

The Effect of Sea-Level Rise on Black Skimmer Nesting Colonies

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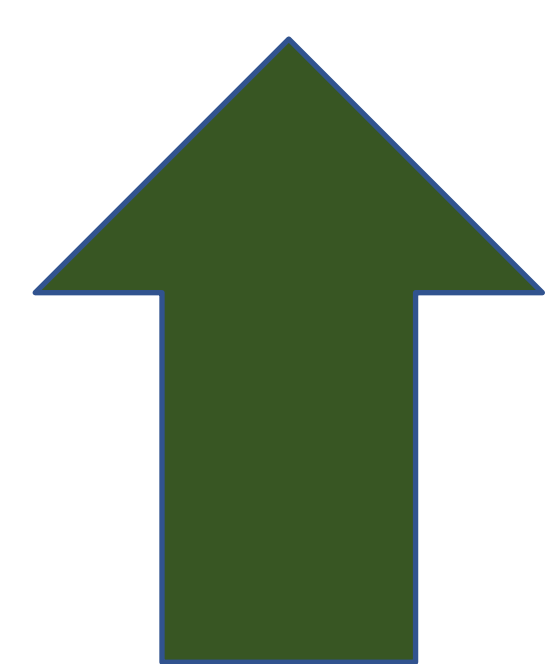


Photo Credit: "A Black Skimmer with her babies" by Lindsay Addison Audubon

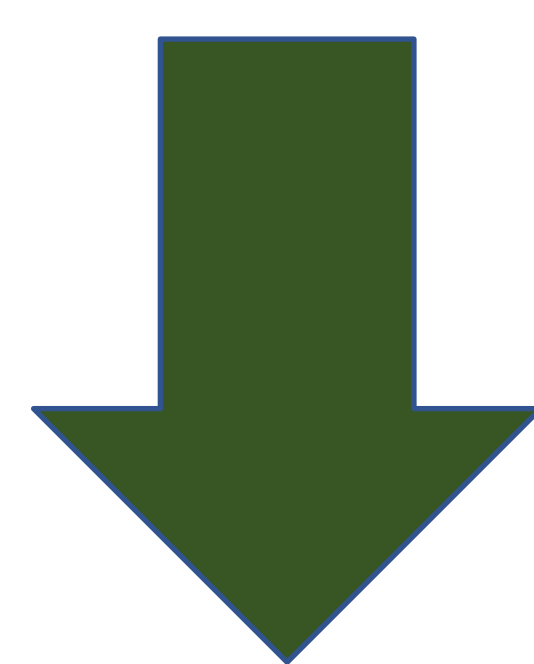
INTRODUCTION

- *Rynchops niger* = Black Skimmer
- Listed as "Species of Special Concern" by NYSDEC
- Migratory Colonial Waterbird
- Live in Salt Marshes and Coastal Beaches
- Global Warming leads to flooding, climate change & sea-level rise
- ↑ Sea-Level Rise = Salt Marsh Erosion
- Extremely picky about nesting colonies
- 89% Abandonment Rate
 - Flooding
 - Predation
 - Human Disturbances

HYPOTHESIS: If there is an increase in sea-level rise, then the number of Black Skimmer nesting colonies will decrease.



Sea-Level Rise



Black Skimmer Nesting Colonies

MATERIALS & METHODS

- A spreadsheet provided by the NYSDEC displayed Black Skimmer colonies in each of the beach and island colonies (1985-2020).
- Using data from the spreadsheet, we created 3 graphs:
 1. Tracking the annual population of Black Skimmers (Figure 2)
 1. Listing the number of annual Black Skimmer colonies (Figure 3)
 2. Creating a 5-year rolling average for total population and colonies (Figure 4)
- Google Earth was used to visualize the loss of colonies from 1985-2020 (Figures 1,1.1)
- NOAA was used to observe sea level rise in specific marsh islands (Figure 5)
- NASA Goddard Space Station tracked the sea level rise all over North America from 1993-2021 (Figure 5)

