

**ECONOMIC AND POLICY ANALYSIS OF A FIXED TERM AUCTION-BASED
INDIVIDUAL FISHING QUOTAS PROPOSAL FOR THE WEST COAST LIMITED
ENTRY GROUND FISH TRAWL FISHERY**

Appendix F

**TO THE
RATIONALIZATION OF THE PACIFIC COAST
GROUND FISH LIMITED ENTRY TRAWL FISHERY
FINAL ENVIRONMENTAL IMPACT STATEMENT**

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F.0 Fixed Term and Auction Analysis and Contractor Report

This appendix contains an analysis of an option considered by the Council which would place a 15- or 16-year limit on the duration of quota share (QS) and introduce biennial auctions of 20 percent of the QS starting in year 15 or 16. The option is more fully described in Appendix A, Section A-6. The analysis was developed for the Council by a contractor (Syldon Inc) and is provided in full in this appendix. The Council's Scientific and Statistical Committee reviewed the contractor's analysis and provided the Council with the following evaluation at its November 2008 meeting.

The SSC . . . received a presentation . . . from Drs. Gil Sylvia and Michael Harte (Oregon State University) concerning an analysis they conducted of the option for a fixed-term auction of quota shares.

The SSC discussed the issue of fixed-term auctions and reviewed the associated analysis contained in Appendix F. Drs. Silvia and Harte presented their analysis to the SSC. The SSC notes that the rationale and goals of a fixed-term auction are not fully developed in the Preliminary DEIS; thus, it is difficult for the SSC to discuss the degree to which its goals would be met. Generally speaking, fixed-term auctions would capture for the public a portion of the rents generated by rationalization. Fixed-term auctions also affect the distribution of the economic benefits and may, to some degree, decrease the overall size of those benefits. Both of these latter effects would vary with the percentage of QS that reverts to an auction. There are many different ways that fixed-term auctions could be implemented; the outcomes will depend on the details of the implementation.

Appendix F analyzes the potential effects of a fixed-term auction. A fixed-term auction increases the amount of uncertainty and risk associated with holding QS. This will tend to decrease the amount of investment QS holders are willing to make in the fishery and, in turn, reduce the economic benefits of rationalization. However, the conclusions in the appendix are stated too strongly and fail to acknowledge the uncertainty involved in predicting the outcomes.

There are several factors that may mitigate reductions in investment and economic benefits. First, the length of the initial allocation of QS is 15 or 16 years. This is a rather long time horizon, and much of the fleet consolidation will likely take place well in advance of the 15 or 16 years. Thus, the remaining QS holders will tend to have larger QS holdings due to consolidation, and they will be the most efficient, profitable, and innovative operators. Second, most businesses operate in risky and uncertain environments regarding costs of inputs, and they tend to take actions to mitigate those risks. QS holders, for instance, could engage in contracts or purchase quota in the private market in anticipation of the auction. Third, investment time horizons may be shorter than those suggested in the appendix because returns on business investments usually have to be realized more rapidly. Generally, the effects of an auction on investment and economic benefits will depend on the percentage that is auctioned. If it is 1 to 5 percent, there may be very small effects. If it is closer to 20 percent, the effects would be larger.

The SSC also discussed the effect of fixed-term auctions on stewardship. The appendix asserts that fixed-term auctions would have a negative effect on stewardship because the returns to stewardship would be partially dissipated by any loss of QS that is not replaced. However, it is unclear to the SSC how large the stewardship incentive associated with QS ownership would be, even if held in perpetuity. The expected number of vessels that will operate in the rationalized fishery may be so large and the percent of the quota owned by a single operator so small (due to accumulation limits) that the private gains to stewardship may not be significant enough to change operations in a meaningful way.

The SSC notes that the analysis in Appendix F is qualitative. As such, the analysis does not support the firm conclusions regarding the magnitudes of the effects, as stated in the report and described in Table 5.1 and Figure F-1.

The SSC is the Council's primary authority on scientific matters and determination of the best available information. The following is one of the primary charges of the SSC:

Provide the Council advice in the development, collection, evaluation, and peer review of such statistical, biological, economic, social, and other scientific information as is relevant to the Council's development and amendment of any Fishery Management Plan in accordance with the Magnuson Stevens Fishery Conservation and Management Act (MSA) and the National Standards as amended through January 12, 2007 (Council Operating Procedure #4).

After reviewing the contractor analysis and the SSC report cautioning the Council on the strength of some of the conclusions of the report, the Council chose to include the following provision as part of its final preferred alternative (Section A-2.3.4).

The Council shall begin a review of the TIQ program no later than 5 years after implementation of the program. The review will evaluate the progress the TIQ program has made in achieving the goal and objectives of Amendment 20. The result of this evaluation could include dissolution of the program, revocation of all or part of quota shares, or other fundamental changes to the program. Holders of quota shares should remain cognizant of this fact when making decisions regarding their quota shares, including buying selling, and leasing of these shares.

The Council shall consider the use of an auction or other non-history based methods when distributing quota share that may become available after initial allocation, such as quota that results after a stock transitions from overfished to non-overfished, when Quota share from an AMP is no longer needed, when "use it or lose it" quota shares are forfeited, and if any quota is available after the initial or subsequent reviews of the program are completed.

The specific form of the auction or other method of distribution shall be designed to achieve the goals of Amendment 20, specifically including minimizing the adverse effects from an IFQ program on fishing communities to the extent practical.

The following rationale was provided in support of including this provision:

This [provision] promotes the idea that the fisheries resources are the property of the citizens of the United States and not perpetual grants to the QS holders. This also recognizes that we are not developing the perfect system. It puts the QS holders on notice that there may be changes to the program that could involve their QS and affect them. There will be a review in four or five years. At that point in time, the Council could consider what is going on in the fishery, including whether there are adverse effects on communities, new entrants are effectively prohibited due to costs of entry, or there are other adverse affects. If the adaptive management program is not adequate, the Council could consider an auction of some of the QS to correct these things or to deal with other results of the review. There are concerns that under the auction those with the deepest pockets will get it all. The last paragraph addresses ways to limit the auction so as to not disrupt communities, e.g., limiting the auction to small vessels. The motion does not require the Council to have an auction; it is a specific item that the Council would consider after the initial review. . . . The earliest the auction that might be implemented would likely be six to eight years after implementation. There would be no additional action or analysis at this time.

Acknowledgements

Syldon Inc would like to thank the staff of the Pacific Fishery Management Council for their assistance in understanding Council needs, clarifying EIS requirements, and formatting the report. We would also like to thank George Khalis for pointing us toward the non-fishery management literature highlighting the importance of asset values for addressing asymmetrical information and collateralizing small firm financing.

Executive Summary

This report analyzes the Pacific Fishery Management Council's preferred option for the West Coast Limited Entry Groundfish Trawl Fishery rationalization plan against a nonpreferred alternative that combines a fixed term privilege (15 or 16 years) with post-term biennial auctions for up to 20 percent of quota shares. Our analysis looks at 5 percent or 20 percent auctions of quota shares for comparative purposes. The report includes a 1) description of the fishery, processors, and communities; 2) a review of literature on fixed term systems and auctions for fisheries and other natural resources; 3) an analysis of the preferred option relative to the fixed term/auction options on fishery rents, resource stewardship, and communities; 4) an analysis of the preferred option relative to the fixed term/auction options on key groundfish management objectives; and 5) a summary of the impacts of the alternative options on 37 related groundfish management goals, objectives, and standards.

The literature review demonstrates that fixed term tenure systems and auctions can be successfully used in allocating and managing natural resources depending on management objectives, resource characteristics, and design of the tenure and auction systems. Fixed term privileges can provide management flexibility and perception of public ownership but can reduce incentives for long term investment and resource stewardship. Auctions can be an efficient mechanism for allocating homogeneous resources and collection of royalties, but may be more difficult to employ when equity and social objectives are important objectives. Fixed term privileges combined with auctions, however, are not commonly used in fisheries management. Auctions are rarely used in allocating fishery assets due ostensibly to the heterogeneity and complexity of fishery resources, uncertain status of fishery stocks, number of management goals, and unpopularity of auctions by resource users. The review suggests that combining fixed privileges with post tenure auctions may reinforce the weaknesses of each approach, particularly for multispecies fisheries.

Analysis of the Council's preferred option relative to the combined fixed term/auction options reveals that the preferred option generates greater benefits across almost the entire range of management objectives. These results are influenced by key characteristics of the West Coast Limited Entry Groundfish Trawl Fishery including: 1) the large number and complexity of assemblages and species; 2) stock rebuilding and bycatch constraints; 3) management focus on protecting small firms; 4) effects of the self-financed buyout program; and 5) number and diversity of dependent/engaged communities. The Council's preferred option results in higher rents and economic efficiency through incentives for entrepreneurial innovation and reduction in risk. In contrast, the fixed term/auction alternatives generate less profit and rent and lead to greater risk due to "wasting effects" and disincentives for rent creation. These effects are magnified over time due to the inherent challenges in managing asset portfolios in a complex multispecies fishery. In addition, the reduction in asset values undermines the ability of family-owned firms to finance operations and manage risk. The fixed term/auction alternatives reduce incentives for stewardship, and negatively impacts communities by increasing risk and inhibiting long term contracting. The auction system may provide for moderate gains in new entrants and price discovery but this is a benefit only if secondary quota markets are failing to function efficiently. The review of the summary results for 37 groundfish management goals, objectives, and standards reveals that the fixed term/auction alternatives have a moderate to significant negative effect on 22 objectives, a slight negative or zero effect on 14 objectives, and a positive effect on only one potential objective (royalty payments).

F.1 Introduction & Scope of Work

The Pacific Fishery Management Council (here after “the Council”) is evaluating management alternatives in preparation for rationalizing the West Coast Limited Entry Groundfish Trawl Fishery. The Council chose a preliminary preferred alternative at their June 6–13, 2008, meeting in Foster City, California. They adopted Individual Fishing Quotas (IFQ) for the non Pacific whiting shoreside sector, either IFQs or co-ops for the shoreside whiting sectors, and cooperatives for the at-sea whiting sectors. One proposed alternative to the preferred option is allocating individual fishing quotas (IFQs) for a fixed term (15 or 16 years) and then auctioning off a portion of the quota (up to 20 percent) on a biennial basis.

F.1.1 The Council’s Preferred Option and Fixed Term and Auctions Option

The IFQ alternative preferred by the Council provides an amount of catch (IFQ) that would be available for use on each trawl limited entry vessel (PFMC 2008a). The IFQ would be transferable and divisible. The timing of harvest and amounts taken would be restricted primarily by each vessel’s individual quota. Each vessel would have both flexibility and individual accountability. IFQ transfers would be tracked by NMFS and checked against vessel catch. An initial allocation may be given to processors. The Council may decide to use an adaptive management provision to provide processor compensation, mitigate against adverse impacts to communities, assist new entrants, or to achieve bycatch reduction and habitat protection goals, among others.

