

Maine Research Array: Bird Siting Assessment Approach

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Avian Data on Exposure Recap

Regional Models

- MDAT

Local data

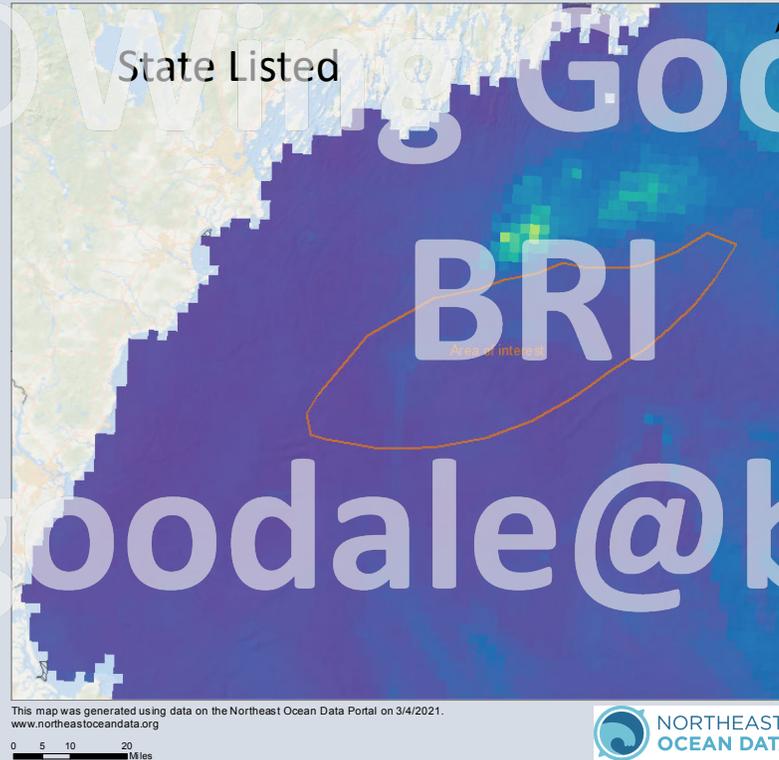
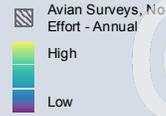
- Northwest Atlantic Catalog

Tracking data

- Non-marine migratory
 - Songbirds
 - Raptors
 - Wading birds
- Marine
 - Colonial nesters
 - Migratory

