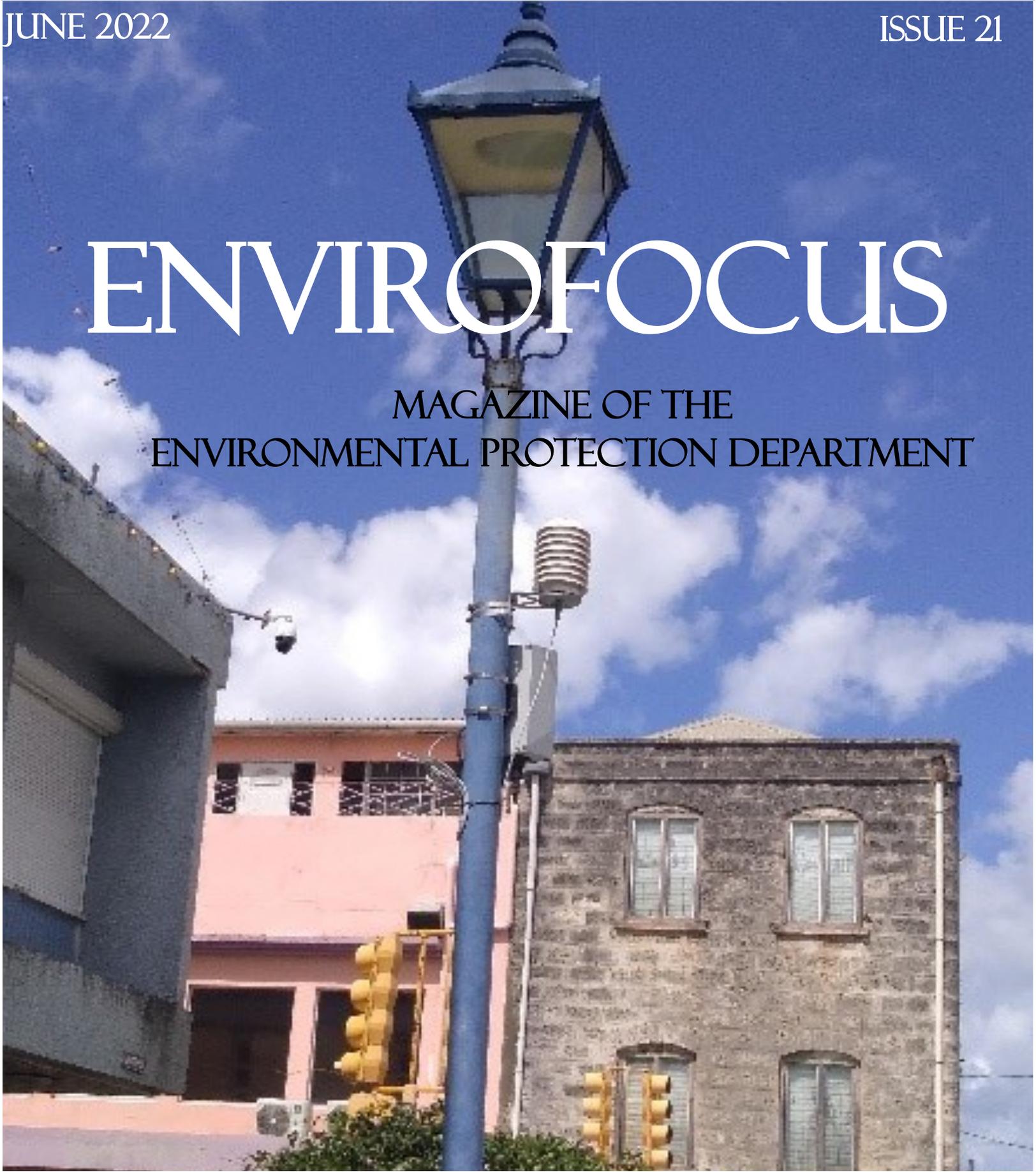


ENVIROFOCUS

MAGAZINE OF THE
ENVIRONMENTAL PROTECTION DEPARTMENT



EnviroFocus Magazine

ISSUE 21

Who We Are...

The Environmental Protection Department (EPD) is a regulatory government agency under the Ministry of Environment and National Beautification. It was established in 1971 and has responsibility for environmental monitoring and control of conditions likely to affect the quality of the land, air, water, and the general health and environmental well-being of the inhabitants of Barbados.

In order to fulfil its functions the EPD has established the following goals:

- Goal 1: To understand our environment;
- Goal 2: Protect our environment and human health from man-made sources of pollution;
- Goal 3: Foster resource efficiency and organization excellence; and
- Goal 4: Promote environmental stewardship.

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Director's Message

Despite the challenges posed by the continuing COVID-19 pandemic, the Environmental Protection Department has managed to remain focused on its mandate of protecting the environment through the monitoring and regulating of pollutants that can negatively impact human health and the environment.

The department has embarked on several initiatives some of which will be addressed in greater detail in this newsletter.

- The development of Guidelines for Solid Waste Facilities to ensure that best practices for the storage and disposal of the solid waste collected on the island are implemented and followed.
- Drafted regulations to provide protections against the hazards related to the use, storage and transport of radioactive sources in line with guidelines from the International Atomic Energy Agency (IAEA).
- Drafting the regulations for the safe and efficient reuse of wastewater and storm water for non-potable uses.
- The establishment of Air and Noise Monitoring networks across the island to help characterize the air quality and the noise impacts in Barbados.
- Updating of the National Action Plan for Antimicrobial Resistance to assist in the

reduction in the emergence and spread of antimicrobial resistant bacteria through chemical management.

- Continuing to participate in the regional Global Environment Facility Project 5558 - Development and Implementation of a Sustainable Management for Persistent Organic Pollutants (POPs) in Eight Caribbean Countries.
- Provided an opportunity for five student interns to learn about the environment, environmental pollution and the operations of the department.

Going forward the EPD will continue to advocate for policies and environmental management legislation, which will allow the department to continue its functions in an effective manner, and to educate the public on their role in protecting human health and the environment. We are particularly interested in forging deeper ties with the University of the West Indies through an environmental research initiative as a means to identify current and future threats to the environment.

Thinking Beyond the 3 R's

So, you have your reusable tote bag for groceries, your water bottle and travel coffee mug. You've tried your hand at composting, but still not sure what else could possibly be done to help 'reduce your carbon footprint'? Here are a few more tips to help us live more sustainably!

