

Bermuda Biodiversity Action Plan Activity Report 2021



GOVERNMENT OF BERMUDA

Department of Environment and Natural Resources

Bermuda Biodiversity Action Plan Objectives

- A:** To ensure effective **coordination**, improved **collaboration** and ongoing **communication** in support of efficient biodiversity conservation such that all key stakeholders are engaged throughout the implementation of this plan.
- B:** To ensure that biodiversity conservation is integrated into all **Government policies, programmes and plans** by 2007.
- C:** To improve and strengthen **environmental education and training** programmes for every age group by 35% over the next 5 years.
- D:** To increase **public awareness of biodiversity**, its inherent values and conservation activities throughout the community by 100% over the next 5 years.
- E:** To increase the active participation of the **community** and the **private sector** in **ecologically responsible behaviours** by 25 % by 2007.
- F:** To provide appropriate economic and other **incentives** to effectively encourage people **to protect and enhance biodiversity**.
- G:** To revise and develop laws that address all key identified gaps in existing **environmental legislation** for implementation by 2007.
- H:** To ensure that **enforcement** effectively deters infractions against legislation such that violations decline by 50% by 2007.
- I:** To strengthen the level of protection, where appropriate, through the re-designation of existing **protected areas**, and to increase the area of fully protected **nature reserves** and **marine protected areas** through land acquisition or marine designation by 25% and 10% respectively; and to ensure the effective management of the protected areas network by 2007.
- J:** To develop new and revise existing **management plans** for all key **species and habitats** and to ensure their implementation by 2007.
- K:** To increase **research and monitoring** by 25% by 2007, as demonstrated by outputs, so as to support the management of Bermuda's biodiversity.
- L:** To secure from both public and private sources the **financial commitment** and other investment necessary for full implementation of the BSAP as required.

Bermuda Biodiversity Action Plan

Summary of Actions Completed by Partners in 2021

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This report is a compilation of activities reported to the National Biodiversity Strategy and Action Plan (NBSAP) Coordinator by partners or appearing in the local news. The activities below are either directly called for in the Bermuda NBSAP or were carried out in the spirit of biodiversity conservation and met the goals of the NBSAP. The bracketed numbers and letters are references to specific lines in the 2003 Bermuda Biodiversity Action Plan. The complete plan can be viewed at http://environment.bm/s/Biodiversity-Action-Plan_March2003.pdf

The report lists activities in chronological order to provide a snapshot of what was happening in Bermuda at various points in the year.

This document is a searchable PDF. The best way to search for specific information within the report is to search keywords in the Adobe search function. Key words have been **bolded** to aid skimming. Photos are the author's unless otherwise indicated.

Any errors or comments on this report can be submitted to the Biodiversity Action Plan Coordinator at environment@gov.bm.

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ABBREVIATIONS USED IN THIS REPORT

BAMZ – Bermuda Aquarium, Museum and Zoo

BAS – Bermuda Audubon Society

BBS – Bermuda Botanical Society

BEST – Bermuda Environmental and Sustainability Taskforce

BOPP- Bermuda Ocean Prosperity Programme

BIOS – Bermuda Institute of Ocean Science

BNT – Bermuda National Trust

BUEI – Bermuda Underwater Exploration Institute

BZS – Bermuda Zoological Society

COP – Conference of Parties

DENR – Department of Environment and Natural Resources

IUCN – International Union for the Conservation of Nature

KBB – Keep Bermuda Beautiful

NOAA – National Oceanic and Atmospheric Administration (USA)

UKOT – United Kingdom Overseas Territories

KEY ACTIVITIES 2021

January 28th 2021 marked the **70th anniversary of the rediscovery of the Cahow** in 1951.

The DENR ramped up its **seagrass conservation project** in 2021, with the building and installation of **turtle excluder cages** over some of Bermuda's few remaining seagrass beds.

In February 2021 Bermuda joined the **Caribbean Marine Mammals Passive Observatory Project** with the deployment of a **hydrophone** off South Shore. DENR maintained the hydrophone throughout the year and sent the data to collaborators.

Throughout 2021 the Government made progress towards the **elimination of single-use plastic products**, including a public consultation and development of a policy paper entitled '**Regulating single-use plastics in Bermuda- An opportunity to clean up our act**'.

BIOS researchers were awarded a Darwin Plus grant for their project '**Assessing the mobile fish biodiversity of Bermuda's deep seas.**' BIOS entered a partnership with Arizona State University in October.

In June the **Bermuda Plan 2018** was tabled in the House of Assembly after a public consultation and appeals process, and the **Development and Planning Amendment Act 2021** was tabled in the House of Assembly in early July.

On August 10th the public consultation period for the proposed invasive species legislation began. The **Invasive Alien Species Act 2021** was tabled on September 10th.

The **UN Climate Change Conference of the Parties (COP26)** was held in Glasgow from 31 October to the 12 November 2021 with the aim of accelerating action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change. A **delegation** of representatives from the **Overseas Territories** attended, led by Bermuda's Minister of Home Affairs Walter Roban.

In November Bermuda's participation in the **Queen's Green Canopy** – a yearlong tree planting initiative to celebrate Queen Elizabeth's Platinum Jubilee – was launched with the planting of an indigenous woodland at Government House.

Bermuda became the first UKOT to join the **Blue Shield Programme** in November. Funded by the UK Government's Blue Belt Programme, the Blue Shield aims to assist the Overseas Territories with marine management and enforcement.

Students participated in BUEI's **first Youth Climate Summit** for a week in November.

JANUARY 2021

Bermuda's 46th annual Christmas Bird Count was held the week of December 28th 2020 to January 1st 2021. This year 6,140 birds were counted from 78 species, including a European Golden Plover, Surf Scoter and Ruby-crowned Kinglet. [The count itself is **BSAP item E3.8** and K3.5 as data is collected by the public.]

http://audubon.bm/images/pdf/Newsletters/Vol_32_No1_Winter_2020_21.pdf

The DENR ramped up its **seagrass conservation project** in January, with the building and installation of **turtle excluder cages** over some of Bermuda's few remaining seagrass beds. The project began last summer, but a donation of materials allowed an intensification of the effort in early 2021. The Minister of Home Affairs thanked the donors and the Marine Conservation Section in a press statement on January 15th. [F3.3 govt and private, L, K2.2 critical habitat, E1.3 habitat restoration, E2 community-driven, F6.3 recognition].

- <https://www.gov.bm/articles/minister-recognises-seagrass-restoration-project-donations>
- <https://bernews.com/2021/01/seagrass-restoration-project-donors-acknowledged/>
- <https://www.royalgazette.com/environment/news/article/20210115/campaign-to-save-bermuda-seagrass-beds-gets-underway/>
- <https://www.royalgazette.com/environment/news/article/20210119/seagrass-recovery-vital-for-young-turtles/>



Seagrass protected by turtle exclusion cages at Trunk Island (Alison Copeland)

The **Department of Planning** initiated the **next phase of the Energov file management system** on January 15th to allow customers to submit planning applications online, estimate fees, request inspections and search planning records. The first phase of the paperless submission system went live in August 2019. [H1 procedure review, H2].

- <https://www.royalgazette.com/environment/news/article/20210114/planning-website-to-be-unavailable-during-upgrade/>
- <https://www.gov.bm/articles/department-planning-services-upgrade-online-submission-system-upgrade-planned-15-january>

In January the Department of Parks undertook a **public consultation on the amenities** to be provided at **Southlands Park**. An online survey asked respondents to rank services and infrastructure. The Department is preparing a management plan for the Southlands property, which became a national park in 2017. [I3.4 consultation, A2.6 decision making, I2].

