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MEMORANDUM

Date: September 7, 2018

To: Chris Moore

From: Jason Didden

Subject: Spiny Dogfish 2019-2021 Acceptable Biological Catches (ABCs)

Introduction

This memo supports the September 2018 Scientific and Statistical Committee (SSC) meeting discussions to set spiny dogfish ABCs for up to three years (May 1, 2019-April 30, 2022).

The Magnuson Stevens Act (MSA) as currently amended requires each Council's SSC to provide, among other things, ongoing scientific advice for fishery management decisions, including recommendations for ABCs. The SSC recommends ABCs that address scientific uncertainty such that overfishing is unlikely to occur per the Council's risk policy. Spiny dogfish are jointly managed by the Mid-Atlantic and New England Fishery Management Councils - their ABC recommendations to NMFS for the upcoming fishing year(s) cannot exceed the ABC recommendations of the SSC. As such, the SSC's ABC recommendations are the upper limit for catches.

Once the SSC meets and recommends ABCs, the technical Spiny Dogfish Monitoring Committee will meet to discuss if changes to other management measures should be considered, such as Annual Catch Limits (ACLs), Annual Catch Targets (ACTs), and Accountability Measures (AMs). Modifications to other operational details of the fishery such as trip limits may also be evaluated. Based on the SSC's, Monitoring Committee's and Spiny Dogfish Committee's recommendations, the Councils will make recommendations to the NMFS Northeast Regional Administrator. Based on NMFS' evaluation of the Councils' recommendations, NMFS will publish a Proposed Rule for specifications and then a Final Rule, which may change from the Proposed Rule based on public comment.

Spiny Dogfish

Summary

-The 2018 assessment update includes several methods of data smoothing to address recent missing and/or variable annual NEFSC survey information. Staff supports the NEFSC-recommended approach of including the unusually low 2017 data point but no longer using the Kalman filter.

-For 2019-2021, staff recommends ABCs of 12,914 metric tons (MT) (28.5 million pounds) for 2019, 14,126 MT (31.1 million pounds) for 2020, and 16,043 MT (35.4 million pounds) for 2021. These ABCs are based on starting with the 2016, 2017, and 2018 survey values and not applying the Kalman filter. They assume a typical life history and a 100% coefficient of variation (CV) on the overfishing catch level to derive ABCs with the appropriate probability of overfishing for a stock that is not overfished but below its target, per the Council's risk policy.

-Fishery participants on the Advisory Panel (AP) reported no marked changes in spiny dogfish abundance. They highlighted that landings are extremely dependent on international demand, which has been relatively weak in recent years. There was also substantial discussion that the trip limit has a strong effect on the pace of landings (some think this is good and some think the trip limit should be increased).

Regulatory Review

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 federal fishery management plan was developed in 1998 and implemented in 2000 in order to halt depletion of reproductively mature female spiny dogfish and allow the stock to recover. The fishery management plan eliminated the directed fishery for spiny dogfish beginning in 2000. Increases in SSB and quotas followed, and were substantially faster than was originally predicted based on the life history/biology of spiny dogfish.

The dogfish fishery currently operates under an open-access permit system with a 6,000 pound federal waters/permit trip limit, which makes the directed fishery a small-boat fishery (mostly gill net and bottom longline). States may set different trip limits in state waters. Further information on regulations applicable to the spiny dogfish fishery may be found at https://www.greateratlantic.fisheries.noaa.gov/sustainable/species/sdogfish/index.html.

The May 1, 2018 – April 30, 2019 ABC for spiny dogfish is 22,635 MT (49.9 million pounds), which translates into a domestic commercial landings quota of 17,325 MT (38.2 million pounds) after discards and other landings are accounted for. Quotas in the previous two fishing years were slightly higher. About 46% of the quota in the 2017-2018 fishing year was landed, and landings in the current fishing year are lagging compared to last year at the same point.

Biological Reference Points, Stock Status, and Projections

A spiny dogfish assessment update is posted to the SSC meeting page. Several smoothing approaches for the terminal years (2016-2018) were considered, and the NEFSC recommended the standard 3-year averaging approach. Council staff concurs that this approach appears most appropriate. Under this approach, the 2018 SSB estimate is 106,753 MT (235.4 million pounds) compared to an SSBthreshold of 79,644 MT (175.6 million pounds) while the fishing mortality estimate for 2017 is 0.202 compared to an Fmsy proxy of 0.2439. Based on the point estimates the stock is not overfished and overfishing is not occurring. The update estimates there is a 13% chance that the stock is overfished and less than a 1% chance that overfishing occurs in 2018 based on recent catch rates.