1. Use containers that can be refilled for bath and cosmetic products such as shower gel, shampoo or conditioner. The containers should be labelled appropriately to prevent misuse.



2. Use less toxic cleaning products, such as vinegar, baking soda and essential oils for fragrances where you can, to reduce the discharge of chemicals to the environment.

3. Use toilet paper made from recycled paper and sustainable sources like bamboo and sugar cane. Make sure to find a brand that is septic safe.



4. When travelling, use reusable travel size containers. Not only do they reduce the use of disposable containers, but they also reduce the weight and space taken up in your luggage.



With the increased push to reduce carbon emissions and slowing down climate change, many manufacturers and companies have increasingly been providing consumers with options for less waste. Today we are provided with so many options, like shampoo bars which allow for reduced packaging or avoid the need for a container altogether; reusable metal or glass bottles that allow customers to refill those bottles at home or at the store and pay for the amount dispensed, be it shower gel, oats, nuts or flour. Or they may encourage more sustainable options such as “sustainable” utensils which use less resources to manufacture.



Explore your options! You will surely find ways to help reduce your carbon footprint and impact on the environment.

Monitoring our Ambient Air

In order to meet the Environmental Protection Department's goal of developing an ambient air quality network, the EPD has been collecting data on the quality of air at specific locations in Barbados. The data collected will be used to establish trends in the ambient air quality over time, which will allow the EPD to identify how air quality has changed over time and allow for the development of policy initiatives and public education, designed to protect human health and the environment.

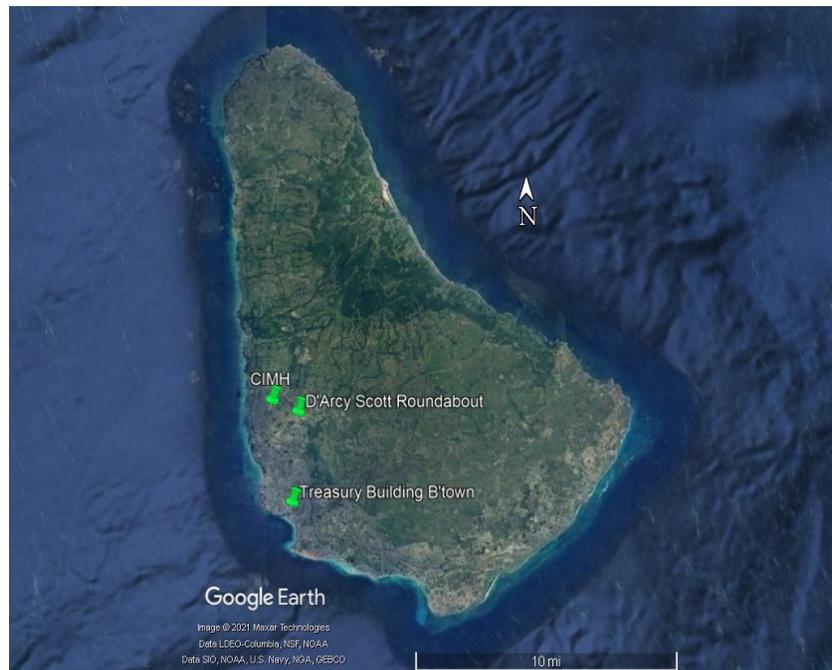
The equipment used consists of sensors to monitor the levels of sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3) and fine particulate matter ($\text{PM}_{2.5}$), which are easily inhaled. All of these pollutants at varying concentrations can negatively impact the environment and human health.

Presently, there are three monitoring sites:

- Treasury Building in Bridgetown,
- D'Arcy Scott Roundabout (also known as the Simpson Motors Roundabout) in Warrens, St. Michael, and
- Caribbean Institute of Meteorology and Hydrology (CIMH) in Husbands, St. James.

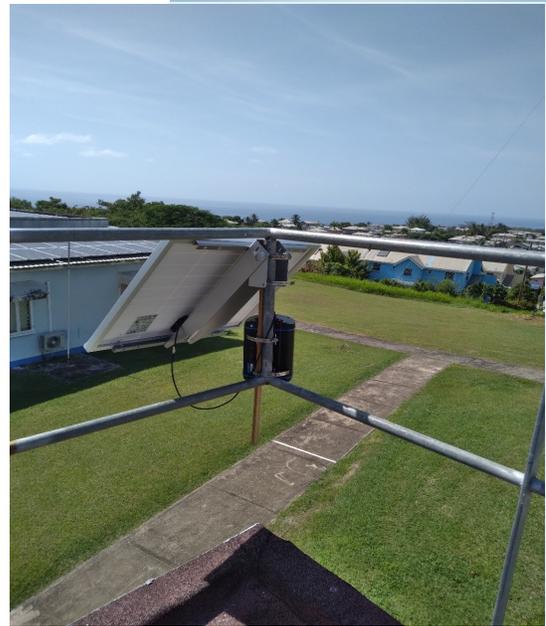
The Treasury Building and D'Arcy Scott Roundabout locations

were chosen as they are areas likely to have higher concentrations of ambient air pollutants due to the types and volume of activities that occur near them such as high traffic volumes, commercial and industrial activity. CIMH was chosen an urban background site as there are limited, nearby significant sources of pollutants.





Monitoring equipment mounted at the Treasury Building in Bridgetown



Equipment located at CIMH in Husbands, St. James



Monitoring unit located at D'Arcy Scott Roundabout, Warrens, St. Michael

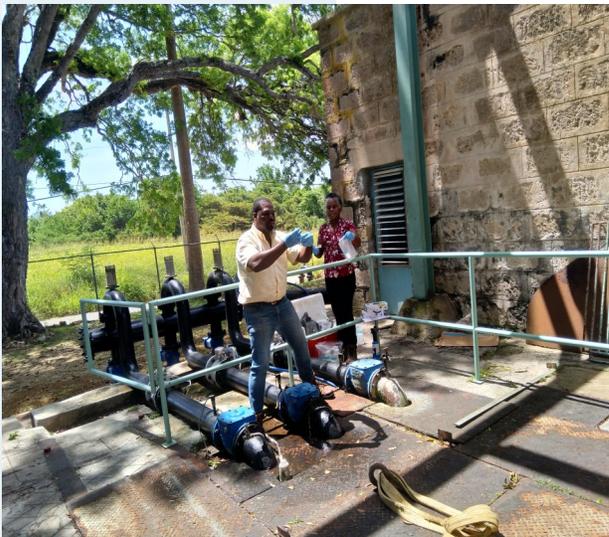
The EPD plans to expand its monitoring network in the future and hopes that with increased resources the equipment would be upgraded from indicative/screening type to more accurate reference method ambient air monitoring equipment.

