

Recommendations for Excessive-Share Limits in the Northeast Multispecies Fishery

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Executive Summary

A. Assignment

The New England Fisheries Management Council (“NEFMC”) has asked us to provide independent advice regarding the establishment of caps on holdings of access privileges to the Northeast Multispecies Fishery, in order to prevent the accumulation of excessive shares or the further increase of excessive shares if they already exist. We define an excessive share to be a share of access rights that would allow a permit owner or sector to influence to its advantage the prices of the fishery’s output or the prices paid for leased Annual Catch Entitlements (“ACE”).

For our analysis, we relied upon theoretical work cited below, quantitative fishery data provided by the National Marine Fisheries Service (“NMFS”) and other sources, and qualitative information gleaned from minutes of public meetings, articles, and our own survey and interviews with fishery stakeholders. Our work here has been guided, in part, by a general framework developed for a similar analysis we conducted for the Surfclam and Ocean Quahog Fishery in 2011¹, captured in the following seven steps: 1) assess quota ownership information, 2) assess competitive information, 3) check threshold condition, 4) establish concentration target(s), 5) determine relationship between share limit and market concentration, 6) identify regulatory and practical constraints, 7) recommend an excessive-share cap.

B. Northeast Multispecies Fishery

The Northeast Multispecies Fishery, commonly referred to as the groundfish fishery, covers the Gulf of Maine, Georges Bank, Southern New England, and the Mid-Atlantic Bight and includes thirteen species of groundfish.²

Prior to May 2010, the groundfish fishery was regulated through input controls, such as trip limits, days-at-sea, gear restriction, and area closures. With the implementation in 2010 of Amendment 16 to the Northeast Multispecies Fishery Management Plan (“FMP”), the fishery is now regulated using output controls based on annual catch limits (“ACLs”) and sectors to directly manage catch levels.³

The allocation of the ACL is administered through sectors, which are contractually related groups of permit owners. Each permit owner (each owner of a vessel

¹ Mitchell, G., Peterson, S., and Willig, R. “Recommendations for Excessive Share Limits in the Surfclam and Ocean Quahog Fisheries,” May 3, 2011; Compass Lexecon, Boston.

² Tammy Murphy, *et al.*, “2011 Final Report on the Performance of the Northeast Multispecies (Groundfish) Fishery (May 2011-April 2012),” U.S. Department of Commerce, December 2012, (hereinafter “2011 Final Report”) p. 1

³ Amendment 16.

that has a permit to operate in the groundfish fishery) is provided with potential sector contribution (“PSC”), or share of ACL. Permit owners holding the vast majority of access rights have elected to affiliate with a sector. ACE is allocated to sectors based on the combined PSC of the sector members for each stock. Generally, sectors retain a percentage of their ACE as a reserve and allocate the unreserved ACE back to sector members in proportion to the PSC each contributed to the sector.

ACE may be traded within a sector or across sectors for cash or by trading ACE for ACE or “fish for fish.” The competitive price of a species’ ACE reflects the actual scarcity of its available ACE relative to the availability of that species, as well as, in some circumstances, the value allowing for bycatch of the species during harvesting of other species.

C. Market Power and Competition

The ability to manipulate market outcomes to one’s advantage based on the share of PSC or ACE in the groundfish fishery would be a typical example of what economists call market power. In markets that are not competitive, some sellers may find that as their output increases the prices they receive fall, in which case they have an incentive to unilaterally reduce output. With reduced output due to the exercise of market power, the operation of the market leaves gains from trade unrealized. In a multispecies fishery, it may also be possible to exercise market power in the markets for the fishing privileges of individual stocks, such as the lease market for ACE.

In markets generally, potential for expanded output (either from existing competitors or from new entrants) can be a constraint on the exercise of market power. The market for fishery access rights is somewhat different. In the fishery, regulators set the allowable catch or the supply of ACE for each stock – there can be no entry or expansion into the market for ACE to replace the withheld ACE.

The groundfish fishery is regulated, in part, with output caps on each regulated species, further delineated in some cases to a specific “stock” (a species in a particular geographic region within the fishery). The need to have ACE for each species caught and the likely need for some fishermen to have to buy ACE to cover the fish they will actually harvest presents additional opportunities for large holders of ACE to exercise market power in the markets for ACE. In particular, imbalances between ACE holdings and availability of species sometimes create a situation in which a species has a low catch limit and may not be itself commercially viable for harvest, but cannot be avoided by fishermen harvesting other species (what some in the fishery call “choke stocks”). A large holder of ACE for a choke stock could potentially engage in the exercise of market power in either the output market for fish or in the markets for ACE trading. This would be inconsistent with the principles of fairness embodied in National Standard 4, and could affect investment in new vessels and gear that would ultimately be to the detriment of the long-term efficiency of the fishery.

The regulation of market power requires a trade-off between potentially increasing efficiency by controlling market power and potentially reducing efficiency by over-regulating market transactions. In the groundfish fishery, overly restrictive caps could limit the growth of efficient firms when there is no material threat of the exercise of market power. Furthermore, conditions in the fisheries have changed over time and will change in the future. If the level of the cap is not revisited periodically, the potential for the excessive-share cap to become an inefficient means to limit the exercise of market power grows.

The U.S. Department of Justice and the Federal Trade Commission (“Agencies”) share responsibility in the United States for determining if a proposed merger is likely to harm competition. The *Horizontal Merger Guidelines* describes the methods the Agencies use to evaluate the competitive impact of proposed mergers, explains the determination of sets of products or services that constitute relevant markets, and describes market concentration thresholds and other considerations that, if satisfied, would indicate that a merger is unlikely to create market power. A standard measure of the level of concentration is the Herfindahl-Hirschman Index, or HHI.⁴ Markets with HHIs below 1500 are considered *unconcentrated*; markets with HHIs between 1500 and 2500 are considered *moderately concentrated*; and markets with HHIs greater than 2500 are considered *highly concentrated*.⁵

With respect to the output from the fishery, there is some evidence of competition from sources outside the fishery and across species within the fishery. However, industry participants suggest that there can be some types of fish (such as locally sourced fresh fish) and pockets of time (or locations) where substitution has been limited. While it may generally be true that the relevant market for groundfish includes substantial quantities from outside the fishery, we have not ruled out the possibility that smaller relevant markets exist for some species at some times. Therefore, we conservatively measure concentration annually from 2010 to 2012 by species, based on landings by permit, grouped together by common permit owners in our analysis of markets for fish, or output markets.

Among the allocated species, landings in the fishery have generally been *unconcentrated*. For example, landings for cod have consistently been the least concentrated species, with HHI ranging from 188 to 280. Only winter flounder has had landings in the *moderately concentrated* range, with HHI of 1,680 in 2011 and 1,600 in 2012. We do not observe a clear time trend in concentration – two species have consistently increasing concentration, one species has consistently decreasing

⁴ The HHI is equal to the sum of the squared market shares of the participants in the market. Thus, if there are three firms with shares of 50 percent, 30 percent, and 20 percent, the HHI is equal to 3800 ($3800 = 50^2 + 30^2 + 20^2 = 2500 + 900 + 400 = 3800$).

⁵ See U.S. Department of Justice and the Federal Trade Commission, *Horizontal Merger Guidelines*, August 19, 2010, p. 19.

concentration, and six have stayed the same or moved up and down from year to year. Concentration for landings would be considerably higher if measured by sector, rather than permit ownership. In theory, a sector able to exert long-term control over ACE could provide opportunities for sector members to exercise market power. As an empirical matter, however, the current institutional structure grants sectors no practical ability to control the behavior of market participants, and thus sectors cannot exercise market power.

With respect to markets for ACE, there are no substitutes outside the fishery (nor is there any potential for entry). We also measure ACE concentration that flows from entities ownership of permits and the PSC the permits confer annually from 2010 to 2012 by species and stock. Among the nine species with ACE data, ACE holdings in the fishery have been *unconcentrated*, every year for every species. In fact, ACE species-level HHIs never exceeded 700 and concentration is roughly similar for individual stocks. Again we observe no time trend in concentration – one species had consistently increasing concentration, three species had consistently decreasing concentration, and five have stayed the same or moved up and down from year to year.

Also, there has been substantial underutilization of allowable catch for many species with ACE data, especially in 2012. Haddock landings, for example, accounted for just 21 percent of ACE in 2010 and dropped further to just 4 percent in 2012. Cod landings were over 80 percent of ACE in 2010 and 2011, but dropped under 45 percent in 2012.

D. Conclusions

The evidence we analyzed does not support a conclusion that market power is currently being exercised through the withholding of ACE in any part of the groundfish fishery, nor is there evidence of market power in the sales of fish or transfers of permits.

Our step-by-step analysis of an excessive-share cap concludes:

1. *Assess quota ownership information:* NMFS has sufficient information on permit ownership to implement an excessive-share cap based on groups of permits with common ownership. However, this grouping of permits does not reliably indicate the entity that controls a particular permit, which is the economically relevant owner. Use of the broad measure of common ownership NMFS currently tracks could lead to unfair application of an excessive-share rule and to economic inefficiencies. We also note that the NMFS would need to have information on long-term (multiple-season) lease transactions, unless such transactions remain prohibited.
2. *Assess competitive information:* There is sufficient competitive information to proceed with the determination of an excessive-share cap. While we find some evidence of competition from outside the fishery for the output of the fishery, and across species within the fishery, we leave the question of

relevant market for groundfish open. This is because any excessive-share cap addressing ACE trading should be sufficient to also prevent market power in the output market, even if the market for some species is limited to the fishery. For ACE trading, the relevant market is the ACE for a stock in the fishery, and there are no competitive substitutes.

3. *Check threshold condition:* When output regulation limits harvest to below the level that a monopoly supplier would produce, there is no opportunity for market power to be enhanced by accumulating shares. If this condition were to apply, then it would not be necessary to set an excessive-share cap, and the analysis could end right here. With the groundfish fishery, however, each of the output limits is well above the quantity that a monopolist would produce for each regulated category of groundfish. Thus, it is necessary to continue on to the next step of the analysis.
4. *Establish concentration targets:* Due to the variety of institutional and competitive constraints preventing participants from accumulating market power through temporary (single-season) leasing of access rights, there is no need for consideration of an excessive-share cap related to landings. It is reasonable, however, for the NEFMC to attempt to maintain *unconcentrated* ACE distribution by species and by “stock,” which means aiming to keep the HHI below approximately 1,500 for each stock. As discussed below, this target can be achieved without interfering with economies of scale.
5. *Determine share limit-market concentration relationship:* The relationship between ownership shares of PSC or ACE and market concentration can vary depending on the distribution of ownership shares. An important competitive condition for ACE trading is whether there is a substantial supply of ACE from numerous suppliers that hold very small shares (what economists call a “competitive fringe” of suppliers with small single-digit shares). For species with a large number of PSC-holders with small shares (*i.e.*, a large competitive fringe), maintaining ACE distribution at an *unconcentrated* level can be achieved with a high share cap. For example, a competitive fringe of 38 percent (*i.e.* at least 38 percent of ACE is allocated to many permit owners that hold at most 1 or 2 percent share) means that a share cap of 25 percent would prevent an HHI in excess of 1500. Without a competitive fringe, however, a share cap of 15.5 percent would be necessary.
6. *Identify regulatory and practical constraints:* Without information about who has controlling ownership for permits with multiple owners, regulators may not always be able to identify the economically relevant owner of each set of shares, and this could impede successful implementation of an efficient excessive-share cap. However, gathering information required to determine beneficial ownership for every PSC allocation could be prohibitively costly and unnecessarily intrusive and there appears to be sufficient information to make a “two-stage” procedure practical. We recommend using the grouping

of permits by common ownership (without determination of beneficial ownership) as an initial threshold requirement – “provisionally” blocking any transfer resulting in an excessive share for a group of permits under some common ownership. In order to avoid erroneously blocking some harmless transactions involving permits that happen to have some overlapping owners, we recommend providing an optional follow-up process that would allow permit holders of a “provisionally” blocked transaction to submit detailed ownership information sufficient to determine who has controlling interest in each permit. If this additional information shows that each controlling ownership share is below the excessive-share cap then the transaction would be allowed.

7. *Recommend an excessive shares cap:* Given the lack of evidence for scale economies continuing to occur for individual owners above 10 to 12 percent of a stock’s ACE, we recommend setting an excessive-share cap on the PSC conferred to permit owner at 15.5 percent of available PSC. We cannot envision any reasonably likely circumstances, however, under which a lower cap would be necessary to prevent excessive shares of fishing access privileges.

We do not find any evidence that an excessive-share cap is an effective means to achieve progress promoting diversity, enhancing sector management, or encouraging diversification. Any excessive-share cap attempting to meet those goals would also sacrifice the efficiency benefits that motivated the adoption of PSC allocation and ACE trading rules. Instead, we note that the PSC allocation and ACE trading can co-exist with other regulations, and that NEFMC should address other goals through these other regulations.

I. Introduction

A. Statement of Work and Terms of Reference

Amendment 16 of the Northeast Multispecies Fishery Management Plan (“FMP”) transformed the regulation of the Northeast Multispecies Fishery. Rather than using input controls, the fishery is now primarily regulated using annual catch limits (“ACLs”) for each regulated stock. A share of each stock’s ACL is granted to organizations of permit holders known as sectors, which further manage the fishing access privileges and allocate them to their members. Amendment 18, which is under development, may implement into this regulatory arrangement additional criteria to address a number of goals, including fishery diversity and preventing excessive accumulation of fishery access privileges.

The New England Fishery Management Council (“NEFMC”) has identified four goals of Amendment 18:

1. *“Promote a diverse groundfish fishery, including different gear types, vessel sizes, ownership patterns, geographic locations, and levels of participation through sectors and permit banks;”*
2. *“Enhance sector management to effectively engage industry to achieve management goals and improve data quality;”*
3. *“Promote resilience and stability of fishing businesses by encouraging diversification, quota utilization and capital investment; and”*
4. *“To prevent any individual(s), corporation(s), or other entity(ies) from acquiring or controlling excessive shares of the fishery access privileges.”*

The NEFMC has asked us to provide independent advice regarding appropriate accumulation limits that may prevent excessive shares or the further increase of excessive shares if they already exist.

There is no standard economic definition of “excessive shares.” However, the fishery management plan must comply with National Standard 4 of the Magnuson-Stevens Fishery Conservation and Management Act. The National Standard 4 Guidelines state:

An allocation scheme must be designed to deter any person or other entity from acquiring an excessive share of fishing privileges, and to

avoid creating conditions fostering inordinate control, by buyers or sellers, that would not otherwise exist.⁶

From a broad economic perspective regarding what could constitute “inordinate control,” we define an excessive share to be a share of access rights that would allow a permit owner or sector to influence to its advantage the prices of the fishery’s output, the prices paid for leased Annual Catch Entitlements (“ACE”), or prices paid for permits. Such influence may disadvantage other holders of fishery access rights relative to prices that would otherwise result. The ability to manipulate prices to one’s advantage based on the share of participation in a market is a typical example of what economists call market power.

