



# LIONFISH AWARENESS STUDY 2015

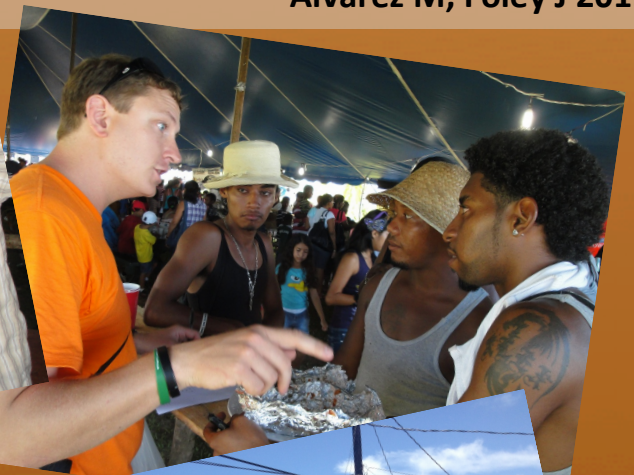


## Project Report

**Lionfish awareness study: tracking changes in public perceptions - 3 year summary report 2011-2014**

**Results of questionnaire surveys from five public events in Punta Gorda 2011-2015**

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## *Abstract*

*Lionfish Pterois volitans have been found coastal water throughout Belize. They are an invasive species which consume small adults and juveniles of multiple native fish species, disrupting the natural balance of the ecosystem. Raising awareness of lionfish, i.e. the cause of invasion, impacts on native fisheries, safe handling, market development and consumption are important factors in reaching long-term management solutions, especially to a coastal community that uses the sea as a means of their livelihood. Public events held each year in Punta Gorda Town have given Toldeo Institute for Development and Environment (TIDE) the opportunity to gauge awareness and educate the general public about lionfish and what can be done to manage the present population. Surveys done at five major public events illustrate that the residents of Punta Gorda Town are receptive to the information and majority of the individuals surveyed are more open to consuming lionfish and wearing lionfish jewellery compare to five years ago.. In addition, the willingness to pay for lionfish has been slowly increasing, which may give rise to a potential lionfish market in the future.*

## Introduction

Lionfish *Pterois volitans* is an invasive species native to the Indo-Pacific Ocean. The species was first documented in Florida in the mid-1980s, and first discovered in Belize in 2008. Their initial introduction is thought to have occurred during Hurricane Andrew in 1992 when at least six lionfish escaped from a broken beachside aquarium near Biscayne Bay. Their anthropogenic introduction and subsequent population increase are now causing negative impacts on many marine ecosystems in the south-eastern seaboard of the United States and the Caribbean Sea (The Nature Conservancy, 2012). Lionfish are very resourceful predators, invading an assortment of natural and artificial habitats, competing with native predator fish and consuming smaller fishes, including the young of large species (Baltz, 1991).

In their native habitat, lionfish populations are controlled by numerous environmental factors such as predation, competition, and disease. In the Atlantic Ocean, they have few natural predators that are capable of reproducing year-round, and are relatively resistant to parasites (Jude et.al, 1995). For these reasons, the lionfish invasion in the Caribbean represents one of the most rapid marine invasions in known history. A recent study found a tenfold increase in their abundance from 2004 to 2008 in parts of the Atlantic and Caribbean. (Paula et.al, 2002).

In reality, there is little hope of eliminating this species from our reefs, the most realistic alternative for alleviating their harmful impacts on native fish species and ensuring continuance of traditional fisheries is to continually manage lionfish on a scale many orders of magnitude larger than what existing culling efforts can currently achieve.

Currently attempts are being made in Belize to strengthen the relationship between Belizean fishing cooperatives and lionfish importers in the United States. If this can be achieved it can secure a market value sufficient to make catching of lionfish economically feasible to Belizean fishers.

In the course of the 2013 Lobster Fest in Placencia, 11.5lbs of lionfish was exported from the culling as a trial shipment to the United States. The main purpose is to indicate to other cooperatives that lionfish can be exported as a marine product. Optimistically this will help to inspire development of lionfish exports from Belize. If successful, this could aid fishers to diversify their products and reduce fishing pressure on commercial species.



TIDE is aware that the only viable long-term management solution for managing and controlling the lionfish population in Port Honduras Marine Reserve (PHMR) is to create the incentive for fishers to catch them on a daily basis. This can only be done if their market value is high enough (similar to lobster) to make it profitable and meaningful to fishers. There is therefore a great need to generate demand for lionfish meat from southern Belize, both locally and internationally.

TIDE remains loyal to supporting this lionfish market expansion through continuous partnership with Blue Ventures, SEA, local restaurants, the public and local community-based fishing cooperatives. Hopefully this year (2015) TIDE can strengthen their relationship with the Rio Grande Fishing Cooperatives to positively move forward in the right direction and commence with the exportation of lionfish so the local fishers can profit from a marine product that remains open all year around.

It is of high priority to determine the ecological impact of current culling efforts on lionfish population dynamics (e.g. population numbers, size frequency distribution, proportion of the population that is reproductive) to predict future lionfish stock. With this in place, a bridge of confidence can be built within cooperatives, exporters and importers to develop this industry towards a long-term, sustainable national scale. This export product will not only reduce their impact on reefs and reef fish, it will also generate lasting sustainable livelihoods for Belizean fishers

## Background and Rationale

### Importance of awareness

The awareness of lionfish is very important to coastal communities, especially those who utilize the marine resources as a means of generating income. A concerted effort has been launched to heighten the presence of the lionfish throughout most of the country of Belize. In the southern part of Belize, Non-Governmental Organizations (NGOs) such as the Southern Environmental Association (SEA), ReefCI and TIDE have been collaborating to educate the surrounding communities about the negative effects lionfish have on the coral reef and the best way to manage the population.

In Punta Gorda Town, TIDE has been the leading NGO that has been active in educating the general public about the effects that lionfish have on coral reefs and how they affect commercial fish species. This is done through major public events such as TIDE Fish Festival and Chocolate Festival which are held annually. During these festivals TIDE is instrumental in bringing about awareness of lionfish through questionnaires and disseminating information through pamphlets, leaflets, lionfish recipes, art, games and lionfish jewellery. ReefCI, has also been a major part of this endeavour by providing TIDE with the lionfish fillet needed to provide free samples to the general public for tasting. TIDE community researchers cooked the fish at the events, providing education to the public about lionfish and showing people how to safely handle and fillet them via public demonstrations. Data from five public events in Punta Gorda, namely TIDE Fests and Chocolate Festivals between 2012 and 2014 were analyzed, tracking shifts in public awareness over time.

Another form of awareness has been through school presentations, TIDE has been educating at various primary schools in Punta Gorda and surrounding communities about the environment and lionfish. By educating the younger generation this will help the marine environment in the hope of the continued demand for consumption of the species.

In the Bahamas, similar events are held around the island to eradicate the lionfish because they are outcompeting and preying on commercially and ecologically important marine species. The Department of Marine Resources suggests that the best way to manage the species is to make the public aware of its effects and consume it. Therefore they host a two-day hunt and cook-off to explore the hunting, handling, cleaning and consumption of the lionfish, which has proven to be quite the delicacy. Chefs from Cape Santa Maria and Stella Maris Resort prepared the fish in a variety of dishes such as fish cakes garnished with locally grown pineapples, and stir-fried lionfish in a tropical Thai curry sauce also with freshly grown pineapples. The Ministry of Tourism in the Bahamas has partnered with individuals in the community in their efforts to bring further awareness about the species. Hunting of the lionfish has also become a tourist attraction, when visitors come into Long Island in the Bahamas, divers take them out snorkelling and educate them about the species. Furthermore, because of the abundance of the species, restaurant owners are being encouraged to add it to their menus; and, entrepreneurs to use parts of the fish for jewellery and other craft items once the enzyme-based venom is denatured through cooking.

Similar to TIDE, they organize lionfish culling, several times of the year to at least be able to clean the shoals, the shores and coral reefs right along the edges of islands and begin to educate individuals about what could be done to manage the population.

### Objectives

To increase the consumption of lionfish in Punta Gorda Town by providing education and awareness

To conduct research on the perception of the lionfish and to determine if it is worthwhile to create a potential lionfish market based on the demand of the product

### Methods

Questionnaires were created with general information about lionfish. These questions were used to determine the perception and level of public awareness people had on lionfish in general. Ten questions were asked; sample questions were:

Are you familiar with lionfish?