This would allow us to compare the current ambient air quality in Barbados to international standards, to further assist with the development of policies and regulations designed to protect human health and the environment.

Widescreen Monitoring Programme

Did you know that the Water Quality Section of the Environmental Protection Department (EPD) regularly tests the drinking water prior to distribution to our homes and businesses? This is to monitor for environmental impacts and to make sure that it is safe for consumption. Every month, a total of 29 wells and 7 springs are sampled in conjunction with the Barbados Water Authority (BWA) as part of our Groundwater Monitoring Program. Analyses are conducted by the Government Analytical Services Laboratory.

Twice a year under the department's Widescreen Monitoring Program, water



asbestos, radionuclides and mercury. Of the metals detected, none have ever exceeded the World Health Organisation (WHO) guideline values for drinking water. Some of the other parameters that were detected and that were well below the WHO guideline values included nitrates, nitrites, sulphates and fluorides.



View inside a public supply well. All water from our public supply wells are chlorinated and tested to ensure safety prior to consumption

samples are shipped to the United States to be analysed for a wider range of parameters. These parameters include an extensive range of metals, volatile organics, pesticides, persistent organic pollutants as well as parameters such as pH, turbidity, chlorides fluorides, nitrates, nitrites, sulphates, Total Dissolved Solids (TDS), cyanide, asbestos and radionuclides.

A ten-year study of the results has shown that most of the parameters have never been detected. These include volatiles and semi volatiles,

Occasional parameters of interest include chlorides and Total Dissolved Solids. These are the result of our unique geology but according to the WHO they have no health based impacts but high concentrations may affect the taste. The BWA continues to work with the EPD to control and reduce the levels of these parameters.



Samples being stored on ice for shipment to our overseas lab partners for analysis

Summer Internship Programme 2021



2021 Summer Interns

L to R: Shenique Maycock, Nathan Wilson-Tempro, Jade Carrington, Maria Beckles and Shonnelle Griffith

The Environmental Protection Department's Summer Internship Programme welcomed five interns, Maria Beckles, Nathan Wilson-Tempro, Shonnelle Griffith, Shenique Maycock and Jade Carrington into the programme, which was held from July 12th to August 27th, 2021.

During this period, the interns were assigned to various sections in the department such as Solid and Hazardous Waste Management, Derelict Buildings, Air and Noise Pollution Control, Water Quality, Marine Pollution Control and Buildings Development to gain valuable work experience, given insight as to the role and functions of the Environmental Protection Department and to gain an awareness of the myriad of environmental issues facing the country. At the end of their internship the interns were asked to write a brief report of their experience working at the EPD, which would be shared with our readers.

Jade's Experience

My name is Jade Carrington. It all started when my school nominated me for a Summer Work Experience Programme. I was successful and was able to work and gain some work experience for a month at the Environmental Protection Department. Leaving Secondary School and going straight to work was a huge change, but the Environmental Protection Department made it an easy and adaptable transition for me. Initially, when I was assigned to be an intern at EPD, I had no idea who they were and what they did, so that made me extremely nervous about joining their team. On the first day, everyone was extremely welcoming, helpful and friendly and as the weeks went by they never changed.



“I also realized how interesting science was while working here. It has also made me start thinking of a different field of study to take since I always tried to avoid any science at all cost at school.”

My favourite moments while working there were the days I went beach water sampling, we sampled beach water from 10 beaches on the south coast. We also did groundwater sampling, where we sampled the water from the springs in St. John and St. Philip. Also, while briefly assigned to the Solid and Hazardous Waste Section my fellow interns and I attended the Launch of the National Pesticides Container Management Scheme in St. Lucy. I learned a lot of things that have expanded my knowledge and also enjoyed a nice cruise to St. Lucy. After going to these three events I was so excited to come home and tell my parents all that I learned and what I did.

I also realized how interesting science was while working here. It has also made me start thinking of a different field of study to take since I always tried to avoid any science at all cost at school. My first assigned tasks involved filing and it was a bit tedious and repetitive, but I put that behind me and focused so I could move on to the next task in the Building Development Control, I scanned documents and did other administrative tasks.

I am very grateful for this work experience. I have learned so much about what the Environmental Protection Department does and how the working world functions, and I have gained lots of knowledge about the environment that I wouldn't have normally paid attention to in the first place.

Jade Carrington

Shenique's Experience

I wish to extend my warm thanks to the Director and the family of the Environmental Protection Department (EPD) for hosting this internship for summer 2021. These few weeks have been filled with valuable learning experiences as well as great insight into the work that goes on at the Environmental Protection Department.



Though, through my studies at the Barbados Community College, I was able to get a brief overview of the various sections such as Water Quality, Air and Noise Pollution and Solid and Hazardous Waste and how human activity can impact both the natural environment and the built environment.

“These few weeks have been filled with valuable learning experiences as well as great insight into the work that goes on at the Environmental Protection Department.”

It was only until I got there at EPD was I able to get that hands-on detailed experience I was looking for. Assisting in the various sections, I was fortunate to observe and take part in numerous tasks such as data entry from analysis reports, zoning and classifications, attend the launch of the Triple Rinse Pesticide Container Seminar as well as reviewing acknowledgement and refusal letters which in turn made me very familiar with Health Service Regulations and as a result gave me a sneak peek into the site visit aspect within the department.

I want to thank the entire staff at the Environmental Protection Department for taking the time to share their knowledge both in the field and at the office. During my few weeks I felt like I was a part of the family, everyone was so warm and welcoming it made my learning experience even more valuable as I was able to ask anyone for advice or help with anything and for that, I say thank you.

Shenique Maycock

Maria's Experience

The seven weeks I spent as an intern at the Environmental Protection Department (EPD) is one experience I will never forget. My time here was spent between the Marine Pollution, Water Quality, Air and Noise Pollution Control and Solid Waste and Hazardous Materials Sections of the Department where I gained invaluable experience and a better understanding of the role EPD plays in protecting both the health and safety of Barbadians and the natural environment.

