

REPORT ON THE RESULTS OF
THE PUBLIC SURVEY ON THE
USE AND IMPACTS OF
FIREWORKS IN
TRINIDAD AND TOBAGO



OCTOBER 1, 2020

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1. Introduction

Fireworks are used in cultural, religious, and national celebrations throughout the world. In Trinidad and Tobago, fireworks are mainly used to celebrate Independence Day, Divali and New Year's Eve. To a lesser extent, they are used in private celebrations, such as, weddings, anniversaries and birthdays, as well as, at some public events, such as, Carnival concerts and fetes.

The increased popularity and availability of fireworks to the general public has led to bigger and more extravagant discharges and displays, and it has been observed that these have resulted in noisier discharges and smokier aftermaths. As a result, more and more persons have been highlighting the negative effects that fireworks may have on humans, animals, and the general environment.

Globally, there is a growing shift to awareness of the effects of traditional fireworks and calls for greater use of noise reducing fireworks. Decisions have been made by public and private entities to restrict the use of loud fireworks and promote the use of silent fireworks instead. In terms of legislation, the Italian town of Collecchio banned loud fireworks in 2015 and replaced these with silent fireworks (Yin 2016). Similarly, the City of Vancouver, British Columbia, Canada is developing an implementation plan to ban the use of personal and consumer fireworks by 2021 (Vancouver City Council 2020). The United Kingdom (UK) Parliament, received a petition in 2019 from citizens calling for a ban on fireworks. It is currently engaging in a fact-based evidence study to determine whether there is in fact a problem and to determine appropriate action, as necessary (Conway 2020). Other general measures and actions include: venues permitting only silent fireworks, local authorities restricting usage of loud fireworks in the vicinity of sensitive receptors, stores stocking noise reducing fireworks only, and personal choices in the types of fireworks bought and used.

1.1 Background

The Environmental Management Authority's (EMA) role in the management of fireworks, in Trinidad and Tobago, is primarily one of a technical advisory nature. Based on the EMA's technical expertise in environmental management, the organisation advises those entities with the jurisdiction for fireworks, in Trinidad and Tobago.

In November 2015, a Joint Select Committee (JSC) on Social Services and Public Administration was convened to conduct an “Inquiry into the Adverse Health Effects of Fireworks”. The EMA appeared before this Committee, in a public hearing in April 2017, to answer queries pertaining to the role of the EMA, and the bounds of its legislation on the issue of fireworks. At this hearing, the EMA was tasked with carrying out an investigation into the negative impacts of fireworks with regard to air and noise pollutants. This study was completed and submitted to the JSC as required. The JSC subsequently concluded its hearing and issued its final report in May 2018, which contained short, medium, and long-term recommendations for the EMA.

In June 2019, the EMA submitted a Draft Cabinet Note to the Ministry of Planning and Development (MPD), recommending a ban on the importation of traditional fireworks and that the use of noiseless fireworks be encouraged. In response, MPD instructed the EMA to conduct further consultations to support this recommendation.

In compliance with this instruction, the EMA reached out to key stakeholders, inviting them to participate in discussions on the issue of fireworks. However, in March 2020, due to the Coronavirus disease (COVID-19) pandemic, the Government of the Republic of Trinidad and Tobago (GORTT) imposed several restrictions, including those regarding gatherings. As a result, the EMA adapted its approach and issued a public survey via electronic media, to gather the necessary information. *Figure 1* provides a road map of the EMA’s interactions with the JSC and MPD, and the requirement for a Public Survey.

1.2 Fireworks Survey

The aim of the fireworks survey was to obtain data from the public, using a random sampling method. The survey sought to garner information on the current practices, with respect to the use of fireworks, as well as, to obtain feedback on its impacts and opinions, on any proposed actions to deal with fireworks.

This data was compiled into this report, to the MPD, in support of the EMA’s recommendation to ban the importation of traditional noisy fireworks, while promoting the use of noiseless fireworks.

