

## WELCOME

to our spring edition of Envirotalk.

In this issue –

- Dr. Jonathan Nisbett stresses the need for improvements in dog owner behaviour, especially for those owning or breeding pitbulls.
- Alison Copeland highlights spring regrowth on Bermuda’s native deciduous tree – the Southern Hackberry
- Dr. Robbie Smith describes a coral disease spreading in the Caribbean and Bermuda’s participation in regional programmes to understand and treat it.
- Dr. Mark Outerbridge introduces us to the Trap Jaw Ant
- The Marine Resources team explains the new fisheries regulations and how they will protect Bermuda’s sharks

Also See:

- Our **News & Notices** for reminders and upcoming events
- The **Planting Calendar** to get a head start on what to plant this spring.

Please contact:

Envirotalk mailing list: [envirotalk@gov.bm](mailto:envirotalk@gov.bm) to be placed on the mailing list or for suggestions for future articles.



## AN UNDENIABLE TRUTH ABOUT BERMUDA'S "FAVOURITE" DOG



Many desire me. Few deserve me

Square Dog Photography—Getty  
Image / Flickr Select

Allow me to ask the following: What one word would you associate with the pitbull dog? In my experience, I've heard the words companion, loyal, agile, strong, athletic, mis-understood, maligned, protector, dangerous.... Was your word amongst this list, or a synonym thereof?

Staff of Animal Control were recently posed with the same one-word challenge, and responses included "mis-treated", "victim" and "disposable". No doubt your word was based upon your experiences with pitbulls or what you've learned about pitbulls. Our words are similarly derived.

There was a day in late January, when I was particularly peeved. On that day, I was called upon to euthanize five dogs. All were healthy animals; none known to have been involved in any kind of attack or anti-social behaviour:

- For three dogs, the owners simply refused to license them and accept them back;
- For another, the owner left the animal behind when he moved out of his residence to an unknown location; and
- The fifth dog was found tied to a post at a local business; no one reported it missing; no one claimed it.

Those five dogs do not include the one left tied to a picnic bench along the railway trail (with a bag of food, bowls and chew toy); two others left behind when the owners left their residences; two dogs abandoned inside of public restrooms; the one recently found tied to a bus stop; or the miniature pinscher left at a boarding facility. Sadly, the list goes on and days like that January day continue. Those five dogs were a part of growing trend of found and seized dogs not being claimed. Of the incidents mentioned above, two occurred in late 2021, the rest during the first six weeks of 2022. Except for the min-pin, all of these animals were pitbulls. The Island's "favourite" breed is one our society abuses and disposes of with reckless abandon.



Abandoned on the railway trail

The Island's favourite breed is  
ABUSED and **DISPOSED OF**  
with reckless abandon.

Were these animals re-homed? Only the miniature pinscher was re-homed. Overall, the number of animals in need of adoption exceeds the number of people willing to adopt. Animal Wardens favour rehoming any dog that displays a friendly temperament. Such dogs are offered to the SPCA but, sadly, we often know the response we will receive, because we know of the difficult position in which the SPCA finds itself. Each of our organizations has its limitations, and we cannot fully serve all animals in need.



**My owner's choices landed me here.**

I plead to people who breed dogs and indiscriminately distribute puppies to recognize their contribution to the animal abandonments. Breeders who offer puppies at low cost will attract buyers for whom owning a dog is a questionable decision. New owners are often drawn to an adorable puppy or want a puppy for their own reasons, but fail to look beyond that initial purchase. Responsible breeders screen potential new owners, and ensure the wellbeing of young animals even after the sales.

I plead to persons receiving dogs to honestly examine your situation. What will occur after the 'honeymoon' phase of puppyhood? Will an adult dog really be a good fit for you, given your living arrangements, your lifestyle and your financial situation? A canine companion may fulfill **your** needs, but will you fulfill **its**?

Any dog acquired locally must come to you already **LICENSED** and **MICROCHIPPED**

Pet ownership can be expensive, especially dog ownership. Proper feed and care carry significant costs, and I appreciate that the current economic climate has made pet ownership difficult or impossible for some owners. Beyond the financial commitment, there is the commitment of

time....the owner's time...spending quality time with the pet, training it, socializing it, exercising it, so that it's not simply existing at the end of chain. The Wardens and I see animals in situations which beg the question 'Why does this owner have this animal?' It is usually a pitbull we find in these situations.