I especially enjoyed accompanying the officers on site visits and assisting with the collection of water samples as a part of the Department's groundwater monitoring and beach sampling programmes.



“I was allowed to review policy documents and reports with the aim of highlighting any measures which may be considered to yield a more robust document.”

My fellow interns and I also had the opportunity to attend the launch of the National Pesticide Container Management Scheme, an initiative that encourages the safe disposal and recycling of pesticide containers. Moreover, I was allowed to review policy documents and reports with the aim of highlighting any measures which may be considered to yield a more robust document.

Sadly, the internship was hampered somewhat by the ongoing COVID-19 pandemic which at one point caused a two-week suspension of the programme. Despite this, I don't believe my experience with the EPD was dampened by any means. These seven weeks well flew by quickly and I'm sorry my time here has come to an end. However, I thoroughly enjoyed getting to know and working with the officers of the Department and my fellow interns.

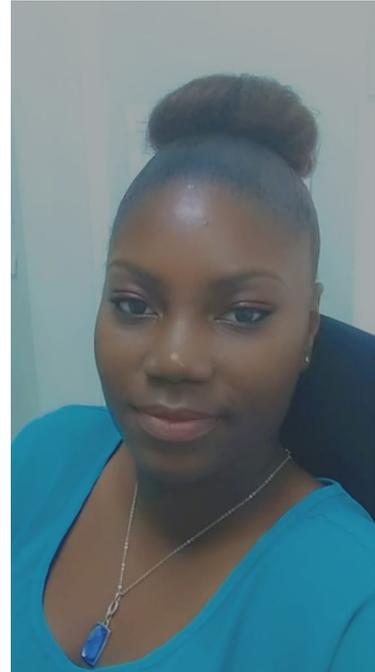
Maria Beckles

Shonnelle's Journey

On the first day of my internship here at the Environmental Protection Department, (EPD), to say I was a nervous wreck was an understatement, but then I was met at the front desk by the nicest person ever; Ms. Rosie Prescott, the department's Secretary who encouraged me to relax. I was not sure what the experience would be like, if I would enjoy the work or if I would understand the work that was being delegated to me. However, my worries were put to rest by the unbelievably patient and kind employees and the amazing work environment here.

Initially we were assigned to different sections based on our areas of study and even though I was only assigned to three sections I was able to get second hand knowledge of the other sections from my fellow interns, through our interactions with each other.

In terms of the actual work experience, I enjoyed both office and field work. However, my preference has got to be the field work; especially taking near shore water samples at the beach, even though all I wanted to do was to jump into the water. In all honesty, this was also my preference because the office can be quite cold.



“I was not sure what the experience would be like, if I would enjoy the work or if I would understand the work that was being delegated to me. However, my worries were put to rest by the unbelievably patient and kind employees and the amazing work environment here.”

Doing office work was very informative, as I learned about some of the different rules and regulations in the different sections such as the Water Quality Section which was tasked with monitoring and protecting our ground water along with the regulating of wastewater treatment plants and, in the Buildings Development Section and their use of the Health Service Building Regulations.

In conclusion my experience here at the EPD has been one filled with knowledge and laughter and I believe from this experience I have not only gained knowledge but have also gained possible lifelong friends.

Shonnelle Griffith

Nathan's Experience

During my work experience at The Environmental Protection Department, I was fortunate enough to have experienced firsthand and learn, many different sides of the Department. Reflecting back to my first day at EPD, it was one of the most memorable days of my time at work. After being introduced to everyone, I was handed a previous project and there I learned what goes into a project, the general process of how a project is initially planned, developed and implemented; as well as how much work and detail goes into every stage.



By observing and learning from my seniors and supervisors, I managed to pick up tips and also learn different types of skills, such as learning to communicate and deal with other companies, to reading and deciphering many different types of plans, to learning about the Health Services Regulations and implementing them into acknowledgement letters.

“I was handed a previous project and there I learned what goes into a project, the general process of how a project is initially planned, developed and implemented; as well as how much work and detail goes into every stage.”

I really enjoyed the times I spent in the field, whether it was setting up air quality devices in various locations of the island, collecting water samples from the beaches and the pumping stations, site visits of building development, or even attending the Triple Rinse Pesticide Container launch. This was probably the most enjoyable part of my experience at EPD, although I enjoy the office my preference is fieldwork, getting to observe and participate in the work I was working on in theory, which helped me to understand the importance of each stage of the project.

The atmosphere at EPD was a very open and friendly one and this instantly made me feel comfortable and definitely made me feel as though I was part of the team. I sincerely enjoyed every moment at the Environmental Protection Department.

Nathan Wilson-Tempro

Environmental Protection Department and Antimicrobial Resistance

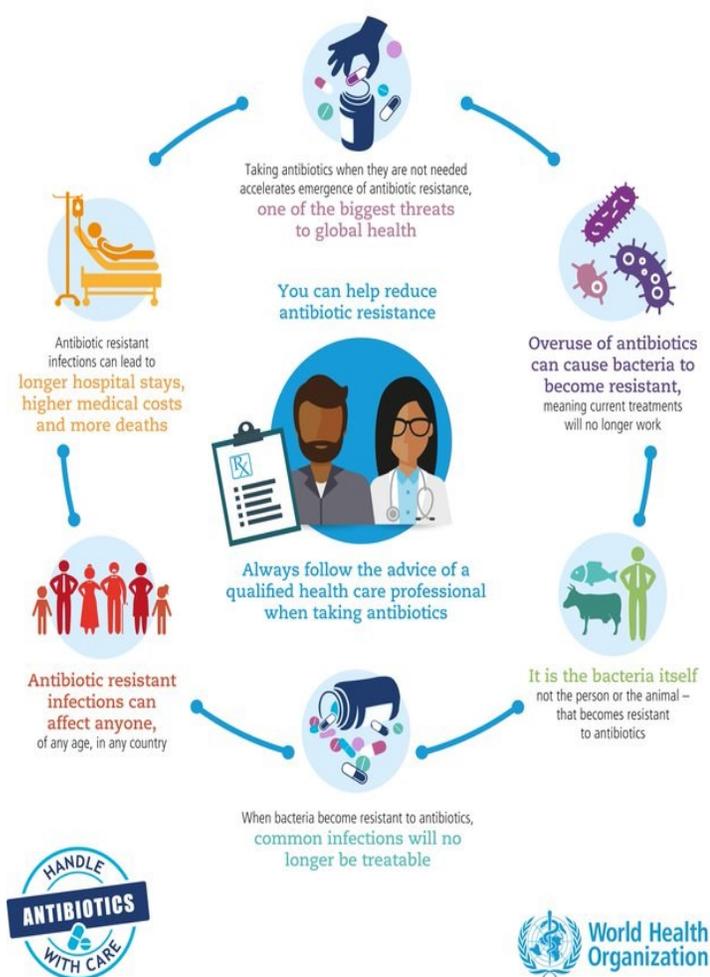
Antimicrobial Resistance (AMR) occurs when a microorganism evolves to resist the effects of an antimicrobial agent. These agents in sufficiently high concentrations can kill bacteria, viruses, protozoa and fungi. However, at sub-lethal concentrations specific genes enable an organism to adapt through a variety of mechanisms and multiply in its presence. One of the main drivers of this is an important group of antimicrobials such as antibiotics. Antibiotics are pharmaceutical chemicals we use to treat bacterial infections that may cause sore throat, ear, or respiratory system infections. They are also heavily used in agricultural settings to treat livestock.