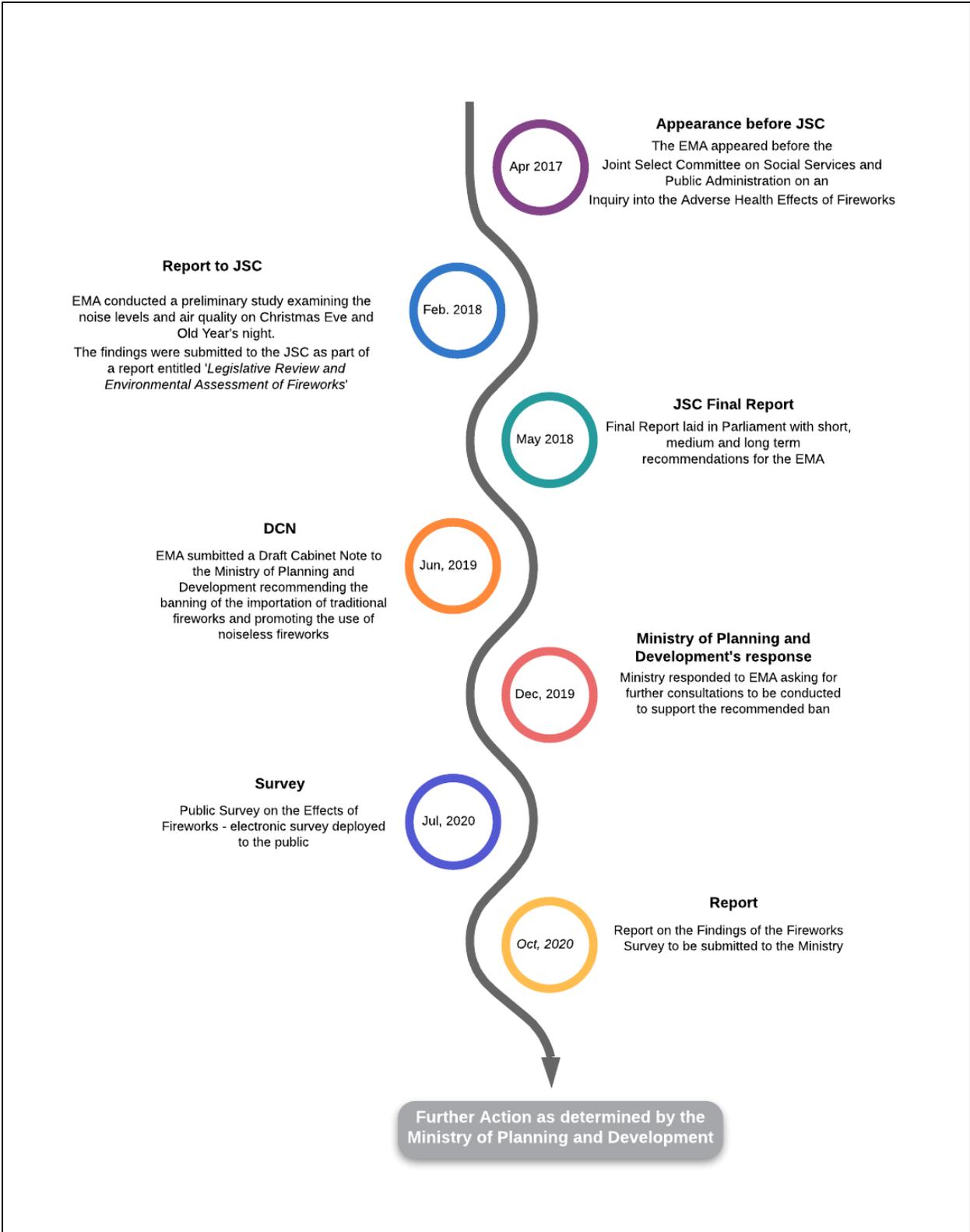


Figure 1: Road Map of the EMA's Involvement in Fireworks Management

2. Methodology

2.1 Survey Development / Design

The survey aimed to acquire information on the following:

- How fireworks are currently used – by whom, when, where, and how,
- The impacts of fireworks – who is affected and how are they affected,
- The preferred actions for dealing with fireworks,
- General comments.

Relevant questions to gather the pertinent information were then formulated. The survey was designed to optimize the experience of the user and to keep the user's interest, while completing the form. Questions were open and closed-ended. There were also options to complete fillable boxes. Respondents were required to type their responses. Where possible, user control options, such as, checkboxes were utilized, as well as branching to omit those questions that were irrelevant to the respondent.

2.2 Administration of the Survey

The survey was administered electronically, to the public, using Survey Monkey. The link to the survey was publicised on the EMA's web page, as well as, the EMA's Facebook account. This survey was available to the public during the period June 19 to July 31, 2020.

The survey was deployed in two iterations. The first iteration did not employ the use of branching or allow multiple selections for queries where multiple responses were applicable. A modified version of the survey that rectified the issues experienced with the first survey was re-administered. As such, there were alterations to some of the questions asked, as well as, the implementation of multiple responses options, for certain questions.

2.3 Data Processing

Due to the differences between the two surveys, some of the data required processing, prior to analysis.

In the first survey, the first question asked for the "*respondent's location.*" Respondents were asked to identify the specific "*Regional Corporation.*" They were required to type their response. However, the second survey provided respondents with options. They were required to select the applicable choice. Data from the first survey was sorted, in order to determine the

relevant Regional Corporation, for each answer provided. Once this was done, the responses were tallied for each Regional Corporation. The responses for both surveys were then combined and analysed.

Participants were required to indicate the “*number of persons within their household.*” In the first survey, respondents were required to type their response. In the second survey, the responses were in the format of a fillable boxes. Respondents had to identify the “*age groups,*” and type in a number which represented the “*number of persons in the household*”, who fell into the appropriate age group. The responses received in the first survey was a mix of numerals and words. All responses were converted into a numerical format and sorted into ranges that were given in the second survey. With the second survey, it was observed that rather than a response representing a number of persons, many of the responses were representative of the actual ages of the household members. Due to this factor, it would have been extremely difficult to use the data, in the form it was intended, (*number of persons in each age group*). As a result, the data was converted into a format similar to that of the first survey, where a total number representing the number of persons in the household was provided. To do this, the response provided by each person was analysed and the total number of persons in their household was calculated. In cases where an age was given it was counted as a single member towards the entire number of occupants in that household. These results were then sorted into ranges and combined with the results from the first survey.

Regarding pet ownership, the first survey provided an option. Respondents had to type in the response regarding the *type of pet* that was owned. While the second survey, provided respondents with options for selection. There was an open-ended response - “*Other*” and they were required to type only were the response. The data collected from the first survey was sorted into the categories used in the second survey. Both sets of responses were combined.

Data collected on who is affected by fireworks in the first survey gave a single option, for “*Age Ranges*” and an open-ended option: ‘*Other.*’ The latter option was used if, a participant’s choice was not present. Whereas, in the second survey, this question was presented in two parts:- one focused on humans and the other on pets. Many responses received in the first survey were related to pets and wildlife rather than humans, using the ‘*Other*’ option. These responses were combined with those received for the corresponding question in the second survey.

Similarly, some responses received in the second survey relative to the question on pets, were specific to humans. These responses were combined with the corresponding question related to humans.

The final question in both surveys invited respondents to provide additional comments, via a text box which allowed responses to be typed. Each response was examined and sorted into categories based on the general theme of the comment.

Where responses were deemed applicable to the previous questions asked with the surveys, they were included in that data set. Although this resulted in increase to the number for certain results the total number of respondents had not changed and therefore the total number of participants for each question was not altered.

Once the data from both surveys were consistent, percentages were calculated and represented graphically.

2.4 Virtual Presentation of Results

The results of the survey were presented to the public virtually on August 25, 2020 via a Webinar hosted on the Zoom platform and simultaneously broadcasted live via the EMA's Facebook page. The public was able to submit questions through both avenues, as well as, through the EMA's Knowledge Series email address. Questions, comments and suggestions received through this medium were also incorporated into the report.

3. Results

3.1 Sample Size

A total of two thousand, nine hundred and seventy-eight (2978) responses were received during the survey period. The Raosoft® Sample Size Calculator was used to determine the minimum sample size for Trinidad and Tobago's population of approximately 1.4 million¹ people, and this was calculated as six hundred and sixty-four (664) persons. Therefore, the responses received were adequate and representative of the population.

3.2 Demographics

3.2.1. Location of Respondents

Respondents were asked to indicate their "*Municipality*," and to identify the locality – that is, the city, or town within which they were located. Figure 2 shows the distribution of responses throughout the country.

A total of two thousand nine hundred and sixty-two (2962) responses were received. Respondents were distributed throughout all fifteen municipalities in Trinidad and Tobago, as seen in Figure 2. The highest number of responses – 18.64% were received in Tunapuna / Piarco, while the lowest number of responses – 0.61% were received in Mayaro / Rio Claro.