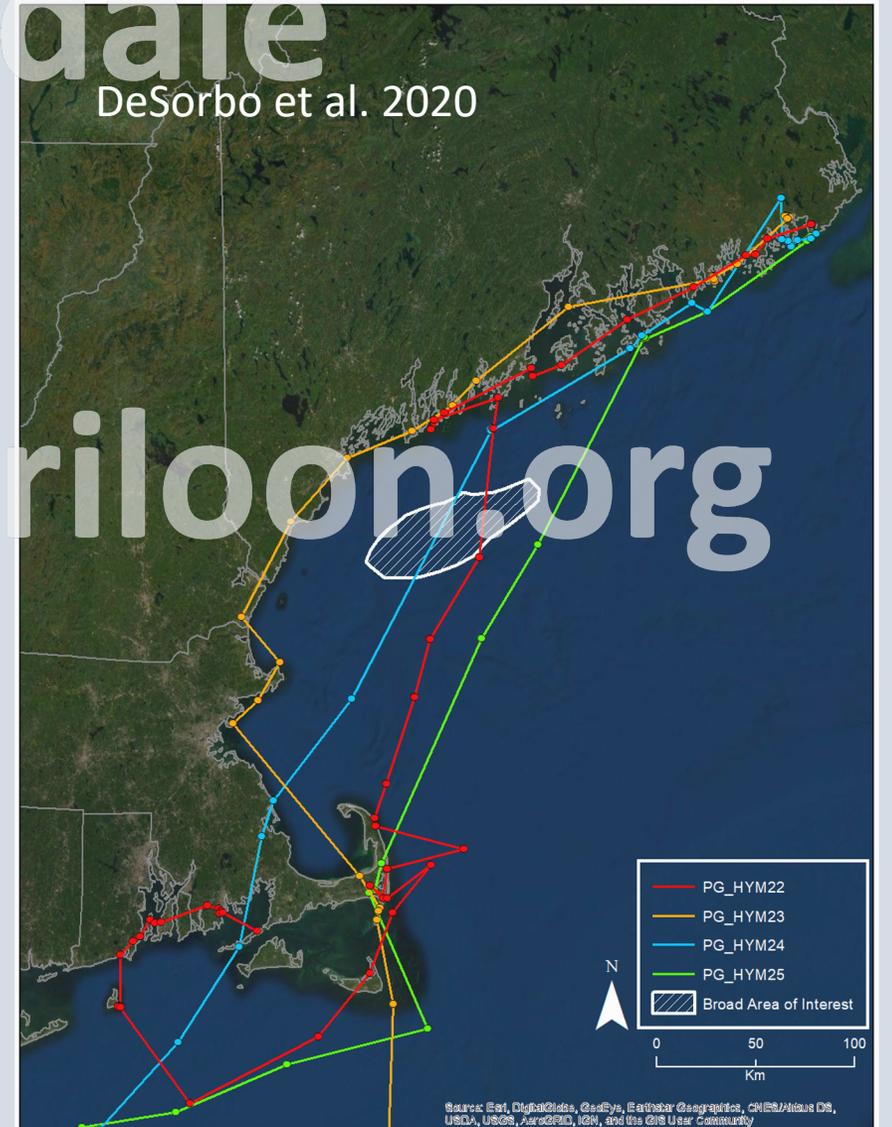
Coastal use data

- Colonies
- Radar
- Stopover sites



What can you learn from MDAT?

- Spatiotemporal use patterns
- Relative abundance
- Distribution
- Seasonal changes