- <https://www.gov.bm/articles/ministry-public-works-regarding-southlands-park-warwick>
- <https://www.royalgazette.com/environment/news/article/20210117/public-survey-on-future-plans-for-southlands-estate/>
- <https://bernews.com/2021/01/govt-encourage-open-dialogue-on-southlands/>

On January 16th the **Bermuda Botanical Society** held a planting event at the Botanical Gardens. Members cleared up the flowerbed next to Camden house and planted it with **native and endemic plants**. They also planted a young **Yellowwood** tree next to the existing large specimen on the western side of the gardens. Planting and maintenance of the indigenous plant bed continued through the year. [J3.10 bg, D2.8, F3.3 ngo].



BBS indigenous plant flowerbed and planted Yellowwood (Alison Copeland)

In an article in the Royal Gazette on January 25th farmer Roland Hill highlighted the dangers posed by **scrambler bikes** racing on the pathways in **Hog Bay Park** and the damage to his crops [I3, D3.6 infraction].

<https://www.royalgazette.com/environment/news/article/20210125/farmer-wants-brakes-put-on-bikers-using-park-as-a-racetrack/>

On January 27th Bermudian filmmaker and author Andrew Stevenson presented a virtual lecture as part of the BZS lecture series. In his talk, entitled **‘What are the Humpback Whales doing in Bermuda?’** he shared what he has learned about whales in Bermuda’s waters since he began observing and filming them in 2007. [A2.4 lecture, K1.7].

January 28th marked the **70th anniversary of the rediscovery of the Cahow** in 1951. The event was celebrated with a Lunch and Learn at the Bermuda College, where Dr.

David Wingate and Jeremy Madeiros spoke about the history of the Cahow recovery programme and its latest successes. The event was streamed live online. [A2.4, F6.3, J, K1.7].

- <https://www.royalgazette.com/environment/news/article/20210128/cahows-at-70-their-survival-is-as-precarious-as-it-is-miraculous/>
- <https://www.royalgazette.com/environment/news/article/20210128/david-wingate-it-became-my-goal-to-rediscover-them/>
- <https://bernews.com/2021/01/column-70th-year-of-rediscovery-of-the-cahow/>

A winter storm passed Bermuda on January 28th bringing **hurricane force winds** to the island and causing shoreline erosion and salt burn to vegetation island-wide.

The **Environmental Statistics Compendium for 2020** was released by the Cabinet Office on January 28th. It contains 13 sections with tables and graphics on measurable variables such as fisheries landings, waste and energy generation. [D2, K6 trends, A2.8 gov information]. www.gov.bm/environmental-statistics-compendium.

The Department of Environment and Natural Resources began clearing **invasive *Casuarina equisetifolia* trees** from **Cooper's Island nature reserve** in January, with work continuing throughout the spring. Casuarinas were removed from cliffs and sand dune areas between Cooper's Point and Well Bay. The dunes were planted with bay grape, buttonwood and native vines and shrubs to repair damage from last year's hurricane. [E1.4 culling invasives, I3 protected area mgt, E1.3 restoration, F3.3, J mgt plan].

<https://environment.bm/news-hot-topics//casuarina-tree-removal-from-coopers-island-nature-reserve-1>



Chipping cut Casuarinas along the road at Long Bay, Cooper's Island (Alison Copeland)

The **7th annual winter lionfish derby** took place from the 1st to 31st of January 2021. During the event 74 participants culled 1,215 invasive lionfish. [K3.4 distrib invasives, K6.1 trends in invasive sp, A2.5 social event, D4 feral control, J1 mgt plan, K3.5 comm spp. data, E3 community data].

<https://bernews.com/2021/02/1215-lionfish-caught-winter-derby/>

The Bermuda Audubon Society undertook a **work party** on January 31st to clear storm damage and open woodland trails at its **Stokes Point East nature reserve** in St. Georges. [E1.3 habitat restoration, E1.4 culling, I3 protected area mgt].

FEBRUARY 2021

In early February the Minister of Home Affairs (with responsibility for the environment) Walter Roban visited the **Riddell's Bay** nature reserve with Senator Lindsay Simmons, MP Jason Wade and the property managers. The Riddell's Bay (Warwick Parish) Special Development Order (SDO) 2020 designated areas of the former golf course as residential lots, open space, recreation areas and nature reserve parcels. [D8.2 tour for officials, B1]. <https://www.gov.bm/articles/minister-tours-riddells-bay-conservation-area>

In early February sightings of one, possibly two, visiting **Peregrine Falcons** made news. [D2.2]. <https://www.royalgazette.com/environment/news/article/20210208/rare-visiting-falcon-swoops-over-city/>



Peregrine Falcon over Cooper's Island on February 5th (photo: Alison Copeland)

On February 8th the Sargasso Sea Commission announced receipt of a **\$3 million grant from the Global Environment Facility (GEF)**, and more than \$25 million in co-financing from a range of partners, to finance a major Ecosystem Diagnostic Analysis of the Sargasso Sea, and the development of a Strategic Action Programme. Among other things, the project will investigate threats such as climate change, plastic pollution and commercial activities to inform adaptive management. This project is the first ever **GEF grant** targeting governance of a high seas ecosystem. [L4.1, L4.3, L6, A3.4, J1.6 new plan, K2, K6.2, K5.3 trash].

- <https://www.gov.bm/articles/global-environment-facility-support-sargasso-sea-project>
- <https://www.royalgazette.com/environment/news/article/20210209/multimillion-dollar-grant-awarded-to-protect-sargasso-sea/>
- <https://bernews.com/2021/02/gef-support-sargasso-sea-project/>

The Bermuda Ocean Prosperity Programme (BOPP) urged the public to take part in the **ocean use survey** and other **stakeholder engagement** exercises as part of the ongoing information gathering for the marine spatial plan. BOPP has been soliciting input since last autumn from targeted user groups, and will soon conclude the wider public consultation phase of the project. [A2.6 ngo involvement, C7.4 use survey, I2, I5, E1comm driven].

- <https://www.royalgazette.com/environment/news/article/20210209/last-few-days-to-take-ocean-use-survey/>
- <https://www.royalgazette.com/environment/news/article/20210212/deadline-looms-for-marine-areas-survey/>
- <https://bernews.com/2021/02/public-urged-take-part-ocean-use-survey/>
- <https://bernews.com/2021/01/have-you-submitted-your-ocean-use-survey-yet/>

On February 8th the Regulatory Authority announced that the moratorium on introducing **5G wireless technology** to Bermuda may be lifted. [K6 global trend]. <https://www.royalgazette.com/environment/news/article/20210208/moratorium-on-5g-likely-to-be-lifted-says-ra-panel/>

In February 2021 Bermuda joined the **Caribbean Marine Mammals Passive Observatory Project** with the deployment of a **hydrophone** off South Shore. The hydrophone, one of a network of twenty throughout the region, was designed by the University of Toulon and purchased by the Department of Environment and Natural Resources to expand our knowledge of what whale and dolphin species can be heard in Bermuda's waters a various times of the year. An article about the project appeared in the autumn 2021 Envirotalk: <https://conservation-services.squarespace.com/s/Envirotalk-853-Autumn-2021.pdf>



Divers placing the hydrophone (photo: Alison Copeland)

Gardeners were able to purchase native and endemic plants, vegetables and vegetable plants, and ornamental species at the **Bermuda National Trust's annual plant sale** on February 13th. [E2.4]

On February 17th Grow Biointensive teacher Frances Eddy presented a **webinar** hosted by the National Library entitled '**Is my soil good?**' The lecture was part of her series promoting backyard gardening. [A2.4] <https://bernews.com/2021/02/soil-good-webinar-february-17/>

Weldon Wade gave an online lecture as part of the BZS's lecture series, on February 23rd. His talk was entitled '**Guarding Our Reef Against Lionfish**'. [A2.4 lecture, D4 invasive sp.].