¹ The Central Statistical Office (CSO) Mid-Year Population Estimate as of June, 2019 is stated as 1 363 985 persons. Source: <https://cso.gov.tt/tt-at-a-glance/>

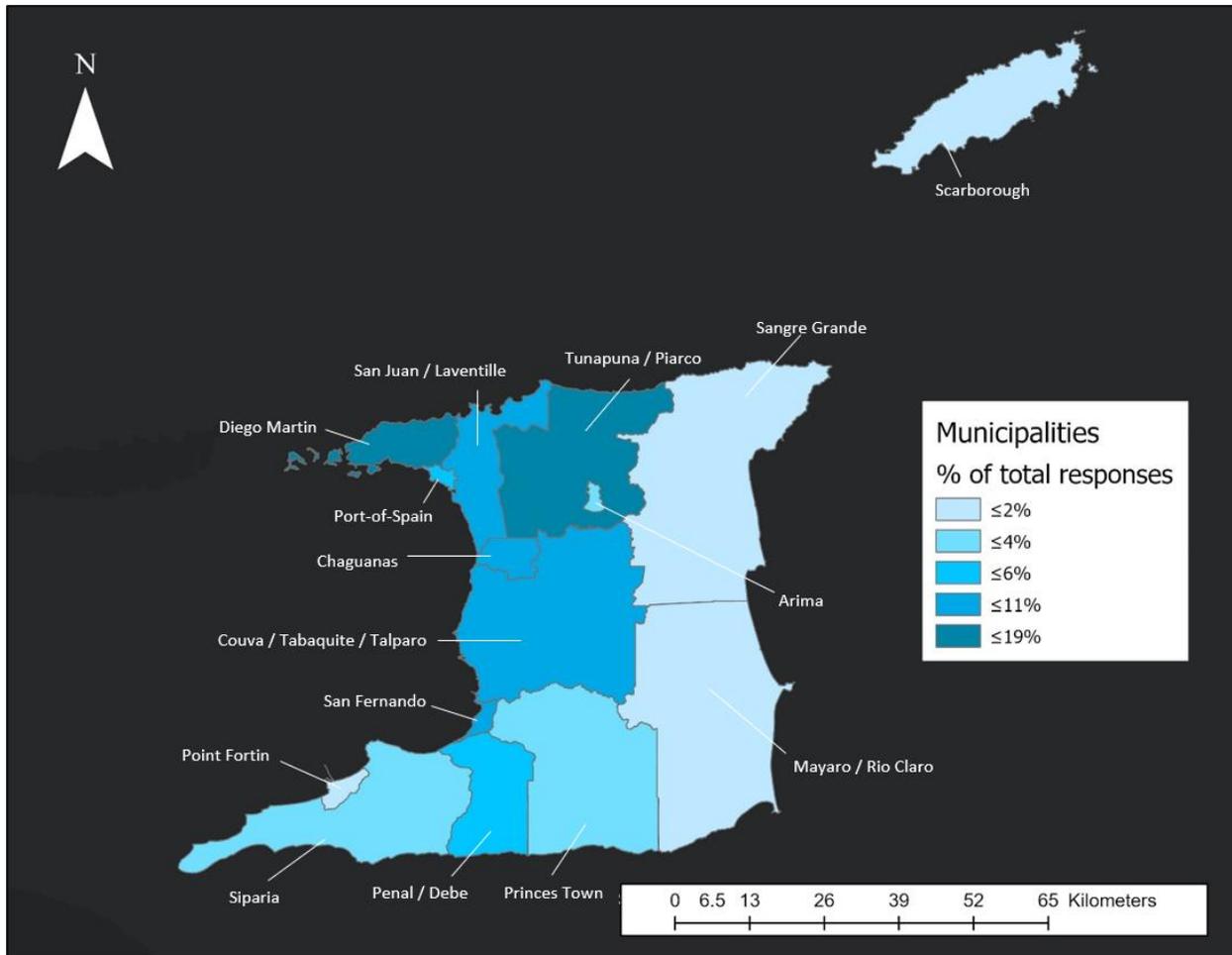


Figure 2: Geographic Location of Respondents

3.2.2. Age and Gender of Respondents

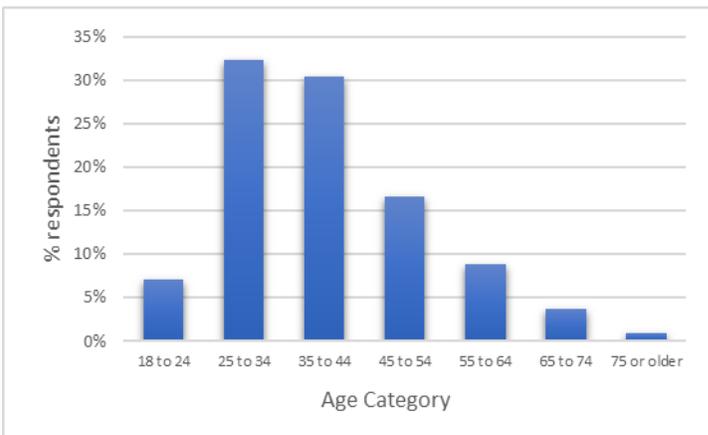


Figure 3: Respondent Age Categories

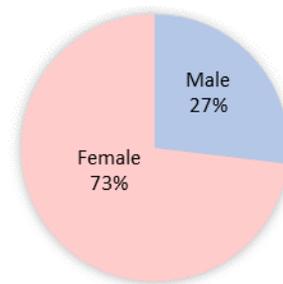


Figure 4: Respondents by Gender

A total of one thousand, five hundred and forty (1540) respondents answered the query on their age. As seen in Figure 3, the majority (62%) of respondents were between the ages of 25 and 44 years old. Seventeen percent (17%) were within the 45 to 54 age bracket, nine percent (9%) were within the 55 to 64 age bracket, seven (7%) percent were within the ages of 18 and 24, four percent (4%) were 65 to 74 years old, and one percent (1%) stated their age as 75 years or older.

A total of two thousand nine hundred and seventy-five (2975) responses were received, with almost three quarters of respondents (73%) indicating that they were female, as seen in Figure 4.

