



**Mid-Atlantic Fishery Management Council**  
 800 North State Street, Suite 201, Dover, DE 19901-3910  
 Phone: 302-674-2331 | Toll Free: 877-446-2362 | FAX: 302-674-5399 | www.mafmc.org  
 Richard B. Robins, Jr., Chairman | Lee G. Anderson, Vice Chairman  
 Christopher M. Moore, Ph.D., Executive Director

## MEMORANDUM

**DATE:** September 23, 2013  
**TO:** Joint Spiny Dogfish Committee  
**FROM:** Jim Armstrong, Chair, Spiny Dogfish Monitoring Committee  
**SUBJECT:** **Summary of Spiny Dogfish Monitoring Committee Management Measure Recommendations for 2014**

The Spiny Dogfish Monitoring Committee (MC) met via webinar on September 23, 2013 in conjunction with the ASMFC Spiny Dogfish Technical Committee (TC) to review management measures for the 2014 fishing year. Monitoring Committee members in attendance included Jim Armstrong (MAFMC staff), *Tobey Curtis (NERO)*, *Eric Schneider (RI-DEM)*, *Dan McKiernan (MADMF)*, *Holly White (NCDMF)* and *Carrie Kennedy (MD DNR)*. *Members of the TC (but not the MC) that were in attendance included Marin Hawk (ASMFC staff), Matt Cieri (ME DNR), Matt Gates (CT DEP), Greg Skomal (MADMF), and Scott Newlin (DNREC).*

### Stock Status / OFL / ABC

The MC received an update on the status of the stock as well as the Scientific and Statistical Committee's (SSC's) overfishing limit (OFL) and acceptable biological catch (ABC) recommendations. The status of the stock is summarized in the stock assessment update report (NEFSC 2013) and the staff memo, both of which are included as separate attachments. The stock is not overfished and overfishing is not occurring. OFL in 2014 was not estimated as part of existing multi-year specifications - only 2013 was provided. Based on the updated assessment, OFL for 2014 is estimated as the median of total catch at Fmsy ( $F = 0.2439$ ), and is 32,210 mt (71.011 M lb). Existing ABC for 2014 is 25,154 mt (55.455 M lb) and for 2015 is 25,057 mt (55.241 M lb), and the assessment update provided a basis for re-estimating ABC in 2014 (27,596 mt; 60.389 M lb) and 2015 (28,310 mt; 62.413 M lb).

Calculation of Existing Federal TAL and commercial quota

The federal spiny dogfish TAL is calculated using the process outlined in Amendment 2 to the Spiny Dogfish FMP (i.e., Omnibus ACL/AM Amendment). The values corresponding to the steps in the process are given in Table 1 for existing specification years (2013-2015). The TAL and commercial quota are the remaining catch available as landings after accounting for management uncertainty and all other types of removals considered by the assessment. The other types of removals include Canadian commercial landings and U.S. discards (commercial and recreational). The commercial quota is the remaining landings after a further reduction from the TAL to account for U.S. recreational landings.

**Table 1. Spiny dogfish management measures for 2013-2015 as currently specified.**

2013 Measures	Basis	M lb	Mt
OFL	$F_{MSY} (0.2439)$	67,576	30,652
ABC	$Constant F (0.19528)$	54,474	24,709
Canadian Landings	$= ave\ 2009-2011$	0.179	81.0
Domestic ABC	$= ABC - Canadian\ Landings$	54,295	24,628
ACL	$= Domestic\ ABC$	54,295	24,628
Mgmt Uncert. Buffer	$Ave\ pct\ quota\ overage\ since\ 2010$	1,697	770
ACT	$= Domestic\ ACL - mgmt\ uncertainty$	52,598	23,858
U.S. Discards	$= ave\ 2002-2011$	11,698	5,306
TAL	$ACT - Discards$	40,900	18,552
U.S. Rec Landings	$= ave\ 2010-2011$	0.058	26.5
Comm Quota	$TAL - Rec\ Landings$	40.841896	18,526

2014 Measures	Basis	M lb	Mt
OFL			
ABC	$Constant F (0.19528)$	55,455	25,154
Canadian Landings	$= ave\ 2009-2011$	0.179	81.0
Domestic ABC	$= ABC - Canadian\ Landings$	55,277	25,073
ACL	$= Domestic\ ABC$	55,277	25,073
Mgmt Uncert. Buffer	$Ave\ pct\ quota\ overage\ since\ 2010$	1,737	788
ACT	$= Domestic\ ACL - mgmt\ uncertainty$	53,540	24,285
U.S. Discards	$= ave\ 2002-2011$	11,698	5,306
TAL	$ACT - Discards$	41,842	18,979
U.S. Rec Landings	$= ave\ 2010-2011$	0.058	26.5
Comm Quota	$TAL - Rec\ Landings$	41.783807	18,953

**Table 1 (continued)**

2015 Measures	Basis	M lb	Mt
OFL			
ABC	<i>Constant F (0.19528)</i>	55.241	25,057
Canadian Landings	<i>= ave 2009-2011</i>	0.179	81.0
Domestic ABC	<i>= ABC - Canadian Landings</i>	55.063	24,976
ACL	<i>= Domestic ABC</i>	55.063	24,976
Mgmt Uncert. Buffer	<i>Ave pct quota overage since 2010</i>	1.728	784
ACT	<i>= Domestic ACL - mgmt uncertainty</i>	53.335	24,192
U.S. Discards	<i>= ave 2002-2011</i>	11.698	5,306
TAL	<i>ACT - Discards</i>	41.637	18,886
U.S. Rec Landings	<i>= ave 2010-2011</i>	0.058	26.5
Comm Quota	<i>TAL - Rec Landings</i>	41.578491	18,860

### Application of Updated ABC to Federal TAL and commercial quota

The updated OFL and ABC values as well as updated adjustments in calculation of the commercial quota provide the basis for alternatives to the specified management measures for 2014 and 2015 and are summarized in Table 2. Modifying the specified ABC and making other adjustments could increase the commercial quota by as much as 17.4% in 2014 and 21.7% in 2015.

**Table2. Commercial Quota Calculation Based on Updated ABC for 2014 and 2015.**

2014 Measures	Basis	(Existing)		ABC Update (mt)	No ABC Update (mt)
		M lb	mt		
OFL	<i>Projected Catch at Fmsy</i>			32,210	
ABC	<i>Constant F</i>	55.455	25,154	27,596*	25,154
Canadian Landings	<i>= ave since 2009</i>	0.179	81	65	65
Domestic ABC	<i>= ABC – Canadian Landings</i>	55.277	25,073	27,531	25,089
ACL	<i>= Domestic ABC</i>	55.277	25,073	27,531	25,089
Mgmt Uncert. Buffer	<i>Ave pct quota overage since 2010</i>	1.737	788	0	0
ACT	<i>= Domestic ACL - mgmt uncertainty</i>	53.540	24,285	27,531	25,089
U.S. Discards	<i>= ave since 2002</i>	11.698	5,306	5264	5264
TAL	<i>ACT – Discards</i>	41.842	18,979	22,267	19,825
U.S. Rec Landings	<i>= ave since 2010</i>	0.058	26.5	24	24
Comm Quota	<i>TAL – Rec Landings</i>	41.783807	18,953	22,243	19,801

\* The updated ABC is based on projections from the updated assessment.

**(Existing)**

2015 Measures	Basis			ABC Update (mt)	No ABC Update (mt)
		M lb	mt		
OFL	<i>Projected Catch at Fmsy</i>				
ABC	<i>Constant F</i>	55.241	25,057	28,310*	25,057
Canadian Landings	<i>= ave since 2009</i>	0.179	81	65	65
Domestic ABC	<i>= ABC – Canadian Landings</i>	55.063	24,976	28,245	24,992
ACL	<i>= Domestic ABC</i>	55.063	24,976	28,245	24,992
Mgmt Uncert. Buffer	<i>Ave pct quota overage since 2010</i>	1.728	784	0	0
ACT	<i>= Domestic ACL - mgmt uncertainty</i>	53.335	24,192	28,245	24,992
U.S. Discards	<i>= ave since 2002</i>	11.698	5,306	5264	5264
TAL	<i>ACT – Discards</i>	41.637	18,886	22,981	19,728
U.S. Rec Landings	<i>= ave since 2010</i>	0.058	26.5	24	24
Comm Quota	<i>TAL – Rec Landings</i>	41.578491	18,860	22,957	19,704

\* The updated ABC is based on projections from the updated assessment.

### Management Uncertainty and Calculation of the ACT

The Annual Catch Target (ACT) accounts for management uncertainty, and for 2014-2015, the ACTs were reduced from ACLs based on observed quota *overages* of about 4% from 2010-2011. Updated landings show an average *underharvest* of 4% since 2010 which could offset a deduction for management uncertainty. Because of the underharvest, the existing deduction from the domestic ACLs (1,001 mt; 2.208 M lb) may be thought of as resulting in foregone yield. As such, according to the update, the management uncertainty buffer could be reduced to zero.

### *Accuracy of Past Assumptions about Catch Components*

- The specified deduction for Canadian landings is 81 mt (ave 2009-2011), while Canadian landings from the updated assessment are 65 mt (ave 2009-2012).
- The specified adjustment for discards is 5,306 mt (ave 2002-2011) and the updated value is 5,264 mt (ave 2002-2012).
- The specified adjustment for recreational landings is 26.5 mt (ave 2010-2011) and the updated value is 24.0 mt (ave 2002-2012).

It was noted that each of the updated adjustments correspond to reduced deductions at each step in the calculation of the commercial quota. The updates are generally modest, however in total, a greater commercial quota is available whether ABCs had been adjusted or not.

## Trip Limits

The MC did not make a recommendation on trip limits. The MC did discuss trip limits at length, but came to the conclusion that there is no biological basis for recommending alternative trip limits at this time.

## Summary of Recommendations

- The upper limit on the commercial quota in 2014 and in 2015 is based on the SSC's adjusted ABC calculations for those years. The upper limit on the commercial quota for 2014 is 22,243 mt (49.037 M lb) and for 2015 is 22,957 mt (50.612 M lb).
- The current performance of the fishery suggests that the specified 2013 commercial quota (18,526 mt; 40.841 M lb) will not be limiting in 2013. If the fishery continues to perform at this level in 2014-2015, the specified quotas will not be limiting in those years either.
- Updated Canadian landings, U.S. discards, and U.S. recreational landings are modestly different (all lower) than those used in calculating the commercial quota in the existing 2014-2015 specifications.
- There is no biological basis for recommending or advising against alternatives to the existing 4,000 lb federal trip limit.
- The MC could not identify any negative impacts to the fishery associated with either maintaining the specified management measures, or revising them to account for the updated scientific information, in light of the recent performance of the fishery.

## *References*

NEFSC. 2013. Update on the status of spiny dogfish and initial evaluation of alternative harvest strategies. Report to MAFMC SSC September 12, 2013. 51 p.

