

The Salt Marsh Periwinkle

Field Marine Science 2015



http://www.vcrfiter.virginia.edu/gallery23/main.php?g2_view=core.DownloadItem&g2_itemId=3664&g2_serialNumber=2

Salt Marsh Periwinkle (*Littorina irrorata*)

- Invasive species of snails that originated in Europe
- Indicator species of health in the saltmarsh habitat

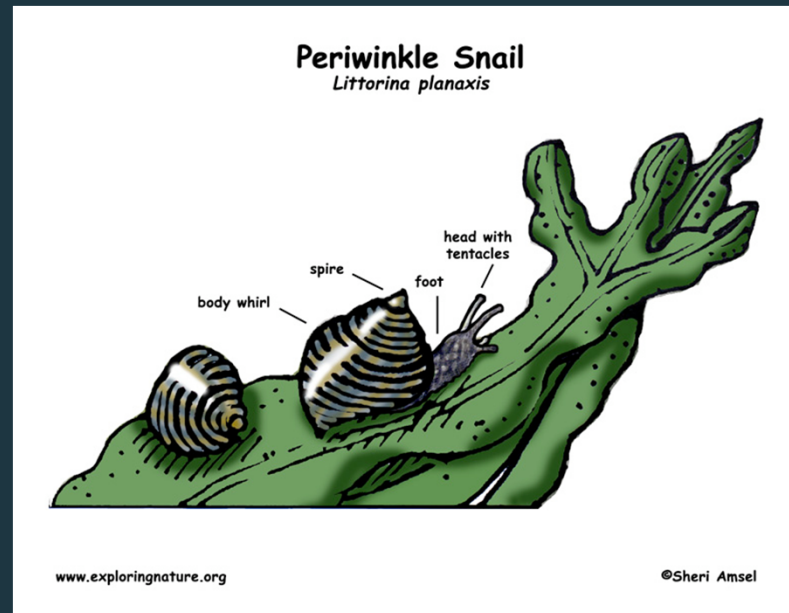


<http://www.wildernessclassroom.com/wp/wp-content/uploads/2013/12/Marsh-Periwinkle-3.jpg>



Appearance

- Spiraled, grooved shell
- Shells grow up to 2.5 cm in length
- Move with a fleshy foot, a short tail, two antennae, and tentacles used to see and taste
- Excrete sticky mucous to stay attached to coastal grasses
- Gills



Diet

- Herbivores
- Use their file-like tongue, the radula, to eat
- Eat algae, detritus, diatoms, and coastal grasses
- Fungal decomposers



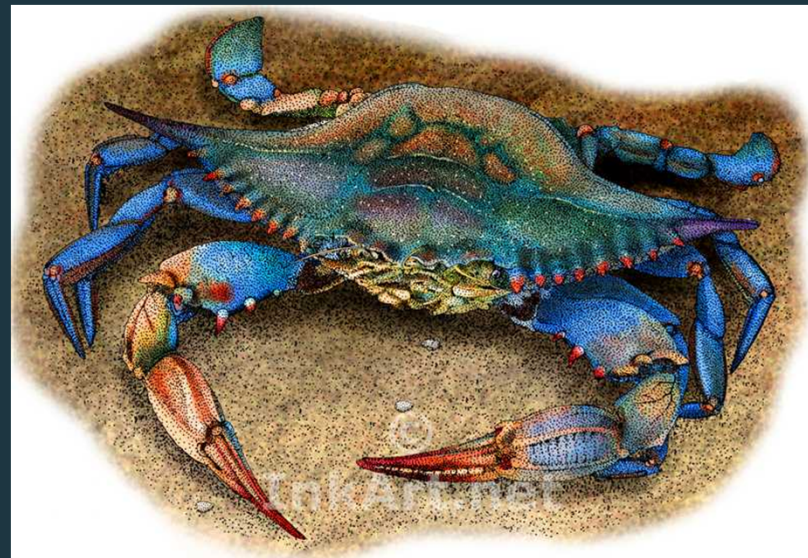
<https://nextwaveny.files.wordpress.com/2011/07/p1010542.jpg>