Do you know that lionfish is an invasive species?

How many time have you tasted lionfish?

Are you aware that lionfish can affect other fish populations?

Do you think lionfish has any effect on the reef?

What part of the lionfish is edible?

Do you think lionfish are: poisonous or venomous?

What part of the lionfish are dangerous to humans?

Are you aware that lionfish can be eaten?

How many times have you eaten lionfish?

At major public events held throughout the year, (TIDE Fest 2012, Chocolate Fest 2013, TIDE Fest 2013 and Chocolate Fest 2014 and TIDE Fest 2014). TIDE in partnership with Blue Ventures and Reef CI created lionfish booths with educational materials. Free lionfish samples were given to individuals willing to try lionfish; provided that a questionnaire was filled out. Outreach activities were created by TIDE and Blue Ventures (e.g. games, recipes, videos, awareness questionnaires, fact sheets, safe handling and filleting demonstrations) for children and adults to learn more about lionfish.

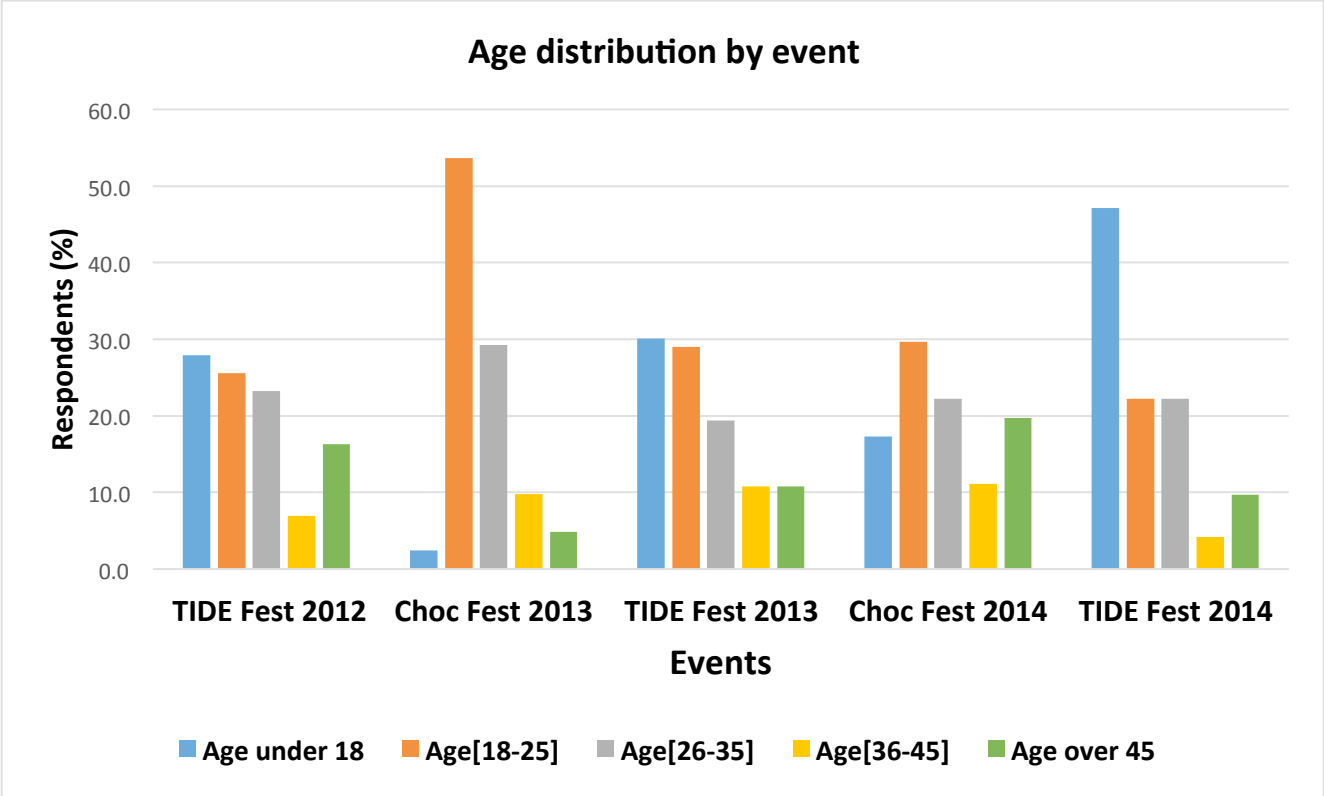
TIDE community researchers also participated in cooking the lionfish, providing education and awareness to the public to suppress any doubt or misperceptions they had about lionfish. Data from all five events were analysed, tracking shifts in public awareness over time.

## Results

Table 1.1 Showing events and number of respondents that were surveyed.

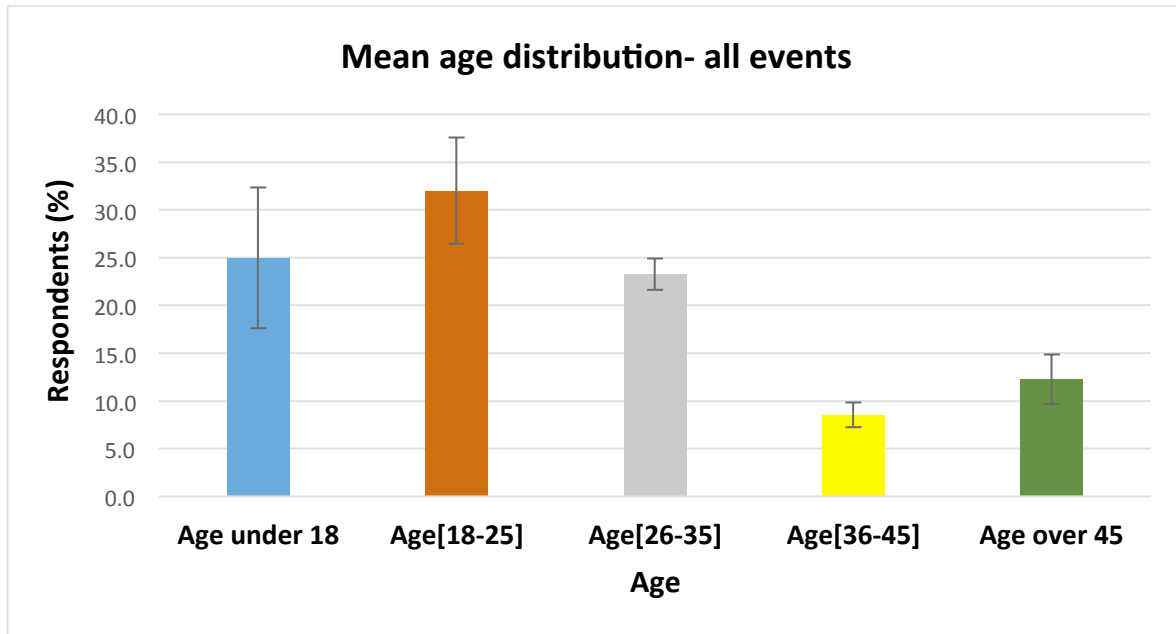
Event	Number of Respondents
TIDE Fish Fest 2013	93
Chocolate Fest 2013	42
Chocolate fest 2014	95
TIDE Fish Fest 2012	46
TIDE Fish Fest 2014	165





