



THE UNIVERSITY OF BRITISH COLUMBIA
Institute for the Oceans and Fisheries

Working Paper Series

Working Paper #2019 - 03

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the financial performance of owner-operators**

D. N. Edwards and E. Pinkerton

Year: 2019

Email: d.edwards@oceans.ubc.ca

Priced Out of Ownership: Quota leasing impacts on the financial performance of owner-operators

D. N. Edwards^{1*} and E. Pinkerton²

Institute for Oceans and Fisheries

The University of British Columbia, Vancouver, Canada

¹Institute for the Oceans and Fisheries, University of British Columbia, AERL, 2202 Main Mall, Vancouver, BC Canada V6T 1Z4

²School of Resource & Environmental Management, Simon Fraser University, Burnaby, BC Canada V5A 1S6

*Corresponding author: d.edwards@oceans.ubc.ca

Abstract

Individual Transferable Quotas (ITQs) have been widely promoted as a means to improve the conservation and economic outcomes of fisheries by enabling the transfer of quota access privileges to the most efficient operators who in turn have a strong financial incentive to safeguard the long-term sustainability of the fishery. The British Columbia Pacific halibut fishery has long been held up as an example of successful ITQ management. An in-depth investigation of this fishery, however, has identified significant failings of the ITQ system. The ownership profile of the fishery has changed dramatically under ITQs, transitioning from predominantly owner-operated to absentee owners and lessee fishermen. An analysis of fishing enterprise financial performance demonstrates the overwhelming impact of leasing on the viability of fishing enterprises. A representative owner-operator fishing enterprise leasing more than 80% of the quota that they fish, which characterizes all of the owner-operators that have entered the fishery since 2001, cannot earn enough from the fishery to re-invest, including replacement of the vessel or purchasing of quota. The fishery, under current leasing and purchase price conditions, is not self-sustaining as an owner-operator fishery. Socio-economic objectives for the fishery are not being met, raising important questions about the design and implementation of ITQ management systems.

Keywords: individual transferable quotas (ITQs), distributional impacts, financial performance

1. Introduction

Individual Transferable Quotas (ITQs) are permits allowing the holder of the ITQ to catch or transfer a share of a total allowable catch (TAC). ITQs have been promoted as an effective mechanism for efficient fishermen to buy out their less efficient counterparts and, in so doing, increase the returns to the fishery [1–5]. The implicit assumption is that fishing is undertaken by those who own the majority of the quota that they fish (i.e., quota owners) [6,7]. ITQs are an example of a market-based approach to fisheries management that focuses on the privileges of quota owners, in whose interest the fishery is managed. This is one of two dominant visions for fisheries management that has emerged since the discrediting of top-down approaches in the

1990s following harvest declines and fishery collapses, with the other being that of community-based fisheries management to achieve current and future needs of fishermen and fishing dependent communities [8].

The successive implementation of ITQs in British Columbia (BC) fisheries over the previous three decades has demonstrated a clear preference of the management agency, Fisheries and Oceans Canada (DFO), for market-based mechanisms. However, fisheries in Canada are held to objectives that extend beyond the needs and wants of current quota owners. In Canada, “the oceans and their resources offer significant opportunities for economic diversification and the generation of wealth for the benefit of all Canadians, and in particular for coastal communities” [9]. Historically, the vision for fisheries in Canada was to “create a healthy, stable industry; one which can bring prosperity and security to the people in it” [10].

The British Columbia Pacific halibut fishery is an ITQ-managed fishery that is a well-managed and prosperous fishery by metrics of success typically used to assess fisheries [3,11]. The halibut fishery was an early example of ITQs in Canada, with individual non-transferable quotas introduced in 1991 and temporary transferability of ‘blocks’ of quota introduced in 1993 [12]. ITQs were fully implemented in the fishery in 1999, with the introduction of permanent and ‘by the pound’ transferability as well as restrictions on the minimum and maximum quota allowed on a licence. With 100% on-board monitoring and dockside validation, requirements to own or lease quota to cover their directed and non-directed (bycatch) catch, the small-boat groundfish fisheries in BC are some of the most closely monitored and strictly managed fisheries in the world. The halibut stock is managed jointly by Canada and the United States through the International Pacific Halibut Commission, which is responsible for adjusting the total allowable catch (TAC) annually to account for stock status and to ensure that the stock is not overfished in any part of its range from northern Alaska to California. Since 1991, the halibut TAC has ranged from a high of 13 million lbs in 1998 to a low of 5.3 million lbs in 2018. Market demand for halibut is high and the landed price for halibut has almost doubled since 2004, offsetting the loss of landed value from the drop in the TAC. Evaluations of halibut fishery performance commissioned by DFO have been positive [13–15].