Predators

- The blue crab
- Boat-tailed grackles and other birds



https://www.audubon.org/sites/default/files/styles/nas_bird_teaser_illustration/public/4407_Sibl_9780307957900_art_r1.jpg?itok=bIUtTqcd



http://www.inkart.net/animals/images/large/atlantic_blue_crab.jpg

Habitat

- Range from New England to the Gulf Coast of Texas
- Live in high-marsh areas around freshwater seeps and low-marsh areas of 25 ppt saltwater
- 50-300 individuals per m^2

Reproduction

- Females lay eggs
- After birth, no parental investment is needed
- The average periwinkle lives 3 years



http://farm2.static.flickr.com/1064/4732805745_4d525ba5c2.jpg

<http://blog.wfsu.org/blog-coastal-health/wp-content/uploads/2013/06/P1020245.jpg>

Tides

- High tide
 - Crawl up stems of the coastal grasses
- Low tide
 - Crawl across mud to look for food



http://www.groundtruthtrekking.org/static/uploads/photos/sitka-periwinkles-littorina-sitkana_2.jpg

Periwinkle Recapture



<https://rebeccainthewoods.files.wordpress.com/2011/04/010.jpg>

Questions to answer

- Do periwinkles have a high site fidelity?
- If more were found in one quadrat than the other, would that be an indication of predators?

