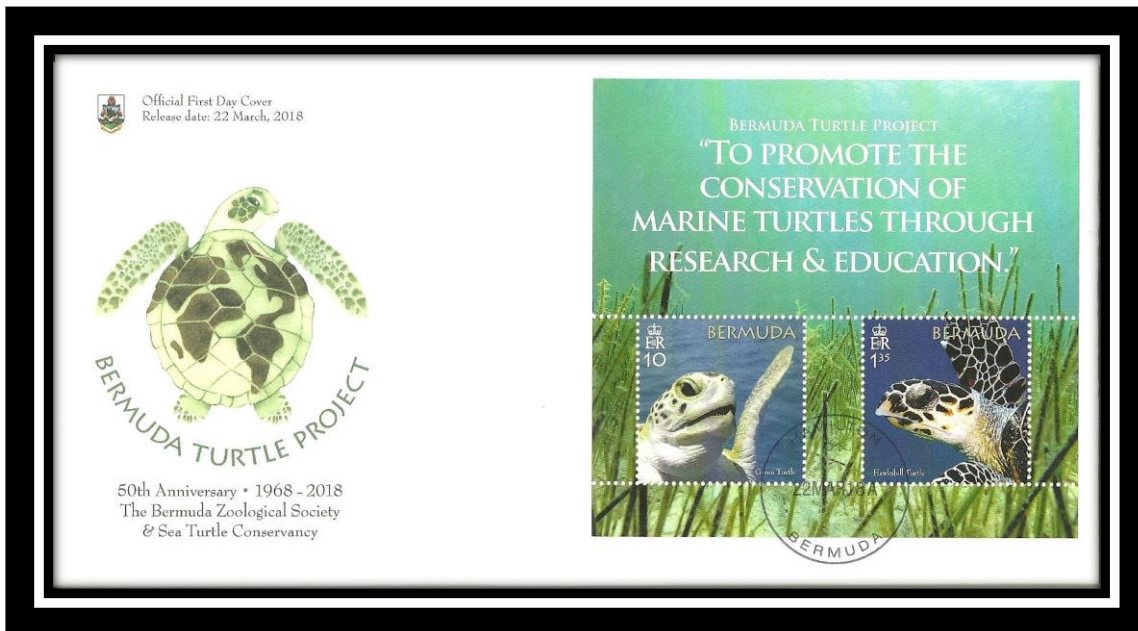


BERMUDA TURTLE PROJECT

Annual Report for 2018 (the 50th year)

Anne Meylan, Peter Meylan and Jennifer Gray

The Bermuda Turtle Project (BTP) continued in 2018, committed to the goal of promoting the conservation of marine turtles through research and education. BTP is a joint project of the Bermuda Zoological Society (BZS) and the Sea Turtle Conservancy (STC). Project activities during 2018 included field and laboratory research, training of international and local students, and public education via presentations, the media, and the Bermuda Turtle Project webpage. During 2018, we celebrated the 50th anniversary of the project which led to some special events, including a special issue of stamps by the Bermuda Postal Service commemorating the success of the project.



Sampling of the Bermuda sea turtle aggregations was carried out for 10 days during August 2018 by Jennifer Gray (BTP Bermuda Director), Drs. Peter and Anne Meylan (BTP Principal Investigators), Dr. Gaelle Roth (Veterinary Affiliate, Bermuda Aquarium, Museum and Zoo - BAMZ), Patrick Talbot (Curator, BAMZ), Barbara Outerbridge (Registrar, BAMZ), Dr. Dan Evans (STC), students in the annual Sea Turtle Biology and Conservation course, and numerous other volunteers. Camilla Stringer (BZS) assisted with course administration. The BZS research vessel, *RV Endurance*, served as the main vessel for the sampling session and was captained by Nigel Pollard, with Emily Andrew as first mate. The catch boat, *Chevron*, was captained by Jennifer Gray, with Jorge Sanchez, Cameron Bridgewater or Patrick Talbot as first mate. A second catch boat, *Vee Be Gone*, captained by Robert Chandler, was used for sites where large numbers of turtles had been captured in previous years. Ron & Chris Porter also assisted with *Summer Squall* on two sampling days.

