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Quota Share Owner Survey: Initial Results and Analysis

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National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northwest Fisheries Science Center

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**NOAA
FISHERIES**

Quota Share Owner Survey: Initial Results and Analysis

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January 2022

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Abstract

The Pacific groundfish trawl fishery has been under catch share management since 2011, when quota shares were distributed to permit owners according to historical participation. In 2017, the Pacific Fishery Management Council requested a mandatory survey of the fishery's quota share owners "to accurately evaluate the program performance and make adaptive adjustments." The goal of the annual survey is to identify who (by fishery participation characteristics) owns the fishery's quota and to assess where economic benefits are accruing. The Northwest Fisheries Science Center's Economic Data Collection (EDC) Program fielded the first Quota Share Owner Survey (QS-EDC) from October to December 2020. Two types of information are requested on the survey, the dollar amount quota share owners earned from leasing out their quota, and descriptions of each owner's past and present fishery participation. This technical memorandum details the survey development and fielding and presents findings from combining the data collected through this new survey with preexisting data collections, including ownership interest and other data collected through the EDC cost and earnings surveys (CE-EDC).

Quota share owners reported a total of \$3.7 million in earnings from leasing quota on the QS-EDC in 2019. Combined with the quota lease earnings reported on CE-EDC surveys of all vessels owners in the fishery, quota lease revenues totaled \$6.6 million dollars in 2019. The survey results indicate that capital owners (owners of fishing vessels or shorebased processors) earned approximately 64% of this \$6.6 million. A smaller fraction of earnings, approximately 27%, accrued to individuals with active participation in the fishery (fished or worked in processing facilities). Other recipients of quota lease earnings include individuals with no other capital or active participation in the fishery, as well as trusts, estates, quota banks, not-for-profits, and government entities.

1 Introduction

In 2017, the Pacific Fishery Management Council (PFMC) recommended that the West Coast Region and the Northwest Fisheries Science Center's Economic Data Collection Program (EDC) implement the first mandatory Quota Share Owner Survey (QS-EDC) for the U.S. West Coast groundfish individual fishing quota (IFQ) program. The EDC Program previously consisted of surveys of vessel and processor owners (CE-EDC) and is intended to help meet the Magnuson–Stevens Fishery Conservation and Management Act's (MSA) requirement for regular reviews of catch share programs.

This document provides a detailed background on the QS-EDC survey's development and deployment and presents a preliminary data analysis of the results from the inaugural survey. The final section of the report is a case study that uses the quota share survey results to provide analysis to support the sablefish utilization action that was initiated as part of the first five-year review of the Trawl Catch Share Program.

2 Regulatory and Policy Background

In 2011, regulators converted the shoreside component of the U.S. West Coast groundfish trawl fishery to an IFQ/catch share management program. In an IFQ program, individuals or groups of individuals own quota share accounts and receive annual allocations of quota pounds. NMFS and PFMC allocate quota pounds of regulated groundfish species, including Pacific whiting, to these quota share accounts.¹ In order for quota pounds to be used, quota share owners must transfer the pounds to vessels for fishing. Vessels can then also transfer the quota pounds among themselves.

According to the Final Environmental Impact Statement of Amendment 20 (“Rationalization of the Pacific Coast Groundfish Limited Entry Trawl Fishery”),² the economic goals of this IFQ program are to:

Create and implement a capacity rationalization plan that increases net economic benefits, creates individual economic stability, provides for full utilization of the trawl sector allocation, considers environmental impacts, and achieves individual accountability of catch and bycatch. (p. iv)

Fishery managers implement catch share programs in regulated fisheries to “rationalize” them (to eliminate the race to fish, increase economic efficiency, etc.). A potential consequence of the catch share structure is a change in the distribution of benefits, as noted in a paper by Sumaila (2010):

Concentration of fishing power has been noted in many fisheries in which [Individual Transferable Quota] ITQ schemes have been introduced (Grafton 1996, Eythorsson 1996). In economic terms, this is not considered a problem because the proponents of ITQs expect such concentration to take place. In fact, this is one of the channels through which the introduction of ITQs is expected to achieve economic efficiency (Hannesson 1996). (p. 36)

To understand the net economic benefits of an IFQ fishery, fishery managers must: 1) calculate vessel-level quota net revenue (the total revenue from fishing and quota leasing minus the total costs related to fishing and leasing quota) from buying and selling this transferable quota, and 2) characterize the distribution of quota lease earnings over time (i.e., whether or not the benefits are accruing to the fishery participants or to quota share owners outside the fishery). Steiner (2019) notes that:

The costs and earnings from quota are an important component of the economic health of the companies that fish in the catch share program. The value of quota is theoretically equal to the profitability of the asset. In theory, a quota owner will fish the quota if the profit they earn from fishing the quota is higher than the price they would receive if they sold the quota. (p. 160)

¹“Pacific whiting” refers to *Merluccius productus*, also called “Pacific hake.” This report uses “Pacific whiting” for consistency with the U.S. Code of Federal Regulations (USOFR 2021).

²<https://www.pcouncil.org/documents/2010/06/groundfish-amendment-20-final-environmental-impact-statement.pdf/>. ITQ stands for individual transferable quota. The U.S. West Coast groundfish trawl fishery is an ITQ fishery because the fishing quota is transferable.

The purpose of the QS-EDC is to collect additional information to more precisely calculate net benefits and meet the MSA requirement for regular reviews of catch share programs.

Prior to the QS-EDC, there was incomplete information about where quota lease earnings were accruing and, although detailed quota share ownership information was collected, limited information was available about what other roles (e.g., fisherman, fish dealer) those owners played. The sources of information about quota lease earnings data included: a quota transactions database where quota and vessel owners log quota transfers, providing useful information on quota flow including the volume, value (optional), and participants of the transfer; and the CE-EDC survey that collects annual vessel and processor level costs and earnings, including earnings from leasing quota. Another source for quota share owner participation data was the Pacific Coast Groundfish Social Study (PCGFSS), a voluntary survey administered in 2010, 2012, and 2016.³ A section of this survey asked quota share owners about their fishery participation. Interviews were also conducted with quota share owners, asking questions about participation and attitudes toward the catch share program. Throughout this paper we quote from these interviews to explain ownership concepts. Combined, these pre-existing sources contribute necessary but incomplete data. We describe these data sources and explain the gap that exists between them and the holistic assessment of net revenue and economic benefits.

³<https://www.fisheries.noaa.gov/west-coast/socioeconomics/west-coast-groundfish-trawl-fishery-social-study>

3 Pre-existing Data Sources

Transactions Database

In 2011, NMFS began collecting quota transaction data from quota share and vessel owners. The database records quota pound transfers from quota share accounts to vessel accounts, and vessel-account-to-vessel-account quota transfers. “Quota pounds” are the pounds allocated into quota share accounts each year based on the percentage shares held in each account. Quota owners report the species, amount of quota pounds, buyer, seller, date, and type of transfer for each quota transaction. Quota owners can voluntarily report the cash value of the transaction. This information may or may not be reported, depending upon the type of transfer and whether the information is available at the time of transfer. In 2019, quota share accounts made 690 transfers of quota pounds to vessel accounts (Table 3-1), of which just under 30% were self-designated as **Cash Sale**. Quota owners recorded cash values for about 78% of the **Cash Sale** transfers. **Self-trade**, making up just over 40% of trades, implies that quota pounds were transferred to a vessel account owned by the same entity as the quota account. We would not expect a cash value associated with these types of transactions. **Barter QP** is trading quota for quota. In a 2016 PCGFSS interview, a quota owner describes bartering:

We actually trade. We trade. We say, “We’ll give you this much black cod. You give us this much whiting.” And that seems to work pretty well. The same with our halibut... we lease halibut through bycatch, and we trade things and try to get whiting for it.
(Washington Quota Share Owner)

Anecdotally, from speaking to quota share owners, transfer type **Other** frequently includes transfers under contract arrangements. Contracts generally specify the quota lease payment as a share of total ex-vessel revenue after landings have occurred, so the quota value would not necessarily be known at the time of quota transfer. Less than 1% of **Other**-classified transactions have a cash value associated with the transaction.

Quota share owners who do not fish or own a vessel anymore may not be interested in daily management of their quota transactions. In these cases, it is common for some or all of the pounds in a quota share to be leased to a single entity, annually, for a flat fee. The decisions and factors that determine the value of this transaction are beyond the scope of this survey; however, it is likely the market value for the species differs from the leasing value in these arrangements. Another quote from the 2016 PCGFSS describes a potential subset of these contracts:

I lease the whole fish out. I lease the whole package out so I don’t have to deal with any paperwork. I get one flat check fee a year, and that’s up to him. Give us what’s fair because I don’t want to do it. I would rather make something on it than sit on the fish. I just make a flat fee for it. (Oregon Quota Share Owner)

We expect the QS-EDC to capture all cash transactions, including contracts, regardless of how the transaction type was self-reported in the transactions database. The information is requested nearly a year after the fishing season has ended, so all settlements should have already occurred. Also, the earnings are reported at an annual level (not transaction or quota category), so that participants can easily retrieve their information from their accounting system without worrying about individual details.

Table 3-1. Types of quota pound transfers from quota share accounts to vessel accounts in 2019, and the percentages* of each that recorded a cash value.

Transfer Type	Count	Percent Total Transactions	Percent That Have Cash Value Recorded
Self-Trade	282	40	1
Cash Sale	198	29	78
Barter QP	25	4	0
Cash and Barter	6	<1	33
Other	179	26	1
Total	690		

*These percentages are the share of quota transfers with a value greater than \$1 USD (quota owners occasionally enter \$1 as a placeholder value).

Ownership Interest Database

The West Coast Region has been collecting ownership (names, addresses, and percent ownership stake) data on quota share owners and vessel owners since the beginning of the IFQ program. The primary purpose of the dataset is to monitor control limits, the maximum amount of quota share that a person may own or control (USOFR 2010). The database contains detailed information about the ownership structure of the quota owning companies, including those where one quota share account can be owned by one company that is in turn owned by multiple companies that are owned by multiple individuals. Owners of a quota share permit or vessel account “must provide the names of all persons who have a 2% or greater ownership interest in the permit, license, and/or vessel, as applicable, and the amount of ownership interest each of those persons own in the permit, license, or vessel (given as a percent)” (p. 27).⁴ Quota share owners record their ownership structure as shown in Figure 3-1.

After accounting for the ownership structure of each of these accounts and all of the associated companies, the database calculates the individual-level percent share of ownership. In Figure 3-1, only the percentages shown in the right column are incorporated into this analysis (bold boxes); the intermediate ownership structure is only important for calculating the individual percent stakes. The same information is available for all vessel accounts in the IFQ Program.

In 2019, there were 239 unique individuals (persons) who owned quota shares, amounting to 86.9% of total quota pounds issued in that year. Certain entities are not required to report ownership to the individual person level; those types include trusts, estates, not-for-profit companies, government entities, and publicly held corporations. We consider these “terminal ownership” types. In 2019, 12.1% of issued quota pounds were held by entities that did not report person-level information. A balance of 1% of total quota pounds do not have ownership information. It is assumed that the quota pounds are owned by individuals who own less than 2% of any given quota-owning entity.

⁴ Compliance Guide Pacific Coast Groundfish Trawl Rationalization Program

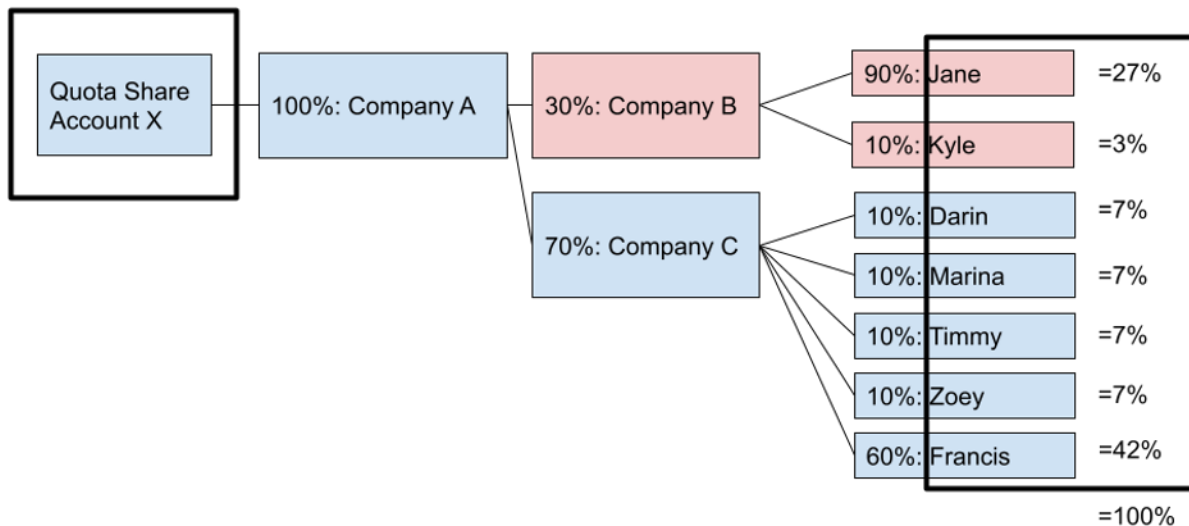


Figure 3-1. Diagram of ownership structure in Ownership Interest Database.

