

# Inland Bays Horseshoe Crab Tagging Protocol



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## Safety First!

Horseshoe crab surveys take place at night, on dark beaches. Thus, volunteers may encounter a variety of hard to see hazards, which could lead to falls, cuts, or other injuries.

To keep everyone as safe as possible, it is essential that all volunteers be familiar with and observe the following practices during the surveys. Team leaders will be responsible for enforcing safety rules. Volunteers who do not, or cannot, follow these rules will not be permitted to participate.

- All volunteers must sign a liability waiver form, including parents or guardians who accompany minors. Minors must be supervised by an adult at all times.
- If thunderstorms are in progress, **do NOT** go onto the beach.
- Bring a headlamp or flashlight. Headlamps are preferred because they free up both hands. [High lumen headlamps are best!]
- Wear appropriate clothing for weather and wet conditions at the water's edge. Closed-toe shoes with soles are REQUIRED. No bare feet, flip-flops, or neoprene booties will be allowed. We recommend rubber boots, waterproof shoes (with soles) or old sneakers.
- Work gloves are useful if there are high densities of horseshoe crabs on the beach. You may have to feel into the sand beneath crabs or lift animals up to count those underneath.
- Keep an eye out for tripping hazards or debris that may cause injuries to you or your teammates.
- Bay water contains bacteria that may, in rare cases, lead to serious infections of cuts or puncture wounds. If you have any open cut or wound, we recommend that you not participate until it is healed.
- Inform your team leader immediately if you sustain any type of injury, even if it seems minor. All teams will have a first aid kit. Consult a medical provider if you have any concerns, particularly if you sustain a cut or puncture wound that could become infected. Team leaders should complete an incident report form.
- Use sunscreen during the day and insect repellent when needed.
- Do not take risks or do anything that makes you uncomfortable. Safety is always the most important consideration.

## Tagging Protocol

### Horseshoe Crab (HSC) Tagging Teams & Members Rotation

The tagging team requires at least four individuals, each performing a different tagging role (*see below*) at each site. Please, contact your team leader to secure and confirm your tagging date(s).

1. Grabber(s)- person to hand capture HSCs to be tagged.
2. Measurer- person to measure the prosomal width in millimeters.
3. Driller- person who will drill the prosomal hole.
4. Tagger- person who will insert tag.
5. Recorder- person who provides tagger with sequential tag and records prosomal width, age of the HSC, and unusual characteristics of the tagged crab.

### Tagging Procedure

Tags will be attached to the left-wing, the left posterior (rear) point of the prosoma, (*see Figure 1.*) There is a high concentration of fibrous material within the body in this area, which minimizes bleeding. Before drilling the attachment hole, clean off any epibionts (barnacles, slipper shells, algae, etc.) near the attachment site.

The tag is attached by drilling a 5/32" hole through the left side of the prosoma near the dorsal edge and then pushing the plastic pin (with tag) into the hole as far as it will go. It should NOT go all the way through the prosoma and come out the other side. The cork "stop" will allow the drill to only penetrate the first layer of the wing. A small amount of bleeding may be noticed and occasionally eggs will exude from the drilled hole. Attach only one tag per horseshoe crab. If the HSC is damaged or has heavy epibionts attached near the tagging site, attach the tag to the opposite side (*remember to record this change in the data sheet*), or do not tag the animal.

On the data, sheets record the name of the tagger, and organization affiliation. Other data that needs to be collected for each HSC includes the tag number, sex, age, prosomal width (PW) in millimeters (measured at the widest point of the HSC), the date tagged, beach name, waterbody name, and state. Preprinted Tagging Record Sheets with tag numbers are included in your tagging materials. Record descriptive information on a crab such as damage to prosoma, lost appendages, or excessive epibiont growths on the carapace of the HSC.

### Age Determination for HSCs

Horseshoe crabs live approximately 21 years and molt yearly until reaching sexual maturity at approximately age 9-10. It then undergoes its final molt and sexual dimorphism is marked allowing gender determination. Age classification for our study will be Young Adult (Y), Mature Adult (M), and Old Adult (O) (*see Figure 2*). A young adult will have recently undergone its final molt, developed its sexual dimorphism, have a smooth "waxy" appearance with little or no epibionts attached. As the HSC ages, it will lose its waxy texture, darken from deep olive green/brown to almost black in color as the upper layer is worn away. Mature Adults will start to have areas eroding where bacteria and fungi have softened the chitinous material of the prosoma, There may be significant epibionts attached. The Old Adult will be very dark in color, have soft areas on the prosoma, and may actually have holes in the prosoma.

