ACJV Salt Marsh Workshop: Black Duck Non-Breeding Habitat Conservation

BDJV Partnership

Albany, NY

July 2015

ACJV Salt Marsh Workshop

- Outline:
  - Acknowledgements
  - Background
  - Big Picture
  - ABDU, Salt marsh, and Bio-energetics
  - Back to the big picture
  - Questions

ACJV Salt Marsh Workshop

- Acknowledgements:

Atlantic Flyway Council, Ducks Unlimited, Ducks Unlimited Canada, Nova Scotia Habitat Trust Fund, Connecticut Department of Energy and Environmental Protection, Delaware Division of Fish and Wildlife, New Jersey Division of Fish and Wildlife, New York State Department of Environmental Conservation, Virginia Department of Game and Inland Fisheries, Canadian Wildlife Service, U.S. Fish and Wildlife Service Migratory Bird Program (Region 5), Cap May, Chincoteague, Edwin B. Forsythe, Prime Hook, and Black Water National Wildlife Refuges, University of Delaware, Southern Illinois University, Suffolk County Department of Parks, Upper Mississippi River and Great Lakes Region Joint Venture, Atlantic Coast Joint Venture, Black Duck Joint Venture, and a host of private donors.

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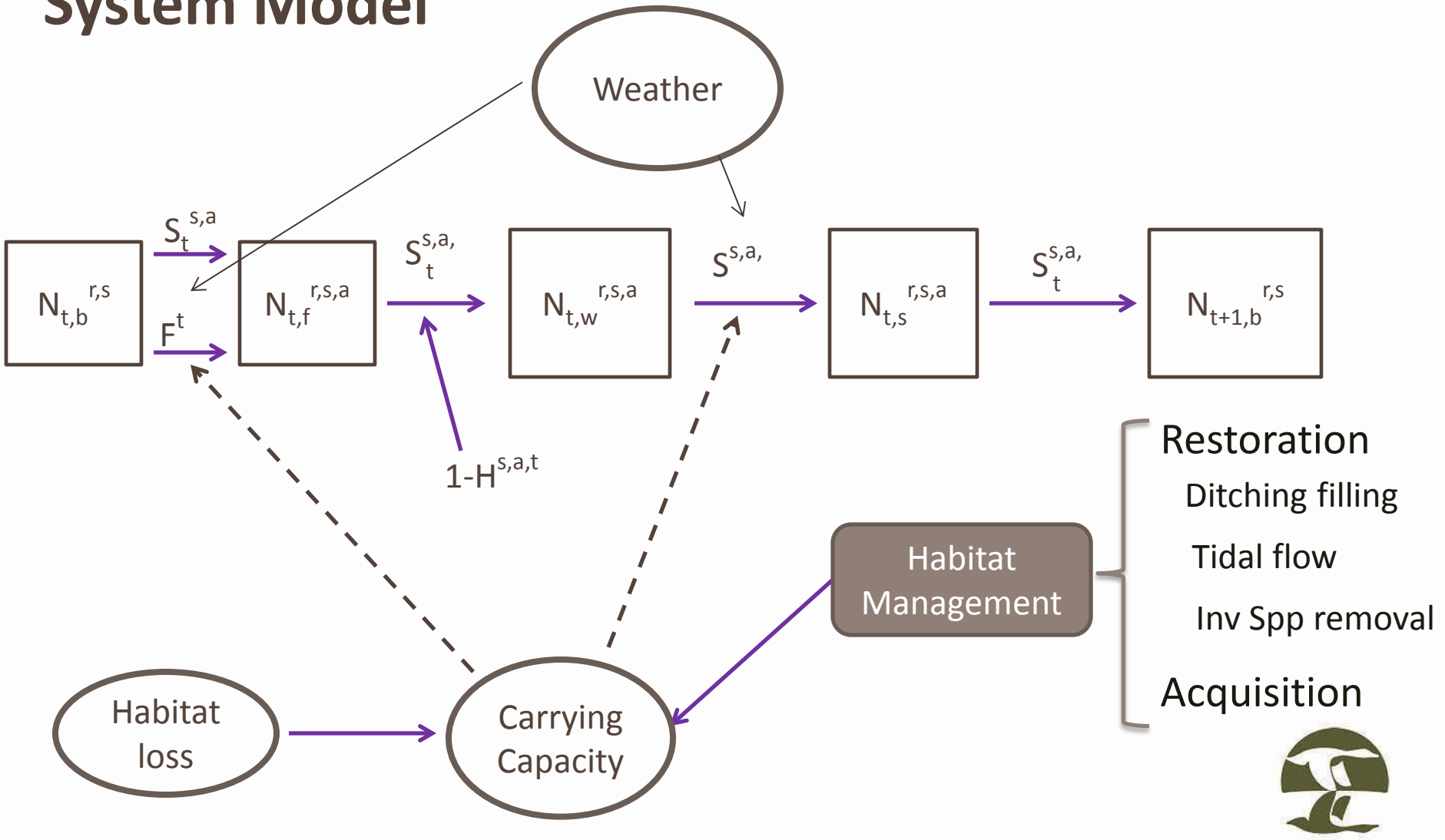
Salt Marsh Workshop

- Background:
  - Historically most abundant dabbler in eastern US
  - Cultural significant
  - Long-term decline
  - Mission of ACJV and Partners:
    - Secure and manage habitat to support stepped down population goal for ABDU
    - Hypothesis: ABDU growth is limited by energetic supply during the non-breeding season
      - Salt marsh is critical component

