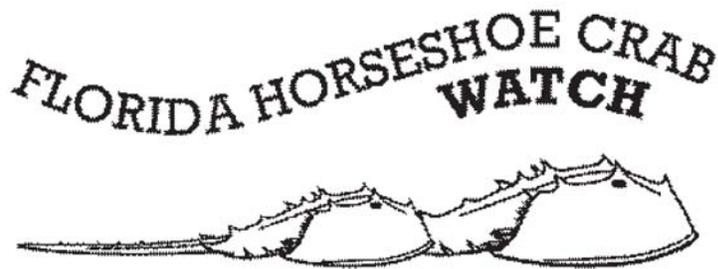




Volunteer Coordinator(s) sought for Horseshoe Crab Monitoring in Manatee, Sarasota, Charlotte, Lee, and Collier County.

In 2015, FWRI and the University of Florida launched a citizen science initiative which trained volunteers to assist biologists in surveying, tagging, and re-sighting Florida's nesting horseshoe crab populations using a standardized scientific protocol. The program has been so successful that FWC is expanding its efforts to a statewide level.



Linked with Limulus

Volunteer Coordinator(s) responsibilities:
(training and assistance will be provided)

- Using tide charts and moon phases, create a schedule to monitor for horseshoe crabs spawning events
- Prepare datasheets and sampling kits
- Recruit and manage volunteer citizen scientists
- Lead survey walks, oversee tagging, and educate others about the program
- Enter data in a timely fashion

Contact outreach@chnep.org and Berlynn Heres at Berlynn.Heres@myfwc.com for more information on this position.

FLORIDA HORSESHOE CRAB WATCH



Linked with Limulus

Site Coordinator Manual



Authored & Compiled by:

Tiffany H. Black, Florida Fish and Wildlife Conservation
Commission, Fish and Wildlife Research Institute

Dr. Savanna C. Barry, University of Florida, UF IFAS
Nature Coast Biological Station and Florida Sea Grant



FLORIDA HORSESHOE CRAB WATCH



Linked with Limulus

Table of Contents

Contents

1	COORDINATING A FLORIDA BREEDING SURVEY.....	2
1.1.1	CHOOSING SITES	2
1.1.2	CREATING SCHEDULES	2
1.1.3	COORDINATING VOLUNTEERS AND SAMPLING SCHEDULES.....	4
1.1.4	PREPARING KITS FOR EACH SAMPLING SITE.....	4
1.1.5	SURVEY SUPPLIES (one for each survey site).....	4
2	GEAR MAINTENANCE AND REPLACEMENT	5
2.1.1	KIT CONTENTS	5
2.1.2	SOURCE LIST AND COST OF KIT CONTENTS.....	5
3	SHAREPOINT: DATA ENTRY AND DOCUMENT ACCESS	6
3.1.1	LOGIN AND PASSWORD.....	6
3.1.2	DOCUMENTS	6
3.1.3	DATABASES	6
3.1.4	MAIL AND FILE DATA SHEETS	7
4	VOLUNTEER RETENTION	7
4.1.1	COMMUNICATION IS KEY.....	7
4.1.2	VOLUNTEER APPRECIATION.....	7
5	APPENDIX	8

HORSESHOE CRAB CITIZEN SCIENCE PROGRAM BACKGROUND AND OVERVIEW

The Citizen Science Horseshoe Crab spawning surveys and tagging study asks the following questions:

- Do horseshoe crabs come back to the same beach every year to mate? How far do individuals in this population move?
- What are the spawning population trends; are horseshoe crab numbers increasing, decreasing or stable within Florida populations?
- What is the sex ratio of adult males to females?
- What are the average sizes of males and females?
- What are the average ages of crabs nesting on Florida's beaches?
- Are newly molted individuals being recruited into the population?
- Does the mating status of females and males change over time? What are the environmental conditions that stimulate breeding? Does recruitment differ among sites?



Video Link: <https://youtu.be/pV0Nf-Mq69A>

NOTE: The data are most useful when they are compiled consistently over many years, so please plan to remain engaged year after year.

1 COORDINATING A FLORIDA BREEDING SURVEY

1.1.1 CHOOSING SITES

The protocol is based on Delaware Bay surveys, which have been conducted since 2002. As of 2015, several locations along the Gulf coast (Big Bend) and one on the east coast (New Smyrna Beach) have been established. These locations were chosen based on historical data and anecdotal reports that indicated horseshoe crabs consistently nested in these areas. Sites are set up as a permanent transect so that the same exact section of beach is consistently sampled each season and year. For each new site you set up, you will assign a name, specify exactly where the surveys will begin and end (by taking photos and GPS coordinates), and measure the length in meters.

You will create a guidance document for each site for volunteers to know exactly where to begin and end the survey. The guidance document should include an aerial photo and a ground photo of the start and end points, as well as GPS points, information about landmarks, and driving directions to the site. (See Appendix for example guidance document).