The NEFMC provided the following Terms of Reference to guide the project:

1. Describe a theoretically sound method to specify the maximum possible allowable percentage share of the market for the fishery access privileges (permits, PSC) and/or the quota leasing (ACE trading) that would prevent an entity from obtaining an excessive share of the access privileges allocated under the Northeast Multispecies Fishery. Use the Herfindahl-Hirschman Index prescribed within the “US Department of Justice Horizontal Merger Guidelines” or other accepted rule as appropriate.
2. Apply the process or rule developed under Number 1 to determine if excessive shares already exist in this fishery. If excessive shares do not exist today, describe potential constraints that could prevent excessive shares from existing in the future. Alternatively, if excessive shares do exist, describe a process or rule that will allow for a theoretically sound procedure to prevent future increase.
3. If the rule cannot be applied because of incomplete data, provide suggestions of how to apply the rule in the best way possible that is consistent with the theoretical underpinnings of the rule. Also, identify data that would be necessary to apply the rule.
4. Identify conditions where entities could exert “inordinate control” of quota as outlined in the National Standard 4 Guidelines. Such entities could include business entities holding permits, sectors, or organizations of sectors.
5. Alternate approaches to achieving the Amendment 18 goals (other than accumulation caps) may be proposed.

⁶ National Marine Fisheries Service, 2009. NMFS National Standards Guidelines. 50 CFR 600.310 et seq.

B. Research Methods

Our analysis here is based on economic principles and analysis of the data available on ownership and control of fishing rights and the functioning of markets for ACE and for fish. Economic analysis incorporates economic theory as well as empirical analysis of data. Economic empirical analysis is conducted on quantitative data, often with some statistical analysis, but is also supplemented by qualitative information relevant to the economic issues and markets under consideration. Qualitative information is useful for determining the proper focus of the more detailed analysis of data.

We focus our analysis of accumulation limits on the determination of levels of shares that may allow permit holders to influence market outcomes, such as prices and the quantity of a stock harvested, while also accounting for other efficiency-related issues, such as potential economies of scale. Thus, our work addresses the potential for large owners of access rights to influence markets, which could raise the price of fish above competitive levels or transfer wealth among participants in the fishery.

We (along with Robert Willig) previously conducted a similar analysis for the National Marine Fishery Service (“NMFS”) and the Mid-Atlantic Fishery Management Council regarding accumulation limits for Surfclams and Ocean Quahogs, culminating in a published report similar to this one (“SCOQ Report”).⁷ Although many details of the Surfclam and Ocean Quahog Fishery are substantially different from the Northeast Multispecies Fishery, our work here has been guided, in part, by a general framework developed for the SCOQ Report. As is the case here, that analysis followed the general approach used by economists and that is described in the *Horizontal Merger Guidelines* published by the Department of Justice and the Federal Trade Commission. The peer-review panel for the SCOQ Report determined that this general framework was an appropriate approach to use for analyzing excessive-share limits for catch share fisheries. It is represented by the following seven steps:

1. Assess quota ownership information;
2. Assess competitive information;
3. Check threshold condition for permit owners to influence markets;
4. Establish concentration target(s);
5. Determine relationship between share limit and market concentration;

⁷ Mitchell, G., Peterson, S., and Willig, R. “Recommendations for Excessive Share Limits in the Surfclam and Ocean Quahog Fisheries,” May 3, 2011; Compass Lexecon, Boston.

6. Identify regulatory and practical constraints
7. Set the excessive-share cap.

For the analysis here, we relied upon theoretical work cited below and quantitative fishery data obtained from the National Marine Fisheries Service (“NMFS”) and import/export data obtained from the National Oceanic and Atmospheric Association (“NOAA”). We were also able to glean qualitative information from minutes of public meetings, articles, and our own survey and interviews with fishery stakeholders. Due in part to a federal shutdown during our research period that delayed the production of data, we conducted our quantitative analysis after collecting extensive qualitative information.

Qualitative information provides essential insights for the analysis of economic data. For example, interviews can help identify issues in need of specific economic analysis. For example, interviews may uncover opinions that certain markets are functioning well or functioning poorly, and can reveal issues where market participants generally agree (or generally disagree). This information can be substantiated (and disagreements reconciled) through economic analysis of the markets.

For the reasons described above, our research began with telephone and in-person interviews with a variety of fishery stakeholders, with particular focus on those able to provide insight into the operation of markets for permits, ACE, and fish. Interviews continued over the course of the project. Many were initiated by the stakeholders themselves, who contacted us to express their views. Others we initiated, to ensure that we had input from a diverse set of stakeholders.

In total, we received input from about 50 individuals. Interviewees included:

- Managers and presidents of at least six groundfish sectors based in Rhode Island, Massachusetts, New Hampshire, and Maine, and from within and outside the Northeast Fishery Sector network;
- Vessel captains and owners, including:
 - owner-operators and shore-based owners,
 - stakeholders operating in off-shore and in-shore areas, and
 - stakeholders owning both a small and large number of fishery access privileges;
- Representatives of the Northeast Seafood Coalition and Northeast Sector Services Network;

- Representatives of the Environmental Defense Fund;
- And other individuals connected to the fishery, such as community fishing supporters, academic researchers, fish processors, and fish auction operators.

We also solicited information more broadly through survey forms and a public webinar that was hosted by the NEFMC. The invitation to participate in the surveys and webinar were posted on the NEFMC website and distributed to over 800 people via email. These invitations encouraged people to call or email if they did not want to or could not participate in the surveys or webinar.

We received about a dozen survey responses (two through email and the rest on line). Four of the respondents identified themselves as vessel operators active in the fishery (with the rest split between sector managers, academics, other stakeholders and three respondents who did not identify their role related to the fishery). We presented initial findings and solicited feedback at a public NEFMC meeting with an on line “webinar” – there were 24 participants of the webinar, including five NEFMC staff, 3 NMFS staff, 11 industry members or representatives, four representatives of environmental or research non-profit organizations, and one state agency staff member.

In addition, we have reviewed transcripts and summaries of public meetings, including scoping hearings on Amendment 18, NMFS reports on the fishery, and annual reports prepared by sectors and state-operated permit banks.

We presented preliminary results of our analysis at a public meeting of NEFMC’s Groundfish Oversight Committee. Feedback from Committee members informed the analysis performed and the conclusions below.

The various stakeholders we interviewed and met with represent a range of concerns and views as to the immediate problems facing the fishery and the appropriate regulation of the fishery. Economic analysis, however, is based on facts and data. Stakeholders expressed to us a variety of dissimilar opinions regarding policy matters. Importantly, however, stakeholders also provided highly similar descriptions across different sources for several of the key factual matters for our analysis – including: a) the methods used for trading ACE, b) whether there have been observed instances of withholding of ACE or fishing effort in order to raise prices, c) how much variation in fishery performance occurs across seasons, d) who effectively controls ACE within the sectors, and e) how well (or poorly) participants are able to predict which stocks will be in short supply during a fishing year. Thus, our data analysis conformed with the qualitative information we received from stakeholders, among whom we did not observe meaningful disagreement for issues relevant to our analysis.

After securing appropriate data access agreements, we received quantitative fishery data from NMFS via the NEFMC related to the groundfish fishery. This data covered landings, catch, and allowable catch for species and stock area by permit from fishing seasons 2010 through 2012, along with groupings of permits based on ownership information. We also examined ex-vessel prices, and data on quantities of imported fish and fish products available on the NMFS website. We also obtained data from NOAA on fishery product imports and exports.

The regulation under consideration in our analysis, excessive-share caps on fishery access privileges, addresses potential consolidation of the fishery, which has many potential social impacts. For example, consolidation may reduce the number of ports with active fleets, leading to social hardships associated with lost employment in the fishery and so forth. These issues are important, but are beyond the scope of our economic analysis of excessive-share caps. In addition, potential consolidation may have implications for economic efficiency, such as loss of efficiency due to market failure or gains in efficiency due to cost reductions with increased scale.

II. Overview of the Northeast Multispecies Fishery

The Northeast Multispecies Fishery covers the Gulf of Maine, Georges Bank, Southern New England, and the Mid-Atlantic Bight. The fishery includes thirteen species of groundfish and is often referred to as the groundfish fishery.⁸ In Fishing Year (FY⁹) 2011, landings of all species groundfish were over 61 million pounds. Revenues associated with groundfish landings were over \$90 million.¹⁰ Massachusetts ports account for the lion's share of the landings. Over \$77 million of groundfish landings occurred in Massachusetts. Landings in Maine and New Hampshire totaled over \$10 million. The remaining landings are spread across the other coastal New England and Mid-Atlantic states. In 2011, there were 1,421 limited access eligibilities. Of these, 1,279 were associated with vessels. As described below, this figure overestimates the number of independent entities with access privileges, because some entities own more than one

⁸ Tammy Murphy, *et al.*, “2011 Final Report on the Performance of the Northeast Multispecies (Groundfish) Fishery (May 2011-April 2012),” U.S. Department of Commerce, December 2012, (hereinafter “2011 Final Report”) p. 1.

⁹ The fishing year is May 1 to April 30.

¹⁰ 2011 Final Report, Table 2. These figures include fish harvested on non-groundfish trips as well as groundfish trips.

permit. Nevertheless, fishing activity is still highly dispersed, with over 420 vessels reporting revenue from a groundfish trip.¹¹

Fisheries are an archetypal common-property resource: absent regulation, there are no limitations on who may access and use the resource or on the intensity of use. Generally, the result of free entry into a common property resource is that the resource is overexploited. The incentive for overexploitation exists, because individuals consider only their private costs and gains associated with their use of the resource. However, each user of the resource has a negative effect on the other users. For example, in a fishery, a vessel that catches fish reduces the number of fish available for others to catch. Individual vessel owners do not take the negative effect of their fishing on others into account, however. The result is that individuals acting on their individual incentives overuse the resource in the aggregate.¹²

Fisheries are renewable resources. This means that there is a return to leaving some fish in the fishery to multiply and provide harvestable fish in the future. When there is no fishing activity, the stock of fish grows until there is insufficient food to support a larger stock of fish. At this stock level, the stock is in equilibrium—it does not rise or fall. When fishing removes a portion of the stock of fish each year, the stock of fish may rise or fall depending on the rate that the remaining stock reproduces. With fishing, the stock of fish is stable when the annual harvest of fish is equal to the annual rate at which the stock replenishes itself. The expanding stock of fish benefits everyone who harvests in the fishery, but each individual could take a few more fish without affecting next year's catch appreciably. Of course, when all fishermen take some additional fish, the productivity of the fishery can be significantly reduced.

Open access to the fishery creates incentives for fishermen to expend more effort than maximizes the economic return on the fishery resource, and the individual incentive for a fisherman to leave fish in the fishery to reproduce is generally quite small. Private incentives can lead to overfishing. Economically, overfishing occurs when the catch each year is lower than it would be with the same total fishing effort.¹³ This outcome is economically undesirable.

¹¹ 2011 Final Report, Table 10.

¹² See, e.g., Gordon, H. Scott, "The Economic Theory of a Common-Property Resource: The Fishery," *The Journal of Political Economy*, Vol. 62, Issue 2, April 1954.

¹³ For a discussion of these issues see National Research Council, *Sharing the Fish, Toward a National Policy on Individual Fishing Quotas*, 1999 (hereinafter "Sharing the Fish"), pp. 22-23; Clark, Colin W., *Mathematical Bioeconomics: The Optimal Management of Renewable Resources*, Second Edition (New York: John Wiley & Sons, Inc. 1990), Chapter 2. The definition of overfishing varies.

When access to a fishery is limited and harvests regulated to maximize the value of the fishery, the fishery will produce “economic rents” (this is the term economists use to describe a payment to a factor of production in excess of the payment required to keep that factor in its current use). The rents occur because with regulated fishing effort, total fishing activity is reduced to a level where the negative effects of each vessel’s operations on other vessels is limited. At the economically optimal output level the revenue from the fishery is greater than the total cost of fishing operations, including a return on the capital invested.¹⁴ Access rights to the fishery are valuable because they allow vessels with access to earn above-competitive profit levels. These rents (or profits) are not the result of market power or other manipulation of market outcomes. They result from the fact that at the regulated output level nature provides fish that are less costly to catch and sell than they are worth in a competitive market for fish. Of course, the existence of these economic rents provides individual incentives to expand output to capture a greater share of the available rents. Unregulated expansion of output would eventually eliminate the rents, as described above.

Fisheries need not be regulated with the particular goal of maximizing the economic value of the fishery. Fisheries may be regulated to allow for the maximum sustainable yield or according to other biologic standards. However, if restrictions on access to the fishery reduce fishing effort below the level that would occur without restrictions, the fishery will generate rents. These rents are economically beneficial. It is necessary, however, to distinguish economic rent from above-competitive profits associated with a permit owner using its large ownership stake in access privileges to influence market outcomes.

Prior to May 2010, the groundfish fishery was regulated through input controls, such as trip limits, days-at-sea, gear restriction, and area closures.¹⁵ With the implementation of Amendment 16 to the FMP, the fishery is now regulated using output controls rather than input controls. Output is regulated using annual catch limits.¹⁶ There are thirteen groundfish species covered by the FMP, but ACLs are not allocated for all

¹⁴ The relevant measure of costs include the long-run costs necessary to maintain the capital and labor required to mount fishing operations.

¹⁵ See, e.g., New England Fishery Management Council, 2009. Amendment 16 to the Northeast Multispecies Fishery Management Plan Including an Environmental Impact Statement and Initial Regulatory Flexibility Analysis. 905 p.; Statement of Work; Catherine A. Latanich, “Hard Catch Limits in the Northeast Multispecies Fishery: Balancing Accountability and Opportunity in a Multispecies Complex,” 2007, p. 3.

¹⁶ Statement of Work.

thirteen species.¹⁷ Some species also have different stocks that are defined by area (e.g., cod is managed by Gulf of Maine and Georges Bank stocks).

The allocation of the ACL is primarily administered through sectors, which are contractually related groups of permit owners. Permit owners accounting for approximately 98 percent of access privileges have joined sectors. A relatively large number of very small permit holders continue to operate under in the common pool and are subject to “effort” regulations such as trip limits and time and area closures.¹⁸ The small permit holders operating outside of sectors are competitively irrelevant in that they do not have any prospect of influencing the price of fish. Our analysis focuses on permit holders operating within sectors.

Each permit provides its owner a potential sector contribution (“PSC”). A permit’s PSC is a share of the ACL for each of the allocated stocks of groundfish and is based on the catch history of the permit.¹⁹ The permit owners that join together as a sector combine their PSC. Based on the sector members’ combined PSC for each stock, the sectors are allocated ACE. Each sector can determine how to allocate its ACE among its members. In most cases, ACE is allocated back to sector members in proportion to the PSC each contributed to the sector, after the sector retains a percentage of their ACE in reserve.

