KELP-FISH HABITAT PROJECT

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KELP-FISH HABITAT PROJECT

- Humphries Lab at URI independent survey in 2015
- Humphries Lab joins regional consortium (KEEN) from 2016-2018
- DEM joins in 2019
  - Added Newport location and control sites
  - Modified fish count method to include more precise measurements of fish abundance and biomass
  - Standardized methods across other habitats in RI (eelgrass; oyster, artificial reefs)
- Objectives
  - Establish a timeseries for kelp habitat in RI
  - Assess impact of kelp on fisheries production (direct and indirect) relative to control sites
  - Develop models that help inform fish-habitat linkages in RI

KELP ARE ECOSYSTEM ENGINEERS

Primary Producers

- 30 – 2,600 g C/m^{2*}year (Krumhansl & Scheibling, 2012; Average of 500 g C/m^{2*}year)

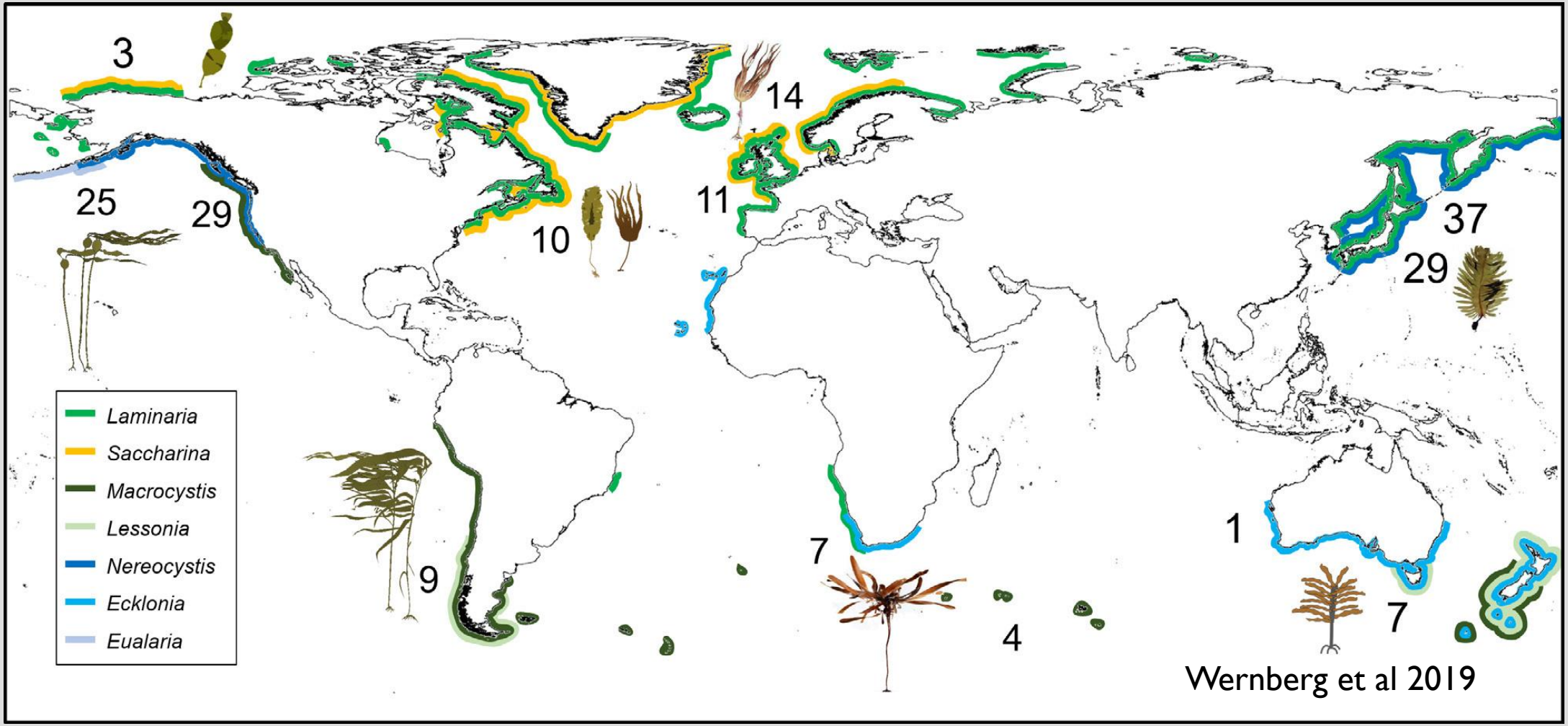
Foundation Species

- Support biologically diverse temperate ecosystems

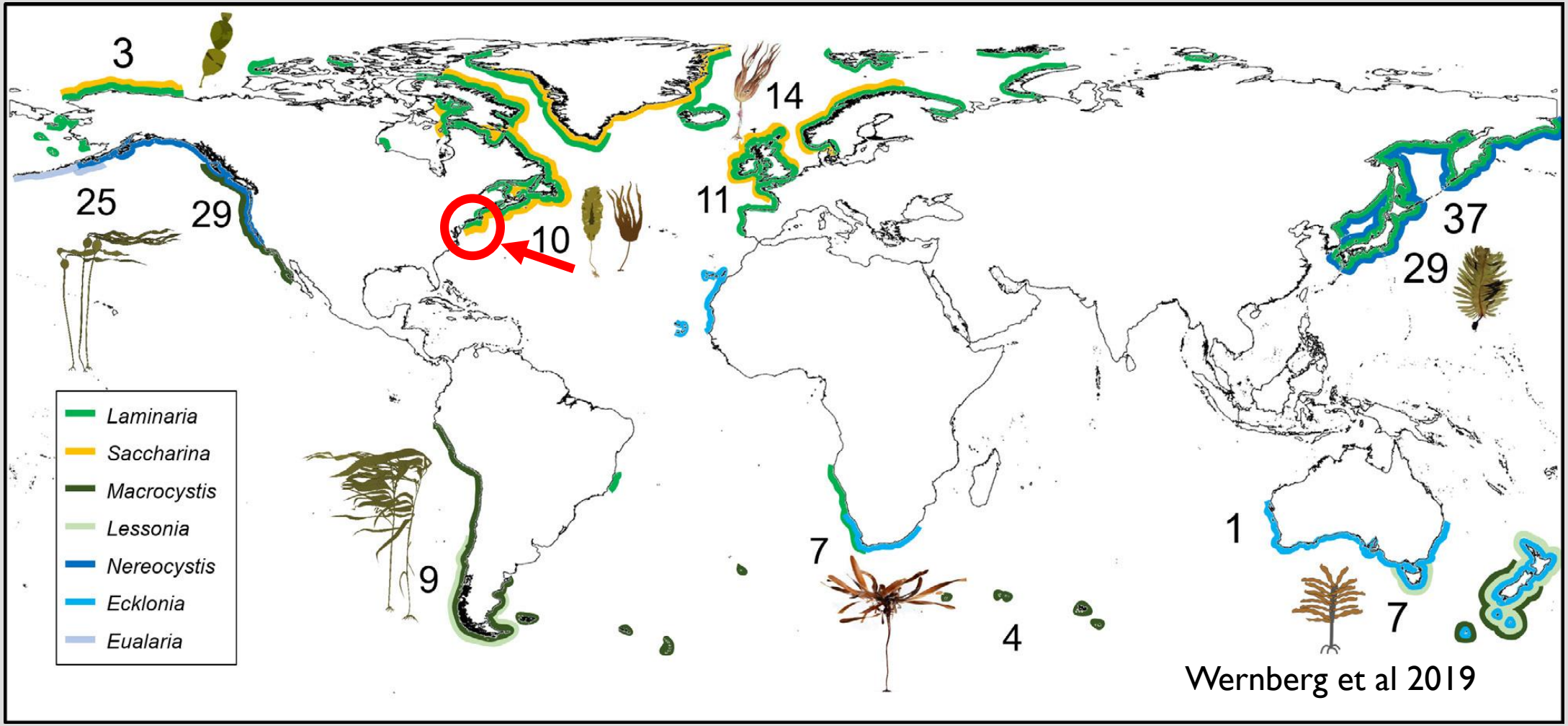
Secondary production

- herbivores, detritus feeders, habitat for forage fish

GEOGRAPHIC RANGE

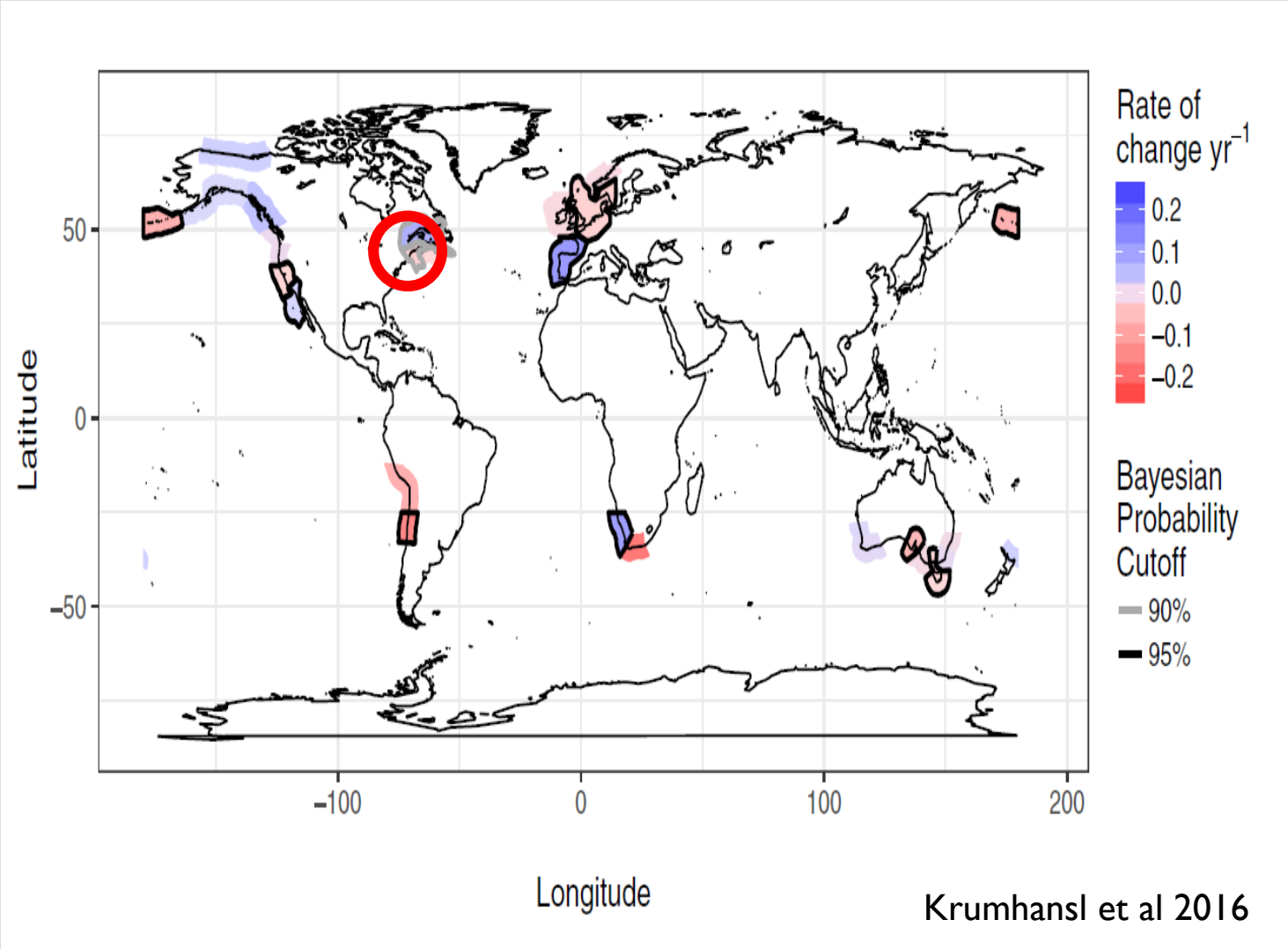


GEOGRAPHIC RANGE



THREATS TO KELP

- Climate Change
  - Heatwaves
  - Increased SST
  - Storm magnitude and frequency
- Rhode Island is on southern boundary of range
  - Increased SST will likely have large impact on RI kelps
- Overharvesting (less of a threat here in RI)