3.2.3. Household Information

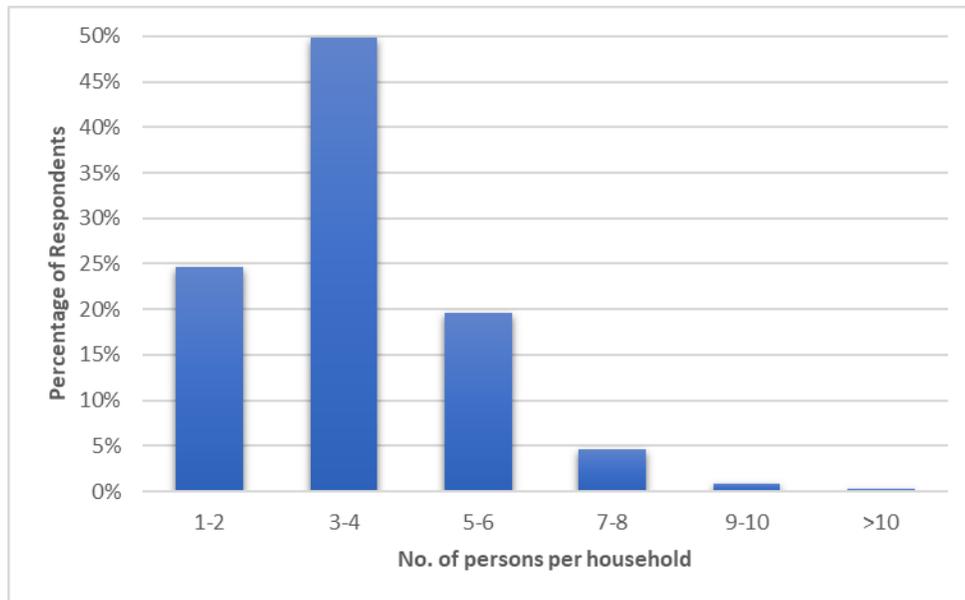


Figure 5: Household Size

A total of two thousand nine hundred and seventy-three (2973) responses were received, and the distribution of these responses are presented in Figure 5. Approximately fifty percent (50%) of households contained three to four persons, twenty-five percent (25%) were in a household comprising of one to two persons, twenty percent (20%) were in households with five to six persons, approximately four percent (4%) of respondents lived with seven to eight persons, while one percent (1%) of respondents lived with nine or more persons.

Respondents were also asked to indicate whether they owned pets. If they did, to indicate the type of pets that they owned. Eighty-five percent (85%) of respondents were pet owners, and

Figure 6 shows the types of pets owned and the distribution. Pet types were: dogs (62%), cats (18%), birds (13%), and other (7%). Other pet types included: fishes, rabbits, turtles, squirrels, and farm animals.

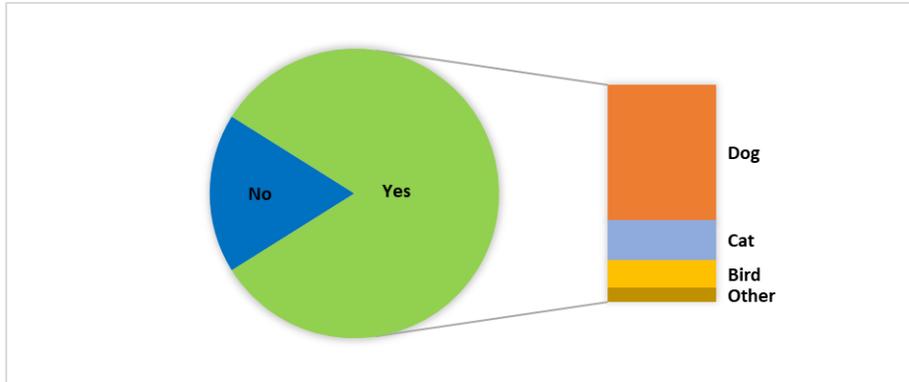


Figure 6: Pet Type

Respondents were asked to indicate the type of residence, in which they resided. As seen in Figure 7, the majority, eighty percent (80%) of respondents lived in a single home, just under nine percent (9%) lived in an apartment, approximately six percent (6%) lived in a townhouse, and five percent (5%) indicated that they lived on a farm or large property.

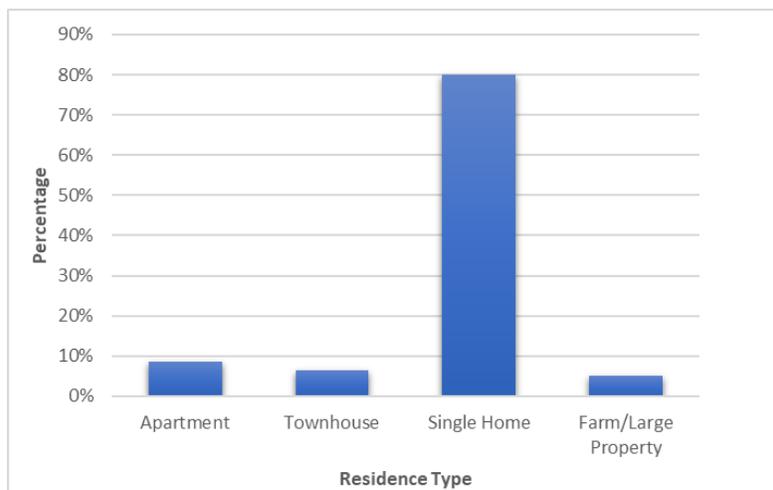


Figure 7: Residence Type

3.3 Fireworks Use

3.3.1. Purchase of Fireworks

Respondents were asked whether they, or anyone in their household purchased fireworks for use at home, within the last five years. A total of two thousand nine hundred and seventy (2970) responses were received, with eighty-seven percent (87%) of those respondents indicating that no fireworks were purchased.

Respondents who responded positively were asked to state where these fireworks were purchased. These responses are presented in Figure 8. Fifty-five percent (55%) of fireworks was purchased at roadside vendors, thirty-nine percent (39%) was purchased at stores or outlets, malls and markets accounted for one percent (1%) each of the purchase. While the remainder, four percent (4%) stated other localities, such as, the Divali Nagar, fireworks companies, and shops.

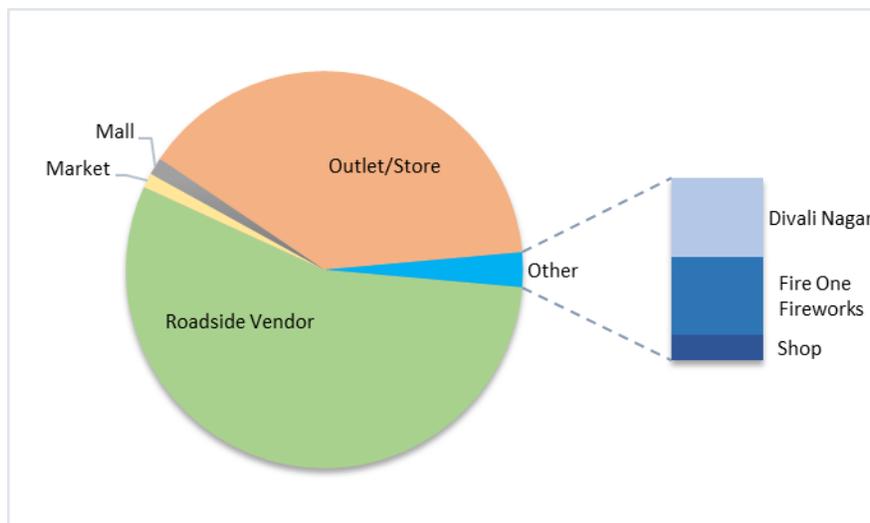


Figure 8: Fireworks Purchase Location

3.3.2. Discharge of Fireworks

Respondents were asked to indicate when the fireworks were used. A total of two hundred and thirty (230) responses were received. The distribution of these responses are shown in Figure 9. Fifty-seven percent (57%) indicated that fireworks were used on New Year's Eve (commonly referred to as Old Year's Day, in Trinidad and Tobago), thirty-eight percent (38%) indicated that they were used for national / cultural / religious occasions, four percent (4%) indicated that they were used at private events, such as, weddings, parties), and one percent (1%) of respondents indicated that they are used as a wildlife deterrent around aircrafts.