<https://www.royalgazette.com/environment/news/article/20210212/lionfish-zoom-talk-to-be-held/>

The Bermuda Audubon Society held a **month-long birding contest in February** to encourage more birders to be out making observations. One hundred and ten species were reported, including the first sighting of a **Mountain Bluebird**, a new record for Bermuda. [K3.5 comm spp. Data, E3 community data]. <https://environment.bm/s/851-Envirotalk-Spring-2021.pdf>

In collaboration with researchers in Europe, the DENR continued work to place **GPS trackers** on nesting Cahows in February. The devices will reveal where adult **birds are foraging** at sea. [A3.4, K migratory, K3.1, K2.2 sites, K4.2 habitat resto plan, J1.3 implement plan].



GPS tracker on the leg of an adult Cahow (Alison Copeland)

MARCH 2021

On March 5th the Minister of Home Affairs, the Hon. Walter Roban gave an update in the House of Assembly on progress towards the **elimination of single-use plastic products**. He announced that a policy paper had been produced outlining the Government's strategy. The paper, entitled '**Regulating single-use plastics in Bermuda- An opportunity to clean up our act**' will be published circulated shortly for public consultation. [E10.7retailers, **E10.16 straws**, F2 incentives, D2.7 consumer choice, D8.3 media, G3 new legislation, B1.6 gov collaboration].

The Minister's Comments:

- <https://www.gov.bm/articles/ministerial-statement-reporting-progress-elimination-single-use-plastics>

Related press articles:

- <https://www.royalgazette.com/environment/news/article/20210312/best-praises-moves-to-ban-single-use-plastics/>
- <https://www.royalgazette.com/environment/news/article/20210305/single-use-plastic-ban-could-start-next-year-minister/>
- <https://bernews.com/2021/03/best-applauds-minister-robans-statement/>
- <https://bernews.com/2021/03/minister-elimination-single-use-plastics/>

A team from the Department of Environment and Natural Resources and the Bermuda National Trust joined forces to collect **endemic Bermuda Killifish** from Trott's Pond **for introduction into** the newly created **Eve's Pond**. The recovery plan for the killifish calls for new breeding populations to be established whenever possible, and the fish will help control mosquitos in the nature reserve. On March 15th 200 killifish were released at the pond, joining the 48 that were release in 2020. [J3.11 area for introduction, K4.2, K4.1, I3 protected area mgt, I5 restoration, A3.4 collaboration].



Dr. Mark Outerbridge (DENR) and Myles Darrell (BNT) releasing killifish at Eve's Pond (photo: Alison Copeland).

On March 20th the Bermuda underwater Exploration Institute (BUEI) celebrated **World Water Day** with a free community open house. [E8.2 int'l day, C3.11 buei].
<https://bernews.com/2021/03/buei-celebrate-world-water-day-march-20/>

Articles in the March 22nd edition of **Envirotalk for Spring 2021** included an update on the tank water and sediment test in the neighbourhoods around BELCO. There was also information on attracting butterflies to your garden, the ongoing Casuarina tree removal work at Cooper's island and a report on the February contest to count bird species held by the Audubon Society. Envirotalk can be downloaded from:
<https://environment.bm/s/851-Envirotalk-Spring-2021.pdf>
 [D2.1 articles, D2.5 online content, D4 invasive, K3.5 comm spp. Data, E3 community data, E5.6 gardening, K5 impact research].

Several newspaper articles were generated from the Envirotalk content [D2.2]:

- BELCO monitoring: <https://www.royalgazette.com/environment/news/article/20210325/study-finds-trace-pollution-levels-around-belco-are-safe/>
- February birding: <https://www.royalgazette.com/environment/news/article/20210326/first-sighting-of-a-mountain-bluebird-in-bermuda/>

Participants from Bermudian NGO's and the Department of Environment and Natural Resources presented at the '**Staying connected for conservation in a changed world: UKOTCF online conference 2021**' in March. The online sessions ran on March 2nd, 3rd, 9th and 10th. Abstracts and recommendations from the conference can be found online here: <https://www.ukotcf.org.uk/our-conferences/onlineconference2021/>. [A3.2 conference, A3.4 information sharing, A2.4 update stakeholders, **A3.5 conference**, K6 several issues].

On March 25th the Bermuda Audubon Society and BZS presented a pair of bird-themed lectures. Andrea Web presented "**The Silver Lining of Covid Restrictions: How I Discovered Bird Watching**" and Janice Hetzel presented "**All Things Bluebird**" about the natural history of the Eastern Bluebird in Bermuda and how to take care of a bluebird box. The talk included an introduction to NestWatch (www.nestwatch.bm), an online monitoring and data collection program. [A2.4 lecture, K3.5 community data gathering, E2.8 bluebird box, E3.2 monitoring boxes, E3.5 photographers,].

Greenrock undertook a media campaign encouraging Bermudians to turn off unnecessary lights and electrical devices for **Earth Hour** on March 27th 2021 from 8:30 to 9:30pm. [E8.1 dates, D9.2 festival, D2.7 consumer, A2.5 social event].

- <https://www.royalgazette.com/environment/news/article/20210301/earth-hour-time-to-consider-dependence-on-fossil-fuels/>
- <https://bernews.com/2021/03/sailgp-supports-earth-hour-campaign/>
- <https://bernews.com/2021/03/siriuspoint-lead-sponsor-earth-hour/>

On March 25th the BZS's virtual lecture series had two speakers from the Bermuda Audubon Society. Andrea Webb gave a talk called 'The silver lining of COVID restrictions: How I discovered bird watching'. Janice Hetzel spoke on the natural history of Bermuda's **Eastern Bluebirds**, and introduced the **NestWatch** online monitoring and data collection programme for bluebird boxes (www.nestwatch.bm). [A2.4 lecture, K3.5 comm spp. data, E3 community data, E2.8 bluebird nest, E3.2 bluebird monitoring].

APRIL 2021

The **Garden Club of Bermuda** celebrated their **100th anniversary** on April 4th. A four stamp commemorative series depicting a century of horticulture and education work was released by the Post Office. [E5.4 symbols, E5.2 art].

<https://www.royalgazette.com/environment/news/article/20210407/garden-club-centenary-stamps-issued/>



Stamp series (from <https://gardenclubbermuda.org>).

On April 5th the Department of Environment and Natural Resources (DENR) reported receiving reports of reckless boaters and swimmers getting **too close to migrating humpback whales**. The public were reminded to adhere to the government's whale watching guidelines and report violators. [E1.7 responsible boating, D3.4 reporting, D3.3, D3.6 media, K5.6 recreational]. <https://bernews.com/2021/04/govt-issue-guidelines-for-whale-watching/>

Due to rising COVID-19 infection rates, the Government imposed a 'stay at home order' for 7 days from April 13th to 20th 2021.

When schools were closed to in-person teaching in early April because of Covid-19, BIOS's Ocean Academy educators developed **online lessons** for primary school students on **seagrasses and ocean sound**, which are elements of the Cambridge Curriculum. [C2.2 educators, C2.3]. <https://bernews.com/2021/05/virtual-classes-science-sound-plants-more/>

The Cabinet Office issued a climate change-focused press release on April 21st, ahead of **Earth Day** on the 22nd. <https://www.gov.bm/articles/government-bermuda-%E2%80%93-protecting-environment> [E8.1, E8.2 int'l day].

In a press release for **Earth Day, Greenrock** challenged Bermudians to undertake activities including recycling, using reusable bags, not using single use plastics, picking up trash, eating no meat, cycling for transport and planting a tree or home garden. [E8.1, E8.2 int'l day, D2.7 consumer choice].

- <https://bernews.com/2021/04/greenrock-puts-challenge-earth-day-2021/>
- <https://www.royalgazette.com/environment/news/article/20210421/challenge-made-to-mark-earth-day/>

The annual **Agricultural Exhibition** due to be held as a virtual event on April 23rd was cancelled due to the Covid-19 pandemic. The event later took place virtually in May [C3.9, D9.2].

