

# Socio-economic aspects of turtle conservation in the Cayman Islands

Key results report | October 2015



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## **Executive summary**

The aim of the project “*Socio-economic aspects of turtle conservation in the Cayman Islands*” is to provide data on the role of the Cayman Turtle Farm in wild turtle conservation. The project, granted to the Cayman Islands Department of Environment and funded through the UK Government’s Darwin Initiative, is being implemented in collaboration with researchers from the University of Exeter, UK. This project aims to allow determination of cultural importance, current prevalence and socio-economics of turtle consumption in the Cayman Islands.

From September 2014 to June 2015, we conducted interviews with 597 households, 174 high school students, 204 international tourists, and 39 restaurants to investigate demand, cultural and age effects in the consumption of turtle meat and the potential influence of price and availability of farmed turtle meat in incentivising or reducing take of wild turtles.

According to our results, 30% of all residents and 62% of Caymanians by descent, i.e., having a Caymanian grandparent, consumed turtle meat at least once in the last year. Among Caymanians by descent, 7% ate turtle once during last year, 39% ate turtle meat a few times, 14% had turtle every month and 2% had turtle every week. Key reasons given for eating turtle include taste, tradition and culture, and celebrating special occasions.

After adjusting for price, demand for the traditional turtle stew has remained relatively constant since 1996. While socio-demographic changes may influence the prevalence of turtle meat consumption in the future, we found inconclusive evidence of age-related differences in turtle consumption among residents, suggesting that this behaviour is not expected to “die out” in the near future. However, possible generational effects among residents who are Caymanian by descent may be important in the longer term because young people (<35yrs) within this socio-demographic group were significantly less likely to have eaten turtle in the last year.

We identified 41 restaurants or informal food businesses serving turtle dishes in the Cayman Islands. Among residents, 79% did not have turtle meat in a restaurant last year, 2% had it once, 14% had it a few times per year, 3% had it every month and 1%

had it every week. During our tourist sampling period in November 2014, 2% of the stay-over tourists and 6% of the cruise ship tourists ate turtle during their visit to the Cayman Islands.

Our results show that resident turtle meat consumers are significantly influenced by the price of turtle meat, distance which must be travelled to obtain it, and the source of the meat, preferring lower prices, shorter distances, and farmed meat. Price was the main driver of consumer decisions, suggesting that the general consumer will choose the cheapest turtle meat, regardless of its source. While farmed meat is generally preferred by the overall consumer population, wild meat is selected if distances to obtain farmed meat are too great. Our study also shows that 16% of consumers prefer wild turtle. Taste was the main reason for consumers preferring wild turtle, while wild turtle being illegal and availability were the main reasons for consumers preferring farmed turtle.

Despite the presence of a legal source of turtle meat, illegal take is high relative to the size of the Cayman Islands wild turtle nesting population, with at least 195 households estimated to have bought illegal turtle meat during the last year.

Our study indicates that action must be taken to safeguard Cayman Islands wild turtle populations and continued monitoring of turtle meat sales and illegal take should be undertaken so that management interventions can be informed by robust scientific evidence on social, economic and biological aspects of turtle conservation.

## **Study rationale**

Throughout the history of the Cayman Islands, turtles have played an important role in the economy and culture; the turtle is a national emblem, enshrined in the flag and currency, and turtle meat is considered by some to be the Cayman Islands' "national dish". In 1968, a commercial captive breeding operation, now the Government owned Cayman Turtle Farm (CTF), was established to provide turtle meat for consumption, reduce demand on wild stocks, and replenish the wild nesting population through the release of hatchling and yearling turtles. In 1978, legal protection for the remnant wild turtle nesting population, through prohibiting take of turtle eggs and nesting females, was instituted; further protections were added in 1985 and 2008.

However, illegal take of turtles from the wild is known to occur and production of turtle meat by CTF (as well as the importance and current prevalence of turtle consumption) is often hotly debated and controversial. CTF has also recently been subject to an international campaign to end turtle farming by the international NGO World Animal Protection (WAP; formerly known as WSPA – World Society for the Protection of Animals). This campaign has raised animal welfare issues and, from a species management and conservation perspective, arguments have been made that CTF is creating demand among international tourists, maintaining or stimulating demand among Caymanians, and potentially driving a black market for wild turtle products by creating market opportunities for turtle meat obtained through illegal take. Alternatively, CTF and the Cayman Islands Government have argued that CTF is both enhancing wild stocks through releases and reducing illegal take of wild turtles by providing a legal source of meat.

The aim of the ongoing "*Socio-economic aspects of turtle conservation in the Cayman Islands*" project is thus to provide robust scientific data on the role of the Cayman Turtle Farm in wild turtle conservation. The project, granted to the Cayman Islands Department of Environment (DoE) and funded through the UK Government's Darwin Initiative, is being implemented in collaboration with researchers from the University of Exeter, UK (UoE). In this document, we focus on the key findings regarding the social component of the project.

## **Study approach**

In June-July 2014, a researcher from UoE conducted semi-structured interviews with 26 stakeholders (including representatives of the Cayman Turtle Farm, Cayman Islands Department of Environment and Department of Tourism, World Animal Protection, members of the hospitality and diving industries, and members of the Cayman Islands Seafarers Association) to identify questions of conservation and policy relevance regarding turtle meat in the Cayman Islands. That information was then used to design and implement social surveys targeting resident households (n=597), airport tourists (n= 87), cruise ship tourists (n= 117), high school students (n= 174) and restaurants (n=39) in the Cayman Islands. Social surveys were conducted during: 19<sup>th</sup> September to 2<sup>nd</sup> December 2014 for resident household; 10<sup>th</sup> to 21<sup>st</sup> November 2014 for cruise ship tourists; 14<sup>th</sup> to 26<sup>th</sup> November 2014 for airport tourists; 3<sup>rd</sup> to 24<sup>th</sup> November 2014 for high school students; and 3<sup>rd</sup> November 2014 to 18<sup>th</sup> June 2015 for restaurants. Sales information provided by CTF was also analysed.

This document describes our key findings, providing scientific information for each of the main questions listed by stakeholders in our initial surveys; the detailed methodological description of our approach and further findings are presented elsewhere. The questions were categorized into the following five encompassing themes that we use to group them in this document: demand by residents; restaurants and tourists; turtle meat sales; illegal turtle meat; and management preferences.

Unless stated otherwise, the term “consumers” used throughout this report refers to people that consumed turtle at least once during the 12 months prior to our study.

The term “residents” used throughout this report refers to people who have been living in the Cayman Islands for at least 6 months or intend to live in the Cayman Islands for 6 months or more, following the terminology used for Cayman Islands’ official national census.

95% confidence intervals are provided in brackets for our estimates, representing a range that is plausible given the values actually observed.

When figures are presented, bars surrounding estimates represent standard errors.



## **Key findings**

This section presents a summary of our results, providing information for each of the main questions listed by stakeholders. The detailed methodological description of our approach and further findings will be presented in scientific publications; additional information can be obtained directly from the researchers (contact details are provided on page 2).

### **I. Demand by residents**

#### ***a. How was the sample of resident households selected?***

The Cayman Islands household register, compiled by the Cayman Islands Economics and Statistics Office, was used as a sampling frame for household selection. One hundred households in each of the six districts were randomly selected. The islands of Cayman Brac and Little Cayman were considered together as part of the Sister Islands district. Given that the number of households sampled from each district is not proportional to their representation in the total population, we accounted for that in our analyses through weighting. This is a standard procedure used to convert this information to give estimates for the total population through scaling values proportionally to district population size.

In table 1, we present key characteristics of our sample of resident households. The percentages in the total resident population in the Cayman Islands (5<sup>th</sup> column) were taken from available information presented in Labour and Census reports from 2013 and 2010, respectively. Thus, they are presented here simply as an indicative measure, given the time lag and different reference levels (e.g. younger age group in those reports ranges from 15 to 24, instead of 18 to 24 as we used in our study).

**Table 1.** Key socio-demographic characteristics of sample of resident households.

<b>Name of variable</b>	<b>Level</b>	<b>Percentage in study sample <sup>a</sup></b>	<b>Weighted percentage in study</b>	<b>Indicative percentage in total population</b>
Gender	Male	50.5	50.9	48.7 <sup>b</sup>
	Female	48.6	49.1	51.3 <sup>b</sup>
Level of education	Primary school or lower	9.2	4.7	4.6
	High school	49.3	47.2	47.8
	Higher education	39.5	48.0	45.5
Household size	Below median (<3)	47.0	45.6	N/A <sup>c</sup>
	Equal or above median (≥ 3)	52.0	54.4	
Age group	18-24	8.4	7.2	10.4 <sup>d</sup>
	25-34	18.7	21.7	17.5 <sup>d</sup>
	35-44	27.1	27.6	21.0 <sup>d</sup>
	45-54	26.4	27.3	17.8 <sup>d</sup>
	55-64	9.4	9.6	9.5 <sup>d</sup>
	65+	10.0	6.6	7.0 <sup>d</sup>
Nationality	Cayman Islands	52.7	41.7	55.2 <sup>e</sup>
	Jamaica	20.4	23.6	21.8
	Other	12.8	17.3	5.6
	Cayman Islands & other	7.5	8.9	--- <sup>e</sup>
	UK/USA	6.4	8.5	17.4
Registered for voting	Yes	53.0	45.7	45.1
	No	45.2	54.3	54.9
Any grandparents born in CI	Yes	48.4	36.1	N/A
	No	50.3	63.9	
District	George Town	16.4	54.4	54.3
	West Bay	16.2	19.5	19.7
	Bodden Town	16.1	17.2	17.6
	North Side	16.7	2.3	2.2
	East End	17.3	2.6	2.4
	Sister Islands	17.3	4.0	3.8

<sup>a</sup> Percentages do not always sum up to 100% due to missing data (i.e. when respondent refused to answer a specific question or interviewer entered information incorrectly).

