



# Envirotalk



GOVERNMENT OF BERMUDA  
Ministry of The Environment and Sports

FALL 2009  
VOLUME 77 No. 3

PROMOTING APPRECIATION, ENHANCEMENT AND CONSERVATION OF BERMUDA'S ENVIRONMENT

## WELCOME

### In this issue...

- Vanese Flood Gordon, Waste Education and Enforcement Officer, provides some frightening information on our trash culture.
- Joanna Pitt, Temporary Marine Resources Officer, reports on a collaborative research project between BIOS and The Department of Environmental Protection focusing on links between Bermuda's offshore fisheries and local oceanography.
- Mark Rowe, Hydrogeologist, advises on the safe use of well water and how the law protects us.
- As usual we have two mouth-watering recipes for you to try and the Fall planting calendar.
- We profile the summer students that have been working with us this summer at the Department of Environmental Protection.
- Check out the details for the upcoming Botanical Society Fall Festival.
- Finally, we have a new item especially for the kids (or those young at heart) – have a go at our Envirotalk crossword.

Please contact Caroldey Douglas (Tel: 239-2307 or e-mail: [cdouglas@gov.bm](mailto:cdouglas@gov.bm)) with ideas for future articles.

Please contact Alison Green (Tel: 239-2310 or e-mail: [agreen@gov.bm](mailto:agreen@gov.bm)) if you would like to be added to the subscriber list.

## ONE MAN'S TRASH. . .

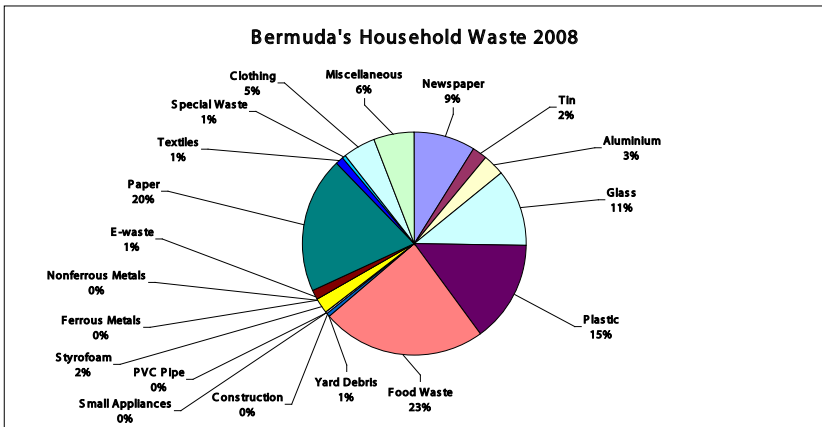
They say that one man's trash is another man's treasure. In 2006 the average Bermuda resident threw out 835.2 lbs of trash or household waste. That's the equivalent of 2.3lbs per person per day.

This number elicits "wows" from schools kids all over Bermuda when I do my 3Rs presentation – Reduce, Reuse and Recycle. However, you can hear a pin drop when I tell kids that 6,000,000 lbs of that trash could have been recycled.

Waste numbers like these are determined the old fashioned way – we roll up our sleeves, put on some gloves and tear open some trash bags. Looking at the bigger picture (see pie chart) helps us to understand how our fellow Bermuda residents deal with their waste.

Take a look at the 20 categories and it becomes immediately apparent that 15% or 126 lbs of (TAG) tin, aluminum and glass recyclables can be removed from each person's waste stream. Remove used clothing (send to The Barn or other second-hand store) and non-ferrous metals and you reduce the numbers by another 6%. Add to that compostables (food 18% and yard waste 4%) and the grand total of non-waste items in the average Bermuda household trash is 43%.

Nearly half of all that we throw out could be removed from the waste stream and sent overseas for recycling, reused or composted right here in Bermuda. Removal of these items from the waste stream helps the Tynes Bay waste to energy incinerator work more efficiently – keeping your tax dollars working harder for you.



