Interannual Variation in Beach-Nesting Bird Communities Across Contrasting Coastal Habitats of the Rockaway Peninsula, New York (2025-2026)



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Acknowledgments



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Why beach-nesting birds matter?



Dynamic Habitats

Coastal environments are highly heterogeneous, shaped by wave action, sediment drift, and anthropogenic modifications[1].



Contrasting Strategies

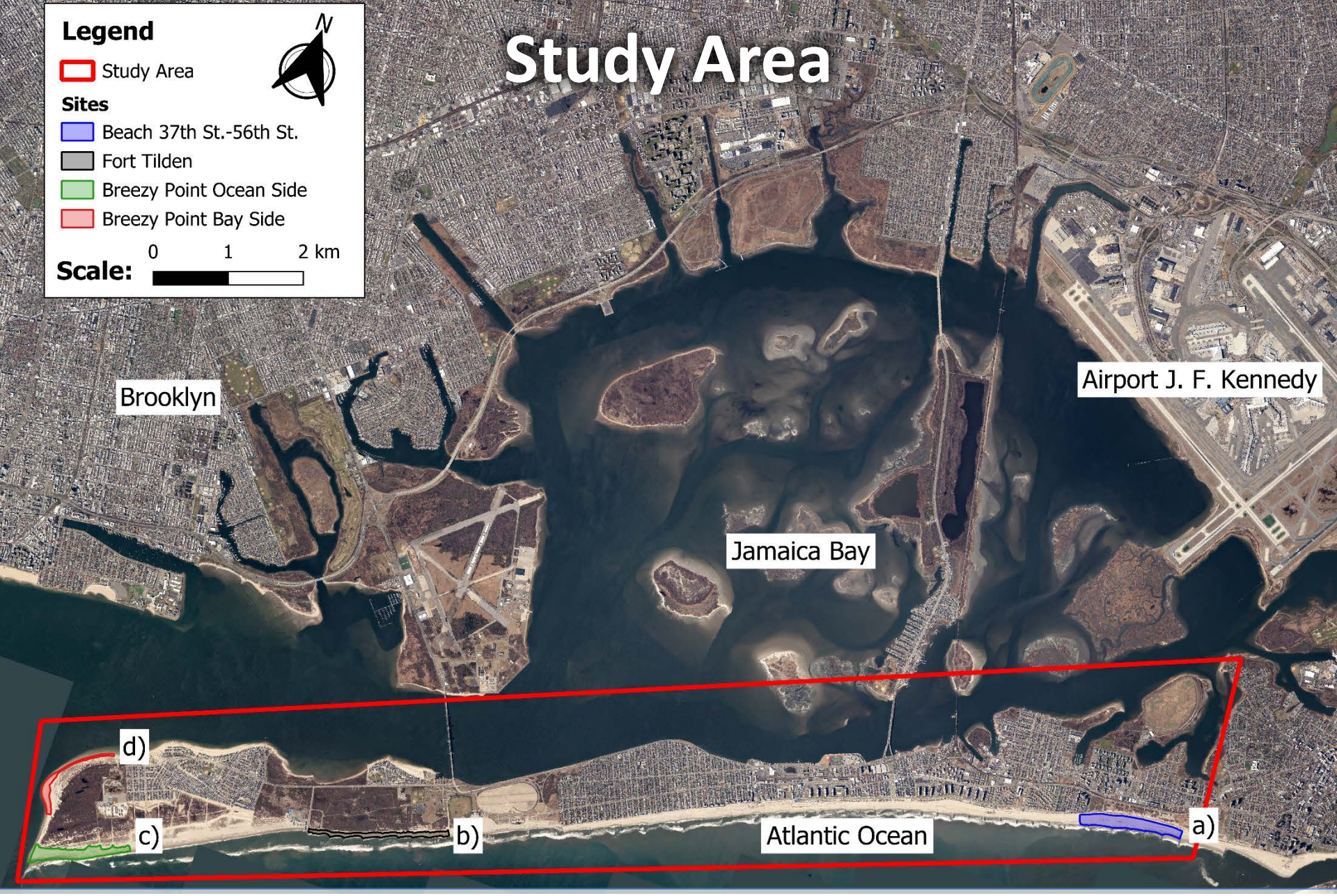
Species utilizing the same barrier system exhibit vastly different nesting behaviors, spatial organization, and habitat requirements[2].



Vulnerability

These populations fase accelerating pressures from habitat change, coastal infraestructura, and dense recreational use[2,3].

