

Nature Society (Singapore) Horseshoe Crab Rescue and Research (HSC R&R) Programme

The HSC R&R is a horseshoe crab conservation programme based on the citizen science approach. It consists of four components:



Monthly trips to Mandai mudflats to search for and release horseshoe crabs trapped in abandoned fishing nets, concurrent with second component below.



Monthly trips to Mandai mudflats to conduct survey of mangrove horseshoe crab population numbers and structure:

- collect a random sample of 300-500 horseshoe crabs to measure size and to record gender and breeding status, monitor population density
- analyse and publish data in scientific journals, contribute data to the IUCN Horseshoe Crab Specialist Group



Annual island-wide survey in March:

- survey remaining natural coastlines in Singapore to monitor distributions of the coastal horseshoe crab and mangrove horseshoe crab
- conduct interviews with fishermen to collect anecdotal evidence of horseshoe crab sightings
- analyse and share data with international scientific community



Public education and outreach:

- hands-on experience with the process of scientific research, field work and handling of wild animals
- learn about the biology and ecology of horseshoe crabs
- be informed of the threats facing horseshoe crabs and the reasons for conserving them

The following presentation slides are used in public talks (typically in schools and tertiary institutions) for the following purposes:

1. Educate the public about the biology and ecology of horseshoe crabs
2. Recruit volunteers for the HSC R&R

Attached are also two annexes:

Annex A - Nature Society (Singapore) Horseshoe Crab Training and Accreditation Program (HSC TAP).

Annex B - Fishermen's Survey of Horseshoe Crab Sightings and Catch

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February 2013

Nature Society (Singapore)

Horseshoe Crab

Research and Rescue Project





- 《我很丑，可是我很温柔》 (I am very ugly, but I am very gentle)

Singer in the picture is Zhao Chuan. His most famous Mandarin pop song is “I am very ugly, but I am very gentle”.



- I am very ugly, but I am very gentle

A horseshoe crab may look very menacing, but they are actually harmless.

Handling the crabs



NEVER BY THE TAIL!

All pictures in this presentation are of the mangrove horseshoe crab, *Carcinoscorpius rotundicauda*.

Horseshoe crabs aren't really crabs!



- Relatives of spiders & scorpions
- Able to regrow lost limbs

The Parts



The Parts



www.myitchyfingers.wordpress.com

The Mouth



www.myitchyfingers.wordpress.com

Gender Differences



- Male – bulbous fore legs
- Female – no bulbous fore legs

Macam belangkas

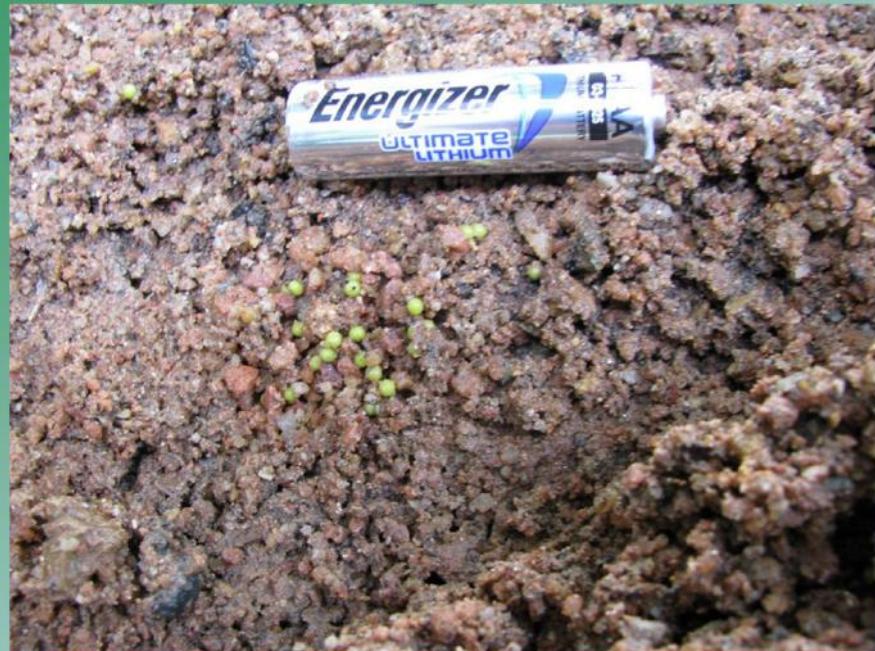


The Malay proverb “macam belangkas” describes two people who are inseparable. It literally means “like horseshoe crab”. Macam: similar to; belangkas: horseshoe crab. Horseshoe crabs spend a long time in amplexus.



