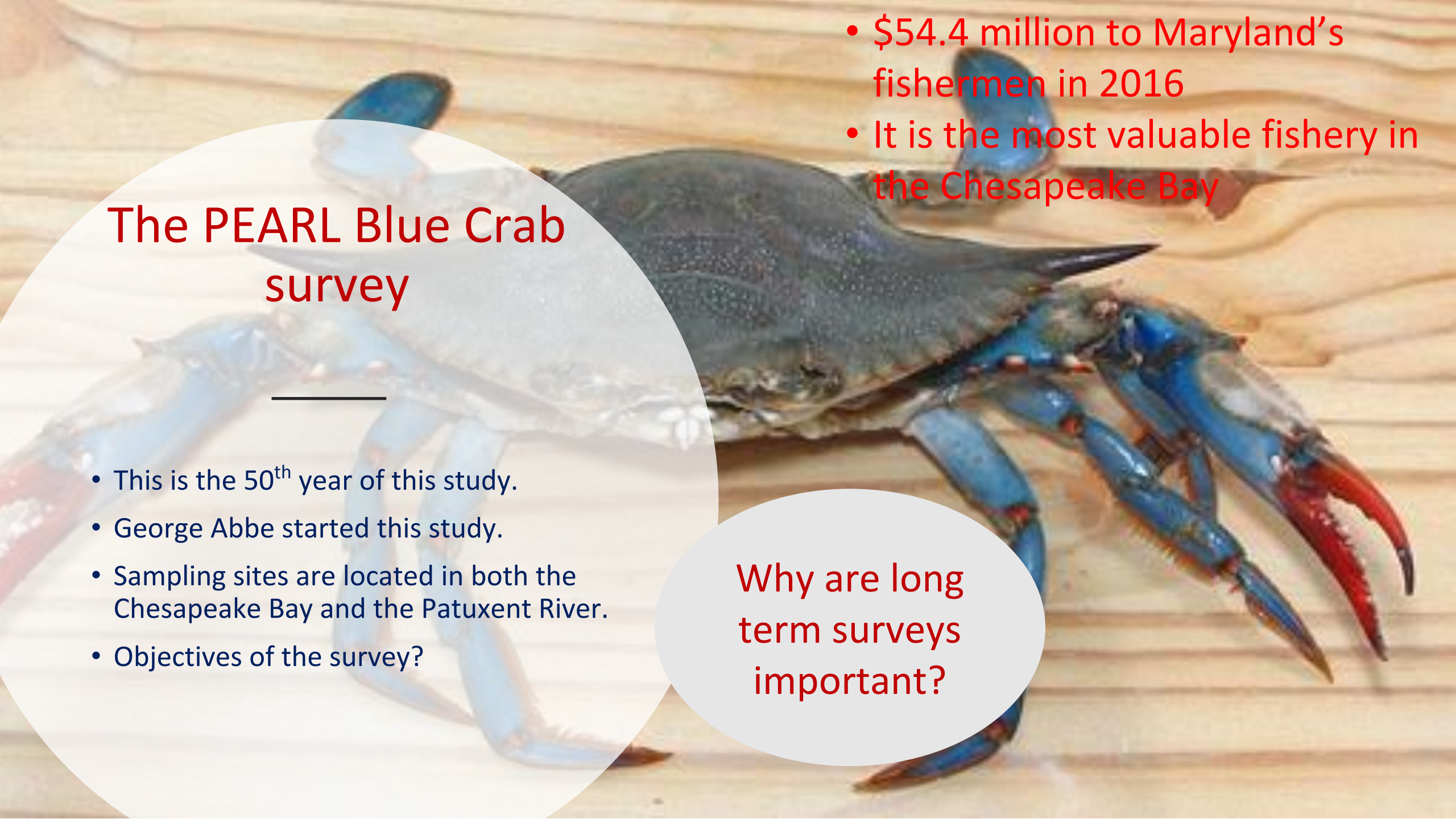2018 Summer Internship Program

Stanley Nwakamma; Morgan State University.

Investigating the feasibility of improving the efficiency of the PEARL Blue Crab (*Callinectes sapidus)* survey

The PEARL Blue Crab survey

- $54.4 million to Maryland's fishermen in 2016
- It is the most valuable fishery in the Chesapeake Bay

- This is the 50th year of this study.
- George Abbe started this study.
- Sampling sites are located in both the Chesapeake Bay and the Patuxent River.
- Objectives of the survey?

Why are long term surveys important?

