Estimating tidal marsh bird population sizes in the Northeast, USA

Whitney A. Wiest, Maureen D. Correll, Brian J. Olsen, Chris S. Elphick, Thomas P. Hodgman, David R. Curson, and W. Gregory Shriver

Delaware Wetlands Conference

3 February 2016

Northeast salt marsh

Tidal marsh specialist birds

Rallidae

1. Clapper Rail (*Rallus crepitans*)

Scolopacidae

2. Willet (*Tringa semipalmata*)

Emberizidae

3. Nelson's Sparrow (*Ammodramus nelsoni*)

4. Saltmarsh Sparrow (*A. caudacutus*)

5. Seaside Sparrow (*A. maritimus*)

Monitoring issues

Difficulties

- Birds are cryptic and secretive
- Habitat is difficult to access
- Underrepresented on BBS routes (roadside)

Common monitoring program limitations

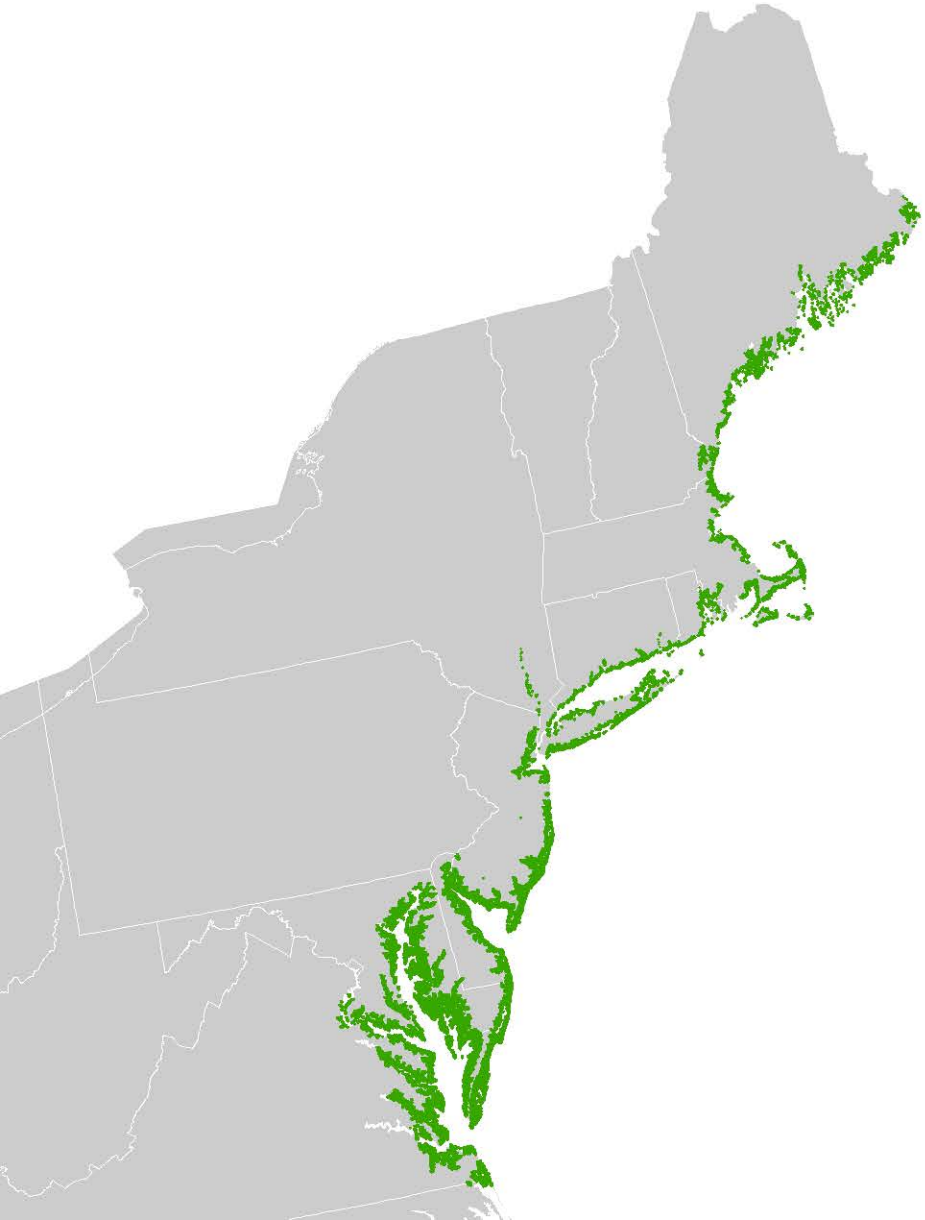
- Budget, equipment, time, personnel

1998 International Marsh Bird Monitoring Workshop

- Standardized North American marsh bird monitoring protocol (Conway 2011)
- A sampling design framework for monitoring secretive marshbirds (Johnson et al. 2009)

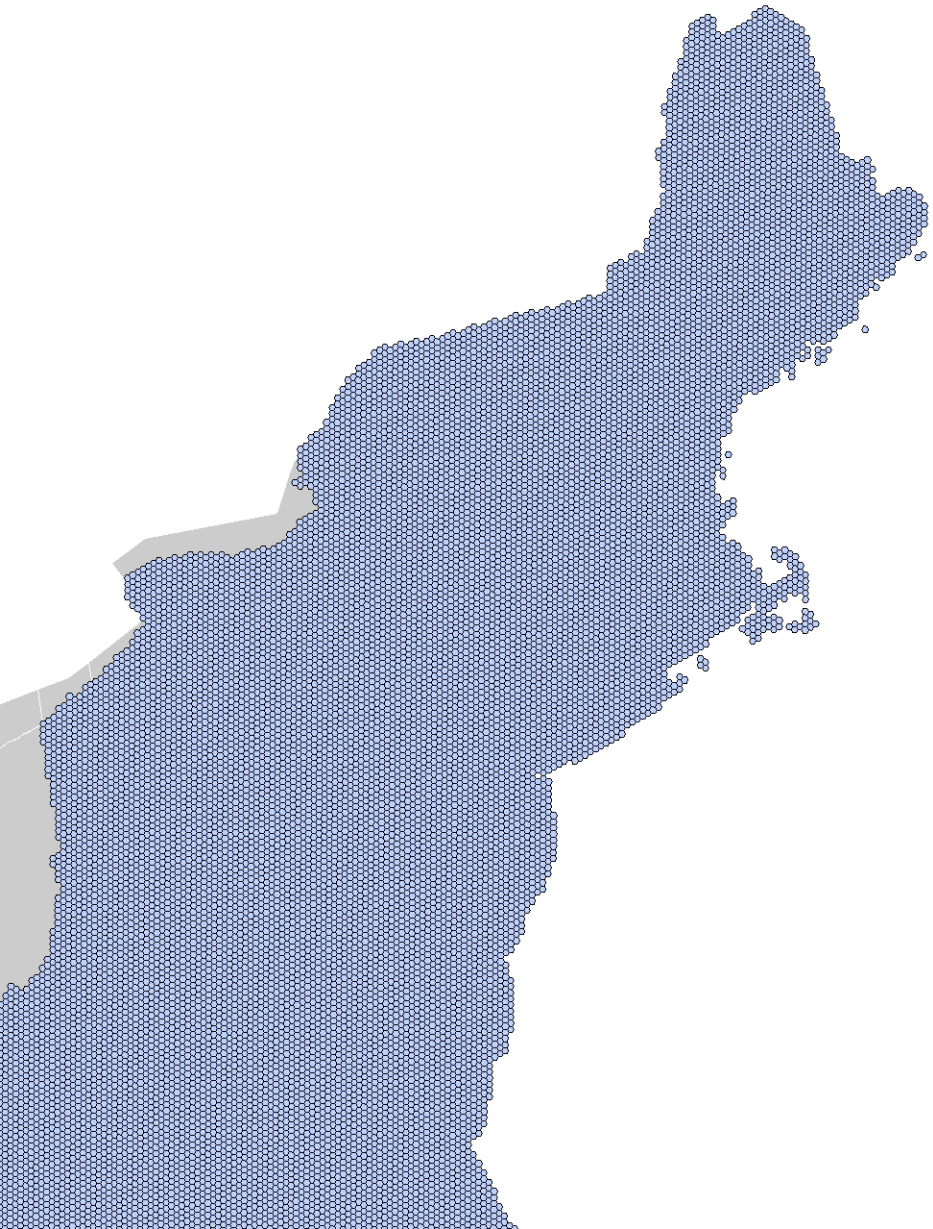
Photo credit: Viewing nature with Eileen, UMCES