The proliferation of antibiotics and other antimicrobials in the environment is a result of actions such as over prescription, use of antimicrobial chemicals in everyday settings e.g. anti-bacterial soaps and disinfectants where plain soap and water would suffice, improper disposal of expired antimicrobials by flushing down the drain or by elimination of excess from the body in human and animal waste.

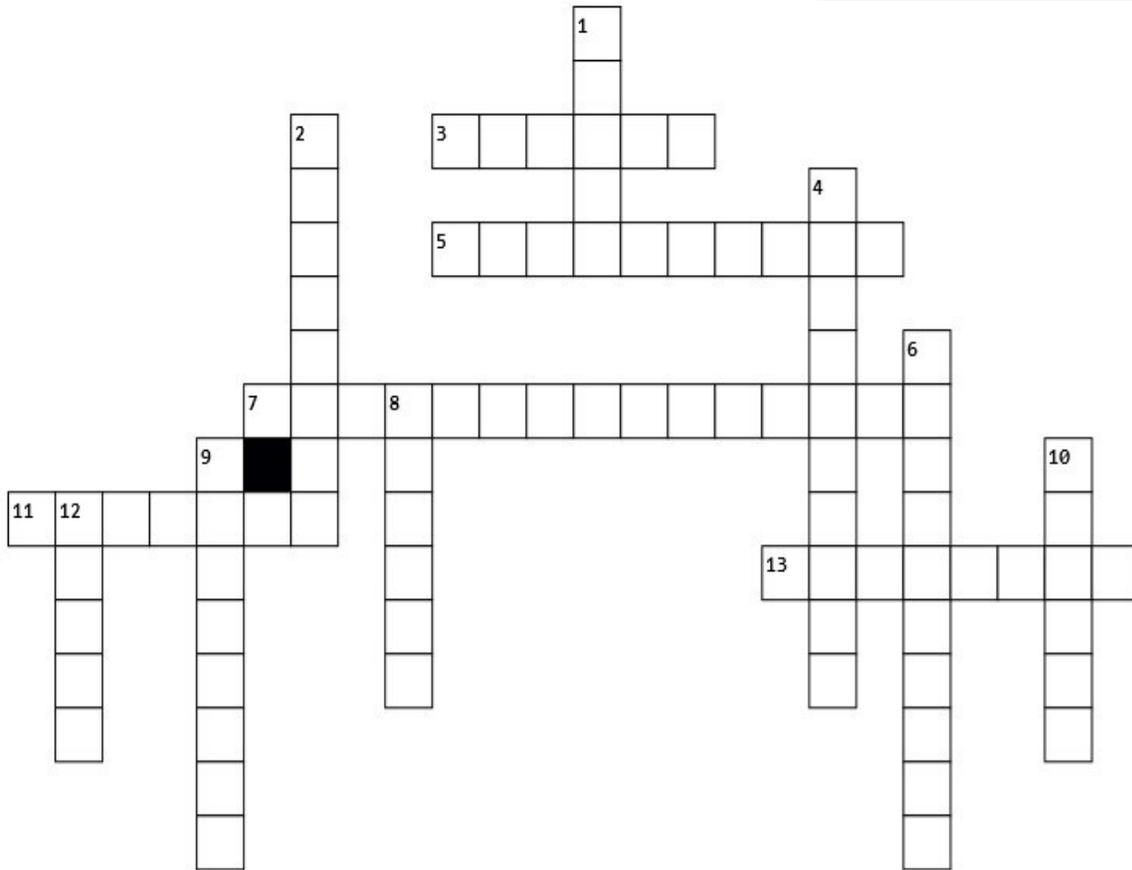
So important is this development, the World Health Organization (WHO) has declared that AMR is one of the top 10 global public health threats facing humanity. According to the World Health Organisation (WHO), the social and economic impacts from resistant organisms are longer illnesses periods, increased mortality, prolonged stays in the hospital, loss of protection for patients undergoing operations and other medical procedures, loss of productive hours from work, and increased treatment costs.

(continued on page 18)

Misusing and overusing **ANTIBIOTICS** puts us all at risk



EnviroFocus Crossword Challenge



ACROSS

- 3. One of the 3 Rs
- 5. This monitoring of groundwater happens bi-annually
- 7. An air pollutant monitored by the EPD
- 11. How often does groundwater monitoring occur?
- 13. A type of container used when travelling

DOWN

- 1. Another one of the 3 Rs
- 2. The location of an ambient monitoring station
- 3. A type of organic pollutant
- 5. An organism may develop this ability when overexposed to antibiotics
- 7. This is required to import or dispose of radioactive sources
- 9. This chemical is added to our drinking water to make it safe for use.
- 10. " _____ " and decisions are reached after monitoring and assessments
- 12: Another air pollutant monitored by the EPD

Test your knowledge on the articles in the newsletter in this crossword puzzle!

Environmental Protection Department and Antimicrobial Resistance

(Continued from page 16)

What is the role of the EPD in fighting Antimicrobial Resistance?

At the Environmental Protection Department, we have investigated the presence of antimicrobial resistant organisms in the marine environment since 2010 with repeated assessments in 2013 and 2015.

