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New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
John Pappalardo, *Chairman* | Paul J. Howard, *Executive Director*

MEMORANDUM

DATE: March 8, 2010

TO: Scientific and Statistical Committee (SSC)

FROM: Council

SUBJECT: Terms of Reference - Review of Skate ABC

The Council, at its January 26-28, 2010 meeting, requested that the SSC consider the data from the 2008 NMFS autumn bottom trawl survey in updating the ABC for the skate complex.

The Council submitted Final Amendment 3 to the NE Skate Complex FMP for approval in November 2009. A proposed rule was published on January 21, 2010 which includes the limits and measures described in the amendment including a 30,643 mt ABC, a 26% reduction in total catch.

The ACT is 75% of the ABC, or 22,982 mt and the total TAL is 9,427 mt after deducting 58% for dead discards and 3% for state water landings. Landings in 2009 were 5,059 mt of bait skate (mostly little skate) valued at $1.1 million and 12,706 mt of skate wings (mostly winter skate, converted to whole weight) valued at $5.6 million. Data to estimate 2009 discards are not yet available for analysis.

The deadline for comments on the proposed rule was February 22, 2010 and NMFS is considering these comments to issue a final rule. Implementation of the Amendment 3 measures is anticipated on May 1, 2010 at the beginning of the 2010 fishing year. Amendment 3 establishes a two-year specification process which would adjust the ABC and other skate limits for the 2012 fishing year. The Council would initiate this specification process with a SAFE Report to be delivered in June 2011.

Following the December 2008 Data Poor Assessment Workshop (DPWS), the SSC reviewed in February 2009 a revised model that re-estimated the effects of various exploitation rates on changes in skate biomass, determining that the median exploitation ratio was a suitable proxy for the basis of a skate ABC. Similar to the skate status determination procedure, the SSC recommended an ABC that was the product of the median exploitation ratio and the latest three-year survey biomass index average. The SSC also recommended using the latest three year average discard ratio for setting an ACT and skate TALs.

The Council subsequently approved the final amendment in April 2009, with an ACL framework that relied on the ABC approved by the SSC. During the development of the final amendment document, it was discovered that a missing value for the 2008 little skate index had been omitted from the original calculations and that the 2009 spring little skate biomass index which had been available to the DPWS had not been used. During a September 2009 SSC meeting, the SSC approved a revised Skate ABC that included the appropriate correction and update to the little skate biomass index. Thus, the ABC recommendation for 2010 and 2011 were based on survey data from the 2005-2007 fall survey and (for little skate) the 2006-2008 spring survey. The Council incorporated the new ABC into the final amendment document, which was submitted for approval in November 2009.

At the September 2009 SSC meeting, the fall 2008 survey indices (which apply to six of the seven skate species) and the appropriate ABC calculations were available. There were however concerns about the validity of a large increase in the winter skate biomass index, and the potential persistence of high winter skate biomass. The SSC decided to defer consideration of the fall 2008 survey indices until the data had been peer reviewed. It was unclear when this peer review would occur, but there was some thought that it would occur when the RV Bigelow calibrations were developed and a new specification process began.

Since then, the industry has become alarmed about the effect that the Amendment 3 skate limits will have. And since new data were available, the industry has asked the Council to expedite this review that had been deferred in September 2009. If the SSC approves a change in the Skate ABC, the 2010 and/or the 2011 ABC, the TALs, and potentially the skate possession limits could be adjusted by one of a variety of procedures.

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Term of Reference for SSC review of the fall 2008 skate biomass index for adjustment of the aggregate skate ABC:

Update the Skate Complex ABC, using the 2008 NMFS autumn bottom trawl survey for skates and the same basis for determining the ABC which the SSC approved on February 6, 2009.

****

The aggregate Skate ABC is a simple calculation of the sum of products of the median exploitation ratio and the three-year biomass index over all seven managed skate species. This value is reduced by 25% to account for uncertainty (ACT) and then assumed discards are deducted from the ACT to determine total allowable landings (TAL), allocated as a fixed ratio to the skate wing and bait fisheries.

The Skate PDT has examined the 2008 fall survey data to advise the SSC on the effects of including this data into the ABC value.

Documents:

1. March 8, 2010 Background and Terms of Reference memo
2. March 8, 2010 memo from Skate PDT on the 2008 fall survey data and the effect on a revised skate ABC.
3. September 23, 2009 memo from Dr. Steve Cadrin, SSC chair, to Mr. Paul Howard, "Correction to the 2010-2011 Acceptable Biological Catch (ABC) recommendation for the skate complex"

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MEMORANDUM

DATE: **March 8, 2010**

TO: Scientific and Statistical Committee

FROM: Skate PDT

SUBJECT: **Review of fall 2008 survey indices and effect on skate catch limits**

After closely examining and analyzing the 2008 survey data, particularly for the winter skate abundance and biomass index, the Skate PDT finds no scientific justification for excluding the fall 2008 index from the Skate ABC calculation. Unlike the 2008 survey data, the 2009 spring and fall surveys were conducted with the RV Bigelow using different trawl gear. Peer-reviewed calibrations are not yet available for examination of survey data beyond fall 2008.

The fall 2008 skate indices do not appear to be anomalous, despite the increase in the winter skate biomass index from 2.48 kg/tow in 2006 and 3.71 kg/tow in 2007 to 9.50 kg/tow in 2008 (the 5th highest in the 42 year time series), an increase that might occur due to a significant change in catchability, a large recruitment event, or a transient immigration of adult skates. There were also biomass increases for clearnose and little skates in 2008. Other surveys which are not used in the formal status determination and not used in the formal ABC calculation appear to corroborate the increase in the fall survey winter skate biomass index (Figure 1).

The PDT examined the following characteristics to make this determination about the validity of the 2008 survey data:

1. The survey indices are calculated by a standard program, SURVAN. This software has been well reviewed and is used to calculate survey indices for a very wide range of stocks in the NE Region.

2. The geographical distribution of survey tows with winter skates (Figure 2 and Figure 3) do not appear to be appreciably different than previous years.

3. The mean catch per tow by stratum appear to be relatively consistent with one another (Figure 4), i.e. there is not just one large stratum with an extraordinary tow that is generating the higher winter skate biomass index in 2008.

4. The variability of winter skate biomass in survey tows over all strata does not appear to have increased (Figure 5).

5. The size frequency of winter skates in the 2008 fall survey data appear to be mostly consistent with the 2007 data (Figure 6) when growth (Frisk and Miller 2006) and natural mortality (M=0.2) are taken into account, however there is a higher catch of 75-90 cm skates in 2008 than was predicted from 2007 length frequency data.

Although the winter skate biomass increased by a large amount, this increase is not unprecedented, occurring in 1982-1985. Frisk et al. (2008) concluded that the increase in winter skate biomass in the early 1980s was partially attributable to an influx of large winter skates from the Scotian Shelf, but based on US survey data these skates appeared to persist in US waters for several years. There appears to be some indication that the winter skates observed in the 2008 survey were larger than those predicted to grow from the 2007 survey distribution, hinting that a similar immigration of adult winter skates may have once again occurred.