Threesomes having a good time are often found.

The eggs



Eggs are small and difficult to detect in the field. The battery is placed beside the eggs to give a sense of scale.



As tiny as the size of a finger nail (approx. 0.5 cm)



The bigger ones would be larger than palm size.

One that's in the process of molting



'Split' in the shell is already visible.
Whole crab will be crawling out of the split and
'abandoning' the old shell.



A horseshoe crab undergoing moulting.





Our field site, Mandai mudflats at Kranji. The substrate is very muddy. The mud flats are littered with debris, planks of wood, cans, concrete blocks. Sometimes foam mattresses, polystyrene, even a half a fridge.

Our Story started when some birdwatchers at the site saw horseshoe crabs, still alive, trapped in abandoned fishing nets. Contacted NSS to ask them to arrange to rescue them. So every couple of months a team of volunteers would go to the site with cutters to rescue the horseshoe crabs.

Horseshoe Crab Training and Accreditation Programme

The aim of this Training and Accreditation Programme is to establish a pool of Conservation Volunteers with a consistent standard of searching for and handling of Horseshoe Crabs (HSC), measurement techniques, research data collection and recording and correct manner of freeing entrapped HSC. We also hope to nurture environmental responsibility and inculcate safety first practices during each monthly visit to the Mandai mudflats. For details, refer to Annex A.

Search



Buried / camouflaged by the mud

Typically, mangrove horseshoe crabs are half buried in the mud in our field site. This photo shows a pair in amplexus.

Juveniles on the surface, adults sometimes buried about 2cm.

Measuring and recording data

- Measure the size
- Sex the horseshoe crabs
- Check for breeding pairs
- Check for deformities





Lesley briefing the volunteers on what to do



Measuring and other data collection





The holding 'trough' while data is being collected.



**Releasing the crabs back
to their habitat.**



Tough rescue work!



Laboriously cutting away the nets to release the crabs.

Some 50 – 100 crabs are rescued at each session.



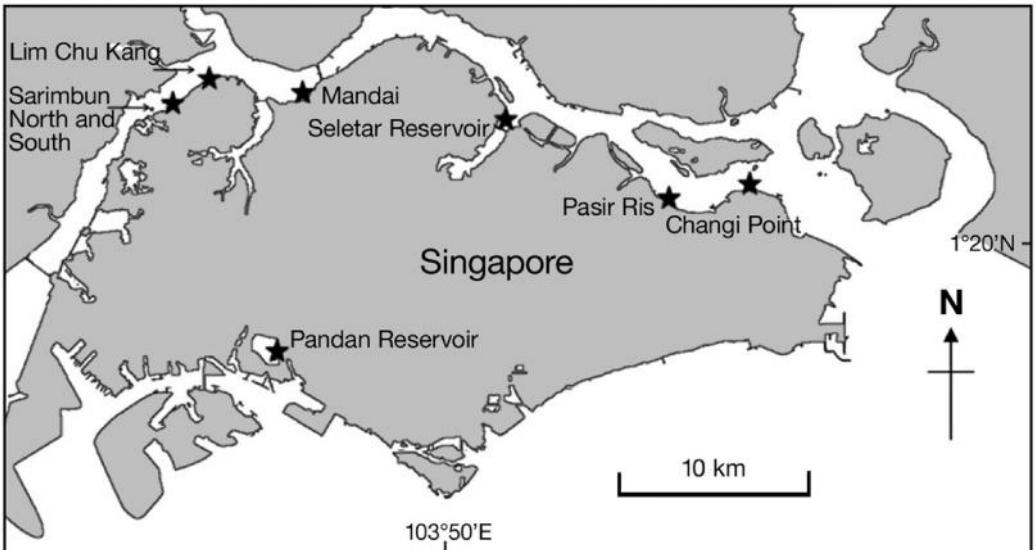
Sometime we find big bundles with the horseshoe crabs tightly caught up. Some visits we find none, sometimes 20-30, even as many as 200 and once >400 caught up in nets. So the first part of our work has been to rescue crabs from nets.