Krumhansl et al 2016

PROJECT OBJECTIVES

1. Establish a timeseries for kelp habitat in RI
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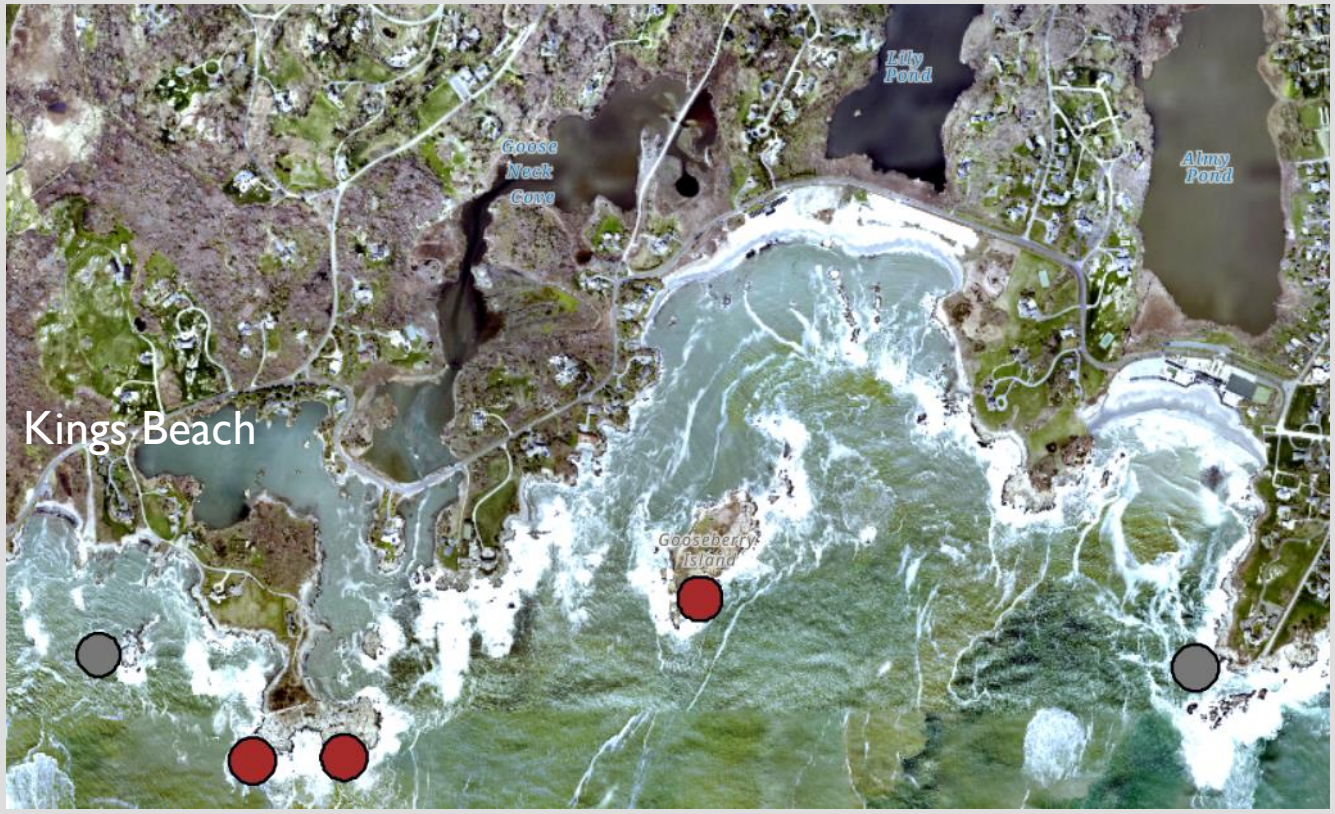
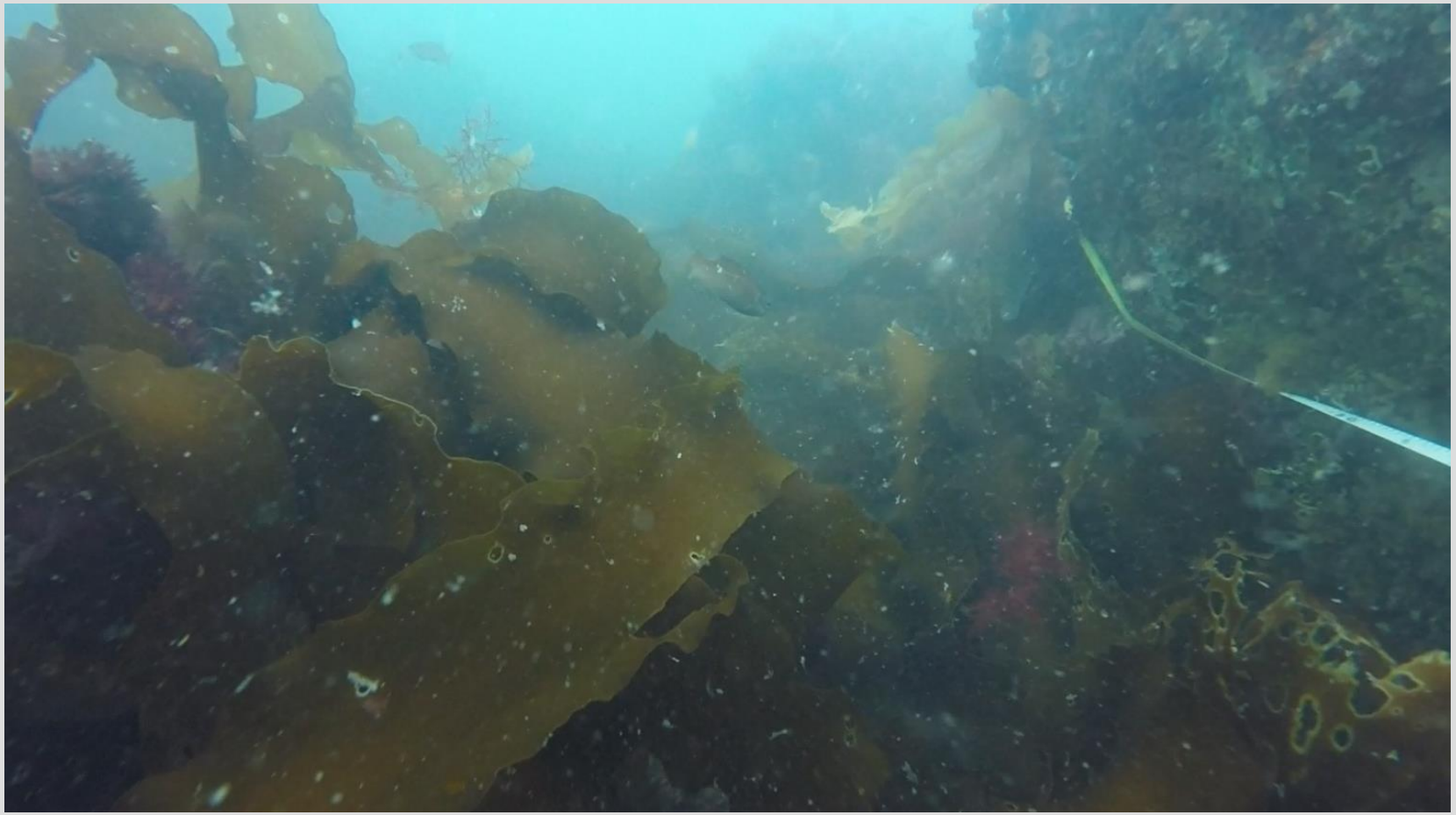
3. Develop models that help inform fish-habitat linkages in RI