Study area



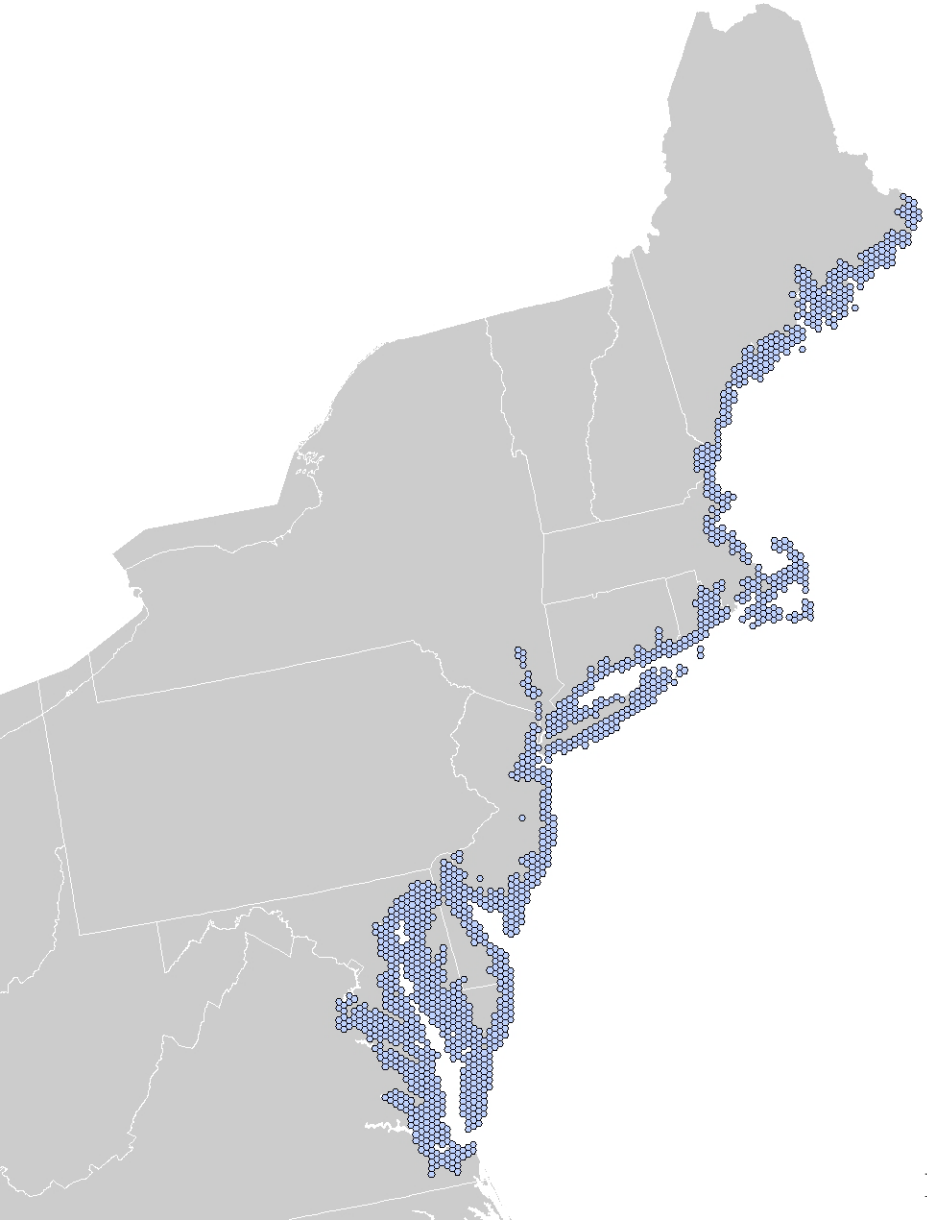
National Wetlands Inventory
estuarine intertidal emergent wetland (E2EM)

