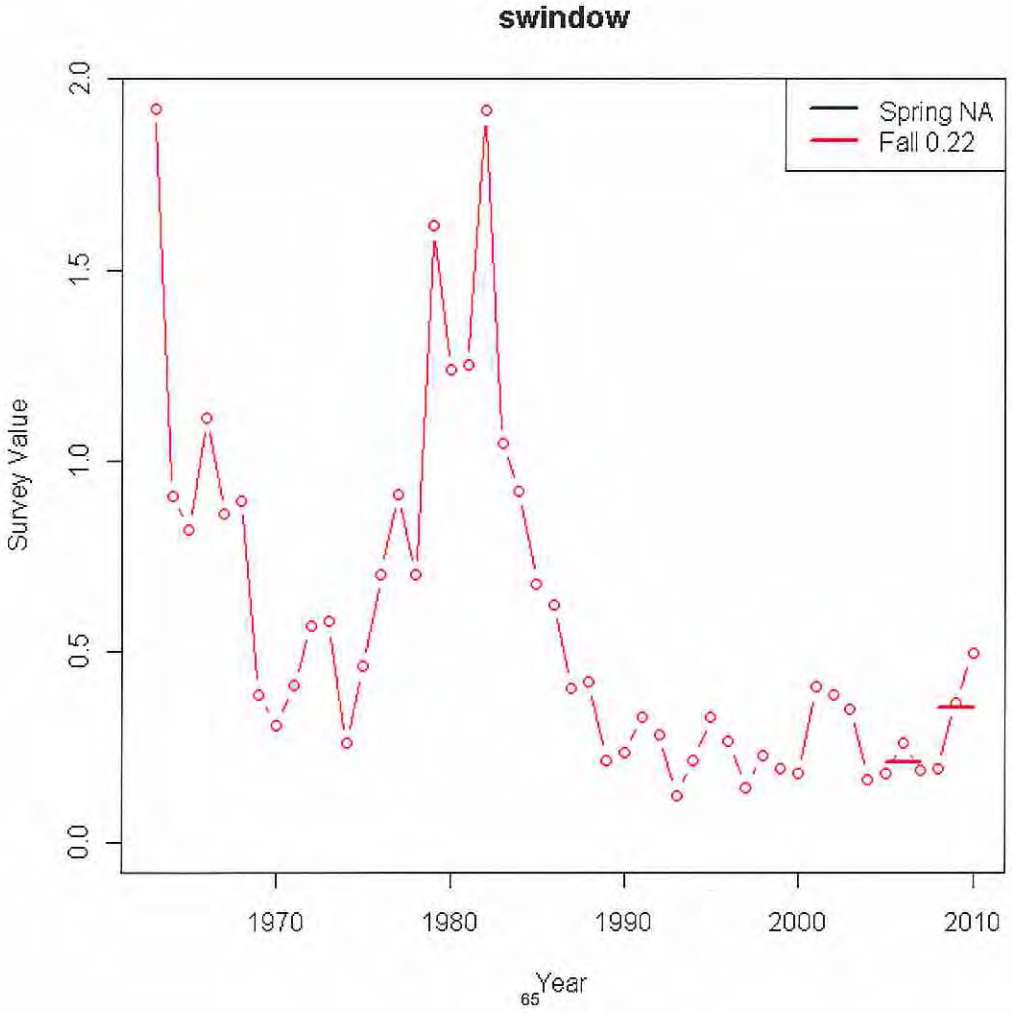
1990
2000
2010
Year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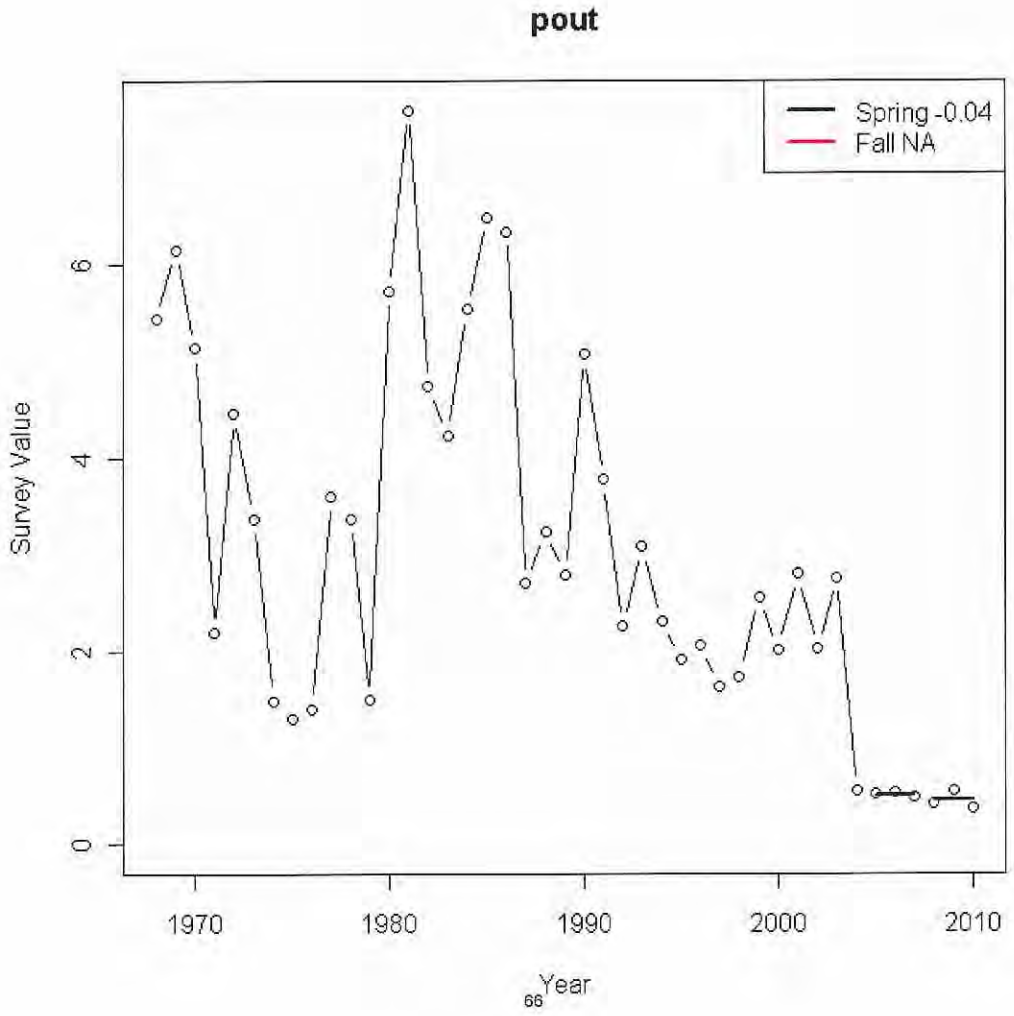
1980
1990
2000
2010
Year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Fall NA
Survey Value