KELP SITES


Fort Wetherill


Kings Beach
Goose Neck Cove
Lily Pond
Almy Pond
Gooseberry Island



FISH COUNTS

- Visual fish census along transect
- Number at length
- Provides density and biomass of finfish species
- Common Species
  - Cunner
  - Tautog
  - Scup

SWATH

- Two, 40 x 1m swaths
  - On and Offshore
- All nekton and sessile inverts
- Provides abundance and density of mobile crustaceans and patchy inverts
- Common Species
  - Jonah Crab
  - Sea Stars
  - Star Coral

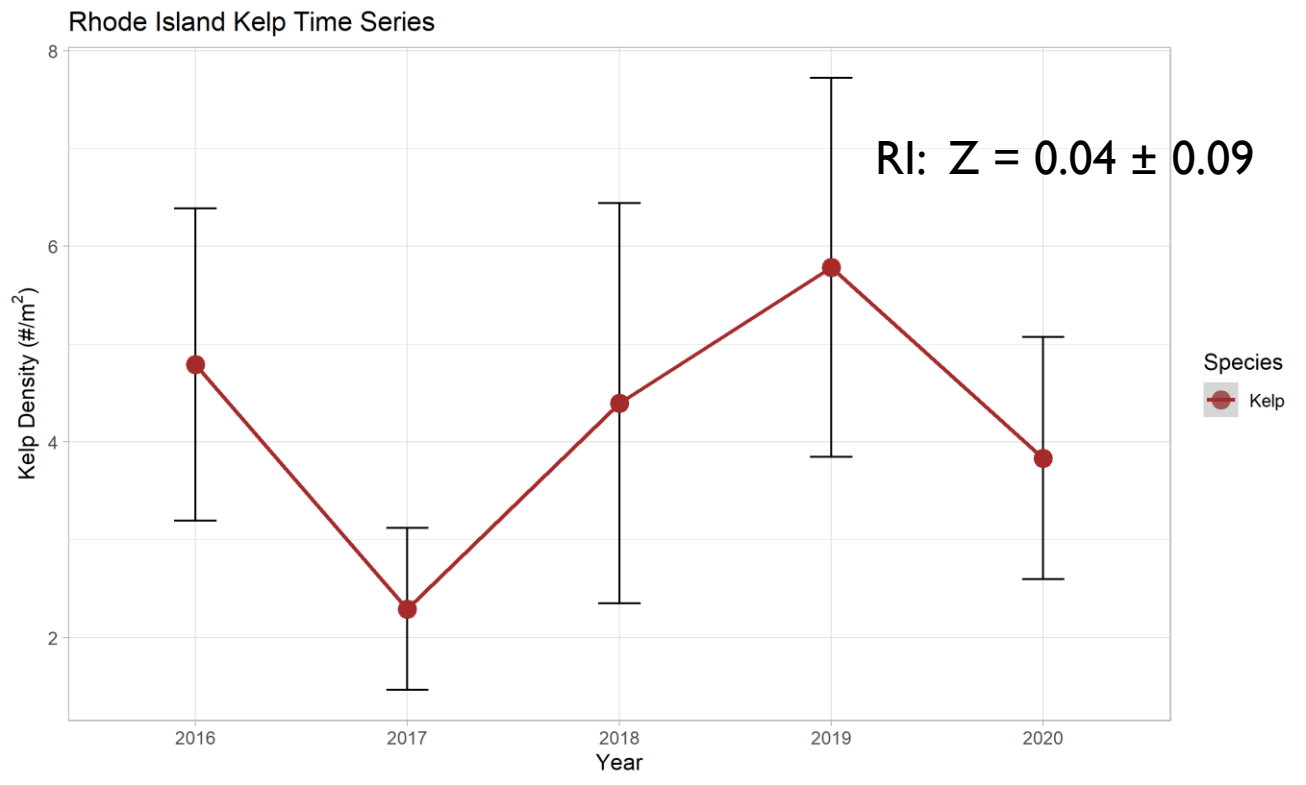
UNIFORM POINT COUNT

- 80 individual "points" at each meter
- Cross section of everything
  - Includes substrate type
- Percent cover along entire transect
- Common Species
  - Marco Algae
  - Bryozoans
  - Sponges
  - Coral
  - Boulders

QUADRAT

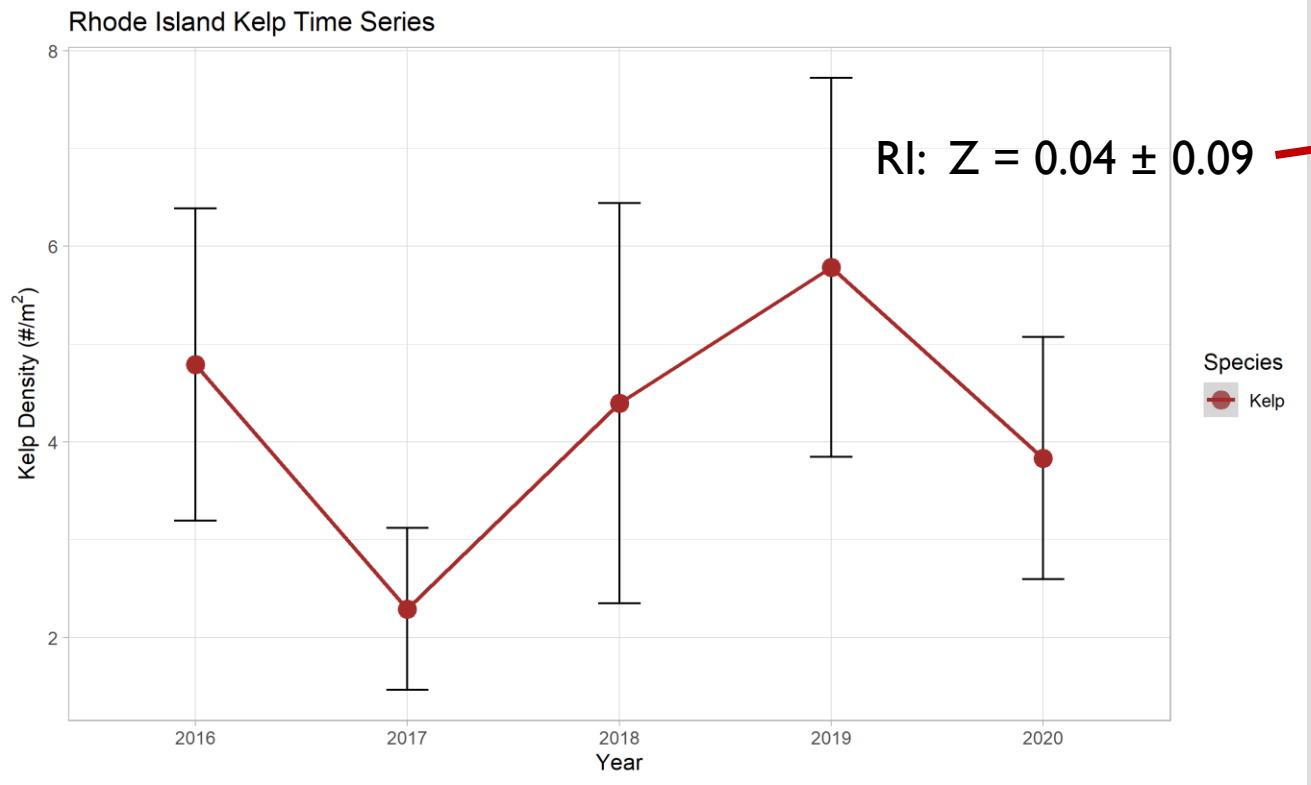
- Six 1m quadrats placed along the each transect
- Enumerate all sessile inverts and macro algae species
- Provides estimates of kelp density
- Common Species
  - Sacharrina latissima (Sugar Kelp)
  - Laminaria Digitata
  - Palmaria Palmata (Dulse)