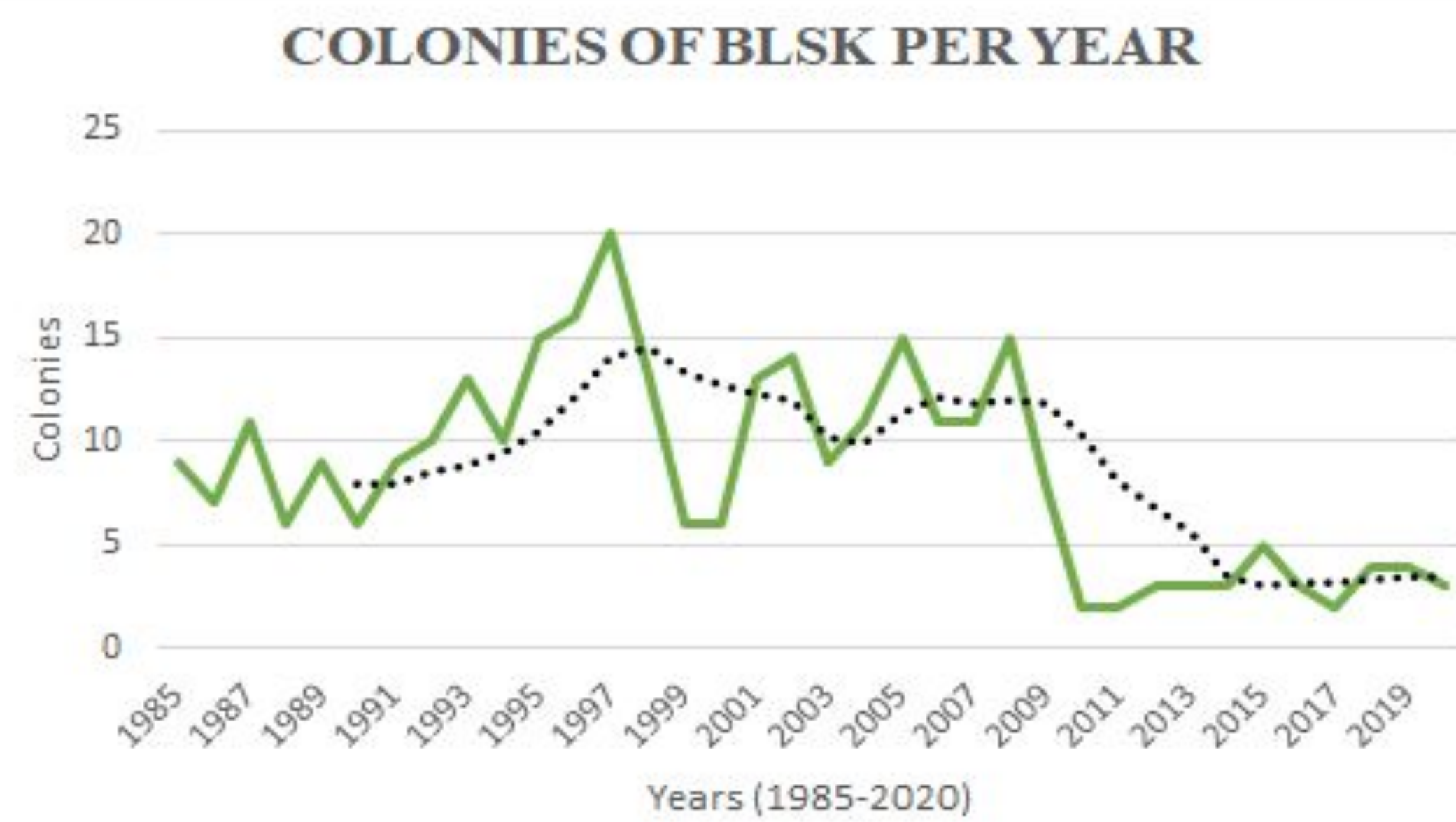


Figure 2. A graph of overall trends in the number of BLSK colonies annually from 1985 - 2020 (pictured in green) with a moving average trendline with a period of 6 represented by the dotted line.

