

MARKET-BASED INCENTIVES FOR RESPONSIBLE FISHING

*Market study on local consumption
of finfish in Belize*



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Inter-American Development Bank Project (BL-T1123)

Oceana, Inc (Executing Agency)

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This market report builds on [the first market report](#) done for Ambergris Caye and Caye Caulker mapping finfish consumption of mainland coastal communities in each district.

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Executive Summary

The fishing industry in Belize is mainly focused on the capture and export of the spiny lobster and queen conch, but also includes finfish species such as groupers, snappers, jacks, hogfish, king mackerel, and the great barracuda (FAO, 2021). With the finfish fishery valued at \$21.3 million in 2019, the sector supports the livelihoods of more than 2,500 fishers and indirectly benefits more than 15,000 Belizeans, whilst providing local consumption of finfish, including species targeted for export and those of less commercial value - such as the grunts, snooks, and porgies (FAO, 2021; UNCTAD, 2021). However, the finfish fishery lacks a structured management regime, which has affected the sustainable use and development of the fishery. Therefore, it is imperative that measures are set in place to alleviate pressures on the resource and trade diversification, as well as expand livelihood opportunities (UNCTAD, 2021).

In 2016, Oceana in Belize collaborated with a host of NGOs and local fishers to launch the Fish Right, Eat Right (FRER) program in Belize. The FRER program aimed to curb illegal fishing, support sustainable fishing practices, and promote the responsible sourcing and consumption of seafood by certifying fishers and highlighting establishments that engage with the program. The program also encourages consumers to consider the importance of sustainability in the supply chain. Nonetheless, the program faces challenges in sourcing sustainably caught seafood as restaurateurs rely on a small network of local fishermen to meet their demands, compromising the system. The program would benefit immensely from a virtual marketplace enabling the communication between fishermen and restaurants by showing country-wide seafood availability in real time (Oceana, 2020).

The present study aims to support the rollout of a virtual marketplace for participants in Belize's Fish Right, Eat Right program by providing baseline studies for fishing communities in the Corozal, Belize, Stann Creek, and Toledo Districts. Likewise, a market study on the local consumption of finfish was conducted by implementing two quantitative surveys directed at (1) fishermen and (2) restaurant owners or managers, where key harvesting data was collected - such as location of fish catch - and a finfish demand map was drafted. Additionally, the study compared its results with those from the Market-Based Incentives for Responsible Fishing: Market study on local consumption of finfish in Caye Caulker and San Pedro study conducted in the summer of 2020.

The study was unfortunately restricted by several limitations, including the lack of a representative sample size, the collection of unstandardized data, and the use of a non-probabilistic sampling method for the selection of participating restaurants, all of which were mainly due to time constraints. Most importantly, the study compares districts categorized as non-tourist areas with two cayes (islands), which are both major tourist destinations in Belize. These challenges limit comparisons between both market studies, given that the methodology differs significantly in each. Notwithstanding, the data was analyzed as effectively as possible and comparisons between the two studies were drawn providing a general overview of the finfish fishery and its local market consumption in Belize.

The study results establish the snapper as the preferred finfish to purchase by restaurateurs, as well as the most commonly sold and requested finfish species in Belize. Other species important to the local consumption of finfish in the country include the hogfish and grouper. Belizean fishers capture these finfish, and others, using marine protected areas under all fishing areas delineated by

the Belize Fisheries Department in the Managed Access Program. Restaurateurs purchase both whole and finfish fillet, and prefer the finfish to weigh an average of 1lb for either finfish cut. According to the fishers surveyed, the average price per pound of whole finfish ranges from \$2.67 to \$8.00 a pound, whilst the finfish fillet averages between \$10.00 to \$14.00 per pound. This has led restaurateurs to price their finfish meals between \$6 to \$60 across the year, with fluctuations in the price of finfish registered in Easter, lobster and conch open seasons, and the peak tourism season.

The most salient recommendation for this study is the need to conduct further and more comprehensive studies of the local consumption of finfish in Belize, as the study presents crucial limitations in the sampling methods and data collection. Likewise, further market studies on local finfish consumption need to consider the perspectives of other stakeholders, including the general public (local consumer), fisher associations, seafood suppliers, non-governmental organizations, and government entities.

Methodology

A market survey for finfish in Belize was attained through the implementation of two nationwide quantitative surveys directed at (1) fishermen and (2) restaurant owners or managers (Annex 1, 2). The communities surveyed were Corozal Town, Copper Bank, and Sarteneja from the Corozal District; Orange Walk Town in the Orange Walk District; Belize City in the Belize District; Esperanza Village in the Cayo District; Dangriga, Hopkins, Independence, and Placencia in the Stann Creek District; and Punta Gorda and Hopeville in the Toledo District. The surveys utilized for this study were taken from the Market-Based Incentives for Responsible Fishing: Market study on local consumption of finfish in Caye Caulker and San Pedro conducted in the summer of 2020. The surveys focused on demographics, finfish preference, finfish catch, and awareness of Belize's fisheries regulations.

A non-probability sampling method was used by Oceana Belize to select participating restaurants. Restaurants were previously identified through an exhaustive online search, on the ground scouting, and previous knowledge/relationships with restaurateurs. During the surveys, restaurateurs were asked to provide the contact information for their finfish supplier who were later contacted for participation in the fisher survey - a non-probability sampling technique known as snowball sampling method. The participating fishers were also selected through Oceana's Gillnet Buyback Beneficiary Program in the case of Belize City and the Stann Creek District; likewise, fishers at the Conch Shell Bay fish market in Belize City were also surveyed. A seafood supplier (meat shop) in Belize City was also selected to partake in the restaurant surveys as a frequent purchaser of finfish

The survey team consisted of 11 individuals, 4 Oceana Field Representatives and 7 Oceana Wavemakers (volunteers). Due to the ongoing COVID-19 restrictions, as well as Oceana's organizational policy, surveys with restaurateurs and fishers were mainly conducted via telephone, however, 35 interviews were conducted in person with the convenience of the interviewee in mind (e.g., ease of communication). Restaurant surveys were also emailed to the restaurant owners and re-submitted to Oceana at a later date. The surveys were executed during a six-week period which started in July 2021 and were conducted in an average of 30 minutes, attempting to avoid survey fatigue and be sensitive to interviewees.

Study limitations

Several factors limited the number of individuals available for an interview - whether participants were fishermen or restaurateurs. These factors are detailed below:

- The time frame for conducting surveys was narrow, where fisher surveys were carried out at the beginning of the lobster season (1 July 2021). This unfortunately meant that many fishermen were unavailable for an interview as they were out harvesting lobster for days at a time, especially in the case of fishers from the Corozal District.
- A few fishers from the southern communities of Placencia Village and the Toledo District requested an incentive to participate in the survey. Providing participants with incentives was not initially considered in the methodology and therefore not offered.
- A few fishers declined participation or stopped answering phone calls from Oceana's survey team because of misinformation concerning the organization's continual advocacy for the use of sustainable fishing gear in Belize.

- The survey team felt intimidated by fishers at the Conch Shell Bay fish market in Belize City, which led to only two individuals being interviewed during the visit.
- Scheduling issues, time constraints, and lapse in requesting responses for interviews were among the limiting factors for restaurateur participation. Other restaurateurs were unable to complete the surveys due to time constraints or the manager/owner being out of town during the survey timeframe (e.g., restaurants in Belize City: Lucca, Celebrity, and Midtown).
- The COVID-19 pandemic also contributed to several restaurants closing temporarily or permanently, especially in the Corozal (e.g., Sarteneja Inn), Belize (e.g., Calypso), and Toledo Districts (e.g., Gomier's), where 9 restaurateurs were unable to partake in the survey. Likewise, 1 restaurateur from the Corozal District was not interviewed as the restaurant no longer served finfish meals in response to the decrease in tourism resulting from the pandemic.
- The Statutory Instrument No. 46 of 2020 issued on 8 April 2020 by the Government of Belize, defined commercial fishing as an essential service and fishers as essential workers as a response to the state of emergency during the COVID-19 pandemic (GOB, 2020). However, several fishers stated having to reduce their fishing efforts or stop fishing completely due to the pandemic - thus limiting the number of survey participants. A total of 7 fishers reported no longer fishing as a result of COVID-19; 1 fisher from the Corozal District and 6 fishers from the Stann Creek District.

Results

Characterization of Belize's fishermen

A total of 28 fishers were interviewed; 7 fishers were from the Corozal District, 5 from Belize, 1 from Cayo¹, 7 from Stann Creek, and 8 from the Toledo District. The age of the all-male participants ranged from 19 to 76 (mean 43.1, median 43) and their years of fishing experience ranged from 5 to 56 years (mean 26.5, median 25). The level of education amongst the fishers ranged from none (5) to tertiary (2) level, with 15 fishers having a primary level education and 4 fishers a secondary; 2 fishers preferred to not respond. Twenty-two fishers responded working full-time as fishermen, whilst 5 worked part-time and one gave no answer. Their fishing schedule varied from 18 fishers working weekly, 6 fishers bi-weekly, and 4 fishers working at random times (e.g., weekends and no set time).

The vessel type used by most fishers was the skiff with 19 fishers reporting it as a means of transportation. This was followed by 6 fishers using sailboats, 2 fishers using a combination of a skiff and camps/traps off an island, and only 1 fisher reporting camps/traps off an island. All fishers who reported using a sailboat as a vessel were from the Corozal District.

When fishers were asked about belonging to an association, the majority of 9 fishers stated they belonged to a cooperative and 5 fishers belonged to a fishing association - 6 fishers belonged to neither and 8 fishers did not provide an answer (figure 1). Cooperatives mentioned by a few fishers were the Northern Fishermen Cooperative Society Ltd. and National Fishermen Cooperative Society

¹ The fisher from the Cayo District was surveyed in the Stann Creek District. In the market study section of the results, the data provided by this fisher is analyzed as part of the Stann Creek District as this is where he was surveyed.

Ltd., whilst the associations mentioned were the Wabafu Fishermen Association and Hopkins Fishermen Association.

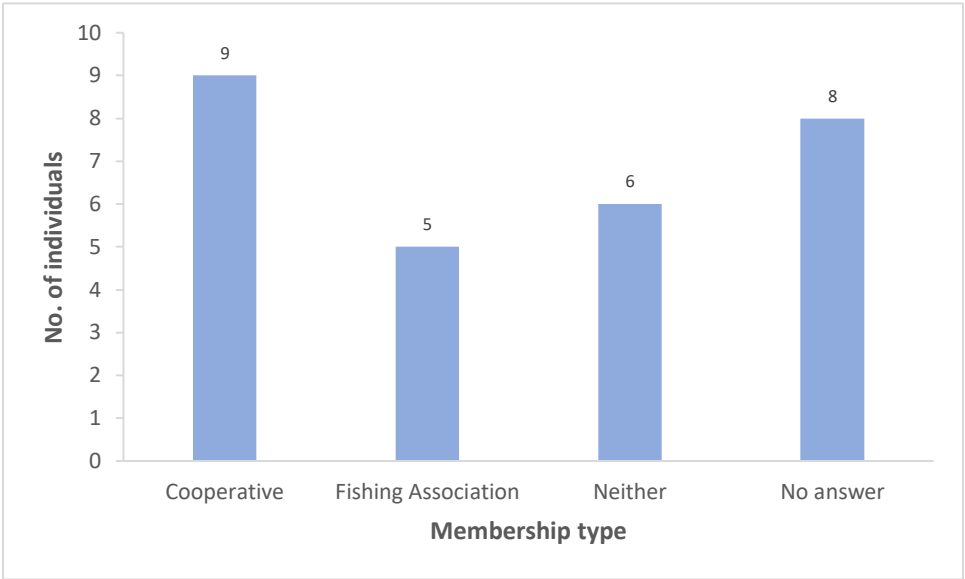


Figure 1. Belizean fishers’ affiliations with different associations.

When asked about fishing gear used, fishers from the Corozal District reported using the greatest variety of fishing gear - fish traps, spear guns, hook line, deep sea, and other (sling). Conversely, fishers from the Toledo District only reported using two fishing gear types, the spear gun and the hook line. The Cayo and Stann Creek Districts both used the same 3 gear types, spear gun, hook line, and deep sea, whilst the Belize District used 4 gear types, spear gun, hook line, deep sea, and other (lobster traps). Overall, the spear gun and hook line were the two gear types used in all districts, whilst fish traps were only used in the Corozal District (figure 2). Fishers in all districts reported using at least two different types of fishing gear.

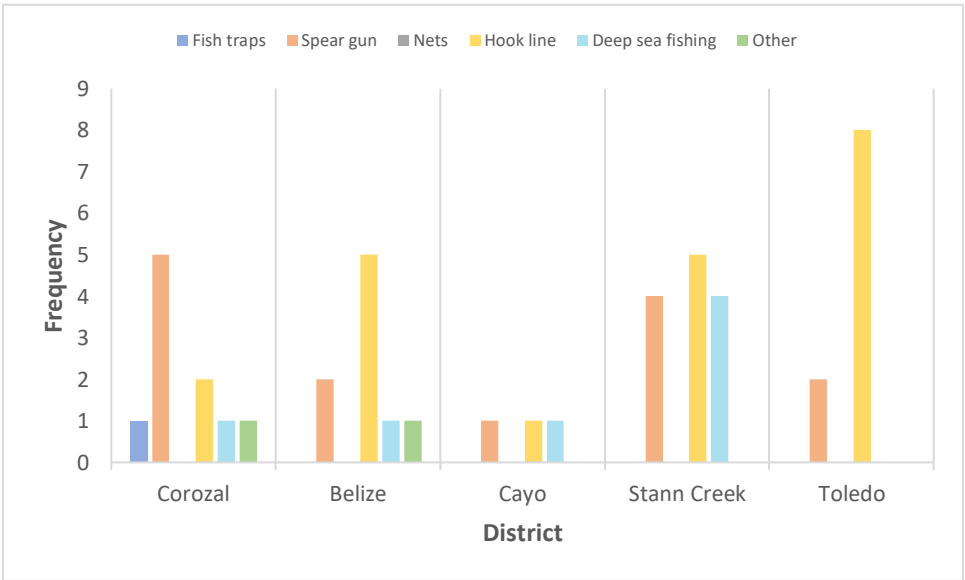


Figure 2. Types of fishing gear used by fishers from the Corozal, Belize, Cayo, Stann Creek and Toledo Districts in Belize.