STATUS UPDATE

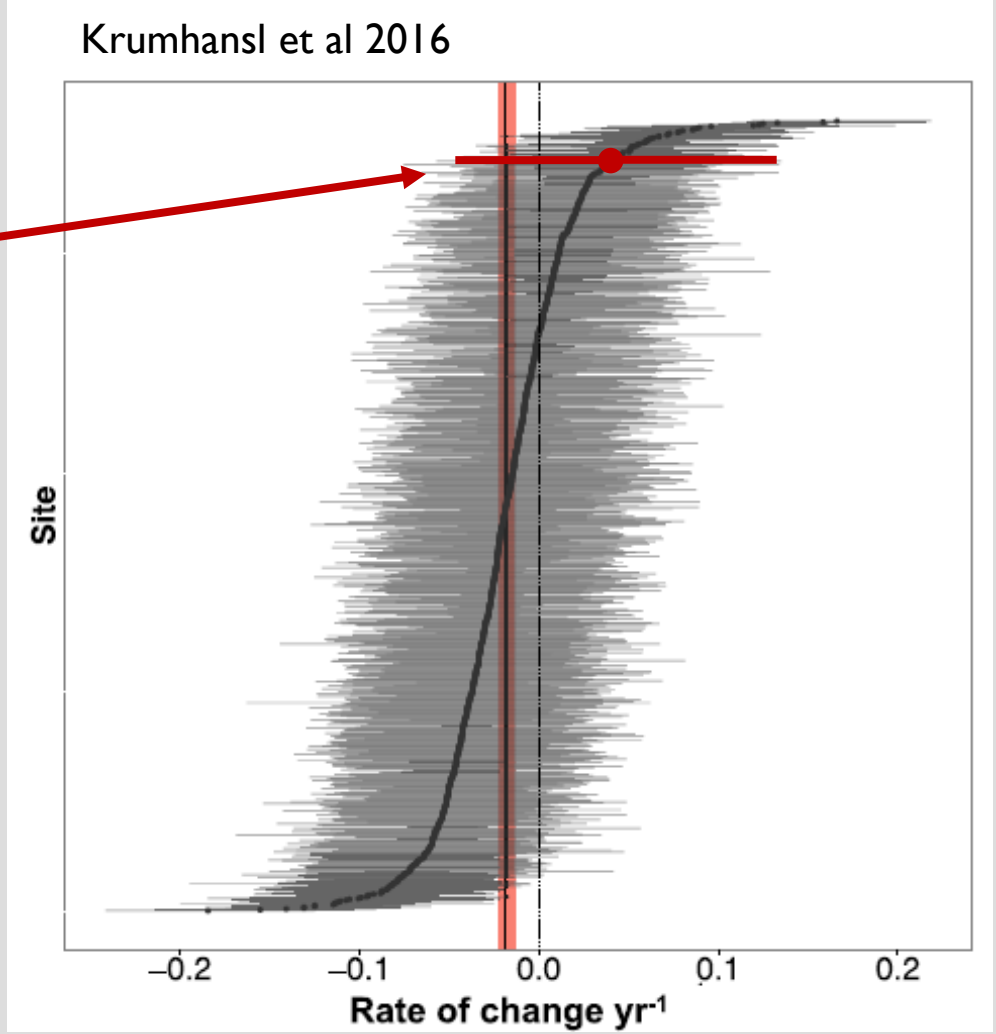


1. Establish a timeseries for kelp habitat in RI

STATUS UPDATE



RI: Z = 0.04 ± 0.09



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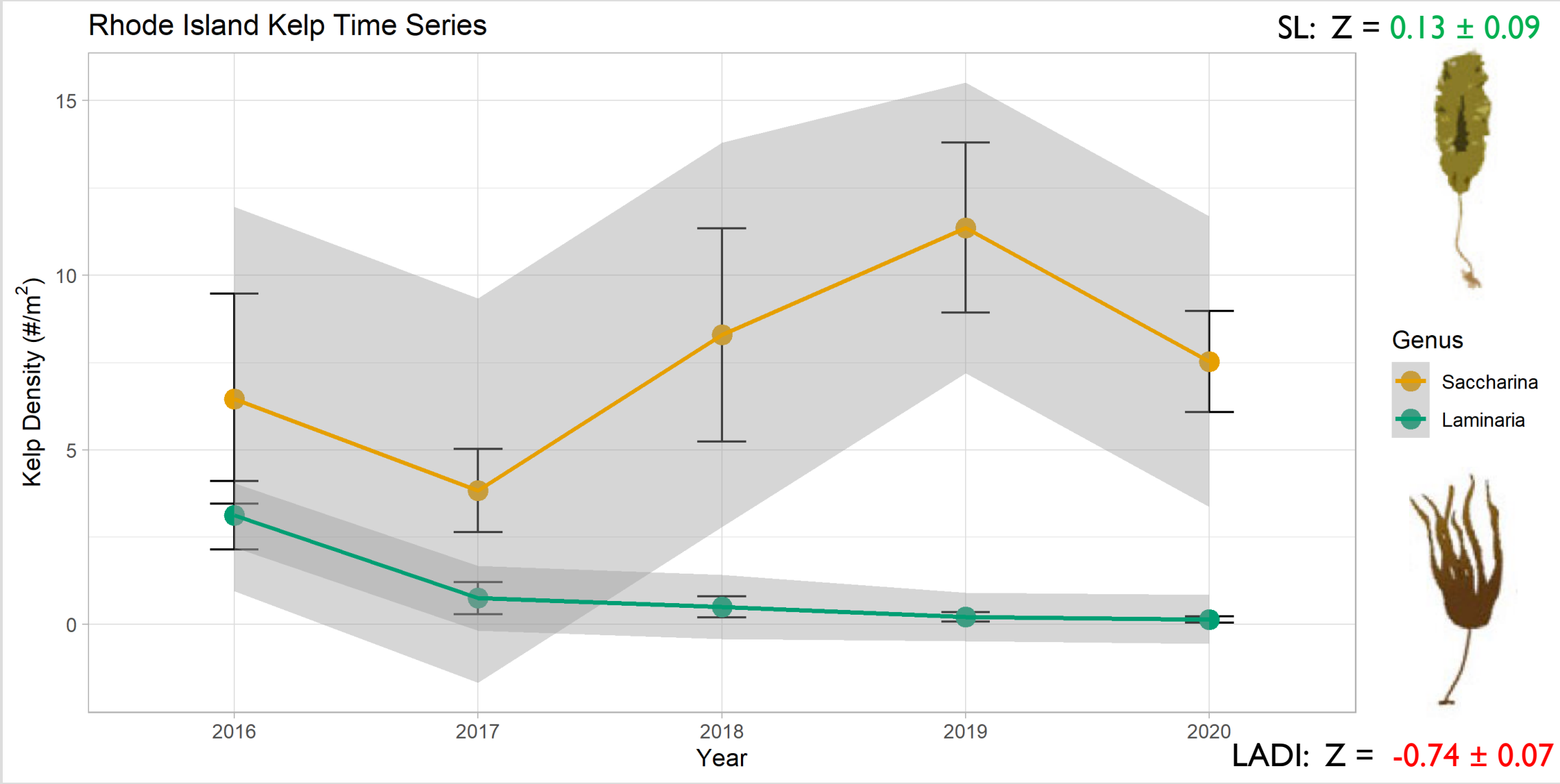

