U.S. Seafood Industry and For-Hire Sector Impacts from COVID-19: 2020 in Perspective

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Cover photo: A young woman wearing a protective mask and gloves buying fish in a supermarket.
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Executive Summary

The COVID-19 pandemic caused large scale disruption to the U.S. economy and global markets in 2020. As states implemented a suite of social distancing measures in March 2020 to restrict the spread of the virus, large segments of the economy shutdown causing gross domestic product (GDP) to contract 9.03% in the second quarter relative to the previous year. The contraction was so severe that a recession was declared for March and April 2020. As states began to relax restrictions, the decline in GDP tapered but remained negative in both the third (-2.8%) and fourth quarter (-2.4%).

This report provides a snapshot of the effects of COVID-19 on the seafood industry (commercial harvesters, aquaculture, seafood dealers and processors) and for-hire fishing sector for 2020. As documented herein, the impacts to the seafood industry and for-hire sector were immediate, more severe and more long-lasting than those incurred in most other sectors of the economy.

Key Findings

A series of measures taken globally to reduce the spread of COVID-19 had an immediate and profound impact on the seafood industry and for-hire sector. Both supply and demand side market forces worked against the seafood sector.

- Supply chain effects: The broad scale closure of ports and seafood processing facilities in China in late January 2020 was just the initial shock to the international seafood supply chain. Subsequent port closures and border closures coupled with restrictions on foreign workers, the cost of purchasing personal protection equipment, increased shipping costs and shipping times as well as reduced shipping and airfreight capacity, and the physical challenges of distancing employees on plant floors and crew on boats also contributed to supply chain disruptions.
- Global contraction in seafood demand from the foodservice sector: A number of studies point to the implementation of social distancing measures — including restaurant closures, restrictions on social gatherings, and stay-at-home orders — along with individuals' actions to reduce exposure to the virus as major factors affecting seafood demand in 2020. In the United States, foodservice sales fell 40% in the first quarter of COVID-19 (March–May 2020) relative to average sales in the three preceding quarters. Mollusks (e.g., scallops, oysters, mussels) incurred the highest losses (down 60%). For the period March to November 2020, sales were down 21% relative to the three preceding quarters.
- Global increase in seafood sales from retailers: In the U.S. and abroad, seafood retail sales surged in 2020. A recent study by FMI – The Food Industry Association found that in the U.S., seafood retail sales increased significantly in 2020 across all seafood categories: frozen, up 36%; fresh, up 25%; and grocery (canned, pouches, etc.), up 21%.

Overall, commercial fishing landings revenue declined 22% in 2020 relative to the five-year baseline (2015–2019), with all regions experiencing a significant decline. Relative to the baseline period, regional landings revenue from March to December 2020 were down 16% to 36% (Atlantic HMS, -15%; Northeast, -18%; Southeast, -27%; Alaska and West Coast, -29%; and Hawai'i, -36%). Depressed market conditions existed in all regions, with high-value products and seafood exports bearing the brunt of these losses, particularly during the initial months of the pandemic. No region posted an increase in monthly landings revenue relative to the baseline until October 2020: the Northeast posted a 4% increase in landings revenue in October 2020 and the Atlantic HMS fishery posted a 21% increase in landings revenue in November 2020.

Aquaculture operations also faced disrupted markets domestically and globally as well as increased costs from having to maintain product while businesses searched for new markets. Shellfish growers were particularly hard hit given their reliance on export markets and restaurant services. A series of industry surveys conducted by Virginia Tech and Ohio State found that the highest impacts were incurred during the first quarter but that high impacts persisted for the remainder of the year. For example, while 80% of growers reported cancelled contracts in Q1, 44%

of respondents reported cancelled contracts for the remainder of the year.

Seafood retail sales increased significantly in 2020 across all seafood categories: frozen, up 36%; fresh, up 25%; and grocery (canned, pouches, etc.), up 21%. In contrast, foodservice sales declined sharply. Foodservice sales fell 40% in the first quarter of COVID-19 (March–May 2020) relative to average sales in the three preceding quarters. For the period March to December 2020, foodservice seafood sales were down 21% relative to the three preceding quarters.

There was also a shift in 2020 to direct marketing of seafood as well as increased online sales. Grocery stores reported that 44% of seafood purchases were made online (up from 19% in 2019).

Seafood exports declined 23% in 2020 when compared to the baseline. All regions experienced decreases in export values, with the exception of the Pacific Islands. Regionally important species — pollock, cod, lobster, scallops, crab, shrimp, and wild and farmed salmon — experienced overall declines in export values.

Seafood imports in 2020 were relatively flat compared to the baseline, declining just under 1%. Imports of fresh and frozen product declined by 7% and less than one half percent, respectively. Import values of tuna in cans and pouches increased by 38% in 2020.

The for-hire sector experienced an 18% decrease in trips during 2020 relative to the baseline period. The effect of COVID-19 restrictions on the for-hire sector varied across regions. In the Southeast (North Carolina to Louisiana), the number of for-hire angler-trips decreased 5%, from an annual average of 1.7 million trips 2015 to 2019 to 1.6 million trips in 2020. The states of the Southeast did not have as many restrictions in general, or for as long duration, as some of the states in other regions. In contrast, the for-hire sectors in Alaska and Hawaii, which rely heavily on non-resident tourists for a large share of their customers, experienced a 48.6% and 73% decrease, respectively, in trips relative to the five-year baseline. In the Northeast, for-hire trips decreased 27% in 2020 relative to the five-year baseline while West Coast for-hire trips decreased 31%, with California, Oregon and Washington experiencing a 17%, 23%, and 38% decrease, respectively, relative to the baseline.

In addition to these trend analyses, and to better isolate and understand the impact of COVID-19 from other ongoing economic trends and seasonal fluctuations during 2020, for the first time ever, NOAA Fisheries conducted a large-scale sectoral assessment of the seafood industry. This assessment used an approach that mirrors the approach economists use to assess the status of the U.S. economy, i.e., whether it is experiencing a recession, an economic recovery, etc.

The analysis identified a significant and sustained contraction in the commercial fishing sector beginning from the first quarter of 2019 (2019 Q1) through the second quarter of 2020 (2020 Q2). Seasonally adjusted quarterly total U.S. ex-vessel revenue fell by 27% over this period, from a peak of $1.3 billion to a low of $953 million.

The seafood dealer/processor sector also experienced a sustained contraction but it was of shorter duration than that experienced by the commercial fishing sector. Beginning 2019 Q3 through 2020 Q2, seafood dealers and processors sustained a decline in value added of $598 million, a 13.47% decline. A careful examination of the data revealed seafood imports helped to cushion the impact of the economic downturn in the domestic harvest sector. However, in those regions with limited imports such as Alaska, impacts to the harvest sector directly translated into losses to the seafood dealers and processors.

National Overview of U.S. Seafood Industry and For-Hire Sector Impacts from COVID-19 in 2020

I. Introduction

The COVID-19 pandemic caused large scale disruption to the U.S. economy and global markets in 2020. As states implemented a suite of social distancing measures in March 2020 to restrict the spread of the virus, large segments of the economy shut down, causing gross domestic product (GDP) to contract 9.03% in the second quarter relative to the previous year.[1] The contraction was so severe that a recession was declared for March and April 2020.[2] As states began to relax restrictions, the decline in GDP tapered but remained negative in both the third (-2.8%) and fourth quarter (-2.4%).

COVID-19 began to disrupt seafood markets as early as January 2020. As documented in an earlier NOAA Fisheries assessment (NMFS, 2021), the broad-scale closure of ports and seafood processing facilities in China resulted in a 32% decrease in U.S. seafood exports to China in January, followed by a 45% decline in exports in February relative to the previous year. The U.S. was not the only country affected by China's measures to control the spread of the virus. A recent study by the OECD (2020) noted that the cancellation of lunar new year celebrations in China, which are traditionally associated with the consumption of high-value seafood, had devastating impacts on lobster fisheries in Australia, Kenya, New Zealand, the United Kingdom, and the United States, among others.

In March, the protective measures implemented in the United States and in many other countries to reduce the transmission of the disease—including closing restaurants but eventually extending to stay-at-home orders for all but essential workers—triggered a series of economic shockwaves across the seafood industry, including aquaculture and the for-hire fishing sector. Recent studies have identified impacts throughout the entire seafood supply chain, from harvesters and aquaculture operations, seafood dealers and processors, through to wholesalers and retail and foodservice in the U.S. and globally (FAO, 2020a; FAO, 2020b; Love et al., 2021; OECD, 2020; Ogier et al., 2021; Pititto et al., 2021; Stoll et al., 2020; White et al., 2020).

This study quantitatively assesses the impacts on the U.S. seafood sector (commercial fishing, aquaculture, seafood dealers and processors, and seafood markets and trade) and the for-hire sector. This first chapter provides a national overview of economic trends in these sectors, drawing upon state and federal commercial fisheries landings data, trade data, and seafood market reports. It also summarizes key findings from surveys conducted of commercial fishing and aquaculture operations, seafood businesses, and for-hire operations. Impacts to the for-hire fleet from COVID-19 restrictions are further analyzed in terms of changes in the trips taken in 2020 relative to the baseline period (2015–2019).

In addition, and to better isolate and understand the impact of COVID-19 from other ongoing economic trends and seasonal fluctuations during 2020, for the first time ever, NOAA Fisheries conducted a large-scale sectoral assessment of the seafood industry. The assessment used an approach that mirrors the approach taken by economists to assess the status of the U.S. economy, i.e., whether it is experiencing a recession, an economic recovery, etc. Chapter 2 focuses strictly on the aquaculture sector, drawing upon a series of surveys conducted with growers to assess COVID-19 impacts as well as other industry reports and news. The remaining chapters provide an in-depth analysis of COVID-19 impacts on each region (Northeast, Southeast, West Coast, Alaska, Pacific Islands, and the Atlantic Highly Migratory Species

1 Bureau of Economic Analysis. Table 1.1.6. Real Gross Domestic Product, Chained Dollars. Last Revised May 27, 2021. https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=2&isuri=1&1921=survey

2 National Bureau of Economic Research. 2021. Business Cycle Dating Committee Announcement, July 19, 2021: Determination of the April 2020 Trough in US Economic Activity. https://www.nber.org/news/business-cycle-dating-committee-announcement-july-19-2021

fishery), largely focusing on the commercial fishing sector, the for-hire sector and, to a lesser extent, seafood markets and trade.

II. Commercial Fisheries Impacts

a. Commercial Landings Revenue Trends

To analyze the impact of COVID-19 on commercial fisheries performance, monthly landings revenue data from state and federal fisheries for 2015 through 2020 were compiled for each region. Average monthly landings revenue in inflation-adjusted 2020 dollars (2020 $) were calculated for 2015 to 2019 (henceforth referred to as the baseline) and compared to preliminary monthly landings revenue in 2020. In some instances, the results reported in this chapter may not match the results reported in the regional chapters. In most instances, this can be attributed to the national summary being based on slightly more recent data (Northeast, Atlantic HMS, and West Coast). In addition, the West Coast chapter compares 2020 landings revenue to the median landings revenue from the baseline period while the national summary uses the five-year average of landings revenue for comparison.

Nationally, commercial landings revenue averaged $5.9 billion annually (2020 $) during the baseline period. Measures taken by federal, state, and local governments to reduce the risk of transmission, coupled with actions taken by individuals to reduce their risk of exposure, resulted in a 40% reduction in foodservice demand for seafood from March to May 2020 relative to average sales in the three preceding quarters, with losses tapering in subsequent quarters in 2020. As a result of this pull back in demand both domestically and globally, seafood prices and the quantity demanded fell for many species. In the commercial fishing sector, landings revenue fell 22% in 2020 relative to the baseline.[3] Landings revenue fell 34% in the second quarter relative to the baseline; and landings revenues in the third and fourth quarter fell 25% and 15%, respectively.[4] Regionally, commercial landings revenue losses in 2020 relative to the baseline ranged from 12% and 16% in the Atlantic Highly Migratory Species fishery (HMS) and the Northeast, respectively, to 26% and 31%, respectively, in Alaska and Hawaii (Table 1.1). For the period March to December 2020, regional landings revenue were down 15% to 36% relative to the baseline (Atlantic HMS, 15%; Northeast, -21%; Southeast, -27%; Alaska and West Coast, -29%; and Hawai'i, -36%).

Table 1.1. Percentage change in commercial fisheries landings revenue from baseline period (2015–2019) to 2020.[5]

Region	Percentage Change in Landings Revenue
United States	-22%
Alaska	-26%
West Coast	-24%
Hawaii	-31%
Northeast	-16%
Southeast	-25%
Atlantic HMS	-12%

Examining monthly landings trends, commercial landings revenue declined 19% in March 2020 relative to average landings revenue for March during the baseline period and sustained monthly losses ranging from 30% to 38% from April through July (Figure 1.1). Monthly losses relative to the baseline tapered somewhat in August and September (down 21% overall), declined 7% in October, but averaged a 22% monthly loss in November and December. The largest monthly decline occurred in July, largely driven by declines in Alaska landings revenue.

Landings revenue of high-value species (e.g., tunas, halibut, sablefish, lobster, sea scallops, Dungeness crab, salmon, snappers, and black sea bass) that typically rely on strong restaurant demand for fresh seafood here and abroad generally fell 20% to 65% relative to baseline values due to restaurant closures and reduced exports. For example, the price per pound of American lobster in the Northeast region declined by 39.6% to $4.82 per pound in March 2020 compared to an average of $7.99 per pound during March 2015–2019. Lobster prices continued to be below the baseline in 2020 until August when they began to somewhat recover. In the Hawaii longline fishery, which harvests high-value tunas and swordfish, prices were down 11.5% and landings were down 21.9% relative to the baseline. Similarly, in Alaska, halibut, Pacific cod, and

3 The baseline period for Atlantic HMS is 2019. See regional chapters for additional data information on data and data sources.
4 West Coast at-sea processor and shellfish monthly revenues were not available when this summary was prepared.
5 All data is preliminary.

salmon landings revenues were markedly down on a combination of lower landings and lower prices. Relative to the baseline, revenues for these species declined 41% (halibut) to 47% (Pacific cod at-sea sector). See the regional chapters for more detailed information on these and other regional trends.

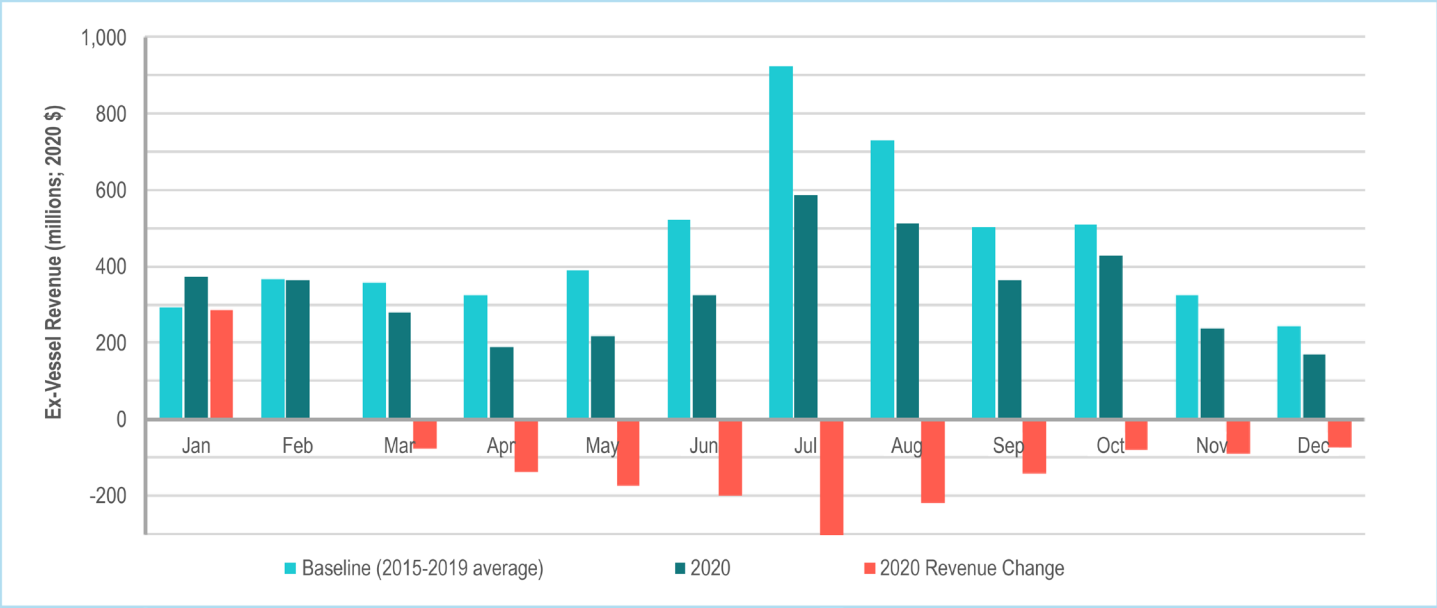

Figure 1.1. **Monthly landings revenues for the baseline period (2015–2019) and 2020.**

All of the regional assessments reflect substantial losses in the majority of their fisheries. Two recent surveys by NOAA Fisheries of Northeast and Southeast (South Atlantic and Gulf of Mexico; Puerto Rico and U.S. Virgin Islands) commercial fishermen and a third survey by Ocean Strategies of West Coast and Alaska fishermen underscores this point. Findings from these surveys[6] (Table 1.2) indicate that between 87% and 93% of the Northeast, South Atlantic and Gulf, and Alaska and West Coast commercial fishermen surveyed had reduced landings revenues and, further, that these fishermen incurred losses ranging from 43% to 49%. Losses in Puerto Rico and USVI were greater, with fishermen in Puerto Rico and the USVI reporting losses of 65% and 55%, respectively. These losses directly impacted employment, with 17% to 35% of commercial fishing operations reporting a reduction in employees.

6 The Northeast and Southeast surveys covered January through December 2020; the Alaska and West Coast survey, conducted by Ocean Strategies, covered January through June 2020.

Table 1.2. Results from regional surveys of commercial harvesters on COVID-19 impacts.

Category	Subcategory	Northeast	South Atlantic and Gulf	Puerto Rico	USVI	Alaska and West Coast
Who were the respondents?	Fishermen impacted by COVID-19 that identified fishing as primary source of income	77%	77%	67%	64%	84%
	Average number of years owned vessel	30	28	26	16	26
COVID-19 Impacts	Fishermen reporting revenue losses relative to 2019	90%	87%	91%	95%	93%
	Average revenue loss for those with losses	-43%	-49%	-65%	-55%	-49%
	Fishermen reporting reduction in employees	28%	35%	17%	30%	32%
	2020 operating capacity relative to 2019	61%	53%	48%	48%	67%
	Fishermen reporting stopped fishing during 2020	78%	85%	93%	77%	70%
	Stopped fishing for less than 1 month	18%	12%	4%	25%	29%
	Stopped fishing for 1 to 3 months	55%	44%	24%	35%	38%
	Stopped fishing for more than 3 months	19%	30%	60%	33%	14%
	Stopped fishing indefinitely with plans to resume	6%	8%	12%	8%	10%
	Went out of business	<1%	4%	0%	0%	2%
Top 3 COVID-19 impacts on business	Loss of or difficulty finding crew	26%	23%	N/A	N/A	N/A
	Reduced trips	20%	20%	79%	68%	23%
	Difficulties finding bait or supply	14%	N/A	N/A	N/A	21%
	Lack of markets or reduced prices	N/A	N/A	71%	76%	41%
	Government restrictions	N/A	17%	48%	38%	N/A

Declines in domestic landings revenue in 2020 relative to the baseline period were on par with losses experienced by foreign fleets. In Europe, a study of eight European Union member states found that landings revenue declined between 0.3% (Denmark) to over 40% (Sweden and Bulgaria) from 2019 to 2020, for an average loss of 26%. Denmark benefited from two of its key fisheries — herring and mackerel — being in low season from March to May, the period when impacts were highest. As in the United States, high-value species in Australia incurred substantial losses due to disruptions in global markets (17% of high-value species are exported) and social distancing measures that closed restaurants.

b. Commercial Fisheries Economic Trends Empirical Analysis

To better isolate and understand the impact of COVID-19 from other ongoing economic trends and seasonal fluctuations during 2020, for the first time ever, NMFS has seasonally adjusted economic data from the U.S. seafood sector. Seasonal adjustments are used to better identify trends and irregular cycles in the data by removing the predictable seasonal patterns in data from certain activities (holidays, school, and fishing seasons) that occur at relatively the same time each year. It is important to separate these normal ups and downs of economic activity from the general underlying trends in fishing revenues and value added over the course of a couple months or quarters. Three economic data series for the U.S. seafood sector are seasonally adjusted: total U.S. fisheries ex-vessel revenue, the value added by processors and dealers from domestic fisheries, and the value added by processors and dealers from imported seafood. As this seasonal adjustment tends to smooth out a data series, it becomes easier to identify trends and periods of sustained expansions or contractions in economic activity within the U.S. seafood sector. This analysis defines a two consecutive quarter decline in seasonally adjusted economic activity as a period of sustained contraction, and it will identify these periods over the 2015–2020 period for the U.S. seafood sector.

To identify these periods, aggregate monthly ex-vessel revenue data were gathered from each region (Alaska, Northeast, Pacific Islands, Southeast, and West Coast) along with monthly U.S. import value data and then deflated to 2020 dollars using the GDP implicit price deflator. The value added by processors and dealers of domestically landed seafood is separated from the value added from imported seafood to allow for separate trends in volume and value as well as changes in species and product mixes. Imported seafood constitutes a large proportion of domestic consumption and, similarly, the value added from imported seafood is larger than that from domestically landed seafood. Each time series was then seasonally adjusted separately using the Census Bureau's X-13ARIMA-SEATS software program and variable-specific regARIMA models. The seasonally adjusted data were then aggregated to the quarterly level across all five regions of the U.S. A comparison of quarterly trends was then conducted on total seasonally adjusted ex-vessel revenue, value added from domestic landings, and value added from dealers and processors of imported seafood to identify periods of sustained contraction in the different segments of the U.S. seafood sector.

The top left panel of Figure 1.2 shows total U.S. quarterly seasonally adjusted ex-vessel revenues from 2015–2020 and documents three separate periods of sustained contraction in ex-vessel revenues of at least two consecutive quarters: 2016 Q3–Q4; 2018 Q1–Q2; and 2019 Q1–2020 Q2. While there is evidence of several sustained contractions in fisheries ex-vessel revenues, the longest and most significant occurred over five quarters from the first quarter of 2019 through the second quarter of 2020. Seasonally adjusted quarterly total U.S. ex-vessel revenue fell by 27% ($346 million) over this period, from a peak of $1.3 billion to a low of $953 million (Figure 1.2). The value added from domestic landings is currently estimated to have sustained a similar reduction by 27% ($249 million) over this period, from a peak of $935 million to a low of $686 million (Figure 1.2).

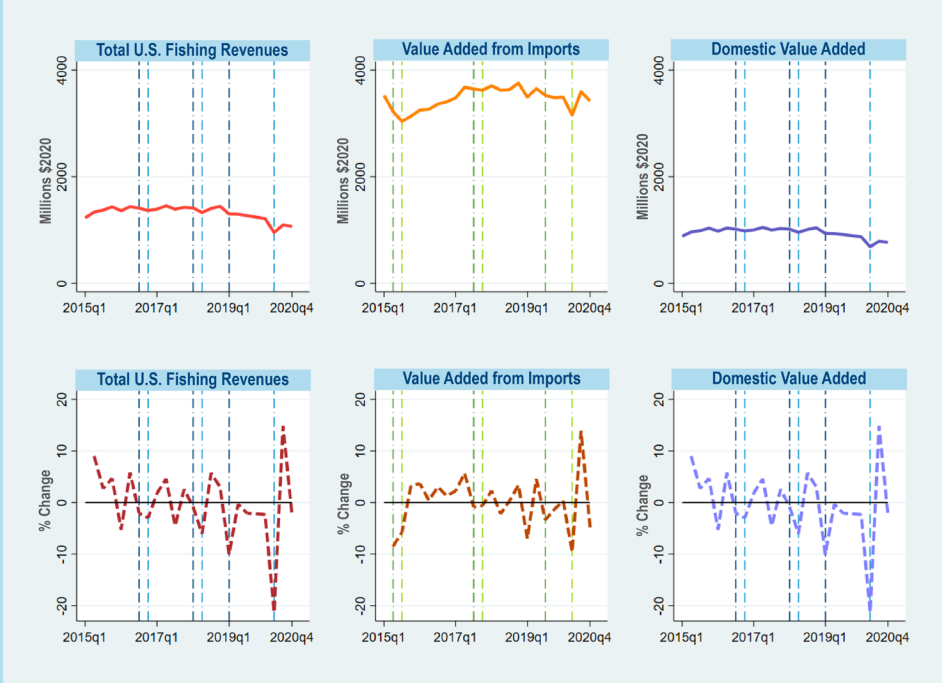

Figure 1.2. Seasonally adjusted ex-vessel revenue, value added from domestic landings, and value added from imported seafood, 2015–2020. Bottom panel reflects percentage changes.

The dealers and processors of imported seafood experienced a slightly different impact than the producers of domestic landed seafood, which experienced a sustained contraction from Q3 of 2019 through Q2 of 2020 (Figure 1.2). They experienced a shorter and smaller percentage decline in value over this period with value added from imports falling by 10.54% ($372 million). However, given the larger scale of this sector, they experienced a larger absolute decline in value of $372 million compared with the $249 million loss from the domestic value added sector and $346 million from the domestic harvesting sector (over their longer sustained contraction from 2019 Q1–2020 Q2). These results also highlight the fact that the U.S. seafood sector was experiencing significant weakness through much of 2019 that was further exacerbated by the COVID-19 pandemic in late Q1 of 2020 and had a sustained impact on this sector through Q2 of 2020. More information on this analysis can be found in the Appendix.

III. Aquaculture Sector Impacts

The aquaculture industry struggled throughout 2020 despite the incremental re-opening of restaurants beginning in May 2020. A series of industry surveys conducted by Virginia Tech and Ohio State found that the highest impacts were incurred during the first quarter but that the industry continued to be severely impacted throughout the year (Figure 1.3). For example, while 90% of respondents indicated that they had been impacted by COVID-19 during Q1, on average 83% of respondents indicated that they had been impacted in subsequent quarters in 2020. Further, while 80% reported cancelled contracts in Q1, 44% of respondents reported cancelled contracts for the remainder of the year. The number of respondents reporting they had laid off employees ranged from a peak of 38% in Q1 to 22% in Q4.

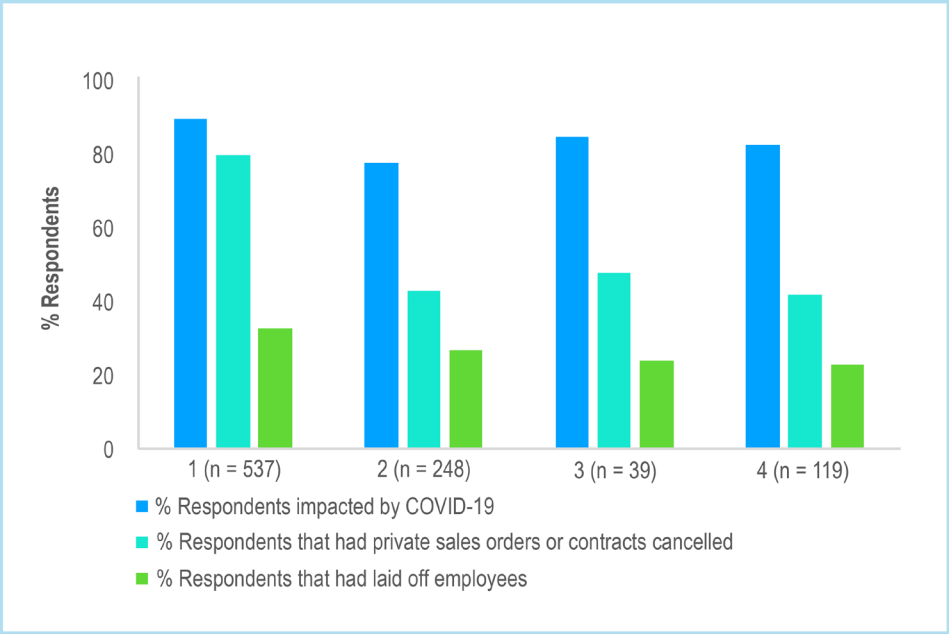

Figure 1.3. **Major effects of COVID-19 on the aquaculture industry, by quarter.**

IV. Seafood Dealers and Processors Impacts

Disruptions in global markets coupled with largely declining domestic harvests has significantly impacted seafood businesses. Regions reporting the number of active seafood dealers reported a decline in active dealers ranging from 9% to 21%. In addition, preliminary results of seafood dealer/processor surveys conducted in the Northeast and Southeast regions found that 78% and 85% of dealer/processors in the Northeast and Southeast, respectively, reported reduced sales during 2020. Losses to these firms averaged 45% in the Northeast and 46% in the Southeast. A similar survey conducted by the Western Pacific Fishery Management Council found that 86% of dealer/processors experienced revenue losses during May and June, with losses averaging 43%. A shortage of cold storage facilities continues to be an issue in some regions. Some industry participants have pivoted to direct sales from vessels or from wholesale to retail to offset losses.

All industry sectors experienced increased costs from actions taken to reduce the transmission of COVID-19 including testing, personal protective equipment (PPE), and safety precautions and protocols (e.g., quarantining workers, increased cost of transporting workers, socially distancing workers) and, in some cases, dealing with closures related to poor sales or COVID-19 outbreaks. A recent study found that harvesters and processors in Alaska alone had spent $70 million to reduce the risk of COVID-19 transmission. One cost saving that benefited both the commercial fishing and for-hire sector was lower fuel prices in 2020 relative to the previous year. Fuel prices declined 17% relative to 2019; for the period March to December 2020, fuel prices declined 20%.

V. Seafood Markets and Trade Impacts

Retail sales of seafood increased sharply beginning in May 2020, as restaurant restrictions and social distancing measures persisted (Figure 1.4). Relative to 2019, seafood sales from these outlets were on average up 46% in

May through July 2020. Sales remained high — though not as high — for the remainder of the year (up 31% in August, with successive months slightly lower to end the year up 24% in December).[7]

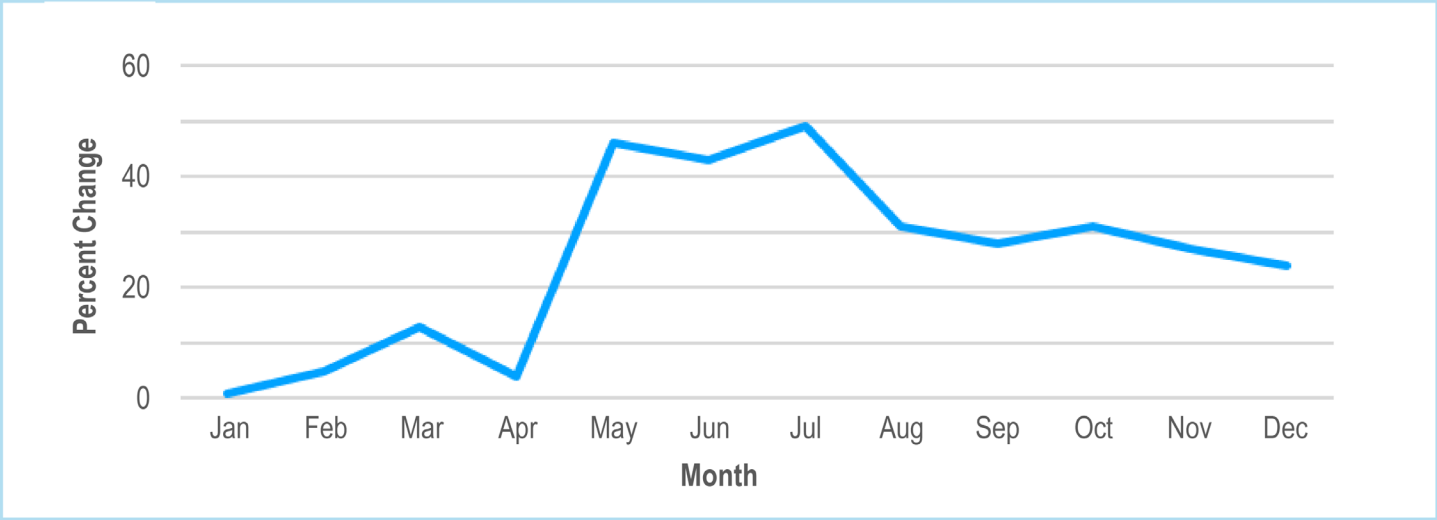

Figure 1.4. **Change in grocery store seafood sales from 2019 to 2020.**

A 2021 study by FMI – The Food Industry Association found that 2020 seafood retail sales increased 28.4% over 2019 sales with all seafood categories posting an increase: frozen, up 36%; fresh, up 25%; and grocery (canned, ouches, etc.), up 21%. In total, seafood generated more than $16.6 billion in sales for food retailers in 2020.[8] Nearly identical results were found by 210 Analytics.[9] The FMI study also found that one in three people (33%) consumed seafood frequently in 2020 (up from 25% in 2019) and that 44% of seafood purchases were made online (up from 19% in 2019).

In contrast to seafood retail sales, a 2021 study presented as part of the National Fisheries Institute Global Seafood Market Conference found that foodservice sales were sharply down. That is, using NPD Supply track data, the study showed that foodservice seafood sales fell 40% in the first quarter of COVID-19 (March–May 2020) relative to average sales in the three preceding quarters. Mollusks (e.g., scallops, oysters, mussels) incurred the highest losses (down 60%). For the period March to December 2020, sales were down 21% relative to the three preceding quarters.[10]

Seafood exports declined 23% in 2020 when compared to the baseline. All regions experienced decreases in export values, with the exception of the Pacific Islands. Export values from the Pacific Islands declined in the first half of the year but then increased during the second half of the year. Regionally important species – pollock, cod, lobster, scallops, crab, shrimp, and wild and farmed salmon – experienced overall declines in export values.

Seafood imports in 2020 were relatively flat compared to the baseline, declining just under 1%. Imports of fresh and frozen product declined by 7% and less than one half percent, respectively. Import values of tuna in cans and pouches increased by 38% in 2020.

7 From IRI Consumer Purchased Good index. [Available at https://indices.iriworldwide.com/covid19/?i=0]

8 FMI. 2021. FMI Power of Seafood 2021 Provides Insights on Ways to Maintain Strong Seafood Sales. [Available at https://www.fmi.org/newsroom/latest-news/view/2021/02/23/fmi-power-of-seafood-2021-provides-insights-on-ways-to-maintain-strong-seafood-sales]

9 Blank, Christine. 2021. US retailers notched record seafood sales in 2020. Seafood Source. [Available at https://www.seafoodsource.com/news/foodservice-retail/us-retailers-notched-record-seafood-sales-in-2020]

10 National Fisheries Institute. Global Seafood Market Conference. 2021. Bi-Valve Panel. April 7, 2021.

VI. For-Hire Sector Impacts

Across the nation, for-hire fishing is very popular with recreational anglers and is an economically important part of fishing-based communities. Charter boats and head boats offer both local anglers and tourists a chance to go fishing with experienced guides and seek out commonly caught species, as well as more rare species. From 2015 to 2019, there were over 3.6 million for-hire angler fishing trips on average each year. In 2020, the various restrictions on the for-hire fishing industry due to COVID-19 were widespread and resulted in a decrease in the number of angler trips compared to the average over the five-year baseline. There were approximately three million trips nationwide in 2020, a 17.7% decline from the previous five-year annual average.

The data on angler trips is available on a bimonthly ("wave") basis and show that the effects of COVID-19 restrictions varied over time during 2020 (Figure 1.5). In January/February of 2020, before COVID-19 restrictions were in place, there was a 19% increase in for-hire angler trips compared to the five-year average for the same time period. In March and April, when COVID-19 restrictions were put in place in nearly all states, there was a 73% decrease in the number of for-hire angler trips during these two months (approximately 118,000 angler trips in 2020 compared to 439,000 on average in the previous five years). The large decrease was a result of a complete shutdown in for-hire operations in many states during most, if not all, of this time period. Restrictions on for-hire operations began to be lifted in some states in May and June. There was a 30% decrease in trips for this period nationwide in 2020 compared to the baseline average of 974,000 angler trips.

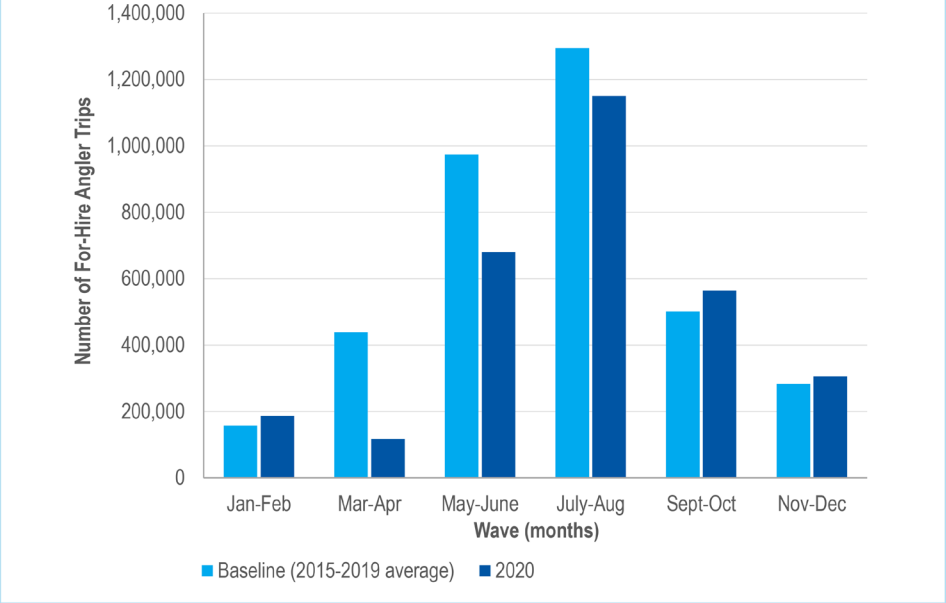

Figure 1.5. **Total national angler trips in the for-hire sector by wave, baseline compared to 2020.**

From 2015 to 2019, the two-month period with the highest number of trips on average was July/August. During those summer months, the annual average was 1.3 million trips, but in 2020 there was an 11% decrease to 1.1 million trips. In September and October, trips increased 12% relative to the baseline, in part due to COVID-19 restrictions continuing to be lifted and potentially as a result of pent-up demand from anglers too. Many news stories and feedback from angler organizations noted that the popularity of fishing soared during 2020 as people sought locally available outdoor activities in their community while travel restrictions and cautions remained through much of 2020. Although much of this increase in activity was from anglers fishing from shore or in private boats, for-hire operations were likely in high demand when trips were once again offered. In the final two months of 2020 (November and December), total angler trips were 8% higher (306,000) than the baseline (283,000).

The effect of COVID-19 restrictions varied across regions and over time in a region. In the Northeast and Mid-Atlantic (Maine to Virginia), total for-hire trips decreased in five out of six bimonthly periods compared to the average number from 2015–2019. This region was affected by COVID-19 outbreaks earlier in 2020 than some other areas, which resulted in some significant impacts in March and April. The number of for-hire angler trips in the New England and Mid-Atlantic regions combined fell 97% from a 2015–2019 baseline average of about 26,700 to 714 during these months. Trip numbers rebounded some between May and August, but were still below

average. September and October had a 10% higher number of trips compared to the baseline, before decreasing slightly for the remainder of the year. NOAA Fisheries conducted a survey to find out how for-hire operators were impacted by COVID-19. For the Northeast and Mid-Atlantic regions, one of the key findings was that on average, for-hire businesses operated at 56% capacity in 2020 compared to 2019's baseline capacity.

In the Southeast (North Carolina to Louisiana), the number of for-hire angler-trips was 1.7 million on average from 2015 to 2019. In 2020 there was a slight decrease (5%) to 1.6 million trips. The states of the Southeast did not have as many restrictions in general, or for as long, as some of the states in the Northeast and Mid-Atlantic regions which resulted in less of an overall decrease in trips for 2020 compared to the baseline. According to the NOAA Fisheries survey, eighty-eight percent (88%) of affected party/charter/for-hire businesses stopped taking fishing trips for some period of time in 2020. However, the majority (60%) responded that they stopped taking trips for three months or less.

Along the Pacific coast, for-hire angler-trips in Washington decreased by 38% in 2020 compared to the years 2015 to 2019. The number of trips in Oregon were 23% lower in 2020 compared to the baseline, and 17% lower in California.

In Alaska and Hawaii, for-hire operations were significantly affected due to COVID-19, in large part because non-resident tourists account for a large share of their customers. Given that travel by non-residents was severely restricted in 2020 to both of these states, the impact on the for-hire operations was particularly large compared to other regions of the country. In Alaska, the number of charter fishing trips taken in 2020 was only 48.6% of those taken in the baseline period (2015–2019). A survey of Alaskan for-hire operators regarding COVID-19 impacts indicated that 17% of the businesses closed for the fishing season in 2020 (May to September). In Hawaii, due to numerous restrictions affecting tourism and local activities (e.g., stay-at-home orders, visitor quarantine mandates, and suspension of harbor operations and commercial ocean activities), the number of for-hire trips in 2020 was 73% less than the baseline average from 2015 to 2019. When looking at the data for April to December (when restrictions really set in), the number of trips were down 90% in 2020 relative to the baseline.