I appreciate the feeling of shame, embarrassment or failure that may come along with having to surrender a beloved pet, and I understand those who use the cover of darkness to leave their pets at a veterinary facility or at the SPCA, hoping the pet will have a chance at a good home. But I am very challenged by those who simply never seek a missing pet, or refuse to license their dogs and simply abandon them. I detect no sense of responsibility or commitment in those owners, and my fear is that they will simply obtain other disposable dogs.

Dog attacks are a public health concern in our community; hence the need for dog legislation and the need for secure keeping of all dogs, especially those of a restricted breed. Prior to 2018, the Dogs Act 2008 offered no legal recourse for the keeper of an illegal dog. Many dogs were destroyed, and the Government was heavily criticized for its strict stance. In 2018, Parliament amended the legislation to allow for the legalization of illegal dogs. However, very few owners of illegal dogs have voluntarily taken advantage of the opportunity to legitimize their animals, and even fewer have legally bred their pitbull. It is ironic that whilst the legislation allows an alternative to euthanasia of illegal dogs, Bermuda is now on track to kill more dogs than when policy and legislation were stricter.

A LEGAL dog will  
have both a  
LICENCE and a  
**REGISTERED MICROCHIP**

It is clear that some dog owners want the joys of dog ownership, without the responsibilities and obligations. Those responsibilities and obligations include the following:

- **Food, water, shelter, care** – Simple, physical elements of pet care are legally required. Meeting the animal's social & mental needs are also important.
- **Licence, microchip** – Every dog you obtain, including puppies, must come with its licence and registered microchip. This is true whether the animal comes from a pet store, a breeder, the SPCA, your relative, neighbour or friend. If the animal does not come with a licence and registered microchip, do not accept the animal.
- **Secure fencing or enclosure** is required for all canines of a restricted and prohibited breed. Tethering and invisible fencing are not acceptable options.
- **Leash** – All dogs must be leashed while in a public place and accompanied by a person who can maintain control of the animal.
- A **Breeder's Licence** must be obtained to breed dogs, have a pregnant dog or raise a litter. Contact the Department of Environment and Natural Resources well in advance for advice.
- **Multiple dogs** - A special permit is required to keep more than two dogs on a premises, inclusive of all dogs in all households on the premises.
- No dogs are permitted on a public beach between 1st April & 31st October each year.

A **good** life isn't found  
at the end of a chain.

Bermuda can do better. Bermuda must do better.

Questions arising from this article may be directed to [animals@gov.bm](mailto:animals@gov.bm).

**J. Nisbett, DVM**  
**Chief Veterinary Officer**

### **SOUTHERN HACKBERRY – BERMUDA'S NATIVE DECIDUOUS TREE**

Spring is springing in Bermuda in March, the signs are everywhere; including flowers and buds appearing on our Southern Hackberry trees. The Southern Hackberry (*Celtis laevigata*) is native, meaning it is found in Bermuda and other places such as the United States from Virginia to Texas, and northern Mexico. The Southern Hackberry is special because it is one of the few native plants that is winter deciduous, meaning its leaves turn yellow in the autumn and drop off the tree, which stays leafless for the winter months. In the spring – right about now- the inconspicuous flowers appear, followed by the buds of new leaves. By summer, the tree is again covered by bright green, pointed leaves, and the spring flowers have turned into berries about the size of a pea. These turn from green, to reddish brown, to dark purple as they ripen. In the late summer and autumn they provide food for resident and migrant birds. The berries are sweet, giving the tree its other common name – Sugarberry.



**Southern Hackberry flowers at Spittal Pond**

If you want to see Southern Hackberry trees, good places to look for them are the path at the western end of Spittal Pond (by the cows), or the end of the pond boardwalk at Cooper's Island. If you are thinking of planting Southern Hackberry some things to consider are the size, spread and deciduous nature of this tree. It grows up to 35ft tall, and 15ft wide; and tends to spread by suckers – therefore it is

only appropriate for large gardens and should be planted away from structures. Also as it is leafless for part of the year, it looks best when mixed among evergreen species.

