Short Term Economic Impacts of Scallop Framework 21

Daniel Georgianna
Chancellor Professor of Economics
School of Marine Science & Technology
University of Massachusetts Dartmouth

January 7, 2010

Introduction

On 18 November 2009, the New England Fishery Management Council (Council) voted to reduce catch limits for 2010 fishing year (March 1, 2010 to February 28, 2011; all years in this document refer to fishing year) in Framework 21 (FW 21) to the Atlantic scallop fishery management plan. This paper presents an economic impact analysis for 2010 that estimates the average loss in landed value per full-time scallop vessels from FW 21 as compared to other options using estimated landings and prices for 2009 and 2010 from the FW 21 documents prepared by Council staff. The analysis also adapts models developed by the Northeast Regional Science Center (Science Center) to estimate the overall impact on sales, income, and employment on the Northeast Region of the U.S. generated by these losses in exvessel revenues.

The document presents a background on FW 21, a discussion of the different applications of status quo, estimates of the loss in revenue per vessel relative to different options, and overall impacts on the region from these estimates of losses in revenue. While some familiarity with scallop fishery management and economic impact analysis are helpful in understanding this analysis, I have tried to write this for as wide an audience as possible.

Background on Framework 21

At their November 2009 meeting, the Council approved Scallop Fishery Management Plan Framework 21 (FW 21) that set specifications to limit the annual catch and adjust the day-at-sea (DAS) allocations and an area rotation schedule for the 2010 for full-time limited access (full-time) vessels. The Scallop Plan Development Team (PDT) presented the Council four scenarios (Council, FW 21, p. . The first scenario (called "status quo") set the Annual Catch Limit at 41.5 million pounds that would be accomplished through a maximum of 29 DAS in the open areas and four closed area trips (two in the Elephant Trunk Area, one in Delmarva Area, and one in the Nantucket Lightship Closed Area) for full-time vessels. The second scenario set the Annual Catch Limit of 47.2 million pounds that would set a maximum of 38 DAS in open areas and the same set of closed area trips as the first scenario. Scenarios three and four included closing an additional area to scalloping that was not recommended by Council committees and will not be consider further in this analysis.

At the Council's Scientific and Statistical Committee (SSC) meeting in September

Massachusetts Marine Fisheries Institute

2009, the SSC set the Acceptable Biological Catch for FY 2010 at 58 million pounds for the overall fishery (a fishing mortality rate of 0.29), after deductions for discards and incidental mortality. This was estimated as the catch associated with a 25% probability of reaching the overfishing limit of 80 million pounds. The SSC did not give advice on the economic impacts to the Council. In 2007, the most recent stock assessment for sea scallops established that the U.S. Atlantic scallop resource was neither overfished nor was overfishing occurring (Science Center, 45th SAW, p. 141). The SAW established the overfishing threshold at fishing mortality of 0.29, an increase from the previous overfishing threshold of 0.24.

In preparation for the meeting of the Council, the Council staff, in consultation with the National Marine Fisheries Service (NMFS) presented an Economic Impact document that estimated the long run economic impact for the four scenarios that included estimated landings, revenues, and prices for 2010 through 2023. The Council staff's analysis showed lower landings and revenues in 2010 for the "status quo" compared to the other scenarios but slightly higher landings and revenues for subsequent years. Using a discount rate of 7%, the report estimated that the present value of the "status quo" was less than 1% higher than the present value from the second scenario over 2010 through 2016 and over the longer period (2010 through 2023).

Based on these documents and the discussion during the meeting, the Council set the catch at the "status quo" option that would limit the annual scallop to 41.5 million pounds. This recommendation went to the Regional Office of NMFS, which will present its recommendation to NMFS headquarters and eventually to the Secretary of Commerce.

Application of Status Quo

With regulations codified in several Federal and state laws, marine fisheries are probably one of the most regulated industries in the U.S. Federal laws, especially the Magnuson-Stevens Act (MSA) as Amended in 2007, intended fishery management as open political processes, with all of the complexities that such political processes generate. While the MSA refers to regulations based on science, political rhetoric often rules. Such is the case with the term status quo, a powerful concept in U.S. jurisprudence and less formal means of persuasion, which in general means the state of affairs that existed previously, but implies a fall back position that puts the burden of proof on alternative proposals to show significant improvement over status quo. The choice of application of the state of affairs that existed previously to use as status quo also has rhetorical significance.