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Aquaculture Industry Impacts from COVID-19

National Overview

The United States aquaculture industry was heavily impacted by COVID-19 throughout 2020 with the closure of the restaurant and retail industries and the interruptions in international export markets. Aquaculture operations, similar to processing plants, had to adjust business practices to follow local and state health regulations pertaining to COVID-19 such as accounting for social distancing and the use of personal protective equipment, commonly referred to as "PPE". Unlike wild-caught fisheries, aquaculture businesses and farms were challenged with deciding what to do with their market-ready products they had been tending to in preparation for the 2020 season, while balancing a loss of sales and considering their future operations. Loss of sales, labor issues, and increased costs of operations were common challenges facing aquaculture business throughout the year. And, as the year progressed, the aquaculture industry faced increasing secondary impacts to farm activities and operations, particularly from allied businesses.[1] The aquaculture sector benefited from the eventual relaxation of COVID-19 restrictions and the re-opening of restaurant and retail businesses. Many businesses implemented or began to implement direct-to-consumer marketing techniques to help bolster sales.

Some aquaculture businesses also benefitted from several state and federal COVID-19 relief assistance programs, however, many expect the challenges of COVID-19 to continue into 2021.

Aquaculture farms and allied businesses in the contiguous United States and in the Pacific Islands reported severe losses in sales as early as March and April in 2020. The closure of high-end restaurants strained businesses who sold sushi-grade farmed fish as seen in Hawai`i.[2] An Alaska Sea Grant mariculture survey[3] revealed that 43% of participants reported losses of more than 50% of their typical revenue, and about a third of participants had laid off employees by May 2020. Some aquaculture farms in the Pacific Northwest reported losses of 75%[4] and 90% of their sales by April 2020. The oldest continuously operating oyster facility[5] in the United States, located in Louisiana, experienced a 50% decrease in sales in March and then a 98% decrease in sales in April compared to previous years. Farmed species that are typically enjoyed by groups of people at gatherings like crab and crawfish boils also took a hit with stay-at-home restrictions and social distancing measures in place. In March 2020, Louisiana crawfish farmers[6] reported that they were only able to sell about 10-15% of their catch. The oldest commercial kelp farm[7] in the United States, located in Maine, abruptly lost 80% of their clients as they were preparing their harvest in April, prompting the acceleration of the development of their retail brand and products.

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1 Van Senten, Jonathan. 2020. Personal commun. Assistant Professor and Extension Specialist, Virginia Seafood Agricultural Research and Extension Center, 102 S King St., Hampton, VA 23669. jvansenten@vt.edu

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7 Hill, Sam. 2020. Atlantic Sea Farms doubles its harvest in 2020, shifts to retail focus. Seafood Source. Available from https://www.seafoodsource.com/news/aquaculture/atlantic-sea-farms-doubled-its-harvest-in-2020-shifts- to-retail-focus.

Similar to wild-caught fisheries, some aquaculture businesses turned to utilizing direct-to- consumer marketing techniques in order to help supplement, but not substitute, revenue lost due to the closure of restaurants resulting from COVID-19 restrictions. For example, a shellfish farm[8] in Shelton, Washington noted that their online retail sales direct-to-consumer were up 600% in the past year, but that it was still only considered a "modest part of total sales and doesn't make up for drops in sales to the retail and foodservice sectors." Oysters on the half shell present unique challenges for retail, as a majority of oysters are enjoyed in restaurants where staff shuck the oysters for customers. Once oyster season opened in Maryland in October, seafood restaurants and oyster companies took advantage of oyster "pop-up" locations,[9] where customers could pre-order dozens of oysters and watch live shucking demonstrations. One Baltimore-based restaurant opened a new oyster shack and began selling to-go kits for the first time, which include a dozen oysters, a shucking knife, accoutrements, and a how-to-guide.

In addition to the eventual relaxation of COVID-19 restrictions and reopening of restaurants, some shellfish farms benefited from oyster reef conservation projects and research initiatives that purchased surplus oysters. The Rutgers University – New Brunswick's Haskin Shellfish Research Lab[10] received funding from the NOAA Sea Grant COVID-19 Rapid Response Aquaculture Funding Opportunity which allows for the purchase of 76,000 overgrown oysters. In partnership with New Jersey Sea Grant, New Jersey Department of Environmental Protection, Stockton University, Barnegat Bay Partnership, Partnership for the Delaware Estuary, The Pew Charitable Trust, and the New Jersey Aquaculture Association, the farmed oysters will be transplanted to targeted restoration sites in Little Egg Harbor and Mullica River in New Jersey. The Nature Conservancy's (TNC) Supporting Oyster Aquaculture and Restoration (SOAR)[11] includes purchase of up to five million surplus oysters from farmers in Northern New England, the Mid-Atlantic, and the state of Washington in partnership with The Pew Charitable Trusts. SOAR began purchasing oysters in October 2020 from farmers from Maine, New Hampshire, and Massachusetts. TNC purchased 90,000 oysters[12] from a small farmer in Buttermilk Bay, Massachusetts for $0.45 per oyster — about $0.15 less than normal years, but about $0.15 more than the current market rate at the time — which were the farmer's only sales since March 2020. Over two years, the oysters will be used to help rebuild 27 acres of native shellfish reefs at 20 restoration sites.

Aquaculture Industry Survey

The Virginia Tech Seafood Agricultural Research and Extension Centers (AREC) and the Ohio State University Extension initiated an online, quarterly survey of the U.S. aquaculture, aquaponics, and allied businesses on March 23, 2020 to capture the effects of COVID-19 on the industry. Survey questions were added and updated throughout the year in response to evolving conditions. The regions highlighted in the survey summaries are based on the USDA Aquaculture Regions. The Northeastern Aquaculture Region includes Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island, Vermont, Washington D.C., and West Virginia. The North Central Aquaculture Region includes Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The Southern Aquaculture Region includes Alabama,

8 Kramer, Lauren. 2020. Pandemic persists and Pacific NW shellfish sector digs in. Global Aquaculture Alliance. Available from https://www.aquaculturealliance.org/advocate/pandemic-persists-and-pacific-nw-shellfish-sector- digs-in/.

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Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, Puerto Rico, South Carolina, Tennessee, Texas, U.S. Virgin Islands, and Virginia. The Western Regional Aquaculture Region includes Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

Respondents

Nearly half of the respondents in Quarter 1[13] were from the USDA Southern Aquaculture Region and this region represented the highest proportion of businesses in Quarter 2,[14] as well. The Northeastern Region was the second-highest represented region in Quarters 1 and 2. Information on Quarter 3's regional composition is not available at this time. In Quarter 4,[15] the Northeastern and Southern Regions both represented about a third of the responses (Table 2.1).

Table 2.1. Survey respondents by USDA region and quarter.

Category	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Northeastern	26 %	24%	N/A	29%
North Central	11%	5%	N/A	10%
Southern	49%	42%	N/A	33%
Tropical and Sub-Tropical	3%	2%	N/A	0%
Western	10%	14%	N/A	23%
No response	2%	13%	N/A	5%

Mollusk farmers represented 41-64% of respondents while foodfish farmers represented 18- 28% of respondents each quarter; sportfish farmers represented 4-8% of respondents; crustacean, seaweed, baitfish, and allied businesses represented 3% or less of primary product each quarter; other products represented 4-23% of respondents; and 1-6% did not provide a response each quarter (Table 2.2). Out of those who produced foodfish, catfish represented 43-66% of farms, tilapia represented 8-23%, and only 0-1% of respondents13, 14, 15. No information is available for Quarter 3.

13 Van Senten, J., M. A. Smith, and C. R. Engle. 2020. Impacts of COVID-19 on U.S. aquaculture, aquaponics, and allied businesses.: Quarter 1 Results. Virginia Cooperative Extension, Virginia Tech. Available from https://vtechworks.lib.vt.edu/bitstream/handle/10919/98343/AAEC-218.pdf.

14 Van Senten, J., M. A. Smith, C. R. Engle, C. Clark, S. Fluharty, and M.H. Schwarz. 2020. Impacts of COVID-19 on U.S. aquaculture, aquaponics, and allied businesses: Quarter 2 Results. Virginia Cooperative Extension, Virginia Tech. Available from https://vtechworks.lib.vt.edu/bitstream/handle/10919/100440/AAEC-228.pdf.

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Table 2.2. Primary product that the farm or business produces.*

Category	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Mollusks	41 %	47%	N/A	64%
Foodfish	21%	28%	N/A	18%
Crustaceans	3%	2%	N/A	3%
Seaweed	1%	1%	N/A	0%
Sportfish	6%	4%	N/A	8%
Baitfish	1%	1%	N/A	2%
Allied business	3%	1%	N/A	0%
Other	23%	10%	N/A	4%
No response	1%	6%	N/A	3%

Note: Due to rounding, some totals may not be equal to 100%.

National Trends

In Quarter 1 of 2020, 90% of survey respondents said their businesses were being impacted by the effects of the COVID-19 pandemic largely in the form of lost sales, labor and employment, lost private and government sales contracts, and impacts to farm operations (Fig. 2.1).[13] This amount dropped slightly throughout the rest of the year but remained above 78% of businesses14,15. Lost sales continued to be a challenge for a majority of survey participants throughout 2020. In Quarter 1, 84% of respondents reported lost sales, including about 25% of respondents who reported lost sales to international markets.[13] The estimated amount of lost sales per quarter can be found in Table 2.3. In Quarter 2, 74% of respondents reported lost sales with an additional 22% of respondents reporting lost international sales.[14] In Quarter 4, 81% of respondents reported lost sales due to COVID-19 with 16% reporting lost sales to international markets.[15] Seventy-five percent of respondents predicted they would see lost sales in Quarter 1 of 2021.

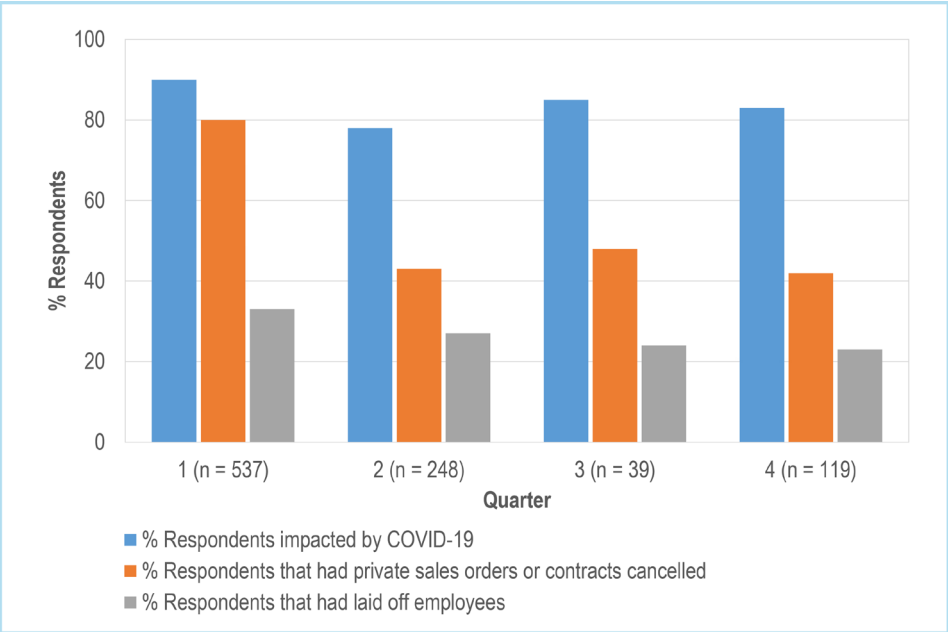

Figure 2.1. High-level COVID-19 effects on the aquaculture industry.

Quarter 1 also saw the highest number of survey participants who responded that they had lost private sales orders or had contracts cancelled.[13] Eighty percent of participants had private orders or contracts cancelled and 9% reported cancelled government orders. The number of respondents who reported cancelled private orders or contracts remained between 42% and 48% of respondents.[14, 15]

About one third of respondents reported laying off at least one employee, and some businesses reported laying off over 20 employees in Quarter 1.[13] An additional 26% of respondents reported needing to lay off employees "soon". The amount of respondents reporting laying off employees remained between 23% and 27% throughout the year.[14, 15] In addition to employment, survey participants reported other challenges related to the impacts of

COVID-19 including production challenges (not related to labor), increased costs of production, and being unable to pay bills or cover liabilities; some also reported challenges related to an increased demand of their products.

Quarter 1 survey participants were asked about potential COVID-19 relief assistance options that could help their farm or business. Sixty-five percent reported that federal assistance would increase the likelihood for their aquaculture business or farm to survive (n = 446). Nearly half of the respondents indicated that state assistance could also increase the likelihood of their survival.[13] In Quarter 2, survey participants were asked whether they had applied for various COVID-19 assistance and relief programs. Forty-eight percent of participants had applied for the Paycheck Protection Program (n = 141), 33% applied for Economic Injury Disaster Loans, 19% used personal credit or private bank loans, 18% applied for Small Business Administration Loans, and 11% applied for unemployment benefits.[14] Information on Quarter 3 results are not available at this time. In Quarter 4, 51% (n = 105) of respondents reported that they applied for the USDA Coronavirus Food Assistance Program, 37% applied for the Paycheck Protection Program, 26% applied for Economic Injury Disaster Loans, 21% applied for Small Business Administration Loans, 13% applied for the NOAA CARES Act Section 12005 funding, and 13% used personal credit or private bank loans.[15]

Table 2.3. Estimated value of lost sales by quarter.

Category	Quarter 1	Quarter 2	Quarter 3	Quarter 4
$1 - $25,000	31%	28%	N/A	30%
$25,001 - $100,000	24%	29%	N/A	29%
$100,001 - $500,000	18%	28%	N/A	23%
Greater than $500,001	8%	11%	N/A	9%
Cannot estimate	19%	3%	N/A	3%
No response	1%	1%	N/A	5%

Regional Trends

Figure 2.2 highlights some high-level regional effects of COVID-19 seen during Quarter 1. At this time, the breakdown of survey responses by region is not available for Quarters 2–4. In Quarter 1, 70% to 95% of business reported lost sales when compared to the same time period in previous years. Over 73% of survey respondents had reported that they had private sales orders or contracts cancelled in the first quarter of 2020. Survey respondents in all four regions responded that they had laid off employees in Quarter 1, ranging from 25% in the North Central Region to almost 50% in the Western Aquaculture Region.[13]

Figure 2.2. Economic effect of COVID-19 on aquaculture regions in Quarter 1, 2020 by region.

Direct-to-Consumer Marketing

An issue commercial fishers did not have to contend with but aquaculture faced throughout 2020 was deciding what to do with their products after reaching market size while facing sharply reduced demand. A majority of survey respondents noted that holding onto market-ready product would make it less marketable. This concern increased from 60% in Quarter 1 (n = 453), to 73% in Quarter 2 (n = 121), to 75% in Quarter 4 (n = 96).[13, 14, 15] This information is currently unavailable for Quarter 3. In Quarter 4, respondents answered that holding onto market-ready product would result in a lower price (71%), reduce the quality of the product (67%), and/or result in a lower quantity sold (67%).[15] In late March, crawfish farmers in Louisiana[16] were debating whether to drain their crawfish ponds to grow rice instead or prepare for a rice and crawfish pond the following year, in response to a decrease in the amount of crawfish that dealers were purchasing with limited retail options. Also in March, a shellfish larvae producer[8] in Oregon was worried about having to throw out their oyster eye larvae because of the uncertainty in the shellfish market amid COVID-19 regulations. The slow reopening of restaurants throughout the summer, however, helped sustain their shellfish larvae sales throughout the year, as reported in November.

In Quarter 2, respondents were asked whether their farm or allied business had implemented or attempted to implement a new marketing or sales channel during the time the Quarter 2 Survey was open (April 10 to June 29) because of COVID-19. Thirty-four percent of respondents said "yes" and an additional 10% of respondents were in the process of implementing or attempting a new marketing channel (Table 2.4, n = 137).[14] Of those who had implemented or attempted a new marketing technique, an average of 44% of sales went through direct-to-consumer channels. Of those who had either implemented or attempted new marketing strategies, 70% turned to online sales, 59% had implemented curbside pickups, 44% used home deliveries, and 15% opened a form of a retail outlet (Table 2.5, n = 27).[13] This information is currently unavailable for the Quarter 3 survey. In Quarter 4, 38% of respondents indicated that they had either implemented or attempted a new marketing channel in response to the evolving markets during COVID-19 and an additional 17% were in the process of implementing (Table 2.4, n = 109).[15] Of those who had either implemented or attempted new marketing strategies, 34% of respondents indicated sales went through direct-to-consumer channels, 64% had initiated curbside pickup services, 52% implemented online sales, 52% implemented home delivery services, and 8% either opened or attempted to open a retail outlet (Table 2.5, n = 25).[15] Respondents also indicated they used a variety of avenues like setting up drop off/pickup locations, roadside kiosks, and farmers' markets.

Table 2.4. Percent of farms or business that implemented or attempted to implement a new marketing or sales channel.

Category	Quarter 2	Quarter 3	Quarter 4
Yes	34%	N/A	38%
In the process of implementing	10%	N/A	17%
No	45%	N/A	41%
No Response	11%	N/A	5%

Table 2.5. Types of direct-to-consumer methods used.*

Category	Quarter 2	Quarter 3	Quarter 4
Home delivery	44%	N/A	52%
Curbside pickup	59%	N/A	64%
Opened a retail outlet	15%	N/A	8%
Online sales	70%	N/A	52%
Other	22%	N/A	20%

**Note: Survey respondents were allowed to select all options that applied. Totals will not sum to 100%.*

16 Schultz, Bruce. 2020. Crawfish farmers urged not to drain ponds yet despite drop in sales The Daily Advertiser. Available from https://www.theadvertiser.com/story/money/2020/03/27/coronavirus-crawfish-farmers-urged- not-drain-ponds-yet/2930848001/.

Alaska Fisheries Impacts from COVID-19

Overview

The data presented in this section are estimates of 2020 monthly ex-vessel revenues and landings for all State and Federal fisheries in the waters off Alaska. While landings are known with a high degree of certainty in near real time for most Alaska/North Pacific fisheries, the final price the fisher receives for their catch is often not known until after the conclusion of the season, resulting in a lag between when landings are known and when ex-vessel revenues are known. Thus, methods have been developed to estimate current year prices and revenues (see Section 6 of the Groundfish Economic Stock Assessment and Fishery Evaluation [SAFE] report; Fissel et al.).[1] These ex-vessel revenue estimates represent the best estimates currently available of 2020 Alaska/North Pacific fisheries values, but are likely to be different than the final values that will be presented in the 2021 Groundfish Economic SAFE. Therefore, the numbers presented in this section are to be considered estimates and will be compared with final realized values for 2020 in the 2021 Groundfish Economic SAFE.

Harvest volumes in 2020 are down in Alaska approximately 10% (~583,000 metric tons [MT]) compared with 2019 and the prior five-year average baseline period (2015–2019; Fig. 3.1), and prices are generally expected to be lower in 2020 than prior years. 2020 revenues are estimated to have declined by 15% compared to 2019 (–$275 million) and 23% (–$456 million) from 2015–2019 average values (in 2020$, deflated using the GDP deflator) across all State and Federal fisheries in Alaska.

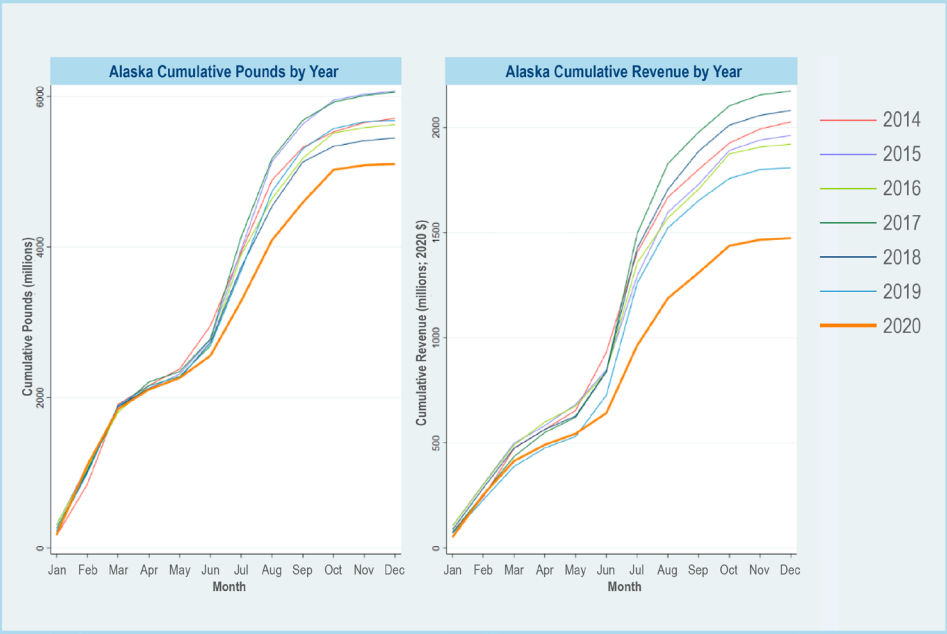

Figure 3.1. Alaska Region Landings and Ex-vessel Revenue by Year, 2014–2020.

Alaska is the U.S. region with the largest annual seafood export value (about $2 billion), and experienced a 16% decline in value in 2020 relative to 2019. The largest decline in value occurred in the months of July and August which are peak export months. There was also a 15% decline in seafood imports to Alaska, but those only represent a very small amount (approximately $1.2 million). China is the U.S.'s top export country for seafood and is a major export destination of Alaska seafood. Exports to China (including cod, crab, pollock, and salmon) decreased from the $667 million baseline average to $474 million in 2020, a 29% decline (NMFS Foreign Trade Data).[2] However, the

1 Fissel, Ben, Michael Dalton, Brian Garber-Yonts, Alan Haynie, Stephen Kasperski, Jean Lee, Dan Lew, Chang Seung, Kim Sparks, Marysia Szymkowiak, Sarah Wise. Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Gulf of Alaska And Bering Sea/Aleutian Islands Area: Economic Status Of The Groundfish Fisheries Off Alaska, 2019. Available at https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/econGroundfishSafe.pdf

2 https://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/

U.S. dollar weakened from January through December 2020 against the Euro (–8.7%),[3] Yen (–5.0%),[4] and Yuan (–5.5%),[5] which should have helped U.S. and Alaska seafood export competitiveness. However, while the January–October US$/Yuan exchange rate weakened overall, the US$ appreciated in value compare with the Yuan from January through August which may have decreased U.S. export competitiveness to China over much of the groundfish and salmon fishery seasons in 2020.

COVID-19 Impacts

Alaska Governor Dunleavy declared a state of emergency on March 11, 2020 and the first confirmed case of COVID-19 in the state occurred on March 12, 2020. Restaurants, bars, breweries, and food trucks all closed beginning on March 18, 2020, which may have limited seafood sales in some communities. However, the large scale and global nature of Alaska fisheries means that restaurant closures throughout the lower 48 states and globally are more likely to impact Alaska seafood sales. The Governor announced on March 23, 2020 that "All people arriving in Alaska, whether resident, worker or visitor, are required to self-quarantine for 14 days and monitor for illness. Arriving residents and workers in self-quarantine, should work from home, unless you support critical infrastructure (see Attachment A)." Fishing and processing businesses are included in Attachment A as "essential businesses," which allowed many fishing operations to continue in 2020, albeit at a substantial cost to the harvesting and processing industries in Alaska to maintain a safe working environment for their employees and minimize spread to local community residents. More information on the actions of the State of Alaska in response to this crisis can be found on the Office of Governor Mike Dunleavy's webpage on COVID-19 Health Mandates.[6]

COVID-19 impacts were assessed through voluntary surveys of Alaska harvesters and processors sponsored by the Alaska Seafood Marketing Institute in March 2021 (McKinley Research Group LLC).[7] Estimates from the report indicate that the processing industry has spent approximately $70 million in COVID-19 mitigation efforts, with travel and quarantine costs representing over half of these costs. Two-thirds of the processing companies reported receiving COVID-19 relief payments which covered roughly a quarter of the mitigation costs. Roughly half of the processing companies reported a reduction in workforce as a result of COVID-19. Most harvesters that responded to the survey reported some (major or minor) impact to their business from COVID-19. The most significant impact that harvesters reported were reduced prices for their products; the pandemic also negatively impacted logistics and planning for fishing trips. Roughly two-thirds reported no reduction in crew sizes. Roughly half of the harvesters reported receiving COVID-19 relief payments (excluding Paycheck Protection Program [PPP] loans); one-third of those reported that the payments covered their losses. While these are the most comprehensive and targeted surveys of COVID-19 impacts (particularly for costs) on Alaska's seafood industry to date, due to fairly low response rates and the voluntary nature of the surveys it's difficult to determine how representative the results are for the industry as a whole. Through the end of 2020, the seafood industry had been fairly successful in Alaska limiting virus spread, while simultaneously dealing with a substantial reduction in transportation options in many Western Alaska and Aleutian Islands communities and limited ability to switch crews throughout the fishing seasons to date. However, several COVID-19 outbreaks at processors at the beginning of the 2021 groundfish season have resulted in ongoing challenges for the seafood industry in the future.

Landings and Ex-Vessel Revenue by Species for 2020

Figures 3.2 and 3.3 present the cumulative landings and ex-vessel revenues by month and year for all State and Federal fisheries off Alaska in 2020 (the thick

3 https://www.x-rates.com/average/?from=USD&to=EUR&amount=1&year=2020
4 https://www.x-rates.com/average/?from=USD&to=JPY&amount=1&year=2020
5 https://www.x-rates.com/average/?from=USD&to=CNY&amount=1&year=2020
6 https://gov.alaska.gov/home/covid19-healthmandates/
7 McKinley Research Group LLC. 2021. 2020 COVID-19 impact surveys prepared for Alaska Seafood Marketing Institute. Available at https://www.alaskaseafood.org/covid-19-impact-reports/

orange line), compared with each of the years 2014-2019.[8] The following section provides a brief summary of cumulative landings and revenue trends by species or species grouping for calendar year 2020.

Figure 3.2. Cumulative Landings by Species and Year.

Invertebrates

This species grouping includes all crab and other shellfish species as well as other invertebrate fisheries throughout Alaska. Calendar year 2020 invertebrate landings in 2020 were up 22% from the 2019 level and 5% above the 2015–2019 average by volume. However, while revenues in 2020 are estimated to be up 5% compared with 2019, they are expected to be 11% below the 2015–2019 average (Figs. 3.2 and 3.3).

Flatfish

Calendar year 2020 flatfish landings in 2020 were up 1% from the 2019 level and even with the 2015–2019 average by volume, but revenues are estimated to be down 13% compared with 2019 and 3% lower than the 2015–2019 average (Figs. 3.2 and 3.3).

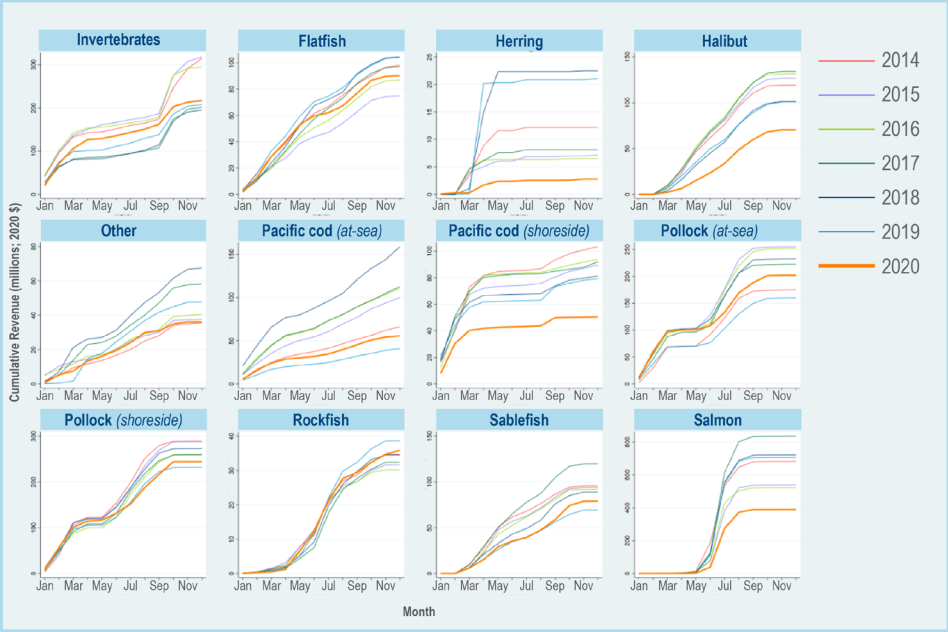

Figure 3.3. Cumulative Ex-vessel Revenue by Species and Year.

Herring

Herring experienced the largest percentage decline of any fishery in 2020, with herring landings down 66% from the 2019 level and 68% less than the 2015–2019 average by volume, with estimated ex-vessel revenues declining 87% compared with 2019 and 79% compared with the 2015–2019 average (Figs. 3.2 and 3.3).

Halibut

Calendar year 2020 saw a reduction in halibut landings of approximately 9% from the 2019 level and 7%

8 Note that Atka mackerel is included in "other" grouping.

from the 2015–2019 average. Reduced landings combined with lower prices have resulted in a decline in revenues of 30% in 2020, relative to 2019, and a 41% decline relative to the 2015–2019 average (Figs. 3.2 and 3.3).

Other Species

The "other species" grouping includes all species not included in the other categories, and is made up of mostly groundfish species. The largest species included in this grouping is Atka mackerel. Calendar year 2020 landings were unchanged from the 2019 level and 5% lower than the 2015–2019 average by volume, but revenues were down 24% compared with 2019 and 28% lower than the 2015–2019 average (Figures 3.2 and 3.3).

Pacific Cod

Ex-vessel prices in 2020 have decreased slightly from 2019, but remain above 2014–2018 levels. Consistent with total allowable catch (TAC) declines in Pacific cod in the Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA), shoreside landings of Pacific cod have declined by approximately 19% from 2020 relative to 2019, while shoreside landings are down 39% from the 2015–2019 average. A slight decrease in ex-vessel prices in 2020 has resulted in a reduction in shoreside BSAI Pacific cod revenue of approximately 36%, compared with 2019, and 42% for 2020 compared with the 2015–2019 average (Figs. 3.2 and 3.3).

For the at-sea sector, fishing conditions were mixed this past year. Prices in 2019 and 2020 were down relative to 2018 but were within 2014–2017 levels. Consistent with TAC declines in Pacific cod in the BSAI and GOA, at-sea landings have declined by approximately 17% from 2020 relative to 2019, while at-sea landings are down 36% from the 2015–2019 average. Estimated ex-vessel revenue for at-sea Pacific cod were down approximately 47% for 2020 relative to the average from 2015-2019, but surprisingly increased 36% relative to revenue in 2019 (Figs. 3.2 and 3.3).

Pollock

For the shoreside sector, landings in 2020 were down 2.7% compared with 2019 and 4.5% compared with the 2015–2019 average (Fig. 3.2). Shoreside pollock prices in 2020 were relatively stable in both the GOA and BSAI relative to 2019 and within the historical range. Pollock shoreside revenues in 2020 were estimated to be 5% above 2019 levels but 7% below the 2015-2019 average.

For the at-sea sector, 2020 landings were below recent periods (2% less than the 2015–2019 average and 5% lower than 2019), and revenues were estimated to be lower than the 2015–2019 average by approximately 10%, while revenues were up nearly 26% in 2020 compared with the same period in 2019, which was the lowest revenue year over this period for this sector (Figs. 3.2 and 3.3).

Rockfish

Rockfish ex-vessel prices are currently within the 2014–2019 range. Rockfish landings in 2020 were down 5% from 2019 levels, but were 11% above the 2015–2019 average. Similarly, ex-vessel revenues in 2020 are estimated to be down 7% from 2019 levels, but 7% above the 2015–2019 average (Figs. 3.2 and 3.3).

Sablefish

There was a large increase in sablefish harvested over the summer of 2020 as shown in Fig. 3.2. Sablefish landings in 2020 were up 12% from 2019 levels and 27% above the 2015–2019 average (Fig. 3.2). Ex-vessel revenues in 2020 were up by 14% above the lowest revenue over this period, which occurred in 2019, but were still 15% below the 2015–2019 average (Fig. 3.3).

Salmon

Calendar year 2020 salmon landings were down 40% from the 2019 level and 38% lower than the 2015–2019 average by volume, and revenues were estimated to be down 45% compared with 2019 and 41% lower than the average from 2015–2019 (Figs. 3.2 and 3.3).

Charter Sector Impacts

In response to COVID-19, the North Pacific Fishery Management Council and International Pacific Halibut Commission relaxed some halibut-related charter fishing restrictions for the remainder of the season effective June 15, 2020. This consisted of relaxed size limits in Areas 2C and 3A and a relaxed annual limit and no day of the week restrictions for charter halibut fishing in Area 3A. During 2020, reports from the field suggested that charter fishing was well below normal levels early in the season throughout Alaska, with some in the industry estimating between 30-50% losses for the season. An industry poll (October 2020) with n=156 respondents suggested about 17% (26 businesses) closed for the season, and over half of the businesses that were opened for at least part of the season reported a decline in bookings of over 50% compared to the previous year.

Historically, during the 2015–2019 baseline, 31.5% of total trips took place in May (7.1%) and June (24.4%) for a total of approximately 32% of total annual trips, while nearly all of the remaining trips took place from July–September (see Fig. 3.4). During 2020, the number of charter fishing trips was about half (48.6%) of those taken in recent years (2015–2019). Eighty percent of charter fishing trips were taken in the July–September period. After relaxation of the charter halibut fishing restrictions in mid-June, there was a marginal increase in fishing activity in July and August, most notably in Area 3A, as Pacific halibut (a primary target species on 3A charter trips) harvest through July picked up relative to May and June, but remained lower than previous years. Nevertheless, estimated Pacific halibut harvest for 2020 was about 47.5% of the harvest in 2019.

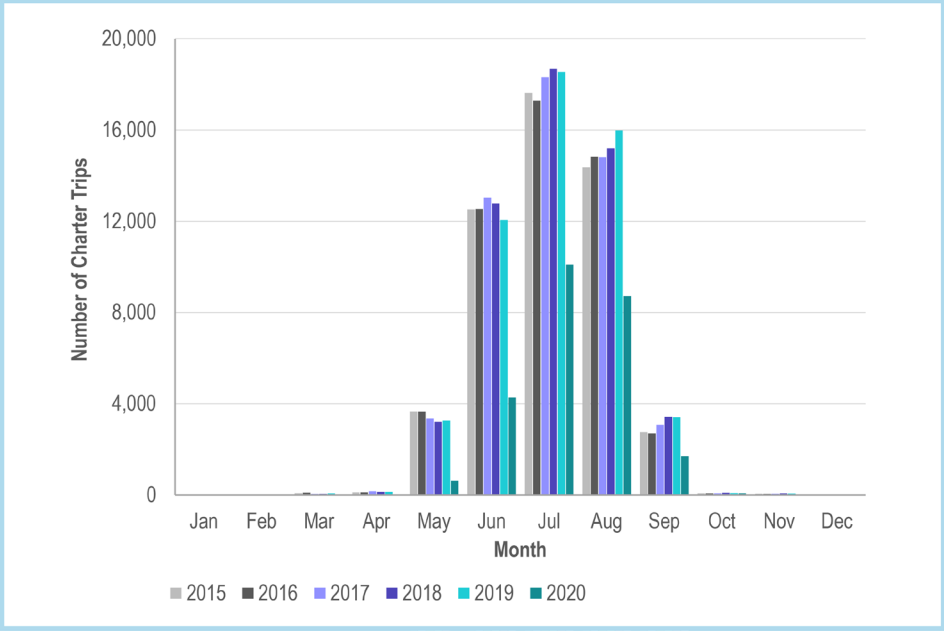

Figure 3.4. Charter trips by month (2015-2020).*

**Data are from ADF&G charter logbook program; 2020 estimates are based on preliminary data.*

West Coast Fisheries Impacts from COVID-19

2020 Commercial Fisheries Landings Trends and Impacts

In 2019, approximately 3,300 non-tribal commercial fishing vessels operated in West Coast fisheries and landed products valued at $526 million (including aquaculture shellfish, where available). The top commercial fisheries by landings revenue in 2019 were crab, groundfish (including whiting), and shrimp. Many of the participants in West Coast commercial fisheries are active year-round, shifting from one fishery to another as seasons open and close. Broadly speaking, West Coast fishermen were initially affected by the cessation of exports caused by the closure of Asian seafood markets beginning in January 2020. Losses were compounded by the sharp decrease in demand for seafood, both domestically and globally, as countries imposed social distancing restrictions that closed restaurants, where the majority of seafood is consumed. For some seafood products, like salmon and tuna, decreased demand from restaurants was mitigated by shifts towards retail consumption. Fishers and processors also incurred pandemic-related operational costs, including expenses for protective measures and expenses incurred to accommodate shifting markets.

We summarize 2020 landings for each species group and region, and calculate the five-year median of landings (2015-2019) for each grouping to provide a baseline comparison to 2020 landings.[1] A five-year baseline is chosen because it corresponds to the timeframe used for fishery disaster declarations. While this method cannot disentangle impacts specific to the pandemic from other factors that affected landings in 2020, it is an important initial analysis for considering the potential impacts of the COVID-19 pandemic on West Coast fisheries. Data for these comparisons are available from January through December 2020. Comparisons restricted to March through December are also provided (when notably different) to emphasize impacts more likely related to the pandemic, since the period coincides with the introduction of stay-at- home orders and restaurant closures on the West Coast. Ex-vessel revenue is adjusted for inflation.

In 2020, total West Coast shoreside commercial ex-vessel revenue was 22% lower than the baseline median of $474 million. From March-December 2020, total ex-vessel revenue was 29% lower than the March-December 2015-2019 median of $330 million. At the start of the year, coastwide ex-vessel revenue was higher than the baseline period, largely due to Dungeness crab landings, but fell below the baseline starting in March and continuing through December, which coincides with the start of stay-at-home orders and restaurant closures on the West Coast. Figure 4.1 illustrates ex-vessel revenue by species group generated during the months of March through December each year between 2015 and 2020. Total commercial fishing revenue in 2020 during these months was lower than any of the previous five years. The same is true of specific fisheries including tuna, IFQ trawl and fixed gear non-whiting groundfish, Puget Sound fisheries, and other coastal pelagic fisheries.

Comparisons of 2020 landings to the baseline period vary across states. In California, the fisheries that contributed most to 2020 ex-vessel revenue were crab, market squid, and other species. Total ex-vessel revenue in 2020 was 29% lower than the baseline median of $188 million and 31% lower than the baseline median from March through December ($135 million). In Oregon, the fisheries that contributed most to 2020 ex-vessel revenue were crab, shrimp, and shoreside Pacific whiting. Total ex-vessel revenue in 2020 was 6% lower than the baseline median of $157 million and 21% lower than the baseline median from March through December ($107 million). In Washington, the fisheries that contributed most to 2020 ex-vessel revenue were crab, tuna, and Puget Sound fisheries. Total ex-vessel revenue in 2020 was 26% lower than the baseline median of $120 million and 29% lower than the baseline median from March through December ($79 million).

1 Landings tracker. NOAA Fisheries, Northwest Fisheries Science Center. [Available at https://dataexplorer.northwestscience.fisheries.noaa.gov/fisheye/landings_tracker/]

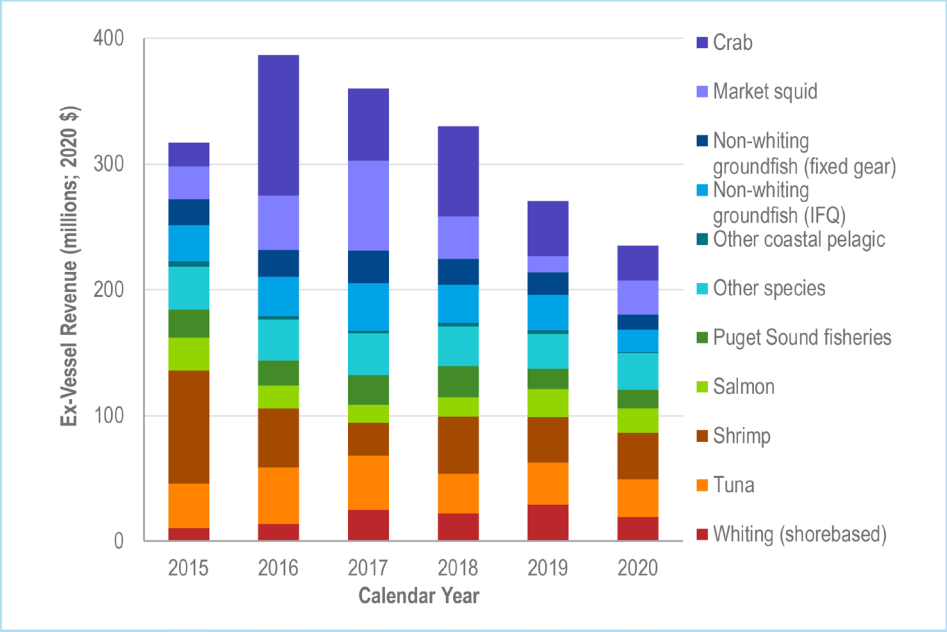

Figure 4.1. **Total shoreside commercial ex-vessel revenue generated during the months of March through December each year between 2015 and 2020 by species group.**

Non-Whiting Groundfish Fishery

From 2015-2019, the non-whiting groundfish fisheries contributed to about 11% of coastwide shoreside ex-vessel revenue, and approximately 970 commercial fishing vessels participated annually. Vessels target multiple species, including sablefish (also called black cod), rockfish, petrale sole, and Dover sole, and primarily use trawl nets and fixed gear (e.g., longlines, pots). Ex-vessel revenue from all non-whiting groundfish fisheries in 2020 was 40% lower than the baseline (2015-2019 median) of $57.7 million, and landed weight was 14% lower. Ex-vessel revenue was consistently below the 5-year median in each month of 2020, with the largest declines below the baseline (between 46% and 55%) observed in April through September (Fig. 4.2).

