

Asian shore crab population decline at a marsh restoration site in Stratford, Connecticut

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Introduction:

Hemigrapsus sanguineus (Asian shore crab) invasion has coincided with declines in many native species along the U.S. Atlantic coast (Lord & Williams 2017). Some crab species are associated with marsh declines (Holdredge et al. 2009), but research on the interactions between salt marshes and Asian shore crabs is lacking. Our previous predation experiments found that predation on Asian shore crabs was higher within vegetated marsh compared to adjacent unvegetated areas, suggesting that restoring salt marshes may reduce Asian shore crab population sizes in some locales. This study tested the **hypothesis that Asian shore crab populations decline as a restored marsh in Stratford, Connecticut matures** by measuring *Spartina alterniflora* density and conducting mark-recapture studies to estimate Asian shore crab population sizes between 2018 and 2022.

Methods:

July 2018, 2019, 2020, 2021

- Counted # *Spartina alterniflora* stems in 10 randomly selected 0.25 m² quadrats along two 60-m transects placed near the middle of the restored marsh (Fig. 1)



Figure 1. Restoration site at Stratford Point, Connecticut with marsh transect locations and Asian shore crab sampling area marked.

July 2019, 2021, 2022

- Collected 887 – 1,655 Asian shore crabs from Stratford Point
- Marked crabs with metallic Sharpie and held in the lab overnight (Fig. 2) before releasing them in the field at low tide
- Resampled 24 hours after releasing marked crabs
- Collected 1,492 – 2,538 crabs on resampling and counted the number of marked and unmarked crabs

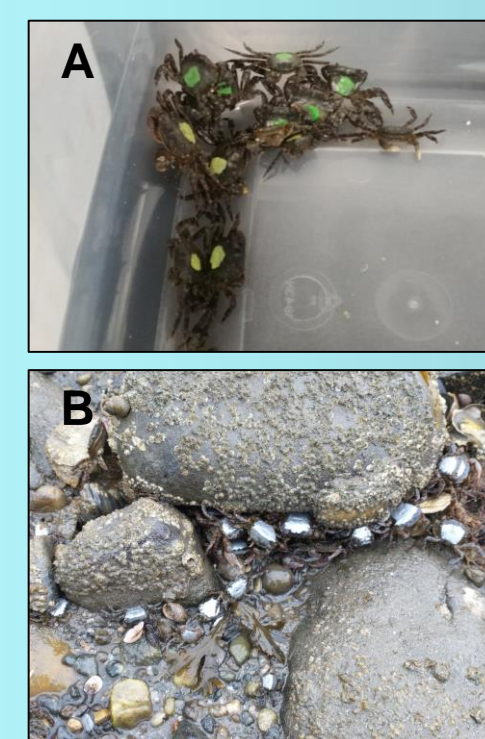


Figure 2. Marked Asian shore crabs A) in the lab before release, B) after being released in the field.

Asian shore crab populations decreased by 24-25% at a restoration site as *Spartina alterniflora* density increased.