One proposed alternative is allocating individual fishing quotas (IFQs) for a fixed term and then auctioning off a portion of the quota. The alternative is described as:

“The IFQ program could optionally include a 15 or 16 year limit on all the QS that has been issued. Starting with Term-2 of the program, every 2 years up to 20 percent of all QS will be returned to NMFS for reissuance via an auction. The specific form of the auction would be decided by the Council in the period between trawl rationalization implementation and the first auction. It would be designed to achieve the goals of the trawl rationalization program, including reducing bycatch; increasing operation flexibility; and producing measurable economic and employment benefits through the seafood catching, processing, distribution elements, and support sectors of the industry.” (PFMC 2008a, page 11).

As with all options it must be evaluated according to goals, objectives and standards found in the Pacific Coast Groundfish Management Plan (2008c), the Trawl Rationalization Plan (2000a), the MSA (NOAA Fisheries 2006), and other standards relevant in conducting Environmental Impact Statements (EIS).

F.1.2 Scope of this Report

This report compares and analyzes the Council’s preferred option relative to the fixed term/auctions option. The report includes:

- A review of auctions for renewable and non renewable resources with reference to using fixed term/proportional auction strategies relative to the goals of economic efficiency, resource conservation, and minimizing environmental and community impacts.
- Discussion of literature and key concepts associated with fixed terms and quota auctions relative to economic, social, and environmental objectives of the West Coast Limited Entry Groundfish Trawl Fishery.
- A comparative qualitative analysis of the fixed term/auction alternative for the West Coast Limited Entry Groundfish Trawl Fishery including evaluation of the costs and benefits

advantages/disadvantages of this option relative to relevant management goals, objectives, and standards. Analysis includes the potential impacts of this alternative on 1) the creation, size, and capture of fishery rents; 2) effects on voluntary resource stewardship and fishery investment; 3) flexibility of private and public management; and new entry into the fishery. The evaluation also includes impacts to various stakeholders including, but not limited to, trawl harvesters, non-trawl harvesters, processors, communities, groundfish resources, and management agencies.

F.1.3 Caveats and Assumptions

Because of the range and complexity of the options, including differences between the Pacific whiting and non-whiting sectors, and the uncertainty regarding how the fixed term/auction would be applied, the following caveats/assumptions have been made:

- For purposes of the comparative analysis, it is assumed that the only options being analyzed are the fixed term/auction options versus the Council's preferred option(s). Where options are not preferred or equally preferred, and the option may impact the comparative analysis, the analysis includes the specific alternative options. The analysis is not intended to analyze alternative rationalization plans or option design in order to achieve higher goals, objectives, or benefits.
- The fixed term/auction option does not specify an amount to be auctioned beyond "up to twenty percent." For the purpose of comparative analysis we assume either 5 percent or 20 percent of the quota is surrendered and auctioned.
- The Pacific whiting sector includes cooperative and non-cooperative options. Given uncertainty about whether the fixed term/auction option would apply to cooperatives, the analysis is conducted assuming that all sectors of the Pacific whiting fishery are managed under the IFQ preferred option.
- While this report discusses basic types and design features of auctions, it is beyond the scope of this work to analyze or recommend design elements for an auction mechanism for the West Coast Limited Entry Groundfish Trawl Fishery.

F.1.4 Structure of the Report

The Report is structured in six major sections. The next section briefly describes key characteristics of the West Coast Limited Entry Groundfish Trawl Fishery, the processing sector, and coastal communities. Based on a review of the literature, Section 3 summarizes comparative advantages and disadvantages of fixed term privileges and auctions for natural resources including fisheries. Section 4 analyzes the predicted impacts of the fixed term/auction option relative to the Council's preferred option on resource rents, environmental stewardship, and coastal communities. Section 5 summarizes specific impacts on key federal and west coast fisheries management objectives. Attachment A provides a literature review of fixed term privileges and auctions for managing natural resource industries including fisheries. Attachment B is a brief discussion of resource rent creation, an issue central to much of Sections 3, 4, and 5. Chapter 1 in the main document lists the Council's objectives for groundfish management and groundfish rationalization that provides the basis for the comparison of the Council's preferred IFQ option against the fixed term/auction alternative.

F.2 Characteristics of the West Coast Limited Entry Groundfish Trawl Fishery

F.2.1 Introduction to the Limited Entry Groundfish Trawl Fishery

From almost any perspective, the West Coast Limited Entry Groundfish Trawl Fishery is a complex fishery that has undergone major and sometimes wrenching change over the last thirty years. It is part

of a broader network of west coast fisheries that stretch over four states (including the distant water fishery primarily fishing in Alaska) involving thousands of fishing firms, hundreds of seafood processors and support industries; and scores of “engaged” “dependent”, and “at-risk” communities. The trawl fishery harvests from major fish assemblages representing widely varying habitats and life histories that include over 80 species, of which more than half are commercially harvested and sold.

The fishery has transitioned through five major periods during the last 30 years:

- Pre-MSA (before late 1970s): characterized by open access management and domination by foreign fleets;
- Post MSA (1980s - early 1990s): development of a groundfish management plan, domestication of the fleet, foreign-domestic joint ventures, regulated open access management, priority for year-round landings and processing;
- Limited Access (mid 1990s): development of a limited access permit fishery, domestication and allocation of the Pacific whiting fishery, creation of the Pacific Whiting Cooperative;
- Overcapitalization (late 1990s): disaster declaration, biological limits and overfished status for some stocks, overcapitalized fleet, self financed permit buyback program;
- Conservation and Rationalization (present): implementing rebuilding plans for overfished stocks, establishing rockfish conservation zones (RCA) and essential fish habitats, rationalizing the fishery using Limited Access Privileges.

After the establishment of the Exclusive Economic Zone (200-mile limit) and passage of the MSA, the groundfish trawl fleet grew to more than a thousand vessels that were ultimately permitted into the limited entry groundfish trawl fishery. But with the exception of Pacific whiting, harvest and total revenue dropped 30-50 percent from the 1980s to the present. For example, shoreside landings by nonwhiting nontribal commercial sectors totaled only 25,000 mt, in 2004 compared to landings of 60,000 mt in 1995 and 1996, respectively. Groundfish trawl permits for the shoreside sector which totaled nearly 400 when the Limited Entry plan was initially developed decreased to 183 by 2003 due to the purchase and aggregation of permits by the at-sea whiting catcher processing vessels and the self financed buyout program which retired more than 40 percent of the permits active in the fishery at the time.

The growth and decline in non-Pacific whiting groundfish trawl harvests paralleled the growth and reduction of the groundfish seafood processing sector (<http://www.pcouncil.org/groundfish/gfspex/07-08/ch7.pdf>.) The number of firms engaged in processing trawl-caught groundfish in the three west coast states totaled approximately 140-150 in the mid eighties but declined by 60 percent to 55 companies by 2005. Besides fewer processors, the processing industry also significantly consolidate with the top three companies processing 77 percent of the product and the top six companies processing some 90 percent. To some extent, however, these numbers are skewed due to the large proportion by weight of Pacific whiting, which is a large industrial processing operation dominated by a few companies.

F.2.2 Harvesting, Processing, and Communities

The west coast has an active commercial and recreational groundfish fishery made up of thousands of shore based trawl, at sea trawl, fixed gear, tribal and recreational charter and recreational private vessels. Trawl and fixed gear vessels make most of their landings in Oregon. Newport, Astoria, and Charleston (Coos Bay), Oregon were three of the largest four ports for landed weight and exvessel revenue during the 2000–2003 period.

Port Districts have invested significantly in infrastructure to support the trawl fishery and processing sectors in these ports. Nevertheless this investment is always at risk from environmental and market factors and also from changes in the regulatory regime for trawl fisheries. For example, because of the trawl buyback program, some port communities, mainly smaller ports, appear to have lost relatively more groundfish trawl vessels than other ports.

Vessels participating in shore-based groundfish fisheries deliver to shore-based processors along the entire west coast. However, processing capacity has been both consolidating and declining in recent years. Many small ports have lost both processors and on-site buyers, and trucking groundfish from these ports to larger communities for processing has become common place. Nevertheless, processing remains an important source of employment and regional income. From 2000 to 2004 seafood processing on the west coast generated approximately 380 to 420 million dollars in wages and employed over 10,000 workers.

The capital and associated infrastructure invested by industry and port districts is not easily transported to other sectors or locations should changes occur in the groundfish fishery due to new harvest or market conditions or new management plans. Significant port capital is fixed in location and designed to handle fishing vessels and fish products. When landing volumes fall below the economic capacity of a plant, operators have little choice but to consolidate operations, often leaving plant and infrastructure to rapidly deteriorate in prime waterfront communities. Maintaining working waterfronts that efficiently use valuable real estate to support fewer vessels and consolidation in processing capacity is an ongoing challenge for port districts and the seafood industry

This dependence on the seafood industry and limited resilience to change means that many coastal communities are potentially vulnerable to changes in the management of the groundfish fishery. The Council identifies some 38 cities and 18 counties as vulnerable commercial and/or recreational fishing communities. Four cities and six counties are identified as the most vulnerable. The cities are: Garibaldi, Ilwaco, Moss Landing, and Neah Bay. The counties are: Coos, Grays Harbor, Humboldt, Lincoln, Mendocino, and Pacific (Pacific Fishery Management Council 2006). Focusing just on dependency on the commercial groundfish fishery, Neah Bay is identified as a most vulnerable area. Other vulnerable areas include Astoria, Bellingham, Coos Bay, Crescent City, Eureka, Fort Bragg, Moss Landing, Pacific City, and Port Orford.

F.2.3 Key Characteristics of the Groundfish Fishery

The history and description of the groundfish fishery, processing, and community sectors reveals some of the complex characteristics relevant for this analysis. These include:

- Large number of assemblages and species: The fishery targets a variety of assemblages and species (e.g., flatfish, rockfish, deep water, and mid water (primarily Pacific whiting) across different habitats found along more than a 1,200 mile coastline. Individual species and assemblages may be either complements or substitutes, and targets or nontargets depending on the fishing strategy, quotas, market demand, geography, habitat, and captain's skill.
- Complex quota: Each of the assessed species have associated quotas. Even within assemblages, these quotas may be substantially different across species, given biologically intrinsic differences for each species/stocks and different stock status. This heterogeneity creates significant costs to develop fishing strategies consistent with harvesting the "optimal" proportion of each stock given regulations, market demand, and environmental conditions.
- Heterogeneity in species productivity: One distinguishing characteristics of some of the groundfish stocks is their relatively slow growth. This is particularly true of some of the rockfishes which may grow to be over 100 years old. In contrast, other stocks may be relatively

fast growing (e.g., ling cod). Still other stocks may have moderate to fast growth but show significant variability in recruitment (e.g., Pacific whiting).