Sampling with the 1406 ft. entrapment net was conducted 13—24 August 2018. A total of 258 green turtle (*Chelonia mydas*) captures was made with the net at 17 sites around the island; two additional green turtles and one hawksbill (*Eretmochelys imbricata*) were captured by hand. The net-captured green turtles ranged in size from 25.3 to 65.7 cm straight carapace length (SCL) (see sampling log below).

Sampling Log for Bermuda Turtle Project 2018

Date	Sample No.	Location	Set No.	Latitude	Longitude	Bottom Temp (° C)	# of Turtles	Depth (ft.)
08/13/2018	725	Baileys Bay	1	32.35043	64.72413	28	14	6.5
08/13/2018	726	Baileys Bay	2	32.34922	64.72595	28.5	22	3.5
08/14/2018	727	Tudor Hill	1	32.27258	64.88251	28	2	16.1
08/14/2018	728	Wreck Hill	2	32.27861	64.88597	29	20	7.2
08/15/2018	729	Grotto Bay	1	32.35464	64.70927	28	1	6.2
08/15/2018	730	Walsingham Bay	2	32.34424	64.70718	29	2	7
08/16/2018	731	Somerset Long Bay	1	32.30562	64.87437	29	1	11.3
08/16/2018	732	King Charles Hole	2	32.29812	64.87665	29	46	8.9
08/17/2018	733	Dockyard Camber	1	32.31934	64.84053	28.5	21	9.9
08/20/2018	734	Methelin Bay	1	32.30312	64.87956	29	33	4.4
08/20/2018	735	Vixen	2	32.3076	64.88655	29	0	10.6
08/21/2018	736	Fort St. Catherine	1	32.38601	64.66943	29	0	10.8
08/21/2018	737	Blue Hole	2	32.34859	64.70808	28.5	1	5.4
08/22/2018	738	Annie's Bay	1	32.35582	64.65888	28	21	4.2
08/22/2018	739	Long Bay	2	32.35076	64.65455	28	2	11.2
08/23/2018	740	Somerset Long Bay	1	32.3042	64.87355	30	69	6.6
08/23/2018	741	Cowground Flats	2	32.31587	64.86731	30	0	155
08/24/2018	742	Outside Daniel's Head	1	32.32552	64.91975	27	0	12.3
08/24/2018	743	Grey's Bridge	2	32.31194	64.84888	28	3	8.1

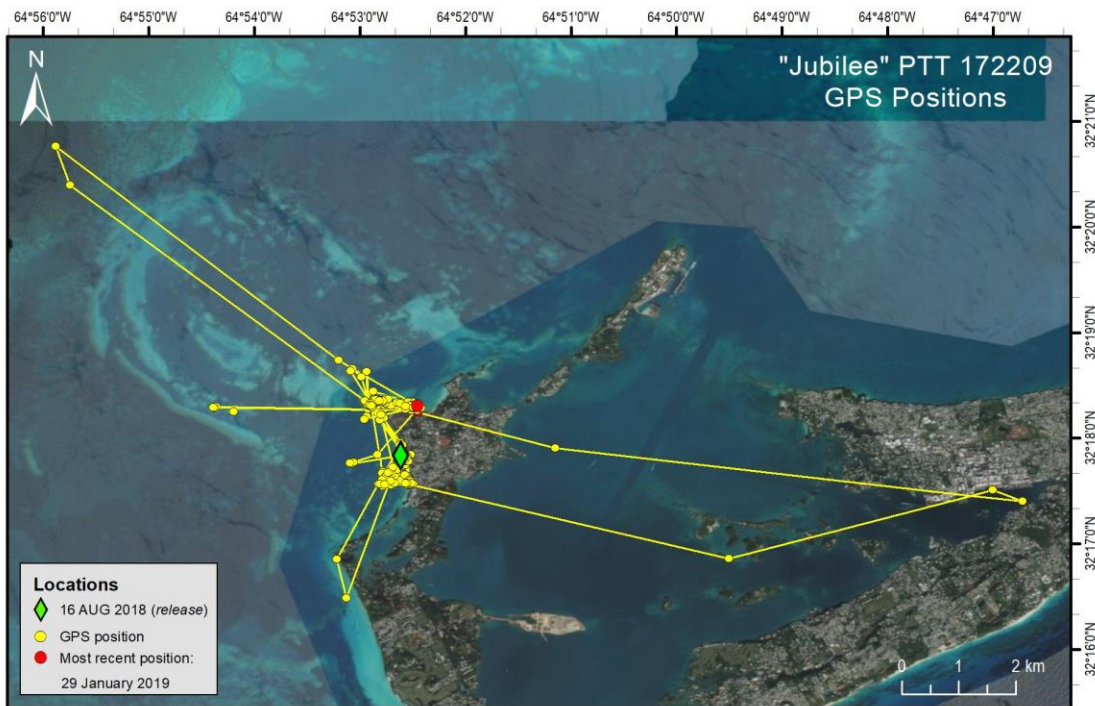
Total # of Captures for 2018 (thru Sample 743) 258