MAFMC staff memorandum from Jim Armstrong to Chris Moore: "Spiny dogfish ABC and Management Measures for 2014," dated September 12, 2013. 9 p.

Report of the September 2013 Meeting of the MAFMC SSC. 16 p.

## **Section Intentionally Blank**

### **Spiny Dogfish**

*The SSC will provide a written report that identifies the following for up to two fishing years (i.e., 2014-2015):*

*1) The materials considered in reaching its recommendations;*

- Rago, P., and K. Sosebee. 2013. Update on the Status of Spiny Dogfish in 2013 and Projected Harvests at the Fmsy Proxy and Pstar of 40%. Northeast Fisheries Science Center, NOAA Fisheries. 51 pp.

- MAFMC staff memorandum from Jim Armstrong to Chris Moore: “Spiny dogfish ABC and Management Measures for 2014,” dated September 12, 2013. 9 pp.
- MAFMC Staff. 2013 Spiny Dogfish AP information document – 2013. Mid-Atlantic Fishery Management Council. 14 pp.
- MAFMC Staff. 2013. 2013 Spiny Dogfish fishery performance report. Mid-Atlantic Fishery Management Council. 2 pp.

*2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the Omnibus Amendment;*

Level 3. The assessment provides plausible estimates of the absolute levels of biomass and abundances, and the assessment also provides a plausible set of reference points that together represent the best available science. The SSC notes that the biological reference points were calculated outside of the assessment model. The SSC also believes that important sources of uncertainty were not incorporated into estimates for the biological reference points. Both concerns prevent this assessment from achieving a higher rank.

*3) If possible, the level of catch (in weight) and the probability of overfishing associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy;*

The  $F_{msy}$  proxy is calculated from a projection model for which the finite rate of population increase = 1.0. For Spiny Dogfish, the  $F_{msy}$  proxy = 0.2439. This is equivalent to a catch of **OFL = 32,166 mt**, based on the projected biomass in 2014 and the assumption that the catch in 2013 will be equal to 24,709 mt (the ABC = ACL from last year).

*4) The level of catch (in weight) and the probability of overfishing associated with the acceptable biological catch (ABC) for the stock, the number of fishing years for which the ABC specification applies and, if possible, interim metrics that can be examined to determine if multi-year specifications need adjustment prior to their expiration;*

The SSC applied the Council's risk policy for a typical life history<sup>1</sup>, an estimated  $B_{2014}/B_{msy}$  ratio > 1, and a CV of the OFL distribution of 100% assuming a lognormal distribution. Using these parameters, the Council's risk policy implies a  $P^* = 0.40$ . Applying this  $P^*$  to the OFL produces an **ABC = 27,596 mt**.

The SSC notes that the stock biomass is projected to decline in the future because of poor recruitment in earlier years, before recovering again. Current projections suggest that the ratio of (median  $B_{current}$ )/ $B_{msy}$  may be <1 for 2018-2023. As a result, the  $P^*$  value developed by the Council's risk policy will be lower, thereby leading to a reduced ABC for these years.

The SSC recommends a 2-year ABC specification. The SSC recommends that ABC be calculated based on a constant F policy, which translates to an ABC in the subsequent year 2015 of **28,310 mt**.

The SSC will examine Spiny Dogfish discard rates, survey abundance trends (size composition, sex ratio and pup size), average size and sex in commercial landings, agreement between observed and predicted catch and survey forecasts, changes in Canadian landings, and the spatial distributions of catch and survey abundances each year of the specification to determine if the multiyear ABC should be abandoned.

<sup>1</sup> The SSC notes that the assessment for Spiny Dogfish has been structured to account for many aspects of the unique life

history of this species.

5) *The most significant sources of scientific uncertainty associated with determination of OFL and ABC;*

- The assessment relies heavily on an assumed efficiency of the survey gear in developing minimal swept area estimates of biomass.
- Inter-annual differences in availability of the stock to the survey gear.
- $F_{msy}$  proxy is based on a projection model that relies on a time-invariant selectivity estimated from data up to 2008. The assessment assumes selectivity has not changed subsequently, but may be variable.
- Both the  $F_{msy}$  proxy and the projections rely on a model that assumes constant pup survival and pup production rates. Empirical evidence suggests pup survival correlates positively with maternal size.
- Inconsistency between the estimation model and the projection model.
- Potential changes in fishery selectivity. Large increases in catches could induce changes in the overall selectivity pattern in the fishery.
- Potential inconsistency between the life history-based estimates of fishing mortality rates and the biomass reference points derived from the Ricker stock recruitment curve.
- Total discard estimates and estimated mortality of discarded dogfish.
- The revised estimate of biomass reference point is uncertain with an asymptotic CV of about 30%.
- The updated assessment shows a retrospective bias resulting in the model underestimating recruitment by upwards of 50% near the end of the time series.

6) *Ecosystem considerations accounted for in the stock assessment, and any additional ecosystem considerations that the SSC took into account in selecting the ABC, including the basis for those additional considerations;*

No explicit or specific ecosystem considerations were included in the assessment. Furthermore, no additional ecosystem considerations were applied in calculating the ABC.

7) *Prioritized research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation;*

- Revise the assessment model to investigate the effects of stock structure or distribution, sex ratio, and size of pups on birth rate and first year survival of pups.
- Continue large scale (international) tagging programs, including conventional external tags, data storage tags, and satellite pop-up tags, to help clarify movement patterns and migration rates.
- Investigate the distribution of spiny dogfish beyond the depth range of current NEFSC trawl surveys, possibly by using experimental research or supplemental surveys.
- Continue aging studies for Spiny Dogfish age structures (e.g., fins, spines) obtained from all sampling programs (include additional age validation and age structure exchanges), and conduct an aging workshop for Spiny Dogfish, encouraging participation by NEFSC, Canada DFO, other interested state agencies, academia, and other international investigators with an interest in dogfish aging (US and Canada Pacific Coast, ICES).
- Evaluate ecosystem effects on Spiny Dogfish acting through changes in dogfish vital rates.





---

## **2013 Spiny Dogfish Fishery Performance Report**

The Spiny Dogfish Advisory Panel (AP) met from 1 PM – 2:30 PM Sept 10, 2013 via webinar to develop a Fishery Performance Report (FPR) for consideration during the upcoming specification cycle. Following the meeting, the AP reviewed and approved the summary below as the FPR.

MAFMC Dogfish Advisers in attendance were: Eric Brazer (MA commercial fishing organization), James Fletcher (NC commercial fishing organization), Jack Musick (VA academic), and James Sulikowski (ME academic). Also in attendance were Marin Hawk (ASMFC Plan Coordinator), Nils Stolpe (Saving Seafood), and Janice Plante (Commercial Fisheries News).

### **Recreational Fishery Issues**

No discussion

### **Market / Economic Issues**

#### **Market Demand Controlling Landings**

The market for dogfish is currently very depressed with ex-vessel prices of about \$0.12/lb compared to a typical prices \$0.22/lb. Market conditions were described as explaining 100% of landings levels, i.e., the availability and abundance of the resource (nearshore or offshore) is not at all constraining right now. The low value of dogfish limits the extent to which fishermen are willing to retain dogfish as part of their offshore catch in preference of more valuable species.

#### **Constraints on Market Demand**

The primary market outlet for most of the processed spiny dogfish is the EU, so any perturbations in demand by that market greatly influence the rate at which domestic processors will accept the product. Whereas the processors typically accept dogfish seven days/week, they are now only accepting full or reduced dogfish limits a few days/week. There was an apparent PCB issue in the EU involving reduced detection standards that has, at least, temporarily depressed that market. There is some hope that as the fresh market opens up (beginning of Sept) the issue may subside. Fishermen do not feel that the issue has been clearly defined or communicated to them. The impact of this event is especially disappointing to fishermen given that certification of the fishery by the Marine Stewardship Council was expected to improve the size and stability of the export market. It was noted that the Pacific spiny dogfish fishery is also currently very depressed.

#### **Change Market Name of Dogfish**

It was suggested that a change in the market name for spiny dogfish (for example "chipfish" which comes from the use of the product in fish and chips) might help in the development of a domestic market. It was pointed out that according to the USDA's "Principles for Determining Acceptable Market Names", a coined name (Principle 6) can be used as long as it complies with all other USDA Principles.

The limitations of such a change was also brought up since the common name, spiny dogfish, is well known and well established in the scientific literature.

### **Environmental Issues**

No noteworthy changes were identified that were linked to the distribution or availability of spiny dogfish. There was a suggestion that groundfish are currently distributed further offshore and that lower retention of dogfish on offshore trips is occurring, but the differential availability of dogfish nearshore vs. offshore was not the issue.

There was a comment that preliminary evidence suggests like sized spiny dogfish and cod may be competing for forage resources.

### **Management Issues**

#### **Trip Limit**

An interest in exploring alternatives to the current "one size fits all" approach for trip limits was discussed. It was suggested that an exploration of alternative trip limits for different components of the commercial fishery should be initiated. The current trip limit is 4,000 lb coastwide in federal waters and varies by state. The increase from 3,000 lb to 4,000 lb has not produced any negative biological impacts, however, a trip limit scenario that considers gear and vessel type was suggested as a potential improvement.

#### **Limited Access**

Support for a limited entry permit program was repeated from last year's discussion. There was unanimous support for exploring limited access options to ensure that the fishery is operated by experienced dogfish fishermen who have a history in the fishery and can avoid protected species issues.

#### **Male Dogfish Fishery**

The lack of a commercial fishery for the male component of the stock was discussed. There was support for the development of a separate accounting system for male dogfish so that a market and directed fishery for male dogfish could be developed. The transition to a separate accounting system could have implications for population modeling.

#### **Alternative Unit Stock Definition**

It was suggested that tagging work that has been done on spiny dogfish movement and distribution could affect the definition of the management unit and, therefore, how the stock(s) is (are) managed. It was pointed out that evidence for multiple stocks would need to be incorporated into the assessment work and so a multiple stock approach would need to be examined and validated within a peer-reviewed assessment exercise. A peer-reviewed benchmark assessment could be conducted according to the currently accepted schedule or could be added to the schedule upon Council request.

#### **Other**

The very low pup production from 1997 to 2003 should be entering the exploitable stock now. Any underperformance of the fishery was suggested as offsetting the decreased productivity of the stock associated with that transition.