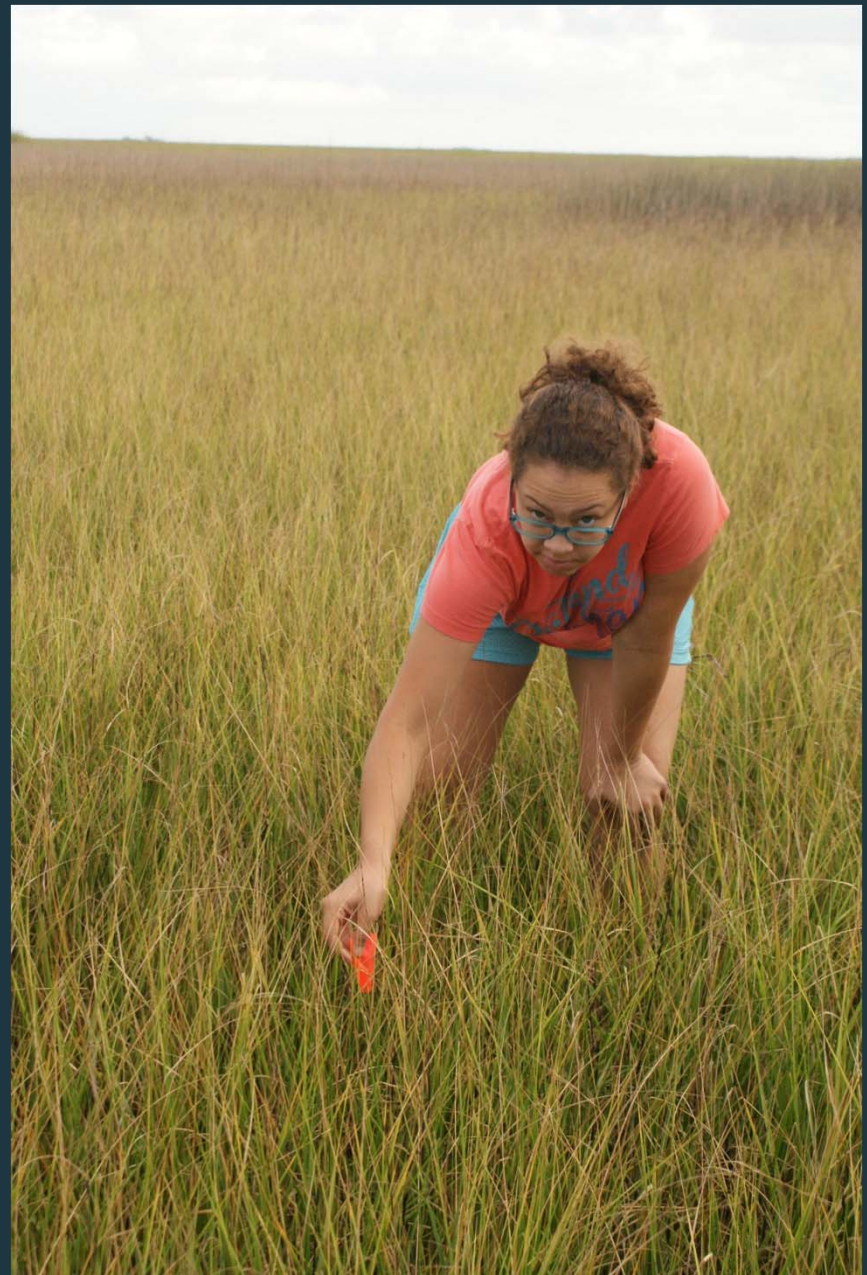
Hypotheses

- Alternative: The marsh periwinkles will return to their original location due to site fidelity.
- Null: The marsh periwinkle will not return to their original location due to a lack of site fidelity.



Further Hypotheses

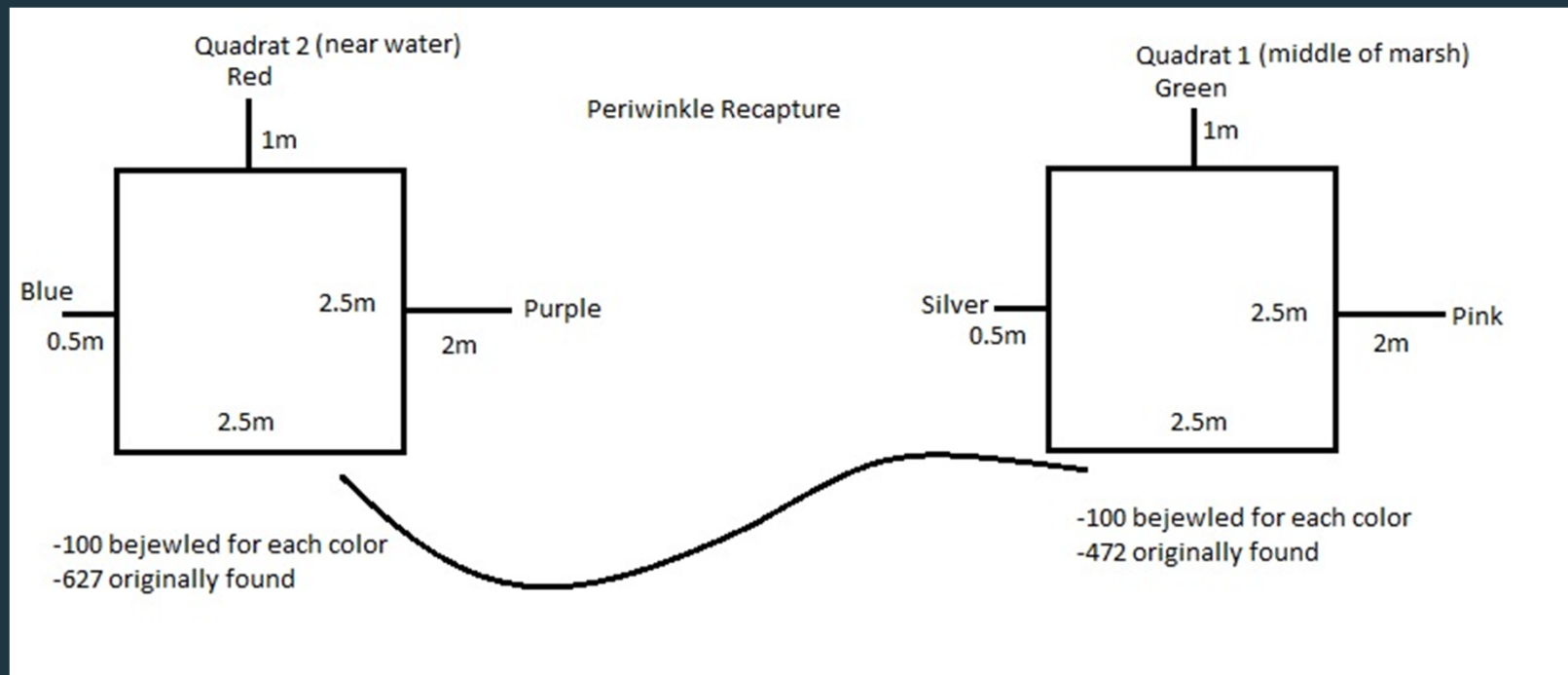
- More marsh periwinkles will be found within the 2.5 m^2 quadrat in the middle of the marsh due to less predators.