Fishers were also asked to state the depth at which they obtained their catch. The depth range considered for this study went from 5ft to +106ft. The depth range used by most fishers was 36-45ft, with individuals from Corozal, Cayo, and the Toledo Districts. This was followed by the +106ft range, with fishers from Corozal, Belize, and the Stann Creek Districts. The ranges 16-25ft, 46-55ft, and 89-95ft were only used by fishers from the Corozal District, with 1, 3, and 2 fishers respectively. The 5-15ft was the only range reported as not used by fishers (figure 3). Additionally, fishers in the Cayo and the Stann Creek Districts reported using only one depth range. Meanwhile, the Belize and Toledo Districts reported using one or two depth ranges, whilst fishers from the Corozal District used from 1 to 4 different ranges.

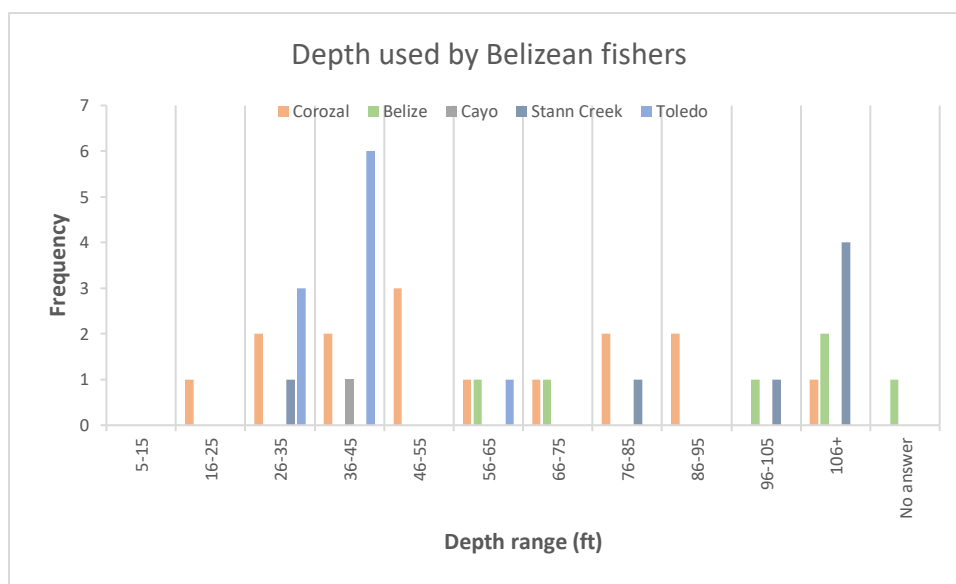


Figure 3. The different depth ranges used by Belizean fishermen whilst fishing for finfish.

The respondents used all nine fishing areas described by the Belize Fisheries Department's Managed Access Program (Annex 3), where area 3 was the most used with 17 fishers, followed by area 4 with 15 fishers, and area 8 and 9, each with 14 fishers. The least used area was area 1 with 3 fishers. Area 3 was also the only area used by fishers from all districts surveyed (figure 4).

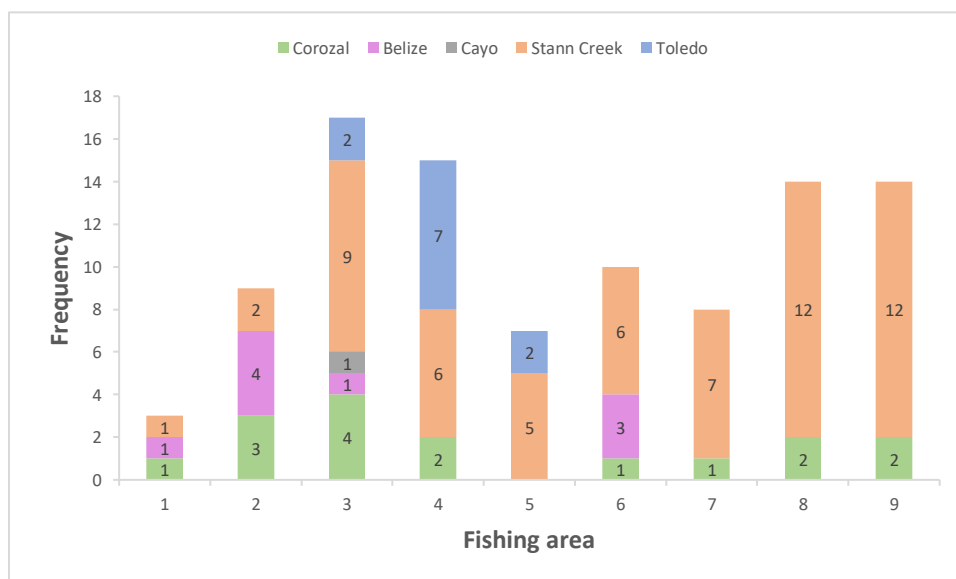


Figure 4. The Managed Access areas used by Belizean fishers.

When fishers were asked if they were involved in the extraction of another fishery species, 22 fishers said yes, 1 said no, and 5 fishers preferred not to answer. Of the 22 fishers that said yes to catching another fishery species, all individuals reported extracting lobster or a combination of lobster and another specie(s); however, only 3 fishers only captured lobster. A majority of 12 fishers captured lobster and conch, followed by 6 fishers capturing a combination of lobster, conch, and crab. Only 1 fisher captured a combination of lobster, conch, sea cucumber, crabs, and whelks (figure 5).

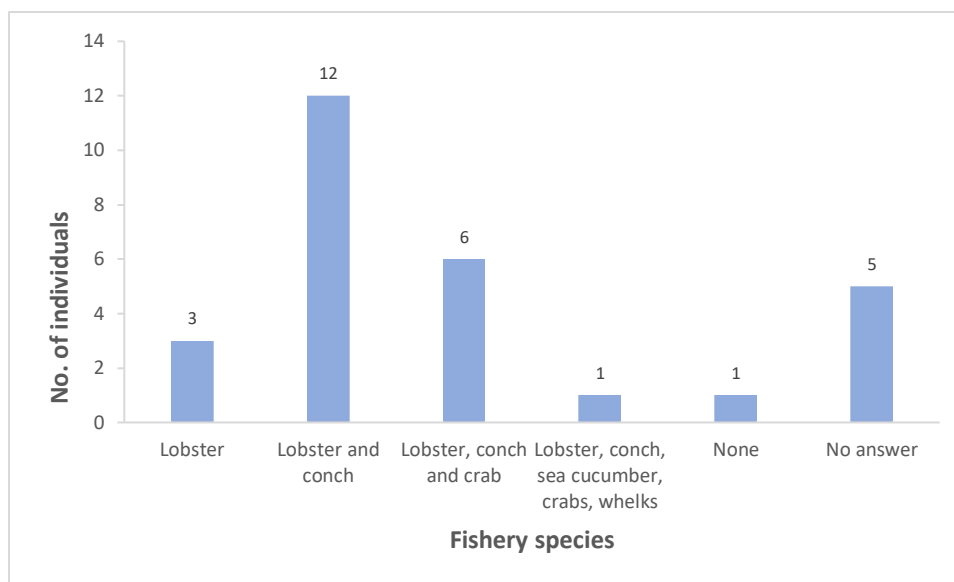


Figure 5. Other fishery species extracted by the Belizean fisher.

Finfish demand mapping

The demand of finfish in Belize was mapped and includes information on districts where fishers reside, fishing areas, landing sites, and point of sale used by fishers (e.g., communities, markets, restaurants). The mapping of the finfish demand can be observed in table 1, where:

- Area 3 of the Managed Access Program was the only area used by fishers from all districts.
- Belize City was the most frequently used landing site with fishers hailing from 3 districts - Corozal, Belize, and Stann Creek Districts.
- Fishers from the Stann Creek District reported the most landing sites in 7 communities, including the tourist destinations of San Pedro and Caye Caulker, as well as the most populated community in the country, Belize City.
- Fishers from all districts, except the Cayo District, provided fish to their communities or the general public.
- Fishers from the Belize and Toledo Districts were the only fishers who supplied fish to a market.
- Fishers from the Stann Creek District were the only fishers who provided fish to resorts.
- Restaurants across the country of Belize were supplied with fish by fishers from the Corozal, Belize, and Toledo Districts.
- Vendors and wholesalers were supplied by fishers from the Corozal, Cayo, and Stann Creek Districts.

Table 1. Mapping of the finfish demand in Belize.

District	Fishing areas used by fishers	Landing sites	Point of sale			
			Communities	Market	Restaurant / resort	Other
Corozal	Area 1, 2, 3, 4, 6, 7, 8, 9	<ul style="list-style-type: none"> • Placencia • Belize City • Mango Creek 			Restaurants	<ul style="list-style-type: none"> • Vendors / Wholesale buyer • Cooperative • General public
Belize	Area 1, 2, 3, 6	Belize City		Conch Shell Bay	<ul style="list-style-type: none"> • Bird's Isle • Midtown • Other restaurants 	<ul style="list-style-type: none"> • Cooperative • People who request fish • Martins
Cayo	Area 3	Dangriga				Wholesale buyer
Stann Creek	Area 1, 2, 3, 4, 5, 6, 7, 8, 9	<ul style="list-style-type: none"> • Dangriga • Hopkins (southside) • Independence • San Pedro • Caye Caulker • Belize City • Seine Bight 	<ul style="list-style-type: none"> • Locals in Dangriga and Hopkins • Villages and out of district 		<ul style="list-style-type: none"> • Pelican Beach Resort • Resorts in Hopkins 	Wholesale
Toledo	Area 3, 4, 5	Punta Gorda	<ul style="list-style-type: none"> • Cattle Landing • Indianville • Hopeville 	Market	Restaurants	<ul style="list-style-type: none"> • Loyal customers • Home consumption

Characterization of Belize's food service industry

A total of 36 restaurateurs were interviewed; 6 restaurateurs were from the Corozal District, 1 from Orange Walk², 7 from Belize, 17 from Stann Creek, and 5 from the Toledo District. Nine of the 36 restaurateurs surveyed were owners/managers of a restaurant associated with a resort or hotel. The business years of the restaurants ranged from 1 to 50 years (mean 14.1, median 12). Restaurateurs reported that in current times restaurant staff ranged from 2 to 162 staff (mean 18.7, median 7), whilst the restaurant capacity ranged from 10 to 150 individuals (mean 55.6, median 45).

Restaurateurs were also asked about the average customers they received per week at their establishment, pre-COVID-19 and the current status. Of the 36 interviewees, only 22 were able to provide an answer for both cases; the other 14 interviewees either provided responses only for the current status, were unable to give an average or provided no answer. The range for the average customer received per week went from 88 to 1600 customers pre-COVID-19 (mean 405, median 300). Adversely, the range of customers received per week during current times went from 5 to 800 customers (mean 241, median 213).

Market study on local finfish consumption

The finfish fishery of Belize

Fishers were asked to state the most common finfish species they caught, sold, and the most requested pre-COVID-19 and in the current status of the COVID-19 pandemic.

Figure X illustrates the most common finfish species caught by Belizean fishers in pre-COVID-19 and in current COVID-19 times, where 13 finfish species were reported as commonly caught. The most commonly caught finfish during pre-COVID-19 times was the snapper reported by 27 fishers (96.43%), followed by the barracuda reported by 11 fishers (39.28%), and the grouper and the hogfish, each reported by 7 fishers (25%). Conversely, the least commonly caught finfish species were the hamlet, rockfish, and lionfish, each reported by 1 fisher (3.6%).

In the current status of COVID-19, the snapper remained the most commonly caught finfish reported by 26 fishers (92.86%); however, it demonstrates a slight decrease of 1 individual from pre-COVID-19 times. The second commonly caught finfish remained as the barracuda reported by 11 fishers (39.28%) - unchanging from pre-COVID-19 - and followed by the grunt and jack, each reported by 5 fishers (17.86%). The least commonly caught finfish species remained similar to the pre-COVID-19 times, with the hamlet and rockfish each reported by 1 fisher (3.6%), whilst the lionfish increased by 1 individual (figure 6).

² As only one restaurateur completed the survey for this district, the data was analyzed as part of the Corozal District.

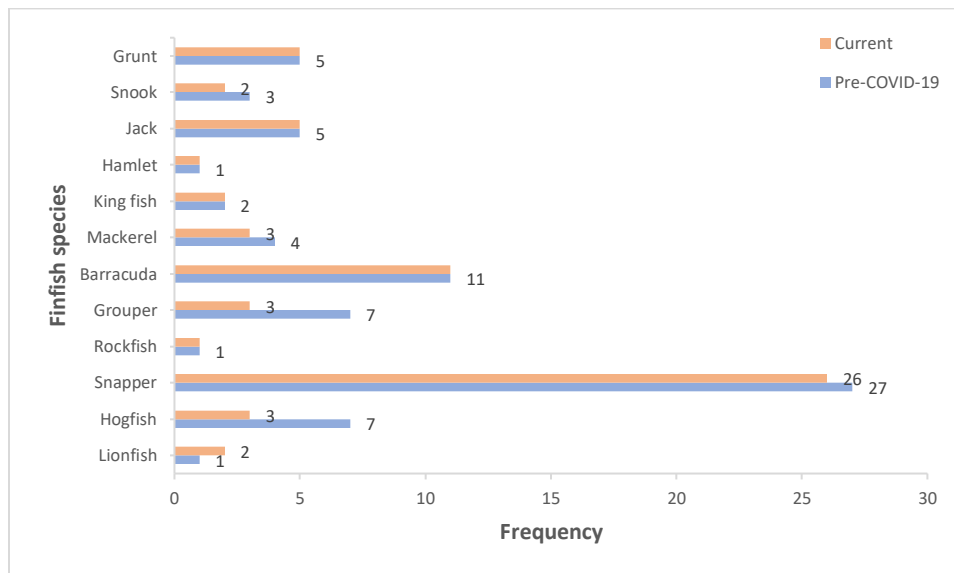


Figure 6. Common finfish species caught by Belizean fishers in pre- and current COVID-19 times.

When asked about the common finfish species sold in pre-COVID-19 times, fishers mentioned a total of 6 species. Twenty-three (23) fishers (82.14%) reported the snapper as the most common finfish sold, followed by a significant gap with the hogfish as the second commonly sold and reported by 6 fishers (21.43%). The hogfish was closely followed by the barracuda, reported by 4 fishers (14.26%). The least commonly sold finfish species were the snook and jack, each reported by 1 fisher (3.6%), and the grunt reported by 2 fishers (7.14%).

In current COVID-19 times, fishers mentioned 7 finfish species as commonly sold with the snapper remaining as the most commonly sold finfish species in Belize, with no difference reported when compared to pre-COVID-19 times. The hogfish also remained as the second most common finfish species sold; however, a slight decrease was observed whilst comparing to pre-COVID-19 times with 4 fishers (14.26%) reporting it as commonly sold as opposed to 6 fishers (21.43%) in pre-COVID-19. The barracuda and grunt closely followed the hogfish, each reported by 2 fishers (7.14%). The least commonly sold finfish in current COVID-19 times remained the snook and jack, and were joined by the lionfish, each reported by 1 fisher (3.6%). Additionally, the lionfish is a newly reported species for the current status of COVID-19 (figure 7).