- Rebuilding stocks and bycatch: Seven groundfish stocks are presently listed as “overfished” and have been placed on rebuilding plans. Quota for some of these stocks is less than 100 metric tons for the entire west coast. These severe limits have required harvesters to dramatically alter fishing behavior in order to keep below individual and aggregate bycatch quotas. In some cases the bycatch is the most significant binding constraint on the fishery and has resulted in early closures of the fisheries.
- Family owned firms: Most of the vessels landing product are relatively small family firms. Average vessels range from 60-80 feet with rights to harvest less than 1-2 percent of the total available quotas given existing regulations. Some permits are owned by seafood processors who hire vessels to land the permitted catch. Very large vessels sometimes greater than 200 feet in length characterize the at-sea whiting catcher processing industry, which is dominated by large seafood firms.
- Complex interactions of west coast fisheries: Many west coast trawl groundfish vessels also own permits and licenses in other fisheries in order to maximize profits and manage risk. Recent history has demonstrated that major changes in the west coast limited entry trawl fishery can create rippling or “cascading” effects in other fisheries.
- Self financed buyout program: In 2003, almost half of the West Coast Limited Entry Groundfish Trawl Fishery permits were retired as part of a voluntary government-backed loan and auction buyback scheme. Remaining permit holders must repay the loan based on a tax on landings.
- Cooperation in science and management: Members of the West Coast Limited Entry Groundfish Trawl Fishery have invested time and money over the last 30 years in cooperative science and management through the Council process and formation of harvester and processor organizations. West coast trawl vessels are now used in conducting groundfish surveys for assessment purposes by NMFS. The Pacific Whiting Cooperative conducts collaborative science including monitoring of Pacific whiting pre-recruitment.

This brief snapshot of the history and key features of the groundfish fishery provides a limited sense of the complex and interdependent biological, economic, and social issues that impact this industry. These features will prove important in influencing the impact of the rationalization options which are analyzed in the remaining portions of this report.

F.3 An Overview of Fixed Term Rights and Auctions as Resource Management Policy Options

This section provides a general background to the evaluation of the costs and benefits of the limited term/auction alternative for the West Coast Limited Entry Groundfish Trawl Fishery described in Section I. Drawing on relevant literature (documented more extensively in Attachment A) it explores the use of fixed term rights and auctions of natural resources to promote the goals of economic efficiency, resource conservation, and minimizing negative environmental and community impacts. The evaluation of auctions and fixed term privileges are each conducted separately. It should be noted that there are few instances where the literature addresses the combination of these policy options. Our analysis in Sections 4 and 5, however, are based on the combined effects of fixed term privileges and auctions in the context of the specific biological, economic and social context of the West Coast Limited Entry Groundfish Trawl Fishery.

F.3.1 Fixed Term Fishing Rights versus “Permanent” Rights

Privileges to extract a public resource may either be of permanent duration or be time-limited. Although permanent privileges, or more accurately “conditional” permanent privileges, are the tool of choice in fisheries around the world, fixed term privileges are common in other public resource industries.

The choice of duration of the privilege can have implications for:

- The flexibility that managers have in addressing policy goals.
- The level of transaction costs for the managed sector.
- The incentives that resource users face for investment in, and conservation of, public resources.

F.3.1.1 Permanent privileges may reduce transaction costs

Transaction costs are the resources dedicated to establish, operate, and enforce a market system (Lee and Jouravlev 1998). Permanent privileges are homogenous in duration so their value is determined solely by the factors underlying supply and demand. Privileges subject to a fixed-term, however, are a “wasting asset” i.e. their value diminishes with time (Hodgson 2006) . Higher information and renewal costs may be associated with renewing or replacing fixed term assets. These costs will be higher the greater the degree of uncertainty associated with the status and/or management of the resource. Permanent privileges can help avoid potentially contentious, time-consuming, and costly future re-allocations (Libecap 2006; Morgan 1995) .

F.3.1.2 Permanent privileges can encourage efficient investment

Secure rights to a resource reduce risk, thereby promoting long term investment and technological improvements(White 2006). Investment and innovation by firms collectively improve the economic efficiency and competitiveness of a sector (Bess 2006; Harte, *et al.* 2008; Harte and Barton 2007).

For example, if a fishing entity does not know if they will have the right to fish in five years time it is less likely to make new capital investments in equipment and durable assets. In sectors where markets take a long time to establish, permanent or long term access to the resource is more conducive to the formation of more-efficient business arrangements (Bess 2006).

F.3.1.3 *Permanent privileges can promote resource and environmental stewardship*

Secure privileges to harvest natural resources may encourage stewardship for the resource and the environment it is found in (Morgan 1995). The longer the duration of the privilege, the larger the stake the user has in the industry and the greater the user's desire to engage in long term stewardship behavior (Beddington, *et al.* 2007; Costello, *et al.* 2008; Grafton, *et al.* 2006; Griffith 2008; Townsend and Shotton 2008).

In contrast, Macinko and Bromley (2001) argue that the degree of long term stewardship that a user will exercise is determined not by the duration of the privilege but by the user's rate-of-time preference -- that is, how an individual evaluates present income versus future income. Individuals with a higher discount rate are less likely to care for the long term health of a resource. If enough fishery participants have a high discount rate, the economic incentive to ensure the long term sustainability of a resource will be much reduced because the sector believes short term gains are better employed in other uses (Clark 1990). Page (1977) calls this the "iron law of the discount rate." The effects of this iron law may mean that time limited privileges have the same implications for resource and environmental stewardship behavior as do permanent privileges, provided they are of sufficient length.

F.3.1.4 *Fixed terms can provide opportunities for change*

Problems can arise from the initial allocation of privileges. For example, allocations made by administrative decision are almost never economically efficient (Morgan 1995). There may also be concern over excessive market share situations developing. Both of these concerns may be mitigated by a system of time-limited privileges, since there is a defined future opportunity for managers to adjust the structure of the regulated sector (Lee and Jouravlev 1998).

Although administrative allocations may not be efficient in the short-term, secondary markets can be designed or allowed to develop that result in more efficient resource allocations over time. Excessive market share concerns can be addressed through caps on ownership or other methods. Changes in conditions attached to permanent privileges after they have been allocated can generate significant uncertainty and may undermine secondary markets for privileges (Lee and Jouravlev 1998). The conditions attached to any system of privileges need to be clear from the beginning.

Fixed-term rights also offer potential flexibility to resource managers. Necessary changes in policy may be implemented more easily, and with less resistance under a system of time-limited rights (Macinko and Bromley 2001). Fixed terms provide managers with predictable regular intervals at which to make changes to the management program in light of new developments. Privilege holders also have a high degree of certainty about when changes to the system will be made and can plan accordingly. There may also be less resistance to changes in management procedures if the privilege holders do not hold a permanent, vested share in the industry.

In the context of the rapidly changing understanding of the oceans and the shift towards ecosystem-based science and management (Upton, *et al.* 2007), this flexibility may make it easier for adaptive management to occur. For example, The United States Commission on Ocean Policy (2004) recommended assigning:

...quota shares for a limited period of time to reduce confusion concerning public ownership of living marine resources, allow managers flexibility to manage fisheries adaptively, and provide stability to fishermen for investment decisions.

Fixed term privileges may also provide industry with increased flexibility, especially when there is uncertainty about the status or management of a resource. For example, the lower cost and protected nature of fixed term contracts for water use reduces the farmer's exposure to risk in the event of a long term drought where farming is unviable. Flexibility in this case comes at the expense of long

term security. But in an industry where seasonal flows are often highly variable, the amount of long term security from having permanent access to water may be negligible. Sometimes the duration of the right may depend on the level of uncertainty regarding the right. For example, in Iowa, the legislature restricts the term of water use rights to 10 years if the aquifer capacity is uncertain (Hodgson 2006).

The durability of the privilege depends not just on the length of time it is issued for, but also on the privilege holder's perceptions of a program's management and whether or not long term expectations for the resource will be met. For example, a fixed-term privilege granted for a short period but with a strong presumption of renewal may be just as durable and will confer the same or greater economic benefits than a privilege granted for 20 years but carries with it an expectation that the government will fundamentally change aspects of the management program within that period.

F.3.1.5 *Equity considerations*

A concern about permanent privileges is that they capitalize the value of the fishery and therefore, when traded, confer benefits to the initial recipients in the form of windfall gains (if the initial allocation is free or cheap). These may be viewed as inequitable from society's standpoint.

The Redstone Group (2007) modeled the economic gains of implementing a Limited Access Privilege Program in the snapper-grouper fishery under the jurisdiction of the South Atlantic Fishery Management Council (SAFMC). They found that implementing the LAPP would provide \$15-20 million in benefits, much of which would come from consolidation and de-capitalization in the fishery. However, they also found that most of these gains could be taken out of the fishery in the form of quota purchased from exiting privilege holders.

Macinko (2008) states that the effect of the LAPP would be: "...*transferring the entire future (enhanced) value of the fishery into the hands of those chosen by the particular qualification scheme...*" This is known as the transitional gains trap, when the initial recipients of privileges are able to capitalize a portion of the stream of future benefits and extract these from future participants in the fishery, thereby depriving them of these same benefits. Fixed term privileges may help avoid this transitional gains trap.

However, this rather simplistic view of the transitional gains trap argument reflects a misunderstanding of the concept of resource rents and confuses several important issues. First it may be equating the creation of desirable resource rent with undesirable monopoly rents. Monopoly rents arise when a sole supplier or buyer can charge a higher price to buyers or pay a lower price to suppliers due to their market position. This situation leads to inefficient resource allocations and concerns about equity. However, monopolies rarely exist in fisheries and even if there is a concentration of ownership in one region or sector, the availability of the same or similar fish from other countries and regions mean a commercial seafood company is generally a price taker and unable to generate monopoly rents.

Second, and more importantly, it views rents as somehow unearned and a windfall to those who receive them. However, a significant portion of the asset value of a resource arises from rents generated by the innovation and enterprise of the resource extracting sector (see Attachment B for a more detailed discussion of the concept of Resource Rent). These resource rents are very different from unearned monopoly rents or windfall gains and arise because natural resources, like any other economic good, are scarce and can be sold for a price which is higher than the costs of extraction. Without investment and innovation the resource would remain underutilized with little or no rent generated. Neither are resource rents independent of the prevailing regulatory regime. Regulation affects the amount of resource rent generated because it either creates incentives or disincentives for investments and innovation.

Unlike monopoly rents and windfall gains, resource rents can represent efficiency and sustainability and therefore are a benefit to society. Creating a Limited Access Privilege System with either fixed duration or a relatively unlimited or “rolling” duration does two things:

- It allows those who have created an asset value for the resource through investment, innovation and entrepreneurship to capture a portion of that value through the sale or leasing of privileges.
- It encourages new entrants to enter a sector because they now have the potential to extract a proportional share of the future benefits created from rents generated by their ongoing investment, innovation and entrepreneurship.

From this perspective, individuals arguing against the unfairness of the “transitional gains trap” may be overstating the inequality aspects of the issue. In fact, rather than creating an inequality, a Limited Access Privileges Program may address an existing inequality where participants in a fishery have previously been unable to capitalize the benefits generated by their investment, entrepreneurship and innovation (Harte and Barton 2007). By establishing a tradable privilege with an asset value, participants can now obtain some of the benefits they have created.

Another equity issue regarding permanent privileges is that of the perceived private ownership of a public resource. Even though marine organisms in U.S. waters are the property of the people of the U.S. until they are captured, and will remain so under a Limited Access Privilege Program, fixed term privileges may have a moderating effect on public concerns regarding this issue (Macinko 2008).