Salt Marsh Workshop: big picture

System Model



ABDU bio-energetics approach

Population Food Energy Supply

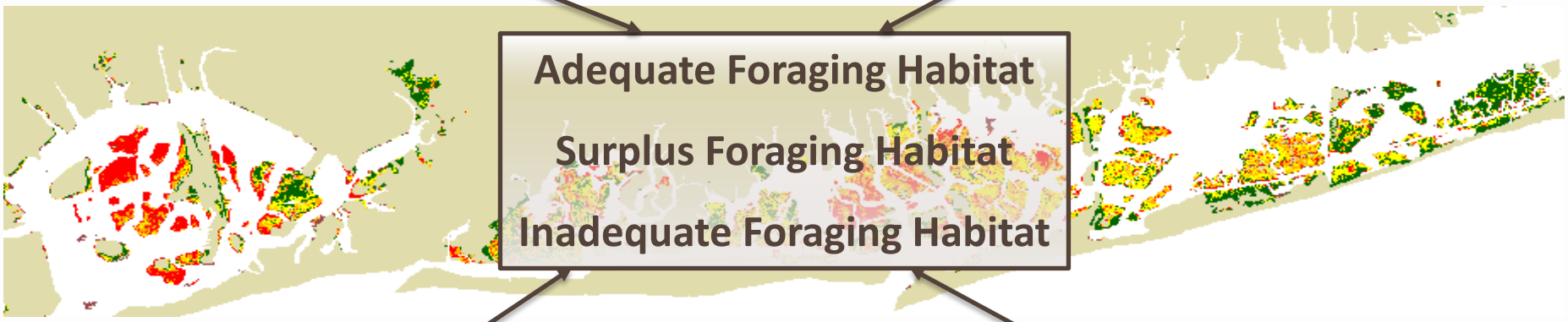
Habitat Area

Habitat Foraging Values

Population Energy Demand

Population Objectives

Daily Energy Requirements



Adequate Foraging Habitat

Surplus Foraging Habitat

Inadequate Foraging Habitat

Habitat Loss

Urban growth

Sea level rise

Invasive species

Habitat Conservation

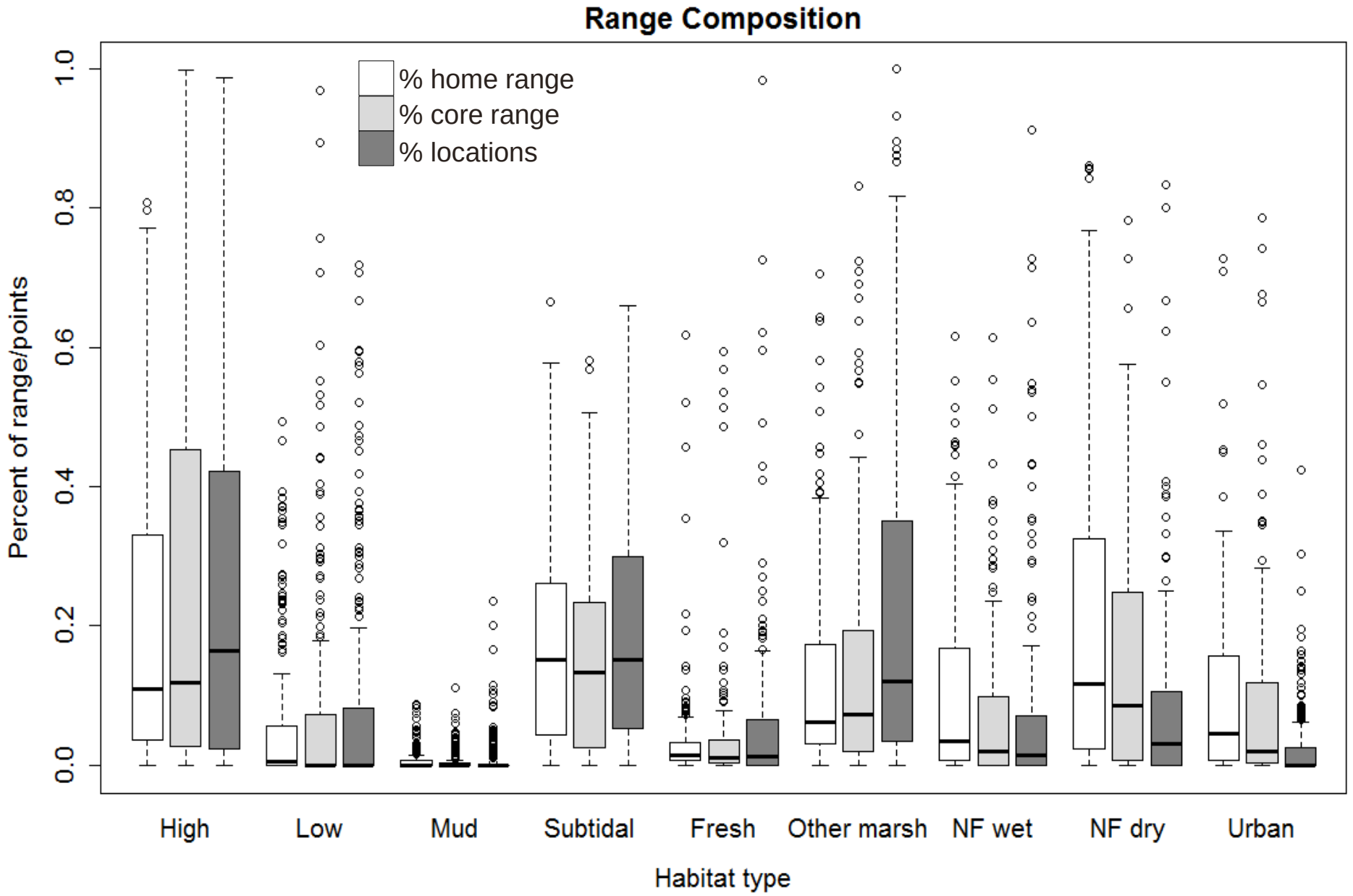
Securement

Restoration/Enhancement

ABDU bio-energetics approach

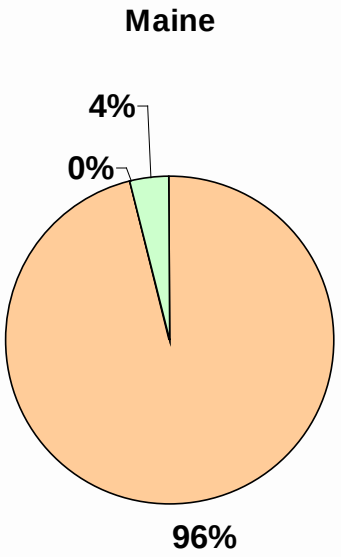
- 9 field projects
  - Nova Scotia to Virginia
  - Standardized methods
  - Habitat use
  - Daily energetic requirements
  - Food Habits
- 1 meta-analysis
- 2 Lab projects
  - TME
  - RMR and behavioral multipliers
- GIS analyses
  - Available habitat by wetland type
  - Total energetic Capacity
  - Total energetic demand