### Tag Returns and Rewards

Tag return information will be taken by the USFWS-Maryland Fishery Resources Office via the website printed on the tag. For anyone who returns tagged crab

information, a certificate of release, a letter about the program, and a pewter horseshoe crab pin (one per household), and fact sheets of shorebirds and horseshoe crabs will be sent out from the USFWS. If you encounter previously tagged HSCs in your tagging study, record the tag number and sex of the HSC in the margin of your tagging record sheet so that the tag may be included in the Resight Report that CIB will submit once the tagging program is completed.

## Submission of Data Sheets

Completed tagging data sheets should be returned to Nivette Pérez-Pérez with a copy to Dr. Dennis Bartow at the Center for the Inland Bays. Please make a copy of your data sheets for your records as a backup record. The information from your data sheets will be transferred to the USFWS reporting form and electronically sent to the Regional Office in Annapolis, MD.

### HORSESHOE CRAB TAG PLACEMENT

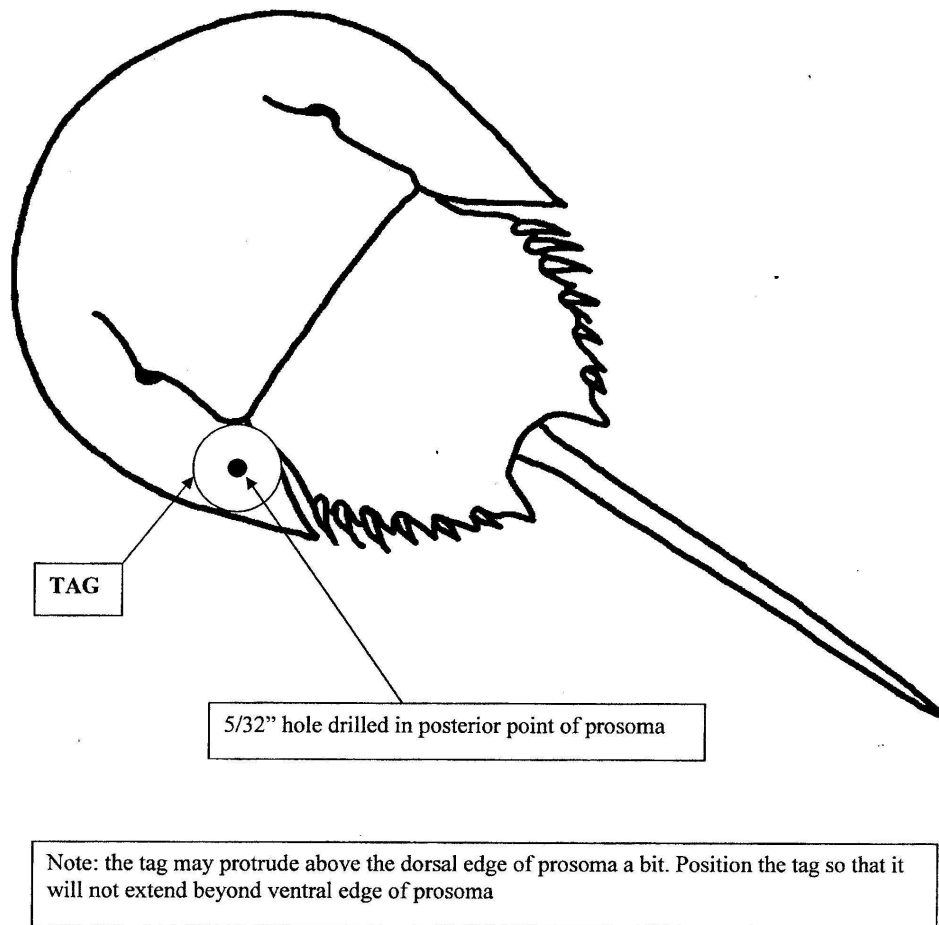


Figure 1. Horseshoe crab tag placement. Attached to the left wing, the left posterior (rear) point of the prosoma.