Sampling design



Atlantic Flyway
40 km^2 hexagons

Sampling design



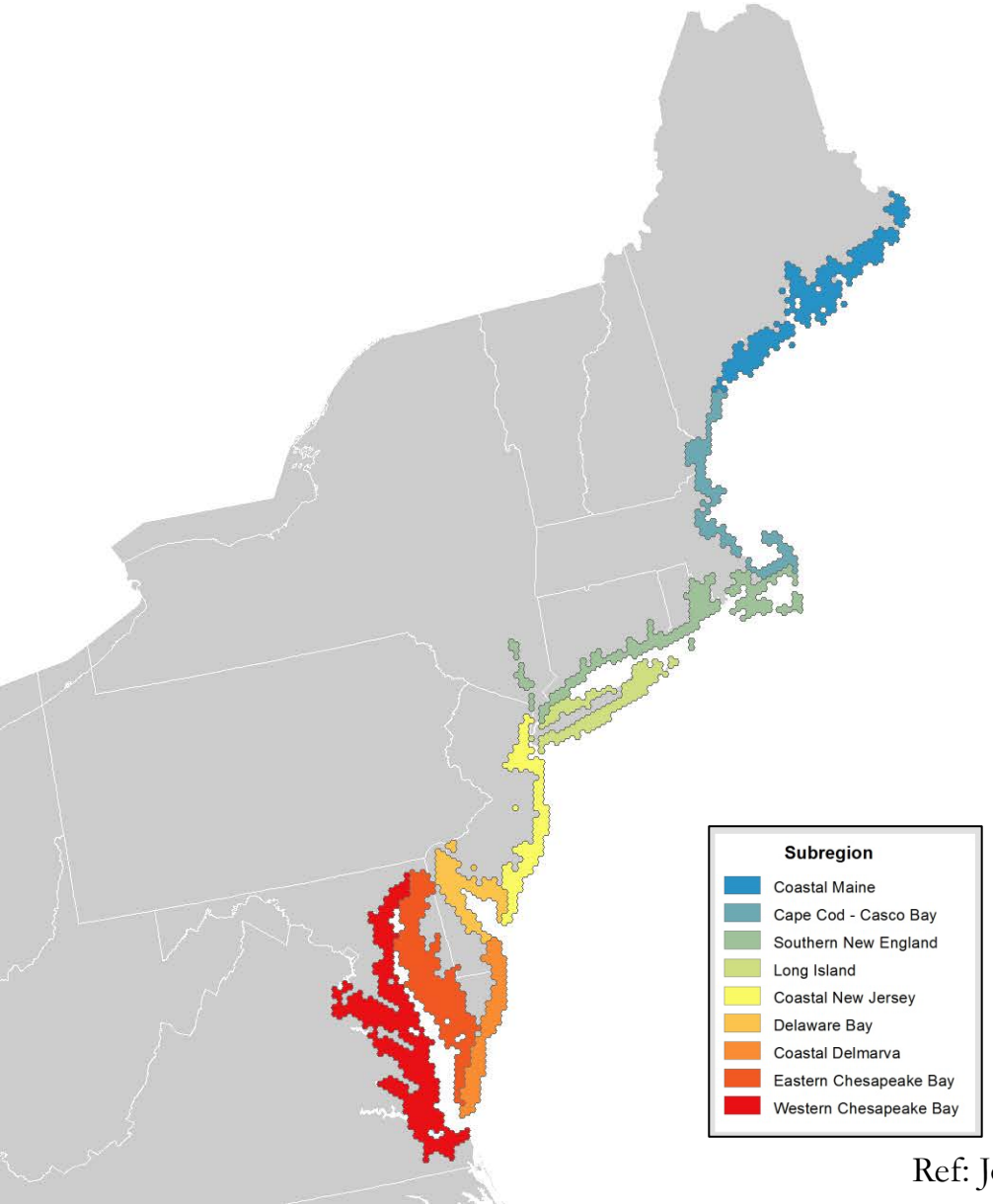
Sampling Universe
40 km^2 hexagons with
estuarine intertidal emergent wetland

Two-stage Cluster Sample

- Primary sampling units - hexagons
- Secondary sampling units - survey points

Ref: Johnson et al. 2009, Kincaid and Olsen 2012, Thompson 2012

Sampling design



Sampling Universe

40 km^2 hexagons with
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- Primary sampling units - hexagons
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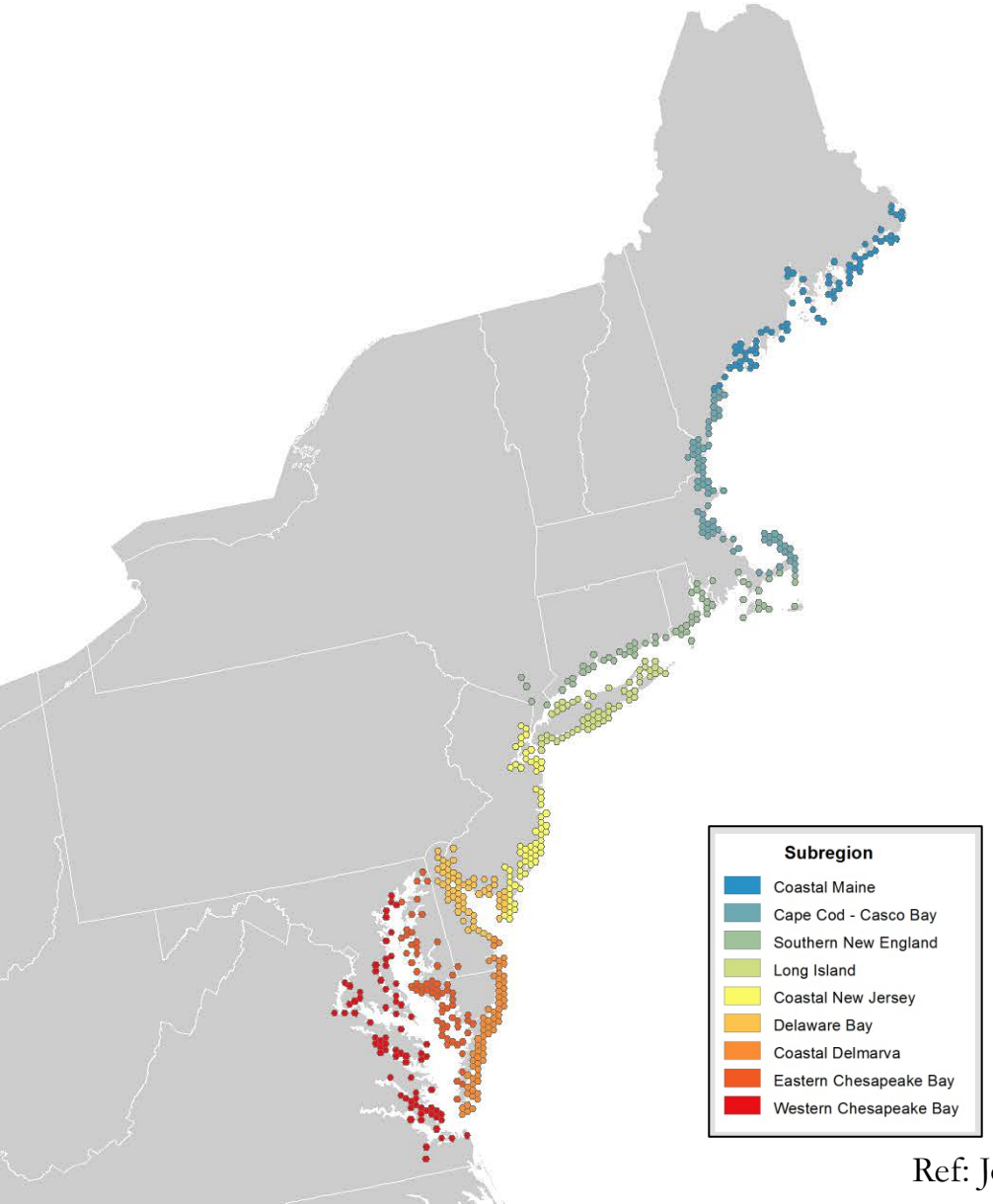
Generalized Random Tessellation Stratified (GRTS)