During 2021, the Department worked with the AMR Inter-Collaborative Task Force (AMR-ICTF) to update the Barbados Antimicrobial Resistance National Action Plan 2021 to 2025. The Plan aims to set out the strategies and actions necessary to manage the risks from operations like medical institutions and agricultural facilities; and control potential human and animal exposure to AMR organisms through food, food animals, horticulture and aquaculture operations and the environment.

Well-characterized classes of resistance-driving chemicals include the following^{1,2}:

- antimicrobials, of which there are four subclasses:
 - antibiotics,
 - antifungals,
 - antivirals, and
 - anti-parasitic compounds;
- heavy metals; and
- (3) biocides (i.e., disinfectants and surfactants).

These classes of chemicals are vital to modern societies and our way of life. Figure 1 illustrates the drivers of antimicrobial resistance, including AMR genes and the potential routes of entry into the environment. The EPD plans to expand these assessments for AMR organisms to determine their presence in groundwater.

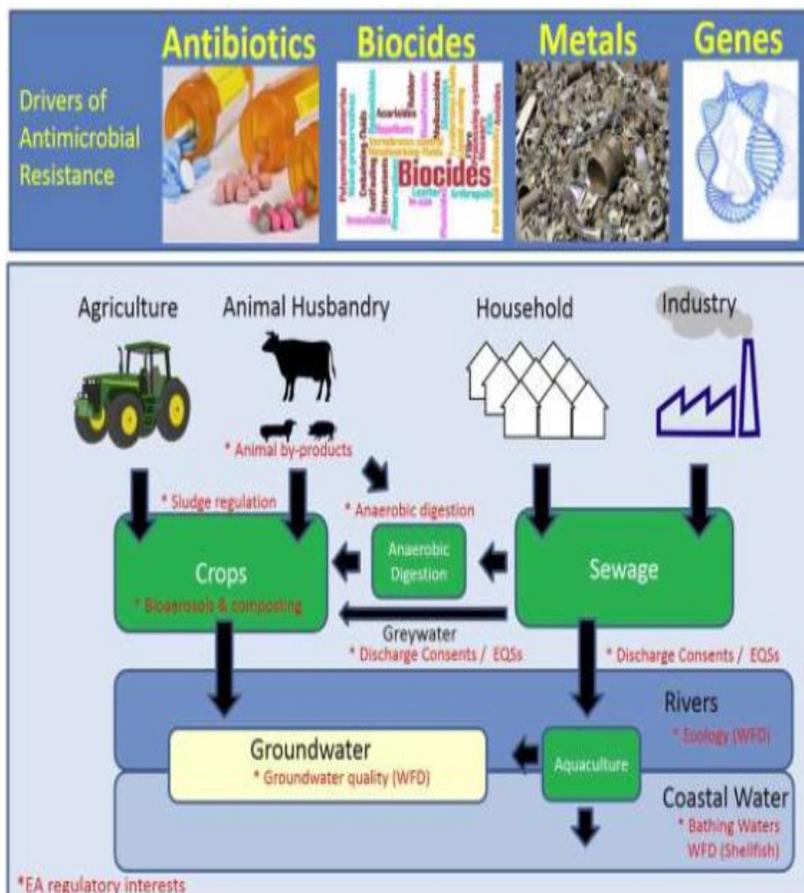


Figure 1: AMR pathways

¹Singer, A., Shaw, H., Rhodes, V. and Hart, A., 2022. Review of Antimicrobial Resistance in the Environment and Its Relevance to Environmental Regulators.

²Gaze, W. and Depledge, M., 2022. Frontiers 2017: Emerging Issues of Environmental Concern Chapter 1. [online] UNEP - UN Environment Programme. Available at: <<https://www.unep.org/resources/frontiers-2017-emerging-issues-environmental-concern>> [Accessed 27 April 2022].

Development and Implementation of a Sustainable Management Mechanisms for the Management of Persistent Organic Pollutants in the Caribbean

What are persistent organic pollutants?

Persistent organic pollutants or POPs are a group of chemicals with the following properties:

- They remain unchanged in the environment for long periods of time;
- They may be transported over long distances by natural processes in water, air and soil;
- They bio-accumulate; that is their concentrations increase as they move up the food chain; and
- They are toxic to humans and wildlife.

POPs are considered a global problem since they have been detected globally in the environment and living organisms including in regions that are long distances from known sources of environmental releases.

What is Barbados doing to protect human health and the environment from POPs?

Barbados is a signatory to the Stockholm Convention on Persistent Organic Pollutants. It is a global treaty which seeks to protect human health and the environment from POPs. The Convention lists twenty eight (28) POPs chemicals which countries that sign the Convention are required to reduce and/or eliminate their production and use and ensure their environmentally sound disposal.

Additionally, Barbados is one of eight countries participating in a regional project titled “Development and Implementation of a Sustainable Management Mechanism for the Management of Persistent Organic Pollutants in the Caribbean”. The objective of the project is to

assist the countries in the region to reduce or eliminate the threat of persistent organic pollutants (POPs).

The project is funded by the Global Environment Facility, the implementation agency is the United Nations Industrial Development Organisation (UNIDO) and the executing agency is Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean Region (BCRC-Caribbean). The Environmental Protection Department has the responsibility of executing the project in Barbados which began in 2015 and is expected to be completed in 2022.

The four components of the project are:

- i. Creating the enabling mechanisms in the Caribbean for effective implementation of the Stockholm Convention;
- ii. Reducing the emission of unintentionally produced POPs by improving poor waste management at waste disposal sites;
- iii. Assessing potentially contaminated sites to determine the level of contamination; and
- iv. Protecting the environment and human health by safely managing and disposing stockpiles of POPs.

Public Education and Awareness

The activities under component one of the project included the development of a communications framework for POPs. It was recognised that educating the general public and specific stakeholder groups such as farmers was critical to the success of many of the initiatives of the project and the work of governments in implementing the Stockholm Convention.

Development and Implementation of a Sustainable Management Mechanisms for the Management of Persistent Organic Pollutants in the Caribbean

Public Education and Awareness Cont'd (Continued from previous)

The Arthur Lok Jack School of Business was contracted to develop the communications framework. Surveys were conducted in each country and a communications strategy for each country participating in the project and a wide range of public education materials were developed. These included printed materials such as brochures, posters and banners; videos; debate guidelines and a game.