Table 3-2. Counts of terminal owners by owner type and percent share of total quota pounds, as recorded in the Ownership Interest Database in 2019.

Category	Number of Owners	Percent of Quota Pounds Owned
Person	239	86.9
Trust or Estate	36	7.6
Not for Profit or Government or Publicly Held Corporation	10	4.5
Unknown	n/a	1.0

Cost and Earnings Component of the EDC Survey (CE-EDC)

The CE-EDC has been collecting vessel and processor costs and earnings data since 2011 using a mandatory annual survey deployed to vessel owners. One part of the survey collects data on vessel owners' costs and earnings from leasing quota. The survey questions request:

Costs on quota pound lease: Provide the total amount paid for the lease or purchase of quota pounds, and fishing permits during 2020 in the West Coast limited entry groundfish fisheries. Include brokerage fees.

Earnings from quota pound lease: Provide the total amount paid for the lease or purchase of quota shares, quota pounds, and fishing permits during 2019 in the West Coast limited entry groundfish fisheries. Include brokerage fees. Any license or permit renewal fees should be reported in Question 19. If you did not incur a particular expense, please write **NA**.⁵

⁵Note that, for the purposes of data collection and analysis, costs and earnings from Quota Pound Lease, Quota Pound Sale, and Quota Share Lease are all treated as equivalent, since they all infer annual, one-time use of quota.

Not all quota lease earnings are captured by the CE-EDC surveys. Quota is allocated to quota share accounts (not vessels), and the quota share owners then transfer/sell the quota to vessel accounts. Earnings generated from the initial transactions between owners and vessel accounts are not necessarily captured by the CE-EDC. Earnings generated through subsequent transactions between vessels are captured by the CE-EDC. To illustrate:

Three people own Quota Share Permit A. Permit A sells 6,000 quota pounds to Vessel B. Vessel B fishes 3,000 of those pounds and sells the other 3,000 to Vessel C.

The CE-EDC survey captures the sale of 3,000 pounds between Vessel B and Vessel C. It does not capture any earnings gained by the three owners of Quota Share Permit A for the sale of the 6,000 pounds. The result is that we have incomplete information when assessing quota cash flow in the fishery. We know that quota costs were incurred by active fishing vessels, but we do not know the roles of the quota share owners that received those earnings. Through the data collected on the CE-EDC survey, we are able to analyze the quota lease revenue recorded by vessels, but lease revenues accruing to those with unknown participation remain outside the scope of previous surveys. Table 3-3 presents this concept with an example.

In Table 3-3, the lease fees recorded by vessels on CE-EDC forms (red cell) are substantially higher than the lease revenue recorded by these vessels (blue cell). The difference (green cell) is the quota lease fees paid to companies that do not submit CE-EDC forms. Without the QS-EDC, the only information the CE-EDC could provide to PFMC was that there were more quota costs recorded on the CE-EDC forms than earnings, and therefore, individuals not completing CE-EDC forms were earning quota lease revenues. No additional information was available about who was receiving these earnings or what their role in the fishery was. Furthermore, some quota share owners transfer all their quota to a vessel account that acts as a broker—selling quota to fishers for multiple quota share owners. These amounts are not captured on the CE-EDC form, because the generated revenue is not owned by the vessel account owner. In the 2016 PCGFSS, a California quota share owner described how he uses someone else’s vessel account to lease his quota:

Table 3-3. Cash flow summary table based on revenue and expenses reported by vessels on CE-EDC forms (**Owners of Active Fishing Vessels** column) for 2019.

	Owners of Active Fishing Vessels (\$)	Unknown Participation Type (\$)
Revenue		
Fishing revenue	26,063,041	
Quota lease revenue	2,903,304	3,699,436
Total Revenue	28,966,345	3,699,436
Expenses		
Crew and Captain	8,765,552	
Equipment and fishing gear	2,166,124	
Fuel and lubrication	2,110,982	
Buyback fees	964,070	
Other variable costs	1,254,115	
Observers	1,221,520	
Cost recovery fees	755,747	
Other fixed costs	1,439,123	
Quota lease fees	6,206,128	
Total Expenses	24,883,361	
Total cost net revenue	4,082,984	
Expenses and % of revenue	85.9%	

Quota Share Owner: Yeah, that's the steps it takes. He leases my trawl permit and he leases my quota share account. And then he transfers to his quota share account for his boat. That's how he uses 'em.

Interviewer: So would that be technically, like a vessel account? But you don't [own] a vessel that it's attached to.

Quota Share Owner: Yeah, I have a quota share account and he leases it and he puts it into his quota share account...

Interviewer: Okay, so you just give him that?

Quota Share Owner: Yeah. Basically, there's a lot of trust that goes on. You have to be careful when you're leasin' 'em to who you're dealin' with because they could transfer them in there and sell your pounds off forever, not just lease. There's some, it's a trust issue.

This arrangement is an example of quota revenue that would not have been captured on the CE-EDC form, despite being traded from a vessel account—but that would be captured on the new QS-EDC form.

4 Quota Share Owner Survey Component of the EDC Program (QS-EDC)

The QS-EDC fills in two data gaps, as established above, by asking for two pieces of data: 1) yes/no responses to potential descriptions of the owner's relationship to the fishery, and 2) the dollar amount earned from leasing quota by permit owners. This provides "role" information about all quota share owners, as well as complete accounting of quota earnings by quota share owners. The full survey is deployed as follows:

1. Is this quota share account solely owned by a Not-for-Profit organization?
2. Select **Yes** next to every description that applies to this person. Use the **Other** field for descriptions not listed.
 - a. Owner of a vessel that fished in the IFQ program in 2019
 - b. Owner of a vessel that fished on the West Coast in 2019
 - c. Vessel operator or crew member that fished in the IFQ program in 2019
 - d. Vessel operator or crew member that fished on the West Coast in 2019
 - e. Retired vessel operator or crew member
 - f. Previous owner of a fishing vessel, dealer or processor
 - g. Vessel operator or crew member who did not fish in 2019
 - h. Owner of a fish dealer or fish processor in 2019
 - i. Employee of a fish dealer or fish processor in 2019
 - j. Family member⁶ of any of the above
 - k. Deceased
 - l. Other role in fishing industry or fishing-related industry, please specify⁷
3. How much was received for leasing quota from this permit in 2019?

Include:

 - Gross amounts from all cash transactions, including sales, contracts, etc.
 - Any earnings occurring after self-trades (i.e. at the point the quota leaves the company)

Do not include:

 - Estimates of barter or self-trade values
 - Earnings already recorded on the 2019 EDC Catcher Vessel form, i.e. earnings received by a vessel for leasing out quota
 - Earnings already recorded on the 2019 EDC First Receiver and Shorebased Processor form, i.e. earnings received by a company for leasing out quota

Question 1 eliminates the burden of Question 2 for not-for-profit organizations. Question 2, also called the "person questionnaire," provides various descriptions of potential owner relations to the U.S. West Coast and IFQ fishery. Owners had to click **Yes** or **No** next to each description. Question 3 asks for the total permit quota leasing revenue.

⁶Family is defined as spouse, party to civil union, parents, children, and siblings (USOFR 2013).

⁷Fishing-related businesses include net suppliers, gear suppliers, equipment suppliers, fuel, shipyards, repair services, etc.; or management of fishing and fishing related business

Methods for the Quota Share Owner Survey

We deployed the Quota Share Owner Survey (QS-EDC) to owners by integrating the survey into the online annual quota share permit renewal portal hosted on NOAA's website. Every year, quota share owners log into an online portal to update ownership information and certify the renewal of their quota share permit. There can be one or more owners on each permit; however, only one person (an owner or an authorized agent) per permit logs into and completes the application and survey. This person certifies the ownership updates and survey responses at the end of the renewal. This certifier completes the person questionnaire for each individual owner, and answers Question 3 of the survey for the totality of permit earnings.

Deploying the QS-EDC as part of the online permit renewal process has multiple benefits: permit owners are familiar with and prepared to log into an online renewal portal, so integrating the survey into an established platform reduces any additional time burden; as for NOAA personnel, while new data collection tables had to be built, the mechanism to collect the input data into accessible data tables via the renewal portal already existed.

Figure 4-1 is a screenshot of the survey page within the renewal portal. After verifying address and ownership information, the certifier pages to the survey. The survey has instructions at the top, a preliminary question ascertaining if the quota share is a not-for-profit organization (if **Yes** is clicked, Question 2 disappears), "person buttons" underneath Question 2, and Question 3 with instructions at the bottom. Each person button is designated with one owner's name. Clicking on the person button opens the person questionnaire, as seen in Figures 4-2 and 4-3.

Certifiers were able to answer all, some, or none of the questions. A status marker changed from red to yellow to green based on who many of the questions within the questionnaire were answered. Certifiers were able to submit permit renewals with incomplete surveys, but received a warning that the survey was incomplete.

Survey content

Question 1

Not-for-profit entities are not required to submit ownership information. This includes trusts, quota banks, and not-for-profit organizations. If a certifier clicks **Yes** on Question 1, Question 2 disappears.

Question 2

The goal of Question 2 is to ascertain each individual owner's relationship to the U.S. West Coast and IFQ fisheries. The yes/no questions provide several categories of engagement: current, previous, or retired operator or crew member on an IFQ or U.S. West Coast fishing vessel; employee of a processor; current or previous owner of a vessel or processor; family member of any of the previous; and a selection for **Other** which provides a box to write in an association. There were also categories for quota share owners with no affiliation to the fishing industry, and for unknown affiliations (certifiers may not know details on every owner), deceased owners, and owners that are no longer on the permit.

Step 4 QS Survey OMB Control No. 0648-0618 Expiration Date: 04/30/2021

Quota Share Permit
Quota Share Owner Name

Who is responsible for submitting: All owners of a Quota Share permit and account.
Complete all questions. This Quota Share Permit cannot be renewed until this survey is complete. The survey will not be considered complete unless there is an answer to every question.
More information [click here](#) or contact Erin Steiner at nwfsco.edc@noaa.gov / (206)-860-3215.

Quota Share Owners Survey

1.) Is this quota share account solely owned by a Not-for-Profit organization? Yes No

2.) For each owner/partial owner of this quota share permit, click on a card and provide relevant information.

Owner 1

Click to Select Roles

Owner 2

Click to Select Roles

3.) How much was received for leasing quota from this permit in 2020?

Include:

- gross amounts from all cash transactions, including sales, contracts, etc.
- any earnings occurring after self-trades (i.e. at the point the quota leaves the company).

Do not include:

- estimates of barter or self-trades values
- earnings already recorded on a 2020 EDC Catcher Vessel form; i.e. earnings received by a vessel for leasing out quota
- earnings already recorded on a 2020 EDC First Receiver and Shorebased Processor form; i.e. earnings received by a company for leasing out quota

\$

Figure 4-1. Quota Share Owner Survey, main page. The year referenced in the survey is the year prior to the current year. When the quota share owners accessed the survey during permit renewal in 2020, the survey referenced 2019. These screenshots were taken in 2021, and reference 2020.

QS Survey Roles X

Owner:

Select yes next to every description that applies to this person. Use the "Other" field for descriptions not listed.

Owner of a vessel that fished in the IFQ program in 2020	<input type="radio"/> Yes <input type="radio"/> No
Owner of a vessel that fished on the West Coast in 2020	<input type="radio"/> Yes <input type="radio"/> No
Vessel operator or crew member that fished in the IFQ program in 2020	<input type="radio"/> Yes <input type="radio"/> No
Vessel operator or crew member that fished on the West Coast in 2020	<input type="radio"/> Yes <input type="radio"/> No
Retired vessel operator or crew member	<input type="radio"/> Yes <input type="radio"/> No
Previous owner of a fishing vessel, dealer or processor	<input type="radio"/> Yes <input type="radio"/> No
Vessel operator or crew member who did not fish in 2020	<input type="radio"/> Yes <input type="radio"/> No
Owner of a fish dealer or fish processor in 2020	<input type="radio"/> Yes <input type="radio"/> No
Employee of a fish dealer or fish processor in 2020	<input type="radio"/> Yes <input type="radio"/> No
Family[2] member of any of the above	<input type="radio"/> Yes <input type="radio"/> No

Close
Save

Figure 4-2. Quota Share Owner Survey, Question 2 (person questionnaire). Part 1.