The non-whiting IFQ bottom trawl fishery operates year-round and accounts for nearly half of total non-whiting groundfish ex-vessel revenue in 2020. This fishery has experienced a 52% decrease in ex-vessel revenue in 2020 relative to the 5-year median value of $32.7 million and a 25% decrease in landed volume, with both volume and ex-vessel revenue below the baseline in each month of 2020. The fixed gear sablefish fishery accounts for nearly a third of the non- whiting groundfish fishery ex-vessel revenue in 2020 and is primarily executed between April and October. The primary sablefish tier fishery season generally ends on October 31; however, an emergency rule was implemented in 2020 to extend the season to December 31 to address low attainment, due to COVID-related delays in Alaskan fisheries that many vessels also participate in.[2] From March-December, ex-vessel revenue was 47% lower than the 5-year median of $16.8 million and volume landed was 20% lower.

Pandemic-related business and restaurant closures created market challenges for the non- whiting groundfish industry as many groundfish products are sold fresh to the foodservice sector. As seafood demand shifted more towards retail, the non-whiting groundfish industry reportedly struggled to shift to this market since groundfish products are less established in the retail sector.[3] Sablefish, a high-valued species typically exported or sold to restaurants, has been impacted by both the decline in export to Asian markets as well as the decline in domestic

2 USOFR. 2020. 50 CFR Part 660: Fisheries Off West Coast States; Emergency Action To Temporarily Extend the Primary Sablefish Fishery Season (RIN 0648-BK15). Federal Register 85:208(27 October 2020):68001–68004.

3 Rowe, Allison, and Janna Hennig. 2020. Economic Outlook Survey of the West Coast Groundfish Industry, 2020. 35 p. [Available at https://static1.squarespace.com/static/5a3051588fd4d2db4fb25f26/t/5f5fb4325dcee615c1695538/1600107579 886/2020+West+Coast+Groundfish+Industry+Economic+Outlook+Survey_Positively+Groundfish.pdf]

demand due to restaurant closures. Groundfish fishermen reported less frequent delivery schedules, and lower delivery limits and ex-vessel prices. In particular, weighted average ex- vessel prices were down from 2019 levels for key groundfish species from March to December, including sablefish (26% lower), petrale sole (13% lower), Dover sole (13% lower), and widow rockfish (29% lower).

Figure 4.2. Coastwide non-whiting groundfish ex-vessel revenue (millions of 2020 $).

Salmon Fishery

The commercial ocean troll salmon fishery on the West Coast typically contributes 3-4 percent of fisheries revenue, with over 600 participating vessels. Participants target multiple, mixed stocks and the season typically runs from April through September with rotating open periods throughout (Fig. 4.3). In 2020, total ex-vessel revenue in the salmon fishery was 6% higher than the 5-year median (2015-2019) of $18.2 million and landed weight was 11% higher. These increases over the baseline period are due to conditions in California, which experienced average to above-average landings and ex-vessel prices May-July. By contrast, landings were down considerably in Oregon and Washington.

Salmon volume and revenue in California from May, the first month the fishery was open, to December were higher than the 5-year (2015-2019) median. Ex-vessel revenue in 2020 was 76% higher than the baseline median ($7.9 million) and landed weight was 106% higher. This is likely because of a low baseline value due to poor stock conditions in previous years, average to above-average ex-vessel prices, and reasonably good stock conditions in 2020. Salmon fishermen in California reported average to above-average prices during the 2020 summer (approximately $9 per pound). Demand for salmon has been surprisingly strong, as buyers have made up some of the lost revenue from sales to restaurants by increasing sales to grocery stores and other retail outlets. Much higher sales to direct-to-consumer channels, though still a relatively small proportion of demand, and sales to markets in the Midwest and East Coast helped support prices.

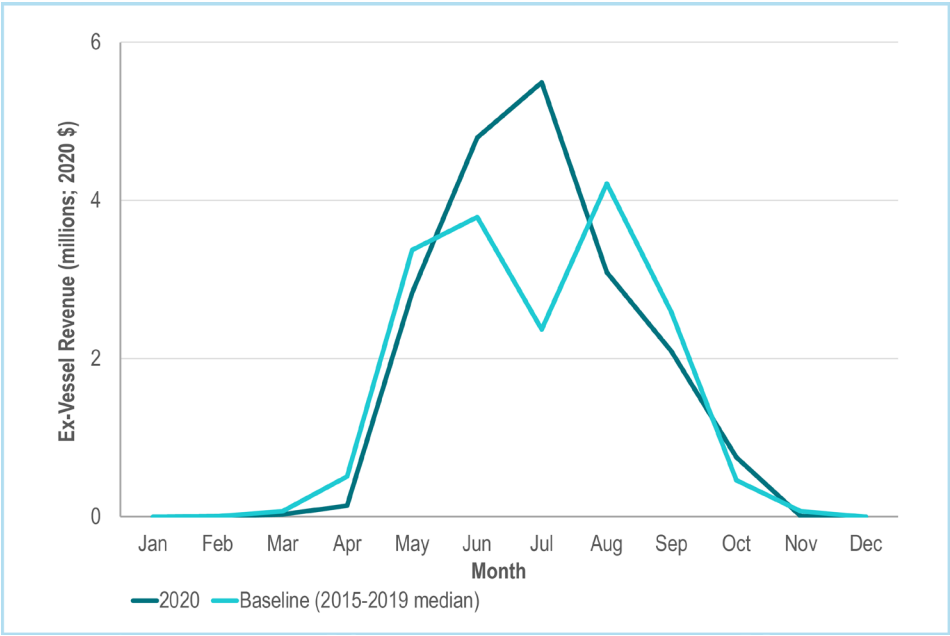

Figure 4.3. Coastwide salmon ex-vessel revenue (millions of 2020 $).

In Oregon, ex-vessel revenue in 2020 was 39% lower than the 5-year median ($4.9 million) and volume landed was 11% lower. In Washington, ex-vessel revenue was 44% lower than the baseline ($4.3 million), while landed weight was similar. This decline is due primarily to stock conditions. Demand from restaurants declined, but very low landings combined with some increased demand from retail and direct-to-consumer outlets meant that operators and buyers were able to move all of their product. This helped support prices in the fishery.

Health and safety concerns had limited impact in the salmon fishery due to the nature of operations. A large proportion of vessels are captain only or have one additional crew member on board. Therefore, many vessels were not affected by social distancing requirements on board. Also, a relatively large proportion of salmon output in the Pacific region is sold as fresh product to local markets, which limits the use of large-scale processing facilities that have been affected by COVID-19 health and safety concerns. In Washington, however, concerns over the health and safety impacts of COVID-19 resulted in the full closure of the port of Neah Bay and the partial closure of the port of La Push during the commercial salmon seasons.

Health and safety concerns affected collection of biological data for management use. California commercial salmon fisheries around Monterey and San Francisco opened in the early stages of the pandemic, but fishery sampling was delayed until managers could acquire personal protective equipment and develop safety protocols. As a result, statistical uncertainty around abundances, harvest rates, and forecasts likely increased. Oregon and Washington data collection were less affected, but some data collection was restricted in those states as well.

Shrimp Fishery

From 2015-2019, the shrimp fisheries contributed to about 9% of coastwide shoreside ex-vessel revenue, and around 180 commercial fishing vessels participated annually. Shrimp revenue largely comprises the pink shrimp fishery, which runs from April through October, as well as spot prawns (Fig. 4.4). While total volume of shrimp landings in 2020 was 16% higher than the baseline (likely in part due to La Niña conditions),[4] ex-vessel revenue was 18% lower than the baseline median of $46.6 million, indicative of lower ex-vessel prices. The weighted average pink shrimp ex-vessel price in 2020 was $0.52 per pound, down from $0.74 per pound in 2019. Price drops were attributed to pandemic-related closures that generated large inventories as well as changes in European markets unrelated to COVID-19 that shifted more shrimp to domestic markets.[5]

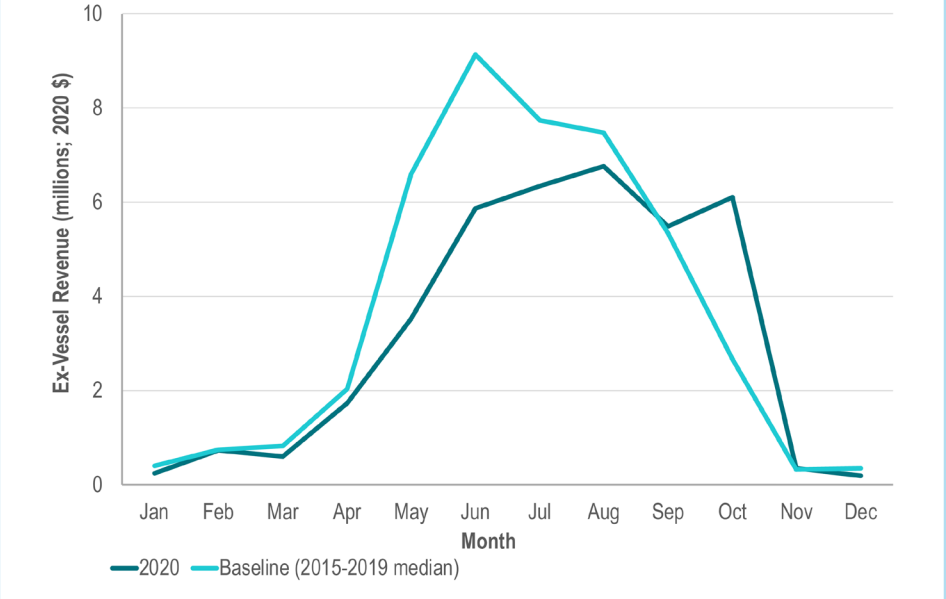

Figure 4.4 Coastwide shrimp ex-vessel revenue (millions of 2020 $).

Shrimp landings in 2020 for Oregon and Washington were primarily composed of pink shrimp. In Oregon, ex-vessel revenue was 16% lower than the baseline median of $27.1 million and landed weight was 22%

4 Undercurrent News. 2020. La Nina drives Oregon pink shrimp fishery to best harvest since 2015. [Available at https://www.undercurrentnews.com/2020/11/16/la-nina-drives-oregon-pink-shrimp-fishery-to-best-harvest- since-2015/]

5 Seafoodnews.com. 2020. West Coast Pink Shrimp Season a Win for Landings; Not so Much for Markets, Price. [Available at https://www.seafoodnews.com/Story/1184197/West-Coast-Pink-Shrimp-Season-a-Win- for-Landings-Not-so-Much-for-Markets-Price]

higher. Landed weight and revenue were generally lower than the baseline in the first several months of the season, but surpassed the baseline in the later months. In California, ex-vessel revenue from shrimp landings was largely composed of prawn. In 2020, ex-vessel revenue was 33% lower than the baseline median of $11.7 million and landed weight was 63% lower. Industry feedback in September indicated that demand from restaurants for live products declined for shrimp in particular, due to their perishability and poor transportability once cooked; the industry endeavored to expand direct-to-consumer sales.

Whiting Fisheries

The at-sea and shoreside Pacific whiting seasons open on May 15 each year, and whiting vessels in the at-sea sector typically depart the fishery to fish for Bering Sea pollock from July through September (Fig. 4.5). In 2020, volume was 4% lower than the 5-year median in the at-sea catcher-processor sector and 43% lower than the 5-year median in the at-sea mothership sector. In the shoreside sector, landed weight was 5% higher than the 5-year median while ex- vessel revenue was 12% lower than the baseline median ($22 million), with a lower than average ex-vessel price. In the Advisory Panel report in the 2021 stock assessment, the industry reported favorable fishing conditions and abundance during the 2020 Pacific whiting season; however, effort was reduced, due in part to COVID-related impacts. Implementation of COVID testing and quarantine protocols contributed to a slower season start in the spring, and fall fishing was delayed as the pollock B season was longer than normal due to a combination of high total allowable catch (TAC) and pandemic-related effects. In addition, participation and effort were hindered by plant closures and vessel tie-ups due to virus outbreaks in the shoreside and catcher-processor sectors, as well as by a water emergency in Newport, Oregon midsummer that halted shoreside processing operations.[6] Effects on Pacific whiting markets reportedly varied by product type, with some more adversely impacted than others.

Fewer motherships participated in the fall fishery than usual, and one mothership processor decided to limit their activities to Alaska during the 2020 season to mitigate the risk associated with

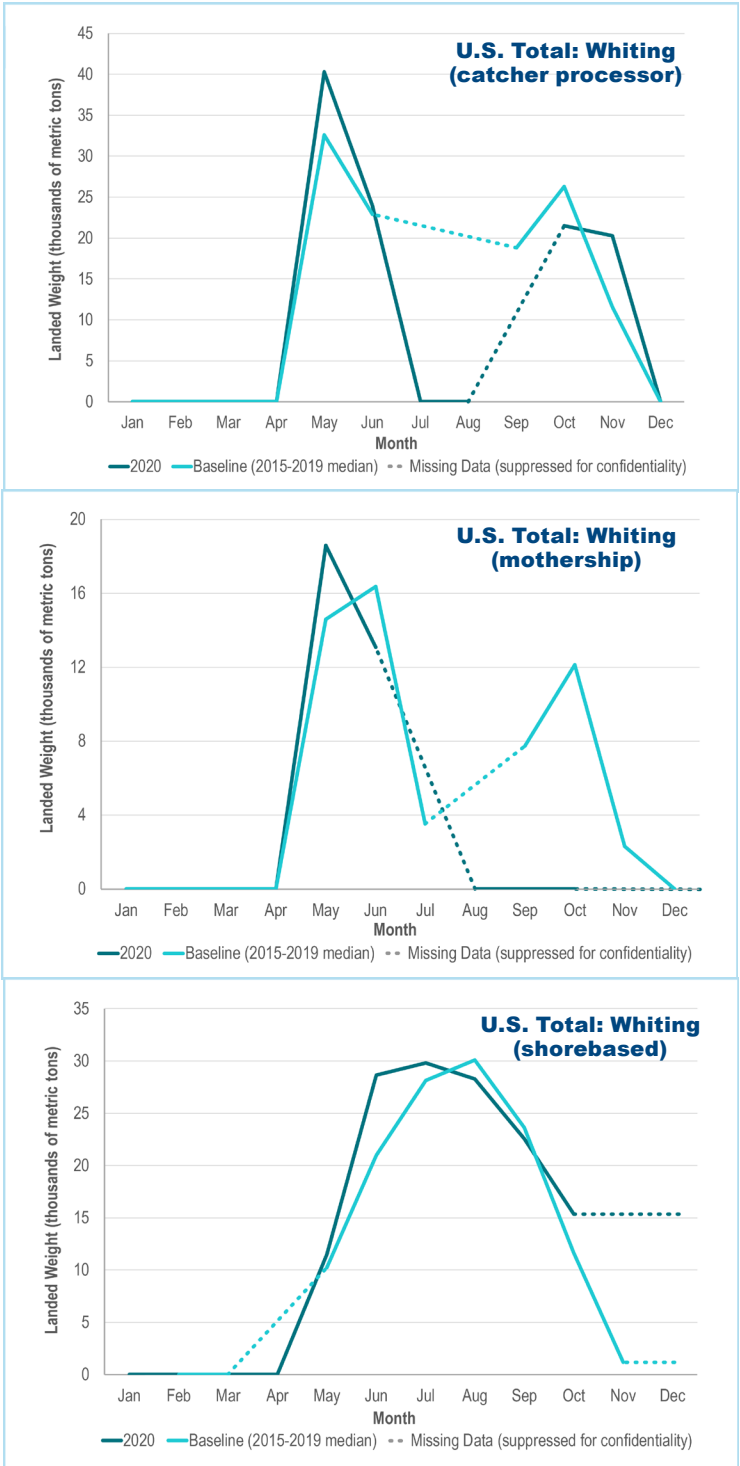

Figure 4.5. **Total commercial volume landed (thousands of metric tons) in at-sea and shoreside Pacific whiting fisheries.**

6 Johnson, Kelli F., Andrew M. Edwards, Aaron M. Berger, and Chris J. Grandin. 2021. Status of the Pacific Hake (whiting) stock in U.S. and Canadian waters in 2021. 269 p. [Available at https://media.fisheries.noaa.gov/2021-03/hake-assessment-post-srg-final_20210303.pdf]

COVID-19, which left some catcher vessels without a processing platform. To provide operational flexibility, NOAA Fisheries issued an emergency rule to allow eligible mothership and catcher-processor vessels to operate as either type of processing platform during the 2020 Pacific whiting season.[7] The industry notes that several factors, including outbreaks and timing, prohibited utilization of this rule during the 2020 season. An extension of this emergency rule for the 2021 season has been requested and is currently under consideration.[8]

Crab Fishery

The Dungeness crab fisheries, which comprise the majority of West Coast crab landings revenue, generally open in early December and most landings occur between December and February (approximately 80% of landed weight in the baseline) (Fig. 4.6). The 2019/2020 fishing season and the 2020/2021 season both began with delayed starts for several reasons including domoic acid levels, price negotiations, and concerns about whale entanglement. Ex-vessel revenue in January 2020 was 4% higher than the baseline median ($76.7 million) but fell to 15% below the baseline median ($43 million) in February, and cumulative ex-vessel revenue from March through October was 32% lower than the baseline median ($35.8 million).[9] Industry feedback indicated that demand from Asian nations that import crab was down early in the year, and the high-value live crab market was effectively cancelled for the fishing season. Ex-vessel revenue from the start of the 2020-2021 season (December 2020) was 88% lower than the baseline median ($8.2 million), at least in part due to delays in the season start.[9]

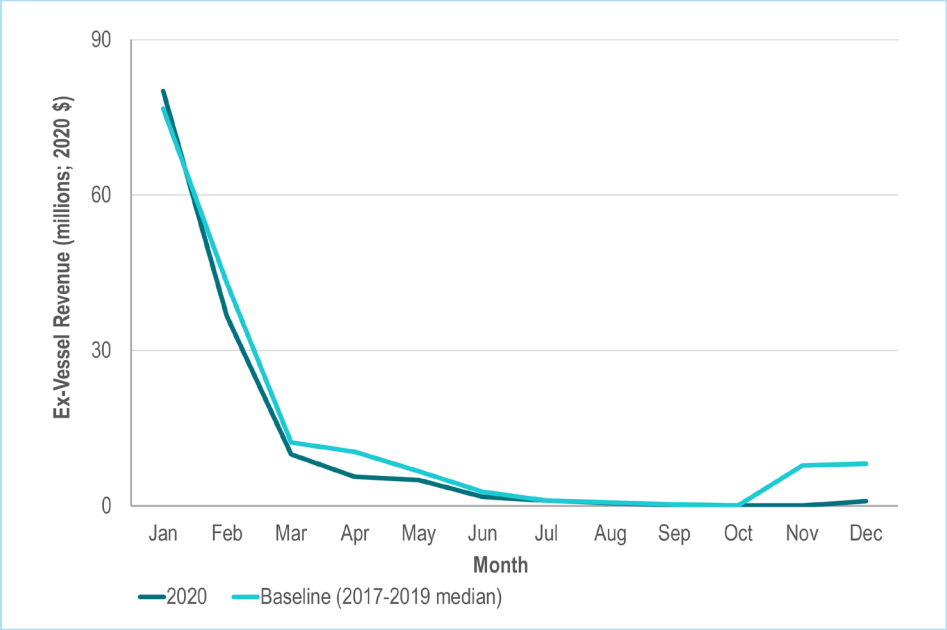

Figure 4.6. **Coastwide Dungeness crab ex-vessel revenue (millions of 2020 $).**

In Oregon, Dungeness crab ex-vessel revenue from January to October 2020 was 6% higher than the 5-year median (2015-2019) of $67.7 million and volume landed was 4% higher. The 2020-2021 season began on December 16th for some regions. Ex-vessel revenue from December 2020 was 94% higher than the baseline median ($485 thousand), and volume landed was 16% higher, with higher ex-vessel prices observed this season thus far. In California, Dungeness crab ex-vessel revenue from January to October 2020 was 15% lower than the baseline median of $35.4 million and volume landed was 18% lower. The 2020-2021 season began on December 23rd and total volume and ex-vessel revenue from December 2020 were 99% below the baseline median ($8.1 million). In Washington, Dungeness crab ex-vessel

7 USOFR. 2020. 50 CFR Part 660: Fisheries Off West Coast States; Emergency Action To Temporarily Remove Seasonal Processing Limitations for Pacific Whiting Motherships and Catcher-Processors (RIN 0648- BJ83). Federal Register 85:119(19 June 2020):37027–37030.

8 Request for Emergency Action, Submitted by Pacific Whiting Conservation Cooperative, Aleutian Spray Fisheries (F/V Muir Milach, F/V Nordic Star), F/V Lisa Melinda, Midwater Trawlers Cooperative, and United Catcher Boats, March 3, 2021. [Available at https://pfmc.psmfc.org/CommentReview/DownloadFile?p=ba2a045a-0993-4af7-abe2- 8b9d9d0737c1.pdf&fileName=2021_emergency_rule_request_PFMC_B1_OpenPublicComment_March2021. pdf]

9 For the Dungeness crab fishery, we remove 2015 and 2016 from this calculation because the fishery received a Federal fishery disaster designation in both years. Removing the disaster years puts the median within 4% of the average from 2011 to 2019.

revenue from January to October 2020 was 16% lower than the baseline median of $46.6 million, and volume landed was 15% lower. The 2020-2021 season did not begin in Washington until February 16, 2021.

There were concerns that quantity demanded and prices of crab would be depressed in the 2020-2021 Dungeness crab season due to increased inventory of frozen crab as restaurant closures depressed retail sales during the summer of 2020. Ex-vessel prices in 2021 thus far are higher than those observed in corresponding months in 2020 and the baseline, which could indicate that inventories are depleting. There are reports of processors converting products originally packaged for restaurant sales to products that could be sold to grocery stores and retail.[10]

Coastal Pelagic Fisheries

The Coastal Pelagic Species (CPS) fishery targets the following: anchovy, market squid, sardine, and other coastal pelagics (which include mackerel). During the 2015 through 2018 period, over 94% of total CPS landings and revenues occurred in California. The share of revenues from the Pacific Northwest were higher earlier in the decade but declined, in part, due to the closure of the West Coast major directed commercial Pacific sardine fishery in 2015 (over 70% of Pacific sardine revenues occurred in the Pacific Northwest in the 2009-2015 period).

The primary directed fishery for Pacific sardine has been closed since 2015. Beginning in 2018, there has been a major increase in market squid landings and revenues in the state of Oregon, however the majority of market squid landings and revenues remain in California.

Coastwide 2020 ex-vessel revenue from coastal pelagic fisheries was 22% lower than the 5- year median (2015-2019) of $43.2 million and landed weight was 42% lower. From March- December, ex-vessel revenue was 24% lower than the baseline median ($36.8 million) and volume landed was 51% lower than the baseline. In California, total 2020 ex-vessel revenue in coastal pelagic fisheries was 31% lower than the 5-year median of $40 million, while landed weight was 47% lower. From March-December, ex-vessel revenue was 35% lower than the baseline median of $33.6 million and volume landed was 56% lower. In Oregon, the 2020 total ex-vessel revenue from coastal pelagic fisheries was 143% higher than the 5-year median of $2.5 million and landed weight was 81% higher.

For market squid, ex-vessel revenue in 2020 was 20% lower than the baseline median of $40 million and landed weight was 32% lower. From March-December, ex-vessel revenue was 20% lower than the 5-year median ($33.8 million) and volume landed was 45% lower than the baseline. In California, ex-vessel revenue in 2020 was 29% lower than the baseline median of $36.8 million and landed weight was 44% lower. From March-December, ex-vessel revenue was 32% lower than the 5-year median ($30.6 million) and volume landed was 57% lower than the 5-year median. In Oregon, ex-vessel revenue in 2020 from the market squid fishery was 105% higher than the baseline median of $2.9 million and landed weight was 96% higher.

For anchovy, total ex-vessel revenue in 2020 was 66% lower than the 5-year median (2015- 2019) of $2.1 million and landed weight was 59% lower. From March-December, ex-vessel revenue was 80% lower than the baseline median ($2.0 million) and volume landed was 74% lower than the 5-year median. A majority of the anchovy landings occurred in California.

Landing revenues for Pacific and other mackerel fisheries are captured in the other coastal pelagic fishery category. As can be seen by Figure 4.7, landing revenues for this species grouping were significantly down relative to the prior 5-year median.

10 Hagenbuch, Brian. 2021. West Coast Dungeness fishery navigates late start, pandemic. Seafood Source. [Available at https://www.seafoodsource.com/news/supply-trade/west-coast-dungeness-fishery-navigates-late-start-pandemic?]

Figure 4.7. Coastal Pelagic Species ex-vessel revenue by type and location (millions of 2020 $).

Tuna Fisheries

In 2020, total ex-vessel revenue from the tuna fisheries was 15% lower than the 5-year median (2015-2019) of $36.2 million and landed weight was 6% lower. During the peak months of the season, total ex-vessel revenue from August was very close to the five-year median, but 2020 revenues were below the median in July, September, and October (Fig. 4.8).

In Oregon, total ex-vessel revenue in 2020 was 36% lower than the 5-year median (2015-2019) of $11 million and landed weight was 33% lower. In California, total ex-vessel revenue in 2020 was 10% higher than the 5-year median (2015-2019) of $7.3 million and landed weight was 72% higher. From March-December, ex-vessel revenue was 7% higher than the baseline median of $6.8 million and volume landed was 74% higher than the 5-year median. For Washington, total ex-vessel revenue in 2020 was 28% lower than the 5-year median (2015- 2019) of $21.7 million and landed weight was 8% lower. The disparities between changes in revenues compared to changes in weights suggest negative impacts of the pandemic on tuna prices.

Commercial albacore fishing industry members reported extra costs due to protective measures such as grocery delivery services to vessels coming into port, to avoid requiring crew to leave the boat and face risk of contracting or spreading COVID-19. It was not clear to what degree these added costs reduced profitability. Longline vessels making deliveries to San Diego reported a shift from sales to processors to direct sales to customers due to the loss of fresh catch demand from the restaurant industry.

U.S. tropical tuna purse seine vessels in both the Eastern Pacific and the Western and Central Pacific oceans faced declining catch. Crew were not allowed to leave vessels to fly home, there were no observers, and drydocking was

not possible. Vessel operators faced increasing difficulties in obtaining parts and supplies. Landings prices were down, and profits were adversely impacted.

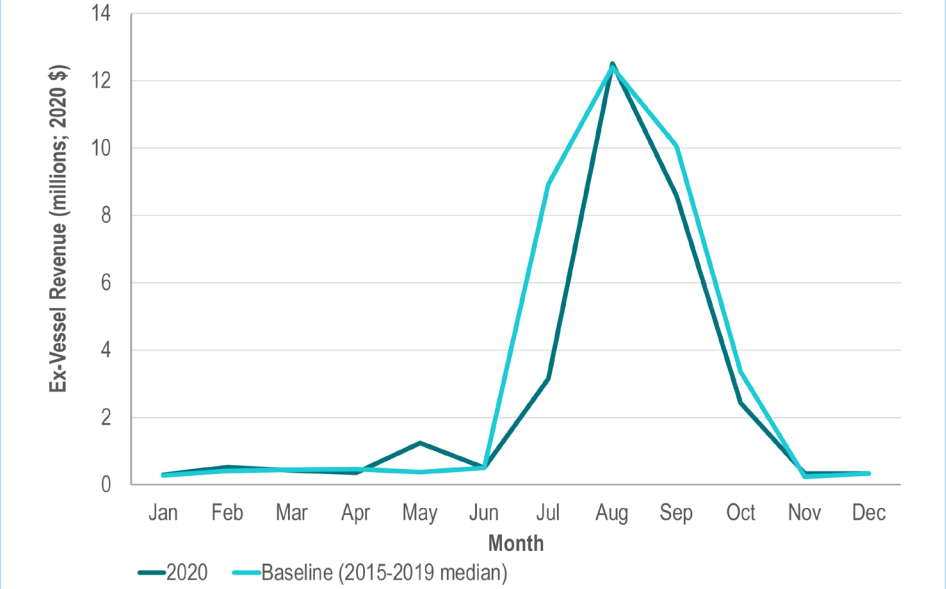

Figure 4.8. Coastwide tuna ex-vessel revenue (millions of 2020 $).

Seafood Processors

Approximately 1,000 buyers purchased seafood from harvesters and producers in the West Coast Region in 2019. In 2020 and thus far in 2021, these processors have faced increased costs and reduced demand coastwide. There have been a number of reported COVID-19 outbreaks at facilities. News sources indicate that some processing plants in Astoria/Warrenton and Newport, Oregon temporarily closed due to outbreaks. Closures reportedly ranged from several days to two weeks.

On the demand side, interviews with seafood processors conducted early during the COVID-19 outbreak indicated that the fresh seafood market was greatly affected by restaurant closures.

There are reports that industry (at various levels of the supply chain) shifted towards other markets, including direct-to-consumer and community-supported fishery (CSF) sales. There are reports of strong demand for seafood in retail channels, which is due in part to reduced ability to consume in restaurants. This increased retail demand bolstered some shelf-stable products but not others. Salmon buyers have reportedly attenuated losses in restaurant sales by increasing sales to grocery stores and other retail outlets. Interviews with large tuna processing companies in September indicated consumer retail demand for shelf-stable products remained strong but institutional demand for frozen products was adversely impacted. Interviews with seafood processors of highly migratory species indicated that retail was strong but wholesale was moving smaller volumes than "normal," with slight increases as restaurants reopened or expanded operations. General uncertainty negatively impacted wholesale prices. Groundfish products were not positioned to take advantage of strong retail demand. Few groundfish products are packaged for consumer retail sale.

Processors are facing cost increases on several fronts. In addition to the cost of closures due to outbreaks, they have made changes to infectious disease safety protocols and changes to requirements for workers on processing lines. Distancing, installation of plexiglass shields between positions, and hiring on-site medical personnel are actions that some processors have taken. Additionally, processors have reportedly incurred increased cost for repackaging items for retail sale that are typically packaged for restaurants.

Cold storage shortage is an issue that will likely continue to affect prices in the months ahead. Restaurant closures have pushed much seafood into cold storage, so inventories are reportedly quite high. A high level of inventories will potentially diminish demand in the months ahead.

Recreational Fishing — For-Hire Sector

After widespread closures occurred at the beginning of 2020, all modes of recreational fishing are now open. In most jurisdictions, the relaxation of restrictions started with the opening of boat launches for private boats, followed by opening of public beaches, then for-hire operations. The majority of for-hire operations began operating

as local guidelines allowed, with many operations starting in mid to late May. Prior to mid-May, some for-hire operations may have shifted to commercial fishing without passengers to maintain some level of income. Vessel launch and trip booking websites outlined protocols in place for social distancing. Vessels carried fewer passengers per trip due to a mix of regulatory and market pressures, with some operations increasing ticket prices to make up for carrying fewer passengers per trip. A small number of charter vessels located on Indian reservations remain shut down as the reservations are still closed to the public.

Retail tackle shops reopened after the lifting of state and local mandated closures to non- essential business. Closures and openings varied significantly by jurisdiction. Some fishing tackle shops with online infrastructure were able to continue selling and shipping goods; others were able to take orders over the phone for pick up by appointment. Shops without an online presence were likely more impacted by a longer period of closure and/or no sales.

Many fishing trade shows were cancelled, or postponed only to be later cancelled, due to limits on public gatherings, closure of host locations, and logistics needed to change locations and dates of such large events. A handful of large fishing shows for 2021 have already been cancelled. Fishing tournaments were also cancelled due to stay at home orders. As restrictions were lifted however, some tournaments and small outdoor fishing shows have resumed.

For-Hire Effort Update from RecFIN Data

Across the West Coast, for-hire angler trips were considerably lower in 2020 relative to the 5- year median. In California, sampling was not conducted from April through June, due to COVID-19 restrictions, and these data are likely to remain missing. In addition, California salmon and highly migratory species trips data are not available for 2020 and therefore have also been omitted from the previous five years to allow for a more direct comparison. Most of the curtailment of effort occurred in the first half of the year across the three states. Reductions for the for-hire recreational fishing sector in 2020 were as follows: 38% for Washington relative to a 5-year median of 41,753 (Fig. 4.9), 23% for Oregon relative to a 5-year median of 61,282 (Fig. 4.10), and 17% for California relative to a 5-year median of 571,250 (Fig. 4.11).

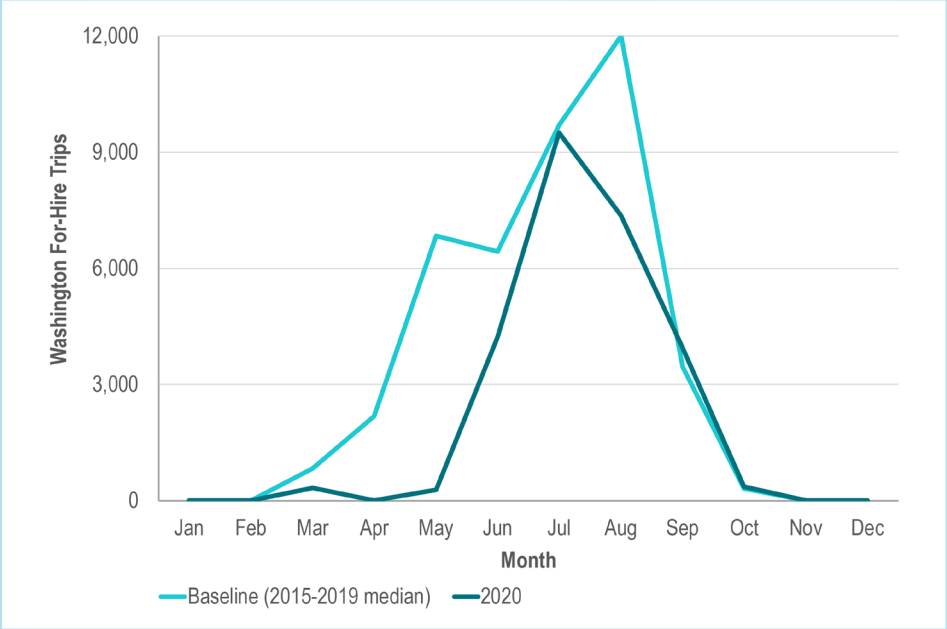

Figure 4.9. For-hire trips in Washington.

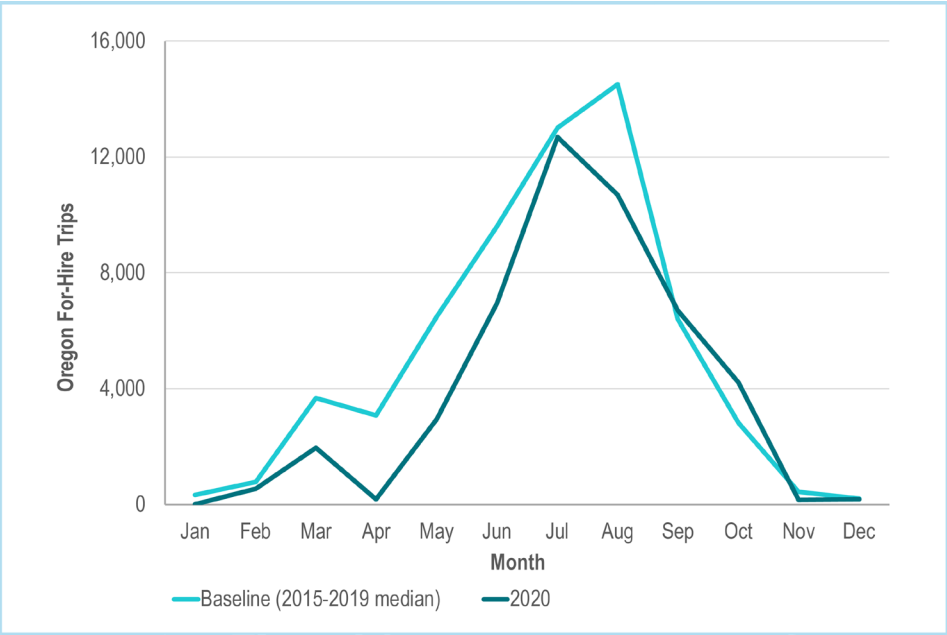

Figure 4.10. For-hire trips in Oregon.

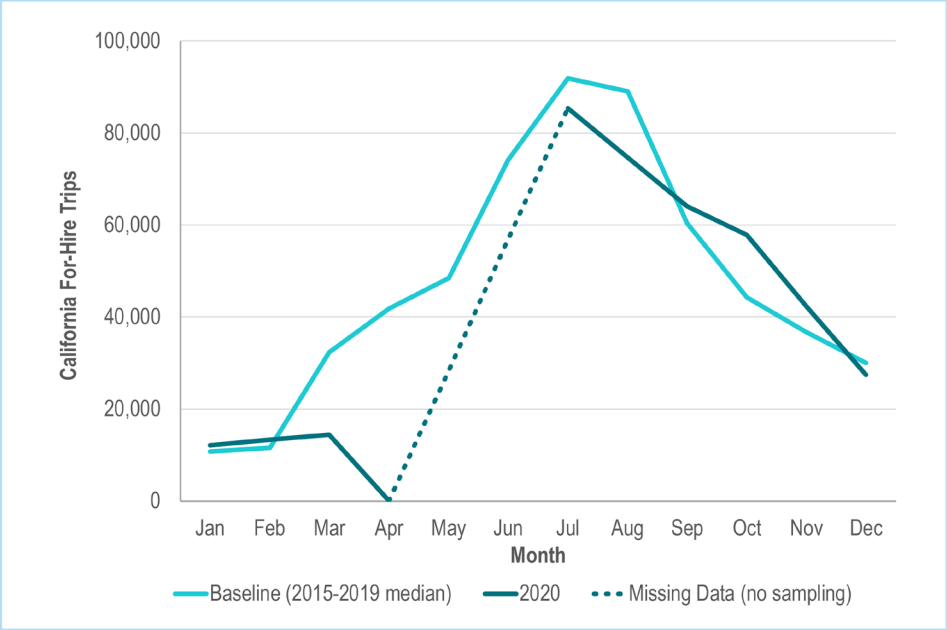

Figure 4.11. For-hire trips in California. Dotted line indicates missing data due to COVID-related closure of sampling program. Salmon and highly migratory species trips are not included in either series.

Pacific Islands Fisheries Impacts from COVID-19

Hawai‘i

The state of Hawai‘i implemented numerous protective measures to prevent the spread of the novel coronavirus beginning in mid-March 2020, including social distancing (March 13), cancellation of public gatherings (March 15), a statewide stay-at-home work-at-home order (March 25), and a requirement that all persons entering Hawai‘i (visitors and returning residents) self-quarantine for 14 days or for the duration of their stay in Hawai‘i, whichever is shorter (March 26).[1]

Along with many other states, these restrictions were slowly relaxed between the months of May to July 2020, as the islands staged an incremental reopening strategy. However, surges in domestic cases in June and July precluded the state from relaxing quarantine restrictions further. Initial plans were to launch a program called “Safe Travels” on August 1 that would allow travelers with pre- travel negative test results to bypass quarantine. This program was delayed because local case counts spiked in August and September; the islands returned to a strict lockdown with renewed statewide stay-at-home orders for a period of 4 weeks (August 27 – September 23).[2] In mid- October the “Safe Travels” program was finally initiated.[3] The first COVID-19 vaccines arrived in Hawai‘i in mid-December,[4] and at that time quarantine periods were also reduced from 2 weeks to 10 days.[5]

Hawai‘i’s largest industry, tourism, which provides high demand for the state’s seafood products, remained shuttered for most of 2020, creating significant economic hardship statewide. Cumulative visitor counts for the months of April-July 2020 (53,000 visitors) were down 98.5% from this same April-July period in 2019 (3,600,000 visitors).[6] August to December (537,000 visitors) saw moderate gains from April-July, however this still reflects an 87% decline relative to 2019 (4,100,000 visitors). In total, the number of visitors in 2020 was down 74% relative to 2019, slightly exceeding early predictions from the state’s Department of Business, Economic Development, and Tourism (DBEDT).[7] Seasonally-adjusted unemployment rates in Hawai‘i were some of the highest in the nation between April-July, and unfortunately this trend continued for the remainder of 2020 with unemployment rates as high as 14.8% in September and declining to 10.2% by December, compared to national rates of 8.4% and 6.7%, respectively. The state had the highest unemployment rate in the nation between September and December 2020. While fishing and seafood markets are classified as an “Essential Business,” the Hawai‘i fishing and seafood industry has experienced significant economic impacts as a result of global COVID-19 spread.