Respondents were then asked to indicate where the fireworks were discharged. A total of one thousand, four hundred and eight (1408) responses were received. The distribution of these responses are shown in Figure 10.

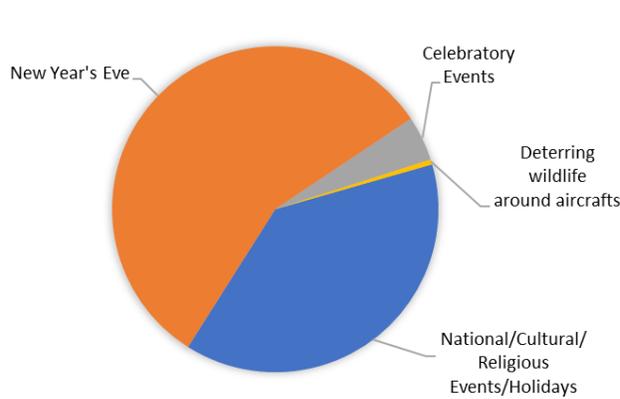


Figure 9: Events during which Fireworks were used

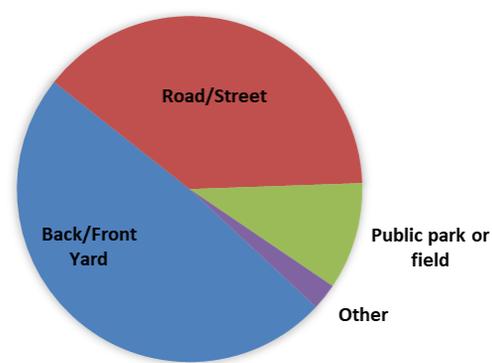


Figure 10: Fireworks Discharge Locations

Forty-nine percent (49%) percent of respondents stated that they were discharged from their private properties (front or back yards), thirty-nine percent (39%) indicated that they discharged fireworks in the road or street, approximately ten percent (10%) indicated that they were discharged in a public park or field. Two percent (2%) opted for the option of 'Other', and specified locations, such as: beaches and vacant land.

3.4 Fireworks Impacts

3.4.1. Affected Parties

Respondents were asked whether they, or anyone in their household were negatively affected by fireworks use. Two thousand nine hundred and fifty (2950) responses were received, with seventy-nine percent (79%) of respondents indicating that persons were negatively affected. These results are presented in *Figure 11*, as well as, the age distribution of those who were affected.

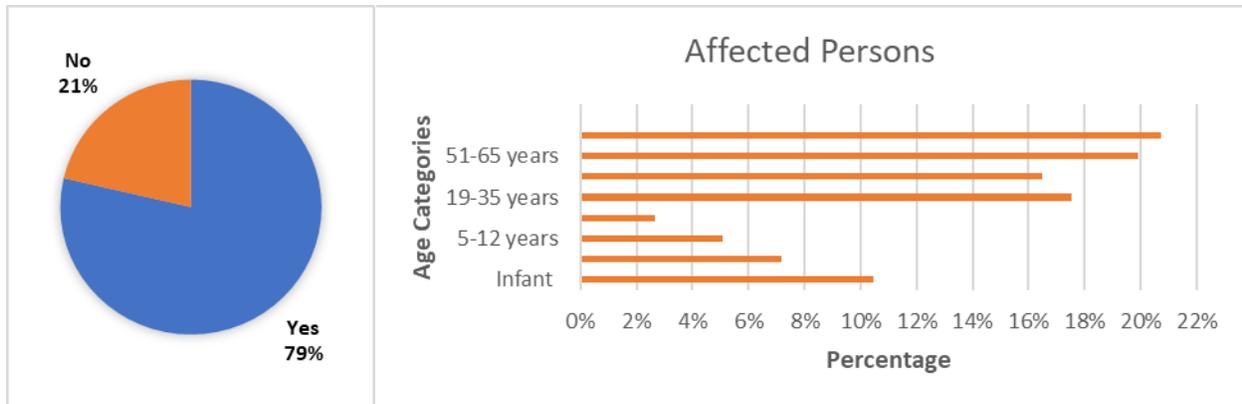


Figure 11: Affected Persons and Age Groups

Respondents were asked to indicate the ages of persons who were affected. The least affected fell within the ages of five (5) and eighteen (18) years, accounting for eight percent (8%). Approximately seven percent (7%) of affected persons were between one (1) and four (4) years, and ten percent (10%) were infants. The percentages for age categories for nineteen (19) years and older were generally consistent, ranging from eighteen percent (18%) to twenty-one (21%).

Respondents were also asked to indicate the types of pets that were affected, and this distribution is shown in *Figure 12*. Dogs were the major type of pet affected, by sixty percent (60%), followed by cats which accounted for seventeen percent (17%) of responses, and birds with thirteen percent (13%). Other types of pets, which accounted for ten percent (10%) included: squirrels, fishes, horses, and livestock.

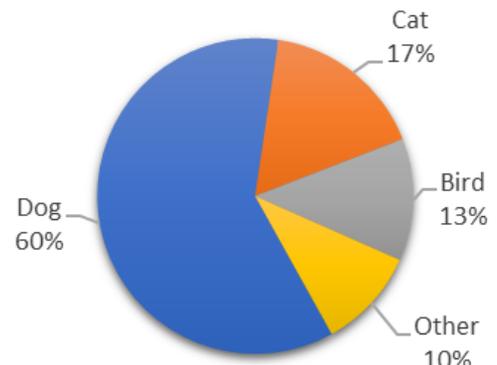


Figure 12: Affected Pet Types

The effects of noise experienced by respondents and persons in their households included:

- Irritability,
- Anxiety,
- Sleep deprivation,
- Headaches,
- Earaches and temporary/partial hearing loss,
- Hypertension,
- Chest pains,
- Stress,
- PTSD triggers,

- Burns/blast injuries,
- Panic attacks,
- Heart arrhythmia,
- Sinus problems and asthma attacks,
- Worsening of prior health conditions such as Alzheimer's, Bipolar Disorder, Autism.

The observed effects on pets included:

- Loss of life
- Erratic behaviour
- Traumatized wildlife seeking refuge
- Running off / running away
- Seizures
- Anxiety
- Distress
- Self-destruction
- Decreased egg production

3.3.2. Time and Frequency

The sources of the impacts were reported to have originated from neighbours (fifty-six (56%) percent), nearby events (twenty-two (22%) percent), and national / religious or cultural activities (twenty-two (22%) percent), as seen in Figure 13.