- Probabilistic sample
- Spatially balanced
- Flexible
- Program R - spsurvey

Ref: Johnson et al. 2009, Kincaid and Olsen 2012, Thompson 2012

Sampling design



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Hexagon Selection

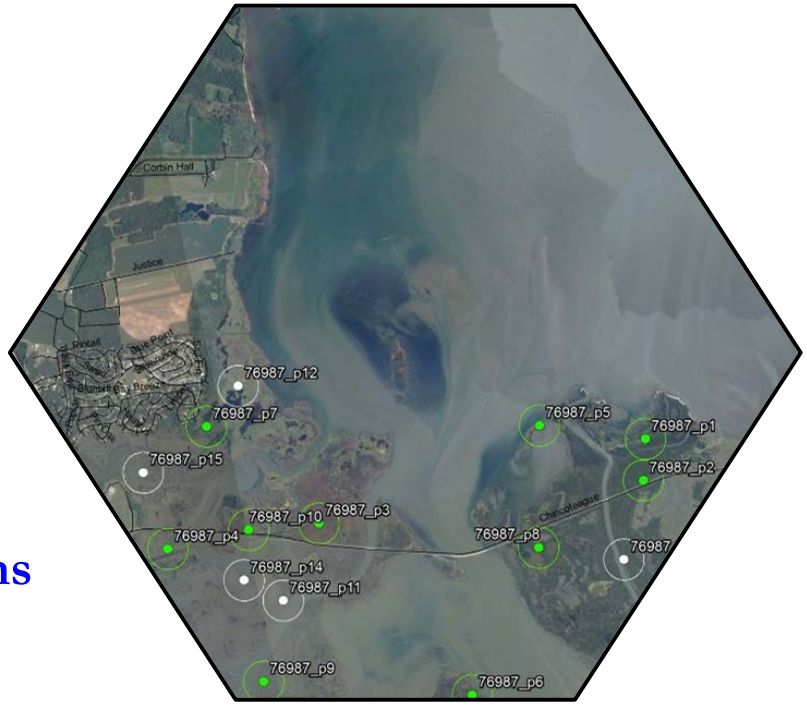
1. Random draw by subregion
2. Random draw by state lands
3. Forced inclusion of federal lands (USFWS/NPS)

Ref: Johnson et al. 2009, Kincaid and Olsen 2012, Thompson 2012

Sampling design / Bird sampling

Survey Point Selection

- Historic marsh bird survey points (20 projects)
- Random points using GRTS
- 400 m between points

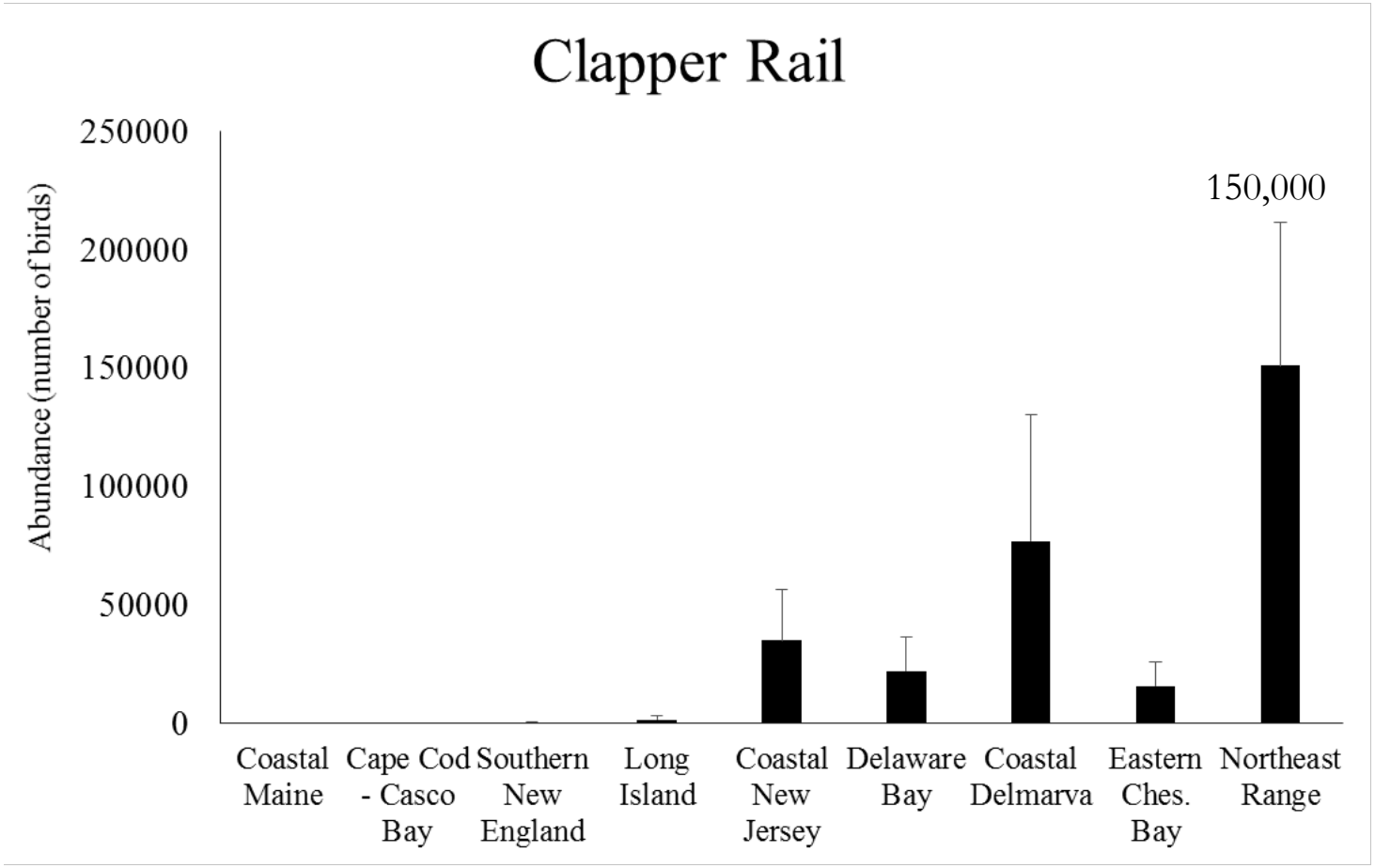


Total: 1,780 points sampled in 277 hexagons

Standardized North American Marsh Bird Monitoring Protocols (Conway 2011)

- 5-minute point count + call-broadcast
- Distance bands: 0-50 m, 50-100 m, 100+ m
- 2-3 surveys/point during 2011-2012 breeding seasons (mid-April to July)