Sectors are free to trade ACE. Sector managers report that they carry out the trades on behalf of fisherman. In some cases, sector managers may take a greater role in ACE trading by serving as a broker for ACE trades and take a commission on transactions. In these instances, the broker may advise fisherman on the market price for ACE and the best options for disposing of or acquiring ACE. In either case, sector managers indicate that the decisions regarding the use, purchase, and sale of the ACE allocated to an individual permit holder remains with the permit holder.²⁰

ACE may be traded within a sector for cash or by trading ACE for ACE or “fish for fish.” ACE is controlled at the sector level. Thus, trades between members of the same sector amount to a reallocation of ACE within the sector. ACE can also be traded

¹⁷ 2011 Final Report, p. 1.

¹⁸ 2011 Final Report, p. 2.

¹⁹ 2011 Final Report, p. 1.

²⁰ Sectors may set rules for transfers by sector members – for example, requiring members leasing ACE to offer leases other sector members before going outside the sector. As a practical matter, however, any sector member who found a particular sector’s restrictions objectionable could simply change to another sector (in the next season). Sectors provide no long-term constraint on the behavior of sector members.

between sectors. In practice, individuals who are members of different sectors will agree on the terms of the trade and the sector managers will broker the trade on their behalf. The trade occurs, however, as if it were between the two individuals, despite the need for the sectors to participate in the trade as the official holders of the ACE. This system operates much like an individual transferable quota system with individual permit owners deciding how to use or sell their catch entitlement, but it is the sectors rather than the sector members that are allocated ACE.²¹

The competitive price of a species' ACE reflects the actual scarcity of its available ACE relative to the availability of that species. When fishermen expect catch levels to be well below the ACL, then ACE is abundant and would trade competitively at relatively low prices (even with abundant ACE, however, the price must cover the cost of conducting the transaction). When fishermen expect catch levels to be near the available ACE for a stock, the competitive price of the stocks' ACE may be quite high.

The value of ACE for some stocks can be driven by the fact that the stock is frequently caught as "bycatch" when other species are being targeted. In fact, it is possible that the competitive price of ACE for some species with very low catch limits may exceed the value of the fish at the dock, provided there is sufficient value in harvesting related stocks with an unavoidable associated catch of the limited species (which some in the fishery refer to as "choke stocks"). The value of the stock's ACE in this instance is that it allows a vessel to fish for other species that are caught with the limiting stock. Thus, the competitive price of the limiting stock's ACE captures not just the value of being able to harvest the species directly covered but also the value of being able to harvest other species.

III. The Economics of Market Power

A. The General Case

In perfectly competitive markets, each market participant's individual purchases or sales have no influence on the equilibrium market price.²² Competition among sellers

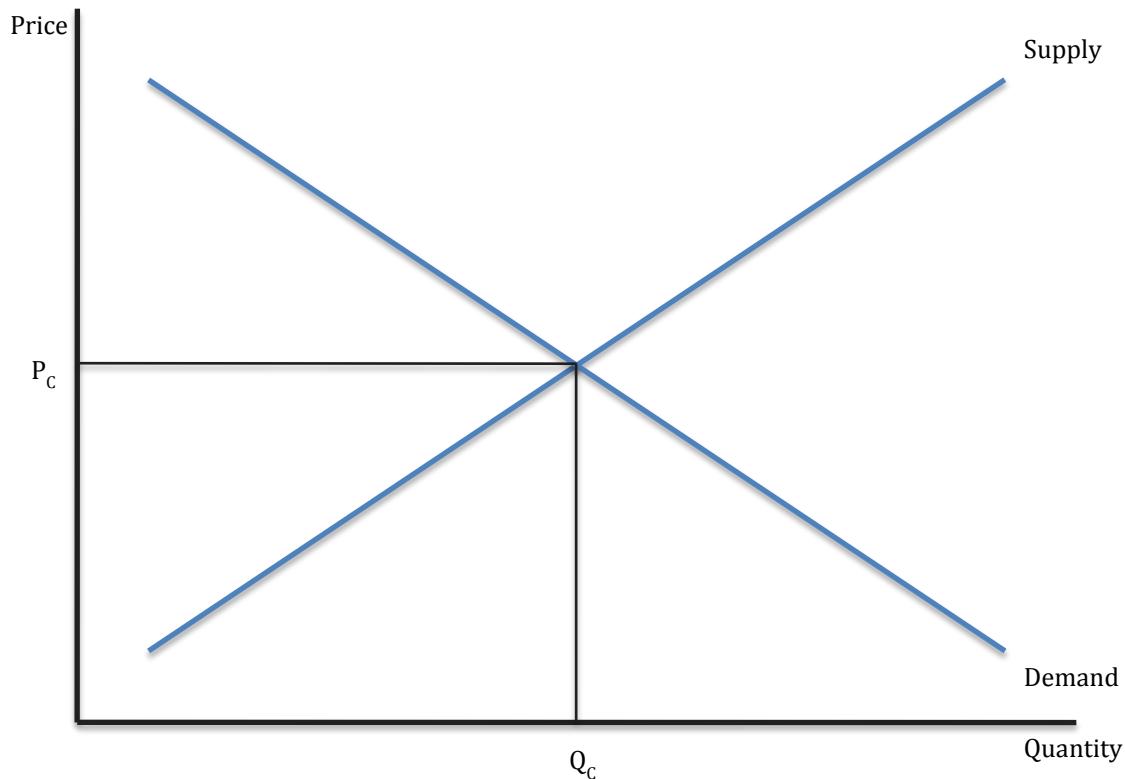
²¹ Trades between sectors are generally subject to the right of first offer by members of the seller's sector, with the goal of keeping ACE within the sector if it can be efficiently utilized.

²² The standard competitive model assumes that there are many small buyers and sellers, which is why no individual participant can influence equilibrium price. However, markets with large firms may behave competitively, depending on the nature of strategic interaction between firms, and markets with small firms may not behave competitively, depending on the differentiation of products across competitors.

in a competitive market leads them to expand their output until the cost of producing an additional unit just equals the revenue received from selling it. Consumers similarly purchase until the benefit of an additional unit falls just equal the market price. The competitive price brings supply and demand into balance, with suppliers offering just the quantity of goods that consumers want to buy. At this point, all of the gains from trade have been realized. If suppliers increased their output, the cost of doing so would exceed the benefit that consumers would obtain from additional consumption and their willingness to pay for the additional goods.

Figure 1 illustrates competitive market equilibrium. The downward sloping market demand curve indicates willingness of consumers to pay for the good at each output level. The upward sloping supply curve indicates the cost that competitive suppliers must be paid to bring the indicated quantity to market. Equilibrium occurs at the price P_c , where the quantity supplied equals the quantity demanded, Q_c . Each supplier receives that price regardless of the quantity each supplier produces, so each supplier-specific demand curve (not shown on the graph) is a horizontal line at the market equilibrium price.

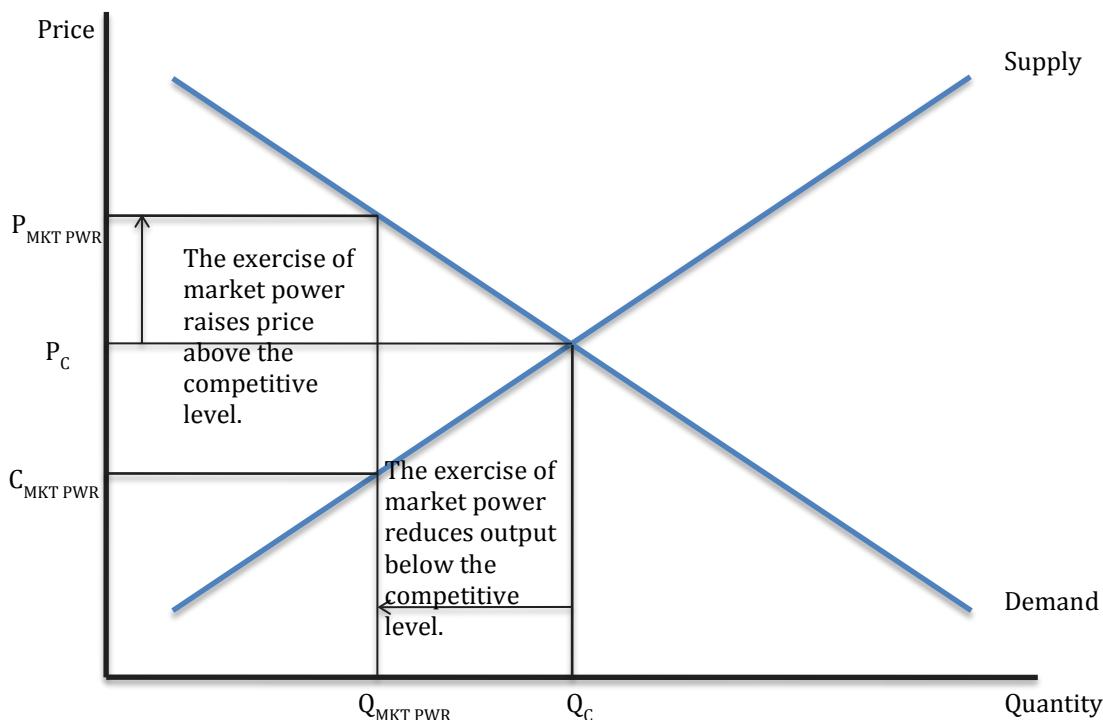
Figure 1
Competitive Market Equilibrium



In markets that are not competitive, some sellers may realize that the level of their sales influences the market price they receive. Specifically, they find that as their output increases the prices they receive fall. This outcome reflects a downward slope for the supplier-specific demand curve. As output from that supplier become less scarce, buyers are willing to pay less for each additional unit.

Suppliers that are large enough for their increased output to lower market prices on all of their output have a unilateral incentive to withhold some output from the market in order to raise the market price. Figure 2 shows a market where a firm has withheld supply from the market. The price, $P_{MKT\ PWR}$, is above the competitive level and the quantity supplied to the market, $Q_{MKT\ PWR}$, is below the competitive output level. This is inefficient because buyers would be willing to pay more than the cost of supplying additional output. (The height of the demand curve at $Q_{MKT\ PWR}$, which indicates willingness to pay for more output, is above the height of the supply curve at $Q_{MKT\ PWR}$, which indicates the cost to suppliers of increasing output.) With reduced output due to the exercise of market power, the operation of the market leaves gains from trade unrealized.

Figure 2
 Equilibrium in a Market with Market Power



B. Market Power in a Fishery

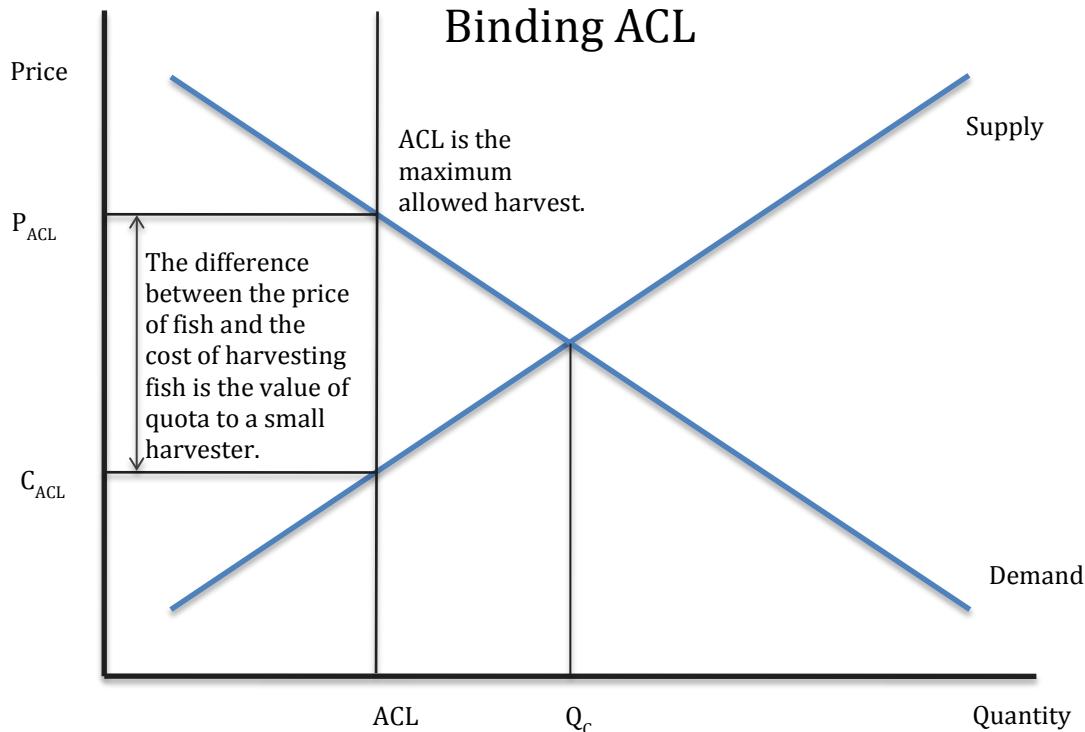
The basic economic principles describing market power apply within a multispecies fishery with output regulation. However, it is important to keep track of two issues that arise in the application of the economic principles. First, it is possible for the output limitations on the fishery to be the limiting constraint on catch of some or all species. This is not market power. Moreover, output limits can be the binding constraint on output even when there are large holders of access rights who could exercise market power under other market conditions. Second, it is not possible for fishermen to be perfectly selective when targeting particular species within a multispecies fishery. Therefore, to target one (or more) species requires privileges to catch other, non-targeted species. Differences between the allocation of catch entitlements and the species actually caught can affect whether it is possible to exercise market power in a multispecies fishery.

The description of market power above pertains to the exercise of market power to raise prices in the market for fish. We first consider the effect of annual catch limits and transferable access rights for a single species. We then consider how this discussion applies to a multispecies fishery, in which it may also be possible to exercise market power in the markets for the fishing privileges of individual stocks. This would occur if a large holder of access privileges withheld some access privileges from the market in order to raise the price of the privileges it did sell. Such an exercise of market power enriches one participant in the fishery at the expense of another. The exercise of market power by one permit holder against other permit holders in, say, the lease market for ACE suggests the permit holder with market power has inordinate control.