We're throwing away treasure everyday – recyclables such as aluminum and tin have ready markets in the US and glass is a valuable aggregate right here in Bermuda. Sales of recyclables in US markets helps defray the cost of

waste collection in Bermuda, cuts down on waste in Tynes Bay and disposal at the Airport facility, keeping our environment safer and cleaner for future generations.

Remember to turn your trash into national treasure by practising the three Rs – REDUCE, REUSE and RECYCLE.

To see Bermuda's new Recycling Centre in action and learn more about recycling in Bermuda email [recycle@gov.bm](mailto:recycle@gov.bm).

*Vanese Flood Gordon  
Waste Education and Enforcement Officer  
Ministry of Works and Engineering*

### **CAFÉ BERMUDA: WHAT BRINGS WAHOO AND YELLOWFIN TUNA TO OUR WATERS?**

The Marine Resources Section of the Department of Environmental Protection has recently been involved in a collaborative research project with the Bermuda Institute of Ocean Sciences (BIOS), making use of the long history of data collection at both organisations and focusing on links between Bermuda's offshore fisheries and local oceanography.

The research was conducted by Cátia Matias, a master's student from Portugal who came to Bermuda as part of the Nippon Foundation's Partnership for Observation of the Global Oceans (POGO) Centre for Excellence. This educational initiative brings together up-and-coming oceanographers from around the world for an intensive programme of study at BIOS. The interesting results obtained during her POGO studentship prompted the Department of Environmental Protection to sponsor Cátia's continued stay at BIOS so the study could be developed further.

Wahoo and yellowfin tuna are two of the most important species in the local commercial fishery, with average annual landings of 200,000 lbs and 100,000 lbs respectively. They are also an important component of the offshore recreational fishery. Traditionally caught during their spring and fall "runs", these species pass by Bermuda during annual migrations that take them throughout the central Atlantic, although small individuals may remain in the area through the summer. It is thought that the Bermuda Seamount is an important feeding stop for these species during their long migratory journeys.

Cátia investigated how variations in ocean conditions influence the landings of these two species. She focused on changing water temperature, which is thought to drive their migratory behaviour, and chlorophyll concentration, which represents the plant material at the bottom of the food chain and is an

indication of the amount of food that will ultimately become available to the fishes. The research project aimed to determine how much of the variability in the landings of wahoo and yellowfin tuna can be attributed to variability in these two basic oceanographic parameters.

To do this, Cátia compared information from the Marine Resources fisheries database with oceanographic data from the Bermuda Atlantic times-series Study (BATS) at BIOS. The BATS programme has been compiling oceanographic measurements at a location 50 nautical miles off Bermuda since 1988, and the fisheries database also extends back into the 1980s. However, the offshore commercial fishery in Bermuda did not really develop until fish pots were banned in 1990, so this was chosen as the start for the study. 2006 was the last year for which complete data were available, providing a 17-year time-series of both oceanographic and fisheries data. Datasets such as these are only now building up to the point where analysis becomes meaningful, so this was a unique study opportunity.

The results indicate that seawater temperature does indeed drive the presence of wahoo and yellowfin tuna in Bermuda waters, and that the amount of plant material available to the food chain strongly influences landings. The “spring bloom” is a highly productive period in February and March, and the amount of plant material produced at this time influences the size of the spring runs, as well as how long these fishes stay in the local area. It affects landings over the rest of the year, since length of stay and relative abundance of these fishes translates to the likelihood of their being caught. Other minor and less predictable bursts of productivity contribute to variability in landings later in the year.

The roles of the North Atlantic Oscillation (NAO), which drives climate in the north Atlantic, and the Gulf Stream, used by many oceanic species during their migrations, were also examined. Climatic effects of the NAO correlate with fish landings, since increased winter storm activity in the local area during certain NAO phase’s stirs up nutrients from deeper waters, enhancing the spring bloom and thus increasing landings. In addition, the Gulf Stream brings more fishes



to Bermuda and encourages them to stay in the area when it is in a more southerly position.

Although fish abundance and landings are dependent on a multitude of factors, the four factors investigated in this study appear to be among the most important and account for a significant proportion of the variability in the local landings of wahoo and yellowfin tuna.

A copy of the full report is available at the Department of Environmental Protection Library. Please contact our librarian, Alison Green, at 239-2310 or [agreen@gov.bm](mailto:agreen@gov.bm).

*Endnote: Cátia Matias is grateful for the opportunities provided by The Nippon Foundation, The Bermuda Institute of Ocean Sciences (BIOS) and the Government and people of Bermuda.*

*Joanna Pitt  
Temporary Marine Resources Officer*

## USE OF WELL WATER IN BERMUDA PRECAUTIONS AND THE LAW!

Bermuda's fresh ground water resources, in the form of "lenses", remain the main source of water delivered by pipelines and trucks to supplement household rain water supplies. Up to one and a half million imperial gallons of treated well water is distributed from these resources each day.

Chemical and bacteriological analyses have shown that ground water continues to be of wholly adequate quality as a source of water **to be treated** for public supply. Persistent, heavy contamination of ground water is known to occur in only a few areas of limited extent, which are not developed by supply wells. The cause of this contamination has been historical leakage of petroleum fuels from pipelines and storage tanks at various facilities throughout Bermuda. Monitoring and remediation of these sites has been underway for several years.

The supply of water from any well - commercial or private - for drinking purposes is unlawful without treatment and a licence from the Health Department (Public Health Act 1949). This law is a very important precaution, because any natural body of water is susceptible to contamination. Bermuda's ground water, for example, is particularly vulnerable to contaminants that are present in waste water, which is discharged into cesspits at the majority of homes in Bermuda.

Nitrate is a ground water pollutant of concern, globally, and is attributable to waste water disposal and/or fertilisation of agricultural land. It is potentially dangerous to infants, in whom it can cause a condition which interferes with

the ability of blood to carry oxygen. The World Health Organization drinking water standard for nitrate, of 10 milligrams per litre, is exceeded in Bermuda's ground water where there is the highest concentration of cesspits, in densely housed areas. This leaves no doubt that human activities impact on ground water quality in Bermuda; and that use, or provision, of untreated ground water for potable purposes poses an unacceptable health risk.

Treatment of well water is necessary to ensure that contaminants are removed and drinking water standards are met. Water sold by licensed suppliers in Bermuda is for the most part treated by reverse osmosis – a filtration process which removes 99% or more of virtually all pollutants, ranging from pesticides, through nitrates to salt. As a further safeguard, ground water which has been treated at these facilities is subject to testing by the Health Department.

In summary, well water must not be used, or provided, for potable purposes unless it has been supplied from a source which has been licensed by the Health Department.

*Mark Rowe*  
*Hydrogeologist*



## IN THE KITCHEN

### Banana Muffins

- 6 tablespoons shortening
- ½ cup sugar
- 1 large egg, beaten slightly
- 1 ½ cups all-purpose flour
- 1 cup mashed ripe bananas
- ½ cup chopped walnuts
- 1 teaspoon baking soda
- 1 teaspoon double-acting baking powder
- 1 teaspoon salt
- 1 teaspoon vanilla

In a large bowl combine shortening, sugar, egg, salt and vanilla. Into a bowl sift together flour, baking soda and baking powder, add to the shortening mixture, and stir the batter until it is just combined. (The batter should be lumpy). Fold in mashed bananas and chopped walnuts,

and spoon the mixture into 12 buttered muffin tins, filling them two-thirds full. Bake in a pre-heated oven (350 °F) for 15-20 minutes, or until they are golden. Makes 12.

### **Sweet Potato Casserole**

- 4 large sweet potatoes (boiled and peeled)
- ½ cup brown sugar
- 2 eggs
- 1 stick butter (soft)
- 2 tsp. vanilla

#### Crunchy topping

- 1/3 cup melted butter
- ¼ cup flour
- ½ cup brown sugar
- 2 tsp. cinnamon
- ½ cup crushed walnuts

Whip the potatoes until fluffy. Add all other ingredients, mixing well. Pour the mixture into a greased casserole dish.

Combine all the ingredients for the crunchy topping and spread over the casserole mixture. Bake for 45 minutes at 350°.

*Submitted by Jennifer Bulford*



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## **PLANTING CALENDAR – WHAT TO PLANT IN THE FALL...**

### **September**

Beans, Broccoli, Brussels Sprouts, Cabbage, Carrots, Cauliflower, Celery, Chard, Cucumber, Eggplant, Kale, Leeks, Mustard Greens, Parsley, Pepper, Potatoes, Radish, Rutabaga, Tomato, Turnip.

## October

Beans, Beets, Broccoli, Brussels Sprouts, Cabbage, Carrots, Cauliflower, Celery, Chard, Chives, Cucumber, Eggplant, Endive, Kale, Leeks, Lettuce, Mustard Greens, Onions, Parsley, Pepper, Potatoes, Radish, Rutabaga, Spinach, Squash, Strawberries, Thyme Tomatoes, Turnip.

## November

Beans, Beets, Broccoli, Brussels Sprouts, Cabbage, Carrots, Cauliflower, Celery, Chard, Chives, Kale, Leeks, Mustard Greens, Onions, Parsley, Potatoes, Radish, Rutabaga, Spinach, Squash, Strawberries, Thyme, Tomatoes, Turnip.

## THE SUMMER STUDENTS OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

Each summer, the Department engages several students through the Human Resources Summer Student Programme to assist staff with work and provide a working experience for the students. Summer students are given the opportunity to work in the areas of Plant Protection, Marine Resources, Hydrogeology and with the Government Veterinarian.



Name: Kyle Furbert

Age: 17

Education: Christchurch School, VA

Interests: Languages, Science, Golf, Fitness, Fishing

Kyle is a bright young man with an easy smile, and always ready to go insect collecting. Once started on a job he always sees it through to completion. He enjoys working with the Marine Resources section and when there is mention of them going

out on the boat he's usually the first one out the door.

This is Kyle's first year with the Department.

*"I enjoy being on the water helping with the Grouper Tagging Project. I find the outdoors and ocean to be very interesting. I have learned much from Plant Protection and Marine Resources. This experience will be valuable in the future."*





Name: Maurisa 'Ris' Smith

Age: 21

Education: Thames Valley University,  
University of West London, UK

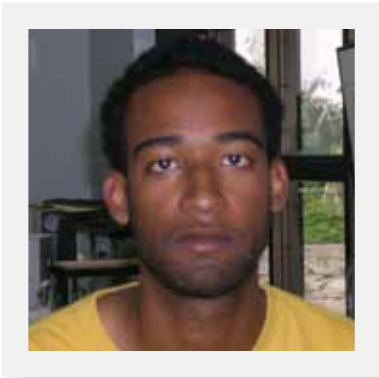
Programme: Digital Animation

Interests: Drawing, Volleyball, Physics,  
Psychology, Paintball

Maurisa, or 'Ris' as she is commonly known in the office, is a bright, bubbly personality who enjoys making the staff and visiting groups of children laugh. Working primarily in the Plant Protection Lab, she has, amongst other tasks, assisted with visiting school/summer day camp children with their 'bug' and 'recycling' art crafts. As a returning summer student she knows the routines of the Department and can help out in many areas from operating the phone switchboard, to interacting with customers, to plant inspection.

This is Maurisa's third year with the Department.

*"Working at the Department, I have gained both knowledge and friends that I can take with me long after the summer is done. I now realize that working at Environmental Protection is a difficult job that takes both skill and patience."*



Name: Daniel Rogers

Age: 20

Education: Northern Caribbean University,  
JA

Programme: B.Sc. – Biochemistry

Interests: Football, Music, Chemistry

Daniel is a hardworking and bright young man who also enjoys the great insect hunt! He is an enthusiastic worker who doesn't mind getting his hands dirty.

Primarily assigned to the Marine Resources section, Daniel has enjoyed his work on the boat collecting black groupers.

This is Daniel's first year with the Department.

*"Besides being seasick, it was amazing to watch and participate in the tagging surgery of the groupers. There was always something interesting to observe."*



Name: Jasmine Trott

Age: 17

Education: Warwick Academy

Interests: Art, English, Dance

Jasmine is a fun and enthusiastic young lady and takes an interest in everything going on in the Plant Protection Lab. She is always willing to work hard and is very reliable. Her good interpersonal skills enable her to be very helpful with visiting school/ summer day camp

children. Jasmine is very good at inspecting incoming plant shipments in the Lab and is a keen asset to the team. This is Jasmine's third year as a returning summer student.

*"My favourite part of working in the Lab is receiving packages and feeling important!"*

*Plant Protection Staff*

*Kim Burch- Technical Assistant*

*Claire Jessey- Plant Protection Officer*

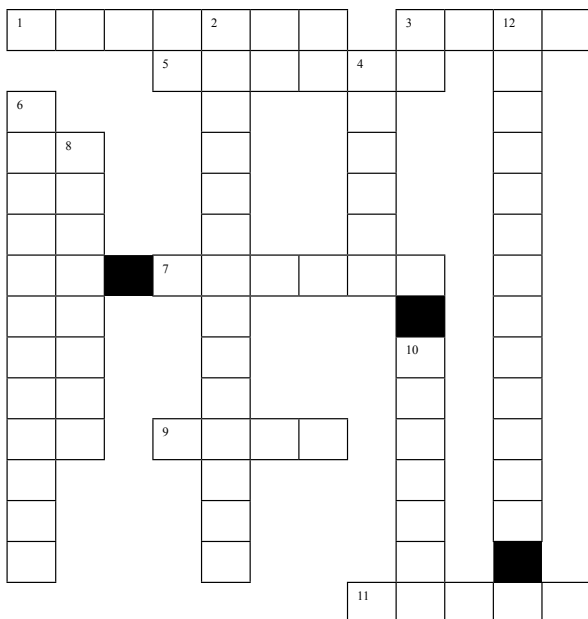
## **BOTANICAL SOCIETY FALL FESTIVAL**

**Sunday, 8 November ~ 2 p.m. – 6 p.m.**

Come along to the Botanical Society Fall Festival in the Botanical Gardens. The Fall Festival is a little later than usual this year and there will be a Guy Fawkes theme. It's sure to be a fun day out for the whole family. Activities will include a fun castle, train, arts and crafts, cupcake decorating, apple bobbing and lots of games.

See you there!

## ENVIROTALK CROSSWORD #1: ISSUES WITH FISH, WATER AND TRASH!



**Across:**

1. The offshore commercial fishery in Bermuda didn't develop until \_\_\_\_\_ were banned.
3. The Marine Resources Section was involved in a collaborative effort with \_\_\_\_\_.
5. October and November are good months for planting \_\_\_\_\_.
7. The main source of Bermuda's fresh water comes from \_\_\_\_\_.
9. Yellowfin tuna and wahoo make spring and fall \_\_\_\_\_, pass Bermuda.
11. One of the three R's

**Down:**

2. Leakage from \_\_\_\_\_ causes contamination of groundwater.
4. One of the three R's.
6. One summer student collected these during summer employment.
8. When creating a sweet potato casserole \_\_\_\_\_ provides just the right kick.
10. Last of the three R's.
12. What parameters and measurements were compiled that attributed to landing variability in wahoo and yellowfin tuna?

\*The answers to the crossword are found in the articles contained in *this* issue of Envirotalk. Please read the articles before attempting the crossword. Answers will be provided in the next issue.\*

# ON HER MAJESTY'S SERVICE



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