F.3.1.6 *Interplay of duration, economic, ecological and institutional variables*

Recent modeling work by Costello and Kaffine (2008) shows that the value, growth characteristics and duration of the harvest privilege all impact incentives for resource stewardship and economic efficiency. Modeling the abalone and spiny lobster fisheries in Baja California, Mexico the authors demonstrate how limited duration privileges could induce resource stewardship. However for slower growing stocks, either a long tenure period or high certainty of renewal is required to induce stewardship. This finding is consistent with work by Larkin et al. (2006) who showed that stock growth rates fundamentally impact the economically efficient management strategy for overfished stocks required to meet a mandated rebuilding target. Importantly, Costello and Kaffine show that a tenure system will encourage stewardship depending on the tenure length, the probability of renewal (as a function of the probability of achieving a predetermined “escapement” level), and the economic and biological characteristics of the fishery. Although modeled for relatively high value single species fisheries, this work demonstrates the context specific nature of the complex relationship between stock characteristics, duration of fishing privileges and the certainty of privilege renewal.

F.3.1.7 *International treatment of the duration of fishing privileges*

Globally there is no consistent pattern to the duration of fisheries privileges. They range from annual to perpetual. For example, in New Zealand privileges are held in perpetuity (Harte, *et al.* 2008) while in the Falkland Islands privileges are held for 25 years (Harte and Barton 2007). In Canada, privileges are granted “annually” while in Australia they vary from fishery to fishery depending on the duration of the management plan (Arnason 2001).

With few exceptions (notably several fisheries in Chile) privileges have what Anderson and Holliday (2007) call *rolling conditional permanence*. For example, in both the Canadian and Australian situation the continual renewal of short-term privileges has resulted in the expectations by holders and management agencies that the privileges are a form of rolling conditional privileges. Holders of such privileges have a legal or procedural expectation based on precedence that their basic privilege to access a fishery will be renewed before or when it expires. As noted earlier it is the certainty associated with the management of the fishery that matters as much as the statutory duration of the privilege when it comes to the perception of its value by the asset owner and the broader marketplace.

F.3.2 Auctions for Privileges to Extract Public Resources

Most initial allocations of public resources have been undertaken using historical participation rules. Such first possession rules are politically popular but are complicated and often involve perceptions of wrangling and back-room dealings. They do have desirable characteristics, in that they benefit socially desirable industry pioneers, and optimal share sizes might have been determined through years of use (Libecap 2006). The allocating authority may also have tighter control over who actually ends up with the privileges (Morgan 1995). However, there are drawbacks to this method of allocation. First, they may discriminate against new entrants, initial allocations are often economically inefficient, and undesirable market situations often exist as a result of them. Auctions may not produce these effects to the same degree.

Auctions are market institutions with explicit sets of rules determining resource allocation and prices on the basis of bids from market participants (McAfee, R.P. and McMillan 1987). In the United States they have been used to sell treasury notes, landing slots at busy airports, parts of the electromagnetic spectrum for use by cellular phone companies, electricity transmission time slots, pollution licenses, mineral leases such as oil and gas, timber plots for harvest, leases on grazing lands, and surface water rights. There were auction “experiments” in Estonia and Russia for allocating fishery privileges, and they are currently in use in Chile for one fishery.

Auctions have several desirable attributes. They can:

- Promote economic efficiency in the allocation of privileges.
- Generate revenue for public expenditure.
- Provide price information to market participants.
- Be designed to promote social and political goals.

F.3.2.1 Auctions can promote economic efficiency in the allocation of scarce resources.

Auctions can be economically desirable because those bidders with the highest and best use for the resource (i.e. those with the lowest production costs or the ability to gain a price advantage) will be willing to pay the most for the privilege of utilizing the resource therefore promoting economic efficiency (Libecap 2006; McMillan 1994; Morgan 1995). However, efficiency in the auction process itself may not guarantee an efficient industry (Longo 2003). An economically efficient sector depends as much on the operating rules that are made by the management authority as the initial allocation of privileges.

F.3.2.2 Auctions may be a suitable royalty recovery mechanism.

Many argue that the public should be compensated by private companies via royalties for the right to use a public resource (Anderson and Holliday 2007). Auctions may be an effective mechanism for collecting royalties as the resource users themselves establish the level of rent they think is present in the bids they submit (Morgan 1995). Auctions were used to great effect in collecting resource rent from the sale of radio spectrum licenses in 1994, when over \$10 billion in revenue was collected (McMillan 1994).

It can be difficult to establish the amount that society should be compensated for a right to access a resource. As owners of the resource the public is clearly due a portion of the rents generated in a fishery (see Attachment B for a more detailed discussion of resource rents). But resource rent is a dynamic concept rather than a simple fixed amount. Industry may generate new rents through innovation, lower production costs, market development, and improved science and resource management. Leaving a proportion with the industry provides an incentive to invest in the fishery and improve economic performance. Total rents accruing to both the public (through general taxation and reinvestment in the economy) and private sectors will increase. If an auction extracts all forms of

rents then this incentive is removed. Allowing industry to retain a portion of rents may actually optimize the total rents that could be accrued by government (a concept analogous to an “optimal” tax rate and backward bending supply of tax revenue). Allowing industry to retain rents can be especially important when access to capital is limited and/or external investors view the sector as risky.

A second and related issue is that it is difficult to identify the rent that is due to the public ownership of the fishery. Rents are the residual that remain after subtracting costs of production from gross revenue. They include the “highliner rents” (“inframarginal” rents) earned by participants who have unique skills or knowledge that enables them to produce at lower costs than other companies operating under the same conditions. It would be a mistake if rent recovery policies sought these rents.

Anderson (2001, p.36) sums up this debate:

The rent from a fishery is determined by the size and reproductive capacity of the fish stock and the types and amounts of fixed and variable inputs that are used to catch, process, and market the fish. It is difficult if not impossible, to state how much is due to the fish stock and how much is due to the choice of inputs. The creation of rights-based fishing if done correctly provides the incentives for owners to select the appropriate inputs. Care must be taken to insure that incentives to seek out and implement new ways of production are not unduly weakened.

F.3.2.3 Auctions are particularly useful when asymmetries of information exist

When one party has more information than another, the auction provides a mechanism to communicate that information in a simple way. All the available information underlying supply and demand is incorporated into the price of that item so all that a buyer or seller needs to know to make a rational decision is that price. They may also be desirable when the government has little idea about the value of the privileges for sale.

F.3.2.4 Auctions may be designed to take social and political goals into account

As compared to administrative allocations that often occur behind closed doors, auctions are a transparent method of allocating public resources. The auction process is generally an open one, with the rules set in advance, and can avoid claims of favoritism, influence by politically powerful movers, and corruption. This may be extremely important in gaining public acceptance for the process of allocating a public resource. Auctions were used in Russia partly as a way of bringing the allocation process into the public eye and allegations of corruption were reduced (Anferova, *et al.* 2005).

Favoring certain bidders may be justified if willingness-to-pay does not reflect social value (McMillan 1994). For instance, the preservation of disadvantaged small-scale communities may be desirable. Similarly minority groups, small companies, or other previously disadvantaged groups may not be able to compete at auction. There are several ways that they can be taken into account:

- Entry restrictions help ensure that only certain targeted participants can take part in an auction
- A price preference can be granted to certain classes of bidders, such as small scale operators, minorities, or firms that exhibit better than normal environmental stewardship.
- Set-asides for some or all of the resource can be created. A certain amount of privileges may be withheld from the general auction for side-auctions (or perhaps allocation by another method) to designated bidders.

It can be the case that existing participants in an industry will cooperate with each other to create favorable market distortions. In these cases, it may be desirable to introduce new entrants. Auctions can be a fair and transparent way of re-allocating privileges (Anferova *et al.* 2005).

Although auctions are generally held to be an economically efficient method of allocating resources, they may also be designed to provide political flexibility. The simple auction design of “highest bidder wins” does not have to follow, and governments can manipulate auction design to address policy goals in a variety of ways. Social objectives can be incorporated into auction design, but any such alteration of the unrestricted auction structure to incorporate these considerations will likely entail a loss of economic efficiency. There is, therefore, a tradeoff between the efficiency benefits of auctions and their ability to achieve social objectives.

Having many benefits, auctions also have limitations:

- Auctions may be subject to collusion or gaming by potential bidders and may not reflect actual rents generated.
- Auctions for annual or short term privileges give no or limited security of access to holders and may lead them to focus on exploitation rather than value added activities, and in poorly enforced fisheries, may lead to over-fishing.
- Small fishing companies may not have access to the finance or subsidies that larger entities have access to, handicapping them in auctions. Arrangements that favor smaller companies distort the auction market and may lead to lower rents being generated or a smaller proportion of the rents being collected.
- Auctions for long term rights will result in one-off payments to the government that then requires the government to invest wisely if a long term income stream is desired.
- Bid prices for long term rights may be highly discounted by the commercial industry given the financial risk involved in many fisheries.

F.3.2.5 *Examples of auctions for fishery privileges*

Fishery privileges were auctioned in the Russia Far East from 2001-2003 (Anferova et al. 2005), in Estonia from 2001-2003 (Vetemaa, *et al.* 2001; Vetemaa, *et al.* 2005), and in Chile for the Patagonian toothfish fishery (Gonzales, *et al.* 2001).

In 1991 Chile introduced an auction system for privileges in a new, large-scale industrial fishery targeting Patagonian toothfish (Gonzalez et al. 2001). The auction system was designed to provide equal opportunities for bidders, provide revenue for the state budget, and to avoid monopolies in the market for fishing rights. It was also seen as a way of minimizing complaints and conflicts among fishing interests. As the fishery was fairly new, no change in the structure or distribution of the fishery was needed. Fishing companies in the fishery at the time the auction system was implemented were granted prior-use rights. Initially they were allowed to continue their fishing activities for a period of three years, and after this period were granted permits totaling 10 percent of the allowable catch. These permits had a term of 10 years. The fraction of the allowable catch allocated to firms decreased by 10 percent each year and the 10 percent was then re-auctioned

Auctions for fishery quota in Estonia were first implemented in 2001 (Vetemaa et al. 2001; Vetemaa et al. 2005). Prior to 2000, fishing privileges were of indefinite duration. However, with the new system privileges depreciated by 10 percent annually and the 10 percent reclaimed was to be sold at annual auction. This was intended to promote new entry and provide revenue to the government. The other 90 percent was allocated according to historical participation criteria. Despite its apparent success in meeting its objectives for revenue generation and transparency, the auction system was abolished for political reasons in 2003.

Auctions for fishing quota were employed in Russia from 2001-2003 (Anferova et al. 2005). The main purposes of the Russian auctions were to allocate fishery quota in a fair, transparent manner, and to increase the share of resource rents accruing to government. A maximum of 20 percent of the quota would be allocated by auction on a yearly basis. There was a considerable increase in state

revenues as a result of the auctions, and it was felt that the auction system was transparent. However, although the auction system proved successful in increasing state revenues, it was abolished due to ongoing implementation issues and its perceived negative impact on the economic performance of the fishing fleet.