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1 Department of Health. 2020. News Releases from Department of Health. State of Hawaii. Available at https://health.hawaii.gov/news/covid- 19-updates/

2 Consillio, Kristen. 2020. Honolulu Mayor Kirk Caldwell extends stay-at-home, work-from-home order. Honolulu Star Advertiser. Available at https://www.staradvertiser.com/2020/09/09/hawaii-news/caldwell-extends-stay-at-home-work-from-home-order/

3 Gomes, Andrew. 2020. Gaps cited in Hawaii’s pre-travel COVID-19 tests, contact tracing. Honolulu Star Advertiser. Available at https://www.staradvertiser.com/2020/09/29/hawaii-news/gaps-cited-in-state-pre-travel-covid-19-tests-contact-tracing/

4 Consillio, Kristen. 2020. Vaccines arrive in Hawaii, thousands more on the way. Honolulu Star Advertiser. Available at https://www.staradvertiser.com/2020/12/15/hawaii-news/vaccines-arrive-thousands-more-on-the-way/

5 O’Connor, Christina. 2020. Hawaii’s travel quarantine period reduced to 10 days. Pacific Business News. Available at https://www.bizjournals.com/pacific/news/2020/12/17/ige-travel-quarantine-reduced.html

6 Department of Business, Economic Development & Tourism. 2021. Visitor Statistics. State of Hawaii. Available at https://dbedt.hawaii.gov/visitor/tourism/

7 Department of Business, Economic Development & Tourism. 2020. DBEDT Quarterly Tourism Forecast. State of Hawaii. Available at https://dbedt.hawaii.gov/visitor/tourism-forecast/ (accessed 9/17/20)

The Hawai'i fishing and seafood industry is an integrated food production and supply system that links fishermen to our nation's only fresh tuna auction, the fish auction buyers (mainly wholesalers), and ultimately retailers and restaurants in Hawai'i and across the United States.

Between March and December 2020, the COVID-19 pandemic virtually eliminated market demand for Hawai'i seafood in local restaurants, which are heavily dependent on tourism, and severely restricted the mainland U.S. retail market. What remained were the local retail and direct-to- consumer markets in Hawai'i. This significant reduction in market demand cascaded through market channels to the fishing sector, which faced significant reductions in fish prices, and the market struggled to balance supply with reduced demand. The economic viability of fishermen, the fish auction, and fish processors continued to be threatened by the economic effects associated with pandemic restrictions and shifts in demand.

Despite these challenges, the fishing community (commercial fishers, non-commercial fishers, seafood distributors) in the Pacific Islands region play a vital role in supporting local food systems, nutrition, food security, and social cohesion.[8] This importance is amplified in the face of natural disasters and human health crises, and fishing communities across the Pacific Islands region have adapted to continue these crucial functions in the face of this unprecedented disruption. New markets such as direct sales from wholesalers to the public, roadside sales, and Community Supported Fisheries initially provided deep discounts to the community and have continued to provide alternative means to supply fresh fish directly to local populations.[9]

Commercial Fisheries Landings and Trends

In 2018, Honolulu was the nation's #7 port in seafood value ($106 million).[10] On average, the Hawai'i longline fishery comprises approximately 97% of Honolulu fishery revenues and over 85% of the state's fishery revenues. Other important commercial fisheries in Hawai'i include small boat fishers targeting tunas and other highly-migratory species, as well as bottomfish, nearshore, and reef fish species. The state's commercial fisheries are year-round fisheries, with revenues peaking in the months between March and June, and a second seasonal peak during the holiday months of December and January. During 2018, there were 121 active seafood dealers, over 2,500 licensed fishers with commercial sales, and a world-renowned charter/for-hire industry.

Average monthly commercial fishing inflation-adjusted revenues over the five-year baseline period of 2015-2019 were approximately $10.1 million. Monthly revenues for 2020 show significant impacts from COVID-19 (Fig. 5.1, Table 5.1). Market price declines of just under 75% that hit in mid- March[11] and held over the last two weeks of the month, coupled with industry-imposed landing limits, resulted in revenue declines of nearly 50% for the months of March and April relative to baseline monthly averages. Hawai'i commercial fishery revenues (March-July 2020) experienced an over 42% decline relative to the five-year baseline period. The period of August-December saw marginal improvement as restrictions gradually lifted, but fishery revenues were still down nearly 29% relative to the baseline during this period. Aggregate 2020 Hawai'i commercial fishery revenues were down 31%, or an estimated $37.6 million from the five-year baseline average.

8 Allen, Stewart. 2013. Carving a Niche or Cutting a Broad Swath: Subsistence Fishing in the Western Pacific. Pacific Science 67(3), 477- 488. https://doi.org/10.2984/67.3.12

9 Allen, Stewart. 2013. Carving a Niche or Cutting a Broad Swath: Subsistence Fishing in the Western Pacific. Pacific Science 67(3), 477- 488. https://doi.org/10.2984/67.3.12

10 National Marine Fisheries Service. 2020. Fisheries of the United States, 2018. U.S. Department of Commerce, NOAA Current Fishery Statistics No. 2018. 140 p. Available at https://www.fisheries.noaa.gov/feature-story/fisheries- united-states-2018

11 Daysog, Rick. 2020. Fish prices plummet as coronavirus pandemic cripples industry and idles boats. Hawaii News Now. Available at https://www.hawaiinewsnow.com/2020/03/27/fish-prices-plummet-coronavirus-pandemic-cripples-industry-idles-boats/

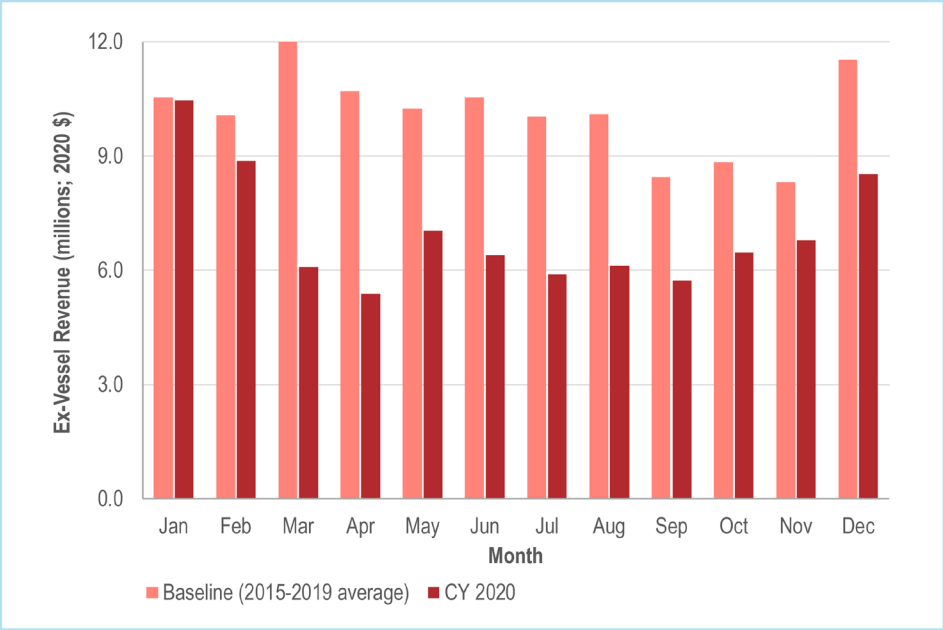


Figure 5.1. **Monthly Hawai'i commercial landings revenue, 2020 relative to 2015-2019 (inflation-adjusted, 2020 dollars).**

Table 5.1. **Hawai'i Commercial fisheries performance:** percentage change in 2020 compared to baseline (2015-2019).[1]

Month	Revenues	Landings	Prices	Fishers[2]	Dealers[3]
January	-0.7	-18.3	+21.5	-24.2	-6.8
February	-11.9	-11.4	-0.6	-16.4	-9.2
March	-49.4	-24.3	-33.1	-28.1	-16.7
April	-49.7	-29.4	-28.7	-39.0	-36.7
May	-31.4	-25.1	-8.4	-37.1	-28.2
June	-39.3	-43.3	+7.0	-31.3	-33.1
July	-41.4	-34.1	-11.1	-36.3	-32.8
August	-39.4	-21.1	-23.3	-33.9	-23.3
September	-32.0	-24.8	-9.7	-24.7	-22.5
October	-26.9	-13.3	-15.6	-13.8	-18.1
November	-18.4	-17.7	-0.8	-23.4	-13.2
December	-26.0	-11.7	-16.2	-10.7	-13.4
Annual	**-31.0**	**-23.1**	**-10.2**	**-27.4**	**-21.4**
March - July	-42.5	-31.2	-16.5	-34.4	-29.6
August - December	-28.8	-17.1	-14.4	-21.9	-18.2

1 Source: State of Hawai'i Division of Aquatic Resources.

2 Number of unique fishers submitting commercial reports.

3 Number of unique dealers submitting dealer reports.

Commercial Fishing Impacts

Longline Fishery

During 2019, there were 150 active longline fishing vessels, landing approximately 26.5 million pounds, valued at nearly $95 million. Despite the pandemic, effort within the fishery during 2020 was quite similar to 2019. In 2020, there were 147 active longline vessels taking a mere 4% fewer trips with 7% fewer sets than in 2019. However, these similarities mask the dilemma that the industry faced – to lose money tied up in port or lose money fishing. Average monthly expenses to tie up vessels are estimated around $10,000-$15,000; most businesses chose to continue fishing.

Fish prices at the Honolulu auction crashed on March 14, 2020 with price declines of nearly 75% the following week, and these historically low prices held through the remainder of the month. The industry immediately self-imposed vessel and landing limits in an effort to buoy prices in the face of the catastrophic reduction in demand. Price improvements for key species (bigeye and yellowfin tuna) were seen during mid-May through June. However, these price increases may be attributed to a near 50% decline in landing levels (Table 5.2) due to reduced catch rates and the market working to balance supply with local demand. It should also be noted that during May and June there was improved access to mainland markets as states began to open up, paired with the relaxing of local restrictions which helped raise prices for key target species. However, as rising COVID case counts in many states in July-August coincided with heightened restrictions, the industry saw these price increases disappear. August prices were down 25% from baseline averages, highlighting the direct impacts of COVID-19 restrictions on the Hawai'i seafood market. As catch rates slowed in July-August, the industry lifted daily landing restrictions in an effort to keep the fishery afloat.

Table 5.2. Hawai'i longline fishery performance: percentage change in 2020 compared to baseline (2015-2019).[1]

Month	Revenues	Landings	Prices	Fishers[2]
January	+5.5	-13.8	+22.4	+4.6
February	-9.3	-9.2	-0.2	+1.9
March	-49.2	-20.7	-36.0	-1.3
April	-50.1	-28.3	-30.4	-13.4
May	-30.5	-23.7	-8.9	-2.4
June	-41.8	-46.0	+7.8	-9.4
July	-40.7	-32.8	-11.8	+0.4
August	-37.4	-16.4	-25.1	-6.7
September	-31.6	-25.1	-8.7	-2.1
October	-28.3	-14.2	-16.5	-1.0
November	-18.8	-18.3	-0.6	-1.5
December	-28.1	-12.8	-17.5	+1.1
Annual	**-30.4**	**-21.9**	**-11.5**	**-2.5**
March - July	-42.9	-30.1	-18.3	-5.2
August - December	-29.0	-16.8	-14.7	-2.0

1 Source: State of Hawai'i Division of Aquatic Resources.

2 Number of unique fishers submitting commercial reports.

The period of August through December 2020 saw revenues down 29% and prices down nearly 15% from the five-year baseline average. The most notable development during this period was the reopening of the islands to tourism in late October through the "Safe Travels" Program. The market saw gradual price improvement in mix/whitefish species,[12] primarily marketed to the foodservice (restaurant) sector, although this was coupled with lags

12 Opah, mahimahi, monchong, ono, walu, and billfish species.

in target species (bigeye tuna) prices in late-November through mid-December, dampening industry revenues. In total, 2020 longline fishery revenues were down 30.4% relative to the five-year baseline. These revenue declines, coupled with fixed costs and operational losses, resulted in industry-estimated losses in 2020 upwards of $40 million.

To support the local community and alleviate challenges in matching supply and demand, the Hawai'i seafood industry established valuable new partnerships with community organizations during 2020. In late April, the industry donated approximately 2,000 pounds of fresh fish to the Hawaii Foodbank and established an ongoing partnership. In early July, a "fish-to-dish" program was established between the Hawaii Longline Association, the United Fishing Agency (UFA), which runs the Honolulu fish auction, and the Hawaii Seafood Council to distribute fish to people in need in the community. An estimated 350,000 servings of fresh fish were distributed to the community through partner agencies during the five month program.

The long-term financial outlook for the Hawai'i longline fishery remains highly uncertain and depends on both local and national recovery efforts. The top COVID-19 related factors affecting business for the Hawai'i longline fishing sector in 2020 were:

- Reduction of market prices and landed value.
- Reduced market demand from foodservice sector.
- Market competition with cheaper foreign imported frozen products.
- Reduced opportunities for credit offered by supply companies (e.g., fuel).

Other Commercial Fisheries

Other important commercial fisheries in Hawai'i include small boat, spear, and nearshore fishers targeting tunas and other highly-migratory species, as well as bottomfish, nearshore, and reef fish species. Similar to the longline fishery, these fishers faced negative pricing impacts on account of COVID-19 since they also market their fish through the UFA auction, dealers/processors, restaurants, retail storefronts, and within their community. Historically low prices and statewide stay-at-home orders severely limited commercial small boat fishing effort during March. However, as local restrictions relaxed in May and June, fishing activity was able to pick up, helping some through the difficult economic conditions. The months of October through December saw fishing activity moving closer towards baseline conditions. Many commercial small boat fishers were forced to and/or chose to shift to marketing their fish via social media, within community networks, and in partnerships with local Community Supported Fishery (CSF) style businesses. Some also developed value-added products with their catch. Pursuing these marketing channels, coupled with significant reductions in longline fishery landings, likely helped this sector realize less dramatic price declines relative to the Hawai'i longline fishery.

In 2020, approximately 900 fishers with commercial marine licenses reported landings, roughly 31% fewer than the 2015-2019 baseline and 35% fewer than 2019. This decline continues downward trends in active commercial fishers in the state in recent years. Aggregate 2020 fishery revenues were approximately $5.8 million below the five-year baseline (Fig. 5.2). In 2020 Hawai'i other (non-longline) commercial fishery revenues experienced an approximate 35% decline relative to the five-year baseline (2015-2019) (Table 5.3). There was also a notable reduction in active seafood dealers, on account of COVID-19 impacts and restrictions.

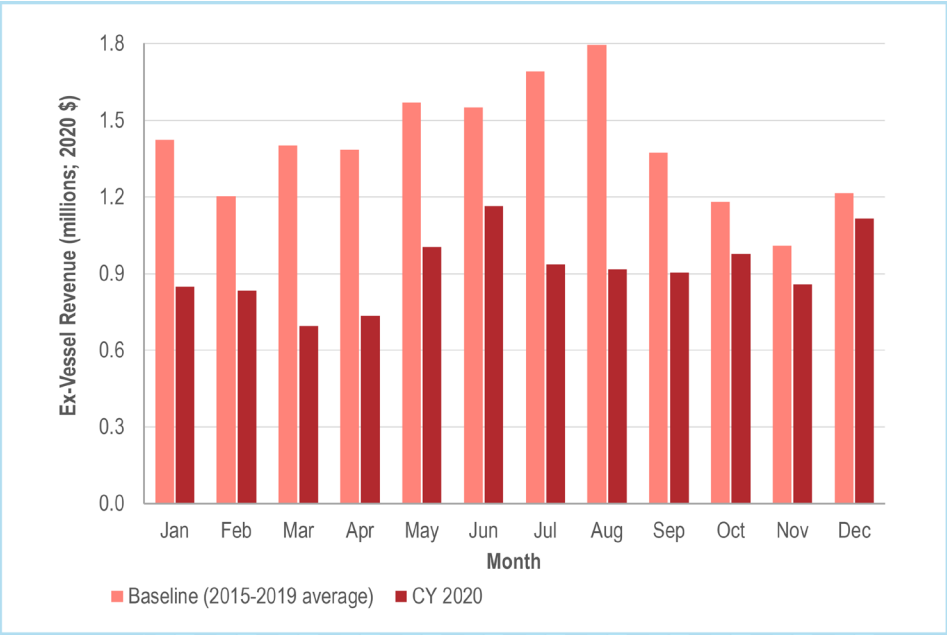


Figure 5.2. **Monthly Hawai'i other (non-longline) commercial fisheries landings revenue, 2020 relative to 2015-2019 (Inflation-adjusted, 2020 dollars).**

Table 5.3. **Hawai'i other (non-longline) commercial fisheries performance:** percentage change in 2020 compared to baseline (2015-2019).[1]

Month	Revenues	Landings	Prices	Fishers[2]	Dealers[3]
January	-40.5	-45.6	+9.4	-29.4	-6.7
February	-30.8	-27.7	-4.2	-20.1	-9.4
March	-50.4	-50.5	+0.3	-33.1	-16.9
April	-46.9	-37.3	-15.4	-43.3	-37.4
May	-36.1	-33.3	-4.2	-42.4	-28.7
June	-24.8	-28.8	+5.6	-34.5	-33.6
July	-44.6	-39.8	-7.9	-41.7	-33.6
August	-49.0	-39.6	-15.7	-38.0	-23.4
September	-34.2	-23.0	-14.6	-28.2	-23.0
October	-17.4	-7.2	-11.0	-16.3	-18.3
November	-15.0	-12.6	-2.8	-27.8	-13.6
December	-8.2	-0.4	-7.8	-13.1	-13.7
Annual	**-34.6**	**-30.7**	**-6.7**	**-31.6**	**-21.8**
March - July	-40.3	-37.4	-4.5	-39.0	-30.1
August - December	-27.5	-19.4	-10.3	-25.5	-18.6

1 Source: State of Hawai'i Division of Aquatic Resources.

2 Number of unique fishers submitting commercial reports.

3 Number of unique dealers submitting dealer reports.

These fishers (along with thousands of non-commercial fishers)[13] play vital roles in supporting local food systems, nutrition, food security, and community social cohesion.[14] This importance is amplified in the face of natural

13 Ladao, Mark. 2021. Noncommercial fishing is booming in Hawaii during pandemic. Hawaii News Now. Available at https://www.staradvertiser.com/2021/01/18/hawaii-news/noncommercial-fishing-is-booming-during-pandemic/

14 Allen, Stewart. 2013. Carving a Niche or Cutting a Broad Swath: Subsistence Fishing in the Western Pacific. Pacific Science 67(3), 477-488. https://doi.org/10.2984/67.3.12

disasters and human health crises. A public Facebook group "Hawaii Fishermen Feeding Families"[15] was established in mid-April to promote fisher contributions to local food security. During 2020, over 1,200 individual fishers had posted a cumulative estimate of over 11,275 pounds of fish that have helped to feed over 11,780 people across the state.

Seafood Dealers/Processors

The Hawai'i longline fishery supplies ice-chilled, high quality fresh fish that seafood dealers and processors distribute to Hawai'i and U.S. mainland foodservice and retail markets. The Hawai'i seafood industry produces over 80% of U.S. domestic landings of bigeye and yellowfin tuna and 55% of the nation's domestic supply of swordfish. There are about 1,000 workers in the state directly employed in wholesale seafood and supply businesses and thousands indirectly employed in local restaurants supplied by Hawai'i commercial fisheries. As shown in previous tables, in 2020 there were approximately 21% fewer active seafood dealers in Hawai'i relative to the five-year baseline (2015-2019).

Throughout 2020 the industry faced significant challenges matching fishery supply with local consumer retail demand. In the early months of the pandemic, fresh air freight capacity for all seafood products was limited, which reduced access to U.S. mainland markets. Loss of direct flights to the east coast and to some cities on the west coast added to shipping times and sometimes increased transportation costs. In an effort to mitigate low prices, some processors began direct marketing to local consumers in an effort to generate cash flow and move product. Competition with cheaper frozen import product inventories posed a significant short term challenge to the industry also, due to price competition in local retail markets as communities endured harsh economic conditions and dramatic increases in statewide unemployment stressed food budgets.

The Western Pacific Fishery Management Council (WPFMC) engaged in communications[16] with Hawai'i seafood dealers and processors during the months of May and June. Approximately 28 businesses engaged in these communications. A majority (86%) experienced negative revenue impacts in the first quarter of 2020, ranging from -5% to -95%, with an average of -43%. Over 72% of businesses reduced their workforce when COVID restrictions took effect, with an average of 35% staff reduction (47 workers, with a minimum of 2 and maximum of 140). A combined 80% indicated that the COVID-19 pandemic was somewhat, substantially, or completely responsible for these losses. Seafood businesses whose most important customers were restaurants experienced the greatest average loss of employees, followed by businesses whose most important customers were retail establishments, and then businesses whose most important customers were distributors. A majority expected negative impacts for the remaining quarters of 2020, in the -25% to -75% range.

As stated by one representative, *"COVID 19, combined with the effects of the Hawai'i travel quarantine, has almost destroyed our business, it's been extremely impactful and making it hard for all of us [in the seafood industry] to survive."*

The top COVID-19 related factors affecting business for seafood dealers/processors in 2020 were:

- Reduced demand across all markets (mainland and Hawai'i; retail and particularly restaurants).
- Managing inventory (decreasing storage capacity for fresh local product).
- Shipping/distribution constraints - reduction in air cargo capacity as airlines limited flights.

15 Ramsey, Matthew. 2020. Hawaii Fishers Feeding Families. Facebook Group. Available at https://www.facebook.com/groups/2954623664605258/permalink/3610635259004092/

16 Western Pacific Fishery Management Council (WPFMC). 2020. Personal commun. WPFMC, 1164 Bishop Street, 1400 Honolulu, Hawaii 96813.

Charter/For-Hire Impacts

As the only state in the U.S. where marlin and other trophy billfish can be reliably caught year- round, Hawai'i is well known among serious anglers as a destination for big game fishing trips. Although Kailua-Kona (Big Island) draws in many return and regular patrons with its world renowned tournaments, historic harbor, and promises of trophy fish, for the most part Hawai'i's charter operations host first-time patrons visiting the state. The Hawai'i charter/for-hire industry was effectively closed for large portions of 2020 (mid-March until the fall) due to social distancing mandates, stay-at-home orders, drastic reduction in visitor numbers,[17] visitor quarantine mandates, and suspension of harbor operations and commercial ocean activities, including tournaments.[18] Initial charter/for-hire permit restrictions were relaxed in late May/early June, but social distancing and tourism restrictions precluded any significant industry rebound.

During the baseline period of 2015-2019, there was an average of 8,246 charter/for-hire trips per year, and an average of 76 captains active in any given month. Reported charter/for-hire trips in 2020 were down 73% from the baseline average; during the months of April through December, reported charter/for-hire trips were down 90% relative to the baseline (Fig. 5.3). The average number of active captains per month declined 78% during these months as well, compared to the baseline. A mere 121 charter/for-hire fishing trips were reported statewide between June and August 2020, a 95% decline from the baseline average of just over 2,500 trips taken during this peak season.

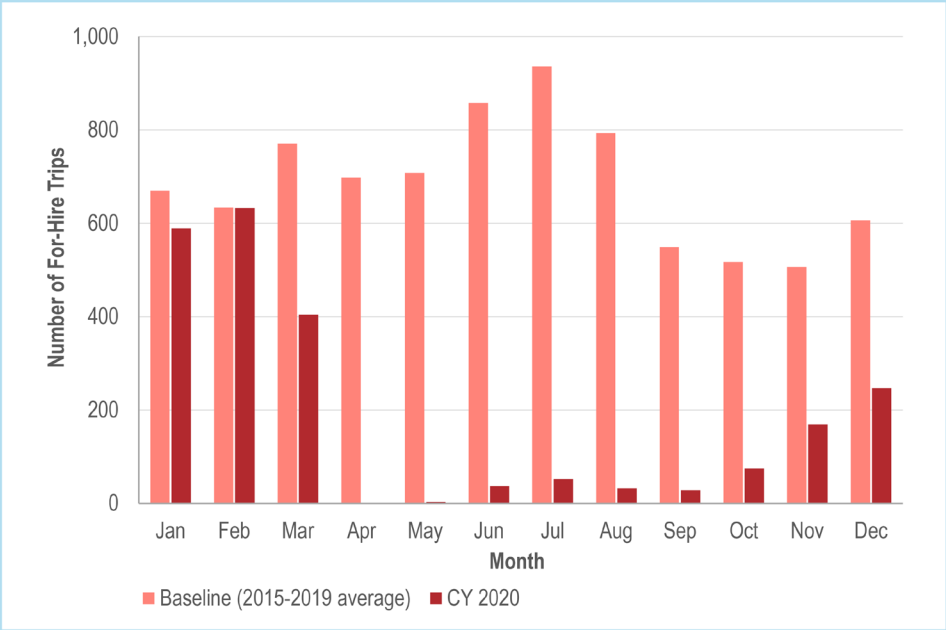


Figure 5.3. **Monthly Hawai'i charter/for-hire trips in 2020 relative to 2015-2019.**

The 2020 Hawaii International Billfish Tournament (HIBT) was cancelled due to COVID-19, and several local tournaments scheduled between March and July were also cancelled. The 2020 Hawaii Marlin Tournament series was held as scheduled in July through September but with significant reductions in participation from previous years (about one-third of traditional participation levels).[19] The "Safe Travels" program which began in mid-October was a critical step to affording access to out-of-state travelers, a key clientele for the Hawai'i charter/for-hire industry. COVID-19 and the restrictions in place to mitigate its spread have imposed catastrophic financial burden on charter operators in Hawai'i and many of them indicate the viability of their operations in the near future is highly uncertain. The severe decline in charter/for-hire trips has also deprived the state of significant economic contributions through supporting industries[20,21] and the scientific community of valuable tagging data.

17 Department of Business, Economic Development & Tourism. 2021. Daily Passenger Counts. State of Hawaii. Available at https://dbedt.hawaii.gov/visitor/daily-passenger-counts/

18 Department of Land and Natural Resources. 2020. COVID-19 DOBOR Response. State of Hawaii. Available at https://dlnr.hawaii.gov/dobor/covid-19-dobor-response/

19 Tropidilla Productions, LLC. 2020. Hawaii Marlin Tournament Series. Available at https://konatournaments.com Visited (9/17/20)

20 Rollins, Emily, and Sabrina Lovell. 2019. Charter fishing in Hawaii: A multi-region analysis of the economic linkages and contributions within and outside Hawaii. Marine Policy 100, 277-287. https://doi.org/10.1016/j.marpol.2018.11.032

21 Rollins, Emily, and Justin Hospital. 2019. Economic contributions of pelagic fishing tournaments in Hawaii, 2018. NOAA Tech. Memo. NMFS PIFSC-91, 32 p. https://doi.org/10.25923/sdtk-yg68

American Samoa

American Samoa implemented strict protective measures to prevent the spread of the novel coronavirus including social distancing and cancellation of public gatherings associated with a public emergency declaration (March 18) and Island-wide stay-at-home work-at-home order (March 24).[22] Businesses were subject to a curfew, and restaurants, bars, and nightclubs, which are primary destinations for island seafood, could serve only 10 or fewer customers, leading many to shut down entirely, unable to cover payroll, rent, utilities, and other fixed costs. Perhaps most significantly, on March 30, all flights between

Hawai'i and American Samoa were suspended for 30 days,[23] and these flight restrictions were broadened and extended resulting in no commercial flights throughout 2020, effectively closing the island.[24] In early 2021, repatriation flights began to allow residents stranded off island to begin to come home.[25]

The American Samoa government imposed a 15-day quarantine on foreign vessels that have visited other ports, met up with another vessel, or fueled via a tanker. These vessels supply the StarKist Samoa cannery. Cannery staff and stevedores are allowed onboard to offload product, but the crew are not allowed to depart vessels. The Department of Health has maintained diligence to ensure crew are safe and limiting exposure to local populations. Given ongoing travel restrictions, many skippers and crews were not able to return home during 2020. Travel agencies specializing in providing tickets for fisheries workers and observers were out of work since the flights stopped in March 2020. In November, the first three cases of COVID-19 were reported in three crew members of a container ship in the port of Pago Pago. However, steps were taken to contain the cases and there was no community spread.[26] To date, there are no reported cases of COVID-19 across the islands of American Samoa.

Commercial Fishing Landings and Trends

In 2018, Pago Pago was the nation's #5 port in seafood value ($132 million) and #9 port in pounds landed (186.7 million).[27] The purse seine fishery is the largest contributor to commercial landings and value through deliveries to the StarKist Samoa cannery in Pago Pago. Other important commercial fisheries in American Samoa include a longline fishery, and alia and small boat fisheries which are a mix of subsistence, cultural, recreational, and quasi-commercial fishers.

Purse Seine Fishery

In 2020, a total of 14 U.S.-flagged purse seine vessels responsible for 68 trips delivered product to the StarKist Samoa cannery in American Samoa. These reflect declines of 23% and 12%, respectively, relative to the five-year baseline (2015-2019), continuing recent trends of reduced participation within the fishery. However, it is a notable increase (+28%) in the number of trips offloading in American Samoa relative to 2019. Pounds offloaded in American Samoa in 2020 were up 1.7% from 2019, although down nearly 10% relative to the baseline. In 2020, approximately 40% of U.S.-flagged purse seine landings were offloaded in American Samoa, which is a 1%

22 Department of Legal Affairs. 2020. Public Notices. American Samoa Government. Available at https://www.legalaffairs.as.gov/blog

23 Sagapolutele, Fili. 2020. Update: Hawaiian Air Service to American Samoa Suspended. Samoa News. Available at https://www.samoanews.com/update-hawaiian-air-service-american-samoa-suspended

24 Office of the Governor. 2020. Declaration of Ongoing Public Health and Emergency State of Emergency. American Samoa Government. Available at https://4307e575-0744-4fa0-bcca-68011612de53.filesusr.com/ugd/4bfff9_209244296662496c949e0f42d4749b57.pdf

25 Samoa News Staff. 2021. ASG releases further repat flight dates and need for cost sharing. Samaoa News. Available at https://www.samoanews.com/local-news/asg-releases-further-repat-flight-dates-and-need-cost-sharing

26 Samoa News Staff. 2020. Update: Three crew on container vessel test positive for COVID-19. Samoa News. Available at https://www.samoanews.com/local-news/update-three-crew-container-vessel-test-positive-covid-19

27 NOAA Fisheries. 2020. FOSS. NOAA Fisheries. Available at https://www.fisheries.noaa.gov/foss/f?p=215:11:4752013883188::NO:::

increase from the baseline average (39%). Considering fishery performance, while pounds per trip in 2020 were up about 1% from the baseline, they were down almost 21% from 2019. Inflation-adjusted prices in 2020 were up 13% from 2019, but down just over 8% relative to the baseline period.

Due to ongoing travel restrictions during 2020, these operations were under continued strain to maintain morale for skippers and crew facing long onboard confinement. While observer requirements were waived on a case-by-case basis, a significant operational cost borne by industry was the repatriation of fishery observers. In March 2020 Bill Gibbons-Fly, executive director of the American Tunaboat Association (ATA) that represents the U.S. Pacific tuna purse-seine fleet, detailed key challenges faced by industry in 2020,

"The increasing travel constraints throughout the Pacific are complicating efforts to get crew, repair parts, technicians and supplies to boats in a timely fashion." Operational difficulties associated with COVID-19 restrictions that likely negatively impacted fishery effort and performance during 2020 included limited at- sea transshipment, inability to change crews and conduct routine maintenance, and quarantine periods associated with port calls, on top of other factors such as low prices for periods of the year (particularly April-June and September-October).[28]

Longline Fishery

The American Samoa longline fishery operates out of Pago Pago, American Samoa. In 2019, there were 17 active vessels that took approximately 100 trips, landing nearly 3 million pounds valued at about $4 million. The primary target is albacore tuna and the fishery delivers primarily to StarKist Samoa. During 2020, the fleet was down to 10 active vessels that took 78 trips and landed approximately 1.8 million pounds valued at just over $2 million. Both fishery revenues and landings in 2020 were down 60% relative to the baseline period of 2015-2019 (Fig. 5.4).

The fishery has faced significant economic struggles in recent years,[29] and 2020 would suggest a continuation of reduced economic performance. Additional challenges the fleet faced in 2020 included struggles in recruiting fishing crew, given COVID-19-related travel restrictions. Many of the fishing crew originate from Apia in Samoa, and travel restrictions prevented international workers from returning to American Samoa. Some longline boats adapted by sharing crew members or hiring locally. In August, travel exceptions were made for specialized workers, including fishing crew, to travel from Samoa.

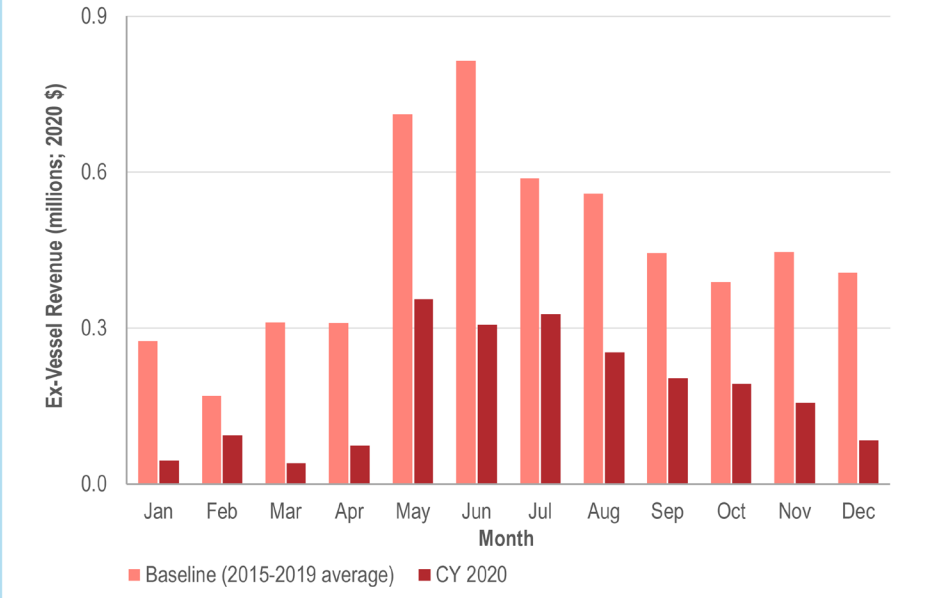


Figure 5.4. Monthly American Samoa longline fishery revenues in 2020 relative to 2015-2019 (inflation adjusted, 2020 dollars).

Other Commercial Fisheries

American Samoa alia and small boat fisheries are a mix of subsistence, cultural, recreational, and quasi-commercial fishers. Fish and fishing is an integral part of the culture and important component of the social fabric in American Samoa. In addition to social

28 Thai Union. 2021. Raw Material Price Trend. Available at https://investor.thaiunion.com/raw_material.html

29 Western Pacific Fishery Management Council (WPFMC). 2018. Annual Stock Assessment and Fishery Evaluation Report for U.S. Pacific Island Pelagic Fisheries Ecosystem Plan 2017. Available at http://www.wpcouncil.org/wp-content/uploads/2019/05/Pelagic-FEP- SAFE-Report-2017-Final-Revision-1.pdf

importance, most fishers consider the fish they catch to be an important source of food for their families. Fishing is critically important in terms of building and maintaining social and community networks, perpetuating fishing traditions, and providing fish to local communities as a source of food security. During the baseline period of 2015-2019, inflation-adjusted commercial fishery revenues (2020 dollars) for these fisheries was approximately $361,000 per year.[30] Commercial fishery revenues for 2020 were estimated at just over $225,000 (nearly 37% below the baseline period).

A group of local fishing experts reported that, in spite of COVID-19, part-time alia and small boat fishing continued as normal in 2020, including sports fishing events, and there was no disruption in the local availability of seafood products. They also confirmed that strong cultural traditions of sharing and resource distribution as a source of community resilience, mitigated any effects of private sector job loss.

Seafood Dealers/Processors

StarKist Samoa, the largest local private employer on island with about 2,000 workers, received exempt status from the American Samoa governor's emergency declarations, allowing it to maintain operations that include evening and sometimes weekend shifts.[31] Despite COVID-19 restrictions and challenges to fulfill seafood demand, contributions from U.S. and foreign purse seine vessels allowed fish supply to remain steady throughout 2020 and allowed the plant to operate at full capacity. Flight restrictions to and from American Samoa increased the cost of air freight for the cannery. Additionally, flight restrictions hampered plant maintenance projects, constrained professional service contracts, and disrupted new recruitments for cannery workers. Despite these obstacles, StarKist Samoa continues to play a vital role in the U.S. food supply chain with average annual canned tuna exports to the U.S. of approximately $400 million per year in recent years.[32] The risk of COVID-19 to cannery operations cannot be overstated as any positive cases in American Samoa would likely put cannery operations at significant risk, jeopardizing the American Samoa economy and the broader U.S. seafood supply chain.

Commonwealth of the Northern Mariana Islands

The Commonwealth of the Northern Mariana Islands (CNMI) implemented strict protective measures in March 2020 to prevent the spread of the novel coronavirus including a public emergency declaration that ordered social distancing and cancellation of public gatherings coupled with a stay-at-home work-at-home order (March 17),[33] and a requirement that all inbound travelers, including returning residents undergo a 14-day quarantine (March 23).[34]

Tourism is by far the largest industry in the CNMI and COVID-19 impacts began in February 2020, with 11 major hotels collectively reporting the lowest occupancy rates – less than 20% – ever recorded. That month they began the planning stage of laying off employees, closing entire wings, closing restaurants, and suspending contracts for outsourced services.[35] In March, visitor arrivals were down 85% from 2019 and tourism was effectively shut down due to flight suspensions for all non-residents. This loss of livelihood, coupled with federal immigration

30 Western Pacific Fisheries Information Network (WPacFIN). 2020. WPacFIN Data Portal. NOAA Pacific Islands Fisheries Science Center. Available at https://apps-pifsc.fisheries.noaa.gov/wpacfin/home.php

31 Sagapolutele, Fili. 2020. StarKist Samoa and support businesses to be allowed to operate. Samoa News. Available at https://www.samoanews.com/local-news/starkist-samoa-and-support-businesses-be-allowed-operate

32 American Samoa Department of Commerce. 2017. American Samoa Statistical Yearbook 2016. American Samoa Government. Available at https://sdd.spc.int/digital_library/american-samoa-statistical-yearbook-2016

33 Marianas Variety Staff. 2020. Governor declares state of public health emergency. Marianas Variety. Available at https://www.mvariety.com/cnmi-local/73-local/2483-governor-declares-state-of-public-health-emergency

34 Marianas Variety Staff. 2020. Stricter quarantine for all travelers. Marianas Variety. Available at https://www.mvariety.com/cnmi- local/73-local/2636-stricter-quarantine-for-all-travelers

35 Marianas Variety Staff. 2020. Hotel occupancy lowest in recorded history, says HANMI. Marianas Variety. Available at https://www.mvariety.com/cnmi-local/73-local/2412-hotel-occupancy-lowest-in-recorded-history-says-hanmi

work visa policies, led to significant out-migration of international workers from the Philippines, the Marshall Islands, and the Federated States of Micronesia (FSM).

In response to the drastic and dramatic decline in tourists during the pandemic, the CNMI government implemented austerity measures to balance projected budget shortfalls, which among other measures included 16-hour schedule cuts (a reduction to a 64 hour biweekly work schedule) for government employees.[36,37] The first two confirmed positive cases for COVID-19 in the CNMI occurred on March 29, 2020. As of December 31, 2020, there have been over 120 COVID-19 cases; one case included a commercial fisher traveling from the Philippines, which one discussant described as stimulating additional health concerns around the fishing industry.

A survey conducted by the Saipan Chamber of Commerce[38] during the summer of 2020 found that 55% of responding businesses either made large operational reductions or were temporarily closed; 72% either reduced staff or decreased hours; 40% reduced over a quarter of their total staff; 79% saw a reduction in revenue for more than four weeks; and 47% potentially lost more than $100,000 in revenue due to COVID- 19 and the economic downturn.

These economic challenges compounded impacts from destructive typhoons in the past six years, which have left these island communities vulnerable and, in many cases, in a state of continued recovery. One discussant for this annual snapshot noted heightened levels of stress in the community as people rebuilding their homes, living in tents, and struggling with food security and unemployment awaited assistance from the government during 2020.

Similar to other regional fisheries, small boat fisheries in the CNMI are a mix of subsistence, cultural, recreational, and commercial fishers. Fish and fishing is an integral part of the culture and an important component of life in the CNMI. Most fishers consider the fish they catch to be an important source of food for their direct and extended families. Fishing supports social and community networks across the islands, perpetuates traditions, and provides food security for local communities.[39] During the baseline period of 2015-2019, inflation-adjusted commercial fishery revenues (2020 dollars) for CNMI fisheries were approximately $719,000 per year.[40] Commercial fishery revenues for 2020 were estimated at approximately $583,000 (nearly 19% below the baseline period). Additionally, COVID-19 restrictions significantly constrained fisheries monitoring and data collection efforts throughout 2020.