Population size



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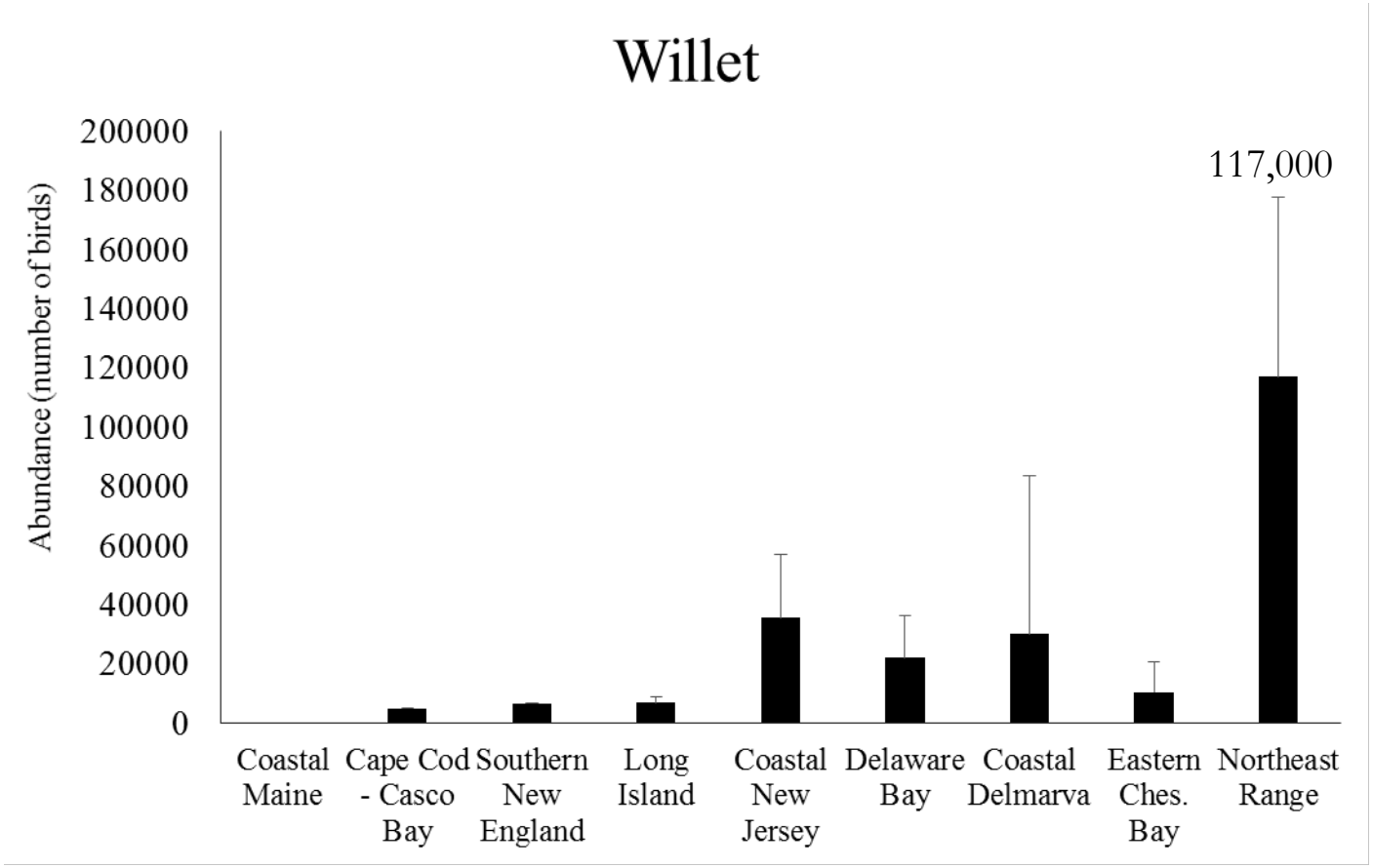
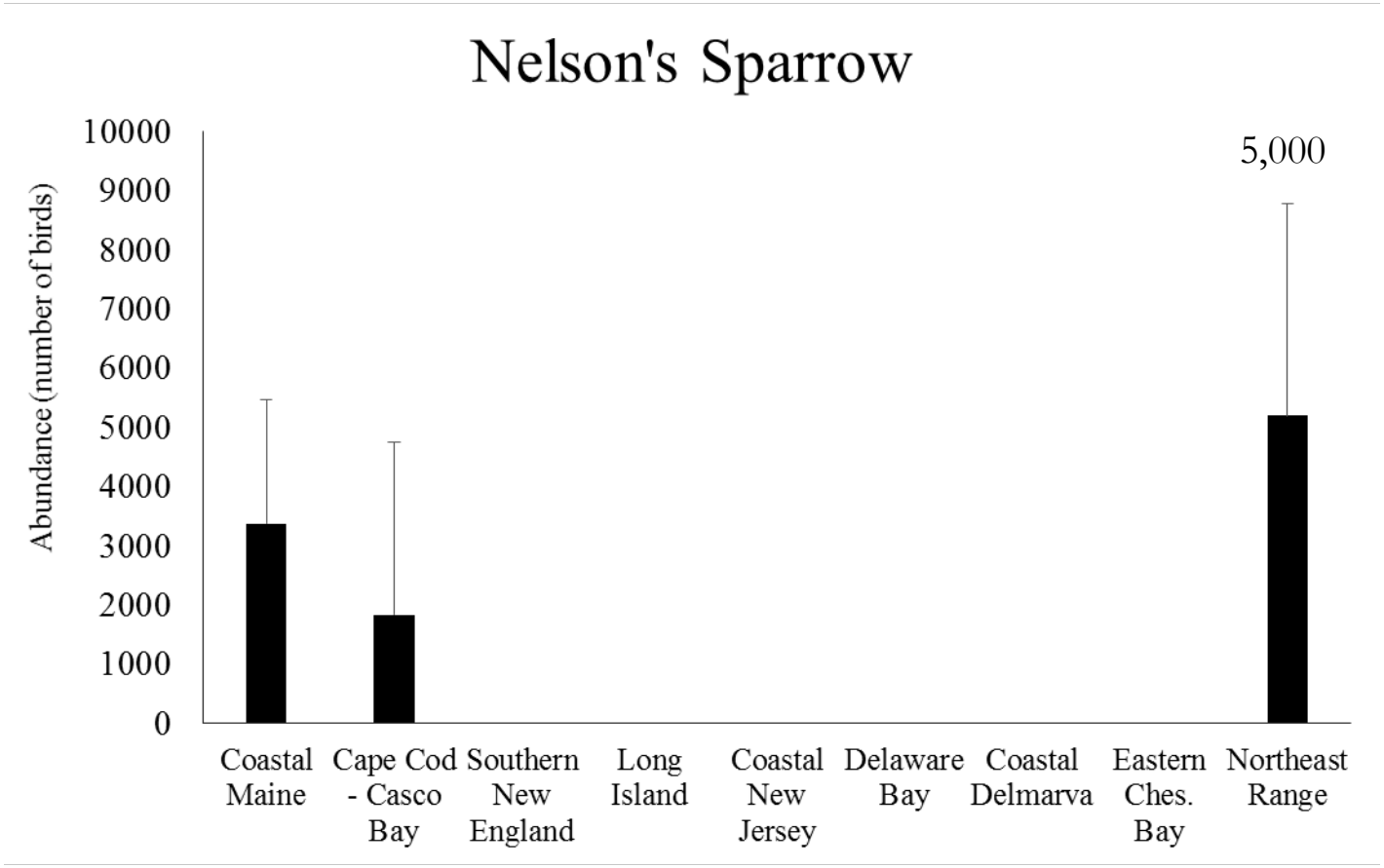