Respondents were also asked to indicate the frequency that fireworks were discharged. The distribution of these responses are shown in Figure 14. Approximately eighty-eight (88%) percent of respondents stated that fireworks were typically discharged during National / Cultural / Religious holidays, and New Year's Eve. The remaining respondents indicated that fireworks were discharged quarterly (4%), monthly (2%), weekly (<1%), daily (2%), or infrequently (4%).

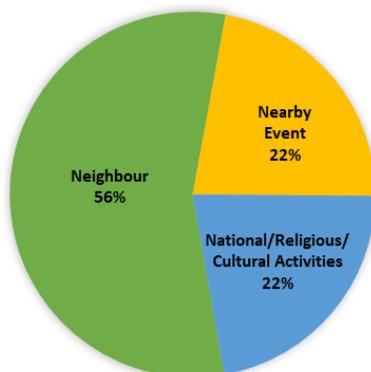


Figure 13: Source of the Impact

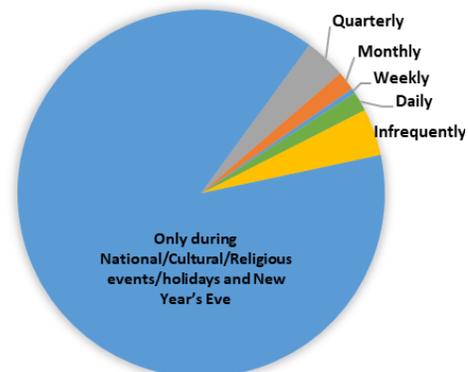


Figure 14: Frequency of Fireworks Discharge

Respondents were asked to indicate the time of impact experienced from fireworks. As seen in *Figure 15*, the time period 9:00 p.m. to 12:00 midnight garnered the majority of responses (63%), 23% of responses was received for the 12:00 midnight to 3:00 a.m. period, and 14% was received for the 6:00 p.m. to 9:00 p.m. period.

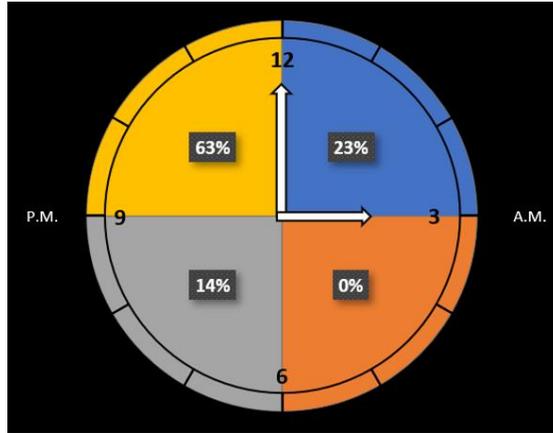


Figure 15: Time Period During Which Firework Impacts were Experienced

3.5 Proposed Actions

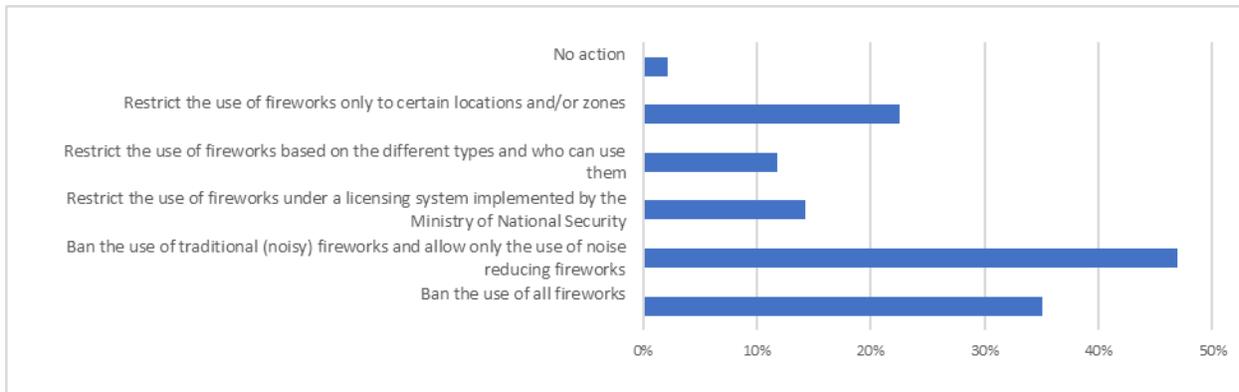


Figure 16: Preferred Actions to be Taken to Address the Issue of Fireworks

Respondents were asked to select the type of action(s) that they preferred to be taken to address the issue of fireworks. Two thousand eight hundred and eighty-one (2881) responses were received, and the distribution of responses are presented in Figure 16. Forty-seven percent (47%) of respondents were in favour of banning the use of traditional (noisy) fireworks and allowing the use of noise reducing fireworks. Thirty-five percent (35%) indicated that the use of all fireworks should be banned, twenty-three percent (23%) were in favour of restricting the use of fireworks to certain locations or zones, fourteen percent (14%) indicated that the use of fireworks should be restricted under a licencing system implemented by the Ministry of National Security, twelve

percent (12%) indicated that use of fireworks should be restricted based on the different types and who should be able to use them. Two percent (2%) indicated that they preferred that no action be taken. This group of respondents (two percent (2%)) had no problem with the way in which fireworks are currently managed.

3.6 General Comments

The final question of the survey invited respondents to provide additional comments, in the form of an open-ended question. The comments received fell into one of three broad categories: (i). additional comments on the use, (ii). effects and impacts of fireworks, (iii). recommendations on the use and management of fireworks, and iv. comments on the survey.

As stated in Section 2.2, comments about the survey that were received in the first issue of the survey were used to rectify the issues experienced, and the survey was re-administered.

