Summary of 2018 Horseshoe Crab Survey

Paul Bushmann, Eric Fons, Paulette Levantine and Chelcey Nordstrom
Anne Arundel Community College, Arnold, MD 21012

The goals for the 2018 horseshoe crab survey season were 1) to continue the yearly surveys of Cove Point, 2) to involve volunteers in surveys of other beaches and Cove Point in daytime, 3) to examine genetic diversity between spawning beaches, and 4) to use beach profiles to better construct a three-dimensional model of Cove Point beach.

Cove Point Surveys

1. May 13-16, 2018

This was the earliest possible tide cycle in which crabs might be spawning. It was a new moon cycle. We visited the beach during the nighttime high tides but observed no spawning activity or crabs on any night.

2. May 27-30, 2018

This was a full moon cycle. It marked the beginning of the spawning season, as we found spawning pairs on the beach for the first time. This cycle had the largest number of spawning females on the beach.

May 27 – 12 females and 13 males were observed.
May 28 – 38 females and 35 males were observed.
May 29 – 54 females and 75 males were observed.
May 30 – 29 females and 50 males were observed.
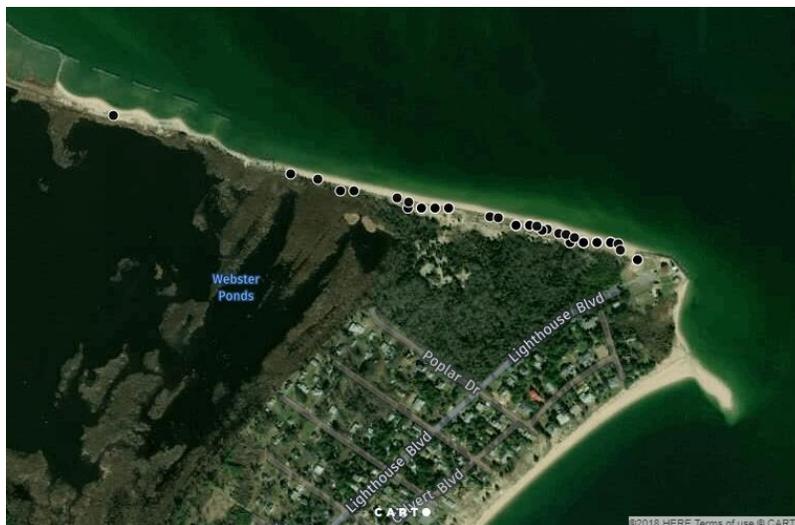
A map of spawning female location along Cove Point beach on May 29.

3. June 12-15, 2018

This was a new moon cycle.

June 12 – nine females and 11 males were observed.
June 13 – 14 females and 20 males were observed.
June 14 – Storms and high winds prevented a survey.
June 15 – Still stormy, no females or males were observed.
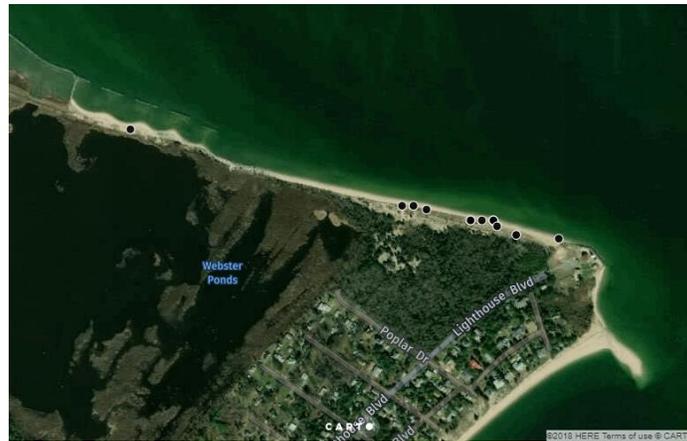
A map of spawning female location along Cove Point beach on June 13.

4. June 25-28, 2018

This was a full moon cycle. The spawning season appeared to be nearing its end, as fewer crabs were observed during this period.

June 25 – 13 females and 32 males were observed.
June 26 – three females and three males were observed.
June 27 – one male and one female were observed.
June 28 – seven females and nine males were observed.
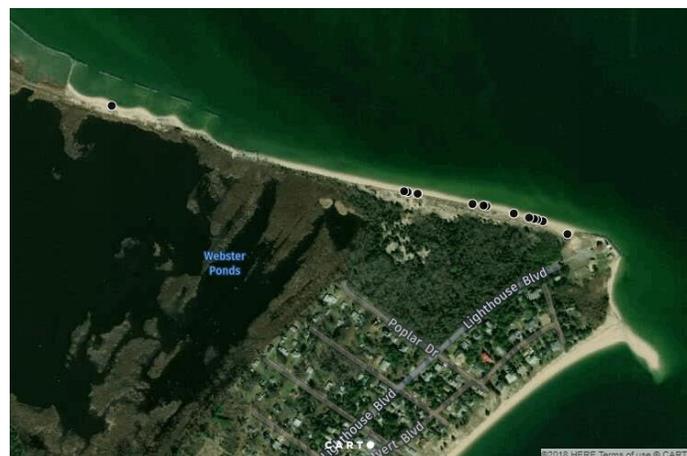
A map of spawning female location along Cove Point beach on June 25.