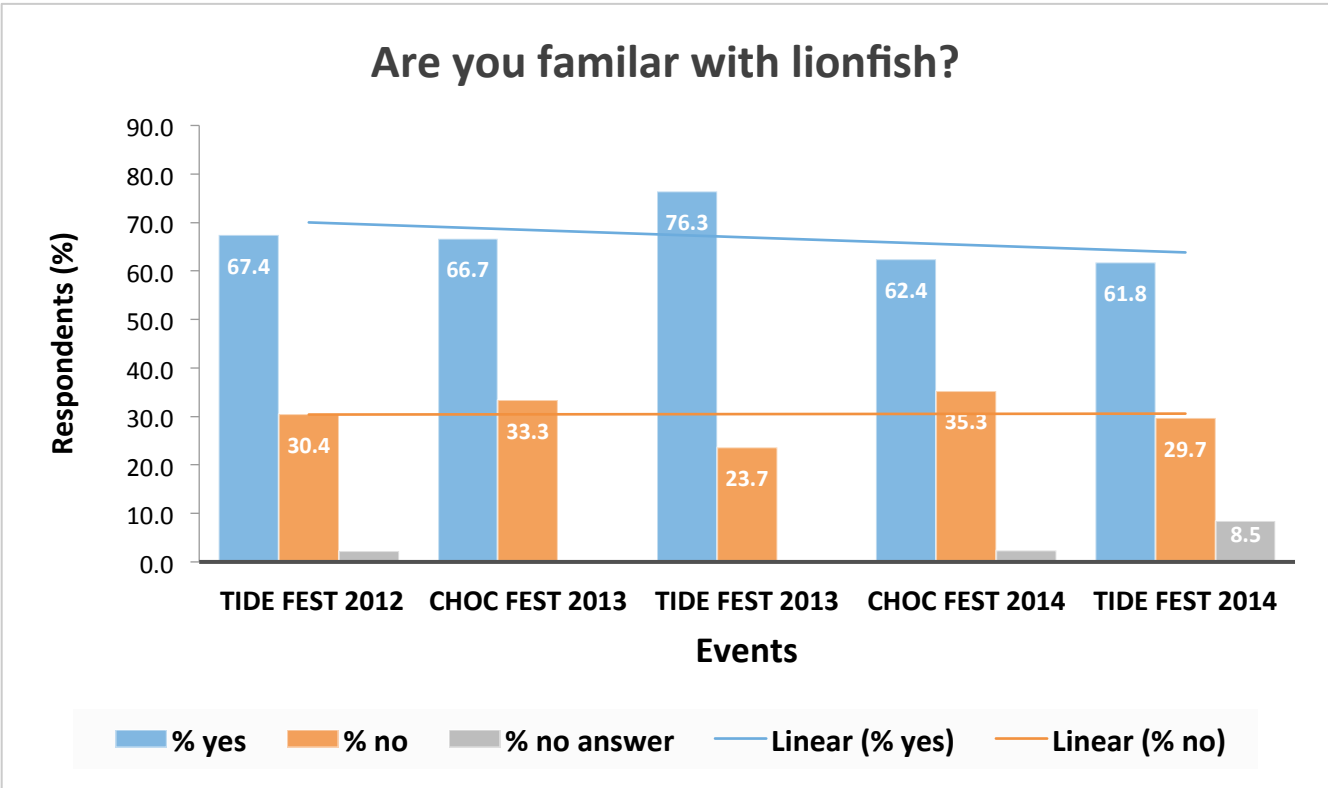
**Figure 1: Graph showing age distribution by event.**

In general 36-45 age category had the least amount of respondents with the exception of Chocolate Fest 2013, and ranged from 4.2% to 11.1%. There was a consistently high proportion of respondents ranging from age under 18 and 18-25 years. Age range 26-35 had a relatively even spread throughout the course of the five events ranging from 19.4% to 29.3%.



**Figure 2: Graph showing mean age distribution of all events combined**

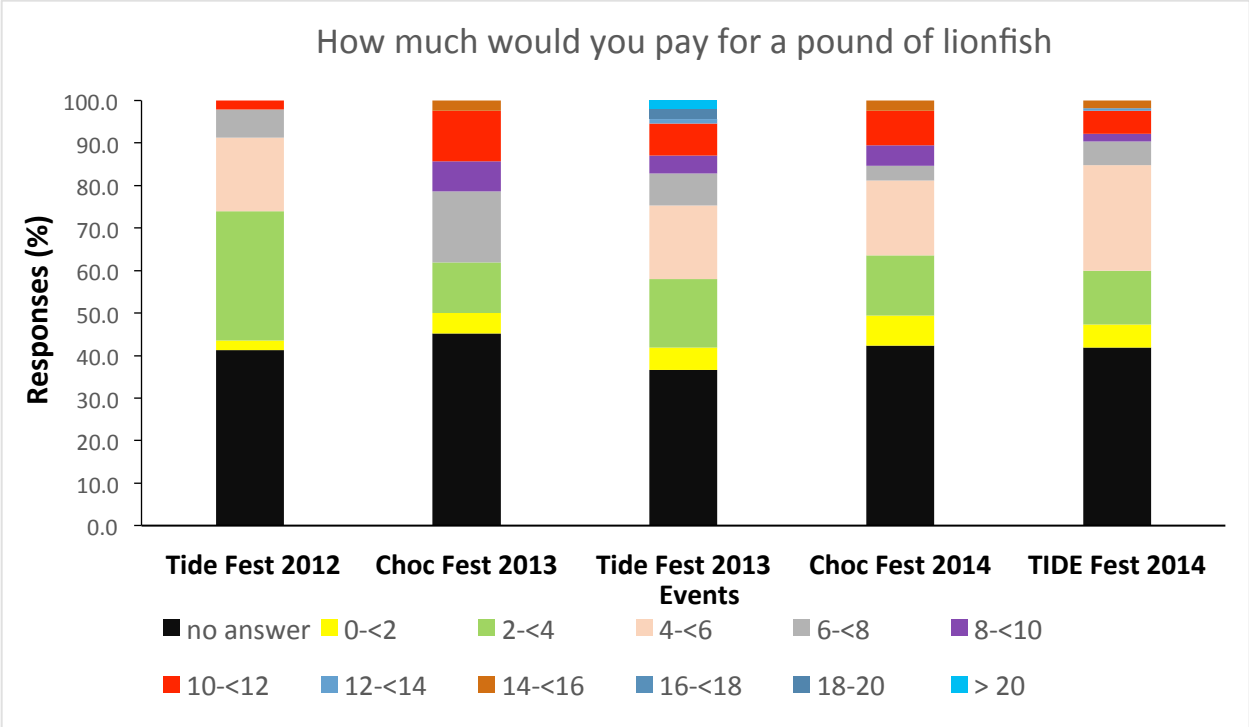
On average the 18-25 years age category had the highest representation but the second greatest variance ( $32.0\% \pm 5.57$  SE). On average the 36-45 years age category had the lowest representation and the least variance ( $8.6\% \pm 1.30$  SE). The under 18 category also had a high representation on average and greatest variance ( $25.0\% \pm 7.38$  SE). The age category over 45 had a variance of ( $12.3\% \pm 2.60$  SE).



**Figure 3: Graph showing percent respondents familiar with lionfish.**

Overall, the events show that there have been a relatively stable amount of respondents that are familiar with lionfish. However it also shows a decrease in familiarity at Choc Fest 2014 (event 4) (62.4%) and TIDE Fest 2014 (event 5) (61.8%). TIDE Fest 2013 shows the highest amount of respondents familiar with lionfish (76.3%) the lowest amount of respondents familiar with lionfish was at TIDE Fest 2014 (61.8%). Choc Fest 2014 had the highest number of respondents that were not familiar with lionfish (35.3).

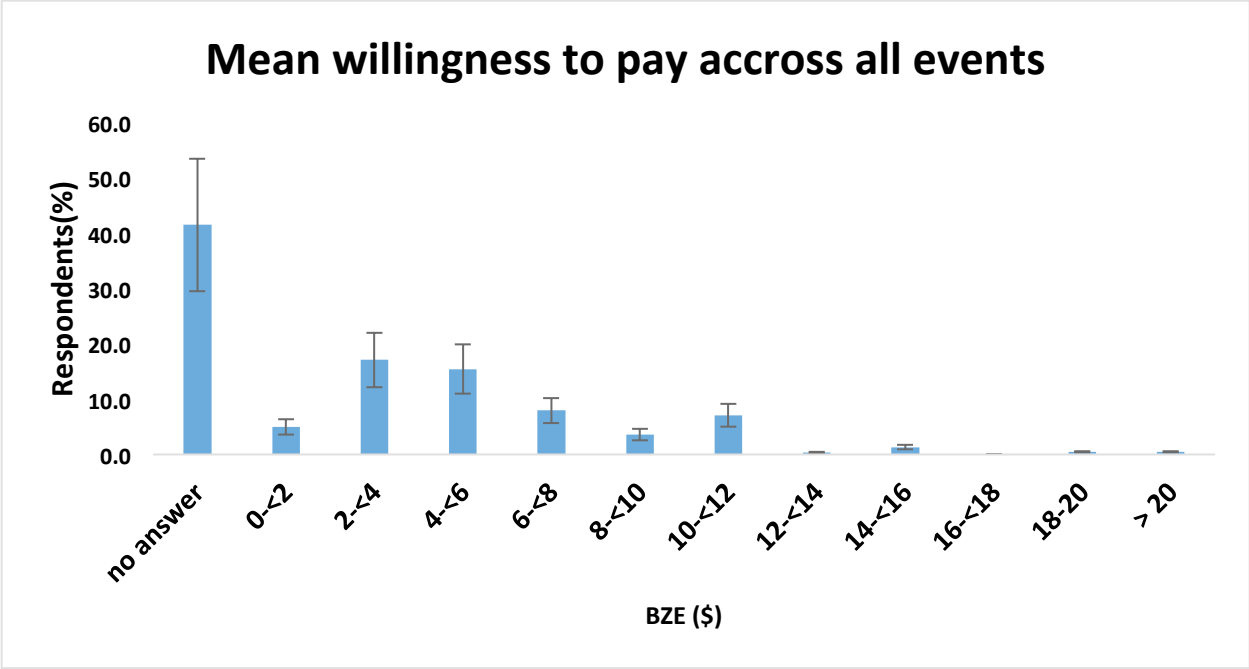
Overall, around two thirds of people claim to be familiar with lionfish, and around one third claim not to be. These proportions have remained relatively static over the time period.