1.1.2 CREATING SCHEDULES

Horseshoe crabs breed year-round in some areas of the state. However, there are times when peak spawning activity occurs, generally in spring and fall. Surveys should take place during March and April for spring and September and October for fall (3 or 4 sampling rounds each season). A sampling round takes place across three consecutive days during the new and full moons. This is a period of time when high tides are extra high and spawning typically peaks. You should plan to survey during the three highest DAYTIME high tides (based on predicted high tide) during that moon phase. You can look up the dates of the full and new moons at <https://www.timeanddate.com/moon/phases/> and then use <http://saltwatertides.com/index.html> to find dates and times of the highest high tides around the new and full moons for your area (see example table below and video tutorial). Examine the predicted tide heights and pick the three consecutive days with the highest predicted daytime

high tides closest to the full or new moon. Choose the dates and times in advance and stick to them except under extraordinary circumstances such as severe thunderstorms.

As a volunteer coordinator, you should create a schedule of dates and times for surveys in your area. Volunteers will always need to record the date and time of surveys on their data sheets. Keep in mind that estimated high tides may be different for different survey locations so you may need to create unique schedules if you coordinate sampling at multiple sites.

TIP: Scheduling can be done well in advance so you can begin recruiting volunteers to fill sampling slots ahead of time.

Tides for Cedar Key starting September 17, 2017 (new moon): In this example, the three consecutive days with the highest predicted tides around the new moon have been selected (yellow highlighting with bold). This table was downloaded from <http://saltwatertides.com/index.html> using the Cedar Key station.

Day	Date	High/Low Tide	Time		Tide Height (feet)	% Moon Visible
Su	17	High	12:53	AM	3.4	13
		Low	6:23	AM	1.4	
		High	12:18	PM	4.1	
		Low	7:16	PM	0.1	
M	18	High	1:30	AM	3.6	6
		Low	7:14	AM	1	
		High	1:12	PM	4.2	
		Low	7:57	PM	0.1	
Tu	19	High	2:02	AM	3.7	2
		Low	7:58	AM	0.7	
		High	1:58	PM	4.3	
		Low	8:34	PM	0.2	
W	20	High	2:32	AM	3.8	0
		Low	8:39	AM	0.5	
		High	2:41	PM	4.2	
		Low	9:07	PM	0.4	
Th	21	High	3:00	AM	3.9	0
		Low	9:17	AM	0.4	
		High	3:21	PM	4.1	
		Low	9:38	PM	0.6	

Even though night-time tides may be higher, we choose the three highest consecutive DAYTIME tides because this is when volunteers are likely to be most available. If you are interested in sampling during the nighttime tides, feel free to do so. If sampling at night, be sure to use RED headlamps as white light blinds the crabs.



Video Link: <https://youtu.be/48S8MReglSE>

1.1.3 COORDINATING VOLUNTEERS AND SAMPLING SCHEDULES

We have provided you with a coordinator's binder for easy organization of paperwork. You will create your own master spreadsheet your volunteer contact information, predicted tide tables around the full and new moons, and a spreadsheet with date, time, and location for volunteers to meet. Plan for your volunteers to meet at the survey location at least 15 minutes before the survey start time (high tide). Make sure there is a point-person responsible for gear pick-up and drop-off, and that everyone in the group has a contact list with phone numbers for the other volunteers. This is helpful in case anyone does not show up or gets lost on the way to the site.

1.1.4 PREPARING KITS FOR EACH SAMPLING SITE

Prepare a separate set of gear and data sheets for each survey site (ex: in Cedar Key, there are 8 sites, requiring 8 sets of gear and 8 data sheet packets). Each sampling kit should be equipped with clipboard with attached pencil and large rubber band (to help with windy conditions) and fresh data sheets. Before each sampling round, check over gear to ensure clipboards are in good condition and have pencils/rubber bands attached. Ensure there are enough fresh data sheets on the clipboards (typically one survey sheet for each day and one tag resighting sheet for each round). Print data sheets using a laser printer on waterproof paper (Rite-in-the-Rain) and use a hole-punch to make three-ring binder holes in the data sheets.

