

**Title:** Costs and Benefits of Community Protection Measures in the Alaskan Halibut ITQ Program  
Marysia Szymkowiak  
11.30.2013

**Background/Introduction:**

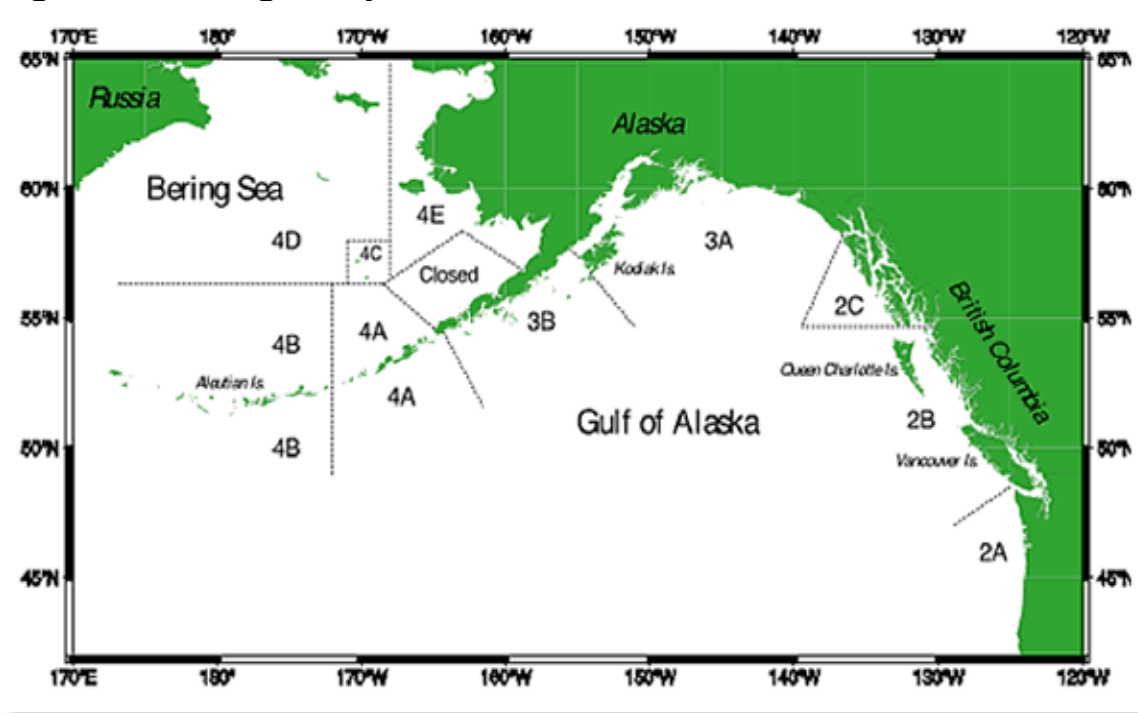
Rights-based management programs are becoming an increasingly popular tool for fisheries managers in the U.S. and throughout the world. These programs can facilitate achieving both biological goals – meeting, but not exceeding the TAC - and socioeconomic goals – decreasing overcapacity and increasing efficiency in the fishery. Rights-based fisheries management programs allocate to fishermen a guaranteed portion of the annual TAC. Fishermen then have the incentive to optimize the value of this share, leading to more economically efficient behavior. Because less efficient operators will find it more profitable to sell or lease their shares, they will tend to leave the fishery and overcapacity in the fishery will decrease. This exodus can have negative impacts on some fishermen and communities, as vessels and their associated employment leave the community.

Rights-based management programs often include provisions to protect various stakeholders and fishing communities from some of the potentially adverse impacts of implementing this type of management scheme. For example, the effects of consolidation in the fishery, a common result of rights-based programs, can have negative socioeconomic impacts on some stakeholders and communities. To mitigate these impacts managers will develop provisions that restrict the trade of quota shares based on geography, vessel size, or gear type, that mandate landings in certain communities, that provide direct allocations to communities, that set aside a percentage of the annual total allowable catch for social programs, etc. There are costs associated with these measures, however, as they restrict the rights of the shareholder, and thereby his capacity to maximize the value of his shares. These costs are in terms of the lost potential economic efficiency gains that could be had with unrestricted rights. In implementing these types of provisions, managers have to balance these costs against the expected benefits to the intended targets of the protections.

Although the effects of rights-based management programs have been the focal point of numerous studies, there is a limited amount of literature that discusses the impacts of specific provisions contained within such programs. However, as fisheries managers increasingly utilize rights-based programs to achieve biological, economic, and social goals, there is a critical need for an understanding of how particular provisions in existent programs have worked towards achieving their goals. The following group of essays will address this gap by exploring the impacts of these kinds of provisions in the Alaskan halibut ITQ program, in order to inform management prescriptions in future iterations of ITQ programs.