<sup>b</sup> These values refer to the overall resident population (i.e., not only adults).

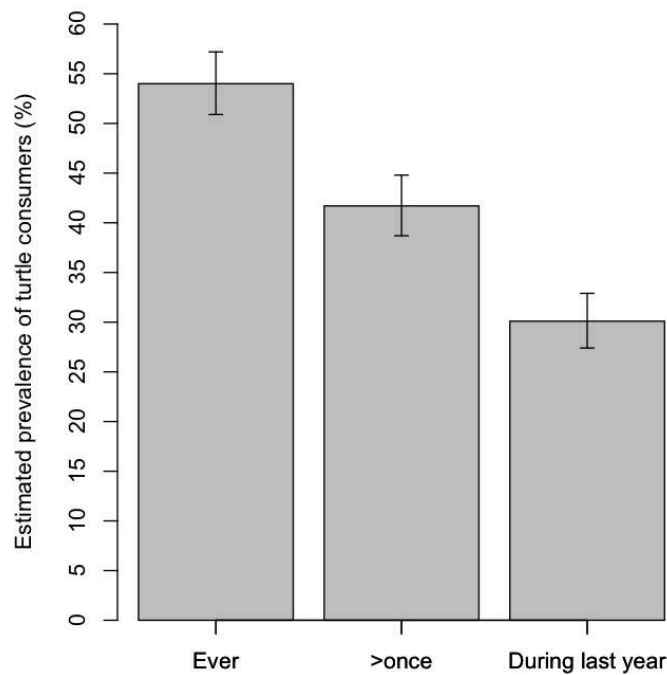
<sup>c</sup> Information not available in the same format but estimated national average household size was 2.4 people in 2010.

<sup>d</sup> Younger age group in available reports ranges from 15 to 24, instead of 18 to 24 as we used in our study.

<sup>e</sup> This percentage includes all residents with Cayman nationality, including those with dual nationalities (which we have considered separately in our study).

**b. What is the prevalence of turtle consumption by residents?**

In the Cayman Islands, approximately 54% (95% CI: 50.9-57.2) of the resident households have consumed turtle at least once during their lifetimes (Figure 1). 42% (95% CI: 36.0-48.0) of the resident households have eaten it more than once, suggesting that around 22% of those who tried it are potentially no longer interested in consuming it. 30% (95% CI: 25.1-35.9) of the resident households consumed turtle at least once during the 12 months previous to our study.



**Fig. 1.** Estimated prevalence of turtle meat consumers among resident households in the Cayman Islands. Ever: consumed turtle meat at least once during their lifetimes; >once: consumed turtle meat more than once during their lifetimes; during last year: consumed turtle meat at least once during the 12 months previous to the study.

**c. What are the reasons given by residents for eating or not eating turtle meat?**

To avoid leading respondents into giving answers in a specific way, we asked them to list their reasons for eating or not eating turtle meat without providing pre-defined options. The number of respondents mentioning a certain reason is thus used here as an indication of its relative importance, and percentages are merely suggestive.

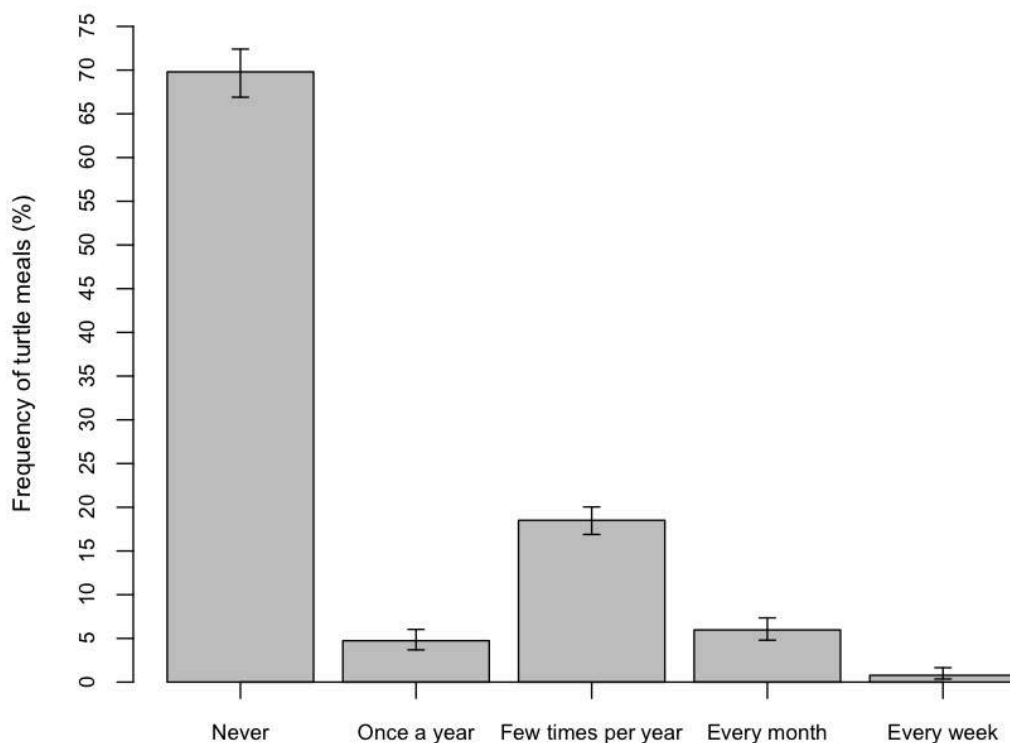
**Table 2.** Reasons mentioned by survey respondents for eating or not eating turtle meat.

Respondents were allowed to list multiple reasons.

<b>Type of behaviour</b>	<b>Reasons mentioned by respondents</b>	<b>Number of respondents that mentioned reason</b>	<b>Percentage out of total number of respondents per group</b>
Consumption of turtle meat (N= 281)	• Taste	166	59
	• Tradition	91	32
	• Culture	62	22
	• Celebrating special occasions	29	10
	• Availability	10	4
	• Belief of being healthy food	2	1
Never eating turtle meat (N= 217)	• Simply not being interested	105	48
	• Eating turtles being “wrong” (e.g. turtles not seen as food)	17	8
	• Religion	15	7
	• Animal welfare/endangered species	13	6
	• Lack of opportunity, including high price	12	6
	• Vegetarian	7	3
	• Not in their culture	5	2
	• Allergic to seafood	1	1
Only having eaten turtle meat once (N= 62)	• Dislike for its taste after trying it	38	61
	• Curiosity	10	16
	• Not had another opportunity	3	5
	• No longer being interested after “meeting sea turtles”	1	2

**d. How often do residents consume turtle meat?**

As reported in question *b*, approximately 70% of resident households did not eat turtle in the Cayman Islands during the 12 months previous to our study. Around 5% (95% CI: 2.9-7.5) of the resident households had it once during the last year, 19% (95% CI: 15.3-21.4) ate turtle meat a few times, 6% (95% CI: 3.8-8.9) had turtle every month and 1% (95% CI: 0.2-3.3) had turtle every week (Figure 2). This means that, among turtle consumers only, around 16% (95% CI: 9.5-25.1) had it once, 62% (95% CI: 50.9-71.4) ate turtle meat a few times, 20% (95% CI: 12.8-29.6) had turtle every month and 3% (95% CI: 0.6-11.0) had turtle every week.



**Fig. 2.** Estimated prevalence of frequency of turtle consumption by resident households in the Cayman Islands during the 12 months previous to the study.

**e. What is the prevalence of turtle consumption by residents split by different socio-demographic factors?**

In our study, we collected information on several factors that might be useful to identify consumers of turtle meat, including: gender, education level, household size, age group, nationality, being registered for voting, having at least one grandparent born in the Cayman Islands and district of residence. We found that several of these factors were important predictors of turtle consumption and should be considered simultaneously

(see question *f*). Nevertheless, in table 3 we present a brief summary of prevalence of turtle consumption by residents split according to individual socio-demographic characteristics (for example, estimated prevalence of turtle consumption for men vs. women) without accounting for other factors.

**Table 3.** Estimated prevalence of turtle meat consumers (people who ate turtle during the 12 months previous to our study) among residents split according to individual socio-demographic variables (from bivariate analysis).