In considering COVID-19 impacts to the CNMI fishing community, the Saipan Fishermen's Association (SFA) cancelled their annual Mahimahi Fishing Derby scheduled for March 28, 2020. In response to the first two positive cases, one of which had travelled to Tinian, on March 30 the Tinian government implemented a "sunset–to-sunrise" curfew and closed the harbor to recreational and commercial fishing.[41] This restriction was also enforced in Saipan and effectively shut down night-time spear and bottom fishing, the latter of which relies on a sunset bite, according to one discussant. The following day, fishing outside the reef was also banned and all but one boat ramp was closed so that fishing activities could be closely monitored. This effectively shut down small boat pelagic fisheries and the fresh fish market. The curfew and social distancing guidelines reduced consumer traffic and access to fish, even if caught by friends and family. All stores, including fishing tackle shops, were shut down for a period such that fishers couldn't replenish their gear. The

36 ,Marianas Variety Staff. 2020. Austerity options include retirees' 25%. Marianas Variety. Available at https://www.mvariety.com/cnmi-local/73-local/1496-austerity-options-include-retirees-25,

37 Marianas Variety Staff. 2020. Sen. Manglona questions austerity measure. Marianas Variety. Available at https://www.mvariety.com/cnmi-local/73-local/1596-sen-manglona-questions-austerity-measure

38 Western Pacific Fishery Management Council (WPFMC). 2020. Summer 2020 Pacific Islands Fishery News. Available at http://www.wpcouncil.org/summer-2020-pacific-islands-fishery-news/

39 Hospital, Justin, and Courtney Beavers. 2014. Economic and social characteristics of small boat fishing in the Commonwealth of the Northern Mariana Islands. National Marine Fisheries Service. Available at https://repository.library.noaa.gov/view/noaa/4773

40 Western Pacific Fisheries Information Network (WPacFIN). 2020. WPacFIN Data Portal. NOAA Pacific Islands Fisheries Science Center. Available at: https://apps-pifsc.fisheries.noaa.gov/wpacfin/home.php

41 Marianas Variety Staff. 2020. Tinian mayor to enforce strict Covid-19 measures. Marianas Variety. Available at https://www.mvariety.com/cnmi-local/73-local/2788-tinian-mayor-to-enforce-strict-covid-19-measures

community petitioned to relax the restrictions on fishing, and in April and May changes were made to the curfew and boat ramp access which allowed for fishing again.

In late July as restrictions were rolled back, the SFA hosted its annual international fishing derby without the usual BBQ and banquet, with up to six people at the official weigh-in in compliance with local regulations. The previously cancelled mahimahi derby was rescheduled and took place in December 2020 with 49 participating vessels.

Restrictions continued to loosen throughout 2020, and community members cite virtually no restrictions to fishing opportunities since the fall. Roadside vendors, previously closed, have reopened. The market for fresh fish, however, which relied heavily on a tourism economy, has been greatly reduced with low demand (two-week visitor quarantines were still in place throughout 2020). One commercial fishing business reported a 50% decline in profit relative to recent years due to its ability to offload only to local consumers. The majority of fresh fish available to the population now come from people who fish for themselves or their family. The sharing of fish between community members is prevalent.

Guam

Guam implemented strict protective measures to prevent the spread of the novel coronavirus including, social distancing, cancellation of public gatherings, a public emergency declaration (March 14), island-wide stay-at-home work-at-home order and closure of non-essential businesses (March 19),[42] and suspension of travel to Guam from foreign markets (March 20).

Due to COVID-related impacts, Guam's tourism industry was shuttered for most of 2020 which created significant economic hardship statewide. Tourism impacts began in February 2020, with major hotels experiencing roughly 30% reductions in occupancy rates.[43] March arrivals were down nearly 76% relative to 2019, creating significant economic hardships. The suspension of travel to Guam from the countries of Japan, South Korea, and Taiwan (originally scheduled to be lifted July 1, 2020)[44] continued throughout 2020. Military personnel movement and patronage of restaurants and bars was also intermittently restricted throughout 2020.[45] Cumulative visitor arrivals for 2020 was approximately 328 thousand, down 80% from 2019[46] with aggregate April to December 2020 visitor counts (18.6 thousand) down 98.5% from April to December 2019. Unemployment rates on Guam during 2020 exceeded the State of Hawaii. Quarterly unemploy-ment rates trended upwards throughout 2020, from 17.9% in September to 19.4% in December,[47] compared to national rates of 8.4% and 6.7%, respectively.

Guam small boat fisheries are diverse, largely driven by subsistence, cultural, and recreational motivations, as most fishers consider the fish they catch to be an important source of food for their direct and extended families. However, many fishers also sell fish to offset costs, build and maintain social and community networks,

42 Office of the Governor. 2020. JOINT RELEASE: GovGuam to Close for 14-Day Period; Updated Information on Confirmed Cases. Government of Guam. Available at https://governor.guam.gov/press_release/joint-release-govguam-to-close-for-14-day-period- updated-information-on-confirmed-cases/

43 Marianas Variety Staff. 2020. Guam hotel occupancy declines as tourist cancellations rise. Marianas Variety. Available at https://www.mvariety.com/cnmi-local/73-local/2060-guam-hotel-occupancy-declines-as-tourist-cancellations-rise

44 Gilbert, Haidee Eugenio. 2020. Guam tourism gearing up for early 2021 reopening. The Guam Daily Post. Available at https://www.postguam.com/news/local/guam-tourism-gearing-up-for-early-2021-reopening/article_b1fbc58a-11cc-11eb-afb7- 8fecc5bf37cd.html

45 Pacific News Center. 2020. Joint Region Marianas extends public health order. Available at https://www.pncguam.com/joint-region- marianas-extends-public-health-order/

46 Guam Visitors Bureau. 2021. Visitor Arrival Statistics. Available at https://www.guamvisitorsbureau.com/research/statistics/visitor- arrival-statistics

47 Guam Department of Labor. 2021. Employment Indicators. Government of Guam. Available at http://bls.guam.gov/

perpetuate fishing traditions, and provide fish to local communities as a source of food security.[48] Fish and fishing play an important social and cultural role on Guam. During the baseline period of 2015-2019, commercial fishery revenues (2020 dollars) for Guam were approximately $567,000 per year.[49] Commercial fishery revenues for 2020 were estimated at approximately $278,000 (nearly 51% below the baseline period). Additionally, COVID-19 restrictions significantly constrained fisheries monitoring and data collection efforts throughout 2020.

The Guam Fishermen's Cooperative Association (GFCA) is a central component of Guam's contemporary fishing industry that continues to pursue and broaden its original mission of providing marketing services, fuel, and ice for its small-boat fishermen members. Organized in 1976, GFCA's influence has become pervasive, providing a variety of benefits not just to its members, but for fisheries conservation, marine education, and the greater Guam community.[50] Amid coronavirus concerns, the GFCA remains open to support fishers and provide seafood to the local community, whose restaurant options for fresh fish have dwindled. The GFCA continues to sell more non-traditional products, including locally farmed tilapia and shrimp and imported seafood. However, the GFCA cited a number of challenges including a hard-hit tourism industry, decreased supply of locally caught seafood, tough economic conditions, reduced business hours, and ineligibility for CARES Act funds.Community members described considering these challenges as they made fishing decisions, for example, limiting their fishing so as not to flood the GFCA's reduced market capacity or timing fishing trips to be able to offload within the GFCA's reduced hours. The GFCA faces threat of closure due to continued economic hardship, despite a slight rebound in sales in late 2020 up from 20-30% of typical revenues during the fall of 2020.

Discussions with members of the local fishing community indicate that the charter fishing industry, mostly shut down since March, resumed operations in late 2020 at 25% capacity for local and military clients. Reopening in the face of capacity restrictions, however, poses challenges for small-boat charters with already limited capacity. It has been reported that some recreational and charter boating activities have circumvented such social distancing and capacity recommendations.[51]

Logistical and health considerations for fishing activity have also affected the frequency and social aspects of fishing across age groups. Community members have reported the sustained closure of many beach access points, which poses challenges for those that fish or depart from shorelines to fish. Observations from local fishers and business owners indicate certain fishers' participation has declined during the pandemic given health concerns, particularly in the 50-60+ age group. COVID-19-related deaths within the fishery in this demographic have also been reported by discussants. Despite an overall increase in fishing activity during the pandemic, reduced participation from older fishers has implications for local seafood supply, given this age group's association with the regular provision of fresh seafood to Guam and with more frequent fishing trips.

Despite declines in fishing for certain demographic groups and types of fishing, community members from Guam's fisheries described an overall increase in fishing participation given that many other activities have been classified non-essential. They noted more boats on the water, more traffic at marinas, and emphasized the role of locally caught seafood for households' food security. Fishers have also invested more time offloading their fish directly to consumers via existing relationships and social media given the closure and reduced operations of typical venues like fish markets, restaurants, and hotels. Fishing and fishers' positions in the community have thus provided a mechanism for resilience during the pandemic.

In the fall of 2020 community members estimated that fishing revenues were at an all-time low, despite

48 Hospital, Justin, and Courtney Beavers. 2012. Economic and social characteristics of Guam's small boat fisheries. NMFS, Pacific Islands Fish. Sci. Cent. Admin. Rep. H-12-06,60 p.. Available at https://repository.library.noaa.gov/view/noaa/4420

49 Western Pacific Fisheries Information Network (WPacFIN). 2020. WPacFIN Data Portal. NMFS. Pacific Islands Fisheries Science Center. Available at https://apps-pifsc.fisheries.noaa.gov/wpacfin/home.php

50 Allen, Stewart, and Paul Bartram. 2008. Guam as a Fishing Community. National Marine Fisheries Service. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-08-01, 61 p. Available at https://repository.library.noaa.gov/view/noaa/3583

51 Chargualaf, Wayne. 2020. Are people flocking to boat cruises to avoid COVID restrictions. Pacific News Center. Available at https://www.pncguam.com/are-people-flocking-to-boat-cruises-to-avoid-covid-restrictions/

increased fishing activity overall. Multiple community members attributed this to restricted avenues of supply rather than decreased local demand. While some restaurants have undergone permanent closure, others have been able to rehire furloughed staff through 50% indoor capacity, outdoor seating, and takeout options.

The type of fish available has also changed. Where before tuna, mahimahi, marlin, and wahoo were commonly purchased from local fishers, many fishers focused on bottomfish in the summer and fall of 2020, perhaps for their high comparative market value. Community members also noted an unusually slow 2020-2021 winter season for wahoo and mahimahi, which some associated with pandemic-delayed deployments of fish aggregating devices (FADs).

Social Impacts

The Pacific Islands region has experienced a number of unique concerns in its battle with COVID-19 during 2020. Residents tend to live in large, crowded, multi-generational households[52] with a higher proportion of older residents than most other states,[53] placing the population in the region at higher risk. In Hawai'i, Pacific Islander and Filipino populations have experienced higher percentages of cases, hospitalizations, and deaths compared to their share of the state population,[54] following patterns of disparate effects on the most disadvantaged communities seen in other parts of the country and common in pandemics.[55] In addition, extended families are often spread throughout the region, which includes many remote island-based communities where medical facilities are limited. In American Samoa, arriving passengers from one flight on March 26, 2020 filled the capacity of the temporary quarantine centers and resulted in a halt on passenger travel between Honolulu and Pago Pago.[56] Through much of the rest of 2020, airlines significantly limited flights across the Pacific Islands region and travel restrictions forced individuals into indefinite periods of separation from loved ones, causing significant added anxiety.

As evident during 2020, fishing communities across the Pacific Islands Region played a vital role in supporting local food systems, nutrition, food security, and community social cohesion. COVID-19 has amplified these critical roles of fishing in island communities and there is a shared hope for an increased understanding and value of all local fisheries to island communities, economy, and food security for the future.

52 Lofquist, Daphne. 2012. Multigenerational Households: 2009-2011. United States Census Bureau. Available at https://www2.census.gov/library/publications/2012/acs/acsbr11-03.pdf

53 Himes, Christine, and Lillian Kilduff. 2019. Which U.S. States Have the Oldest Populations? Population Reference Bureau. Available at https://www.prb.org/which-us-states-are-the-oldest/

54 Department of Health. 2020. Hawaii COVID-19 Data. State of Hawaii. Available at https://health.hawaii.gov/coronavirusdisease2019/what-you-should-know/current-situation-in-hawaii/

55 Bambra, Clare et al. 2020. The COVID-19 pandemic and health inequalities. Journal of Epidemiology and Community Health. 74(11) 964-968. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7298201/

56 Sagapolutele, Fili. 2020. Update: Hawaiian Air Service to American Samoa Suspended. Samoa News. Available at https://samoanews.com/update-hawaiian-air-service-american-samoa-suspended

Northeast Region Fisheries Impacts from COVID-19

Commercial Fisheries Landings and Trends

From 2015 to 2019, an average of approximately 13,500 commercial fishing vessels operated in the Northeast region, accounting for an average of $1.82 billion in ex-vessel revenue.[1] Of these vessels, about 3,400 held permits issued by the Greater Atlantic Regional Office (GARFO), which accounted for 69% of region-wide harvest revenue. The remaining 31% of regional fishing revenue was landed by 10,100 vessels that either fished in state waters, fished in the EEZ for species that are not regulated by a Federal Fishery Management Plan (FMP), or held federal permits for Highly Migratory Species (HMS) (e.g., tunas, swordfish, and sharks) that were not issued by GARFO.[2] The Northeast has a variety of commercial fisheries, with lobsters and scallops alone averaging just over $1 billion (64%) of total landings revenue from 2015 to 2019 (Fig. 6.1). Important fisheries for blue crab, squids, groundfish, menhaden, surfclams, ocean quahogs, summer flounder, black sea bass, scup, monkfish, and Jonah crab accounted for an additional $392 million. These fisheries combined with lobster and scallops accounted for an average of 86% of landings revenue.

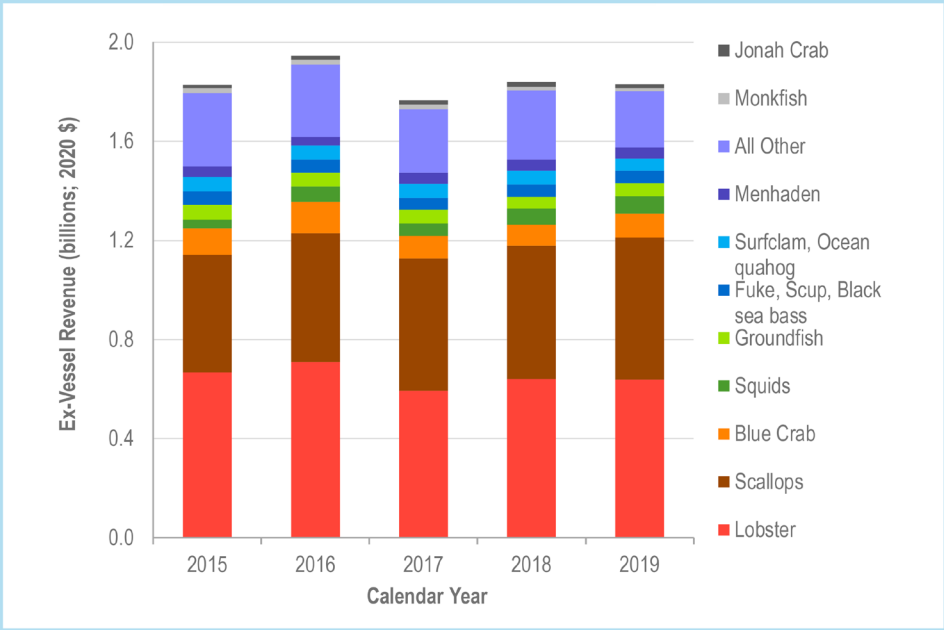


Figure 6.1. **Inflation adjusted ex-vessel revenue for the top 10 Northeast region fisheries.**

Although most Northeast fisheries are prosecuted year-round, there are seasonal differences among fisheries that have implications for the timing and magnitude of potential market disruptions resulting from COVID-19. Figure 6.2 plots the 2015-2019 Jan.-Dec. baseline monthly average revenue from lobster and species that are regulated by the regional Councils (New England and Mid-Atlantic) and CY 2020 Jan.-Dec. revenues.[3] Typically, revenues are lower during the winter months, increase during the spring and summer, peaking in August, then taper off through December. Calendar year 2020 revenues exceeded baseline revenue during January and February but were below baseline in every month

1 Fishery landings and revenue reported by Federally permitted dealers, as well as landings from state waters as reported through the ASMFC Atlantic Coastal Cooperative Statistics Program. Reported revenue excludes oysters, mussels, softshell clams, and hard clams because the mix of wild and farm raised production for these species could not be reliably determined. Farm raised Atlantic salmon was also excluded.

2 Federally permitted vessels were ascertained from GARFO's permit application data.

3 Fisheries that take place exclusively in state waters, or nearly so, were excluded from Fig. 6.2 because available data were incomplete.

through September. Over the last quarter of the year, monthly revenues were nearly equal to the baseline, indicating some stabilization of aggregate revenues, but the cumulative losses for the entire year were $263 million (Fig. 6.2). Just over 75% of the reduced revenues during the year were from American lobster (56%) and Atlantic sea scallops (20%), with lesser revenue losses from surfclams and ocean quahogs (6%); summer flounder, scup, and black sea bass (3%); loligo and illex squid (3%); monkfish (2%); and groundfish (1%) (Fig. 6.3).

The majority of the cumulative reduction in 2020 revenues occurred during the five months of April through August, with approximately 45% of revenue losses occurring during May ($55 million) and August ($64 million). Just over 80% of the reduced revenues during May were associated with reduced revenue from American lobster ($10.5 million) and sea scallops ($34.8 million) while 80% of the August reduction in revenue was associated with American lobster alone ($51.2 million). The reduction in sea scallop revenue in May was partly due to a 17% reduction in the scallop quota from 2019 levels that took effect at the start of the scallop fishing year on April 1, 2020. Based on the 2015-2019 average share of landings for April (10.7%) and May (15.4%), expected 2020 landings for a 51.6 million pound quota would be 5.5 and 7.9 million pounds in April and May respectively. Actual landings were 4.4 million pounds in April and 5.3 million pounds in May, for an aggregate reduction of 3.7 million pounds. Note that June scallop landings were 7.3 million pounds, which is nearly equal to what would be expected based on 14% of a 51.6 million pound quota and is similar to the baseline average landings for June.However, June scallop prices were nearly 13% below the 2015-2019 average, resulting in 2020 June revenues $8.7 million below baseline. In fact, lower prices have been a general trend for many species throughout the Northeast region.

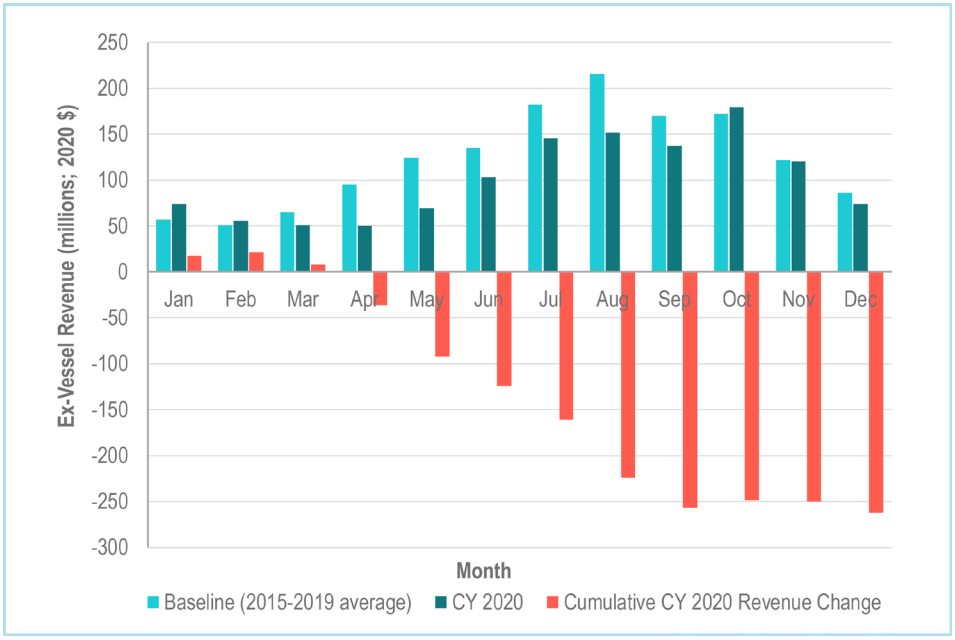


Figure 6.2. Ex-vessel revenue for the baseline (2015-2019), CY2020, and cumulative change in CY2020 revenue for American lobster and species managed by the Mid-Atlantic and New England Fishery Management Councils.

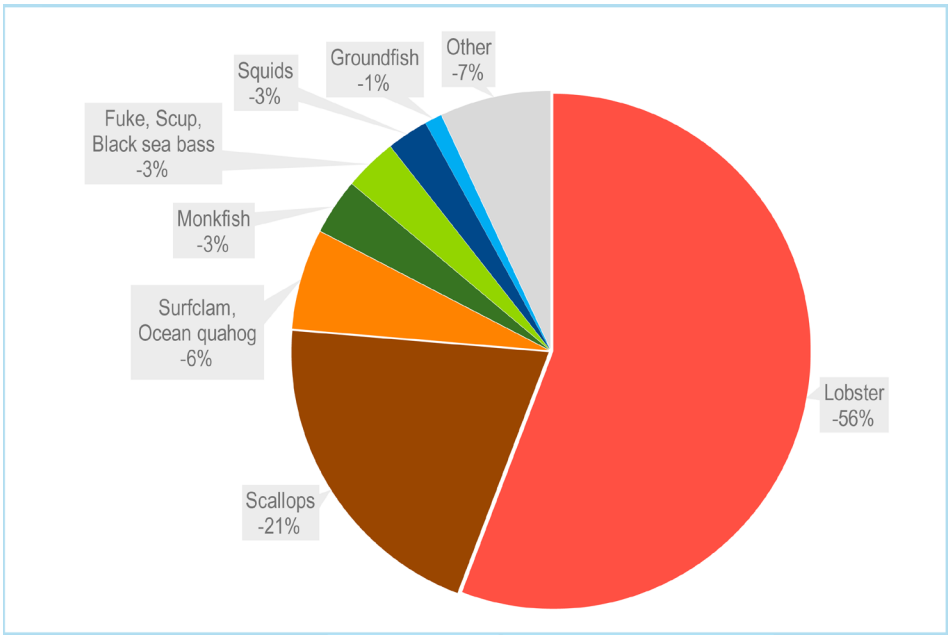


Figure 6.3. Percentage of CY2020 total revenue reductions by species and Fishery Management Plan.

Across nearly all species, month over month prices have been well below baseline 2015-2019 average prices (Fig. 6.4). For example, lobster prices were initially 13% above baseline average prices in January but declined by 39.6% to $4.82 per pound in March 2020 compared to an average of $7.99 per pound during March, 2015-2019. In June 2020 the average price per pound fell to $3.82 from a

2015-2019 June price of $5.29. Lobster prices fell even further to $3.35 per pound in July and were $3.53 per pound in August when lobster landings were peaking. Since August, American lobster prices have rebounded and were above baseline through December. Sea scallop prices have also been above baseline since October, ending the year at almost 19% higher than 2015-2019 average prices. By contrast, average prices for monkfish, groundfish, summer flounder, scup, and black sea bass have remained below baseline throughout all of CY2020. Surfclam and ocean quahog prices per bushel were one of the few fisheries where 2020 prices remained at or slightly above 2015-2019 baseline prices. However, even though prices remained unchanged, landings of surfclams and ocean quahogs were down by 31%, resulting in revenues that were down by $16.5 million (Fig. 6.5). By contrast, CY2020 landings of groundfish (Fig. 6.6); summer flounder, scup, and black sea bass (Fig. 6.7); and squid (Fig. 6.8) were above baseline but in each case the higher landings were more than offset by lower prices, resulting in reduced revenues of $2.8 million, $11.7 million, and $6.8 million, respectively. Monkfish revenues were down by 50% of baseline due to the joint effect of a 28.3% reduction in CY2020 landings and a 32.3% reduction in prices (Fig. 6.9).

Revenue impacts for both American lobster and Atlantic sea scallops follow a pattern similar to that of monkfish. Specifically, lobster landings were down by nearly 19% and monthly average prices were down by 13.3% for the year, but prices were down 21.3% during the months of June–August, which accounted for nearly 40% of annual landings (Fig. 6.10). The combined impact of lower landings and prices resulted in a revenue loss of $147.5 million compared to the 2015-2019 baseline average. Note that CY2020 landings were closer (-9%) to more recent landings during 2019. However, since 2019 prices were comparatively high, the combined impacts of reduced landings and prices received during CY2020 means that compared to 2019, rather than 2015-2019, the revenue losses would still be high at $136.4 million.

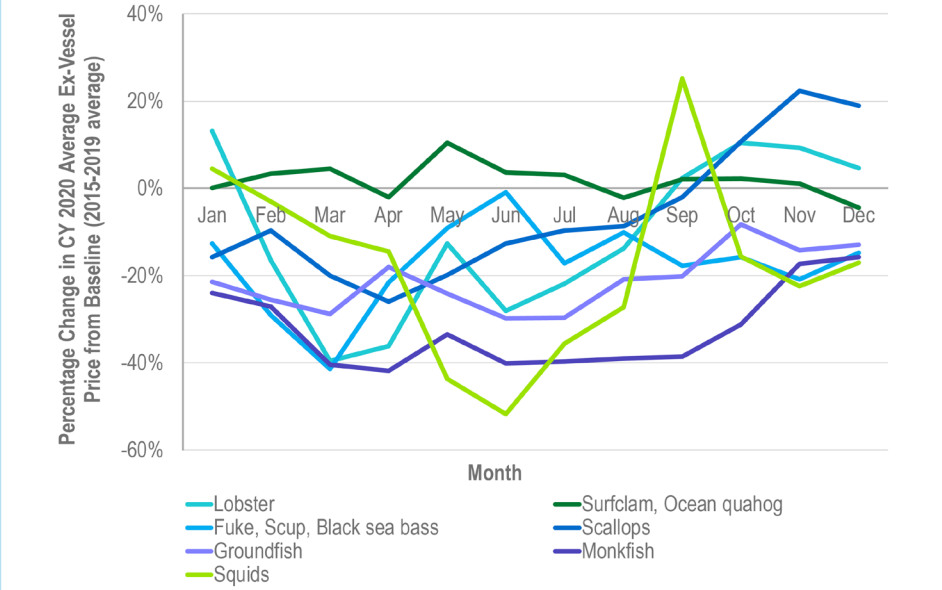
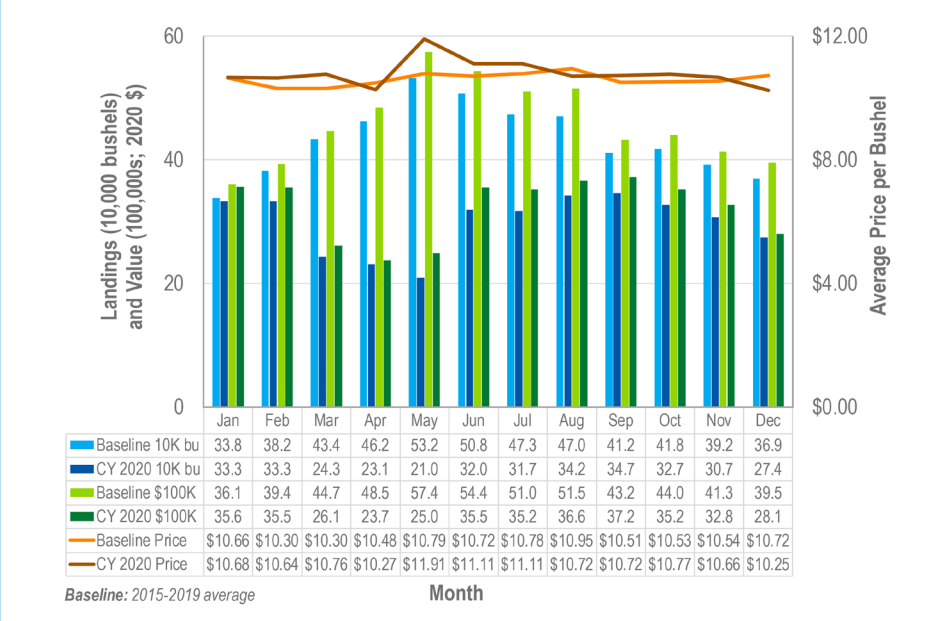
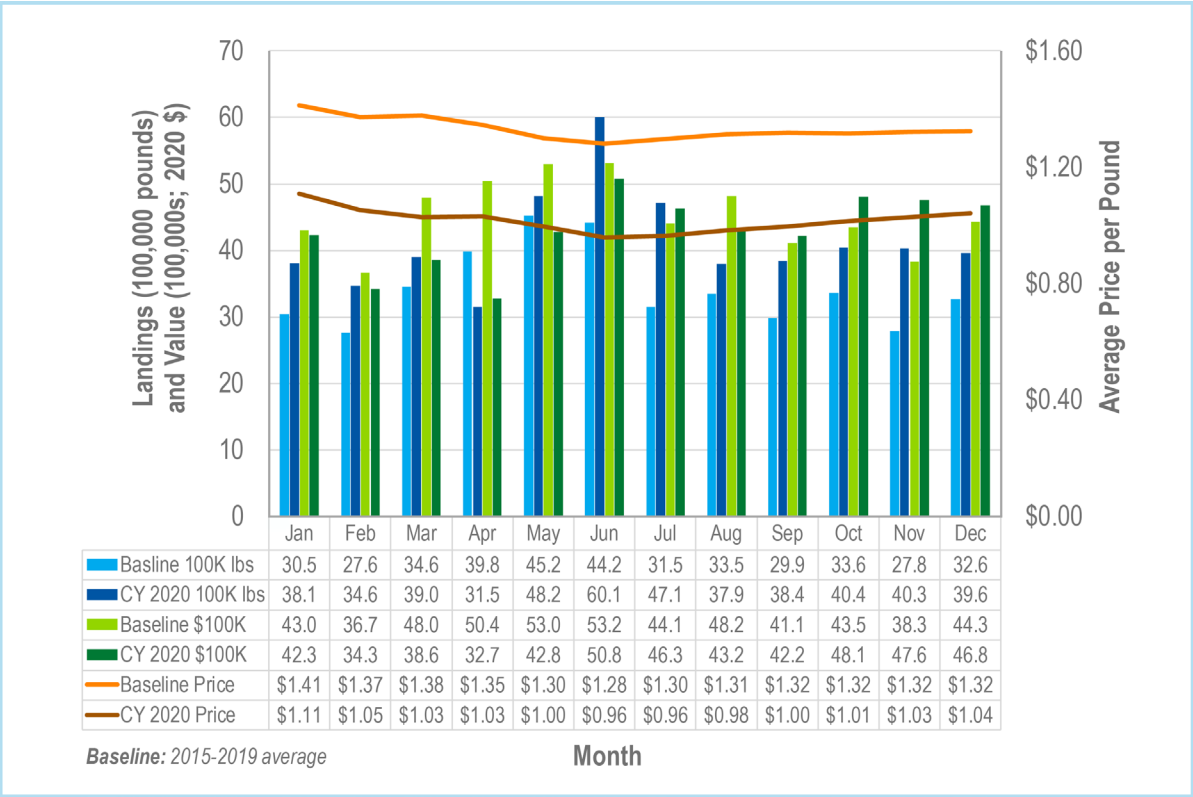


Figure 6.4. Percent change in CY2020 average ex-vessel price from baseline (2015-2019).



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseline 10K bu	33.8	38.2	43.4	46.2	53.2	50.8	47.3	47.0	41.2	41.8	39.2	36.9
CY 2020 10K bu	33.3	33.3	24.3	23.1	21.0	32.0	31.7	34.2	34.7	32.7	30.7	27.4
Baseline $100K	36.1	39.4	44.7	48.5	57.4	54.4	51.0	51.5	43.2	44.0	41.3	39.5
CY 2020 $100K	35.6	35.5	26.1	23.7	25.0	35.5	35.2	36.6	37.2	35.2	32.8	28.1
Baseline Price	$10.66	$10.30	$10.30	$10.48	$10.79	$10.72	$10.78	$10.95	$10.51	$10.53	$10.54	$10.72
CY 2020 Price	$10.68	$10.64	$10.76	$10.27	$11.91	$11.11	$11.11	$10.72	$10.72	$10.77	$10.66	$10.25

Figure 6.5. 2015-1019 Baseline average and CY2020 landings, revenues, and average prices by month for surfclam and ocean quahog.

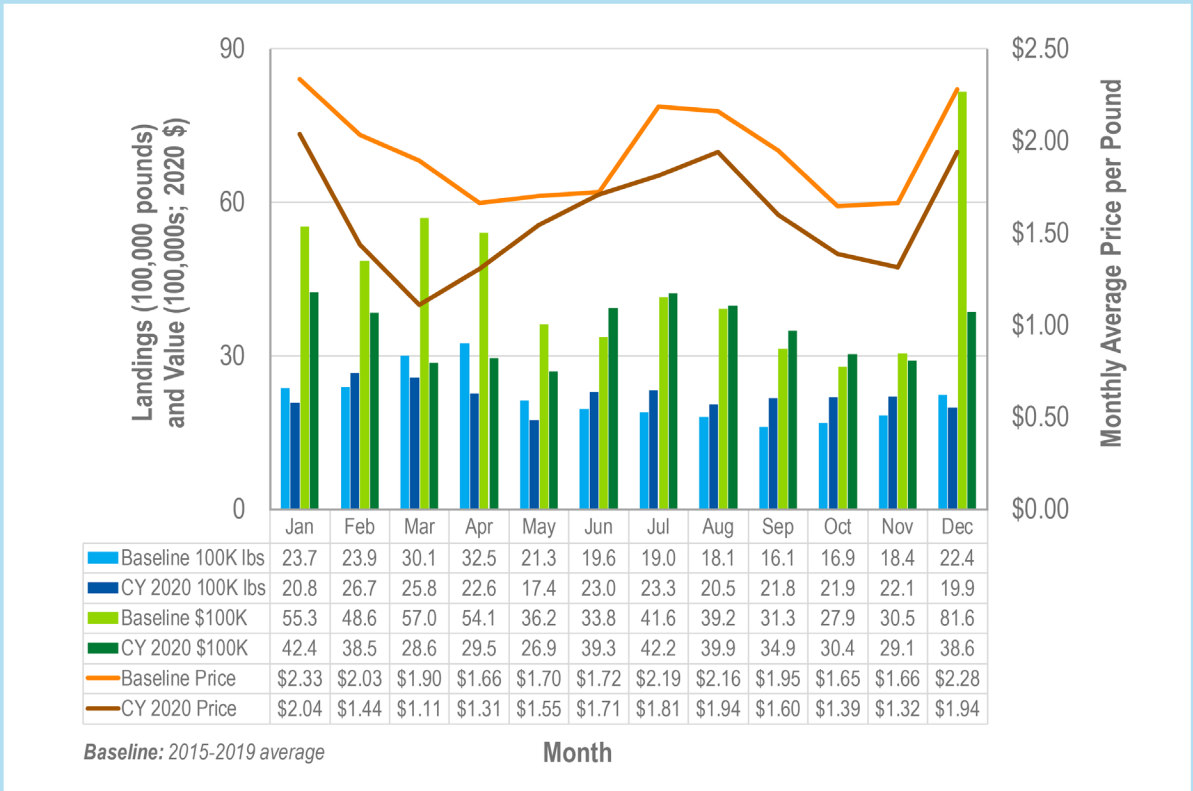


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Basline 100K lbs	30.5	27.6	34.6	39.8	45.2	44.2	31.5	33.5	29.9	33.6	27.8	32.6
CY 2020 100K lbs	38.1	34.6	39.0	31.5	48.2	60.1	47.1	37.9	38.4	40.4	40.3	39.6
Baseline $100K	43.0	36.7	48.0	50.4	53.0	53.2	44.1	48.2	41.1	43.5	38.3	44.3
CY 2020 $100K	42.3	34.3	38.6	32.7	42.8	50.8	46.3	43.2	42.2	48.1	47.6	46.8
Baseline Price	$1.41	$1.37	$1.38	$1.35	$1.30	$1.28	$1.30	$1.31	$1.32	$1.32	$1.32	$1.32
CY 2020 Price	$1.11	$1.05	$1.03	$1.03	$1.00	$0.96	$0.96	$0.98	$1.00	$1.01	$1.03	$1.04

Baseline: 2015-2019 average

Month

Figure 6.6. 2015-2019 baseline average and CY2020 landings, revenues, and prices for groundfish.