The halibut ITQ program<sup>1</sup> was implemented in 1995, with eight management areas (Areas 2C, 3A-B, and 4A-E)<sup>2</sup> (See Figure 1) and four vessel classes (one freezer vessel class, and three subcategories of catcher vessels delineated on the basis of vessel length (greater than 60 feet, 36 to 60 feet, and under 35 feet)). Quota shares (QS) in the program are allocated by vessel class-area combination, with no transferability between areas or vessel classes. The ITQ program was developed in response to increasing overcapacity, overharvesting, and derby-style fishing in the halibut fishery. Participation in this fishery had been increasing in the decades prior to its implementation for several reasons: 1) proximity to shore makes the species particularly easy to catch, 2) implementation of limited entry programs in salmon fisheries and 3) decreases in crab stocks both meant fishermen were looking for a substitute fishery. The first two points were also reasons for increasing participation of small vessels, while the third meant an influx of larger vessels.

**Figure 1: IPHC Regulatory Areas**



In developing the halibut ITQ program, the North Pacific Fishery Management Council focused on incorporating provisions targeted towards maintaining diversity in the fleet, minimizing adverse impacts on coastal communities, and limiting consolidation. Amongst these provisions are allocations that are specific to a vessel class-area designation with no transferability between either areas or vessel classes, individual and vessel use caps, quota blocks for QS below a certain size which could only be transferred as a block (with limits on the number of blocks that can be

<sup>1</sup> The halibut ITQ program is part of the halibut/sablefish ITQ program. The program was initially developed for sablefish alone, and the halibut component is based on the prototype developed for the sablefish fishery. Halibut was added because fishermen tend to be active in both fisheries.

<sup>2</sup> Area 2A is managed by the states of California, Oregon, and Washington, and area 2B is in Canadian water.

owned), and a general prohibition on leasing QS. Although subsequent amendments attenuated the block quota provisions, the other measures have remained largely intact.

The following set of essays will explore both the costs and the benefits of these provisions in the Alaskan halibut ITQ program. Although the costs and benefits are not directly comparable, as they are estimated in different metrics and are not borne by the same parties (losses in economic efficiency being borne by society as a whole and the benefits in job maintenance and the associated multiplier effect occurring at a micro level), presenting the impacts of the community protections measures in terms of their costs and benefits provides managers with an appropriate paradigm for exploring these provisions. The essays will also aim to explore other potential ways that managers could achieve their desired objectives, without having to limit the rights of the shareholders and thereby decrease the economic efficiency gains that can be had with a rights-based management program. Although the costs and benefits may not be directly comparable, the essays will serve to quantify the costs of one restriction in the program and to assess the impacts of two other provisions, all of which were designed to protect certain stakeholders and communities in the fisheries and to maintain fleet diversity. This analysis will serve to address several key issues for managers who are utilizing these types of protectionist provisions: whether the costs are comparable to the value of providing protections for the intended beneficiaries, whether the impacts are on target with the desired objectives, and whether there are other mechanisms by which managers can achieve these goals.

## Essay 1

**Title:** An assessment of the costs of quota share trading restrictions in the Alaskan Halibut ITQ Program

**Purpose:** The Alaskan halibut ITQ program includes 4 vessel categories and 8 management areas resulting in 32 quota share (QS) markets with no QS trading between the markets. The purpose of this case study of the Alaskan halibut ITQ program is to provide both an estimate of how QS trading restrictions affect the generation of rent (total revenue minus total cost) and a general linear programming (LP) model that can be applied to other fisheries for a quick estimate of the costs of similar restrictions. Using LP, this study will estimate the costs, in terms of lost potential rent, of restricting trade between vessel classes in the Alaskan halibut ITQ program and identify which vessel class-area designations would likely purchase the QS under loosened restrictions.

Numerous other ITQ programs include similar provisions that restrict QS trading between geographic areas, vessel sizes, or gear types. There is, therefore, wide applicability for assessing the costs of QS trading restrictions in a rights-based management program. For example, in Norway's coastal fleet fishery, where individual vessel quotas are assigned to specific vessels, quota can only be transferred within the county where the vessel is registered (Hannesson, 2013). Furthermore, quota is not transferable between gear sectors or vessel size classes (Hannesson, 2013). In the Nova Scotia Mobile Gear fishery, during the fishing season IFQ transfers are generally restricted to vessels of the same gear type, but out-of-season transfers are not subject to the same restrictions (Kroetz and Sanchirico, 2010). Leasing across gear sectors was also prohibited in Australia's Southeast Trawl Fishery in the first several years of the ITQ program, but the ban was lifted in 1998 (Sanchirico, 2006). Numerous management areas with restricted trading across areas exist in the BC IVQ Trawl fishery and New Zealand, the latter of which has over 500 fishing quota markets (Sanchirico, 2006).