Lastly, fishers were asked to report the most commonly requested finfish species pre-COVID-19, where 5 species were listed by fishers. The snapper was reported by 23 fishers (82.14%) as the most commonly requested finfish and followed with a significant gap by the hogfish with 6 fishers (21.43%). The least common requested finfish were the snook and grouper, each with 1 fisher (3.6%), followed by the barracuda with 2 fishers (7.14%).

In the current status of COVID-19, 4 species were listed by fishers as commonly requested: the snapper with 23 fishers (82.14%), the hogfish with 5 fishers (17.86%), the barracuda with 2 fishers (7.14%), and the snook with 1 fisher (3.6%). The hogfish presented a slight decrease from pre-COVID-19 times of 1 individual (3.6%), while the grouper was no longer requested during the current status (figure 8).

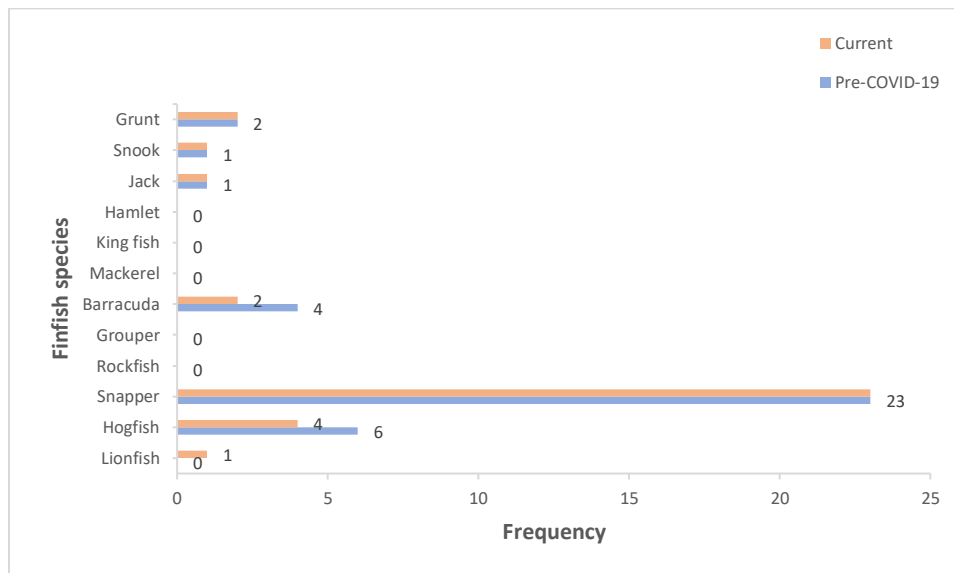


Figure 7. Common finfish species sold by Belizean fishers in pre- and current COVID-19 times.

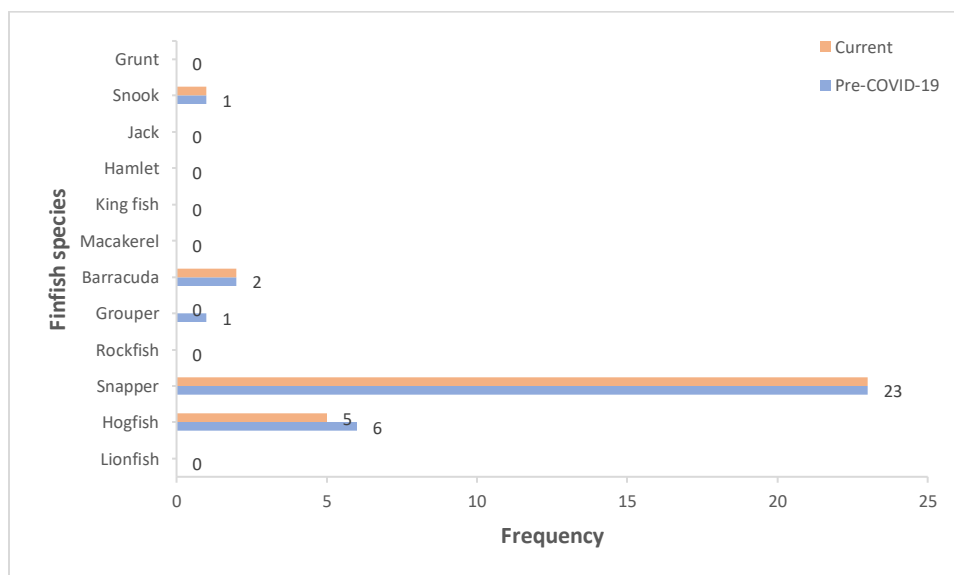


Figure 8. Common finfish species requested in Belize pre- and current COVID-19 times.

Fishers were also asked to quantify their average catch. Unfortunately, data was not standardized whilst being collected and fishers' responses included the quantity of finfish per day or trip (number of days varied and were usually not specified), sometimes stating the catch as whole or finfish fillet or neither cut, and in other instances providing species or not. Consequently, a general analysis was made of the data which allows for a broad understanding of the average catch of finfish by fishers. Fishers reported average catches of 800lb of combined fish or 500lb per trip; 350lb of whole finfish per trip and 150lb of fillet per trip; 250lb of combined finfish per day and 50lb per day on a 'bad day'; and 150 to 200lb total catch per trip, which averaged 10 days. According to the fishers surveyed, a fishing trip can be either 1, 3 or 10 days.

Fishers were asked about the price per pound of whole and finfish fillet in pre-COVID-19 times and in the current COVID-19 times, where 32.14% of fishers (9 of 28 individuals) provided an answer. The average price per pound of whole finfish ranged from \$2.67 to \$8.00 a pound (mean \$5.57,

median \$5.00) in pre-COVID-19 times. Although the range was maintained in the current COVID-19 times, the value of the mean and median price per pound increased by \$0.12 and \$1.00 respectively. Regarding the price per pound of the finfish fillet, the average price ranged between \$10.00 to \$14.00 per pound (mean \$12.31, median \$12.25) pre-COVID-19. Similarly to the whole finfish, the fillet only reported a difference in the mean and median in COVID-19 times, with an increase of \$0.75 and \$1.75 respectively (table 2).

Table 2. Price per pound (lb) of whole and fillet finfish sold by fishers in Belize in pre- and current COVID-19 times.

Finfish cut	Average price per pound (lb) of finfish							
	Pre-COVID-19				COVID-19			
	MIN	MAX	MEAN	MED	MIN	MAX	MEAN	MED
Whole	\$2.67	\$8.00	\$5.57	\$5.00	\$2.67	\$8.00	\$5.69	\$6.00
Fillet	\$10.00	\$14.00	\$12.31	\$12.25	\$10.00	\$14.00	\$13.06	\$14.00

Table 3 demonstrates the average length in inches of the common finfish species reported by fishers in pre-COVID-19 and COVID-19 times. The Toledo District reported the highest average length in pre-COVID-19 times with 18.1in (min 8.9in, max 28in), followed by the Corozal District with 15.6in (min 8in, max 26.5in) and the Stann Creek District with 11.4in (min 8in, max 22in). The lowest average length of the common finfish species was 9.8in (min 8.5, max 10.5in) in the Belize District.

When comparing the average lengths of the common finfish species in the current status of COVID-19, the average lengths were maintained across districts. However, a slight decrease was registered in the Toledo District of 0.9in from 18.1in to 17.2in. Conversely, the Corozal and Stann Creek Districts reported an increase of 0.1in and 0.2in respectively.

Table 3. Average length in inches of the common finfish species caught by fishers in Belize in pre- and current COVID-19 times.

District	Average length (inches) of common finfish species							
	Pre-COVID-19				COVID-19			
	MIN	MAX	MEAN	MED	MIN	MAX	MEAN	MED
Corozal	8	26.5	15.6	14.5	8	26.5	15.7	13.8
Belize	8.5	10.5	9.8	10	8.5	10.5	9.8	10
Stann Creek	8	22	11.4	9.5	8	22	11.4	9.5
Toledo	8.9	28	18.1	18.3	8.9	22.7	17.2	18.3

The weekly income of Belizean fishers

Table 4 demonstrates the weekly income of the Belizean fishers from the Corozal, Belize, Stann Creek, and Toledo Districts. Fishers from the Belize District reported the highest income range between \$600.00 to \$2500.00 weekly (mean \$1212.50, median \$875.00), followed by the Toledo District with a range of \$400.00 to \$1500.00 weekly. The lowest weekly income was reported by fishers from the Corozal District with a range between \$125.00 to \$750.00 weekly (mean \$316.70, median \$250.00), closely followed by the Stann Creek District with \$175.00 to \$1000.00 of a weekly income (mean \$578.60, median \$625.00). The difference in income from the highest earning fishing district (Belize) to the lowest earning fishing district (Corozal) was \$475.00 to \$1750.00 weekly.

Additionally, when comparing the fishers' weekly income from finfish sales in pre-COVID-19 times with the current status of COVID-19, the fishers from the Toledo District experienced the highest difference in their weekly income, with a decrease of an average of \$287.50 a week. Meanwhile, fishers from the Belize District experienced no change in their weekly income pre- and during COVID-19. The fishers from the Corozal and Stann Creek Districts reported similar differences in their weekly income, with a decrease of \$62.50 and \$69.60 a week respectively (table 4).

It is worth noting that one fisherman from the Corozal District and another from the Belize District did not provide an answer when asked about their weekly income from finfish sales.

Fishers were also asked what percentage of their catch was finfish during the lobster and/or conch season, where 16 of 28 fishers surveyed (57.1%) provided an answer. The percentage of finfish caught during the lobster and/or conch season ranged from 0 to 90%, averaging at 32.6% (median 27.5%).

Table 4. Weekly income reported by fishers in Belize during pre- and current COVID-19 times.

District	Fishers' weekly income from finfish sales (Belizean dollars)								
	Pre-COVID-19				COVID-19				Avg. inc. diff pre- and in COVID-19
	MIN	MAX	MEAN	MED	MIN	MAX	MEAN	MED	
Corozal	\$125.00	\$750.00	\$316.70	\$250.00	\$125.00	\$375.00	\$254.20	\$250.00	\$62.50
Belize	\$600.00	\$2500.00	\$1212.50	\$875.00	\$600.00	\$2500.00	\$1212.50	\$875.00	\$0.00
Stann Creek	\$175.00	\$1000.00	\$578.60	\$625.00	\$112.50	\$1000.00	\$508.90	\$600.00	\$69.60
Toledo	\$400.00	\$1500.00	\$937.50	\$950.00	\$400.00	\$1200.00	\$650.00	\$600.00	\$287.50

The Food Service Industry of Belize

Preferred fish to purchase

Table 5 provides a generalized description of restaurateurs' preferred fish species to purchase for each district. Overall, the snapper was the predominantly preferred fish to purchase by restaurateurs, being purchased by all restaurants from all districts studied. Conversely, the cobia

was only purchased in the Stann Creek District, whilst the barracuda was only purchased in the Corozal District. When comparing preferred finfish to purchase in high and low seasons of pre-COVID-19 to preferences in the current status with COVID-19, most restaurateurs maintained their preferences whilst 3 restaurateurs reported a change in their purchasing preferences. For example, one restaurateur from the Corozal District purchased snapper, lionfish and hogfish pre-COVID-19 and in current COVID-19 times, they preferred to purchase only hogfish. These changes in purchasing preferences are also seen in the Stann Creek and Toledo Districts.

Table 5. Preferred finfish species purchased by restaurateurs in Belize in pre- and current COVID-19 times.

District	Generalized description	
	Pre-COVID-19: high and low season	Current status
Corozal	Restaurateurs preferred to purchase snapper, lionfish, hogfish, barracuda, and tilapia, in both the high and low seasons.	Restaurateurs preferred to purchase snapper, lionfish, hogfish, barracuda, and tilapia. One restaurateur went from purchasing snapper, lionfish, and hogfish pre-COVID-19 (both high and low season) to preferring the purchase of only hogfish in the current status.
Belize	Restaurateurs preferred to purchase snapper, grouper, hogfish, and jack in both the high and low seasons.	Restaurateurs' preferred fish purchases remained the same.
Stann Creek	Restaurateurs preferred to purchase snapper, snook, grouper, jack, cobia, and hogfish. Snapper was the predominant finfish species preferred by restaurateurs in both the high and low season.	Restaurateurs' preferred fish purchases remained the same. Snapper was also the most predominant finfish species preferred by restaurateurs in both the high and low season. One restaurateur went from purchasing snapper and snook pre-COVID-19 (both high and low season) to preferring the purchase of only snapper in the current status.
Toledo	Restaurateurs preferred to purchase snapper, mackerel, and snook during the high season. In the low season, there was only mention of snapper and snook being purchased, as most restaurateurs did not provide a response for this season.	Restaurateurs preferred to purchase snapper, snook, and king fish. One restaurateur went from purchasing snapper and mackerel pre-COVID-19 (both high and low season) to purchasing snapper and kingfish.

Whole and fillet finfish, purchasing preference and identification by restaurateurs

Restaurateurs were asked for their preference of whole and/or fillet when purchasing finfish, with a majority of 27 restaurateurs purchasing both whole and fillet finfish. This number was led by the Stann Creek District with 12 restaurants purchasing both finfish cuts, followed by Corozal District with 6, Belize District with 5, and the Toledo district with 4 restaurants purchasing both finfish cuts.

The Stann Creek District was the only district where restaurateurs either purchased whole, fillet or both finfish cuts. Meanwhile, restaurateurs in the Corozal and Toledo District either purchased whole or both finfish cuts, but no fillet independently; whilst restaurateurs in the Belize District either purchased fillet or both finfish cuts, but no whole finfish independently.

It is worth noting that the restaurateurs' purchasing preferences of finfish cuts remained the same throughout all seasons pre-COVID-19 and in the current status of COVID-19 (figure 9). However, 4 restaurateurs from the Toledo District did not provide a response to their preference during the low season pre-COVID-19.

Restaurateurs were also asked if they were able to identify a whole or a fish fillet, where 36 restaurateurs responded yes to being able to identify a whole fish, whilst 29 restaurateurs responded yes to identifying a fish fillet. The 7 restaurateurs who were unable to identify a fish fillet were: 4 from the Toledo District, 2 from Corozal District, and 1 from the Stann Creek District.