**Alison Copeland, Biodiversity Officer**

## CORALS, CORAL DISEASE AND CLIMATE CHANGE

I am sorry to report on another pandemic which, fortunately, has not reached our shores. A relatively new disease is affecting corals throughout the western Caribbean, termed Stony Coral Tissue Loss Disease or SCTLD (coral scientists say this as: *skittle-D*). This disease emerged around the Port of Miami in 2014, in association with a dredging project. Over a few months it moved northwards and affected primarily brain corals and star corals. It seemed to follow the current patterns and scientists assumed it was probably a water-borne bacteria. But over time the disease began to move westwards, upstream, to the Florida Keys.



SCTLD infection on the symmetrical brain coral, *Pseudodiploria strigosa*. Photo credit: Cayman Islands Dept. of Environment.

The disease presents itself as large areas of the coral where the tissue has died quickly, revealing the white skeleton underneath. Similar to what we call “coral bleaching” but more like the Black Band Disease (BBD) that we have on some of our brain corals, but without the distinctive dark line. Scientists have struggled to identify the agent that causes the new disease. The reasonable assumption was that it is a bacteria. We know that a huge diversity of beneficial bacteria live on the surface of corals and occasionally this community breaks down, often due to stress or injury to the coral. This condition allows pathogenic bacteria to get started, producing a disease like BBD, which rarely kills a coral. SCTLD seems quite different. Here is a link to the Florida story: <https://floridakeys.noaa.gov/coral-disease/disease.html>

By 2018, the disease had spread to reefs in Mexico and by 2019 it was in the Bahamas, Turks and Caicos, Cayman Islands and had spread eastward to the US Virgin Islands. By this time coral reef scientists were much more informed on the disease and how lethal it was for infected corals, not 100%, but still very high. A number of treatments were devised and the most successful was a paste that included an antibiotic (Amoxicillin) which was applied to the infected coral underwater and remained in place for a few weeks. Given that brain and star corals are abundant across all our reefs, from shallow to very deep, the threat of a new and more lethal disease seemed ominous and potentially catastrophic.

I became aware of the disease in 2019 and, during a busy summer doing fish surveys on our reefs, never saw any evidence of SCTLD. Likewise in 2020. Early in 2021, a forum was organized by the Joint Nature Conservation Committee (JNCC), a group funded initially through the UK Dept. for Environment, Food and Rural Affairs, followed by a DARWIN+ grant, to support SCTLD treatment efforts and related coral reef research in the Caribbean UK Overseas Territories. My DENR colleague, Dr. Sarah Manuel (Senior Marine Conservation Officer) and I were invited to join this group of coral reef scientists, environmental NGOs and reef managers from the other UKOTs. Sarah and I learned of the treatments and protocols UKOT reef managers were using to try to limit the spread of the disease. In Cayman and TCI they worked very hard with their dive industry to disinfect diving gear so nothing could be spread between popular dive sites, as well as using the antibiotic paste. There has been some success but the disease is still actively spreading in many places, despite the treatments. If you see corals that look like this please forward an image to me at: [srsmith@gov.bm](mailto:srsmith@gov.bm).



SCTLD infection on the great star coral *Montastraea cavernosa*. Photo credit: Cayman Islands Dept. of Environment.

In summer of 2021 I was again out surveying corals and reef fishes, with intrepid interns Triana Zuill, Jasper Thomas, Samantha Dill, Macy Aicardi and Elijah Grigsby and, thankfully, still no SCTL. Sarah responded to an observation of “infected corals” reported by a visiting colleague from the US Virgin Islands, who knew what to look for, in Castle Roads. But it proved to be some unhappy brains corals, most likely impacted by marine debris. We recorded a low frequency of Black Band Disease again.



**Black Band Disease infection on the symmetrical brain coral, *Pseudodiploria strigosa*, off John Smith's Bay, September, 2015. Photo credit: Robbie Smith.**