Avian Data on Exposure: Catalog Data

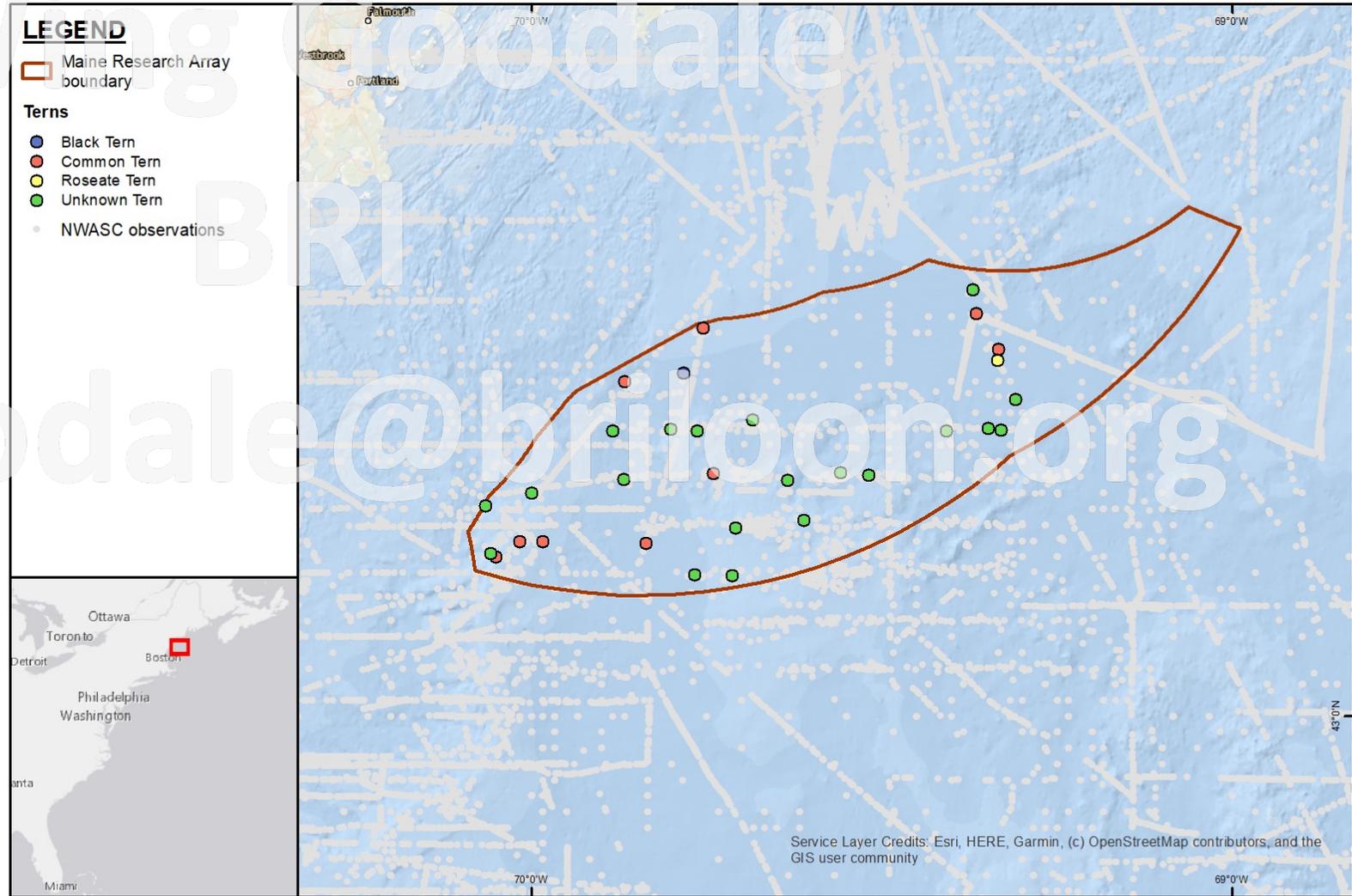
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Northwest Atlantic Seabird Catalog

- Some local data used in MDAT models
- Inconsistent effort
- Old data
- Poor spatial coverage



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A. Gilbert

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Document: MEResearch_Array_NWASC_terns



0 5 10 20 Miles

0 10 20 40 Km



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

Terns in the NWASC Observations
in the proposed Maine Research Array
Offshore southern Maine

Step 1: Spatial Assessment with MDAT Model

Spatial Analysis with MDAT

- Currently species are weighed equally
- Will combine based upon vulnerability
- Based upon methods used by Kelsey et al. 2018 and others

$$\text{Population Vulnerability(PV)} = (\text{POP} \pm \text{POPu}) + (\text{AO} \times (\text{POCSpop} \pm \text{POCSpopu})) + \text{TS} + (\text{BR} \times (\text{AS} \pm \text{ASu}))$$

$$\text{Collision Vulnerability(CV)} = ((\text{NFA} \pm \text{NFAu}) + (\text{DFA} \pm \text{DFAu}))/2 + (\text{RSZt} \pm \text{RSZtu}) + (\text{MAc} \pm \text{MAcu})$$

$$\text{Displacement Vulnerability(DV)} = (\text{MA}d \pm \text{MA}u) + (\text{HF} \pm \text{HF}u)$$

Collision

- Avoidance (literature)
- Time in RSZ (Catalog data)
- Flight activity (literature & Catalog)

Displacement

- Avoidance (literature)
- Habitat flexibility (literature)

Population

- Proportion population exposed (MDAT)
- Conservation status, including state Species of Greatest Conservation Need (SGCN)
- Adult survival (literature)

Step 2: Covariate Considerations

Considering relationships

- Physical or environmental factors related to bird relative abundance
- Included in MDAT models