There is a vast amount of literature on the impacts of ITQ programs in general and on specific communities and stakeholders, but the literature on the impacts of specific provisions in the programs, though growing, remains relatively small. However, several studies have been conducted to evaluate the effects of various restrictions on ITQ owners. Dupont (2000) conducted an ex-ante study of inter-sector trading restrictions in the British Columbian salmon fishery, with estimated annual economic losses of \$1million. Lian et al. (2008) estimated the losses of limiting trading in the West Coast groundfish fishery at 10% of the reduction in costs that could be expected with the implementation of an ITQ program. Others have looked at the impacts of allowing trading of quota between species groups (Anderson & Bogetoft, 2007), attenuating vessel length restrictions (Grafton et al, 2000), and accumulation limits (Lian et al., 2008). Wilen and Brown (2000) evaluated the economic impacts of the "blocking" provisions in the Alaskan halibut fishery, which minimize the divisibility of QS holdings that are less than 20,000 pounds, a restriction implemented to ensure that smaller portions of quota will

always be available on the market. Sanchirico and Krotez (2010) provide an overview of these studies and look at the potential impacts of restricting inter-sector trading or eliminating a particular sector from the ITQ program in the West Coast groundfish fishery.

This study will provide managers with both an estimate of the costs of QS trading restrictions in the Alaskan halibut ITQ program and a general context for discussing the impacts of such provisions in other catch share programs. In generating estimates of a community protection provision, this study will add to a limited body of literature on the costs of restrictions in catch share programs. Since numerous rights-based programs around the world include similar provisions, there is wide application for this discussion.

**Approach/Method:** This study will utilize linear programming to assess the costs of QS trading restrictions between vessel classes in the Alaskan halibut ITQ program. Linear programming (LP) is a tool, which allows manipulation of the QS market to optimize the rent that can be generated. It allows for estimating the highest rent possible under different trading scenarios. QS trade restrictions are simulated as constraints in the LP models, with the maximized objective function representing the rent generation possible under these trading scenarios.

The goal of a LP problem is to optimize (maximize or minimize) an objective function. In this study, LP is used to see how rent generation, which is the objective function to be maximized, changes under different QS trading scenarios, simulated as constraints in the models. This will be the estimated cost, in terms of the lost potential rent, of restricting QS trading between vessel classes in the Alaskan halibut ITQ program. Also, because the LP models redistribute the QS in order to maximize the objective function, the solutions to the LP models will demonstrate which vessel classes would benefit from the QS redistribution (or, which classes would buy the QS if the trading restrictions were lifted).

The LP models simulate two QS trading scenarios: 1) the current condition of restricting trading between vessel classes and between areas, and 2) a loosened trading scenario under which trading is allowed between vessel classes within areas. The LP models are set up such that they provide a corner solution to the problem of maximizing the possible rent in the halibut ITQ fishery. That is, the models reallocate the harvest of all vessel classes in an area to the vessel class with the highest QS price for that year. The solutions from these LP models will have to be presented with numerous caveats as this kind of corner solution likely gives the upper bounds for the rent that can be generated when QS trading restrictions between vessel classes within areas are loosened. The models may also be revised to include the capacity limits of the vessel classes within areas and/or QS demand curves such that QS prices change with the amount of QS made available on the market. The models will be run for the last five years for which data is available to look at how the potential rent in the fishery could change over time, to see how the redistribution of the TAC would change based on inter-annual differences in the QS

trading prices, and to serve as a test for the results of the models (with the assumption that the inter-annual differences in the rent that could be generated should not be very large).

The data for this study comes from the halibut QS transfer report published by the Restricted Access Management office in Juneau. The report provides both the QS transfer prices and the harvests by vessel class-area combination (a proxy for the TAC by vessel class-area combination since over 95% of the TAC is harvested). The QS transfer prices will be discounted to the present to estimate QS lease prices, which will be applied in the LP models to estimate the current rent that could be generated in the fishery.

There may be some issues associated with the QS lease prices used in the models. First, since the start of the program there have been some changes in the reporting formats for QS transfers. Therefore, there may be some inconsistencies in the QS transfer prices over time. In order to address this, I will be using data from 2000 to 2010, when the reporting became more standardized. Second, the QS transfer prices are self-reported, which can lead to misreporting and error. For example, there have been some issues associated with fishermen including brokerage fees in the recorded transfer prices. Third, the QS lease prices estimated from these QS transfer prices may be inaccurate due to the assumptions used in discounting. That is, the factors affecting the lease price – the ex vessel price of halibut, the TAC, and the marginal cost of fishing – are held constant in the model. In reality, all three of these factors have changed over time.

**Reference List:**

Hartley, M., Fina, M., 2001. Changes in fleet capacity following the introduction of individual vessel quotas in the Alaskan Pacific halibut and sablefish fishery. In: Shotton, R. (Ed.), Case Studies on The Effects of Transferable Fishing Rights on Fleet Capacity and Concentration of Quota Ownership. FAO Fisheries Technical Paper No. 412. FAO, Rome: 186-207.

McCay, B.J. 1995. Social and ecological implications of ITQs: an overview. *Ocean and Coastal Management* 28 (1-3): 3-22.

