

Longwood University Digital Commons @ Longwood University

Spring Showcase for Research and Creative Inquiry

Research & Publications

Spring 2019

Restoring the Population of Keystone Species in the Chesapeake Bay: How the Preservation of Submerged Aquatic Vegetation Can Improve the Blue Crab Population

Christina Bell
Longwood University

Follow this and additional works at: https://digitalcommons.longwood.edu/rci_spring

Part of the [Biology Commons](#)

Recommended Citation

Bell, Christina, "Restoring the Population of Keystone Species in the Chesapeake Bay: How the Preservation of Submerged Aquatic Vegetation Can Improve the Blue Crab Population" (2019). *Spring Showcase for Research and Creative Inquiry*. 43.
https://digitalcommons.longwood.edu/rci_spring/43

This Poster is brought to you for free and open access by the Research & Publications at Digital Commons @ Longwood University. It has been accepted for inclusion in Spring Showcase for Research and Creative Inquiry by an authorized administrator of Digital Commons @ Longwood University. For more information, please contact hamiltonma@longwood.edu, alwinehd@longwood.edu.

Restoring the Population of Keystone Species in the Chesapeake Bay: How the Preservation of Submerged Aquatic Vegetation Can Improve the Blue Crab Population



Christina Bell, Department of Biological and Environmental Sciences

Background

- Blue Crabs (*Callinectes sapidus*) are a keystone species in the Chesapeake Bay. They inhabit lagoons and estuaries and can now be found from Nova Scotia to South America (Condrey and Gelpi, 2010) (Hines et al, 2011).
- Their numbers have declined due to increased fishing habits
- Scientists have implemented guidelines in states such as Maryland and Virginia to prevent the fishermen from collecting too many crabs (Bunnell et al, 2010).
- This however, only sustains the current population



Figure 1: This is a picture of a Blue Crab (*Callinectes sapidus*)
From: <https://www.splendidtable.org/recipes/okra-gumbo-with-blue-crabs-and-shrimp>



Figure 2: The geographic range of (*Callinectes sapidus*)
From: baltimorecrabs.wordpress.com

Specific Aim

- To determine if preservation of submerged aquatic vegetation (SAVs) will improve the Blue Crab (*Callinectes sapidus*) population.
- Why? The entire east coast is dependent on these crabs. The Blue Crab fishery brings in at least \$70 million in revenue per year (Rains et al., 2016).

Hypothesis

- We believe that areas with submerged aquatic vegetation (SAVs) will produce more juvenile crabs
- We will test these hypotheses by placing the juveniles in plots of Red Algae (*Gracilaria vermiculophylla*) and Eelgrass (*Zostera marina*)
- The amount of juveniles found will be similar for both species



Figure 4: An image of Red Algae
<https://arstechnica.com>



Figure 5: An image of Eelgrass
From: iucnredlist.org

Methods

Collection and Placement

- Juvenile crabs are collected with seining nets
- The specimens are tethered to fishing lines to prevent escape

Observation

- The juveniles are monitored for 24hrs. to ensure proper movement

Statistics

- A cell-based model is used to measure each vegetation plot

Potential Pitfalls

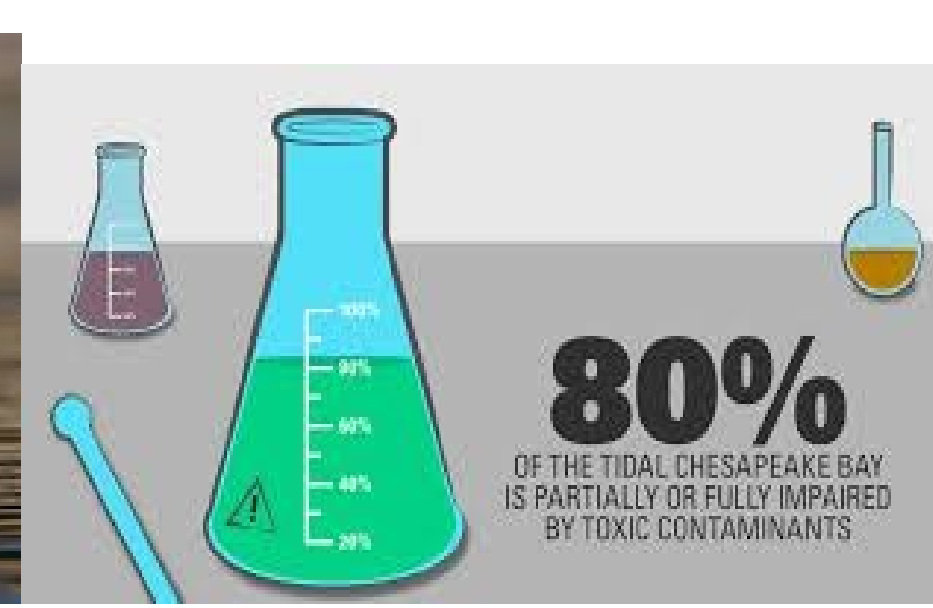
- The fishing wire used to tether the crabs to the pvc pipes could snap
- Tethering the crabs to the pole may increase predation
- The pvc pipes could be damaged by extreme weather conditions
- The biggest pitfall we could face is pollution



From: bobvila.com



From: Chesapeakebay.net



From: Chesapeakebay.net

Potential Conclusions

- The heavily vegetated plots could produce larger crabs overall
- The specimens in the non-vegetated areas are more likely to be preyed upon in the 12-25hr. Period
- The amount of juveniles produced could be determined by the vegetation density
- The juvenile abundance could be determined by pollution

References

- Bunnell, David B., et al. 2010. "The Bioeconomic Impact of Different Management Regulations on the Chesapeake Bay Blue Crab Fishery." *North American Journal of Fisheries Management*, 30(6):1505–1521
- Condrey, Richard, and Carey Gelpi. 2009. "Blue Crab (*Callinectes Sapidus*) Use of the Ship/Trinity/Tiger Shoal Complex as a Nationally Important Spawning/Hatching/Foraging Ground." U.S. Department of the Interior Minerals Management Service. 1–61
- Hines, A.h., et al. 2011. "Predicting Effects of Climate Change on Blue Crabs in Chesapeake Bay." *Biology and Management of Exploited Crab Populations under Climate Change*
- Rains, Sarah A. M., et al. 2016. "Sex Ratios and Average Sperm per Female Blue Crab *Callinectes Sapidus* in Six Tributaries of Chesapeake Bay." *Marine and Coastal Fisheries*. 8(1):492–501.