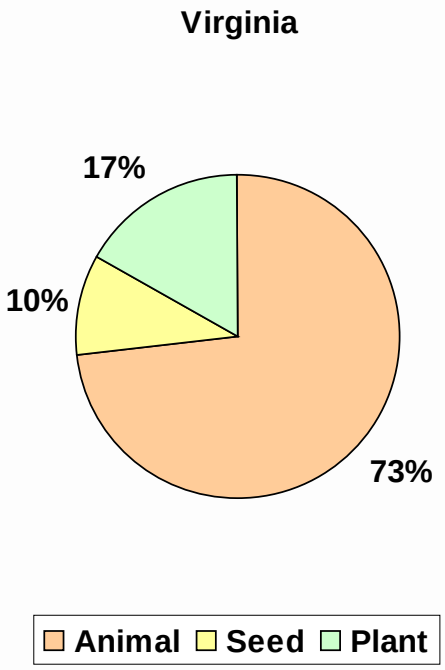
ABDU bio-energetics approach

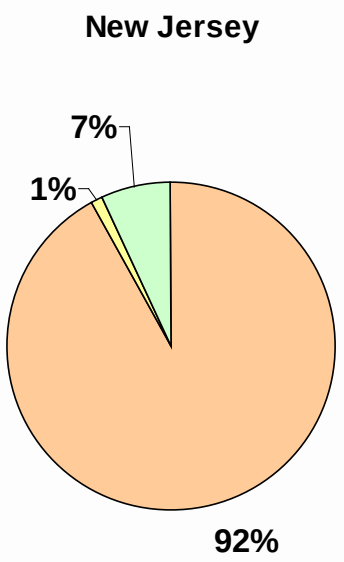


ABDU bio-energetics approach

Food Habits







Jorde and Owen 1990

Periwinkles
Amphipods
Mussels

Lewis 2011

Amphipods
Mussels
Salt marsh snails

Costanzo & Malecki 1989

Salt marsh snails
Fiddler crabs
Algae

ABDU bio-energetics approach

Food Biomass