<b>Name of variable</b>	<b>Level</b>	<b>Estimated prevalence (%)</b>	<b>95% confidence intervals</b>
Gender	Male	32.0	24.8-40.2
	Female	27.6	20.7-35.7
Level of education	Primary school or lower	35.4	16.8-59.9
	High school	30.1	23.0-38.4
	Higher education	29.1	21.8-37.7
Household size	Below median (<3)	20.7	14.7-28.5
	Equal or above median ( $\geq 3$ )	39.0	31.3-47.2
Age group	18-24	37.3	21.1-57.0
	25-34	20.9	12.9-32.0
	35-44	23.5	15.1-34.5
	45-54	39.5	28.6-51.5
	55-64	43.3	25.6-63.0
	65+	24.4	10.8-46.0
Nationality	Cayman Islands	55.6	46.7-64.3
	Jamaica	12.3	6.3-22.7
	Other	8.9	3.5-20.6
	Cayman Islands & other	26.6	12.3-48.1
	UK/USA	2.5	0.4-13.7
Registered for voting	Yes	52.5	43.7-61.1
	No	11.8	7.4-18.2
Any grandparents born in CI	Yes	62.2	53.0-70.5
	No	12.5	8.2-18.7
District	George Town	22.8	15.3-32.5
	West Bay	38.5	29.0-48.9
	Bodden Town	36.7	27.3-47.1
	North Side	45.2	35.3-55.4
	East End	41.2	31.9-51.3
	Sister Islands	47.4	37.7-57.4

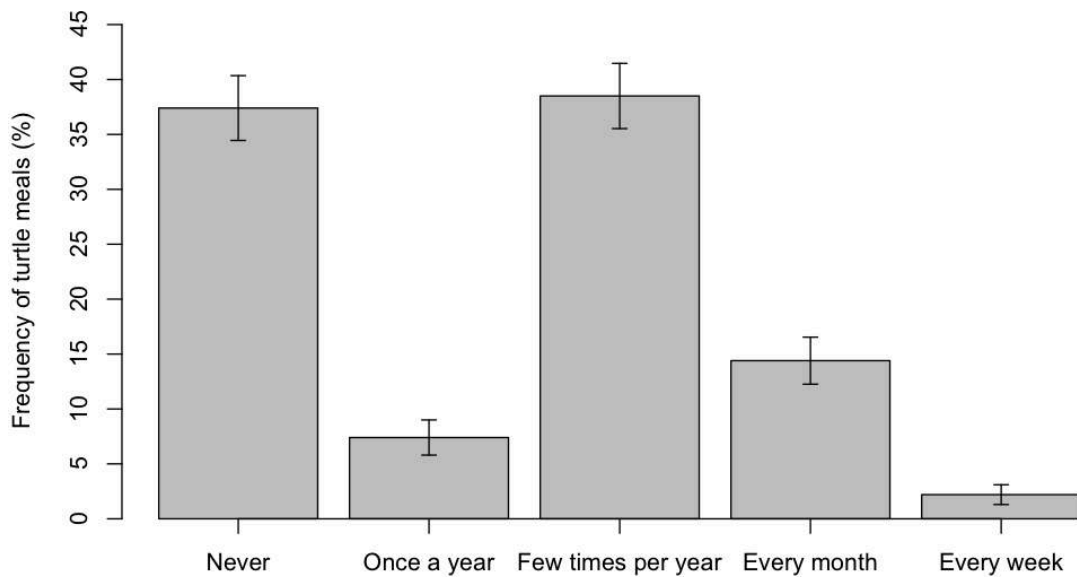
***f. What is the socio-demographic profile of turtle consumers among residents?***

Among the socio-demographic variables that we collected in the social surveys (i.e. household size, district of residence, age, gender, education level, nationality, having at least one grandparent born in the Cayman Islands and being registered for voting), the best predictors of turtle consumption were: gender, voting registration and having at least one grandparent born in the Cayman Islands. For example, the “typical” person that ate turtle meat during the 12 months previous to our study is a man, registered for voting and with at least one grandparent born in the Cayman Islands (52% prevalence in this group), while the typical non-consumer is a woman, not registered for voting and without Cayman-born grandparents (1% prevalence in this group).

***g. Is nationality a good predictor of turtle consumption among residents?***

According to our statistical analyses, when comparing with other socio-demographic variables, nationality was not among the most important factors predicting turtle consumption (see question *f*), although being a Caymanian by descent, i.e., having a Caymanian grandparent, was an important predicting factor. Nevertheless, if we ignore the other socio-demographic factors (i.e. take only nationality into consideration), Caymanian residents were more likely to eat turtle meat than people with other nationalities. Estimated prevalence of consumption among different nationalities, as shown in table 3, is: 56% among Caymanian; 27% among Caymanians who have dual nationality; 12% among Jamaican; 3% among British and American; and 9% among other nationalities.

By looking at differences between those with and without Caymanian grandparents, we find that, as shown in table 3, Caymanian by descent were more likely to have consumed turtle meat during the last year; estimated prevalence of consumption is 62% for those with a Caymanian grandparent and 13% for those without. In addition, if we focus on the frequency of turtle meals for only those people with at least one Cayman-born grandparent, we find that 37% (95% CI: 31.6-43.2) did not have turtle during the last year, 7% (95% CI: 4.3-10.5) had it once, 39% (95% CI: 32.7-44.3) ate turtle meat a few times, 14% (95% CI: 10.2-18.6) had turtle every month and 2% (95% CI: 0.5-4.0) had turtle every week (Figure 3).



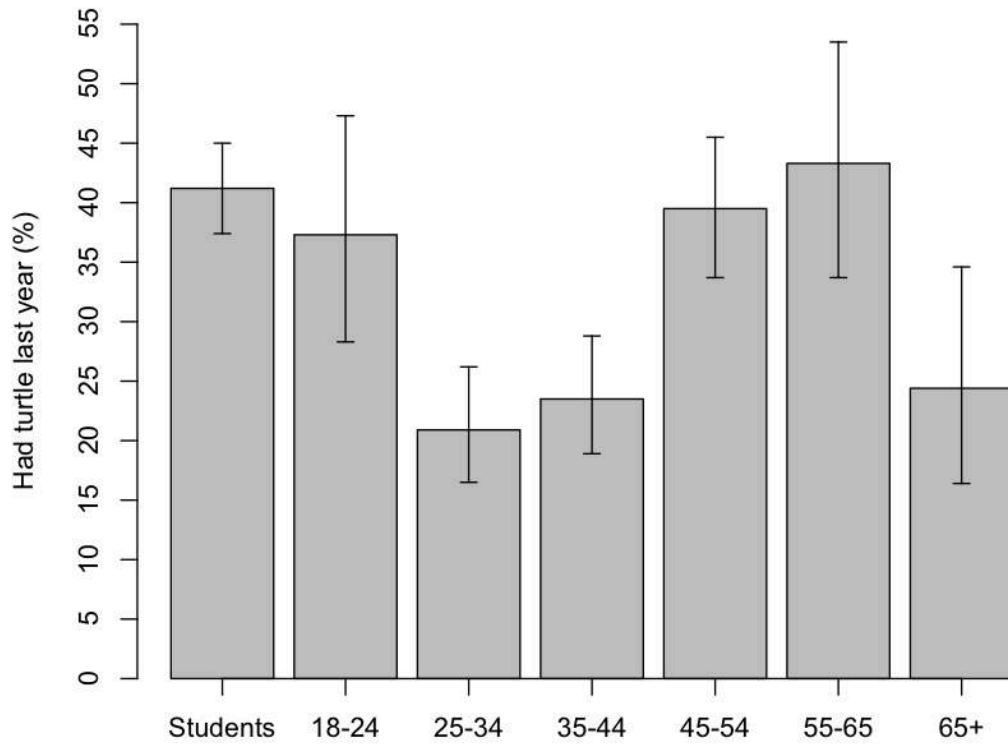
**Fig. 3.** Estimated prevalence of frequency of turtle consumption during the 12 months previous to the study by residents with at least one Cayman-born grandparent.

***h. Are there age differences in turtle consumption among residents?***

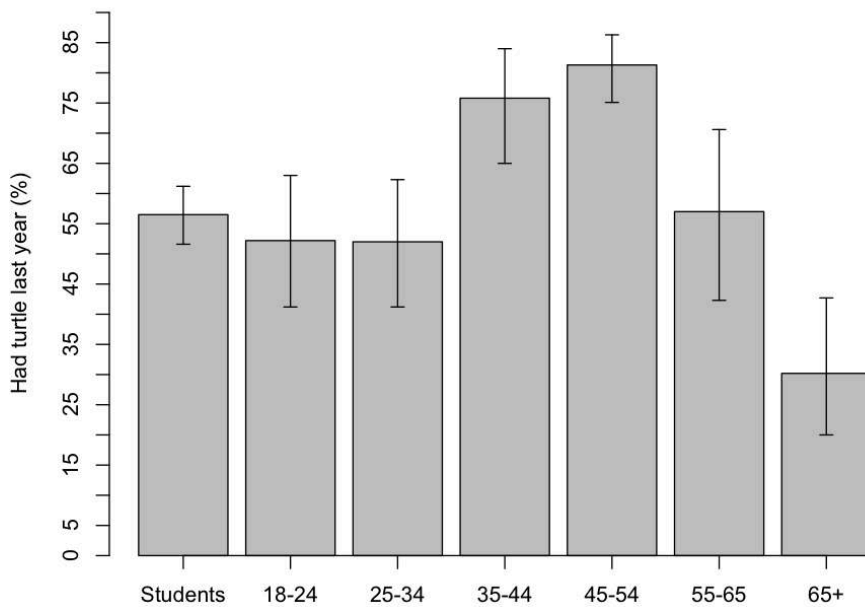
According to our statistical analyses, when comparing with other socio-demographic variables, age was not among the most important factors predicting turtle consumption (see question *f*). Nevertheless, if we ignore the other socio-demographic variables (i.e. take only age group into consideration), we find that some age groups seem to have higher prevalence of turtle consumers but these differences are not statistically significant (Figure 4); we thus found inconclusive evidence of age differences in turtle consumption among residents. In addition, based on surveys of high school students (aged 13 to 17 in our sample), prevalence among high school students is similar to that by other young people (Figure 4).