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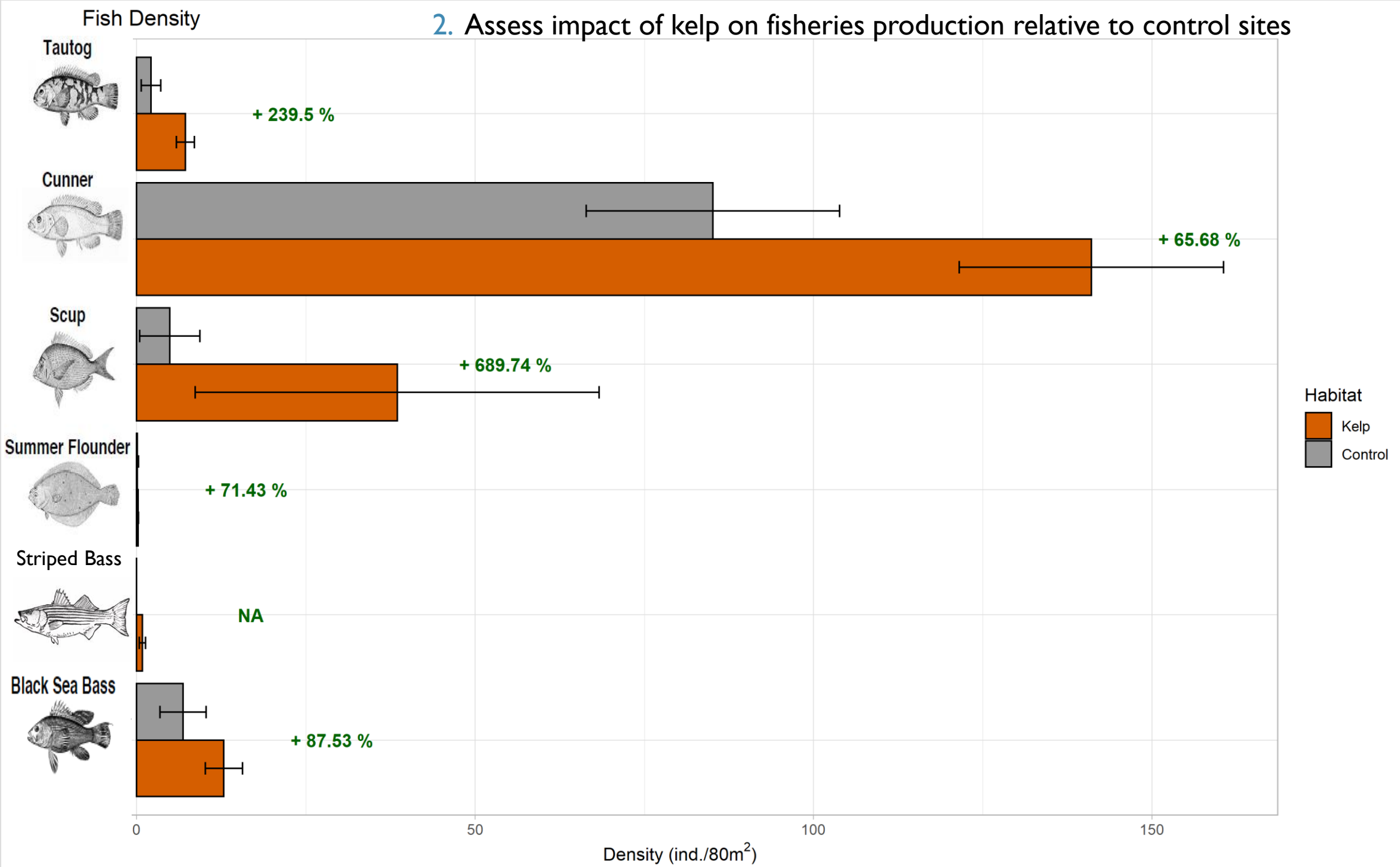