**Figure 4: Graph showing how much respondents would pay per pound for lionfish.**

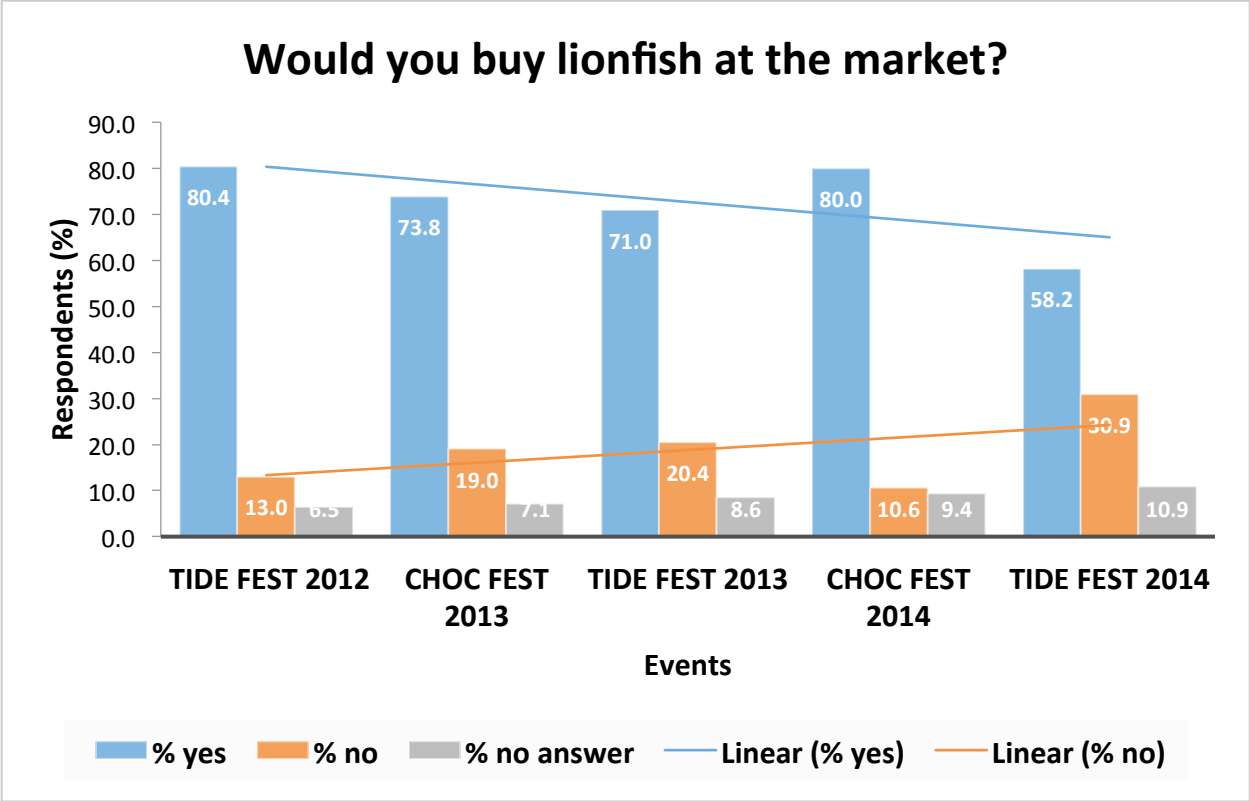
An average of 41.5% of the respondents did not answer the question, of the remaining 58.5%, 32.5% answered stated that they would pay within the lower pay bracket BZ\$2-\$4, and BZ\$4-\$6 per pound. There have been an increase in respondents paying between BZ\$4-\$6, (TIDE Fest 2012 (event 1) (17.4%) TIDE Fest 2014 (event 5) 24.8%. Overall only 0.8% of the population would pay between BZ\$18 to \$20.





Graph 5: Showing mean willingness to pay for lionfish across all events.

On average, the no answer had the highest representation and highest variance (41.5% ± 11.97 SE). The 2-4 category had the second highest representation and second highest variance (17.1% ± 4.93 SE). The 4-6 category had the third highest representation and third highest variance (15.4% ± 4.45 SE). The 10-12 category had a representation of (7.1% ± 2.04 SE).

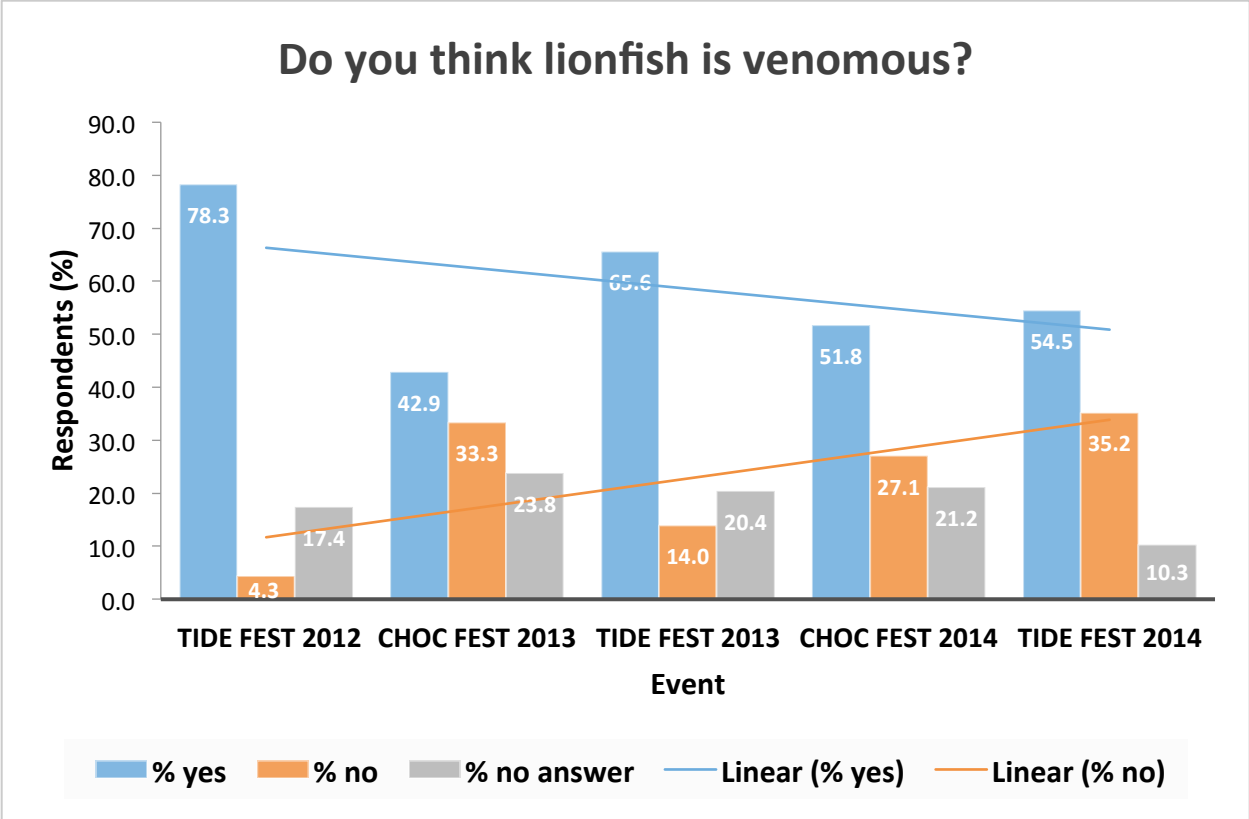


**Figure 6: Graph showing the percent of respondents that would or would not buy lionfish at the market.**

Overall, an average of 72.6 % of respondents say they would purchase lionfish if it were sold in the market. An average of 18.78% answered no and 8.5% did not respond to the question.