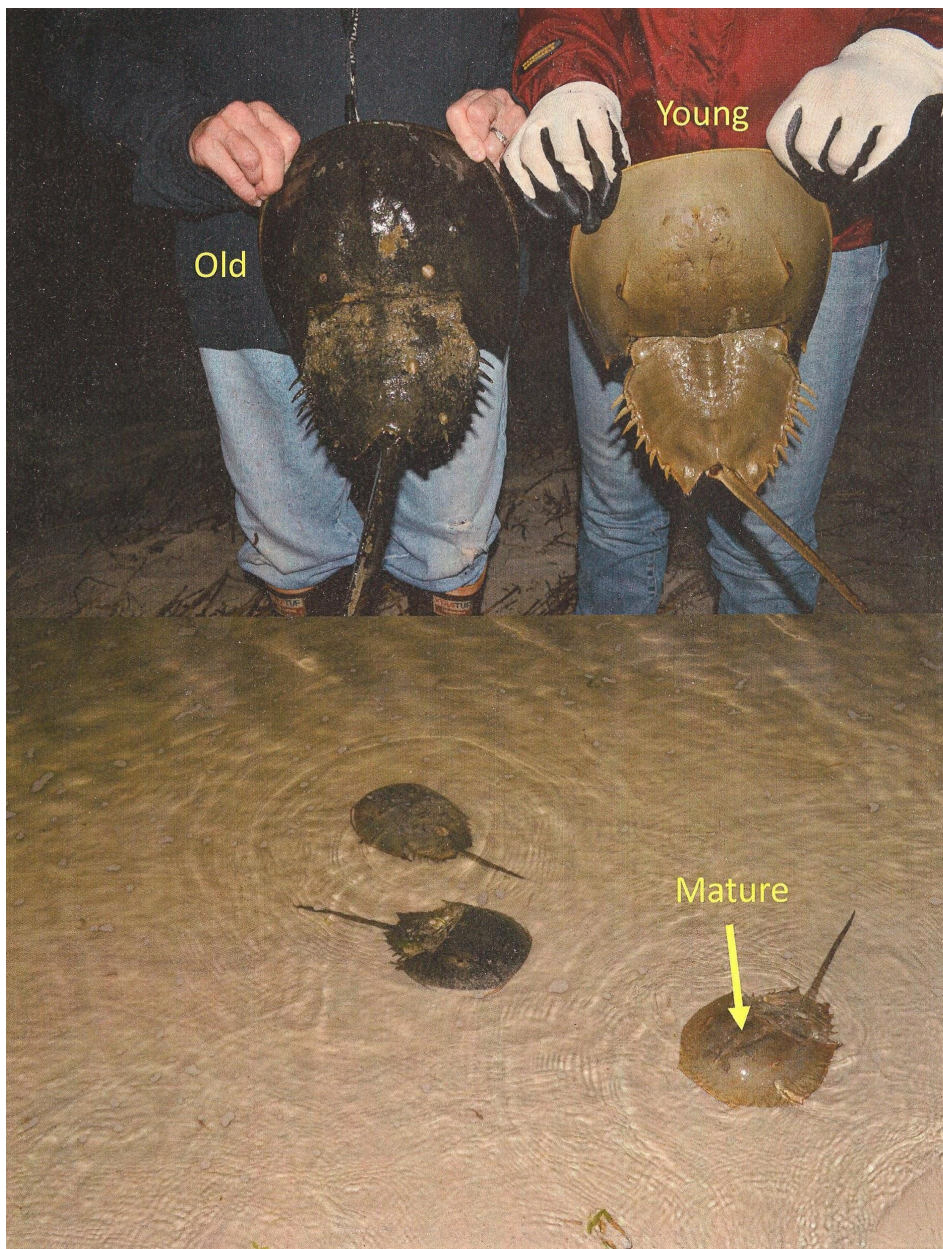


Figure 2. Age Classes of Horseshoe Crabs. The mature HSC will show areas of darkening on the prosoma due to wearing during spawning and through epibiont activity. Photo by CIB- Eric Buehl

## Horseshoe Crab Survey Contacts

### Coordinators

- Nivette Pérez-Pérez (CIB), Manager of Community Science  
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- Dennis Bartow (CIB), Survey Coordinator  
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## Site Team Leaders

Site	Team Leader (s)	Phone Number	Email
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Bay Colony	Christine Warwick	302-562-1058	cwarwick@cecil.edu
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Ellis Point	Karen Ritgert	410-967-4592	kritgert@hotmail.com
Camp Arrowhead	Gary Nennstiehl Kristin Peters	410-251-0477	garynenn@gmail.com adultsknowbetter@gmail.com

## Equipment & Supplies

- Five-gallon buckets or troughs
- Cordless drill
- 5/32" drill bits
- Tags with attachment pins
- Data Sheets for assigned tags
- Metric rule for measuring prosoma width
- Clipboard & pencils
- Work gloves for those handling the HSCs
- First Aid Kit
- Camera

## Personal Things to Bring

- Headlamps/ flashlights
- Insect repellent
- Closed-toe shoes w/ soles (no bare feet or flip flops)!
- Mobile phone with Team members and emergency numbers.
- Camera in Ziploc bag for storage
- Gloves
- Face mask (optional)