## Spiny Dogfish AP Information Document - 2012

### Management System

The Spiny Dogfish Fishery Management Plan (FMP) was implemented in 2000 establishing joint management authority over the fishery in federal waters for the Mid-Atlantic and New England Fishery Management Councils. Amendment 2, (effective 1/1/2012) incorporated the development of annual catch limits (ACLs) and accountability measures (AMs) into the specification process. Specifying spiny dogfish management measures is a joint process conducted by the two Councils. The Council's Scientific and Statistical Committee (SSC) reviews assessment results, and the Advisory Panel's fishery performance report, and determines the acceptable biological catch (ABC) for the upcoming year. The Spiny Dogfish Monitoring Committee develops and recommends specific coastwide management measures (commercial quota, trip limit) that will achieve the catch target and makes further adjustments to total catch as needed based on management uncertainty. Finally, the Councils meet to develop recommendations to be submitted to the National Marine Fisheries Service. Table 1 below illustrates how the management measures for 2013 - 2015 were calculated based on the Councils' recommendations.

**Table1. Derivation of spiny dogfish quotas for 2013 through 2015. All values are in lbs.**

2013 Measures	Basis	M lb
OFL	$F_{MSY} (0.2439)$	67.576
ABC	$Constant F (0.19528)$	54.474
Canadian Landings	$= ave\ 2009-2011$	0.179
Domestic ABC	$= ABC - Canadian\ Landings$	54.295
ACL	$= Domestic\ ABC$	54.295
Mgmt Uncertainty Buffer	$Ave\ of\ quota\ overages\ (pct)\ in\ 2010-2011\ (4.0\%)$	1.697
ACT	$= Domestic\ ACL - management\ uncertainty$	52.598
U.S. Discards	$= ave\ 2002-2011$	11.698
TAL	$ACT - Discards$	40.900
U.S. Rec Landings	$= ave\ 2010-2011$	0.058
Comm Quota	$TAL - Rec\ Landings$	40.841896

2014 Measures	Basis	M lb
OFL		
ABC	$Constant F (0.19528)$	55.455
Canadian Landings	$= ave\ 2009-2011$	0.179
Domestic ABC	$= ABC - Canadian\ Landings$	55.277
ACL	$= Domestic\ ABC$	55.277
Mgmt Uncertainty Buffer	$Ave\ of\ quota\ overages\ (pct)\ in\ 2010-2011\ (4.0\%)$	1.737
ACT	$= Domestic\ ACL - management\ uncertainty$	53.540
U.S. Discards	$= ave\ 2002-2011$	11.698
TAL	$ACT - Discards$	41.842
U.S. Rec Landings	$= ave\ 2010-2011$	0.058
Comm Quota	$TAL - Rec\ Landings$	41.783807

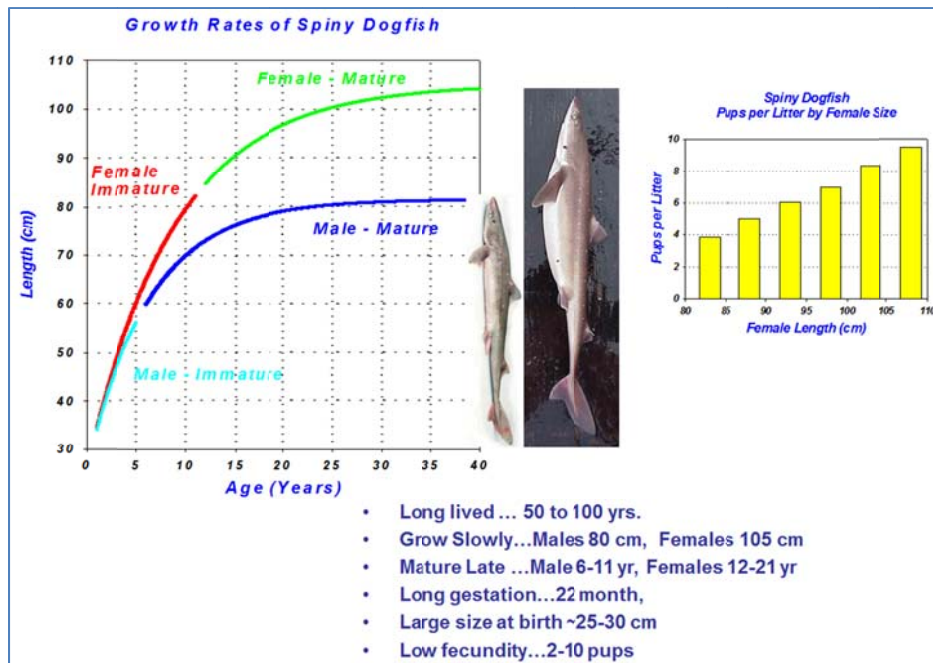
**Table 1 continued**

2015 Measures	Basis	M lb
OFL		
ABC	<i>Constant F (0.19528)</i>	55.241
Canadian Landings	<i>= ave 2009-2011</i>	0.179
Domestic ABC	<i>= ABC - Canadian Landings</i>	55.063
ACL	<i>= Domestic ABC</i>	55.063
Mgmt Uncertainty Buffer	<i>Ave of quota overages (pct) in 2010-2011 (4.0%)</i>	1.728
ACT	<i>= Domestic ACL - management uncertainty</i>	53.335
U.S. Discards	<i>= ave 2002-2011</i>	11.698
TAL	<i>ACT - Discards</i>	41.637
U.S. Rec Landings	<i>= ave 2010-2011</i>	0.058
Comm Quota	<i>TAL - Rec Landings</i>	41.578491

### Spiny Dogfish Biology

Reports on “Stock Status,” including annual assessment updates, Stock Assessment Workshop (SAW) reports, Stock Assessment Review Committee (SARC) panelist reports and peer-review panelist reports are available online at the NEFSC website: <http://www.nefsc.noaa.gov>. EFH Source Documents, which include details on stock characteristics and ecological relationships, are available at the following website: <http://www.nefsc.noaa.gov/nefsc/habitat/efh/>.

Figure 1 below provides a snapshot of several relevant characteristics of the spiny dogfish stock that influence management of the commercial fishery. Among these are: 1) Spiny dogfish are slow growing and, therefore, recovery of an overly exploited stock can require prolonged rebuilding. 2) Males and females grow at different rates and to different maximum sizes such that the largest fish in the population are almost all female and these are more valuable to the commercial fishery. 3) Litter size, or fecundity, increases with age such that productivity can be markedly hampered by an absence of large females in the stock. 4) Maturity is delayed (12-21 years) in females such that the immature stock is susceptible to mortality for a prolonged period before contributing to stock production.



**Figure 1. Summary of biological characteristics spiny dogfish relevant to the species' commercial fisheries exploitation (from Rago 2010 unpubl.).**

### *Historical Stock Condition*

At the onset of the domestic commercial fishery in the early 1990's, population biomass for the Northwest Atlantic stock of spiny dogfish was at its highest estimated level (approx. 1.2 billion lb). A large scale unregulated fishery developed and quickly depleted the stock of mature female spiny dogfish such that in 1997 a stock assessment showed that the stock was *overfished* (NEFSC 1997). The Spiny Dogfish FMP was developed in 1998 and implemented in 2000 in order to halt further depletion of mature female spiny dogfish and allow the stock to recover to a sustainable level. Because the directed commercial fishery concentrated on mature females, rebuilding required suspension of the directed fishery. The rebuilding program was highly successful and in 2010 the Northeast Regional Office (NERO) of NMFS communicated the *rebuilt* status of the stock to the Councils.

## **Current Status of the Stock**

### Not Overfished

The Bmsy reference point defines when the stock is rebuilt (above Bmsy) and overfished (below  $\frac{1}{2}$  Bmsy). For spiny dogfish, Bmsy (proxy) is the spawning stock biomass that maximizes recruitment (SSBmax) in a Ricker type (dome-shaped) stock-recruitment model. SSBmax is estimated to be 159,288 mt (351 M lb) with  $\frac{1}{2}$  of that target corresponding to the biomass threshold (79,644 mt; 175.5 M lb).

An updated assessment for 2013 was not available at the time this document was prepared. In September 2012, the Northeast Fisheries Science Center (NEFSC) assessment update indicated SSB for 2012 was 215,444 mt (474.972 M lb), about 35% above SSB<sub>max</sub> (159,288 mt). This estimate was associated with a *100% probability that the stock was not overfished*.

### Overfishing not Occurring

The fishing mortality reference point above which overfishing is occurring is  $F_{msy} = 0.2439$ . All accountable sources of removals contribute to the estimate of fishing mortality (F) under the current assessment. For the most recent complete fishing year (2011), these include U.S. commercial landings (20.900 M lb), Canadian and Distant Water Fleet commercial landings (588k lb), U.S. dead discards (10.554 M lb), and U.S. recreational landings (71k lb). Total removals in 2011 were approximately 32.113 M lb corresponding to an F estimate of 0.148, well below  $F_{msy} = 0.2439$ . In updating the assessment, the NEFSC estimated a *100% probability that overfishing was not occurring* ( $F_{2011} < F_{threshold}$ ).

## **Fishery Performance**

Table 2 provides the coastwide quotas and landings for the spiny dogfish fishery since the establishment of the FMP in 2000. Toward the end of the federal rebuilding schedule that ended in 2010, substantial increases in stock biomass allowed for an increase in the federal quota in 2009 to 12 M lb while still maintaining the rebuilding fishing mortality rate. Under the interstate FMP, quota increases began earlier in 2006 – 2008 (Table 3). Note that in 2010-2011, the commercial quota implemented in state waters was lower than for federal waters. Both quotas were based on the same technical advice, however, the state water quota reflects reductions for overages in accordance with Addendum 2 to the ISFMP. Similar accountability measures will be applied in federal waters in accordance with Amendment 2 to the federal FMP.

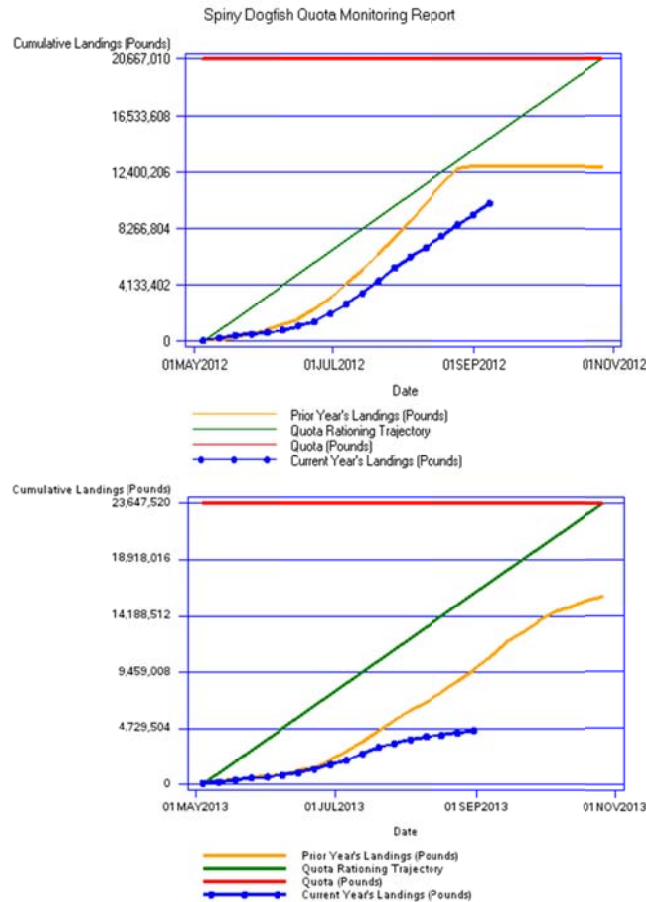
Federal and interstate quotas differed in four of nine years since 2003. The larger of the two quotas was exceeded four times by an average of 7.8%. For the current 2012 fishing year, the commercial fishery is on track to underharvest the quota in Period 1 (Figure 3). If this trend continues to the end of the fishing year, it would be the first time the stock was declared to be rebuilt that the quota is under-harvested. A major purpose for the AP Fishery Performance Report will be to explain non-biological constraints on landings.