F.3.3 Discussion

A review of the literature suggests that both permanent privileges and limited term privileges have advantages and disadvantages. Permanent privileges have two potential benefits:

- The homogenous nature of the privileges may reduce the level of transaction costs at which the industry operates.
- Permanent privileges are more secure privileges, and may increase incentives for long term investment in the industry, and for resource stewardship.

Fixed terms privileges have the benefit of potentially providing:

- Flexibility for managers to adjust the regulatory environment.
- A balance between the benefit of clear, appropriate and enforceable private privileges and the public ownership of many natural resources.

Limited access privilege type systems operate around the world with a high degree of variability in their statutory duration. Most, if not all, are considered successful in promoting resource stewardship and economic viability of the fishery. This suggests that it is the overall “quality” of the privilege that matters. A high quality title is certain and secure. Certainty and security are increased proportionately with the predictability of the privilege. The more certain and secure the privilege the more likely are fishers to invest in capital and the fisheries to enhance the quality of their catch. Furthermore, the more certain and secure the privileges, the more likely that financial institutions will accept title as collateral against loans.

Limited duration privileges are often promoted on the grounds that they increase management flexibility because the system can be changed on the expiry of rights. In practice, the management system is always under review. This occurs in two ways:

- Through the monitoring of individual companies’ compliance behavior and performance.
- Through going oversight of the management system by management agencies, the industry and other stakeholders.

This means any issues arising from the limited access privilege system will be identified and regulations and policies changed in response. Adaptive management provisions are common in fisheries legislation and fisheries management plans around the world.

Many amendments can be introduced into the auction system that may serve social or community goals well but some of the economic efficiency benefits might be lost. For example, set-asides or price preferences for minority groups or small fishing communities may introduce distortions that may be politically desirable, but the economic benefits of auctions could be significantly reduced. In these cases where social and community objectives are more important than economic efficiency and government revenue generation, alternative allocation methods may be more suitable.

Efficient re-allocations may also be made through a functional secondary market, such as that for North Pacific halibut and sablefish IFQs. In Iceland, electronic auctions are held which has the effect of broadening the participation in the auction and increasing competition. Increased competition decreases the chance of collusion occurring and also increases the prices that privileges sell for (Arnason 2001).

Auctions can be efficient revenue raisers for management agencies, transferring a portion of the rents generated in a fishery to the government. A one-off auction of initial rights will see a one-off collection of royalties. Rolling auctions through the take back of privileges from existing holders produce a steady revenue flow but can have considerable distributional and equity consequences for fishery participants.

Auctions are commonly used to allocate natural resources, but rarely in fisheries. Trondheim (2004) suggests fishery privileges have heterogeneous product attributes that have various values. Knowledge about the current status of the fishery resource and its future status is very limited compared to other natural resources such as forests, minerals, water and oil and gas. And while auctions may occur on a stock by stock basis, these stocks are also economically and ecologically interdependent. Auction design may be many times more complicated for fisheries resources than for other natural resources and the potential for unintended consequences far greater.

Auctions appear most effective in new fisheries with few participants or a significant history of industry participation, such as the Chilean Patagonian toothfish fishery, and where catch history allocations have not been made in the past. They can be designed to take a range of policy goals into account.

The allocative efficiency properties of auctions are highly desirable in situations where economic efficiency and fleet capacity reduction are important policy goals. In situations where auctions for fishing privileges have been used, initial allocative efficiency appears to have been achieved. Their limited use in fisheries appears due to concerns about distributional impacts, perceived complexity of design and administration and a lack of popularity with fishery participants and administrators vis-à-vis non-auction alternatives.

F.4 Analysis of Fixed Term/Auction Option versus Council's Preferred Option: Cross Cutting Issues

F.4.1 Introduction

The previous sections of this report described the characteristics of the West Coast Limited Entry Groundfish Trawl Fishery and reviewed the advantages and disadvantages of fixed term tenure and auction systems for achieving alternative objectives in managing fisheries and other natural resources.

This section and section 5 evaluate the advantages/disadvantages and costs/benefits of the fixed term/auction alternative relative to the Council's preferred auction given the specific characteristics of the trawl fishery. Particular emphasis is given to the potential dynamic effects on the fishery from combining fixed term quota shares with an auction of up to 20 percent of the quota shares previously held by participants in the fishery. Previous sections, in contrast, focused on the benefits and costs of auctions and limited duration privileges as independent policy options.

The analysis is based on two assumptions regarding intent of the Council:

- The Council is attempting to strike a balance between pure economic efficiency, environmental protection, and support for social needs and communities in order to increase net regional and national benefits. This assumption is consistent with the first goal in the Trawl Rationalization Plan (see Chapter 1 in the main document). It is also consistent with the combination of preferred alternatives that are not solely focused on efficiency (e.g., relatively small ownership caps on individual IFQs), and concern about communities (e.g., holdback of 10 percent of quota to be distributed to selected communities).

- The Council will continue to use adaptive techniques to improve management of the limited entry trawl fishery including tools and incentives in addition to those incorporated in the preferred option of the West Coast Limited Entry Groundfish Trawl Rationalization Plan.

F.4.2 Wealth Creation (Rents) and Economic Efficiency

The comparative analysis on the limited term/auction option versus the Council's preferred option with respect to rents and economic efficiency rests on the following assumptions:

- Rents and economic efficiency are dynamic concepts. Rents in the trawl groundfish fishery are created over time due to the entrepreneurial activity of industry and supporting sectors given prevailing institutions, incentives, and regulations. Rents can result from investment in all key aspects of the fishery including production, management, and science.
- The amount and time stream of rents are influenced by many factors including the design of the management system and fishing privileges. These design features include all the tools which the Council uses to manage groundfish including tools that influence harvest, allocation, and rationalization.

A more detailed discussion of resource rents and their creation can be found in Attachment B.

The remaining part of this analysis is based on the comparative advantages and disadvantages of the two options based on Section 3 and Attachment A. For each of the major issues, we provide a comparative discussion and analysis given the fundamental features of the west coast limited entry groundfish trawl fishery.

F.4.2.1 Impact of a Wasting Asset

As described in Section 2, the west coast limited entry trawl fishery is a complex fishery characterized by multiple assemblages and species, multiple sectors, severely binding quotas (rebuilding rockfish), multiple biological habitats, and coastal communities with supporting infrastructure spread over a 1,200 mile of coastline. Under the preferred alternative, the "rolling conditional permanence" LAPP (Anderson and Holliday 2007) would allow quota holders over time to build a complex portfolio of species to meet their specific business needs and the unique characteristics of their operations (geography, markets, personal expertise, and capital configuration (e.g., vessel size and design)). Quota holders would be expected to alter the quota configurations (both leases and assets) in response to changing resource conditions and changing environments, markets, and regulations. Quota holders would also be expected to invest in new markets and technologies -- and as their past history demonstrates -- engage in co-management, science and cooperative ventures with industry, agency, and community partners. Given the complexity of the challenges and the slow growth of some stocks, returns on investment could take 10, 20, and 30 years or more. Given the assurance of "rolling conditional permanence" quota holders would be willing to invest in projects that increase profits and create entrepreneurial rents over relatively long periods of time.

In contrast to the Council's preferred alternative, the fixed term/auction alternative causes the IFQ quota to become a "wasting asset" as describe in Section 3. This implies that its asset and rental value will decline over time as the end point approaches (in this case end points given that 20 percent of the quota must be given up every two years). Flexibility would be reduced and economic theory suggests that quota holders would be less likely to invest in their operations, research, or management as the end point approaches given diminishing opportunities to realize a return on investment. An individual wishing to acquire additional catch shares, or enter the fishery, could decide to wait until future allocations take place, leaving potential sellers at a disadvantage.

Asset values would significantly drop and approach the annual lease price value. Although many fishermen might plan to stay in the fishery and bid for quota, asset values and total rents would remain lower than the Council's preferred option. True entrepreneurial rents, that is those rents created due to the investment and innovation of the industry would be reduced. Given the absence of empirical data on this option, it is impossible to determine the relative degree of loss rents; but based on the complexity and heterogeneity of the fishery it could be significant, particularly if 20 percent of the operator's IFQ was auctioned.

F.4.2.2 *Limiting and extracting entrepreneurial rents*

Unless carefully designed, one of the challenges of fixed tenure or auctions is that they can reduce the amount of rents created in the fishery due to disincentives. Anderson and Holliday (2007), in their discussion of LAPPS and rent recovery schemes, cautioned against weakening incentives for rent creation and "destroying the goose that lays the golden egg." Possibly a more apt analogy would be "destroying the goose with potential to lay two, three, or more golden eggs." Wilen (2005) estimated that worldwide, fisheries managed under rights-based schemes could generate \$80 billion in rents, an amount \$30 billion higher than comparable studies. He bases his estimate on the rent-creating potential of fisheries due to entrepreneurial innovation.

The fixed term/auction option can limit entrepreneurial creation of rents in two ways: 1) through disincentives associated with the fixed term that would discourage investment and innovation; and, 2) an auction design that after years 15 or 16 would take 20 percent of the quota and associated resource rent and return it to the government every two years. The rents associated with potential entrepreneurial innovation in the trawl fishery, whether it is in production, marketing, science, or management, would be lost in forced auctions to those who did not create them (government). This would discourage the very creation of the rents and wealth in the first place (which is why patent laws protect intellectual property for a reasonable period of time, e.g., 30 years). A fundamental question is whether an average quota term of five to six years (portfolios would include a mix of termed assets ranging from 10 to 2 years or less) is a long enough period to induce innovation and return on investment?

There may be configurations of auctions and/or tenure that could potentially optimize rents and rent creation while sharing rents with the public. The type of auction and tenure system embodied in this alternative, however, appears to create disincentives to entrepreneurial rent creation.

F.4.2.3 *Increasing risk and uncertainty*

Fishing is a risky business and high risks have the potential to reduce rents. Given fishing's inherent risk, a primary objective of fishery management should be to reduce risks, or at a minimum, not exacerbate risks through poorly conceived management strategies, (dis)incentives, and institutions.

Given ownership caps, most quota will be owned by family-owned firms with (presumably) less access to financial tools to manage risks relative to larger companies (the exception being larger processors and the catcher-processing sector of the at-sea Pacific whiting fleet). Due to information asymmetries and relatively higher proportional transaction costs, small firms must also rely, to a greater degree than large firms, on the value of their assets to collateralize loans (Brewer 2007; Hutchinson 1999). The complex and high risk nature of the west coast trawl fishery suggest that fishermen in an IFQ fishery will attempt to address risks through the types of quota portfolios they inherit and purchase over time. Some of these risks may be substantial given the complex substitute/complement nature of the assets and the constraints associated with bycatch and overfished stocks. Having an extra 100 pounds of canary or yelloweye rockfish may be critical to both asset value and risk management strategies. One would expect that each fishermen holding quota would build an "optimal" quota portfolio that matched their business and risk management strategies.