It takes time to tease out the fine nylon strands. We find only adults trapped, with approx 70 to 75% males. Worst times have been in June and July. So we try to make sure a team goes along in the these months each year.



For some the rescue comes too late!

The remains of this female was found among the nets. What is left of her spawns are clearly visible.



- **Island wide population and distribution survey**

Separate from our monthly visits to the Mandai mudflats, the island-wide survey is conducted once every year (typically in March) across several sites in Singapore. The objective is to survey the distribution of the mangrove horseshoe crab (*Carcinoscorpius rotundicauda*) and coastal horseshoe crab (*Tachypleus gigas*) on Singapore's shores.

In addition, volunteers also conduct interviews with fishermen and recreational anglers to gather anecdotal information on horseshoe crab sightings. Volunteers also take the opportunity to highlight, to the fishermen and anglers, threats facing horseshoe crabs.

See Annex B for the interview questions.

Conclusions

- There is a healthy, thriving population of mangrove horseshoe crabs at Mandai Mudflats. **We must look after them.**
- They seem to breed year round but there are some months of low reproductive activity.
- The nets are a threat, so fishing with fixed nets should be discouraged.
- Rescue from the nets should be done definitely from April to August when there are more large horseshoe crabs.

What we still don't know:

- Where the larval stages live
- How often they molt
- How long they live. Some say about 20 years!
- How long they survive when tangled in the nets
- And lots more.....



Annex A

Nature Society (Singapore) Horseshoe Crab Training and Accreditation Program (HSC TAP).

The aim of this Training and Accreditation Program is to establish a pool of Conservation Volunteers with a consistent standard of searching for and handling of Horseshoe Crabs (HSC), measurement techniques, research data collection and recording and correct manner of freeing entrapped HSC. We also hope to nurture environmental responsibility and inculcate safety first practices during each visit.

There will be 4 levels of accreditation:

- 1. Qualified HSC Conservation Volunteers/ HSC R&Rers,**
- 2. Supervisors,**
- 3. Trainers and,**
- 4. Leaders.**

The Training Program for accreditation as a Qualified HSC R&R Conservation Volunteer consists of attendance in at least 3 HSC R&R sessions in a year and involves participation in the following modules:

1. Open and Transect search.

Attainment goals: ability to locate and identify juvenile, adults, gender, recently moulted, moults, parts of carapace of dead HSC, mating pairs or groups; ability to correctly handle without injury to self or HSC during capture, proper transfer, sea water sample collection and sea water temperature recording etc.

2. Measuring and Recording of data.

Attainment goals: use of measuring calipers, correct handling and measurement of HSC, growth stage and gender identification, other pertinent observations, communication between measurer and recorder, recording procedure, marking, distress minimisation during storage and proper release of HSC.

3. Search & Rescue.

Attainment goals: search for nets etc. which can entrap HSC, use of shears to free entrapped HSC from nets, collection of specimens for recording, removal and, if necessary, destruction of nets at site.

4. Responsible environmental good practice behavior and safety first.

Example: avoid littering and removing live specimens, collect and discard 5 items of man-made litter at each session, replace objects which are up-turned for search, be aware of danger from the elements like lightning and sharp objects/ creatures which can cut, bite or sting, etc.

5. Group (and personal) equipment care and use.

Example: proper set up of work station, collection of sea water for HSC storage containers, proper care of measuring equipment and data record documents, responsibility for pails, shears etc., cleaning of all equipment at end of session and responsibility for cleaning area used.

6. Practical Test.

Qualified HSC R&Rers will be awarded a certificate and a cap.

Qualified HSC R&Rers with effective participation records at assisting/guiding trainees or other inexperienced participants in the 3 core areas of:

- 1. Open or Transect search,**
- 2. Measuring and Recording of data, and**
- 3. Search & Rescue,**

during each of another 3 monthly HSC R&R sessions, and assist in inculcating and nurturing environmental good practice behavior, safety first and group equipment care and use, will be awarded with a Supervisor's certificate and cap.

