

Bermuda Biodiversity Action Plan Activity Report 2015



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 2015

Compiled by Alison Copeland,
Biodiversity Officer

This report is a compilation of activities reported to the Biodiversity Action Plan (BAP) Coordinator by partners or appearing in the local news. The activities below are either directly called for in the Bermuda BAP or were carried out in the spirit of biodiversity conservation and met the goals of the BAP. 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://www.conservation.bm/publications/bermuda-biodiversity-strategy-and-action-plan-2003/BAP_March2003.pdf.

In the first section activities are listed in chronological order to provide a snapshot of what was happening in Bermuda at various points in the year. Additional activities that were ongoing throughout the year or for which no time frame was reported are listed in the second section by contributor.

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.

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

KEY ACTIVITIES 2015

Amendments to the **Firearms Act** and the **Protection of Birds Act** allowing designated pest control shooters to cull named species of pest birds were approved in February.

The **re-development of Morgan's Point** began in March and continued throughout the year.

In April 2015 the Bermuda Zoological Society acquired 2.2 acres of **Trunk Island** to create a "Living Classroom".

The Minister of Health, Seniors & Environment **suspended the importation of glyphosate** to Bermuda in May 2015.

In July Bermuda sent 7 representatives to the **UK Overseas Territories Conservation Forum (UKOTCF) meeting** - "Sustaining Partnerships: A conference on conservation and sustainability in the UK Overseas Territories, Crown Dependencies and other small island communities" in Gibraltar.

In the summer of 2015 the first camps and activities were held by **BZS on Trunk Island**, including the first residential Conservationist Camp in August.

The **Bermuda Turtle Project** set a new project record by catching 58 turtles in a single day. In total 289 turtles were caught in 2015, also a new record.

A dredging operation to **widen the North Channel** took place in October.

The dumping of dredged material in the **South Basin at Dockyard to create a landfill** took place in October. Imported aggregate material was deposited in November to complete the landfill, which will be developed for the America's Cup village in 2016/17.

JANUARY 2015

The results of the Bermuda Audubon Society's **Annual Christmas Bird Count** were published online on January 1st 2015. The count was held on December 27th 2014 and marked the 40th annual CBC held in Bermuda. Continuation of the Christmas Bird Count is BAP item E3.8. [K3.5, D2.2, E 3.8]. <http://www.audubon.bm/birding/bird-reports/161-christmas-bird-count-2014>

Canadian gastropod specialist Dr. Kristiina Ovaska visited Bermuda in January to **conduct surveys of land snails**, particularly the 2 endemic *Poecilozonities* species and their predators. During her visit, she conducted island-wide surveys in collaboration with the Department of Conservation Services, and deposited a number of snails in the collection of the Natural History Museum at BAMZ. [J3.11, K1.4, K1.5, K1.9].



Land snail survey

Bermuda Audubon Society president Andrew Dobson presented **two public lectures** at the BUEI. His talk, entitled **“The 2014 Birding Year in Bermuda: Spies, Superstars & Surprises!”** contained many photos and was sold out. [A2.4 lecture, E3.5 photographers, K3.5 community data gathering].

In January LookBermuda unveiled their **Airport Art Project** at LF Wade International Airport. <http://www.lookbermuda.com/airportart/>. The installations include large scale photos of flora, fauna and landscapes [E5.2, E3.5 photographers].

A winter lionfish tournament was held by Ocean Support Foundation and the Lionfish Taskforce between January 15th and Feb. 1st to encourage spearfishers to get in the water over the winter. The aim was to collect lionfish from nearshore waters so that their winter diet could be examined. [J.1, K3.4 research invasives, K3.5 volunteers collect data, K6.1 invasive sp., D.4 communication, D4.2 feral animal control, K1.7, E3 community monitoring]. <http://bernews.com/2015/01/bermudas-first-annual-winter-lionfish-tournament/>

The **COP12 National Report** from the United Kingdom appeared on the Ramsar Website on January 14th. [I4.7 site protection, I1.2 report, A3.4 information sharing, touches on A3.5.] http://www.ramsar.org/sites/default/files/documents/library/uk_national_report_cop_12_final.pdf

FEBRUARY 2015

[Corange Science Week 2015](#) was held at the Bermuda College during the last week of January. Dr. David Chapman was the 2015 Corange Scientist, and he gave a public lecture on January 26th entitled “**Unexpected yet Understandable: Development as a Barrier to Renewable Energy**”. [C3.2 curricula college, A2.4 lecture, D9 event].

The Bermuda National Trust held their **Annual Children's Nature Walk** at Spittal Pond Nature Reserve on February 17th. [D5 regulations to children, C3.10 outdoor teaching, D9 event].

Gardeners were able to purchase native and endemic plants, vegetables and vegetable plants, and ornamental species at the Bermuda National **Trust annual plant sale** on February 14th [E2.4].

A petition was circulated in mid-February for the public to object to the Dept. of Parks **maintenance yard to be constructed at the Botanical Gardens**.
<http://www.royalgazette.com/article/20150119/NEWS/150119706> [I4.4, A2.6 NGO input].

Amendments to the **Firearms Act** and the **Protection of Birds Act** went to the house for approval in February. The amendments will allow the Minister of the Environment to authorize members of the public to become pest control shooters, and also named pest species to be targeted. [H2.1 resources for officers, J1 invasive mgt plan, G2 legislation gaps, G3 facilitate amendment of existing legislation – all items in G3].

<http://www.royalgazette.com/article/20150309/NEWS/150309711>

<http://www.royalgazette.com/article/20150324/NEWS/150329861>

The Bermuda Audubon Society held a **volunteer work party** at Seymour's Pond on February 21st to clear invasive plants and reopen the trail around the pond [E1.4 culling invasives + replanting endemics, F3.3 NGO sponsorship, I1.3 protected area mgt activity].

In February, **volunteers** from Aspen assisted the Bermuda National Trust with clearing invasive plants from their nature reserve at Scaur Lodge. Also, staff from Lancashire Re assisted with planting at Devonshire Marsh. [E1.4 culling invasives + replanting endemics, F3.3 NGO sponsorship, I1.3 protected area mgt activity].

The Bermuda Audubon Society held a **bird watching field trip** to Spittal Pond on Feb. 28th. [E3, observations collected.]

The Development Applications Board rejected a **development plan** for a piece of Agricultural Reserve at the Pink Beach hotel property. [I4.4]

<http://www.royalgazette.com/article/20150212/NEWS/150219893>

Mandy Shailer, GIS Analyst at the Department of Conservation Services, attended the [Overseas Territories Regional QGIS and data management workshop](#) in the Turks and Caicos Islands from February 2nd to 6th hosted by the Joint Nature Conservation Committee (JNCC). [C7.4 GIS skills, A2.4, A3 Caribbean info exchange, A3.2 regional workshop, A3.4 info exchange, tech transfer].

MARCH 2015

At the end of March, Mr. Ross Conrad from Dancing Bee Gardens in the US visited Bermuda to meet with local **bee keepers**, government representatives and conduct **workshops** at the Botanical Gardens, hosted by BEST. The first workshop for established beekeepers, included information on Varroa and other pests and diseases and organic pest control. His second workshop was for the public and those new to beekeeping, and included information on bee biology and getting started with organic bee keeping [E5.5 cottage industry, A3.4 collaborative info exchange].

On March 8th, 28 teams of students met at the pool at the National Sports Centre to compete in the HSBC Explorer's **2015 MARINE ROV Angelfish Challenge**. The students had spent 2 months designing and building Remotely Operated Vehicles (ROV), and met at the pool to complete obstacle courses and compete for prizes in various categories. [F6.3 awards for innovation, E7.3 youth media, E7.2 youth group specific project, L funding corporate].