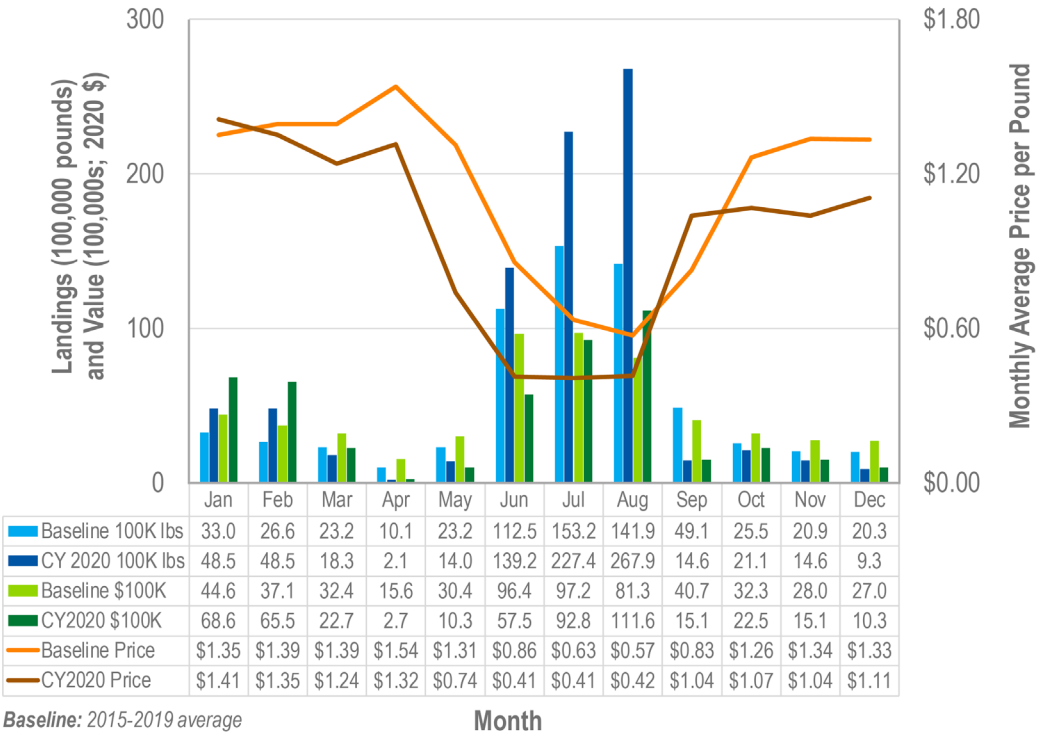


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseline 100K lbs	23.7	23.9	30.1	32.5	21.3	19.6	19.0	18.1	16.1	16.9	18.4	22.4
CY 2020 100K lbs	20.8	26.7	25.8	22.6	17.4	23.0	23.3	20.5	21.8	21.9	22.1	19.9
Baseline $100K	55.3	48.6	57.0	54.1	36.2	33.8	41.6	39.2	31.3	27.9	30.5	81.6
CY 2020 $100K	42.4	38.5	28.6	29.5	26.9	39.3	42.2	39.9	34.9	30.4	29.1	38.6
Baseline Price	$2.33	$2.03	$1.90	$1.66	$1.70	$1.72	$2.19	$2.16	$1.95	$1.65	$1.66	$2.28
CY 2020 Price	$2.04	$1.44	$1.11	$1.31	$1.55	$1.71	$1.81	$1.94	$1.60	$1.39	$1.32	$1.94

Baseline: 2015-2019 average

Month

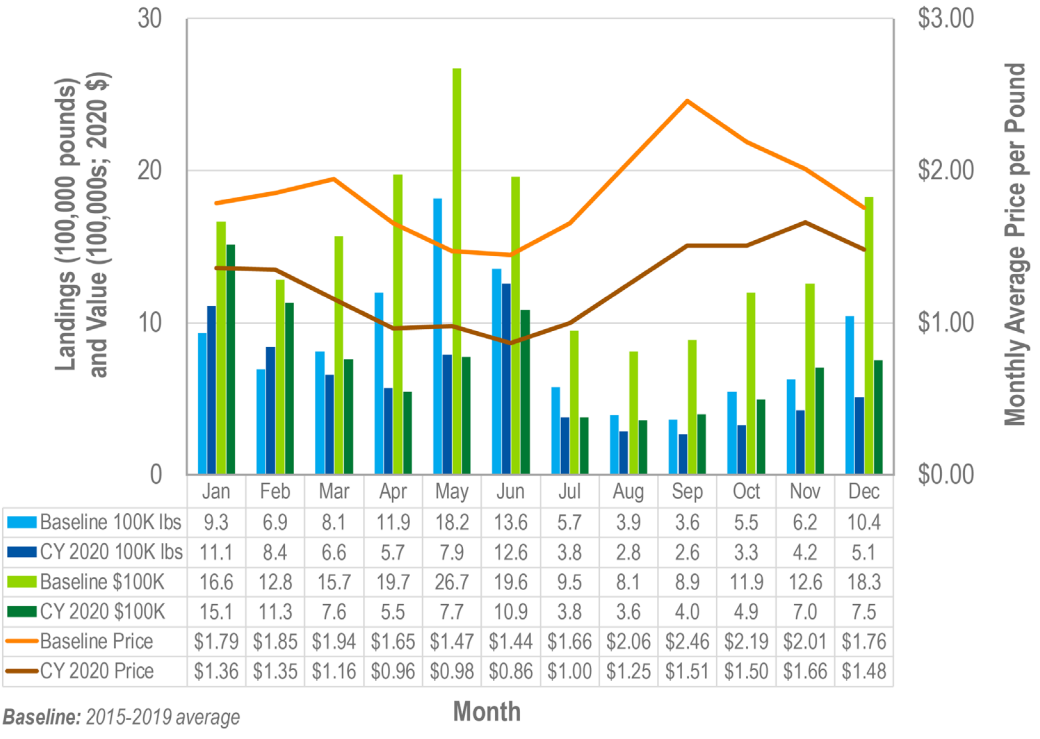
Figure 6.7. 2015-2019 baseline average and CY2020 landings, revenues, and prices for combined summer flounder, scup, and black sea bass.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseline 100K lbs	33.0	26.6	23.2	10.1	23.2	112.5	153.2	141.9	49.1	25.5	20.9	20.3
CY 2020 100K lbs	48.5	48.5	18.3	2.1	14.0	139.2	227.4	267.9	14.6	21.1	14.6	9.3
Baseline $100K	44.6	37.1	32.4	15.6	30.4	96.4	97.2	81.3	40.7	32.3	28.0	27.0
CY2020 $100K	68.6	65.5	22.7	2.7	10.3	57.5	92.8	111.6	15.1	22.5	15.1	10.3
Baseline Price	$1.35	$1.39	$1.39	$1.54	$1.31	$0.86	$0.63	$0.57	$0.83	$1.26	$1.34	$1.33
CY2020 Price	$1.41	$1.35	$1.24	$1.32	$0.74	$0.41	$0.41	$0.42	$1.04	$1.07	$1.04	$1.11

Baseline: *2015-2019 average*

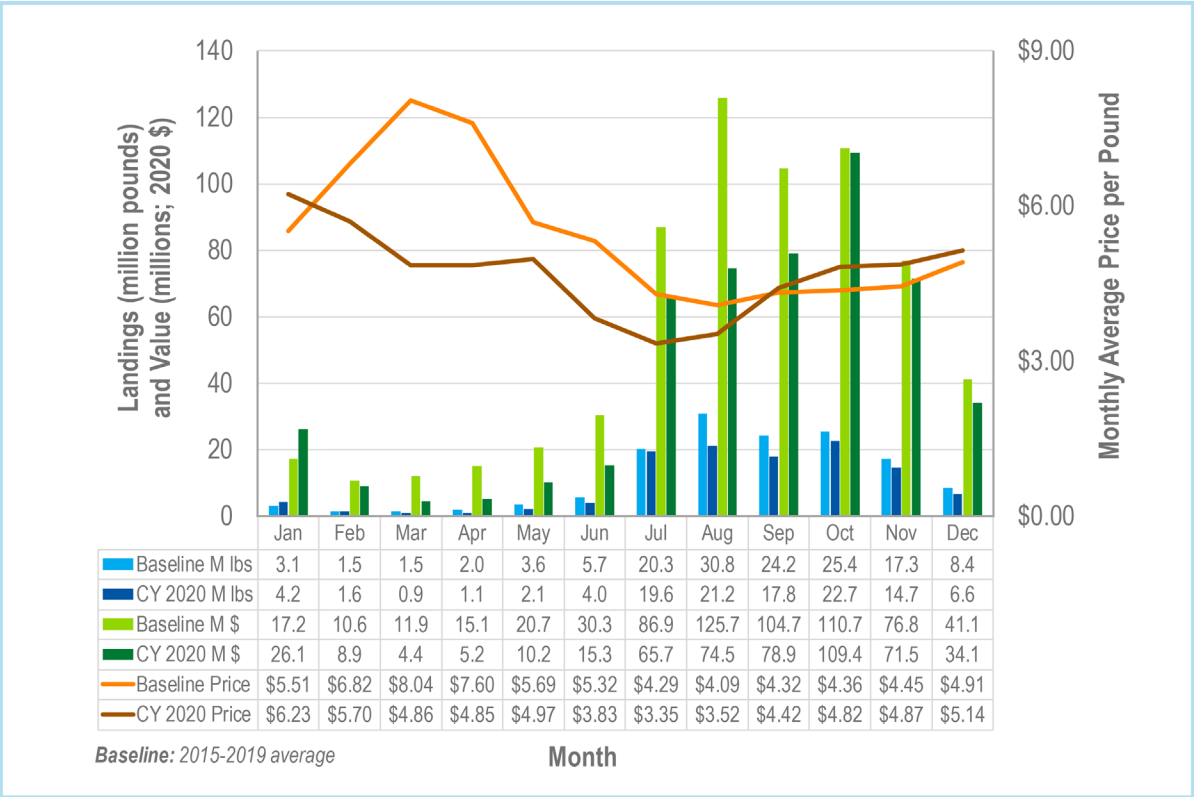
Figure 6.8. 2015-2019 baseline average and CY2020 landings revenues and prices for loligo and illex squid.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseline 100K lbs	9.3	6.9	8.1	11.9	18.2	13.6	5.7	3.9	3.6	5.5	6.2	10.4
CY 2020 100K lbs	11.1	8.4	6.6	5.7	7.9	12.6	3.8	2.8	2.6	3.3	4.2	5.1
Baseline $100K	16.6	12.8	15.7	19.7	26.7	19.6	9.5	8.1	8.9	11.9	12.6	18.3
CY 2020 $100K	15.1	11.3	7.6	5.5	7.7	10.9	3.8	3.6	4.0	4.9	7.0	7.5
Baseline Price	$1.79	$1.85	$1.94	$1.65	$1.47	$1.44	$1.66	$2.06	$2.46	$2.19	$2.01	$1.76
CY 2020 Price	$1.36	$1.35	$1.16	$0.96	$0.98	$0.86	$1.00	$1.25	$1.51	$1.50	$1.66	$1.48

Baseline: *2015-2019 average*

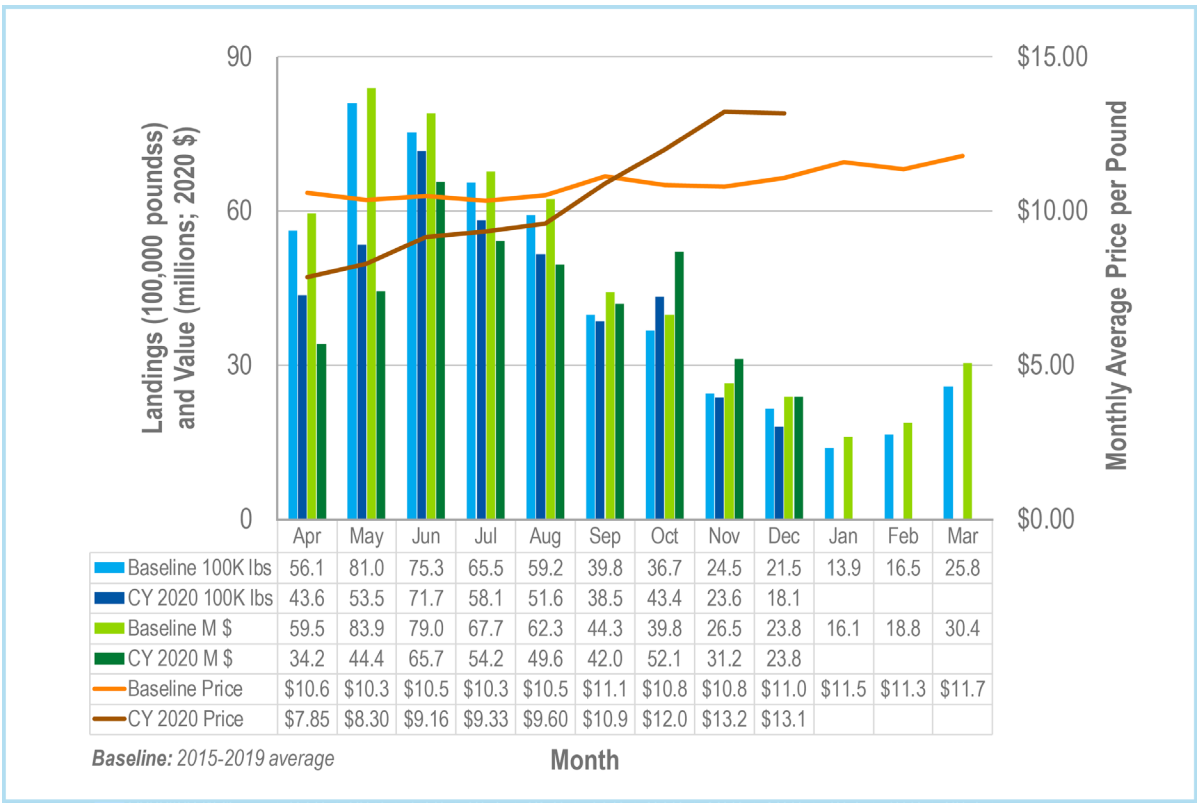
Figure 6.9. 2015-2019 baseline average and CY2020 landings, revenue, and prices for monkfish.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseline M lbs	3.1	1.5	1.5	2.0	3.6	5.7	20.3	30.8	24.2	25.4	17.3	8.4
CY 2020 M lbs	4.2	1.6	0.9	1.1	2.1	4.0	19.6	21.2	17.8	22.7	14.7	6.6
Baseline M $	17.2	10.6	11.9	15.1	20.7	30.3	86.9	125.7	104.7	110.7	76.8	41.1
CY 2020 M $	26.1	8.9	4.4	5.2	10.2	15.3	65.7	74.5	78.9	109.4	71.5	34.1
Baseline Price	$5.51	$6.82	$8.04	$7.60	$5.69	$5.32	$4.29	$4.09	$4.32	$4.36	$4.45	$4.91
CY 2020 Price	$6.23	$5.70	$4.86	$4.85	$4.97	$3.83	$3.35	$3.52	$4.42	$4.82	$4.87	$5.14

Figure 6.10. **2015-2019 baseline average and CY2020 landings, revenues, and prices for American lobster.**

As previously noted, the Atlantic sea scallop quota for the 2020 fishing season, which began in April, was reduced by 17% to 51.6 million pounds. This means that estimated impacts on the scallop fishery based on a calendar year conflates the potential impact of the COVID-19 response with a substantial reduction in quota. To adjust for these effects, the average share of landings by month for the 2015-2019 baseline was multiplied by the 2020 quota of 51.6 million pounds to project what landings and revenues may have been during scallop fishing year 2020 in the absence of the pandemic. Actual scallop fishing year landings for 2020 started out 22.4% and 33.9% below projected baseline landings and, with the exception of October, were below the projected baseline in every month through December 2020 (Fig. 6.11). Scallop prices were 25.9% lower during April and 19.8% lower in May compared to 2015-2019 average prices. Prices remained lower than baseline through September but have been higher from October through December 2020. However, even with improved prices, the reduced landings resulted in revenues below the projected baseline in every month except October, for a cumulative difference between actual and projected scallop fishery revenue of $89.7 million from April to December 2020.



	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Baseline 100K lbs	56.1	81.0	75.3	65.5	59.2	39.8	36.7	24.5	21.5	13.9	16.5	25.8
CY 2020 100K lbs	43.6	53.5	71.7	58.1	51.6	38.5	43.4	23.6	18.1			
Baseline M $	59.5	83.9	79.0	67.7	62.3	44.3	39.8	26.5	23.8	16.1	18.8	30.4
CY 2020 M $	34.2	44.4	65.7	54.2	49.6	42.0	52.1	31.2	23.8			
Baseline Price	$10.6	$10.3	$10.5	$10.3	$10.5	$11.1	$10.8	$10.8	$11.0	$11.5	$11.3	$11.7
CY 2020 Price	$7.85	$8.30	$9.16	$9.33	$9.60	$10.9	$12.0	$13.2	$13.1			

Figure 6.11. **Projected and actual 2020 scallop fishery year landings, revenues, and prices for Atlantic sea scallops.**

The general decline in landings and prices, and hence revenues, has affected the number of federally permitted vessels that have landed fish with a federally permitted dealer in the Northeast region. During the 2015-2019 baseline period, the number of participating vessels followed a pattern similar to that of revenues, with lower numbers of vessels landing seafood during the winter (1,314 vessels during February) then increasing during the summer to a peak of 2,657 in July before tapering off through the rest of the year. The number of vessels reporting sales through a Northeast Region dealer was above the 2015-2019 baseline average in both January and February but began to fall to 11% below the baseline in March and continued to run over 20% below the baseline in both April and May (Fig. 6.12). The gap between the number of federally permitted vessels offloading seafood narrowed to 14.3% below baseline in July and to 9.5% in August but has remained from 6% to 12.2% below the baseline from August through December. A survey was conducted to ascertain how commercial harvesters may have been impacted by COVID-19.

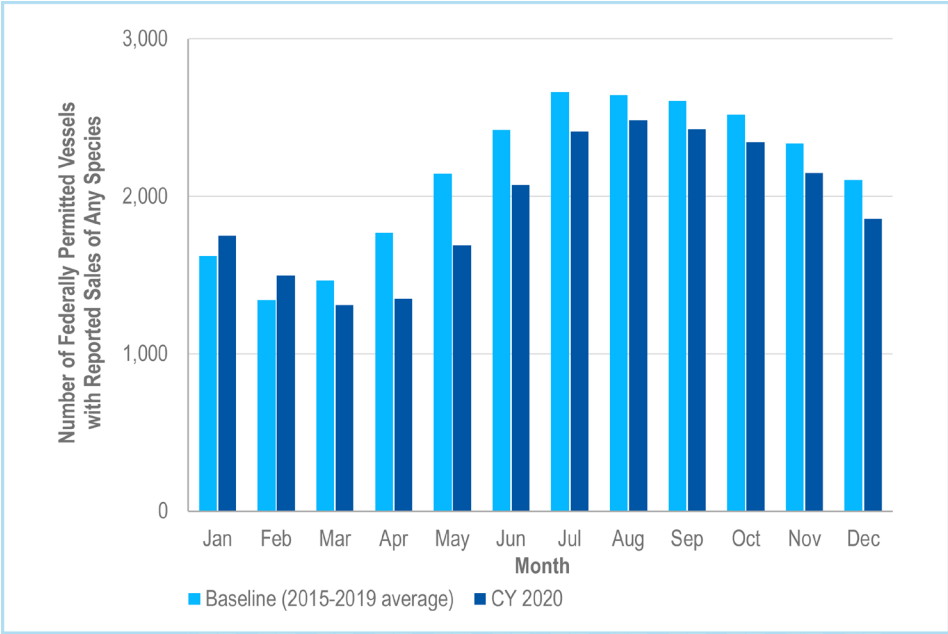


Figure 6.12. **Number of federally permitted vessels with reported sales of any species.**

Key findings from that survey are as follows:

- 86% of commercial harvester respondents were impacted by the COVID-19 pandemic.
- Fishing was the primary source of income for 77% of the respondents.
- On average, the respondents had owned a vessel for 30 years.
- The top three COVID-19 pandemic impacts on their businesses were:
  - Loss of crew or no crew available (26%)
  - Reduced trips (20%)
  - Difficulties obtaining bait or supplies (14%)
- 78% of survey respondents stopped fishing for some period of time:
  - 18% stopped fishing for less than 1 month.
  - 55% stopped fishing for 1 to 3 months.
  - 19% stopped fishing for more than 3 months.
  - 6% had stopped fishing indefinitely with plans to resume.
  - Less than 1% had gone out of business.
- On average, their level of fishing activity operated at 61% for all of 2020 compared to 2019.
- Compared to conditions during the first half of 2020, 36% reported that conditions had been worse over the last half of 2020 while 31% reported improved conditions.
- 72% of respondents had not reduced the number of employees.
- 90% of respondents reported reduced revenue, 1% reported increased revenue.
  - Average reduction in revenue was 43%.
  - Average increase in revenue was 37%.

Seafood Dealers/Processors

During 2015-2019, an annual average of 640 federally permitted seafood dealers reported purchasing fish and/or shellfish from a fishing vessel in the Northeast Region. Although some seafood products are primarily exported or have a high volume of exports (e.g., lobster and monkfish), much of the Northeast Region's seafood product is consumed domestically. A mix of species that are primarily sold fresh to restaurants with limited processing had sizable price and revenue declines in CY2020 due to restaurant closures. During CY2020, seafood consumption habits changed significantly from away from home to at- home consumption. This resulted in higher demand for frozen shelf-stable products and value added processing for preparation at home. The changes in seafood wholesale and retail markets resulted in a decline in the number of federally permitted dealers that purchased seafood by a month-over-month average of 8.3% from January to June 2020 compared to the January to June monthly average during the 2015-2019 baseline (Fig. 6.13). This trend has continued throughout the rest of CY2020, with some narrowing of the gap during July and August to 5-6% below baseline, but the number of federally permitted seafood dealers averaged 11.8% below the 2015-2019 baseline month-over-month from Sept.–Dec., 2020.

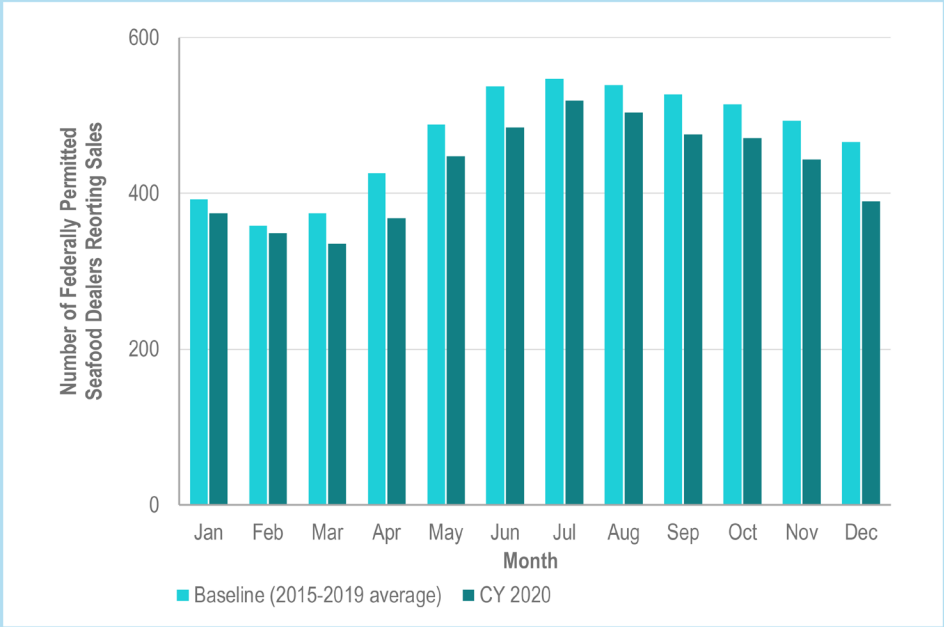


Figure 6.13. Monthly number of federally permitted seafood dealers reporting sales for CY2020 as compared to baseline monthly average (2015-2019).

NOAA Fisheries conducted a preliminary survey of seafood dealers to ascertain the impacts of the COVID-19 pandemic on business operations over the January to June 2020 period. A follow-up survey was conducted for the entire January to December period.

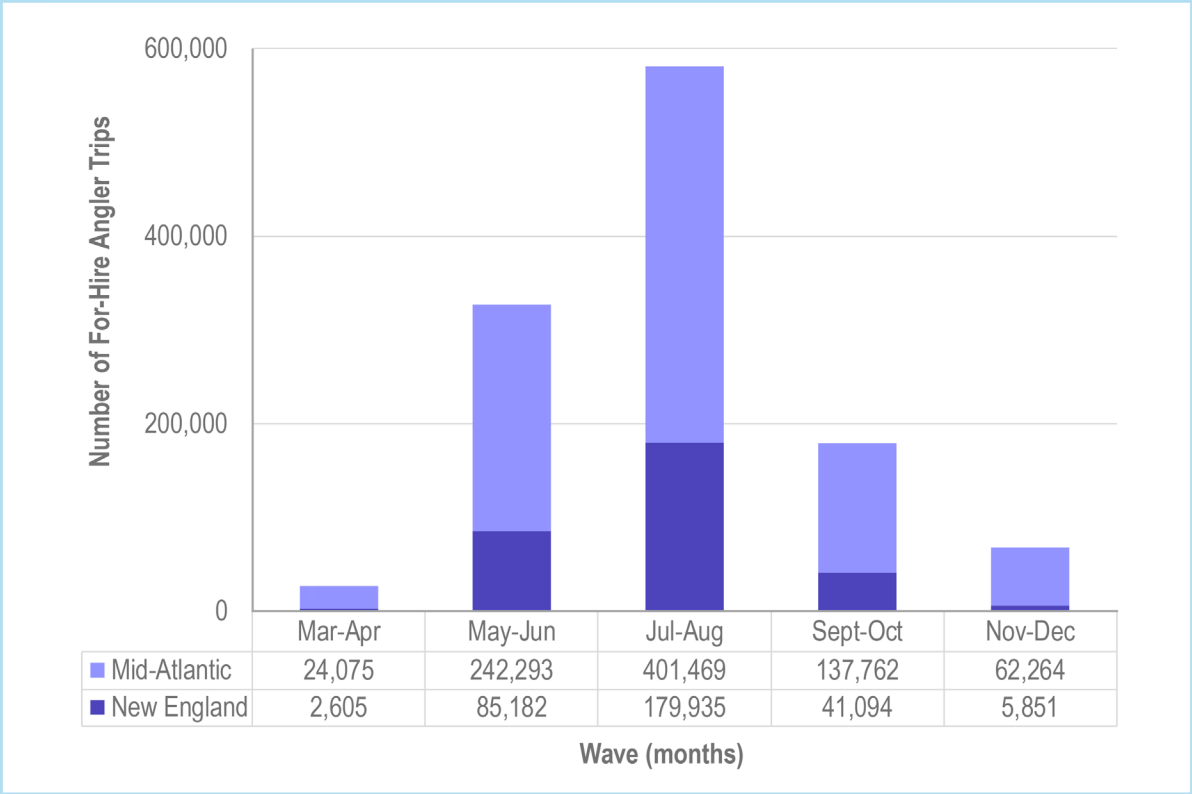
Key findings of impacts from that survey are as follows:

- 87% of seafood dealer/processor respondents were impacted by the COVID-19 pandemic.
- Most common impacts were:
  - Restrictions by state and local governments (16%)
  - Lower prices (12%)
  - Increased costs for PPE (10%)
  - Loss of employees (10%)
- 43% of dealer/processors closed their business operations for some period of time.
  - 22% were closed for less than 1 month.
  - 51% were closed for 1 to 3 months.
  - 16% were closed for more than 3 months.
  - 8% have closed indefinitely with plans to reopen.
- On average, responding dealer/processors operated at 58% of business activity for 2020 compared to 2019.
- Compared to the first 6 months of 2020 conditions had improved from June to December 2020 for 36% of responding dealers but had gotten worse for 35%.
- On average, responding dealer/processors normally employ 11 people on-site but 44% had reduced the number of on-site employees by an average of 6 people; just over half (52%) of responding businesses had maintained their normal staffing levels.

- 78% of dealer/processors reported reduced sales for 2020 while 12% reported increased sales.
  - Of those having increased sales, revenues increased an average of 27%.
  - Of those with reduced sales, revenues decreased by an average of 45% .

Recreational Fishing — For-Hire Sector

The recreational for-hire sector in the Northeast Region includes a range of services from trips that carry six or fewer passengers and focus on large game (e.g., tunas or sharks) or small game (e.g., bluefish or striped bass), to operations that carry a large number of anglers and focus on bottom fishing for species such as groundfish, black sea bass, scup, and summer flounder. During 2015 to 2019, for-hire operators in the New England and Mid-Atlantic Regions combined collected passenger fees averaging $123.5 million (2020 $) and provided recreational fishing services on an average of 1.2 million angler trips. Of these angler trips, 888,000 (73%) were taken in Mid-Atlantic states from New York to Virginia and 315,000 were taken in the New England Region.[4] Demand for for-hire services is seasonal, with the majority of trips taken from May to August in both New England (84%) and Mid-Atlantic (74%) Regions covered under the Marine Recreational Information Program (MRIP) although the season is longer in the Mid-Atlantic (Fig. 6.14).



	Mar-Apr	May-Jun	Jul-Aug	Sept-Oct	Nov-Dec
Mid-Atlantic	24,075	242,293	401,469	137,762	62,264
New England	2,605	85,182	179,935	41,094	5,851

Figure 6.14. Average number of for-hire angler trips by wave for New England and Mid-Atlantic MRIP regions for a 2015 to 2019 baseline.

4 All for-hire data were based on MRIP region definitions that put North Carolina in the South Atlantic Region. For this reason, trends and impacts on the for-hire sector in North Carolina are reported in the Southeast region section of this report.

Given the close proximity of participants on for-hire recreational fishing trips, the pandemic-related public health guidance for social distancing had a large impact on angler trips in 2020. Restrictions on gathering size and closures of non-essential businesses were implemented in New England and Mid- Atlantic states, particularly during March and lasting through much of May and into June for some states. The timing and relative severity of the restrictions on gatherings is measured as an index rating from 0 to 4 where 0 is no restrictions at all and 4 is limitations of 5 to 10 people or fewer (Fig. 6.15).[5] With the exception of Virginia with an index value of 3, all other states were at a 2; allowing gatherings ranging from 50 to 250. By the end of March, Maine and Virginia were at a 3 but all other states had implemented much more restrictive limits on gathering. In most states these limits remained in place during April and May, with easing of restrictions in many states by the end of June. However, with the resurgence of COVID-19 cases during the fall of 2020, some states returned to restrictions on gatherings that had been in place earlier in the year. These restrictions were implemented in Rhode Island and New York during October. Massachusetts, Connecticut, New Jersey, and Maryland implemented more restrictive gathering limits during November, and Virginia and Delaware followed suit during December.

Even though statewide restrictions may not necessarily apply to all for-hire recreational fishing businesses, they may have a dampening impact on the demand for party/charter fishing trips. During wave 2 (March and April) when limitations on gatherings were most restrictive, the number of for-hire angler trips in the New England and Mid-Atlantic Regions combined fell from a 2015-2019 baseline average of about 26,700 to 714 (Fig. 6.16).[6] With some easing of the restrictions on gatherings the number of for-hire angler trips during wave 2 (May and June) increased to 212,000 but was still 35% lower than the baseline average of 327,500 angler trips. This trend continued into July/August 2020 with party/charter angler trips running 29% lower (412,696) compared to the baseline average of 581,404 angler trips. During wave 4 (September/October 2020), the number of party/charter angler trips was 10% above the baseline. It dropped to 10% below the 2015-2019 average during wave 5 (November/December 2020).

To obtain more information on impacts of the COVID-19 pandemic, NOAA Fisheries conducted a survey of for-hire operators in the New England and Mid-Atlantic Regions. Respondents were asked to compare their 2020 operations to 2019.

Key survey findings include:

- 85% of respondents in the for-hire sector were impacted by the COVID-19 pandemic.
- For 49% of those responding, fishing was their primary source of income.
- The top three COVID-19 pandemic factors impacting their businesses were:
  - Restrictions by state and local governments (38%)
  - Increased costs for PPE (20%)
  - Loss of crew (11%)
- 84% of responding for-hire operators stopped fishing for some period of time:
  - 8% stopped fishing for less than 1 month.
  - 59% stopped fishing for 1 to 3 months.
  - 17% stopped fishing for more than 3 months.
  - 13% had stopped fishing indefinitely with plans to resume.
  - 3% went out of business.
- On average, survey respondent's fishing activity operated at 56% for all of 2020 compared to 2019.
- Compared to the first half of 2020, conditions improved over the last half of the year for 37% of the responding businesses but conditions got worse for 31%.
- 80% of respondents had not reduced the number of employees.
- 87% of respondents reported reduced revenue; average reduction in revenue was 51%.

5 Oxford COVID-19 Government Response Tracker. Available at https://www.bsg.ox.ac.uk/research/research- projects/coronavirus-government-response-tracker

6 The MRIP survey is implemented in two-month "waves" beginning with Wave 1 in Jan.-Feb. and ending with Wave 6 in Nov.-Dec. However, Wave 1 is not implemented in the New England or Mid-Atlantic Regions due to low recreational fishing effort at that time of year.

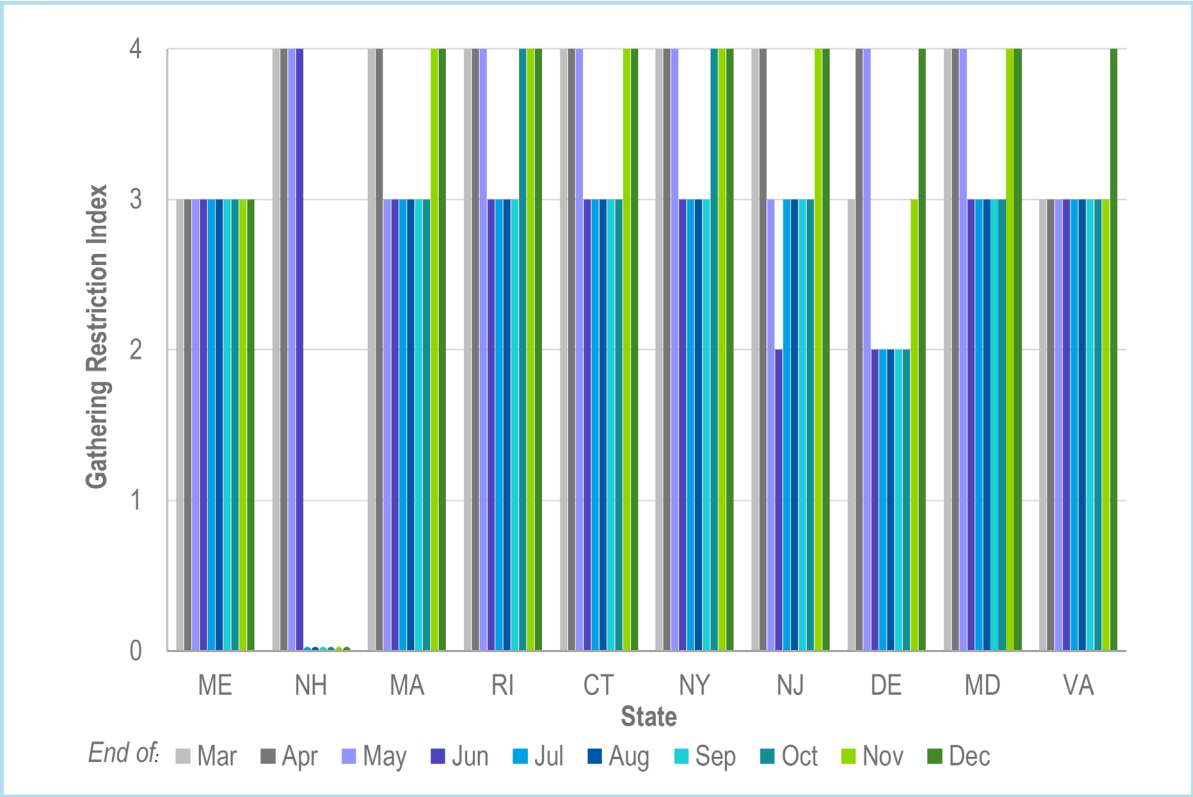


Figure 6.15. Gathering restriction index for March 1, 2020 and index value on the last day of the month for March to December, 2020. Source: Oxford COVID-19 Government Response Tracker.

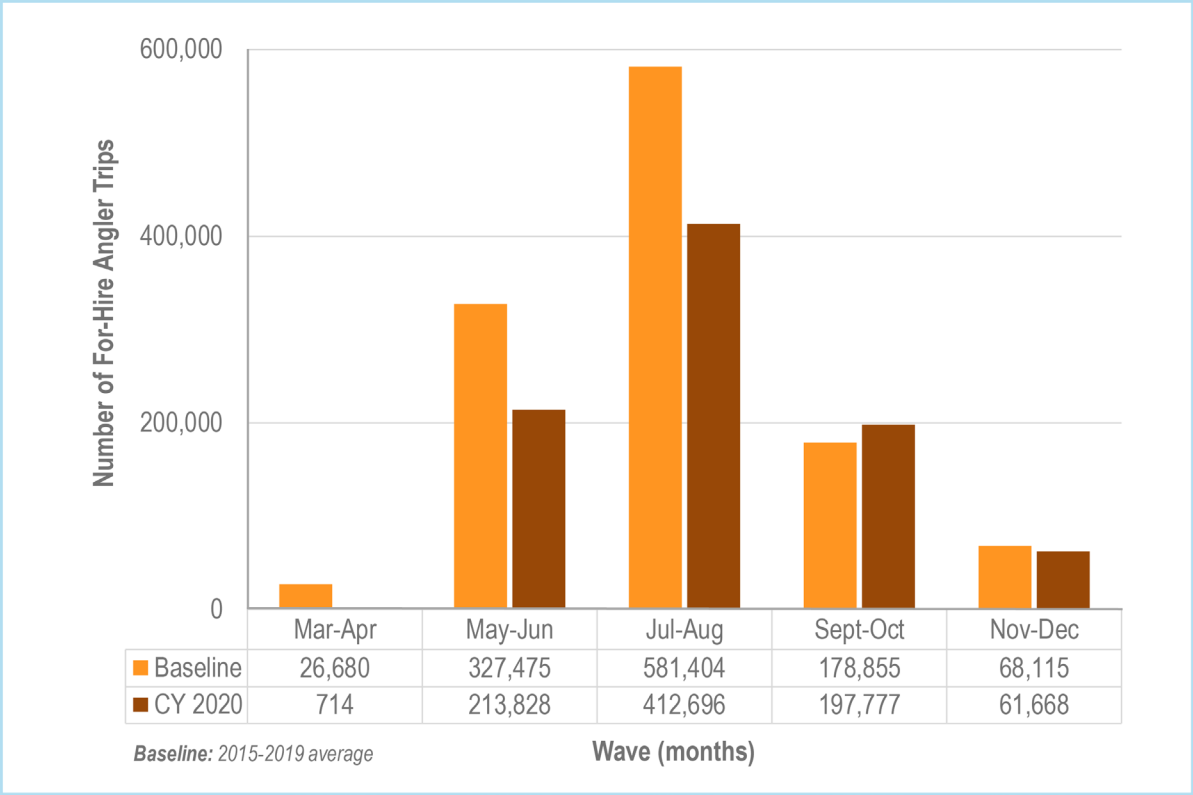


Figure 6.16. Number of for-hire angler trips taken during 2020 by two-month waves compared to the baseline average.

Atlantic Highly Migratory Species Fisheries Impacts from COVID-19

The Atlantic Highly Migratory Species (HMS) fishery is a high-value fishery comprised of seven key species and species groups: bluefin tuna, BAYS tunas (bigeye, albacore, yellowfin, and skipjack), swordfish, and sharks. All of the HMS species/species groups are harvested year-round (within open seasons) but most species typically have lower average monthly landings revenue ($1.8 million per month) from February through April as compared to other months ($3.2 million per month) through- out the year. All high-end products, particularly bluefin and yellowfin tunas, that are typically sold to restaurants suffered major price declines in March through June of 2020 as restaurant restrictions were implemented domestically and air travel restrictions slowed global shipping of exports.

Commercial Fisheries Landings Trends and Impacts through December 2020

Overall, Atlantic HMS ex-vessel revenue was 10.2% lower in the first half of 2020 as compared to 2019. COVID-19 impacted landings starting in the second half of March 2020 and resulted in second quarter landings decreasing 31.4% as compared to 2019. To date, April experienced the steepest monthly decline in Atlantic HMS landings value with a 66% decrease as compared to April of 2019 (Fig. 7.1).Since the April low of $439,000 in ex-vessel landings of Atlantic HMS, commercial land- ings have improved sig- nificantly. Monthly landings peaked in September at $4.5 million, but they were still 21% lower than landings for September of 2019.

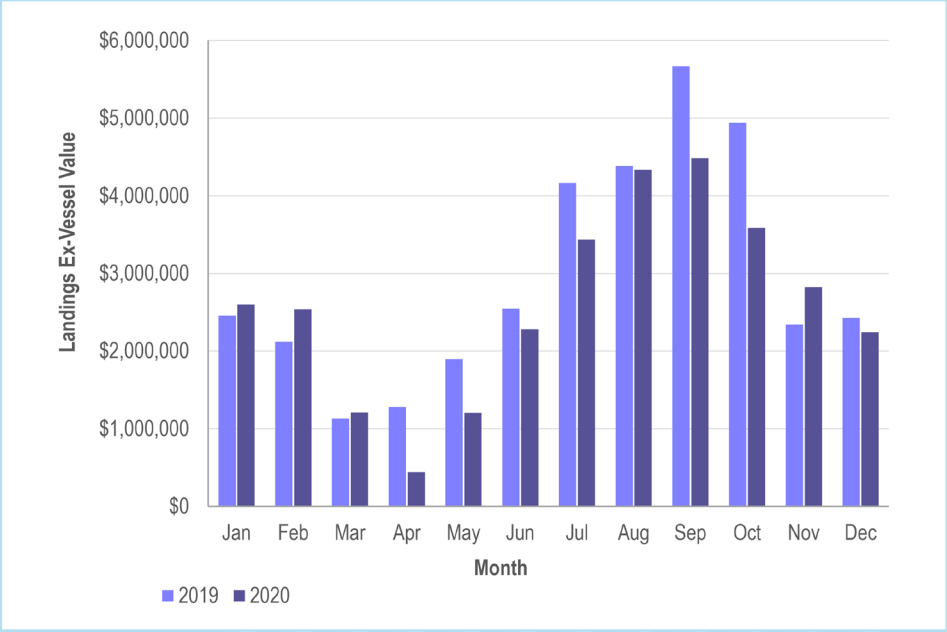


Figure 7.1. Atlantic HMS commercial landings (ex-vessel value).

In terms of species, bluefin tuna landings have been most impacted. April landings value declined by 69.2%, May landings value declined by 87.5%, June landings value declined by 45.9%, July landings value declined by 51.1%, and October landings value declined by 49.5% as compared to the same months in 2019. The decline was primarily due to a decrease in demand for high end sushi and a decrease in the availability of shipping to the international market. The average ex-vessel price per pound dressed weight for bluefin tuna declined by 20.4% ($5.24/lb compared to $6.58/lb in 2019) in the second quarter of 2020 as compared to the second quarter of 2019. The average ex-vessel price per pound dressed weight for yellowfin tuna declined by 23.1% ($3.24/lb compared to $4.22/lb in 2019) in the second quarter of 2020 as compared to the second quarter of 2019. The average ex-vessel price per pound dressed weight for bigeye tuna increased by 0.5% ($5.99/lb compared to $5.96/lb in 2019) in the second quarter of 2020 as compared to the second quarter of 2019. However, the average ex-vessel price per pound dressed weight for swordfish increased by 20.1% ($5.30/lb compared to $4.41/lb in 2019) in the second quarter of 2020 as compared to the second quarter of 2019. There have been some indications that there has been an increase in demand for

swordfish by the domestic retail market and some decreases in swordfish imports, which could have contributed to the price increase. Regardless of the price increase, the overall value of swordfish landings decreased 65.9% in April, 37.7% in May, and 10.4% in June as compared to those months in 2019. In July, the value of swordfish landings recovered substantially and far exceeded the weak July 2019 harvest.

Atlantic HMS Commercial Fleet

One high frequency indicator of fleet activity available to NOAA Fisheries is the number of hail outs reported by Vessel Monitoring Systems (VMS). VMS is required by vessels equipped with pelagic longline onboard; bottom longline vessels fishing off South Carolina, North Carolina, and Virginia from January through July; gillnet vessels issued a directed shark limited access permit operating near the Southeast U.S. Monitoring Area from December through March; and purse seine vessels. The number of trips taken by the Atlantic HMS vessels equipped with VMS decreased by 54% in April (Fig. 7.2). However, by May, vessels resumed taking trips that were comparable to 2019 levels and continued doing so for the remainder of the summer. October and November saw modest decreases in the number of trips as compared to 2019, but in December the fleet activity had recovered and trip reports were 10% higher than the previous year. However, the distance, length, and level of fishing effort were likely reduced as a result of the market shifts associated with COVID-19.