- <https://www.royalgazette.com/event/news/article/20210406/plans-for-a-virtual-ag-show-postponed/>
- <https://www.royalgazette.com/environment/news/article/20210503/first-virtual-ag-show-to-be-held-this-month/>

At the end of April, the **Tropicbird Cam** began broadcasting live from Nonsuch Island for the 4th year. The view of a Longtail nest streams live to the internet thanks to a collaboration between Nonsuch Expeditions, the DENR and Cornell University. The Longtail egg hatched on April 24th. [A3.4 collaboration, D2, L4.3 funding]

- <https://bernews.com/2021/04/longtail-tropicbird-cam-now-broadcasting-live/>
- <https://www.royalgazette.com/environment/news/article/20210503/longtail-livestream-is-back-in-action/>

DENR celebrated Earth Day by announcing the **cahow nesting population** had expanded to **142 pairs in 2021**, including 27 pairs on Nonsuch Island. These parents are currently incubating 71 chicks. Last year there were 135 pairs [J1.3 implement plan, K1.5 gov priority, A3.4, D3.7 success, J2.3 gov adopted plan, J2.5 report].

- <https://bernews.com/2021/04/new-record-high-142-breeding-cahow-pairs/>
- <https://www.royalgazette.com/environment/news/article/20210424/record-number-of-cahow-breeding-pairs/>

On April 29th the Bermuda College and BEST co-hosted their fourth lunch and learn for the year, entitled “**the Perils of Plastic Pollution**”. The presentation was streamed live online, and featured a panel of local experts, including Dr. Robbie Smith, Curator of Bermuda’s Natural History Museum, Eugene Dean, Executive Director of Greenrock, Erich Hetzel, BEST Plastic Pollution Team Leader and Bermuda College student Zahria Furbert. [A2.4, E10, F2.1, K5.3 endangered sp, D2.7 consumer choice].

- <https://bernews.com/2021/04/eco-lunch-learn-presentation-april-29/>
- <https://www.royalgazette.com/environment/news/article/20210426/plastic-pollution-under-the-spotlight-at-talk-this-week/>

MAY 2021

On May 1st the **Blue Striped Grunt aggregation area** off Fort St. Catherine was closed to fishing until June 1st. [D3.2, D3.3 news, D3.4, E5.3 fishermen, G3, J5.1 harvested, J5.2 Update]. <https://www.royalgazette.com/environment/news/article/20210504/fishing-banned-in-area-north-of-st-georges/>

On May 11th at least five **derelict boats** were removed from Coot Pond in St. Georges by a contractor with a barge and crane, in collaboration with the Bermuda Government. [E1.5 coastal cleanup, B1.6 collaboration, E1.7 boating, G legislation]. <https://www.royalgazette.com/environment/news/article/20210512/abandoned-hulks-cleared-from-sea/>

Planning issues were in the news again in May, when a **retroactive application** by the St. Regis hotel developers was denied by the Department of Planning. The hotel is set to open on May 22nd. [H1.4 retroactive planning, D3.4 reporting, D3.6, F1.2 fines]. <https://www.royalgazette.com/tourism/news/article/20210512/hotel-developers-caught-out-by-islands-strict-planning-laws/>



The St. Regis hotel under construction (Photo: Alison Copeland)

On May 13th the Government entomologist Claire Jessey presented an online talk as part of the BZS's lecture series, on Bermuda's ant species. Her talk, entitled '**Bermuda's ants, interesting ant facts and most importantly control**', focused on ant behaviour and alternatives to chemical pest control [D4 invasive, A2.4 lecture].

On May 31st the Department of Parks opened a **community garden** on a piece of formerly neglected agricultural land within the **Southlands** National Park in Warwick. [E2, B1.6 community areas, E5.5, E5.6 space not seminar, E5.7 agriculture, I3].

- <https://www.royalgazette.com/general/news/article/20210527/garden-leaders-appeal-as-community-plots-launched/>
- <https://bernews.com/2021/05/southlands-community-gardens-launch/>
- <https://www.gov.bm/articles/southlands-community-gardens-launch>

Ahead of the sailing races in mid-May, **SailGP** released a video showcasing their collaboration with the Department of Environment and Natural Resources and ClimateWise on a **seagrass preservation** project. <https://youtu.be/sNVtdmHxDbg>. [F3.3 sponsor, K2.2 habitat, A3.4, E1.3 restoration, E1.7 boating, F6, D1 awareness, D2, D2.9 TV, L4.3].

In a press conference on May 20th, Minister of Home Affairs Walter Roban spoke about **Bermuda's bees**, his own beekeeping efforts and a new partnership with the Massachusetts Institute of Technology (MIT). [E5.5 beekeeping, A3.4].

- <https://bernews.com/2021/05/video-minister-walter-roban-press-conference-2/>
- <https://www.gov.bm/articles/bermudas-bees-and-mit-programme-minister-home-affairs-remarks>
- <https://www.royalgazette.com/environment/news/article/20210614/the-minister-with-a-passion-for-bees/>

On May 19th the Royal Gazette published an article on the work of BIOS plankton ecologist Dr. Leocadio Blanco-Bercial, who is studying **copepod species** and other **cave-dwelling fauna** collected from **seawater wells** at BIOS and the Aquarium, including at least one that may be new to science. [K3.1 poorly studied taxa, **K5.2 fauna of deep wells**].

<https://www.royalgazette.com/environment/news/article/20210519/pipe-dream-comes-true-for-bios-scientist/>

Keep Bermuda beautiful hosted their **Great Big Cleanup** event over the weekend of May 22nd and 23rd. Tonnes of trash were collected by over 250 volunteers at 56 locations around the island. [E1.5].

- <https://www.royalgazette.com/general/news/article/20210527/hundreds-of-volunteers-clear-tonnes-of-trash-in-kbb-event/>
- <https://bernews.com/2021/05/250-volunteers-join-kbb-great-big-cleanup/>

In May, Dr. David Wingate wrote an article for the Audubon Society newsletter, which was later picked up by the newspaper, highlighting the threat anticoagulant **rat poisons** pose to Bermuda's **Barn Owls**. The BAS asked the public to report owl sightings. [E2.2 alternative pest control, E10.13, K6.5 chemicals, K3.5 comm data, E3 citizen science, E3.6].

<https://www.royalgazette.com/environment/news/article/20210525/stronger-rat-poisons-can-kill-barn-owls-naturalists-warns/>

JUNE 2021

The BZS held a **virtual Shark Week** from June 7th to 11th in celebration of World Oceans Day. The weeks presentations included virtual dives at the Bermuda Aquarium and Ripley's Aquarium in Toronto, as well as talks on the history of sharks in Bermuda, Bermuda's eagle and cow-nose rays, the cultural use of shark oil in Bermuda, and a virtual look at the BUEI shark teeth collection. [A3.4, A2.4, J5, K1.7 forum, E3.9 visiting scientists].