The method for calculating the ABC was approved by the SSC in February 2009. The ABC is calculated as the sum of the product of the median catch/biomass ratio and the most recent three year average survey biomass. Including the fall 2008 survey, skate biomass indices in the three-year average calculations (and dropping the 2005 fall biomass) would increase the ABC from 30,643 mt to 41,080 mt (+34%), due primarily to the large increase in observed winter skate biomass.

Table 1. Amendment 3 catch limits (current) for the 2010 and 2011 fishing years, compared to potential adjustment using the fall 2008 survey data.

	Current	Updated
ABC/ACL	30,643	41,080
ACT	22,982	30,810
TAL	9,427	12,638
Skate Wing TAL	6,269	8,404
Skate Bait TAL	3,158	4,234

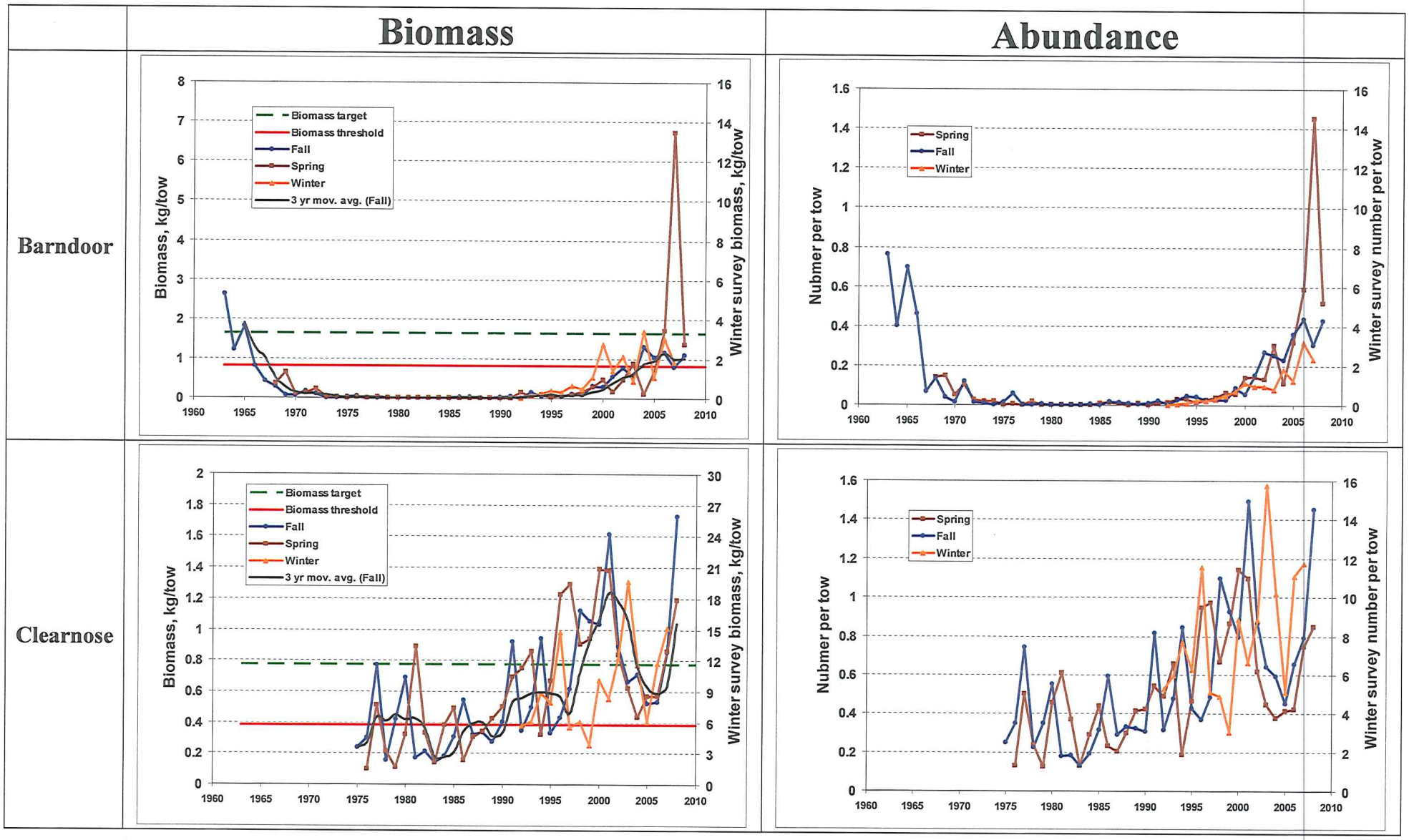
Updating the ABC, a revised TAL would likewise increase from 9,427 mt to 12,638 mt (+34%), which might allow the Council to increase the skate possession limits. If discard estimates are updated, however an increase in skate discards might be expected due to the higher biomass of little and winter skate. This in turn may affect the TAL, decreasing if the discard rate increases and vice versa.