**Table 2. Summary of spiny dogfish landings relative to the quota(s) for 2000 - 2011.**

Fishing year (May 1 - Apr 30)	Quota (M lb)		Landings (M lb)
	Federal	States'	
2000	4.0	n/a	8.2
2001	4.0	n/a	5.1
2002	4.0	n/a	4.8
2003	4.0	8.8	3.2
2004	4.0	4.0	1.5
2005	4.0	4.0	2.6
2006	4.0	6.0	6.6
2007	4.0	6.0	6.5
2008	4.0	8.0	9.0
2009	12.0	12.0	11.8
2010	15.0	14.4	14.5
2011	20.0	19.5	22.5
2012	35.7	35.7	28.0*

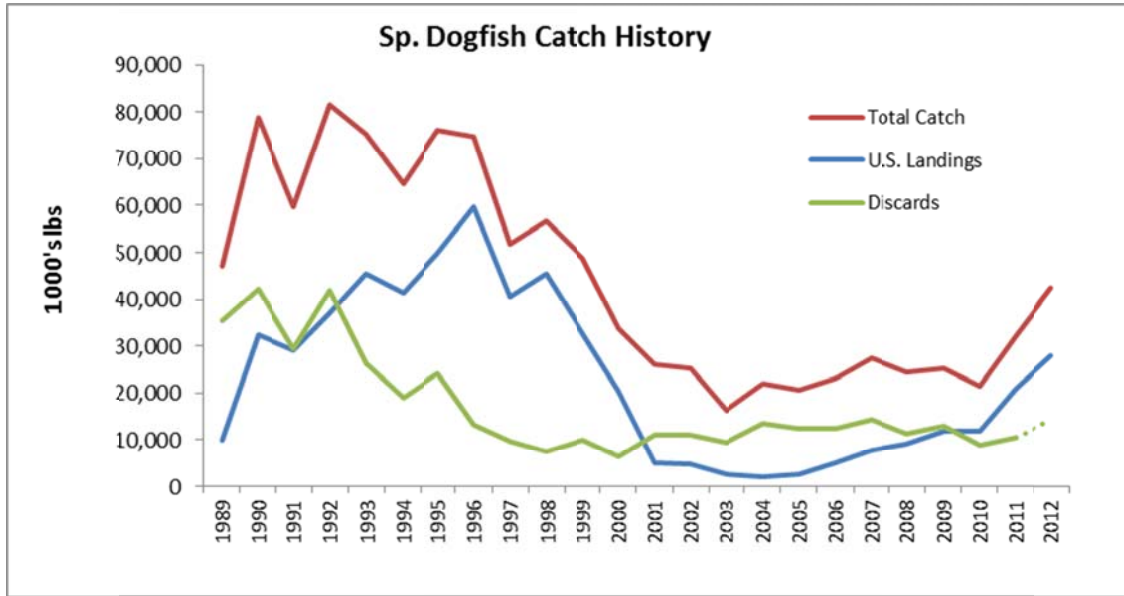
\* From quota monitoring webpage

**Figure 2. Comparison of 2011(top) and 2012 (bottom) commercial landings in mid-September from the [NMFS quota monitoring website](#)**



### Landings History

The catch history for the fishery since 1989 is illustrated in Figure 2. The largest landings occurred during the unregulated fishery of the 1990s. The gradual increase in landings since 2005 is consistent with increasing biomass during rebuilding. A significant increase in landings occurred in 2011 when the quota for the rebuilt stock was increased to 20 M lb.



**Figure 3. History of spiny dogfish landings and discards and total catch from 1989 – 2012. From NMFS 2012 and Dealer reports.**

### Landings by Gear

Certain commercial gear types are associated with the retention of spiny dogfish in federal waters. The catch of spiny dogfish by gear in FY2012 is given in Table 4. Spiny dogfish landings came mostly from sink gillnets (67.58%), bottom otter trawls (20.23%), hook and line (11.58%), as well as unknown or other gear (0.58%).

**Table 3. Commercial gear types associated with spiny dogfish harvest in FY2012. Note that total VTR landings are less than total dealer-reported landings. This is because vessels with state issued permits only are not required to complete VTRs.**

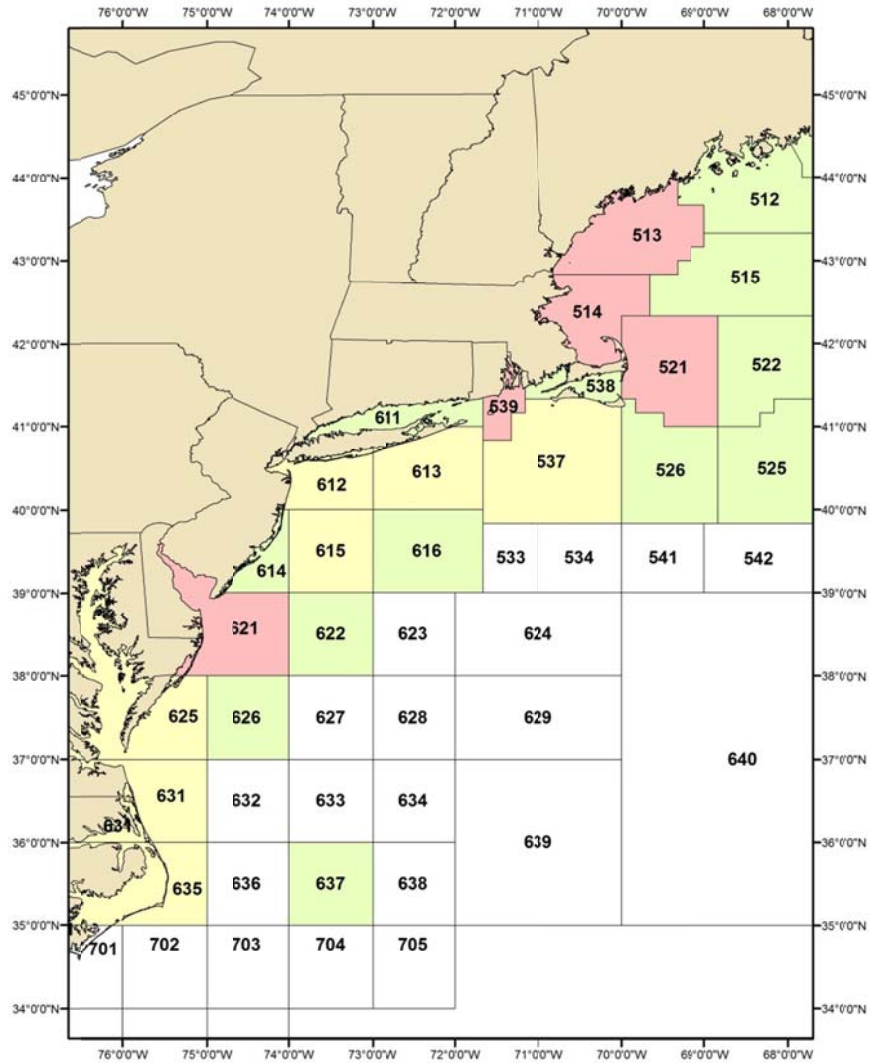
Gear	Lbs	Pct
GILL NET	12,367,393	71.7%
TRAWL, OTTER, BOTTOM	1,791,693	10.4%
HOOK AND LINE	3,067,743	17.8%
OTHER	29,962	0.2%
Total	17,256,791	100.0%

Source: Vessel Trip Reports



*Landings by Area*

The Northeast Region is divided into 46 statistical areas for federal fisheries management (Figure 4). According to VTR data, six statistical areas collectively accounted for 73.04 % of spiny dogfish landings in 2010, with each contributing greater than 5.0 % of the total (Table 5). These areas also represented 73.5% of the trips that landed spiny dogfish suggesting that resource availability as expressed by catch per trip is fairly consistent through the range where harvest occurs.



**Figure 4. NMFS Northeast statistical areas. Shaded areas indicate where spiny dogfish harvest occurs. Red areas comprise 5% or more of harvest, yellow areas 1% to 5% of harvest, and green areas less than 1%.**

**Table 5. Statistical areas that accounted for >1 % of the spiny dogfish catch and/or trips in FY2010 VTR data. Shading (red or green) is provided for reference with Figure 4.**

STATAREA	Trips	lbs	Pct_Trips	Pct_Lbs
514	3,487	4,684,764	29.1%	27.1%
521	2,262	4,354,554	18.9%	25.2%
513	1,839	1,892,981	15.3%	11.0%
621	559	1,083,718	4.7%	6.3%
539	933	927,956	7.8%	5.4%
631	268	674,602	2.2%	3.9%
615	294	646,755	2.5%	3.7%
612	476	617,641	4.0%	3.6%
537	560	540,071	4.7%	3.1%
625	211	442,140	1.8%	2.6%
635	120	433,391	1.0%	2.5%
613	313	353,403	2.6%	2.0%

Source: Vessel Trip Report database

### *Canadian Commercial Spiny Dogfish Landings*

Historic Canadian commercial landings have been low relative to landings from the U.S. commercial fishery (Table 1). In 2001, following the implementation of the U.S. Federal FMP, Canadian landings exceeded U.S. landings for the first time. In 2008, Canadian landings were about 3.5 M lb, but in 2009 landings dropped precipitously to about 250,000 lb. In 2010, the increased availability of U.S. spiny dogfish continued to constrain demand for Canadian product (pers. comm. Barndollar<sup>1</sup> and Marder<sup>2</sup> 2011) even though Canada has allowed a directed fishery under a 2,500 mt (5.512 M lb) quota with no trip limits. In 2010 Canadian landings dropped further to 13,000 lb.

### *Recreational Landings*

As previously stated, no significant recreational fishery exists for spiny dogfish. Some retention of recreationally caught spiny dogfish does occur, however. Recreational landings are provided in the 2012 assessment update.