Three different applications of status quo have been used in recent framework adjustments to the Scallop Fishery Management Plan. In FW 16 (July, 2004), which specified the rotation schedule in the closed areas, status quo referred to the regulations that existed previously. For FW 16, status quo specifically meant, the maximum number of DAS that existed before FW 16 with no access to closed areas (Council, FW 16, p. 6-1).

FW 18 (December 2005) applied status quo to the fishing mortality set by the Council as a management target to approximate maximum sustainable yield (MSY) (Council, FW 18, p. 3-9). FW 18 set status quo as the overfishing limit for scallops based on the most current overfishing reference point from the stock assessment reduced by 20% to ensure that management error would not result in overfishing. In 2004, the Stock

Assessment Workshop (SAW) had established an overfishing reference point at fishing mortality of 0.24 (Science Center, 39th SAW Summary, p. 15). Reducing this by 20% would result in management regulations that would limit fishing mortality to 0.20, which was the status quo set by FW 18.

FW 19 (December 2007) applied status quo to the management target fishing mortality (0.20) from the previous framework (FW 18) without updating the target fishing mortality from the most recent stock assessment. As noted above, SAW 45 in June 2007 increased the overfishing threshold to fishing mortality of 0.29 based on its more recent data on fishing selectivity, meat weight, and growth. Following the logic of FW 18, reducing this limit by 20% to account for error would increase the management target fishing mortality to 0.24. FW 19 referred to status quo as target fishing mortality of 0.20, however. Status quo went from a fishing mortality based on management target to achieve MSY in FW 18 to an invariable fishing mortality point estimate of 0.20. In response to a comment in the FW 19 Final Rule that argued that the increase in biomass estimated by the SAW warranted a higher catch limit, NMFS responded that the lower limit adjusted fishing mortality for localized overfishing (US DOC, FW 19 Final Rule, p. 30796).

The Council's recommendation for FW 21 used the third aspect of status quo, a fixed fishing mortality without updating the management target fishing mortality with more recent information on stock biomass and the higher fishing mortality that would maintain MSY. The Council was presented and chose a status quo of fishing mortality of 0.20, even though the SSC had recommended two months before an overfishing limit fishing mortality of 0.37 and an Acceptable Biological Catch fishing mortality of 0.29 (Council, FW 21, p. 20). Following the logic of FW 18, status quo could have been conservatively set at fishing mortality of 0.24, which would have accounted for a buffer of 20% from the SSC Acceptable Biological Catch to account for management error.

FW 21 documents include an analysis of a No Action alternative, which was considered separately from status quo in FW 21 and earlier frameworks. Under No Action, the limited access vessels would lose two closed area trips on Georges Bank because no trips would be allocated for these closed areas (Council, FW 21, p.16).

Economic Impacts of Framework 21

The following impact analysis compares average revenue per full-time scallop vessel and economic impacts from the Council's recommendation for FW 21 (catch limit of 41.5 million pounds) with revenues and economic impacts from estimated landings in 2009 (56 million pounds) (Council, FW 21, p. vii) and with the higher catch limit from the scenario rejected by the council (47.2 million pounds; F=0.24).

Each of these options corresponds to a different application of status quo. FW 21 corresponds to fixed point fishing mortality of 0.20 used in FW 19. Estimated landings in 2009 correspond to status quo of regulations (the application of status quo used in FW 16) assuming that the 2009 regulations would yield the same landings in 2010 as in 2009. The higher catch limit of 47.2 million pounds corresponds to the status quo based on 20% reduction from the target overfishing limit, adjusted for management error used in FW 18.

The most complete set of data is from FY2007. These were the data used in the IMPLAN model by Science Center staff to assess the regional impacts of the changes

proposed in Amendment 15 to the scallop FMP. Rather than use data from 2007, I decided to scale the expected landings for 2009 (56 million pounds) by the factors in the 2007 data. Specifically, I used the number of full-time vessels and their share of total landings from 2007 to estimate loss in revenue per vessel (Science Center, Analysis of Shoreside Impacts of Permit Stacking, p. 3). I used the multipliers from 2007 to estimate overall impacts on the Northeast Region (Ibid, p. 8). Using the 2007 data for landings would show larger losses from FW 21 than does 2009 landings.