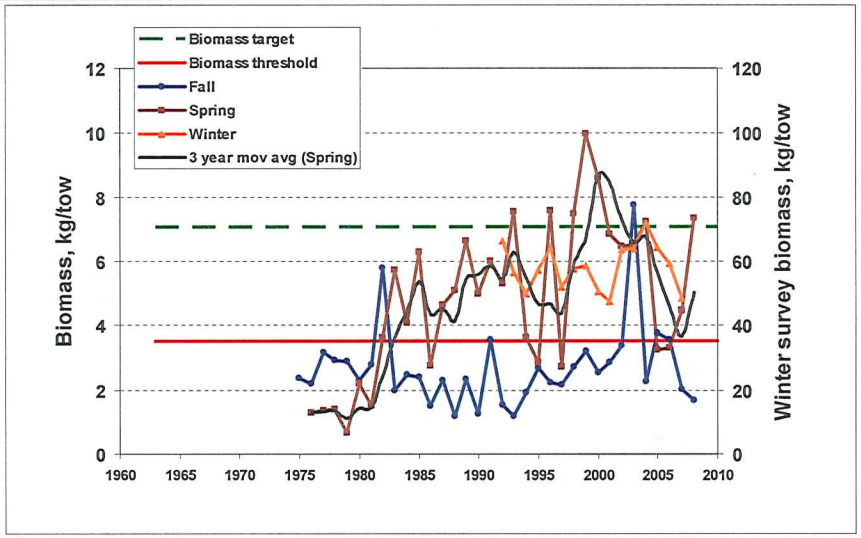
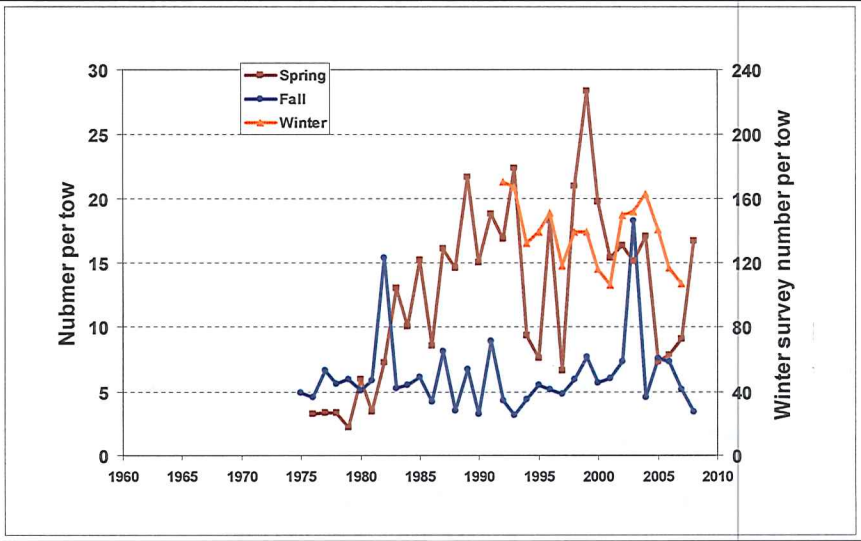
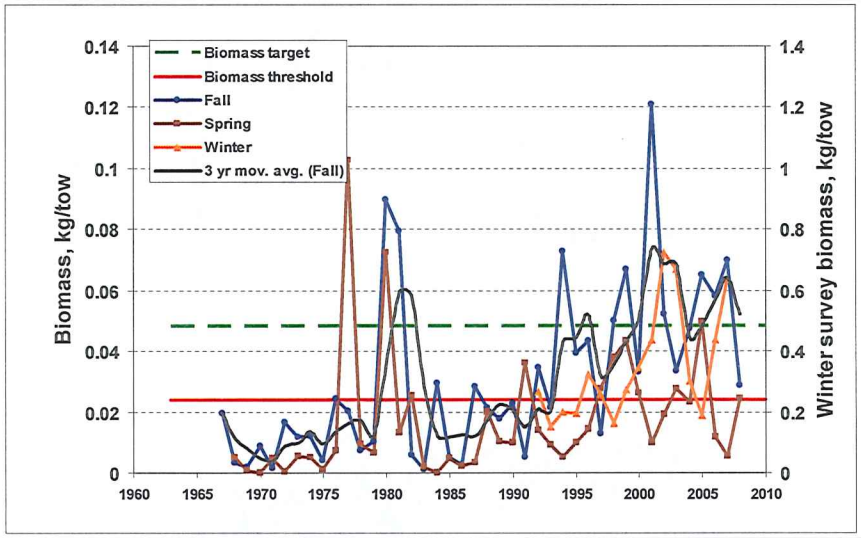
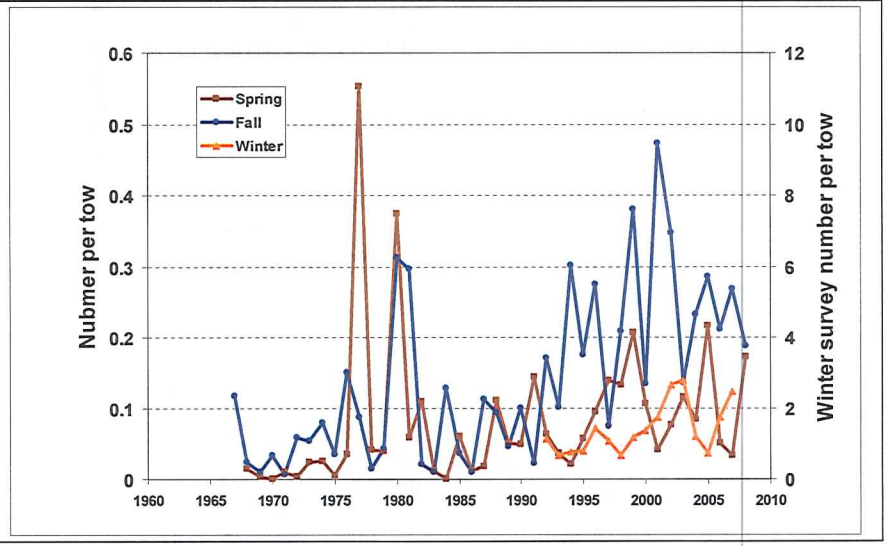
Further analysis would also be required to determine the degree to which skate wing possession limits (which were estimated to achieve a TAL of 11,544 mt) could be increased. The PDT notes however that such an increase in the ABC and possession limits would be less conservative for overfished smooth and thorny skates, which arise as bycatch on skate and other trips. The