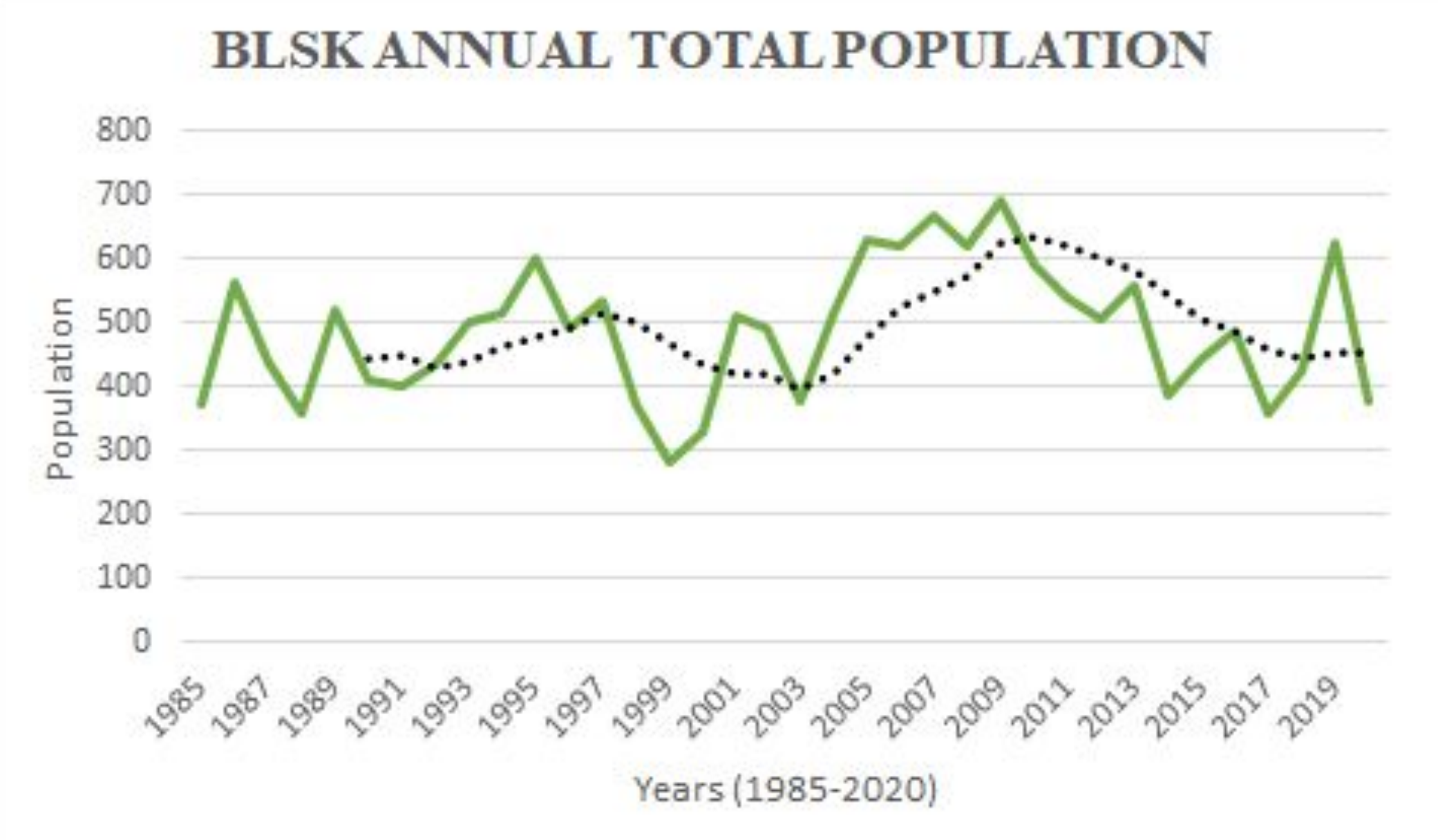


Figure 3. A graph of the total annual population of BLSK from 1985-2020 (pictured in green) with a moving average trendline with a period of 6 represented by the dotted line.