The following analysis does not account for any changes in stock size, stock composition or in any other biological variables. Framework 21 documents state that all scenarios presented to the Council would maintain biomass at sufficient levels to maintain MSY. The documents do not make such claim for continuing the catch at the 2009 rate of landings. Higher fishing mortality may reduce the yield per day in the open areas either through a reduction in scallops on the sea floor or a reduction in the average size of scallops.

The table below shows average value per vessel and economic impacts from FW 21 in 2010 compared to landings in 2009 and the higher catch limit associated with higher fishing mortality of 0.24. The number of limited access full-time vessels was assumed the same under each option (252 from Science Center, Analysis of Shoreside Impacts, p. 3).

Exvessel prices for 2010 were taken from Framework 21 for each of the scenarios adding 2% inflation per year to adjust prices from 2008 to 2010. The estimated price for No Action from Framework 21 was used as the estimated price for expected 2009 landings, increased by 2% for expected inflation in 2010, which probably overestimates price for 2009 landings, but FW 21 did not estimate price for expected 2009 landings.

Average Value of Landings per Vessel and Regional Impacts for FW 21, 2009 Scallop Landings and the Catch Associated with F=0.24

	FY 21 (F=0.20) Catch Limits	2009 Landings	F=0.24 Catch Limits
Landings (Mill lb)	41.5	56	47.2
Average Value in 2010 Per Limited Access Full-Time Vessels	$913,947	$1,192,788	$1,033,789
Regional Impacts			
Sales (Millions)	$800	$1,041	$905
Income (Millions)	$363	$473	$411
Employment	3,955	5,277	4,494

Regional impacts show the overall effects of the reduction in landings for 2010 from FW21 using the multipliers for direct and indirect effects (expenditures from scalloping) from scallop harvesting on the Northeast Region from the Science Center (p. 8). These were calculated from IMPLAN Pro using data for income and costs from scalloping in 2007. In order to capture some of the induced effects from scalloping, I added the effects of wholesaling on sales and income taken from multipliers associated with wholesaling of groundfish, which was also supplied by the Science Center. I did not include the induced effects of processing because most of the processing of scallops is done on board. Scallops also add value to sales and income at the retail level in supermarkets and restaurants, but there are no data from which to estimate these effects.

For employment, I scaled employment from the Science Center's IMPLAN model by 2007 landings to calculate direct (fishing) plus indirect (shoreside) employment and multiplied by landings for each of the three options. As with sales and income, I added the induced effects on employment from wholesaling. These are a guess, at best. There are essentially no data for employment in fishing; only the number of crew per trip is collected by NMFS. The Science Center's analysis assumes that more than 2/3rds of the full-time scallop vessels share crew and assumes that all crew are full-time. This probably underestimates the employment in scalloping. The Science Center estimates employment of 1,063 on 252 full-time vessels in 2007. Georgianna and Shrader (p. 188) estimated employment at 1,449 on 105 New Bedford full-time scallop vessels in 2002, using settlement house data. They estimated that about ½ of the employment on scallop vessels was part-time.

The table below shows the economic losses in average revenue per vessel and economic impacts from FW 21 in 2010 relative to expected 2009 landings and the higher catch limit associated with higher fishing mortality of 0.24.

Economic Losses from Framework 21 (F=0.20) Compared to 2009 Landings and Fishing Mortality of 0.24.

	2009 Landings	F=0.24 Catch Limits
Annual Value of Landings Per Limited Access Full-Time Vessels	$278,840	$119,842
Regional Impacts		
Sales (Millions)	$241	$105
Income (Millions)	$110	$48
Employment	1,321	539

Conclusions

This analysis predicts substantial losses in annual revenue per full-time scallop vessels (about 25% of revenue for 2009) and substantial losses in total effects to the Northeast Region. The losses in total effects were probably underestimated because they do not include losses from on-shore processing and retail sales.