<http://www.bios.edu/education/marine/>

On Saturday March 28th Bermuda participated in **Earth Hour**. Greenrock hosted the 7th annual celebration in the City of Hamilton, this year at Waterfront Properties. The event included a 5K Glow Fun Walk and Run with over 500 participants. <http://www.earthhour.bm> [E8.1 dates for enviro., D9.2 existing street festival.]



The Ministry of Education has commended the Bermuda Zoological Society on their **BZS Schools Programme**. Habitats were the focus of a spring teacher training workshop, led by Education Officer Jamie Bacon. The 'habitats and adaptations' class being offered to Primary 4 students, was praised by attending teachers, as it integrates material from the Cambridge Curriculum into a hands-on, fun learning experience. [C3.3 train educators, C3.10 outdoor learning, C3.11 support BZS].

In March the golf club at the Tucker's Point Club approached various stakeholders, to begin collaborating on ways to implement the **Audubon Cooperative Sanctuary Programme** on their golf course. Tucker's Point Golf Club became a member of the National Audubon Society (US) in February to initiate the programme. [TPC April 2015 newsletter](#) [E9.1, E9.2, E9.5, E10].

Dr. Kevin Burgess and Dr. David Wingate gave a **talk** at the March 13th meeting of the Garden Club on the results of their collaboration to study **hybridisation between Red and White**

Mulberry in Bermuda and the possibility that Red Mulberry is a native species. [E2.2, E3.9 visiting scientists public feedback, A2.4 stakeholder research update].

<http://www.royalgazette.com/article/20150321/NEWS/150329939>

From March 14th to 16th Dr. Kevin Burgess and local collaborators collected plant species for the **Flora of Bermuda genetic barcoding project**. Collections were made at Paget Marsh, Walsingham, Devonshire Marsh, Warwick Pond, Cooper's Island and from local gardens. [G4 genetic resources, K5, K3.1 poorly studied taxa, K3.3 formerly economically important sp.].



Dr. Burgess and field assistant Scott Silvus pressing collected plants

Plans for the **redevelopment of Morgan's Point** were submitted to Planning in late March.

In March, the Bermuda National Trust's **annual Palm Sunday Walk** took the public through St. David's to explore beautiful and historic places of interest. These included Cooper's Island Nature Reserve, St. David's battery, Great Head Park and Fort Popple [D9 public event].

During KBB's annual island-wide spring clean-up teams of volunteers removed 4.5 tons of trash from 28 locations around Bermuda [E1.5].

APRIL 2015

This year's **Agricultural Exhibition**, was cancelled in January as a cost-savings measure by government.

On April 17th an article on **American and European Eels** and their migration to the Sargasso Sea appeared in the **Bermudian Magazine**. Researchers in Canada have implanted acoustic tags in American eels and are collaborating with BIOS, using the BIOS AUV 'Anna', to listen for eels in the sea around Bermuda.

<http://www.thebermudian.com/66-myblog/home-grown-made-in-bermuda/1582-bermudian-eels>
[A3.4 collaboration, J5 economic marine sp., K3.1 poorly studied taxa, K3.3 economically important].

In April an application to build a warehouse on a lot adjacent to **Devonshire Marsh** (zoned as Open Space Reserve) was refused by the Development Applications Board after objections from several environmental NGOs and the public. [I4.3, A2.6 public input].

On **Earth Day**, April 22nd, Tokio Millennium staff helped to clear up hurricane damage in the Bermuda National Trust's Gilbert Nature Reserve in Somerset. Volunteers cut up and chipped fallen trees, secured damaged cedars and planted 10 Olivewoods along the path. [E1.6 tree planting, E8.3 culling invasive plants, F3.3 corporate sponsorship, E8.1 international day, E8.2 activity on international day].

In spring 2015 the BUEI awarded 3 **Teddy Tucker Marine Scholarships**. These scholarships allowed students to participate in classes that discuss the importance of environmental awareness. [C2.7, C2.8 camps, C3.11 education role BUEI, F6.3 award].

In April 2015 the Bermuda Zoological Society acquired 2.2 acres of **Trunk Island** to create a "Living Classroom". [C7.3 land mgt, I2.3 ngo, L5.1].

Ms. Helena Turner from the University of Kent and Dr. Gerardo Garcia from Chester Zoo were in Bermuda in May and June to conduct population assessments for the Bermuda Skink with the Department of Conservation Services. This intensive field effort, involved a mark/recapture survey of main populations and a presence/absence survey of other areas, along with genetic and morphometric sampling. [A3.4 collaboration, L4.3, K1.5 prioritised research, K3.1 species, will relate to K4.]



MAY 2015

May is Heritage Month in Bermuda, and this year's theme "**Bermuda: an Atlantic Garden**" celebrates our cultural connection to biodiversity. [D9.2 existing festival].

Students from Somersfield Academy built a Parrotfish float made from all natural materials for the Bermuda Day Parade and donated it to BAMZ after the parade. The parrotfish was on display for the month in the Aquarium Hall along with some underwater-themed trash **art created by students** from Creative Touch Home Preschool. [D9.2 existing festival, E5.2 art].

As a result of pressure from the public and following various stakeholder meetings, the Minister of Health, Seniors & Environment **suspended the importation of glyphosate** to Bermuda in May 2015. During the suspension, officers of the Bermuda Government were to conduct a range of analyses to understand the level of risk to the public from a variety of potential exposure pathways <https://www.gov.bm/glyphosate-monitoring-strategy> [legislation related to pesticide use G2.4, amphibian research K5.1, international data on chemicals K6.5, relates to E10.11, relates to E10.13, somewhat relates to E9].

The Bermuda National Trust and the ACE Gallery hosted an opening reception on May 7th for the exhibit **“Lansdown Guilding: A Natural History of Bermuda”**. The show features paintings done in Bermuda in 1831 by visiting fellow of the Linnean Society Lansdown Guilding. [E5.2 art, A2.5 social event.]

Under the guidance of Dr. David Wingate, work was carried out by the Bermuda National Trust to selectively **cull invasives** from the interior of the marsh at Higgs Nature Reserve at Tivoli in Warwick. [E8.3 culling invasive plants, F3.3 corporate sponsorship].

The week of May 21st Dr. Adam Csank and Kristen Greer visited the Island from Nippising University to work with the Dept. of Conservation Services and the National Museum to create a **tree-ring chronology for the Bermuda Cedar**. While in Bermuda he trained DCS staff on the collection of tree cores and simple microscope techniques for aging specimens. <https://empiretimber.wordpress.com/2015/06/11/blog-4-team-canadas-bermuda-research-trip-may-2015/> [K3.1 spp. Research for mgt, E3.9 feedback from visiting scientist, A3.4 tech transfer/skill sharing].



Dr. Csank placing a cedar core into a straw

The **Garden Club of Bermuda** announced the 4 winners of their **2015 scholarships**. The following was provided:

- Mr. Jayson Jackson is a first-time awardee and he will return to Guelph University, Canada, to complete an associate diploma in turf grass management before returning to Bermuda next year to continue his career at a golf course.
- Mr. Hutson Carter II is pursuing a career as a golf course superintendent and is due to complete his diploma at Florida Gateway College, US, in December.
- Ms. Anna Terceira is midway through studying for registration as a horticultural therapist certified by the Horticultural Therapy Institute, US, offered through courses at Colorado State University, US, together with more than 480 hours of internship. Ms. Terceira is known for her achievements in this field at Windreach.
- Mr. Kidane Callender is a graduate of CedarBridge Academy and is preparing for his second year at Warwickshire College, UK, for a diploma in horticulture and landscaping. He developed his interest in horticulture as a day-release student in a programme run by Roger Parris who is in charge of The Arboretum for the Parks Department.
<http://www.gardenclubbermuda.org/scholarships.htm> [C6, C7, E7.3 youth celebrated].