However, when we restricted this analysis to people with at least one Cayman-born grandparent, we found that consumption prevalence was highest amongst those aged 45-54 years old. People in this age group were significantly more likely to have consumed turtle than people at the youngest age groups (18-34) and people at the oldest age group (65+; Figure 5). This suggests potential issues related to access and/or interest in turtle meat according to age group in residents who are Caymanian by descent.





**Fig. 4.** Estimated prevalence of turtle consumption during the 12 months previous to our study according to age group of residents in the Cayman Islands.



**Fig. 5.** Estimated prevalence of turtle consumption during the 12 months previous to our study according to age group of residents with at least one grandparent born in the Cayman Islands.

***i. To what extent do residents feel they can get turtle meat if they want to?***

When comparing current (i.e. during last year) and desired frequency of turtle meals among consumers, approximately 55% (95% CI: 44.4-65.0) would maintain the same consumption level, 44% (95% CI: 33.8-55.0) would like to have turtle more often, and 1% (95% CI: 0.2-4.0) would decrease their consumption. In general, those who currently eat turtle every month reported that they would like to keep the same consumption level while those who have turtle once a year would like to eat more often, i.e., either monthly or weekly. For those that would like to eat turtle more often (n=95), restrictions mentioned by the respondents were related to price (n=91; 96%) and availability (n=40; 42%).

Based on the estimated 2.5 individual servings per pound of turtle meat cooked at home (information obtained in this study<sup>1</sup>), an additional 31,000 lbs of turtle meat per year would be needed to meet desired consumption levels, suggesting that demand by residents is currently not being fully met. This would represent an increase of more than 50% compared to the current level of sales reported by CTF in 2014. Please note this does not take price and availability into account (i.e. respondents were reporting “ideal” scenarios while ignoring potential restrictions) and animal welfare and husbandry factors should be taken into consideration when making decisions about animal production.

***j. Are residents currently eating more or less turtle than before?***

Because information about turtle meat consumption by individual households was not previously collected, we asked study respondents to recall past behaviour and compare how often they eat turtle meat currently with how often they think they used to eat it 5 years ago. When compared to how often they used to eat turtle 5 years ago, 45% (95% CI: 35.1-56.0) of the consumers reported eating less frequently now, 11% (95% CI: 5.8-19.0) eat more frequently now and 44% (95% CI: 34.0-55.0) kept similar frequency levels.

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<sup>1</sup> The conversion of 2.5 individual servings of cooked turtle per pound of raw turtle was the average of the conversion factors reported by surveyed household respondents who cook turtle themselves.

Price (n=76; 62%) and availability (n=25; 20%) were the main barriers mentioned by respondents who decreased consumption (n=123), with other reasons including: change in personal conditions (n=16; 13%), such as adopting new religion; personal health and change in diet (n=14; 11%), and animal welfare (n=1; 1%). Those that increased consumption (n=26) mentioned personal taste/change in family conditions (n=14; 54%), reduction in price (n=7; 27%) and increased availability (n=6; 23%) as reasons for their new habits.

***k. In the near future, is the prevalence of turtle consumption by residents likely to change?***

The inconclusive evidence about age differences in turtle consumption among all residents (see question *h*) suggests that this behaviour is not likely to “die out” in the near future, although socio-demographic changes in the resident population might affect its overall prevalence. However, given the differences in consumption prevalence among residents who are Caymanian by descent, our results suggest possible generational effects being of importance in the longer term because those younger than 35 years old were significantly less likely to have eaten turtle. Nevertheless, current high consumption prevalence among all age groups among residents who are Caymanian by descent suggests that, in the near future, consumers will remain interested in eating turtle. Actually, given that most consumers reported being interested in maintaining or increasing the frequency of turtle meat consumption (see question *i*), prevalence of turtle consumption by resident consumers is not expected to decrease in the near future and would most likely increase if turtle meat production increased.

**II. Restaurants and tourists**

***1. How many restaurants serve turtle in the Cayman Islands?***

We identified 41 restaurants or informal food businesses serving turtle dishes; 34 were located in Grand Cayman and 7 in the Cayman Brac. The total of 41 restaurants serving turtle dishes were considered for our survey but we could not contact 2 of them and, unfortunately, 9 refused to answer our survey.

Among the 30 surveyed restaurants, 12 served turtle dishes several times per week, 12 once a week and six a few times a month or less often. Sixteen of these restaurants

would like to serve turtle dishes more often and 14 would like to keep the same frequency, while none would like to sell turtle dishes less often. Among those 16 restaurants that would like to serve turtle dishes more often, reasons for currently not serving turtle dishes as often as desired included price (n=13) and access/availability of turtle meat (n=11), as well as being a demanding dish that requires a lot of preparation (n=1) and currently having fewer customers than usual (n=1). Reported reasons for serving turtle dishes included: demand (n=21), national dish/tradition (n=15) and perceived health benefits (n=1).

***m. How many turtle meals are served by restaurants?***

Because no receipts or sales information from restaurants was available to quantify this, we used several sources of information to estimate a plausible range of numbers of turtle meals being served in restaurants in the Cayman Islands:

- Based on self-reported information provided by surveyed restaurants, the total number of meals served in restaurants in the Cayman Islands per year is around 47,970 (95% CI: 31,980 - 95,940), generating an annual revenue of approximately \$CI 461,000 - 1382,000. However, 9 restaurants refused to answer our survey and, although we did not find a systematic bias according to expected the level of turtle sales according to receipts from CTF (i.e. low, medium or high), it is possible this affected the robustness of this extrapolation.
- Based on self-reported information provided by surveyed restaurants, 95% of restaurant clients ordering turtle are “locals” and 5% are tourists. This provides a rough estimate of approximately 1,596-4,800 turtle meals served to tourists per year in the country. However, information gathered from tourist surveys suggests that this might be considerably underestimated (see question *n*).
- Based on information provided by resident households, 79.1% of residents (95% CI: 75.6-82.3) did not have turtle meat in a restaurant last year, 2.3% (95% CI: 1.3-3.8) had it once, 14.3% (95% CI: 11.6-17.3) had it a few times per year, 3.2% (95% CI: 2.0-4.9) had it every month and 0.7% (95% CI: 0.2-1.7) had it every week. This suggests around 75,142 turtle meals being consumed per year by residents in restaurants.

- Based on sales information available from CTF, at least 25,287 lbs of turtle meat were sold to restaurants in 2014. Assuming 1.5 individual servings per pound of turtle meat cooked in restaurants (information obtained in this study<sup>2</sup>), this represents around 37,931 turtle meals. However, 37.5% of the CTF receipts had missing name information and could not be allocated to type of buyer (i.e. restaurant, individual or group).

To produce a more robust estimate of turtle meals served in restaurants, sales information could be made available directly from restaurants. Accurate records must also be kept by the Cayman Turtle Farm for comparison and auditing purposes, compared to the sales information reported by the restaurants. Nevertheless, our findings suggest that around 38 000 - 95 900 turtle meals have been consumed in restaurants last year.

***n. What is the prevalence of turtle consumption among tourists?***

We surveyed cruise ship tourists and stay-over tourists during a three-week period in November 2014; this brief sampling period does not allow robust extrapolation to annual estimates because tourists' preferences and socio-demographics may vary during the year so our estimates are suggestive only.

In our study, 2.3% (95% CI: 0.4-7.0) of the stay-over tourists and 6.0% (95% CI: 2.6-11.3) of the cruise ship tourists had eaten turtle during their visit to the Cayman Islands. Extrapolating these values to the number of tourists that entered the Cayman Islands in November 2014, this represents around 683 turtle meals consumed by stay-over tourists and 7,633 consumed by cruise ship tourists during that month. Among the ten surveyed tourists that had eaten turtle, two of them ate it at street stands during Pirates week, suggesting the need to quantify effect of increased availability of turtle meat during this time of the year on consumption prevalence among tourists. In addition, please note discrepancy with estimates obtained from information self-reported by restaurants, suggesting the need to undertake regular monitoring of turtle consumption by tourists and through restaurants to gain additional information (see question *m*).

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<sup>2</sup> The conversion of 1.5 individual servings of cooked turtle per pound of raw turtle was the average of the conversion factors reported by the restaurants themselves during this survey.

***o. What are the reasons given by tourists for eating or not eating turtle meat?***

To avoid leading respondents into giving answers in a specific way, we asked them to list their reasons for eating or not eating turtle meat without providing pre-defined options. The number of respondents mentioning a certain reason is thus used here as an indication of its relative importance, and percentages are merely suggestive.

**Table 4.** Reasons mentioned by tourists for eating or not eating turtle meat.

Respondents were allowed to list multiple reasons.