QS Survey Roles

Vessel operator or crew member who did not fish in 2020	<input type="radio"/> Yes <input type="radio"/> No
Owner of a fish dealer or fish processor in 2020	<input type="radio"/> Yes <input type="radio"/> No
Employee of a fish dealer or fish processor in 2020	<input type="radio"/> Yes <input type="radio"/> No
Family[2] member of any of the above	<input type="radio"/> Yes <input type="radio"/> No
No other affiliation with fishing industry	<input type="radio"/> Yes <input type="radio"/> No
Affiliation unknown	<input type="radio"/> Yes <input type="radio"/> No
No longer an owner of this Quota Share permit	<input type="radio"/> Yes <input type="radio"/> No
Deceased	<input type="radio"/> Yes <input type="radio"/> No
Other role in fishing industry or fishing-related industry[1], please specify	<input type="radio"/> Yes <input type="radio"/> No

[1] Fishing-related businesses include net suppliers, gear suppliers, equipment suppliers, fuel, shipyards, repair services, etc.; or management of fishing or fishing related business.
 [2] Family is defined as spouse, party to a civil union, parents, children, and siblings (13 C.F.R. § 121.103(f))

Close Save

Figure 4-3. Quota Share Owner Survey, Question 2 (person questionnaire). Part 2.

Question 3

Question 3 asks for the total cash value of quota leased from this permit account. Many quota share owners also own vessels that fish in the IFQ program and therefore complete CE-EDC surveys. In order to prevent double-counting, we instruct the certifier to exclude amounts already listed on the CE-EDC surveys.

Survey participants

The population was all owners of a quota share permit with a greater than 2% stake in the quota share. In 2019, there were 239 individual permit owners owning 167 permits, plus 15 permits owned by trusts, quota banks, or NGOs (all not required to submit owner-level detail). Sixty-five people owned more than one quota share permit, and 77 permits were owned by more than one person. Because the survey was integrated into the permit renewal system, we only received survey responses from permits that were renewed in 2020 (for the 2021 fishing year). We had 227 people respond on 151 renewed permits, plus 14 trusts, quota banks, and NGOs. Our response rate was therefore 95% of individuals and 91% of permits.

For each permit, only one person logs into the permit renewal system and completes the process, including the survey. This certifier had from 1 October through 30 November 2020 to complete the survey—the same time period allowed for permit renewal.

QAQC process

We tracked survey responses as they were submitted by creating a real time dashboard in the open source statistical computing package RStudio. The dashboard presented two types of information—information on individual owners, and information on the permit as a whole. The dashboard alerted staff to completely blank person questionnaires or questionnaires with only **No** responses (Question 2). The dashboard also presented all of the lease information available for all vessels within the same ownership group as the quota share permit. This includes lease values reported on the QS-EDC and CE-EDC, as well as the quota transactions database. Presenting lease information for all available information sources allowed staff to evaluate whether any double-reporting was occurring, or if there were missing lease values. We completed other QAQC manually, compiling further research if any quota accounts entered \$0 for cash value but had a significant amount of quota pounds leave their account to an unassociated fishing vessel. In order to compile and compare these dashboard data, we constructed a network analysis of people, quota shares, and vessels by using ownership data.

The RStudio package `networkD3` (Allaire et al. 2017) was used to create network diagrams and Sankey graphs using JavaScript. With `networkD3`, we were able to join vessels and quota share accounts by common owner name. Using these name-to-name joins, we created network diagrams of vessel and quota share account overlap. These diagrams ranged from simple to complex. A simple diagram, for example, represents a small number of owners owning the same quota share account and the same vessel. This relationship is illustrated in Figure 4-4. In the figure, one vessel is linked to one quota share owning company through the common owners (person nodes). One of the most common ownership structures in the fishery is a company owned by a husband and wife who own one quota share account and one vessel.

A complex ownership network is when multiple owners own multiple vessels and quota shares, but overlap in ownership on only one or some of these vessels and quota shares. A complex owner network is illustrated in Figure 4-5. With a network like this one, tracing quota leasing amounts between quota shares and vessels can be difficult. Mapping these connections allows us to more accurately complete quality control by cross-checking the quota leasing values reported in the CE-EDC surveys.

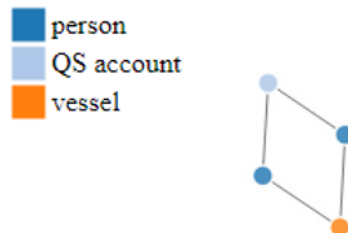


Figure 4-4. A simple ownership network.

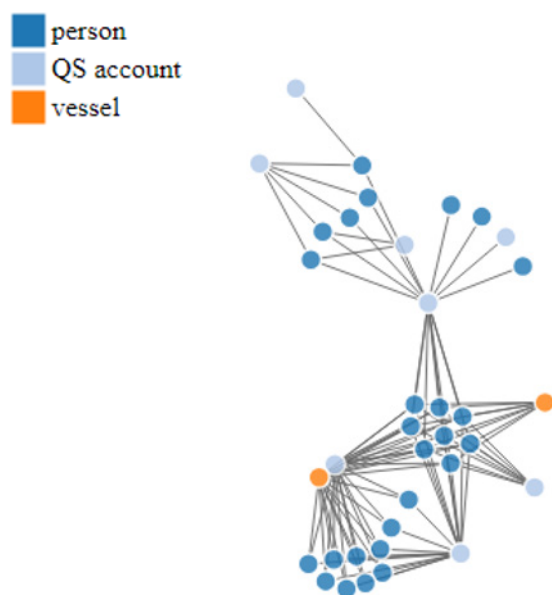


Figure 4-5. A complex ownership network.

Using the transactions database and the network analysis, we were able to track important common survey user errors via the RStudio dashboard. Errors on the person questionnaire (Question 2) include: leaving all person-specific questions blank, selecting only **No** responses, and entering conflicting information across permits. Errors associated with Question 3 include: leaving it blank, duplicating the amount quota leasing revenue value entered on the CE-EDC survey, and entering an incorrect value. We contacted 34 permit owners to discuss potential survey issues. Table 4-1 displays the total contacts by issue.

Table 4-1. Survey issues requiring follow-up.

Issue	Number of Permits Contacted
Quota cash value amount entered not supported by transactions data	15
Empty person questionnaire (all blanks)	11
Conflicting person questionnaire	5
Only Nos on person questionnaire	3

Upon survey completion, the certifier enters their contact phone number and email address. When issues with the survey arose, we contacted certifiers via the information they provided.

Question 2 errors: Empty person questionnaire (all questions left blank), conflicting person questionnaires, and only **No** answers on the person questionnaire.

Using the person-level information compiled in the R dashboard, we were able to flag any inconsistencies or errors in Question 2. We set up the dashboard to flag an owner (by name) if a certifier submitted a person questionnaire that was either all blank or all-**No** responses. To reduce overall time burden in the case of omissions for these multiple permit owners (65 individuals), a complete answer to Question 2 on one permit was applied to other permits under the same ownership. For example, if Jane is on Permits X, Y, and Z, and only Permit X completes the person questionnaire for Jane, Jane’s person questionnaire is considered completed and Permits Y and Z will not be contacted for that information. We set up the RStudio dashboard alert to specify how many permits the owner has an ownership stake in and to remove the notification after at least one survey is completed for that owner.

A certifier entering only **No** responses results in a contradiction. Only **No** responses would mean the certifier answered **No** for **Unknown Affiliation**, implying that the certifier knows the affiliation but did not provide an answer. We contacted these survey certifiers unless the quota share owner owned another permit that was completed with noncontradictory information.

Anecdotal conversations with certifiers who left Question 2 completely blank suggested that these certifiers did not understand they were supposed to click on the person buttons to open Question 2. Provided no other certifier submitted completed person questionnaires on owners with all blanks, we called these certifiers and read them the yes/no questions over the phone.

The dashboard also enabled resolution of conflicting responses on multiple permits. We waited until certifiers completed all surveys and then compared all responses for each individual. For the 65 owners on multiple permits, only five had conflicting person questionnaires.

Question 3 Errors: Quota cash value entered not supported by transactions data, or quota cash value entered same as CE-EDC survey value.

Certifiers submitted 15 surveys where the transaction database information did not support the lease cash value entered in Question 3. Frequently, this meant the survey amount was \$0 or blank; however, we were able to see quota transferred from the quota share accounts to vessel accounts. Quota owners can select **Self-trade** when making a transfer, thus providing a reasonable justification for the \$0 cash value. If a quota transfer was not marked **Self-trade** and the quota cash value amount on the survey was \$0, we called the survey certifier to discuss the outcome. In all cases, we were able to confirm that either: a) \$0 was correct, b) the certifier did not see Question 3, or c) the certifier did not understand the question. All contacted certifiers provided the missing information.

A second issue that required correction was instances of duplication of the QS-EDC earnings, with the same amount entered on a CE-EDC survey of vessel-level sales. Using the ownership network analysis, we connected vessels to quota shares through common owners. The RStudio dashboard displayed the CE-EDC quota leasing value for all vessels in the individual's ownership grouping. We were able to contact these owners and discuss if they had double-counted the amounts listed on the surveys. If so, we clarified which survey the amount should have been entered on (i.e., were these vessel-level sales or quota share account-level sales) and corrected the data.

Caveats/Issues/Notes/Fine Print

Comparing total reported quota revenues and quota costs

In [Section 3](#), we described the CE-EDC survey that surveys vessel owners for costs of buying quota as well as revenue from leasing out quota. Because only vessel accounts can purchase (lease) quota, the total CE-EDC survey leasing cost should equal the sum of the CE-EDC survey and the QS-EDC survey lease revenues. Using 2019 data, combined quota revenue (CE + QS) is greater than the quota costs captured on the EDC surveys by \$396,620 (Figure 4-6); this represents 6.0% of the combined EDC quota revenue.

There are several explanations for why this discrepancy may be occurring in the data; two of these

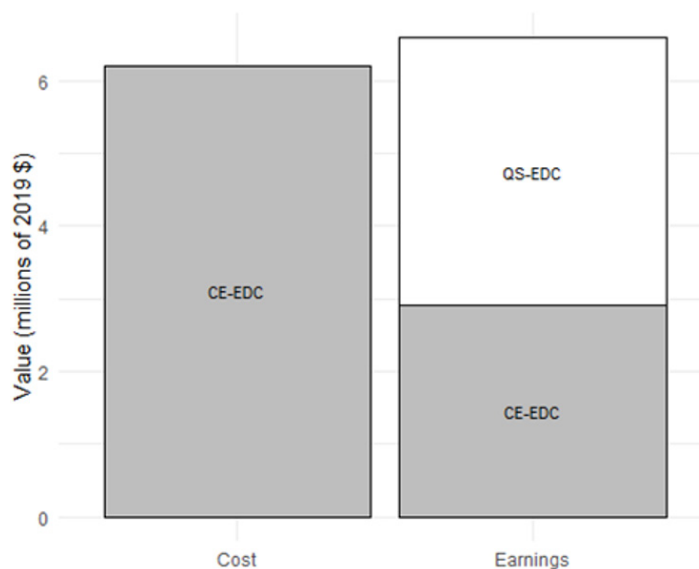


Figure 4-6. Quota leasing revenues (CE-EDC + QS-EDC surveys) compared to CE-EDC quota leasing costs.

issues relate to the structure of the CE-EDC survey design. First, the CE-EDC survey only surveys vessels with limited entry trawl permits—but, to purchase quota, a vessel only needs to have an associated vessel account. These “vessel account-only” vessels cannot fish in the IFQ program without a limited entry trawl permit, but are used by companies to “store” quota until they can be transferred onto a fishing vessel. In 2019, of the eight vessels that had vessel accounts and received quota pounds from a quota share account—and of the 109 vessels that had vessel accounts and received quota pounds from other vessel accounts—a total of 12 did not have a limited entry trawl permit and therefore did not submit CE-EDC or QS-EDC surveys. Further, 118 vessel accounts sold quota, but those 12 vessels without trawl permits did not fill out CE-EDC forms. The implication is that there are unaccounted-for quota costs and revenues. The total value of the quota transactions by these 12 vessels as reported in the transactions database (with all the previous caveats about the unreliability of that information) was approximately \$382,000.