1. Market Power with Annual Catch Limits

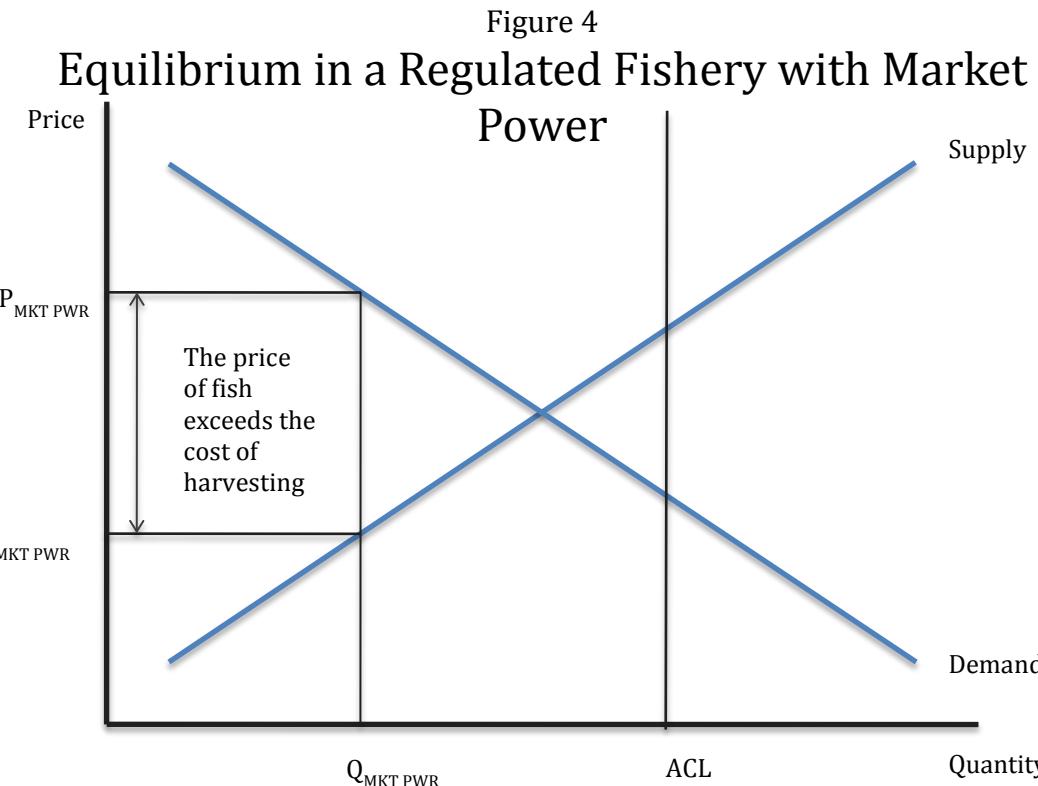
Exercising market power to raise the market price of a good, such as fish or ACE, requires withholding supply of the good from the market. In an output-controlled fishery, the limitation on supply may come from the regulation of the fishery itself. This circumstance is illustrated in Figure 3. The figure shows supply and demand for the fish from the fishery. The vertical line represents the maximum harvest permitted, or the ACL. In Figure 3, the ACL is below the competitive market output of the fishery. The ACL is, therefore, the binding constraint on how many fish will be harvested. The market price in Figure 3 is equal to P_{ACL} , which is above the competitive price. The market price is also above the cost of bringing additional fish to market, as indicated by the height of the supply curve where it intersects the vertical line where output equals the ACL, or C_{ACL} . The difference between the price of fish and the cost of harvesting additional fish shown in Figure 3 is the source of the rents created by a limited access fishery described above.

Figure 3
Competitive Equilibrium in a Regulated Fishery with Binding ACL



The outcome for a fishery with ACLs below competitive equilibrium is similar to the outcome resulting from the exercise of market power. The price is above the competitive level and output is below the competitive level. The reduction in output below the competitive level arises directly from the regulation of the fishery rather than from the withholding of ACE or fish from the market. Unlike the exercise of market power, the limitation of output from a fishery can be efficient, because it reduces the inefficient application of fishing effort.

The output of a fishery can be below the ACL, and this can occur with or without the exercise of market power. If demand for the output of a fishery is low relative to the cost of harvesting fish, competitive forces rather than fishery regulation limit the total catch. Alternatively, it could be the case that the output limit on the fishery does not bind, and that participants in the fishery are withholding supply to raise prices. This circumstance is shown in Figure 4. In the groundfish fishery, this could occur if large holders of ACE (e.g., individuals, sectors) were to neither use nor sell their ACE in order to reduce the annual catch below the allowed limit and with the goal of increasing prices.



In Figure 4, the exercise of market power raises the price of fish above the cost of catching additional fish, which is shown by the height of the supply curve at the fishery's output level, $Q_{MKT\ PWR}$. A large owner of access privileges restrains the output of the market, because each additional unit it produces lowers the price on the units it would otherwise sell at the higher price, reducing its profits. In contrast, a small owner of access privileges does not have the ability to influence the price. Therefore, a small owner will view the value of additional catch as the difference between the market price of fish and the cost of catching additional fish. Since this is positive, a small owner of access privileges will want to expand output, if it had the ability (privileges) to do so.

The discussion above illustrates that large and small owners have different incentives regarding withholding supply from a market, whether the market is for fish or for access privileges (*i.e.*, ACE). Sufficiently small market participants *cannot* benefit by withholding either access privileges or fish from the market. By definition, the exercise of market power entails an entity withholding from the market to influence prices *to its*

advantage. Small market participants acting independently cannot influence prices. They simply respond to the prices they face.

A simple example of the different incentives of large and small holders of access privileges illustrates the inability of owners of small shares of access privileges to profitably influence prices. Consider a large owner of privileges with 50 units of a fishery's 100 access privileges. The owner has a 50% share of the available privileges. If the large owner does not fish, but simply leases privileges, consider the circumstances under which the owner makes more money by withholding some of the access privileges. Suppose the price of privileges is \$1 apiece when the owner sells all of its privileges, but that the price of privileges would rise if the owner withholds 5 units (10% of the large owner's holdings). The owner would earn \$50 selling all of his privileges. If the owner is to make more money by selling 45 privileges than by selling 50 privileges, then price would have to rise to just over \$1.11 (50 times \$1 equals 45 times \$1.11). This is an 11% increase in the price of privileges. Is this plausible? The large owner has withheld 5% of the available privileges from the market and needs the price of privileges to rise by more than 11%. This requires the elasticity of demand for privileges to be less than 0.45 ($5\%/11\% = 0.45$).²³ A demand curve with an elasticity of about one-half is considered inelastic, but the elasticity is not necessarily implausibly low.

Now consider whether it would be worthwhile for a small owner of 10 units (10% of the total privileges) to withhold from the market to raise price. If the small owner withheld one privilege (10 percent of the small owner's holdings), then again, the price would have to rise from the competitive price of \$1 to just over \$1.11 in order for the owner's revenue to rise (10 times \$1 equals 9 times \$1.11). This is the same price increase as would have to occur for the large owner, but in this case, the price change would have to occur in response to a much smaller reduction in quantity. In this case, withholding just 1% of the privileges in the market must increase the market price by more than 11%. In order for this price increase to occur, the demand curve would have to be extremely sensitive to changes in the available privileges. The elasticity of demand would be less than 0.09 ($1\%/11\% = 0.0909$). Such a demand curve is highly price inelastic (and outside the range that would be plausible for the Northeast Multispecies Fishery).

The relevant comparison between the two cases is that the responsiveness of prices to a change in available privileges would have to be five times as large for the small rights holder to profitably withhold relative to the large rights holder. In the example above, the small owner needs the same 11% price increase as the large seller,

²³ The elasticity of demand is the percentage change in quantity divided by the percentage change in price. The presentation here is informal and adopts some common simplifying conventions. For example, the actual result of the elasticity calculation is a negative number, reflecting the downward sloping demand curve, but we discuss the elasticity as if it were positive.

but the small seller needs this price increase to occur when one unit is withheld rather than five units. Thus, small holders of access privileges are significantly less likely to be able to exercise market power profitably than larger holders.

In markets generally, potential for expanded output (either from existing competitors or from new entrants) can be a constraint on the exercise of market power. In order for sellers in a market to successfully exercise market power, they must be able to withhold supply from the market without that supply being replaced by other firms. Frequently, the high prices generated by the withholding of supply would attract new firms to the market and with them, expanded output. Expanded output would bring prices back down toward competitive levels.

The market for fishery access rights is somewhat different. In the fishery, regulators set the allowable catch or the supply of ACE for each stock. If a firm withholds ACE, small, unconsolidated holders of ACE can release additional ACE to the market to take advantage of the high prices and will have the incentive to do so. However, there can be no entry or expansion into the market for ACE to replace the withheld ACE. Only the regulator can expand the total supply of ACE for a stock.

2. Market Power in a Multispecies Fishery

The Northeast Multispecies Fishery is regulated with output caps on each regulated stock. Permit owners are assigned PSC (and, ultimately, receive their ACE from their sector) based on the catch history of the permits they own.²⁴ Since conditions change over time, fishermen may hold rights to catch fish that are poorly aligned with fish that are available to catch in the fishery. For example, some fishermen may be short of one species and long on another relative to the capacity of their vessels to actually catch fish given fishery conditions. This means that fishermen will find it in their interest to trade ACE to match their expected catch. The need to have ACE for each species caught and the likely need for some fishermen to have to buy ACE to cover the fish they will actually harvest presents opportunities for large holders of ACE to exercise market power in the markets for ACE.²⁵

²⁴ A permit's potential sector contribution depends on the catch history of the permit. In practice, sectors allocate ACE to their members in proportion to the PSC they bring to the sector. Therefore, fishermen generally start the fishing year with catch entitlements that are determined by the catch histories of the permits they own.

²⁵ ACE is an input into the “production” of fish. There may be instances where withholding ACE would not influence the price of fish in the output market. However, if there are fishery rents (unrelated to market power) associated with the use of a particular stock’s ACE, it may be possible for someone with large ACE holdings to capture those rents from other fishermen (even without changing the price

A large holder of ACE for a particular stock may choose to not use all of its ACE holdings and to refuse to sell ACE to others who would use it. Such withholding of ACE could reduce the supply of the species from the fishery and, if the withholding were to have a substantial impact on output quantity, could raise the price of the species to the advantage of the large ACE holder. In the multispecies fishery, restricting the catch of one species may also reduce supply and raise prices of other associated species that are caught alongside the species with ACE being withheld from the market. Whether the withholding of ACE, and thus fishery output, for one or more species of fish will raise the price of fish depends on a number of factors. If, for example, the species is available from other fisheries, the supply of fish will not, in fact, be reduced and prices will not rise. Another possibility is that customers are willing to switch their consumption to other species when the price of the withheld species increases, making it difficult to increase prices without losing substantial sales. These issues are addressed below.

Imbalances between ACE holdings and availability of species sometimes create a situation in which a species has a low catch limit and may not be itself commercially viable for harvest, but cannot be avoided by fishermen harvesting other species (what some in the fishery call “choke stocks”). If a catch limit is sufficiently low and fishermen cannot adjust their fishing to avoid the species, then the constraint creates a substantial cost for harvesting associated species. Thus, the total amount of choke stock available can strongly affect the output and price of multiple species in the fishery or in a stock area. A large holder of ACE for a choke stock could potentially engage in the exercise of market power in either the output market for fish or in the markets for ACE trading.

Depending on competition with other substitute products, such as other species or fish brought in from other regions, including imports, it may not be possible to raise the price of fish by withholding ACE. Even in those circumstances, however, a large holder of a choke stock’s ACE may still be able to exercise market power in the market for ACE.

When a particular species’ ACE is in short supply relative to other stocks caught concurrently, different fishermen will have different levels of demand for the limiting stock’s ACE. Some will have a balanced portfolio of ACE even where one stock limits the harvest of others. Some may fish areas (or use gear) for which it is relatively easy to avoid catching the limiting stock while targeting other species. Other fishermen will have relatively more difficulty avoiding the limiting stock, because they have gear that is less selective or because their home ports are near fishing grounds where the limiting stock is relatively abundant. The variation in the importance of the limiting stock’s ACE to different fishermen means that each fisherman has a different willingness to pay for the

of fish in the output market). Allowing such rent capture would be inconsistent with National Standard 4 Guidelines.

limiting stock's ACE and that the demand curve for the limiting stock's ACE is downward sloping.

Under these circumstances, a holder of a sufficiently large share of the limiting stock's ACE can withhold some of its ACE in order to raise the price to fishermen looking to acquire it. Exercising market power in this fashion need not raise the price of fish to consumers. However, the exercise of market power in markets for ACE does transfer income between fishermen operating in the fishery because some fisherman must pay more than the competitive market price for the choke stock's ACE.

It is the portion of the price above the competitive level that is the relevant transfer between fishermen. The exercise of market power in the markets for ACE would be inconsistent with the principles of fairness embodied in National Standard 4. In addition, if the extraction of income from one group of fishermen were to persist over time, investment in new vessels and gear would ultimately be affected to the detriment of the efficiency of the fishery.

C. Excessive-Share Caps to Regulate Market Power in a Fishery with Output Regulation

Access to a fishery subject to an output limit is valuable when the regulation restricts fishermen from inefficiently expanding output and eroding profits or "rents." Access to the groundfish fishery is controlled by permit ownership, which results in fishermen obtaining effective control of ACE that they can trade among themselves. Thus, the rents associated with access do not flow directly to vessel owners harvesting the fish but to those who hold ACE. The rents attributable to access to the fishery have been severed from the harvesting of fish. This is most clear in the case of a permit owner that does not fish, but sells its ACE to others who do fish. The market value of a stock's ACE is the rent associated with catching that stock for the vessel owner that is just willing to purchase the ACE and the permit owner just willing to sell the ACE. This rent is the value of the fish the ACE allows the least efficient user of the ACE to catch (which may include other stocks) less than the cost catching the fish.

On the buyer side of the market, many buyers may get surplus when buying ACE at the market price – meaning the buyer acquires the ACE at a price lower than the buyer values the ACE. However, the market price is established by the value placed on the ACE by the *marginal* buyer – the vessel owner just willing to buy the ACE when supply equals demand. This vessel owner is indifferent between buying and not buying and is the buyer that uses the ACE least efficiently among the group of those who actually choose to buy. All other buyers use the ACE more efficiently and receive surplus from the transaction.

On the seller side of the market, the market value is equal to the value placed on the ACE by the *marginal* seller – the seller that is just willing to sell the ACE rather than

use it himself when supply equals demand. This is the seller that would use the ACE most efficiently among the group of sellers that actually choose to sell ACE. All other sellers would use the ACE less efficiently and gain by selling it rather than using it in their own operations. These sellers place a lower value on the ACE in their own operations and receive a surplus from their sales.

The paragraphs above indicate that ACE trading in *competitive* markets is *expected* to price some vessel owners out of the markets for ACE. In fact, this is the very purpose of high competitive market prices. When a product is scarce, the price rises leading to a reduction in the quantity demanded as buyers who cannot afford the high price choose to do with less or to do without entirely. This is not a consequence of market power. Rather, it is the natural operation of competitive markets. This result is to be expected in a multispecies fishery that is regulated using access privileges for individual stocks that can be traded among vessel operators through their sectors. The concern for regulation is that when permit owners are able to exercise market power, they are able to artificially create scarcity by withholding supply. Scarcity and high prices arising because the total amount of available ACE is low is not a competitive concern.

As noted above, market power could be exercised in two ways. Withholding ACE may reduce the supply of fish, raising the price to consumers to the benefit of some fishermen. Withholding ACE can also raise the price of the ACE traded to other fishermen above the competitive level. When this occurs, fishery rents that should accrue to one group of fishermen are transferred to the entity exercising market power.