Population size



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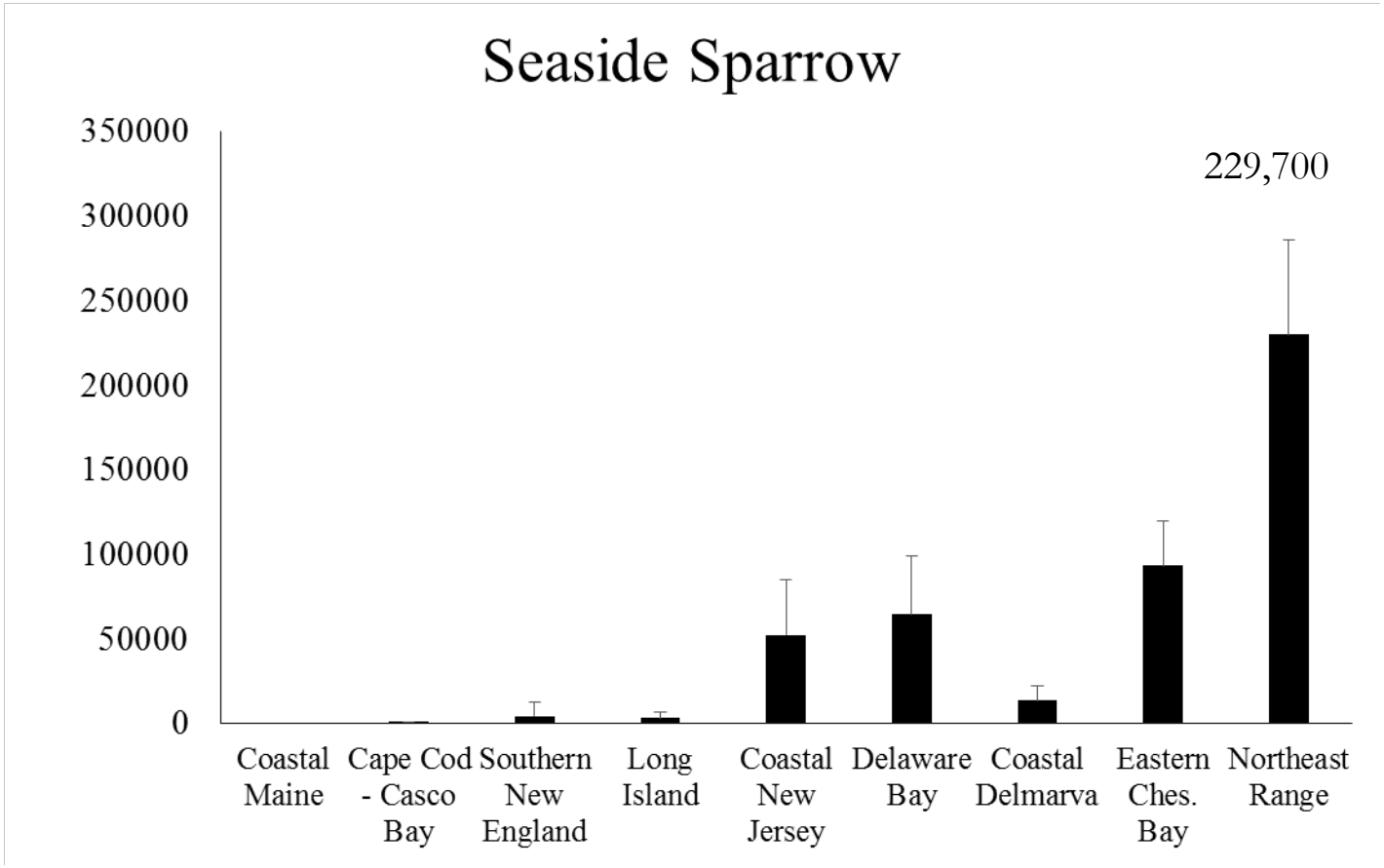
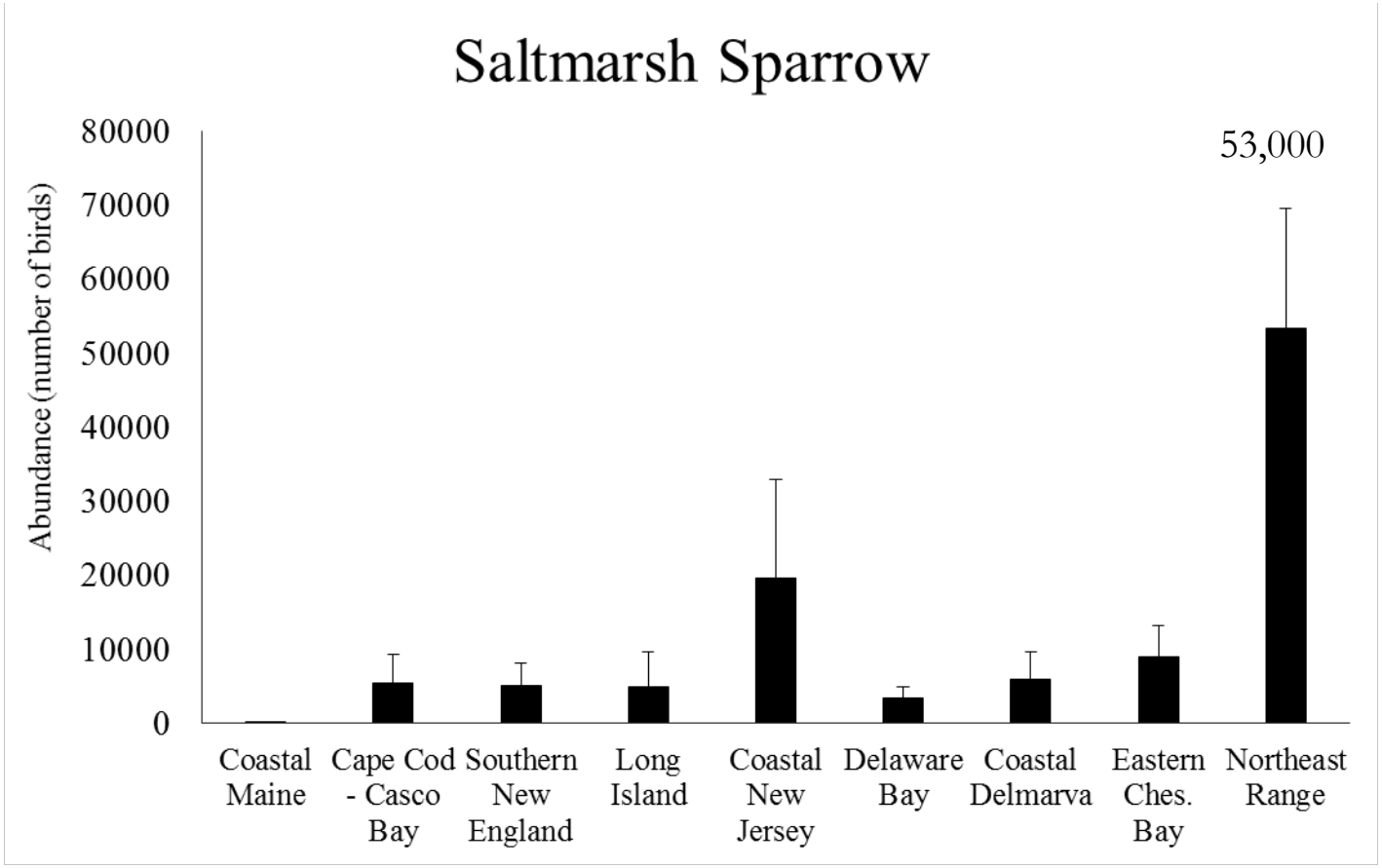
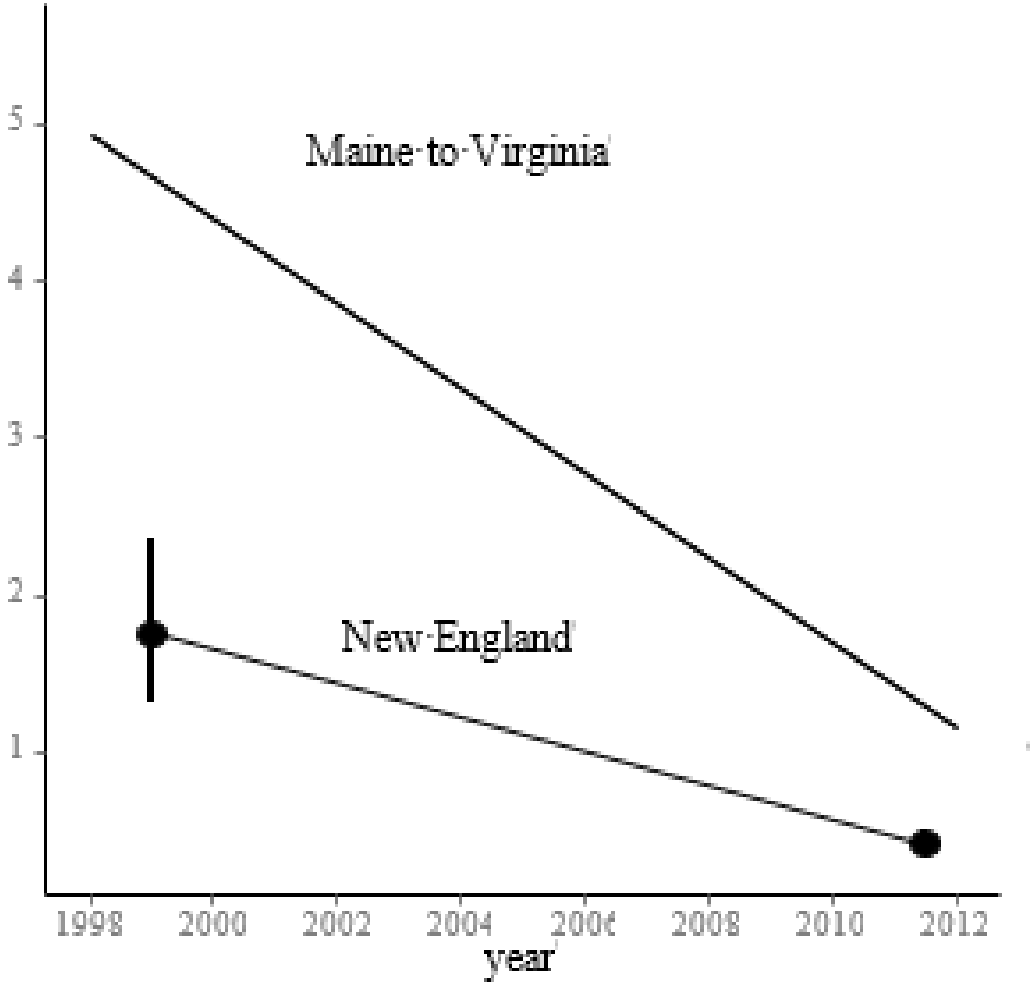