### *Landings by State*

Commercial harvest has historically been dominated by Massachusetts (Table 6). Starting in 2007, dogfish landings from Virginia were greater than or approximately equivalent to those of Massachusetts. State-by-state landings since 2007 are influenced by the regional allocation of commercial quota through the ASMFC's Interstate FMP. Currently, the ISFMP allocates 58% of the annual quota to a northern region (Maine –Connecticut), and the remaining 42% among

<sup>1</sup> Steve Barndollar was on the MAFMC's Spiny Dogfish Advisory Panel and is the owner of Seatrade Int'l, one of the primary processors of U.S. and Canadian spiny dogfish on the Atlantic Coast. He attended the Spiny Dogfish Monitoring Committee meeting in September 2011.

<sup>2</sup> Brian Marder is the owner of Marder Trawling, Inc., a major processor of U.S. and Canadian spiny dogfish on the Atlantic Coast. He attended the Spiny Dogfish Monitoring Committee meeting in September 2011.

states from New York – North Carolina (NY 2.707%; NJ 7.644%; DE 0.896%; MD 5.920%; VA 10.795%, NC 14.036%).

In fishing year 2011, Massachusetts accounted for 43.6% of coastwide landings (Table 12). North Carolina (13.1%), Virginia (10.7%), New Hampshire (7.9%), and New Jersey (7.8%) were also important landings states. No other states contributed more than 5% of annual landings.

**Table 6. Commercial landings (1,000s lb) of spiny dogfish by state from fishing years 1989 through 2011.**

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	Total
1989	4,962	0	5,100	47	24	13	1,434	0	714	18	0	9,903
1990	6,251	185	20,304	2,968	9	44	4,754	0	5,150	62	41	32,475
1991	2,059	0	13,523	1,901	22	74	2,382	6	3,338	165	1,463	29,049
1992	1,818	405	17,457	2,116	9	140	1,493	0	1,877	220	8,635	37,165
1993	3,408	1,639	26,189	1,554	170	100	707	0	1,893	379	8,806	45,509
1994	1,788	2,610	23,181	603	85	475	1,422	63	2,233	665	6,929	41,447
1995	1,683	2,094	28,789	414	408	815	2,581	0	7,752	1,065	9,525	50,068
1996	904	1,135	27,208	1,518	619	1,381	5,833	0	4,820	4,832	10,304	60,055
1997	437	999	21,417	682	282	312	3,831	0	2,105	3,945	5,924	40,460
1998	288	1,935	24,866	1,906	241	1,704	7,091	2	2,199	5,004	3,928	45,476
1999	28	1,233	14,824	1,237	87	2,868	6,586	0	808	1,750	3,601	32,760
2000	1	2,279	5,545	130	12	145	5	0	0	72	12	20,407
2001	0	529	3,912	395	7	62	17	0	0	178	0	5,056
2002	1	349	3,800	455	6	49	1	0	2	114	0	4,839
2003	0	175	2,006	141	2	41	0	0	5	451	520	2,579
2004	3	0	1,094	129	60	42	7	0	1	39	20	2,160
2005	31	162	1,826	173	93	44	1	0	11	66	10	2,535
2006	180	633	2,744	518	62	11	3	0	16	2,286	144	5,212
2007	99	185	2,796	523	23	21	10	0	25	2,575	167	7,723
2008	49	1,370	3,559	239	10	23	50	0	114	2,479	1,416	9,057
2009	594	1,885	3,881	940	92	192	1,342	14	175	1,487	1,708	11,752
2010	229	1,214	6,442	708	107	468	1,208	8	542	1,731	1,887	14,543
2011	349	1,646	9,069	1,265	187	407	1,628	31	1,265	2,237	2,727	20,811

Source: NMFS Commercial Fisheries Database.

### *Landings by Month*

Under the current federal FMP, the annual commercial quota is allocated seasonally to two half-year periods. Period 1 (May 1 – Oct 31) is allocated 57.9% of the quota and Period 2 is allocated 42.1% of the quota. This allocation scheme was implemented as part of the rebuilding plan in order to match seasonal availability of the resource with the historic landings patterns by communities over the fishing year. Upon implementation of Amendment 3 to the FMP, there will be no seasonal allocation of the federal coastwide quota. The elimination of this provision is being implemented to minimize conflicts with the ASMFC plan which allocates the coastwide quota by state and region, rendering moot any federal attempt to use seasons as a proxy for regional allocation.

In fishing year 2011, spiny dogfish were landed in all months with peak landings occurring in June-August of Period 1 and Nov – Jan of Period 2 (Table 13).

**Table 1. Spiny dogfish landings (lb) by month in FY2011.**

	<b>Month</b>	<b>Landings(lb)</b>	<b>Pct of Total</b>
<b>Period 1</b>	May	668,690	3.21%
	Jun	2,289,432	11.00%
	Jul	4,842,812	23.27%
	Aug	5,101,594	24.51%
	Sep	27,861	0.13%
	Oct	153	0.00%
	<b>Total</b>	<b>12,930,542</b>	<b>62.13%</b>
<b>Period 2</b>	Nov	2,678,766	12.87%
	Dec	1,894,919	9.11%
	Jan	2,990,281	14.37%
	Feb	102,685	0.49%
	Mar	135,241	0.65%
	Apr	78,289	0.38%
	<b>Total</b>	<b>7,880,181</b>	<b>37.87%</b>
	<b>Grand Total</b>	<b>20,810,723</b>	<b>100.00%</b>

Source: NEFSC NMFS Commercial Fisheries Database, SEFSC General Canvass Data

### **6.4.3 Commercial Fishery Value**

Unpublished NMFS dealer reports indicate that the total ex-vessel value of commercially landed spiny dogfish in calendar year 2011 was about \$4.646 million, and in fishing year 2011 was about \$4.456 million. The approximate price/lb of spiny dogfish was \$0.22 and \$0.21 in those timeframes, respectively (Table 8).

**Table 8. Ex-vessel value and price per pound of commercially landed spiny dogfish, Maine - North Carolina combined, 2000-2011.**

Calendar Year	Value (\$1,000)	Price (\$/lb)	Fishing Year	Value (\$1,000)	Price (\$/lb)
2000	4,342	0.21	2000	1,989	0.24
2001	1,137	0.22	2001	1,147	0.23
2002	989	0.20	2002	970	0.20
2003	364	0.14	2003	415	0.12
2004	311	0.14	2004	260	0.17
2005	479	0.19	2005	545	0.21
2006	1,188	0.23	2006	1,434	0.22
2007	1,508	0.20	2007	1,360	0.20
2008	2,207	0.24	2008	2,157	0.24
2009	2,544	0.21	2009	2,360	0.22
2010	2,674	0.22	2010	3,119	0.21
2011	4,646	0.22	2011	4,456	0.21

Source: NMFS Commercial Fisheries Database

In FY2011, 174 vessels with federal dogfish permits were reported in the dealer data to have had dogfish revenues greater than 5% of total revenue (dogfish revenue range \$100 to 51,029, average = \$14,454; dogfish rev / total rev range 5.0% to 100%, average = 41.0%).

*Commercial Vessel and Dealer Activity*

According to unpublished NMFS permit file data, 2,743 vessels were issued federal spiny dogfish permits in 2011, while 326 of these vessels contributed to overall landings. The distribution of permitted and active vessels by home port state is given in Table 10. Most of the active vessels were from Massachusetts (31.6%), New Jersey (14.7%), New Hampshire (11.4%), Rhode Island (9.8%), New York (8.0%), North Carolina (6.7%), and Virginia (5.8%). The remaining 39 vessels from all other states comprised 12.0% of the total.

**Table 2. Federally permitted dogfish vessel activity by home port state in FY2011. Active vessels are defined as vessels identified in the dealer reports as having landed spiny dogfish in FY2011.**

State	Permitted Vessels	Pct of Total	State	Active Vessels	Pct of Total
MA	1,012	36.89%	MA	103	31.60%
NJ	404	14.73%	NJ	48	14.72%
RI	176	6.42%	NH	37	11.35%
NY	283	10.32%	RI	32	9.82%
NC	157	5.72%	NY	26	7.98%
VA	126	4.59%	NC	22	6.75%
NH	131	4.78%	VA	19	5.83%
ME	303	11.05%	ME	16	4.91%
MD	41	1.49%	MD	13	3.99%
CT	51	1.86%	CT	8	2.45%
DE	26	0.95%	Other	2	0.61%
PA	17	0.62%	<b>Total</b>	<b>326</b>	<b>100.00%</b>
FL	11	0.40%			
Other	5	0.18%			
<b>Total</b>	<b>2,743</b>	<b>100.00%</b>			

Source: NMFS permit data, Commercial Fisheries Database

NMFS permit data indicate that 311 dealers possessed federal spiny dogfish dealer permits in 2010 while dealer reports indicate 76 of those dealers actually bought spiny dogfish. The distribution of permitted and active dealers by state is given in Table 11. Most of the active dealers were from the states of Massachusetts (27.63%), New York (21.05%), Rhode Island (13.16%), North Carolina (13.16%), New Jersey, (9.21%), Virginia (6.58), and Maine (3.95%) with the remaining four dealers in other states comprising 5.26% of the total.

**Table 3. Federally permitted spiny dogfish dealers by state in FY2011. Active dealers are defined as dealers identified in the federal dealer reports as having bought spiny dogfish in FY2011.**

State	Permitted Dealers	Pct of Total	State	Active Dealers	Pct of Total
MA	85	27.33%	MA	21	27.63%
NY	68	21.86%	NY	16	21.05%
NJ	39	12.54%	RI	10	13.16%
RI	33	10.61%	NC	10	13.16%
NC	25	8.04%	NJ	7	9.21%
ME	20	6.43%	VA	5	6.58%
VA	18	5.79%	ME	3	3.95%
MD	8	2.57%	Other	4	5.26%
NH	7	2.25%	<b>Total</b>	<b>76</b>	<b>100.00%</b>
CT	3	0.96%			
PA	3	0.96%			
Other	2	0.64%			
<b>Total</b>	<b>311</b>	<b>100.00%</b>	Source: NMFS permit data, Commercial Fisheries Database		

### Port and Community Description

Spiny dogfish landings were reported from a total of 68 unique ports in the dealer data. Landings by port for FY2011 are given in Table 15. Gloucester, MA accounted for the largest share of total FY2011 landings (16.37%), followed by Chatham, MA (16.27%), Scituate, MA (6.00%), New Bedford, MA (5.99%), and VA Beach/Lynnhaven, VA (5.50%). No other port comprised greater than 5% of total landings.

Spiny dogfish revenue was calculated as a % of total port revenue and was both greater than \$100,000 and greater than 1% of port revenue in Virginia Beach/Lynnhaven, VA (9.7%), Rye, NH (6.2%), Scituate, MA (7.6%), and Seabrook, NH (5.4%). Port descriptions for these ports from the NEFSC's "Community Profiles for the Northeast US Fisheries" are provided in Appendix 1. A complete set of profiles is online:

<http://www.nefsc.noaa.gov/read/socialsci/communityProfiles.html>

Table 4. Commercial landings (lb) and value of spiny dogfish by port for fishing year 2011.