The ownership profile of the fishery has changed dramatically under ITQs, however, transitioning from a traditionally owner-operated fishery to one with growing corporate and processor control and ownership by ‘investors’. In 1991, when individual quotas were first introduced, owner-operators owned and caught about 90% of the halibut quota. In 2016, owner-operators caught 45% of the halibut catch and owned just 15% of the halibut quota [16]. This major shift in the ownership profile in the fishery has implications for both individual fishing enterprises and the performance of the fishery as a whole, particularly in meeting objectives for stable and prosperous fisheries that provide benefits to fishery participants and adjacent communities. Fishery participants and observers have asserted that ownership trends and leasing practices in the fishery are undermining the viability of the small boat owner-operator fleet in the BC halibut fishery [17,18]. The majority of the landed value goes to lease fees for quota leases, with only a small fraction of the total catch value remaining to cover operating costs and crew and captain wages after quota owners are paid [17,19].

Fishery participants have pointed to the lack of owner-operator provisions or other ownership restrictions having allowed quota ownership to shift to non-fishing interests. This lack of restrictions has led to the emergence of a new ‘investor’ class of owners, who have no interest in the halibut fishery beyond the owning and leasing out of quota [16]. However, there has been little government consideration of the impacts of leasing in the fishery. DFO completed an evaluation of the Commercial Groundfish Integration Pilot Program (CGIPP) in 2009 that

concluded “the diversity and complexity of leasing arrangements under CGIPP makes it challenging to provide a snapshot analysis” and acknowledged that quota leasing was the most contentious issue [20], but with no subsequent follow-up. Ownership and leasing is not regularly tracked and reported on by DFO, and until recently, there has been little evidence available on how the ownership profile of the fishery has changed, the extent of leasing, and the impact of leasing on the halibut fishing fleet.

There has also been only very limited tracking of financial performance data for BC fisheries, despite acknowledgements of the importance of financial performance information for the management and planning activities of the management agency [13,21]. DFO regularly conducted a costs and earnings survey to update information on the financial performance of Canada's Pacific commercial fisheries, but discontinued the survey due to low response rates. The last year for which halibut cost and earnings data was made publicly available from this survey was 1994 [22]. In 2008, a new series was commissioned to address the gap in costs and earnings data for Pacific commercial fisheries, and two reports were completed that included the halibut fishery, for 2007 and 2009 [13,14]. The data presented in those reports, by the author’s own admission, were not based on a census or a statistically representative sample and did not include analysis of the actual ownership and transfer data to quantify the extent of quota leasing in the halibut fishery. The financial performance of halibut fishing enterprises considered only scenarios where 0%, 30% or 60% of the halibut quota was leased. In 2006, more than a third of the halibut fishing fleet was leasing more than 60% of its catch, and a quarter of the fleet was leasing more than 80%. By 2016, the majority of fishing enterprises leased more than 60% of the halibut quota they fished, and all owner-operators that entered the fishery since 2001 leased more than 80% of the quota that they fished, on average leasing 95% [19].

To reconcile the discrepancy between what superficially appears to be a healthy, successful fishery with the experiences of fishery participants that are struggling to remain viable, financial outcomes of a hypothetical owner-operator halibut fishing enterprise were examined, informed by analysis of fleet characteristics to:

1. Characterize fishing enterprise financial performance under different lease price and quota ownership scenarios that are common in the fishery
2. Consider the impacts of leasing on new entrants and fishery reinvestment

2. Methods

An enterprise-level financial performance model was developed for a hypothetical owner-operated halibut fishing enterprise to consider the financial impact of quota leasing. The model provides relative and generalized financial performance metrics under different leasing arrangements, from both a short- and long-term perspective. An owner-operator fishing enterprise was defined as an individual or company that owns a vessel and licence that the owner of the licence, or a close family member, personally fishes. An owner-operator enterprise may own multiple vessels and/or licences, but only to an extent which can be reasonably operated by a single owner.

The financial performance model was informed by an ownership and quota leasing database that was constructed as part of a broader research project into the BC groundfish fisheries [23]. The database was compiled from three datasets received from DFO through access to information requests, supplemented by the Statistics Canada Inter-Corporate Ownership historical databases, BC Provincial Corporate Registry Services records, BC provincial processor licence lists, the Transport Canada ships registry and online searches including court proceedings, address

directories, and fisheries advisory process documents. The database was used to determine the extent of leasing, participation in other fisheries, and licence and quota ownership of both halibut and non-directed species quota caught in the halibut fishery to develop financial performance scenarios that are reflective of the conditions under which owner-operator fishing enterprises are operating in the fishery. As well, DFO’s conditions of licence, vessel and licence registration requirements and annual management plans were reviewed to ensure scenarios were consistent with the regulatory environment within which fishing enterprises operate.