In recent years, actual scallop landings have usually been higher than those predicted by the models used in the frameworks. For example, in 2009, preliminary estimates from Framework 21 expect landings about 10 million pounds higher than the model predicted (Council, FW 21, p. vii). Higher than predicted landings would mitigate at least some of the losses expected by this short-term economic impact analysis relative to 2009 landings, but raise questions about the efficacy of the biological model used in FW 21. In 2008, more than ½ of landings per full-time vessels came from the closed areas. About the same results are expected in 2009. As closed area trips have fixed trip limits, the overages of landing were due to much higher than predicted landings per day in the open areas. This was caused by either larger biomass in the closed area than the model predicted or higher rates of processing on board. Rather than evidence for reducing the catch limits, as stated by FW 21, the excess of actual over predicted landings may indicate reasons for increasing catch limits.

The results from this short-term impact analysis are not directly comparable to the analysis of long-term effects done for FW 21, which showed modest improvements in revenues and producer and consumer surpluses from 2010 through 2023 compared with the higher management target fishing mortality of 0.24. While OMB guidelines prescribe long-run economic analysis for fishery management plans, both short-run and long-run economic impact projections are useful for achieving the "optimum yield from each fishery for the United States fishing industry" (MSA, National Standards, p.58).

Short-term analysis is useful because FW 21 was intended to set catch limits for 2010 only, not future years. The history of scallop management indicates that frameworks change substantially every two years. The length of time over which to estimate benefits strongly affects the results. Using the analysis from FW 21, Georgetown Economics shows that over a three-year period (2010 - 2012) the present value of benefits from the higher fishing mortality (F=0.24) surpasses the benefits from the fishing mortality chosen by the Council (F=0.20).

References

Georgetown Economics. 2009 An Assessment of the New England Fisheries Management Council's Economic Impact Report. http://www.savingseafood.org/economic-impact/an-assessment-of-the-new-england-fisheries-management-council-s-economic-impact-r-3.html

Georgianna, D. and D. Shrader. 2008. "The Effects of Days at Sea on Employment, Income, and Hours of Work: Some Preliminary Evidence" *Human Ecology Review. Vol. 15:1.*

New England Fishery Management Council. 2009. Framework 21 to the Atlantic Sea Scallop FMP**, i**ncluding an Environmental Assessment, an Initial Regulatory Flexibility Analysis and Stock Assessment and Fishery Evaluation (SAFE) Report.

New England Fishery Management Council. 2009. Economic Impacts. Mimeo (See http://www.nefmc.org/scallops/index.html November 17-19, 2009 Council Discussion Documents).

New England Fishery Management Council. 2007. Framework 19 to the Atlantic Sea Scallop FMP Including an Environmental Assessment, an Initial Regulatory Flexibility Analysis and Stock Assessment and Fishery Evaluation (SAFE) Report.

New England Fishery Management Council. 2005. Framework Adjustment 18 to the Atlantic Sea Scallop FMP including an Environmental Assessment, Regulatory Impact Review, Regulatory Flexibility Analysis and Stock Assessment and Fishery Evaluation (SAFE) Report.

New England Fishery Management Council. 2004. Framework 16 to the Scallop FMP and Framework 39 to the Northeast Multispecies FMP with an Environmental Assessment, Regulatory Impact Review, and Regulatory Flexibility Analysis.

Northeast Fishery Science Center. 2009. Analysis of Shoreside Impacts of Permit Stacking. Scallop Committee & Council Meeting Materials. September 1-2, 2009 Scallop Oversight Discussion Documents.

Northeast Fishery Science Center. 2007. 45th SAW Assessment Report. Northeast Fisheries Science Center Reference Document 07-16.

Northeast Fishery Science Center. 2004. 39th Northeast Regional Stock Assessment Workshop (39th SAW) Assessment Summary Report. Northeast Fisheries Science Center Reference Document 04-10a.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 2008 Atlantic Sea Scallop Fishery; Framework Adjustment 19 Final Rule. Vol. 73, No. 104 / Thursday, May 29, 2008. P. 30790-30811.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 2007. Magnuson-Stevens Fishery Conservation and Management Act As Amended Through January 12, 2007.