Port	Landings (lb)	Pct of Total	Value (\$)	Pct of Total	Total Port Value (\$)	Dogfish Value / Port Value
GLOUCESTER, MASSACHUSETTS	2,864,652	16.37%	570,141	14.62%	45,509,416	1.3%
CHATHAM, MASSACHUSETTS	2,846,747	16.27%	546,656	14.02%	14,218,775	3.8%
SCITUATE, MASSACHUSETTS	1,049,300	6.00%	231,160	5.93%	3,060,331	7.6%
NEW BEDFORD, MASSACHUSETTS	1,048,340	5.99%	302,517	7.76%	289,648,827	0.1%
VIRGINIA BEACH/LYNNHAVEN, VIRGINIA	962,000	5.50%	221,255	5.67%	2,286,877	9.7%
OCEAN CITY, MARYLAND	806,402	4.61%	189,602	4.86%	5,032,587	3.8%
BARNEGAT LIGHT/LONG BEACH, NEW JERSEY	779,662	4.46%	181,377	4.65%	23,688,379	0.8%
POINT JUDITH, RHODE ISLAND	700,592	4.00%	123,671	3.17%	30,697,930	0.4%
POINT PLEASANT, NEW JERSEY	636,570	3.64%	144,866	3.71%	19,392,086	0.7%
LITTLE COMPTON, RHODE ISLAND	556,233	3.18%	125,692	3.22%	3,369,617	3.7%
PORTSMOUTH, NEW HAMPSHIRE	537,737	3.07%	124,327	3.19%	4,737,034	2.6%
RYE, NEW HAMPSHIRE	536,330	3.07%	144,805	3.71%	2,347,292	6.2%
SEABROOK, NEW HAMPSHIRE	451,521	2.58%	121,179	3.11%	2,234,730	5.4%
All Others (55)	3,719,465	21.26%	873,160	22.39%	301,429,058	0.29%
<b>Total</b>	<b>17,495,551</b>	<b>100.00%</b>	<b>3,900,408</b>	<b>100.00%</b>	<b>747,652,939</b>	<b>0.52%</b>

Source: Unpublished NMFS dealer reports

### Bycatch

Discards of non-target species in the directed spiny dogfish fishery are difficult to characterize since defining the directed fishery can be done a number of ways. Gear-specific landings data suggest that catch composition varies among gears and that some gear (e.g., bottom longline) are more likely to produce catches that are predominantly spiny dogfish, while other gear (e.g., bottom trawls) are characterized by a more diverse catch. Discards have been tabulated for observed trips in 2011 where any dogfish were retained and are summarized in Table 7.

On gillnet trips, spiny dogfish comprised 61.09% of total observed discards, with other major discard species including lobster (11.20%), and winter skate (5.35%), and seven other species comprising between 1% and 5% of discards (Table 7) with 56 other species less than 1% each, but in aggregate 6.70% of total discards.

On observed bottom longline trips, a total of 19 species besides spiny dogfish were accounted for in the discards. Atlantic cod comprised 29.90% of discards, spiny dogfish 28.30%, thorny skate 27.90%, and five other species comprising between 1% and 5% of discards (Table 7) and twelve other species less than 1% each, but in aggregate 3.40% of total discards.

On observed trawl trips, spiny dogfish comprised 30.41% of discards, little skate 13.36%, and winter skate 10.36%, and red hake 5.13%. Thirteen other species comprised between 1 and 5% of discards (Table 7), and 92 additional discard species were less than 1% each, but in aggregate, 13.90% of total discards.

The species composition would likely be different if only trips that directed on spiny dogfish were considered. Those trips represent a subset of the trips where any amount of spiny dogfish was landed and would likely include a smaller suite of bycatch species.

**Table 5. Discards associated with the dominant gear types used to harvest spiny dogfish in Fishing Year 2011 as reported in northeast fisheries observer program (NEFOP) data when any spiny dogfish were landed. Species comprising 1% or more of the discards by gear are shown. Stock status for each discard species is also indicated (see below)**

Hook and Line			Gill Net, Sink			Trawl, Otter, Bottom		
Discard Species	Discards (lb)	Pct Of Total for this Gear	Discard Species	Discards (lb)	Pct Of Total for this Gear	Discard Species	Discards (lb)	Pct Of Total for this Gear
COD, ATLANTIC <sup>d,e</sup>	955	29.90%	DOGFISH, SPINY <sup>a,b</sup>	53,272	61.09%	DOGFISH, SPINY <sup>a,b</sup>	111,986	30.41%
DOGFISH, SPINY <sup>a,b</sup>	905	28.30%	LOBSTER <sup>a,b</sup>	9,770	11.20%	SKATE, LITTLE <sup>a,b</sup>	49,211	13.36%
SKATE, THORNY <sup>a,d</sup>	893	27.90%	SKATE, WINTER <sup>a,b</sup>	6,995	8.02%	SKATE, WINTER <sup>a,b</sup>	38,136	10.36%
SKATE, WINTER <sup>a,b</sup>	99	3.10%	SKATE, BARNDOOR <sup>a,b</sup>	2,249	2.58%	HAKE, RED <sup>a,b</sup>	18,891	5.13%
BASS, STRIPED <sup>A,B</sup>	75	2.30%	MONKFISH <sup>a,b</sup>	2,196	2.52%	SKATE, NK <sup>n/a</sup>	17,701	4.81%
LOBSTER <sup>a,b</sup>	72	2.30%	SKATE, THORNY <sup>a,d</sup>	1,712	1.96%	HAKE, SILVER <sup>a,b</sup>	16,420	4.46%
SKATE, BARNDOOR <sup>a,b</sup>	48	1.50%	SKATE, LITTLE <sup>a,b</sup>	1,526	1.75%	CRAB, HORSESHOE <sup>C,F</sup>	11,924	3.24%
OCEAN POUT <sup>d,b</sup>	41	1.30%	RAVEN, SEA <sup>n/a</sup>	1,339	1.54%	HAKE, SPOTTED <sup>n/a</sup>	7,900	2.15%
OTHER (12 sp.)	108	3.40%	BLUEFISH <sup>a,b</sup>	1,217	1.40%	SCALLOP, SEA <sup>a,b</sup>	5,868	1.59%
			COD, ATLANTIC <sup>d,e</sup>	1,063	1.22%	FLOUNDER, WINTER <sup>mixed - a,d,b</sup>	5,746	1.56%
			OTHER (56 sp.)	5,866	6.70%	STARFISH, SEASTAR, NK <sup>n/a</sup>	5,559	1.51%
						SKATE, BARNDOOR <sup>a,b</sup>	5,543	1.51%
						BUTTERFISH <sup>a,d</sup>	5,513	1.50%
						LOBSTER <sup>a,b</sup>	4,962	1.35%
						FLOUNDER, WINDOWPANE <sup>d,e</sup>	3,997	1.09%
						FLOUNDER, SUMMER <sup>a,b</sup>	3,850	1.05%
						FLOUNDER, FOURSPOT <sup>n/a</sup>	3,821	1.04%
						OTHER (92 sp.)	51,244	13.90%
<b>Total</b>	<b>3,088</b>	<b>100%</b>	<b>Total</b>	<b>81,339</b>	<b>100%</b>	<b>Total</b>	<b>368,271</b>	<b>100%</b>

<sup>a</sup> not overfished, <sup>b</sup> overfishing not occurring, <sup>c</sup> overfished is unknown, <sup>d</sup> overfished, <sup>e</sup> overfishing is occurring, <sup>f</sup> overfishing unknown, <sup>n/a</sup> not applicable; <sup>A,B</sup> not overfished, no overfishing (ASMFC), <sup>C,F</sup> status unknown (ASMFC)

Source: Northeast Fishery Observer Program, 3<sup>rd</sup> Quarter 2012 NMFS Fish Stock Sustainability Index





**Mid-Atlantic Fishery Management Council**  
800 North State Street, Suite 201, Dover, DE 19901-3910  
Phone: 302-674-2331 | Toll Free: 877-446-2362 | FAX: 302-674-5399 | www.mafmc.org  
Richard B. Robins, Jr., Chairman | Lee G. Anderson, Vice Chairman  
Christopher M. Moore, Ph.D., Executive Director

## MEMORANDUM

**DATE:** September 12, 2013  
**TO:** Chris Moore, Executive Director  
**FROM:** Jim Armstrong  
**SUBJECT:** Spiny Dogfish ABC and Management Measures for 2014

### Summary

The existing spiny dogfish specifications established management measures for the 2013 - 2015 fishing years. Management measures for the upcoming 2014 fishing year may remain unchanged if the previously recommended ABC for 2014 (25,154 mt) is determined by the SSC to still be appropriate following review of an updated assessment. The 2013 assessment update (Attachment A) indicates that, as in the 2012 update, the spiny dogfish stock is not overfished and overfishing is not occurring. The estimate of mature female biomass (211,372 mt) for 2013 is 133 % of  $B_{MSY}$  (159,288 mt) and realized  $F$  for 2012 (0.149) is approximately 61% of  $F_{MSY}$  (0.2439).

The staff recommendation is to maintain the specified  $ABC = 25,154$  mt as the basis for management measures in 2014. ABC for 2014 was derived by applying constant  $F = 0.19528$  in harvest projections where  $F=0.19528$  corresponded to the  $P^*$ -based ABC for 2013 given  $OFL = 30,652$  mt and  $B_{2012}/B_{MSY} > 1$ . Application of the  $P^*$  algorithm for 2014, based on updated  $OFL$  (32,210 mt) generates  $ABC = 26,085$  mt, a 3.7% increase from the specified ABC suggesting that the ABC specified for 2014 may be risk averse.

In accordance with the Council's Omnibus ACL/AM Amendment, for spiny dogfish, a *domestic* ABC is set equal to total ABC minus Canadian landings and  $ACL = \text{domestic ABC}$ . A value of 81 mt Canadian landings (ave 2009-2011) was used to calculate the domestic ABC / ACL for 2014, and the updated Canadian landings are 65 mt (ave 2010-2012). The ACT for 2014 (24,174 mt) was reduced from ACL based on observed quota overages of about 4.5% from 2010-2011. Updated landings show an average underharvest of 4.5% since 2010 which could offset a deduction for management uncertainty. Similar updates such as estimated discards (5,306 mt specified, updated to 5,264 mt) and U.S. recreational landings (26.5 mt specified, updated to 24.0 mt) could be set lower than originally specified.

Multi-year management measures were established in 2012 because stock conditions permitted and because the stability provided by multi-year management measures benefits stakeholders. Current market conditions suggest that the fishery would be unable to accommodate the potential increases in the commercial quota, and as such, maintaining the specified measures for 2014 will not reduce fishing opportunity.