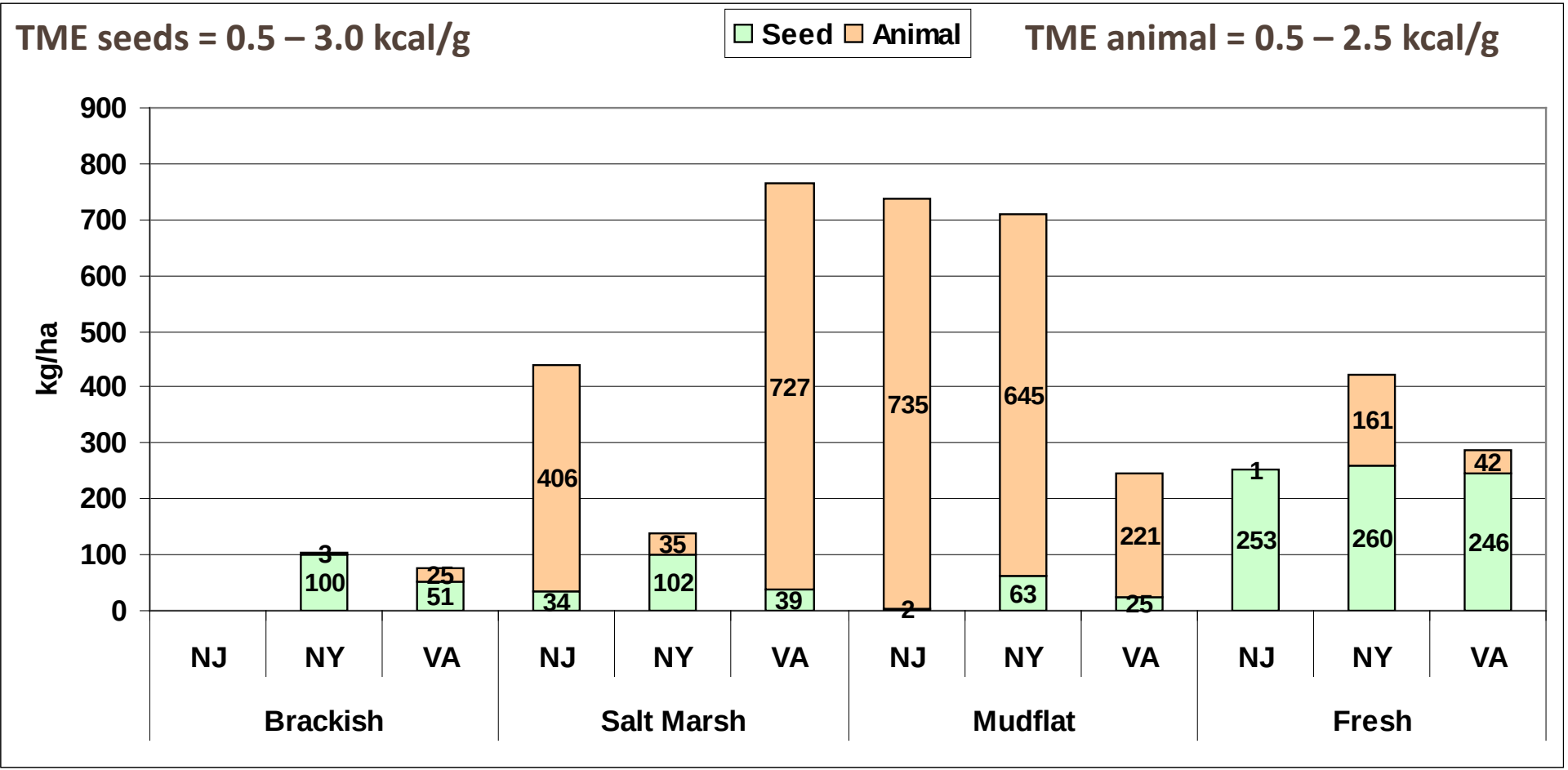
Inland Fresh Water Habitats

Animal ~ 30 – 80 kg/ha

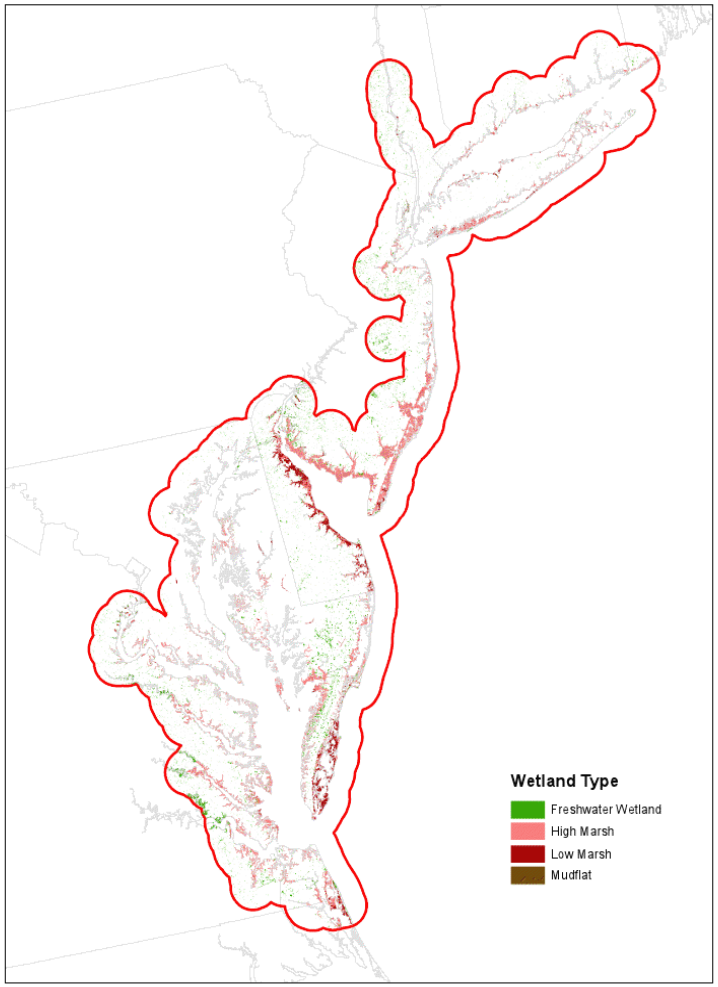
Seeds ~ 400 – 3,155 kg/ha

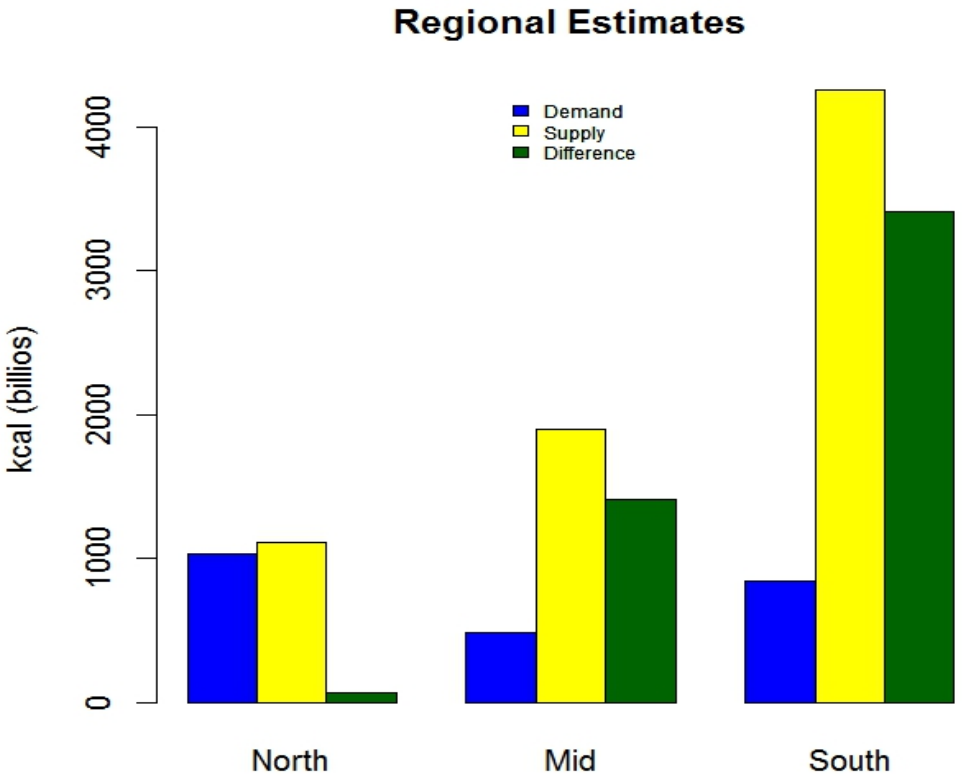
TME seeds = 0.5 – 3.0 kcal/g

TME animal = 0.5 – 2.5 kcal/g



Salt Marsh Workshop: Prototype Model V1



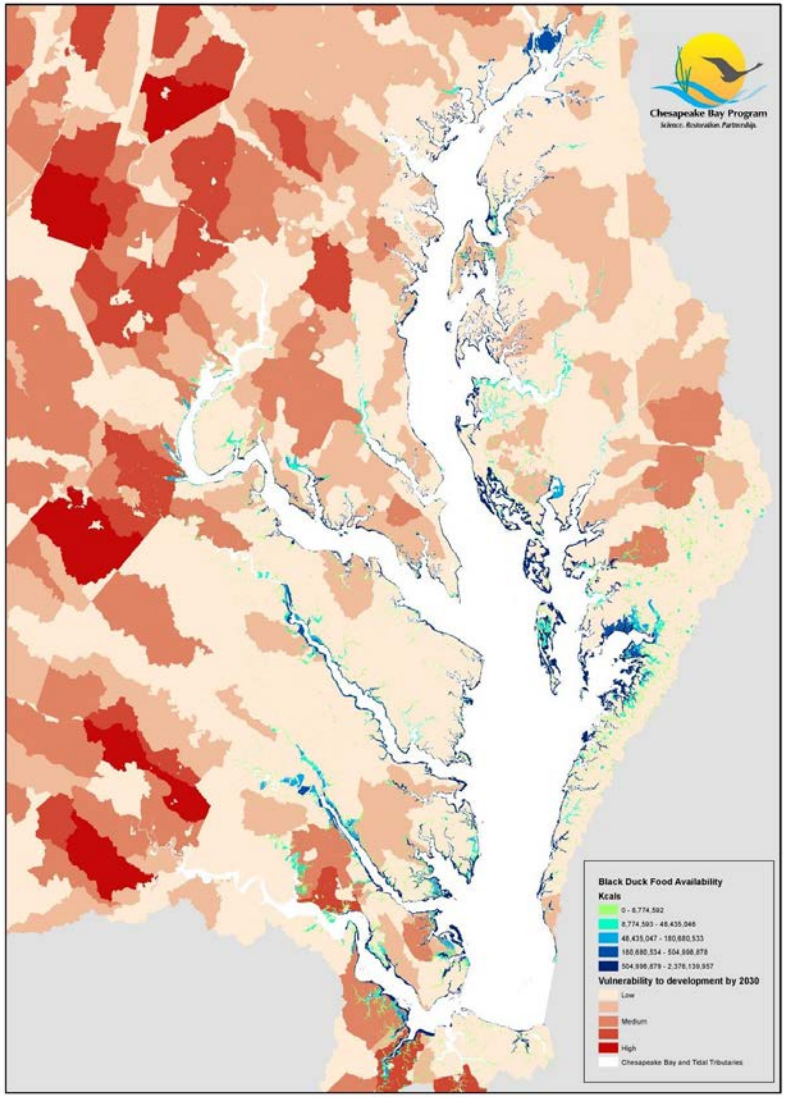


Salt Marsh Workshop: Prototype Model V2