<b>Type of behaviour</b>	<b>Reasons mentioned by respondents</b>	<b>Number of respondents that mentioned reason</b>	<b>Percentage out of total number of respondents per group</b>
Consumption of turtle meat (N= 20)	• Unique experience	8	40
	• Taste	5	25
Never eating turtle meat (N= 184)	• Simply not being interested	94	51
	• Animal welfare/endangered species	33	18
	• Lack of opportunity	31	17
	• Vegetarian	7	4
	• Didn't know about it	7	4
	• Allergic	1	1

***p. After eating turtle, are tourists interested in eating it again?***

58% of the surveyed stay-over tourists had already been to the Cayman Islands at least once before the current visit. For the “repeat stay-over tourists”, 24% had tried turtle meat in previous visits to the Cayman Islands and 3 out of these 12 people ate turtle again during the current visit.

48% of the surveyed cruise ship tourists had already been in the Cayman Islands at least once before the current visit. For the “repeat cruise ship tourists”, 11% had tried turtle

meat in previous visits to the Cayman Islands and all six of these people ate turtle again during the current visit.

Please note this is a small sample size and further investigations would be needed to robustly quantify if, after trying turtle, tourists generally repeat this behaviour.

***q. What is the prevalence of visitors to the CTF among tourists? And do they know CTF produces turtle for human consumption?***

19% of the surveyed cruise ship tourists and 28% of the stay-over tourists went to CTF during their current visit to the Cayman Islands. The most recent information available from CTF suggests 11-13% of cruise ship and stay-over tourists visited CTF in 2012, respectively.

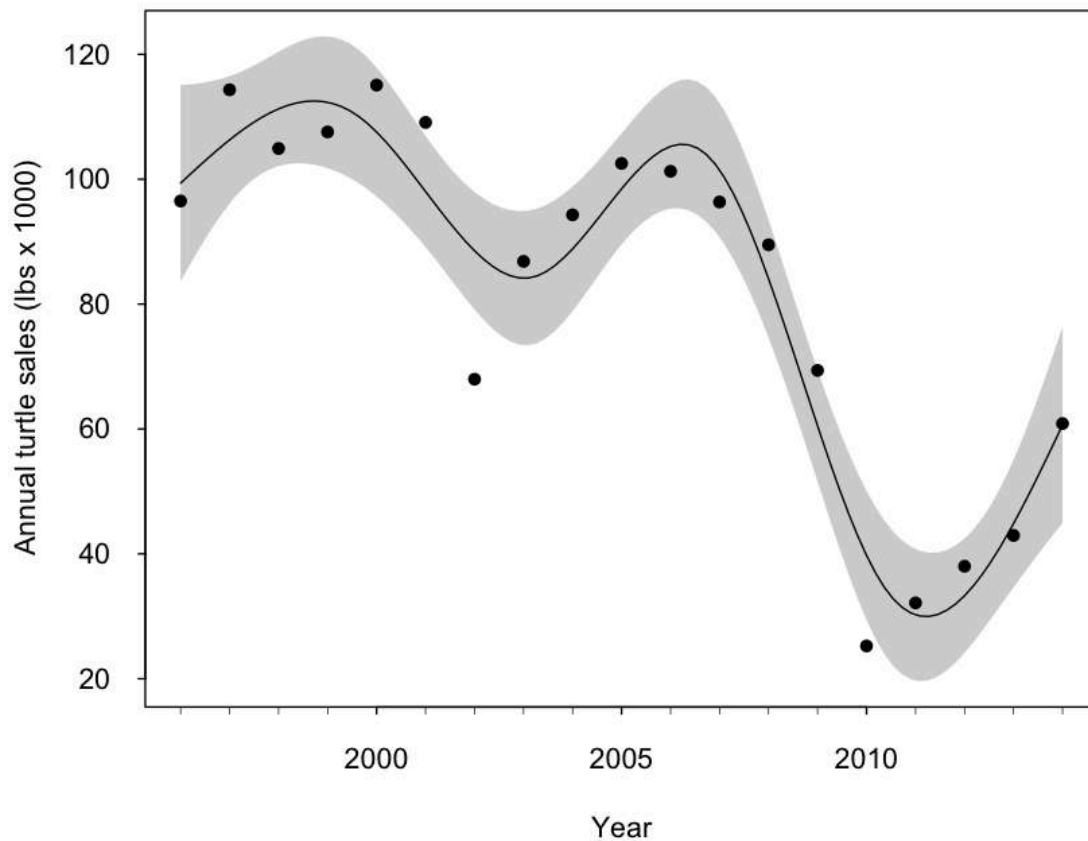
22% of the surveyed cruise ship tourists knew that CTF breeds sea turtles for human consumption, while 44.8% of the stay-over tourists were aware of that. Among the 64 tourists that had gone to CTF during this or previous visits to the Cayman Islands, 52% knew CTF farms turtles for human consumption.

### **III. Turtle meat sales**

***r. Have sales of turtle meat by CTF changed over time?***

Since 1996, annual sales of turtle meat by CTF have gone through several ups and downs: relative stable sales from 1996 to 2001 with a drastic decrease in 2002 (Cayman Islands severely affected by hurricane in late 2001); post-hurricane recovery period which peaked in 2005 and decreased afterwards, reaching minimum annual sales in 2010 (turtle meat prices increased up to 200% in February 2010); and an ongoing increasing trend afterwards (Figure 6). The CTF deliberately reduced the amount of turtle meat available for sale in 2009 due to production sustainability issues (T. Adam, personal communication) but no other information on supply produced by the CTF over time (i.e. how many turtles were available for slaughter and what percentage of those were sold) is available.

Our results also suggest that, after accounting for price effects, demand for turtle stew has remained relatively constant over time, while demand for turtle steak has been significantly decreasing.



**Fig. 6.** Estimated annual trend fitted to sales of turtle meat (measured in thousands of lbs) from 1996 to 2014 (n=19), along with 95% confidence bounds. Points represent raw data based on CTF reports (1996 to 2013) and receipts (2014).

**s. Who buys turtle from CTF?**

According to our household surveys, 11.1% of all households (95% CI: 8.1-14.2) bought turtle at the Turtle Farm during the last year, suggesting that a total of 1,894-3,312 households purchased turtle from the CTF. Please note this number is considerable higher than the one obtained from CTF's receipts (see below), suggesting a need to improve the receipt system in order to better quantify number of buyers.

Based on receipts from sales of turtle meat at the CTF in 2014, with dates ranging from the 4<sup>th</sup> January 2014 to 31<sup>st</sup> December 2014, a total of 60,862 lbs of turtle meat were sold by the CTF, generating a revenue of CI\$ 497,578. This meat was sold to: 17 different groups including a number of schools, churches and associations, suggesting this meat



was potentially used for special events; 42 restaurants/food businesses (one closed down since then); and 579 individual customers. Because 37.5% of the receipts had incomplete or missing name information, it is likely that these are conservative estimates of the number of different buyers, particularly for individuals.

Restaurants were the main type of buyers of turtle meat from the farm, buying 41.5% of the total meat and generating 44.3% of the revenue, although we were not able to identify the type of buyer for 27.3% of the total turtle meat and 24.7% of revenue (Table 5). Most of the turtle meat was sold as stew and buyers from George Town generated 32.1% of the revenue, although district information was missing for around a third of the total amount of sold meat.

**Table 5.** Amount of turtle meat sold by the CTF from the 4<sup>th</sup> January to 31<sup>st</sup> December 2014 and revenue generated from those sales according to type of buyer, type of turtle product and district. Information based on 3,712 receipts available from CTF.

<b>Categorical variables</b>	<b>Level</b>	<b>Amount of turtle meat (lbs)</b>	<b>Amount of turtle meat (%)</b>	<b>Revenue (CI\$)</b>	<b>Revenue (%)</b>
Type of buyer	Individuals	17,008	27.9	139,709	28.1
	Restaurants	25,287	41.5	220,486	44.3
	Groups	1,995	3.3	14,570	2.9
	N/A	16,572	27.3	122,813	24.7
Type of turtle product	Stew	44,087	72.4	369,930	74.1
	Manavelins	15,219	25.0	100,465	20.1
	Steak	1,505	2.5	28,388	5.7
	Bones	51	0.1	235	0.1
District	West Bay	5,947	9.8	48,885	9.8
	George Town	18,149	29.8	159,949	32.1
	East End	4,510	7.4	35,130	7.0
	North Side	3,230	5.3	31,315	6.3
	Bodden Town	1,661	2.7	13,989	2.8
	Sister Islands	5,350	8.8	42,420	8.5
	N/A	22,015	36.2	167,330	33.5

***t. What is the socio-demographic profile of turtle meat buyers from CTF among residents?***

Among the socio-demographic variables that we collected in the social surveys (i.e. household size, district of residence, age, gender, education level, nationality, having at least one grandparent born in the Cayman Islands and being registered for voting), the best predictors of having bought turtle from CTF were: education level, household size,

being registered for voting, having at least one grandparent born in the Cayman Islands and nationality. For example, the “typical” person that bought turtle meat from CTF during the 12 months previous to our study has a medium-large household ( $\geq 3$  people), attended high school or higher education, Caymanian nationality, registered for voting and with at least one grandparent born in the Cayman Islands (53% prevalence in this group).