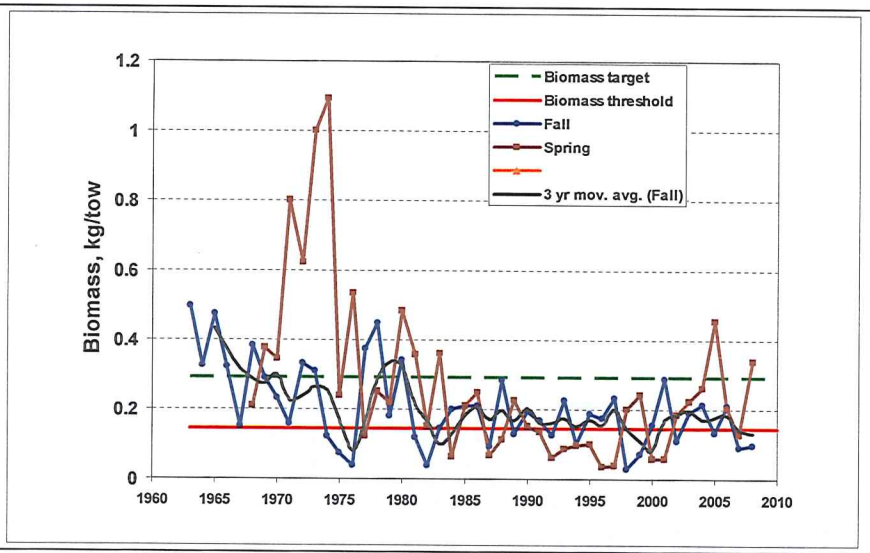
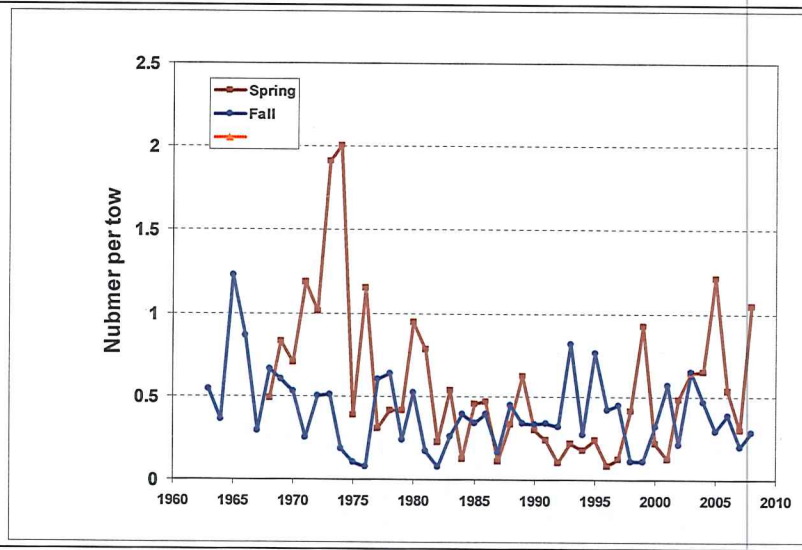
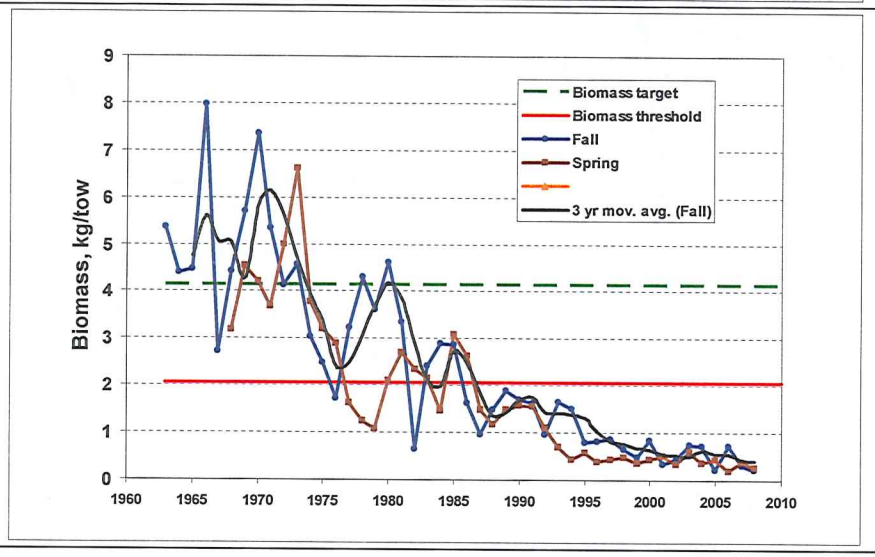
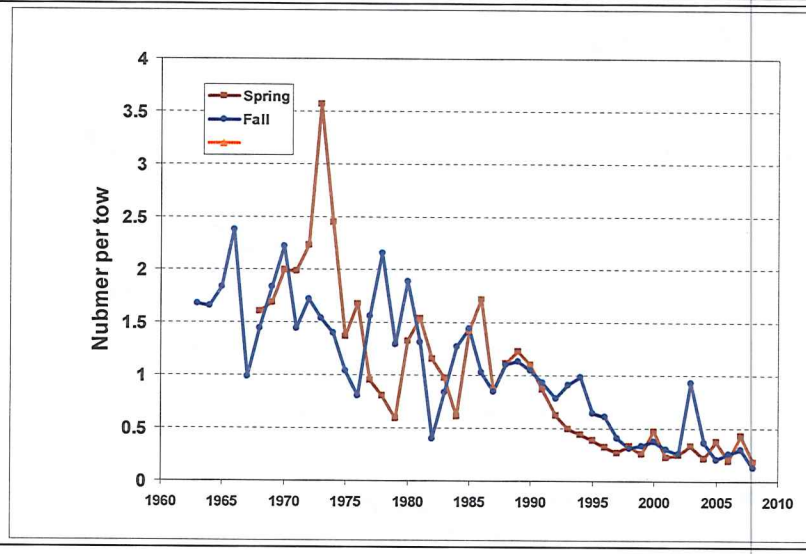
PDT also notes that frequent updates to an index based ABC using a three year moving average is likely to have some natural instability (Figure 7). Updating the index means that not only one year of new data is added, but also one year is dropped from the calculation.

Updated survey values beginning with spring 2009 will depend on calibration of the RV Bigelow data. Calibration analyses have been completed for little and winter skates, but more analysis is required and calibration may be problematic for other skates due to low sample size in the paired tow experiments.

Figure 1. Updated survey trends in skate biomass and abundance through 2008.



Little		
Rosette		

Smooth		
Thorny		

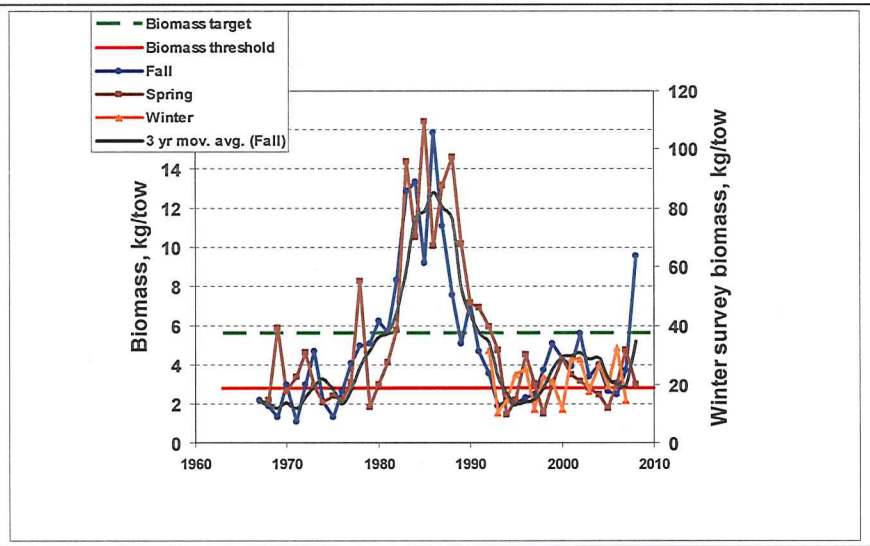
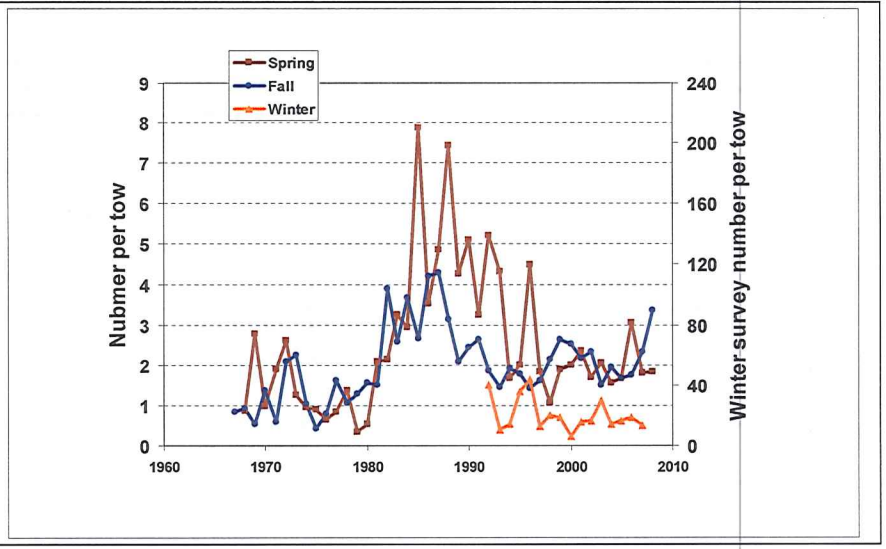
Winter	 Biomass target Biomass threshold Fall Spring Winter 3 yr mov. avg. (Fall) Biomass, kg/tow Winter survey biomass, kg/tow 0 2 4 6 8 10 12 14 0 20 40 60 80 100 120 1960 1970 1980 1990 2000 2010	 Spring Fall Winter Nubmer per tow Winter survey number per tow 0 1 2 3 4 5 6 7 8 9 0 40 80 120 160 200 240 1960 1970 1980 1990 2000 2010

Table 2. Survey biomass trends and skate status determinations as of 2008.