Total # of Captures since 1992 4903

All turtles captured in the entrapment net in 2018 were judged to be immature based on previously established shell and tail size criteria. They were tagged, biometric data were collected, and then, the turtles were released at or near their capture site. Blood samples or skin biopsies were obtained from a sample of the animals for genetic analysis to study nesting beach origins of Bermuda green turtles, and for hormone analyses to establish gender and sex ratio.

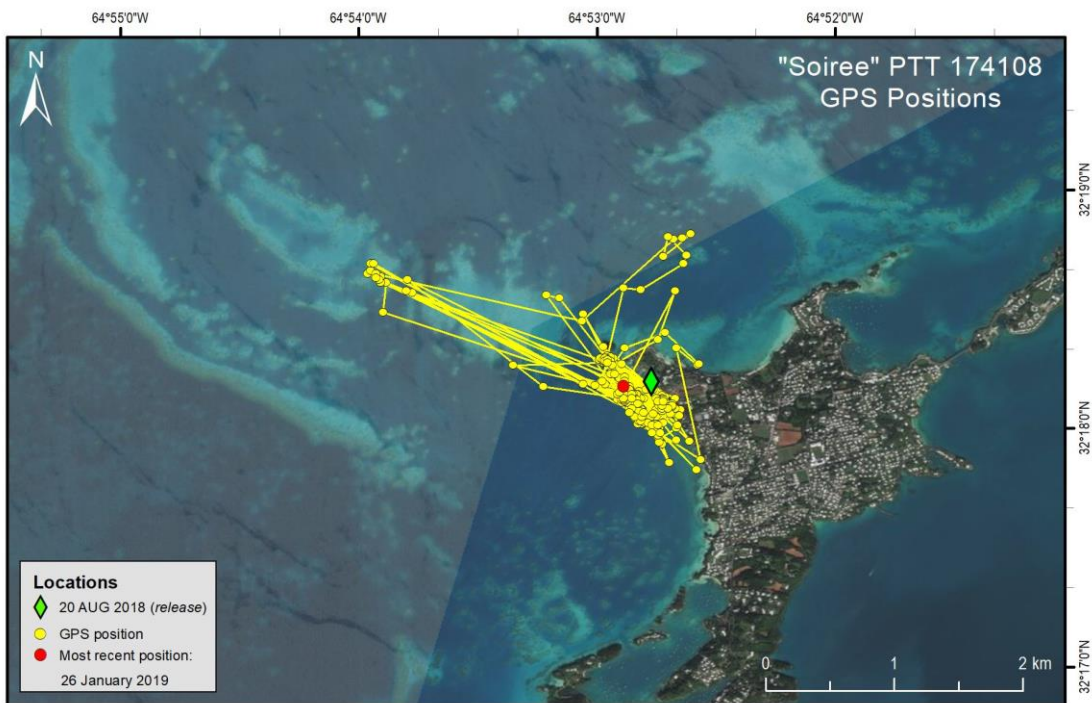
Of the 258 green turtle net captures, 95 (37%) were recaptures of animals tagged in previous years. This compares with 34% in 2017 and 33% in 2016. The recapture rate is greatly affected by the extent to which the exact same sites are sampled as in previous years. Most recaptures occurred on the same grass bed on which the animals were first tagged. No turtles captured in 2018 exhibited signs of the disease fibropapillomatosis.