The second survey design-related explanation for the discrepancies between the total CE-EDC costs and quota lease revenue is that we collected the CE-EDC survey on a fiscal-year basis. Fiscal years can vary by organization. It is common for vessels to shift their fiscal year in order to accommodate fishing seasons such as the crab season, which often spans calendar years. For convenience, we allow businesses to report costs and earnings based on their own fiscal-year calculations. This means that vessel owners report their quota costs for their entire fishing year. Quota share owners report their quota lease earnings on the QS-EDC survey based on the calendar year.

In addition to these structural issues, there are also limitations to the program, such as a time lag between earnings and survey collection, the limitations of self-reported data (self-reported data bias; Dillman 2000), and misunderstanding the question. Although we contacted quota share owners that had large discrepancies between their answer to Question 3 and what we saw in the transactions database, we are unable to identify smaller discrepancies in reported cash values. It is possible the sum of these differences contributed in part to the \$396,620. It is also possible that there was under-reporting in the CE-EDC survey on the costs side. As additional years of data are collected, we will continue to improve our QAQC process to more effectively identify inaccuracies.

Barter, contracts, and Pacific whiting

In interpreting the quota value results of this survey, it is important to remember that not all quota owners trade quota for a cash value. In the transactions database, 25 transactions were classified as **Barter**, six as **Cash and Barter**, and 179 as **Other** in 2019 (out of 690 total transactions). Further classifying the **Other** transactions was beyond the scope of this study. Additionally, this survey may not capture the complete economic value of barter trades. The 2016 PCGFSS captured this idea in an interview with a California quota share owner:

Interviewer: Is it, when you need to add in more pounds or whatever, are you doing it to cover a deficit or anticipating one?

Quota Share Owner: Yeah, what we do is, like with our hake quota, we trade that to, to guys for black cod.

Interviewer: Okay.

Quota Share Owner: And then at the end of the year if I go over on the black cod or channel rock, I got a couple of really good friends that have giant-ass hake boats. They always need rock cod and stuff, so we'll trade 'em rock cod to cover what I've gone over on.

Interviewer: Okay, so you're able to trade rather than have to go out and buy pounds?

Quota Share Owner: Yeah. Luckily, available to trade.

Bartering between friends or associates, as described in this interview, facilitates quota trading when needed; however, the market value of the quota is not visible. Similarly, it is common for processors with quota holdings to transfer Pacific whiting quota to delivering catcher vessels with no shared ownership at no cost to the vessels. While these transactions may result in exclusive processing agreements between the vessel and the processor, there are no cash transactions involved with these quota transfers.

5 Results

Participation Types

The QS-EDC survey consists of just three questions. The first question identifies the entities that do not need to report participation information: trusts/estates, not-for-profit companies, government entities, and publicly held corporations. The only purpose of this question is to facilitate determining whether further information about participation is required.

The survey has two data-gathering questions: Question 2, the “person questionnaire,” and Question 3, which asked for the permit’s total lease revenue. For Question 2, owners could check off as many **Yes** responses as are applicable to their personal situation. Table 5-1 and Figure 5-1 display all **Yes** responses in two different ways. Table 5-1 displays the total tally of **Yes** responses. Each **Yes** represents one owner, but because each owner can check **Yes** for multiple roles, the numbers are not additive. In the alluvial plot following in Figure 5-1, the bar sections represent owners responding **Yes** to the questions related to the categories displayed in the legend. The lines between the bars represent individual owners as they respond **Yes** to multiple different categories. For example, the dark blue bar representing *Any fishing or processing* has many lines flowing into *Owner of vessel or processor*, showing the overlap between active fishers and processors and owners of vessels and processors.

Table 5-1. Number of quota share owners and percent of total quota pounds owned by participation type (*Category*). These categories are not mutually exclusive and do not include the responses from entities that were not required to submit participation information.

Category	Number Owners	Percent Quota Pounds Owned	Category	Number Owners	Percent Quota Pounds Owned
Owner of a fishing vessel that fished on the West Coast	159	72	No affiliation with the fishing industry	4	3
Owner of a fishing vessel that fished in the IFQ program	130	67	Previous owner of a fishing vessel, dealer, or processor	26	6
Family member of anyone fitting the other category descriptions	112	40	Employee of a fish dealer or fish processor	21	16
Owner of a fish dealer or processor	58	23	Vessel operator or crew member who did not fish	21	10
Retired vessel captain or crew member	49	30	Affiliation unknown	6	3
Vessel operator or crew member that fished on the West Coast	46	15	No longer an owner of this quota share permit	4	1
Other role in the fishing industry or in a fishing-related industry	41	20	Deceased	4	2
Vessel operator or crew member that fished in the IFQ program	34	12	No Response	12	1.3

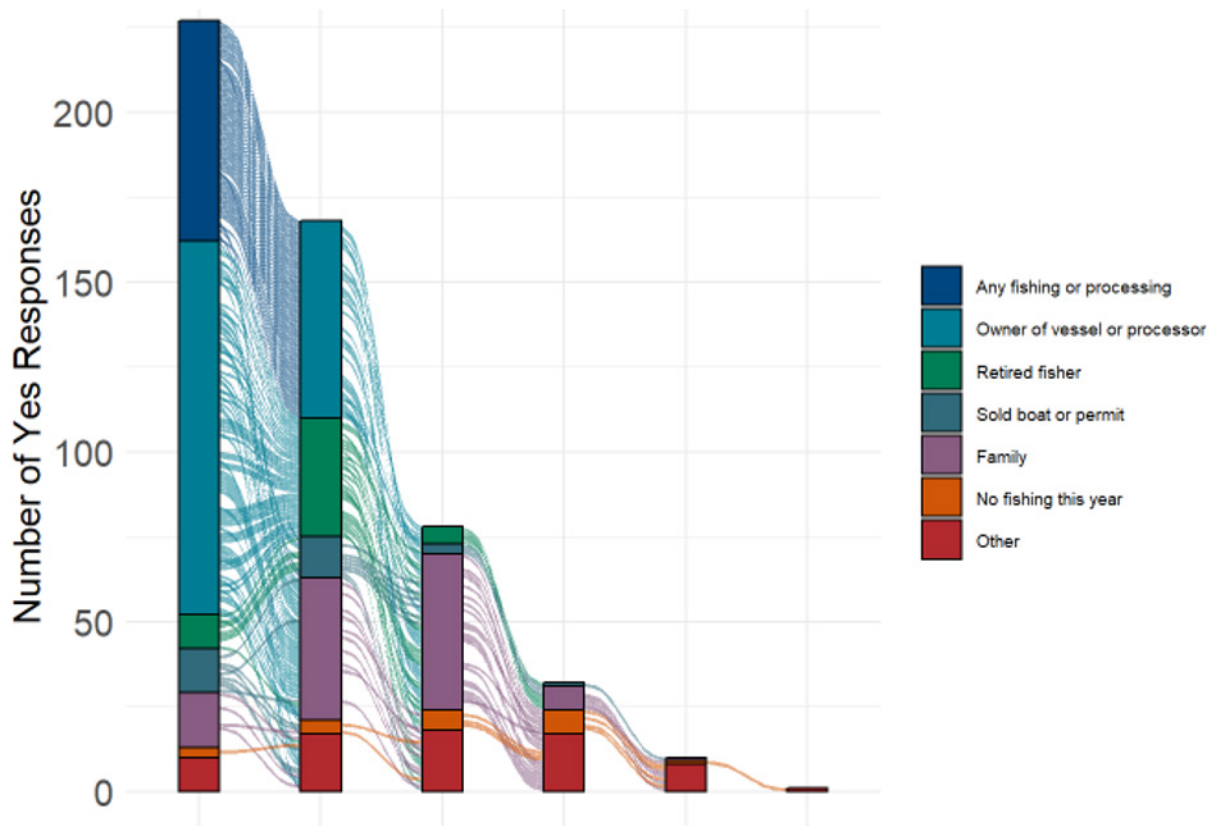


Figure 5-1. Alluvial plot of all **Yes** responses to Question 2: fishery participation characteristics.

Twelve owners of quota shares in 2019 did not renew their permits in 2020 for 2021. We assigned those individuals to the **No Response** category, and they account for 1.3% of all quota pounds owned at the end of 2019.

Following the alluvial plot flow, 65 quota share owners responded that they had participated in any fishing or processing in 2019 (**Vessel operator or crew member that fished on the West Coast, Vessel operator or crew member that fished in the IFQ program, and/or Employee of a fish dealer or fish processor**). Of these 65 fishing and/or processing quota share owners, 89% (58 individuals) also owned a vessel or processor that operated in 2019 (**Owner of a fishing vessel that fished on the West Coast, Owner of a fishing vessel that fished in the IFQ program, and/or Owner of a fish dealer or processor**). Next, 110 quota share owners owned a vessel or a processor but did not actively fish or process (**Owner of a fishing vessel that fished on the West Coast, Owner of a fishing vessel that fished in the IFQ program, and/or Owner of a fish dealer or processor**). Of these vessel/processor owners who didn't fish, 32% are retired fishers (35 individuals) and 34% (37 individuals) are family members of other fishery participants (**Retired vessel operator or crew member and Family of any of the above**). Of the 112 quota share owners that responded **Yes** to **Family of any of the above**, only 12 had no other connection. Ten quota share owners are retired fishers who do not own vessels or processors. Of these ten retired fishers, 60% previously owned a boat (**Previous owner of a fishing vessel, dealer, or processor**). These figures are meant to illustrate the overlapping participation characteristics of quota share owners.

Capital Ownership and Participation Type

The fishery participation characteristics of quota share owners can be assigned to mutually exclusive categories. For illustrative purposes, we developed one set of categories that focus on whether an individual was active in the fishery and/or was a capital owner. New analyses can easily be performed based on specific PFMC or analytical needs.

A common topic of discussion around quota share ownership and lease earnings is whether the individuals who own quota are “active participants” in the fishery. This was a key question in the five-year review of the Trawl Catch Share Program. The survey was designed for flexibility in designating whether a quota share owner is active; for the purposes of this analysis, we consider quota share owners who actively fish or process as “active.” In survey question terms, this means the owner responded **Yes** to at least one of the three descriptions:

- **Vessel operator or crew member that fished on the West Coast in 2019**
- **Vessel operator or crew member that fished in the IFQ program in 2019**
- **Employee of a fish dealer or fish processor in 2019**

Similarly, we consider capital ownership to mean owning a vessel or processor that fished or processed in 2019. Another common question is whether the individuals who own quota also have other investments in the catch share fisheries. We consider quota share owners who own vessels or processors to be “capital owners.” A small number of owners owned vessels in 2019, but those vessels did not fish in 2019. This situation would result in potential quota transactions from a vessel account, but a **No** response to the questions above. In survey question terms, this means the owner responded **Yes** to at least one of the three descriptions:

- **Owner of a fishing vessel that fished on the West Coast in 2019**
- **Owner of a fishing vessel that fished in the IFQ program in 2019**
- **Owner of a fish dealer or processor in 2019**

From Table 5-1, we know that 159 quota share owners responded that they owned a vessel that fished on the U.S. West Coast in 2019, 130 responded **Yes** to owning a vessel that fished in the IFQ program, and 58 quota share owners responded that they own a fish dealer or processor; while 46 quota share owners responded they are active captains or crew members on the U.S. West Coast (also 46 for IFQ), and 21 are employees of fish dealers and processors. All quota share owners can be divided into the four categories summarizing capital ownership and active participation, as displayed in Table 5-2. Nearly half of all quota share owners were categorized as *Inactive, Capital Owner*. These are individuals who owned quota shares and were also owners of a vessel, fish dealer, or processor, and were not a captain, crew member, or employee of a fish dealer or processor. The next highest category, representing just over one-quarter of all quota share owners, was *Active, Capital*—individuals who both owned a vessel, fish dealer, or processor, and were also a captain, crew member, or employee of a fish dealer or processor. Calculated separately, 71% of all quota share owners were classified as *Inactive* and 73% of quota share owners were classified as *Capital Owners*. We calculate the percent of quota pounds owned by first converting the quota from metric tons to pounds.

Table 5-2. Capital ownership and participation.

Status	Number of Quota Share Owners	Percent of Quota Pounds Owned
Inactive, Capital Owner	110	44
Active, Capital Owner	58	29
Inactive, No Capital	52	12
Active, No Capital	7	<1
Trust, Estate, Not-for-Profit, Government, or Publicly Held Corporation	46	13
No Response	12	1
Unknown	n/a	1

Table 5-3 assigns individual quota share owners into mutually exclusive categories based on the activities of the vessels they own: those that owned vessels that fished in the IFQ fishery (responded **Yes** to West Coast and **Yes** to IFQ), those that fished on the U.S. West Coast but not in the IFQ fishery (**Yes** to West Coast but **No** to IFQ), and those that did not own a vessel that fished on the U.S. West Coast in 2019. Owners that also owned a vessel that fished owned 72% of all quota pounds issued in 2019.