Method

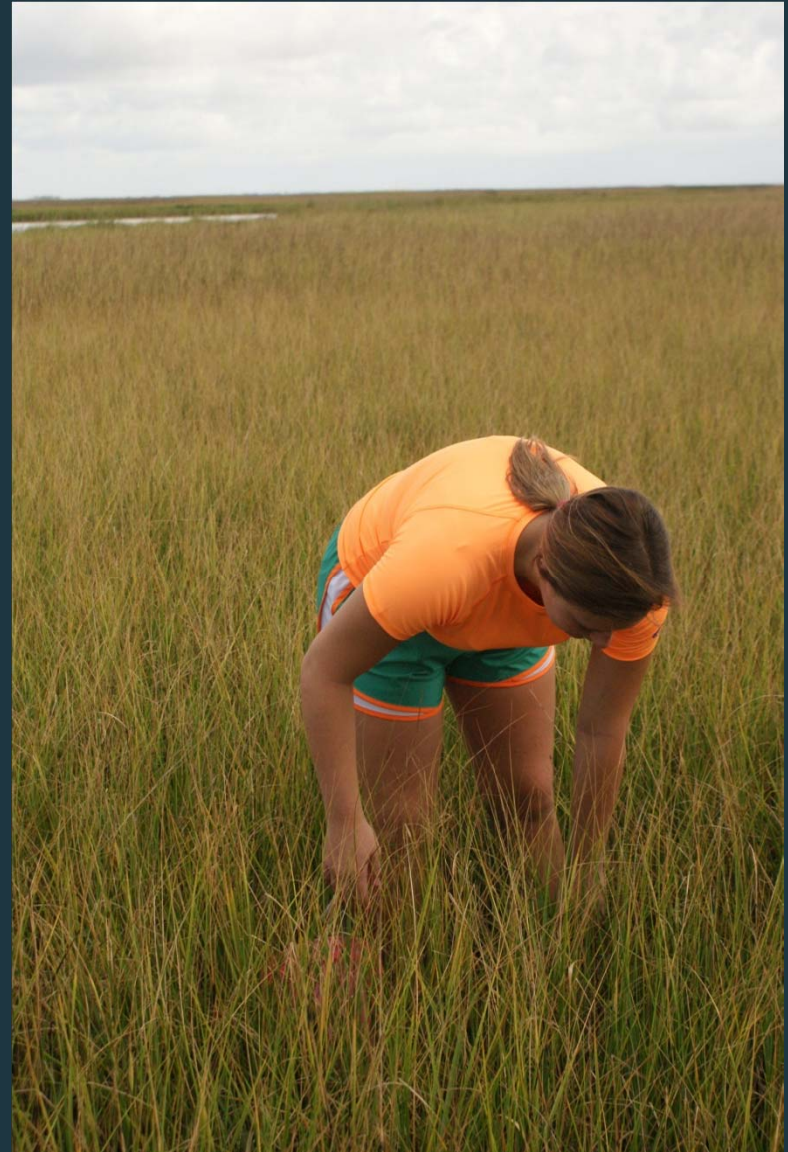
- Two 2.5m quadrats
 - 1 in middle of marsh
 - 1 near water
- Collect all periwinkles from quadrats
- Tag 300 from each with 3 different colors
- Release periwinkles at 0.5m, 1m, and 2m
- Wait 24 hours and recapture again
- Wait 48 hours and recapture again