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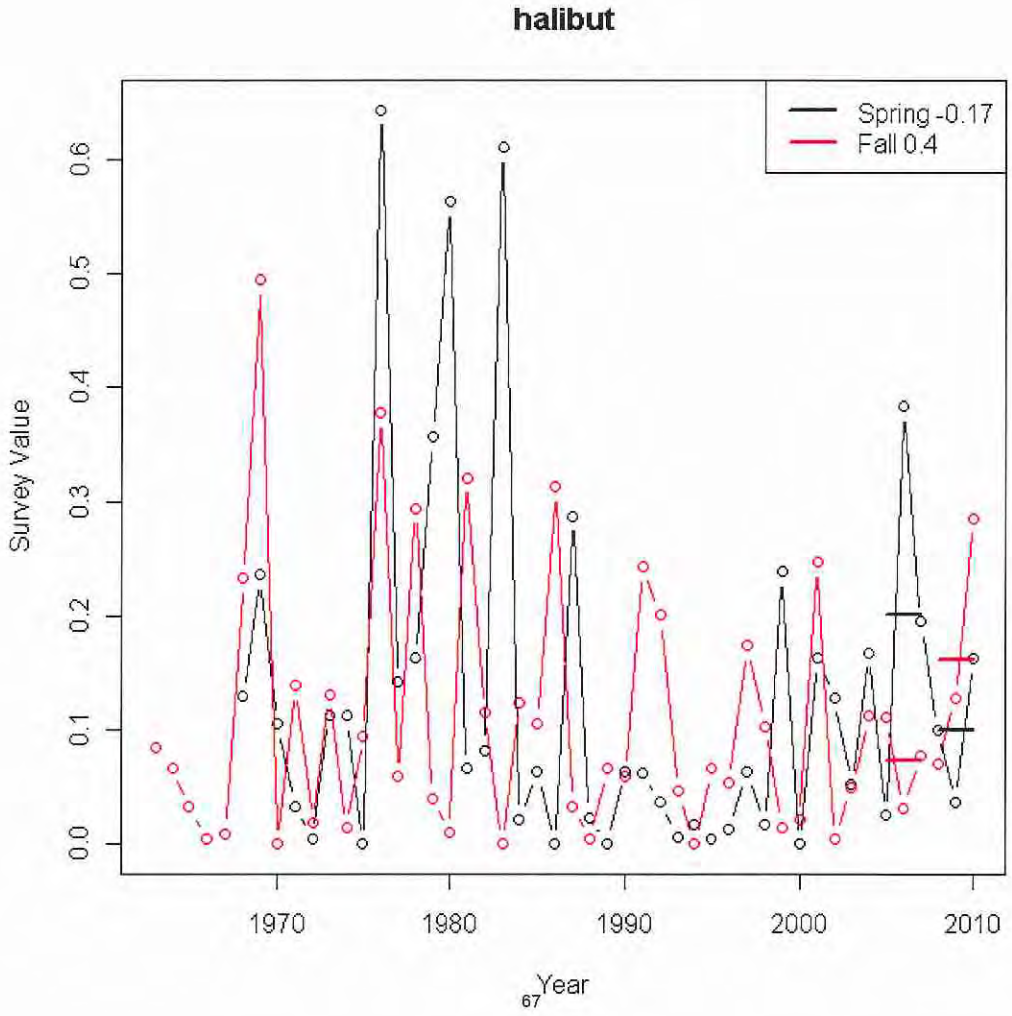
4
6
1970
1980
1990
2000
2010
Year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Fall 0.4
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0.6