Supervisors with effective supervision record of Qualified HSC R&Rers in the 3 core areas, as mentioned above, during each of another 3 monthly HSC R&R sessions, and assist in inculcating and nurturing environmental good practice behavior, safety first and group equipment care and use, will be awarded with a Trainer's certificate and cap.

Trainers with record of effectively assisting the Leader in the 3 core areas, as mentioned above, during each of another 3 monthly HSC R&R sessions, and assist in inculcating and nurturing environmental good practice behavior, safety first and group equipment care and use, will be awarded with a Leader's certificate and cap and can conduct the monthly HSC R&R and HSC TAP sessions.

Prepared by:
Dr. Hsu Chia Chi.

January 2013

Fishermen's Survey of Horseshoe Crab Sightings and Catch.

Date: _____ Place/Site: _____

Name interviewer: _____

Please ask the fishermen following questions, and circle the appropriate answer he gives:

1. Have you ever seen horseshoe crabs? (Show picture A) (Mangrove HSC) : Yes/No.
 (Show picture B) (Coastal HSC): Yes/No. *

2. If yes, where? (A) a) Beach b) Mangrove c) At sea d) Others _____
 (B) a) Beach b) Mangrove c) At sea d) Others _____ **

3. When did you last see them?

(A) a) Within last 3 months b) 3-6 months ago c) 6-9 months ago d) 9-12 months ago e)

More than 1 year ago f) Others _____

(B) a) Within last 3 months b) 3-6 months ago c) 6-9 months ago d) 9-12 months ago e)

More than 1 year ago f) Others _____ **

4. When do you see them most often?

(A) a) day b) night c) spring tide d) neap tide e) high tide f) low tide? g) Others _____

(B) a) day b) night c) spring tide d) neap tide e) high tide f) low tide? g) Others _____

5. At what months of the year do you see them?

(A) J F M A M J J A S O N D. (Circle). Others _____

(B) J F M A M J J A S O N D. (Circle). Others _____ **

6. At the peak season how many do you see each time?

(A) a) One b) Pairs c) 3-5 no. d) 5-10 no. e) Many.

(B) a) One b) Pairs c) 3-5 no. d) 5-10 no. e) Many **.

7. If you have caught horseshoe crabs how far were you from shore at high tide?

(A) a) Within 50m b) 50-100m c) 100-200m d) 200-500m e) More than 500m

(B) a) Within 50m b) 50-100m c) 100-200m d) 200-500m e) More than 500m **

8. Are they edible?

(A) Yes/No. If Yes, which parts? Specify: _____ *

(B) Yes/No. If Yes, which parts? Specify: _____ *

9. Any other information? _____

10. Please ask the fishermen to let us have his hand phone number if he has seen horseshoe crabs in the last two years so we can follow up with him.

Fisherman's name & hand phone number: _____

11. Please give the fisherman the photos of the horseshoe crab with NSS tel. no. and ask him to call the number if he sees a horseshoe crab in the next year.

"Thank you very much for your help with our survey."

Notes to conduct of Fisherman's Survey of Horseshoe Crab Sightings and Catch

Please explain to the fisherman as follows:

'We are volunteers of Nature Society (Singapore), and we are conducting a survey to count the number of horseshoe crabs we have around the shores of Singapore and to find out where they can be found. We are asking as many fishermen as possible to tell us if they see any horseshoe crabs and where and when they see them. Please help us with this survey.'

(Show pictures of horseshoe crabs on phone)

* Take opportunity to share with them the 2 species of horseshoe crabs found in Singapore, (A) Mangrove horseshoe crab & (B) Coastal horseshoe crab and their (A) Vulnerable & (B) Endangered status in Singapore.

Vulnerable/ 易危 / Terjejas: Fewer than 1000 mature individuals and there may or may not be any other evidence of decline, small range size, or fragmentation.

Endangered/ 濒危 / Terancam: Fewer than 250 mature individuals, and no other evidence of decline or fragmentation.

** More than one answer may be recorded.

For your information, horseshoe crabs in Malay is: Belangkas
and Chinese for it is: 马蹄蟹 (只限香港) 、 蟹 hòu