As detailed financial information, particularly at the enterprise level, is not readily available for BC fisheries, cost inputs for a representative fishing enterprise were estimated from available data, with corrections and updates provided by fishery participants. Industry participation was facilitated through the Canadian Fisheries Research Network – a six-year research network funded by the Natural Sciences and Engineering Research Council of Canada (NSERC) that brought together academia, industry and government to undertake collaborative research on fisheries in Canada. Revenue and cost inputs were also informed by the DFO-commissioned reports on Pacific fishery financial performance for 2007 and 2009 [13,14], with significant adjustments to better reflect prices and costs in 2016 [19].

3. Fishing Enterprise Cost and Revenue Categories

A halibut fishing enterprise financial model consists of gross revenue and a series of cost categories (Fig. 1). The gross revenue is the landed value of the enterprise catch, which in the case of halibut enterprises includes halibut catch and non-directed catch of other species in the halibut fishery, such as sablefish, lingcod and rockfish. The gross revenue for a fishing enterprise must cover a number of short-term (e.g., operational and fixed expenses) and long-term costs (e.g., vessel replacement, quota amortization). What remains after short-term costs are deducted is the enterprise share – the earnings before interest, taxes, depreciation and amortization (EBITDA). The enterprise share covers debt servicing of previous investments and new investments to upgrade or replace the vessel or make purchases of quota or licences. The remainder is the net profit, which is needed to mitigate losses in years when expenses are greater than planned and provide the financial opportunity to innovate new technologies and approaches and re-invest in the fishing enterprise to improve performance and safety.

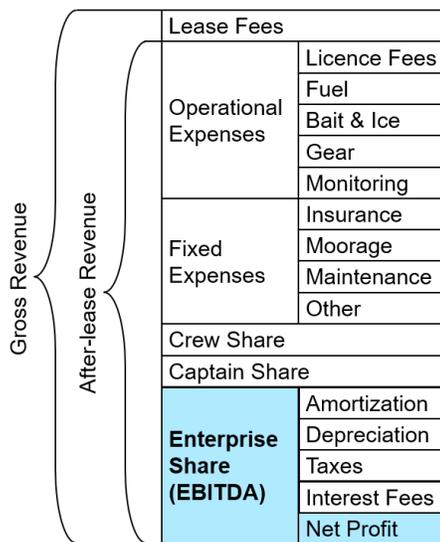


Figure 1. Enterprise level financial cost and earning categories.

In addition to the gross revenue from the halibut fishery, most fishing enterprises that fish halibut in BC also own licences for other fisheries, which has been a long-standing feature of the fishery [22,24]. In 1991 and 1994, the halibut fishery provided about one third of the gross fishing income of the average halibut fishing enterprise, with fisheries such as salmon and herring providing the remainder [21,22]. This information on the contribution of the halibut fishery to fishing enterprise gross revenue, from the DFO cost and earnings survey, is not available for the years after 1994, but most halibut fishing enterprises continue to be multi-licenced with other fisheries. Only 7 of 65 owner-operators were licenced solely for halibut fishing in 2016. Most halibut fishing enterprises are multi-licenced with salmon, followed by herring, rockfish and tuna. These other fisheries can be an important source of additional fishing income, helping cover fixed expenses, the captain share, and the enterprise share, and offsetting low returns in the halibut fishery. However, owning multiple licences is not a guarantee that these other fisheries will make a positive contribution to the enterprise. Fishery participants have noted an increased reliance on the halibut fishery, as returns from other fisheries, notably salmon and herring, have declined. For example, average salmon troll gross revenue was \$30,000 in 2009 with an average EBITDA of \$7,500 (2009 current dollars) [14]. In 1994, average gross income for salmon troll was \$73,000 with net income of \$23,500 (1994 current dollars) [22]. For salmon gillnet, average gross revenue in 2009 was \$13,000 and EBITDA was -\$2,700 and the herring fishery was also reported to yield marginal returns [14].

4. Financial Model Base Input Values

The performance of an owner-operator vessel participating in the halibut fishery was evaluated, with revenue and cost inputs for a representative fishing enterprise estimated from available data (Table 1). The assumption for the base case is that for both the captain share and fixed expenses, the halibut fishery would cover 50% of these expenses, with another fishery that the enterprise pursues covering the remaining share. Where income is insufficient to cover these expenses, the captain can take a reduced share and/or defer maintenance and repairs of the vessel, albeit at the risk of having an unsafe and deteriorating vessel.