#### **IV. Illegal turtle meat**

##### ***u. What is the prevalence of consumption of turtle meat taken from the wild?***

Please note that legal harvest of sea turtles from the wild in the Cayman Islands is possible only for licensed fishermen; each legally captured turtle must be presented to fisheries officers for inspection but no legal take of sea turtles has been recorded since 2008. This means that any turtle purchased as wild in the 12 months previous to our study was obtained illegally.

Because purchasing turtle meat that was taken from the wild without a license is illegal, information obtained using social surveys is likely to underestimate true rates of behaviour. We thus applied a number of specialized questioning techniques developed to obtain more reliable estimates, as well as allowing us to triangulate information gathered by asking different questions to obtain similar information. In addition, respondents were also guaranteed anonymity and interviews were conducted by neutral people not employed by Cayman Islands Department of Environment, CTF or WAP.

According to respondents’ answers to a direct question about buying wild turtle during the 12 months previous to our study, 2% (95% CI: 0.8-4.8) of all resident households bought meat of turtles illegally, representing a possible total of between 195 and 1115 households. In addition, based on respondents’ answers to where they purchased turtle meat during the last year, 1% (95% CI: 0.3-4.1) of households are estimated to have bought from door-to-door seller. Turtle meat sold door-to-door is likely to be of illegal origin so self-reporting purchasing turtle this way means that, scaled up across the country, between 21 and 288 resident households were potentially engaging in illegal behaviour. It must be noted that possible sources of wild turtle being referenced by

survey respondents could include turtle taken illegally from the wild or turtles stolen from the CTF and believed by consumers to have been taken from the wild.

***v. What is the socio-demographic profile of illegal turtle meat buyers among residents?***

Given that very few households self-reported purchasing wild turtle, it is not possible to gain further insights into potential effects of any of the socio-demographic variables that we collected in the social surveys (i.e. household size, district of residence, age, gender, education level, nationality, having at least one grandparent born in the Cayman Islands and being registered for voting). The only exception was within district of residence; respondents in Bodden Town were less likely to report purchase of wild meat than those in West Bay.

However, we also used other questions to explore potential factors that could be useful to identify potential characteristics of people that purchase illegal turtle meat:

- Based on answers to the question “Do you know someone that might be involved in illegal take of turtles in the Cayman Islands?”, we found significant differences between districts. While 4.5% to 7.9% of residents are estimated to know “turtle poachers” in West Bay, Bodden Town and George Town, this rate is 26.1% in East End, 20.4% in North Side and 18.6% in the Sister Islands.
- Based on respondents’ attitudes, age, gender, nationality, having at least one Cayman-born grandparent and district were consistently good predictors of type of attitude towards purchasing wild turtle meat. For example, 13.4% of respondents agreed with the statement “Buying turtle meat taken from the wild is a good thing for me to do”. Respondents were more likely to agree with this statement if they had at least one Cayman-born grandparent, non-UK/USA nationality, did not live in George Town, and were aged 45 or older. While attitudes are indirect proxies of behaviour, our findings suggest these characteristics could be used to target potential conservation interventions.

**w. *What is the socio-demographic profile of illegal turtle “poachers”?***

Our study did not aim to target “poachers” directly, as we were focused on understanding demand for turtle products. Nevertheless, similarly to question v, we used respondents’ attitudes towards turtle harvest from the wild to gain additional insights and identify potential characteristics of people who might be involved or support this behaviour.

Based on respondents’ attitudes, age, gender, nationality, having at least one Cayman-born grandparent, voting registration and education level were good predictors of type of attitude towards harvesting turtles from the wild. For example, the “typical” person that agrees with statement “I am confident I could hunt turtles if I wanted to” is a man, attended high school or higher education and has at least one Cayman-born grandparent. While attitudes are indirect proxies of behaviour, our findings suggest these characteristics should be used to target potential conservation interventions.

**x. *What are the preferences of consumers regarding wild and farmed turtle?***

Consuming turtle meat that was taken from the wild without a license is illegal, so we used different techniques to better understand consumer preferences regarding wild and farmed turtle:

- Out of the 21 people that provided additional information about where they got wild turtle, 1 person reported getting it as a gift from a friend, while the others purchased 4 to 15 pounds of meat (median amount: 9 lbs; 95% CI: 5-10) at CI\$4-25 per lb (median price: CI\$5/lb; 95% CI: 5-8). This median price is cheaper than the prices charged by CTF at the time of the study (using stew as comparison).
- Based on consumers’ self-reported preferences (i.e. directly asking them if they prefer wild or farmed turtle), 16.1% (95% CI: 11.6-21.4) of consumers reported preferring wild turtle, with the remaining preferring farmed meat or having a relatively neutral preference. Taste was the main reason for consumers preferring wild turtle, while wild turtle being illegal and availability were the main reasons for consumers preferring farmed turtle (Table 6). Nationality and

having at least one Cayman-born grandparent were good predictors of reporting a preference towards wild turtle. A typical person that prefers wild turtle has at least one Cayman-born grandparent and Caymanian nationality.

**Table 6.** Reasons mentioned by consumers for preferring wild or farmed turtle (104 consumers did not report a specific preference). Respondents were allowed to list multiple reasons.

<b>Type of behaviour</b>	<b>Reasons mentioned by respondents</b>	<b>Number of respondents that mentioned reason</b>	<b>Percentage out of total number of respondents per group</b>
Prefer wild turtle (N= 35)	• Taste	23	66
	• Healthy food	4	11
	• Fresh meat	2	6
	• Cheaper price	1	3
Prefer farmed turtle (N= 78)	• Wild is illegal	24	31
	• Availability	19	24
	• Health/ safety	9	12
	• Conservation	6	8
	• Taste	6	8
	• Habit	3	4

- Based on consumers' attitudes towards buying wild or farmed turtle meat, 7.0% (95% CI: 3.2-14.5) of them showed a more positive attitude towards wild meat (i.e. they thought buying wild turtle was better for them than buying farmed turtle). Age, education level, nationality, having at least one Cayman-born grandparent and voting registration were good predictors of having a more positive attitude towards wild turtle than farmed turtle. People were more likely to think this way if they had at least one Cayman-born grandparent, Caymanian nationality, were registered for voting, attended only primary school, and were not aged between 35 and 54 years old (i.e. respondents younger than 35 and older than 55 had similar levels of preference towards wild meat).

- Based on experiments where preferences were investigated by asking consumers to choose between different alternatives, we found that, regarding purchasing any raw turtle meat, the overall consumer population prefers:
  - 1<sup>st</sup> priority: cheapest prices (increasing price from \$5 to \$10 or \$20 decreases willingness to buy by 55-82%, respectively);
  - 2<sup>nd</sup> priority: farmed turtle instead of wild turtle (farmed turtle increases willingness to buy by 63%);
  - 3<sup>rd</sup> priority: intermediate frequency of turtle meals (consumers prefer having turtle a few times per month instead of a few times per year or every week; having turtle a few times per year or every week instead of a few times per month decreases consumers willingness to buy by 26-49%, respectively);
  - 4<sup>th</sup> priority: travelling small distances (increasing distance from 5 to 15 or 20 miles decreases consumers' willingness to buy by 29-36%, respectively);
  - 5<sup>th</sup> priority: high numbers of nesting turtle population (increasing population size from 20 to 600 turtles increased customers' willingness to buy by 38%).

In addition, we found no conclusive evidence that the overall consumer population is willing to pay more or less for wild turtle. However, we found some evidence that increasing distance to selling point from 5 to 15 miles increases consumers' willingness to buy wild turtle instead of farmed turtle, and consumers also seem to prefer buying wild turtle when turtle is consumed very frequently (i.e. every week) but seem to prefer farmed meat if turtle is only consumed a few times per year. Nevertheless, given the illegal nature of buying wild turtle, results need to be interpreted with caution because respondents might not be willing to self-report potential illegal behaviour.

***y. Would consumers buy wild turtle if CTF closed down?***

Given that consumers already buy wild turtle, despite availability of farmed meat, this suggests that at least those consumers would keep purchasing wild turtle. To gain further insights into potential consumer behaviour in face of changing conditions, we also compared their attitudes towards wild meat currently and if CTF closed down; this

is suggestive of their potential behaviour or, at least, as a sign of protest (it is likely people over-reported potential illegal behaviour to manifest against proposed changes).

Based on respondents' attitudes, we found that 46.8% (95% CI: 36.4-57.5) of consumers self-reported being more likely to be interested in purchasing wild turtle in case of a closure of CTF. Age, nationality and voting registration were good predictors of consumers thinking this way. People were more likely to think this way if they were registered for voting, Caymanian and younger than 24 or older than 55. While attitudes are indirect proxies of behaviour, our findings suggest these characteristics could be used to target potential conservation interventions and conflict management in case CTF closes down.

In addition, based on questions about behavioural intentions (i.e. if respondents were planning to buy wild turtle meat in the next year under current conditions and if they were planning to buy turtle meat if CTF closed down), we found that the overall intention to buy wild meat increased under the CTF closure scenario. Whilst 15.3% (95% CI: 8.8-25.4) of consumers are estimated to have intentions to acquire wild turtle meat in the next year, this prevalence increased to 42.9% (95% CI: 33.0-53.3) of consumers under a hypothetical CTF closure. However, it is likely that consumers over-reported their intentions to buy wild turtle as a sign of protest, so these rates are merely suggestive.