Conflicting & uncertain relationship

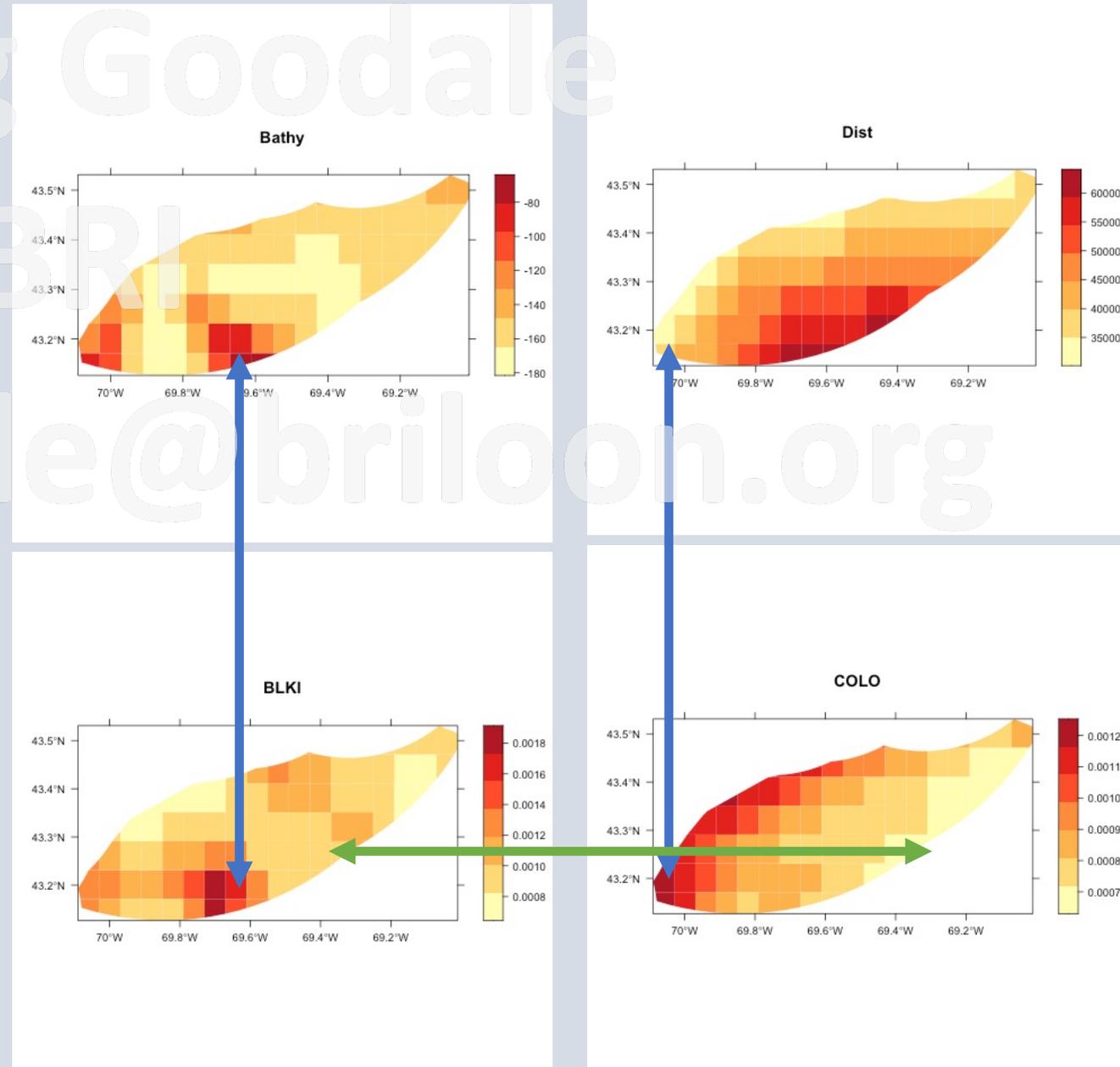
- Highly variable by species
- Some relations generally known
- But high uncertainty

Species groups and life cycle

- Seabirds (breeding, wintering, migrating)
- Terrestrial migrants

General heuristics possible for some species

- Further from shore; deeper water



Step 3: Tracking and Other Data

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How do we use tracking data?