	BARNDOOR	CLEARNOSE	LITTLE	ROSETTE	SMOOTH	THORNY	WINTER
Survey (kg/tow) Time series basis Strata Set	Autumn 1963 – 1966 Offshore 1 – 30, 33-40	Autumn 1975-2007 Offshore 61-76, Inshore 15-44	Spring 1982-2008 Offshore 1-30, 33-40, 61-76, Inshore 1-66	Autumn 1967-2007 Offshore 61-76	Autumn 1963-2007 Offshore 1-30, 33-40	Autumn 1963-2007 Offshore 1-30, 33-40	Autumn 1967-2007 Offshore 1-30, 33-40, 61-76
1997	0.11	0.61	2.71	0.01	0.23	0.85	2.46
1998	0.09	1.12	7.47	0.05	0.03	0.65	3.75
1999	0.30	1.05	9.98	0.07	0.07	0.48	5.09
2000	0.29	1.03	8.60	0.03	0.15	0.83	4.38
2001	0.54	1.61	6.84	0.12	0.29	0.33	3.89
2002	0.78	0.89	6.44	0.05	0.11	0.44	5.60
2003	0.55	0.66	6.49	0.03	0.19	0.74	3.39
2004	1.30	0.71	7.22	0.05	0.21	0.71	4.03
2005	1.04	0.52	3.24	0.07	0.13	0.22	2.62
2006	1.17	0.53	3.32	0.06	0.21	0.73	2.48
2007	0.80	0.85	4.46	0.07	0.09	0.32	3.71
2008	1.09	1.73	7.34	0.03	0.10	0.21	9.50
2000-2002 3-year average	0.38	1.23	8.47	0.07	0.17	0.55	4.45
2001-2003 3-year average	0.62	1.05	6.59	0.07	0.20	0.50	4.29
2002-2004 3-year average	0.88	0.75	6.72	0.04	0.17	0.63	4.34
2003-2005 3-year average	0.96	0.63	5.65	0.05	0.18	0.56	3.34
2004-2006 3-year average	1.17	0.59	4.59	0.06	0.19	0.55	3.04
2005-2007 3-year average	1.00	0.64	3.67	0.06	0.14	0.42	2.93
2006-2008 3-year average	1.02	1.04	5.04	0.05	0.13	0.42	5.23
Percent change 2001-2003 compared to 2000-2002	65	-14	-22	-9	16	-8	-4
Percent change 2002-2004 compared to 2001-2003	41	-29	2	-34	-14	25	1
Percent change 2003-2005 compared to 2002-2004	9	-16	-16	11	6	-11	-23
Percent change 2004-2006 compared to 2003-2005	22	-6	-19	16	6	-2	-9
Percent change 2005-2007 compared to 2004-2006	-15	8	-20	12	-26	-24	-4
Percent change 2006-2008 compared to 2005-2007	2	63	37	-19	-7	0	78
Percent change for overfishing status determination in FMP	-30	-30	-20	-60	-30	-20	-20
Biomass Target	1.62	0.77	7.03	0.048	0.29	4.12	5.6
Biomass Threshold	0.81	0.385	3.515	0.024	0.145	2.06	2.8
CURRENT STATUS	Not Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring	Overfished Overfishing is Not Occurring	Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring

Figure 2. Distribution of winter skate weight per tow in 2006-2008, RV Albatross and MADMF fall surveys.

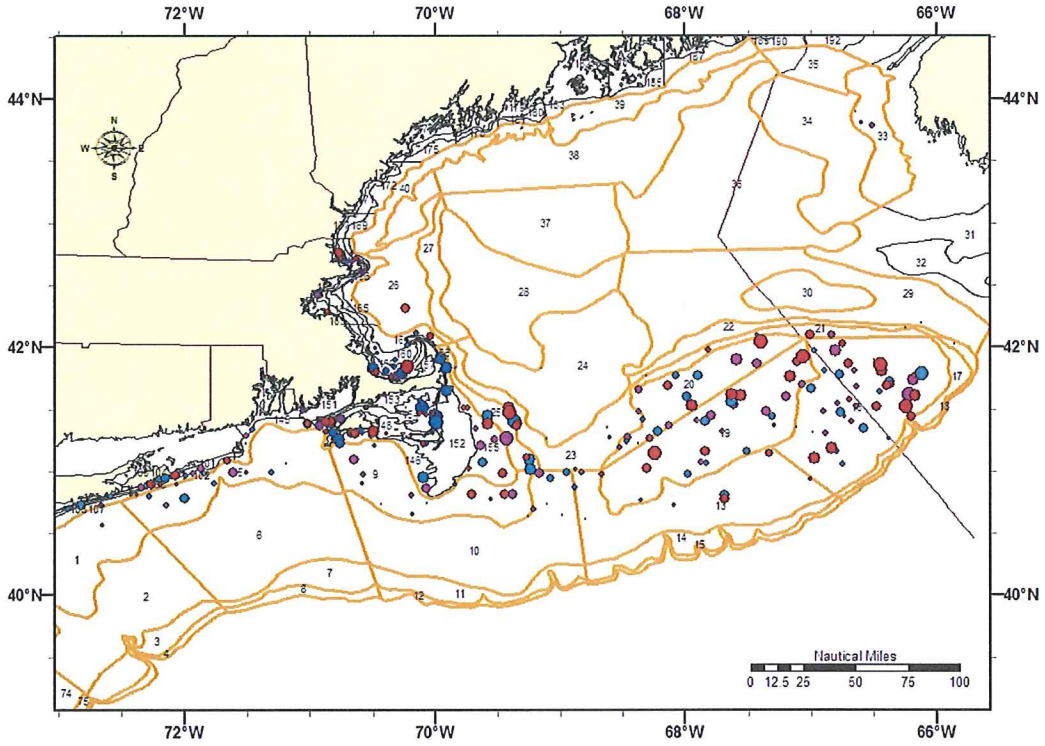


Figure 3. Trend in winter skate biomass (stratified mean kg/tow) for different sets of fall survey strata.