[1] 10.3390/jmse10070989
[2] 10.1002/ece3.4564
[3] 10.1093/ornithapp/duad003



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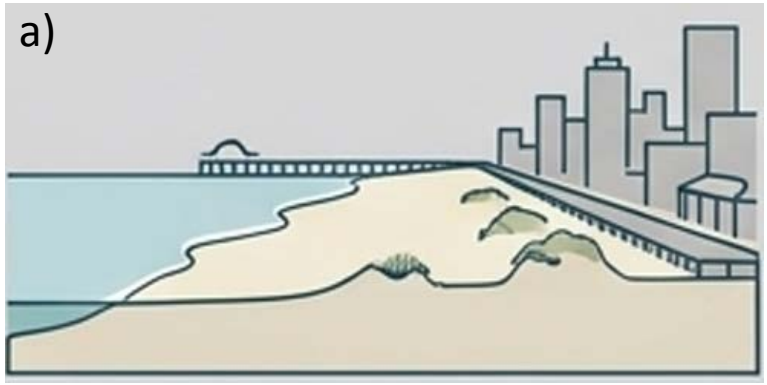
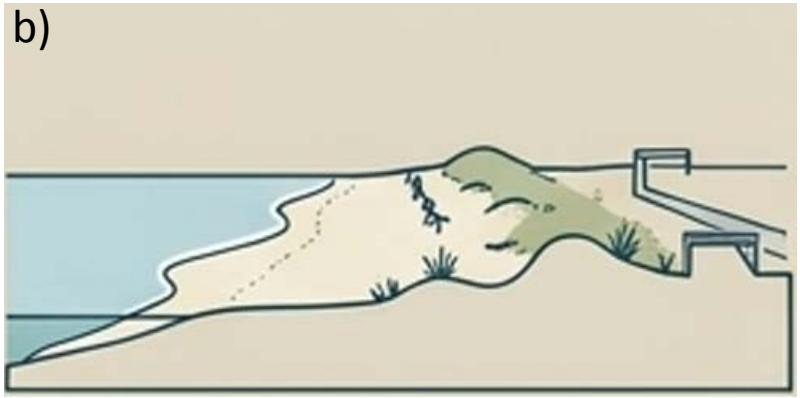
Study Area



Beach 37th–56th St. (B): Managed urban beach with wide sand, low dunes, high recreation, and nearby infrastructure.



Fort Tilden (FT): Semi-natural beach with developed dunes, mari time vegetation, wetlands, and relatively low human disturbance.



Breezy Point Ocean Side (OS): Exposed, largely undeveloped oceanfront with wide beaches, extensive dunes, and strong Atlantic influence.



Breezy Point Bay Side (BS): Sheltered Jamaica Bay habitat with tidal flats, salt marshes, and spatially constrained sandy nesting areas.

The Research Gap

Total nest abundance alone provides an incomplete baseline for community dynamics.



Species Composition **Spatial Distribution** **Temporal Phenology**

True Community Trajectories

Objective: Compare 2025-2026 data across four sectors using species-level counts, geolocated nest records, and temporal aggregation of maximum recorded egg counts.



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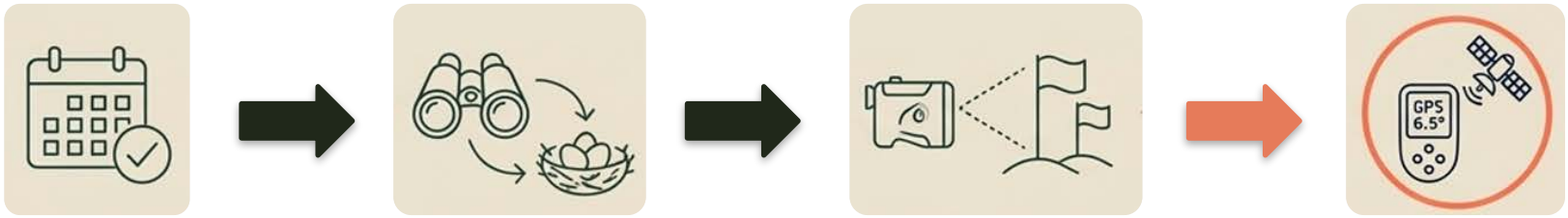
Methodology