Two satellite transmitters were deployed during 2018. The first was deployed on a green turtle captured with the net at King Charles Hole on 16 August 2018. The transmitter (M4263/PTT 172209) was attached to a 65.7 cm SCL turtle, nicknamed "Jubilee," that was originally captured at the Vixen in 2004 and seen there again in 2006. Since satellite attachment in August, this individual has spent the time in the original capture area and at nearby Somerset Long Bay. This transmitter continues to function normally and is providing positional information as of 29 January 2019.



Track of Jubilee, PTT 172209, through 29 January 2019.

A second transmitter (PTT 174108/M6835) was deployed at Methelin Bay on 20 August 2018 on a 59.2 cm SCL green turtle nicknamed "Soiree." This turtle was originally captured at Somerset Long Bay in 2013. Most recorded positions were in the vicinity of Methelin Bay with occasional forays offshore. This transmitter is still transmitting data as of 26 January 2019.



Track of Soiree, PTT 174108, through 26 January 2019.

During 2018, genetics classes at Eckerd College obtained DNA sequence data for 95 different green turtles. We were able to identify 14 different haplotypes among these samples. Most of the samples were taken since 2014 and are important in a new analysis that shows that the sources for green turtles in the Bermuda foraging aggregation have changed significantly over time. One important advance was that students are now working with both tissue and blood samples. Previously, the faculty wanted them to work only with blood samples. The capacity to use tissue samples allowed us to assign haplotypes to seven turtles that were tracked by satellite transmitters during recent years and 12 stranded turtles for which a humerus was collected for an aging study.

Jeff Schwenter, South Carolina Department of Natural Resources, continued laboratory analyses of hormones of Bermuda turtles for determination of gender. Results were received for samples from 2013 and 2014; analyses of samples for 2015 and 2016 are still in progress. Analyses of sex ratios of the Bermuda green turtle foraging aggregation over time continued with help from Dr. Brett Tornwall, statistician with the Florida Fish and Wildlife Conservation Commission.



Course students pipetting blood samples for hormone analysis on *RV Endurance*, 2018.

Two international tag returns of green turtles originally tagged in Bermuda were received during 2018. One turtle was captured by a fisherman from Awastara, Nicaragua. She had been tagged 24 yrs. prior in Bermuda at Rockfish Shoals and had been seen once again at Rockfish in August of 1993; she was observed a third time at Outside Daniel's Head in 1996. She was presumably killed in Nicaragua. A Bermuda-tagged turtle was also captured in a net in Haiti during 2018. She had been tagged in 2009 near Dockyards, Bermuda. Tag returns provide important information about the destinations and fates of

turtles after they leave Bermuda waters. Coordination of tag returns and payment of rewards were provided by the Archie Carr Center for Sea Turtle Research and the Sea Turtle Conservancy, respectively. The Nicaraguan tag recoveries were received via researchers Dr. Cynthia Lagueux and Dr. Cathi Campbell.

The Bermuda Turtle Project offered its International Course on the Biology and Conservation of Sea Turtles for the 22nd time from 12-24 August 2018. The course is offered by the Bermuda Zoological Society and the Sea Turtle Conservancy and is provided free-of-charge thanks to donor support. The two-week course consists of lectures, class discussions of assigned readings, a necropsy session, and ten days of field work aboard the *RV Endurance*. The students learned to capture immature green turtles using the entrapment net and searched for hawksbills on the reefs. They also gained extensive practical experience in collecting data from the turtles once they were captured and brought on board the research vessel. The course was taught by Drs. Peter and Anne Meylan, Jennifer Gray, Dr. Gaelle Roth and Dr. Dan Evans. This year's course participants were drawn from Belize, Bermuda, Brazil, Colombia, Jamaica, and the United States. The students came from a number of backgrounds, including universities and natural resource agencies in the Caribbean region and beyond.



Course teachers and participants on *RV Endurance*, 2018.