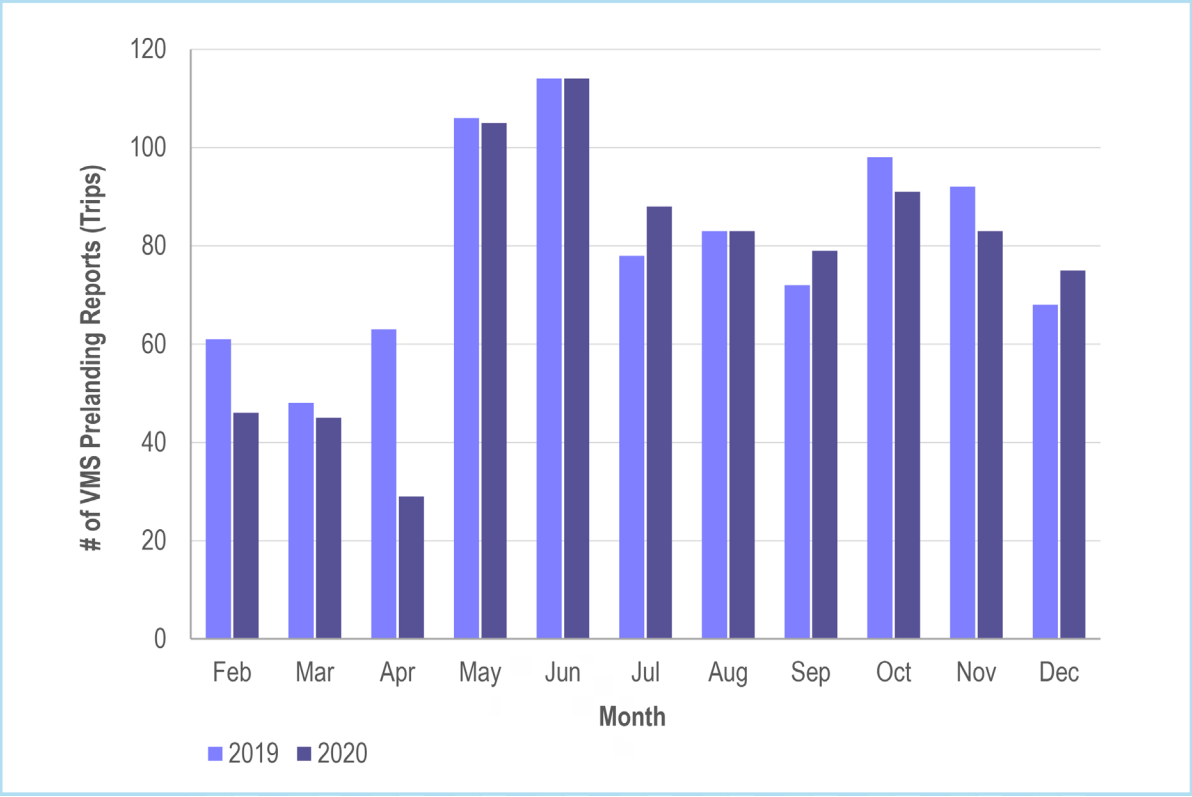


Figure 7.2. HMS commercial vessel activity (trips).*

**Based on VMS hail outs for Atlantic HMS vessels.*

Atlantic Pelagic Longline Fleet

Pelagic longline vessels are also required to report on each gear set via their VMS unit. That data can be used to measure the fishing effort of this fleet in real time. Effort in the Atlantic pelagic longline fleet decreased by 20% in March and by 63% in April as compared to the same months in 2019 (Fig. 7.3). By June, effort had recovered

substantially and actually exceeded June 2019 effort by 4%. July effort was just 5% below 2019 and August was just 1% above 2019 effort levels. The recovery in effort continued after August until the end of November. In December, effort dropped again to 13% lower than December 2019 levels.

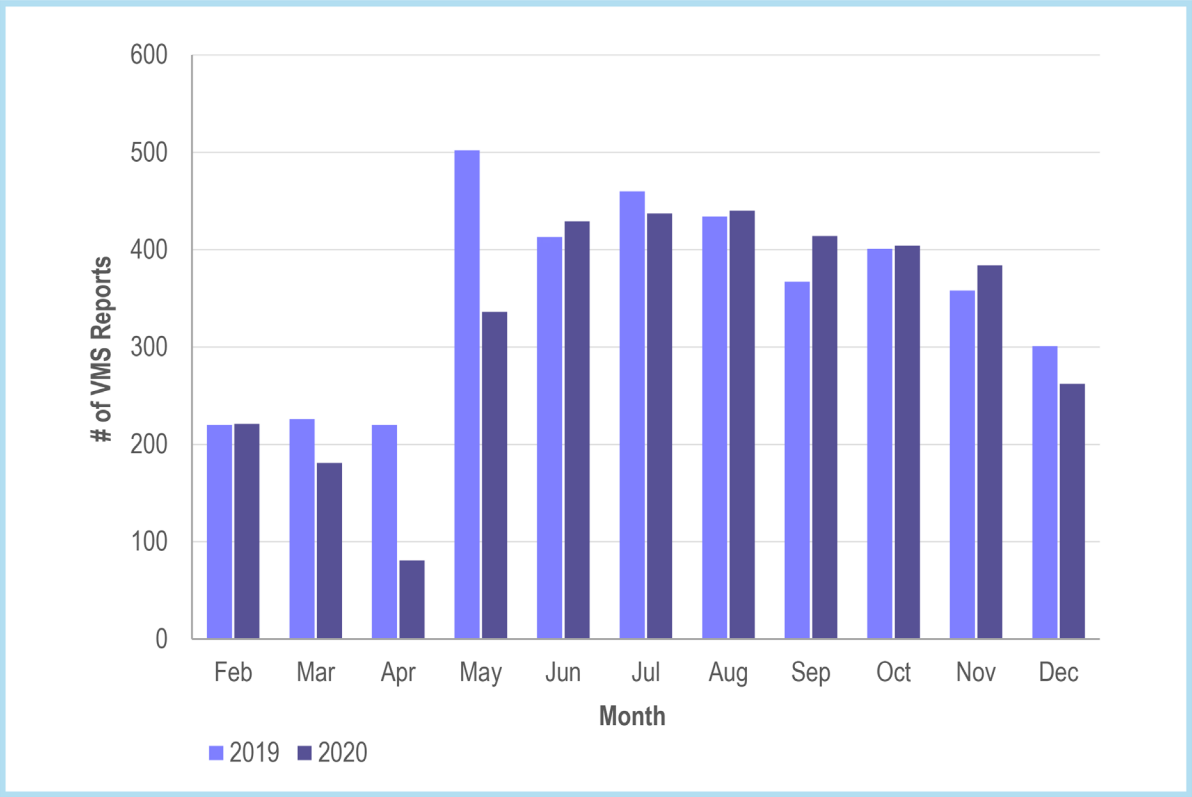


Figure 7.3. Pelagic longline fleet effort for 2020.

Seafood Dealers

While there were 170 seafood dealers that handled Atlantic HMS product in 2019, in 2020, there were 161 dealers. Only two or three Atlantic HMS dealers have contacted NOAA Fisheries stating that they shut down due to COVID-19.

Recreational Fishing

Charter Sector

During the spring months when the COVID-19 pandemic first arose, the active HMS for-hire fishery was relegated to the South Atlantic and Gulf of Mexico, as is typical for that time of the year. The primary targets of the HMS for-hire fishery during spring include tuna and sailfish. Atlantic HMS staff contacted 24 HMS charter/headboat permit holders in the South Atlantic (n = 13) and Gulf of Mexico (n = 11) states in April. Of those contacted, 100 percent reported that their business had been impacted by the COVID-19 pandemic and the associated closures and social distancing measures put in place by their states, with 19 vessels reporting that all of their April bookings had been cancelled. On average, vessel captains reported that 97 percent of their April bookings were cancelled. Most captains reported additional cancellations extending into May, with four reporting cancellations into June. NOAA Port Agents also canvassed the Southeast for-hire industry in late March, and reported reductions in effort ranging from 80-100 percent by state. Approximately 63 percent of those captains interviewed

reported having to lay off or reduce the hours of their staff, with reductions in hours averaging 95 percent. (Most employees of for-hire operations are fishing mates that are technically classified as 1099 employees or independent contractors.) Those captains that did not report laying off staff either did not have any or kept what little staff they had on to assist with boat maintenance projects. For-hire operators cited hotel and restaurant closures as among the primary factors impacting their business.

While the initial months of the pandemic were extremely difficult on the HMS for-hire sector, fishing effort data collected by the Large Pelagic Survey (LPS) in the summer and fall on the northeast Atlantic coast (the LPS runs June through October from Maine to Virginia) found a substantial increase in charter fishing trips targeting HMS. Overall, the LPS found a 50% increase in charter fishing trips for HMS during 2020 compared to the previous five-year average (Fig. 7.4). The increase in fishing effort was most pronounced in the month of June which saw a 91% increase in charter vessel trips. The months of July through October also saw substantial increases ranging from 39 to 50 percent. However, the increases in for-hire fishing effort were not evenly distributed across states, and two states even saw modest decreases in HMS charter vessel trips (Fig. 7.5). The increases in for-hire fishing effort were most pronounced in Maryland and Delaware which saw a 112 percent increase in for-hire effort, and Massachusetts which saw a 72% increase in for-hire effort. New Hampshire and Maine (36%) and New Jersey (27%) saw significant if not more modest increases in for-hire effort, while Virginia (5%), Connecticut/Rhode Island (-7%), and New York (-10%) saw modest increases or decreases in for-hire effort that were within the range of variability seen in the previous five years of sampling.

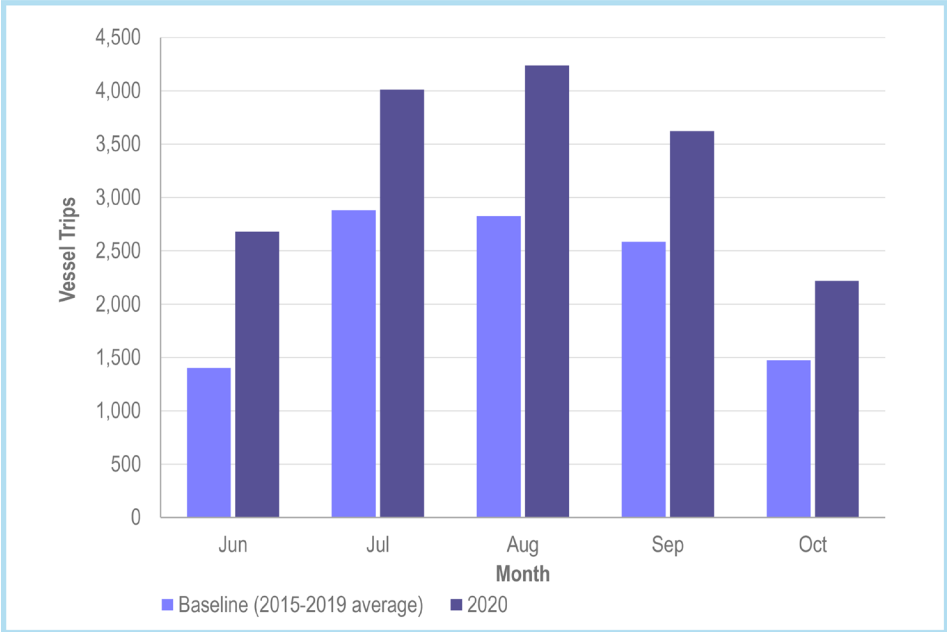


Figure 7.4. Estimates of charter boat vessel trips by month from the Large Pelagic Survey comparing 2020 estimates to the previous five- year average (2015-2019).

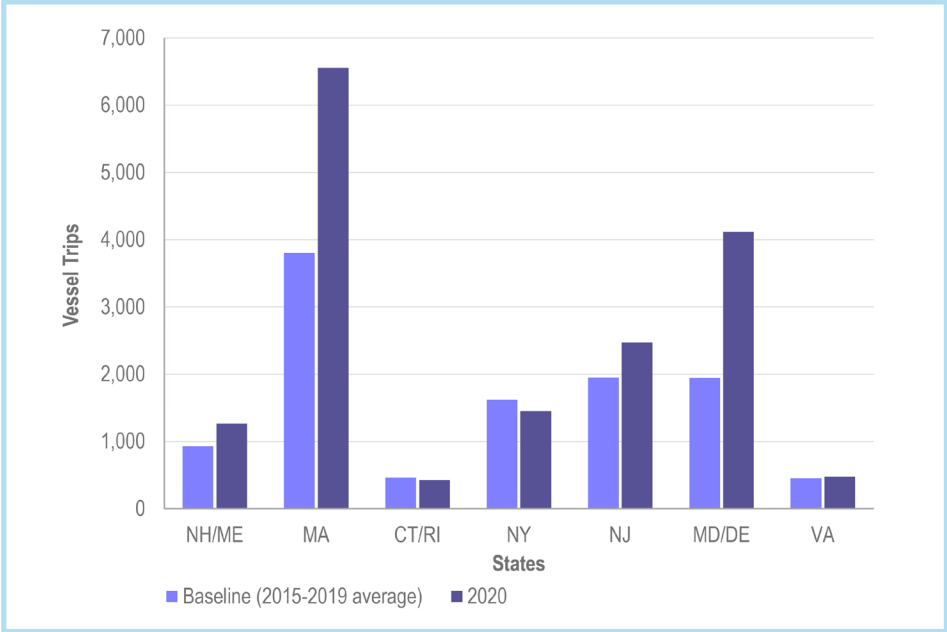


Figure 7.5. Estimates of charter boat vessel trips by state or state group from the Large Pelagic Survey comparing 2020 estimates to the previous five-year average (2015-2019).

Directed HMS trip estimates from MRIP data show that many of the southern states saw increases in HMS for-hire effort as individuals sought safe outdoor recreational activities to take the place of the indoor or social activities that were made unsafe by the pandemic. While HMS for-hire trips in the South Atlantic declined by two-thirds (66%) compared to the previous 5-year average during the months of March and April, they increased by a third (33%) between May and December (Fig. 7.6). An even more impressive rebound in HMS for-hire effort was seen in the Gulf of Mexico. Following a near complete disappearance of HMS effort in March through June, HMS for-hire effort in July and August was ten times greater than it had been for that same time period over the previous 5-year average (Fig. 7.7). The months of September and October also saw HMS effort tripled in the Gulf States before effort levels declined again in November and December to finish out the year (Fig. 7.7).

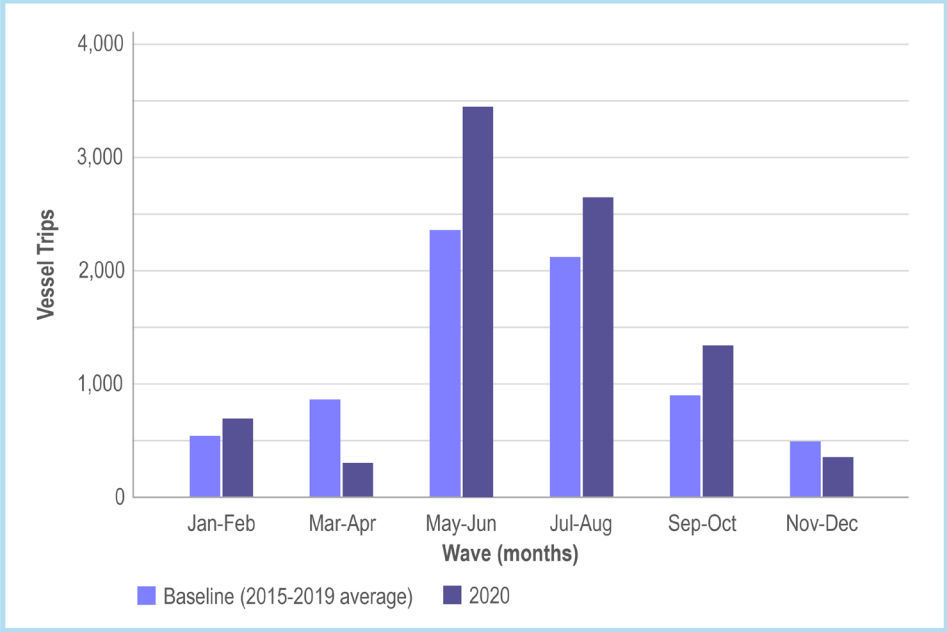


Figure 7.6. Estimates of HMS charter boat vessel trips in the South Atlantic by two-month wave from the Marine Recreational Information Program comparing 2020 estimates to the previous five-year average (2015-2019).

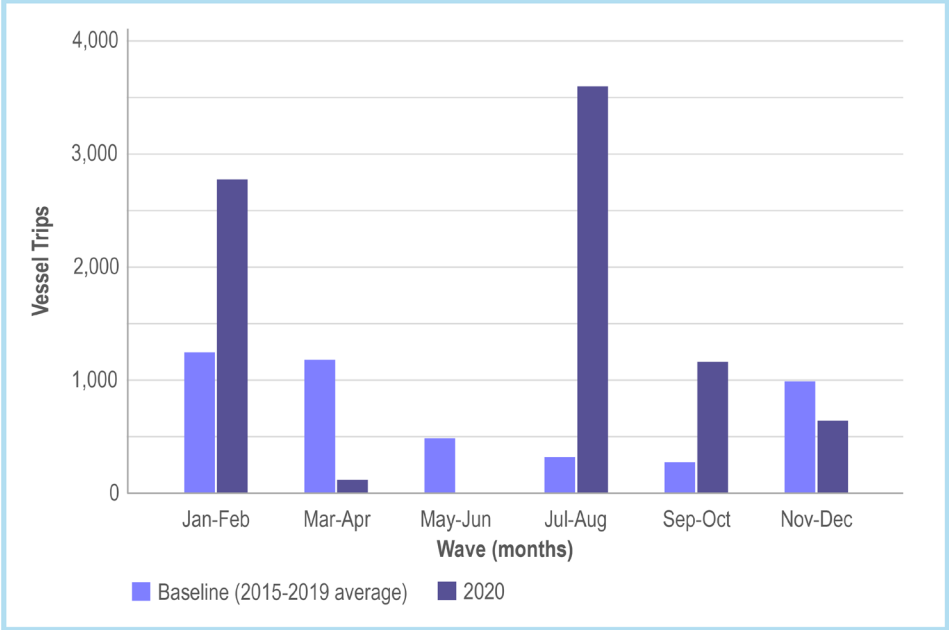


Figure 7.7. Estimates of HMS charter boat vessel trips in the Gulf of Mexico by two-month wave from the Marine Recreational Information Program comparing 2020 estimates to the previous five-year average (2015-2019).

Tournaments

A 2016 study by NOAA Fisheries estimated that HMS tournaments conducted in the Atlantic, Gulf of Mexico, and the Caribbean contributed approximately $129 million in annual economic impacts to the U.S. economy. Since 2009, an average of 259 HMS tournaments have registered withNOAA Fisheries each year. Atlantic HMS tournament registrations were almost unchanged in the first quarter of 2020 (26 versus 25 in 2019) (Fig. 7.8). Second quarter HMS tournament registrations were down 34% compared to 2019 (64 versus 97 in 2019). The third quarter of the year saw somewhat of a recovery with only 15% fewer tournaments registered compared to 2019, while the fourth quarter saw registered tournaments decline by 35% with the greatest reduction occurring in the Caribbean. Overall, there were 22% fewer registered tournaments occurring through December 2020 compared to 2019 (191 versus 246). These numbers reflect the adjustments made for eight tournaments that registered in 2020 but later reported cancelling their events and five postponements; however, it is likely additional events in the second quarter made

such changes without reporting them to NOAA Fisheries. Compared to 2019, 55 fewer tournaments were registered in 2020.

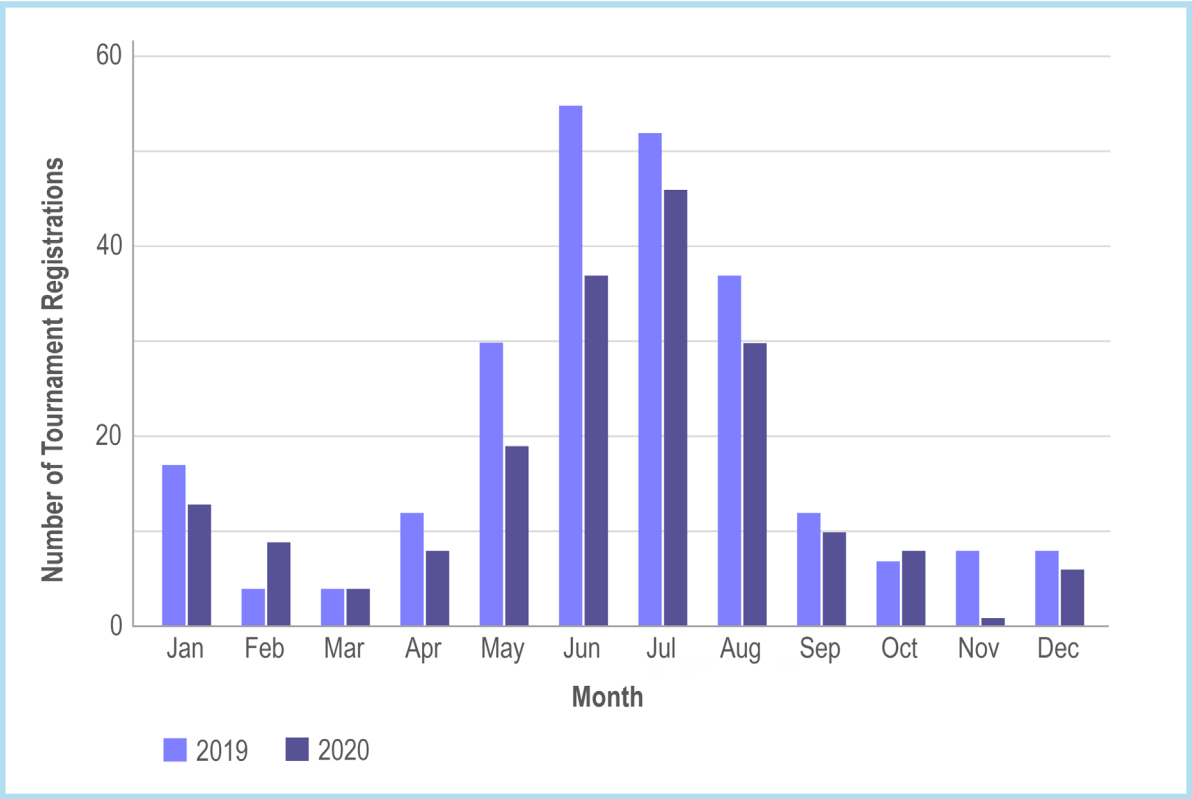


Figure 7.8. Number of Atlantic HMS tournament registrations.

Southeast Fisheries Impacts from COVID-19

Commercial Fisheries Landings Trends and Impacts

From 2015 to 2019, approximately 10,000 commercial fishing vessels operated in the Southeast commercial fisheries and landed products valued on average at $1.06 billion annually. During those years, the top three commercial fisheries by landings revenue in the Gulf of Mexico were shrimps, oysters, and menhaden; the top fisheries by landings revenue in the South Atlantic were blue crab, shrimps, and snapper-grouper. Many of the participants in Southeast commercial fisheries are active year- round, reflecting the seasonality of these fisheries (see Fig. 8.1). For the period March to May, which corresponds to the period in 2020 during which social distancing measures were first implemented and most restrictive, the shrimp fishery has been somewhat less active than during other parts of the year, with 17% of annual shrimp landings revenue earned during this 3- month period. In contrast, 22% to 30% of stone crab, coastal migratory pelagics, blue crab, black sea bass, and Eastern oyster landings revenue was earned during this period while 35% and 68% of deepsea golden crab and dolphinfish-wahoo revenue, respectively, were earned during this period.

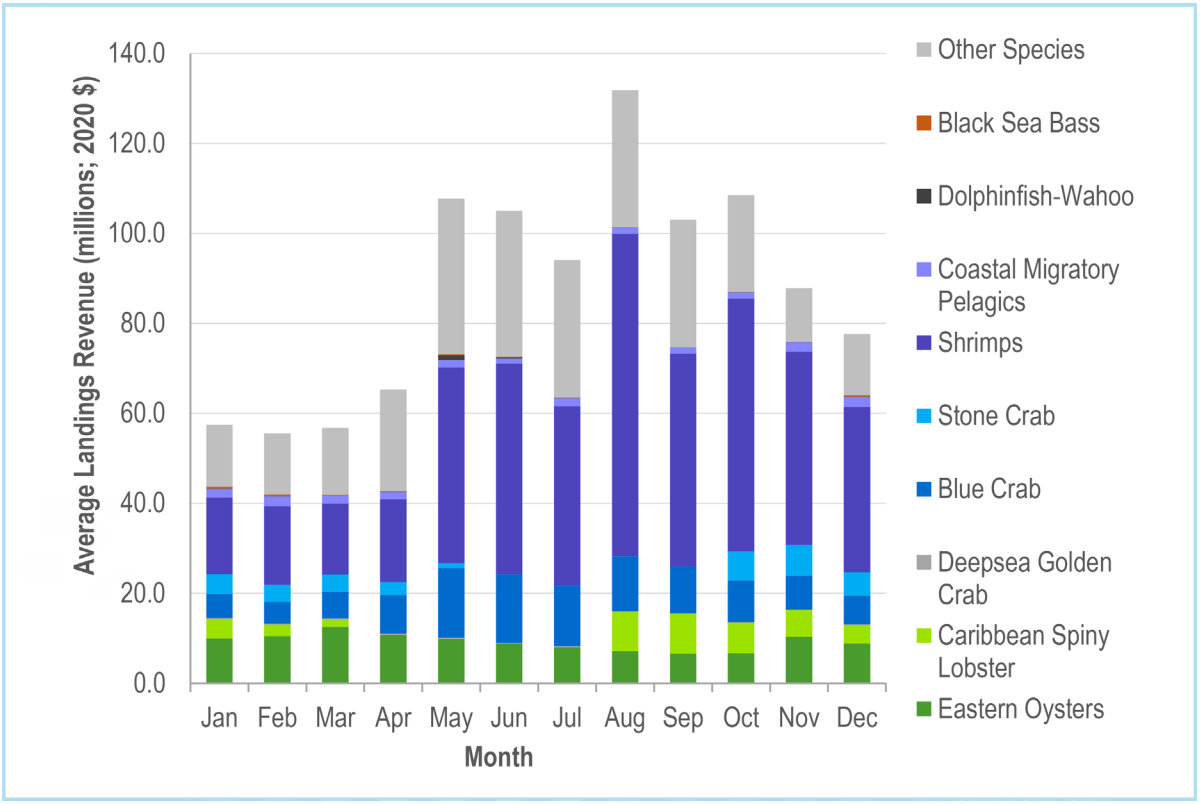


Figure 8.1. **Southeast average monthly landings revenue for selected commercial fishing sectors, 2015 to 2019. Data source: Southeast Fisheries Science Center Accumulative Landings System (ALS). Note that menhaden data are confidential and are included in Other Species.**

To assess the effects of COVID-19 on Southeast commercial fisheries, data were obtained from the Southeast Fisheries Science Center Accumulative Landings System (ALS) to calculate the average baseline of Southeast landings revenue from 2015-2019 as well as revenue totals for 2020. Note that ALS data for 2020 reported in this document are considered preliminary and results in this snapshot are likely to change as final data becomes available later in 2021.

Overall, annual landings revenue for 2020 decreased 25% compared with the baseline average for 2015-2019 (Fig. 8.2). Landings revenue declined 13% from January through March relative to the 2015-2019 baseline but then dropped sharply (43%) in April and May. Landings revenue recovered modestly in June and July but was still down 15% relative to the baseline. Landings revenue in the last five months of 2020 decreased significantly when compared to the baseline, ranging from a decline of 18% in December to a decline of 36% in September (Fig. 8.3). Once again, it is important to note that ALS data are preliminary and likely underreported for the latter months of 2020; thus, revenue declines in the latter half of 2020 are likely overestimated.

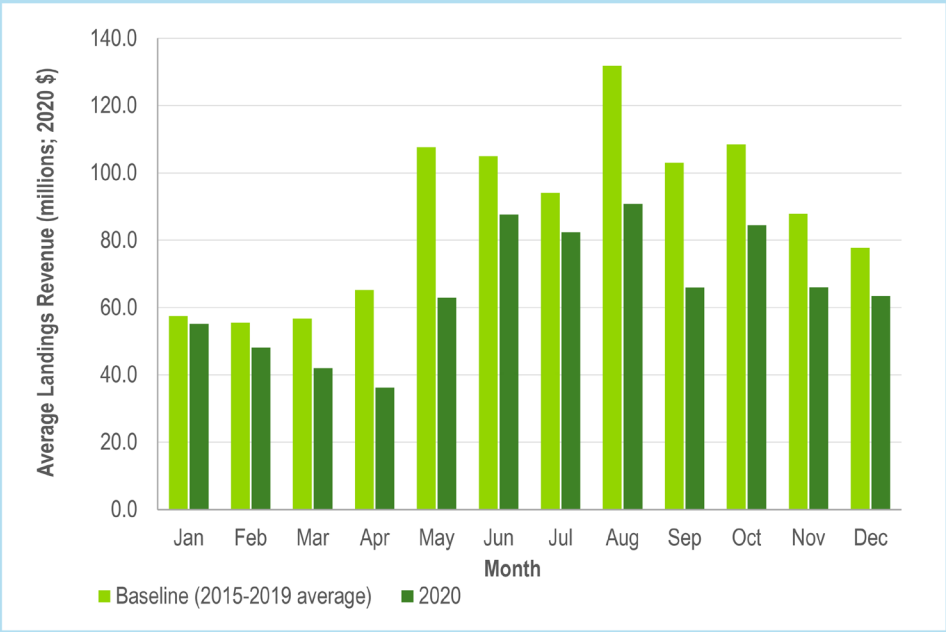


Figure 8.2. **Southeast monthly landings revenue in 2020 compared to the 2015-2019 baseline average. Data source: ALS.**

Figure 8.3. **Percentage change in Southeast monthly landings revenue in 2020 relative to the 2015-2019 baseline average. Data source: ALS.**

Although ALS data are preliminary, we analyze trends in Southeast commercial annual fisheries revenue and average ex- vessel prices for 2020 relative to 2019 and the 2015-2019 baseline based on best available data (Table 8.1). Note that we do not report menhaden statistics due to confidentiality restrictions. For most commercial fisheries, changes in 2020 landings revenue and ex-vessel prices were not as severe relative to 2019 when compared to the baseline of 2015-2019. This suggests that recent structural changes in most fisheries were present prior to COVID-19 displacements. For instance, landings revenue from black sea bass, blue crab, dolphinfish-wahoo, Eastern oysters, and shrimps ranged from 6-11 percentage points less when comparing the baseline average to 2019 declines, while the decline was about the same in both time periods for coastal migratory pelagics and stone crab. While landings revenue for Caribbean spiny lobster and deepsea golden crab were down 26% and 27% relative to 2019, respectively, both fisheries still fared much better than when compared to declines of 44% and 65% of 2015-2019 baseline revenue.

For most fisheries (i.e., black sea bass, deepsea golden crab, dolphinfish-wahoo, Eastern oysters, and shrimps), ex-vessel prices were either stable or decreased less than 5% relative to 2019, while ex-vessel prices for blue crab and coastal

migratory pelagics increased relative to 2019. Caribbean spiny lobster and stone crab experienced the largest price declines relative to 2019, which were likely influenced by a restriction in exports. Ex-vessel prices for coastal migratory pelagics, Eastern oysters, and shrimps stayed constant relative to the 2015-2019 baseline while blue crab and stone crab prices increased significantly. Ex-vessel prices in the black sea bass, Caribbean spiny lobster, deepsea golden crab, and dolphin- wahoo fisheries were significantly lower compared to the baseline, with declines of 8% to 17%.

Table 8.1 also shows that the golden crab, dolphinfish-wahoo, black sea bass, spiny lobster, and Eastern oysters fisheries experienced the highest revenue declines in 2020 relative to the 2015-2019 baseline, ranging from a 65% to 42% decrease. Next, the shrimps and blue crab fisheries experienced 18% and 13% revenue declines to the baseline. Lastly, the coastal migratory pelagics and stone crab fisheries experienced smaller reductions in revenue. Caribbean spiny lobster also incurred an ex-vessel price decline of 17% relative to the 2015-2019 baseline, likely due to export restrictions in the first half of 2020. The Eastern oysters, stone crab, and blue crab fisheries reported increases in average ex-vessel prices ranging from 1% to 13%.

Table 8.1. Percentage change in annual landings revenue and average ex-vessel price for selected Southeast commercial fisheries for 2020 relative to 2019 and the 2015-2019 baseline. Data source: ALS.

Fishery	Percent change in landings revenue (2019)	Percent change in average ex-vessel price (2019)	Percent change in landings revenue (2015-2019)	Percent change in average ex-vessel price (2015-2019)
Black sea bass (includes NC landings north of Cape Hatteras)	-41%	-4%	-51%	-6%
Blue Crab	-7%	14%	-13%	13%
Caribbean spiny lobster	-26%	-12%	-44%	-17%
Coastal migratory pelagics	-8%	5%	-8%	0%
Deepsea golden crab	-27%	-1%	-65%	-10%
Dolphinfish-wahoo	-46%	-4%	-57%	-8%
Eastern oyster	-32%	-4%	-42%	1%
Shrimps	-11%	-3%	-18%	-1%
Stone crab	-13%	-8%	-11%	7%

Table 8.2 summarizes impacts to ex-vessel landings revenue and average ex-vessel price for selected Southeast commercial fisheries that are managed under Annual Catch Limit (ACL) regulations or by a catch shares (individual fishing quota – IFQ) program. These data are updated regularly by the SEFSC and SERO for annual quota and catch share allocation management purposes, thus allowing for a more confident annual comparison of estimated effects due to COVID-19 in 2020 relative to 2019 and the baseline of 2015-2019. Note that these fisheries were included in the Other Species category when analyzing preliminary ALS data. As was seen in Table 8.1, changes in 2020 landings revenue were not as severe relative to 2019 when compared to the baseline of 2015-2019, while comparison of changes in ex- vessel prices is mixed. Landings revenue from Gulf of Mexico reef fish and South Atlantic snapper-grouper ranged from 2% to 7% less when comparing the baseline average revenue declines to 2019 declines.

Ex-Vessel Prices for Non-IFQ

Gulf of Mexico reef fish species declined 3% relative to 2019 and the 2015-2019 baseline, while prices for IFQ reef fish species declined more relative to 2019 (5%) than to the baseline (1%). The South Atlantic snapper grouper fishery experienced the largest price decline relative to 2019 (11%); however, ex-vessel prices were still up by 1% relative to the baseline period.

Table 8.2 also indicates that the aggregate fisheries managed by quotas experienced significant annual landings revenue declines relative to the 2015-2019 baseline, ranging from 28% for South Atlantic snapper-grouper to 40% for Gulf reef fish. Gulf IFQ fisheries reported a 9% decline in annual revenue relative to the baseline.

Table 8.2. Percentage change in ex-vessel landings revenue and average ex-vessel price for selected Southeast commercial fisheries for 2020 relative to 2019 and the 2015-2019 baseline. Data source: SEFSC ACL monitoring system and SERO LAPPS database.

Fishery	Percent change in landings revenue (2019)	Percent change in average ex-vessel price (2019)	Percent change in landings revenue (2015-2019)	Percent change in average ex-vessel price (2015-2019)
Gulf of Mexico reef fish (non-IFQ species)	-33%	-3%	-40%	-3%
Gulf of Mexico reef fish (IFQ species)	-5%	-5%	-9%	-1%
South Atlantic snapper grouper (excludes black sea bass)	-26%	-11%	-28%	1%

Several commercially important reef fish species are managed under the Gulf of Mexico Red Snapper and Grouper- Tilefish IFQ programs. IFQ programs are management regulations that set species-specific total allowable catch (i.e. quota) for a fishing season and distribute annual allocations of the yearly dedicated portion of the quota through shares to individual accounts. These shares are transferable among approved entities and also enable shareholders to postpone harvesting their quota if market conditions are unfavorable, as occurred during spring of 2020 when social distancing measures implemented to reduce the spread of COVID-19 closed restaurants both domestically and globally.

Figure 8.4 reveals underlying trends in the economics of the Gulf of Mexico IFQ fisheries. A steep decline in 2020 landings revenue of Gulf of Mexico IFQ species was reported in March and April 2020 relative to the year before, but beginning in May, landings rebounded. Cumulative landings revenue of all IFQ species were only 5% less than cumulative landings revenue in 2019 (Table 8.2).

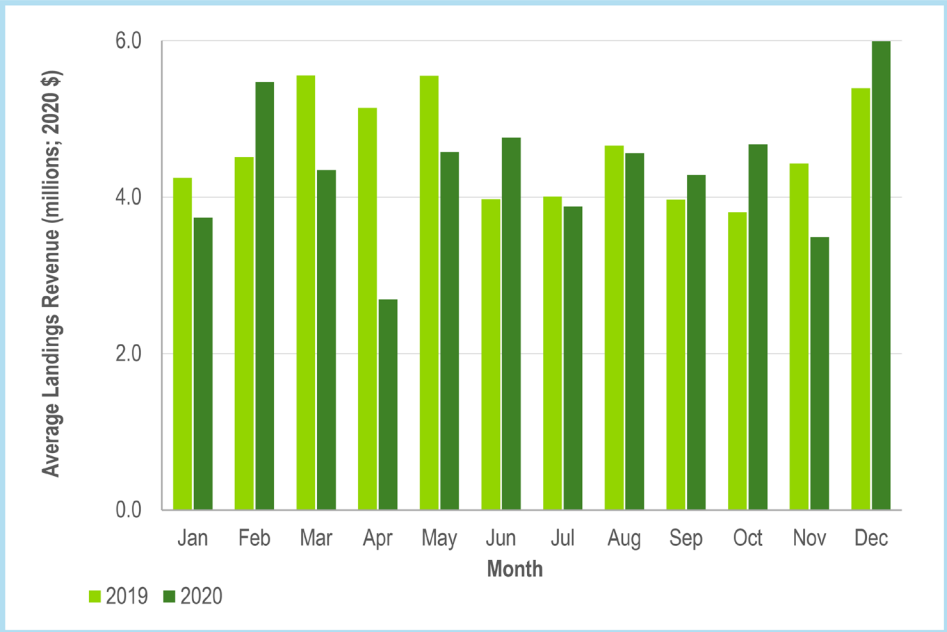


Figure 8.4. Landings revenue for all Gulf of Mexico IFQ species by month for 2019 and 2020.

Table 8.3 summarizes impacts to ex-vessel landings revenue and average ex-vessel price for selected species that are managed under a catch shares (IFQ) program. These data are updated regularly by the SERO for catch share allocation management purposes, thus allowing for an annual comparison of estimated effects due to COVID-19 in 2020 relative to 2019 and the baseline of 2015-2019. For all species, changes in 2020 landings revenue were not as severe relative to 2019 when compared to the baseline of 2015-2019, while comparison of changes in ex-vessel prices were either worse or about the same in 2019 compared to the baseline. This difference may be due to a number of factors such as red tide, hurricanes, and regulatory effects, so it is hard to discern exactly the effect of COVID-19 on these fisheries in 2020. For the most part, the flexibility allowed under a catch shares system in general would provide the fleet the opportunity to make up lost landings later in the season, which is what appears to have happened in the Gulf IFQ fisheries. All species reported less landings revenue relative to both 2019 and the baseline of 2015-2019 except red grouper which reported revenue 10% higher than 2019. A number of environmental and regulatory shocks in particular has affected the red grouper sector over the last few years, so its relatively high performance in 2020 compared to other IFQ fisheries may not be due to resilience to COVID-19 impacts but rather

due to recovering from recent problems. Ex-vessel prices declined relative to 2019 for all species, ranging from 3% for gag grouper to 10% for yellowedge grouper.

Table 8.3. Percentage change in ex-vessel landings revenue and average ex-vessel price for selected Gulf of Mexico IFQ species for 2020 relative to 2019 and the 2015-2019 baseline. Data source: SERO LAPPS database.

IFQ species	Percent change in landings revenue (2019)	Percent change in average ex-vessel price (2019)	Percent change in landings revenue (2015-2019)	Percent change in average ex-vessel price (2015-2019)
Gag grouper	-14%	-3%	-16%	4%
Golden tilefish	-21%	-5%	-38%	-5%
Red grouper	10%	-5%	-22%	12%
Red snapper	-5%	-5%	0%	-6%
Yellowedge grouper	-26%	-10%	-9%	-2%

Commercial Fishing Permit Holder Survey

Besides an analysis of landings data trends, the SEFSC conducted a survey of commercial for-hire and dealer processor fishing businesses to understand the impact of COVID-19 related changes on particular businesses and sectors in calendar year 2020. Through this survey, we were able to contact 390 commercial fishing permit holders in the eight states in the Gulf of Mexico and South Atlantic Regions between January 25 and March 25, 2021. Of those contacted, 87% reported that COVID-19 related factors had affected their fishing operations. For 77% of respondents affected by these factors, commercial fishing represented their primary source of income. Forty-one percent (41%) of commercial permit holders contacted reported owning one vessel, 32% reported owning two vessels, and 24% reported owning three or more vessels.

Some 87% of affected commercial fishing permit holders reported reduced revenue in 2020 in comparison to 2019, with revenue declining 49% on average. Only 3% reported increased revenue in comparison to 2019. Thirty-five percent (35%) of commercial permit holders reported a reduction of employees/crew, with an average decrease of three employees. Only 1% of commercial permit holders reported an increase in number of employees.