## **Introduction**

The specification of spiny dogfish management measures is a joint process conducted by the Mid-Atlantic and New England Fishery Management Councils (Councils). A separate specification process is also undertaken by the Atlantic States Marine Fisheries Commission's Spiny Dogfish Management Board (Board). The Northeast Fishery Science Center (Center) annually updates the spiny dogfish assessment and conducts long-term projections. The Mid-Atlantic Council's Scientific and Statistical Committee (SSC) reviews assessment results and determines the acceptable biological catch (ABC) for the upcoming year or reviews previous ABC determinations within a multi-year specification period (up to five years). The Councils' Spiny Dogfish Monitoring Committee (MC) develops and recommends specific coastwide (Maine – Florida) management measures, including a commercial quota and trip limit, and makes further adjustments to total catch as needed based on management uncertainty. Finally, the Councils, at their respective meetings, develop recommendations to be submitted to the National Marine Fisheries Service.

In this memorandum, information is presented to assist the SSC and MC in their roles in the specification process for 2014. The existing spiny dogfish specifications established management measures for the current 2013 as well as the upcoming 2014 - 2015 fishing years. Specified management measures may remain unchanged if the previously recommended ABC for 2014 (25,154 mt) is determined by the SSC to still be appropriate following review of the updated assessment. Assessment update results are presented briefly herein and a detailed Stock Status Report prepared by the Center is attached under separate cover. That and other listed documents are distributed in conjunction with this staff memo:

Attachment A: Stock Status Report (NEFSC 2013)

Attachment B: SSC Report from 2012

Attachment C: Fishery Performance Report

## **Management History**

A long term landings history (1962-2012) is provided in Table 1 of Attachment A. The federal FMP was developed in 1998 and implemented in 2000 in order to halt large scale depletion of reproductively mature female spiny dogfish and allow the stock to recover to a sustainable level. The directed dogfish fishery of the 1990s harvested primarily the largest (80+ cm) spiny dogfish in the stock, and the species' life history is such that these fish are primarily mature females. The FMP eliminated the directed fishery for spiny dogfish beginning in 2000 by instituting a 4 million pound (1,814 mt) commercial quota that essentially served as a bycatch allowance. Substantial increases in SSB followed and an increase in the commercial quota to 12 million pounds (5,443 mt) in 2009 was possible while continuing to achieve  $F_{rebuild}$ . The stock was declared rebuilt in 2010 and commercial quotas have increased markedly since then (15 M lb in 2010; 20 M lb in 2011; 36 M lb in 2012, and ~41 M lb in 2013-2015).

## **Regulatory Review (Current Management Measures)**

For the current 2013-2015 fishing years (Table 1), the SSC recommended ABC based on  $F = 0.19528$  which was the fishing mortality rate that corresponded to  $P^*$ -based ABC in 2013 (Attachment B). Constant  $F$  was applied to projections and provided ABC for 2014 and 2015 as well. The SSC chose to limit multi-year ABC to three years, ending in 2015, because projected biomass showed a decline beginning in 2016 as the low 1997-2003 year classes recruited into the exploitable stock.

Based on recommendations from the spiny dogfish monitoring committee for 2013, the Council adopted a commercial quota of 40.842 M lbs (18,526 mt) and trip limits of 4,000 lbs. The commercial quota accommodated a reduction from ABC to allow for average discards (5,306 mt) as well as recreational landings (26 mt) taken from the 2012 assessment update (Table 1).

**Table1. Derivation of spiny dogfish quotas for 2013 through 2015.**

2013 Measures	Basis	M lb	MT
OFL	$F_{MSY} (0.2439)$	67.576	30,652
ABC	$Constant F (0.19528)$	54.474	24,709
Canadian Landings	$= ave\ 2009-2011$	0.179	81
Domestic ABC	$= ABC - Canadian\ Landings$	54.295	24,628
ACL	$= Domestic\ ABC$	54.295	24,628
Mgmt Uncertainty Buffer	$Ave\ of\ quota\ overages\ (pct)\ in\ 2010-2011\ (4.0\%)$	1.697	770
ACT	$= Domestic\ ACL - management\ uncertainty$	52.598	23,858
U.S. Discards	$= ave\ 2002-2011$	11.698	5,306
TAL	$ACT - Discards$	40.900	18,552
U.S. Rec Landings	$= ave\ 2010-2011$	0.058	26
Comm Quota	$TAL - Rec\ Landings$	40.841896	18,526

2014 Measures	Basis	M lb	MT
OFL			
ABC	$Constant F (0.19528)$	55.455	25,154
Canadian Landings	$= ave\ 2009-2011$	0.179	81
Domestic ABC	$= ABC - Canadian\ Landings$	55.277	25,073
ACL	$= Domestic\ ABC$	55.277	25,073
Mgmt Uncertainty Buffer	$Ave\ of\ quota\ overages\ (pct)\ in\ 2010-2011\ (4.0\%)$	1.737	788
ACT	$= Domestic\ ACL - management\ uncertainty$	53.540	24,285
U.S. Discards	$= ave\ 2002-2011$	11.698	5,306
TAL	$ACT - Discards$	41.842	18,979
U.S. Rec Landings	$= ave\ 2010-2011$	0.058	26
Comm Quota	$TAL - Rec\ Landings$	41.783807	18,953

2015 Measures	Basis	M lb	MT
OFL			
ABC	$Constant F (0.19528)$	55.241	25,057
Canadian Landings	$= ave\ 2009-2011$	0.179	81
Domestic ABC	$= ABC - Canadian\ Landings$	55.063	24,976
ACL	$= Domestic\ ABC$	55.063	24,976
Mgmt Uncertainty Buffer	$Ave\ of\ quota\ overages\ (pct)\ in\ 2010-2011\ (4.0\%)$	1.728	784
ACT	$= Domestic\ ACL - management\ uncertainty$	53.335	24,192
U.S. Discards	$= ave\ 2002-2011$	11.698	5,306
TAL	$ACT - Discards$	41.637	18,886
U.S. Rec Landings	$= ave\ 2010-2011$	0.058	26
Comm Quota	$TAL - Rec\ Landings$	41.578491	18,860

## **Biological Reference Points**

The  $B_{MSY}$  proxy for spiny dogfish is "spawning" stock biomass ( $SSB_{MAX}$ ), which is estimated to be 159,288 mt (351.170 M lb), and the level at which the stock is determined to be overfished ( $\frac{1}{2} B_{MSY}$ ) is 79,644 mt (175.585 M lb). The  $B_{MSY}$  proxy was reviewed and accepted by TRAC reviewers in 2010 and is described in Rago and Sosebee (2010).

Overfishing occurs when fishing mortality is above the  $F_{MSY}$  proxy which is estimated to be 0.2439. The current  $F_{MSY}$  proxy was accepted for use as a basis for OFL by an SSC working group in August, 2011.

### **Stock Biomass**

*The spiny dogfish stock is not overfished.* The updated stochastic estimate of female spawning stock biomass (SSB) for 2013 (211,372 mt) is about 33% above the  $SSB_{max}$  biomass target (159,288 mt). This is the sixth consecutive year in which the SSB estimate has been above  $SSB_{max}$ . The probability that the  $SSB_{2013}$  is below  $SSB_{max}$  is estimated to be less than 25%. The probability that  $SSB_{2013}$  is above the biomass threshold (79,644 mt, i.e.,  $\frac{1}{2} SSB_{max}$ ) is estimated to be 98%.

Uncertainty in the biomass estimate is accounted for in the underlying variability in the spring trawl survey data as well as uncertainty in the size of the footprint of the average trawl tow. Uncertainty in the Ricker S-R based biomass reference point is accounted for in the confidence interval associated with model fit.

### **Fishing Mortality**

Several sources of removals contribute to the estimate of  $F$  for the most recent complete fishing year (2012). These include U.S. commercial landings (10,660 mt), Canadian commercial landings (65 mt), Distant Water Fleet landings (137 mt), U.S. commercial discards (4,848 mt), and U.S. recreational landings (19 mt). Total removals in 2012 were approximately 15,729 mt corresponding to a stochastic  $F$  estimate of  $F_{2012} = 0.149$ , below the overfishing threshold of  $F = 0.2439$  and. The probability that *overfishing is not occurring* ( $F_{2012} < F_{threshold}$ ) is approximately 91%.

Uncertainty is quantified in model estimates of  $F$  and is based on uncertainty in biomass as well as the variance associated with discard estimates, sex ratio, size composition, selectivity and other parameters (Attachment A). Uncertainty in the fishing mortality reference point corresponding to OFL is also estimated (Attachment A).

### **Other Sources of Uncertainty**

Because spiny dogfish biomass estimates are primarily based on catches in the Center's spring trawl survey, an important source of uncertainty is the calibration between the R/V Albatross and FSV Bigelow. The efficiency of the RV Albatross net is estimated to be approximately 64% that of the FSV Bigelow.

Other important sources of scientific uncertainty:

- Canadian landings
- Changes in selectivity

- Discards
- Scaling with landings
- Fate of discarded fish
- Scale of population—Q
- Sex ratios of landings
- Male dogfish

### Specification of 2014 ABC and Management Measures

ABC, ACL, ACT, and the commercial quota and trip limit for 2014 were established as part of three year (2013-2015) specifications. Those measures will remain in place unless ABC is determined by the SSC to no longer be appropriate or if the Council chooses to modify any of the measures. Based on the assessment update, ABC and other management measures could be modified to allow for greater available yield than currently specified. Potential adjustments to the specified values for 2014 are provided in Table 2. The adjusted commercial quota could be increased by as much as 9.2% if ABC is adjusted and 4.5% if ABC is not adjusted. Although these adjustments would accommodate larger potential landings, the fishery has underperformed recently and so the currently specified measures are not expected to constrain harvest or reduce fishing opportunity in 2014.

**Table2. Derivation of spiny dogfish quotas for 2014.**

2014 Measures	Basis	(Existing)		ABC Update (mt)	No ABC Update (mt)
		M lb	mt		
OFL				32,210	
ABC	<i>Constant F (0.19528)</i>	55.455	25,154	26,085*	25,154
Canadian Landings	<i>= ave 2009-2011</i>	0.179	81	65	65
Domestic ABC	<i>= ABC – Canadian Landings</i>	55.277	25,073	26,020	25,089
ACL	<i>= Domestic ABC</i>	55.277	25,073	26,020	25,089
Mgmt Uncertainty Buffer	<i>Ave of quota overages (pct) in 2010-2011 (4.0%)</i>	1.737	788	0	0
ACT	<i>= Domestic ACL – management uncertainty</i>	53.540	24,285	26,020	25,089
U.S. Discards	<i>= ave 2002-2011</i>	11.698	5,306	5264	5264
TAL	<i>ACT – Discards</i>	41.842	18,979	20,756	19,825
U.S. Rec Landings	<i>= ave 2010-2011</i>	0.058	26	24	24
Comm Quota	<i>TAL – Rec Landings</i>	41.783807	18,953	20,732	19,801

\* The updated ABC is based on the Council's risk policy for a level 3 assessment.