3.6.1. Additional Comments

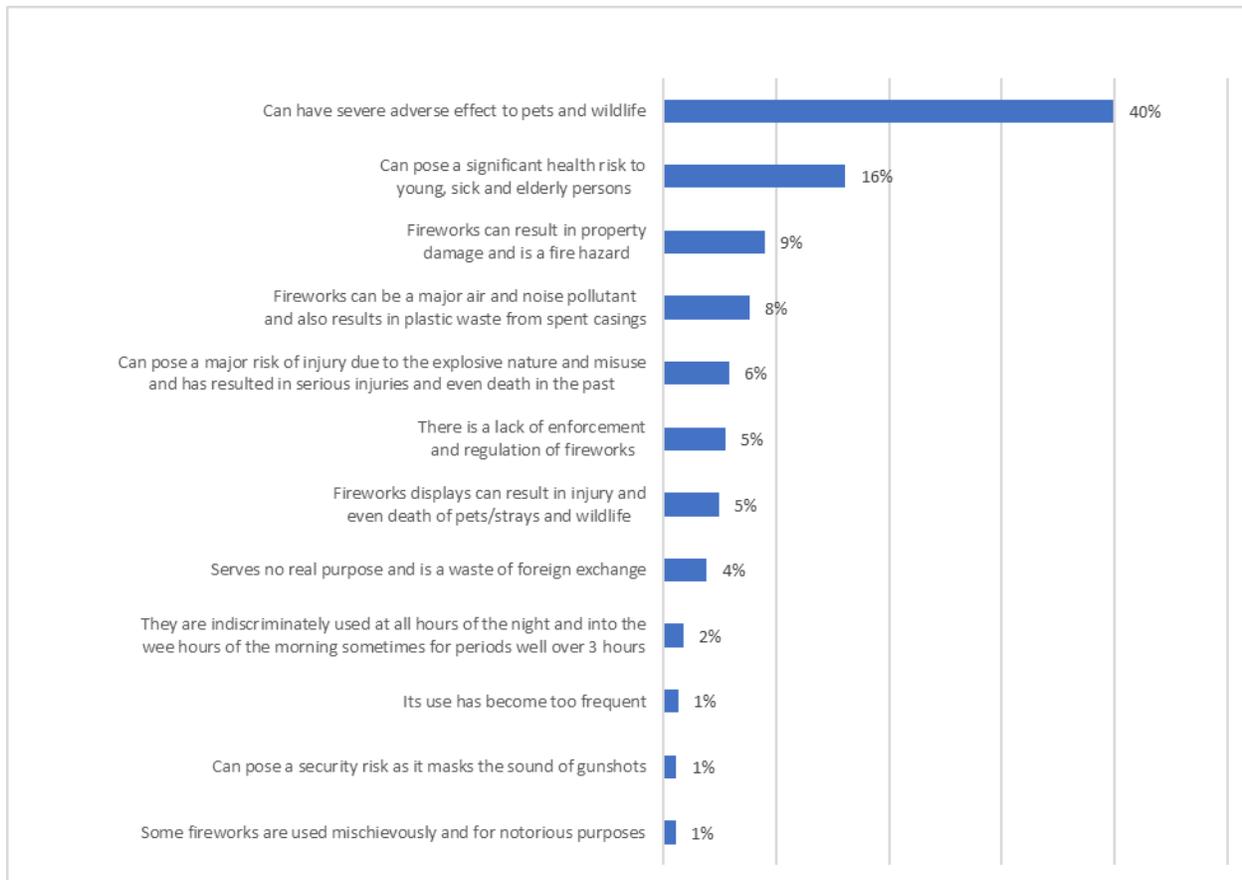


Figure 17: Additional Comments Received

A snapshot of some of the general comments received are presented in **Error! Reference source not found.** The most common response was that fireworks can have severe adverse effects on pets and wildlife, with approximately forty percent (40%) of respondents providing this comment. Other comments included: significant health risks to vulnerable groups, damage to property, as it is a fire hazard, source of noise, air and plastic pollution. Respondents also highlighted the lack of enforcement and regulation regarding fireworks, and the ease of accessibility of fireworks due to the increased number of retailers. The use of fireworks at night, and at early hours of the morning, and the frequency of these discharges, as well as, the potential security risks, specifically the discharge of fireworks masking the sound of gunshots were also mentioned by several respondents.

While the majority of comments focused on the negative impacts of fireworks, there were some comments that spoke favourably about the use of fireworks. Those comments noted that: there was cultural significance to the use of fireworks, hence it should not be banned. It makes special occasions memorable and therefore should not be banned. Fireworks are aesthetically pleasing, and due to the infrequent use. Therefore, it does not pose any issues. It serves an important role in the management of birds around landing aircrafts. These comments accounted for approximately one percent (1%) of the total comments received in this category.

3.6.2. Recommendations

Figure 18 provides a snapshot of the recommendations that were received by respondents. The comments included recommendations for changing the current legislation to close existing gaps; to include other activities, such as, bamboo bursting. To introduce stricter enforcement, and implementation of heavy fines. Both were seen as a deterrent and a source of revenue. The implementation of noise restrictions on the type of fireworks that are imported.

Respondents also suggested the use of designated areas for the discharge of fireworks. The places where its use should be permitted, were offshore, large open parks and savannahs. Conversely, some advocated for banned or restricted locations, for their use, such as, residential areas, in the vicinity of sensitive receptors, zoo and wildlife sanctuaries. There were also suggestions to limit the duration and periods during the year, whereby fireworks may be discharged. There were suggestions to not permit firework usage during specific periods, such as, during Carnival events.