Table 5-3. Quota share owners by vessel participation.

Vessel Activity	Number of Quota Share Owners	Percent of Quota Pounds Owned
IFQ Fishing	130	67
Non-IFQ, West Coast Only	29	5
No Participation	68	15
Trust, Estate, Not-for-Profit, Government, Publicly Held Corporation, No Response, or Unknown	n/a	13

Table 5-4 breaks out the quota share owners by designations that will be helpful in interpreting data results presented in the rest of Section 5. In 2019, 46 quota share owners actively fished, 49 were retired vessel captains or crew members, 65 actively fished or processed, and 168 owned capital (vessel or processor). These categories are not mutually exclusive.

Table 5-4. Select quota share owner designation categories.

Category	Number of Quota Share Owners	Percent of Quota Pounds Owned
Fisher	46	15
Retired	49	30
Active	65	30
Capital Owner	168	73

Geographic Distribution of Quota Share Owners

The West Coast Region’s Permits and Monitoring Branch has collected ownership information on quota share owners since 2011. With the new survey data, we were able to join the addresses from the original collection to the QS-EDC data by owner name, allowing us to analyze fishery roles and participation by owner location. Table 5-5 includes all quota owners and their state of residence.

Table 5-5. Quota share owners by state of residence. Not included: locations of trusts, estates, and publicly held corporations.

State	Number of Quota Share Owners
WA	89
OR	92
CA	41
Other	5

Capital Ownership and Active Status of Quota Share Owners, by State

Using the same information about active fishery participation and capital ownership from Table 5-1, we were able to join the owner location data to understand the geographic distribution of active participation and capital ownership. Table 5-6 divides the four previously mentioned categories by their geographic locations: Oregon, California, Washington, and other states. Table 5-7 presents quota share owners that also owned vessels that fished on the U.S. West Coast in 2019. These quota share owners are broken out by state of residence.

Table 5-6. Number of owners and their share of total quota pounds (QP), by status and state of residence.

Status	WA		OR		CA		Other States	
	Owner Count	% QP Owned	Owner Count	% QP Owned	Owner Count	% QP Owned	Owner Count	% QP Owned
Active Capital Owner	20	7.5	24	16.5	13	3.5	***	***
Active, No Capital	4	0.2	3	0.7	0	0	***	***
Inactive Capital Owner	47	10.7	39	27.6	21	3.4	***	***
Inactive, No Capital	18	4.9	26	4.6	7	2.4	***	***
Total	89	23.3	92	49.3	41	8.4	5	4.6

*** Asterisks indicate that data are suppressed to protect confidential information.

Table 5-7. Number of quota share owners that owned a vessel that fished on the U.S. West Coast in 2019, by state of residence.

State	Number of Quota Share Owners	
	Owning IFQ Vessels	Owning Non-IFQ Vessels
WA	51	8
OR	55	8
CA	20	13
Other	4	0

Table 5-8. Retired fishers who own quota shares, by state of residence.

State	Number of Retired Fishers Owning Quota Shares
WA	22
OR	16
CA	7
Other	4

In total, 49 quota share owners described themselves as retired fishers (Table 5-8). The largest number was in Washington (22) and the lowest was California (7). These are individuals who previously fished on the U.S. West Coast, but are no longer working on a fishing boat. These individuals can have other characteristics, such as vessel owner or other industry affiliations.

Distribution of Quota Lease Earnings

In 2019, quota share permit owners reported a total of \$3.7 million (QS-EDC), and vessel owners reported a total of \$2.91 million (CE-EDC), earned from leasing quota, for a total of \$6.61 million in quota lease earnings. Ownership information for both quota share permits and vessels was combined to assign each recipient of quota earnings to one of three categories: quota share and vessel owner, only vessel owner, and only quota share owner (Table 5-9). Only 6% of total quota earnings were paid to non-quota share owners (i.e., individuals or entities that only own a vessel). These quota lease earnings resulted from the transfer of quota from a quota share account to an unaffiliated vessel account; the quota was then resold by someone who only owns a vessel.

Table 5-9. Total quota earnings by survey (CE-EDC and QS-EDC), quota share ownership, and vessel ownership, in millions of dollars.

Data Source	Owner of Quota Share and Vessel	Owner of Vessel Only	Owner of Quota Share Only	Total
CE-EDC	\$2.49	\$0.42	—	\$2.91
QS-EDC	\$1.77	—	\$1.93	\$3.70
Total	\$4.26	\$0.42	\$1.93	\$6.61

Assuming quota revenue generated by quota accounts is distributed pro rata to stakeholders' ownership shares (quota share- or vessel-owning company), we can calculate earnings accruing to owner participation categories. The revenues in Figure 5-2 report quota earnings recorded on both the QS-EDC (green) and CE-EDC (blue) surveys. The categories include the four categories from Table 5-2 that are not required to provide ownership information. To show the complete distribution of quota earnings, independent of the survey instrument, the quota earnings from the CE-EDC survey are also provided. The *No Response* category is not included because no lease information was reported for those permits.

Owners who owned capital but did not fish or process earned the most revenue from leasing quota (about \$2.56 million). Owners who fished or processed but did not own a vessel or a processor earned the least revenue from leasing quota (approximately \$85.4 thousand). Approximately \$8,000 is attributed to *Unknown* ownership. This revenue is accruing to individual owners with a less than 2% ownership stake, and to vessel owners who do not own any quota shares and therefore did not report participation types on the QS-EDC survey, despite reporting earnings on the CE-EDC survey. There is a small portion of CE-EDC earnings reported to vessels owned by quota share owners who responded on the QS-EDC survey that they did not own a vessel that fished in 2019. These vessel/quota share owners own a vessel that did not actively fish, but traded quota through the vessel accounts. Estates and trusts earned approximately \$406,000, and not-for-profit organizations, government entities, and publicly held corporations combined earned approximately \$407,000 from quota leasing in 2019. None of these categories of participants are required to report participant information through the QS-EDC survey.

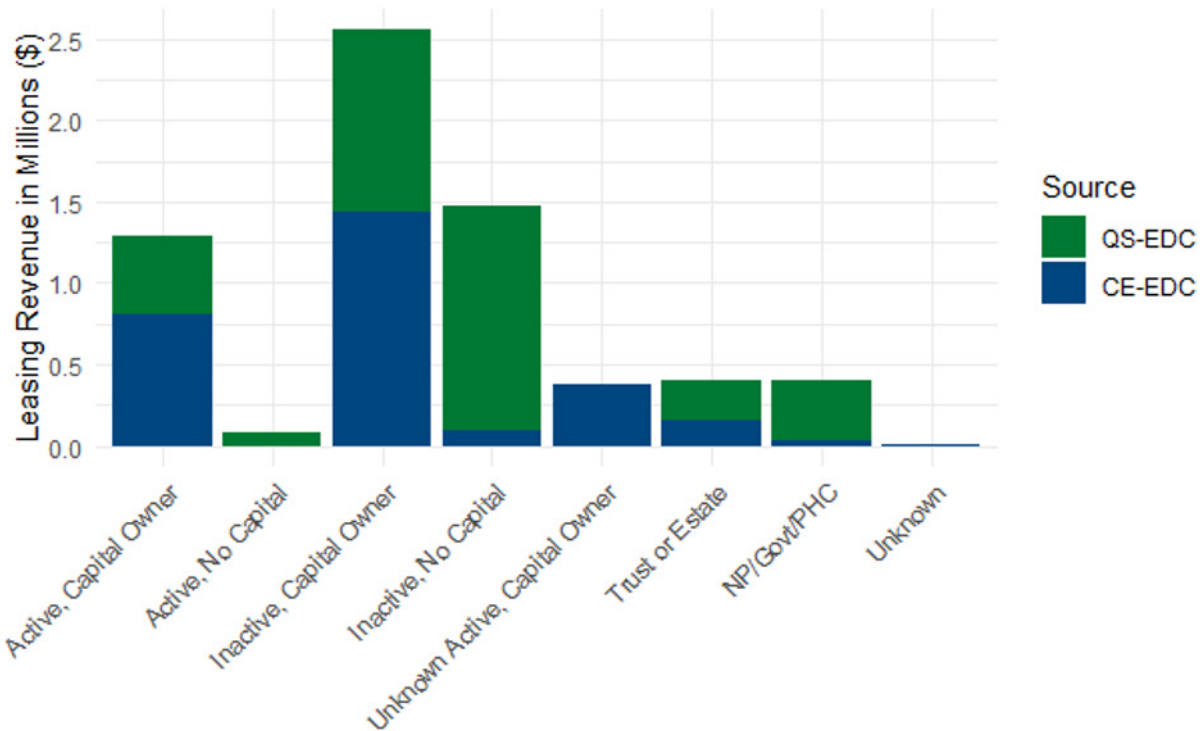


Figure 5-2. Quota revenue (2019) by owner participation in 2019, including trusts, estates, not-for-profit organizations, government entities, and publicly held corporations.

We use the address information described above to present quota share owners and their earnings by geographic data. Table 5-10 displays this information.

Table 5-10. Quota share leasing revenue, by state and participation status. Data sources: CE-EDC, QS-EDC.

Owner Participation	Washington	Oregon	California & Other States
Active, Capital Owner	\$216,699	\$775,508	\$291,123
Active, No Capital	\$17,389	\$68,000	n/a
Inactive, Capital Owner	\$700,783	\$1,410,389	\$183,290
Inactive, No Capital	\$603,563	\$706,399	\$166,128
Trust or Estate	\$207,166	\$78,070	\$120,827
Unknown Active, Capital Owner	\$314,870	\$60,000	\$5,118
Not-for-Profit/Government/Publicly Held Corporation	—	—	\$406,886
Unknown	—	—	\$7,976

Incorporating NOAA Fisheries social indicators for coastal communities

NOAA Fisheries maintains commercial fishing community engagement and reliance indices. The commercial fishing engagement index “measures the presence of commercial fishing through fishing activity as shown through permits, fish dealers, and vessel landings. A high rank indicates more engagement,” while the commercial fishing reliance index “measures the presence of commercial fishing in relation to the population size of a community through fishing activity. A high rank indicates more reliance.”⁸ Using these indices and our database of quota share owner addresses, we are able to analyze the Quota Share Owner Survey results by community reliance and engagement. To transform the engagement and reliance scores into low, moderate, and high categories, we used the following methodology from Colburn et al. (2016):

Factor scores for each community were ranked based on standard deviations into the following categories: High (1.00 SD), Moderate (.500–.999 SD) and Low (.500 SD).

Tables 5-11 and 5-12 include people, trusts, estates, not-for-profits, government entities, and publicly held corporations. The majority of quota share owners live in high-engagement, low-reliance communities. To maintain confidentiality standards, information on the owners living in high-reliance communities is suppressed from this analysis (asterisks). Similarly, total quota lease revenue by community engagement and reliance profile shows that most quota lease revenue accumulates in high-engagement, low-reliance communities.

Table 5-11. Number of quota share owners by community engagement category. Revenue is in millions of dollars.

Engagement	Number of Owners	Total Lease Revenue
Low	83	\$0.99
Moderate	7	\$0.37
High	153	\$1.60
Area Not Ranked	30	\$0.74

Table 5-12. Number of quota share owners by community reliance category. Revenue is in millions of dollars.