Catch and Landings

U.S. commercial activity has dominated catch in most years. The fishery operated at a moderate level in the 1980s and at a higher level in the 1990s. Landings were restricted in the early 2000s to allow rebuilding and have increased in the later 2000s to current. Discards have been a substantial source of mortality, and were often responsible for more mortality than landings in the 2000s. Discards have decreased as a proportion of mortality as landings have increased while discard quantities remained approximately level. Landings have been substantially below the commercial quotas for the last six fishing years and appear to be on a similar trajectory in the current fishing year. Fishery participants report that landings have been less than the quota due to low market demand and associated low prices (see Fishery Performance Report and Informational Document at http://www.mafmc.org/council-events/2018/september-2018-ssc-meeting).

OFL/ABC Recommendations

OFL/ABC

The updated assessment recommends an OFL of 21,549 MT (47.5 million pounds) for 2019, which is also recommended by staff. Future OFLs depend on the ABCs that are implemented.

ABC

The variability in the spring survey and recent issues with survey performance suggest there is relatively high uncertainty for spiny dogfish biomass, which translates to high uncertainty about ABCs. In terms of variability, the survey would suggest that in the last 15 years the biomass of mature females usually changes by more than a third from year to year with frequent oscillations up or down by 50% or more. For such a long-lived species (up to 40 years), a survey that tracked abundance with reasonable precision would be expected to change slowly. While the various smoothing approaches address the noisiness of the survey results to some degree, it is not clear to staff how much of the result is true abundance versus residual variability in availability. In terms of survey performance, 2018 saw a delay and loss of 1/3 of the survey stations, 2017 was normal, 2016 was delayed by about a month, 2015 was normal, and 2014 was late with enough missed stations in important strata that an index for dogfish is not computed.

Given these issues with the survey, which the assessment hinges on, staff sought and constructed a complementary index of abundance based on the average spiny dogfish discards per bottom trawl trip 1989-2017 (generally there are 7,000-12,000 bottom trawl trips per year). The trawl discards are as estimated in the assessment update, and previous NEFSC center work related to river herring bycatch had provided an estimate of total bottom trawl trips from 1989-2017. As illustrated in Figure 1, this "discard index" is remarkably similar to the survey-based biomass index in the 1990s in both trend and scale of decline, and follows the upward trend in the 2000s but to a much lesser degree. A slow increase is more what one would have expected given the life history of spiny dogfish compared to the apparent survey regime-shift that occurred from 2005-2006. Staff suspects the higher trawl indices from 2006-2012 and declines in the early 2010s are primarily related to availability issues, and two recent papers have suggested that vertical and horizontal availability issues may be substantial for the survey specifically for spiny dogfish (*AE Carlson et al 2014* and *SR Sagarese et al 2016*).

However, the re-alignment of the 3-year survey average with the staff discard index in the terminal years suggests to staff that using the NEFSC-recommended 3-year averaging approach for the survey should currently be reasonable. That said, staff has substantial reservations about the year-to-year usefulness of the survey as a standalone indicator of spiny dogfish biomass, even when smoothed. The substantial variation in biomass/projected catch outcomes, depending on the chosen smoothing approach, reinforces this concern.

Based on all of the above, the assessment update, and the Advisory Panel's Fishery Performance Report, staff recommends ABCs of 12,914 MT (28.5 million pounds) for 2019, 14,126 MT (31.1 million pounds) for 2020, and 16,043 MT (35.4 million pounds) for 2021, following the NEFSC 100% CV P*[1] projections (which are based on the 2016-2018 survey numbers without the Kalman filter). Incidentally, these ABCs would allow modest increases (about 15% each year) in landings compared to the 2017-2018 fishing year.

[1] P* refers to the Council's policy for determining the acceptable risk of overfishing. Based on the recommend smoothing approach, assuming a typical life history, and considering the estimated spiny dogfish stock status (above overfished but below the target), the Council's P* risk policy suggests the appropriate risk of overfishing for spiny dogfish is 26.9% in 2019, 27.4% in 2020, and 29.6% in 2021.