Predicting into the future:

1. Est. energy gained via mgmt (A_t)

$$C_g = \widehat{C_c^i} - \widehat{L_t^i} + \widehat{A_t^i}$$



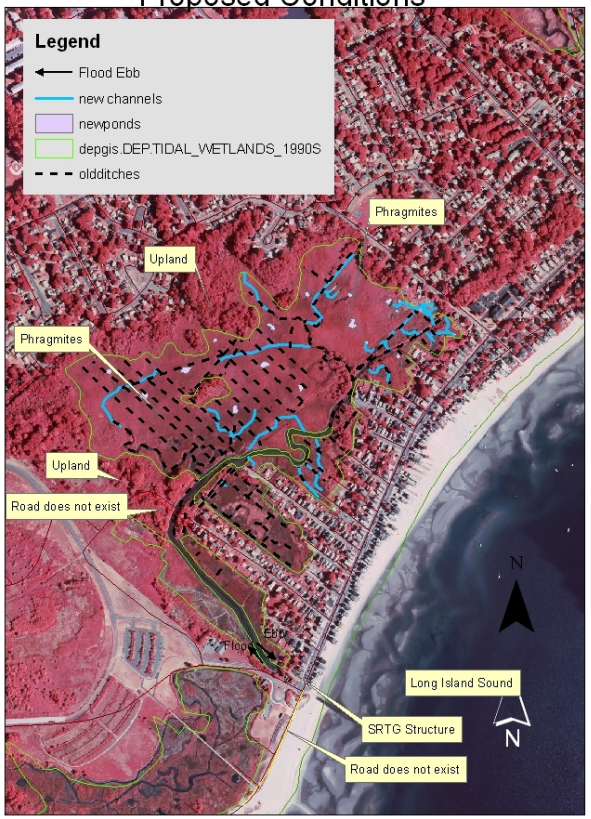
Salt Marsh Workshop: Prototype Model V2

Predicting into the future:

Est. energy gained via mgmt (A_t)

1. ***B**efore-**A**fter-**C**ontrol-**I**mpact Study*
2. *Estimating abundance using UAS*