Investigating the feasibility of improving the efficiency of the PEARL Blue Crab survey

The traditional method of baiting allows for fewer numbers of samples to be counted in the analysis.

A more efficient method of baiting has been proposed and must be evaluated before modifying the 50-year study.

This study will document whether the proposed change will introduce a bias into catch metrics.

Objectives

Determine if the new baiting method captures crabs similarly to the traditional method.

H_0: There is no significant difference between the number of crabs caught using the Traditional (Trad) baiting method and the New baiting method, during my sampling. (Trad = New)

H_A: There is a significant difference between the number of crabs caught using the Traditional (Trad) baiting method and the New baiting method, during my sampling. (Trad ≠ New)

Methods

Line 1

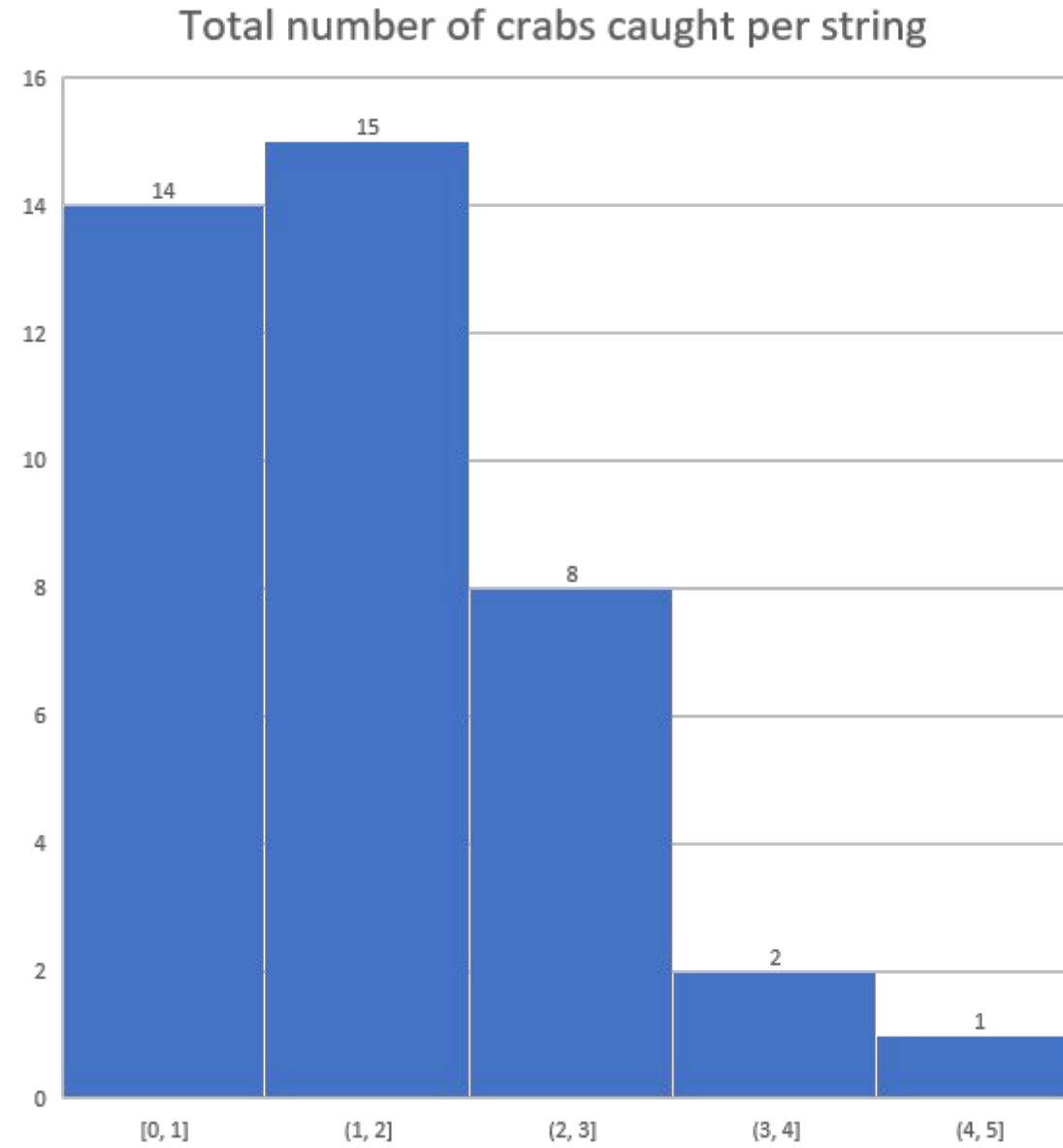Paired sample

Line 2

Paired sample
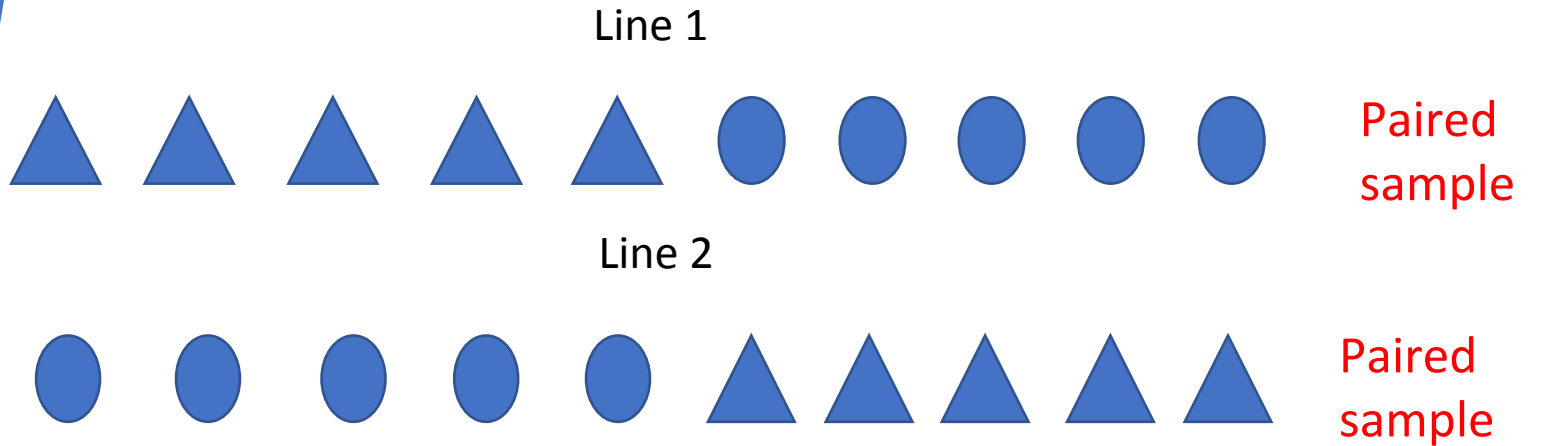
Half of the pots at the sampling site will be baited using a new baiting method – bait is replaced completely each day.

Half of the pots at the sampling site will be baited using the traditional baiting method – adding a fresh bait to the old bait on the 2nd day of trapping.

The differences in the catch for each of the two methods will be analyzed.

Sample Data not Normally Distributed

Total
0
4
2
3
5
0
0
0
1
0
3
3
2
2
2
1
3
3
2
2
2
2
1
2
0
3
2
4
3
1
2
2
1
2
2
0
2
1