Students conducted necropsies of 10 dead turtles that had been collected by the Bermuda Sea Turtle Stranding and Salvage Network (BAMZ), including one turtle rescued by the course members after it had been struck by a boat. This turtle did not survive but provided a good teaching opportunity for the students. Veterinarian, Dr. Gaelle Roth, performed a detailed necropsy at the beginning of the session, and then helped the student teams as they conducted necropsies themselves. In addition to providing an opportunity to learn basic anatomy of sea turtles, the necropsy session enables participants to learn first-hand about some of the mortality factors for sea turtles, such as entanglement in monofilament line, ingestion of hooks used in various fisheries, disease, and boat collisions. Samples collected during the

course necropsy session and during other necropsies by BAMZ are being used by collaborators for multiple purposes, including genetic identification, diet and feeding biology, and age-at-recruitment.

Over the twenty-two years during which the Sea Turtle Biology and Conservation course has been offered, it has served 206 students from around the world. Participants have been drawn from Anguilla, Antigua, Argentina, Aruba, Belgium, Belize, Bermuda, Bonaire, Brazil, the British Virgin Islands, Canada, the Cayman Islands, Colombia, Costa Rica, Cuba, El Salvador, France, Grenada, Guatemala, India, Italy, Jamaica, Mexico, Mozambique, the Netherlands, Nicaragua, Panama, Peru, Portugal, St. Kitts/Nevis, Saint Lucia, Saint Maarten, Saint Vincent, Spain, Trinidad and Tobago, Turkey, the Turks and Caicos Islands, the United Kingdom, the United States, Uruguay, and Venezuela.

During 2018, BAMZ registrar, Barbara Outerbridge, and Drs. Peter and Anne Meylan worked with Armando Santos (Fundação Pró-TAMAR) and others on a manuscript describing long-distance migrations and growth rates of hawksbills originally tagged in Brazil. One of the recaptures was made in Bermuda. The manuscript has recently been accepted for publication by *Chelonian Conservation and Biology*.

A total of 1,243 volunteer hours were donated to the Bermuda Turtle Project by 17 volunteers in 2018. The volunteers included local and international students, BZS-BAMZ volunteers, and other members of the community. We are especially grateful for the many hours contributed by Debbie Boyer producing outreach materials.

In honor of the 50th year celebration of BTP, a series of public lectures were presented in Bermuda by BTP associates: David Godfrey gave a lecture in March about the history of BTP. Dr. Ian Walker presented a lecture about BAMZ's sea turtle rehabilitation program in July. Dan Evans gave a seminar about leatherback turtle migration in August. Peter Meylan gave a talk about scientific discoveries of BTP in October. In combination, these presentations helped us meet the environmental education goals of the project.

The 50th anniversary culminated in a very well attended Gala Event on 2 November 2018 at O'Hara House in Hamilton. More than 200 participants helped to celebrate the success of the Bermuda Turtle Project over the course of its first 50 years and in doing so, contributed to the establishment of an endowment to support the project. Highlights of the event included live and silent auctions, live music, great food, and the presentation of the Archie Carr Lifetime Achievement Award to Anne and Peter Meylan. The presentation was made by David Godfrey of STC.



David Godfrey making presentation at BTP gala on 2 Nov. 2018; Archie Carr Award.

In 2018, Jennifer Gray gave project presentations for the BZS Natural History Course, the Bermuda High School, Saltus Grammar School, the Rotary Club of Bermuda, and the Lifelong Learning Centre. Jennifer also presented at the WIDECAST meeting held in Tobago in March 2018 and participated with Dr. Ian Walker on a series of local radio talk shows highlighting BTP.

Early in 2017, BTP worked closely with local partners to establish and promote a *Sea Turtle Hotline* for public responses to sightings of, or encounters with, sick or injured sea turtles. The hotline continued to function successfully throughout 2018.

Information about the Bermuda Turtle Project is available at <http://www.conserveturtles.org/bermuda/> which is maintained by the Sea Turtle Conservancy. During 2018, this site received 2,664 unique visitors who accounted for 5,572 page views. In addition, there were 22,935 page visits of Bermuda satellite-tracked turtles from 2014-2018. BTP continues to increase its social media presence through Facebook at <https://www.facebook.com/Bermudaseaturtles/>.

The outcomes of the Bermuda Turtle Project in 2018 were made possible by generous support from the Atlantic Conservation Partnership, the Bermuda Zoological Society, the Helen Clay Frick Foundation, Eckerd College, Florida Fish and Wildlife Conservation Commission, and the Sea Turtle Conservancy.