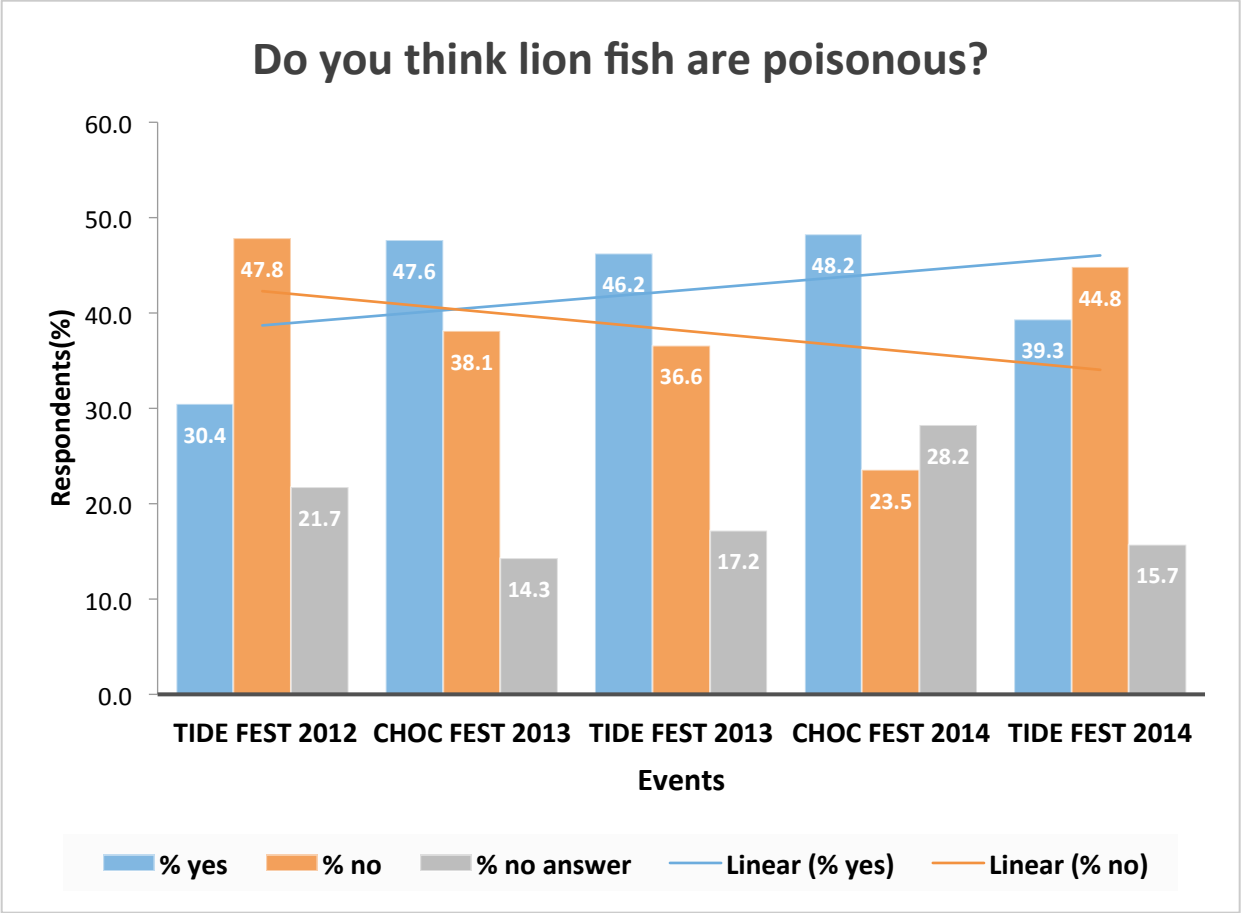
Positive responses decreased from 80.4% at TIDE Fest 2012 (event 1) to a 73.8% at chocolate fest, thereafter to 71.0% at TIDE Fest 2013 (event 3) between the first three events. Tide Fest 2012 had the least number of respondents that did not answer the question (6.5%). TIDE Fest 2014 (event 5) had the most number of respondents that did not answer the question.

Overall, while the percentage of people willing to buy lionfish at the market stays substantially higher than those not willing, the proportion of “yes” thinkers has decreased over time while the proportion of “no “ thinkers has increased over the same time.



**Figure 7: Graph showing percent respondents that think lionfish are venomous or not.**

An average of 58.6% of the respondents think that lionfish are venomous, an average of 22.8% think they are not venomous and an average of 18.6% did not respond to the question. TIDE Fest 2012 (event 1) had the highest number of individuals (78.3%) answering yes, that they think lionfish are venomous. There was an increase to (65.6%) at TIDE fest 2013 (event 3) in respondents answering yes to the question. TIDE Fest 2014 had the highest number of respondents that thought lionfish was not venomous (35.2%). Choc Fest 2013 (event 2) had the highest number of respondents that did not answer the question (23.8%). Overall, while the percentage of people thinking lionfish are venomous stays substantially higher than those thinking lionfish are not venomous, the proportion of “yes” thinkers has decreased over time while the proportion of “no “ thinkers has increased over the same time.