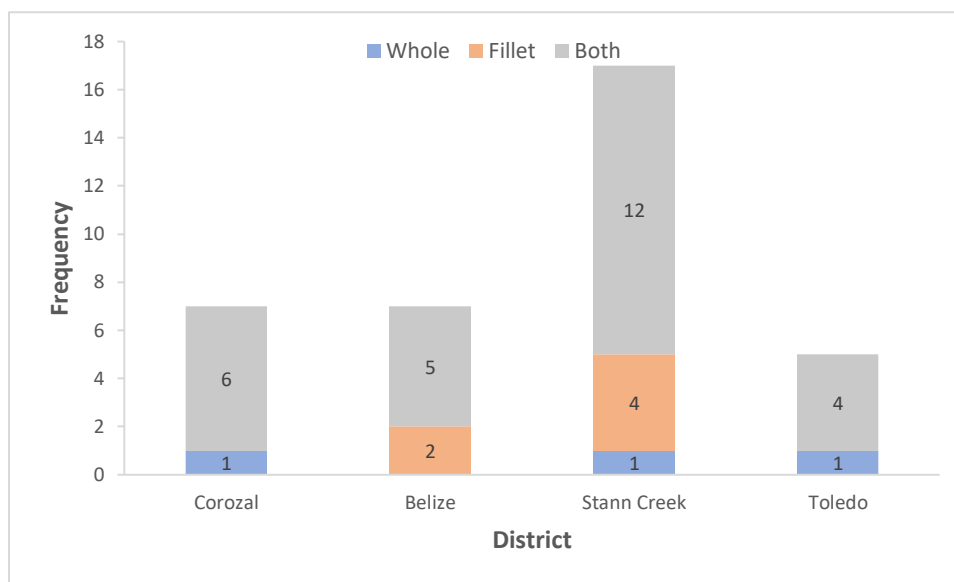


Figure 9. Finfish cuts preferred by restaurateurs in Belize.

Note: The data represented on the graph demonstrates whole and/or finfish preference by restaurateurs for pre-COVID-19 high and low seasons and for COVID-19 current status. However, four (4) restaurateurs from the Toledo District were unable to provide a response to their preference during the low season pre-COVID-19. This data is not reflected on this graph.

Restaurateurs' knowledge of the origin of purchased finfish

Restaurateurs were asked if they knew the origin of the finfish they purchased, whereby 33.3% of restaurateurs responded yes - 19.4% of restaurateurs (7/17 individuals) were from the Stann Creek District, 8.3% (3/7 individuals) from Corozal, 2.8% (1/7 individuals) from Belize, and 2.8% (1/5 individuals) from the Toledo District. Although 33.3% of restaurateurs responded knowing where their finfish originated, only a few individuals listed the sites. Restaurateurs from the Corozal District reported their finfish originating from Glover's Reef, Turneffe Atoll and Area 3 of the Managed Access Program; Stann Creek mentioned South Water Caye and Glover's Reef, as well as the landing sites of Independence, Dangriga, and Placencia; and the Toledo District mentioned Area 4 and 5 of the Managed Access Program. The restaurateur from the Belize District who knew the place of origin of their purchased finfish did not provide the name of the area.

Preferred finfish size by Belize's food service industry

Restaurateurs were asked to state their preferred finfish size for whole and/or finfish fillet when purchasing from their supplier and answers were given in weight (lb) and/or size (in).

Restaurateurs from the Corozal District responded in pounds and in inches, providing preferred purchase sizes for both whole and finfish fillet. In terms of preferred finfish weight, responses were as follows:

- 6 of 7 respondents (85.7%) provided weight in pounds for whole finfish. The weight ranged from 0.82lb, preferred by 1 restaurateur, to 8lb, also preferred by 1 restaurateur. The remaining 4 restaurateurs preferred their finfish to weigh between 1 to 1.5lb.
- 4 of 7 respondents (57.1%) provided weight in pounds for finfish fillet. Each of the 4 respondents had a different preference to the weight of finfish fillet they purchased, starting at 0.37lb, 0.75lb, 1.5lb, and 8lb (figure 10).

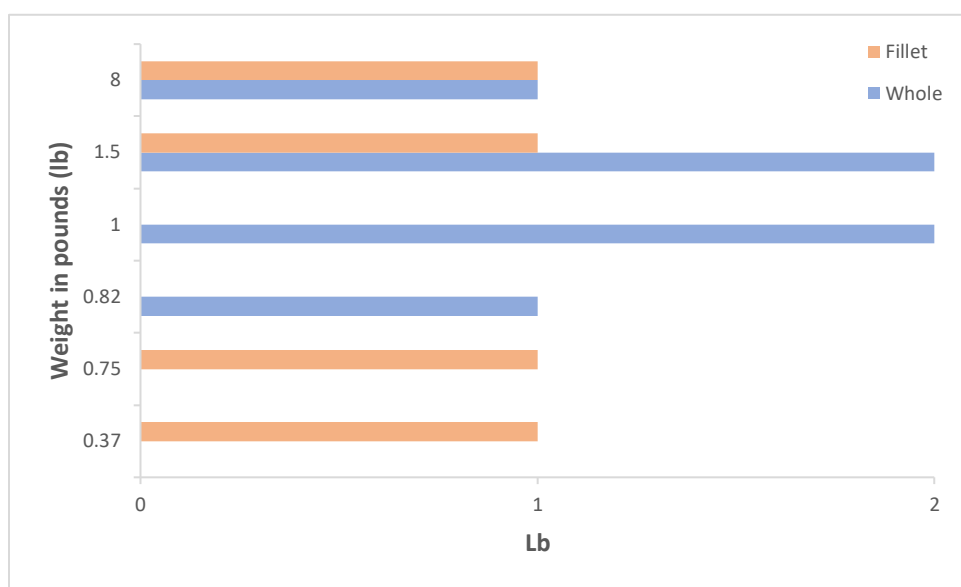


Figure 10. Preferred finfish weight in pounds for whole and fillet cuts stated by restaurateurs in the Corozal District.

In terms of preferred finfish size by restaurateurs in the Corozal District, responses were as follows:

- 7 of 7 respondents (100%) provided sizes in inches for whole finfish. The size ranged from 8 to 18 inches, with 85.7% of respondents (6 individuals) from the Corozal District preferring to purchase whole finfish measuring between 8 to 11in, whilst 14.3% of respondents (1 individual) preferred a size of 18in when purchasing whole finfish.
- 4 of 7 respondents (57.1%) provided sizes in inches for finfish fillet. Two respondents preferred an average of 8.25in, 1 respondent of 11in, and 1 respondent preferred purchasing finfish fillet measuring 18in (figure 11).

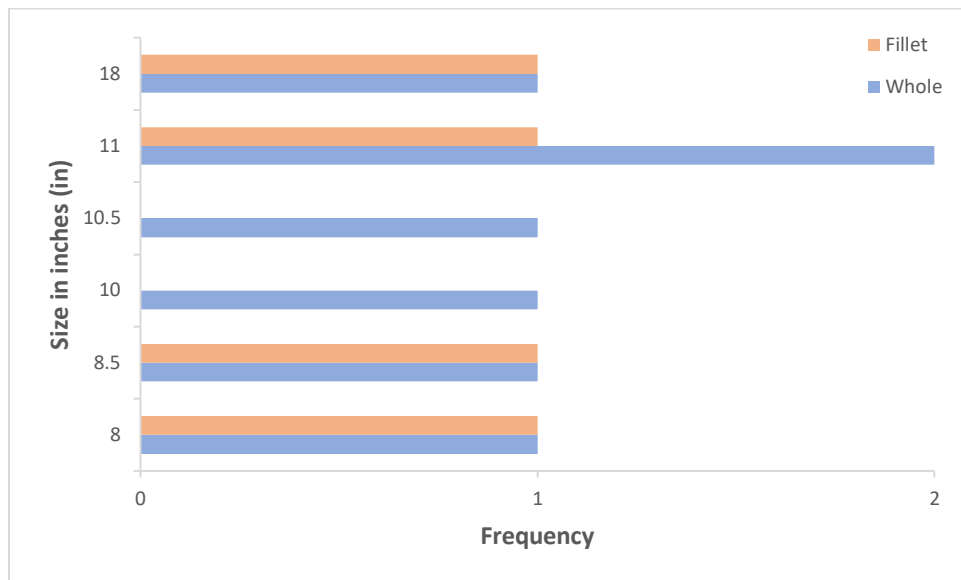


Figure 11. Preferred finfish size in inches for whole and fillet cuts stated by restaurateurs in the Corozal District.

Restaurateurs from the Belize District provided size preferences for finfish in both pounds and inches for whole and finfish fillet, with:

- 4 of 7 respondents (57.1%) provided weight in pounds. Answers applied for both whole and finfish fillet, where 1 individual preferred their finfish to be 0.63lb, 2 individuals preferred 1lb, and 1 individual preferred the finfish they purchased to be 1.5lb in size.
- 2 of 7 respondents (28.6%) provided sizes in inches. One restaurateur mentioned a preference of 11in when purchasing either whole or finfish fillet, whilst another restaurateur stated preferring to purchase 13.5in of fillet only.
- 1 of 7 respondents (14.3%) gave no answer.

Meanwhile, restaurateurs from the Stann Creek District provided their preferred finfish weight only, with reports of both whole and finfish fillet sizes. The responses were as follows:

- 13 of 17 respondents (76.5%) provided weight in pounds for whole finfish. Restaurateurs' preference on whole finfish weight ranged from 0.5 to 1.5lb, with a majority of 6 individuals preferring their whole finfish to weigh 0.5lb, followed by 4 individuals preferring 1lb. The remaining 3 individuals preferred their whole finfish to either weigh 0.81, 0.88, or 1.5lb.
- 15 of 17 respondents (88.2%) provided weight in pounds for finfish fillet. The finfish weight preferred by restaurateurs ranged from 0.25 to 2.5lb, with 0.5lb being the most preferred weight with 4 individuals, followed closely by 0.38lb with 3 individuals and 1lb with 2 individuals (figure 12).

Restaurateurs from the Toledo District provided their preferred finfish size in inches, where 4 of 5 respondents (80%) provided sizes for both whole and finfish fillet, whilst 1 of 5 respondents (20%) only provided a size preference for whole finfish. The sizes were either 9 or 10 inches for both the whole and finfish fillet, where the preferred size was 10 inches for both the whole and fillet.

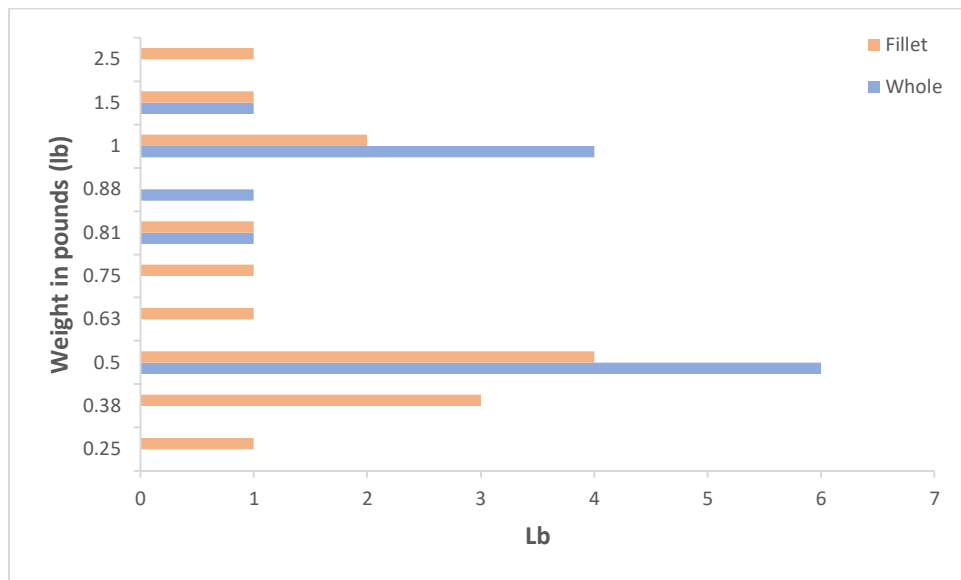


Figure 12. Preferred finfish weight in pounds for whole and fillet cuts stated by restaurateurs in the Stann Creek District.

Price of finfish (whole and fillet) reported by restaurateurs

Restaurateurs were asked to provide the average price per pound of whole and finfish fillet purchased.

The restaurateurs from the Belize District paid the highest average per pound of whole finfish of \$8.90 (min \$8, max \$11), closely followed by the Corozal District with an average price of \$8.00 a pound. Contrastingly, the Toledo District paid an average of \$3.45 less than the Belize and Corozal Districts, and presented the lowest average per pound of whole finfish of \$5.00 (min \$5, max \$5), closely followed by the Stann Creek District with an average price of \$6.00 per pound. The restaurateurs from the Belize and Toledo Districts reported paying the same average price per pound for whole finfish throughout all seasons pre-COVID-19 and in the current status of COVID-19. Conversely, the Corozal and Stann Creek Districts reported an increase in the average price of whole finfish of \$0.10 and \$2.00 in the current status with COVID-19 (table 6).

Table 6. Average cost of whole finfish per pound according to restaurateurs in Belize in pre- and current COVID-19 times.

District	Average cost of whole finfish per pound (Belizean dollar / lb)											
	Pre-COVID-19								COVID-19			
	High season				Low season				Current status			
	MIN	MAX	MEAN	MED	MIN	MAX	MEAN	MED	MIN	MAX	MEAN	MED
Corozal	\$6.00	\$12.00	\$8.00	\$8.00	\$6.00	\$12.00	\$8.00	\$8.00	\$6.00	\$10.00	\$8.10	\$8.00
Belize	\$8.00	\$11.00	\$8.90	\$8.50	\$8.00	\$11.00	\$8.90	\$8.50	\$8.00	\$11.00	\$8.90	\$8.50
Stann Creek	\$5.00	\$12.00	\$6.00	\$5.00	\$5.00	\$12.00	\$6.00	\$5.00	\$5.00	\$15.00	\$8.00	\$7.00
Toledo	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00

The restaurateurs from the Belize District paid the highest average per pound of finfish fillet of \$13.80 (min \$12.70, max \$15.00), closely followed by the Stann Creek and Corozal Districts, both with an average price of \$12.00 a pound. Contrastingly, the Toledo District paid an average of \$12.60 less per pound than the Belize, Stann Creek, and Corozal Districts, and presented the lowest average per pound of finfish fillet of \$6.00 (min \$6, max \$6). The restaurateurs from the Belize and Toledo Districts reported paying the same average price per pound for whole finfish throughout all seasons pre-COVID-19 and in the current status of COVID-19. Concurrently, the Corozal District reported a slight decrease of \$0.90 per pound of fillet in the current status of COVID-19, whilst the Stann Creek District reported an increase in the average price of finfish fillet of \$2.00 a pound (table 7).