Table 1. Base scenario inputs for a hypothetical owner-operator halibut fishing enterprise, catching a full block of quota (1% of the TAC).

Category	Value
Halibut Catch Revenue	\$579,500
Non-directed Catch Revenue	\$25,000 (net after lease)
Operational Expenses	\$40,000
Fixed Expenses (50% of total)	\$12,500
Crew Share (for 3 crew)	lower of 50% of after-lease landed value or \$110,000
Captain Share (50% of total)	\$30,000

4.1. Halibut Catch Revenue

There are a number of licence conditions and requirements that impact how a halibut fishing enterprise operates, including minimum quota holdings, limits on how much quota can be fished on one vessel and the transferability of licences. As a ‘vessel based licence’, halibut licences are issued “in respect of a vessel” and not to an individual or company [12]. The vessel must be registered as a Canadian commercial fishing vessel and can have only one halibut licence issued to it at a time. Once a licence has been fished in a year, it cannot be transferred off that vessel until the following year. There are no restrictions on the number of vessels, or halibut licences, that an individual or company can own, and no restrictions on who can own a vessel or licence.

Ownership of multiple halibut licences is uncommon among owner-operators and only one owner-operator owned and fished two halibut vessels in 2016.

Halibut licences must retain a minimum 0.01149% of the halibut TAC, which was 710 lbs in 2016¹. This quota can be leased off the licence each year but cannot be permanently transferred off the licence. Halibut licences can hold a maximum quota amount, a ‘full block’, of 1% of the halibut TAC, equivalent to about 61,000 lbs of quota in 2016 (with some exceptions up to 1.25% based on historical catch). The maximum quota cap applies to both leased and permanently held quota. Of the 65 halibut owner-operators in 2016, 42% fished at least 90% of a full block and the median for the amount fished was 80% of a full block. The halibut catch revenue base input value used was based on a full block of 61,000 lbs in 2016 at the 2016 average landed price per pound of \$9.50 [19].

4.2. Non-directed Catch Revenue

The halibut fishery is a multi-species fishery in practice, with catch of a number of rockfish species and other groundfish including lingcod and sablefish caught alongside halibut, and the halibut fishery has an allocation of rockfish quota in recognition of this. This ‘non-directed’ catch accounted for about one-quarter of the catch by weight in the halibut fishery in 2016 [25]. With the implementation of the Commercial Groundfish Integration Pilot Program in 2006, lingcod, sablefish and higher volumes of rockfish were permitted to be landed in the fishery, but all catch also had to be accounted for with quota, enforced through an on-board camera monitoring system in addition to dockside validation. This has meant that halibut fishing enterprises must own or lease quota for their non-directed catch. The majority of the owner-operator fleet had to lease quota to cover most of the rockfish that they caught. For sablefish catch, most owner-operators had to lease 100% of the sablefish quota that they caught. While there is considerable overlap between the halibut and sablefish fisheries, joint ownership in the fisheries is concentrated with corporate and processor owners. Only 3 of the 65 owner-operators in the halibut fishery in 2016 owned sablefish licences and quota.

The input value of \$25,000 for non-directed catch revenue was based on a gross revenue of \$45,000 less a lease price of \$20,000, from typical non-directed catch reported in Nelson (2009), updated to 2016 landed and lease prices reported by fishery participants. Enterprises were assumed to lease 100% of the sablefish and lingcod quota and 50% of the rockfish quota.

4.3. Operational and Fixed Expenses

The operational expenses and the fixed expenses were based on data provided by fishery participants, and validated against aggregate values reported in Nelson (2009). The average fixed expenses were estimated to be about \$25,000, of which 50% was assumed to be covered by the halibut fishery under the base scenario, and the other 50% covered by other fisheries that the fishing enterprise participates in. The assessment of the sensitivity of the enterprise share to the cost inputs included low and high cost operational and fixed expense scenarios, to consider how the results varied if the fishing enterprise were a lower cost (i.e., more efficient) versus a higher cost (i.e., less efficient) operation. This sensitivity analysis tested the impact of the assumptions on input costs and also provided insights into how variable input costs would impact the financial outcomes for different fishing enterprises. The operational expenses were reduced by 50% to \$20,000 for the low cost scenario and increased by 50% to \$60,000 for the high cost scenario.

¹ For this paper, all halibut weights are expressed as ‘dressed head off’ weight, in pounds, as per the management and industry standard. The conversion factor for round to ‘dressed head off’ is 0.75. All other fish weights are expressed as round weight, in pounds. The conversion factor for tonnes to pounds is 2204.6.