The fixed term/auction alternative may increase risks in potentially three ways. First, as the fifteen year term unfolds, asset values will be influenced, not only by changes in the normal activities of the quota markets, but through the influence of the “wasting” characteristics of the asset. This will become more pronounced as the term expires and quota holders relinquish twenty percent of their portfolios. Given the potentially “balanced” nature of the quota holdings, this could increase the risks associated with holding and trading quota given changing market conditions. Secondly, the quota holders will face risk given their uncertain financial situation when the expected first auction takes place. Quota holders will be forced to relinquish and then buy back quota regardless of their financial situation—this will also create risk. And third, prices at the auction may be uncertain given the large amount of quota available at the auction and the limited 10 year tenure associated with 20 percent of the quota. Risk/uncertainty may also be increased due to high and possibly speculative prices for bycatch constraining stocks.

Given the impacts on risks/uncertainty, the fixed term/auction alternative will reduce rents relative to the Council’s preferred option. This may even be true for the 5 percent auction given the critical importance (and presumably high price) of the constraining bycatch stocks.

F.4.2.4 Summary

The comparative qualitative analysis indicates that on balance, the Council’s preferred option relative to the fixed term/auction results in significantly higher rents and economic efficiency through incentives for entrepreneurial innovation, rent creation, and reduction in risk and uncertainty. In contrast the fixed term/auction alternatives generate less rent due to the disincentives for rent creation and greater risk and uncertainty. The auction system may provide for moderate gains in new entrants and price discovery but this depends on whether secondary market will function efficiently. The analysis suggests that developing LAPP systems perceived as “fair” while also producing significant entrepreneurial rents is an important challenge.

The qualitative results of the analysis can also be represented if Figure 4.1. Over time rents will increase for the Council’s preferred option due to creation of entrepreneurial rents and reduction in risk and uncertainty. The fixed term/auction alternatives generate less initial rents and rents decrease over time due to the “wasting effects” of the fixed term, decrease in entrepreneurial rents, and greater risk and uncertainty due to the timing and structure of the auction system. As shown by the 5 percent and 20 percent auction curves, the loss of economic rents increases as the auction approaches.

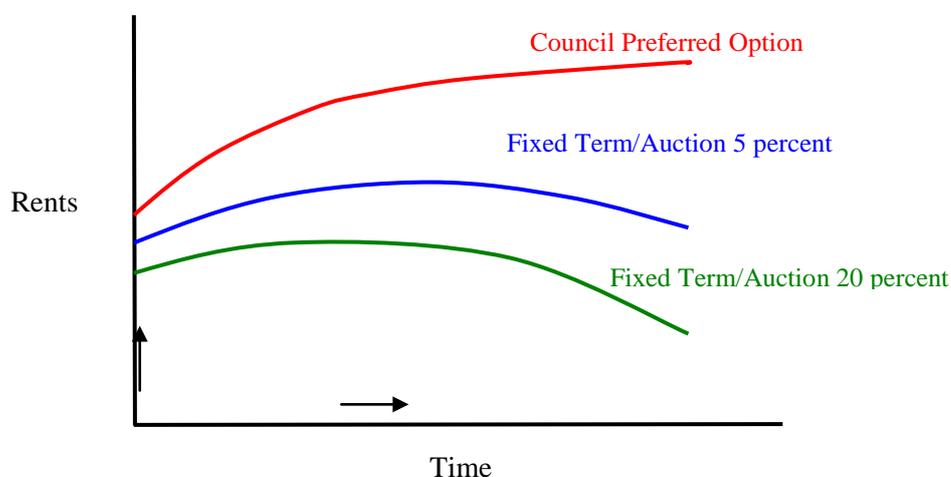


Figure F-1. The level of rents across time as a function of the Council’s preferred option, fixed term/5 percent auction, and fixed term/20 percent auction.

F.4.3 Incentives for Resource Stewardship

The history of the west coast groundfish trawl fishery demonstrates the difficult and sometimes contentious issues associated with conserving stocks and managing anthropogenic effects on marine ecosystems. The Council has made major efforts in managing these effects including mandating MSY stock levels, eliminating trawl roller gear, creating rockfish conservation zones, establishing trawl closure areas, reducing effort through vessel and permit buybacks, and rebuilding overfished stocks. Many of these decisions were difficult and at times wrenching given their economic and social impacts. Some of these efforts were required under the MSA, while others were developed by the Council as the best approach to conserve groundfish stocks and ecosystems.

As discussed in Section 3 and Attachment A, the creation of rights and privileges is expected to generally have a “stewardship effect” if the assets are relatively well defined, have long duration, and are reasonably secure. These features induce asset holders to conserve the stock over time in order to enhance overall profits, increase entrepreneurial rents, and maximize quota (asset) value. Reviews of rights based fisheries in New Zealand, the United States, Canada, and other nations generally provide supporting evidence for conservation and stewardship of the targeted resource and habitats.

Conversely, inadequate stock conservation and protection of supporting habitats and ecosystems could potentially reduce long term profits, rents, and asset values. As Section 3 points out, some analysis believe that even a well designed rights based system may not lead to long term conservation of stocks and ecosystems if fishermen have high rates-of-time-preference (high discount rates) and/or stocks are relatively slow growing and unproductive.

Whether the Council’s preferred option would have stronger stewardship effects relative to the fixed term/auction is partially determined by the types of impacts that the groundfish industry could produce. Most of these effects would not be generated by a single fisherman but would be produced in aggregate by all groundfish trawlers owning assets or annual leases. These impacts would fall into three classes:

- Class I: Adverse resource impacts caused by a user group’s collective “club” good (e.g., groundfish quota holders) which reduces the productivity of the groundfish resource and lowers the asset value of their user privilege. This might take the form of excessively targeting units of the resource important for reproduction and recruitment (e.g., “big fat old females”) or destroying habitats important for spawning and feeding (rocky reefs).
- Class II: Adverse impacts are caused by a second party’s activities (e.g., a second group of fishermen) that reduce the productivity of the resource and lower the asset value of the first group’s property right. This might include fishermen targeting important prey species or damaging the environment through inappropriate use of gear.
- Class III: Adverse impacts are caused by a user group’s activities but do not influence the productivity of the asset-related resource, nor directly lower the asset value of their user right. For example, quota owning trawl fishermen may fish using methods that do not significantly impact the productivity of the commercially targeted groundfish but may adversely impact other aspects of the resource (e.g., excessive bycatch of non quota species).

For class I and II impacts, the groundfish quota holders will have incentives to collectively “internalize” the externalities -- even without direct intervention by the Council -- including voluntary management and enforcement. For Class II impacts, groundfish quota holders would be expected to lobby the Council or use LAPP systems and quota markets (if broadly developed) to alter the behavior of the second party. Class III impacts may require the active leadership, participation, and “coercion” of the Council and regulatory/enforcement bodies in order to alter fishermen behavior.

The remaining part of this analysis is based on the comparative advantages and disadvantages discussed in Section 3 and Attachment A. For the two “stewardship” related issues discussed below we provide a comparative analysis given the fundamental features of the west coast limited entry groundfish trawl fishery.

F.4.3.1 *Stewardship effects of a wasting asset*

Similar to the discussion on rents, the fixed term/auction alternative would have a “wasting asset” effect on quota values due to potentially inadequate investment in stewardship. Assuming that the long term health of the stock and supporting environment has an important positive affect on groundfish asset values, under the preferred option one would expect LAPP groundfish quota holders to invest in voluntary resource conservation, habitat protection, and scientific research leading to improved resources, environments, and asset values. This would be especially true for Type I and Type II impacts. Given the difficult problems associated with bycatch of rebuilding stocks, one would also expect strong investment in conserving and avoiding quota-based “bycatch” stocks. The expected high quota value of bycatch rebuilding stocks, coupled with the high costs of exceeding bycatch quota, would reinforce active stewardship behavior.

In contrast, the fixed term/auction options would induce a “wasting asset” effect, reduce rents and entrepreneurial innovation, and inhibit efforts to reduce Type I and Type II resource and environmental impacts. As time progressed toward the 15th year, incentives for stewardship would decrease, and given the inhibitory effects of the biennial auctions on entrepreneurial rent creation, would decrease conservation investment. The degree of effects could be similar to those illustrated in Figure 4.1.

Two additional points should be noted. The first is that for Type III impacts, neither option would necessarily induce a stewardship effect. Second, is that other tools used by the Council to incentivize or regulate stewardship behavior, combined with market influences to reward stewardship, could somewhat mitigate stewardship differences between the two options. In general, however, relatively secure rights with higher rent creative potentials should induce a stronger stewardship effect than options without these virtues.

F.4.3.2 *Stewardship effect of impacts on discount rates*

As discussed in Section 3 and Attachment A, some analysts argue that the “iron law of the discount rate” favors fixed tenure systems. This “law” suggests that fishermen with high discount rates would under-invest in stewardship regardless of tenure length, particularly for slower growing stocks. Given this problem, they argue that tenure systems coupled with auctions would provide an opportunity for resource managers to adjust the system to better encourage stewardship through improved regulation and incentives for conservation-based participants.

There is, however, little empirical evidence supporting the argument that fishing industries have higher intrinsic discount rates than other sectors of society, particularly with respect to financial activities and investment. It is true that fishermen can be observed engaging in risky and destructive behaviors that put fishery resources at risk. However, these behaviors usually reflect poorly crafted institutions that create open access conditions and race-for-the-resource business strategies. Fishermen reflect their institutions, and apparent destructive behaviors are as much a function of the management system than any inherent high discount rate. In general, poorly regulated or open access fisheries will tend to attract individuals with high discount rates who “prosper” in such systems (at least in the short run). Conversely, well managed fisheries with incentives and rights that motivate entrepreneurship and innovative will tend to attract risk averse fishermen and quota asset holders with lower discount rates. Studies of New Zealand’s rights based fisheries including groundfish (Harte, *et al.* 2008) suggests that implicit discount rates based on the observed ratio of nominal lease and asset

prices are quite reasonable, (8 to 22 percent), particularly given the inherent risk in using and managing marine natural resources.

Given these arguments there is no prior reason to expect that the fixed tenure/auction option will increase stewardship and conservation relative to the Council's preferred option; in fact the converse is probably true. In addition, as a backstop measure, any behavior by fishermen leading to violation of MSA conservation standards would result in the revocation of the privilege or additional regulation constraining harvest activities.

F.4.4 Impacts on Communities

Pacific Management Council staff identify some 38 cities and 18 counties as vulnerable commercial/and or recreational fishing communities. Four cities and six counties are identified as most vulnerable. The cities are: Garibaldi, Ilwaco, Moss Landing, and Neah Bay. The counties are: Coos, Grays Harbor, Humboldt, Lincoln, Mendocino, and Pacific counties (Pacific Fisheries Management Council 2006).

The rationalization of the Groundfish limited entry trawl fishery is anticipated to have the following impacts on communities (Pacific Fisheries Management Council 2008):

- More economically efficient vessels are expected to remain in the fishery, while less efficient vessels leave the fishery. Communities with inefficient vessels or operators may see greater levels of exit behavior.
- Ports that have a higher degree of fishing support business (agglomeration) make it easier and more efficient for operators to conduct day-to-day activities and may favor some communities over other communities.
- All things being equal, communities with vessels that have a longer travel time to fishing ground will be at a disadvantage when compared to other regions.
- Ports that are adjacent to fishing grounds with a high abundance of over-fished stocks subject to rebuilding mandates would also be at a disadvantage encouraging operators to move to areas with lower abundance.