Table 7. Average cost per pound of finfish fillet according to restaurateurs in Belize in pre- and current COVID-19 times.

District	Average cost of finfish fillet per pound (Belizean dollar / lb)											
	Pre-COVID-19								COVID-19			
	High season				Low season				Current status			
	MIN	MAX	MEAN	MED	MIN	MAX	MEAN	MED	MIN	MAX	MEAN	MED
Corozal	\$8.50	\$18.00	\$12.00	\$11.50	\$8.50	\$18.00	\$12.00	\$11.50	\$8.50	\$13.00	\$11.10	\$12.00
Belize	\$12.70	\$15.00	\$13.80	\$13.80	\$12.70	\$15.00	\$13.80	\$13.80	\$12.70	\$15.00	\$13.80	\$13.80
Stann Creek	\$8.00	\$16.00	\$12.00	\$12.00	\$8.00	\$16.00	\$12.00	\$12.00	\$10.00	\$18.00	\$14.00	\$15.00
Toledo	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00

Local finfish consumption in Belize

Restaurateurs were asked to state what percentage of the seafood they purchased during the conch and lobster season was finfish, having in mind the different tourist and non-tourist seasons in the year.

In the high tourist season of pre-COVID-19, the results were:

- Five (5) restaurateurs stated that 100% of their purchased seafood in the conch and lobster season was finfish - 1 restaurateur from the Toledo District, 2 from Stann Creek District, and 2 from the Belize District.
- With 16 of 17 restaurateurs (94.1%) from the Stann Creek District responding, 80% of restaurateurs reported that between 70 and 100% of their purchased seafood in the conch and lobster season was finfish. Therefore, the Stann Creek District was the district with the overall highest percentage of finfish purchased over seafood in the conch and lobster season. The remaining approximate 20% of restaurateurs ranged between 50 to 69% of purchased finfish.
- In the Belize District, 5 of 7 restaurateurs (71.4%) provided a response, where the lowest percentage of finfish purchased over seafood in the conch and lobster season was registered, with a range of 20 to 29% stated by one restaurateur (figure 13).

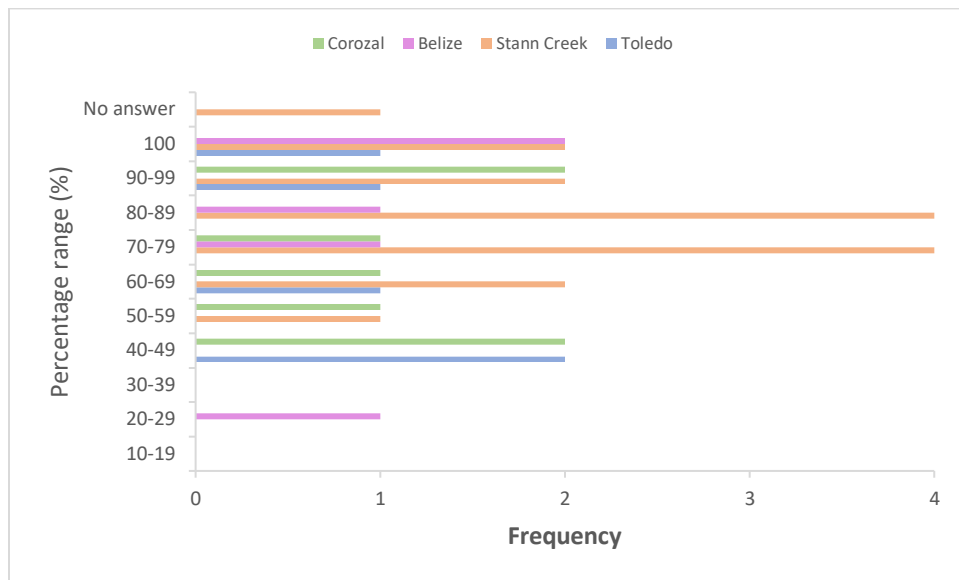


Figure 13. Finfish percentage of purchased seafood by restaurateurs in the lobster and conch season of the high tourist season in Belize during the pre-COVID-19 pandemic.

In the low tourist season pf pre-COVID-19, the results were:

- A total of 4 restaurateurs stated that 100% of their purchased seafood in the conch and lobster season was finfish - 2 restaurateurs from the Belize District and 2 from the Stann Creek District.
- The Stann Creek District remained as the district with the overall highest percentage of finfish purchased over seafood in the conch and lobster season, with over 50% of the 15 of 17 restaurateurs who answered stating that their purchased finfish comprised between 70 to 100% of the seafood purchased during the conch and lobster low tourist season.
- The Belize and Corozal Districts presented the lowest percentage of finfish purchased over other seafood, with a range of 20 to 29% (figure 14).

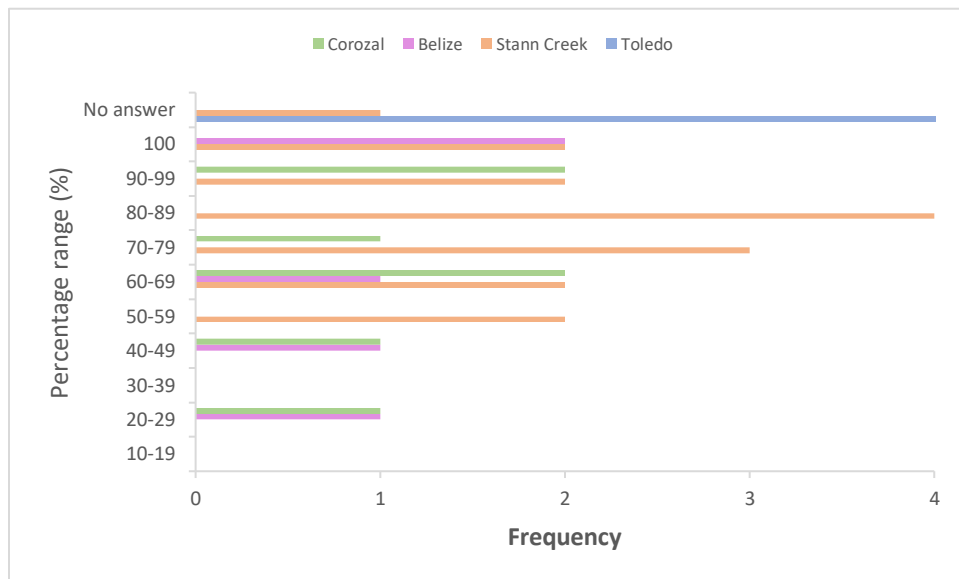


Figure 14. Finfish percentage of purchased seafood by restaurateurs in the lobster and conch season of the low tourist season in Belize during the pre-COVID-19 pandemic.

In the current status of the COVID-19 pandemic, the results were:

- A total of 6 restaurateurs stated that 100% of their purchased seafood in the conch and lobster season was finfish - 2 restaurateurs from the Belize District, 2 from the Stann Creek District, 1 from the Corozal District, and 1 restaurateur from the Toledo District.
- In the Belize District, 5 of 7 restaurateurs (71.4%) provided a response, where the lowest percentage of finfish purchased over seafood in the conch and lobster season was registered, with a range of 20 to 29% stated by one restaurateur.
- The Stann Creek District reported the overall highest percentage of finfish purchased over seafood in the conch and lobster season, with over 50% of the 15 of 17 restaurateurs who answered stating that their purchased finfish comprised between 70 to 100% of the seafood purchased during the conch and lobster season in the current status of COVID-19 (figure 15).

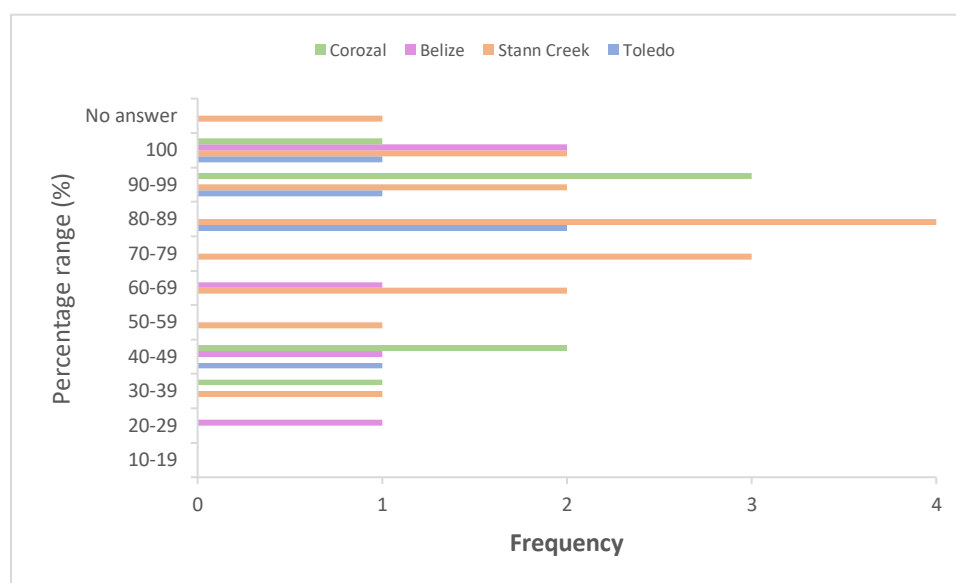


Figure 15. Finfish percentage of purchased seafood by restaurateurs in the lobster and conch season in the current status of the COVID-19 pandemic.

The fluctuation in price of finfish in Belize

Restaurateurs were asked about finfish price fluctuation during Easter, lobster and conch open season, and the peak tourism season in pre-COVID-19 and current COVID-19 times. Throughout the year, 47.2% of all restaurateurs reported a fluctuation in the price of finfish and 52.8% stated there was no fluctuation. Of the 47.2% that said yes to a fluctuation in finfish price, 27.8% were from the Stann Creek District, 11.1% from the Corozal District, and 8.3% were restaurateurs from the Belize District.

When examining the fluctuation in the price per pound of finfish in the different seasons of the year, 41.7% of restaurateurs reported a price fluctuation in Easter, 11.1% in the lobster and conch seasons (it is worth noting that another 11.1% of restaurateurs did not provide an answer for this season), and 27.8% responded yes to a fluctuation in price for the peak tourism season. The stated fluctuations remained the same in pre- and during COVID-19 times.

Of the 41.7% of restaurateurs who reported a finfish price fluctuation in the Easter season, 57.1% were restaurateurs from the Corozal District, 47.1% from the Stann Creek District, and 42.9% were

restaurateurs from the Belize District. Restaurateurs from the Toledo District reported no fluctuation in the finfish prices during the Easter season (figure 16).

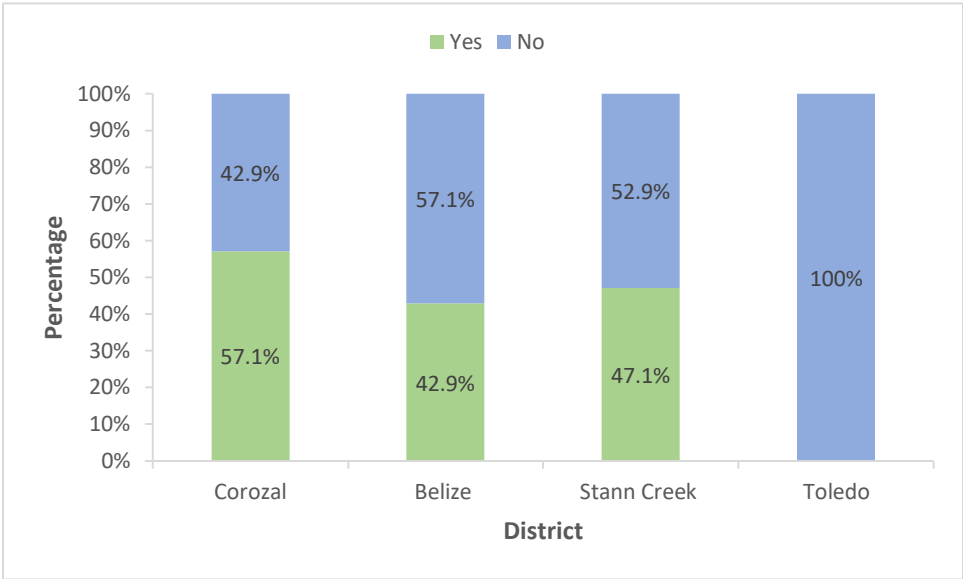


Figure 16. Restaurateurs' responses to a fluctuation in finfish prices during the Easter season in Belize in pre- and current COVID-19 times.

Of the 11.1% of restaurateurs who reported a finfish price fluctuation in the lobster and conch seasons, 28.6% were restaurateurs from the Belize District and 11.8% from the Stann Creek District. Restaurateurs from the Corozal District reported no fluctuation in the finfish prices and restaurateurs from the Toledo District did not provide an answer (figure 17).

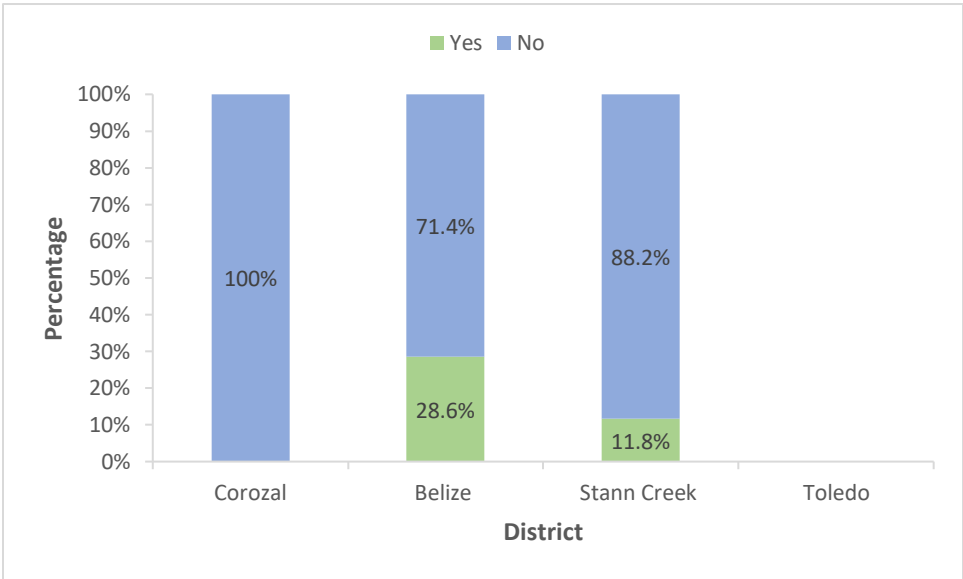


Figure 17. Restaurateurs' responses to a fluctuation in finfish prices during the lobster and conch season in Belize in pre- and current COVID-19 times.