- <https://bernews.com/2021/06/bermuda-zoological-society-hold-shark-week/>
- <https://www.royalgazette.com/environment/news/article/20210603/week-to-highlight-sharks-to-launch-next-monday/>

In early June, Saltus Grammar School and Waterstart Ltd. announced a collaborative project called the **Sustainable Islands Program**, which offers students experiential learning at Burt's Island and Saltus Island. Both islands have habitat restoration and species restoration projects ongoing, in both the terrestrial and marine environments. [C3.10 outdoor teaching, C2, A3.4, C3, C6, C7.4 gis, C7.3 land mgt, E1.3 restoration, E1.4]. <https://bernews.com/2021/06/waterstart-saltus-announce-islands-program/>

For World Oceans Day on June 8th, the Bermuda underwater Exploration Institute held a **'the Ocean: Life & Livelihoods Career Fair'** for college and high school students with booths and speakers engaged in marine careers from science, to film making, recreation and marine trades. [C6.5 career fair, C7 development and training, C6]. <https://hopin.com/events/ocean-centric-career-fair>

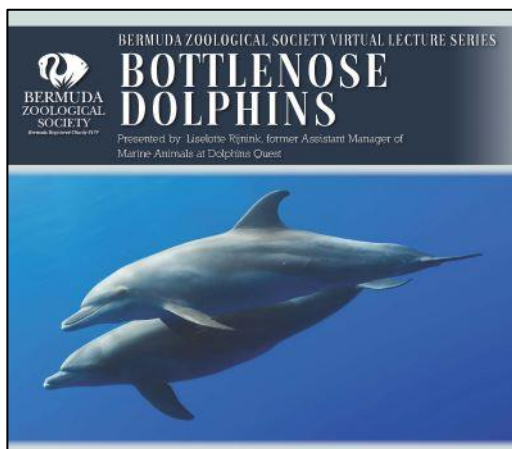
The Overseas Territories Environment and Climate Fund (known as Darwin Plus), funded by the UK Department for Environment, Food and Rural Affairs (DEFRA), selected 31 projects for **Darwin Plus funding** in the spring of 2021. One successfully funded project (DPLUS145) was a 2-year study of migratory predators, including sharks, and other deep sea biodiversity led by the Bermuda Institute of Ocean Sciences, in collaboration with other NGO's, universities and the Bermuda

Government. [J5, K3.1 taxa, K3.3 economically important, K1.5, K2, L4 source financing, L4.1]. **DPLUS145 Assessing the mobile fish biodiversity of Bermuda's deep seas** <https://dplus.darwininitiative.org.uk/project/DPLUS145/> .

- <http://www.bios.edu/currents/bios-receives-u.k.-grant-to-study-deep-sea-marine-life>
- <https://www.royalgazette.com/environment/news/article/20210609/uk-gives-bios-450000-to-study-deep-sea-marine-life/>
- <https://bernews.com/2021/06/uk-govt-announces-almost-450k-bios/>

Warwick Academy's new **Marine Science Center** was populated with corals at the end of May, thanks to a collaboration between the school, BIOS and the Living Reefs Foundation. The corals will be returned to the ocean as part of a restored coral garden when they have grown larger. [K4 restoration research, A3.4, C1, C3, D5].
<http://www.bios.edu/currents/bios-and-living-reefs-foundation-bring-coral-science-into-the-classroom>

In 2021 the BZS completed the 9th year of the **Kids on the Reef** programme which teaches school children free diving skills while they learn about marine conservation. [BZS formal education school groups C3.11, A3.4]. <https://bernews.com/2021/08/bzs-kids-reef-programme/>



On June 23rd Liselotte Rijnink, formerly of Dolphin Quest Bermuda, presented an online lecture for the BZS **lecture** series on Bermuda's **Bottlenose Dolphins**. [A2.4 lecture, K1.7 forum].

Lecture Poster: BZS

The **Bermuda Plan 2018** was tabled in the House of Assembly after a public consultation and appeals process. <https://www.gov.bm/articles/ministerial-statement-final-bermuda-plan-2018>. Several recommendations of the Planning Tribunal made headlines; including a new coastal study to examine the potential threats from climate change and calls for more meaningful engagement between the Department of Planning and objectors. [A2.6, H1.4, I4, K6.4, C7.5, **I2.4 new zonings**, D3.8]

- <https://www.royalgazette.com/environment/news/article/20210608/coastline-threat-from-climate-change-to-be-assessed/>
- <https://www.royalgazette.com/environment/news/article/20210622/tribunal-calls-for-more-meaningful-dialogue-between-planning-and-objectors/>
- <https://bernews.com/2021/07/bnt-on-development-and-planning-act/>

The BUEI education team taught 10 weeks of **camp**s during the summer of 2021 on topics ranging from weather, to deep diving, dinosaurs and fish [C2.7, C2.8, C3.10, C3.11 buei].

The **Bermuda National Trust** held a series of **camp**s from June to August including one on edible plants, shipwreck survivors, Bermuda's natural wonderland and climate change agents [C2.7, C2.8, and C3.10].

Eco-Schools Bermuda celebrated the end of the school year in June with a virtual **recognition ceremony**. Biodiversity is one of the eco-schools pathways:

<https://www.buei.bm/education-old/eco-schools-biodiversity>. [C3.11 BUEI, E7.3 youth success, F6 award.].

The **Summer 2021 Edition of Envirotalk** was published by the DENR on June 29th. This issue introduced the Guinea chick lobster and outlined the regulations for fishing for them in Bermuda, along with an article identifying the 10 common items of foreign fishing industry debris seen on Bermuda's shoreline, and Dr. Philippe Rouja described the highlights to be explored within Bermuda's network of protected dive sites.

<https://environment.bm/s/852-Envirotalk-Summer-2021.pdf>. [D2.1 articles, D2.5 online content, D7, D3.3 layman legislation, E5.3, J5, K5.6 lobsters, K6 trend].

JULY 2021

In July, a **photograph of two tiger sharks** which had been caught by a fisherman appeared on social media and then in the newspaper, prompting calls for increased **conservation measures for sharks** in Bermuda. [D2, J5].

<https://www.royalgazette.com/environment/news/article/20210721/appeal-to-to-end-shark-fishing/>

In early July the **Development and Planning Amendment Act 2021** was tabled in the House of Assembly. The new act required **public consultation of environmental impact assessments** before a **special development order (SDO)** is given for a project. Minister Walter Roban stated that the intention of the amendment act was to increase protection of land and streamline the planning process. A number of environmental groups objected to the amendments, pointing out that SDO's would no longer need to be debated in the House of Assembly before being approved by the Minister.

[C7.5, H1.3, A2.6, B4.13, I4.4, I4.3, G3 amendment].

- <https://www.royalgazette.com/environment/news/article/20210720/development-must-be-balanced-says-new-national-trust-leader/>
- <https://www.royalgazette.com/environment/news/article/20210713/sdo-changes-prioritise-short-term-interests-of-private-companies-over-environment/>
- <https://www.royalgazette.com/environment/news/article/20210710/withdraw-special-development-order-changes-says-best/>
- <https://www.royalgazette.com/environment/news/article/20210702/new-law-changes-way-sdos-are-approved/>



On July 21st Dr Gerardo Garcia from Chester Zoo gave a lecture entitled '**A one plan research approach to recovery of the critically endangered Bermuda Skink**' for the BZS's virtual lecture series. He highlighted Chester Zoos methods and successes in breeding Bermuda Skinks. [K1.7 forum, A2.4 lecture, A3.4 collaboration, J3.1 husbandry, J3.2 breeding, J3.3, J3.4, K4 reintroduction].

Dr. Garcia with a Skink on Castle Island in 2015

This summer 17 Bermudian students participated in **the BIOS 2021 Bermuda Program** summer internships [C3.11, C6, C7].

- <https://bernews.com/2021/08/17-selected-bios-summer-internships/>
- <http://www.bios.edu/currents/a-summer-of-stem>

AUGUST 2021

On August 10th the **public consultation period for the proposed invasive species legislation** began. The general public were invited to use the government's citizens forum website (<https://forum.gov.bm/en/projects/managing-problem-alien-invasive-species-1>) to give their views on a draft of the **Invasive Alien Species Act 2021** and to make suggestions or ask questions. The consultation ran until September 7th. Stakeholders with businesses or other interests directly affected by the new law were consulted separately. [A2.6, B4, B4.11 IAS list, B4.12 response plan, D2.7 consumer, D4 invasives, E2, G3 new legislation, J1 plans, K3.4, K6.1 trends].