The portion of the fixed expenses covered by the halibut fishery was set at \$6,250 (25% of the fixed expenses) under the low cost scenario and \$18,750 (75% of the fixed expenses) under the high cost scenario.

4.4. Crew Share

Nelson (2009) reported crew costs to be 10% of gross revenue per crew member with 3 crew members on vessels fishing about 66,000 lbs of halibut quota, totalling 30% of gross revenue equivalent to \$120,000. While \$40,000 is generally consistent with the high-end of wages paid to crew in the halibut fishery, most crew earn considerably less. The common practice for crew share arrangements, since the introduction of ITQs in halibut, is for crew to be paid on the after-lease revenue rather than the gross revenue. Even where the quota is owned by the captain, a lease fee is usually applied that is paid directly to the captain and the crew is paid on the after-lease revenue [17]. As confirmed by industry informants, the crew share typically ranges from 10% to 20% of the after-lease revenue per crew member, depending on experience and performance. The application of the crew share against after-lease versus gross revenue is an important distinction. Not only does a share of the after-lease revenue translate into much lower earnings than a share of the gross revenue (10% share of gross revenue in 2016 would be about \$62,000 whereas a 20% share of after-lease revenue would be about \$29,500), but while landed price has sharply increased in recent years, lease fees have closely tracked this increase resulting in a stable or decreasing after-lease price [19]. This has meant that crew shares, on a per pound basis, have not increased as landed price increases. The crew share for a crew of three was estimated to be 50% of the after-lease revenue (e.g., two crew receiving 15% each and the senior crew member receiving 20%), to a maximum of \$110,000, as even the highest paid senior crew member would not expect to make more than \$40,000 from the halibut fishery in 2016, and junior crew members even less.

4.5. Captain Share

For the captain share, information on average and living wages was sourced from government and third-party sources [26,27]. The average wage for a supervisor in the natural resources industries before taxes is \$60,000 [26], which is at the low end of a living wage in coastal British Columbia [27]. This is considered a minimum for a reasonable wage, particularly given the skills and experience needed to be a successful captain of a fishing vessel. The captain share can also be supplemented by non-fishing income, family income, and government benefits. Employment Insurance (EI) is used by both crews and captains to supplement their income if their earnings are low. An individual could receive up to a maximum of about \$14,000 in taxable EI benefits in 2016.

The base input for the financial performance model assumed that 50% of the captain share (\$30,000) would be covered by the halibut fishery and 50% covered by other fisheries. For the assessment of the sensitivity of the enterprise share to the cost inputs, the captain share covered by the halibut fishery was set at \$15,000 (25% of the captain share) under the low cost scenario and \$45,000 (75% of the captain share) under the high cost scenario.

4.6. Quota Leasing

Quota leasing by owner-operators is extensive. Nearly all owner-operators lease at least some quota and the majority lease more than half of the quota that they fish. One-quarter of all owner-operators in 2016 owned the minimum quota, and about half of all owner-operators owned less than 0.17% of halibut quota, equivalent to about 10,000 lbs in 2016. For those that entered the fishery since 2001, the quota ownership situation is even more precarious. Two-thirds of new entrants since 2001 owned only the minimum quota in 2016, and all owned less than 10,000 lbs in 2016.

Short-term financial performance was assessed for three ownership scenarios: (1) the minimum quota holdings on a licence (710 lbs in 2016), (2) 10,000 lbs, and (3) 40,000 lbs. Financial performance was also assessed for three price scenarios: (1) \$1.15/lb, which was the average after-lease price in 2016 – the lowest after-lease price since 1998 [19], (2) \$2.00/lb, the ten-year average after-lease price from 2007 to 2016, and (3) \$4.75/lb, a lease price of 50% of landed value available on a preferential basis to some fishing enterprises – typically those with significant quota ownership (i.e., more than 10,000 lbs).

4.7. Interest, Taxes, Depreciation and Amortization

For the assessment of earnings after interest, taxes, depreciation and amortization, base inputs were identified for enterprise taxes, depreciation of an existing owned vessel, interest for debt servicing the purchase of a halibut licence and quota, and amortization of the licence and quota. The tax rate in Canada for small businesses with less than \$500,000 in income in 2016 was 10.5%. Vessel depreciation was set at 5%, on a replacement cost of \$200,000, which is a low-end vessel cost [28]. The purchase price for minimum quota (770 lbs in 2010, 710 lbs in 2016) and a halibut licence was \$100,000 in 2010 and \$135,000 in 2016 [19]. The purchase price of 10,000 lbs of quota and a licence was \$475,000 in 2010 and \$1.02 million in 2016, and for 40,000 lbs of quota and a licence was \$1.82 million in 2010 and \$3.87 million in 2016.