Diagram



Results

- No tagged periwinkles were found in either quadrat after the 24 hour period and the 48 hour period
- The tagged periwinkles were found in the same place where they were released at each interval



Results (cont.)

- Wednesday, July 22nd
 - 472 collected in total for Quadrat 1
 - 627 collected in total for Quadrat 2
- Thursday, July 23rd

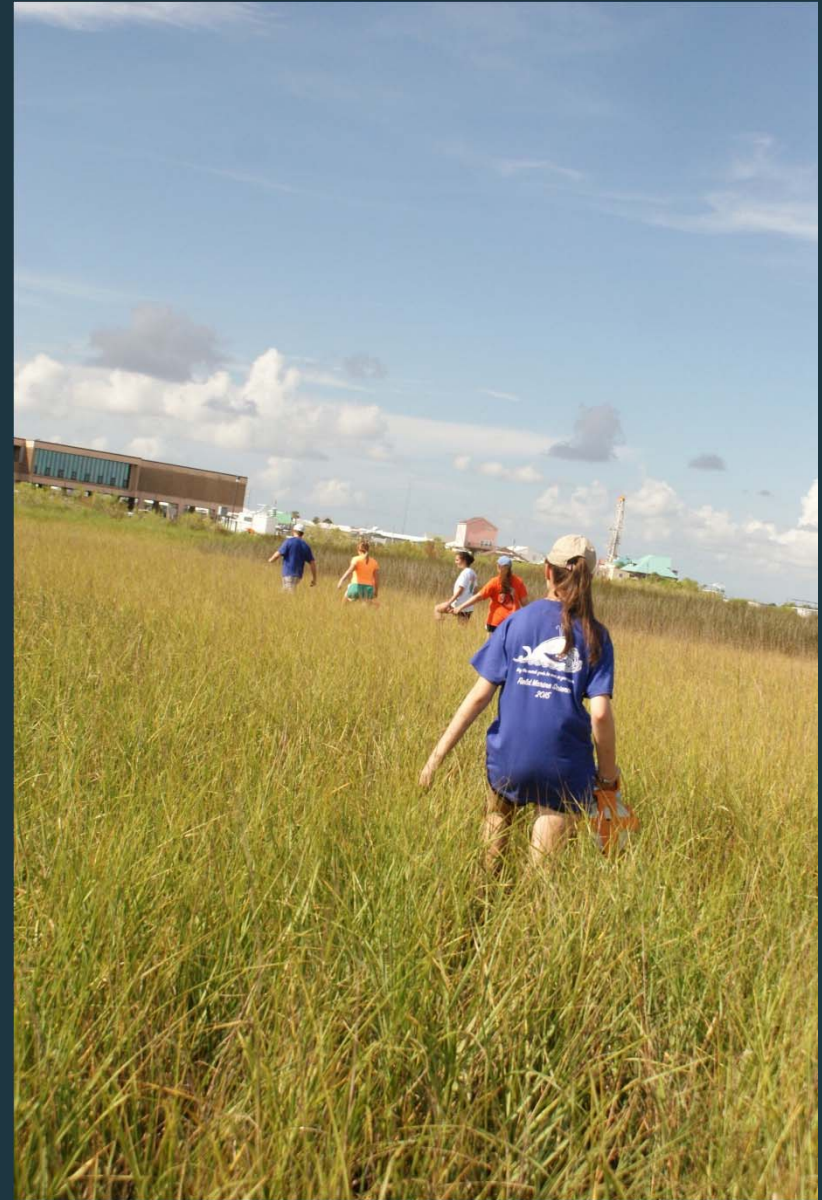
| Quadrat 1 (middle of marsh): | | | | | Quadrat 2 (near water): | | | | |
|------------------------------|--------|-------|------|--------|-------------------------|------|-----|--------|--------|
| Total # | Silver | Green | Pink | No gem | Total # | Blue | Red | Purple | No gem |
| 237 | 0 | 0 | 0 | 0 | 154 | 0 | 0 | 0 | 0 |