RESULTS

- Black Skimmer population begins decreasing (2017-2020)
- Number of Black Skimmer Colonies decrease
 - 1985 ($n=35$)
 - 2020 ($n=3$)
- 76.2 mm (about 3 inches) increase in sea-levels in the last 25 years
- 3.4 mm (about 1/10 inches) increase annually

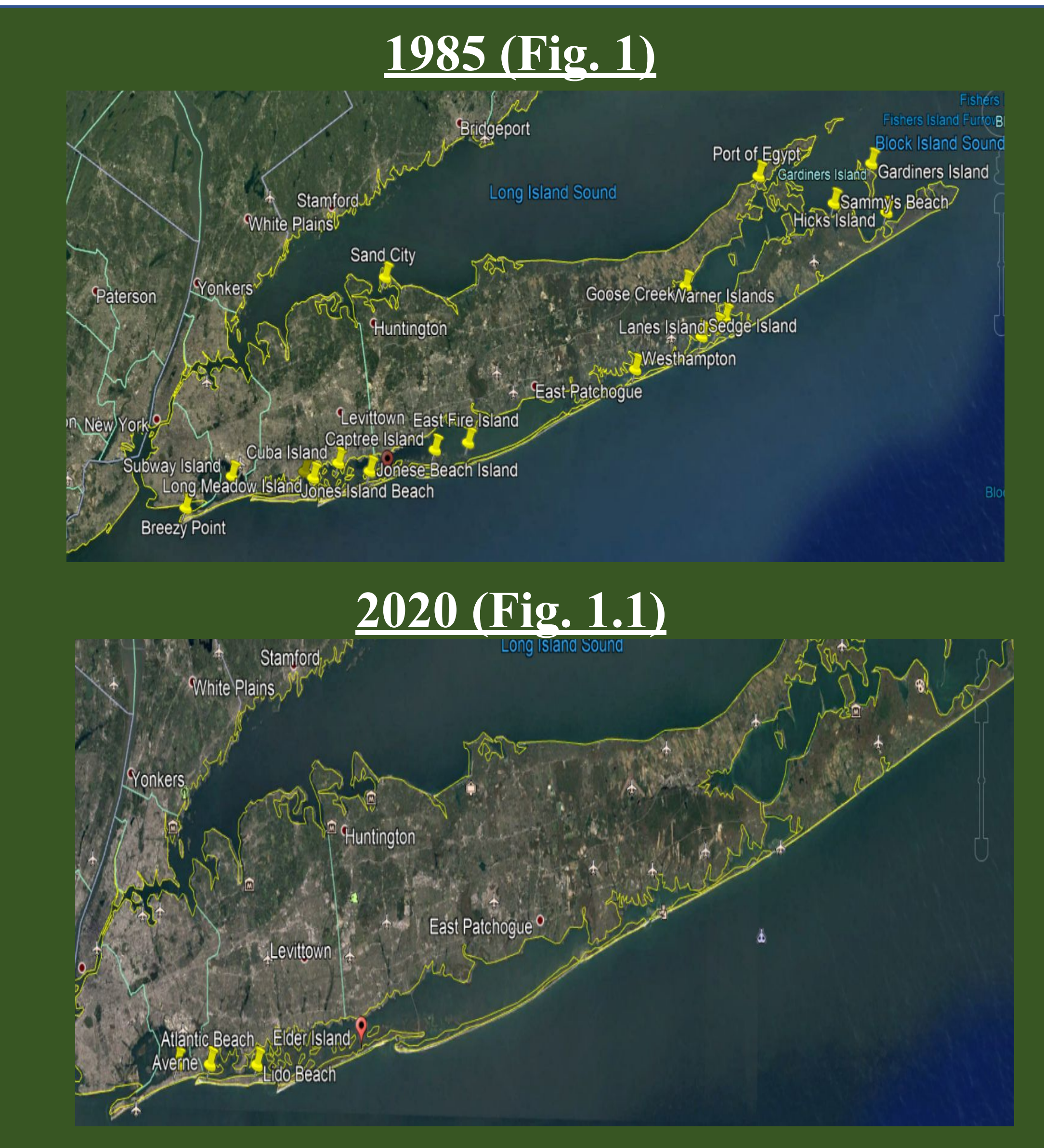


Figure 1. The initial capture of all colonies in Long Island that had BLSK nesting colonies from 1985-2020 using Google Earth.

Figure 1.1. A recent (2020) capture of existing BLSK nesting colonies in Long Island using Google Earth.