Fixed term privileges and the auctioning of up to 20 percent of Quota Shares every two years will likely have three effects:

- It will exacerbate the disadvantages already faced by communities and ports with vessels that have a long travel time to fishing grounds, have less successful operators, more costly vessels, and fewer support businesses.
- The negative impacts of the fixed term/auction alternative will be felt earlier in the most vulnerable communities compared to less vulnerable communities.
- It will create disincentives for collaborative community initiatives such as the creation of statutory Fishing Communities and Regional Fisheries Associations. These disincentives will be felt more strongly in disadvantaged communities.

These expectations are due to the increased uncertainty associated with both the loss of harvest privileges and the need to have access to sufficient capital to participate in the auction to regain or increase quota share holdings. Operators with marginally profitable businesses are more likely to form a higher proportion of operators in disadvantaged communities. They are more likely to sell their Quota Shares and exit the fishery long before the fixed term duration of the privilege turns it into

a wasting asset. Purchasers of these privileges are more likely to be based in more prosperous fishing communities and have access to the capital necessary to take full advantage of the auction system.

Moreover, fishing communities and ports make infrastructure investments with a 30-plus year time horizon. This is well beyond the proposed 15 year fixed term for quota shares. Disadvantaged communities face a higher degree of uncertainty about future level of participation in the groundfish fishery than other fishing communities and may therefore be more risk adverse when deciding about infrastructure investment. This may result in a declining infrastructure base in disadvantaged communities that is increasingly less attractive compared to other communities. Operators will then be more likely to move to ports and communities with better infrastructure to support their operation.

It can be argued that the fixed term/auction alternative potentially allows operators or port-owned entities in disadvantaged communities to form a cooperative-type entity to bid for quota shares and thus retain fishery participants. The MSA provides for both the creation of formal Fishing Communities and Regional Fishery Associations. However, as long as there are efficient secondary markets in privileges these entities will be able to do this in the absence of fixed term privileges and auctions. Cooperative entities will also still face competition in auctions from operators and entities based in more prosperous communities. Irrespective of an efficient secondary market for privileges and the opportunity to acquire quota shares through auction, the loss of up to 20 percent of quota shares every two years may also create major disincentives for any operator, community or port to enter into a cooperative arrangement. This is because of the need for ongoing funds required to sustain the cooperatives' overall holding of privileges. These disincentives become larger the greater the size of the quota takeback.

The Management Council's preferred option contains an Adaptive Management provision. This creates a potential mechanism to assist disadvantaged fishing communities by setting aside 10 percent of the Quota Poundage each year to create incentives for community development, among other purposes. If used to assist communities to remain viable competitive ports, the imposition of fixed term/auction alternative in 15 years could undermine the adaptive management program. This is because the increased uncertainty created by the fixed term/auction alternative disproportionately impacts disadvantaged communities undermining potential gains from the adaptive management program.

F.5 Analysis of Fixed Term/Auction Option versus Council's Preferred Option: Management Goals and Objectives

This section first evaluates the Council's preferred option against the fixed term/auction option with respect to key management goals and objectives for the West Coast Groundfish Trawl Fishery. This evaluation is informed by discussion and analysis in Sections 3 and 4. The goals and objectives for Groundfish Management and Groundfish Rationalization are listed in Chapter 1 of the main document. Second, the section qualitatively scores the relative strengths and weaknesses of the fixed term/auction against the preferred option in Table 4.1. It concludes with a brief discussion of key findings.

F.5.1 Conservation (also see Section 4)

The Council's preferred option provides greater incentives to conserve resources, habitats, and ecosystems than the fixed term/auction alternative. Due to wasting effects, reduction in entrepreneurial rents, and greater risks and uncertainty, the fixed term/auction alternatives significantly reduces resource and habitat conservation efforts over time. Although auctions could be designed to reward conservation efforts, this would be at potentially high costs in lost economic efficiency. There is no evidence that fishermen or quota holders have intrinsically high discount rates that would inhibit them from investing in habitat and resource conservation efforts having moderate or long pay back periods. Class III type environmental impacts may not result in environmental or conservation efforts for either option but would require Council regulatory action and enforcement

including revocation of LAPP privileges. The negative impacts are greater with the 20 percent relative to the 5 percent auction.

F.5.2 Net Economic Benefits (also see Section 4)

The Council's preferred option relative to the fixed term/auction results in significantly higher rents and net economic benefits through incentives for entrepreneurial innovation, rent creation, and reduction in risk and uncertainty. In contrast the fixed term/auction alternatives generate less rent due to the disincentives for rent creation and greater risk and uncertainty. Net economic benefits are lower with the 20 percent auction option relative to the 5 percent.

The auction system may provide for moderate gains due to price discovery and rebalancing price asymmetries but this depends on whether secondary market will function efficiently. The analysis suggests that developing LAPPS systems perceived as "fair" while also producing significant entrepreneurial rents is an important challenge.

F.5.3 Disruption

Compared to the Council's preferred option, the fixed term/auction option will cause significant disruption to the fishing, marketing procedures, and the environment. This is because of the uncertainty that the loss of up to 20 percent of privileges introduces to harvest plans, processing volumes and marketing agreements. It also undermines the operators' potential commitment to the long term sustainability of the fishery and industry. The disruption could take three forms compared to the preferred option:

- Barriers to long term beneficial investments and partnerships because of the uncertainty created by the pending auction.
- Non-productive rent seeking behavior by sector participants in advance of the fixed term expiration and auction to 1) prevent its implementation 2) to gain strategic advantage to minimize losses from the auction processes and/or) maximize individual gains at the expense of the sector as a whole.
- Disruption to existing harvesting, processing and marketing plans following the auction as some operators fail to replace quota, others gain it and new entrants learn about the fishery and sector.

Though it is possible to predict the severity of this disruption, there is no possibility of these disruptions under the preferred option unless they come about from economic or environmental factors exogenous to the Limited Access Privilege Program.

F.5.4 Excessive shares

With respect to excessive shares there is unlikely to be a net difference between the Council's preferred option and the fixed term/auction alternative. This is because the accumulation limits (vessel and control) apply under both options. Operation of secondary markets in Quota Shares will create the same conditions affecting consolidation and quota concentration as an auction. The proposed accumulation limits should prevent any tendency for excessive geographic or consolidation occurring in either the harvesting or processing sector.

F.5.5 Fairness and Equity

A fixed term/auction system could promote fairness and equity through:

- The operation of a transparent and competitive allocation mechanism.
- Returning a share of the rents generated from the exclusive use of a public resource.

Nevertheless, existing inequities with respect to fishing community wellbeing, market position and access to capital could be exacerbated with an auction system leading to a bigger gap between the best performing operators and communities and the poorer performer operators and their communities. On balance the larger the takeback of quota shares the larger the potential for negative impacts on fairness and equity in the groundfish fishery.

F.5.6 Sector Health

The Council's preferred option would promote greater sector health than the fixed term/auction alternatives. The preferred option would promote significantly greater efficiency, resource and habitat conservation, and reduced risk and uncertainty to the harvesting and processing sectors and the service sectors that support them. Quota holders would be expected to develop "optimal" portfolios of quota that met specific business needs. Harvesters and processors would be encouraged to develop long term relationships based on dependable quotas to address market needs and opportunities. Communities and ports could engage with harvesters, processors, and other quota holders to develop long term arrangements and contracts that "underwrite" community investment in critical fishing and seafood industry infrastructure.

F.5.7 Community (also see Section 4)

Overall, communities and disadvantaged communities will be no better off under the fixed term/auction duration compared to the Council's preferred alternative, and disadvantaged communities could be significantly worse off vis-à-vis more prosperous fishing communities.

- It will exacerbate the disadvantages already faced by communities and ports with vessels that have a long travel time to fishing grounds, have less successful operators, more costly vessels, and fewer support businesses.
- The negative impacts of the fixed term/auction alternative will be felt earlier in the most vulnerable communities compared to less vulnerable communities.
- It will create disincentives for collaborative community initiatives such as the creation of statutory Fishing Communities and Regional Fisheries Associations. These disincentives will be felt more strongly in disadvantaged communities.

F.5.8 Labor: Captains, Crew and Processing Plant Workers

The Council's preferred option contains provisions for an adaptive management program and secondary markets in Quota Shares and Quota Poundage will also operate giving labor opportunities for greater ownership of privileges in the fishery. The limited term/auction option although potentially increasing the availability of quota to captains and crew will also result in the loss of quota shares to operators and captains and crew already holding shares. This could negatively impact captains and crew both directly through the loss of quota they have already acquired and indirectly if the vessels they captain or crew lose access to quota.

Processing staff workers may see lower wages and less secure jobs because of the uncertainty generated by the fixed term/auction system. Because no processing company can predict the outcome of the auction process with up to 20 percent of quota shares changing hands, winners and losers from the auction process will be equally impacted by the uncertainty created by the auction process.

Impacts of a fixed term/auction system on vessel safety are difficult to anticipate relative to the Council's preferred option. A Limited Access Privilege Program generally has positive impacts on vessel safety because it ends the race to fish. A fixed term/auction system may reduce these anticipated benefits because:

- Increased uncertainty may delay or stop investment in new vessels and gear which may be safer to operate.
- Prior to an auction, operators may fish harder to make sure they have no uncaught quota poundage if there is the possibility of losing access to the poundage the following season.

All of the potential impacts to labor are sensitive to the size of the auction and associate loss of quota from existing portfolios. The closer the auction to the proposed 20 percent quota share maximum, the greater the impact will be.

F.5.9 Small Entities and New Entrants

Due to the more limited access to capital and the smaller quota holdings, smaller entities are in a more disadvantaged position compared to larger entities under the fixed term/auction option. In particular small entities are potentially more vulnerable to the consequences of being outbid in the auction process and therefore losing up to 20 percent of their harvest privileges. This disruption of their quota portfolio could lead to an unviable business, causing them to exit the fishery and cash in their remaining quota shares. Small entities will be especially impacted by high prices for constraining stocks. Constraining stocks may have a low exvessel price but a high quota value because the availability of quota poundage or quota shares is limited because they are a constraint on the harvest of stocks with a higher exvessel price.

An auction does provide opportunities for new entrants but small-owner operators are likely to be a small minority of new entrants. Moreover, the functioning of an efficient secondary market for quota shares should provide an ongoing opportunity for new entrants to the fishery and only in the case of thin markets would an auction greatly assist new entrants.

The larger the take-back and the amount of quota auctioned each year the greater the impact on small entities and new entrants. For nonconstraining stocks the larger the auction of quota the potential for new entrants increases. At the same time a larger takeback may severely impact small entities that could end up with quota share holdings too small to fish themselves, forcing them to lease quota or exit the fishery. For constraining stocks the effects on small entities could be significant at even relatively low auction percentages.