Population size



Population trend – Saltmarsh Sparrow



THANK YOU
SHARP collaborators!!!

… and many more

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RESEARCH ARTICLE

Population estimates for tidal marsh birds of high conservation concern in the northeastern USA from a design-based survey

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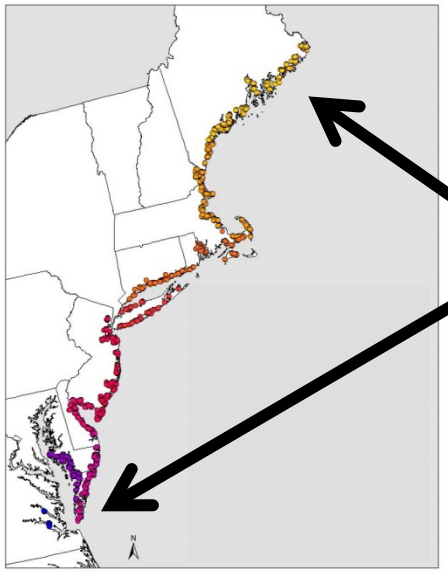
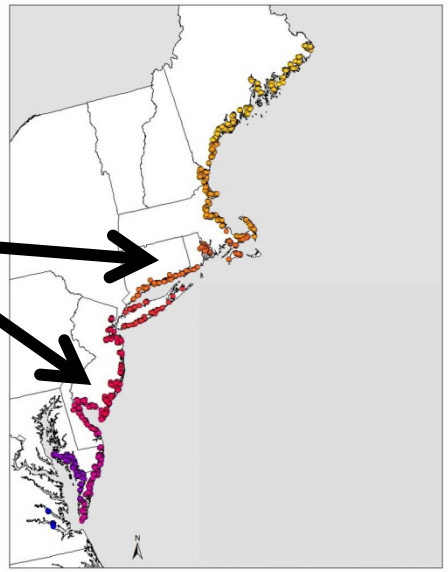
BACI study design

Before

After



Control – **I**mpact



2011-2012

2013-2014

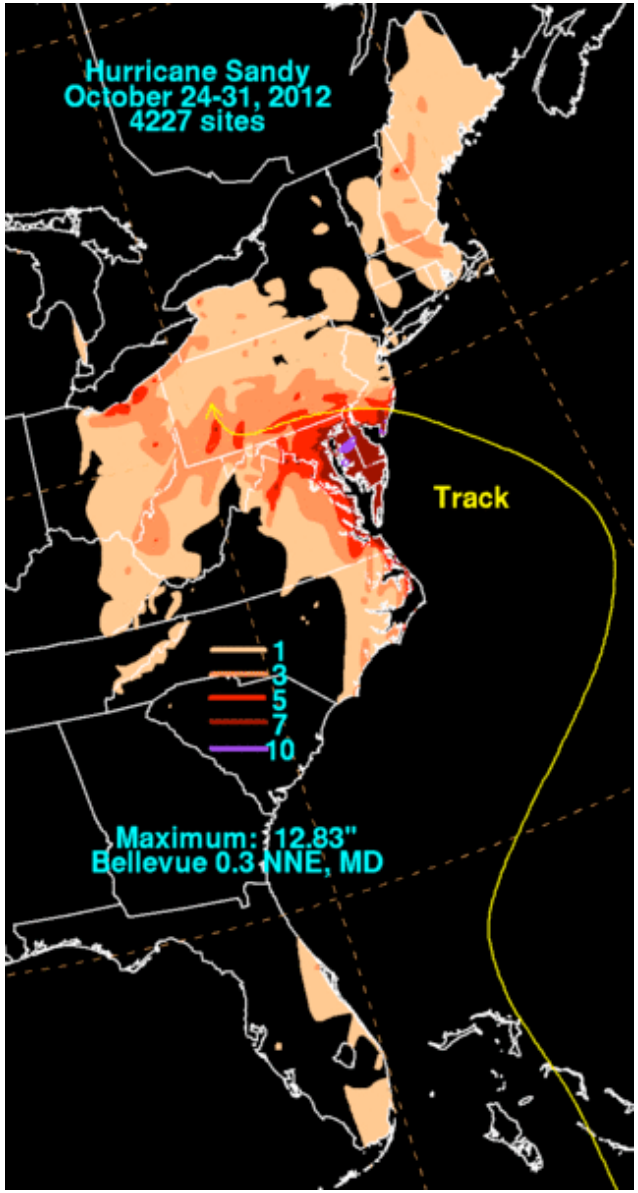
U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