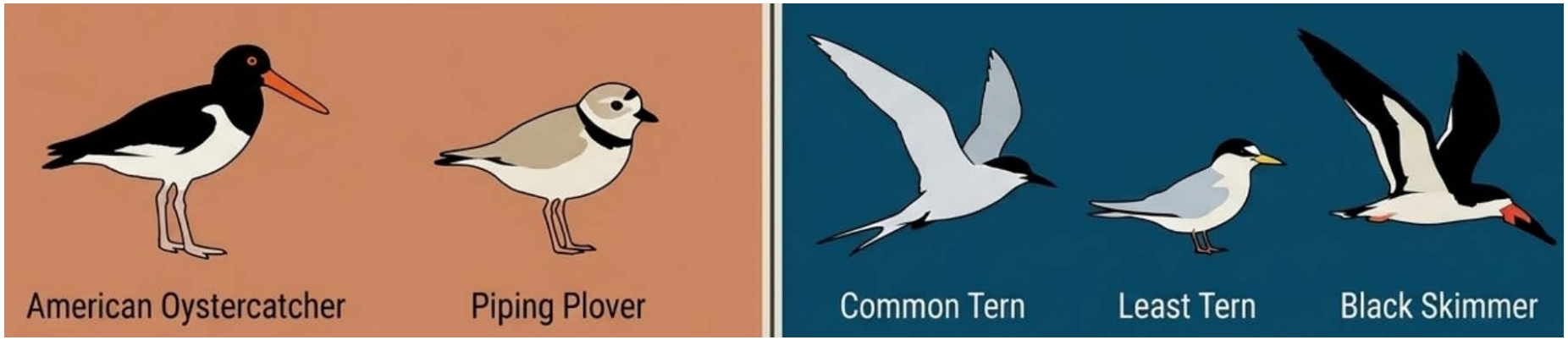
Weekly Surveys
(15 weeks per season, 2 seasons)

Nest Detection

Rangefinder + Seasonal Markers

Final GPS Coordinates
(collected after breeding season)

260 Total Nests Analyzed | 2025-2026



Results

A Moderate Increase Conceals Major Compositional Shifts

Total Nests:

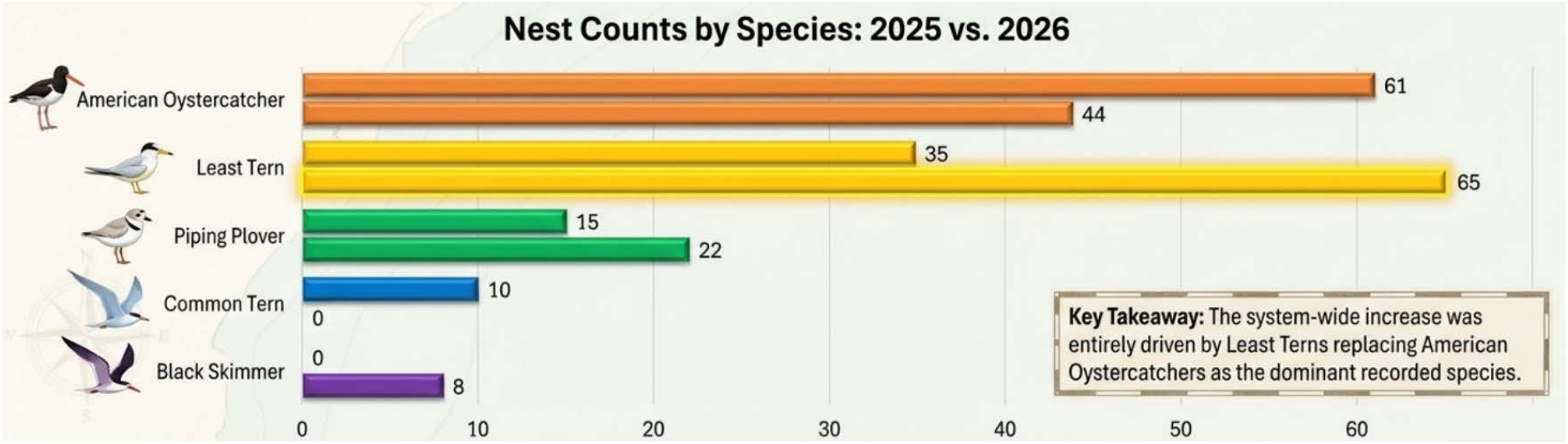
121 → 139

(+14.9%)

Recorded Eggs:

269 → 304

(+13.0%)