JUNE 2015

Mr. Stuart Haryward, president of the Bermuda Environmental and Sustainability Taskforce (BEST) received the **Queen's Certificate and Badge of Honour** in the June 2015 Queens Birthday Honours. Mr. Hayward was recognised for his lifetime of service to the Bermuda community, particularly in conserving the natural environment. [F6.3 recognition of individuals, D3.7 individual in awareness].

On June 11th the **Bermuda Audubon Society** held their AGM followed by a harbour cruise during which members were able to get close views of nesting Common Terns and Barn Owls, as well as a lovely sunset. [A2.5 social event].

In June, staff from Bacardi volunteered to build and help **install bat boxes** for the Bermuda National Trust to use in their reserves bordering Devonshire Marsh.

In June, a group of 30 students from BHS's IB class **volunteered to cull invasive plants** from the woodland at the Bermuda National Trust's nature reserve at Tivoli in Warwick. [E7, E1.3 restoration].

The terrestrial conservation division of the Department of Conservation Services confirmed that 108 **nesting pairs of Cahows** returned to Bermuda this past nesting season and in the spring of 2015 59 chicks fledged. [D3.7 conservation success story outreach].

The Marine Conservation Section of the Department of Conservation Services visited the South Basin in Dockyard on June 19th to capture and **satellite tag the resident green turtles**. [informed mgt K1.3, K1.5, K6.3, K6.4].



Satellite tagging a Dockyard turtle

In 2015, 478 middle school students took part in two-day training courses in free-diving, snorkelling and reef biology through the BZS's 'Kids on the Reef' programme. **Kids on the Reef** was sponsored by XL Catlin, and led by Dr. Alex Amat (Bermuda Zoological Society) and Beth Neale (I AM WATER Conservation Trust), and guest teacher South African freediving champion Hanli Prinsloo. [BZS formal education school groups C3.11].

This year's 3rd **annual REEF Watch** event was held by the Bermuda Zoological Society on June 27th. Despite the rough weather, 12 teams of divers and snorkelers participated in the coral reef health survey, covering 25 sites. They assessed their sites on coral cover, algal cover, herbivores and predatory fish. The event, sponsored by Hiscox, raised over \$15,000 for BZS's reef research programme BREAM, and contributed important citizen science data. This year, for the first time, a primary student reef art competition was held in conjunction with Reef Watch. 63 entries were received, and 9 prizes were handed out.

<https://www.dropbox.com/s/93t66l524ze1fym/Reef%20Watch%20Annual%20Report%202015%20-%20Murdoch.pdf?dl=0>

[Social event A2.5, community participation data collection E3, volunteers data collection K3.5, somewhat? REEF surveys E3.3, K1.9, K2.1 monitoring critical habitats, economically important spp. K3.3, possibly K5.8 ship silting, K6.2 bleaching, business community support L5.1].

Greenrock's Eco Schools programme began during the Sept 2014 to June 2015 School Year, with three schools earning their green flags. [E7.2 support enviro clubs, C2.4 training teachers, C2.6 materials].

On June 23rd 2015, the **Bermuda National Trust Annual Awards** were held at the Elbow Beach Hotel. Congratulations to the honourees and many thanks to the National Trust for providing this information. The following individuals, groups and schools were honoured this year:

School Programme / wee environmentalist	Southampton Preschool	For implementing Green activities with students throughout the year.
School Programme / wee environmentalist	Stepping Stones Preschool	For becoming the first Eco Preschool in Bermuda
School Programme / wee environmentalist	Saltus Foundation Year Saltus Grammar School	For implementing Green initiatives with students throughout the year.
School Programme	Dellwood Middle School	For their M3 Design and Technology Environment Enhancement Green Project
School Programme	BHS Upper Primary Department Bermuda High School for Girls	For increasing an awareness of plastic pollution through school activities
School Programme	MSA Grade 8 Classes Mount Saint Agnes Academy	For their grade 8 Environment Technology Project
School Programme	Saltus Grammar School - Year 4	For creating school gardens in combination with an Earth Day assembly
School Programme	Berkeley Institute	For completing an environmental school-wide waste audit
School Programme	Sandys Secondary Middle School	For their Aquaculture Programme
School Programme	Francis Patton Primary	For their "Eco Engineers Programme" involving the fundamentals of Permaculture
School Programme	Somersfield Academy	For their Green Team school-wide initiatives and becoming the first Eco School
School Programme	West End Primary	For their Garden Club at Sandys Community Gardens
Awareness	Greenrock	For the Eco-schools Programme
Awareness	Michelle Wales	For the Facebook page Bermuda Repurpose and Upcycle and putting these principles into practice at the CV Café in St George's
Awareness	Mark Brown	For commitment to environmental education at Somersfield Academy

Awareness	Bermuda Media	For Going Green magazine
Awareness	Andrew Dobson	For the Bermuda Audubon Society's Facebook page
Awareness	Tara Cassidy	For the upcycled jewellery brand La Garza
Awareness	The Royal Bermuda Yacht Club and Paul Doughty (separate certs.)	For the Queen of Bermuda Exhibit
Awareness	Ronnie Chameau	For enduring commitment to promoting Bermuda's cultural heritage.
Deforest Trimingham (Top Awareness Award)	Jean-Pierre Rouja (LookBermuda)	For the CahowCam project
Deforest Trimingham (Top Awareness Award)	Department of Conservation Services	For the CahowCam project
Environment	Ian MacDonald-Smith	For large-scale habitat and woodland restoration in Flatts
Environment	Guardian	For paper recycling on a large-scale
Environment	ACE Bermuda	For the successful incorporation of green initiatives and practices at the ACE building
Environment	Bermuda Ocean Explorers	For promoting ocean conservation, education and research among divers
Environment	Lisa Whitehead	For continually cleaning trash around Trimingham Hill, Point Finger Road and Crow Lane
Environment	Judie Clec	For enduring commitment to promoting and protecting the Marine Environment
Bermudiana (top Environment Award)	Michael and Tucker Murphy, Friends of the Bermuda Railway Trail	For the restoration of the Bailey's Bay and Winton Hill Railway Trail
Bermudiana (top Environment Award)	Department of Parks	For the restoration of the Bailey's Bay and Winton Hill Railway Trail

[Annual awards F6.1, recognition operational activities F6.2, individual awards F6.3, celebrate youth involvement E7.3, A2.5 social event].

June 17th the Greenrock **Eco-Schools prize giving** was held at BUEI with Minister of Health and Environment Jeanne Atherden presenting the awards. Mrs. Fergusson also gave a brief slide show about the school gardens that have been planted on the grounds of Government House. When all the awards had been presented, the students were captivated by a keynote speech from South African round-the-world sailor Neal Petersen. [Celebrate youth involvement E7.3, enviro clubs E7.2, A2.5 social event].



Elliott finished their Biodiversity pathway

In June students from the Coastal Environmental Science program at **Flagler College** in Florida explored Bermuda along with students from Bermuda College. Under the guidance of the BZS education team, the group did snorkel surveys, visited Nonsuch Island and learned about waste management at the Tynes Bay facility. The visitors were supported by the Atlantic Conservation Partnership (ACP). [A 3.4 collaboration and exchange, C7.2 relationship overseas edu. inst.].

Public consultations on the **City of Hamilton Plan 2015**, an update to the 2001 planning document for the City, began in June. The final Plan was passed by the House in July of 2016. [F4.1, **I2.4** review zoning plans.]

In 2015 the Bermuda Underwater Exploration Institute (BUEI) worked with **BEN's (Bermuda Education Network)** Horizons summer programme along with 5 other sponsors which provided free spaces in BUEI's Educational Camps for 122 students coming from Victor Scott, Prospect Primary, Northlands, Dellwood, East End Primary and Francis Patton. [C2.7, C2.8].