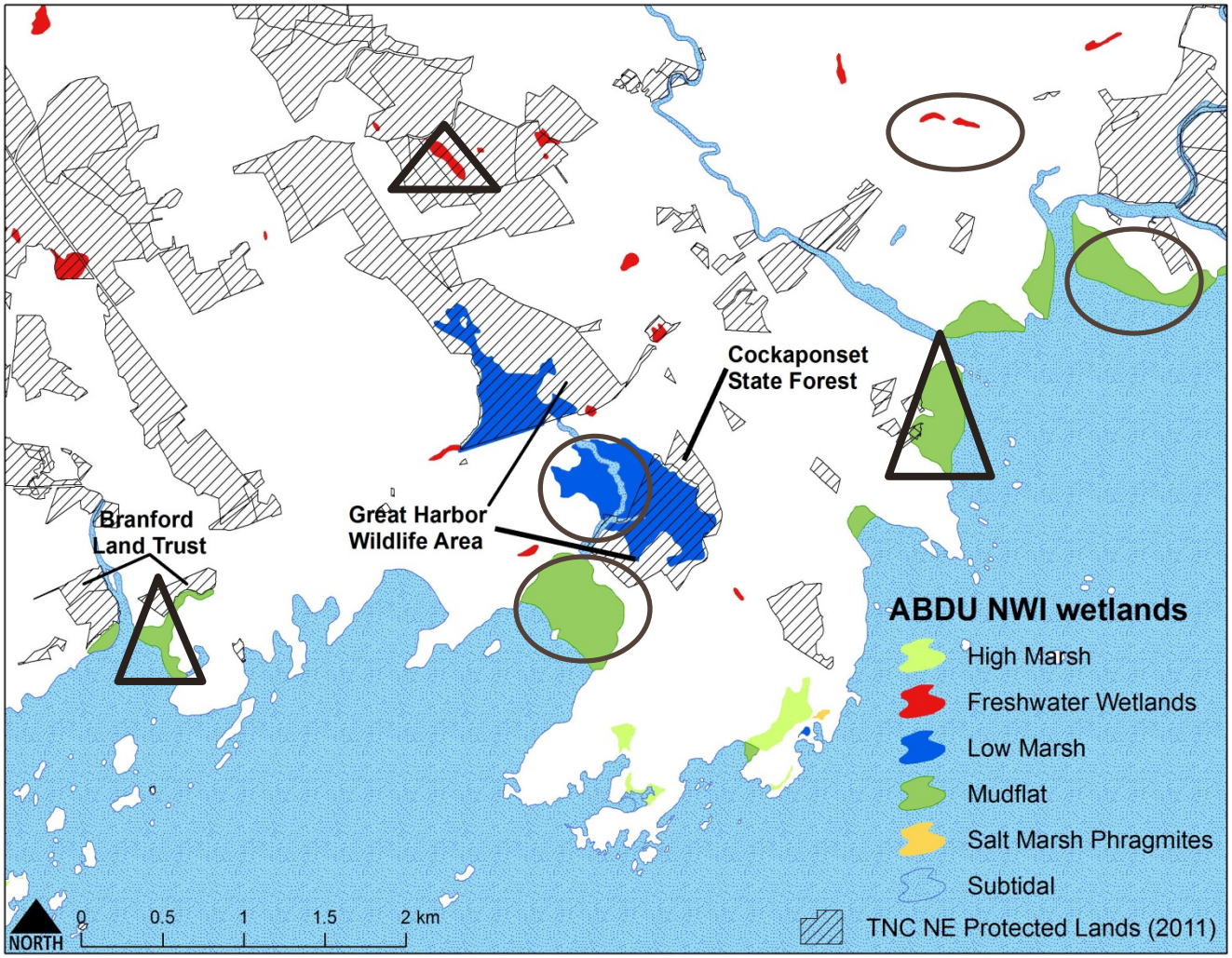
Silver Sands State Park, Milford, CT
Proposed Conditions



$$C_g = \widehat{C_c^i} - \widehat{L_t^i} + \widehat{A_t^i}$$

Salt Marsh Workshop: Prototype Model V2

Targeting Habitat Delivery: securement & restoration



Which Project to fund?

1. Max Energy (kcals)
2. Max Protected area
3. Min P(loss)

Evidence relative to H_0:?

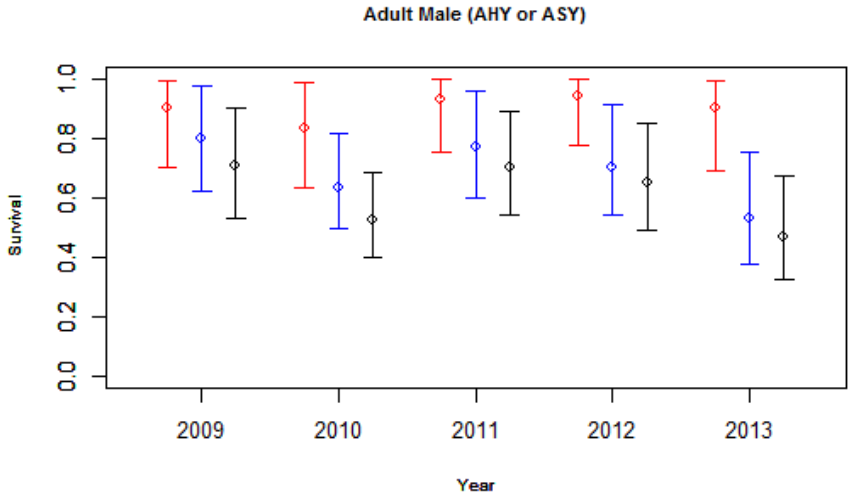
Home range size was smaller for ducks with more salt marsh in their range.