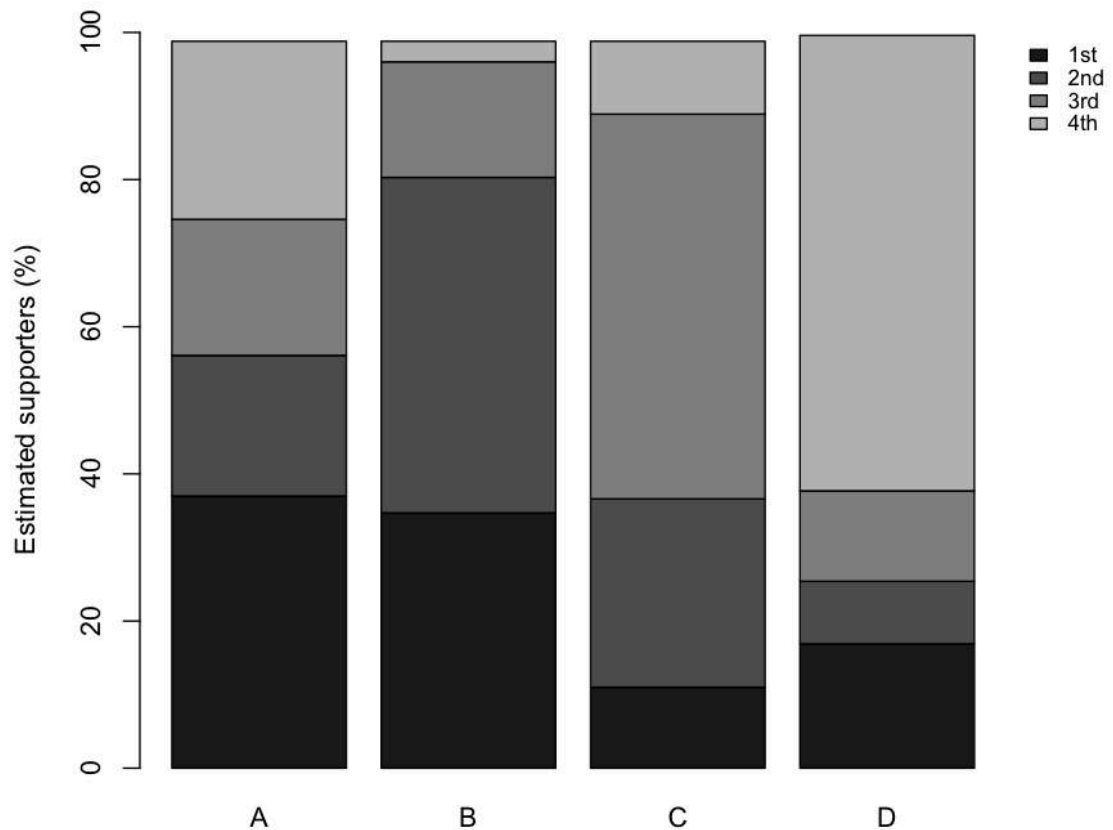
## **V. Management preferences**

### ***z. What management alternatives do residents prefer?***

When asked to rank four different scenarios regarding potential changes in the way turtle is sold by CTF and restaurants, option A (nothing changes) and B (new licensing system) were the preferred options, being the favourite choice of 37% (95% CI: 31.3-43.0) and 35% (95% CI: 29.2-41.0) of resident households, respectively (Figure 7). However, an estimated 81% (95% CI: 74.8-93) of the population chose option B as their favourite or second favourite, and only 3% (95% CI: 1.6-5.0) as their least favourite, suggesting that this would probably be the management strategy receiving bigger public support. Meanwhile, 17% (95% CI: 12.8-22.0) of the residents seem to prefer option D (Turtle Farm becomes turtle hospital instead) but this was also the most disliked option, being the least favourite of 63% (95% CI: 56.5-68.0) of resident households, suggesting

that this management strategy would potentially generate public discontent among residents in the Cayman Islands.

Turtle meat consumers were 1.9 times (95% CI: 1.2-3.0) more likely than non-consumers to prefer less restrictive management scenarios.



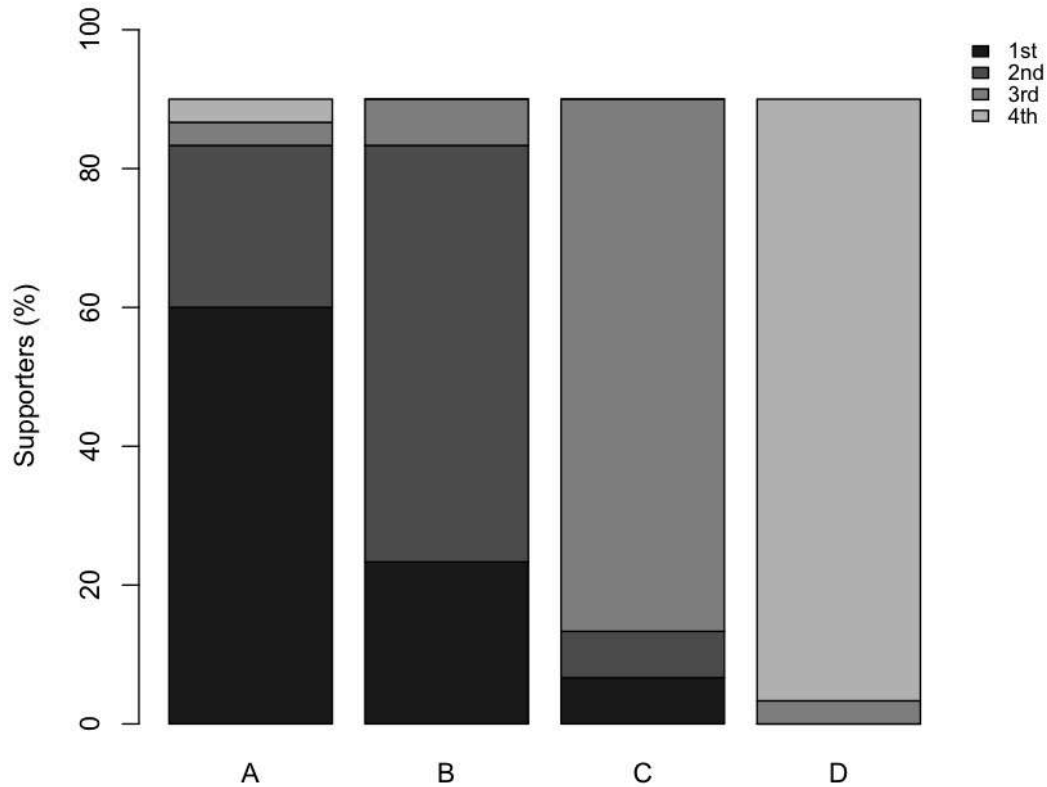
**Fig. 7.** Weighted relative frequencies of preferences among resident households in the Cayman Islands when ranking multiple potential management strategies (A: nothing changes; B: new licensing system for restaurants; C: new licensing system for restaurants and restaurants do not advertise turtle or put it in their menus; D: Turtle Farm becomes Turtle hospital instead) as their favourite (1<sup>st</sup>) to least favourite (4<sup>th</sup>) options. Percentages do not stack up to 100% because 1.2% of respondents did not report a preference between scenarios.

***aa. What management alternatives do restaurants prefer?***

When asked to rank four different scenarios regarding potential changes in the way turtle is sold by the Turtle Farm and restaurants, option A (nothing changes) and B (new licensing system) were the preferred options, being the favourite choice of 18 and 7 out



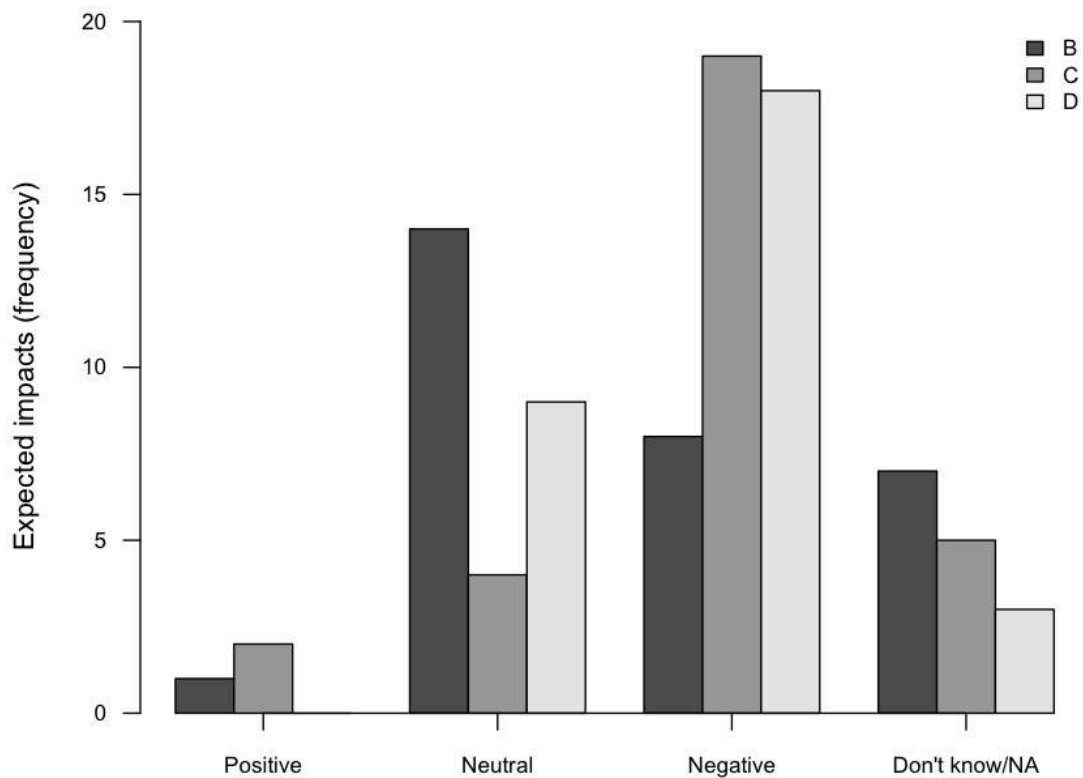
of 30 surveyed restaurants, respectively (Figure 8). Meanwhile, option D (Turtle Farm becomes Turtle hospital instead) was the most disliked option, being the least favourite of 26 out of 30 surveyed restaurants, suggesting that this management strategy would generate discontent among restaurants.