- <https://www.royalgazette.com/environment/news/article/20210812/tough-law-on-invasive-species-put-out-for-public-viewpoints/>
- <https://bernews.com/2021/08/invasive-alien-species-act-public-consultation/>

The Bermuda Ocean Prosperity Programme (**BOPP**) held an **online round table** at the beginning of August with discussion from Dr. Robbie Smith, Dr. Tammy Warren and Dr. Eric Hochberg about the state of Bermuda's marine habitats and the effects of climate change and ocean policy on them. [B4, I1.1 participatory assessment, I2 PA coverage, I5, I4, J5 fisheries, K1.5, K5.6, recreational users, A2.1 stakeholders, A2. Ngo involvement, A3.4, E1 community protection].

- <https://www.royalgazette.com/environment/news/article/20210810/bermudas-coral-reefs-doing-well-but-future-is-uncertain/>
- <https://bernews.com/2021/07/bopp-releases-ocean-use-survey-results/>

Mr. Nasir Rudolph, who is studying marine science at the University of Miami, was announced as the **Environmental Education Grant** winner for 2021/22. [C6, C7, L].

In August Aspen Insurance pledged \$50,000 over two years to support the **experiential learning programmes** of the **Waterstart** charity, including their restoration of Burt's Island and a seagrass restoration project. Volunteers from Aspen helped construct 36 exclusion cages on Burt's Island to protect seagrass beds from

over-grazing by green turtles. [F3.3 corporate+ngo, C3.10 outside teaching, E1.3 restoration, E1.4 planting, L].

<https://www.royalgazette.com/environment/news/article/20210806/aspen-backs-marine-conservation-and-education-scheme/>

SEPTEMBER 2021

In September the BZS announced that Aurum Fund Management Ltd. Had donated \$12,500 towards the creation of a **saltwater pond** at Trunk Island to support a population of **Black Mangrove** trees. [E2, F3 economic native sp., F3.3 corporate sponsor, F4 habitat, I5 protected habitat, E1.3].

- <https://bernews.com/2021/09/aurum-fund-management-donates-bzs/>
- <https://bernews.com/2021/07/support-creation-of-coastal-red-mangrove-forest/>

The autumn edition of the **Envirotalk** newsletter was published on September 20th. It contained an update on the marine mammal **hydrophone** project, an introduction to the **cownose ray** which has become resident in Bermuda's waters, and identification guide to common **burrs** and a discussion of the trends and spatial patterns in the recreational and commercial **spiny lobster fisheries**. It can be read here:

<https://conservation-services.squarespace.com/s/Envirotalk-853-Autumn-2021.pdf>. Envirotalk [D2.1 articles, D2.5 online content, E8.1 dates, D7, K1.7, J5.1, J5.2, K5.6 recreational users, E5.3 fishing practice, K migratory].

News articles resulting from Envirotalk:

- <https://bernews.com/2021/09/new-addition-bermudas-marine-wildlife/>



Vireo griseus bermudianus (Alison Copeland)

In September, the DENR published the first protected species management plan for the White-eyed Vireo or Chick-of-the-Village. The document is titled **Management Plan for the Bermuda White-eyed Vireo (*Vireo griseus bermudianus*)**. It was prepared by PhD candidate Miguel Mejias and contains new ecological data from his recently completed studies. [J1.6 new plan, J1.7 listed spp, J2.1 plan on web, K2 critical habitat, K3 species research, K4 spp. restoration].

<https://environment.bm/s/Bermuda-white-eyed-vireo-2021.pdf>

On Friday, September 10th the Minister of Home Affairs, the Hon. Walter Roban made a ministerial statement in the House of Assembly **tabling the Invasive Alien Species Act 2021** [A2.6, B4, B4.11 IAS list, B4.12 response plan, D2.7 consumer, D4 invasives, E2, G3 new legislation, J1 plans, K3.4, K6.1 trends]. A video of Minister Roban's statement can be found here: <https://youtu.be/gscpBteGHBs> .

On September 15th the Bermuda National Trust hosted a virtual talk called **‘Regulating Single-Use Plastics in Bermuda’**, delivered by David Northcott, the policy analyst for the Ministry of Home Affairs, and Vanese Flood the waste education and enforcement officer at the Ministry of Public Works. [A2.4 lecture, E10.7 retailers, E10.16 straws, F2 incentives, D2.7 consumer choice, D8.3 media, G3 new legislation, B1.6 gov collaboration].

Ecologist Sarah Brookes gave a talk for the BZS virtual lecture series on September 28th entitled **‘Bats: The forgotten mammals of Bermuda’**. A few bat sightings by members of the public were reported following her lecture [A2.4, K3.1, and K3.5].

OCTOBER 2021

Bermuda’s birders took part in the **Global Big Day** on October 9th. The Bermuda Audubon Society gathered data from birders throughout the weekend to submit to various migratory bird databases. [E8.2 international day event, K3.5, community spp data, E3 comm data].

Throughout the month of October staff members from the Department of Environment and Natural Resources participated in a **series of radio interviews** highlighting the work of the department on various environmental issues. Topics included shipwrecks, reef and water quality monitoring, endangered species, fisheries, shark protection, climate change, air quality, seagrass preservation and the work of the Plant Protection Lab. [D2.9 radio, D4.2 radio feral animals, D3.3].

Government Entomologist Claire Jessey spoke at the Eco **Lunch & Learn** put on by BEST and the Bermuda College on October 28th. The title of her talk was **‘Ants! Who’s in control?’** [A2.4]. <https://bernews.com/2021/10/entomologist-claire-jessey-to-speak-on-ants/>

A **Great Blue Heron** nicknamed Harper stopped over in Bermuda in October on her way from Canada to Cuba. The bird was fitted with a solar powered **GPS tag** in Maine in 2019. She flew non-stop for 40 hours from New Brunswick to Bermuda, spent three days in Bermuda, then flew for 30 hours to the Bahamas before continuing to Cuba. [K migratory, D2]. <https://bernews.com/2021/11/harper-travels-for-40-hours-to-bermuda/>



Great Blue Heron in Bermuda

The **UN Climate Change Conference of the Parties (COP26)** was held in Glasgow from 31 October to the 12 November 2021. The COP26 summit brought parties together with the aim of accelerating action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change. A **delegation** of representatives from the **Overseas Territories**, organised by UKOTA, participated in the COP, including an event on Nature and Land Use Day. A panel discussion ‘Our Vision for Healthy Oceans – UK Overseas Territories’, chaired by Minister Walter Roban, was held on November 11th. The presentation included a video, which can be seen here: [Watch the UKOTA video from COP26 here.](#) [A3.5 COP, A3.3].

- <https://www.gov.bm/articles/bermuda-difference-climate-change-and-un-conference-parties-glasgow>
- <https://www.gov.bm/articles/minister-roban-cop26>
- <https://bernews.com/2021/11/bermuda-difference-climate-change/>
- <https://bernews.com/2021/11/bda-promotes-bermudas-strengths-cop26/>
- <https://bernews.com/2021/11/minister-roban-un-climate-change-conference/>
- <https://bernews.com/2021/11/video-minister-walter-roban-interview-cop26/>
- <https://bernews.com/2021/11/minister-roban-at-climate-change-conference/>

EY Bermuda released a report in October titled ‘Waking up to nature – the biodiversity imperative in financial services’. The report includes steps companies can take to integrate consideration of biodiversity into their decision making. [F5, F6, E10]. <https://bernews.com/2021/11/biodiversity-imperative-financial-services/>

The Ministry of Home Affairs undertook a **public consultation** until the end of October on **single use plastics**. The Government has committed to begin eliminating single use plastic items from Bermuda in 2022. A 57-page **policy paper** formed the basis of the consultation. It can be read here: <https://bernews.com/2021/08/regulating-single-use-plastics-in-bermuda/>. [E10.7, F2 incentives, D2.7 consumer].