- Saturday, July 25th

| Quadrat 1 (middle of marsh): | | | | | Quadrat 2 (near water): | | | | |
|------------------------------|------|-----|--------|--------|-------------------------|------|-----|--------|--------|
| Total # | Blue | Red | Purple | No gem | Total # | Blue | Red | Purple | No gem |
| 52 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 |

Conclusion

- The alternative hypothesis was not supported by the data
- The alternative hypothesis was rejected and the null accepted



Other Studies

- “Movement of the common periwinkle (*Littorina littorea*) at Woodneck Beach, Falmouth, Massachusetts” by Kate Buckman, Annette Hynes, and Elizabeth Orchard (for Marine Invertebrates of Cape Cod, Topics Course, Fall Semester 2005)
- “Dispersion of the Salt-Marsh Periwinkle *Littoraria irrorata*: Effects of Water Level, Size, and Season” by Caryn C. Vaughn and Frank M. Fisher

Further Studies

- Technology advancements
- Follow-up on the tagged periwinkles
- Place them all in the same area
- Put them back into the quadrat to see if they move towards the water
- Run it for a longer time
- Control the environment
- Don't walk around the quadrat

Bibliography

- Alexander, S. K. 1979. Diet of the Periwinkle *Littorina irrorata* in a Louisiana Salt Marsh. *Gulf Research Reports* 6 (3): 293-295.
Retrieved from <http://aquila.usm.edu/gcr/vol6/iss3/11>
- Buckman, K., Hynes, A., Orchard, E. (2005). *Movement of the common periwinkle (Littorina littorea) at Woodneck Beach, Falmouth, Massachusetts*. Retrieved from WHOI (25 July 2015).
- Common Periwinkle. (n.d.). Retrieved July 25, 2015, from <http://www.edc.uri.edu/restoration/html/gallery/invert/peri.htm>
- Fotiou, T. (2012, April 18). Marsh Periwinkle (*Littoraria irrorata*): The Fungi-Farming Sea Snail. Retrieved July 25, 2015, from <http://www.epochcatcher.com/blog/2012/4/creature-of-the-week-marsh-periwinkle-littorina-irrorata>
- Marsh Periwinkle. (n.d.). Retrieved July 25, 2015, from http://www.chesapeakebay.net/fieldguide/critter/marsh_periwinkle
- Munoz, A. (2005, January 7). *Littorina irrorata* (marsh periwinkle). Retrieved July 25, 2015, from http://animaldiversity.org/accounts/Littorina_irrorata/
- Periwinkle. (2012, June 28). Retrieved July 25, 2015, from <http://eattheinvaders.org/the-common-periwinkle/>
- Vaughn, C., & Fisher, F. (1992). Dispersion of the Salt-Marsh Periwinkle *Littoraria irrorata*: Effects of Water Level, Size, and Season. *Estuaries*, 15(2), 246-250.
- Walters, K., Coen, L. (n.d.). *Marsh Periwinkle*. Retrieved from DNR.(25 July 2015).
- Wildernessdave. 13 Dec 2013. *Marsh Periwinkle*. Wilderness Classroom Educational Adventures. Retrieved 25 July 2015 from <http://www.wildernessclassroom.com/wilderness-library/marsh-periwinkle/>