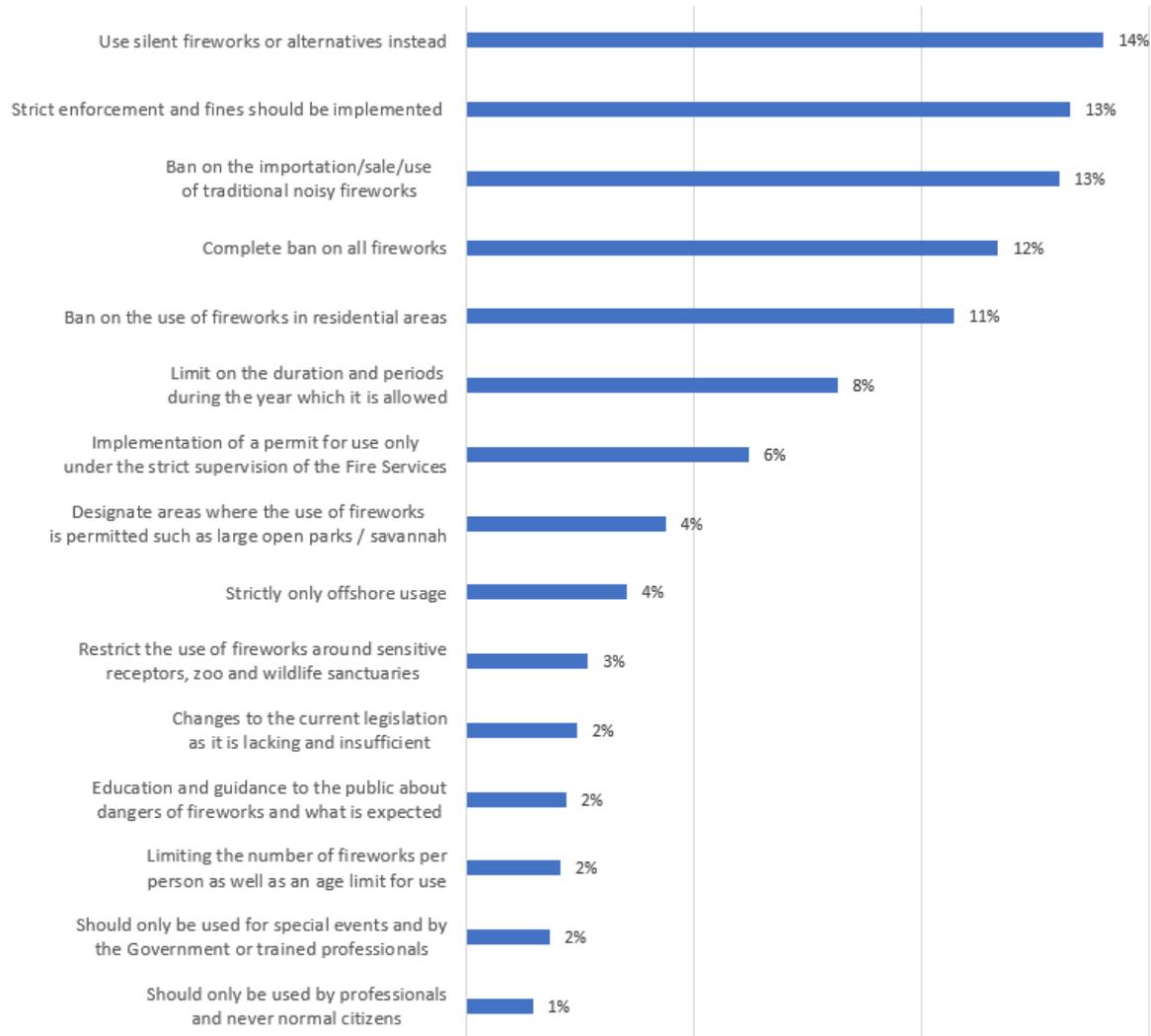


Figure 18: Recommendations Received

Several comments suggested that fireworks use be limited to specially trained professionals. Others suggested the implementation of a permitting system for use of fireworks. Additionally, there was a comment to limit the number of fireworks available to each person. Other comments stated the need to restrict usage through using an age limit.

Approximately thirty-six percent (36%) of the total comments spoke of the banning of fireworks. These recommendations ranged from: a complete ban on all fireworks, a ban on the importation/sale/use of traditional noisy fireworks and use of silent fireworks or alternatives instead.

Some respondents called for closer scrutiny of those companies that imported and sold fireworks. They noted that firework dealers / companies should be required to pay costs, for the medical and veterinary services that are incurred, by the public, as a result of fireworks use.

Some respondents also suggested the following: development of a software application to report fireworks nuisances, conduct a study on Best Practices used in other countries, to address fireworks. Other commenters stated that there is a need to educate and guide the public on the dangers of fireworks.

3.7 Virtual Presentation and Other Comments

3.7.1. Webinar Series

Comments from participants in the EMA's virtual presentation were received via two mediums: live during the session, and via the EMA's webinar email account, after the session.

Queries were made on: the current fines for fireworks related offences, and whether there were recommendations to increase existing fines. There were also queries regarding prosecutions for fireworks offences and the relationship between the EMA/EPU, the Trinidad and Tobago Police Service (TTPS), and the Trinidad and Tobago Fire Services (TTFS) with respect to fireworks use.

Some participants expressed that noiseless fireworks are not silent. They noted that there are still impacts from the use of such alternatives. It was suggested that there should be testing of the 'noiseless' fireworks to determine the noise levels produced, and whether there would in fact be a reduction in the impacts to receptors.

Recommendations, which were similar to those received in the public survey, included: increasing fines for illegal fireworks discharge, limiting the public's access to fireworks, limitations on the types of fireworks available to the general public, limitations on where these should be sold, and zoning restrictions for the discharge of fireworks.

3.7.2. Coalition of NGOs

In response to the public survey, the EMA received correspondence from a coalition of NGOs and private sector organizations, which comprised of the following entities: Animals 360 Foundation, El Socorro Centre for Wildlife Conservation, Animals Alive, Environmental Research Institute Charlotteville, Hikers Inc., Trinidad and Tobago Veterinary Association, Papa Bois Conservation,

Caribbean Discovery Tours, Animal Defence Society, and Wildlife and Environmental Protection of Trinidad and Tobago.

This correspondence outlined the negative effects of fireworks, as well as recommendations for the responsible use of fireworks. The Coalition's recommendations are as follows:

1. That the recommendations of the JSC be implemented.
2. That amendments be made to existing law to prescribe for the discharge of fireworks for national celebrations only (Independence and Old Year's) on designated times and dates.
3. That public spaces be identified by Regional Corporations where residents may gather to witness the discharge of fireworks under proper supervision during the designated times and dates. These being the only locations, times and dates permissible for the discharge of fireworks (whether in a town or not).
4. That end users of fireworks must be licensed to purchase or discharge fireworks.
5. That the remit of the EMA be increased to include noise control / limitations for fireworks.
6. That the fines associated with the unauthorised use of fireworks as prescribed under Section 99 and 100 of the Summary Offences Act Chap. 11.02 be increased.

4. Conclusion and Recommendations

The data collected in the public survey and subsequent webinar on the presentation of results indicate that there are numerous persons and animals who experience varying degrees of negative effects from fireworks use. The data also showed that fireworks usage in Trinidad and Tobago mostly occurs during national, cultural and religious events, and on New Year's Eve.

The general view of the public is that fireworks should not be banned outright, rather there should be greater management, through legislation and enforcement mechanisms regarding fireworks availability and use. The public also favoured the use of 'noiseless' fireworks over the traditional noisy varieties. It should be noted however, that 'noiseless' fireworks are not completely silent. They emit sound when discharged, albeit at a lower decibel level than the traditional fireworks, which produces sound that typically ranges from 125 - 155 dB, with a general average of 140 dB.

Based on the EMA's continued work on the issue of fireworks, we recommend the ban of the importation of traditional fireworks, and the promotion of, and use of noise reducing (<100 dB) fireworks, in Trinidad and Tobago.

Further we recommend the following:

1. Restrict the release of fireworks to certain specific occasions, for example, New Year's Eve, Independence Day, and National Religious Celebrations
2. Restrict the times fireworks are allowed to be discharged on these occasions, e.g.,
 - a. New Year's Eve - beginning 11:15 p.m. ending at 12:15 a.m. of the following day;
 - b. Independence Day - beginning 8:00 p.m. and ending at 9:00 p.m.; and
 - c. National Religious Celebrations - beginning 7:00 p.m. and ending at 8:00 p.m..
3. Designate areas for discharge of fireworks, such as, open public spaces with adequate setbacks from sensitive receptors.
4. Education and sensitisation of citizens as it relates to the benefits of moving towards noise reducing fireworks.
5. Increase fines and penalties for non-conformance of above recommendations.

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