Of the 27.8% of restaurateurs who observed a fluctuation in the finfish price during the peak tourism season, 41.2% were from the Stann Creek District, 28.6% from the Belize District, and

14.3% of restaurateurs were from the Corozal District. Restaurateurs from the Toledo District reported no fluctuation in the finfish prices during the peak tourism season (figure 18).

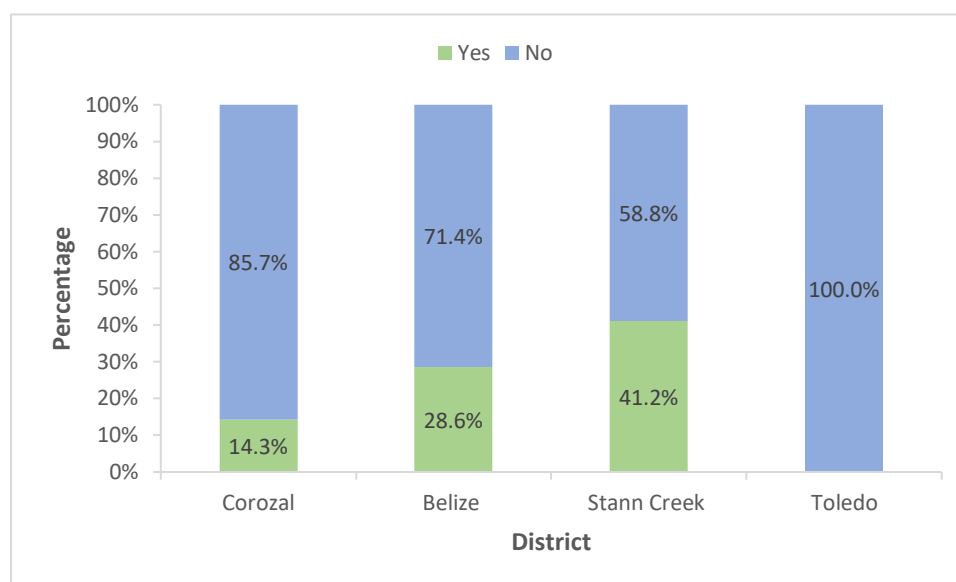


Figure 18. Restaurateurs' responses to a fluctuation in finfish prices during the peak tourism season in Belize in pre- and current COVID-19 times.

A fluctuation in the price per pound of finfish across the seasons in the year was provided by 13 of 36 restaurateurs (36.1%) with an average price per pound of \$2.90 (min \$1.50/lb, max \$5.50/lb, median \$2.00/lb) - prices were for whole and finfish fillet. Only one respondent mentioned the price per pound of finfish increasing by \$2.00 in the current COVID-19 times.

A comparison of finfish meal and other meat meals sold at restaurants in Belize

The overall percentage of finfish meals on the menus of restaurants in Belize ranged from 15% to 100% throughout all seasons pre-COVID-19 and in the current status of COVID-19. Restaurants in the Stann Creek District reported the highest percentage of finfish meals on the menu, with a range from 30 to 100% (mean 62%, median 60%); whilst the Toledo District reported the lowest range from 20 to 60% (mean 32%, median 20%). Stann Creek was the only district with at least one restaurant exclusively serving finfish; likewise, it was the only district that reported unvaried percentages of finfish meals on menus during the high and low season and at the current status due to the COVID-19 pandemic. Only the Belize District presented a change in the percentage of finfish meals on a menu according to seasons, with the maximum range dropping from 80% in the high season to 50% in the low season (mean 37% and 28% respectively). The Corozal District was the only district that presented a significant change in the percentage of finfish meals on the menu when comparing the low season to the current status, with an estimated 7% decrease.

Restaurateurs in the Toledo District were unable to provide a percentage of finfish meals on their menu for the tourist low season (table 8).

Table 8. Percentage of finfish meals sold at restaurants in comparison to other meals with meat during the high and low tourist seasons pre-COVID-19 and in the current status of COVID-19.

District	Percentage (%) of finfish meals sold at restaurants in comparison to other meats											
	Pre-COVID-19								COVID-19			
	High season				Low season				Current status			
	MAX	MIN	MEAN	MED	MAX	MIN	MEAN	MED	MAX	MIN	MEAN	MED
Corozal	90	18	51	45	90	18	48	45	90	10	41	29
Belize	80	15	37	23	50	15	28	23	50	15	26	23
Stann Creek	100	30	62	60	100	30	62	60	100	30	63	60
Toledo	60	20	32	20	NA	NA	NA	NA	40	20	28	20

The average cost of finfish meals

The overall average cost of finfish meals in Belize ranged from \$6 to \$60 a meal throughout all seasons pre-COVID-19 and in the current status of COVID-19. The Belize District reported the highest average cost of a finfish meal with \$60, followed by Stann Creek with \$45. The Toledo District offered the lowest average cost overall for a finfish meal, with meals ranging from \$6 to \$17 for the high season pre-COVID-19 and the current status. However, restaurateurs in the Toledo District were unable to provide an average cost of finfish meals for the low season pre-COVID-19. Notably, the average cost of finfish meals remained consistent throughout seasons, regardless of the COVID-19 status (table 9).

Table 9. Average cost of finfish meals sold at restaurants during the high and low tourist seasons pre-COVID-19 and in the current status of COVID-19.

District	Average cost of finfish meals (Belizean dollar)											
	Pre-COVID-19								COVID-19			
	High season				Low season				Current status			
	MIN	MAX	MEAN	MED	MIN	MAX	MEAN	MED	MIN	MAX	MEAN	MED
Corozal	\$13.00	\$25.00	\$19.00	\$22.00	\$13.00	\$25.00	\$19.00	\$22.00	\$13.00	\$27.00	\$19.00	\$27.00
Belize	\$12.00	\$60.00	\$31.00	\$35.00	\$12.00	\$60.00	\$31.00	\$35.00	\$12.00	\$60.00	\$31.00	\$35.00
Stann Creek	\$12.00	\$45.00	\$25.00	\$25.00	\$12.00	\$45.00	\$25.00	\$25.00	\$12.00	\$45.00	\$25.00	\$25.00
Toledo	\$6.00	\$17.00	\$13.00	\$15.00	NA	NA	NA	NA	\$6.00	\$17.00	\$14.00	\$15.00

Awareness of Finfish Fishery Regulations

Fishers and restaurateurs were asked a series of questions to gauge their awareness on some of the more common finfish fishery regulations in Belize, including (1) complete finfish ban on parrotfish,

permit, tarpon, bonefish, and marine turtles; (2) fillet rules on skin patch and skin patch dimension; (3) Nassau grouper on season, minimum and maximum lengths, SPAG season, and landed whole; (4) conch on season, shell length, market clean weight, fillet weight, and diced conch; and (5) lobster on season, carapace length, and tail weight.

When comparing knowledge of the fisheries regulations between fishers and restaurateurs, fishers had greater knowledge of the regulations overall. The minimum percentage of awareness for fishers was 89.3% for Nassau grouper regulations and the maximum was 100% awareness for both a complete ban on species and lobster regulations. Awareness on fisheries regulations on fillet and conch stood at a midpoint with 94.6% and 94.3% respectively. Conversely, restaurateurs' knowledge ranged from a minimum of 34.7% for regulations on Nassau grouper to a maximum of 87.8% on a complete ban on species. The second highest percentage was 74.1% for lobster regulations, followed by 69.4% for fillet rules, and 68.9% for conch.

Overall, the fisheries regulations of less awareness to both fishers and restaurateurs were that of the Nassau grouper, whilst the regulation with the most awareness was a complete ban on species (figure 19).

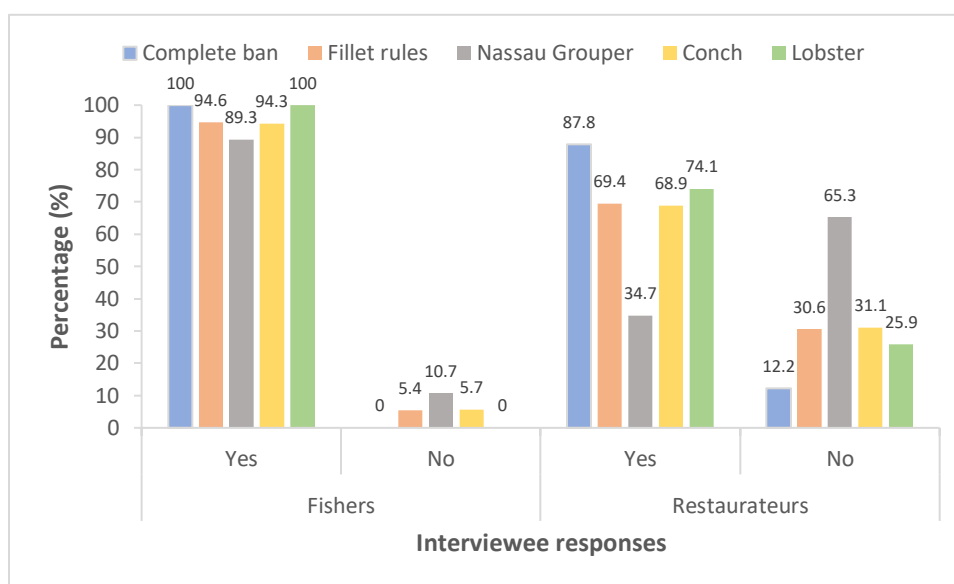


Figure 19. Percentage of awareness of fishers and restaurateurs on the fisheries regulations in Belize, including complete ban on species, fillet rules, and regulations on Nassau grouper, conch, and lobster.

Technology literacy

Fishers were asked about their level of technology literacy and 27 of the 28 fishers responded whereby a majority of 16 fishers stated having a basic experience using smartphones, 6 fishers an intermediate experience, and 5 fishers an advanced experience. Concurrently, fishers were also asked about their interest in a seafood purchasing app. Of the 27 fishers who had different levels of experience using a smartphone, 13 fishers said they were interested in the app, of which 9 fishers had a basic experience in using smartphones, whilst 2 fishers had an intermediate experience, and 2 others had an advanced experience. Following closely behind were 12 fishers who stated no interest in the seafood purchasing app. Of these, 6 fishers had a basic experience using a smartphone, 3 fishers intermediate experience and 3 fishers an advanced experience. Only two individuals had no answer towards their interest in a seafood purchasing app, one with a basic

experience in using a smartphone and the other with intermediate experience (figure 20). This information can also be observed by district in Annex 4.

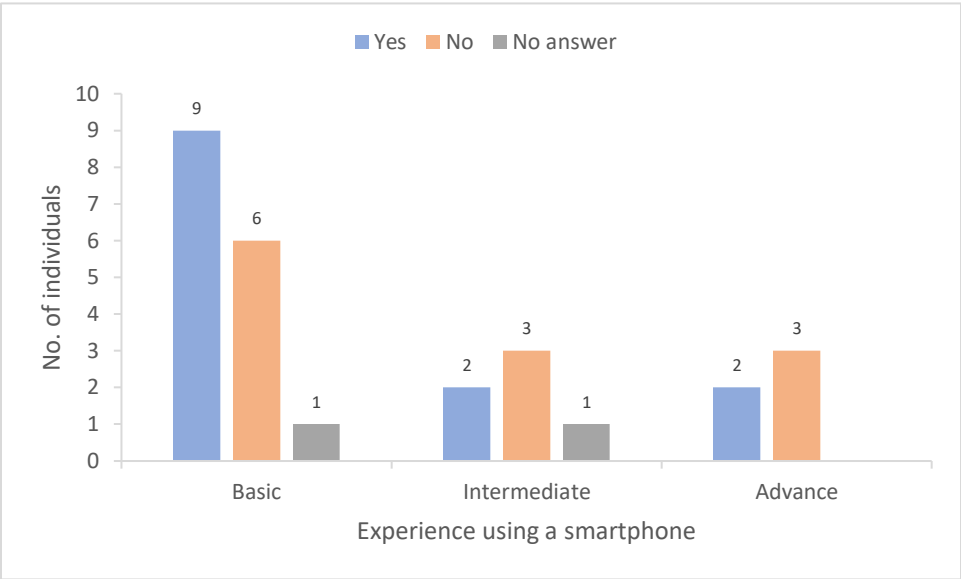


Figure 20. Level of interest in a seafood purchasing app of fishers in Belize in relation to their level of literacy.

All 36 restaurateurs interviewed responded to questions aimed at gauging their level of technology literacy. The majority of 18 restaurateurs had an advanced experience using a smartphone, followed by both a basic and an intermediate experience with 9 restaurateurs each. When asked about their interest in a seafood purchasing app, a majority of 30 restaurateurs said they were interested in the app - 16 of these restaurateurs had an advanced experience in using a smartphone, whilst 7 restaurateurs had a basic experience, and another 7 restaurateurs had an intermediate experience. Only 4 restaurateurs had no interest in the seafood purchasing app and 2 restaurateurs gave no answer (figure 21). This information can also be observed by district in Annex 5.

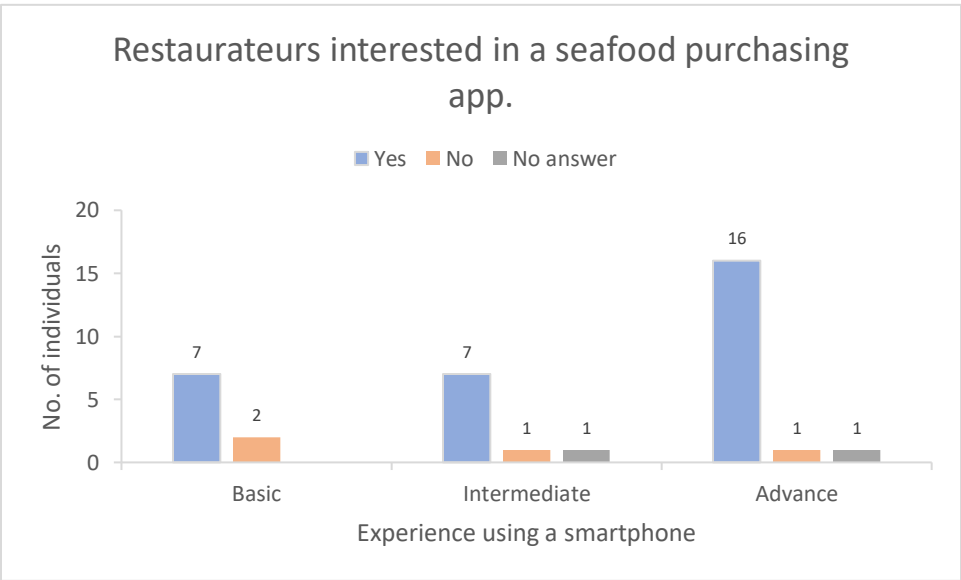


Figure 21. Level of interest in a seafood purchasing app of restaurateurs in Belize in relation to their level of literacy.