1.1.5 SURVEY SUPPLIES (one for each survey site)

- 1" Ring Binder: Coordinator will create this for each site: It should include: Guidance Document for the site; contact information for volunteers and coordinator, blank data sheets, a copy of your group's federal or state handling permit if applicable, and a survey schedule for future dates and tide times.
- Survey data sheet on Rite-in-the-rain paper (with holes punched)
- Re-sighting data sheet on Rite-in-the-rain paper (with holes punched)
- Clipboard (with rubber band to hold sheets down in the wind)
- Large plastic bag (place clipboard in the bag; protects data from rain)
- Pencil attached to clipboard with string
- Complete tagging kit: tagging data sheet, clip board, rubber band, pencil/pen, male and female awl, male and female tags, ruler, two Pesola® scales (1 kg, 2.5 kg), mat, reusable grocery bag, and case
- small first aid kit
- towel (optional)

2 GEAR MAINTENANCE AND REPLACEMENT

2.1.1 KIT CONTENTS

Based on your application and acceptance into FL Horseshoe Crab Watch, you will be given initial kits for your location(s). You are responsible for maintaining and storing the kits. As gear needs to be replaced due to loss or breakage, you will need to obtain replacement parts. Some of our volunteer groups have budgets that can cover the replacement parts for kits; others may need to request parts. The survey manager at FWC will have welded awl tools for puncturing and tags available. We try to keep some stock of other supplies as well. Contact tiffany.black@myfwc.com directly to request awls, tags and to inquire about obtaining other replacement parts if no funding option exists for your location. NOTE: Pesola® scales are expensive and, if not properly maintained, tend to rust and break easily. After sampling rounds it is a good idea to rinse scales with fresh water and leave open to dry. Spraying a bit of WD-40 on the top screw-adjuster will keep it from rusting and allow the scale to be properly calibrated.

2.1.2 SOURCE LIST AND COST OF KIT CONTENTS

Coordinator's Ring Binder 2" to hold completed survey, tagging and resighting sheets (Office Depot)	\$7.00
Ring binder 1" for guidance document, blank data sheets (Office Depot)	\$4.99
First Aid Kit (Lowe's)	\$19.97
Clipboards: Total/season=2 (Office Depot)	\$7.78
Mechanical pencils: (Office Depot) pack of 12	\$6.49
Large Rubber bands: (Office Depot) pack of 50 @\$6.29	\$6.29
String: Total/season= 1 ball (Office Depot) \$7.29	\$7.29
Plastic pencil and ruler box (13" long): (Office Depot)	\$2.99
Rulers (plastic, metric 30 cm long, mm scale): (Office Depot)	\$2.00
Large plastic bags (keep clipboards dry; 2.5 gal): (Publix) box of 12	\$3.99
Shower mat: (Publix)	\$7.69
Polypropylene Tote Bag 13.5" x 15" for weighing crabs: (Publix or Office Depot)	\$1.99
Pesola 2.5 Kg Pesola scale with hook: (Forestry Suppliers)	\$61.00
Pesola scale 1 Kg Pesola scale with hook: (Forestry Suppliers)	\$61.00
Awl (with soldered washer to limit insertion (CONTACT PGRM MGR)	\$9.10
Buckets 5 gal size (6/site): Total/season=6 (Lowe's) \$3.00 each	\$18.00
Hand towels: (Lowe's) bag of 24 @ \$11.48	\$11.48
Tags bag of 25 large tags – program mgr orders from USFWS (CONTACT PGRM MGR)	free
Tags bag of 25 small tags – program mgr orders from USFWS (CONTACT PGRM MGR)	free

Steel wool or carborundum paper for removing rust from awls (Lowe's) 1 pkg. \$5.98	\$5.98
WD40 oil for preserving scales (Lowes's) 1 can \$4.99	\$4.99
Optional: Work table 1(Forestry Suppliers) \$79.95 each	\$79.95

3 SHAREPOINT: DATA ENTRY AND DOCUMENT ACCESS

Florida Fish and Wildlife Conservation Commission is the repository for the data generated by this project. The database is housed on the FWC SharePoint portal <https://fwcc.sharepoint.com/sites/ext/crab/SitePages/Home.aspx> and is entered through an online database, into which you will enter the data from your sites.

3.1.1 LOGIN AND PASSWORD

You will receive an invitation via your email. Depending on whether you have a Microsoft Office account, you may have to create a specific email address and password for using SharePoint. **CHECK SPAM FOLDER if you do not see the invitation in your regular inbox.**

3.1.2 DOCUMENTS

Once you can view the SharePoint site, you will see “Teams” on the homepage. Teams are alphabetically listed by LOCATION. Within each team module you will see different documents including survey data sheets for their specific area, generalized tagging and resighting sheets, guidance documents for each site, and manuals. These are all in PDF format and can be downloaded and printed onto waterproof paper. Punch holes into data sheets after printing for use in binders. *Note: I will be updating these sheets as the year progresses and we come up with unique site names. Locations are already in place; you will fill in “station.”*

3.1.3 DATABASES

There are 3 separate databases housed in SharePoint into which you will enter data. (Beach Survey, Tagging, Resighting). They are all set up the same way.

Depending on your preference, you can select “new” to get a drop down menu or “Quick Edit” to get a left-to-right Excel spreadsheet. Both can be advanced using tab button and “shift+tab” to go backward in the same line.

Note: The databases are set up so the only items entered are those fields pertinent to the data you are taking, and no mathematical calculations are required.