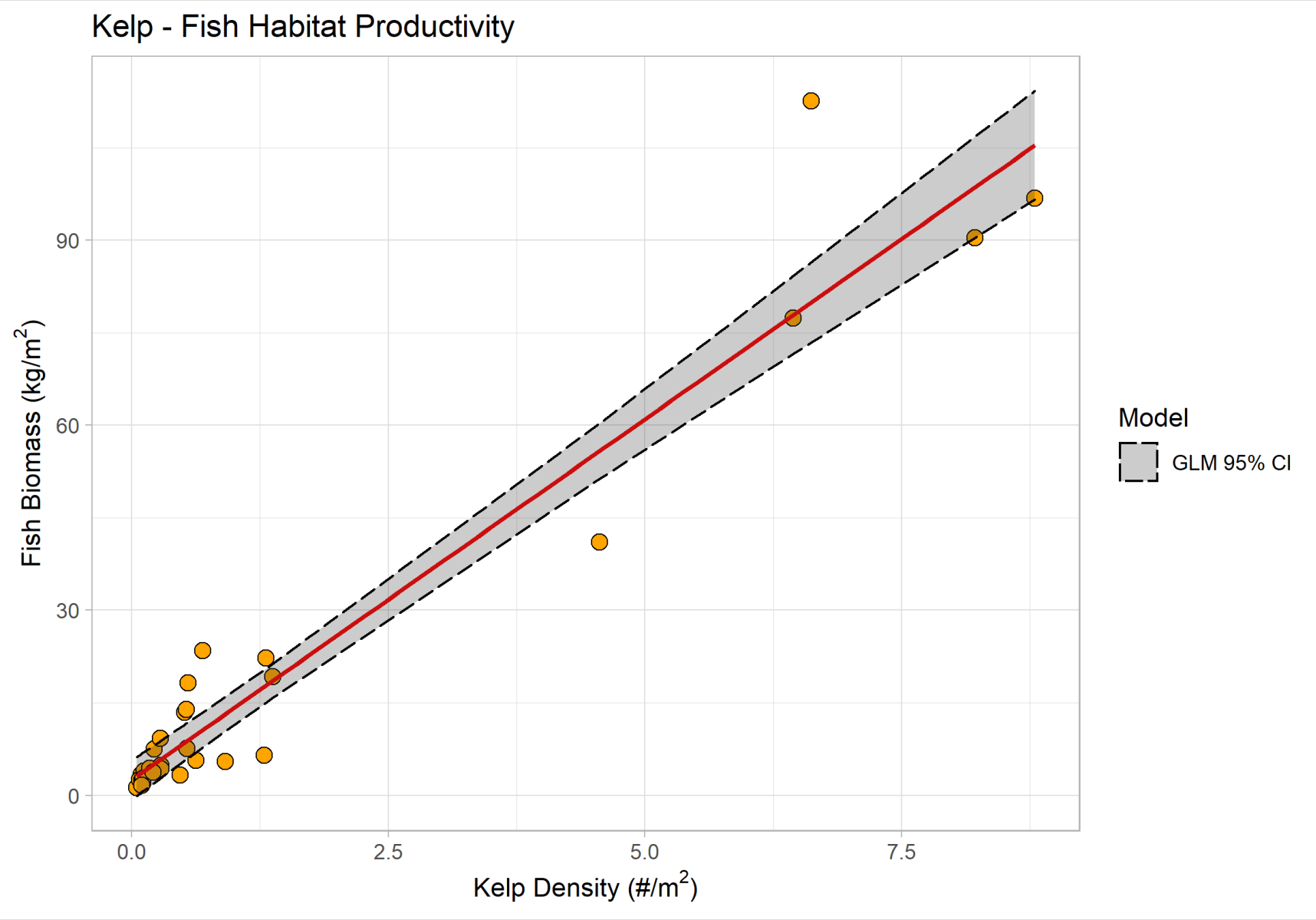
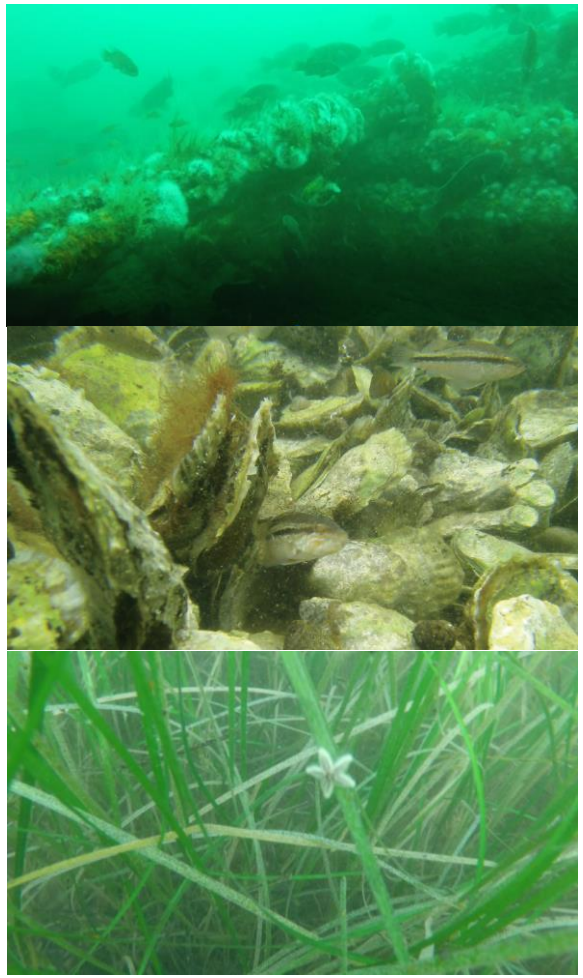