- <https://bernews.com/2021/09/single-use-plastics-public-consultation-extended/>
- <https://bernews.com/2021/09/beyond-plastics-supports-single-use-plastics-legislation/>
- <https://bernews.com/2021/09/consultation-opens-single-use-plastics/>

In October the Bermuda Institute of Ocean Sciences (BIOS) partnered with Arizona State University [A3.4, L]. <https://bernews.com/2021/10/bios-partners-arizona-state-university/>

The Garden Club of Bermuda **donated** \$10,000 to Buy Back Bermuda to assist with the restoration of Eve’s Pond, in celebration of the GC 100th anniversary. [A3.4, I3, F3.3, L]. <https://bernews.com/2021/11/10k-donation-restoration-eves-pond/>

On October 5th, 6th and 8th **volunteers from HSBC** bank joined DENR staff at Shorelands and Cooper’s Island nature reserve for a series of work days. The volunteers built seagrass restoration cages at Shorelands, and helped remove invasive Casuarinas from Goat Island at the end of Officer’s Beach, scattered native plant seeds at the cleared site, and removed marine trash from all the beaches on Cooper’s Island. [F3.3, L, E1.3, E1.4].



(L) HSBC volunteers with trash from Officer's Beach and (R) Goat Island before Casuarina removal (photos: Alison Copeland)

On October 27th DENR's Jeremy Madeiros presented a virtual lecture for the BZS lecture series entitled **'Back from the brink, an update on the restoration of Bermuda's cahow.'** [A2.4 lecture, K1.7 forum].

NOVEMBER 2021

On November 5th the Governor read the **Speech from the Throne**. Environmental initiatives in this year's throne speech included:

- The Ministry of Home Affairs plans to introduce a **Marine Development Act** and a Bill to facilitate the development and testing of renewable energy technologies in Bermuda.
- The Marine Development Act, will also include a marine spatial plan identifying 20% of Bermuda Exclusive Economic Zone (EEZ) as a **marine protected area**.

The Speech can be read here: <https://www.gov.bm/sites/default/files/Throne-Speech-2021-Web.pdf>. [G1, G2, G3, J5, F2 economic incentives, F5, L5 investment, K6.3 infrastructure, I1 mpa, I2, I3 mpa mgt, K1.5 govt priority, B4.13 eia].

In November student volunteers from **BZS, with support from Renaissance Re** and the Parks Department, planted a native and endemic **micro forest** between North Shore Road and the Railway Trail at the bottom of Jennings land hill. [F3.3, E1.4, E1.6, E7.3 youth involvement]. <https://bernews.com/2021/11/bzs-launch-micro-forest-project/>

In November the **2021/22 Cahow breeding season** was well underway with the DENR Terrestrial Conservation Section reporting that **156 pairs** of breeding birds had returned. [D2, D.3.7 success, J1.3 implement plan, J2.3go adopted plan]. <https://bernews.com/2021/11/cahow-season-on-track-to-break-more-records/>

The Bermuda Botanical Society, the Department of Parks and the staff of Government House came together in November to launch Bermuda's participation in the **Queen's Green Canopy** – a yearlong tree planting initiative to celebrate Queen Elizabeth's Platinum Jubilee. On November 6th members of the public were invited to Government House to help install a woodland on the eastern boundary, in a space that had been cleared of invasive species by the Parks Dept. The project aimed to **plant 70 trees** to celebrate the Queen's 70 years on the throne. Olivewood, Cedar, Palmetto, Yellowwood, Bay Grape, Jamaica Dogwood, and other plants were donated by Tulo Valley nursery, or purchased with funds from the Garden Club of Bermuda. [E1.4 culling +planting, F3.3 ngo, govt, A3.4, E7 youth involvement, B1.6 govt collaboration, E1.6 tree planting (not annual), E8.2 jubilee celebrations].

- <https://bernews.com/2021/11/queens-green-canopy-tree-planting/>
- <https://bernews.com/2021/11/queens-green-canopy-tree-planting-initiative/>
- <https://bernews.com/2021/10/id-join-green-canopy-tree-planting-initiative/>



Trees awaiting planting, and Cedarbridge Academy students planting a palmetto (Photos: Alison Copeland)

In early November staff from the Department of Environment and Natural Resources joined staff and volunteers from the Bermuda National Trust on **Palm Island** in Ely's Harbour to begin clearing invasive Casuarina trees from the island. **Casuarina removal** will free up space for planting of native plants, and will also improve the habitat for Longtails and Bermuda Skinks. [I3 PA mgt, E1.3 habitat restoration, E1.4 culling, A3.4 gov ngo collaboration].

On November 17th a new UK Government initiative, the **Blue Shield Programme**, was announced. Funded by the UK Government's Blue Belt Programme, the Blue Shield aims to assist the Overseas Territories with marine management and enforcement. The activities monitored could include illegal, unreported, and unregulated (IUU) fishing, commercial and recreational vessel activity, as well as shipping activity. Bermuda was the first UKOT to sign on to the programme. [D3.6 publicize infractions, D3.4 report violations, H3 enforcement training, H2 enforcement resources, H1 enforcement powers, H4 technologies, H5 relationships, B4.6, G3 legislation].

- <https://www.gov.uk/government/news/new-blue-shield-for-uk-overseas-territories-to-defend-oceans>

- <https://bernews.com/2021/11/bermuda-becomes-1st-ot-join-blue-shield/>

On November 18th Danny Simmons presented a talk for the BEST and Bermuda College Lunch and Learn series. His talk outlined the challenges faced by the **Bermuda Botanical Gardens**, the need for a new management plan, and the necessity of community participation to revitalise the gardens. [A2.4, J4 botanical gardens]. <https://bernews.com/2021/11/eco-lunch-learn-on-botanical-gardens/>

On November 22nd in a press conference Government announced the signing of an agreement with Seabased Limited to **develop wave technology** for generating electricity. Legislation has been tabled recently to facilitate renewable energy technology testing and development in Bermuda. [K6.3 infrastructure]. <https://bernews.com/2021/11/video-minister-seabased-on-wave-technology/>

From November 22nd to 27th students (aged 13 to 22) participated in the **first Youth Climate Summit at the Bermuda Underwater Exploration Institute**. In a series of virtual sessions, participants heard from local and international speakers on conservation, sustainability and climate justice topics. On the final two days, students met at BUEI to create action plans. A Youth Climate Advisory Board was formed, and plans for continuing work in 2022 are ongoing. [E7, E7.3 youth, A3.2 conference, C2 groups for young people, C3.11 buei, C6, C7, K1.7 forum].

- Youth climate summit webpage: <https://ycsbda.com/>
- <https://www.buei.bm/event/youth-climate-summit-2021/>

On November 26th Deputy Premier and Minister of Home Affairs the Hon. Walter Roban updated the House of Assembly on his participation in **the COP26**, where he led the UKOT delegation [A3.5 COP, A3.3]. <https://bernews.com/2021/11/increasing-protection-of-our-fragile-ecosystem/>

From November 27th to December 11th staff from the DENR were **inspecting all imported Christmas trees** arriving in Bermuda for pests and diseases. Trees infested with scale insects were incinerated to ensure the safety of plants and habitats on the island. [D4 invasive animals, K6.1 potential threats, D2.2, A3.4, B4.5 Customs].

The 2021 Atlantic Hurricane season ended on November 30th with **21 named storms**, including seven hurricanes, or which four were major hurricanes.

DECEMBER 2021

Greg Kearns a Park Naturalist from Maryland presented a talk for the BZS virtual lecture series entitled "**Bermuda... "Lifeboat for birds", Soras and the role of MOTUS"** on December 9th. The MOTUS wildlife tracking system is a **radio telemetry network**, which now includes a tower erected on Trunk Island. The Bermuda tower has recorded several observations of tagged migrating birds since it was installed. [A2.4 lecture, K2.2 tracking].