Sanchirico, James N., and Kailin Kroetz. 2010. "Economic Insights into the Costs of Design Restrictions in ITQ Programs," Resources for the Future Report, Available online:  
<http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=21008>

U.S. GENERAL ACCOUNTING OFFICE. 2004. Individual Fishing Quotas: Methods for Community Protection and New Entry Require Periodic Evaluation. GAO-04-277.

Wilén, J.E. and G.M. Brown. 2000. Implications of various transfer and cap policies in the halibut charter fishery. Seattle: National Marine Fisheries Service, Fishery Science Center.

**Target Journals:**

*Marine Resource Economics*

a) aim and scope: <http://marineresourceeconomics.com/page/authors>

b) guidelines for submission: <http://marineresourceeconomics.com/page/authors>

*Natural Resource Modeling*

a) aim and scope:

<http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291939-7445/homepage/ForAuthors.html>

b) guidelines for submission:

<http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291939-7445/homepage/ForAuthors.html>

*ICES Journal of Marine Science*

a) aim and scope: [http://www.oxfordjournals.org/our\\_journals/icesjms/about.html](http://www.oxfordjournals.org/our_journals/icesjms/about.html)

b) guidelines for submission:

[http://www.oxfordjournals.org/our\\_journals/icesjms/for\\_authors/index.html](http://www.oxfordjournals.org/our_journals/icesjms/for_authors/index.html)

## Essay 2

**Title:** An assessment of the efficacy of the owner-on-board requirement in the Alaskan Halibut ITQ Program

**Purpose:** In general, in developing the halibut IFQ program, the NPFMC tried to ensure the maintenance of the social and cultural framework of the fishery by incorporating protectionist provisions into the program. Amongst the numerous provisions incorporated within the program to protect its diverse fleet and historically fishery-dependent coastal communities is a limitation on the use of hired skippers. Hired skippers come on board a QS holder's vessel to fish that QS holder's IFQ, without the QS holder being present. The program allows individual initial issuees in all areas but 2C to hire skippers to fish their IFQ. The exception for 2C was developed to maintain this area's historically owner-operated fleet and to provide for ease of entry into the fishery. This study assesses the impacts of this provision, in terms of achieving its goals, by demonstrating how the characteristics of the fleet in 2C would change if this hired skipper restriction were not in place, using a predictive model developed from the impacts within the other IFQ areas.

One of the key components of the halibut IFQ program has been the use of hired skippers. Only initial issuees (both individuals and non-individuals) in the IFQ program are allowed to employ skippers to harvest their IFQ; new entrants have to harvest their own IFQ. The Council implemented the provision limiting the use of hired skippers to ensure that the fishery will ultimately transition to a full owner-operator fleet (and that the QS would not be bought up by investment speculators), while giving initial participants the latitude to continue the business practices they had had prior to the implementation of the IFQ program. It was also intended to facilitate entry into the fishery, by ensuring that aging skippers had to retire from the fishery rather than lease their quota.

In addition to the restrictions on the use of hired skippers, the Council ensured that the fishery would eventually transition to an individually-owned fishery by restricting the acquisition of QS by non-individuals. Non-initial issuee non-individuals essentially cannot enter the fishery, because they cannot purchase QS. This provision ensured that eventually, through attrition, all non-individual entities would be eliminated from the fishery. In area 2C non-individual entities are also prohibited from acquiring more QS by transfer. This prohibition was implemented to maintain the competitive position of owner-operator operations in 2C. Although this study will only look at the impacts of the hired skipper provision on individuals in area 2C, it is important to keep in mind these other regulatory restrictions in the modeling of hired skipper use.

In all IFQ areas but 2C all initial individual issuees may, and non-individual issues must, hire skippers to fish their IFQ. In area 2C only non-individual initial issuees



are allowed to use hired skippers.<sup>3</sup> Additional restrictions were placed on Area 2C because the fleet in this area was (and is) significantly owner-on-board with smaller crews. In addition, fishermen in 2C organized themselves and formed the Alaska Longline Fishermen's Association (ALFA), which under the direction of organizer and Executive Director Linda Behnken, who served on the NPFMC from 1992 to 2001, pushed for these special provisions for 2C. These members actively sought to maintain the owner-operator characteristic of their fleet and to ensure opportunities for new entrants into the fishery, by limiting the use of hired skippers in Southeast Alaska (Hired Skipper RIR, 2011).

In summary, there are six groups of persons that were afforded different privileges under the halibut ITQ program, with regards to purchasing QS and hiring skippers – individual initial issuees in Area 2C, individual initial issuees in areas 3A through 4D, individual new entrants, non-individual initial issuees in 2C, non-individual initial issuees in areas 3A through 4D, and non-individual new entrants. Individuals in area 2C can buy more QS but cannot hire skippers. Individuals in areas 3A through 4D can buy more QS and hire skippers. New individuals (non-initial issuees) can enter the fishery, but cannot hire skippers, in all areas. All non-individual initial issuees must hire skippers. Non-individuals in 2C cannot buy more QS. Non-individuals in the other areas can buy more QS.<sup>4</sup> No new non-individuals can enter the fishery in any area.