- Migration routes
- Foraging areas, distance
- Phenology
- Qualitatively validate MDAT
- Presence of species not represented in MDAT
(terrestrial migrants and bats)

How do we use colony and other data?

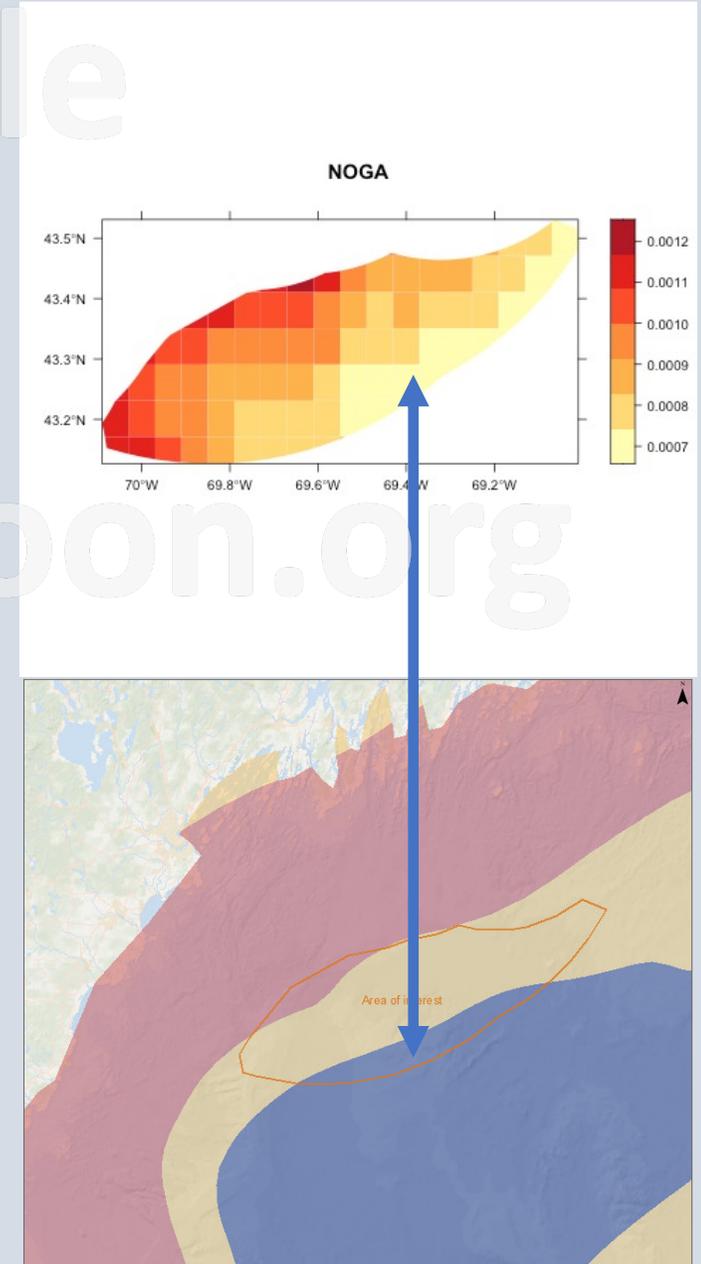
- Potential foraging areas
- Migration routes based upon ecology