The public education materials focused of following groups of POPs:

- **POPs pesticides** – e.g. endrin, DDT, lindane, endosulfan;
- **Brominated flame retardants** – may be found in cathode ray tubes in televisions and plastic and foam in vehicles manufactured before 2004;
- **Polychlorinated biphenyls (PCBs)** – may be found in transformers and capacitors manufactured before 1985 and emitted when burning copper wires;
- **Perfluorooctanesulfonic acid (PFOS)** – may be found in fire-fighting foams and water or stain resistant clothing and carpets; and
- **Unintentionally produced POPs** – by-products of chemical or combustion processes.

Each country was allocated funds under the project to assist with implementing the public education programme. The decision was made to focus on unintentionally produced POPs which may be produced by open burning.

“The video animation on unintentionally produced POPs (UPOPs) is scheduled to be aired on CBC TV during the first quarter of the year between April to June, 2022.”

The video animation on unintentionally produced POPs (UPOPs) is scheduled to be aired on CBC TV during the first quarter of the year between April to June, 2022. For more information please visit <https://www.stopthepops.com> or scan the QR Code below.



The project is scheduled to be completed in 2022; however, the Environmental Protection Department will continue to implement the outputs of the projects and ensure Barbados meets its national obligations under the Stockholm Convention.

STOP THE POPs!

Identify, Learn & Act!

DON'T BURN TO LEARN



Open Burning
Burning of certain materials can lead to the generation of UPOPs.



Poor Waste Management
Mixing of waste when practicing open burning and commingling of waste at landfills can result in exposure to UPOPs through inhalation.



Contaminated Food Sources
Eating meat from contaminated animals that dwell near or around landfills and dump sites can pose serious health risks.



Burning of Copper Cables
The burning of cable wires for copper recovery can lead to the direct inhalation of UPOPs.



Contaminated Water Sources
Potential exposure due to the use of irrigation water from areas downstream of landfills or other contaminated sites.



Safeguard Yourself From UPOPs

In your backyard or even at the dinner table, you may be in contact with **Unintentional Persistent Organic Pollutants (UPOPs)** and not even know it.

Learn More Today! stopthepops.com



This product was developed under the project: GEF 5558
"Development and Implementation of a Sustainable Management Mechanism for POPs in the Caribbean"
JANUARY 2020

EnviroFocus Crossword Challenge

ANSWER SHEET

The crossword puzzle grid contains the following words:

- 1R**: e
- 2T**: reassess
- 3R**: reduce
- 4P**: screens
- 5W**: widescreen
- 6R**: sulphur-dioxide
- 7S**: cr
- 8P**: sulphur-dioxide
- 9C**: cr
- 10M**: monthly
- 11Z**: ozone
- 12N**: thly
- 13L**: ozone
- 14R**: eusable
- 15P**: ozone

WORD SCRAMBLE

WORD SCRAMBLE

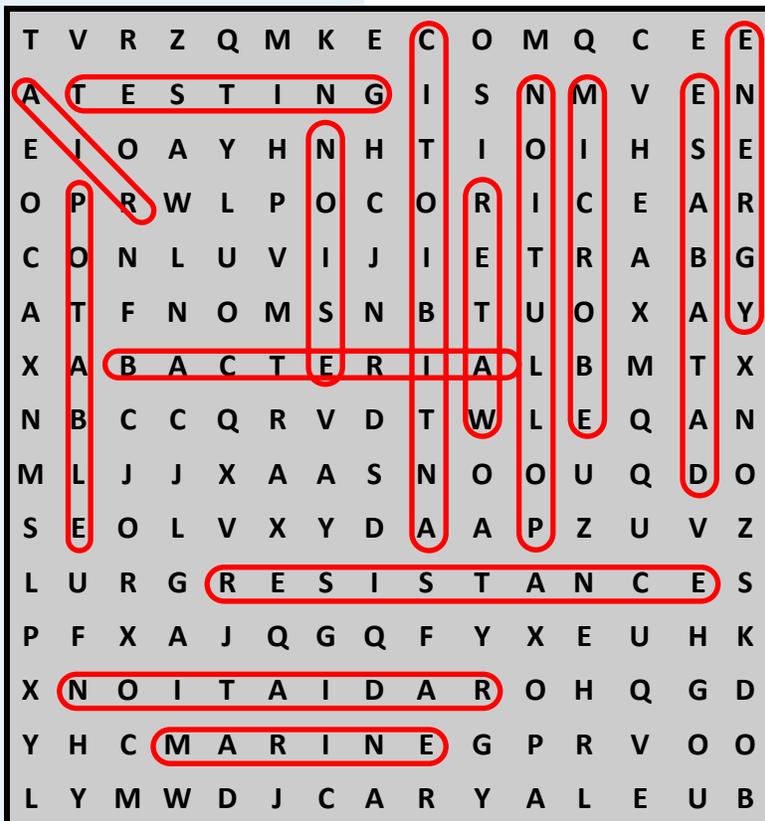
T	V	R	Z	Q	M	K	E	C	O	M	Q	C	E	E
A	T	E	S	T	I	N	G	I	S	N	M	V	E	N
E	I	O	A	Y	H	N	H	T	I	O	I	H	S	E
O	P	R	W	L	P	O	C	O	R	I	C	E	A	R
C	O	N	L	U	V	I	J	I	E	T	R	A	B	G
A	T	F	N	O	M	S	N	B	T	U	O	X	A	Y
X	A	B	A	C	T	E	R	I	A	L	B	M	T	X
N	B	C	C	Q	R	V	D	T	W	L	E	Q	A	N
M	L	J	J	X	A	A	S	N	O	O	U	Q	D	O
S	E	O	L	V	X	Y	D	A	A	P	Z	U	V	Z
L	U	R	G	R	E	S	I	S	T	A	N	C	E	S
P	F	X	A	J	Q	G	Q	F	Y	X	E	U	H	K
X	N	O	I	T	A	I	D	A	R	O	H	Q	G	D
Y	H	C	M	A	R	I	N	E	G	P	R	V	O	O
L	Y	M	W	D	J	C	A	R	Y	A	L	E	U	B