**Approach/Method:** One way of evaluating the effectiveness of the hired skipper provision is to measure how closely the outcomes of the program align with the policy makers' stated goals of maintaining an owner-operator fleet and providing for new entry into the fishery. Although there is no baseline condition in Area 2C against which the impacts of these provisions can be tested, because they were implemented simultaneously with the ITQ program, the evolution of the fleets in the other areas, where these provisions are not in place, can serve to inform how the fleet in 2C would look in the absence of these provisions. The difference between the existent use of hired skippers and facility of entry into the fishery in 2C and those predicted by the comparison with the other areas will provide some information on how these provisions have worked towards achieving their goals. The Council's goals in giving Area 2C different hired skipper privileges also allow for predicting the direction of difference between these areas. That is, we would expect that under the current provisions the fleet in 2C is more owner-operated and entry for new participants is easier than would be the case without these provisions.

---

<sup>3</sup> Individuals and non-individuals (corporations or partnerships) have to demonstrate at least a 20% ownership interest in the vessel on which their QS is being fished. In 2C, this restriction applies to non-individuals. A QS holder who is a shareholder in a corporation will be allowed to employ a hired skipper to fish his or her IFQ aboard a vessel wholly owned by that corporation provided that the QS holder has at least 20% ownership in the corporation that owns the vessel. However, this final rule prevents a QS holder from employing hired skippers through corporations in which they are nominal shareholders. Minimum ownership interest is determined by multiplying the percentage of ownership that a QS holder has in a corporation, partnership, or other entity by the percentage of ownership that a corporation, partnership, or other entity has in the vessel on which a hired skipper is employed.

<sup>4</sup> Non-individual entities cannot acquire by transfer any new QS if the composition of the entity changes. For non-individual entities (corporations or partnerships), the addition of any new shareholder or partner represents a "change."

The impacts of the prohibition on the use of hired skippers will be estimated in this study. These impacts will be assessed on the basis of what could have occurred if these initial issuees had been afforded the privilege of hiring skippers, by developing an alternate area 2C. Using data from the other areas, two models will be generated that will predict the composition of this alternate area 2C based on the characteristics of its participants, fleet, and other relevant fisheries. The composition of the alternate area 2C will be compared to the existent composition of 2C, providing (with caveats) an estimate of the efficacy of these policies at achieving their goals of maintaining an individually-owned and owner-operated fleet and providing for ease of entry into the fishery.

The first model generated will predict how the owner-operator characteristic of the fleet in 2C would change if initial individual issuees in this area were allowed to hire skippers to fish their IFQ. The owner-operator characteristic of the fleet will be measured as the percent of individual initial issuees who are utilizing skippers and the percent of individual initial issuee QS that is being fished by skippers. This model will be developed using the characteristics of fishery participants, the fleet, and other relevant fisheries from areas 3A to 4D to see how these characteristics have impacted the use of hired skippers. Applying these characteristics for 2C into this model will provide an estimate of how the owner-operator nature of the fleet in 2C, as measured by the percent of individual initial issuees who are utilizing skippers and the percent of individual initial issuee QS that is being fished by skippers, would change if individual initial issuees had been allowed to use hired skippers. This model will be applied to all of the years for which data is available to show how this characteristic of the fleet would have changed over time. This alternative owner-operator characteristic in 2C will then be compared to the existent owner-operator characteristic in 2C, with recognition of the caveats (described below) of using this type of approach.

The second model generated will predict how the ease of entry into the fleet in 2C would change if this area were allowed to utilize hired skippers. The ease of entry into the fleet will be measured as the percent of individual QS holders who are new entrants and the percent of individual QS holdings held by new entrants. The development and application of this model will be akin to the other two models, with variables characterizing specific factors that would impact entry into the fishery. This model will be applied to all of the years for which data is available to show how this characteristic of the fleet would have changed over time. The ultimate product will be a comparison of the current ease of entry into the fishery in 2C to the ease of entry that the model predicts would have occurred without the prohibition on the use of hired skippers by individual initial issuees.

The data for this study is currently being compiled from halibut transfer reports, landings tickets, registered buyer permits, and the state of Alaska's Commercial Fisheries Entry Commission (CFEC). I have been working with the Alaska Fisheries Information Network (AKFIN) data person at the AFSC to compile this data, and I will be getting the data at the individual landings and transactions level. Having the

disaggregated data may allow me to perform other tests on it, such as looking at the individual's decision to hire a skipper using a probit/logit model.

Although this study will use data from 2000 to the last year for which data is available to account for some of the programmatic and reporting changes that took place prior to 2000, there may still be some issues associated with the data that will need to be discussed in the results of this study. For example, much of the data for this study is self-reported by participants in the program. There may also be some issues with aligning the QS holders' information in the different databases.