On June 25th **volunteers from Viridian Energy** in the US helped the Department of Conservation Services at Cooper's Island Nature Reserve with clearing up the native plant nursery and culling invasive trees. Staff from KBB were also on hand to lead a beach clean-up. [E2.1 skink area clean-up, E1.4 invasive culling, E1.5 beach clean-up].

JULY 2015

In July the Sustainable Development Department published its **first annual report**, outlining progress made over the past 7 years by both the SD Department and the Sustainable Development Roundtable (SDRT). The Report can be found at: <http://www.sdbermuda.bm/> [B4.1].

The Bermuda Zoological Society held a full suite of **Aqua Camps** in the summer of 2015. A fourth week of Aqua Explorers camp (based on Trunk Island, for M1 and M2 students) was added this year. In all, 558 children participated in Aqua Camps this year. [C3.11 BZS education, C2.7 camps, C2.8 camp attendance].

This summer BAMZ and **BZS welcomed Bermudian intern** Kascia White, a Masters student in Marine Management, studying at Dalhousie University. She was a key planner of the successful Reef Watch in June, and helped lead scientist Dr Thad Murdoch with collating the data submitted by citizen scientists. [A3.4 staff development, C6? training, C7.1 postgrad study].

The 2015 **Environmental Education Grant** was awarded to Cara Philip, a Bermudian student attending Oral Roberts University in Oklahoma studying environmental sustainability. <http://www.bermudascholarships.com/SitePages/scholarship.aspx?sid=196> [C7.1 postgraduate study].

This summer BIOS offered university students **hands-on experience** during courses on coral reef ecology and reef fish biology.

The Department of Conservation Services summer intern Miguel Mejias spent the summer visiting **Longtail nests** around Bermuda to collect data for his Master's thesis on nest selection and breeding success, and to recover tracking tags from birds marked last year. His student report (BAMZ#2929) is available from the Natural History Museum library. Miguel also assisted Dr. David Wingate with **Common Tern surveys**. [K1.5 govt support, K3 species, A3.4, **C7.1** postgrad support].



Re-capturing a Longtail with a tracking tag (Photo: Alison Copeland)

The 5th annual **Groundswell Lionfish Tournament** was held on July 18th 2015. Said by many to be the most successful tournament to date, this year's event included the addition of a photo contest. 110 Lionfish were culled during the event, and an estimated 600 people attended the weigh in and prize giving after-party at BIOS. <http://www.bios.edu/currents/2015-groundswell-lionfish-tournament-photos>

[D9 public events, A2.5 social event, D4 invasive species, D4.2 press animal control.].

The Bermudian Magazine featured an article on the work of Bermuda Institute of Ocean Science (BIOS) researcher Tim Noyes into the **prey choices and impacts of lionfish on Bermuda's deep reefs**. The article featured photos of the rarely seen deep reef and its species, captured during the study using a baited camera. [K3.4 research impact invasives, K6.1 trends invasives, D4.2 press article invasive animal, K2.1 critical habitat].<http://www.thebermudian.com/myblog/66-home-grown-made-in-bermuda/1668-bait-and-see-deep-reef-candid-cameras-reveal-diverse-fish-and-invaders>

The **UK Overseas Territories Conservation Forum (UKOTCF)** meeting was held from July 11th to 15th in Gibraltar. The theme of the meeting was "Sustaining Partnerships" A Conference on conservation and sustainability in the UK Overseas Territories, Crown Dependencies and other small island communities. Bermuda was represented at the meeting by Arlene Brock (former Ombudsman), Robert Chandler (Educator), Alison Copeland (Dept. of Conservation Services), Andrew Dobson (Bermuda Audubon Society), Dr. Annie Glasspool (Bermuda Environmental Consulting Ltd.), Jennifer Gray (Bermuda National Trust) and Dace McCoy Ground (Bermuda National Trust and UKOTCF Council).<http://www.ukotcf.org/confs/gibraltar2015.htm> [A3.2 conference, A3.4 information sharing, A2.4 update stakeholders, A3.5 conference, K6 several issues].



Bermuda representatives (Photo from Andrew Dobson)

AUGUST 2015

The **Bermuda Turtle Project** annual Biology and Conservation of Sea Turtles course took place during the 2nd and 3rd weeks of August. The total number of turtles caught in 2015 was 289, breaking the previous record of 203. Additionally the standing record of 42 turtles caught in one day was broken three times this season, when the team caught 48, 55 and finally a whopping 58 turtles! Also, the team landed a 15 year recapture of a turtle, making it the longest stretch of time for a recaptured turtle. To read more on the Bermuda Turtle Project, please visit their website by [clicking here](#). [K3 species, A3.2 workshop, A3.4 skill transfer collaboration].

<http://bernews.com/2015/09/bermuda-turtle-project-successful-season/>



Turtles awaiting tagging

Dr. Peter Meylan, Professor of Natural Sciences at Eckerd College, St. Petersburg, FL, and Co-principal Investigator of the Bermuda Turtle Project gave a well-attended **talk entitled “Sea Turtle Migration: the Bermuda Perspective.”** The Bermuda Turtle Project collects genetics, tag return and satellite data; and Dr. Meylan’s talk summarized what these data reveal about the connectivity of Bermuda’s sea turtles to regional populations. [E3.9 visiting scientist, A2.4 lecture].

Visiting scientists Dr. Pete van Hengstum, Dr. Tom Iliffe and graduate student Jacque Cresswell from Texas A&M University presented a talk entitled **“Bermuda’s cave environments in time and space”** at the Bermuda Sub Aqua Club on August 19th. [E3.9 visiting scientist, A2.4 lecture, K2.1 critical habitat, K5 anthropogenic impact].

The Bermuda Zoological Society (BZS) held a number of educational and fun ‘Wild on the Water’ **Snorkel trips to North Rock** over the summer months for members, residents and visitors to the island [C3.10 field trip].

BEST released a statement on August 10th, and chairman Stuart Hayward was a guest on 3 radio shows to educate the public on what his organisation saw as the flaws in the planned landfill and related **development at South Basin, Dockyard**. BEST are particularly concerned that an inadequate Environmental Impact Study (EIS) was done that did not cover a number of the end uses of the site. BEST advised that they would be perusing a resolution through the courts.

The BZS held a residential camp, called **Conservationist Camp**, on Trunk Island from August 17th to 21st for M3 to S1 students. This was the first residential camp on the newly acquired 'Living classroom'. Students volunteered their time in the mornings at BAMZ then learned about topics such as lionfish, sea turtles, toads, longtails, marine habitats and fish from local experts and BZS staff. [C2.7camp, C3.10 field trip, C3.11 school group/BZS].



***Conservationist campers learning about Longtail igloos
(Photo: BZS Education dept.)***

A number of new scientific publications of research done in Bermuda were added to the collection of the Natural History Library at BAMZ this summer.

They include:

- Hannelore, P. & B. Akesson, The *Ophryotrocha labronica* group (Annelida: Dorvilleidae) – with the description of seven new species, *Zootaxa*, 2713: 1-24, 2010. (BAMZ #2884)
- Muhs, D. R. et al., Soil genesis on the island of Bermuda in the Quaternary: The importance of African dust transport and deposition, *Journal of Geophysical Research*, 117(F03025): 26 pp., 2012. (BAMZ #2883)

Bermuda's snorkelers, free divers and SCUBA divers joined Bermuda Ocean Explorers, the Bermuda Regiment Underwater Taskforce and Doctoral candidate Corey Eddy for the '**Lionfish Day' Dive Series**. Every Wednesday evening for six weeks beginning on August 12th the series offered diving at different locations along South Shore where civilian divers and divers from the Bermuda Regiment joined forces to hunt for invasive lionfish and collect marine debris. This dive series was one of many late-summer events taking place during the Bermuda Regiments '50 Wrecks in 50 Days' event. [K3.4 distrib invasives, K6.1 trends in invasive sp, E1.5 marine clean up, A2.5 social event].