Market power hurts consumers and causes economic inefficiency. Some industries, such as electricity and natural gas distribution, are directly regulated to control the exercise of market power. Other industries are subject to the antitrust laws, which forbid mergers and anticompetitive conduct that perpetuate significant market power. An excessive-share rule falls into this second category of regulation because it would restrict some permit or ACE transactions but allow others.

The government has an interest in controlling the exercise of market power through the accumulation and withholding of fishing privileges. The regulation of the fishery through catch entitlements that fishermen effectively control and can trade was intended to better husband the fishery's resources and to make the fishery operate more efficiently. The exercise of market power is counter to these goals. Therefore, the government has an interest in seeing that the catch entitlements it created do not become a means for the exercise of market power.

Regulating market power carries its own risk. The regulation of market power limits what firms can do, and may forbid them from engaging in pro-competitive conduct as well as in anticompetitive conduct. Since pro-competitive conduct helps drive market efficiencies, regulation intended to limit market power has the potential to generate its own set of inefficiencies. At a minimum, the design of regulations to control market

power should reflect the fact that limiting the exercise of market power involves a trade-off between the benefits of limiting market power and the risks of reduced efficiency from the regulations. For example, an excessive-share cap could limit the growth of some firms (fleets) operating in fishery. To the extent efficient firms are the ones that grow, limiting firm growth could be detrimental to the efficiency of the fishery and to investment in the fishery. Limiting the growth of such a firm when there is not a realistic prospect that it could exercise market power is not economically justified.

There are options for controlling market power other than an excessive-share cap that may be more efficient under a wide array of circumstances. It is not a threat to competition for one or more firms to grow relatively large as long as other firms remain small and will continue to act competitively, even if larger firms were to attempt to exercise market power. Balancing the benefits of limiting the exercise of market power with the potential costs of unintended over-regulation may require a portfolio of regulatory tools. The benefits of an excessive-share cap is that it is a means of limiting the potential for the exercise of market power that it is easy to apply and treats all firms equally. However, if the level of the cap is not revisited periodically, the potential for the excessive-share cap to become an inefficient means to limit the exercise of market power grows.

D. The *Horizontal Merger Guidelines*

The U.S. Department of Justice and the Federal Trade Commission (“Agencies”) share the responsibility for investigating mergers in the United States. This requires the Agencies to determine whether a particular merger is likely to harm competition. To undertake their work the Agencies have developed expertise in the analysis of competition and the influence of mergers on competition. To aid their work and to help firms that are considering a merger understand how the Agencies will evaluate their particular merger, the Agencies publish the *Horizontal Merger Guidelines*, which describe the methods the Agencies use to evaluate competition and how mergers will influence competition.

1. Relevant Market Definition

Competition analysis is the study of what products and firms compete with one another for sales to consumers. To address this issue, competition analyses frequently begin with the definition of the “relevant market.” The relevant market contains the products and suppliers that customers treat as being good substitutes for one another. A relevant market has two dimensions, a product dimension, which includes the product

that is central to the analysis and its close substitutes, and a geographic dimension, which includes the locations of the sources of supply that buyers view as close substitutes.²⁶

The standard and accepted approach for the identification of the contours of the relevant market is the “hypothetical monopolist test.” This test begins by selecting a candidate market comprising a product that is central to the question under investigation and determining whether a hypothetical profit-maximizing firm that was the only present and future seller of the product(s) in the candidate market could profitably impose at least a small but significant and non-transitory increase in price (a “SSNIP”) on at least one product in the market.²⁷ A SSNIP is typically assumed to be about a five percent increase in price. If the SSNIP would not be profitable because consumers would substitute other goods for the product with the increased price, the “candidate market” is too small. In this case, the closest substitute product is added to the candidate market and the hypothetical monopolist test is run again. This process is repeated until the product dimension of the market contains a sufficiently large number of substitutes that a hypothetical monopolist of all of them could profitably impose a SSNIP. A similar procedure is used to identify the sources of supply of the products in the relevant product market to define the sources of supply in the relevant geographic market.

If a set of products satisfies the hypothetical monopolist test, a larger group of products will also often satisfy the hypothetical monopolist test. However, overly broad markets (i.e., markets that contain more products than are necessary to satisfy the hypothetical monopolist test) are not useful for competition analysis, because they are likely to include distant substitutes for the primary products of interest. These distant substitutes do not impose a meaningful constraint on the prices charged for the products of interest. To avoid including distant substitutes, the product dimension of the relevant market is typically defined to be the smallest set of products that passes the hypothetical monopolist test.²⁸

2. Market Concentration Thresholds and the Analysis of Competitive Effects

The standard measure of concentration used in competition analysis, and identified in the Terms of Reference, is the Herfindahl-Hirschman Index (“HHI”). The HHI is calculated by squaring the market share of each firm and adding up the squared market shares. In a market with three firms with market shares of 50%, 30%, and 20%, the HHI is $3800 (50^2 + 30^2 + 20^2 = 2500 + 900 + 400 = 3800)$.

²⁶ *Horizontal Merger Guidelines* at §4.2.

²⁷ *Horizontal Merger Guidelines* at §4.1.1.

²⁸ *Horizontal Merger Guidelines*, §4.1.1.

The *Horizontal Merger Guidelines* classifies markets into three categories based on their HHIs. If a market's HHI is below 1500, the market is “unconcentrated.” If a market's HHI is between 1500 and 2500, the market is considered “moderately concentrated.” Finally, if a market's HHI is above 2500, the market is considered “highly concentrated.”²⁹ When calculating an HHI, it is necessary that the shares be calculated based on sales (or other relevant measure) from a properly defined relevant market.

The Agencies will not typically oppose a merger if the HHI in the market is under 1500 and the increase in the HHI from the merger is small. This reflects that fact that if the HHI is under 1500, the market is populated by a relatively large number of small firms that can be expected to behave competitively. With an HHI less than 1500, the market could contain about seven or more roughly equal size firms, each with less than 15 percent share. Therefore a merger is unlikely to be motivated by an effort to acquire market power. The small competitive firms in the market will restrain any such efforts.

Many proposed mergers result in concentration levels well above the *moderately concentrated* or *highly concentrated* thresholds found in the *Horizontal Merger Guidelines*, but remain unopposed and are ultimately consummated. In these cases, the Agencies engage in more detailed competitive analysis to determine whether a proposed merger will threaten competition. Thus, the *unconcentrated* range is considered “safe”, but higher ranges may also be safe when more detailed analysis shows that sufficient competition will continue to constrain pricing. This often depends on the nature of competition in the industry among other factors. The Agencies may also approve mergers if the merging firms agree to “remedies,” such as the divestiture of some assets as a condition of approving the merger.

The *Horizontal Merger Guidelines* demonstrates that the context in which consolidation takes place matters. High market shares and high concentration may not be threats to competition under some circumstances. Therefore, simply applying the safe-harbor thresholds for concentration found in the *Guidelines* to the ownership of PSC or ACE may serve as a guideline for establishing an excessive-share cap. However, the regulation need not rigidly conform to the safe-harbor thresholds and could quite reasonably allow for modification as conditions change.

The *Horizontal Merger Guidelines* does describe the economic methods that should be used to evaluate at what level accumulations of PSC or ACE are likely to begin to threaten competition. It is a relatively simple exercise to determine how an excessive-share cap can keep markets within the *unconcentrated* range of HHI. This is “safe”, in that there is little or no concern about the exercise of market power, and efficient

²⁹ *Horizontal Merger Guidelines*, §5.3.

(provided the excessive-share cap does not over-regulate the market by prevent pro-competitive behavior).

IV. Analysis of the Potential Exercise of Market Power in the Northeast Multispecies Fishery

The competitively relevant participants in the Northeast Multispecies Fishery are permit owners, which receive ACE through their sector memberships and vessel owners. Often vessel owners also own permits that give them access to the fishery. However, some permit owners do not fish actively and lease their ACE to others who are actively engaged in fishing operations. This includes permit banks, which own permits and control the PSC and ACE that they confer. Permit banks are organizations that hold permits and acquire ACE to use for a particular purpose, such as supporting a particular fishing community. State-operated permit banks do not have to join groundfish sectors, but private permit banks do.

Below, we address certain aspects of the structure of the Northeast Multispecies Fishery that will be useful when assessing the level of the excessive-share cap.

A. The Market(s) for Fish

It is only possible to raise the price of a species of fish from the fishery if buyers are unwilling to substitute their consumption either to other species or to fish sourced from outside the fishery. When consumers are willing to substitute to alternative species or sources of supply, efforts to raise the price of a species of fish by withholding its ACE and reducing its supply from the fishery will fail. In other words, a firm can exercise market power only if it controls a substantial amount of the substitute products and sources of supply that consumers would turn to when the price of a good is raised.

To see why this is the case, assume that consumers will switch their consumption from species X to species Y when the price of species X rises a bit above that for species Y. Efforts to withhold the supply of species X will fail because as the price rises, consumers will buy less of it and switch their consumption to species Y, which is not subject to withholding. In this case, the relevant product market for species X includes species Y as well. Because species Y is competitively supplied, it is not possible to profitably exercise market power over species X.

Now assume that there are no good substitutes for species X and that consumers will pay more for species X rather than switch to other species of fish if the price of species X rises. In this case, a hypothetical monopolist of species X (*i.e.*, one firm that controls the entire supply) could raise the price to consumers. However, if supply from the Northeast Multispecies Fishery were reduced through an attempt to exercise market

power, processors may be able to obtain species X from another fishery in the United States or elsewhere. If this is the case, then efforts to raise the price of species X by reducing supply from the Northeast Multispecies Fishery will fail because “replacement” supply will be forthcoming from other fisheries. In this case, the product market is limited to species X, but the geographic market includes other fisheries as well.

At a high level, the markets for fish from the Northeast Multispecies Fishery appear highly competitive. Data on imports and exports show that the fishery is a small share of total U.S. fish consumption, and stakeholders consistently report that many species are traded globally. Thus, the relevant geographic market (*i.e.* the sources of supply to U.S. consumers) is larger than the fishery for *at least some* major species, such as cod. There is also anecdotal evidence of substitution between different species of fish (e.g. cod and haddock). Moreover, while some prices have increased with the recent reduction in the output of the fishery, the price increases have been much smaller than the quantity reduction. This is consistent with the data (and stakeholder reports) that increased imports have increased to compensate for the reduction in the fishery’s supply of at least some species.³⁰

To fully assess the potential for the exercise of market power in the markets for fish, however, it would be necessary to determine comprehensively what species of fish compete with one another and who can supply competing species. The determination of the levels of substitution between species of fish and sources of fish is beyond the scope of this report. However, it is worth noting that some stakeholders report that fish prices depend on the supply of individual species, indicating that cod competes with cod and flounder competes with flounder. There is also some anecdotal evidence that prices for the highest quality fish have increased with decreased fishery output, which could indicate that there is a separate relevant market for the highest quality fish for restaurants, for example.

Some consumers may choose to source fish from a particular area to support a particular fishing community. However, the analysis of the relevant market turns on how a marginal consumer, or a consumer who is on the cusp of purchasing a different species of fish or an entirely different product, such as shrimp or poultry, chooses what to purchase. Given the success of imported fish products in the United States, the marginal consumer appears places little or no value on whether a cod filet was originally caught in the Gulf of Maine or on Georges Bank. Moreover, it is presumably not possible for a

³⁰ Some stakeholders noted that certain consumers may have preferences for locally caught fresh fish. This type of “differentiated” demand is completely consistent with broad markets that do not account for the specific preferences, because the size of the relevant economic market depends on the *marginal* consumer – those that would choose not to purchase the product if the price were slightly higher.

typical consumer to determine where a cod filet came from without expending substantial effort. Georges Bank cod and Gulf of Maine cod are indistinguishable to consumers. This means that the relevant markets for fish are no smaller than a species harvested from the fishery (i.e. not differentiated by stock). The success of imports indicates that the relevant markets are likely larger, possibly much larger, for some species.

We evaluate the HHIs in relevant markets defined by individual species. If these narrow markets are unconcentrated, markets that are more broadly defined would be still less concentrated. Therefore, we can conclude that the potential for the exercise of market power over the price of fish is quite small based on markets defined by individual species. In fact, doing so is conservative in that it is more rather than less likely to identify high levels of concentration, which is indirect evidence of market power.

To measure concentration, we rely on data of landings by permit.³¹ Multiple individuals may own interests in vessels and in permits. It is possible to determine who holds the ownership shares, but there is not information showing each owner's interest in a permit or who owns the controlling interest. We address this issue by using a broad definition of ownership, the "GroupID." Group ID combines all individuals with overlapping interests. For example if individual A and B own permit 1, individuals B and C own permit 2, and individuals C and D own permit 3, all three permits will be assigned to the same GroupID. This ownership definition combines permits that may not, in fact, be under common control into a single GroupID. To the extent the GroupID definition of ownership combines permits that are, in fact, independently controlled into a single ownership group, the measures of concentration associated with GroupID will overstate actual concentration. Thus, if we find that the risk that market power will be exercised is small using GroupID, we would find a still lower risk if we had greater detail on the ownership of each permit.

We examine the landings of fish by species. Table 1 shows the HHIs for the landings of the allocated species harvested in the fishery. Most of the HHIs are below 1500, indicating that they are *unconcentrated*, and just one species is at the low end of the *moderately concentrated* range. Table 2 shows the number of different GroupIDs that accounted for all of the landings that went into the concentration measures (GroupIDs with no landings are not reported on Table 2, and have no impact on the concentration measures in Table 1).

³¹ It is not possible to track each trade of ACE within a fishing year to determine the concentration of fishing privileges after trading. NMFS allocates ACE to sectors, which further distribute fishing rights to individual sector members according to the terms of the sector agreements. These trades are generally not reported. Movements of ACE between sectors are approved by NMFS. However, ACE trades within a sector are simply a reallocation of ACE within the sector that was allocated the ACE and are not generally available. As a result, it is not possible to track precisely who comes to control ACE through all of the trades that may occur.

**Table 1: Landings Concentrations for GroupIDs,
by Species and Fishing Year**

Species	Landings HHI (by GroupID)		
	2010	2011	2012
American Plaice	435	511	479
Cod	188	225	280
Haddock	1,018	876	934
Pollock	369	326	367
Redfish	1,018	1,123	1,352
White Hake	424	382	338
Winter Flounder	1,357	1,680	1,600
Witch Flounder	333	389	353
Yellowtail Flounder	531	930	309

**Table 2: Number of GroupID with Landings,
by Species and Year**

Species	Number of GroupIDs		
	2010	2011	2012
American Plaice	206	186	164
Cod	301	275	257
Haddock	233	204	183
Pollock	228	225	199
Redfish	160	166	155
White Hake	201	191	171
Winter Flounder	201	179	158
Witch Flounder	213	202	193
Yellowtail Flounder	230	204	199

The HHIs shown in Table 1 overstate the degree of concentration for many species. At noted, the GroupID definition of permit ownership leads to an overstatement of concentration. In addition, some species face competition from imports and other fisheries. Moreover, different species of fish compete with each other to some degree. These factors indicate that the HHI's for the harvest of the allocated species from the

Northeast Multispecies Fishery overstate the concentration for purposes of assessing the likelihood of market power.