Prioritize monitoring for permitting

- Optimized survey methods

Identify data gaps and research questions

- Exposure of terrestrial migrants
- Flight heights and avoidance rates



Questions and Discussion

MDAT analysis approach

- Questions?
- Feedback

Use of covariates

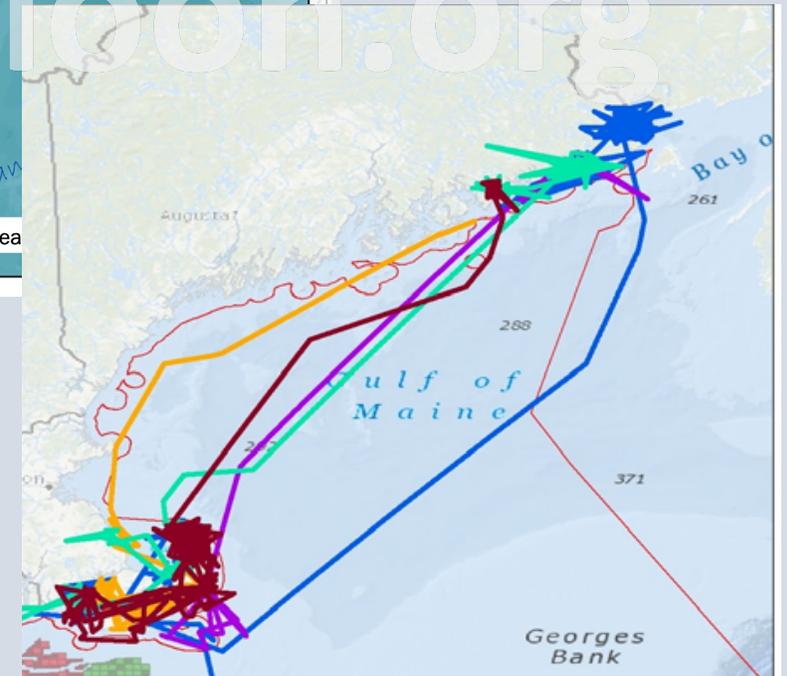
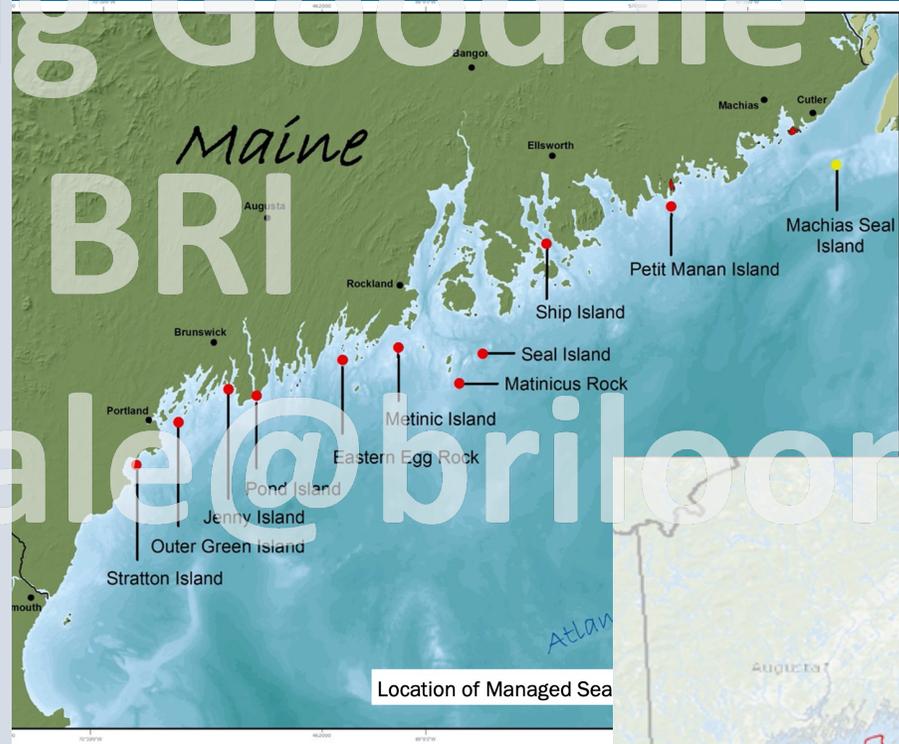
- Key relationships?
- Priority species?

Priority monitoring for permitting

- We have time
- Priority species?

Identify data gaps and research questions

- Priority questions?



Thanks! @Wing Goodale

Questions?

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