In BC, banks will typically not lend more than 50% of the value of the licence and quota, at a maximum, at commercial interest rates (averaging about 5% in recent years, plus or minus 1%), and only for a short amortization period (i.e., 3 to 5 years). If the borrower has other assets such as a house that can be used for collateral, the terms of the loan can be more favourable, including a longer amortization period and a lower interest rate. Both high and low end scenarios for the debt servicing of the purchase of a halibut licence and quota were considered, for the low end at the 2010 purchase price at 3% interest and a ten-year amortization and for the high end at the 2016 purchase price at 5% interest, also with a ten-year amortization.

4.8. Net Profit

Net profit margin is the net profit divided by the total revenue. The average net profit margin was 7.0% for small enterprises in Canada in 2012 and 3.7% for medium-sized businesses [29]. Based on the average net profit margin for small and medium enterprises (SMEs) in Canada and a gross revenue of \$624,500, which was the average gross revenue for a halibut fishing enterprise fishing a full block of quota in 2016, the net profit for a halibut fishing enterprise was expected to be between \$20,000 to \$45,000.

5. Financial Performance

Financial performance was evaluated through a (1) basic profit model to calculate earnings before interest, taxes, depreciation, and amortization (EBITDA) under different quota ownership and after-lease price scenarios (Fig. 2) and (2) through an extended profit model considering high and low cost scenarios for both EBITDA and earnings after interest, taxes, depreciation, and amortization (net profit) (Fig. 3).

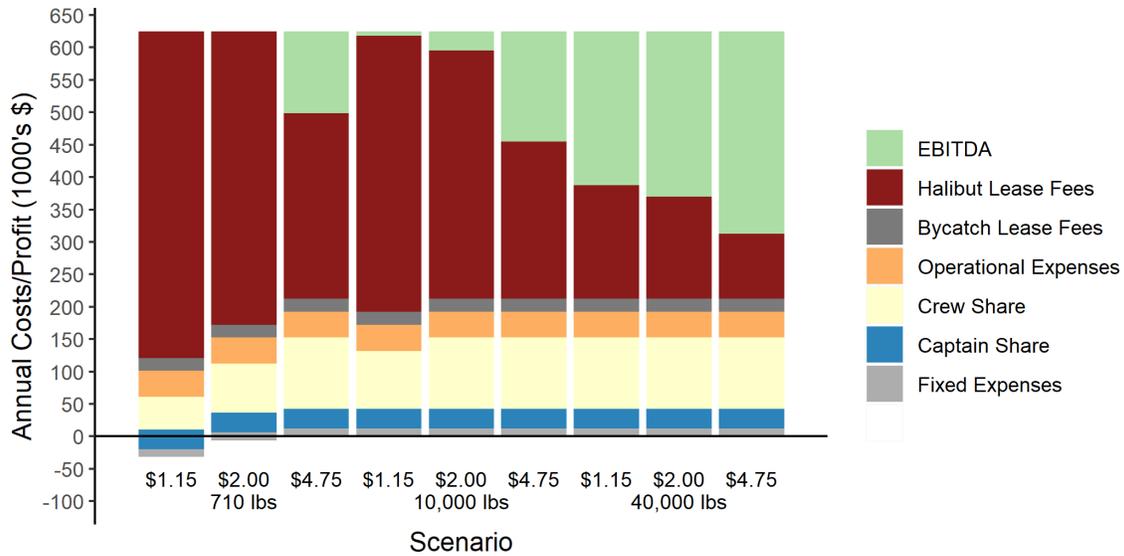


Figure 2. The financial performance of a halibut fishing enterprise under different leasing scenarios, where the after-lease price is one of \$1.15/lb, \$2.00/lb, or \$4.75/lb, and where the quota owned by the fishing enterprise is 710 lbs, 10,000 lbs, or 40,000 lbs.