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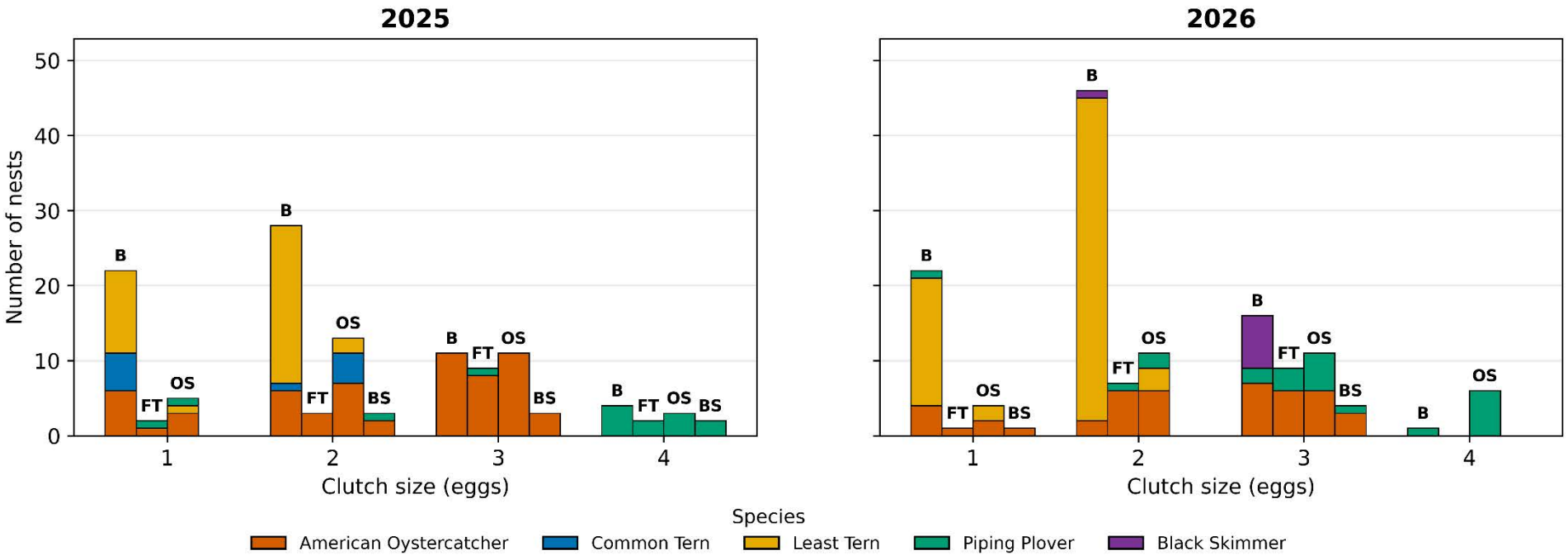
Results