Comparison of 2020 with 2019	Top three COVID-19 related factors affecting commercial permit holders:
– 87% of commercial permit holders reported revenue decreases in 2020 in comparison to 2019. – Commercial permit holders reported 10% to 100% revenue decreases for an average of 49% for those reporting losses. – 35% of commercial permit holders reported a reduction in employees, 1% reported an increase, and 63% reported no change. – On average, commercial fishing permit holders reported operating at 53% of fishing activity compared to 2019. – 24% reported that business had improved in the second half of 2020 (July –December), 29% said it remained the same, and 47% reported that business had gotten worse in the second half of the year.	– Loss of crew (23%) – Reduced numbers of trips (20%) – Government restrictions (17%)

Eighty-five percent (85%) of commercial permit holders that responded to the survey stopped fishing for some period of time in 2020. Of these, 12% stopped fishing for less than a month, 44% stopped fishing for one to three months, and 30% stopped fishing for more than three months. Eight percent (8%) had ceased operations

indefinitely but had plans eventually to resume taking trips. Some 4% of survey respondents reported permanently shutting down their commercial fishing operations. The most common ways that COVID-19 related factors affected commercial fishing permit holders included loss of crew (23%), reduced numbers of trips (20%), and direct government restrictions (17%).

Seafood Dealers

There were 3,240 seafood dealers operating in the Southeast Region in 2018. Notwithstanding a few seafood products that are exported (e.g., spiny lobster to China), much of the Southeast region's product is consumed domestically, with a high proportion dependent upon restaurant sales. King mackerel is a notable exception; it is sold primarily in grocery stores and there remains a strong market for this product, although especially in the Gulf of Mexico it is a seasonal fishery with the majority of sales in January/February and April/May.

NOAA Fisheries interviewed 208 seafood dealers and processors between January 25 and March 25, 2021 regarding the impacts of COVID-19 related factors on their businesses in calendar year 2020. Some 83% of seafood dealers/processors reported that their businesses had been impacted by COVID-19 related factors in 2020. Of those affected, 85% reported reduced revenue in comparison to 2019, with revenue declining on average 46%. Only 6% of those affected reported revenue improved in comparison to 2019, with an average 32% increase in revenue. Some 39% of affected businesses reported a reduction of on-site employees, with an average decrease of six employees. Only 3% of affected businesses reported an increase in numbers of employees (avg. five employees).

Comparison of 2020 with 2019	Top three COVID-19 related factors affecting seafood dealer/processors:
– 85% of dealer/processors reported revenue reductions in comparison to 2019. – Dealer/processors reported 5% to 100% revenue reductions for an average of 46% decrease in revenue in comparison to 2019. – 39% reported a reduction in employees in 2020, 3% reported an increase, and 56% reported no change. – On average dealer/processors reported operating at 58% of business activity compared to 2019. – 30% reported that business had improved	– Government restrictions (15%) – Reduced hours of operation (10%)

Fifty-three percent (53%) of affected dealer/processors closed their business operations for some period of time in 2020. Of those that reported how long they had been closed, 14% were closed for less than a month, 45% were closed for one to three months, and 24% were closed for more than three months. Ten percent (10%) were closed indefinitely but had plans to eventually reopen. Notably, 4% of survey respondents reported permanently shutting down their operations. Respondents provided a range of responses regarding the most significant COVID-19 related factors on seafood dealer processors; the top three identified were government restrictions (15%), reduced hours of operation (10%) and cost increases incurred for Personal Protective Equipment (PPE) (9%).

Recreational Fishing — For-Hire Sector

There were approximately 4,000 and 1,800 charter operations in the Gulf of Mexico and South Atlantic regions, respectively, in 2019. There were also an estimated 63 headboat vessels in the south Atlantic and 69 in the Gulf of Mexico in 2019. From 2016 to 2019, anglers in the Southeast took an average of 1,523,770 charter trips annually.

Charter revenue decreased by 7% across the Southeast for the states from North Carolina to Louisiana in 2020 compared to a 5-year average (2015 to 2019). Total average revenue for the region from 2015 to 2019 was $401 million annually (2020 dollars). In 2020, the total revenue from charter boats was $372 million. The number of for- hire angler trips was approximately 1.7 million on average from 2015 to 2019. In 2020 there were an estimated 1.6 million trips, a decrease of 5%.[1] Note that the decline in revenue and trips between 2020 and 2019 is significantly larger than that revealed by the comparison with the 2015-2019 baseline, with an 18% reduction in the number of both trips and revenue between 2020 and 2019 (see Fig. 8.5).

Headboat revenue decreased by 26% overall in the Southeast (NC to TX) in 2020 compared to the average revenue for the same time-period between 2015 and 2019. Texas was the only state with a slight increase in headboat revenue in 2020 (<1%); Louisiana and Florida had the largest decreases in comparison to the 2015-2019 baseline (- 48% and -41%, respectively).

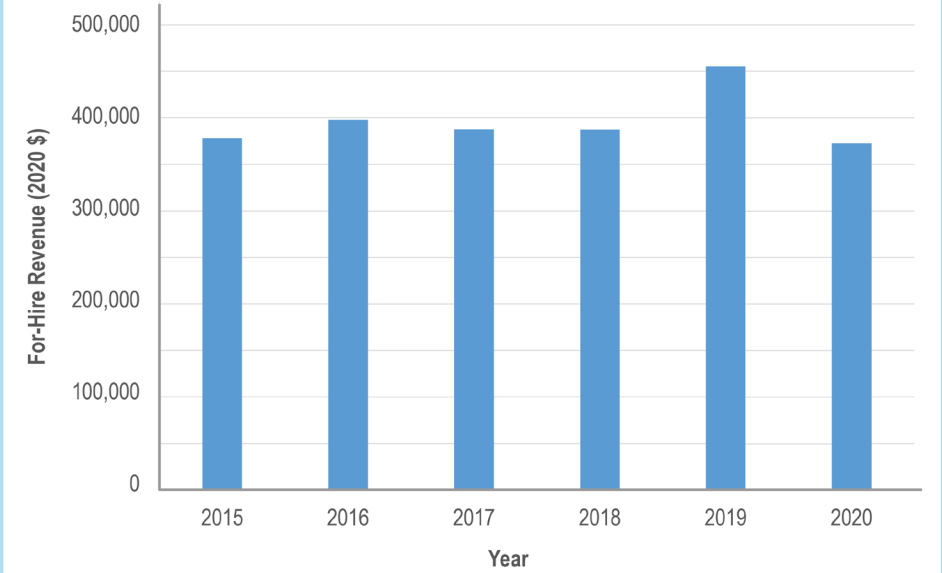


Figure 8.5. **For-hire revenue in the Southeast region, 2015–2020. Note that revenues are in 2020 dollars. Texas is not included in these figures due to lack of 2020 data.**

For-Hire Operators Survey

A total of 378 for-hire businesses were contacted in the eight states in the Gulf of Mexico and South Atlantic regions between January 25 and March 25, 2021 regarding the impacts of COVID-19 related factors on their businesses in the 2020 calendar year. Of those contacted, 91% reported that COVID-19 related factors had affected their businesses. Sixty-two percent (62%) of respondents reported owning one vessel, 23% owned two vessels, and 13% owned more than two vessels. For 74% of affected respondents, charter/for-hire fishing represented their primary source of income. Some 88% of affected for-hire operators reported reduced revenue in the 2020 calendar year in comparison to the 2019 calendar year, with revenue declining 48% on average. Some 10% of those affected reported revenue either stayed the same (8%) or improved (2%) in comparison to 2019 – those that improved reported an average 23% increase in revenue. Some 18% of affected for-hire businesses reported a reduction of employees with an average decrease of three employees. Less than 1% of affected for-hire operations reported an increase in number of employees in 2020.

1 Revenues are in 2020 dollars. Texas is excluded from these figures due to lack of data for 2020.

Comparison of 2020 with 2019	Top three COVID-19 related factors affecting the for-hire sector in 2020:
– 88% of affected for-hire operators reported revenue losses in comparison to 2019. – Affected for-hire businesses reported 8% to 100% revenue losses for an average of 48% decrease in revenue in 2020. – 18% of affected for-hire operators reported a reduction in employees, less than 1% reported an increase, and 80% reported no change. – On average, affected for-hire operations reported operating at 55% of normal fishing activity in 2020 compared to 2019. – Some 45% of for-hire businesses reported that business had improved in the second half of 2020 (July – –December) compared to the first half, 27% said it had stayed the same, and 26% said it had gotten worse.	– Direct government restrictions (40%) – Difficulties obtaining bait/supplies (12%) – Loss of crew (12%)

Eighty-eight percent (88%) of affected party/charter/for-hire businesses stopped taking fishing trips for some period of time in 2020. Of these, 6% stopped taking trips for less than a month, 60% stopped taking trips for one to three months, and 27% stopped taking trips for more than three months. Five percent (5%) had ceased operations indefinitely but had plans to eventually resume taking trips. Only 2% of survey respondents reported permanently shutting down their charter operations. The most common ways that COVID-19 related factors affected charter/party/for-hire operations over calendar year 2020 included direct government restrictions (40%), difficulties obtaining bait/supplies (12%), and loss of crew (12%).

Puerto Rico

Between 2015 and 2019, Puerto Rican fishermen landed, on average, 1.3 million pounds of seafood worth $10.3 million every year. Preliminary fishery statistics for the first nine months (Jan-Sept) of 2020 relative to the same period in 2019 show that self-reported landings and dockside revenues fell by 54% and 55%, respectively (Fig. 8.6). On March 15, 2020, the Governor of Puerto Rico instituted an island-wide lockdown that lasted 88 days.

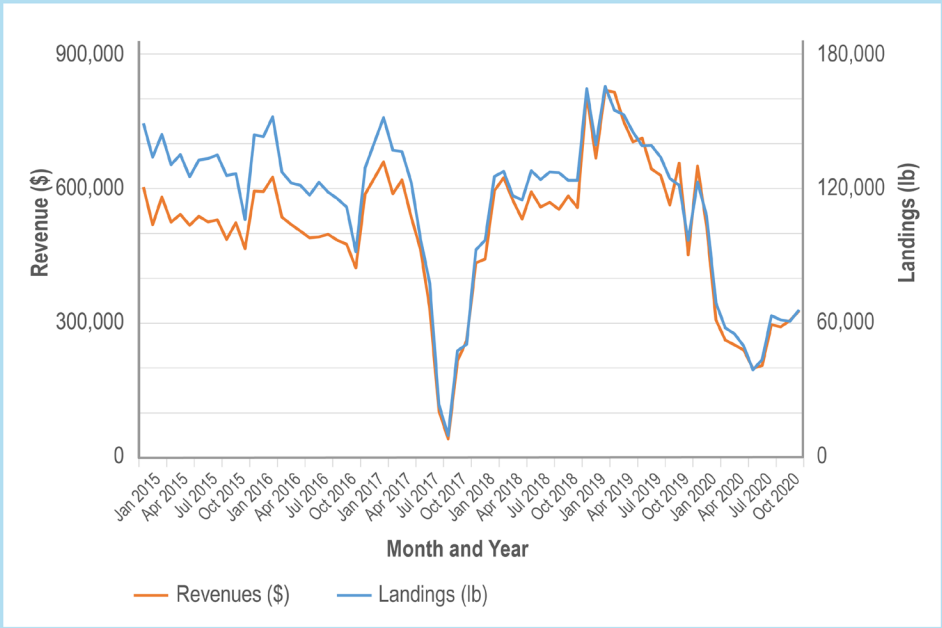


Figure 8.6. Monthly landings and dockside revenues in Puerto Rico (2015-2020).

As essential workers, fishermen were exempted from stay at home orders and curfew hours, but were often mistakenly stopped by members of the police and Guard Corps (Cuerpo de Vigilantes) of the Department of Natural and Environmental Resources (DNER) and told to return home. Many fishermen ended up changing their fishing schedule to avoid curfew hassles. Besides being

frustrated over the misunderstandings related to the enforcement of governmental mandates, many fishermen were upset because they could not renew their expired fishing licenses and boat registrations since government offices were closed. To address these problems, Puerto Rico's Department of Agriculture and DNER reached out to enforcement agencies to clear up misunderstandings and issued provisional fishing licenses.

The following sections describe preliminary results from surveys of commercial harvesters and dealer/processor businesses in Puerto Rico. Although there is a relatively small for-hire sector in Puerto Rico that has been impacted by hurricanes and COVID-19 related closures over the past few years, interviews with that sector have not been completed and therefore are not included in this report.

Commercial Fishing Survey

A total of 139 small-scale commercial fishermen were contacted in Puerto Rico in February and March of 2021 regarding the impacts of COVID-19 related factors on their fishing operations in calendar year 2020. Of those contacted, 99.2% reported that COVID-19 related factors had affected their fishing operations. For 67% of the respondents affected by COVID-19 related factors, commercial fishing represented their primary source of income. Some 91% of affected commercial fishing permit holders reported reduced revenue in 2020 in comparison to 2019, with revenue declining on average 65%. Only one fisherman reported increased revenue in comparison to 2019. Seventeen percent (17%) of commercial fishermen reported a reduction of employees/crew.

Puerto Rico: Comparison of 2020 with 2019	Top three COVID-19 related factors affecting commercial harvesters in Puerto Rico:
– 91% of small-scale fishermen reported revenue reductions in comparison to 2019. – Among those reporting losses, commercial fishermen reported an average 65% decrease in revenue in comparison to 2019. – 17% of commercial permit holders reported a reduction in employees. – On average, commercial fishing permit holders reported operating at 48% of fishing activity compared to 2019.	– Reduced number of trips (79%) – Lack of markets/dealers/buyers/clients and/or reduced prices (71%) – Government restrictions (48%)

Ninety-three percent (93%) of commercial fishermen stopped fishing for some period of time in 2020. Of these, 4% stopped fishing for less than a month, 24% stopped fishing for one to three months, and 60% stopped fishing for more than three months. Twelve percent (12%) had ceased operations indefinitely but had plans to resume taking trips. None of the individuals interviewed reported having gone out of business. The most common ways that COVID-19 related factors affected commercial fishing permit holders included reduced number of trips (79%), lack of markets (71%), and government restrictions (48%).

Seafood Dealer Survey

In Puerto Rico, there are approximately 70 active landing centers and independent dealers that market most of the production locally. Most of Puerto Rico's product is consumed domestically, with a high proportion of sales going to restaurants and hotels.

Puerto Rico: Comparison of 2020 with 2019	Top three COVID-19 related factors affecting seafood dealer/processors in Puerto Ric--o:
– 83% of affected dealers reported reduction in revenue in 2020. – Dealers reporting reductions stated that their revenue had decreased by an average of 59%. – 13% of dealers reported a reduction in employees and 76% reported no change. – On average, affected dealer processors were operating at 45% of business activity compared to 2019. – 45% of the respondents said that their business had improved since July 2020, another 45% said it had stayed the same, and the remaining 11% said it had gotten worse.	– Low seafood prices (51.2%) – Low imports (46.3%) – Reduced operations or business hours (41.5%)

NOAA Fisheries surveyed 41 seafood dealers and processors in Puerto Rico in February and March of 2021 regarding the impacts of COVID-19 related factors on their businesses in calendar year 2020. All 100% of seafood dealers/processors reported experiencing impacts due to COVID-19 related factors. Some 83% of the businesses reported that revenue decreased because of COVID-19 in 2020, while 13.2% reported an increase. Of those with reduced sales, revenue decreased by an average of 59% (31 dealers). Of those having increased sales, revenue increased an average of 50% (5 dealers). Only 5% of businesses (2 dealers) said that revenue had not changed in 2020. Some 13% of affected businesses reported a reduction of on-site employees, while 76% did not change the number of employees and 8% increased their number of employees.

Forty-six percent (46%) of affected dealer/processors closed their business operations for some period of time in 2020 due to COVID-19 related factors. Of these, 11% were closed for less than a month, 33% were closed for one to three months, and 50% were closed for more than three months. Six percent (6%) were closed indefinitely but had plans to eventually reopen. No dealer/processors in Puerto Rico reported having gone out of business. The top factors that impacted seafood dealer/processors businesses in 2020 were low seafood prices (51.2%), low imports (46.3%), and reduced operations or business hours (41.5%).

U.S. Virgin Islands (USVI)

In early 2020, many commercial and charter fishermen in USVI were still struggling to recover from the devastating impacts of hurricanes Irma and Maria that hit the area in late 2017. Some commercial fishermen were fishing on other fishermen's boats, trying to accumulate funds for boat repairs and to purchase new gear. Charter fishermen were just starting to recover from the decline in tourism related to hotel closures and infrastructure damage related to the storms.

In mid-March 2020, Governor Bryan announced the closure of USVI to all tourists after 17 individuals on the islands tested positive for COVID-19. The first closure lasted until mid-July. After a brief reopening to tourism, the USVI was once again closed down as the COVID-19 threshold was exceeded. By the end of 2020, however, the tourism industry had reportedly begun to experience a recovery even though cruise ships had not been brought back to the area. Some commercial and recreational (for-hire) fishermen described recent improvements in numbers of clientele and opportunities to generate revenue among old and new clients. Nevertheless, the cumulative effects of the recent hurricanes and COVID-19 impacts is not fully understood, including the number of fishing operations that may have permanently exited the fishery over the last few years as a result of these impacts.

In March 2021, NOAA contacted 84 commercial and for-hire fishermen on the islands of St. Thomas, St. Croix, and St. John by phone to administer a survey regarding the impacts of COVID-19 related factors on their fishing operations

during the 2020 calendar year. Although there may be some differences between islands, the following sections cover all of USVI. Due to the lack of a significant dealer/processor sector in USVI (since most catch is sold directly to consumers either in the market or directly to restaurants or stores) this sector was not included in the survey.

Commercial Fishing Survey

A total of 76 small-scale commercial fishermen responded to the survey in USVI. Of those contacted, 84% reported that COVID-19 related factors had affected their fishing operations. For 64% of the respondents affected by COVID-19 related factors, commercial fishing represented their primary source of income. Some 95% of affected commercial fishing permit holders reported reduced revenue in 2020 in comparison to 2019, with revenue declining 55% on average. Thirty percent (30%) of commercial fishermen reported reducing their number of employees; 67% had no change in number of crew/employees.

USVI: Comparison of 2020 to 2019	Top three COVID-19 related factors affecting commercial harvesters in USVI:
– 95% of affected USVI commercial fishermen reported revenue reductions in comparison to 2019. – Affected commercial fishermen reported an average decrease in revenue of 55%. – 30% of commercial fishermen reported a reduction in crew; 67% reported no change. – On average, commercial fishermen reported operating at 48% of normal fishing activity compared to the same period in 2019.	– Lack of markets/dealers/buyers/clients and/or reduced prices (76%) – Reduction in the number of trips (68%) – Government restrictions (38%)

Seventy-seven percent (77%) of affected commercial fishermen in USVI stopped fishing for some period of time in 2020. Of these, 25% stopped fishing for less than a month, 35% stopped fishing for one to three months, and 33% stopped fishing for more than three months. Eight percent (8%) had ceased operations indefinitely but had plans to eventually resume fishing.

For-Hire Operators Survey

Charter operations are not licensed so official numbers are not available regarding the total number of for-hire operations in USVI. However, estimates indicate that there may be between 30 and 40 charter operators in St. Thomas/St. John and St. Croix. Of these, only eight charter businesses responded to the survey in USVI. Due to the small sample size, the reported numbers may not be indicative of trends of the entire population. However, it is logical to assume that the disruption of normal tourism activity due to COVID-19 broadly affected for-hire operators across the territory in 2020.

Of the eight charter operators interviewed, 100% reported that COVID-19 related factors had affected their businesses. Charter/for-hire fishing represented the primary source of income for 63% of affected respondents. Sixty-three percent (63%) of affected for-hire operators reported reduced revenue in 2020 in comparison to 2019, with revenue declining on average 67%. Some 25% of affected for-hire businesses reported that they reduced their number of employees and another 75% did not change the number of employees.

USVI: Comparison of 2020 with first half of 2019	USVI: Top three COVID-19 related factors affecting the for-hire sector:
– 63% of affected for-hire operators reported revenue reductions in comparison to 2019. – Affected for-hire businesses reported an average revenue decrease of 67%. – 25% of affected for-hire operators reported a reduction in crew/employees. – On average, affected for-hire operations operated at 21% of normal fishing activity overall compared to 2019.	– Lack of markets/dealers/buyers/clients and/or reduced prices (62.5%) – Government restrictions (37.5%) – Reduced number of trips (25%)

Eighty-eight percent (88%) of affected party/charter/for-hire businesses stopped taking fishing trips for some period of time in 2020. Of these, 14% stopped taking trips for less than a month, 14% stopped taking trips for one to three months, 57% stopped taking trips for more than three months, and 14% stopped fishing indefinitely with plans to resume. We received no reports of charters going out of business.

Appendix: Economic trends in the U.S. Seafood Sector

This appendix provides a description of the approach used to seasonally adjust economic data from the U.S. seafood sector from 2015–2020 to better isolate and understand the impact of COVID-19 from other ongoing economic trends and seasonal fluctuations during 2020. Three types of economic data for the U.S. seafood sector are used: total U.S. fisheries ex-vessel revenue, the value added by processors and dealers from domestic fisheries, and the value added by processors and dealers from imported seafood. Seasonal adjustments are used to remove the predictable seasonal patterns in monthly data because certain activities (holidays, school, and fisheries) all occur at relatively the same time each year, and we want to separate these normal ups and downs of economic activity from the general underlying trends in fishing revenues and value added over the course of a couple months or quarters (BLS).[1] These seasonally adjusted data tend to smooth out a data series, making it easier to identify trends and periods of sustained expansions or contractions in economic activity within the U.S. seafood sector.

U.S. business cycles (defining whether the economy as a whole is in recession or expansion) are determined by the National Bureau of Economic Research's (NBER) Business Cycle Dating Committee. The NBER Business Cycle Dating Committee has established that the U.S. economy was in recession for the months of March and April of 2020.[2] The NBER's definition emphasizes that a recession involves a significant decline in economic activity that is spread across the economy and lasts more than a few months. This appendix is focused only on a single sector and identifies periods of sustained contraction in economic activity which we define as a decline for two consecutive quarters.

Methods

Fisheries Ex-vessel Revenue

Aggregate monthly ex-vessel revenue data from 2015–2020, gathered from each region (Alaska, Northeast, Pacific Islands, Southeast, and West Coast), were first deflated to 2020 dollars using the GDP implicit price deflator.[3] Each region's revenues were then seasonally adjusted separately using the Census Bureau's X-13ARIMA-SEATS software program and region-specific regARIMA models.[4] Model selection was determined through X-13ARIMA-SEATS automatic model selection procedure which closely follows the TRAMO method of Gomez and Maravall (1998). Variable selection was determined through minimizing the F-corrected AIC for models with non-significant seasonal or monthly residual patterns, and all model estimates and descriptive statistics for the seasonal adjustment to each region's ex-vessel revenue data are presented in Table 9.1.

1 https://www.bls.gov/opub/hom/topic/seasonal-adjustment.htm
2 https://www.nber.org/news/business-cycle-dating-committee-announcement-july-19-2021
3 NIPA Table 1.1.9: https://apps.bea.gov/iTable/iTableHtml.cfm?reqid=19&step=3&isuri=1&1921=survey&1903=13
4 https://www.census.gov/data/software/x13as.html

Table 9.1. Final regARIMA model specification for fisheries ex-vessel revenue.

Category	regARIMA Coefficients	Alaska Model	New England Model	Southeast Model	West Coast Model	Pacific Islands Model
General Coefficients	Constant	-0.0701***	N/A	-0.0591	-0.0949***	N/A
	Weekday	-0.0302***	N/A	N/A	-0.0045	N/A
	Length of Month	N/A	-0.0438	N/A	N/A	N/A
	Easter (1)	N/A	-0.0476	N/A	N/A	N/A
Seasonal AR	Lag 12	N/A	N/A	N/A	N/A	-0.5429***
Nonseasonal AR	Lag 1	0.5042***	0.3755***	N/A	N/A	N/A
Seasonal MA	Lag 12	0.5873***	0.5393***	0.9994***	-0.9987***	N/A
Nonseasonal MA	Lag 1	N/A	N/A	-0.6025***	N/A	0.7363***
Descriptive statistics	Obs	72	72	72	72	72
	Transformation	Log(y)	Log(y)	Log(y)	Log(y)	Log(y)
	X11	multiplicitive	multiplicitive	multiplicitive	multiplicitive	multiplicitive
	ARIMA specification	(1,0,0)(0,1,1)	(1,0,0)(0,1,1)	(0,0,1)(0,1,1)	(0,0,0)(0,1,1)	(0,1,1)(1,1,0)
	AICC	540.4124	520.8837	449.48	397.7034	166.8521
Outliers*	AO2015.Feb	N/A	-.4699***	N/A	N/A	N/A
	AO2015.Dec	N/A	N/A	N/A	-1.4567***	N/A
	LS2016.Jan	N/A	N/A	N/A	0.2393***	N/A
	TC2017.Oct	N/A	N/A	N/A	0.4381***	N/A
	AO2018.Jan	N/A	N/A	N/A	-1.0206***	N/A
	TC2018.Feb	N/A	N/A	N/A	0.5975***	N/A
	AO2018.Nov	N/A	N/A	N/A	0.3101***	N/A
	AO2019.Dec	-.5311***	N/A	N/A	0.5154***	N/A
	TC2020.Mar	N/A	N/A	N/A	N/A	-0.5672***
	TC2020.Apr	N/A	-.5679***	N/A	N/A	N/A

**Note: "AO" denotes an additive outlier, "LS" denotes a level shift outlier, and "TC" denotes a temporary change outlier.*

The seasonally adjusted ex-vessel revenues generated from the above procedure were then aggregated to the quarterly level across all five regions of the United States (Figure 9.1).[5] A comparison of quarterly trends was then conducted to identify periods of sustained contraction in the seafood harvesting sector.

Value Added from Domestic Landings and Imported Seafood

The value added by processors and dealers of domestically landed seafood is separated from the value added from imported seafood to allow for separate trends in volume and value as well as changes in species and product mixes. The value added multiplier for seafood processors and dealers for both domestically landed and imported seafood is calculated using Input-Output (IO) multipliers from the FEUS IO model (Richardson)[6] and equals 0.64 of imported seafood value ("value added from imports") and 0.72 of domestic ex-vessel revenue ("value added from domestic landings"). The same model and variable selection approaches were taken for the value added from imports as above; model estimates and descriptive statistics for the import model are shown in Table 9.2. Note that the domestic value added is not again seasonally adjusted since it is a linear function of an already seasonally adjusted time series.

5 Individual trends and seasonal adjustments by region will follow in a future publication.

6 Note that seasonally adjusted value added from imports increased by 0.31% in Q1 of 2020, but was not determined to be a substantial enough increase to offset the declines in other nearby quarters to be considered an end of the contractionary period.

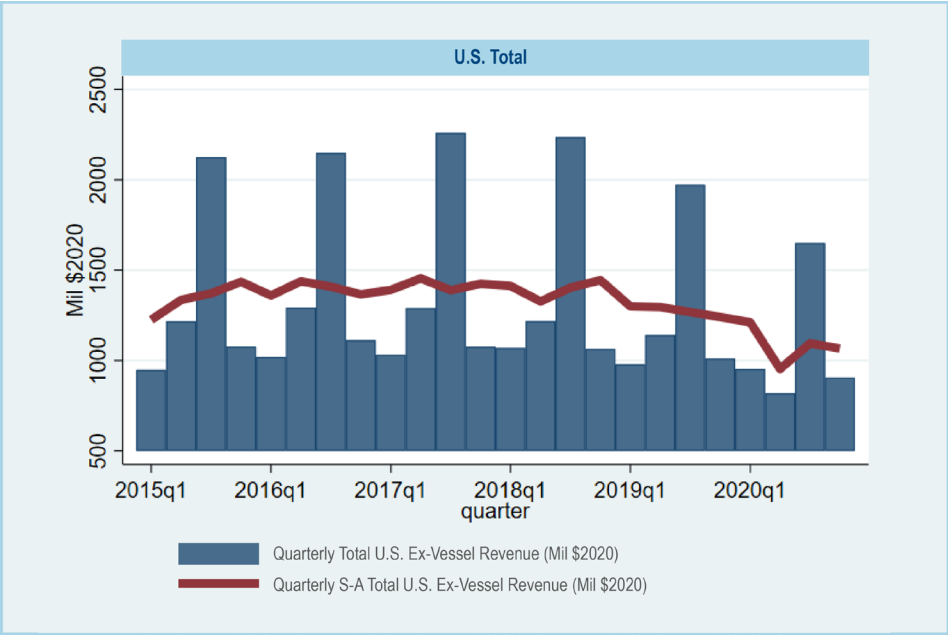


Figure 9.1. Quarterly U.S. ex-vessel revenue and seasonally adjusted ex-vessel revenue.

Table 9.2. Final regARIMA model specification for imported seafood value.

Category	regARIMA Coefficients	Imported Seafood Value Model
General Coefficients	Weekday	-0.2769
	Leap Year	143.0328***
Seasonal MA	Lag 12	0.5985***
Nonseasonal MA	Lag 1	0.5851***
Descriptive statistics	Obs	72
	Transformation	none
	X11 Mode	additive
	ARIMA specification	(0,1,1)(0,1,1)
	AICC	697.7877
Outliers*	A02015.May	-461.2623***
	LS2015.July	-305.5016***
	AO2020.May	-376.7742***

**Note: "AO" denotes an additive outlier, "LS" denotes a level shift outlier, and "TC" denotes a temporary change outlier.*

The seasonally adjusted domestic ex-vessel revenue and value added from domestic landings are shown in the left panel of Figure 9.2, while seasonally adjusted import value and value added from imported seafood are in the right panel. Imported seafood constitutes a large proportion of domestic consumption, and similarly, the value added from imported seafood is larger than that from the seafood that is landed domestically. The quarterly trends in value added from domestic landings and from imported seafood are then computed to identify periods of sustained contraction for the dealers and processors of domestically landed seafood as well as those that deal and process imported seafood.

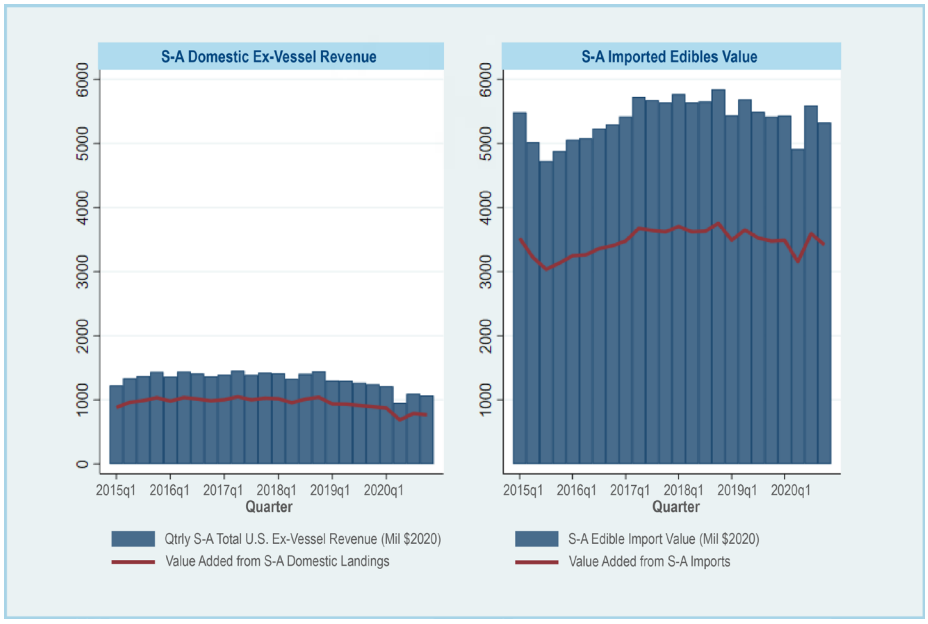


Figure 9.2. Seasonally adjusted quarterly value added from domestic landings and imported seafood.

Results

The top panel of Figure 9.3 shows total U.S. quarterly seasonally adjusted ex-vessel revenues from 2015–2020 and documents three separate periods of sustained contraction in ex-vessel revenues of at least two consecutive quarters: 2016 Q3–Q4; 2018 Q1–Q2; and 2019 Q1–2020 Q2. While there is evidence of several sustained contractions in fisheries ex-vessel revenues, the longest and most significant occurred over five quarters from the first quarter of 2019 through the second quarter of 2020. Seasonally adjusted quarterly total U.S. ex-vessel revenue fell by 27% ($346 million) over this period, from a peak of $1.3 billion to a low of $953 million (Figure 9.3). The lower panel of Figure 9.3 shows the percentage change in total U.S. ex-vessel revenues, which experienced five consecutive quarters of negative growth from Q1 of 2019 through Q2 of 2020, but did experience a somewhat substantial rebound in Q3 of 2020 yet was unable to sustain those gains into Q4 of 2020.

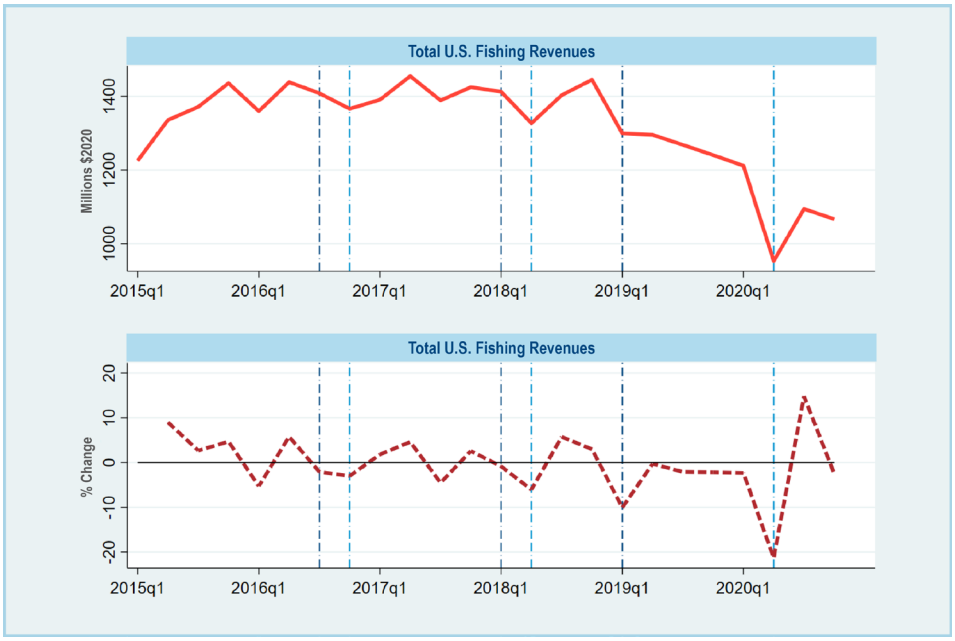


Figure 9.3. Seasonally adjusted ex-vessel revenue from domestic landings.

As mentioned above, the value added from domestic landings is a linear function of total ex-vessel revenue and thus has the same trends and sustained five quarter contraction from Q1 of 2019 through Q2 of 2020 as was experienced in ex-vessel revenues. The value added from domestic landings is currently estimated to have sustained

a similar reduction of 27% ($249 million) over this period, from a peak of $935 million to a low of $686 million (Figure 9.4). Further analysis will be required to separate the trends in domestic landings of seafood harvesters from the value added created by domestic dealers and processors (which can vary based on the relative share of species landed, product forms created, and changes in demand).

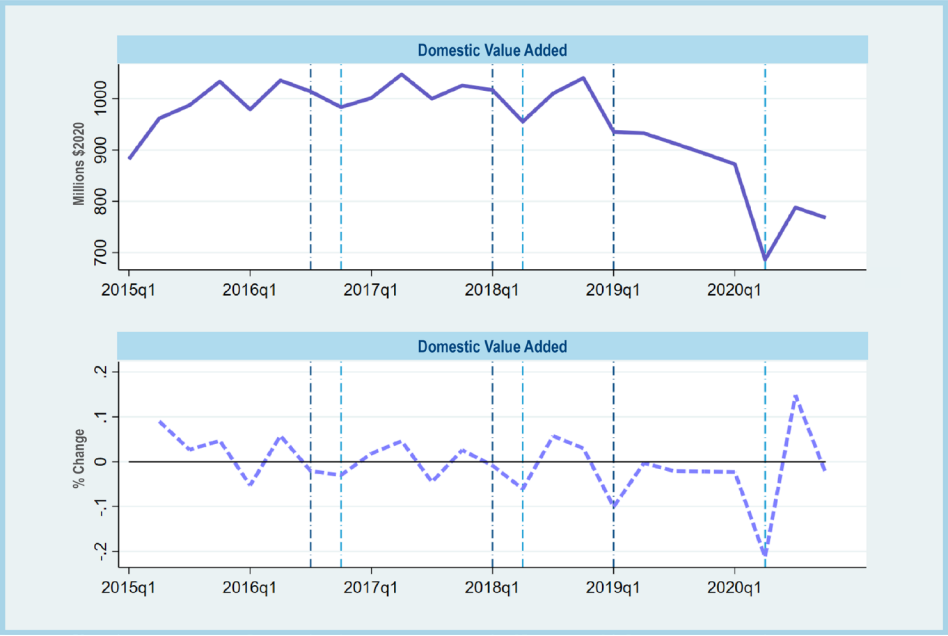


Figure 9.4. **Seasonally adjusted value added from domestic landings.**

The dealers and processors of imported seafood experienced a slightly different impact than the producers of domestic landed seafood from their sustained contraction from Q3 of 2019 through Q2 of 2020 (Figure 9.5). They experienced a shorter and smaller percentage decline in value over this period with import value added falling by 10.54% ($372 million). However, given the larger scale of this sector, they experienced a larger absolute decline in value of $372 million compared with the $249 million loss from the domestic value added sector (from 2019 Q1–2020 Q2) and $346 million from the domestic harvesting sector (from 2019 Q1–2020 Q2). And while the dealers and processors of imported seafood also experienced a similar rebound in Q3 of 2020, it was also not sustained through Q4 of 2020.

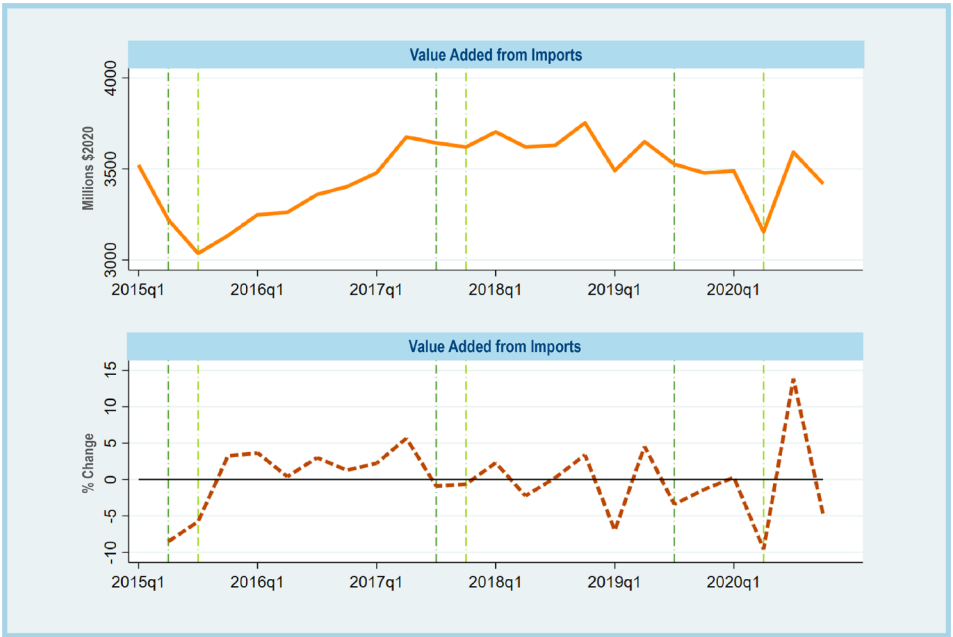


Figure 9.5. **Seasonally adjusted value added from imported seafood.**

Discussion and Conclusion

To our knowledge, this is the first attempt by the National Marine Fisheries Service to present seasonally adjusted U.S. fisheries ex-vessel revenue and value added from dealers and processors. As such, there are a number of useful insights generated from this analysis that have been heretofore unexamined. As shown in Figure 9.1, fisheries ex-vessel revenues in the U.S. follow a fairly consistent seasonal pattern over the course of a year and cyclical patterns over several years, and these patterns can be removed from the data series by seasonally adjusting the data to more accurately assess changes in economic activity in the U.S. seafood sector. Once these predictable seasonal impacts are accounted for, sustained downturns are evident between Q1 of 2019 and Q2 of 2020 for the ex-vessel sector and domestic value added

sector and between Q2 of 2019 and Q2 of 2020 for the dealers and processors of imported seafood. These specific trends are somewhat masked by the unadjusted data due to the high degree of seasonal variability in seafood landings as well as when it is imported.

These results also highlight the fact that the U.S. seafood sector was experiencing significant weakness through much of 2019 that was further exacerbated by the COVID-19 pandemic in late Q1 of 2020 and had a sustained impact on this sector through Q2 of 2020. While both domestic seafood harvesters and processors as well as those that deal and process imported seafood experienced an increase in value in Q3 of 2020, the value declined again in Q4 of 2020. After seasonal adjustment, these values were actually below those of Q4 of 2019, declining by 14% (-$174 million ex-vessel and -$125 million in domestic value added) for domestic harvesters and dealers/processors and by 2% (-$92 million in value added) for the dealers and processors of imported seafood. However, it is worth noting that these results do not address changes that occurred at the retail level during the COVID-19 pandemic or through increasing or decreasing seafood inventory held in cold storage over this period. Both of these factors can have an impact on the bottom line of many seafood businesses as well as the sector as a whole, but currently data are not available or of sufficient quality to adequately address these issues.

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