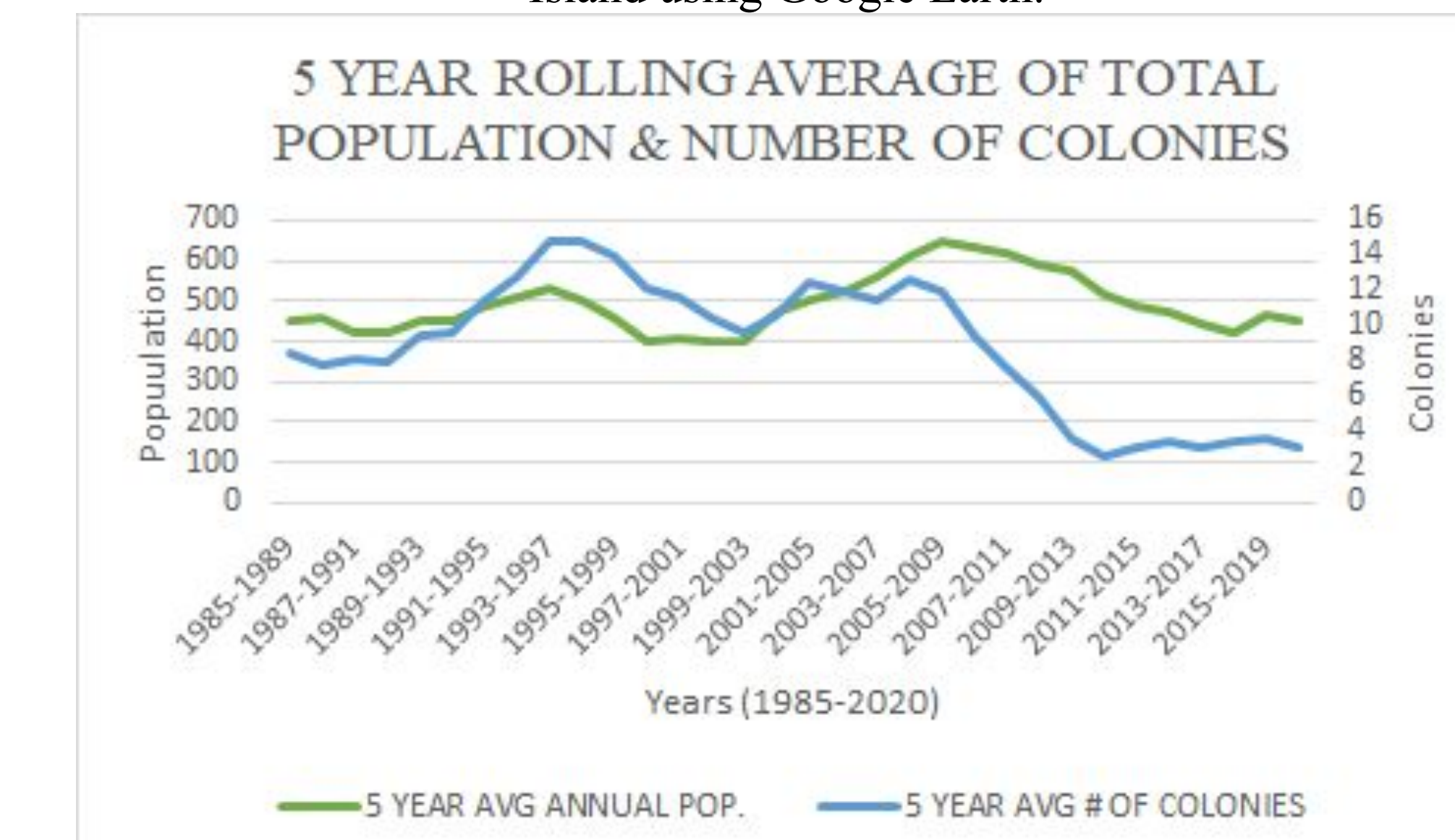


Figure 4. A graph of the 5 year rolling averages of the total BLSK populations and number of colonies to illustrate long-term trends.