Clutch-size frequencies changed, while the overall mean remained similar





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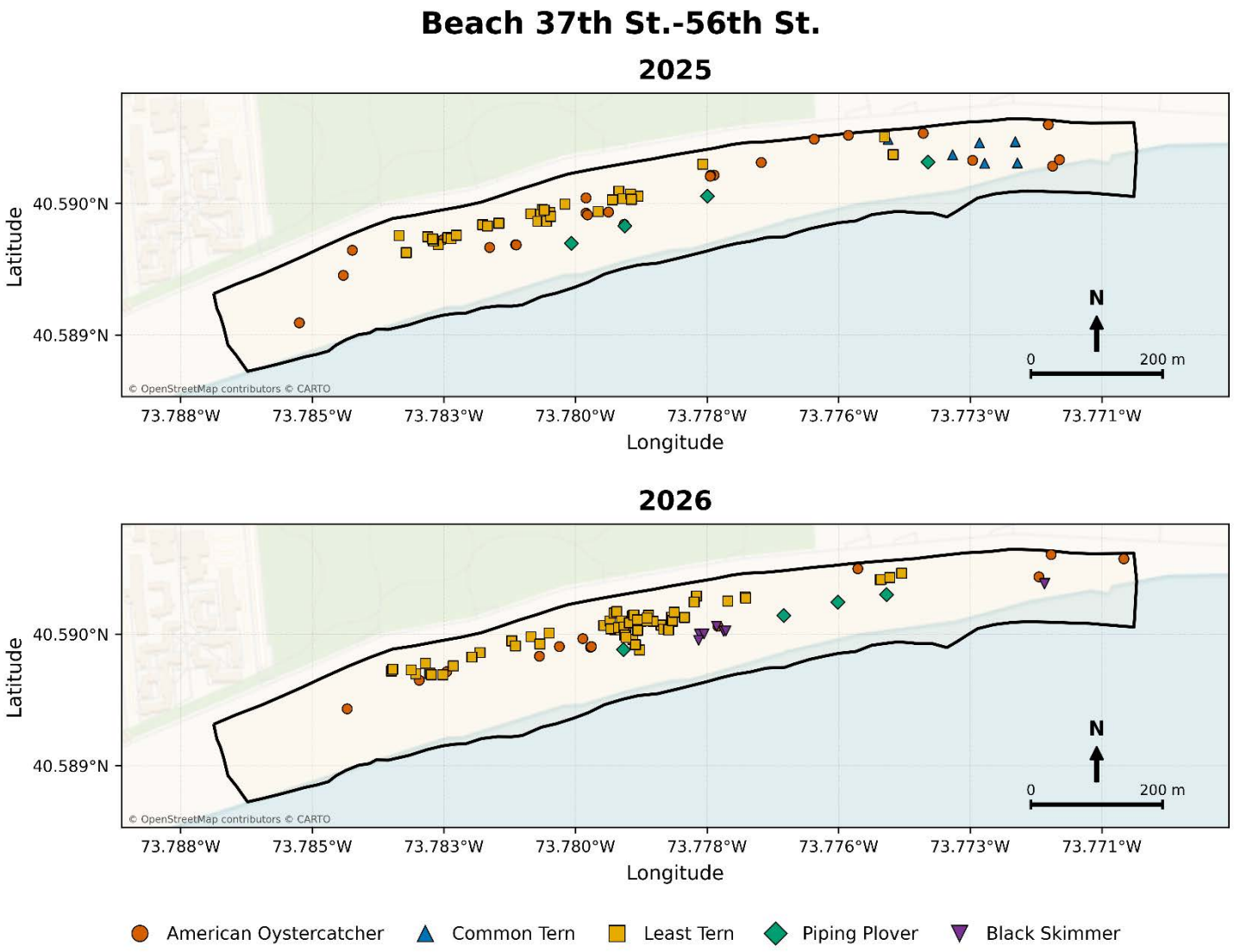
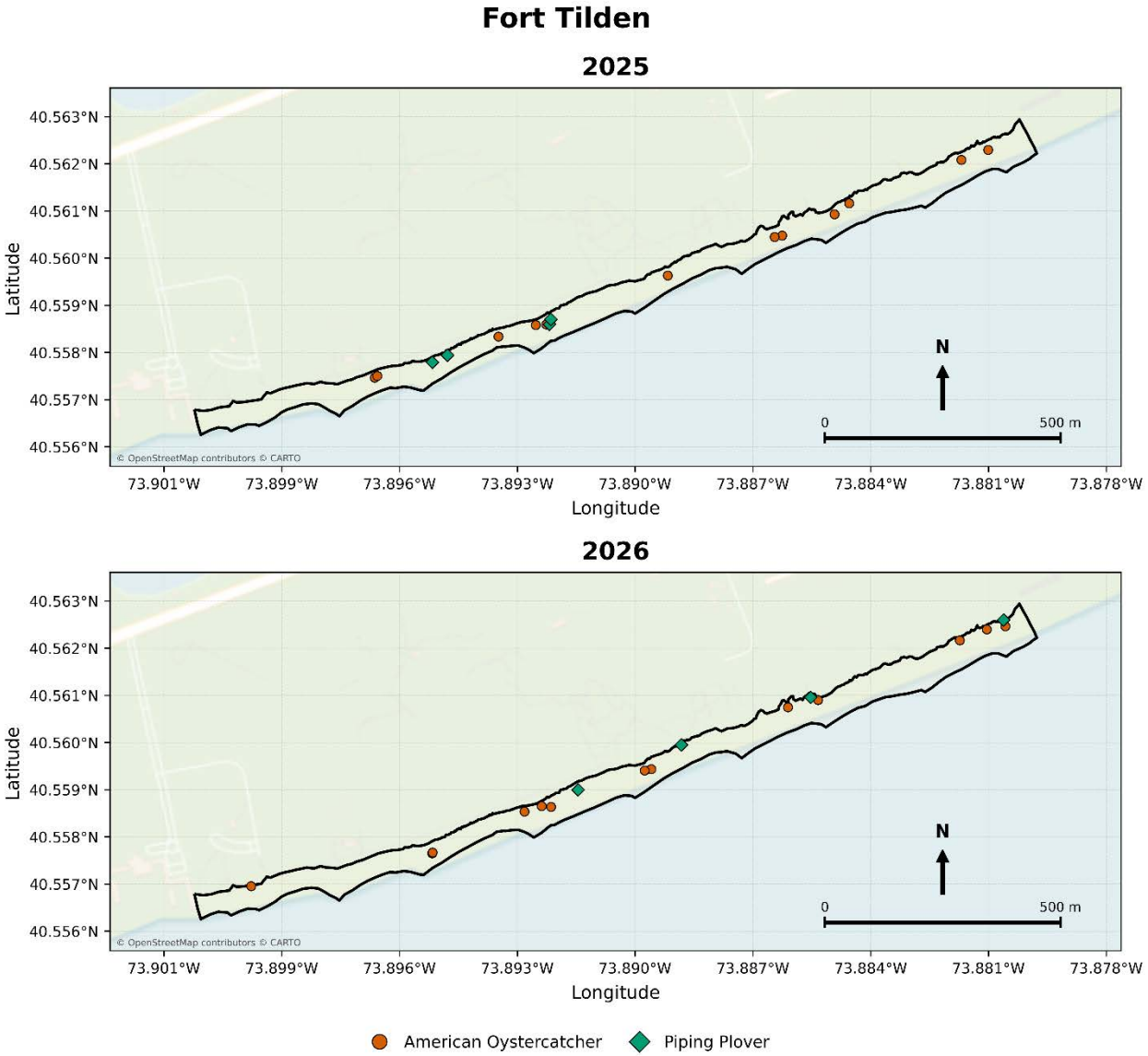
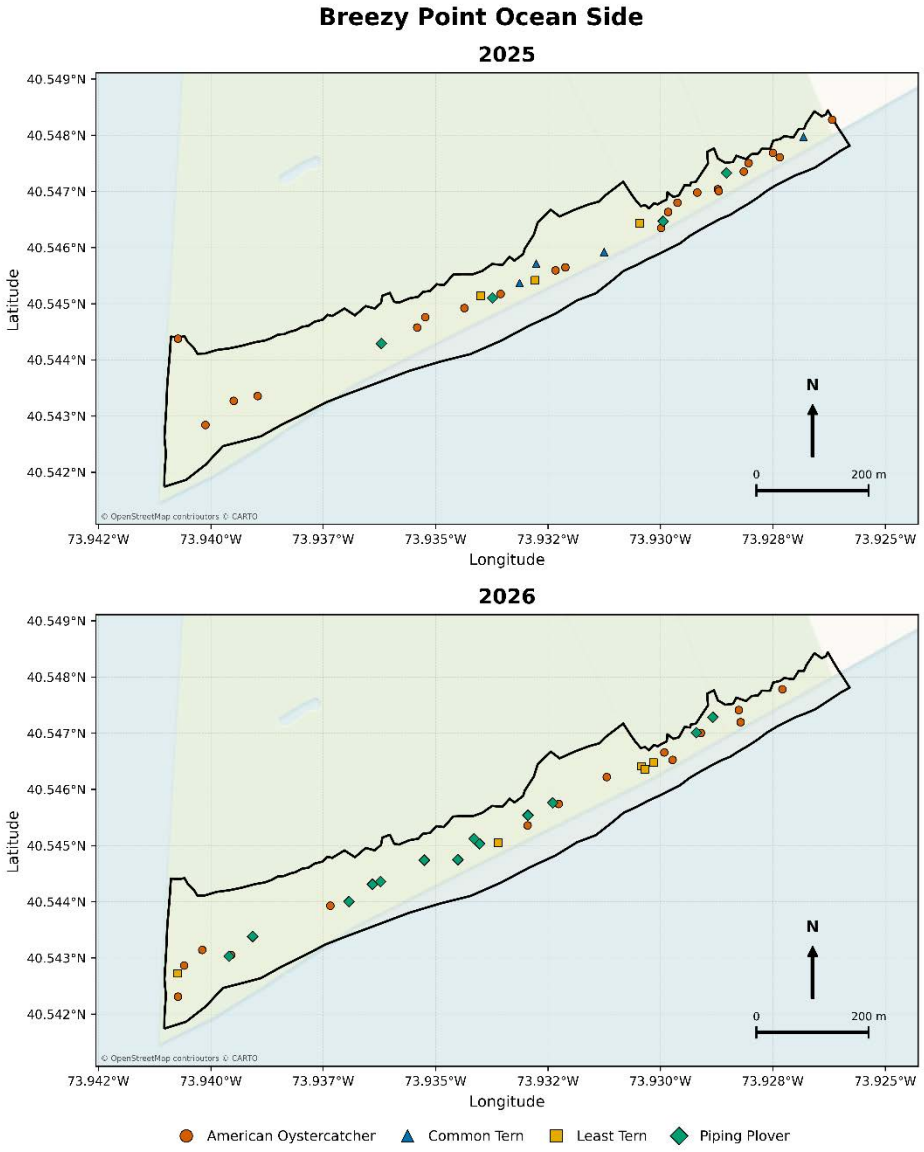
Results: Study Area