SEPTEMBER 2015

In celebration of **World Shorebirds Day**, the Bermuda Audubon Society held a field trip to Spittal Pond on September 6th to look for migrant shorebirds. A sighting of a Baird's sandpiper was the highlight of the day. [E8.2 international day event, K3.5 community spp data, E3 comm data, C3.10 field trip].



Great and Lesser Yellowlegs at Spittal Pond

Throughout the summer and autumn there was public discussion, led by the Bermuda Environmental and Sustainability Taskforce (BEST) about **regulation of cell towers** in Bermuda. Concerns were raised over the RF emissions from the towers and the lack of monitoring of towers placed in residential areas. <http://www.royalgazette.com/article/20151012/NEWS/151019942>

On September 18th a **Silver-haired Bat** was brought to the **animal hospital** at BAMZ from a construction site. This event and resulting news story (<http://www.royalgazette.com/article/20150918/NEWS/150919700>) spurred a number of queries and articles about bats in Bermuda. [D2.2].



Photo: Royal Gazette

The Fall 2015 issue of **Bermudian Magazine** included articles on marine species and the ongoing restoration of Trunk Island into a living classroom by BSZ. See:

- Connecting Bermuda's Youth to Nature: BZS buys Trunk Island to create a living museum
- By the Numbers: Counting the cost of wasteful water bottles
- Spiny & Guinea Chick: Know Your Bermuda Lobster
- Where have all the fish gone?

[D2.1 articles in local magazines].

On September 19th, Keep Bermuda Beautiful (KBB) hosted the **annual coastal clean-up** sponsored by EY Bermuda. [E1.5 cleanup].



Clearwater Students at Officers Beach

On September 25th students in the Earth and Environmental Science class at the Bermuda College participated in **experiential learning and community service** when they visited the National Trust's Gilbert Nature Reserve in Somerset to learn about the impact of invasive species on our environment, while helping to **cull invasive plants**. [C3.10 outdoor learning, E7, E1.3 restoration].
<http://bernews.com/2015/09/bnt-joins-bermuda-college-environmental-studies/>

Dr. Fred Ming retired as the Director of the Department of Environmental Protection at the end of September.

OCTOBER 2015

Hurricane Joaquin passed about 70 miles NW of Bermuda on the evening of Sunday October 4th. Joaquin was a weakening Category 3 storm with sustained winds of 100 mph / 155kmph.
<http://www.royalgazette.com/article/20151004/NEWS/151009869>

BEST's Buzz group participated in the **National Trust's FarmFest** event at Devondale. Volunteers provided information to the public on reducing pesticide use to help protect bees. [A2.5 social event, E, ?D2.7].

The Waste Management Section of the Ministry of Public Works reminded the public to practice **good environmental stewardship** during the **America's Cup World Series** races in Bermuda. Boaters were encouraged to bag and take home their garbage, pick up any floating debris, avoid spilling oil while fuelling and to anchor carefully. [B1.6 ministerial collaboration, E10.17 fuel spilling, E1.7 responsible behaviour boating public]. <http://bernews.com/2015/10/waste-management-section-green-boating-ethics/>

A **fish kill** was reported at the beginning of the month, affecting large fish such as Black Grouper. A number of fish were found floating, either dead or dying, around the island. [B4.10 gov personnel, B4.12 emergency response, J5, ?E3.6]. <http://bernews.com/2015/10/fish-kill-investigation/>



Dead Grouper, Cooper's Island

In October the Bermuda Audubon Society held its annual **Paget Island bird camp** for families. At this year's camp committee member Paul Watson demonstrated how he was using mist nets to catch and band migrant warblers and resident songbirds. [C2.7 camp, K3.5 community spp data collection, E3 comm. data collection, A2.5 social event].

A new series of **photographs depicting Bermuda's birds**, by photographer Reg Grundy were installed in the US Customs hall at the LF Wade Airport. [E5.2]. <http://www.royalgazette.com/article/20151009/NEWS07/151009664>

A number of scientific publications were added to the Natural History Library at BAMZ this fall. They include:

- Luckhurst, B. & T. M. Trott, **A Brief History and Aspects of the Fishery Biology of Black Grouper (*Mycteroperca bonaci*) at Bermuda**, Proceedings of the 67th Gulf and Caribbean Fisheries Institute, November 3-7 2014, Christ Church, Barbados. (BAMZ #2896)
- Worboys, Christopher, **Reducing Fossil Fuel Dependency in Bermuda**, Dissertation in support of MSc in Renewable Energy at Newcastle University, UK. (BAMZ #2897)

On Monday, 19th October, at a press conference in the Aquarium hall, Dr. Ian Walker, principal curator of BAMZ, and Dr. David Wingate thanked two principal sponsors for their **financial support for the Trunk Island Education Programme**. Present for the event, were Mr. Albert

Benchimol, CEO of AXIS and Jim and Spencer Butterfield, representing the Butterfield Family. Each was warmly thanked by BZS for their leadership gifts to the campaign. [F3.3, L,].

In October, **volunteers** from ACE Ltd. helped the Bermuda National Trust to clear fallen trees and invasive plants from the Butterfield Nature Reserve in Pembroke. [E1.4 culling invasives + replanting endemics, F3.3 NGO sponsorship, I1.3 protected area mgt activity].

The **BZS Fall Natural History Course** ran from October 20th to November 21st 2015. Participants got to experience field trips to Spittal Pond, Nonsuch Island, the Alfred Blackburn Smith Nature Reserve and a snorkel trip on-board *Endurance*. Lectures included Man's Impact (Dr. David Wingate), Coral Reef Life, Hurricane Ecology and the Cahow Recovery Project. [C4.2 courses for adults, C3.10 field trip].

On October 26th and 27th the Bermuda Zoological Society education department held several **professional development workshops** for primary, middle school and senior school teachers. The teachers were introduced to Trunk Island, and given insight into how the island can be used as a living classroom. [C3.3 train educators, C3.10 outdoor learning, C2.3].

<http://bernews.com/2015/11/discovering-trunk-island-what-it-has-to-offer/>

Dredging of the North Channel to accommodate larger cruise ships, and the deposition of the dredged material into the South Basin at Dockyard began on October 27th. This operation caused sediment plumes in the affected areas, and concern about this was covered in the media. [K5.8 cruise ship silting]

<http://bernews.com/2015/10/dd-minimal-impact-sediment-plume-dockyard/>

<http://bernews.com/2015/10/best-responds-sediment-plume-south-basin/>

<http://bernews.com/2015/10/north-channel-widening/>

<http://www.royalgazette.com/article/20151110/NEWS25/151119969>

In the fall of 2015, 3 species of Kingbird appeared in Bermuda, and were recorded by Audubon Society members. [K3.5].

NOVEMBER 2015

Dr. Samia Sarkis was appointed director of the Latin American and Caribbean chapter of the **World Aquaculture Society**, through which she hopes to promote Bermuda and techniques developed here. [A3.4 collaboration].

<http://www.royalgazette.com/article/20151216/NEWS07/151219763>

Jonathan Starling was appointed the new **Executive Director of Greenrock**, and began his duties with the Green Building forum on November 3rd.

In November Nigel Maven, a wildlife TV presenter from the UK gave a **public lecture** at the BUEI as a guest of the Audubon Society. Part of the proceeds of the lecture were donated to a charity in South Georgia. [A2.4 lecture].