### **Reference List:**

NMFS, "Regulatory impact review, initial regulatory flexibility analysis proposed regulatory amendment to the halibut and sablefish IFQ program to prohibit the use of hired skippers for future transfers of halibut B, C, and D class quota shares after control date of February 12, 2010," March 2011, available online:

<http://alaskafisheries.noaa.gov/npfmc/PDFdocuments/halibut/HiredSkipper311.pdf>

NMFS, "Final supplemental environmental impact statement/environmental impact statement for the individual fishing quota management alternative for fixed gear sablefish and halibut fisheries," September 15, 1992.

Pautzke, C.G. and C.W. Oliver 1997. North Pacific Fishery Management Council. Development of the Individual Fishing Quota Program for Sablefish and Halibut Longline Fisheries off Alaska.

[http://www.alaskafisheries.noaa.gov/npfmc/sci\\_papers/ifqpaper.htm](http://www.alaskafisheries.noaa.gov/npfmc/sci_papers/ifqpaper.htm)

Pinkerton, Evelyn and Danielle N. Edwards, 2009. The elephant in the room: the hidden costs of leasing individual transferable quotas. *Marine Policy* 33: 707-713.

Standal, Dag and Bernt Aarset, 2008. The IVQ regime in Norway: A stable alternative to an ITQ regime? *Marine Policy* 32: 663-668.

Final Rule, Amendment 54 to FMP for Groundfish Fishery of Bering Sea and Aleutian Islands Area and Amendment 54 to FMP for Groundfish of Gulf of Alaska, 67 FR 20915, April 29, 2002, Available online: <https://federalregister.gov/a/02-10483>

Final Rule, Hired Skipper Requirements for the Individual Fishing Quota Program, June 1999, Available online: (<http://www.alaskafisheries.noaa.gov/frules/skipper.pdf>)

Final Rule, Individual Fishing Quota Program; Community Development Quota Program, September 2007, Available online: <http://www.alaskafisheries.noaa.gov/frules/72fr44795.pdf>

### **Target Journals:**

*Marine Resource Economics*

a) aim and scope: <http://marineresourceeconomics.com/page/authors>

b) guidelines for submission: <http://marineresourceeconomics.com/page/authors>

*Marine Policy*

a) aim and scope: <http://www.elsevier.com/journals/marine-policy/0308-597X/guide-for-authors>

b) guidelines for submission: <http://www.elsevier.com/journals/marine-policy/0308-597X/guide-for-authors>

*Ocean and Coastal Management*

a) aim and scope: <http://www.elsevier.com/journals/ocean-and-coastal-management/0964-5691/guide-for-authors#2001>

b) guidelines for submission: <http://www.elsevier.com/journals/ocean-and-coastal-management/0964-5691/guide-for-authors#2001>

### **Essay 3**

**Title:** Loosening protectionist provisions in the halibut ITQ program – an analysis of amendments to the program

#### **Purpose:**

##### **Analyzing the remaining amendments together**

Below I present two different ways of developing the third essay of my dissertation. The first approach would provide an overview of the halibut ITQ program with respect to its evolution, in terms of how the amendments in the program have worked towards reducing the restrictions. The second approach would be analogous to the first two essays in that it would analyze a specific provision in the program and its impacts. These are tentative ideas for the third essay, and I am asking the committee for general feedback about which approach seems most informative, contributory to the knowledge of catch share programs, and/or methodologically interesting.

The halibut ITQ program has been amended several times, mostly with the intent of loosening some of the restrictions on operators in the program. These amendments are summarized below in the table. The first approach would be to look at all of the amendments together in a broad policy context. They all essentially loosen the QS use restrictions in the halibut IFQ program and demonstrate the need for catch share programs to be adaptive in the protections they afford to different groups. After an initial learning period and as the participants in the program begin to change, the need for some of these restrictions may decrease. The contribution of this essay would be to assess these amendments in terms of their desired and expected impacts (those stated by the Council), and to draw some broader conclusions about whether the provisions had been effectively achieving their goals in the first place. That is, the amendments loosened some of the restrictions in the program, which had been implemented to protect communities and participants, the effects of loosening them could provide some evidence of whether they had been working in the first place.

There is the potential for looking at the realized impacts compared to the expected impacts of each of these provisions, simply by looking at trend lines. In its RIRs for these amendments, the Council gave the directions of the changes that they anticipated. This is a very simplistic methodology, fraught with issues, since there are other contributing factors to the effects of interest. But, there is a lack of information about the actual effects of these amendments and if the impacts were those intended/expected by the Council. Furthermore, it seems that even such a simple analysis could inform the Council's decision-making process. When the Council is developing amendments to the halibut ITQ program, the RIRs usually include a pretty simple discussion of potential impacts. That is, it seems what informs the Council's decisions on amendments are pretty simplistic analyses.