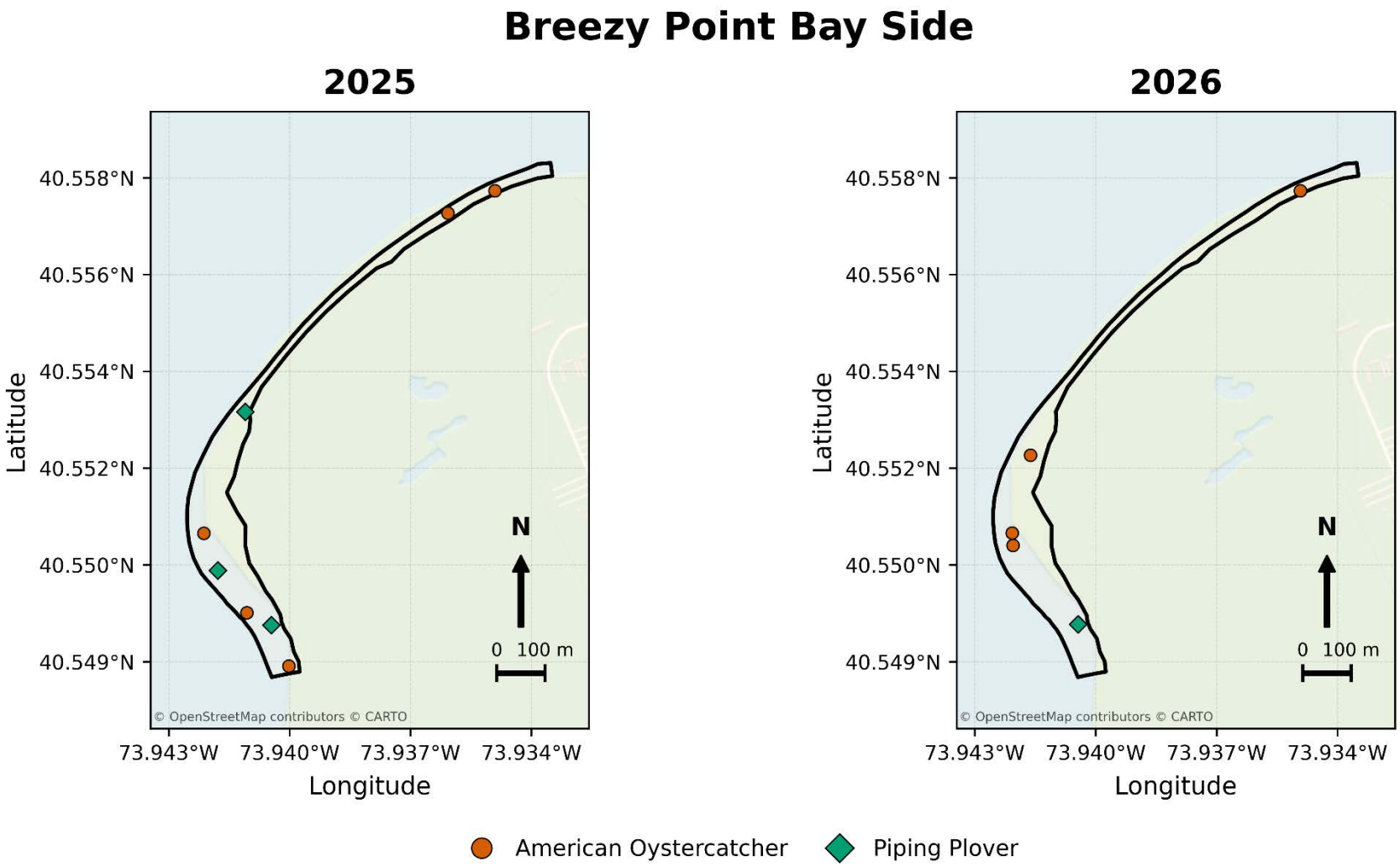
Results: Study Area



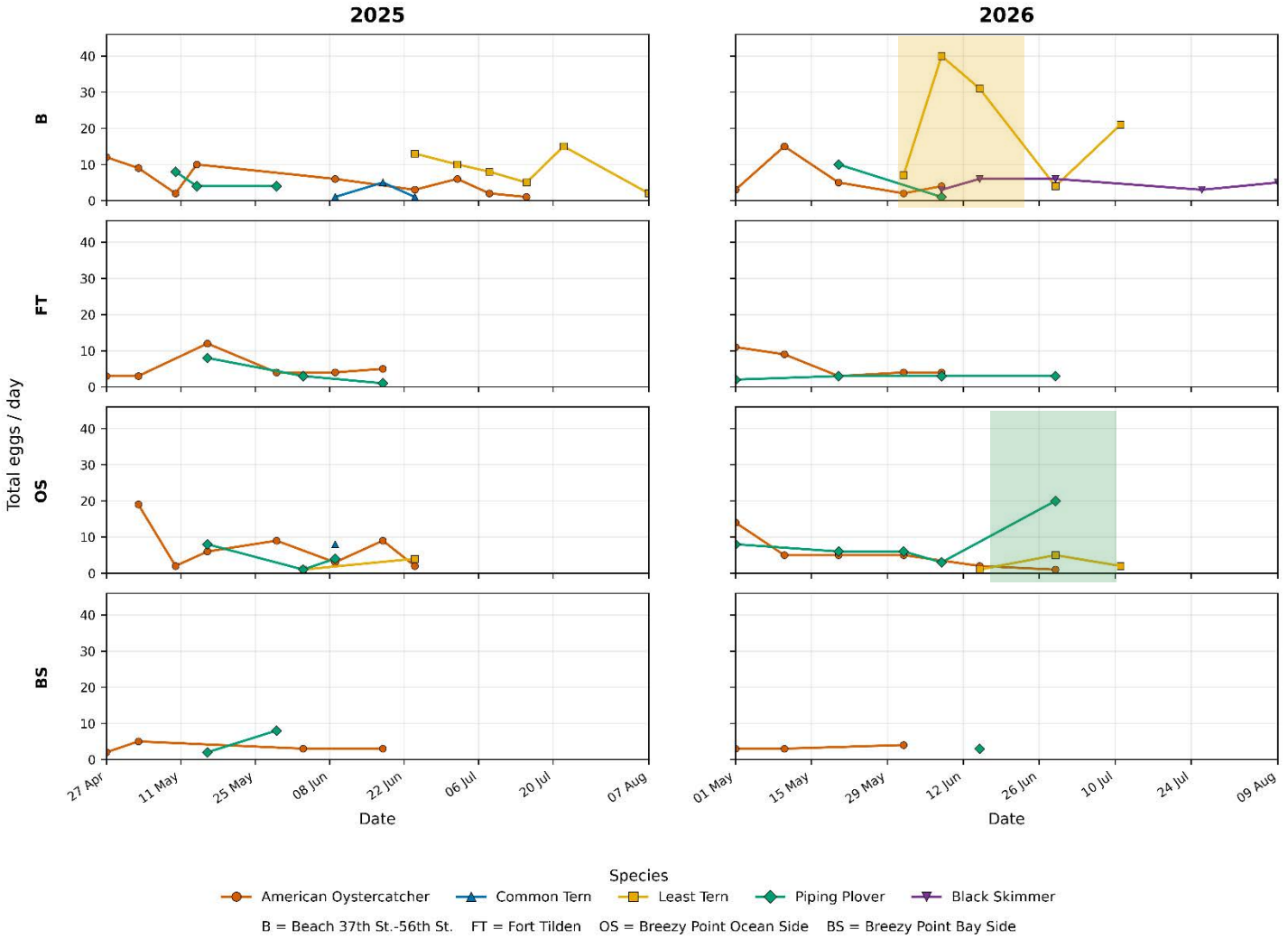
Results: Study Area



Results: Study Area



Results: Temporal Phenology of Recorded Egg Counts



Sector B: Massive mid-June concentration driven entirely by the influx of Least Terns in 2026.

Sector OS: Distinct late-June maximum driven by Piping Plovers in 2026.



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Discussion

Integrating Local Patterns with Ecological Theory

Rockaway Finding	Literature Alignment
Species-Specific Variation	
Contrasting interannual changes in nest abundance among species (American Oystercatcher vs. Least Tern).	Beach-nesting shorebirds can exhibit contrasting population trajectories under shared environmental pressure[1].
Spatial Organization	
Concentrated Least Tern nesting versus more dispersed American Oystercatcher and Piping Plover locations.	Conspecific attraction and colony-site selection contribute to tern nesting patterns, while Piping Plovers may show different nest-site associations[2,3].