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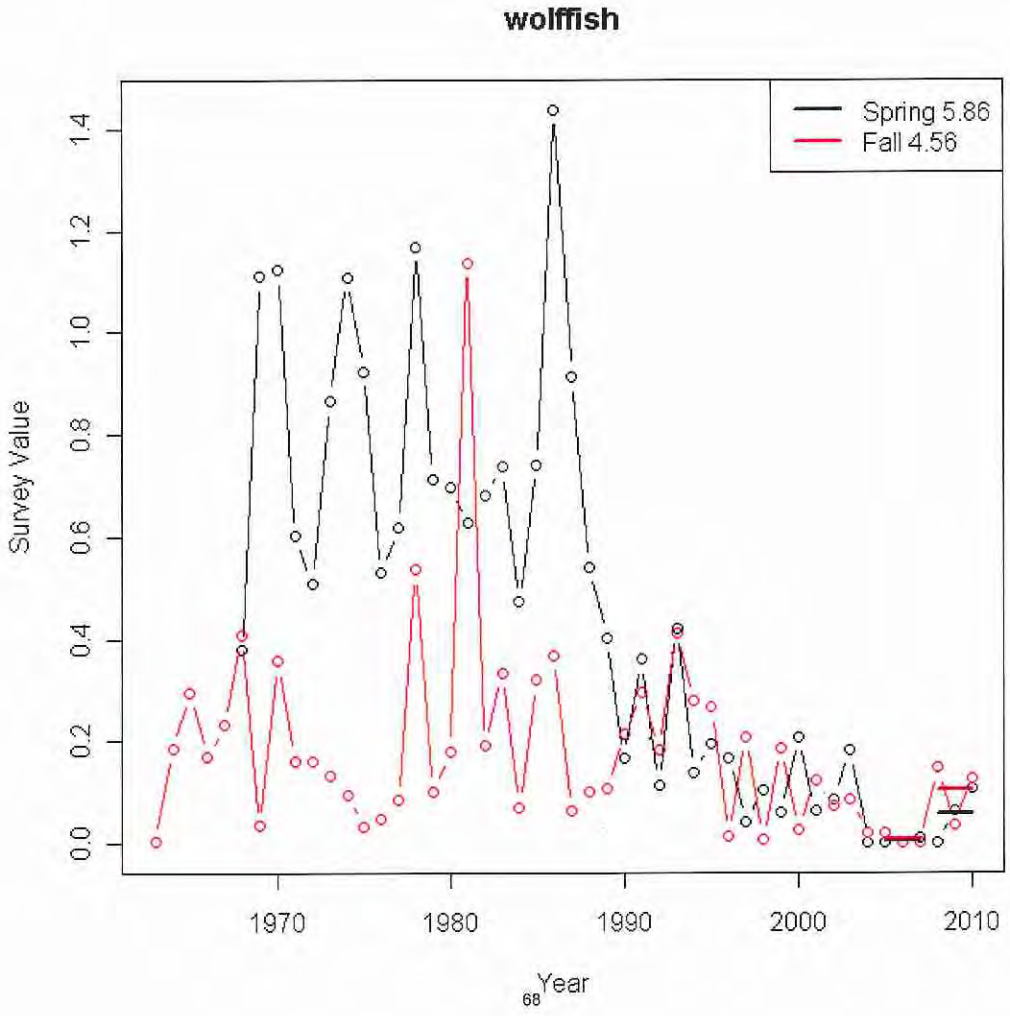
1980
1990
2000
2010
Year


wolffish
Spring 5.86
Fall 4.56
Survey Value
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1970
1980
1990
2000
2010
Year