This third essay could work to tie together the discussions of the first two essays and the amendments of the halibut ITQ program, and also expand on the policy

angle of things, since that is my fundamental interest and the focus of the UDel program. In the introduction to the dissertation, there is a discussion of “community protection measures” in general – why and how they’ve been implemented in other programs, how they affect the rights of QS holders in theory, and what is the literature on their actual impacts. This third essay wouldn’t be a repeat of this introduction, but rather would discuss other provisions in the halibut ITQ program, how they’ve evolved, and what some of the preliminary results indicate are the impacts. The point would be more to talk about how the evolution of the program has been towards a loosening of its restrictions, how these amendments have worked in terms of their intended impacts, and what this means in terms of the Council’s broader goals for the program – maintaining a diverse and owner-operator fleet - than to discuss in detail (with modeling and testing) the impacts of a specific amendment.

**Analyzing the Fish up and Catch sharing plan amendments**

The other approach to this third essay would be to analyze the impacts of another provision in the program. In contrast to the other two essays, this third essay would assess a provision in the program by analyzing an amendment to that provision. This would include an assessment of how the amendment has affected participants in terms of the stated goals and expected impacts of the Council, and of how, in turn, this demonstrates whether the provision was effectively meeting its goals in the first place. There may be some issues in isolating the impacts of any one of these amendments below, because they all went into effect around the same time and often had similar objectives and expected impacts – loosening the QS usage restrictions and increasing consolidation.

However, the coupling of the fish up provision (which allows category D QS (the smaller vessel class) to be fished on vessels less than or equal to 60ft in Areas 3B and 4C) with the catch sharing plan amendment (which allows area 4C QS to be fished in area 4D) presents some potentially interesting impacts. Taken together, these amendments loosen restrictions on QS use by both area and vessel class. Furthermore, these amendments together have some potentially interesting impacts – in terms of fleet composition and ease of entry for new participants. The different areas of impact would necessitate using different methodologies to assess, including GIS. Some text about these methodologies is in the highlighted section below.

Amendment	Year	Area of impact	Goals	Anticipated Impacts	Methods
	2003		Allowed CDQ groups to harvest their 4D allocation in area 4E, w/out requiring transfers (CDQ groups are		

			allocated 30% of 4D and 100% of 4E TAC). (Areas 4C-4E are considered as one stock)		
67 – Fish down (allow category B QS to be fished on vessels <= 60ft LOA in 2C)	2007	2C	1) This implemented into 2C a policy that was already in place in the other areas. The previous restriction in 2C on fishing down was seen as cumbersome and unnecessary.	1) Increase value of B QS. 2) Relative decrease in value of C and D QS. 3) Difficulty in acquiring QS for larger vessel class (B) 4) Benefit small vessel owners with increased availability of QS 5) Change diversity of IFQ fleet in SEAK by decreasing the number of large vessels in the fishery.	I have considered using the d-i-d estimator for this amendment, but am not sure of its applicability. One of the biggest conditions for being able to use the d-i-d estimator is that the treatment is supposed to be random, and it is not in this case. Area 2C was prevented from initially being able to fish down because of concern over the potential consolidation of larger vessel QS on the smaller vessel class that could result from this. Second, there should be no selection bias, as in fishermen shouldn't be able to select themselves in and out of the treatment group, but in the halibut program they can buy QS in any area they want. And they are likely to own QS in adjacent areas. So, fishermen could easily select themselves in and out of the 2C treatment groups Also, I find a lot of potential problems with measuring the anticipated impacts outlined by the Council, as some of them are inherently difficult to measure and for others the impacts would be difficult to differentiate from the impacts of other amendments.
67 – Fish up (allow category D QS to be fished on vessels <=60ft LOA in Areas 3B and 4C)	2007	3B, 4C	1) 3B – address economic hardship and safety concerns of fishing on small vessels. 2) 4C – address reduced catches of Class D IFQ in this area.	1) Increase value of D QS 2) Increase difficulty of new entrants getting in, because of #1 3) Upgrade vessels or team with larger vessel to fish their IFQ. 4) Increase employment opps. for crewmembers holding D QS	A similar provision was recently considered for 4B. I've tried to think about how to look at the impacts of this provision in terms of the stated goals for each area. Economic hardship is categorically difficult to define and measure. As for safety improvements, I thought about looking at changes in safety for