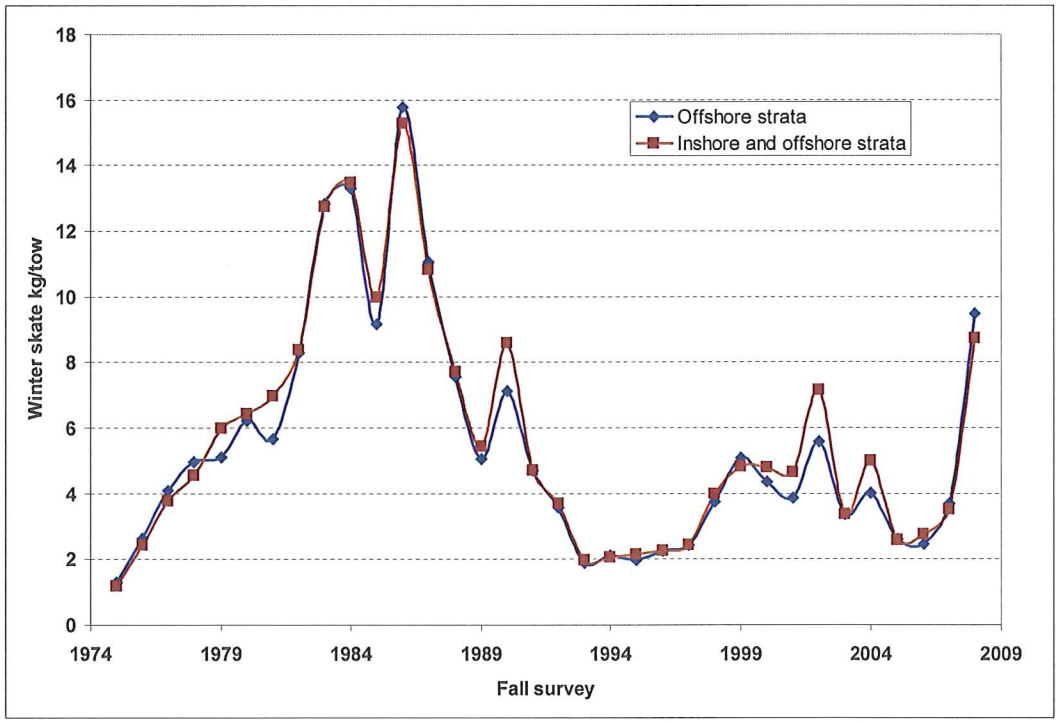


Figure 4. Mean and variance of fall survey tow winter skate biomass for strata with the 10 highest means, 2006-2008.

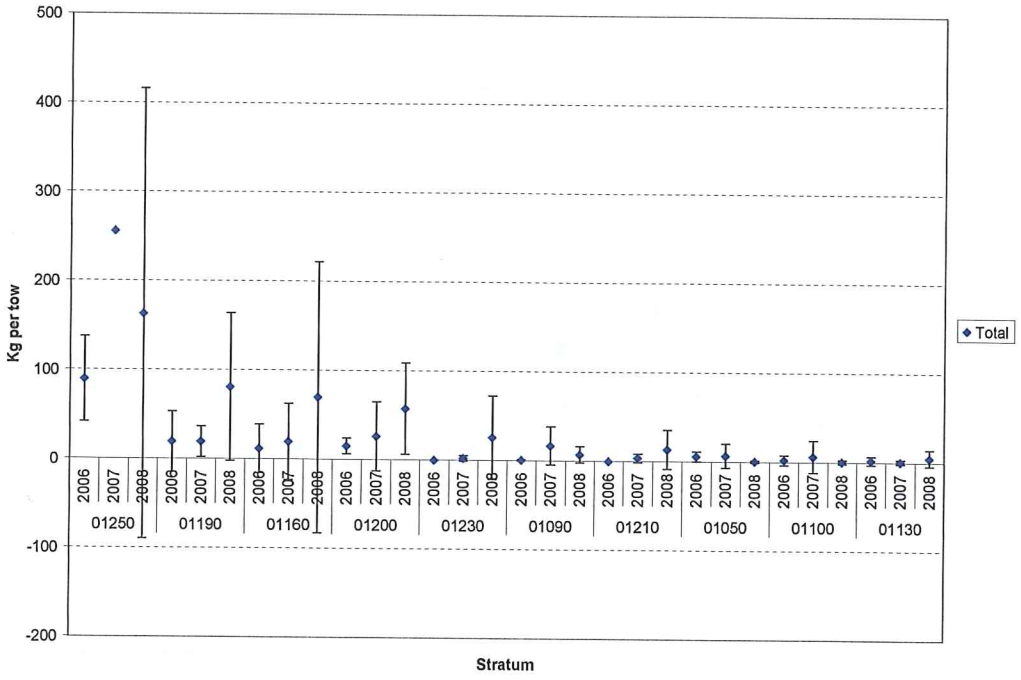


Figure 5. Frequency distribution of winter skate weight per tow, 2006-2008.

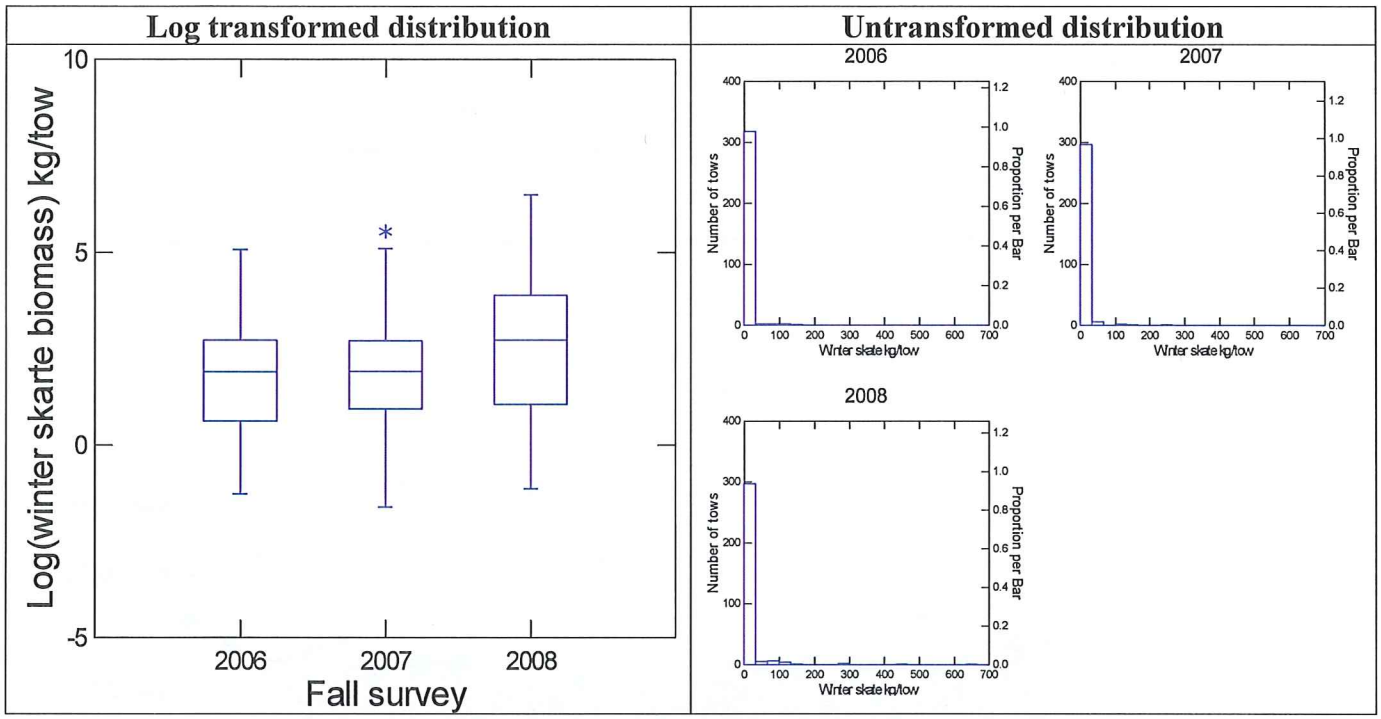


Figure 6. Observed winter skate length frequencies in winter skate status determination strata, compared to projected length frequencies from previous year.