That some species (such as winter flounder or redfish) have relatively higher HHIs in Table 1 does not necessarily indicate that the ACE for the species became relatively more concentrated during the fishing year. In some years, the species with the relatively higher concentrations have significant amounts of unused ACE. For example between 2010 and 2012, landings of redfish reached a high of only about 50% of available ACE. Where there is significant unused ACE for a species, the relatively higher concentrations of landings need not indicate that control of ACE became concentrated, only that relatively few firms targeted the species. This is particularly the case where the initial allocation of ACE for the species was allocated at a still lower level of concentration, as was the case for redfish.

The low concentration of harvest shares indicates that there is not currently a meaningful risk of the exercise of market power in the markets for fish harvested from the Northeast Multispecies Fishery. Production shares show a low level of concentration or a high degree of dispersion, which indicates that the entities harvesting are largely quite small from a competition perspective. Small firms have very little potential to influence prices to their advantage by withholding output.

It is also notable that there has been no consistent pattern of increasing concentration in landings across all species during the three-year period measured here. Some HHIs have increased (but only one species, winter flounder has moved from *unconcentrated* to *moderately concentrated*), while others have decreased. As Table 2 shows, there have been declines in the number of active participants (GroupIDs with landings) for every species in every year, but over 150 active suppliers remain in every category. In addition, we reviewed the data to determine whether there were substantial changes over time for the GroupIDs with the largest share of landings. We cannot report the specific results due to confidentiality issues, but we can say that the data do not show an economically meaningful increase in the shares of landings by the largest GroupID for each species. Furthermore, while some species have one or more GroupIDs with a substantial share of landings, those situations do not correspond with an equally high share of access rights, which we discuss next.

B. The Market(s) for ACE

The analysis above shows that participants in the fishery are quite unlikely to be able to profitably exercise market power in the markets for fish. The question remains whether control over a significant accumulation of PSC and the resulting ACE could be a source of market power in transactions for ACE in the annual lease market. This issue is of greatest concern if the substantial accumulation of PSC or ACE is for a choke stock.

As described above, different fishermen have different abilities to selectively target species while avoiding catching a limiting stock based on gear type, home port, target species, and so forth. This means that, collectively, there will be a downward sloping demand curve for the choke stock's ACE. In this circumstance a fisherman with a high cost of avoiding the choke stock would face the prospect of paying monopolistic prices for choke stock ACE if an entity with a sufficiently large accumulation were to withhold supply. Other fishermen would unnecessarily go without additional ACE covering the choke stock because the price of the ACE is elevated by market power.

The relevant issue is to determine the circumstances where an entity controlling a large share of a choke stock's ACE could exercise market power. In particular, could groups of multiple permit owners be used for this purpose by sectors? Alternatively, could a large individual permit owner that came to control a substantial accumulation of ACE for a choke stock through the PSC associated with its permits exercise market power in the markets for ACE? We address these questions in turn.

1. The Potential for Sectors to Exercise Market Power

Sectors are voluntary groups of permit owners who have contractually joined together to form a sector so that they can convert the PSC associated with their permits into ACE, or catch entitlements. In principle, it would be possible for sectors to behave anticompetitively. For example, the members of a sector could instruct their sector manager to combine their ACE and to market their ACE jointly. If a sector had a large share of a species that other fishermen were willing to pay for, the joint marketing of the members' ACE for this stock could allow the sector to exercise market power. Table 3 shows the concentration of ACE holdings by sectors. The table shows that ACE is *moderately concentrated* ($1,500 < HHI < 2,500$) for several species and also *highly concentrated* ($HHI > 2,500$) for two species, white hake and redfish. Table 4 shows the concentration of sectors' ACE holdings for individual stocks, which are also *moderately concentrated* and *highly concentrated*. Finally, Table 5 shows the number of different sectors that accounted for the ACE holdings that went into the calculation for each of the concentration measures for Table 4 (sectors with no ACE holdings for a specific stock are not reported on Table 5, and have no impact on the concentration measures in Table 4).

**Table 3: ACE Holdings Concentrations of Sectors,
by Species and Year**

Species	ACE HHI (by Sector Name)		
	2010	2011	2012
American Plaice	1,917	1,895	1,901
Cod	967	984	1,034
Haddock	1,498	1,476	1,648
Pollock	1,893	1,907	1,853
Redfish	2,820	2,741	2,880
White Hake	2,800	2,838	2,743
Winter Flounder	1,802	1,909	1,842
Witch Flounder	1,590	1,578	1,608
Yellowtail Flounder	860	903	817

**Table 4: ACE Holdings Concentrations for Sectors,
by Species – Stock and Year**

Species & Stock	ACE HHI (by Sector Name)		
	2010	2011	2012
American Plaice – All	1,917	1,895	1,901
Cod – Georges Bank (East)	1,444	1,473	1,536
Cod – Georges Bank (West)	1,444	1,473	1,536
Cod – Gulf of Maine	1,285	1,315	1,222
Haddock – Georges Bank (East)	1,495	1,475	1,646
Haddock – Georges Bank (West)	1,495	1,475	1,646
Haddock – Gulf of Maine	2,243	2,194	2,279
Pollock – All	1,893	1,907	1,853
Redfish – All	2,820	2,741	2,880
White Hake – All	2,800	2,838	2,743
Winter Flounder – Georges Bank	2,053	2,451	2,467
Winter Flounder – Gulf of Maine	1,162	1,457	1,491
Winter Flounder – S. New England/Mid-Atlantic Bight	none	none	none
Witch Flounder – All	1,590	1,578	1,608
Yellowtail Flounder – Cape Cod/Gulf of ME	978	1,062	1,052
Yellowtail Flounder – Georges Bank	1,338	1,515	1,528
Yellowtail Flounder – S. New England	1,631	1,450	1,399

**Table 5: Number of Sector "Firms"
by Species - Stock and Year**

Species & Stock	Number of Sectors		
	2010	2011	2012
American Plaice – All	18	20	21
Cod – Georges Bank (East)	19	20	21
Cod – Georges Bank (West)	18	20	21
Cod – Gulf of Maine	18	20	21
Haddock – Georges Bank (East)	18	20	21
Haddock – Georges Bank (West)	18	20	21
Haddock – Gulf of Maine	18	20	21
Pollock – All	18	20	21
Redfish – All	18	20	21
White Hake – All	18	20	21
Winter Flounder – Georges Bank	18	20	21
Winter Flounder – Gulf of Maine	18	20	21
Winter Flounder – S. New England/Mid-Atlantic Bight	None	None	None
Witch Flounder – All	18	20	21
Yellowtail Flounder – Cape Cod/Gulf of Maine	18	20	21
Yellowtail Flounder – Georges Bank	18	20	21
Yellowtail Flounder – S. New England	18	20	21

If sectors were to combine members' ACE holdings and market them jointly, there would be concerns regarding the effect of this conduct on competition (and it may also raise potential legal concerns for which sectors should seek counsel). However, discussions with sector managers and others indicate, without exception, that sectors do *not*, in fact, operate to maximize the joint value of the ACE allocated to the sector. No stakeholder reported that sector members allow sector managers to control members' individual holdings. Instead, sectors allocate ACE to individual members who manage their ACE independently. The incentives of individual sector members lead strongly to this result. If a sector did not contractually agree to allocate ACE in proportion to a member's PSC contribution, the member would have an incentive to join another sector that offered a better deal. If sectors later changed their treatment of individual members'

ACE adversely, a member would have an incentive to go to another sector to get a better deal when the opportunity arose. Sectors have responded to these incentives by allowing individual members control over the ACE they effectively bring to the sector.

Sector managers also developed a system for sharing information on offers to buy and sell ACE with their sector members. They must also make the inter-sector trades for their members. However, the individual sector members manage the ACE that the sector allocates to them independently. No sector manager we interviewed indicated that he makes decisions regarding the disposition of members' ACE, except possibly that a member will instruct a manager to sell ACE that the member will not use at the best available price.³² In other instances, sector managers take on more of a broker role and will advise sector members on the prices at which ACE are trading and options for maximizing the value of the individual's ACE holdings. However, the individual sector member retains decision-making control over the disposition of his ACE.

The institutional structure of sectors allows the individual sector members to control the ACE their sectors allocate to them. This means that large concentrations of quota in a sector are not likely to be a threat to competition. Furthermore, none of the stakeholders communicated any instances of sectors acting to withhold ACE from being utilized by vessel operators, or otherwise exercise inordinate control. If the institutional structure of the sectors were to change, then the potential for sectors to be a source of coordination among their member's catch entitlements should be reevaluated.³³

2. Large Individual Accumulations of ACE Acquired within a Season through the Lease Market

If individual permit owners make decisions regarding the ACE they come to control through the PSC they contribute to their sectors, it is necessary to determine the conditions under which individuals could exercise market power in the markets for ACE. The economic issue is whether individuals could exercise market power in ACE markets by acquiring ACE within the fishing year. For this analysis, we assume that the initial

³² For example, a sector member operating in Maine may have no use for ACE allowing the harvest of southern New England stocks.

³³ For example, the existence of an organized sector can provide a mechanism for individual sector members to coordinate their activity. Explicit collusion would violate antitrust laws. Implicit coordinated behavior among competing harvesters in a sector to withhold output (of fish or ACE) may be ineffective without some sort of enforcement mechanism (since each member has an incentive to "cheat" and increase output), and the current institutional structure does not allow sectors to enforce long-term compliance – members can switch sectors (or start new ones) after any fishing season.

allocations of ACE to permit owners are unconcentrated.³⁴ We address competitive issues surrounding the initial allocation in Section 3 below.

Exercising market power through the acquisition of ACE within a season faces a number of impediments. The first is that a permit owner attempting to “corner” the market on a species’ ACE would have to expend significant resources to create a large position. Once the position is created, demand for the ACE would have to remain sufficiently high that it could be sold back into the market at a profit. Of course, if there were significant demand for the ACE in the fishery, the permit holder creating the large position would be competing with others to buy the ACE as he created his position. This would be difficult to do anonymously and would drive up the price of ACE during the period of acquisition. Of course, the strategy is to acquire the ACE at a low price and to sell it at a high price. Driving up the price of ACE in the course of establishing a position that may confer market power works against the strategy. In short, basic supply and demand analysis and mathematics indicate that such a strategy is not logically impossible, but it is unlikely to be pursued profitably.

This strategy for exercising market power is also subject to substantial uncertainty because conditions in the fishery regularly change. Fishermen clearly have expectations each fishing year regarding which species’ ACE will be in short supply. However, there is also substantial uncertainty regarding what species will be available in the fishery. Moreover, sometimes the catch of a particular species picks up in the middle of the fishing year, which influences the value of the species’ ACE. There can also be within-season adjustments to ACLs that negatively influence the value of ACE.

The likelihood of successfully exercising market power by acquiring a large position in one or more stocks’ ACE during the fishing year is quite low and would likely be detected if it were attempted. The strategy requires that the acquirer “guess right” at the beginning of the fishing year about which stock’s ACE will become valuable during the year. In addition, the strategy requires that most other permit owners fail to “guess right” about which stock’s ACE will be valuable while the large position is accumulated. Thus, the exercise of market power in the within-season market for ACE is a risky strategy that requires some measure of luck.³⁵ Therefore, is unlikely to be persistently repeated as would be necessary for it to be a meaningful competitive concern.

³⁴ The initial allocation was based on catch history, and our calculation of HHIs indicates that the resulting allocation was unconcentrated.

³⁵ If the permit owner accumulating the large position is acting on the basis of superior knowledge of the fishery, the “investment” in ACE reflects this knowledge and is not properly referred to as an exercise of market power as long as the buyer ultimately sells or uses the ACE it acquired.

3. The Potential for Individual Permit Owners to Exercise Market Power

Sectors effectively grant back ACE to their members in proportion to the PSC that members contribute to the sector. Thus, the sector system would allow an entity with a large share of the PSC for a stock or stocks to control a large ACE position if the entity owned permits that provided a large PSC position. Control of ACE that comes about through a permanent ownership position creates a greater risk of the exercise of market power than in-season accumulation through leasing because the position does not need to be acquired within the fishing year. Therefore, the cost of acquiring the position does not provide a disincentive to the attempt to engage in the exercise of market power.

The analysis of the exercise of market power based on a large permanent ownership position in permits that provides control of a large share of one or several stocks' ACE begins with the presumption that the large position is in place. As described above, the willingness to pay for a particular stock's ACE will vary among fisherman depending on their own holdings of ACE for the stock and their ability to avoid the stock while targeting other stocks. This means that an entity with a large position in the ACE for a stock that is in demand would be able to withhold some of that ACE and raise the price in the market for ACE.

There is currently no entity operating in the fishery that would be at all likely to succeed a successfully raising the price of ACE by withholding it from others in the fishery. The ownership of PSC contributed to sectors is highly dispersed. Table 6 shows the concentrations of ownership of PSC (*i.e.*, HHIs) for the species with ACE allocations in the fishery; Table 7 shows the concentrations by specific stocks; and Table 8 shows the number of GroupIDs with positive holdings that went into the calculation of concentration measures in Table 7 (GroupIDs with no landings are not reported on Table 2, and have no impact on the concentration measures in Table 1).

These tables show that the HHIs for each species and for specific stocks are in the unconcentrated range. The highest level of concentration for an individual species is 668, and the highest level for a specific stock is 789. These low levels of concentration mean that there cannot be any particularly large holders of any individual stock's PSC, relative to the size that would be a competitive concern. Evaluation of the shares of the largest holders of PSC for each stock show this is the case, with the largest ownership share of any stock's PSC being about 12 percent (only a small portion of the entire market). Ownership shares of this magnitude are not a threat to competition (for the Agencies, monopolization concerns do not arise shares of this magnitude) and are consistent with low measures of concentration. In addition, these relatively small top ownership shares exist in an environment where there are also tens or hundreds of smaller owners of the PSC for each stock. These smaller owners will not have the incentive or ability to behave anticompetitively because they have no prospect of profitably raising prices.