Male and female abundances for each survey night are shown in the figure below. Spawning peaked during high tide nights at the end of June.
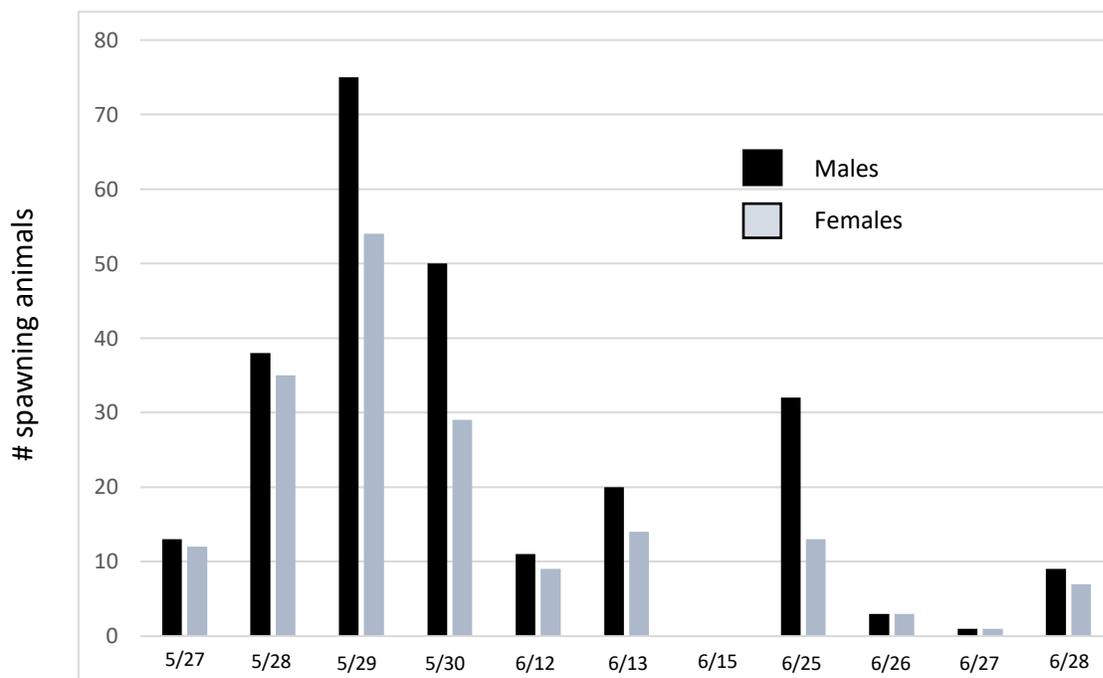
Surveys of Other Beaches

This year several volunteer groups joined our efforts to survey other beaches in Anne Arundel, Calvert and St. Mary's counties. Volunteers also performed several surveys of Cove Point during daytime high tides. The table below summarizes this volunteer work.

AA County	Surveyor	Date Surveyed	Day or Night	Spawning Crabs Found?
Sandy Point	Alexis Park	June 26	Day	Female and male in shallow, no spawning pairs.
Sandy Point	Kiley Taylor	June 26	Day	No crabs observed
Bay Ridge Beach	Paulette Levantine	June 24	Night	Yes
Mayo Beach	Emily Parkhurst	June	Day	Yes, few
Beverly Triton Beach	Emily Parkhurst	June	Day	Yes, more
Calvert County				
Scientists Cliffs	Helen Cummings	June 26-27	Day	Yes

Flag Ponds	Lucy Tonacci	May 29	Day	Yes
Cove Point	AACC	May-June	Night	Yes
Cove Point	Dottie Yunger		Day	No
Daytime	Matt Overton	May 26	Day	No
St. Mary's County				
Point Lookout	Debra Bartlett	May, June	Day	No

Genetic Diversity Between Beach Populations

The Chesapeake Bay horseshoe crab population is genetically distinct from other Atlantic coastal populations (Pierce *et al*. 2000. *Estuaries* 23(5): 690-698). Our earlier tagging work at Cove Point and Flag Ponds suggests that there is very little movement between beaches between spawning tides or from one year to the next. If true, it is possible that there are genetically distinct subpopulations within the Chesapeake Bay. This has important management implications. To test this, we collected hemolymph from 10 female and 10 male individuals at three spawning beaches: Cove Point, Flag Ponds, and Bay Ridge. All are on the western shore, with Flag Ponds about 10 miles north and Bay Ridge about 50 miles north of Cove Point. These hemolymph samples are currently frozen at -80C. DNA will be extracted and used to examine diversity within and between sample groups following established protocols.

Beach Profiles

We have conducted physical profiles of Cove Point beach periodically over the last six years. These profiles produce a 2-dimensional picture of elevation and slope at selected points from the lighthouse to the northern beach terminus. While useful in themselves, these profiles would convey more information if they could be assembled into a 3-dimensional structure illustrating the shape of the beach. Toward that end, Dr. Fons has been collaborating with colleagues at All Points GIS, a company in Denver, Colorado. We hope to use profile data from previous years as well as new profile data from 2018 in this project. When complete, we will have a more accurate measurement of Cove Point beach and a way to detect changes to the beach in subsequent years.