Reliance	Number of Owners	Total Lease Revenue
Low	203	2.52
Moderate	33	0.41
High	***	***
Area Not Ranked	30	0.74

⁸<https://www.fisheries.noaa.gov/national/socioeconomics/social-indicators-coastal-communities>

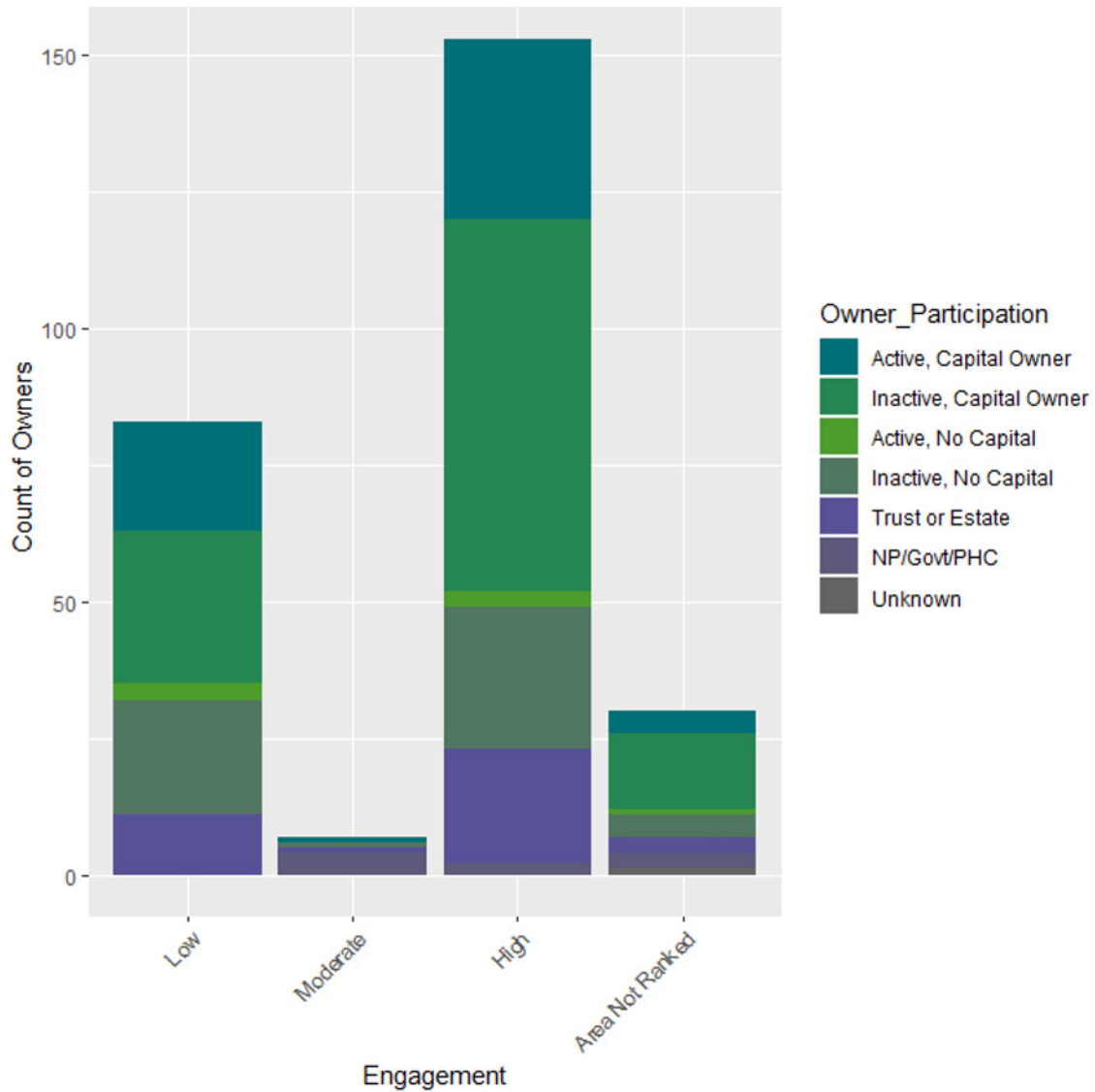


Figure 5-3. Quota share owner lease revenue totals, by community engagement factor and owner participation.

Figures 5-3 and 5-4 break out quota share leasing revenue by community engagement and reliance profile, respectively, and by owner participation status. In Figure 5-3, each owner participation group was most likely to be in a high-engagement community, except for *NP/Gov't/PHC*, which were most common in moderate-engagement communities. *Inactive, Capital Owner* was the most common owner participation group in low- and high-engagement communities, with *NP/Gov't/PHC* the most common in moderate-engagement communities. In Figure 5-4, each owner participation group was most likely to be in a low-engagement community. *Inactive, Capital Owner* was the most common owner participation group in low- and moderate-engagement areas, with high-engagement areas suppressed to comply with confidentiality requirements.

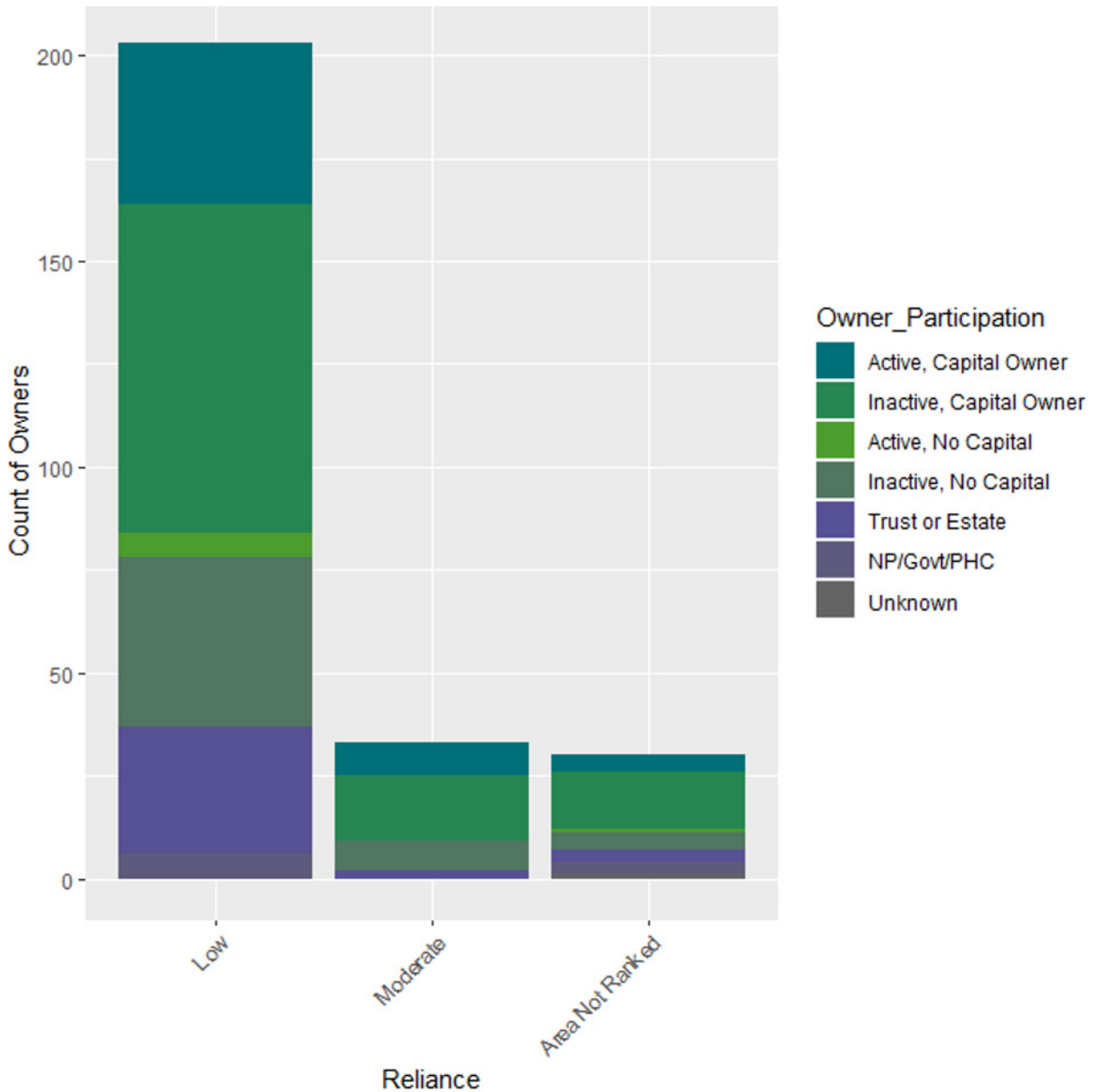


Figure 5-4. Quota share owner lease revenue totals, by community reliance factor and owner participation. High-reliance communities are not reported for data confidentiality reasons.

Leasing revenue by quota pounds in quota share account

Using the ownership network analysis from [Section 3](#), we also analyzed quota share owners’ reported quota lease earnings in relation to the amount of quota pounds owned. We summed the total lease revenue and the total pounds across all quota share accounts within an ownership grouping. The results, excluding Pacific whiting quota, are shown in Figure 5-5, and the results including Pacific whiting are in Figure 5-6. Note that while we are able to parse out Pacific whiting pounds when looking at quota pounds, the quota lease revenue is not reported by species on the QS-EDC.

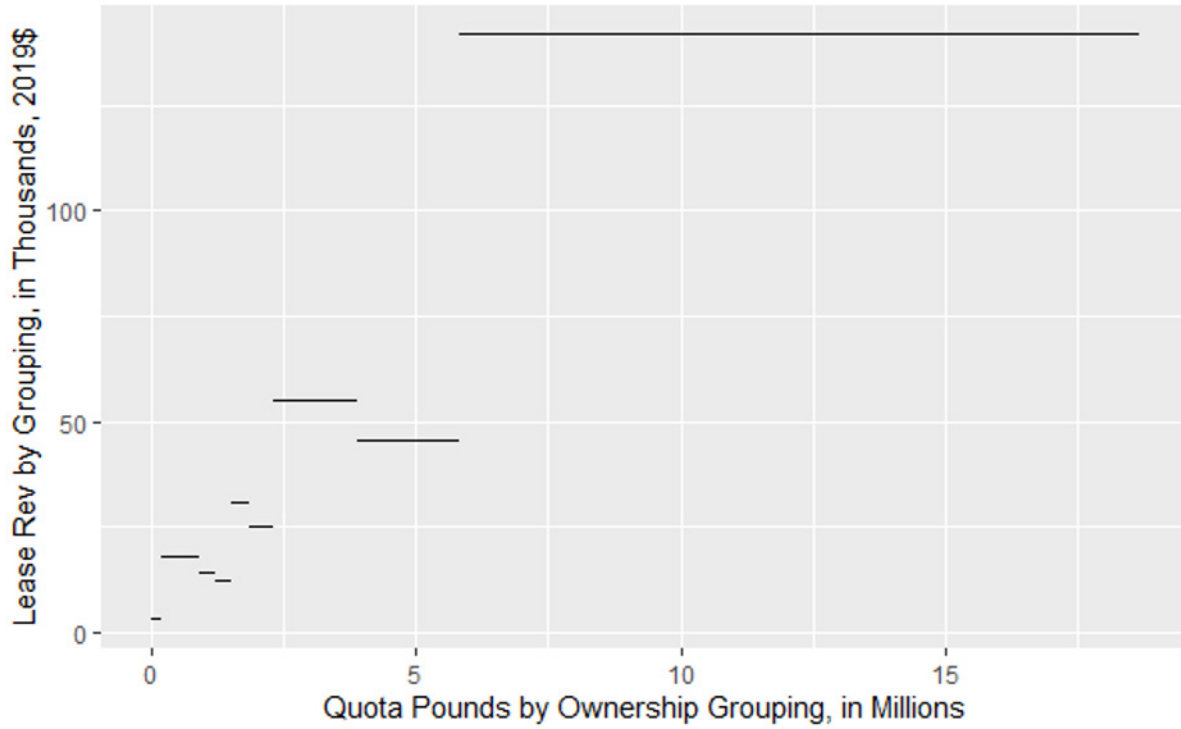


Figure 5-5. Average quota lease revenue by ownership groupings, 10% quantiles, Pacific whiting pounds excluded. The extent of each line represents the min-to-max quota holdings within the decile; the vertical position of the line represents the average lease earnings.