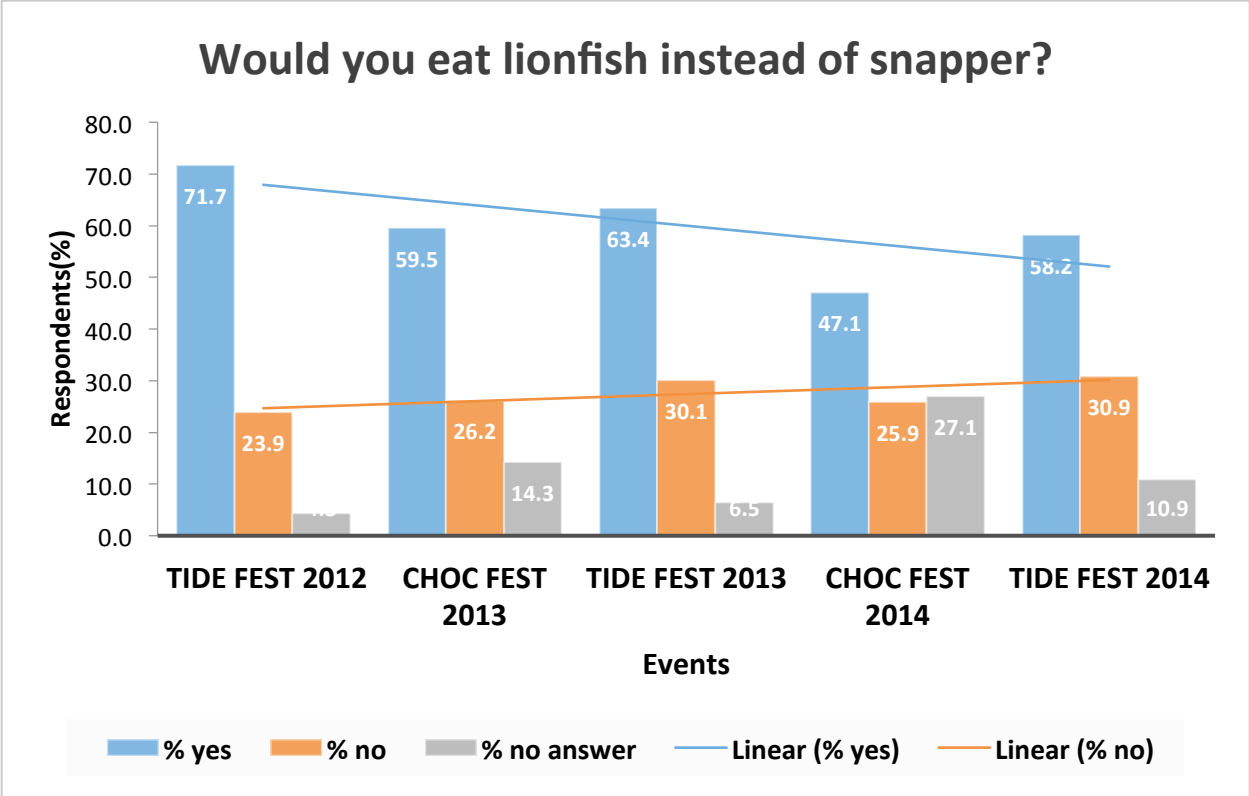


**Figure 8: Graph showing percent respondents that think lionfish is poisonous.**

An average of (42.4%) think lionfish are poisonous, an average of (38.2%) think lionfish are not poisonous. The remaining (19.4%) did not answer the question. A general increase can be seen over time with Choc Fest 2014 (event 4) having the highest respondents responding yes (48.2%) among the four events. TIDE fest 2012 (event 1) had the highest number of respondents (47.8%) answering that they don't think lionfish are poisonous. Chocolate Fest 2014 had the lowest number of respondents (23.5%) stating that lionfish was not poisonous. TIDE fest 2014 (event 5) also had a high number of respondents (44.8%) that stated they think lionfish are poisonous.

Overall, while the percentage of people thinking lionfish are poisonous has increased, while the proportion people thinking lionfish are not poisonous has decreased over the time period.



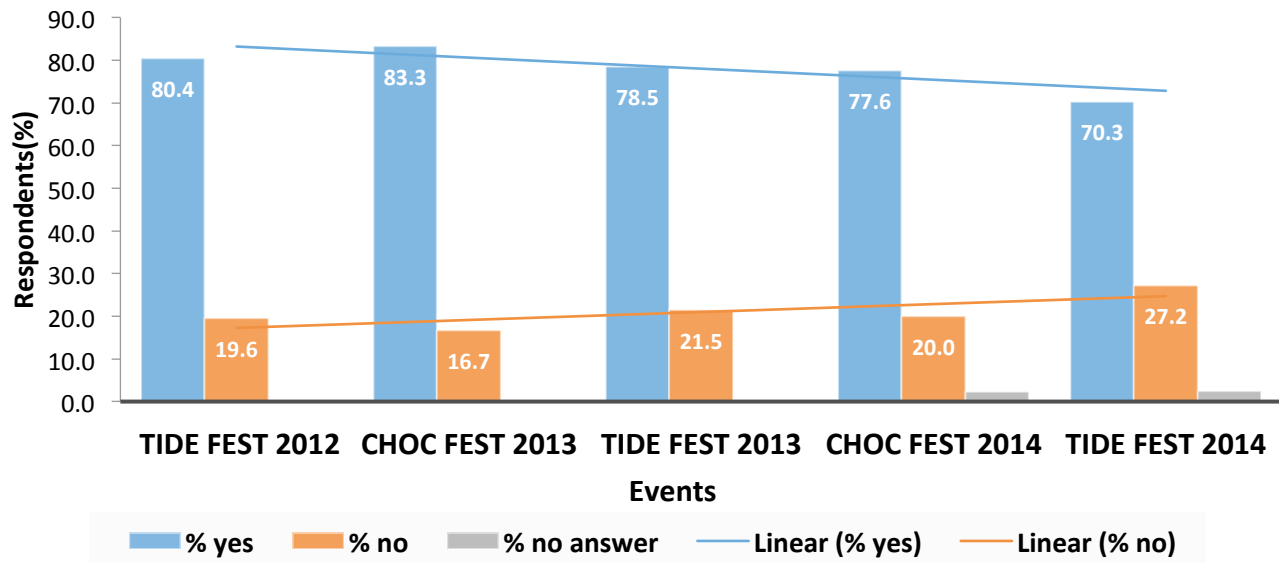


**Figure 9: Graph showing percent respondents that would eat lionfish instead of grouper or snapper.**

An average of (60%) responded and said that they would eat lionfish instead of snapper or grouper. An average of (27.4%) responded that they would not eat lionfish instead of snapper or grouper. An average of 12.6% did not respond to the question. Choc Fest 2014 (event 4) had the highest number of respondents that did not answer this question (27.1%). TIDE Fest 2014 (event 3) had the highest number of respondents (30.9%) saying that would not prefer to eat lionfish instead of grouper or snapper. TIDE Fest 2012 (event 1) had the highest number of respondents (71.7 %) that stated they prefer eating lionfish instead of snapper or grouper.

Overall, while the percentage of people stating they would be prepared to eat lionfish instead of grouper or snapper stays substantially higher than those not willing, the proportion of “yes” thinkers has decreased over time while the proportion of “no “ thinkers has increased marginally over the same time.

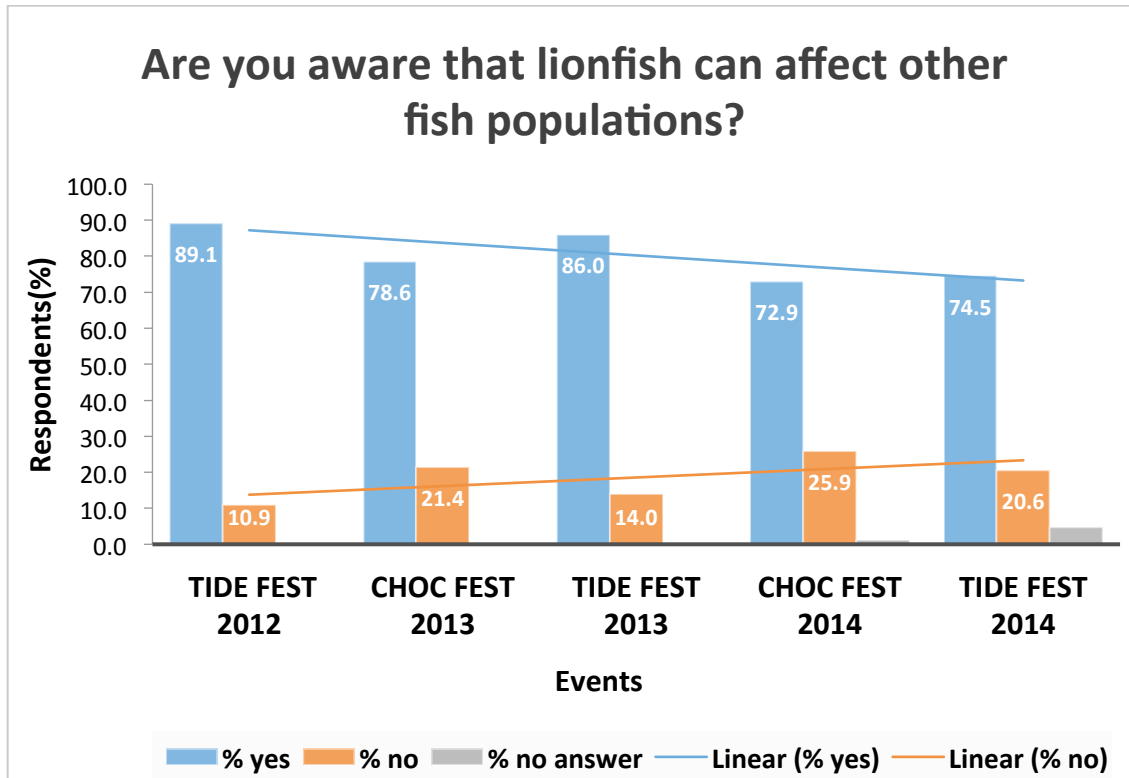
## Are you aware that lionfish are eating native reef fish?



**Figure 10: Graph showing percent respondents that are aware or not aware that lionfish are eating native species.**

An average of (78%) of the respondents over the course of the five events stated that they are aware of lionfish eating native fish species. An average of 21% of the respondents are not aware that lionfish are eating the native fish species, and an average of 1% did not respond to the question. Chocolate Fest 2013 (event 2) had the highest number of respondents (83.3%) aware of lionfish eating native fish species; TIDE fest 2014 (event 5) had the lowest number of respondents (70.3%) aware of lionfish eating native fish species.