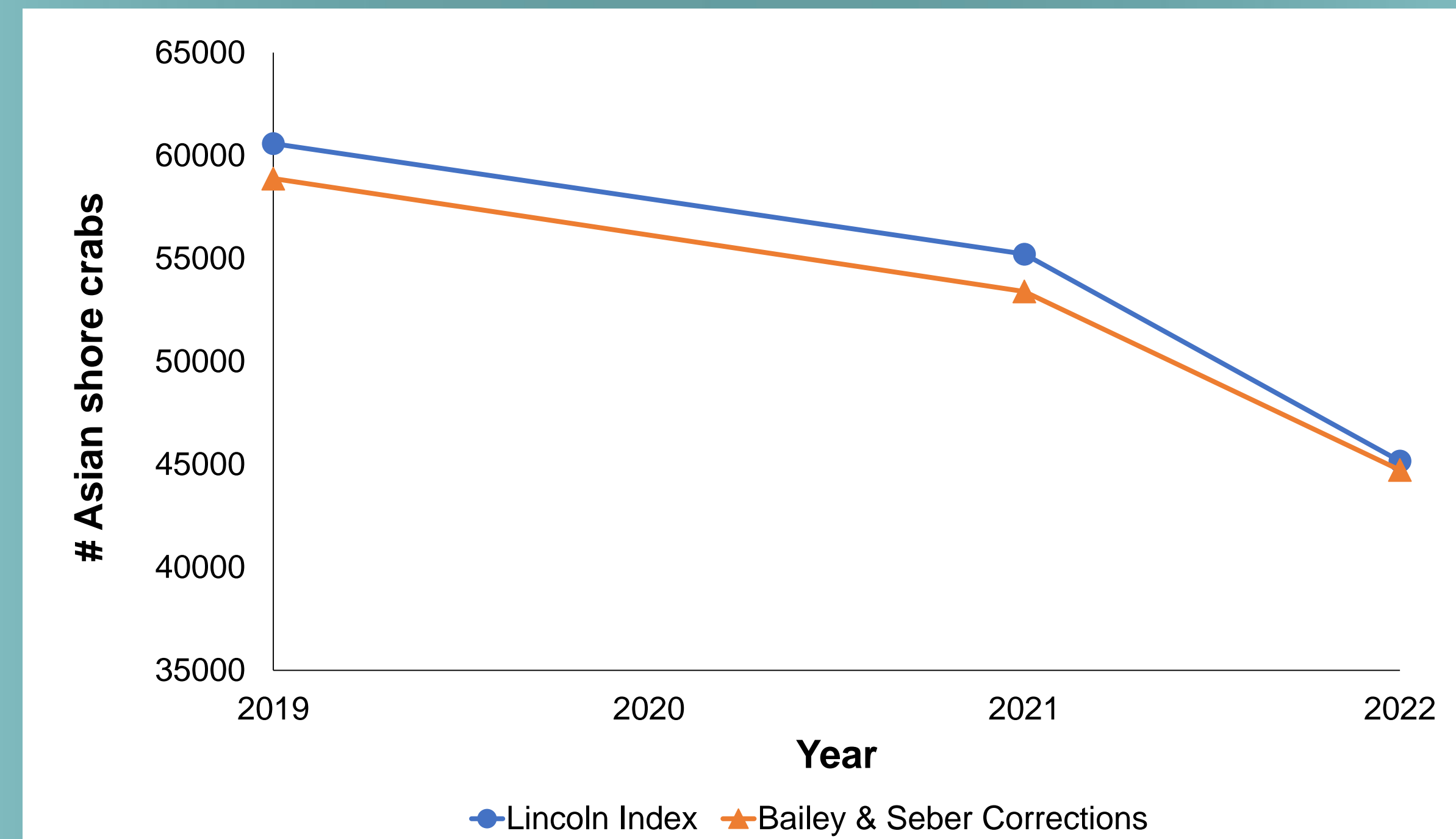


Figure 3. Number of Asian shore crabs at Stratford Point from 2019 to 2022 estimated with the unmodified Lincoln-Peterson index and with Bailey and Jolly-Seber corrections for resampling and non-closed populations. Values for the Bailey and Jolly-Seber modifications overlap, so both indices are shown on one line.