3. Develop models that help inform fish-habitat linkages in RI

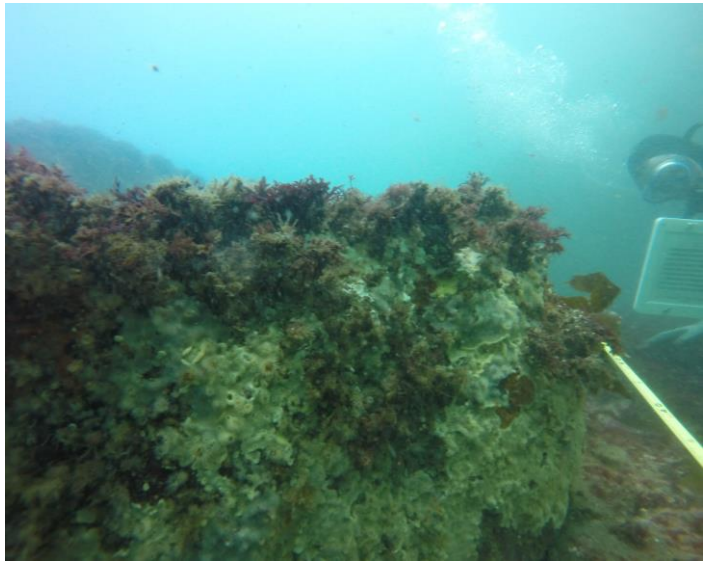


POSSIBLE NEXT STEPS

Determining economic value of enhanced production

Using this standardized approach to estimate fish production of other coastal habitats like oyster reefs, eelgrass, and artificial reefs

Could be used to build spatially-explicit food web models that include habitat, building off Innes-Gold et al. 2020 Narragansett Bay model


THANK YOU