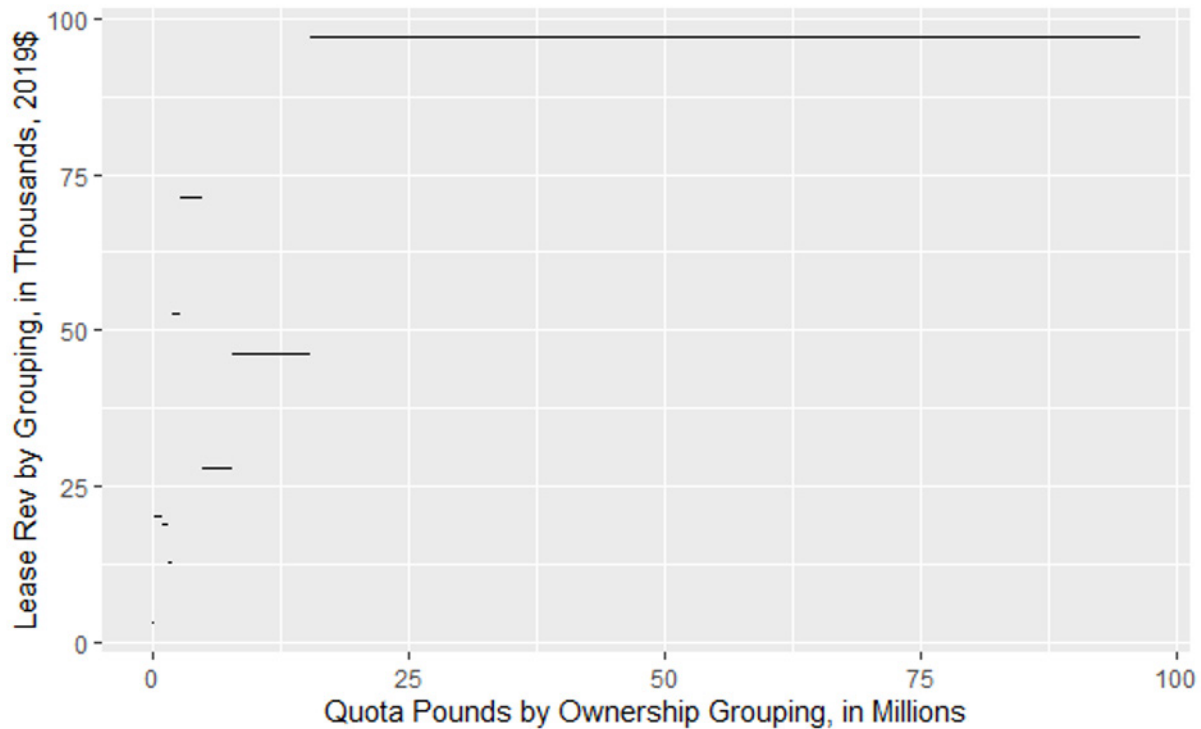


Figure 5-6. Average quota lease revenue by ownership groupings, 10% quantiles, Pacific whiting included. The extent of each line represents the min-to-max quota holdings within the decile; the height of the line represents the average lease earnings.

We ranked each grouping of quota share owners by total quota pounds owned, calculated deciles (10% quantiles), binned each grouping into a decile, and then calculated an average lease revenue for each decile. As explained in [Section 4](#), anecdotally we have heard that Pacific whiting is leased for \$0 to catcher vessels.⁹ When Pacific whiting pounds are included (Figure 5-6), the average leasing revenue for quota pound owners within the top 10% decreases from Figure 5-5, where Pacific whiting pounds are excluded. This seems to mirror our understanding of how Pacific whiting quota is leased: the top 10% quartile in the Pacific whiting-inclusive graph includes owners of large amounts of Pacific whiting quota pounds. However, this Pacific whiting quota does not bring extra leasing revenue, thus bringing the average revenue of the top 10% down. When those accounts with large amounts of Pacific whiting are considered without Pacific whiting quota (and thus in a lower quantile) in Figure 5-5, the top quota pound holders own species leased for cash value, driving the upper quantile average lease revenue up.

Species-Level Ownership/Participation

To demonstrate another way the data can be presented in terms of mutually exclusive categories, based on responses to the QS-EDC survey, individuals were classified into *Fishers* (i.e., fished in the IFQ Program or fished on the U.S. West Coast but not in the IFQ Program in 2019), *No Fishing* (did not fish in 2019; Figure 5-7), *Retired fisherman*, and *Other* (Figure 5-8; see [Participation Types](#)). This information was then combined with the quota share account-level information on species holdings to calculate the total quota pounds owned by the three participant categories. Figures 5-7 and 5-8 present the shares of quota pounds (in millions) of select species among those quota share owners by the *Fisher* and *Retired fisherman* statuses, respectively.

For all quota categories, this was higher ownership of quota shares by individuals that did not fish in 2019 than those that did fish. Within the *Fisher* category, a larger proportion of the sablefish quota was owned by individuals who did not fish in the IFQ program, but did participate in other U.S. West Coast fisheries, than for the other quota categories. Of the quota categories shown, a larger proportion of Pacific whiting quota is held by individuals that did not fish than for the other categories.

Of the four quota categories analyzed, a larger proportion of Pacific whiting quota was owned by individuals who describe themselves as retired fishermen (>40%) than for the other categories, which were all less than 30% of total quota holdings. The *Other* category includes all other forms of participation, including fishers, as well as non-person entities such as trusts and estates.

⁹Based on conversations with industry in November 2020.

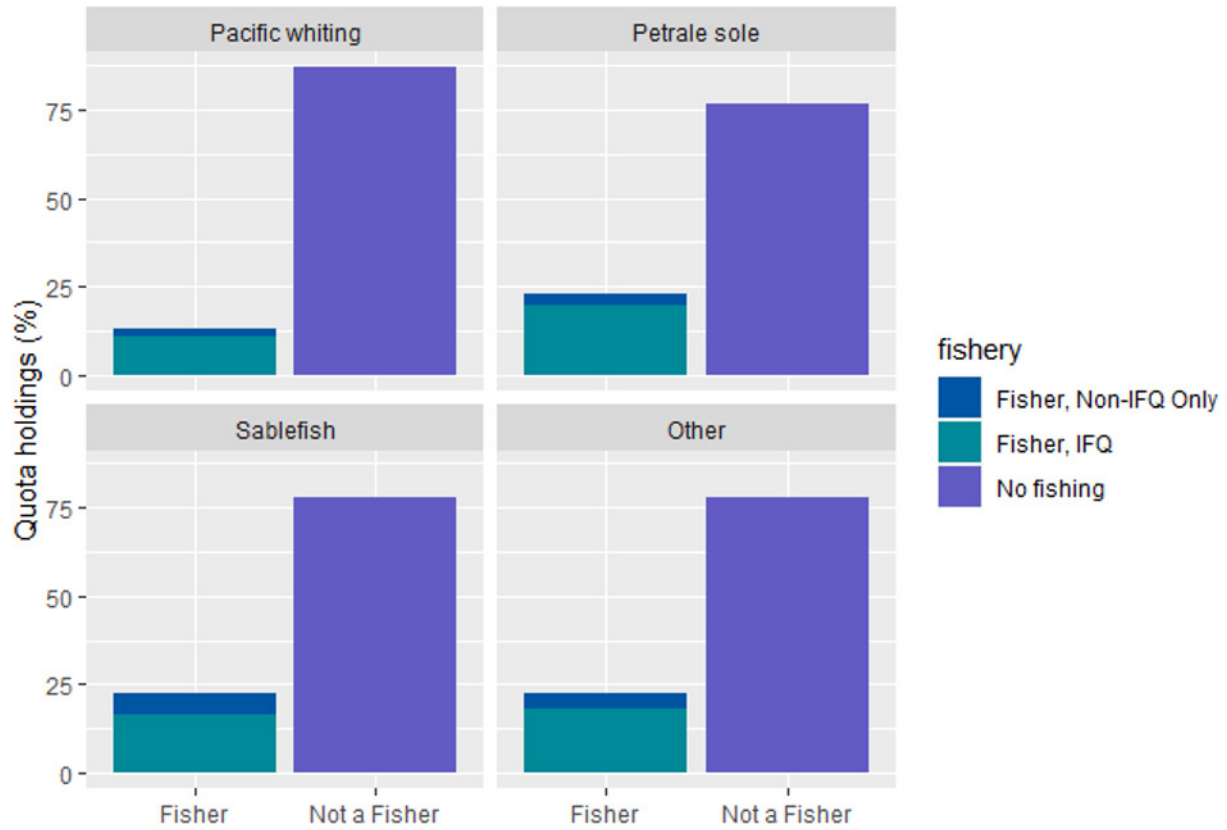


Figure 5-7. Quota holdings by quota share owner fishing participation for select quota categories.

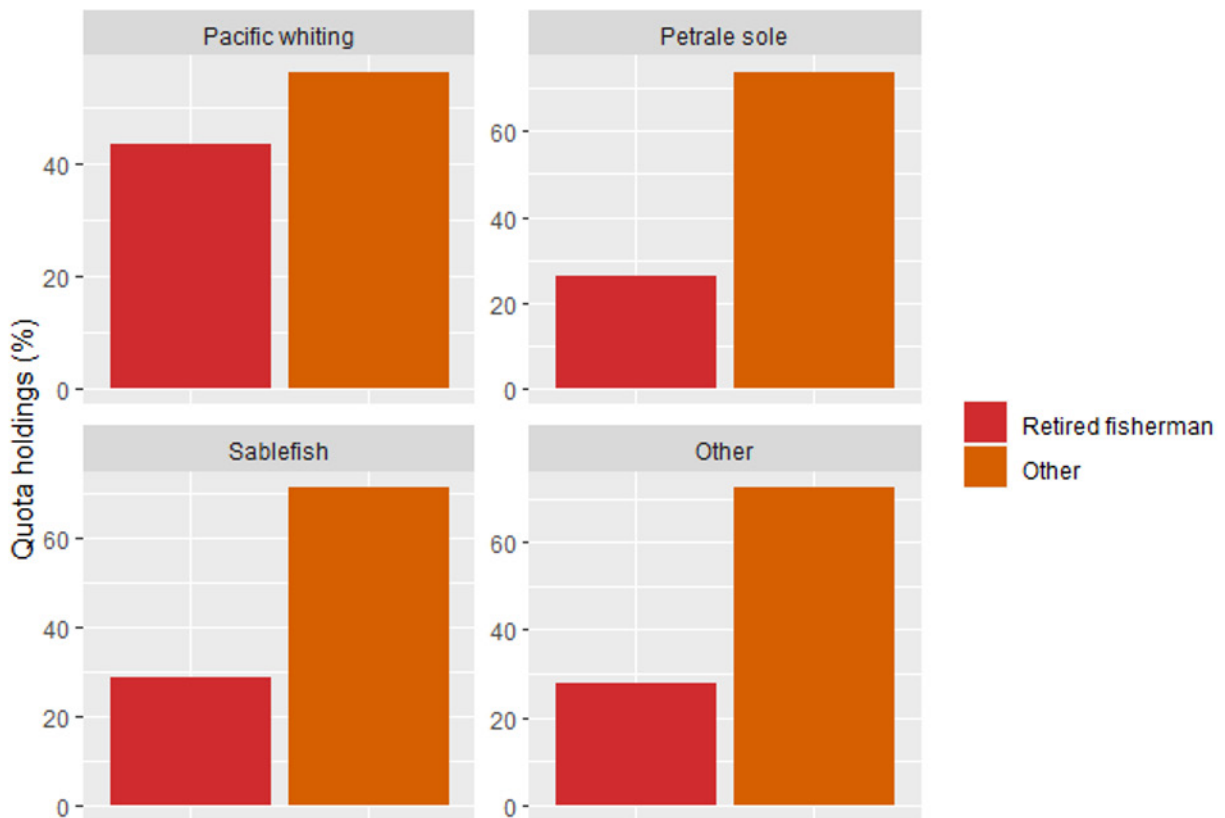


Figure 5-8. Quota holdings by retirement status of quota share owners for select quota categories.

6 Next Steps/Conclusions

Total expenses on quota in the shorebased IFQ Program have ranged from a low of \$4.87 million in 2013 to a high of \$6.74 million in 2011. These represent an average of 18% of the total ex-vessel value of the shorebased IFQ Program. Although it was previously known that these payments were accruing to quota share owners, it was unknown what other roles these individuals played on the U.S. West Coast. In addition, the combined \$6.60 million in quota share leasing revenues accruing to quota share and vessel owners in 2019 is about 11% of the \$60.05 million ex-vessel total value of the shorebased IFQ Program, and about 53% of the total cost net revenue of \$12.50 million for the fishery. To date, the EDC Program has provided detailed reports about the net revenue of vessels and processors in the program, but limited information was available about who was receiving quota lease payments and benefiting from the IFQ Program. The QS-EDC survey fills this important gap in reported earnings and demonstrates that at least 39% of quota share owners that own additional capital (vessels or processing facilities) do not actively fish or process fish.

Further comparisons and analyses will be conducted comparing the responses in the transactions database, the CE-EDC survey, and the QS-EDC survey. Similar to the QS-EDC survey, the EDC Program contacts CE-EDC participants with questions about the data provided to correct any errors resulting from typos or misunderstandings. The QAQC process for the 2019 CE-EDC survey had already concluded when the QS-EDC survey began, but during the 2021 data collection, EDC staff will use the network analysis described previously to have additional conversations with vessel owners about how they answered the quota lease questions to determine whether further adjustments are needed. As this is the first year of the new data collection, it is expected that the data will continue to improve as EDC staff develop new QAQC techniques and participants become more familiar with the program.