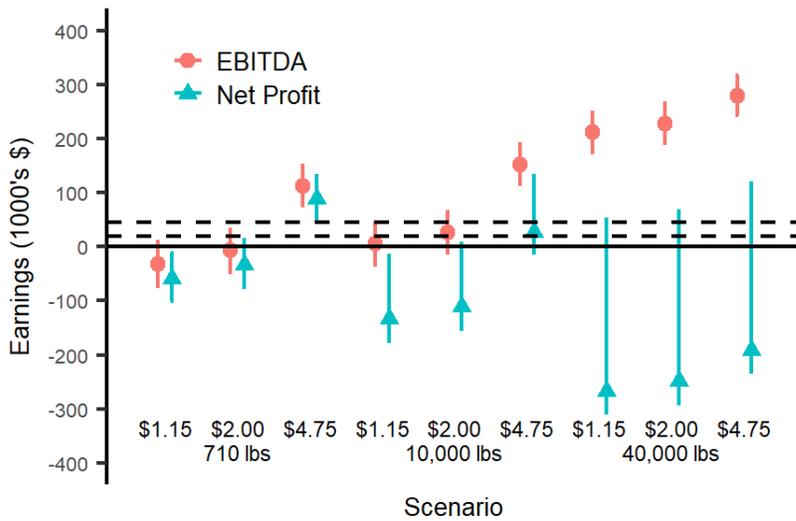


Figure 3. The earnings of a halibut fishing enterprise before interest, taxes, depreciation and amortization (EBITDA) and after (net profit), for three after-lease price (\$1.15/lb, \$2.00/lb and \$4.75/lb) and three quota ownership (710 lbs, 10,000 lbs and 40,000 lbs) scenarios. The vertical bars indicate the range of earnings under high and low cost scenarios. Dashed horizontal lines at \$20,000 and \$45,000 indicate the range of expected net profit.

For fishing enterprises leasing most of the quota that they catch, lease fees are the largest cost category by far. At \$1.15/lb, for an enterprise that owned only the minimum quota holdings, operational expenses could be covered, crews received a very reduced share, the captain earned a partial share but not a living wage, and the halibut fishery made no contribution to fixed expenses for the year. At \$2.00/lb, the crew share was still reduced, but double what was paid under the \$1.15 scenario, the captain received a modest living wage, and some fixed expenses were covered. If a 50% lease rate were available to fishing enterprises with low ownership ratios (enterprises leasing more than 80% of the quota that they fish), enterprises would be profitable.

However, preferential lease prices have typically only been available to owners of large blocks of quota that are able to negotiate prices with processors by guaranteeing delivery of their own quota to the processor. Owner-operators that own 10,000 lbs or less of quota cannot expect to be recipients of a preferential quota price. For those that own 40,000 lbs of quota, the fishery is highly profitable, regardless of the lease price being paid for the remaining 21,000 lbs that they lease. Owners of 40,000 lbs of quota earn more than \$200,000 that would otherwise be mostly paid in lease fees. Even if these owners receive only \$1.15/lb on the 21,000 lbs of halibut that they lease, their fishing operations are profitable on the basis of the quota on which they receive the full landed value. Yet it is these owners that are most likely to receive a higher after-lease price.

While enterprises that owned 10,000 and 40,000 lbs of quota would be profitable under EBITDA scenarios, when debt servicing and repayment costs for the purchase of the halibut quota and vessel depreciation were included, these scenarios were only profitable under the lowest cost scenarios. Even for the 40,000 lbs quota ownership scenario that was highly profitable under EBITDA, the cost of repaying the quota purchase at 2016 quota purchase prices overwhelmed earnings and led to high annual losses, close to \$300,000 per year, over the repayment period. The main difference between the lower and upper cost scenarios for the 10,000 lb and 40,000 lb scenarios was the cost of purchasing the quota, with the purchase price per lb of quota more than doubling between 2010 (the low cost year) and 2016 (the high cost year). Given current price conditions in the fishery, there is no scenario in which the fishery is self-sustaining for owner-operators. It is not possible for new owner-operator entrants, or existing entrants with minimal quota ownership, to earn sufficient income from the halibut fishery to purchase quota and improve their ownership position. The only possible avenue for new entrants to become owners is through the infusion of external capital not tied to commercial repayment terms.

ITQs have been lauded as delivering improved financial performance to fishery participants, driven by higher landed values and more efficient fishery operations. Despite the landed price of halibut, in 2016 constant dollars, doubling between 1991 and 2016, income for many owner-operators has diminished under ITQs. An evaluation of the halibut fishery immediately following the initial individual quota allocation estimated net income per pound of halibut quota to be \$2.73/lb in 1991 [30], in 2016 constant dollars. This was an increase from the 1988 pre-ITQ net income per pound of \$1.57/lb. The increase between 1988 and 1991 was due to a near doubling in landed value over that period, for which 40% of the increase was attributed to ITQ implementation. Due to data availability issues, net income (EBITDA) did not include fixed costs. For comparison, net income per pound for a lessee with minimum quota holdings, not including fixed costs, was estimated for 2016 to be between \$-0.89/lb and \$0.81/lb (\$-1.20/lb and \$0.71/lb when fixed costs were included). Lessee owner-operators are realizing net income per pound substantially less than the net income per pound available to fishery participants in 1988, let alone in 1991. Financial improvements in the fishery attributed to ITQs are not available to fishery participants that entered the fishery following ITQ implementation.