3
1

Total number of crabs caught per string

Bin	Count
[0, 1]	14
(1, 2]	15
(2, 3]	8
(3, 4]	2
(4, 5]	1

Wilcoxon Paired- Sample test.

- H_0: There is no significant difference between the number of crabs caught using the Traditional (Trad) baiting method and the New baiting method, during my sampling. (Trad = New)

- H_A: There is a significant difference between the number of crabs caught using the Traditional (Trad) baiting method and the New baiting method, during my sampling. (Trad ≠ New)

- Let α= 0.05

Results

$n = 8$

$T_+ = 4 + 6 + 6 + 2 = 18$

$T_- = 6 + 2 + 2 = 10$

Critical Value of the Wilcoxon T Distribution: $T_{\alpha\,(2),n} = T_{0.05\,(2),8} = 3$

(If either of the positive or negative differences is less than 3, the null hypothesis will be rejected)

Since $T_+ > 3$

$T_- > 3$

H_0 is *not rejected*.

Findings

There is no significant difference between the number of crabs caught in our sample, whether using the traditional or new baiting methods. The baiting method does not *significantly* affect the outcome.

We could still have a β, or "Type 2" error, because sample size is small.

Why is this important?

Summer 2019 Intern Applications will be accepted from Jan. 1st 2019 to March 1st 2019
It's open to all Undergraduate and recently graduated students, regardless of national origin or citizenship status.
Morgan State University Students are strongly encouraged to apply!

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