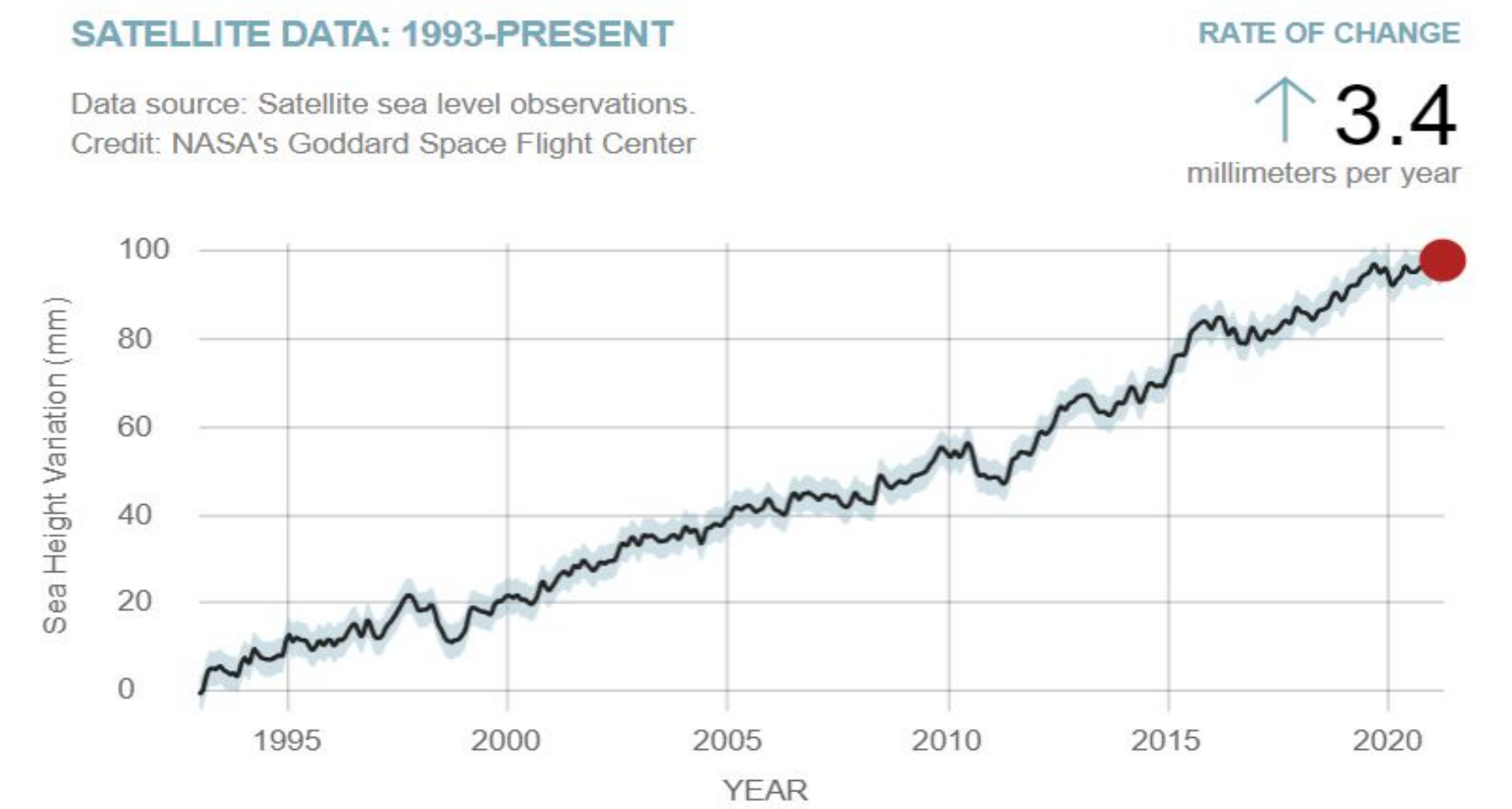


Figure 5. Sea-level measurement in millimeters from NASA's Goddard Space Flight Center via satellite from 1993-2021.

DISCUSSION

We realized that areas that experienced flooding and erosion as a result of sea level rise had caused a **decline** in Black Skimmer's population and reproductive success.

As a result, we recommend that Black Skimmers should be labeled as **endangered**.

- The Department of Environmental Conservation lists general criteria for animals qualifying as endangered, in which Black Skimmers fit 5 of the 11 listed criteria.

Future Initiatives:

1. Use our results to identify habitat nesting requirements
2. Continue to survey Black Skimmers during nesting season (April to May)
3. Test the effectiveness of various Black Skimmer conservation strategies

ACKNOWLEDGEMENTS

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