53 students, staff and parents from Saltus Grammar School undertook a **beach clean-up on John Smiths Bay**, removing 22 bags of trash and 13 bags of recyclables, as part of KBB's Adopt-a-Spot Programme. [E1.5 beach clean-up, E7.2 youth group].

<http://www.royalgazette.com/article/20151109/NEWS07/151109729>

Photographer Andrew Stevenson was awarded “Highly Commended – Most Publically Liked Entry” for his photo of a humpback whale off Bermuda at the Prince of Wales’ Commonwealth Environmental **Photography Awards** ‘Out of the Blue’ competition. [E5.2 art].



The winning photo

The **Best of Bermuda Awards** were announced in November. **Mr. Omari Dill** from Unity Maintenance and Utopia received the award for ‘**Green Initiative**’ in recognition of his work in promoting sustainable agriculture and edible landscapes. Omari volunteers with Greenrock and works with the horticultural therapy programme at WindReach. [E5.7 sustainable agri, E10 private sector, F6.1 award, K6.2 award business activity].

<http://www.greenrock.org/news/blog/1263-best-of-bermuda-award-for-omari-dill>

Boat trips to look for returning **Cahows at sea** were run every weekend in November by the Bermuda Audubon Society in conjunction with the Bermuda Zoological Society [C3.10 field trip].

On Friday the 13th **visiting ornithologist** Bob Flood and local bird specialists led a boat trip off the east end of the island to look for Cahows at sea. During the trip, the group was fortunate to see a **Trindade Petrel** flying with the Cahows. This species is found off the coast of Brazil, and it was the first record of it in Bermuda. [C3.10 field trip, E3.5 photograph, K3.5 citizen science, E3].

<http://www.royalgazette.com/article/20151116/NEWS07/151119814>

<http://bernews.com/2015/11/trindade-petrel-bird/>

<http://www.royalgazette.com/article/20151223/NEWS07/151229906>

On November 4th Marge From and Melanie Landry from Omaha’s Henry Doorly Zoo arrived in Bermuda carrying 60 containers of **juvenile Governor Laffan’s Ferns** to add to the on-island collection of this extinct-in-the-wild endemic species. [A3.4 collaboration, A4.3 repatriation, J3.3 breeding overseas, J3.7 propagation, J3.11 re-intro areas, K3.1 poorly studied taxa, L4.3 overseas funds].

Department of Conservation Services Wildlife Ecologist Dr. Mark Outerbridge was alerted to unknown fish seen in **Pitman's Pond** in the Somerset Long Bay East nature reserve. On visiting the pond he was able to capture **two 8-pound Red-bellied Pacu**. These Amazonian fish were likely pets which were dumped by their owner. Later visits failed to turn up others, but it is unknown if the pair have bred in the pond. [B4.11 invasive list, D4.2 press feral control, D2.2 news article, K6.1 invasive trend, E2.6 unwanted pets, E3.6 report sighting].

<http://www.royalgazette.com/article/20151114/NEWS07/151119854>

<http://www.royalgazette.com/article/20151110/NEWS/151119971>



*Jaws of a Pacu from Somerset.
(Photo by Conservation Services in the Royal Gazette).*

On November 15th members of the public found a **masked booby** at Watford Bridge and took it to BAMZ for rehab. It was released again on December 1st.

In November, Mrs. Abbie Caldas, the coordinator for Greenock's Eco Schools programme, attended the **Global Eco-schools Conference** in Northern Ireland, thanks to sponsorship from the C.V. Zuill Scholarship. [A3.2 conference, A3.4 collaboration, C7.1 training, L]

<http://www.greenrock.org/news/blog/1264-eco-schools-update-december-2015>

In November, the West End Development Corporation (WEDCO) assisted the Bermuda National Trust with clearing creeping Casuarina trees which had been damaging the Watford Island Cemetery. [E1.4 culling, F3.3 ngo support].

On November 16th a man was **fined in Magistrates Court for spearfishing** within one mile of the shore in September 2013. [D3.6 publicise infractions]. <http://bernews.com/2015/11/court-22-year-old-man-admits-spearfishing/>

The bulk carrier *Balder* was in Dockyard in November delivering granite aggregate from Canada to the **landfill site at South Basin**. The landfill was begun in October with material dredged from the North Channel, and will be completed with imported aggregate.

<http://www.royalgazette.com/article/20151117/NEWS25/151119751>



Balder at Dockyard. Photo by David Skinner, from the Royal Gazette.

On Saturday November 28th Bermuda Audubon Society volunteers cleared invasive vegetation along the path and planted some cedars at the **Alfred Blackburn Smith Nature Reserve** in Paget. [E1.4 culling and planting, F3.3 ngo support, I1.3 mgt information].

Greenrock hosted a **climate change rally** at City Hall on November 27th. The purpose of the rally was to raise awareness locally about the upcoming climate change negotiations, which were held in Paris the following week, and to demonstrate Bermuda's solidarity with the Global Climate Change March. The Conference of Parties to the UN CCC (COP21) began in Paris on November 29th. [D9 public event, K6.2 climate change].

<http://bernews.com/2015/11/solidarity-rally-climate-change/>

Approximately 27 students from Bermuda, who are studying in the UK, attended the first **UK Overseas Territories student conference** in London organized by the Joint Nature Conservation Committee (JNCC). [A3.2 conference, A3.4 knowledge transfer].

<http://jncc.defra.gov.uk/page-7225>

In November the Bermuda National Trust submitted a **conservation management plan** to Planning for the Scaur Lodge Nature Reserve in Somerset. The Plan outlines maintenance actions needed for the reserve and the restoration of some arable land. [F3.3 ngo restoration, E1.3 habitat restoration, I3.2 plan for protected area, I1.3 mgt information, F3.1].

Somersfield Academy students made 50 bluebird nest boxes with the Bermuda Audubon Society through the **Dollars for Hours** Programme sponsored by PartnerRe. [F3.3 private sector support, ?E2.8 bluebird box installation].

The 2015 Atlantic Hurricane season ended at the end of November with 11 named storms.

<http://bernews.com/2015/12/normal-atlantic-hurricane-season-ends/>

DECEMBER 2015

The Bermuda Institute of Ocean Sciences (BIOS) received an anonymous \$6 million grant to support a 5-year collaborative research project with the University of California Santa Barbara and Oregon State University on **microbial communities in the Sargasso Sea**. [K3.1 poorly studied, L]. <http://www.royalgazette.com/article/20151215/NEWS07/151219806>

On December 1st the Bermuda Underwater Exploration Institute hosted a talk, **“Ocean Vet, the Journey Continues”**, with proceeds going to the Neil Burnie Foundation and BUEI’s education programmes. [A2.4 lecture].

A **guide book** to Bermuda’s species and natural places was released by artist Jill Amos Raine in early December. [D2]. <http://www.royalgazette.com/article/20151212/NEWS07/151219890>

Staff from ACE Group (now Chubb) donated volunteer time and 53 **cedar trees** to the BZS for planting on Trunk Island. [F3.3 support private sector, E1.3 habitat restoration, E1.4 culling and planting, E1.6 but not annual].

On December 11th **the Protected Species Notice of Intention 2015** was first published. The Protected Species Notice of Intention 2015 (BR96/2015) appeared again in the Government Notices of the Royal Gazette on December 16th, outlining proposed changes to the Protected Species Order and soliciting public comment. [G1.1, G3]. <http://www.bermudalaws.bm/laws/Annual%20Laws/2015/Statutory%20Instruments/Protected%20Species%20Notice%20of%20Intention%202015.pdf>

The Bermuda Environmental and Sustainability Taskforce (BEST) was **awarded a protective costs order** in the Supreme Court, that covered a portion of BEST’s legal expenses after the organisation launched legal action against the Development Applications Board and the Minister responsible for Planning regarding the **South Basin marina** project. <http://www.royalgazette.com/article/20151211/NEWS07/151219923>
<http://bernews.com/2015/12/dd-best-wins-supreme-court/>

The issue of developing the **offshore fishery** in Bermuda was discussed again in a various opinion pieces in the [local press](#), both for and against the idea, and in [the Reply to the 2015 Throne Speech](#). [E5.3 fishing practices, J5 economically important marine].