Table 6: ACE Holdings Concentrations for GroupIDs, by Species and Year

Species	ACE HHI (by GroupID)		
	2010	2011	2012
American Plaice	228	199	201
Cod	127	133	149
Haddock	442	429	452
Pollock	201	198	200
Redfish	362	353	352
White Hake	281	236	223
Winter Flounder	668	524	568
Witch Flounder	214	193	196
Yellowtail Flounder	193	159	132

Table 7: ACE Concentrations for GroupIDs, by Species – Stock and Year

Species & Stock	ACE HHI (by GroupID)		
	2010	2011	2012
American Plaice – All	228	199	201
Cod – Georges Bank (East)	268	247	267
Cod – Georges Bank (West)	268	247	267
Cod – Gulf of Maine	127	141	135
Haddock – Georges Bank (East)	450	439	463
Haddock – Georges Bank (West)	450	439	463
Haddock – Gulf of Maine	254	246	226
Pollock – All	201	198	200
Redfish – All	362	353	352
White Hake – All	281	236	223
Winter Flounder – Georges Bank	773	677	789
Winter Flounder – Gulf of Maine	164	190	188
Winter Flounder – Southern New England/Mid-Atlantic Bight	None	None	None
Witch Flounder – All	214	193	196
Yellowtail Flounder – Cape Cod/Gulf of Maine	180	147	141
Yellowtail Flounder – Georges Bank	348	290	333
Yellowtail Flounder – Southern New England	137	139	158

**Table 8: Number of GroupID "Firms,"
 by Species - Stock and Year**

Species & Stock	Number of GroupID "Firms"		
	2010	2011	2012
American Plaice – All	483	432	425
Cod – Georges Bank (East)	620	556	556
Cod – Georges Bank (West)	620	556	556
Cod – Gulf of Maine	595	523	522
Haddock – Georges Bank (East)	447	415	405
Haddock – Georges Bank (West)	447	415	405
Haddock – Gulf of Maine	458	406	408
Pollock – All	635	570	562
Redfish – All	424	375	373
White Hake – All	549	494	485
Winter Flounder – Georges Bank	428	391	381
Winter Flounder – Gulf of Maine	500	445	445
Winter Flounder – Southern New England/Mid-Atlantic Bight	None	None	None
Witch Flounder – All	531	475	466
Yellowtail Flounder – Cape Cod/Gulf of Maine	466	416	411
Yellowtail Flounder – Georges Bank	372	337	331
Yellowtail Flounder – Southern New England	449	396	388

As with landings, for ACE there is no time trend in the level of concentration across all stocks. Also, the number of GroupIDs with positive ACE holdings in each stock is much higher (and has declined less) than the number of GroupIDs with positive Landings (from Table 2).

As noted in Section IV.A, this broad definition of ownership leads to an overstatement of the shares of PSC held and controlled by individual entities. Overstating individual shares will *increase* the measured level of concentration of permit ownership in the fishery relative to an ownership definition that better reflects who has decision-making authority regarding the ACE that flows from a permit. Thus, the analyses of concentration that we obtain using this ownership definition will overstate the level of concentration of ownership and tend to underestimate the degree of competition in the fishery.

Finally, we also identified substantial underutilization of the 15 groundfish stocks with groundfish fishery allocations. In FY10, FY11, and FY12, there were four, six, and eight stocks, respectively, where less than 50% of the groundfish sub-ACL was caught. The less used stocks include Georges Bank haddock, redfish, pollock, plaice, and the winter flounder stocks.³⁶ The fact that ACE went unused accounts in part for the difference between concentration for ACE holdings and concentration for landings (and the remainder of the difference in concentration comes from ACE trading during the season).

V. Analysis of Excessive-Share Caps

We are now at the point where we can establish a process for evaluating the necessity of or appropriate levels of excessive-share caps for the Northeast Multispecies Fishery. In this section, we apply the economic analysis in Section IV to provide a recommendation regarding “the maximum possible allowable percentage share of the market for the fishery” that is consistent with the control of market power.

As noted previously in Section II.B., we (along with Robert Willig) previously conducted a similar analysis for the National Marine Fishery Service (“NMFS”) and the Mid-Atlantic Fishery Management Council regarding accumulation limits for Surfclams and Ocean Quahogs, culminating in a published report similar to this one (“SCOQ Report”).³⁷ Although many details of the Surfclam and Ocean Quahog Fishery are substantially different from the Northeast Multispecies Fishery, our work here has been guided, in part, by a general framework developed for the SCOQ Report. The peer-review panel for the SCOQ Report determined that this general framework was an appropriate approach to use for analyzing excessive share limits for catch share fisheries.

The recommendation is presented in a series of steps that address information requirements and other considerations that affect the level of the excessive-share cap and its administration.

³⁶ No stock has had its entire groundfish sub-ACL caught within a given fishing year, but if that were to occur, then the entire fishery would close. On a sector level, if a sector catches its entire ACE for a stock, then the sector must cease all groundfish fishing until it leases more ACE from another sector. In sum, there are many factors that drive the use of available catch.

³⁷ Mitchell, G., Peterson, S., and Willig, R. “Recommendations for Excessive Share Limits in the Surfclam and Ocean Quahog Fisheries,” May 3, 2011; Compass Lexecon, Boston.

A. Step 1: Assess the Availability of Information on Permit Ownership and Control

To implement and manage an excessive-share cap or regulation to control the level of concentration of fishery access rights, the regulator must be able to accurately calculate existing ownership shares and levels of concentration. To do this, the regulator must be able to clearly define what constitutes ownership and control of the permits that give rise to the control of PSC and ACE. This requires being able to identify permit owners and the affiliations among owners.

The relevant owner(s) of a permit for the purposes of regulating ownership shares are the parties that make decisions about how the PSC and ACE associated with the permit will be used or sold. These parties have the ability and incentive to make the decision to withhold ACE from the market and are the parties who would reap the benefits of doing so. These parties would benefit from changes in the price of ACE.

The economic analysis above was performed using the GroupID definition of ownership. GroupID does not reliably define owners that actually control permits or reflect the ownership shares of separate entities included in the GroupID. Individuals included in a GroupID may not have an ownership interest in each permit included in the GroupID. Excessive-share caps should be applied to entities that actually have ownership and control of permits and their associated PSC and ACE.

Where there is substantial overlap in the ownership of permits involved in a transaction, determining who the owners with control over permits and the shares of ownership of permits would require that additional details about ownership terms be made available to NMFS (e.g. NMFS doesn't have data on individual's ownership shares of permits). In practice, these information requirements are not likely to be important to the vast majority of transactions. If a transaction will raise the ownership share of a particular GroupID, but the post-transaction share is not near the excessive-share cap, there is no need for additional information. Only when a transaction would lead to a particular GroupID's share of access rights exceeding the cap would it be necessary to request additional information to determine whether the excessive-share cap would, in fact, be surpassed by any independent entity that is included in the GroupID.

Long-term leases can provide the lessee with effective ownership and control of the access rights for the term of the lease. In all of our discussions with industry participants, no one claimed to know of any long-term lease agreements currently in existence, and we understand they are not currently permitted. However, any effective measurement of ownership and control would require reporting of the terms of any long-term lease agreements if they existed.

B. Step 2: Assess the Availability of Competitive Information

A regulator relying on the framework provided in the *Horizontal Merger Guidelines* must have the information necessary to evaluate the state and nature of competition in marketplace in a manner consistent with the *Guidelines*. As noted, the competitive context in which a consolidating transaction takes place matters. In some markets, high concentration is consistent with vigorous competition, while in others concentration threatens the competitive process.

We leave open the question of determining the relevant market for the output of the fishery. While there is substantial evidence of a broad market for each species that includes fish (and, in some cases, fish products) from outside the fishery, and there is some evidence of substitution across species, we have not identified sufficient information or data to rule out the possibility that more narrow relevant markets exist for specific species or sources of fish, or for specific time periods or geographic locations. Nevertheless, there is no evidence that any stakeholder in the fishery has the ability to exercise market power in the markets for fish.

We have also determined that the exercise of market power in the markets for in-season ACE sales through the accumulation of ACE within a season is economically untenable. As such, market power issues for the purchase and sale of ACE can be addressed based on control of access rights that persists across multiple seasons – and this depends on ownership and control of permits and the associated PSCs.

Furthermore, an excessive-share cap related to the permanent control of access rights across multiple seasons will not only address market power concerns in the markets for ACE, but will also address market power concerns (to the extent there are any) in the markets for fish. A rule that limits permit acquisitions based on the share of PSC held by the full portfolio of permits owned will limit the growth of ACE ownership and limit the growth of shares in the output market that could lead to the exercise of market power.

ACE is an input required for catching regulated species in the groundfish fishery. Vessel operators may be able to avoid catching some species some of the time, depending on their gear and fishing location, but as a general rule harvesting fish in the groundfish fishery requires that vessel operators obtain corresponding ACE. Furthermore, ACE that is withheld in the market cannot be replaced by expanding the supply of ACE because that supply is set to predetermined levels based on scientific analysis of the resource. Because vessel operators may need ACE for a particular stock to make use of the ACE they control for other stocks, there are no direct substitutes for a particular stock's ACE. Therefore, the relevant markets for analyzing market power in ACE transactions are the individual markets for each stock's ACE. Although there is some substitution across fishing seasons, these markets are primarily based on the annual ACE allocations, conferred by an owner's PSC.

Finally, permits themselves, with diffuse ownership are only a factor in the exercise of market power through the PSC associated with the permit. Therefore, for the remainder of our analysis, we focus only on an excessive-share cap for PSC (and resulting ACE) under common ownership and control.

C. Step 3: Assess Whether a Cap Is Required

The exercise of market power requires that large owners of PSC or ACE withhold some from the market in order to raise the price of fish or ACE. Of course, when a fishery is output-regulated the regulation of the fishery may restrict output.³⁸ That is, if the output cap binds, all that can be harvested has been harvested and there is no withholding of output by fishery participants to raise prices. The exercise of market power entails the withholding of output below the regulated level. If the output regulation determines the output of the fishery, then there is no withholding.

If the harvest in a fishery regularly reaches the catch limit, concerns regarding the exercise of market power are reduced because output is at the competitive level, given the regulations in place. This condition is not satisfied in the Northeast Multispecies Fishery, however, which has most species with harvests well below ACL in most years. Harvest levels below the ACL are not evidence of market power. Competitive forces, such as high costs or few fish, can readily lead to catch levels below the ACL. When catch levels are below the ACL, however, we cannot conclude immediately that market power is not a concern. We must determine whether it is competition or market power that is leading to output below the allowed levels. This means that we cannot forego analysis of excessive-share caps.

D. Step 4: Establish Appropriate Concentration Thresholds

The *Horizontal Merger Guidelines* offers little direct guidance on the size at which individual firms become a threat to competition. Previous versions of the *Guidelines* have noted that a firm with a 35% market share could possibly have unilateral market power.³⁹ The current version of the *Guidelines* offers no such guidance.

Our analysis addresses the maximum excessive-share cap that will limit the exercise of market power or other forms of influence over markets consistent with

³⁸ Harvesting may stop in the fishery when the output limit is reached for only one stock. If the stock cannot be entirely avoided, no vessel without rights to harvest that stock can fish. Thus, the output regulation may be binding on the harvesting of all species even if the harvest of only one species reaches its catch limit.

³⁹ U.S. Department of Justice and the Federal Trade Commission, *Horizontal Merger Guidelines*, Revised April 8, 1997, p. 25.

inordinate control. On this basis, we propose to define an excessive-share cap that ensures that the concentration of the fishery remains at levels that make the exercise of market power unlikely. Given that a cap treats all firms symmetrically, the cap will be set so that if all remaining firms were to grow to reach the cap, the HHI in the fishery would remain below a certain target level. In developing a cap recommendation, we also evaluate whether the implied size of the firms at the cap is likely to be too small to be efficient.

As a starting point, a low level of concentration within the framework presented in the Merger Guidelines (HHI under 1500), would be consistent with absence of substantial market power. It is also the current state of the markets related to the Northeast Multispecies Fishery. For landings, the HHI at the GroupID level has been lower than 1500 for all but one species (Table 1). Given that many of the species face competition from other sources of product outside the fishery, the HHI for the relevant product markets may be substantially lower. For ACE, the HHI at the GroupID level has also been lower than 1500 (Tables 6 and 7).

It is also important, however, to consider whether a specific target level of concentration may create efficiency concerns by being too low. The most likely concern would be whether there are efficiency gains from scale that would be prevented if the fishery had to remain in the low concentration range. As noted above, the Agencies often allow mergers that result in moderate levels of concentration and may also allow mergers that result in high levels of concentration – provided there are sufficient efficiency gains to offset the concentration increase.

The existence of some larger fleets indicate there are opportunities for economies of scale within the Northeast Multispecies Fishery or at least that efficiency concerns do not preclude larger fleets. However, our analysis indicates that these economies can be reached at relatively low levels of industry concentration. First, there has been little or no increase in concentration during the three years that we analyzed, despite the fact that no cap on share accumulation has been in place. Moreover, the distribution of small and large operators active in the fishery has remained fairly stable, according to the data on landings. There are relatively few owners with more than 10 percent of an individual stock's ACE, and the largest owners have shown no substantial movement to increase their ownership shares. Thus, when presented with the opportunity to grow, there is no market evidence that operators chose to grow above the largest levels we see today.

Note that the issue here is not whether there are incentives for consolidation in the fishery as the result of the change in regulation to output regulation rather than input regulation. In all likelihood, input regulation offered protections to some inefficient operators. Moreover, the determination of the PSC associated with certain permits undoubtedly has left some permit owners at a disadvantage relative to the earlier regulations, and some of these may find they have no choice but to leave the fishery. The issue here is whether there is any efficiency reason to allow for the ownership of access

privileges by a single entity above about 15 percent of all privileges for a stock. We do not find any reason based on increasing efficiency as the result of increasing size to recommend a target level of concentration for shares to rise above about 15 percent or for the concentration of ownership for a stock to rise above 1500.

E. Step 5: Determine the Share Limit Associated with the Target Concentration Level

The share cap required to ensure a target concentration in the low range (HHI below 1500) depends on the portion of the relevant market served by suppliers outside the regulated fishery, and also depends on the size of a “competitive fringe” of small suppliers. A competitive fringe is made up of small firms with, say, ownership shares of about 1 to 2 percent. These firms are too small to influence prices and will behave competitively in response to attempts to exercise market power. For the output markets (where fish are sold), outside sources of supply and the total size of the competitive fringe are large, which means that a large excessive-share cap could still ensure low concentration in the relevant output market. For ACE, however, there are no outside suppliers. So the determination of the excessive-share cap should be based on ACE concentration, which reflects the presence of the competitive fringe but not outside sources of supply.

Currently for several species, much of the ACE is distributed among entities with very small holdings. For cod in 2012, for example, over 40 percent of the ACE was distributed among GroupIDs with less than 1 percent share, and over 60 percent of the ACE was distributed among GroupIDs with less than 2 percent share. For some species, however, there is only a small amount held by a “competitive fringe” – for Redfish in 2012, for example, only 5 percent of ACE was distributed to GroupIDs with less than 1 percent share, and only 15 percent among GroupIDs with less than 2 percent share.

If small operators (*i.e.*, those owning at most about 1 to 2 percent of a stock) are efficient, then they are likely to remain in the fishery and help preserve a competitive market structure. A couple of examples help illustrate how the competitive fringe can affect the determination of an excessive-share cap.

1. When 38 percent of the owners hold less than 2% share, a cap of 25 percent will prevent the HHI from exceeding 1500. With such a cap, the most concentrated the market can be is to have two suppliers at 25 percent, one at 14 percent, and the remaining competitive fringe accounting for the balance. The HHI would be 1470 ($25^2 + 25^2 + 12^2 + 76 = 1470$).⁴⁰

⁴⁰ The calculation is as follows: $25^2 = 625$; $12^2 = 144$; and $19 * 2^2 = 19 * 4 = 76$. $625 + 625 + 144 + 76 = 1470$.