				<p>5) Increase consolidation</p> <p>6) Decrease overall number of crew positions<sup>5</sup></p>	<p>participants in 3B using an index that Grimm et al. developed, which includes injuries, search and rescue missions, vessels lost, and lives lost.</p> <p>The impact of the amendment in terms of its stated goal for 4C seems relatively easy to check, if we just look at the D QS harvests in 4C prior to and after the implementation of this amendment.</p>
64- Catch sharing plan (allow area 4C QS to be fished in area 4D)	2005	4C, 4D	<p>1) Reduce fishing effort in 4C to alleviate localized depletion</p> <p>2) Increase human health and safety of the small boat (IFQ and CDQ) fishery near St. Paul and St. George, by reducing competition w/larger vessels that may harvest in 4D.</p>	<p>There are at least four different groups that were affected by this amendment – IFQ holders in Area 4C (St Paul and St George), IFQ holders in Area 4D, CDQ groups in Area 4C (CBSFA and APICDA), and CDQ groups in Area 4D (BBEDC, CVRF, NSEDC, YDFA) – with some overlap (i.e. IFQ holders can have quota in both areas, CDQ groups can have CDQ allocation in both areas, CDQ groups can have both CDQ allocation and IFQ holdings in both areas).</p> <p>1) Increased competition in 4D, with adverse impacts on CDQ and IFQ holders in that area.</p> <p>2) Increased harvest of 4C QS.</p> <p>3) Increased employment with these increased landings</p> <p>4) Increased net revenues for these fishermen, since fixed vessel operating costs are spread over a larger number of lbs. harvested.</p> <p>5) Decreased availability of IFQ and landings for small vessels and processors, who work for CDQ groups in 4C.</p> <p>6) Small vessel owners upgrade to larger vessels or team with those with larger vessels to make trips to 4D.</p>	<p>Spatial distribution of: 1) catch, and 2) landings</p> <p>- Using GIS one could assess impacts on the geographic fishing distribution of the catch sharing plan amendment coupled with the fish up amendment in 4C. 4C is the little box around St. Paul and St. George. If bigger boats can fish the QS of smaller boats in 4C (due to the fish up amendment), and these boats are allowed to fish this QS in 4D, has there been a shift in fishing effort since these amendments were implemented (in terms of where are the fish being harvested)? CDQ groups are also allowed to fish their 4D allocation in 4E, which could mean that this amendment affects where CDQ allocations are fished in areas 4C, 4D, and 4E.</p> <p>- The other component of this is the spatial distribution of the landings. Whereas the area designation of the QS restricts, where the fish can be harvested, the fish can be landed at any port. If effort is allowed to shift from 4C to 4D and onto bigger boats, have landings shifted out of 4C? This component wouldn't necessitate GIS, since landing tickets provide the port of landing. RAM already reports on how much harvest occurs by</p>

<sup>5</sup> The effects in 5 and 6 were listed as potential impacts of allowing fish up in all western areas.



					<p>area, showing that area 4Ds harvest is now well above 100%, indicating a shift of 4C TAC into this area. But, they do not look at the shifts in landings between ports. A shift of landings out of area 4C could have negative implications for the two communities in that area.</p> <p>New entry:</p> <ul style="list-style-type: none"> <li>- There could also be a shift from small to medium size vessel use by both IFQ holders and CDQ groups resulting from this amendment coupled with the fish up amendment. Coupled with the potential shift in landings between areas, these could have adverse impacts on the community members of 4C and 4D and make entrance into the fishery difficult.</li> <li>- It would also seem likely that the value of QS in 4C would increase with the coupling of these amendments. And then, entry into the fishery would become more difficult in this area.</li> <li>- One could look at any changes in new entrants in terms of what were the expectations regarding entry area 4C prior to this amendment.</li> </ul>
67- Allow QS holders to hold up to 3 blocks, sweep up increase to 5,000 lbs in 2C, increase block to 20,000 lbs in 3B and 4A	2007	All areas, 2C, and 3B and 4A	Increase operational flexibility for fishermen and increase economic efficiency	<ol style="list-style-type: none"> <li>1) A decrease in the value of unblocked QS relative to blocked QS as the price differential between the two narrowed</li> <li>2) A reduction in the opportunities for new entry into the fishery as the availability of small QS blocks decreased</li> <li>3) Increased consolidation of QS</li> </ol>	The effects of this amendment, in terms of its stated goals and the other anticipated impacts would be difficult to differentiate from the impacts of the other amendments.

**Tasks:**

Essays 1 through 3 will have the same tasks:

- 1) Literature Review
- 2) Data Collection
- 3) Data Analysis
- 4) Analysis write-up
- 5) First draft
- 6) Review and revisions
- 7) Final draft

**Due dates:**

Essay 1:

- 1) First draft – January 31<sup>st</sup>, 2014
- 2) Final draft – March 31<sup>st</sup>, 2014

Essay 2:

- 1) First draft – April 15, 2014
- 2) Final draft – August 30, 2014

Essay 3:

- 1) First draft – January 31<sup>st</sup>, 2015
- 2) Final draft – March 1<sup>st</sup>, 2015

Recommendation for candidacy – January 06, 2014

Application for advanced degree – February 15, 2015

Dissertation defense and certification of defense – April 1, 2015

PhD Paper Submission deadline for May graduation – April 15, 2015

**Committee Composition**

Dr. Lee Anderson, major advisor  
Dr. Ron Felthoven, NMFS mentor  
Dr. Kent Messer  
Dr. George Parsons  
Dr. Sunny Jardine