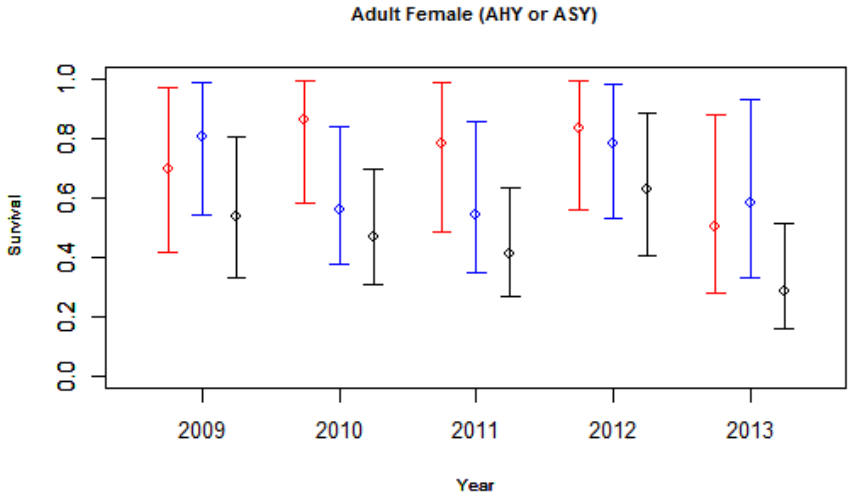
Home range size was larger for ducks experiencing more 4-day frozen periods (cold snaps).

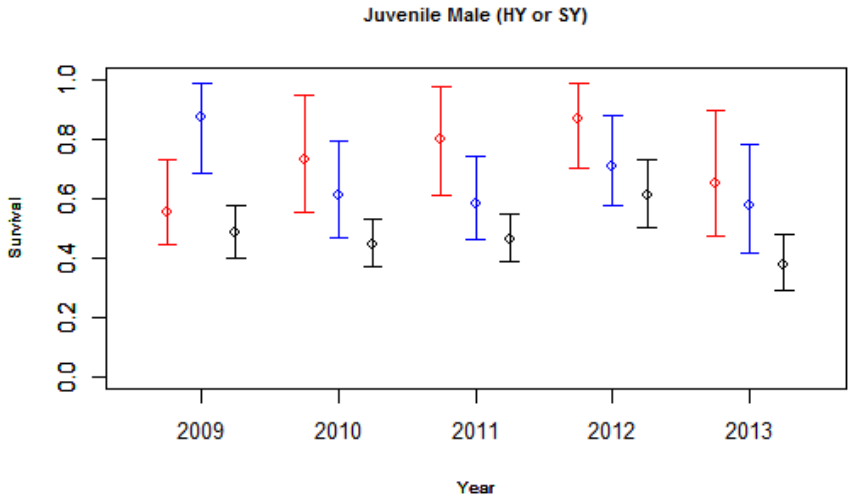
Ducks experiencing more cold snaps and with core ranges containing more freshwater had larger core ranges.

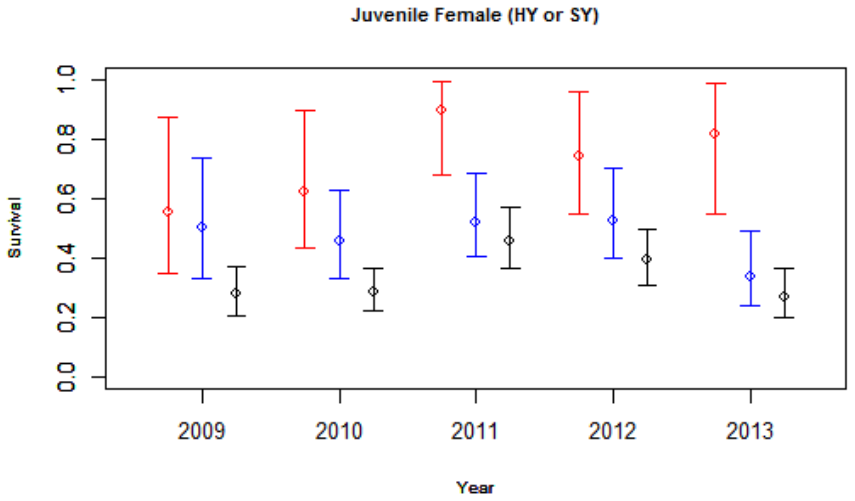
Some evidence post-season survival may be influenced by winter conditions