In 2019, Sarah and I had participated in a JNCC-funded workshop in Anguilla, with our fellow Caribbean OT scientists, where each Caribbean UKOT developed their own Coral Reef Action Plan. We outlined our strengths and deficiencies for managing Bermuda's coral reefs. Two priorities outlined in Bermuda's Action Plan were the need for continued reef surveys, to assess the health of the coral and the fish communities, and for water quality monitoring. In the fall of 2021 JNCC was able to offer DENR some support, derived from a UK Conflict Stability and Security Fund, to begin to work on Bermuda's Coral Reef Action Plan. I took the opportunity to expand the scope of the reef surveys to include new sites and to collect data on the health and status of our corals (with an eye open for SCTL) and the fish communities. We focused on 12 sites, previously surveyed by Dr. Thad Murdoch and his BREAM team in 2015 and 2016. I was

able to hire three research assistants (Andreas Ratteray, Jess Godfrey and Rory Crofts), along with Thad as a data analyst and consultant. Again we failed to find any SCTLD in November and December and our initial sense of the data is that the corals are healthy and the fish communities are as well, including a surprising number of red hinds on our lagoon patch reefs. We expect to finish our data report soon. The Bermuda Zoological Society has provided fiduciary services for the project and the use of one of their boats for the field work.

The Marine Conservation Section used funds to repair and acquire equipment to re-start the DENR water quality monitoring programme, which was developed as part of DENR's seagrass monitoring programme (2007-2017). Although the seagrass monitoring programme clearly showed that the sad state of our seagrass beds was not the result of changes in water quality, we do need to continue monitoring water quality in both our inshore and offshore waters. Changes in water quality cannot only affect the recovery of our seagrass beds but also, and very importantly, the health of our coral reefs.

Climate change will become a stronger influence on the health of our reefs, particularly heat stress. Coral bleaching and subsequent mortality has been a clear symptom of the increasing frequency of bleaching episodes in the Caribbean and Indo-Pacific over the past two decades. Bermuda has been much less affected to date and may be less vulnerable due to the generally cooler waters at our latitude. But this will change over the next few decades.

We do not know if disease incidence and bleaching stress are related but that is only because we only have so few years of SCTLD data to look at and bleaching does not happen every year. We do know that our Black Band Disease becomes much more frequent in our summer months and declines with water temperature in the fall. So we should be concerned that heat stress on corals will increase over time, with climate change. If SCTLD continues to expand in the Caribbean then it raises the risk that it will eventually reach Bermuda and affect the brain corals and star corals that predominate on our reefs. Our challenge is to use Bermuda's Coral Reef Action Plan to continue to monitor our reefs and water quality to understand the scope of all stresses to our reefs, from reduced water quality, sediment re-suspension by shipping traffic and over-fishing, so that they can be reduced. This may allow for some level of resilience to the predicted effects of climate change and coral diseases.

***Dr. Robbie Smith***  
***Curator Natural History Museum, BAMZ***

## THE PRODIGIOUS POWER OF TRAP-JAW ANTS

Bermuda has at least 20 different species of resident ants, the most common being the African big-headed ant *Pheidole megacephala* and the Argentine ant *Linepithema humile*. Both became established on Bermuda between the 1850s and 1950s and are considered to be among the most widespread and destructive invasive ant species on Earth, in addition to being tiresome household pests. However, not all of the ants on Bermuda are problematic. The trap-jaw ant *Odontomachus ruginodis* is one such example. It is native to the Caribbean, and may also be native to Bermuda. Easily the largest member of the ant family on Bermuda, trap-jaw ants average 10 mm total length and possess long and rather fearsome looking jaws which can be opened to 180° then snapped rapidly closed. It is this trait that gives them their common name. Trap-jaw ant colonies contain one queen and up to 50 workers. Nests are constructed in the ground and are typically very shallow, consisting of several small chambers among which adults and brood are scattered. There is no obvious central chamber or single brood pile. Each ant begins life as an egg and, after hatching, undergoes a series of metamorphic changes. Final development occurs in a pale brown silk bag called a pupal case, from which a fully formed adult will eventually emerge. The entire body of the worker ant is generally shiny. The head and legs are a reddish-brown colour while the rest of the body is darker reddish-brown or even black in appearance.



Trap-jaw ants (Internet image: Adrian Smith)

Spring-loading mouthparts allow these insects to greatly amplify muscle power. Trap-jaw ants are able to keep their jaws latched open under tension but any contact with specialized sensory trigger hairs near the mouth causes the jaws to snap shut instantaneously. Trap-jaw ants generate some of the highest velocity limb movements ever recorded for an animal. Some research has shown that the jaws snap shut in as little as 130 microseconds (or 0.000130 seconds), in other words astonishingly fast. The mandibles can accelerate about as fast as a bullet can travelling through the barrel of a gun. Maximum estimated power output

of a trap-jaw strike is almost 500 kW/kg. To put this in perspective, the main engine on the NASA Space Shuttle has a power-to-weight ratio of 153 kW/kg at lift-off. However, force is a product of mass and acceleration, and because the ants are so small and light, they do not produce enough force to hurt you (or your finger if they were to snap it).

Solitary workers forage on the ground frequently with their jaws locked in the open position. In addition to catching fast moving prey, these high speed jaws are also used to defend the colony and to escape from dangerous predators via powerfully propelled jumps. Any unwelcome insect

that intrudes on a trap-jaw ant colony will be struck by the jaws from one of the guard ants. If the offending insect happens to be another species of ant, say an Argentine ant, it can be forcefully propelled as far as 15 cm backwards through the air (quite a feat when you consider how small an ant is). The forward lunge and strike occurs in less than 1/30<sup>th</sup> of a second and is colloquially called 'bouncer defense'. This action succinctly ejects the unwanted ant and reduces the risk of injury to the guard from a confrontation.

Research has also shown that some trap-jaw ant species can use mandible-powered jumps to escape from predators. This behaviour is known as ballistic jaw propulsion and it can create strike forces that exceed 300 times the ant's body weight. Jaw strikes to the ground produce sufficient power to launch the imperiled ant into the air and away from the threat of being attacked and eaten.

Bermuda's trap-jaw ants are among the smallest in the genus *Odontomachus*, which includes at least 60 species found in tropical and sub-tropical areas around the world. *Odontomachus ruginodis* was described as being common on Bermuda prior to the 1930s, but now the species appears to be quite rare. Recent confirmed sightings have occurred in the Eastern parishes within the Walsingham nature reserve as well as Spittal Pond, Nonsuch Island, Castle Island, Higg's Island, and at a few residential properties in Shelly Bay, Bailey's Bay, and Tucker's Town. The Department of Environment and Natural Resources welcomes any reports of trap-jaw ant sightings. Email observations to [info@environment.bm](mailto:info@environment.bm) and please include good quality photographs to help us with species identification.

### **Bibliography:**

- Carlin, N.F. and Gladstein, D.S. (1989) The "bouncer" defense of *Odontomachus ruginodis* and other Odontomachine ants (Hymenoptera: Formicidae). *Psyche* 96:1-19.
- Larabee, F.J. and Suarez, A.V. (2015) Mandible-powered escape jumps in trap-jaw ants increase survival rates during predator-prey encounters. *PLoS ONE* 10, e0124871.doi:10.1371
- Larabee, F.J., Gronenberg, W., and Suarez, A.V. (2017) Performance, morphology and control of power-amplified mandibles in the trap-jaw ant *Myrmoteras* (Hymenoptera: Formicidae). *Journal of Experimental Biology* 220:3062-3071.
- Patek, S.N., Baio, J.E., Fisher, B.L. and Suarez, A.V. (2006) Multifunctionality and mechanical origins: Ballistic jaw propulsion in trap-jaw ants. *Proceedings of the National Academy of Science* 103:12787-12792.
- Spagna, J.C., Vakis, A.I., Schmidt, C.A., Patek, S.N., Zhang, X., Tsutsui, N.D., and Suarez, A.V. 2008. Phylogeny, scaling, and the generation of extreme forces in trap-jaw ants. *The Journal of Experimental Biology* 211(14):2358–2368.
- Wetterer, J.K. and Wetterer, A.L. (2004) Ants (Hymenoptera: Formicidae) of Bermuda. *Florida Entomologist* 87(2):212-221.
- Wetterer, J.K. (2017) Invasive ants of Bermuda revisited. *Journal of Hymenoptera Research* 54:33-41.

**Dr Mark Outerbridge, Senior Biodiversity Officer**

## IMPORTANT NEW SHARK PROTECTIONS ANNOUNCED

In March, the Government of Bermuda published the Fisheries (Protected Species) Amendment Order 2022 and the Fisheries Amendment Regulations 2022 to give greater protection to sharks. The amended Order prohibits the take of all types of sharks with the exception of the Galapagos Shark (*Carcharhinus galapagensis*), the Smooth Dogfish (*Mustelus canis insularis*) and the Sixgill Shark (*Hexanchus griseus*). The amended Regulations require that commercial fishermen obtain a licence to retain the three permitted species, and these licences will have terms and conditions attached, such as catch limits. Under the new legislation, recreational fishermen are not permitted to take any sharks at all.

There are several reasons for instituting these protections at this time. Sharks are a very diverse group, with more than 500 species described globally from shallow waters to the deep sea, and they play an important role in marine ecosystems. At least 20 species of sharks have been found in Bermuda waters. Some of these species are quite common and well known, such as Galapagos sharks, known locally as Dusky's, and Smooth Dogfish, locally called Gummy Sharks. However, many of the other species have only been seen occasionally. In some cases, this is because they are transitory species that just pass through our waters, but in other cases it is because that particular species is now very rare overall.



Photo: Choy Aming, Bermuda Shark Project

Many shark species have been in decline for some time, including some populations in the Atlantic Ocean around Bermuda. A number of sharks are endangered to the point of being on the verge of extinction. This is because several aspects of shark biology make them particularly vulnerable to overfishing. In comparison to bony fishes, shark species tend to be longer-lived and take more time to reach maturity, which happens at a much larger size. For sharks that are exposed to fishing, this increases the likelihood that they will be caught before they have a chance to reproduce. Critically, sharks produce larger, but far fewer, offspring than bony fishes.

While some types of sharks deposit their fertilized eggs on the seabed in a pouch commonly called a 'mermaid's purse,' many shark species retain their embryos for the duration of their development and bear live young. Depending on the species, the size of a typical litter may range from just 2 to more than 100 pups, although litter sizes between 4 and 34 are most common. However, given the long gestation period, some shark species have an effective birth rate of just one pup per year. This extremely low rate of replenishment limits the ability of a population to recover from overfishing.

Although fishing for sharks was fairly common in Bermuda in the past, attitudes towards sharks have changed and the market for them has declined accordingly. The reported take of sharks in Bermuda over the last 5 years has been relatively low, with an average of 395 individuals caught per year (based on 2016-2020 data). Smooth dogfish made up the bulk of the catch, followed by Galapagos sharks, but the difference in average size means that the landed weight was similar for each species.

Despite our low catch rates, Bermuda has an international obligation to protect sharks. A number of organisations have implemented stricter protective measures for sharks in recent years, and Bermuda is party to both the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and the International Commission for the Conservation of Atlantic Tunas (ICCAT). Species found in Bermuda waters that are of particular concern for these bodies are: Oceanic Whitetip, Bigeye Thresher, Porbeagle, Silky, Shortfin Mako and Hammerhead sharks. An assessment of the North Atlantic Shortfin Mako population conducted by ICCAT in 2017 revealed that this population was severely overfished, and that even if fishing mortality was cut to zero, it could take 25 years or more to rebuild the population!

Beyond these top priority species, most of the shark species found in Bermuda waters have been assessed by the International Union for the Conservation of Nature (IUCN) as being endangered, vulnerable to extinction or close to being threatened with extinction. IUCN is regarded as the most comprehensive inventory of the conservation status of animals globally. The importance of Bermuda's participation in collaborative international efforts to protect sharks is best illustrated by the work of the Bermuda Shark Project, which has tracked Tiger Sharks from Bermuda waters as they have migrated throughout the northern part of the Atlantic Ocean and south to the Caribbean. However, some of the other shark species that have been found in Bermuda waters have such reduced populations that every individual counts, and it is vitally important that these species are also protected while they are in Bermuda waters.

### ***The Marine Resources Section***

## News & Notices

### **Lobster Statistics Reminder**

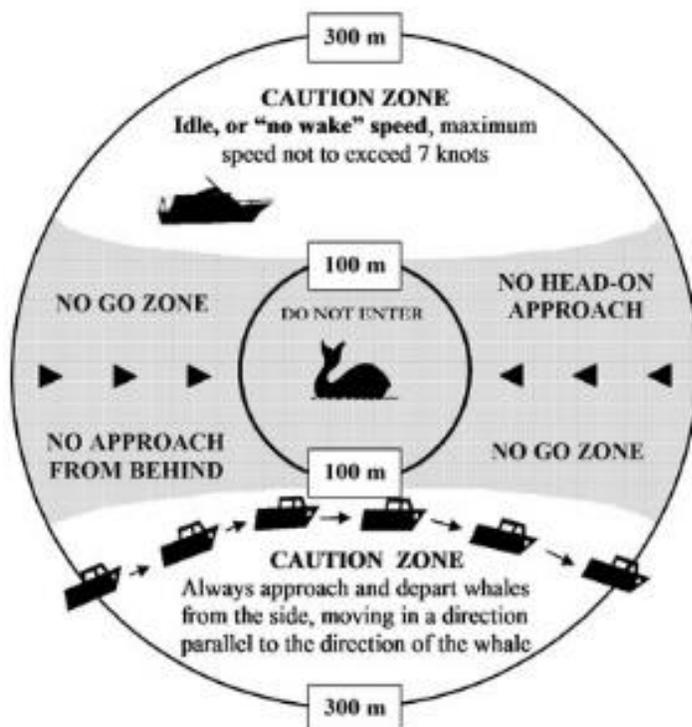
Recreational lobster divers are reminded that their catch statistics for the 2021-22 season must be submitted online (using the portal at [www.fisheries.gov.bm](http://www.fisheries.gov.bm)) **by the end of April**. There should be an entry for each date / location that you fished, and a “No fishing” entry for any month in which you did not fish. Anyone failing to submit catch statistics for the season will not be issued a recreational lobster diver licence for the upcoming 2022-23 lobster season. Please call 2935600 or email [fisheries@gov.bm](mailto:fisheries@gov.bm) if you are having difficulties accessing the portal.

### **Spearfishing Reminder**

Recreational spear fishers are reminded that spearfishing statistics should be submitted **monthly** using the online portal at [www.fisheries.gov.bm](http://www.fisheries.gov.bm). Please call 293-5600 or email [fisheries@gov.bm](mailto:fisheries@gov.bm) if you are having difficulties accessing the portal.

### **Whale Watching Guidelines**

Whale watching can be enjoyed in Bermuda’s waters in winter and spring. The public are reminded that all whales and dolphins are protected by law. Boaters should follow the whale watching guidance located at: <https://environment.bm/whale-watching-guidelines>



## Planting Calendar – What to plant in the spring...

### VEGETABLES

#### March

Beans, Beets, Broccoli, Cabbage, Carrots, Cassava, Cauliflower, Chard, Christophine, Collards, Corn, Cucumber, Eggplant, Kale, Leeks, Lettuce, Muskmelon (Cantaloupe), Mustard Greens, Okra, Pepper, Potatoes, Pumpkin, Radish, Rutabaga, Squash, Sweet Potato, Spinach, Tomato, Turnip, Watermelon

#### April

Beans, Beets, Broccoli, Cabbage, Carrots, Cauliflower, Chard, Christophine, Collards, Corn, Cucumber, Eggplant, Kale, Muskmelon (Cantaloupe), Okra, Pepper, Pumpkin, Radish, Rutabaga, Spinach, Squash, Sweet Potato, Tomato, Turnip, Watermelon

#### May

Beans, Cucumber, Okra, Pumpkin, Radish, Squash, Sweet Potato, Tomato

#### June

Beans, Cucumber, Squash, Tomato

### FLOWERS

#### March/April

Acrolinium, ageratum, alyssum, antirrhinum, aster, aubrietia, baby blue eyes, bachelor's buttons, bird's eyes, blanket flower, begonia, bells of Ireland, calendula, candytuft, carnation, centaurea, chrysanthemum, cineraria, coreopsis, dahlia, African daisy, dianthus, forget-me-not, geranium, gerbera, globe amaranth, globe gilia, godeita, gypsophila, hollyhock, impatiens, larkspur, lathyrus, marigold (African), marigold (French), nasturtium, nicotiana, pansy, petunia, phlox, phlox (annual), red tassel flower, rose everlasting, rudbeckia, salpiglossis, salvia, scabiosa, statice, snow-on-the-mountain, spider flower (cleome), star-of-the-veldt, stock, sweet pea, sweet William, verbena and viola.

#### May

Amaranthus, balsam, calendula, celosia, coreopsis, cosmos, gaillardia, gazania, globe amaranth, hollyhock, marigold, portulaca, rudbeckia, vinca and zinnia.

#### June

Amaranthus, balsam, calendula, celosia, coreopsis, cosmos, gaillardia, gazania, globe amaranth, hollyhock, marigold, portulaca, rudbeckia, vinca and zinnia.



**ON HER MAJESTY'S SERVICE**



GOVERNMENT OF BERMUDA  
**Department of Environment and Natural Resources**

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