**Figure 8.** Percentage of surveyed restaurants (N=30) ranking multiple potential management strategies (A: nothing changes; B: new licensing system for restaurants; C: new licensing system for restaurants and restaurants do not advertise turtle or put it in their menus; D: Turtle Farm becomes Turtle hospital instead) as their favourite (1<sup>st</sup>) to least favourite (4<sup>th</sup>) options. Percentages do not stack up to 100% due to non-response (3 respondents refused to answer this question).

When asked to describe expected impacts to their business of each of the proposed changes, respondents were generally neutral or negative about changes, with option B having fewer expected negative impacts (Figure 9). Expected negative impacts from option B were always related to potential costs of the proposed license (*“impact depends on price of license and who has to pay for it”*), while several respondents were neutral about this strategy because they felt it would not affect their behaviour (*“turtle would be bought from CTF as usual”*) and only 1 respondent mentioned expected positive impacts of implementing strategy B (*“safer way of knowing where turtle meat comes from”*). Several respondents expected negative impacts from implementing strategy C both due

to revenue loss (“*negative impact on business because most tourists come here for the turtle*”) and them being against the loss of access to turtle by tourists (“*tourists should have the right to try turtle meat*”). However, expected impacts of strategy C were neutral to a few restaurants due to minimal or no revenue made from sales to tourists (“*locals are main customers*”) and 2 respondents even expected positive impacts on business (“*it would bring more sales due to secrecy*”). Strategy D was expected to bring negative impacts to many of the surveyed restaurants due to revenue loss (“*this would affect business a lot*”) and loss of access to turtle dishes (“*I want customers to experience turtle meat*”). Seven of the surveyed restaurants described “neutral” impacts because they expected only, according to them, negligible losses due to revenue made from turtle dishes being minimal (“*disappointing but wouldn't affect business*”).



**Fig. 9.** Number of restaurants out of 30 surveyed that mentioned positive, neutral or negative expected impacts to their business from each of proposed changes (B: new licensing system for restaurants; C: new licensing system for restaurants and restaurants do not advertise turtle or put in in their menus; D: Turtle Farm becomes Turtle hospital instead).

**bb. What management recommendations for CTF do restaurants have?**

When asked if they had additional recommendations for CTF, 14 restaurants listed several areas that they felt needed improving, particularly: price (currently too expensive; n=9); access and availability (distribution is temporally and spatially restricted and sometimes not enough for sale; n=9); farming facilities (improve diet and tanks; n=1).

**cc. What management recommendations for CTF do residents have?**

When asked if they had suggestions for how to improve CTF, 57% out of the total respondents provided recommendations. Decreasing turtle meat price, improving animal health and welfare, and increasing education/awareness role and marketing strategy were the most frequently mentioned (Table 7). The listed recommendations can be broadly grouped into the following categories: animal welfare and conservation; supply of turtle meat; management of the Cayman Turtle Farm.

**Table 7.** Categories of recommendations for how to improve the Cayman Turtle Farm according to the study participants and the non-weighted number of respondents reporting each specific recommendation (n=319).

Recommendation	Frequency	Frequency separated by type of respondents	
		Non-consumers	Consumers
<i>Animal welfare and conservation</i>			
Improve animal health and welfare	92	59	33
Increase education/awareness role & marketing strategy	83	51	32
Improve turtle release programme	64	31	33
Improve conservation role	31	21	10
Improve interaction with animals	18	13	5
Use as research and conservation facility only	3	3	0
<i>Supply of turtle meat</i>			
Decrease turtle meat price	122	6	116

Increase turtle meat abundance	59	4	55
Increase number and distribution of selling locations	40	1	39
Stop selling turtle meat	32	31	1
Reduce turtle meat production	4	4	0
Increase turtle meat price	1	1	0
<i>Management of Cayman Turtle Farm</i>			
Improve facilities and activities for visitors	42	25	17
Decrease entrance fee	34	9	25
Improve customer service	18	7	11
Change funding/subsidies	7	5	2
Close down the farm	5	5	0
Create more job opportunities	3	0	3
Improve staff working conditions	2	1	1
Change turtle diet (for better taste)	2	0	2
Use as breeding and selling facility only	2	1	1

## Future studies

Despite the comprehensive nature of the data collected for this study and findings presented in this report, virtually no socio-economic information about turtle consumption in the Cayman Islands was available until this project (the only exception was sales data by CTF). Our study thus represents a detailed baseline for potential long-term analyses. Continued monitoring of turtle meat sales and illegal take should be undertaken so that management interventions can be informed by robust scientific evidence on social, economic and biological aspects of turtle conservation.

We recommend that the following key topics presented in this study should be further investigated:

a) Turtle consumption by tourists

We surveyed a considerable number of international tourists (n=204). However, given our brief sampling period (3 weeks in November 2014) and potential differences in tourists' socio-demographics according to season, our findings

may not allow robust extrapolation to longer periods of time (e.g. number of turtle meals consumed by tourists per year). To robustly investigate prevalence and drivers of demand of turtle consumption among tourists visiting the Cayman Islands, seasonal effects should be considered and systematic data collection should be undertaken over time. In addition, given the reduced number of turtle consumers among “repeat tourists” (i.e. tourists that have eaten turtle meat in previous visits to the Cayman Islands and have returned to the country), the rate of repeated turtle consumption requires further investigation; this would potentially require a larger sample size that should be calculated based on the rates estimated in our study and a power analysis.

b) Prevalence and socio-economic importance of turtle dishes in restaurants

At the time of the study, there were at least 41 restaurants/ food businesses serving turtle dishes in the Cayman Islands. Nevertheless, we were not able to survey all of them due to being unable to find them (n=2) or restaurants refusing to participate in our study (n=9). In addition, number of turtle dishes being served at each restaurant and clientele composition (i.e. prevalence of tourist and “local” clients) were estimated based on approximate self-reported values instead of obtained directly from restaurants’ receipts. Whilst restaurants were generally reluctant to share any kind of detailed socio-economic information, an enforced or somehow incentivized system under which this information is made available would provide useful and more precise insights about the prevalence and socio-economic importance of turtle dishes in restaurants.

In terms of data requirements for future studies and monitoring efforts, we also recommend the following key aspects to be considered:

a) Sales and production records by CTF

Accurate records could be kept by the Cayman Turtle Farm for comparison and auditing purposes. For example, no information on total turtle production by the CTF over time (i.e. how many turtles were available for slaughter and what percentage of those were sold) is available. This is important for disentangling between likely supply and demand effects. In addition, basic data collected over time, such as type of buyer and district, could provide useful information, potentially helping targeting and evaluating interventions that account for people’s interests as well as sea turtle conservation. Improving and maintaining

data collection from receipts could be a cost-efficient way of monitoring market dynamics over time, if data is systematically compiled and made available to DoE or other entities. More detailed information, such as socio-demographic variables or individual identifiers, could also be recorded in order to improve the usefulness of receipts as a monitoring tool to infer changes over time. However, given the expected reluctance of customers to share personal information, adequate incentives and/or additional information should be provided about the purpose of the monitoring system.

b) Harvest and consumption of illegal turtle meat

Given the illegal nature of harvest and consumption of turtle that was taken from the wild without a license or stolen from CTF, a multidisciplinary approach is needed to fully assess trends over time. Because the wild turtle population is currently small, even a few poaching events are likely to have a significant effect on its viability. However, from an enforcement perspective, the assessment of trends over time and space is hindered by their reduced number (i.e. detectability and sample size affect robustness of any inferences). To complement this type of analysis, trends in turtle meat sales, consumer preferences and demand should be considered. In addition, a systematic collection of prices of wild turtle meat over time could be undertaken to gain further insights into price dynamics between farmed and turtle meat (e.g. how prices of wild turtle meat change over time and, potentially, in function of prices charged by CTF).