2. When there is no competitive fringe, a cap of about 15.5 percent would be required to prevent the HHI from exceeding 1500. With such a cap, the most concentrated the market can be is to have six suppliers at 15.5 percent and one at 7.0 percent. The HHI would be $15.5*15.5*6= 1441.5$, plus $7*7=49$, which sums to 1490.5.

In summary, an excessive-share cap of about 15 percent would be sufficient to ensure low concentration for ACE regardless of the level of the competitive fringe. The large competitive fringe for some species could allow for a higher share cap, should the NEFMC choose to recommend separate caps for different species.

F. Step 6: Identify Regulatory and Practical Constraints

As discussed above, the NMFS is able to track ownership of permits with reasonable detail and to track the PSC associated with each permit. Specifically, NMFS knows the names of the owners of each permit, but not their ownership shares. There is no reasonable likelihood that permit owners, starting from a competitive initial permanent allocation of PSC could acquire sufficient ACE to gain market power within a season. Thus, it is only necessary for the NMFS to track permanent ownership of ACE.

The primary shortcoming of the current regulatory data management is the inability to identify controlling ownership when permits have multiple owners. Our analysis has been conducted based on GroupIDs, which assign common group ownership among all permits for which at least one other permit shares a common owner, regardless of whether that common owner has controlling interest. Under an accumulation limit based on GroupIDs, an owner seeking to expand could come up against an accumulation limit because of minority interest in other permits or as the result of the GroupID containing permits in which the owner has no interest. For example, suppose Permit 1 is owned by A and B and has 10 percent share of PSC for a stock, and Permit 2 is owned by B and C and has 5 percent share of PSC for the same stock. If C wants to acquire Permit 3, with a 5 percent share of PSC for the same stock, then the total share for the GroupID would rise from 15 to 20 percent. Permits 1 and 2 are grouped into the same GroupID, even though C has no ownership share in Permit 1 and no control over how the PSC allocated to Permit 1 (and the associated ACE) gets used. Using the share of access privileged held by the GroupID that includes this owner is not consistent with the goals for establishing accumulation limits. Such an owner, in fact, owns and controls a share of privileges well below the assumed cap and allowing the owner to purchase additional access privileges will not threaten competition.

It seems likely, however, that this shortcoming could be addressed on a case-by-case basis by seeking out additional information on ownership shares within a permit only as needed. First, there are relatively few GroupIDs with large ownership shares, and it would be an unnecessary burden to require every single permit holder to specify ownership details. It is also unnecessary. If a permit transaction does not indicate that a

GroupID would rise above the excessive-share cap, then there is no risk that an individual operator would rise above the cap.

In the event that a proposed permit transaction would lead to a PSC share for a GroupID that exceeds the determined excessive-share limit, the owner(s) of the permits could provide to NMFS detailed breakdowns of ownership within each permit (*i.e.*, for Permit 1 owner A has 90 percent and Owner B has 10, for Permit 2 owner A has 10 percent and Owner B has 90 percent, etc.). NMFS could recalculate the PSC based on the detailed breakdown of ownership, assigning to each owner only a share of PSC for each permit. If the resulting calculation leads to a PSC below the accumulation limit with the proposed permit transfer, then the transfer could be permitted to proceed. Ownership information that is more detailed than that which NMFS already collects would only be needed rarely. Moreover, it would be in the interests of permit buyer to provide the detailed information that would allow a transaction flagged by a high post-transaction GroupID share to demonstrate its ownership share will remain below the excessive-share cap.

Finally, there appears to be no regulatory requirement that a share cap be established at the same level for each species and geographic delineation for which ACLs are determined. In the course of our analysis, we identified no major issues related to market power that would lead to differentiated share caps across different species (or geographic delineations), but it is possible that other goals of Amendment 18 could be addressed through different excessive-share caps on different stocks. For our analysis, we focus on a single excessive-share cap recommendation for each species and geographic delineation, but in the concluding section we discuss reasons that the NEFMC may wish to recommend some variation in the level of the excessive-share cap.

G. Step 7: Set the Excessive-Share Cap

We showed above that an excessive-share cap of 15.5 percent on an individual permit owner's share of PSC for a stock would be sufficient to ensure low concentration for ACE regardless of the level of the competitive fringe. By establishing the excessive-share cap at the level of a stock, the rule will limit ownership share below the cap for most stocks. For example, if a permit owner acquired 15.5 percent of the PSC for Gulf of Maine cod and held lower PSC shares for other stocks, the permit owner would only be able to acquire an additional permit if it conferred no PSC for Gulf of Maine cod. Thus, a 15.5 percent excessive-share cap on each stock would effectively keep permit owners from permanently acquiring an amount equal to the cap for more than one stock. If such an operator needed additional privileges for another stock, it could sell one permit and buy another that conferred a higher relative share of PSC for the desired stock relative to the stock for which the cap had been reached.

Limiting the ownership of PSC for each stock is the appropriate way to measure the permanent fishery access privileges permits confer. It is not sensible to limit the

number of permits that an individual can own. Many permits confer very low shares of the PSC for any stock. What matters economically is the share of a stock that a single entity has rights to harvest, not the number of permits that have been combined to assemble that bundle of access rights.

We find no evidence that a cap on the share of privileges held by a single sector should be subject to a cap for the purpose of controlling market power or avoiding inordinate control over market outcomes. If it becomes apparent that a sector is combining the ACE conferred by its members' PSC to influence markets to the advantage of its members, this conclusion would change. However, all reports are that individual permit owners control the ACE that they are allocated by their sectors. Thus, sectors are the official parties to any ACE trade, but the sectors will adjust their members' ACE holdings as if the trade were between individuals. Thus, the individual permit holder is the correct economic entity to which to apply the excessive-share limit. By extension, this reasoning indicates that sectors associated with an organizing body, such as the Northeast Seafood Coalition, do not pose a threat to competition as well.

Finally, we do not recommend limits on the accumulation of ACE within a season or other limits on ACE trading. Market power is the persistent ability of a firm or firms to increase prices above the competitive level. As long as the initial allocations of ACE are competitive, as they currently are, there is a very low likelihood that an individual permit holder could *profitably* establish a position in a stock's ACE within a season that would allow the exercise of market power. The likelihood that such an event could occur persistently over multiple fishing years is lower still.

Clearly, with no limit on ACE trading within a fishing year, we find no evidence that a limit on landings would protect competition. Moreover, such a limit has the potential to harm efficiency. It should also be recognized that NMFS has little control over the concentration of landings in the fishery because NMFS has no control over which operators will target a particular stock. If only a few operators were to find it in their interest to target a particular stock, landings will be concentrated even if the PSC or ACE holdings for the stock are highly dispersed.

The large competitive fringe for some species could allow for a higher share cap, should the NEFMC choose to recommend different caps for different stocks to NMFS. Given the fluctuations present in the industry, however, and the lack of evidence indicating there would be any loss of efficiency with a 15.5 percent cap, our recommendation is to adopt the simple policy of a 15.5 percent excessive-share cap of the PSC held for each individual stock. This balances protection of competition and avoidance of a permit owner gaining inordinate control over access rights that would allow it to influence markets in the fishery with the need to allow for the benefits of scale to be realized where possible.

To recap, we conclude that there is no need for an excessive-share cap on sector-affiliated ACE separate from an excessive-share cap on the PSC associated with permits under common ownership. We also we conclude that there is no need for an excessive-share cap on landings (or on permits). Such additional caps would be redundant, would not provide any additional protection against the exercise of market power, and could create inefficiencies from over-regulation. Our recommendation is for an excessive-share cap only on PSC associated with permits under common ownership.

VI. Conclusion

The evidence we analyzed does not support a conclusion that market power is currently being exercised in the fishery. In particular, market power is not being exercised through the withholding of ACE in any part of the groundfish fishery.

With respect to recommending excessive-share caps:

1. The information NMFS has on permit ownership may not be sufficient, for all potential permit transactions, to reliably define ownership and control of permits and the PSC they confer.
2. There is sufficient competitive information to determine that the relevant markets for ACE trading are the markets for the trading of each stock's ACE. If an operator requires the ACE for a particular stock, there is not a good substitute available.
3. We cannot exclude the possibility of the exercise of market power as the result of the fishery's output regularly reaching the regulated level, which would indicate competitive conduct within the framework of the output regulation. Thus, examination of appropriate caps is necessary..
4. It is reasonable for the NEFMC to recommend that NMFS establish an excessive-share cap to maintain *unconcentrated* (HHI below approximately 1,500) distribution of PSC by capping individual the PSC for each stock that can be conferred to any permit owner.
5. The cap required to ensure an HHI below 1,500 would be 25 percent with a competitive fringe of 38 percent, or 15.5 percent with no competitive fringe.
6. Sectors do not own or control PSC or ACE. Therefore, capping the amount of PSC or ACE held in the aggregate by members of a particular sector would not provide protections against the exercise of market power or the development of inordinate control.

7. We suggest using the grouping of permits by common ownership (based on information already available) for an initial determination of whether a permit transfer exceeds a share cap, but allowing for an optional follow-up submission of detailed ownership information prior to final determination.
8. We recommend setting an excessive-share cap so that no permit owner owns or controls permits conferring more than 15.5 percent of the PSC for a stock.

The excessive-share caps recommended here are at a level that would allow for substantial additional consolidation in the fishery. All ACL categories currently have ACE concentration indices well below 1,500, and all have over a hundred market participants. It is possible with an excessive-share cap of 15.5 percent for an ACL category to move to an ACE concentration of 1,500 and have only seven market participants. This would be substantially more consolidated than the current situation. However, just because something is possible does not mean that it is likely to happen. There has been no common pattern within the groundfish fishery since 2010 despite there being no excessive-share cap. Nevertheless, it is possible that a great deal of consolidation could occur – but our analysis leads us to conclude that even a great deal of consolidation would not lead to the ability to exercise market power, provided no market participant controlled more than 15.5 percent of the PSC for a given stock.

Our recommendation for an excessive-share cap is based solely on Goal #4 of Amendment 18. An excessive-share cap is unlikely to promote Goals #1-3 of Amendment 18 effectively. These goals should be pursued more directly by through the use of other regulatory requirements that can function in concert with transferable ACE based on ACL and directly encourage diversity.

Our recommendation is for an excessive-share cap only on PSC or any stock in the fishery associated with permits under common ownership and control. That cap should be set at 15.5 percent. We conclude that there is no need for an excessive-share cap on sector-affiliated ACE separate from an excessive-share cap on the PSC associated with permits under common ownership. Our analysis shows that sectors are not the relevant nexus of control of how ACE is utilized. However, if sectors were to develop institutional structures that allowed them to exercise control over how vessel operators utilized ACE, it would be necessary to re-examine this conclusion. We also we conclude that there is no need for an excessive-share cap on landings or directly on permits. Such additional caps would be redundant, would not provide any additional protection against the exercise of market power, and could create inefficiencies from over-regulation.

Selected References

Adelaja, AdesAdelaja, Adesoji, Julio Menzo, and Bonnie McCay, "Market Power, Industrial Organization and Tradeable Quotas," *Review of Industrial Organization*, Vol. 13, pp. 589-601.

Anderson, Lee G., "The control of market power in ITQ fisheries," *Marine Resource Economics*, Vol. 23, pp. 25-35.

Clark, Colin W., "The Economics of Overexploitation," *Science*, Vol. 181, No. 4100, August 17, 1973, pp. 630-634.

Clark, Colin W., *Mathematical Bioeconomics: The Optimal Management of Renewable Resources*, Second Edition, New York: John Wiley & Sons, Inc., 1990.

Clark, Colin W., and Gordon R. Munro, "Fisheries and the Processing Sector: Some Implications for Management Policy," *The Bell Journal of Economics*, Vol. 11, No. 2, Autumn 1980, pp. 603-616.

Gordon, H. Scott, "The Economic Theory of a Common-Property Resource: The Fishery," *The Journal of Political Economy*, Vol. 62, Issue 2, April 1954, pp. 124-142.

Hahn, Robert W., "Market Power and Transferable Property Rights," *Quarterly Journal of Economics*, Vol. 99, No. 4, November 1984, pp. 753-765.

Johnson, Ronald N., and Gary D. Libecap, "Contracting Problems and Regulation: The Case of the Fishery," *The American Economic Review*, Vol. 72, Issue 5, December 1982, pp. 1005-1022.

Libecap, Gary D., "Assigning Property Rights in the Common Pool: Implications of the Prevalence of First-Possession Rules for ITQs in Fisheries," *Marine Resource Economics*, Vol. 22, pp. 1-17.

Misiolek, Walter S., and Harold W. Elder, "Exclusionary Manipulation of Markets for Pollution Rights," *Journal of Environmental Economics and Management*, No 16, 1989, pp. 156-166.

Mitchell, Glenn, Steven Peterson and Robert Willig, "Recommendations for Excessive Share Limits in the Surfclam and Ocean Quahog Fisheries," May 13, 2011, Compass Lexecon, Boston.

National Marine Fisheries Service, 2009. NMFS National Standards Guidelines. 50 CFR 600.310 et seq.

Recommendations for Excessive-Share Limits in the Northeast Multispecies Fishery
Mitchell and Peterson, Dec. 31, 2013.

National Research Council, Committee to Review Individual Fishing Quotas, “Sharing the Fish: Toward a National Policy on Individual Fishing Quota,” 1999, pp. 59-66, 280-297.

New England Fishery Management Council, 2009. Amendment 16 to the Northeast Multispecies Fishery Management Plan Including an Environmental Impact Statement and Initial Regulatory Flexibility Analysis. 905 p.

Scoping Hearing Summaries and Sector Annual Reports (various).

<http://www.nefmc.org/nemulti/index.html>

U.S. Department of Commerce, *The Design and Use of Limited Access Privilege Programs*, Lee G. Anderson and Mark C. Holliday, eds., NOAA TM NMFS-F/SPO-86, pp. 50-60, 118-135.

U.S. Department of Justice and the Federal Trade Commission, *Horizontal Merger Guidelines*, August 19, 2010.

Useful Terms

Beneficial Owner: The owner or owners who control an asset and benefit from its use or sale

Common Property Resource: A resource that is available to all, absent regulation. With no ability to exclude potential users, the resource will frequently be over exploited.

Competitive Fringe: A group of small firms with 1 to 2 percent market shares. These small firms have no prospect of profitably influencing the prices in markets and will behave competitively. Their competitive conduct limits the potential for the successful exercise of market power by others.

Market Power: The ability to profitably raise prices in a market by withholding supply from that market. In order for the exercise of market power to be profitable, it must be the case that other firms will not replace the supplies withheld.

Relevant Market: A market that contains the products or services and sources of supply of those products or services that customers regard to be good substitutes or as being reasonably interchangeable.

Rents: The payment to a resource above the amount required to keep it in its current use.