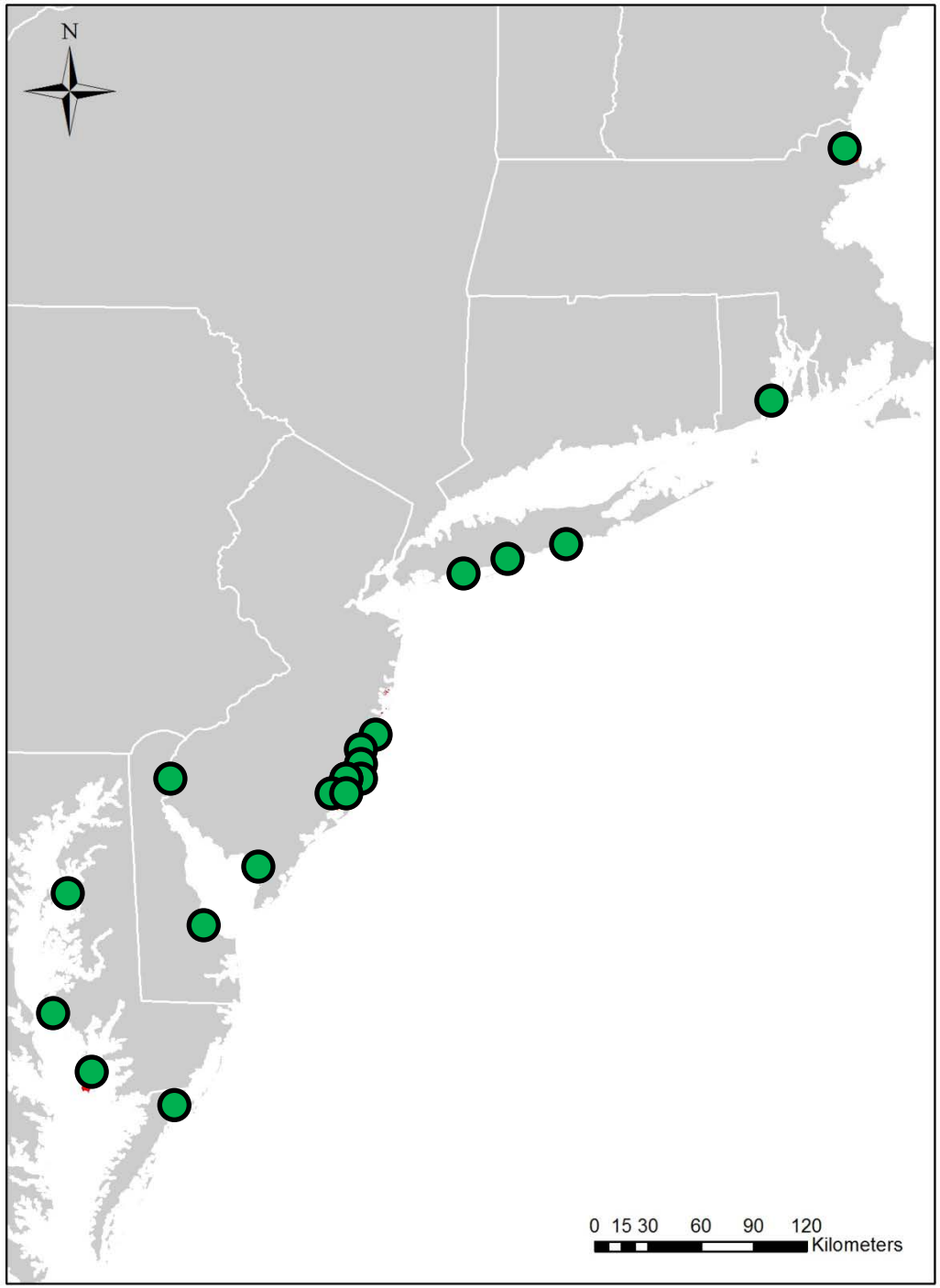
NSF

North Atlantic LCC
North Atlantic Landscape Conservation Cooperative

QUESTIONS

1. What effects do hurricanes have?
   - bird abundance
   - habitat
   - demography
2. What influences resilience?
   - reduced by chronic stressors?
   - increased by land protection?
3. Does restoration work?
   - pre/post comparisons
   - control comparisons
   - regional variations





Restoration activities

- altered hydrology
- sediment additions
- living shorelines
- assisted migration

Population size

	Subregion								Region
	Coastal Maine	Cape Cod - Casco Bay	Southern New England	Long Island	Coastal New Jersey	Delaware Bay	Coastal Delmarva	Eastern Ches. Bay	**Northeast USA**
Clapper Rail	NA	NA	260 (±293)	1,353 (±1,886)	34,947 (±21,571)	22,095 (±14,359)	76,792 (±53,665)	15,685 (±10,431)	**151,132 (±60,530)**
Willet	174 (±393)	4,937 (±4,297)	6,709 (±4,792)	6,955 (±5,014)	35,570 (±21,301)	22,229 (±13,252)	30,121 (±10,311)	10,466 (±6,649)	**117,162 (±29,096)**

Population size

	Subregion								Region
	Coastal Maine	Cape Cod - Casco Bay	Southern New England	Long Island	Coastal New Jersey	Delaware Bay	Coastal Delmarva	Eastern Ches. Bay	**Northeast USA**
Nelson's Sparrow	3,369 (±2,090)	1,835 (±2,915)	NA	NA	NA	NA	NA	NA	**5,204 (±3,586)**
Saltmarsh Sparrow	47 (±60)	5,475 (±3,923)	5,022 (±3,168)	4,966 (±4,713)	19,627 (±13,327)	3,363 (±1,622)	5,950 (±3,653)	8,963 (±4,266)	**53,412 (±16,107)**
Seaside Sparrow	NA	105 (±689)	3,995 (±8,214)	2,859 (±3,555)	52,053 (±33,014)	64,285 (±34,657)	13,314 (±8,910)	93,112 (±26,636)	**229,723 (±56,217)**