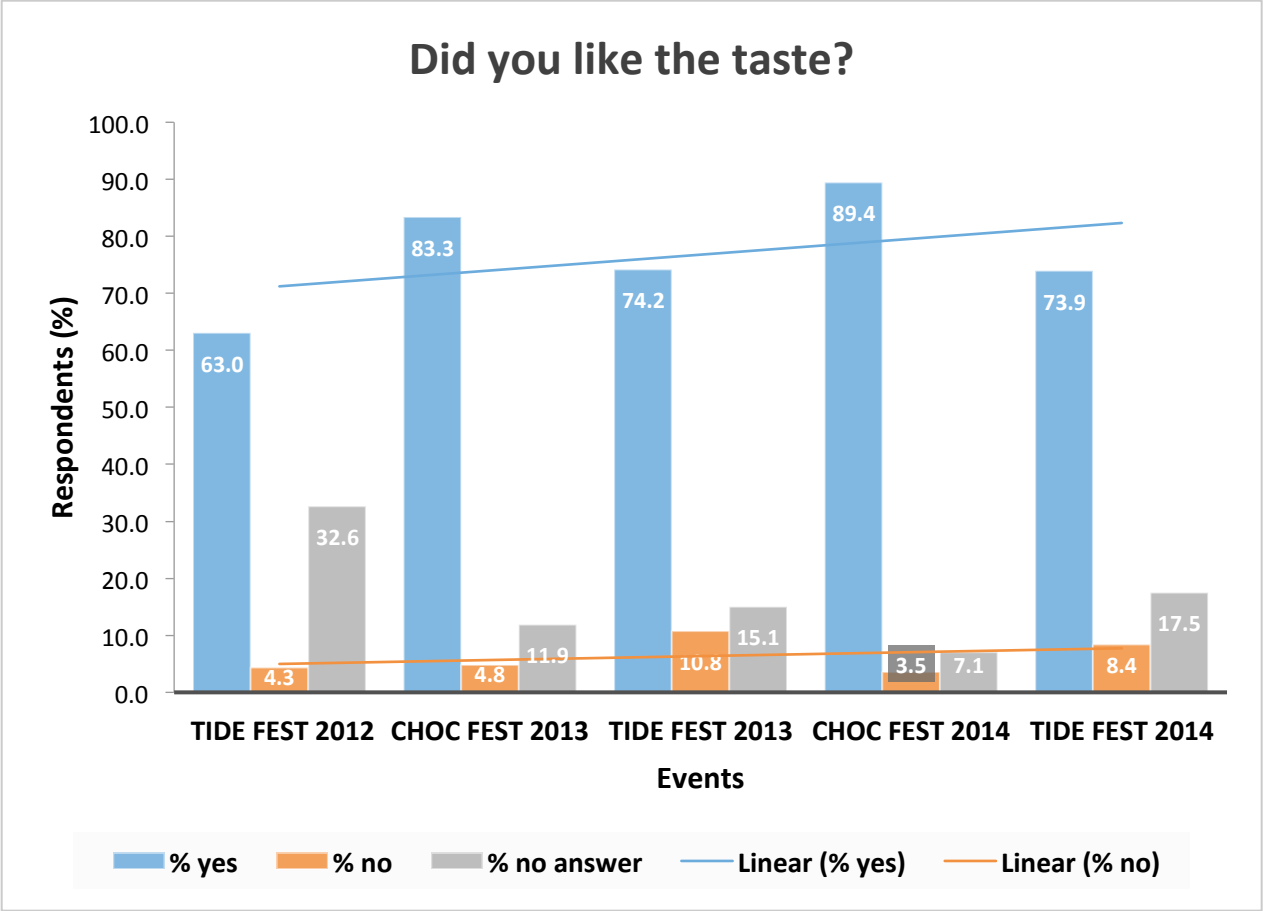
Overall, while the percentage of people stating they are aware that lionfish are eating native reef fish remains higher than those not aware, the proportion of “yes” thinkers has decreased over time while the proportion of “no “ thinkers has increased marginally over the same time.



**Figure 11: Graph showing percent respondents awareness that lionfish affect other fish populations.**

An average of (80.2%) of the respondents are aware that lionfish affect other fish populations. An average of (18.6%) of the respondents are not aware that lionfish affect other fish populations on the reef. And an average of (1.2%) of the respondents did not responded to the question. Over the course of the events, the graph shows an increase and decrease from event to event. The event that had the highest amount of respondents responding yes was at TIDE Fest 2012 (event 1) (89.1%). The event that had the lowest amount of respondents responding yes and highest number of respondents answering no to this question was Choc Fest 2014 (event 4) (72.9%) yes, and (25.9%) no.

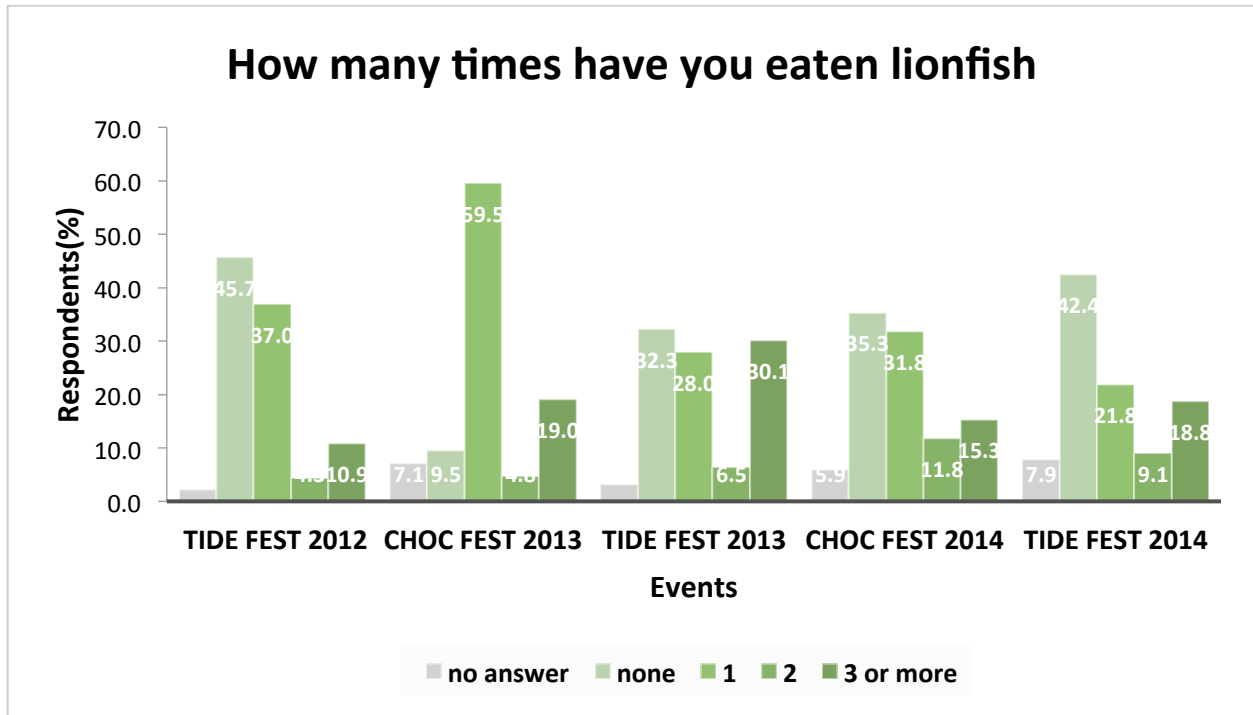
Overall, while the percentage of people thinking lionfish can affect other fish populations remains substantially higher than those who don't think this, the proportion of "yes" thinkers has decreased over time while the proportion of "no" thinkers has increased over the same time.



**Figure 12: Graph showing answers from question: Did you like the taste?**

Overall, throughout the course of the five events, an average of 76.8% liked the taste of lionfish, and an average of 6.4% did not like the taste of lionfish. 16.8% of the respondents did not answer the question. Choc Fest 2014 (event 4) had the highest number of respondents (89.4%) that like the taste of lionfish. TIDE Fest 2013 (event 3) had the highest number of respondents that did not like the taste of lionfish (10.8%). The event with the lowest number of respondents liking the taste was TIDE Fest 2012 (event 1). Throughout the course of the five events the overall liking has gone up.