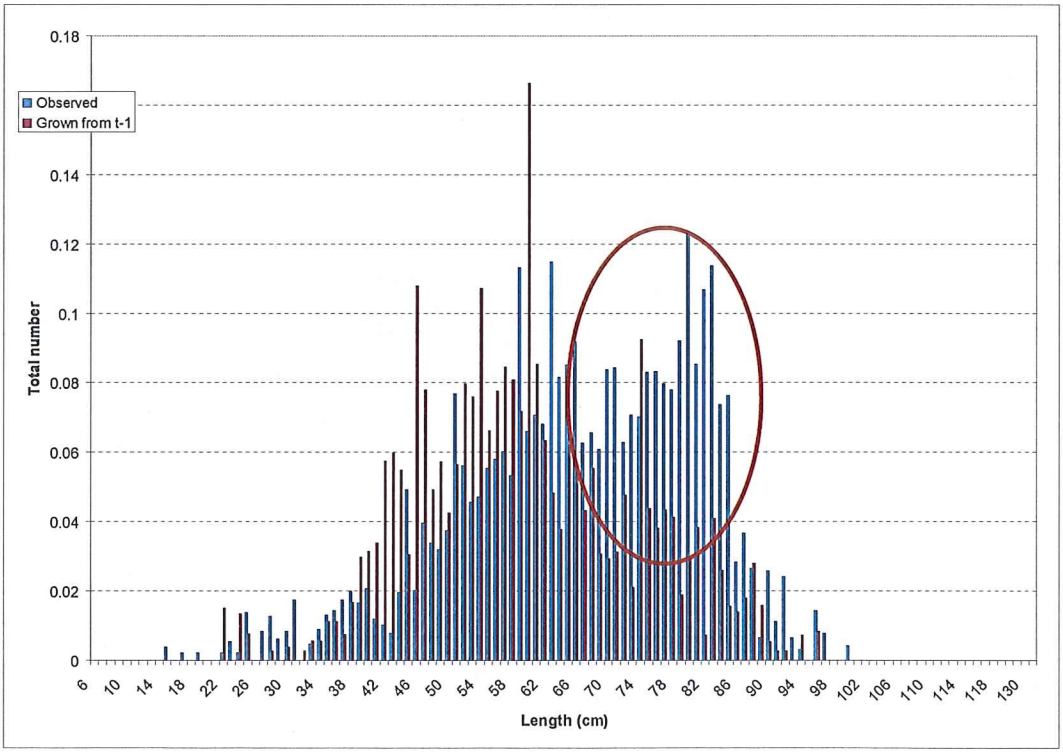


Figure 7. Total skate landings and catch compared to ABC reference points derived from three year moving average for biomass during 1985-2007.

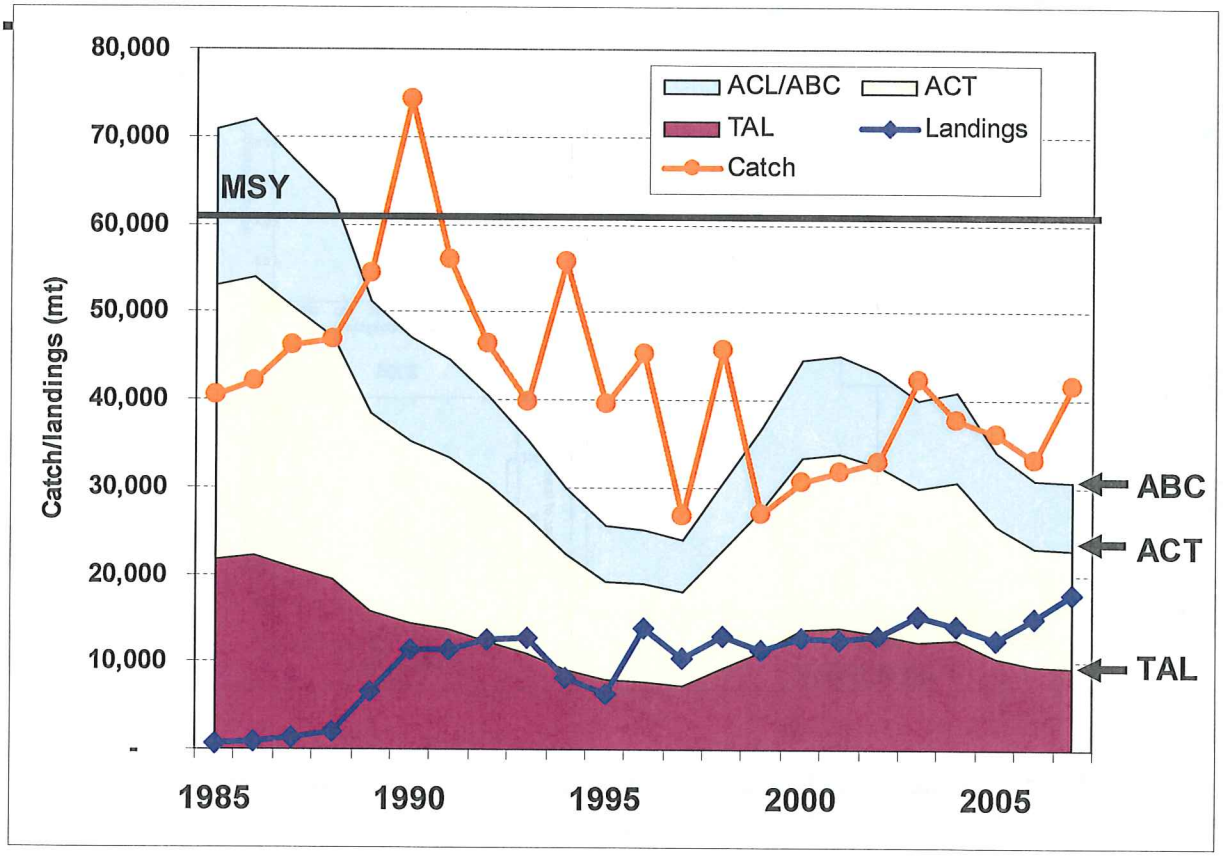


Table 3. Skate landings and ex-vessel revenue by landed product type, 1998-2009, as of March 4, 2010.

	CATEGORY Data					
	Whole		Wings		Total Landings, mt, live weight.	Total Revenue, thousand $.
YEAR	Landings, mt, live weight.	Revenue, thousand $.	Landings, mt, live weight.	Revenue, thousand $.		
1998	4,206	606	8,196	3,136	12,402	3,742
1999	3,731	538	6,411	2,382	10,142	2,920
2000	3,603	588	8,404	2,970	12,007	3,558
2001	3,240	557	8,324	2,432	11,564	2,989
2002	3,157	606	8,122	2,570	11,279	3,176
2003	3,168	546	10,352	3,276	13,521	3,822
2004	2,479	470	11,952	4,337	14,431	4,807
2005	2,548	549	9,930	4,206	12,478	4,755
2006	3,595	811	11,538	5,884	15,133	6,695
2007	3,618	822	13,991	7,530	17,609	8,352
2008	5,570	1,391	13,040	5,834	18,610	7,225
2009	5,059	1,068	12,706	5,560	17,765	6,628

Literature cited

Frisk, Michael G. and Thomas J. Miller. 2006. Age, growth, and latitudinal patterns of two Rajidae species in the northwestern Atlantic: little skate (Leucoraja erinacea) and winter skate (Leucoraja ocellata).