A number of Bermuda’s environmental NGOs, led by KBB and Living Reefs Foundation drafted **guidelines for sustainable regattas** in late 2015, with assistance from 11th Hour Racing. These were implemented at the international Moth Regatta in Bermuda in December 2015. An environmental working group was formed that will continue to offer Bermudian expertise to the organizers of the 35th America’s Cup, which will be held in Bermuda in 2017. [D9.2 existing event, E1.7 responsible boating].

The BUEI hosted a talk by **underwater explorer and filmmaker** Jill Heinerth on December 15th. The talk featured a rare glimpse into Bermuda’s underwater cave habitats. [E3.9 visiting scientist, A2.4 lecture, K2.1 critical habitat]. <http://bernews.com/2015/12/buei-talks-jill-heinerth/>

In early December the Bermuda Audubon Society released **two bird identification cards** featuring breeding birds of Bermuda, migratory land birds, migratory wetland birds and Bermuda's seabirds. The cards will be made available to the schools free of charge in 2016 thanks to a grant from the Bank of Bermuda Foundation. [C1 education material, C1.3, F3.3, L corporate support].

<http://www.royalgazette.com/article/20151217/NEWS07/151219741>
<http://www.audubon.bm/2-about-us/178-bermuda-bird-id-cards-for-sale>



Breeding Birds card

On December 16th, the Royal Gazette reported on the pilot project by Dr. Samia Sarkis, exploring **sea cucumber aquaculture** as a means to conserve the species and provide revenue for the island. [J5 economically important marine, K3.3 econ species].

<http://www.royalgazette.com/article/20151216/NEWS07/151219763>

A **Western Marsh Harrier** was spotted around Morgan's Point in December 2015 and January 2016. This Eurasian species had never been recorded in Bermuda before. Photographs confirmed the identification of the bird, making this one of the few confirmed records from the Western Atlantic. [K3.5 community sp data, E3.6 reporting species].

<http://www.audubon.bm/images/pdf/Newsletters/Vol. 27 No.1.pdf>

Global Indemnity Re-insurance presented a check to the Bermuda Zoological Society on December 21st to support the on-going work of the **Bermuda Turtle Project** and its international course on the biology and conservation of sea turtles. [L, F3.3 support, C4.2 course for adults, C6, C7 training] <http://www.royalgazette.com/article/20151221/NEWS07/151229964>

The following Bermuda **research papers** were published at the end of 2015, they are all available from the [Natural History Library](#) at the Bermuda Aquarium Museum and Zoo (BAMZ):

- Mayer, G.C., **The evidence for evolution**, pp. 28-39 in J. B. Losos, Ed. The Princeton Guide to Evolution. Princeton University Press, Princeton, N. J., USA. (BAMZ #2916)
- **Scott Turner: The New Urban Farmer**, The Bermudian, Winter 2015.

New Reports

- Murdoch, T. J. T., **BZS Reef Watch: Annual Report 2015: A third year for citizen science for Bermuda reef resilience.** Bermuda Biodiversity Project Report, Bermuda Zoological Society, Flatts, Bermuda, 48 pp. (BAMZ #2905/BBP #233)

Scientific Papers

- O'Farrell, S. et al., **Parrotfish sex ratios recover rapidly in Bermuda following a fishing ban,** Coral Reefs, 2015. (BAMZ #2917)
- Venti, A., A. Andersson & C. Langdon, **Multiple driving factors explain spatial and temporal variability in coral calcification rates on the Bermuda platform,** Coral Reefs, 33: 979-997, 2014. (BAMZ #2903)
- Wang, X. T. et al., **Isotopic composition of skeleton-bound organic nitrogen in reef-building symbiotic corals: A new method and proxy evaluation at Bermuda,** Geochimica et Cosmochimica Acta, 148: 179-190, 2015. (BAMZ #2904)
- Fourqurean, J. W. et al., **Water quality, isoscapes and stoichioscapes of seagrasses indicate general P limitation and unique N cycling in shallow water benthos of Bermuda,** Biogeosciences, 12: 6235-6249, 2015. (BAMZ #2902/BBP #231)

Book of Abstracts - 68th GCFI Panama 2015 –

- Drinkwater, E., J. Pitt & B. Collen, **Developing a Shark Management Plan for Bermuda: An Alternative Approach.** (BAMZ #2906)
- Eddy, C. et al., **Feeding Ecology and Prey Selectivity of Invasive Lionfish (*Pterois volitans* and *P. miles*) in Bermuda.** (BAMZ #2907)
- Pitt, J. & T. Trott, **A Lionfish Trap for Use in Bermuda, with Potential Applications Elsewhere.** (BAMZ #2908)
- Sarkis, S. **Culturing the Four-sided Sea Cucumber, *Isostichopus badionotus*, in Bermuda: A Tool for Conserving its Natural Populations.** (BAMZ #2909)

Geological Society of America Abstracts with Programs. Vol. 47, No. 7, 2015 –

- Van Hengstum, P. J. et al., **A Late Holocene Low-Frequency Storminess Signal from an Inland Submarine Cave in Bermuda,** p. 499. (BAMZ #2910)
- Cresswell, J. N., P. J. Van Hengstum & T. M. Iliffe, **The Recovery of Benthic Foraminifera in a Submarine Cave Following an Anthropogenic Disturbance in 1941 CE,** p. 626. (BAMZ #2911)
- Wallace, D. J. et al., **Paleotempestological Reconstruction of Western Atlantic Holocene Hurricane Impacts from Mangrove Lake, Bermuda,** p. 499. (BAMZ #2912)
- Rueger, B. F. et al., **Using Nature Reserves on Bermuda as a Place-Based, Field Oriented Laboratory for Undergraduate Education of Geology Majors,** p. 747. (BAMZ #2913)

Students enjoyed Christmas activities at BAMZ during the week of December 21st, including creating Christmas treats and piñatas for the animals to enjoy.

On December 23rd an article appeared in the **Royal Gazette** on the recent shipment of **Governor Laffan's Ferns** to the island and the attempts so far to reintroduce it to the wild. [A4 repatriation, J3.11 reintroduction, K4.2 ecological requirements, D2.2 article, A3.4 collaboration, L4.3 collaboration funding]. <http://www.royalgazette.com/article/20151223/NEWS07/151229900>

Keep Bermuda Beautiful volunteers and staff from Works and Engineering and the Parks Department collaborated to put out extra trash and recycling bins at Elbow Beach for Christmas celebrations and to **remove the trash from the beach** as quickly as possible over the holiday. [E1.5 beach clean-up].

<http://bernews.com/2015/12/dd-christmas-day-elbow-beach/>

The Annual Christmas Bird Count was conducted by volunteers from the Bermuda Audubon Society on December 27th. More than 8,000 birds were counted by 20 volunteers. This year 92 species were recorded, with rarities including a West Indian Whistling Duck, Eurasian Marsh Harrier and Masked Booby recorded. The news articles of the count is D2.2, the count itself is BSAP item **E3.8** and K3.5 as data is collected by the public.