Overall, the percentage of people stating they liked the taste of lionfish stays substantially higher than those stating they did not like the taste. The proportion of “yes” thinkers has increased over time while the proportion of “no “ thinkers has decreased over the same time.



**Figure 13. Graph showing percent respondents that have tasted lionfish once, twice, never or more than three times.**

An average of (33%) the respondents have never tasted lionfish before, (35.6%) of respondents have tasted lionfish one time. (7.3%) have tasted lionfish two times (18.8%) have tasted lionfish three times or more and 5.3% did not responded. To compare the events, Choc Fest 2013 (event 2) had the most respondents (59.5%) that tasted lionfish one time before. The first event, TIDE Fest 2012, had the greatest number of respondents that had not tasted lionfish before (45.7%). TIDE Fest 2013 (event 3) had the most respondents (30.1%) who had tried lionfish three times or more. The last event, Choc Fest 2014, had the most respondents that had tasted lionfish twice (11.8%)

## Discussion

The public's familiarity with lionfish is based on education, awareness and accessibility of information. TIDE has been disseminating information to the general public at five major events throughout the course of two years. Within events, most of the residents of Punta Gorda Town are somewhat familiar with basic knowledge about lionfish. Overall more than 50% are aware that lionfish is an introduced species and that it is eating some of the native fish species. Some of the youths that partook in the survey knew that lionfish had a negative impact on the reef, which indicates some form of lionfish awareness. The 18-25 year age category had the greatest number of respondents as well as greatest variance among the events. The age ranges sampled throughout the five events were mostly from the 18-25 years category; these respondents may still be attending school and may be supported by their parents or guardians. There were also some individuals that were not open to the idea of lionfish in general, they were actually afraid to taste or even look at it during the fillet demonstrations. Each event seems to have had a diversity of respondents that had different knowledge, awareness and willingness to pay for lionfish. This can be a reason why different respondents would pay more to consume lionfish and take them off the reef and out of PHMR.

Overall most respondents would purchase lionfish if it was sold at the market. They would pay roughly BZ\$4-6 per lb of lionfish. Only a small percentage (1.2%) would pay about BZ\$14 to BZ\$16 per pound of lionfish. It is likely that respondents might be open to purchasing lionfish at the market if they are familiar with the species. To compare the graph above (**Figure 3. Are you familiar with Lionfish?**) it shows a positive correlation between people who would pay for lionfish and respondents who are familiar and have basic knowledge about it. Does age influence how much people would pay for lion fish? The older respondents are the ones that would be able to purchase lionfish and fish in general because they have income.

Conducting the survey, most respondents were not sure about the difference between poisonous and venomous, which might have altered the answers they chose. This graph also correlates to **Figure 3**. Chocolate Fest 2012 had the second highest respondents being familiar with lionfish, hence the respondents might have general knowledge about lionfish. TIDE Fest 2012 (*'Do you think lionfish is venomous?'*) shows correlation with TIDE Fest 2012 (*'Do you*

*think lionfish is poisonous?*) comparing similar events in both graphs it shows that most respondents knew that lionfish are not poisonous but are venomous.

Looking at **Figure 12** (*Do you like the taste?*) 75.5% of the overall respondents like the taste of lionfish. 60.4%. The proportion of “yes” thinkers has increased over time while the proportion of “no” thinkers has decreased over the same time.

**(Figure 8:** *“Would you eat lionfish instead of snapper or grouper?”*) said that they would eat lionfish instead of snapper or grouper. However some respondents expressed that they would want the fish cleaned or filleted because they lack the knowledge to clean due to the venomous spines. Most people in Punta Gorda Town are already accustomed to purchasing and consuming native fish sold at the fish market, because it has been a tradition thought by their parents and grandparents, so getting them to consume more lionfish would be an achievable objective.

Based on the results, most of the respondents are aware that lionfish are eating the native fish species (78%). With continued awareness and public participation, it is possible to develop a pilot project having lionfish available at the fish market for purchase. When this is complete, it can then be observed and monitored over time to track changes in demand; if it is successful it can be expanded and a relationship with the Rio Grande Cooperatives to export lionfish may even be possible. Unfortunately based on the results, the willingness to pay for lionfish is not sufficient enough or worthwhile for fishermen to target them in place of native species. Majority of respondents would pay four to six dollars per pound for lionfish which is not reasonable for the fishermen. What would be worthwhile is something like \$10-\$15 when you factor in fuel and cleaning.

In addition more education and awareness is needed if a potential lionfish market is to be developed. Some individuals are still not open to the idea that lionfish meat is delicious and edible. Moreover, fishermen would need some sort of incentive to extract lionfish; they are in limited amount in PHMR. For a fisherman to get a profitable amount of lionfish to sell they would have to navigate considerable distances to the reef or nearby which is about two hours away from Punta Gorda Town.

## Recommendations

In the future, what can be done to further spread awareness and education to the general public is to have a lionfish festival annually. During the festival, different lionfish activities can be done by various government and non-governmental organizations to illustrate the impacts lionfish have on the ecosystem. Different environmental competitions such as poster, poem, and mascot can be extended to primary and secondary school students to assist them in appreciating the natural resources. Lionfish cook-off competitions for restaurants and the general public can also be extended to secondary school home economics classes. With this being implemented, it will provide the public knowledge of several ways of preparing a lionfish dinner. More awareness can bring about better management of the lionfish population.

When it comes to individuals who are still sceptical about tasting or buying lionfish, a different method can be used to reach out to these people. Aesthetic comes a long way in the business of distribution, how a product is packaged may be what attracts the consumer to take a look at the product as it sits on supermarket shelves. If lionfish fillet is packaged in such a way that the appearance is pleasing, it is hopeful that more lionfish would be in demand based on the price.

Advertisement can also play a major role in promoting a product. It is the best way to communicate to customers about availability, price, importance of consuming lionfish and where it can be found to purchase. This can be done using various media types, different techniques and methods can be used to reach a wider and more diverse target audience. If this can be accomplished in marketing lionfish, eventually more and more people will start to eat lionfish. This in turn will then provide for better control of the lionfish population.



## Conclusion

This survey indicates that in Punta Gorda town, the general public is becoming more aware of the existence of lionfish and the negative impacts they have upon the environment and commercial fish species. Only with the help of the general public can lionfish be properly managed and kept under control. TIDE recognizes that the only feasible long- term management solution for controlling the lionfish population in PHMR is to create the incentives for fishers to catch them routinely. This can only happen if their market value is high enough to make it worthwhile. The residents of Punta Gorda Town are not accustomed to eating lionfish and having it be a part of their diet. For them to consume lionfish, constant awareness and much education is needed for them to change or adapt to eating a non-native fish species. Education and awareness is ongoing, but enhancement of advertisement and more exposure through public events will help more individuals understand the life cycle and behaviour of lionfish and how they are affecting our coral reefs. A lionfish market can be successful if the general public is knowledgeable about it and if they create a demand for lionfish by asking for it at their favourite seafood restaurant. By doing this it will encourage restaurants, local businesses and hotel owners to demand lionfish regularly from fishermen which will form a chain reaction.

Exportation of lionfish jewellery can also be a marketable product that may provide more jobs and income to the local fishermen and perhaps other family members and entrepreneurs. These jewellery products, if packaged and advertised can widen their range to high end hotels, resorts and tourism gift shops in and around the country of Belize. This answer to combat the increasing population of lionfish is a great example of a practical sustainable approach to a problem that touches several issues. By using the momentum of the targeted fishing of lionfish to conserve the coral reef, the social initiative to train Belizean women to make lionfish jewellery would provide income for families, reduce waste, and feed off an already successful initiative to magnify the possible fishery market. This can then increase a labour force all while empowering Belizean women. Hopefully lionfish will start to become a culture in Punta Gorda Town and surrounding villages and the population of lionfish could be managed because of the demand.

The survey indicates that while overall perceptions lean towards the right direction for establishing a lionfish industry, there has been a reduction in awareness over time. This could be

due to changes in demographics from one event to the next, or could be due to more unaware people deciding to approach the lionfish booths as the word spreads. It is suspected that the earlier events attracted more exclusively individuals who were more aware and willing to give it a go, while later on more people have heard at least something about lionfish to convince them to come to the booth even though they have little awareness

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