6. Conclusion

Owner-operators are being priced out of ownership in the halibut fishery. There is no reasonable avenue for new owner-operators to enter the fishery. The owner-operators still active in the fishery include many original entrants that have significant quota holdings. About half of owner-operators in 2016 owned more than 10,000 lbs of quota, of which 80% were original grantees and the remaining 20% were early entrants having entered the fishery by 2001. As original grantees and early entrants exit the fishery and transition to the investor class, owner-operators who own a significant portion of the quota that they fish are not being replaced. Yet it is

the quota-owning owner-operators that past evaluations of leasing in the halibut fishery have focused on [13,14]. The financial performance of original grantee owner-operators has led to the mistaken impression that the situation for owner-operators within the halibut fishery is sustainable over the long-term. The financial performance of new entrants into the fishery tells a different story, and points to a lack of renewal and re-investment and unsustainable lease prices that are inhibiting the renewal of the fleet and fishery. New entrant owner-operators own virtually no quota and are not buying halibut quota in any appreciable amount. The lack of investment can be attributed to a combination of factors: (1) poor returns to lessees in the halibut fishery, (2) high quota purchase costs, and (3) limited access to capital.

Quota lease prices are expected to reflect the resource rent generation in the fishery [6], and sustained high prices are claimed as proof that a fishery is successful and healthy [31]. The implicit assumption is that lease prices will adjust to be profitable for the lowest cost operators. In the case of the BC halibut fishery, profitability is much more a function of quota holdings than operating costs. New entrants are continuing to participate in the halibut fishery because they have few other employment opportunities and can leverage existing assets such as vessels and gear. For these lessees, financial performance is very sensitive to lease price and fishing costs. If owner-operators receive an average or better than average after-lease price and are able to keep fishing costs low, then the captain and crew can earn a marginal living, in most years. Over the short-term, this is rational, if highly optimistic, behaviour. However, at current lease rates and costs of fishing, long-term requirements, such as major vessel repairs and vessel replacement, are not being met. This jeopardizes the safety of the fishing fleet and suggests that the long-term outlook for the fishery is a continued decline of the owner-operator fleet.

For lessee fishing enterprises, revenues after-lease do not support re-investment in the fishery. For quota owners, there is no financial incentive to make large investments in a fishing enterprise when comparable income to fishing can be generated by leasing out quota to others to fish, with no capital outlay required. For original grantees with existing investments in vessels, participating in other fisheries, the revenue generated from fishing their own quota can be enough of an incentive to continue fishing, particularly if they receive a preferential lease rate to supplement their own quota holdings. As these original grantees age, however, they are leaving the fishery and the new entrants replacing them do not have the benefit of existing quota holdings that they can leverage for better lease prices or to supplement their after-lease revenue. This has implications not just for the fishery and owner-operator fleet, but also for the BC shipbuilding, ship repair, and marine service industries, and associated coastal communities. The infrastructure and shipwright skills needed to build and maintain vessels and service the fleet, once extensive and widespread along the BC coast, is at risk of being lost in the absence of investment from the fishing industry.

Small and medium sized enterprises (SMEs) in Canada are recognized as a driver of economic growth, innovation and jobs. SMEs enjoy a low tax rate in recognition of the important role they play in the economy. While it is true that financially robust fishing enterprises are an important source of jobs and economic activity for coastal communities, this is not true of investors that lease their quota out. In fact, the practice of leasing quota, and high lease prices, are undermining fishing enterprises and eroding the ability of fishing enterprises to reinvest in their business and remain viable. The halibut fishery is an important source of employment and business opportunities in BC, but leasing is critically undermining the ability of the fishery to provide prosperity to anyone beyond a few investors and original grantees. Fisheries policy should consider the overall objectives for the fishery. With new entrants priced out of quota ownership, the owner-operator fleet struggling to remain viable, and the vast majority of the wealth from the fishery captured by investors that do not contribute to the fishery or the coastal

communities that have traditionally depended on the fishery, questions should be raised about what the fishery is intended to achieve and whether or not the management approach that has been taken is appropriate.

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Acknowledgements

This paper is based on a research project supported by the NSERC Canadian Fisheries Research Network (CFRN). The first author thanks the fishery participants who shared their experiences to inform this research and her graduate committee for their support in completing this research.