<http://www.royalgazette.com/article/20151229/NEWS07/151229779>

<http://www.audubon.bm/images/pdf/Newsletters/Vol. 27 No.1.pdf>

Ongoing in 2015

The Bermuda Zoological Society was focused in 2015 on advancing their goal of creating a Nonsuch-like **'Living Classroom' on Trunk Island** in Harrington Sound. Activities throughout the year included drawing up educational resources and curricula centred on the opportunities offered by the island, and exposing teachers, students and BZS campers to these new activities. The year also saw great strides in the removal of invasive species from the island and planting of many endemic trees, thanks to the efforts of volunteers and a number of corporate work days. 2015 also saw an ongoing campaign to provide an endowment to fund the ongoing education and habitat restoration activities on the island and ensure resources would be available for long-term management of this new asset. [C2.3 support educators, C2.4 teacher workshop, C2.7camp, C3.3 workshop educators, C3.10 outdoor education, C3.11 BZS education, C4.2 adult education, C7.3 training land mgt, E1.3 habitat restoration, E1.4 culling and planting, E2.8 igloos, E7.2 youth groups, F3.1 landowner advice, F3.3 support ngo/private sector, ?F4.3, I1.3 info on site mgt, I2.1 new PA, I2.3 land for conservation, I3.2 PA mgt plan, I3.4, I5.2 rehabilitation, I5.3 mgt plan, J3.11 spp introduction].

The Bermuda Environmental and Sustainability Taskforce (BEST) **monitors planning applications** every week. In 2015 BEST reviewed 130 applications and objected to 33. Large projects throughout the year included South Basin marina, Morgan's Point hotel development, Pink Beach redevelopment. BEST is now regularly consulted at the early stages of large-scale development projects, which is seen as a step in the right direction. [I4.4 arable land and procedure, **A2.6** ngo input].

Since 2006, more than 3,000 young islanders have participated in the **expeditionary learning program** provided by Bermuda's tall ship, **Spirit of Bermuda**. The annual middle school program fosters intellectual and character growth through structured science, math, engineering and technology-based shipboard lessons, and also supports the Bermuda Public Schools curriculum. - See more at: <http://www.bios.edu/currents/bios-bermuda-sloop-foundation-partnership/#sthash.Iy2YL7PP.dpuf>
[C3.10 outdoor learning, C2 educators, C3.11 bio station].



Spirit of Bermuda at Nonsuch in January

In 2015 a total of 4,823 children attended **educational programs at BUEI**, with 826 students participating in classes specifically related to marine conservation (Marine Biodegradation, Save Our Seas, Healthy Oceans-Healthy Humans, Shark Conservation, Living with the Ocean, etc.). [C3.11 BUEI school groups].

In 2015 the BUEI had 647 **camp explorers** who attended educational camps throughout the year, covering a wide array of environmental issues including:

- global warming
- sea level rise
- extreme weather
- marine biodegradation
- shark conservation
- whale conservation
- effects of deep-sea trawling
- mangrove shoreline impacts
- extreme weather causes
- plastics in the ocean
- exotic invasion-lionfish
- global warming

- unsustainable fishing practices [C3.11 BUEI school groups, C2.7 camps, C2.8].

In 2015 the BUEI developed a **new exhibit** sponsored by Catlin, **Living with the Ocean**, which has sections titled: Perils of Plastics, Overfished & Under-protected, Changing Climate, Changing Seas, and Protecting the Ocean-Bermuda Success Stories. [D2.8 display,]

The Ministry of Youth and Sport works in partnership with Government **After School Programmes** (GASP) and the **Bermuda Underwater Exploration Institute** (BUEI) to provide 3 six-week sessions for groups of students who learn about issues including global warming, impact of extreme weather, marine pollutants, deep sea conservation, and how to protect Bermuda's waters as well as the Living with the Ocean exhibit topics. A total of 118 participated in 2015. [C3.11 BUEI school, gov/ngo partnership].

Throughout 2015 BUEI continued to work in collaboration with the Lionfish Task Force and Ocean Support Foundation to put on the **Lionfish Culling Course**. The course trains recreational snorkelers and divers to cull the invasive fish, after which they are licensed by the Dept. of Environmental Protection. BUEI, BAMZ, DCS, BIOS and some dive shops also continue to receive and freeze lionfish brought in to assist in Corey Eddy's PhD research. [D4, K3.4 invasive sp, a3.2 workshop].

Greenrock's **Green Building Forum** continued to meet every two months to network and exchange valuable information.

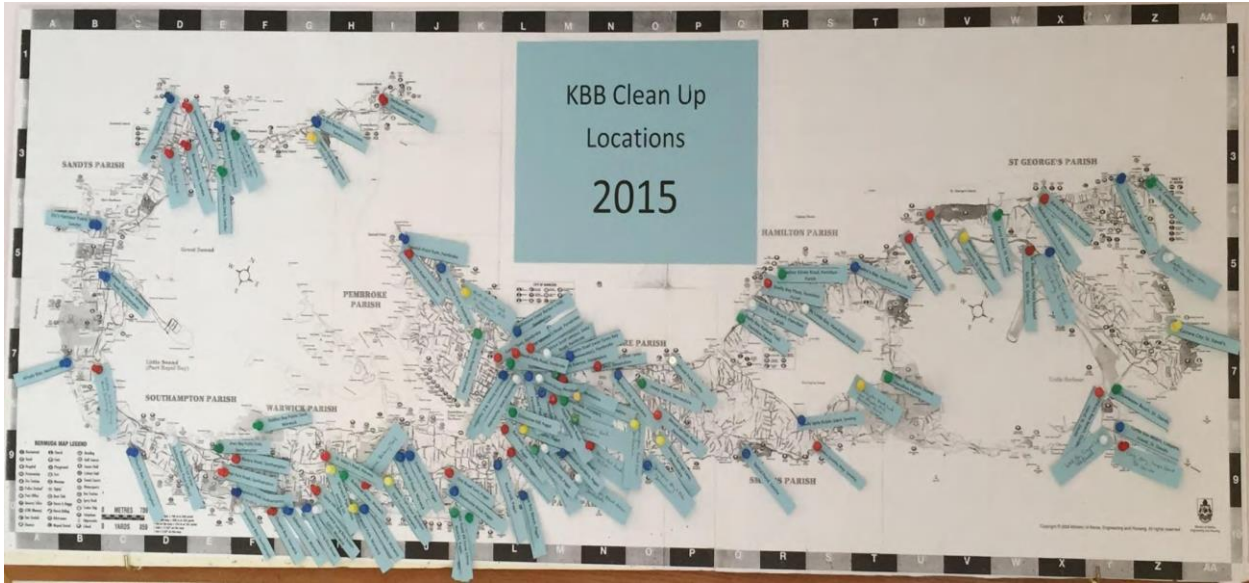
Greenrock's Healthy Harvest and savings for seniors programmes were terminated this year. HH has been rolled into the Eco Schools programme.

Advocacy on **waste issues** continues, with Greenrock leading on banning or reducing single-use **plastic bags**, and BEST leading on banning beauty products with plastic micro beads. [E10.7 enviro damaging products, F2.1 plastic bags].

KBB worked with 4 **international expeditions** that visited Bermuda in 2015 to study **plastic ocean pollution**. Including a visit by Race for Water who are visiting 22 locations in 5 oceans, Plastic Change expedition from Denmark, Plastic Tides stand up paddle board expedition from the US, and the 4th visit to Bermuda of the 5 Gyres team. [A3.4 collaboration, E1.5 beach clean-up].

The **Green Cooperative** is a group of NGOs, government departments and other organisations that together work to make public events 'leave no trace' events. Participating events include Chewstick's Beachfest, the world rugby classic and the End-to-End walk and cycle. [E10, D9, A3.4 collaboration].

Keep Bermuda Beautiful (KBB) schedules a **monthly clean up** in a needy location, and twice a year holds island-wide clean-ups; in the spring for roadsides and in the fall for the coastline. [E1.5]



KBB's clean up map for 2015 (Photo from Anne Hyde).