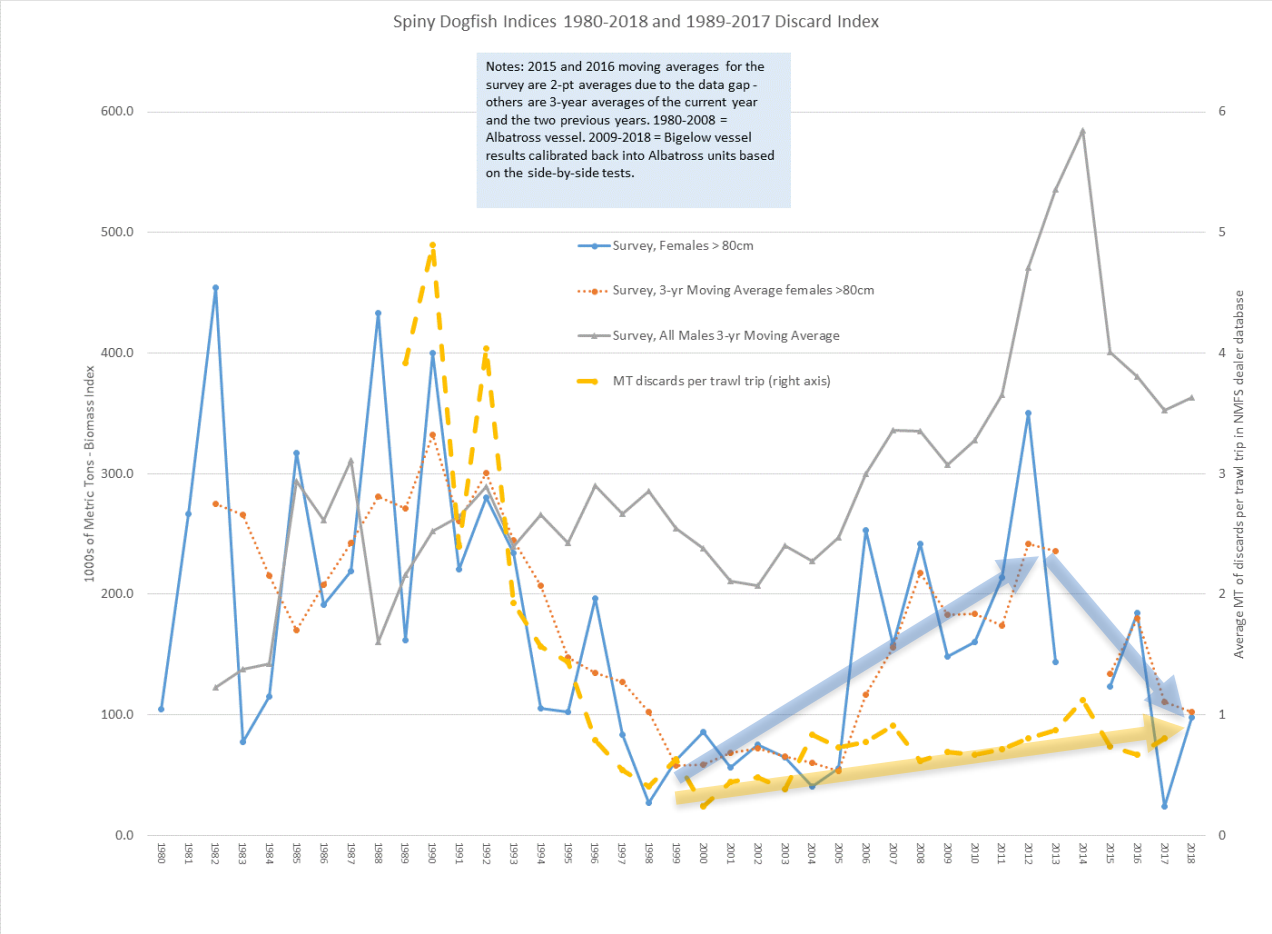

Figure 1. Spiny dogfish survey indices and a basic trawl discard index.

Rationale for 100% C.V.

Staff did not have time to systematically consider the relative appropriateness of 60% vs 100% vs 150% CVs. A 60% CV would not appear appropriate given the survey index issues described in this memo and the uncertainties highlighted in the assessment update. Given the re-alignment of the survey with the staff discard index and that a slow increasing trend from the early 2000s would be consistent with spiny dogfish life history, staff supports the use of a 100% CV at this time.

Citations

Carlson AE, Hoffmayer ER, Tribuzio CA, Sulikowski JA (2014) The Use of Satellite Tags to Redefine Movement Patterns of Spiny Dogfish (Squalus acanthias) along the U.S. East Coast: Implications for Fisheries Management. PLoS ONE 9(7): e103384. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0103384

Skyler R. Sagarese, Michael G. Frisk, Robert M. Cerrato, Kathy A. Sosebee, John A. Musick & Paul J. Rago (2016) Diel Variations in Survey Catch Rates and Survey Catchability of Spiny Dogfish and their Pelagic Prey in the Northeast U.S. Continental Shelf Large Marine Ecosystem, Marine and Coastal Fisheries, 8:1, 244-262, DOI: 10.1080/19425120.2015.1135219