M. G. Frisk, T. J. Miller, S. J. D. Martell, K. Sosebee 2008. New Hypothesis Helps Explain Elasmobranch "Outburst" On Georges Bank in the 1980s. Ecological Applications. 18(1): 234-245.

Skate ABC update

Fall 2008 survey data review
Skate PDT

Background

- February 2009: SSC approved method for setting an aggregate skate ABC based on exploitation ratios and a 3-year average survey biomass index
- April 2009: Council approved final alternative for Amendment 3
- Error discovered in the ABC calculation during the development of the final amendment document
- September 2009: SSC approves correction and update using data that had been reviewed by the DPWS, including fall 2007 and spring 2008 survey indices.
- Fall 2008 biomass indices were available but had not been peer reviewed. New survey gear and the RV Bigelow trawl survey began spring 2009.

Background

- Council submitted a final amendment document in November 2009; proposed rule published on January 21, 2010 with a comment deadline of February 22, 2010.
- Final rule to take effect on May 1, 2010.
- ABC=ACL>ACT>TAL for 2010-2011
- Annual accountability measure to adjust for ACL and TAL overages
- SAFE Report and two year specifications package to be developed in 2011 for the 2012-2013 fishing years

Background

- Issue identified as an SSC priority, reported at the January 2010 Council meeting and put on the March SSC meeting agenda.
- Council will consider SSC recommendations at April 2010 meeting and decide how to proceed.

PDT review

- Data analyzed and scrutinized during late February and early March
- Results reviewed at a March 8 PDT meeting
  - Andrew Applegate, chair
  - Kathy Sosebee, NEFSC
  - Todd Gedamke, SEFSC
  - Tobey Curtis, NERO
  - Fiona Hogan, SMAST
  - Scott Olszewski, RIDEM

PDT review

- Winter skate biomass index increased from 3.71 kg/tow in 2007 to 9.50 kg/tow in 2008
- Calculations are correct, consistent with prior years, and stratified mean biomass indices are produced by a standard, well-used program.
- No apparent anomalous events that affected the geographical distribution of winter skate catches

PDT review

- Winter skate biomass trends seem to be consistent among strata with the 10 highest average catch
- No extra large (possibly anomalous) tows were apparent
- Winter skate size frequencies in 2008 were consistent with 2007, but a little higher than predicted from 75-90 cm
- Immigration of large winter skates occurred in early 1980s and persisted in US waters for several years.

Results

- Inclusion of the fall 2008 survey biomass indices would increase the aggregate skate TAC by 34%
- TAL of 12,638 mt would be 29% less than 2009 landings, and 9% less than 2003-2006 average landings.

	Current	Updated
ABC/ACL	30,643	41,080
ACT	22,982	30,810
TAL	9,427	12,638
Skate Wing TAL	6,269	8,404
Skate Bait TAL	3,158	4,234

Cautionary caveats

- An index based ABC using a 3 year moving average will have some natural instability/variability
- Higher ABC and skate possession limits could have negative implications for overfished smooth and thorny skates
- If updated, skate discard estimates may affect the TAL. An increase in the skate discard rate might be anticipated.

Cautionary caveats

- ABC cannot be adjusted using current methods until survey calibrations are available
  - Calibration coefficients are unavailable for 5 of the 7 skates
  - Issues with changes in survey size selectivity for little and winter skates, even though overall calibration coefficients have been estimated
  - Review/SAFE Report in 2011 for specifications package?
  - A Really, Really Data Poor Workshop?

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

To: Paul J. Howard, Executive Director
From: Dr. Steve Cadrin, Chairman, Scientific and Statistical Committee
Date: September 23, 2009

Subject: **Correction to the 2010-2011 Acceptable Biological Catch (ABC) recommendation for the skate complex**

The Scientific and Statistical Committee (SSC) was asked to review a correction to the skate complex ABC, using the same basis (median catch/biomass from catches determined with the selectivity ogive method) for determining the ABC, approved by the SSC February 6, 2009. This correction substitutes the 2007 spring survey biomass index for little skate, replacing a zero value (included as a missing value) in the previous calculations and adds the 2008 spring survey value, both of which were available for the Data Poor Assessment Workshop.

On September 16 2009, the SSC reviewed several sources of information and associated presentations by the Skate Plan Development Team (PDT):

1. Proposed correction to skate ABC calculation input values
2. SSC recommendations on Skate Amendment 3, February 11, 2009
3. Skate ABCs, updated reference points, and management recommendations (January 26, 2009 memo from Skate PDT to SSC)
4. Skate rebuilding catch limit re-analysis (January 14, 2009 memo from PDT to SSC)

In February 2009, the SSC recommended that:
"Acceptable Biological Catch for the northeast skate complex is 23,826 mt per year for the 2010 and 2011 fishing years. The ABC recommendation is derived as the multispecies skate catch associated with the median of the observed series of a catch/biomass exploitation index and the most recent 3-year average of the multispecies skate survey index. ... The Annual Catch limit (ACL) cannot exceed the ABC. The recommended ABC (23,826 mt) is 57% of the estimated catch in 2007. Therefore total catch (the sum of landings and discards) must be reduced by at least 43%."

The PDT's calculation of the most recent 3-year average of the multispecies skate survey index inadvertently excluded the 2007 spring survey catch of little skates. The multispecies skate index increases by 15% when the 2007 spring survey catch of little skates is included. When the 2008 spring survey catch of little skates (which was available and reviewed by the 2008 Data Poor Stocks Working Group, DPSWG) is included, the index increases by another 11%. Correcting the omission and updating the calculation to spring 2008 produces a 29% increase in the multispecies skate index and the resulting ABC calculation, using the ABC method previously recommended.

Survey information from fall 2008 was not provided to the SSC, nor was it reviewed by the DPSWG or the Skate PDT. Therefore, the ABC recommendations for 2010 and 2011 are based on survey data through spring 2008. The SSC would prefer to consider all available information in the

derivation of ABC recommendations, but the SSC cannot consider data that has not been reviewed by a scientific group in the stock assessment, peer review or PDT process. Therefore, the SSC would like to re-consider the 2011 ABC recommendation based on updated survey data and results from the 2008 survey calibration workshop.

The SSC revises its previous recommendation on Acceptable Biological Catch for the northeast skate complex.

1. **The revised recommendation is that ABC is 30,643 mt per year for the 2010 and 2011 fishing years.**
2. **The revised ABC is 74% of the estimated catch in 2007 (landings plus dead discards). Therefore total catch (the sum of landings and dead discards) must be reduced by at least 26%.**
3. **The 2011 ABC recommendation should be reconsidered by the SSC in 2010 based on the Plan Development Team's review of updated survey data and results from the 2008 survey calibration workshop.**