Comments from a meat shop in Belize City

The owner/manager of a meat shop, and seafood vendor, from the Belize District was surveyed using the survey created for restaurateurs. The individual stated a preference in purchasing snapper, grouper, and hogfish throughout all seasons, as well as pre- and during COVID-19. The establishment purchased both whole and finfish fillet and the owner/manager stated they were able to identify species in either cuts. According to the owner/manager, the fish they purchased originated from English Caye and Placencia, and the preferred finfish size had an average of 1.5lb for whole and 0.67lb for fillet. The whole finfish was purchased from fishers at an average of \$9.50/lb and the fillet at \$16.00/lb in the high season, whilst the whole finfish was purchased at \$7.00/lb and the fillet at \$13.00/lb during the low season, both applied for pre- and current COVID-19.

The establishment purchased a combination of finfish averaging 450lb for the week in high season and 150lb in the low season, both also applying for pre- and current COVID-19 - with 80% of the seafood purchased being finfish. The establishment did not report price fluctuations during Easter, lobster and conch seasons, nor the peak tourism season. Additionally, the owner/manager was fully aware of all fisheries regulations regarding a complete ban, fillet rules, Nassau grouper, conch, and lobster, as well as the Fish Right Eat Right Certification program. Furthermore, they stated that responsible finfish harvest was important to them and of their interest in a seafood purchasing app.

Discussion and Conclusions

The present study captures information from fishers and restaurateurs, in the hopes of attaining a greater understanding of the local consumption of finfish in Belize. The study presents several limitations, most notably a small sample size of the two survey subjects, fishers and restaurateurs. However, the information gathered can serve as a baseline as there is limited information available on the local finfish consumption in Belize. Therefore, general assumptions will be made based on the information gathered during this study.

Likewise, general comparisons will be made with the *Market-Based Incentives for Responsible Fishing: Market study on local consumption of finfish in Caye Caulker and San Pedro* study conducted in the summer of 2020. It is worth noting the limitations in comparisons between the two studies, including the first study using a probabilistic sampling technique with a representative sample, which was conducted in two tourist destinations in Belize, whilst the present study used a non-probabilistic sampling technique with a small non-representative sample size, representing data by districts rather than a specific community. Nevertheless, general comparisons and assumptions prior to COVID-19 were made in an effort to increase the understanding of the local finfish consumption in Belize and provide recommendations for next steps. These are as follows:

Preferred finfish to purchase

The food and service industry in Belize primarily prefers to purchase snapper as a finfish they offer to their local and international clientele, as observed in the market study conducted in the summer of 2020 and the present. The second most sought after finfish varies in both studies, where the grouper is the second most sought after finfish in San Pedro and Caye Caulker, whilst in the mainland coastal districts of Belize the second most sought after finfish is the hogfish.

Notwithstanding, the grouper and the hogfish are listed in both studies among the most preferred finfish purchased by restaurateurs after the snapper, along with four other finfish species (barracuda, kingfish, lionfish, and tilapia). Unfortunately, the preferred species of snapper and grouper could not be determined, as this information was not provided in either study.

Fishers' responses to the most commonly sold and requested finfish species coincide with responses from restaurateurs on the preferred finfish to purchase, where fishers from the first study named the snapper and grouper as most commonly sold and requested, whilst the fishers in the second study reported the snapper and hogfish. These findings coincide with FAO's (2021) profile of Belize's Fishery and Aquaculture, where targeted finfish species for export and local consumption include species of groupers, snappers, hogfish, king mackerel, barracuda, and jacks.

Whole and fillet finfish, purchasing preference and identification

In both studies, the majority of restaurateurs purchased both whole and finfish fillet cuts: 82% of restaurants in Caye Caulker and 78% in San Pedro, compared to 85.7% of restaurants in the Corozal District, 80% in Toledo District, 71.4% in Belize District, and 70.6% in the Stann Creek District. Additionally, a high percentage of restaurateurs can identify whole and finfish fillet across Belize with 94% of restaurateurs from Caye Caulker and 78% from San Pedro being comfortable identifying the different finfish cuts. Likewise, in mainland coastal districts of Belize, 100% of restaurateurs are comfortable identifying whole finfish, whilst 80.6% of restaurateurs can identify finfish fillet.

Origin of purchased finfish

According to restaurateurs' knowledge in both studies, overall, the purchased finfish is mainly caught in marine protected areas in Areas 6 and 8. In the tourist destination of Caye Caulker, 85% of respondents obtained their finfish from Areas 1 and 6, while respondents from San Pedro from Areas 1, 6, and 8. In comparison, less than 50% of restaurateurs from the mainland coastal districts of Belize provided a response to the origin of finfish purchased - e.g., only 14.2% of restaurateurs from the Belize District provided an answer. Therefore, the following percentages indicate the total number of restaurateurs who provided a response for each district. In the Corozal District, 42.8% of respondents obtained their finfish from Areas 3, 6, and 8; 41.1% of respondents from the Stann Creek District mentioned Areas 3 and 8; 20% of respondents from the Toledo District mentioned Areas 4 and 5; and 14.2% of respondents from the Belize District knew the place of origin of their purchased finfish but did not name the area(s).

Concurrently, fishers from the first study report using mainly Area 1 and 6, whilst fishers in the second study mainly use Area 3 and 4 - closely followed by Area 8 and 9. This coincides with the Areas offered by the restaurateurs, which demonstrates restaurateurs having a good knowledge of the origin of their purchased finfish.

It is worth noting that more than half of restaurateurs from the present study did not provide a response to the origin of the purchased finfish. This can be interpreted as restaurateurs preferring to either not respond or not knowing the answer to the question. Therefore, the study provides a broad perception of the restaurateurs' knowledge of the origin of the purchased finfish, but it does not provide an absolute understanding of their level of knowledge.

Preferred finfish size

The majority of restaurateurs in both studies preferred a weight averaging 1lb in the finfish they purchased, whether as a whole fish or fillet. Specifically, 79% of restaurateurs from Caye Caulker and 54% from San Pedro had a preference of 0.5 to 3lb for whole fish, whilst 67% of restaurateurs in Caye Caulker preferred 0.25 to 1lb of fish fillet and in San Pedro, 65% of respondents preferred 0.5 to 1lb. On the mainland, 57.1% of restaurateurs from Corozal District preferred their whole finfish to weigh between 1 to 1.5lb and 57.1% preferred their finfish fillet to weigh between 0.37 to 8lb. As for the Belize District, 57.1% preferred their finfish to be 0.63 to 1.5lb in weight for either whole or finfish fillet, whilst in the Stann Creek District, 76.5% of restaurateurs preferred their whole finfish to weigh between 0.5 to 1.5lb and 88.2% preferred their finfish fillet to weigh 0.25 to 2.5lb. Restaurateurs from the Toledo District only provided their preferred finfish size in inches, where 80% of respondents preferred 9 or 10 inches for either whole and finfish fillet.

The responses of the common average length of finfish provided by the fishers in both studies is inconclusive of the average length of finfish per species and of the finfish cuts (whole and fillet). This is due to unstandardized responses gathered during data collection, as fishers in both studies were inconsistent with the measuring unit they provided (e.g., responses were given in feet, inches, ounces, and/or pounds), as well as type of finfish cut and for which species.

Price of finfish (whole and fillet)

The price paid by restaurateurs in Belize for the pound of whole finfish ranged from \$5.00 to \$20.00 a pound. San Pedro paid the highest price for whole finfish, ranging from \$8.00 to \$20.00 a pound, followed by Caye Caulker with \$7.00 to \$14.00 a pound. They were followed by the Corozal District with \$6.00 to \$12.00 a pound and the Stann Creek District with \$5.00 to \$12.00 a pound. The Toledo District paid the lowest price per pound of whole finfish of \$5.00 a pound.

As for finfish fillet, the price paid by restaurateurs ranged from \$6.00 to \$20.00 per pound of fillet. San Pedro paid the highest price for finfish fillet, with the majority of restaurants paying between \$16.00 to \$20.00 per pound. The highest price for finfish fillet on the mainland was reported in the Belize District and ranged from \$12.70 to \$15.00 per pound, closely followed by Caye Caulker with \$11.00 to \$15.00 per pound of fillet. The Stann Creek and Corozal Districts both paid an average price of \$12.00 a pound, whilst the Toledo District paid the lowest average per pound of finfish fillet of \$6.00 a pound.

Likewise, the fishers from both market studies stated similar price to those of the restaurateurs, where individuals from San Pedro and Caye Caulker sold their catch at an average of \$10.50 and \$9.70 per pound of whole finfish respectively, whilst the mainland fishers were requesting an average of \$5.57 per pound. As for finfish fillet, fishers from San Pedro and Caye Caulker sold the fillet at an average of \$15.70 and \$14.10 per pound respectively, whilst the mainland fishers sold their catch at an average of \$12.25 per pound - a difference of \$6.68 per pound when comparing to the price per pound of whole finfish.

The prices of whole and finfish fillet paid by restaurateurs demonstrates that tourist destinations in Belize, especially San Pedro, pay more for whole and finfish fillet than areas that are not considered tourist destinations, or have fewer tourists present. Moreover, the difference in price per pound between the whole and finfish fillet did not deter restaurateurs from purchasing either finfish cuts, with a majority of respondents preferring to purchase both finfish cuts.

The fluctuation in price of finfish in Belize

As for price fluctuations, the price of finfish in the cayes was dependent on the tourist season, where the peak tourist season - which runs from late November to mid-April - was reported as a main factor influencing the price of finfish as demand for seafood increased. In San Pedro and Caye Caulker restaurateurs paid an additional \$1 to \$6 per pound of finfish, whilst 14% and 33% of restaurateurs in San Pedro and Caye Caulker respectively said the prices remained the same all year round. In the mainland coastal districts, the fluctuation in the price per pound of finfish was provided by 13 of 36 restaurateurs (36.1%) with an average price per pound of \$2.90 for whole and finfish fillet. Only one respondent in the second study mentioned the price per pound of finfish increasing by \$2.00 in the current COVID-19 times.

Unfortunately, fishers in neither market studies were asked about the fluctuation in prices of the finfish in Belize and the reasons for any changes. However, the first market study mentions the high demand for finfish during the high tourism season as the main factor affecting the price fluctuations. Additionally, an increase in fishers' fuel intake due to rough seas was considered as a possible factor affecting the price fluctuations and increasing the price per pound of finfish. A few restaurateurs in the first study did not report any fluctuation in prices during the year, which they attribute to the relationship they have with their supplier. Future fisher surveys should incorporate questions of finfish price fluctuation and their reasons for change, which will allow for a greater understanding of the local consumption of finfish in the country.

The average cost of finfish meals

The average cost of finfish meals was attained in both studies, however, only in the second study were average costs obtained for the high and low tourist seasons in pre-COVID-19 times, and in the current status of COVID-19. Although comparisons between both studies are unachievable due to the unspecified tourist seasons in the first market study, the average prices for a finfish meal in San Pedro and Caye Caulker surpass those of the mainland coastal districts of Belize in any season of the year. For example, San Pedro registered the highest minimum average cost of a finfish meal of \$15.00, whilst Caye Caulker registered the highest maximum average cost of a finfish meal of \$63.00. Surprisingly, the Corozal District presented the second highest minimum average cost of \$13.00, whilst the Belize District reported the second highest maximum average cost of \$60.00. The Toledo District had the lowest minimum and maximum average cost of \$6.00 and \$17.00 respectively.

The higher prices of the average cost of finfish meals in San Pedro and Caye Caulker can be associated with the higher cost at which restaurants purchase the finfish.

Technology literacy

In terms of technology literacy, a majority of 57.1% of fishers expressed having a basic experience in using a smartphone, while only 17.9% said their experience was advanced. Conversely, a majority of 50% of restaurateurs expressed having an advanced experience using a smartphone, while the remaining 50% was divided equally between a basic or intermediate experience. The Fish Right, Eat Right program relies on fishers who are competent in the use of technology, where finfish traceability occurs through the upload of catch information onto a smartphone app. A fisher's basic experience in using a smartphone may not suffice in the effective usage of the app and may lead to

many fishers feeling excluded from the program. Both fishers and restaurateurs had more individuals interested in a seafood purchasing app than not.

Recommendations

Unfortunately, the limitations in the methodology and in the data collection of this study restrict the understanding of the local finfish consumption in Belize. Therefore, the most salient recommendation is to conduct further and more comprehensive studies of the local consumption of finfish in Belize, which will gather the necessary data for informed decision-making in the management of the fishery.

Additional recommendations for this study are similar to those from the Market-Based Incentives for Responsible Fishing: Market study on local consumption of finfish in Caye Caulker and San Pedro conducted in the summer of 2020. These are as follows:

- The finfish fishery would benefit from the adequate implementation of output controls, where the amount, the species, and the size of the fish caught is regulated through catch and size limits, as well as species restrictions. These management measures will prevent the collapse of the fishery by controlling the health of the fish populations at risk, whilst safeguarding the livelihoods of resource users, including those of fishers, restaurant owners, and other workers directly or indirectly dependent on the resource.
- Restaurateurs preferred to purchase whole and finfish fillet within a specific weight or size range. With finfish size limits being recommended as a management measure, education and outreach efforts describing the importance of finfish size limits for the long-term sustainability of the fisheries in Belize should be implemented and directed at fishers, chefs, restaurateurs, and the general public.
- Drafting or modifications in regulations or management measures pertaining to the finfish fishery in Belize should be consulted with all relevant stakeholders, including the Belize Fisheries Department, the NGO community, restaurateurs, seafood suppliers, fisher associations/co-ops, and most importantly, the fishermen. These consultations should have a participatory approach and changes in regulations or management measures should be actively monitored, evaluated and enforced by the Government of Belize and partner NGOs to ensure effectiveness.
- Future market studies on the local consumption of finfish should develop a survey framework specifically for resellers (e.g., meat shops, market vendors, etc.) to include questions to better understand the local finfish market in Belize. As an example, questions should include preferred finfish by clientele, estimated profit on finfish sale, any change in sale during the year, specifically the Easter season, fluctuation on finfish prices during the year, and type of clientele. Likewise, future market studies on the local consumption of finfish should develop a survey framework for the local and foreign public.
- In relation to the comparison made with the first market study conducted in San Pedro and Caye Caulker, it is worth emphasizing that these communities are two popular tourist destinations in Belize and comparisons should ideally be made with communities that present similar characteristics to these communities (e.g., Placencia and Hopkins). Moreover, comparisons should be made with communities and not communities versus districts.
- Further quantitative and qualitative studies should be conducted to determine the socio-economic impacts of COVID-19 on the local consumption of finfish, the fishers' livelihoods,

and on the food and service industry in Belize, especially as the pandemic enters its second year. Moreover, the comparison between the two market studies demonstrates a higher cost in the price of finfish in tourist destinations, with the tourist industry continuously being impacted by COVID-19 restrictions implemented by the Government of Belize, as well as global travel restrictions.