- <https://www.signupgenius.com/go/20f0a4ba8aa2ca1fc1-thelifeboat>
- <https://bernews.com/2021/10/motus-antenna-tracks-red-knot-bermuda/>

The winter Envirotalk newsletter was published in December, with articles on the threat glass bottles pose to **Bermuda Skinks**, an update on the **seagrass restoration** project and ongoing installation of turtle exclusion cages, and the identification of a new species of **Beardfish** from Bermuda's deep reefs. [D2.1 articles, D2.5 online content, D7, K1.7, K3.1, K5.3 trash on endangered sp., E2.1 cleanup skink habitat]. <https://environment.bm/s/Envirotalk-854-Winter-2021.pdf>

On December 9th the Bermuda Ocean Prosperity Programme (BOPP) held a **virtual briefing** for the public, featuring the three **principals of BOPP**: Minister Walter Roban (Minister of Home Affairs), Dr. William Curry (BIOS) and Mr. Ted Waitt (the Waitt Institute). The discussion highlighted recent activities of the BOPP partnership. [A3.4 collaboration, A2.4 lecture, L]. <https://bernews.com/2021/12/bopp-principals-briefing-webinar-on-dec-9/>

Twenty-two members of the Bermuda Audubon Society carried out **Bermuda's 47th annual Christmas Bird Count** on December 18th, with 'count week' running from December 15th to 21st. [The count itself is BSAP item E3.8 and K3.5 as data is collected by the public].

- <https://www.royalgazette.com/environment/news/article/20211215/birders-ask-for-publics-help-in-annual-count-of-bird-species/>

In December the Department of Parks began a public interest survey on future plans for the **Bermuda Botanical Gardens**, including the formation of a 'friends of the gardens' support group made up of volunteers. Plans to revitalise the gardens will progress in the New Year. [A2.6, J4 botanical gardens, I3.4].

On December 22nd, the Winter 2021 edition of the US National **Audubon magazine** was published with a photograph of a Cahow taken by JP Rouja on the cover. The magazine contained an article on the Cahow recovery project entitled "It Takes a Helicopter Parent to Rescue a Rare Seabird from Extinction". [D2.1 int¹, E3.5 photo]. <https://www.audubon.org/magazine/winter-2021/it-takes-helicopter-parent-rescue-rare-seabird>



Magazine cover (www.audubon.org)

New Scientific Papers at BAMZ library this year

(Librarian Alison Green departed BAMZ early in 2021, which is why this section is shorter than in previous reports. I thank her for helping me with this section in past reports.)

Publications that became available at the library in 2021:

Copeland, A., **IUCN Red List Assessment of Bermuda's Endemic Plants 2013-2016**, Technical Report of the Biodiversity Section, Department of Environment and Natural Resources, Government of Bermuda, Flatts, Bermuda, 176 pp., 2020. (BAMZ #3440/BBP #290)

Copeland, Alison I. 2021. **Observations of the native plants protected by the Bermuda Protected Species Act 2003 during the period 2013-2020**. Technical Report of the Biodiversity Section, Department of Environment and Natural Resources, Government of Bermuda. Flatts, Bermuda. 106 pages. This is Contribution #294, Bermuda Biodiversity Project (BBP), Bermuda Aquarium, Museum and Zoo, Department of Environment and Natural Resources. September 10th 2021.

Copeland, A. and T. Hesselberg. 2021. **Habitat preferences of the Critically Endangered greater Bermuda land snail *Poecilozonites bermudensis* in the wild**. Oryx. February 25th 2021. <http://dx.doi.org/10.1017/S0030605320000836>

Copeland, A., **Re-introduction of Governor Laffan's Fern (*Diplazium laffanianum*) to the wild. Report on plantings for calendar year 2020**, Report of the Biodiversity Section, Department of Environment and Natural Resources, Government of Bermuda, Flatts, Bermuda, 11 pp., 2021. (BAMZ #3441/BBP #291)

Croquer, A. & E. Weil, **Changes in Caribbean coral disease prevalence after the 2005 bleaching event**, Diseases of Aquatic Organisms, 87: 33-43, 2009. (BAMZ #3442)

Cyronak, T. et al., **Taking the metabolic pulse of the world's coral reefs**, PLOS One, 13(1): e019082, 17 pp., 2018. (BAMZ #3450)

Cyronak, T. et al., **Short-Term Spatial and Temporal Carbonate Chemistry Variability in Two Contrasting Seagrass Meadows: Implications for pH Buffering Capacities**, Estuaries and Coasts, 15pp., 2018. (BAMZ #3448)

Eddy, C. et al., **The Reef Sweeper: A Remotely Operated Vehicle for Harvesting Invasive Lionfish Without Bycatch at Depths to 300 m**, Proceedings of the 72nd Gulf and Caribbean Fisheries Institute, November 2-8, 2019, Punta Cana, Dominican Republic. (BAMZ # 3445)

Eddy, C. et al., **Stable Isotope Ecology of Invasive Lionfish (*Pterois volitans* and *P. miles*) in Bermuda**, Frontiers in Marine Science, 7(435): 13 pp., 2020. (BAMZ #3452)

Kennedy, A. S. et al., **Local and migratory movements of humpback whales (*Megaptera novaeangliae*) satellite-tracked in the North Atlantic Ocean**, Can. J. Zool., 92: 8-17, 2014. (BAMZ #3444)

Mejias, M., J. Roncal and D.R. Wilson. December 2021. **Territorial responses of male Bermuda White-eyed Vireos (*Vireo griseus subsp. bermudianus*) reflect phylogenetic similarity of intruders and acoustic similarity of their songs**. Journal of Field Ornithology

Moret-Ferguson, S. et al., **The size, mass, and composition of plastic debris in the western North Atlantic Ocean**, Marine Pollution Bulletin, 60: 1873-1878, 2010. (BAMZ #3453)

Outerbridge, M. E., K. Ovaska & G. Garcia, **Recovery Efforts for Endemic Land Snails Continue – Update**, 4 pp., January 2021.

Outerbridge, M.E., K. Ovaska and G. Garcia. March 2021. The Newsletter of the IUCN/SSC Mollusc Specialist Group Species Survival Commission • International Union for Conservation of Nature TENTACLE.

Pezner, A. K. et al., **Lateral, Vertical, and Temporal Variability of Seawater Carbonate Chemistry at Hog Reef, Bermuda**, Frontiers in Marine Science, 8(562267): 18 pp., 2021. (BAMZ #3454)

Pitt J. & J. L. Welch, **An Evaluation of the Baitfish Fisheries in Bermuda**, Proceedings of the 72nd Gulf and Caribbean Fisheries Institute, November 2 – 8, 2019, Punta Cana, Dominican Republic. (BAMZ #3446)

Pitt, J., T. Warren & C. Trott, **Managing Fish Spawning Aggregations in a Changing Climate: A Case Study of Red Hind (*Epinephelus guttatus*) in Bermuda**, Proceedings of the 70th Gulf and Caribbean Fisheries Institute, November 6-10, 2017, Merida, Mexico. (BAMZ #3447)

Smith, S. R. **Assessment survey of the calico scallop (*Argopecten gibbus*) and the zig-zag scallop (*Euvola ziczac*) in Harrington Sound**, Unpublished Paper, 4 pp., 2012. (BAMZ #3443)

Takeshita, Y. et al., **Coral Reef Carbonate Chemistry Variability at Different Functional Scales**, Frontiers in Marine Science, 5(175): 12 pp., 2018. (BAMZ #3449)

van Hengstum, P. J. et al., **Developments of anchialine cave habitats and karst subterranean estuaries since the last ice age**, Nature Scientific Reports, 9: 11907, 2019. (BAMZ #3458)

Wingate, D. B. et al., **Phenology and breeding ecology of Common Terns (*Sterna hirundo*) in Bermuda: An ecologically distinctive island population, now**

critically endangered, The Wilson Journal of Ornithology, 132(2): 271-283, 2020. (BAMZ #3455)

Yeakel, K. L. et al., **Shifts in coral reef biogeochemistry and resulting acidification linked to offshore productivity**, PNAS, 112(47): 14512-14517, 2015. (BAMZ #3451)