Although auctions could provide for more efficient entrants, this may not be the case for the trawl fishery for two reasons: 1) the west coast groundfish fishery undertook a self financed buy out program that eliminated 40 percent of the fishing vessels -- theoretically this should have eliminated less efficient fishing firms; and 2) the auction occurs after 15 or 16 years of trading on the secondary market which, if operating reasonably successfully, should also function to eliminate inefficient firms.

F.5.10 Auctions and Cost recovery

The Council's preferred option provides for cost recovery of up to 3 percent of ex-vessel costs for program costs but does not provide for a system to collect royalties. This raises the question of whether or not the collection of royalties is a high priority for the Council. If it is, then the fixed/term auction option is superior to the Council's preferred option. However, there are many royalty collection mechanisms that could be built into the preferred option without the need to resort to an auction. As discussed previously, setting the level of rent extraction through a royalty mechanism is fraught with difficulty. Set too high and the mechanism may reduce rents in a fishery as it acts as disincentive to innovation, investment and entrepreneurship.

Given that any royalties collected go into the Limited Access Administrative Fund and are then made available by appropriation, there is no guarantee that this revenue will be available to promote fisheries management in the Council's management area. Royalties are a transfer payment and therefore provide no net gain to the nation but are a potential loss to the region. Moreover by

removing beneficial resource rents from the industry it reduces the capital available for reinvestment in the seafood or other wealth creating economic sectors in the region.

F.5.11 Program Performance and Management

Compared to the Council's preferred option, the fixed term/auction alternative potentially imposes significant additional administrative costs on the Management Council. Not only will an effective auction system need to be designed, set up, and operated but an administrative system must be established for taking back up to 20 percent of quota across multiple stocks and multiple owners. Outsourcing this task to the private sector could reduce administrative complexity but will still require significant regulatory oversight.

Fixed duration privileges can create the appearance of increased management flexibility because the system can be changed on the expiry of rights. However in practice, groundfish management is always under review. This means any issues arising from the Limited Access Privilege Program based system will be identified and regulations and policies changed in response.

F.5.12 Summary

Results of the qualitative comparative analysis are shown in Table 5.1. The Table highlights the relative impacts with respect to key groundfish management goals, objectives, and standards (GOS). Results demonstrate that:

- For major conservation objectives the Council's preferred option outperforms the fixed term/auctions. The lower conservation performance of the alternative option is due to the fixed term "wasting effects" and disincentives stemming from the auction's effects inhibiting conservation investment. Information effects and impacts on nongroundfish mortality are considered similar due to Type III environmental impacts.
- Net benefits and efficiency are all considered to be significantly lower for the fixed term/auction option. This is a result of the wasting effects of the fixed term, the rent creation inhibiting effects of the auction, and greater risk and uncertainty. The 20 percent auction impacts are significantly greater than the 5 percent effects.
- The fixed term/auction option will cause significant disruption to fishing and marketing strategies, and the broader business environment. This is because of the uncertainty that the loss of up to 20 percent of privileges introduces to harvest plans, processing volumes and marketing agreements. It also undermines the operators' potential commitment to the long term sustainability of the fishery and industry.
- With respect to excessive shares there is unlikely to be a net difference between the Council's preferred option and the fixed term/auction alternative. This is because the accumulation limits (vessel and control) apply under both options.
- Fairness and inequities with respect to fishing community wellbeing, market position and access to capital could be exacerbated with an auction system leading to a slightly bigger gap between the best performing operators and communities and the poorer performing operators and their communities. There would be no expected difference between the Council's preferred option and the fixed term 5 percent auction.
- The Council's preferred option would promote greater sector health than the fixed term/auction alternatives. The preferred option would promote greater efficiency, resource and habitat conservation, and reduced risk and uncertainty to the harvesting and processing sectors and the service sectors that support them. Year round marketing would be similar under both options.

Table F-1. Benefits and cost of fixed term/auction option compared to the Council’s preferred auction.

Assessment Criteria	Criteria reference	Benefits (+) & Costs (-) of Fixed Term/Auction Option Compared to the Council’s Preferred Auction	
		Magnitude of difference	
		0 No difference - or + Low -- or ++ Moderate --- or +++ High	
		5% Auction	20% Auction
Conservation			
Allocations calculated to promote conservation	MSA - National Standard 4(b)	-	--
LAPPs shall assist in rebuilding overfished species	MSA 303A(c)(1)(A)	-	--
LAPPs shall promote fishery conservation and management	MSA 303A(c)(1)(C)(ii)	-	--
Maintain an information flow on the status of the fishery... as the fishery occurs	GF FMP Objective 1	0	0
Reduce nongroundfish mortality	GF FMP Objective 4	0	0
Minimize adverse impacts on EFH	GF FMP Objective 5	-	--
Total catch accounting; Reduce bycatch, discard mortality, and ecological impacts	A-20 Objective 1 & 3	-	--
Net Benefits and Efficiency			
Consider & provide for a[n] . . . efficient groundfish fishery	MSA - National Standard 5, A-20 Objective 6	--	----
Contribute to reducing capacity	MSA 303A(c)(1)(B)	-	--
Attempt to achieve the greatest net economic benefit to the nation	GF FMP Objective 6	--	----
Maximize the value of the groundfish resource as a whole	GF FMP Goal 2	--	----
Promote measurable economic benefits	A-20 Objective 6	--	----

Table F-1 continued

Assessment Criteria	Criteria reference	Benefits (+) & Costs (-) of Fixed Term/Auction Option Compared to the Council's Preferred Auction	
		Magnitude of difference	
		0 No difference - or + Low -- or ++ Moderate --- or +++ High	
		5% Auction	20% Auction
Disruption			
Accomplish change with the least disruption of current domestic fishing practices, marketing procedures, and the environment	GF FMP Objective 14	--	---
Excessive Shares			
No particular individual, corporation, or other entity [shall] acquire an excessive share of privileges	MSA - National Standard 4(c)	0	0
Address concerns over excessive geographic or other consolidation in the harvesting or processing sectors of the fishery	MSA - 303A(c)(5)(B)(ii)	0	0
Fairness and Equity			
Allocation shall be fair and equitable to all fishermen	MSA - National Standard 4(a)	0	-
Issue privileges to persons who substantially participate in the fishery (as specified by the Council)	MSA - 303A(c)(5)(E)	0	-
Avoid provisions where the primary intent is a change in marketing power balance between harvesting and processing sectors	A-20 Constraint 5	0	0

Table F-1 continued

Assessment Criteria	Criteria reference	Benefits (+) & Costs (-) of Fixed Term/Auction Option Compared to the Council's Preferred Auction	
		Magnitude of difference	
		0 No difference - or + Low -- or ++ Moderate --- or +++ High	
		5% Auction	20% Auction
Sector Health			
Provide for a viable, profitable . . . groundfish fishery	A-20 Objective 2	--	---
Promote measurable economic . . . benefits through the seafood catching, processing, distribution elements, and support sectors of the industry	A-20 Objective 6	--	---
Maximize the value of the groundfish resource as a whole	GF FMP Goal 2	--	---
Promote year-round marketing opportunities and extend those opportunities as long as practicable during the fishing year	GF FMP Objective 7	0	0
Avoid unnecessary adverse impacts on small entities	GF FMP Objective 15	-	--
Labor: Captains, Crew, & Processing Plant Workers			
Assist... entry-level and small vessel owner operators, captains, crew... through set-asides of allocations... or economic assistance in the purchase of quota	MSA - 303A(c)(5)(C)	-	---
Promote measurable... employment benefits through the seafood catching, processing, distribution elements, and support sectors of the industry	A-20 Objective 6	0	-
Promote the safety of human life at sea	MSA - National Standard 10 GF FMP - Objective 17	0	-

Table F-1 continued

Assessment Criteria	Criteria reference	Benefits (+) & Costs (-) of Fixed Term/Auction Option Compared to the Council's Preferred Auction	
		Magnitude of difference	
		0 No difference - or + Low -- or ++ Moderate --- or +++ High	
		5% Auction	20% Auction
Communities			
Consider importance of fishing to communities in order to provide sustained participation and to minimize adverse impacts	MSA - National Standard 8 GF FMP Objective 16 A-20 Objective 5	-	--
Consider basic cultural and social framework of the fishery.	MSA 303A(c)(5)(B) -	-	-
Include measures to assist, when necessary and appropriate... fishing communities through set-asides of harvesting allocations... or economic assistance in the purchase of quota	MSA 303A(c)(5)(C) -	-	--
Small Vessels, Small Entities, and New Entrants			
Promote sustained participation of small owner-operated fishing vessels	MSA 303A(c)(5)(B)(i) -	--	---
Include measures to assist, when necessary and appropriate, entry level and small vessel owner-operators . . . through set-asides of harvesting allocations... or economic assistance in the purchase of quota	MSA 303A(c)(5)(C) -	0	-
Avoid unnecessary adverse impacts on small entities	GF FMP Objective 15	-	---
Auctions and Cost Recovery			
Auctions, or other systems to collect royalties, shall be considered for initial or any subsequent allocation	MSA - 303A(d)	++	+++
Assess and provide a program of fees paid by the quota holders that will cover the costs of management, data collection and analysis, and enforcement activities	MSA - 303A(e)	0	0

Table F-1 continued

Assessment Criteria	Criteria reference	Benefits (+) & Costs (-) of Fixed Term/Auction Option Compared to the Council's Preferred Auction	
		Magnitude of difference	
		0 No difference - or + Low -- or ++ Moderate --- or +++ High	
		5% Auction	20% Auction
Program Performance Monitoring and Modification			
Take into account the management and administrative costs of implementing and overseeing the IFQ or co-op program and complementary catch monitoring programs, and the limited state and federal resources available.	A-20 Constraint 9	--	--
Regular review and monitoring of the program for progress in meeting the goals, 5 year formal review	MSA 303A(c)(1)(G) -	0	0
Privileges may be revoked, limited or modified at anytime. Provide for revocation	MSA 303A(b)(2), MSA 303A(c)(1)(K) -	0	0

- The limited term/auction, option although potentially increasing the availability of quota to captains and crew, will also result in the loss of quota shares to operators and captains and crew holding shares. The 20 percent auction will have only small negative effects on labor and plant workers' employment benefits and safety.
- Fixed term privileges and the auctioning of up to 20 percent of Quota Shares every two years will likely have negative effects on communities by exacerbating the disadvantages already faced by communities and ports, disproportionately impacting vulnerable communities, and creating disincentives for long term collaborative community initiatives with fishermen, processors, and quota holders.
- Due to the more limited access to capital and the smaller quota holdings, smaller entities are in a more disadvantaged position compared to larger entities under the fixed term/auction option. In particular small entities are potentially more vulnerable to the consequences of being outbid in the auction process and therefore losing up to 20 percent of their harvest privileges.
- Both alternatives collect cost recovery fees to pay for administering the LAPP program. If collection of royalties is a priority or objective for the Council, then the fixed/term auction option is superior to the Council's preferred option.
- Compared to the Council's preferred option, the fixed term/auction alternative potentially imposes significant additional administrative costs and program performance monitoring costs on the Council. Not only will an effective auction system need to be designed, set up, and operated but an administrative system must be established for taking back up to 20 percent of quota across multiple stocks and multiple owners.

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