Temporal Phenology	
Species- and year-specific concentrations in maximum recorded egg counts.	Breeding phenology and clutch characteristics may vary seasonally and with local habitat conditions[4] .

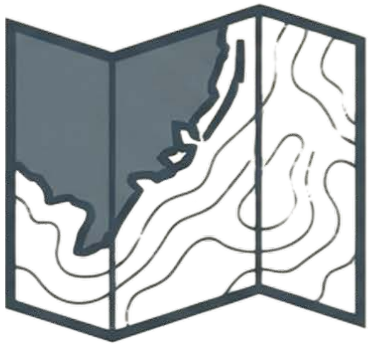
[1] 10.1016/j.biocon.2021.109178
[2] 10.1111/jofo.12206
[3] 10.1093/czoolo/60.4.500
[4] 10.2193/2007-553

Implications for Coastal Management



Maintain species-specific monitoring

Avoid relying solely on total nest abundance.



Monitor all four sectors

Prioritize consistent documentation of established nesting concentrations while retaining coverage of lower-abundance sites.



Extend long-term monitoring

Integrate habitat conditions, disturbance, and reproductive outcomes in future studies.



1. Moderate abundance increase, substantial species turnover.
2. Stable nest totals, changing community composition.
3. Species-specific, spatial, and temporal monitoring is essential.



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Questions?

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