References

FAO. (2021) Fishery and Aquaculture Country Profiles: Belize. [Accessed: 13 October 2021]
Available at: <https://www.fao.org/fishery/facp/blz/en>

GOB. (2020) Movement at Sea and Waterways. Government of Belize Press Office. [Accessed: 3 November 2021] Available at: <https://www.pressoffice.gov.bz/movement-at-sea-and-waterways/>

News 5. (2021) 'Finfish as Export Opportunity'. Interview by News 5. Jun 29, 2021 [Accessed: 13 October 2021] Available at: <https://unctad.org/news/belize-develops-plan-sustainably-manage-dozens-finfish-species>

Oceana. (2020) Fish Right, Eat Right in Belize. 17 August. Oceana [Online] [Accessed: 13 October 2021] Available at: <https://belize.oceana.org/blog/fish-right-eat-right-belize/>

Annexes

Annex 1. Fisherfolk survey

FISHERFOLK INTERVIEW	
Interviewer: _____	Date: _____
Fisher: _____	
Gender: Male or Female	Age: _____
Address & Contact No.: _____	
Education Level: None Primary Secondary Other: _____	
Type of Fishing License: _____	Fishing License No: _____
Years Fishing: _____	
Fishing Zones: 1 2 3 4 5 6 7 8 9 MPA: _____	
Full-time Fisher or Part-Time (other jobs): _____	
Crew: Size: _____	Licensed Fishers: Yes or No
Primary Role of fishing crew? (E.g. Fishing, cleaning, gear repair or other in the value chain) _____	
Landing Sites (San Pedro, Caye Caulker, Belize City etc.): _____	
Point of Sale (where is finfish sold? Restaurants etc): _____	
Cooperative and/or Fishing Association Member: _____	

FINFISH CATCH	Pre-COVID-19	Current
What is the most common spp. caught?		
Do you fish by migration season?		

FISHERFOLK INTERVIEW

FINFISH CATCH	Pre-COVID-19	Current
What is the most common spp. sold?		
What is the most common spp. requested?		
What is your Avg catch (lbs & spp) per day /trip?		
What is the average lengths of the most common spp. caught?		
Price per pound per spp.		

FISHERFOLK INTERVIEW

FINFISH CATCH	Pre-COVID-19	Current
Bycatch (kept/discarded)		
Is there any fish on the Fish ID that you do not catch? (see laminated fish ID)		
Income from finfish (monthly/weekly)		

GEAR TYPE: Fish traps Spear gun Nets Hook Line Deep Sea Fishing Gear

DEPTH RANGE (ft): 5 – 15 16 – 25 26 – 35 36 – 45 46 – 55 56 – 65 66 – 75 76 – 85 86 – 95 96 – 105 106 +

FISHING SCHEDULE: Weekly Bi-weekly Monthly Other: _____

VESSEL: Sailboat Skiff Camps/Traps off Island

Other Fishery: Lobster Conch Sea Cucumber Shark Crabs Whelks Other: _____

What percentage of your catch is finfish during conch season and/or lobster season? _____

FISHERFOLK INTERVIEW

AWARENESS OF FISHERIES REGULATION (Circle YES if aware and NO if unaware)

1. Complete Ban Are you aware of the regulations regarding the catch of parrotfish, permit, tarpon, bonefish, marine turtles? (Ask what the rules are and circle YES if aware and NO if unaware)

Parrotfish: Yes/No **Permit:** Yes/No **Tarpon:** Yes/No **Bonefish:** Yes/No **Marine Turtles:** Yes/No

2. Fillet rules Are you aware of fish fillet regulations? (Ask about rule and skin patch dimension)

Skin patch: Yes/No

skin patch dimension: Yes/No

3. Nassau Grouper Are you aware of:

Nassau Grouper Season: Yes/No **Min & Max lengths:** Yes/No **SPAG season:** Yes/No **Landed Whole:** Yes/No

(Ask questions to determine if interviewee is aware of rules. When is the Nassau Grouper season? Do you know the minimum & maximum harvestable size limits? How should Nassau Grouper be landed? Fillet or Whole?)

4. Conch Are you aware of:

Conch Season: Yes/No **Shell Length:** Yes/No **Market Clean:** Yes/No **Fillet:** Yes/No **Diced conch:** Yes/No

(When is the Conch season? What is the shell length? What is the Market Clean weight? What is Fillet weight?)

5. Lobster Are you aware of:

Lobster Season: Yes/No **Carapace Length:** Yes/No **Tail Weight:** Yes/No

(When is lobster season? What is the legal carapace length? How much should the tail weight be?)

Is responsible finfish harvest important to you? _____

TECHNOLOGICAL LITERACY

What is your experience using Smart Phones: **Basic** **Intermediate** **Advance**

Do you have an E-mail address: Yes or No _____

Interested in App to purchase seafood products: Yes or No _____

How do you access internet: Private or Public

OTHER CONCERNS:

Annex 2. Restaurant survey

RESTAURANT INTERVIEW	
Interviewer: _____	Date: _____
Restaurant Name: _____	
Owner/Manager: _____	
Address: _____	
Years in Business: _____	
No. of staff: _____	
Restaurant Capacity: _____	
Avg. customers per week/month (Pre-COVID-19 & present) _____	

Questions	Pre-COVID-19		Current
	High Season	Low Season	
What is your preferred finfish spp. to purchase?			
Whole or fillet?			
Can you identify fillet and whole fish?			

RESTAURANT INTERVIEW

Questions	Pre-COVID-19		Current
	High Season	Low Season	
Do you know where purchased finfish comes from? (Fishing Areas 1-9, MPA, other districts, imported)			
Do you have a preferred finfish size? lbs (plate size etc.)			
What is the price per lb by spp.? (whole or fillet)			
How many lbs of finfish do you purchase weekly/monthly? (total pounds or by spp.)			
Who is your finfish supplier? Do you have a contact number for them? How long have they been supplying your finfish?			
What other finfish spp. are commonly available for purchase? (legal or illegal) Do you know where these finfish come from?			

RESTAURANT INTERVIEW

Questions	Pre-COVID-19		Current
	High Season	Low Season	
What percentage of your purchased seafood is finfish during the conch and lobster season?			
<p>Does finfish price fluctuate during:</p> <ul style="list-style-type: none"> • Easter • lobster & conch season • peak tourism season <p>By how much?</p>			
What percentage of finfish meals sells at your restaurant compared to chicken, pork and beef meals?			
What is the average cost of a finfish dish at your restaurant?			

RESTAURANT INTERVIEW

AWARENESS OF FISHERIES REGULATION (Circle YES if aware and NO if unaware)

1. Complete Ban Are you aware of the regulations regarding the catch of parrotfish, permit, tarpon, bonefish, marine turtles? (Ask what the rules are and circle YES if aware and NO if unaware)

Parrotfish: Yes/No **Permit:** Yes/No **Tarpon:** Yes/No **Bonefish:** Yes/No **Marine Turtles:** Yes/No

2. Fillet rules Are you aware of fish fillet regulations? (Ask about rule and skin patch dimension)

Skin patch: Yes/No **skin patch dimension:** Yes/No

3. Nassau Grouper Are you aware of:

Nassau Grouper Season: Yes/No **Min & Max lengths:** Yes/No **SPAG season:** Yes/No **Landed Whole:** Yes/No

(Ask questions to determine if interviewee is aware of rules. When is the Nassau Grouper season? Do you know the minimum & maximum harvestable size limits? How should Nassau Grouper be landed? Fillet or Whole?)

4. Conch Are you aware of:

Conch Season: Yes/No **Shell Length:** Yes/No **Market Clean:** Yes/No **Fillet:** Yes/No **Diced conch:** Yes/No

(When is the Conch season? What is the shell length? What is the Market Clean weight? What is Fillet weight?)

5. Lobster Are you aware of:

Lobster Season: Yes/No **Carapace Length:** Yes/No **Tail Weight:** Yes/No

(When is lobster season? What is the legal carapace length? How much should the tail weight be?)

Is responsible finfish harvest important to you? _____

Are you aware of the FRER Certification or any green certification? _____

Do you promote "hook to cook" stories or interested in promoting traceability stories? _____

TECHNOLOGICAL LITERACY

What is your experience using Smart Phones: **Basic** **Intermediate** **Advance**

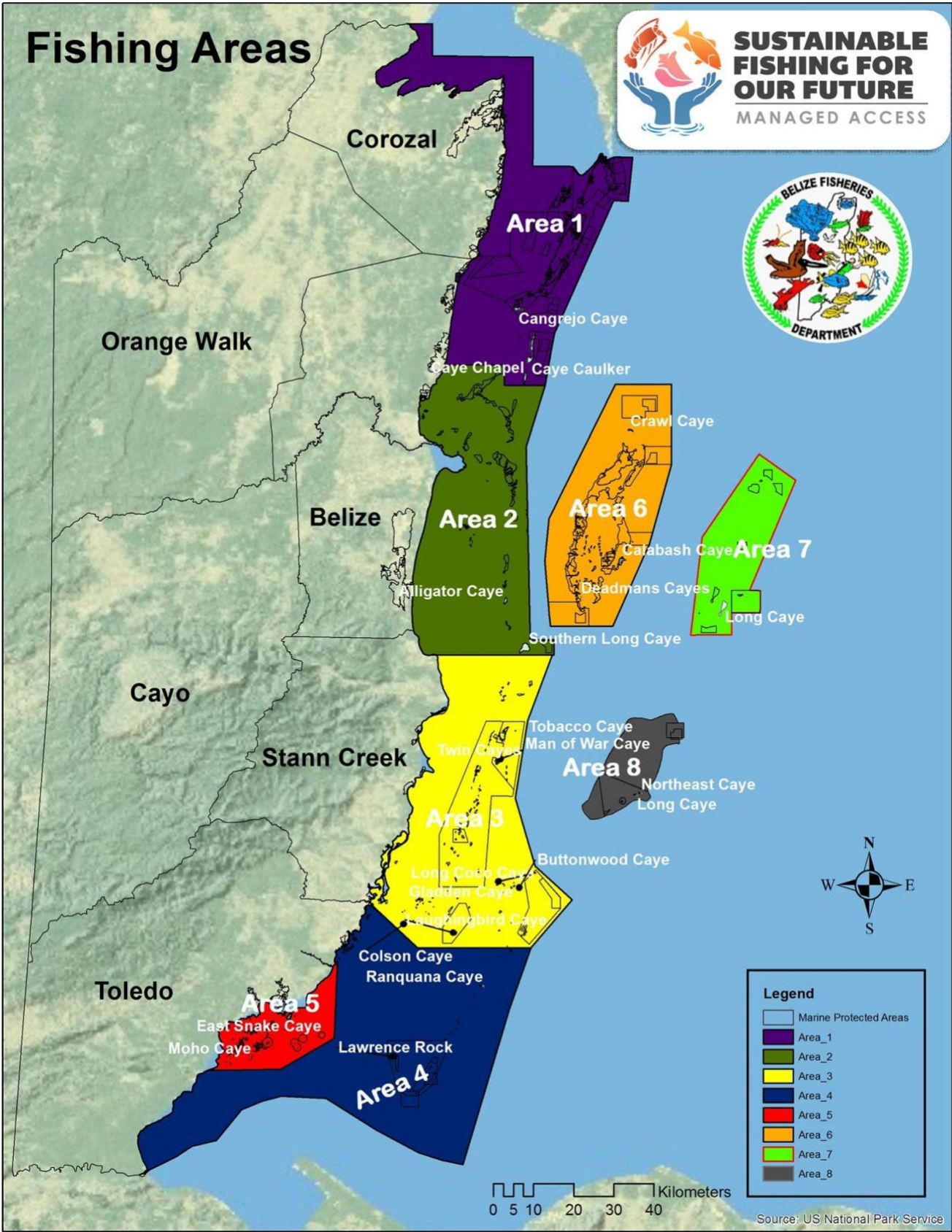
Do you have an E-mail address: Yes or No _____

Interested in App to purchase seafood products: Yes or No _____

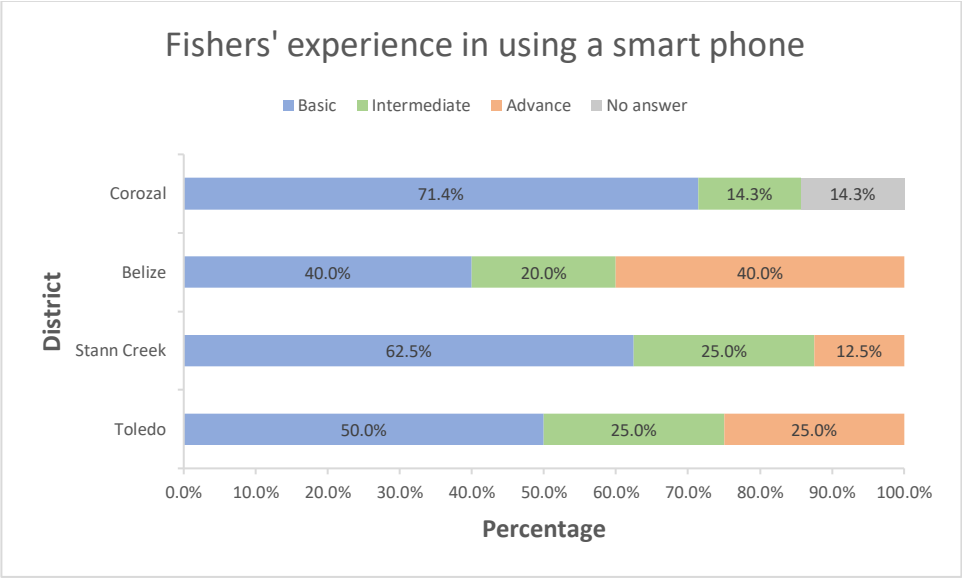
How do you access internet: Private or Public

OTHER CONCERNS:

Annex 3. Fishing Areas under the Managed Access Program.



Annex 4. Fishers' experience in using a smart phone.



Annex 5. Restaurateurs' experience in using a smart phone.