Finally, the PCGFSS interviewed upwards of 50 quota share owners in 2012 and 2016. This survey asked similar participation type information from the owners. The information on this survey could provide information about changing participation patterns over the 10 years since NOAA first collected data, but more work is required to determine the most appropriate way to combine the voluntary social science survey with the QS-EDC data.



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Appendix A: Community and Engagement Scores for Communities Where Quota Share Owners Reside

Tables A-1–A-3 present the communities quota share owners reside in, and their engagement and reliance scores.

Table A-1. Engagement and reliance scores for Washington coastal communities with at least one quota share owner.

Community	Engagement	Reliance
<i>Washington</i>		
Bellingham	High	Low
Neah Bay	Low	Low
Port Townsend	Low	Low
Freeland	Low	Low
Everett	Low	Low
Lynnwood	Low	Low
Edmonds	Low	Low
Kingston	Low	Low
Bothell	Low	Low
Woodinville	Low	Low
Redmond	Low	Low
Seattle	High	Low
Mercer Island	Low	Low
Issaquah	Low	Low
Gig Harbor	Low	Low
Aberdeen	Moderate	Low
South Bend	Low	Low
Kelso	Low	Low
Vancouver	Low	Low

Table A-2. Engagement and reliance scores for Oregon coastal communities with at least one quota share owner.

Community	Engagement	Reliance
<i>Oregon</i>		
Astoria	High	Low
Warrenton	Low	Low
Garibaldi	Low	Moderate
Portland	Low	Low
Lake Oswego	Low	Low
Siletz	Low	Low
Newport	High	Moderate
Toledo	Low	Low
Florence	Low	Low
Coos Bay	High	Low
Bandon	Low	Low
Port Orford	High	Moderate
Brookings	High	Low

Table A-3. Engagement and reliance scores for California coastal communities with at least one quota share owner.

Community	Engagement	Reliance
<i>California</i>		
Crescent City	High	Low
McKinleyville	Low	Low
Eureka	High	Low
Fortuna	Low	Low
Fort Bragg	High	Low
Comptche	Low	Low
Santa Rosa	Low	Low
San Francisco	High	Low
El Granada	Low	Low
Half Moon Bay	High	Low
San Jose	Low	Low
Monterey	Moderate	Low
Templeton	Low	Low
Morro Bay	Moderate	Low
Santa Barbara	High	Low
Los Angeles	High	Low

Appendix B: Sablefish North Case Study

The QS-EDC can provide valuable information to various management decisions. One example application of QS-EDC is to Sablefish North fishery management decisions that the Sablefish Management and Trawl Allocation Attainment Committee (SaMTAAC) of the Pacific Fishery Management Council is currently considering. The SaMTAAC is exploring alternatives that would convey additional gear-switching privileges to any combination of: quota share permits, limited entry trawl permits, or vessels. Fishery researchers and managers can use the results to better calculate net revenue in the catch share fishery and to discuss changes in the distribution of benefits over time, including understanding where the benefits are accruing. Some helpful questions that can be answered by incorporating the QS-EDC are: Who owns Sablefish North quota shares: active fishers? vessel/processor owners? What is the overlap between gear-switching vessel owners and Sablefish North quota share owners? If quota share permit owners are given additional privileges, who actually receives those benefits?

As described in the Purpose and Need Statement (PFMC 2020):

This action is needed because the Shorebased Individual Fishing Quota (IFQ) Program has under attained most of its allocations since the inception of the program in 2011. The under attainment for some northern stocks may be due to the allowance to use fixed gear to harvest shorebased IFQ, declining trawl vessel participation, and the lack of market and infrastructure. Specifically, participants engaging in gear switching are using northern sablefish quota that may otherwise be used by trawl gears (p. 1).

Extensive analysis has already been conducted surrounding these alternatives. The following provides additional details about the participation types of quota share owners in the context of gear-switching.

Overview of Sablefish North Quota Pounds Ownership

In 2019, 206 individuals owned 117 quota accounts with Sablefish North holdings that were not owned by trusts or quota banks. Each year, quota share owners submit ownership information to NOAA, including the percentage of quota owned by each individual with a greater than 2% ownership stake in the quota account. Using these percentages, we calculated the total Sablefish North quota pounds owned by each individual. Because a quota share owner can be part-owner of multiple accounts, we summed the pounds by individual over all accounts. Mean individual ownership, not including quota owned by trusts or quota banks, was 26,448 pounds of Sablefish North per individual owner. Table B-1 displays quartiles of the Sablefish North pounds owned by individual owners in 2019.

Table B-1. Distribution of Sablefish North by individual owner, 2019.

Bottom 3 Average	25%	50%	75%	Top 3 Average
150	4,019	15,586	35,880	162,516

Individual Sablefish North Quota Share Owners Who Responded to the QS-EDC

Ninety-two percent of 2019 quota share permits with Sablefish North holdings responded to the QS-EDC, in line with the overall 91% survey response rate. The non-responses correspond with eight quota share permits with Sablefish North quota that did not renew for the 2021 season. The survey provides us with information regarding 179 individual Sablefish North quota share owners who owned 111 quota permits. In addition, 11 trusts or quota banks owned Sablefish North quota. The mean Sablefish North quota owned by individual owners was 27,345 pounds. The distribution of quota pounds owned by individual survey respondents is shown in Table B-2. Table B-3 displays quota share ownership by state of residence.

Table B-2. Distribution of Sablefish North pounds by individual survey respondent, 2019.

Bottom 3 Average	25%	50%	75%	Top 3 Average
150	4,927	16,093	36,713	162,516

Table B-3. Sablefish North percent of quota share ownership by state of residence.

State	Percent of Sablefish North Quota
WA	19
OR	48
CA	22
Other states	3

Table B-4. Respondents by active status and capital ownership. Asterisks indicate data are suppressed to protect confidential information.

Category	Permit Owners	Percent of Sablefish North Quota
Inactive, Capital Owner	104	36
Inactive, No Capital	39	17
Active, Capital Owner	35	16
Active, No Capital	***	***

Active Quota Share and Capital Owners

In 2019, 135 Sablefish North quota share owners owned a vessel that fished on the U.S. West Coast (112 IFQ vessels), 37 were active captains on the U.S. West Coast (26 IFQ), 51 owned a fish dealer or processor, and 19 were employees of fish dealers and processors. Table B-4 presents mutually exclusive quota response categories summarizing the active/inactive and capital ownership status, the number of respondents, and the percent of Sablefish North quota owned by each category of respondent. For example, in 2019 there were 35 active owners—i.e., 35 people who owned a vessel or a processor and also captained or crewed a vessel or worked at a processor. This category of respondent owns 16% of Sablefish North quota.

Table B-5 displays active status and capital ownership by state (only categories/locations with three or more owners are listed).

Tables B-6 and B-7 further dissect the active/inactive capital owner designations into mutually exclusive fishery categories. Among Sablefish North quota share owners, 112 own vessels that fished in the IFQ program, representing 54% of the quota (Table B-6). Table B-7 presents the number of vessel owners who are also captains (i.e., identifies the active fishers from Table B-6). In addition to the active fishers, there were 30 retired fisher-vessel owners, who owned 19% of Sablefish North quota.

Table B-5. Active status and capital ownership by port.

Category	State	Permit Owners	Percent of Sablefish North Quota
Inactive, Capital Owner	WA	56	10
Inactive, No Capital	WA	13	6
Active, Capital Owner	WA	5	2
Inactive, Capital Owner	OR	29	25
Inactive, No Capital	OR	20	9
Active, Capital Owner	OR	19	12
Inactive, Capital Owner	CA	16	6
Inactive, No Capital	CA	6	7
Active, Capital Owner	CA	10	5

Table B-6. Vessel ownership by fishery, Sablefish North quota share owners, 2019.

Fishery	Quota Share Owners	Percent of Sablefish North Quota
IFQ Fishing	112	54
Non-IFQ, West Coast Only	23	7

Table B-7. Vessel owner-captains, Sablefish North quota share owners, 2019.

Fishery	Vessel Owners Who Are Captains
IFQ Fishing	24
Non-IFQ West Coast Only	11
Did not fish in 2019	5

Gear and Fishing Data

There are two levels of fishing data we connected to Sablefish North quota share owners: vessel-level data and permit-level data. PFMC can allocate a gear-switching privilege at either level—vessel or trawl permit. Combining the ownership interest network analysis (see [QAQC process](#)) with the QS-EDC survey data provides information about the overlap between permit, vessel, and quota share owners, which aids in understanding where the benefits of a gear-switching privilege will accrue. The West Coast Region keeps records of person-level vessel and quota share ownership data. It is therefore a simple connection: the name of the quota account owner matched with the name of the vessel owner. In many cases, a quota-vessel owner may have an ownership stake in more than one vessel and more than one quota share account. We made the assumption that if, for example, an owner owns one vessel but multiple quota share accounts, that one vessel has access to the sum of the individual’s ownership stake across the multiple accounts.

Vessels That Fished Sablefish North

In 2019, 92 trawl and gear-switching vessels fished Sablefish North, and Sablefish North quota share owners owned 76 of those vessels. Of these 76 vessels, six caught Sablefish North quota with fixed gear and 70 trawled. In total, these vessels are owned by individuals who jointly own 55% of Sablefish North quota. Table B-8 reports participation status by individual owners (rather than vessels). Just under half of all vessel owners who also own Sablefish North quota actively fished in the gear-switching fishery in 2019. Of trawl vessel owners who also owned Sablefish North quota, 22% actively fished, as displayed in Table B-9.

Table B-8. Vessels owned by Sablefish North quota share owners, by gear and percent of Sablefish North quota owned, 2019.

Gear	Number of Vessels	Percent of Sablefish North Quota
Trawl	70	50
Switch	6	5

Table B-9. Sablefish North quota-vessel owners, by gear, active status, and percent of Sablefish North quota owned, 2019.

Gear	Active	Inactive	Percent of Sablefish North Quota
Trawl	22	76	47
Switch	4	5	5

Table B-10 summarizes the vessels that fished for Sablefish North in 2019 by gear type, whether or not the vessel owner(s) owned Sablefish North quota, total pounds of Sablefish North caught, total Sablefish North revenue, and the means by category.

Table B-10. Number of vessels, landings volume, and ex-vessel revenue from Sablefish North, by gear type and quota share ownership status, 2019. One vessel can fish with multiple gear types in one year, so the number of vessels is not additive across gear types. Asterisks indicate data are suppressed to protect confidential information.

Gear Type	Owns Sablefish Quota	Number of Vessels	Total Pounds Sablefish North	Total Revenue Sablefish North	Mean Pounds per Vessel	Mean Revenue per Vessel
Gear switcher	Yes	6	750,373	\$1,382,139	125,062	\$230,356
Gear switcher	No	9	1,245,924	\$2,364,618	138,436	\$262,735
Bottom trawl	Yes	49	2,916,757	\$3,030,845	59,526	\$61,854
Bottom trawl	No	5	116,935	\$108,353	23,387	\$21,671
Midwater trawl	Yes	27	396,304	\$71,406	14,678	\$2,645
Midwater trawl	No	2	***	***	***	***

Permit-Level Data

Using the vessels that gear-switched for Sablefish North, we looked up the permits used to gear switch. Similar to vessel data, permit owners must submit ownership information. It is thus possible to connect fishing permit owners to both vessel owners and quota share owners. We identified 14 permits used to gear-switch fish for Sablefish North in 2019. Ten of those 14 permits were owned by Sablefish North quota pounds owners. These 10 permits were connected to groups owned by 17 individuals. Table B-11 presents non-mutually exclusive ownership information on these 17 individuals (we present only those categories with three or more individuals from separate entities).

Table B-11. Owner descriptions of switching permit owners, 2019.

Description	Number of Owners
Owner of a vessel that fished on the U.S. West Coast	11
Owner of a vessel that fished in the IFQ program	9
Previous owner of a fishing vessel	9
Captain of an IFQ vessel, non-IFQ West Coast vessel, or employee of a processor	6
Retired captain or crew member	5
Owner of a processor or fish dealer	3

According to the QS-EDC ownership information, we see overlap between Sablefish North quota pounds owners, gear-switching vessel owners, and trawl permit owners. We have ownership information for owners of 10 of the 14 permits used to gear switch for Sablefish North from the QS-EDC, we know that 11 of these 17 owners also own a vessel, and that at least five own Sablefish North quota pounds, a trawl permit, and actively fish.

Table B-12. Capital ownership and participation, overlap of Sablefish North quota pound owners and owners of permits used to gear switch for Sablefish North, 2019.

Status	Number of Owners
Inactive, Capital Owner	6
Active, Capital Owner	5
Active/Inactive, Non-Owner*	6

*Combined for confidentiality.

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