### **ABC**

ABC for 2014 (25,154 mt) was developed as part of a multi-year ABC determination made by the SSC in 2012 and the value for ABC was derived by applying constant  $F = 0.19528$  to long term spiny dogfish projections. The value  $F=0.19528$  corresponded to  $P^*$ -based ABC for 2013 given  $OFL = 30,652$  mt and  $B_{2012}/B_{MSY} > 1$ . The biomass estimate for 2013 (211,372 mt) represents a small decline from 2012 biomass (217,744 mt), however, the estimate remains more than 30% above  $B_{MSY}$ . Application of the risk policy algorithm for 2014 based on updated  $OFL$  (32,210 mt) and  $B_{2013}/B_{MSY} > 1$  generates  $ABC = 26,085$  mt, a 3.7% increase from the specified ABC (25,154 mt) suggesting that ABC could be increased and that the existing 2014 ABC may be risk averse.

### **ACL**

According to the FMP, a reduction from ABC to accommodate Canadian landings is made to derive domestic ABC which is defined as equal to the ACL. For 2014, the specified deduction for Canadian

landings is 81 mt (ave 2009-2011) resulting in domestic ABC (i.e., ACL) = 25,073 mt (Table 1). Canadian landings from the updated assessment are 65 mt (ave 2009-2012) which suggests that ACL could be increased to as much as 26,020 mt if ABC is adjusted or 25,089 mt if ABC is not adjusted.

### ACT

The Annual Catch Target (ACT) accounts for management uncertainty, and for 2014, the ACT (24,174 mt) was reduced from ACL based on observed quota overages of about 4% from 2010-2011. Updated landings show an average underharvest of 4% since 2010 which could offset a deduction for management uncertainty. Because of the underharvest, the existing deduction from the domestic ACL (1,001 mt; 2.208 M lb) may be thought of as resulting in foregone yield.

**Table 3. Summary of spiny dogfish landings relative to the quota(s) for 2000 - 2012.**

Fishing year (May 1 - Apr 30)	Quota (M lb)		Landings (M lb)
	Federal	States'	
2000	4.0	n/a	8.2
2001	4.0	n/a	5.1
2002	4.0	n/a	4.8
2003	4.0	8.8	3.2
2004	4.0	4.0	1.5
2005	4.0	4.0	2.6
2006	4.0	6.0	6.6
2007	4.0	6.0	6.5
2008	4.0	8.0	9.0
2009	12.0	12.0	11.8
2010	15.0	14.4	14.5
2011	20.0	19.5	22.5
2012	35.7	35.7	28.0*

\* From quota monitoring webpage

### TAL/Commercial Quota

The TAL and commercial quota are calculated according to the process illustrated in Figure 1. For 2014, the deduction for U.S. discards is 5,306 mt (ave 2010-2011) resulting in a TAL of 18,979 mt. Updated discards (ave 2010-2012) are 5,264 mt which could allow the TAL to be adjusted upward to 19,825 mt if ABC is not adjusted and upward to 20,756 mt if ABC is adjusted.

The current deduction for recreational landings is 26.5 mt (ave 2010-2011) resulting in a commercial quota of 18,953 mt. Updated recreational landings are 24.0 mt which would allow the commercial quota to be adjusted upward to 19,801 mt if ABC is not adjusted or upward to 20,732 mt if ABC is adjusted.

### Trip Limits

No adjustment to the existing 4,000 pound trip limit is recommended. It was suggested in the Fishery Performance Report (Attachment C) that reconsideration of a single coastwide trip limit would be desirable to many fishermen. An adjustment to the trip limit could be accomplished through the 2016 specifications.

## **Market Issues**

As mentioned in the Fishery Performance Report, there is currently very low demand in the EU for spiny dogfish, and as such domestic processors are not accepting the species at their facilities in typical quantities. The processors normally accept dogfish seven days/week, but they are now only accepting reduced dogfish limits a few days/week. There was an apparent method and standard issue involving PCB detection for seafood in the EU. This has held up demand for the product and has, at least, temporarily depressed that market. There is some hope that as the fresh market opens up, which is usually the beginning of September, the issue may subside.

Apart from this anomalous issue, the overall export demand for the fresh and/or frozen product is not sufficient to accommodate the entire specified 2014 quota of 41 M lb (pers. comm. John Whiteside, Sustainable Fisheries Assoc.). Landings at the levels observed in fishing year 2012 (approximately 30 M lb) are likely to be the standard until a major shift in market demand occurs. Figure 2, below, illustrates the rate of commercial spiny dogfish landings into early September for the current and previous year, which was insufficient to achieve the 2012 quota and is likely insufficient to achieve the larger 2013 quota. Because of these issues, it is not expected that increased available landings would be harvested if management measure adjustments or ABC were to be revised.

## **Summary**

- The spiny dogfish population is not overfished and overfishing is not occurring for this stock.
- ABC and management measures have already been specified for 2013-2015.
- Although additional catch is available given potential revisions to ABC and management measures, the market would likely be unable to accommodate the increases.
- The staff recommendation is to maintain the existing ABC and management measures for 2014.

### Spiny Dogfish Flowchart

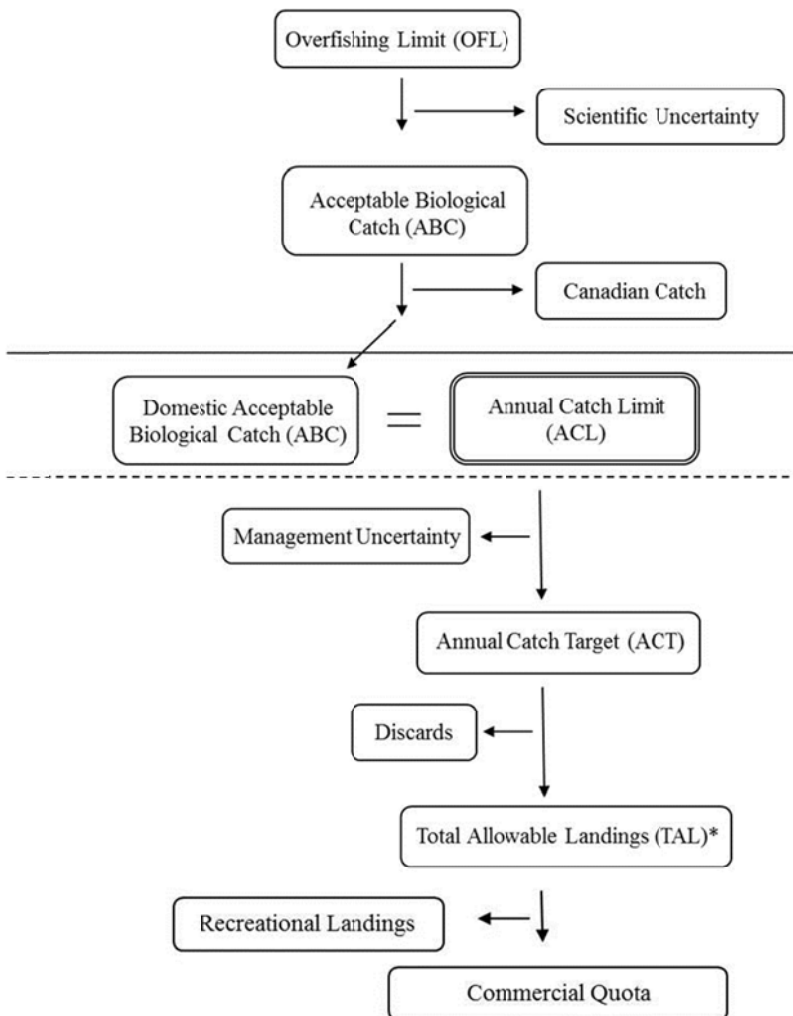


Figure 1. Specification process for spiny dogfish catch regulations as described in the Omnibus ACL/AM Amendment (MAFMC 2011).



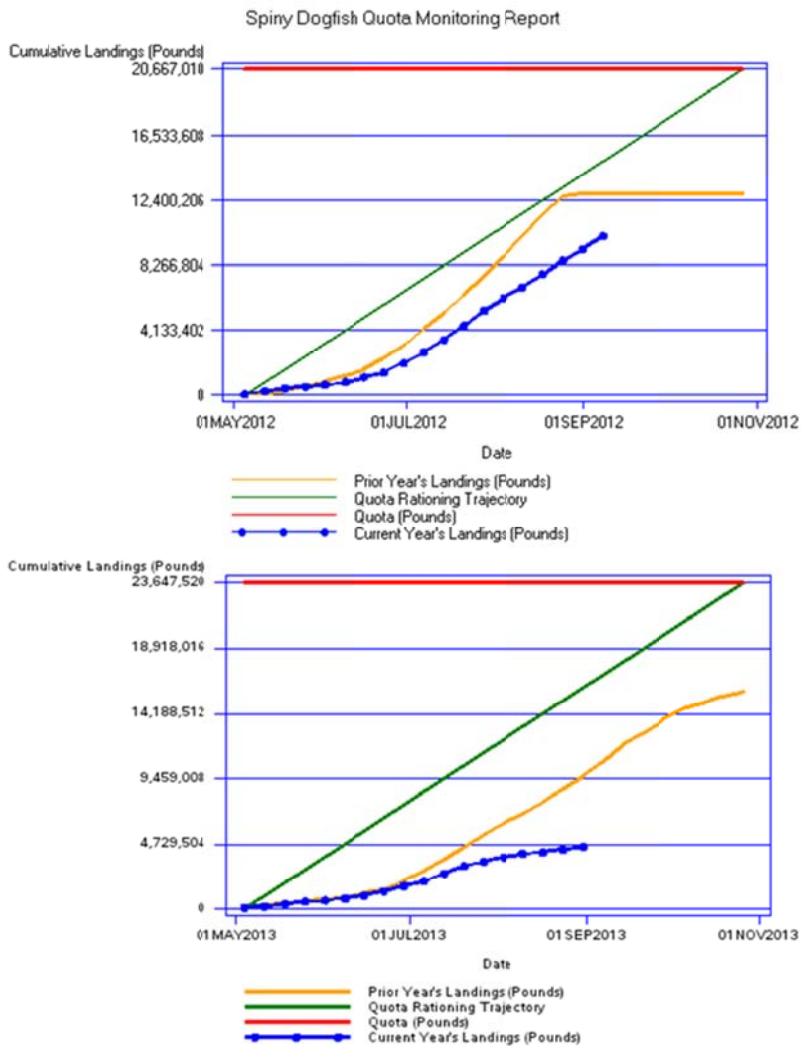


Figure 2. Commercial spiny dogfish landings through mid-September in 2012 (top) and 2013 (bottom). From the [NMFS quota monitoring website](#)