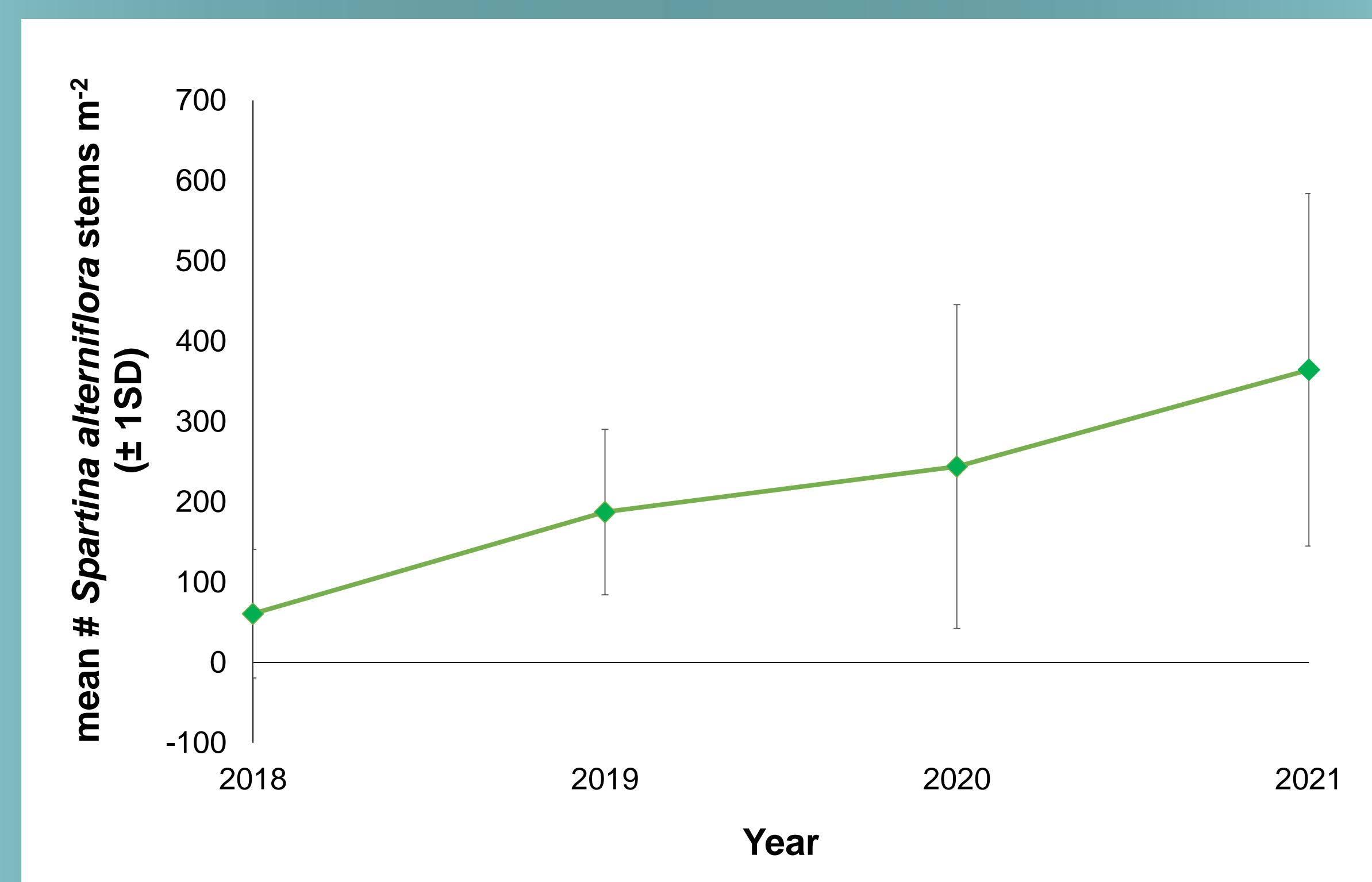


Figure 4. Mean number of *Spartina alterniflora* stems per m² (± 1 SD) at Stratford Point from 2018 to 2021.

Discussion:

The hypothesis was supported since the population of Asian shore crabs decreased over time (Fig. 3) while *Spartina* density increased (Fig. 4). Since *H. sanguineus* occurs mainly in areas with substantial cobble or rock and marshes encourage sediment deposition that can bury rocks, the maturing marsh may be a less suitable habitat for these crabs as rock cover declines (Fig. 5). Although many mark-recapture estimates vary in their reliability (Grimm et al. 2014), the three equations we used to estimate population size closely agreed (Fig. 3). Due to the short period between releasing marked crabs and resampling, as well as the fact that we placed all crabs in a cooler prior to counting during the resampling process, the Bailey and Jolly-Seber corrections were likely unnecessary.



Figure 5. Restored marsh at Stratford Point showing exposed rock.

Future Directions:

Because previously collected data suggested that Asian shore crabs experienced increased predation within marsh vegetation, we plan to conduct additional tethering experiments with cameras on the tethers to document the predators that consume *H. sanguineus* at the site. We conducted a preliminary tethering study in 2022 with a Go Pro recording the tethers but were unable to capture video of the predator that consumed the tethered crabs.

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Literature Cited:

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SCAN ME

Scan for abstract, previous predation data, and more info on the Sacred Heart Living Shoreline!