WORD LIST

AIR
ANTIBIOTIC
BACTERIA
DATABASE
ENERGY
MARINE
MICROBE
NOISE
POLLUTION
POTABLE
RADIATION
RESISTANCE
TESTING
WATER

WORD SCRAMBLE

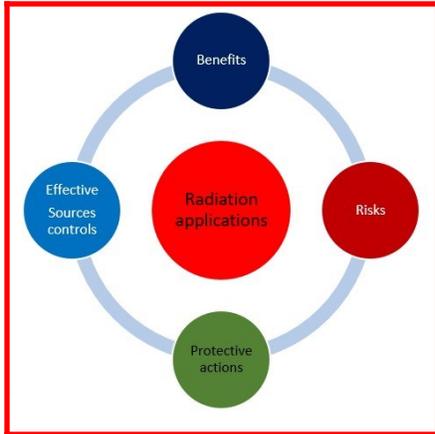
WORD SCRAMBLE



WORD LIST

AIR
ANTIBIOTIC
BACTERIA
DATABASE
ENERGY
MARINE
MICROBE
NOISE
POLLUTION
POTABLE
RADIATION
RESISTANCE
TESTING
WATER

ANSWERS



Radiation Safety Regulatory Authority Information System

As a member of the International Atomic Energy Agency (IAEA), Barbados has an obligation to maintain information on all radioactive sources on the island. This is achieved through a programme called Regulatory Authority Information System (RAIS).

Every member country to the IAEA is required to collect and compile all relevant information related to radioactive sources into a database so that there is a central repository of information that can be used by response agencies to ensure radiation safety.



What is EPD's Role In Radiation Management?

The Environmental Protection Department has responsibility for safety and security regarding radioactive sources and radiation in Barbados.

Most persons may not realize that there are several sources of potentially harmful radiation on island. These range from medical sources such as X-ray machines and radiation treatment application, to specialized equipment used in construction and industrial applications.

Therefore, the EPD responsibility includes ensuring the safety and security of the radioactive sources on the island as well as ensuring the protection of public from the harmful effects of radiation through misuse.

The achievement of radiation safety is done through a multi-agency approach since there are several agencies which are involved in various aspects related to radiation safety. As part of the process for radiation safety, Barbados has been selected to participate in a pilot programme for the RAIS+ which is an improvement of the RAIS and, is aimed at enhancing data collection and maintenance of the database of information.

This programme is expected to run from March to April 2022, it will be done online and will involve personnel from all of the response agencies, which include the Barbados Police Service, Department of Commerce and Consumer Affairs, Customs and Excise Department, Barbados Fire Service, Ministry of Health and Wellness and Environmental Protection Department.

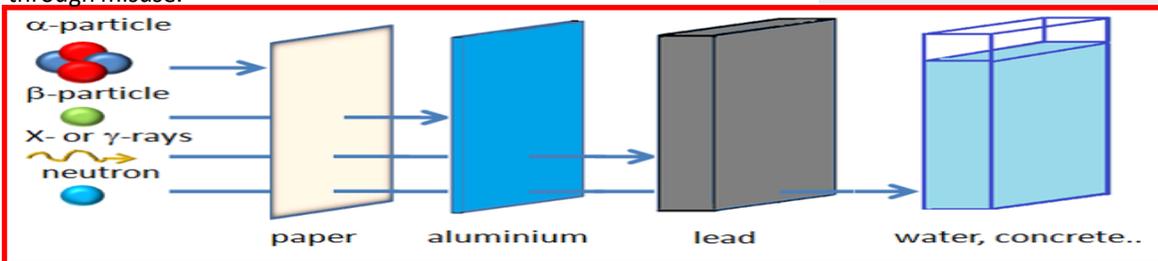


Figure 1: A representation of the types of radiation and their ability to penetrate various substances

Bridgetown Noise Monitoring Programme

The Environmental Protection Department (EPD) has embarked on a project to investigate the sound levels in Barbados, starting with Bridgetown. In March 2020, the EPD set up its first semi-permanent monitoring station at the Treasury Building in Bridgetown.



	dB(A)	
Extremely Loud	120	Aircraft take-off
	110	Car Horn
	100	Subway
Very Loud	90	Truck, Motorcycle
	80	Busy intersection
Loud	70	Noise near highway
	60	Normal conversation
Moderate	50	Residential area
	40	Living room
	30	Quiet rural area
Faint	20	Whisper
	10	Leaves falling
	0	Threshold of hearing

Table 1: Various examples of noise and their referenced decibel levels

A sound level meter, which measures sounds in decibels, was placed on an upper deck of the Treasury Building and was used to continuously gather data on the sound levels.

According to World Health Organization (WHO) Guidelines for commercial areas, the L_{Aeq} of the sound levels (i.e. a kind of average of the sound levels) should not exceed 70dBA and the L_{AFmax} (i.e. a maximum) should not exceed 110dB.

The sound levels recorded at the Treasury Building in 2020 came close to the WHO guideline values at times with the L_{Aeq} at the monitoring site ranging from 53 to 68 dBA and the L_{AFmax} from 82 to 107 dBA. EPD embarked upon this project to quantify the sound levels within Bridgetown as this is one of the busiest areas in Barbados. Additionally, the noise levels there had the potential to impact a wide cross section of persons as a significant number of persons live, work and pass through the city. The main sources of sound identified were traffic, people (e.g. talking, lining), bus terminal activity and vendors/commercial activity.

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As expected, the variation in the sound levels during the day aligned with activity levels. Typically sound levels started to rise from around 03:00–04:00 until around 07:00 where the sound levels continued around that level until around 18:30 where it declined. There were some instances between 10:00–13:00 that the sound levels spiked significantly (most likely due to the loud blowing of horns). As Bridgetown develops it is important to consider how sound levels will be impacted, and also, it is important to allow developments that are compatible with the relatively high sound levels expected in towns.

Environmental Protection
Department Tips

- ◆ **Illegal dumping can affect our water quality, place waste in appropriate receptacles.**
- ◆ **Plant more trees. Trees absorb CO₂, keep areas cool and can help reduce energy use for cooling.**
- ◆ **Conserve water by turning off taps while brushing your teeth and lathering in the shower.**
- ◆ **If you have a business like a night club or a rum shop, noise should not be louder than the background level.**

Let's Keep It Clean

A derelict building is any building that is run-down, unoccupied, structurally unsound and is in a condition that is harmful to the public safety.

A derelict vehicle is any motor vehicle that has been abandoned, taken apart, is no longer roadworthy, or is in a condition that is harmful to the environment and public safety.

If you see any of these vehicles or structures in your area, please contact the Environmental Protection Department at 535-4600 to conduct an investigation.



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