Beach Survey Database:

The only thing you are responsible for “calculating” are the tick marks on the survey (ex: For mating status Pr + 3, if you had 5 of these, you would simply enter 5.) **Do not calculate males to females.**

For “Beach Distance Surveyed,” only add a value if you did not sample your entire survey area

Notes about “Location/Station”. These selections are linked to a non-visible series of data that include your GPS points, paces and the nearest NOAA buoy that we will be utilizing for actual environmental conditions. You will not be able to enter data until we have these parameters programmed into the database.

Tagging Database

Enter values from your tagging data. Please remember to add values in millimeters for Proximal Width and Tare/Total Weight (including Tare) in grams. **You do NOT have to subtract Tare Weight from Total Weight.** Excel will do it for you.

REMEMBER: Your access level allows you to view and print documents and enter/edit data **but you cannot delete data.** If you realize you made an error that needs deletion, make the line as blank as you can and write “delete line” in the comments, call or email tiffany.black@myfwc.com and I will delete the line for you.

3.1.4 MAIL AND FILE DATA SHEETS

Put your original data sheets back into the coordinator's binder in chronological order. Then, either scan and email, fax, or make copies and send via pre-paid FedEx to:

(FedEx account #2574-5092-9)

FWC: ATTN Tiffany Black

11350 SW 153rd CT

Cedar Key, FL 32625

(352) 543-1080

Tiffany.black@myfwc.com

4 VOLUNTEER RETENTION

4.1.1 COMMUNICATION IS KEY

Volunteers typically appreciate consistent and timely communication about their efforts. Contact them well in advance to schedule sampling dates and be sure to follow through if someone has a question or reaches out to you. Make yourself available by phone for questions on sampling days, if possible, and make sure volunteers have your contact information handy in the gear kits.

After sampling is done for a season, thank the volunteers and let them know key information such as how many crabs were sighted that season, how many were tagged, etc. Volunteers like to hear back information about how the surveys went and if there were any items of interest, such as a very big spawning day or a day with a lot of tag resighting. Interesting information about tag resighting rates or long distances travelled by crabs is also highly interesting to most volunteers. We produce a mini-newsletter with this information (example here: <https://spark.adobe.com/page/iAECQcUBeg6rY/> - produced for free using Adobe Spark or here: <http://blogs.ifas.ufl.edu/ncbs/2017/12/20/fl-horseshoe-crab-watch-2017/> using blogs.IFAS) but you can communicate this information for your area however you see fit.

4.1.2 VOLUNTEER APPRECIATION

Consider having some kind of show-of-appreciation for your volunteers once a year at least. We hold casual socials annually where we invite all volunteers and present certificates, and share some basic data and photos from the season. Though this is optional, we find that some small gift or gathering is an important part of our volunteer retention strategy. We and our volunteers have a lot invested in each other, and we want to show them how much we appreciate their efforts.

4.1.3 T-SHIRTS

We have standard art for t-shirts and can share this art with you if you want to produce t-shirts for your volunteers. We have found this is an important way for our volunteers to be recognizable on the beach and is one way volunteers can spread the word about the program to others. Contact savanna.barry@ufl.edu if you are interested in producing t-shirts.

5 APPENDIX

Example: Guidance Document to include in kits for volunteers and horseshoe crab tag resighting flyer.

Seahorse Key Survey Sites



SK surveys begin at the stairs below the lighthouse on the south beach



SK East continues to the point where the beach curves to the left and ends at a set of 3 palms.



SK East is 455m long (starting from the stairs).

SK East ends 75 paces beyond the last large collection of driftwood on the beach (fallen trees). There is still beach beyond this point, but do not conduct surveys beyond this point (you may look for tagged animals beyond this point, however)



This point is about halfway between two USFWS signs that are out in the water; The second one can be seen in the picture.

SK west ends at the farther of the two palm trees that are at the water's edge. You can see them well up the beach. There is beach beyond this point, but do not survey beyond (although you may look for tagged animals in this area).



SK West is 350 m long (starting from the stairs).



Attention

Beachgoers:

Help us collect data on nesting horseshoe crabs by reporting tagged animals



If you see a tagged crab (like the ones in the photo on the left):

- 1) Snap a picture of the tag or record the tag # (number is on the bottom of the tag, shown in the photo on the right).
- 2) Note the date, location, and general condition of the crab (alive or dead)
- 3) Report data using the online form at (www.fws.gov/crabtag/) or by calling 1-888-546-8587 (1-888-LIMULUS).

IMPORTANT:

-DO NOT remove the tag. When recording the tag #, try to limit disturbance to the crab (try not to pick it up and if you must pick it up, NEVER pick it up by the tail).

Data goes into a national database maintained by the US Fish and Wildlife Service and contributes to knowledge about horseshoe crab movements and population numbers.