Salt Marsh Workshop: big picture







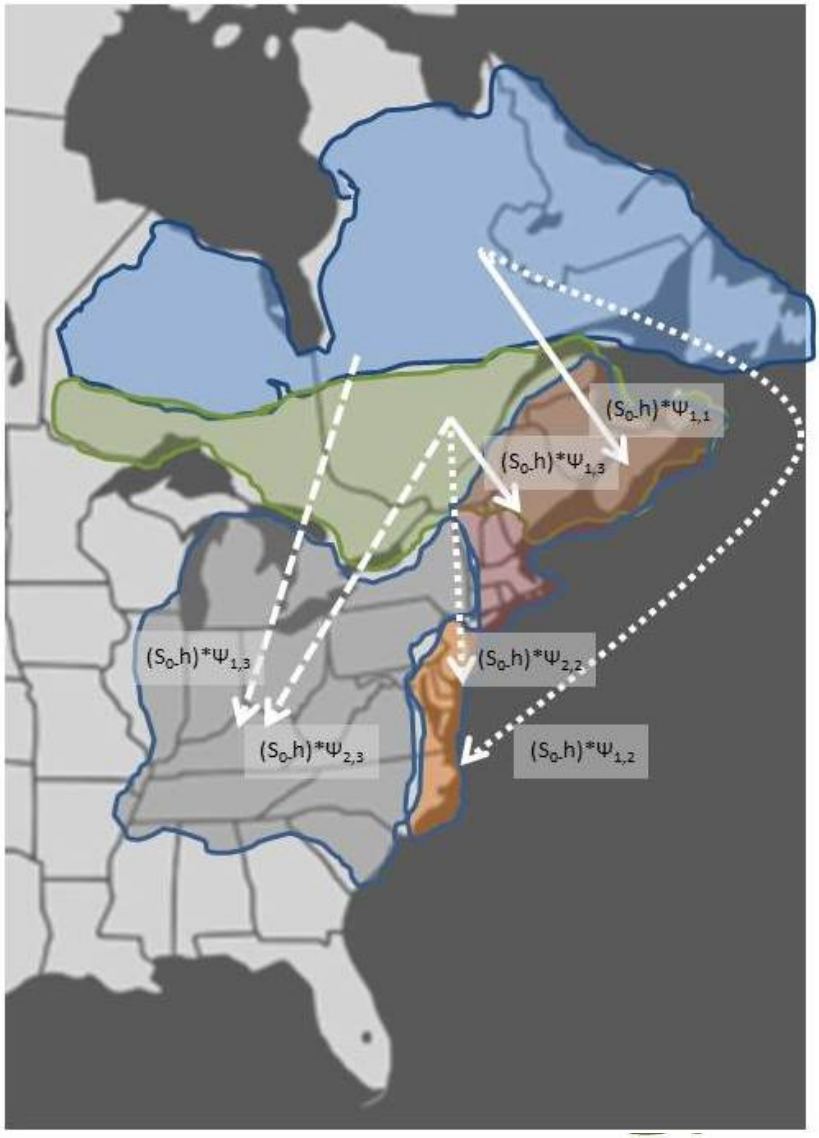


Seasonal Survival (Aug-Jan) Seasonal Survival (Jan-Aug) Annual Survival

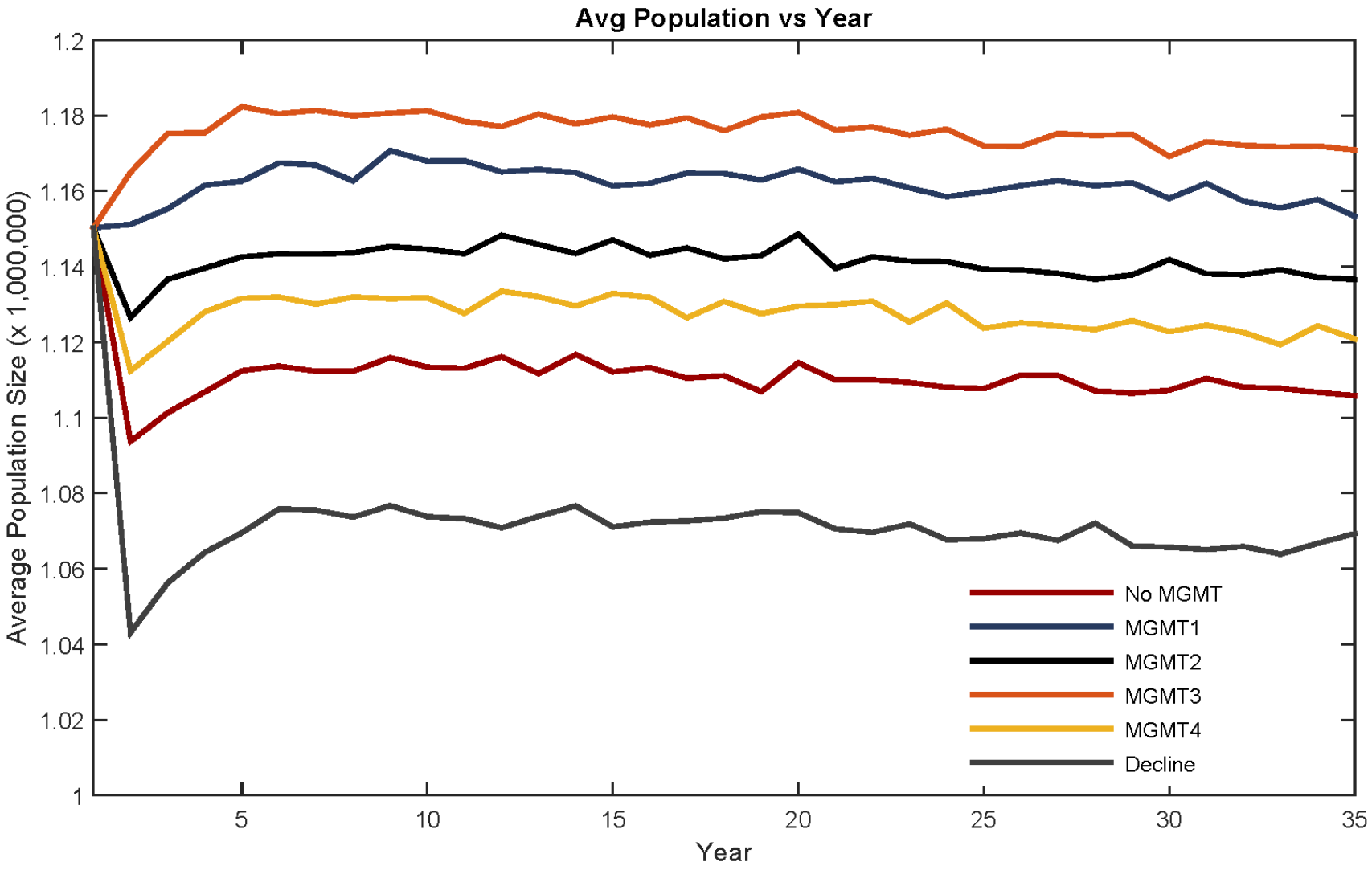
Salt Marsh Workshop: big picture

Est. Habitat Needs:

- Annual life cycle model
- Which regions have greatest influence on growth and abundance?



Salt Marsh Workshop: big picture



Next Steps

- Expand bio-energetics model to all wetland types and species
- Incorporate urban growth & sea level rise
- Incorporate restoration benefits
- Identify and prioritize habitat projects
- Incorporate into FAC model

Questions: