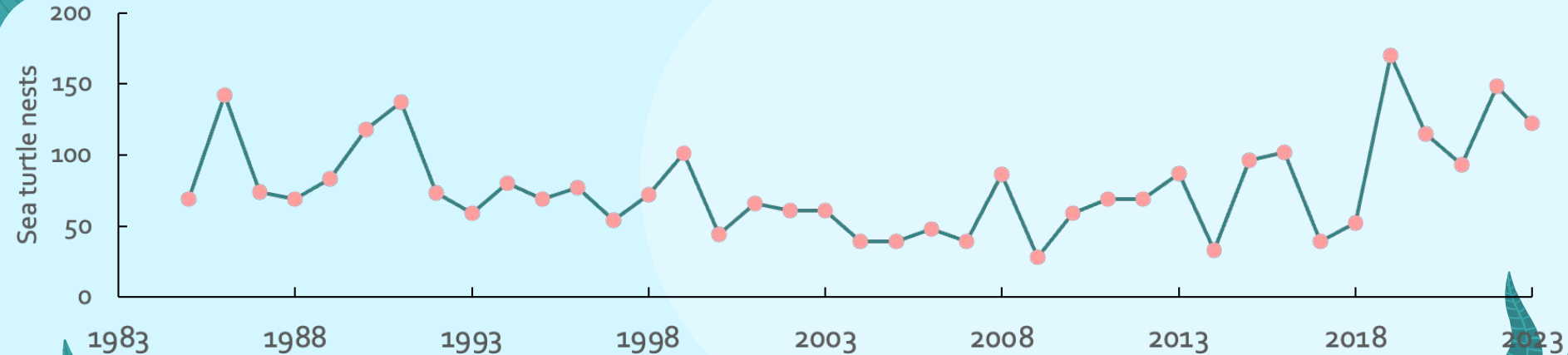


40 Years of Discovery

at Bald Head Island Conservancy



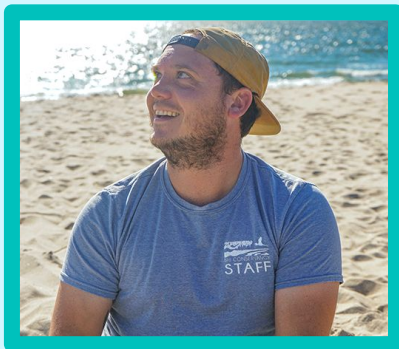
Beth Darrow, Chief Scientist
Bald Head Island Conservancy
JOHNSTON COASTAL SUSTAINABILITY SYMPOSIUM 2024

BHIC's science **team**



Beth Darrow

Chief Scientist



Paul Hillbrand

Sea Turtle Biologist



Allison Polinski

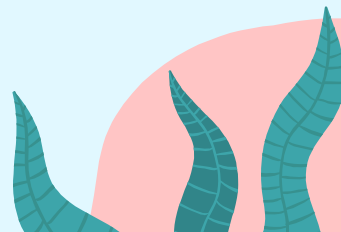
Coastal Scientist



Chris Shank

Executive Director

And dozens of **interns!**



Conservation science at **BHIC**



**Sea turtle nest
protection**



**Environmental
Services
Contract**



**Collaborative
research**

40 years of **discovery**

01

Sea Turtles

Legacy of the Conservancy

02

Maritime Forest

Preserving what is unique

03

Water Quality

Links to our region

04

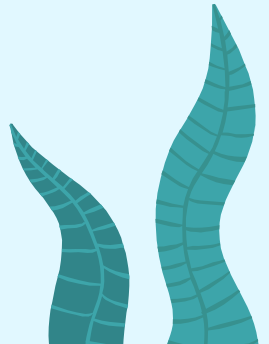
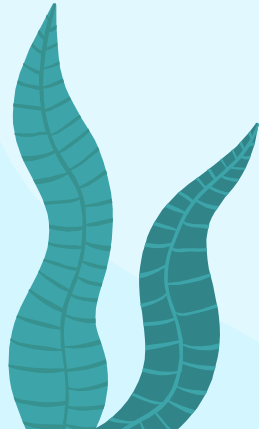
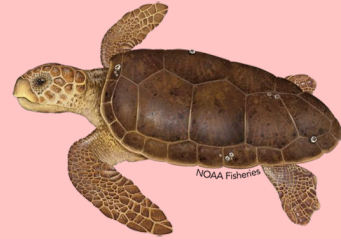
The Future

Understanding human impacts

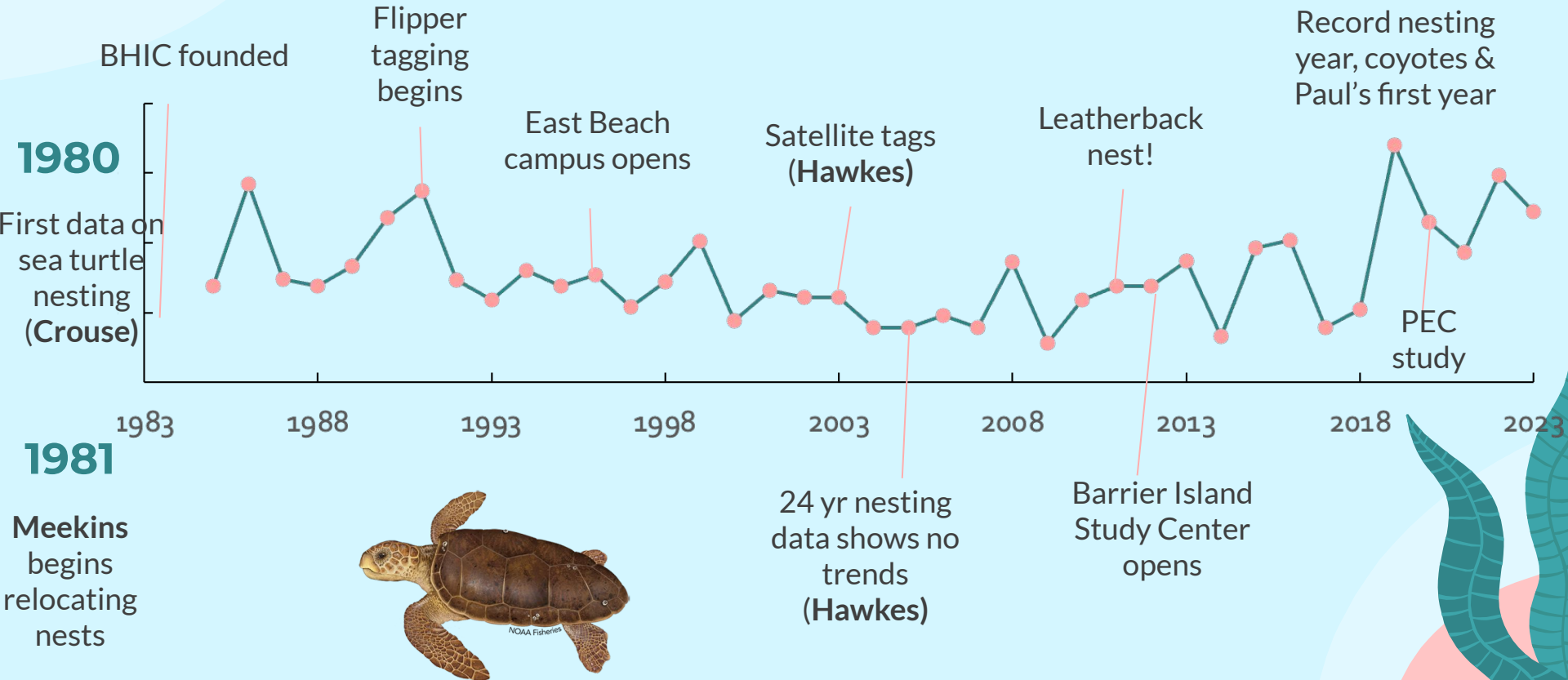
01

Sea Turtle Protection Program

Legacy of the Conservancy



Forty years of **conservation research**



What we have **discovered**



1981

Use of wire screens helped prevent nest depredation by foxes



1983

“Hatchery” use improved hatch success but had many logistical problems



2011

Metabolic heating in BHI nests - both natural & relocated



2016

Decrease in incubation duration correlated with air temperature



2017

Accelerometer data showed different resting behaviors for two turtles



2020

Change in cage type slows nest depredation by coyotes

A large sea turtle is resting on a sandy beach at night. The turtle's head is in the foreground, and its body extends towards the background. A small satellite tag is visible on the top of its shell. The scene is illuminated by a warm, golden light, likely from a low sun or moon. The background shows a dark, possibly wooden structure, and the sand is textured with footprints and shadows.

Future plans

Continue collecting genetic tagging data


Satellite tagging - effects of wind farms

Ecotoxicology - blood samples

Maritime Forest

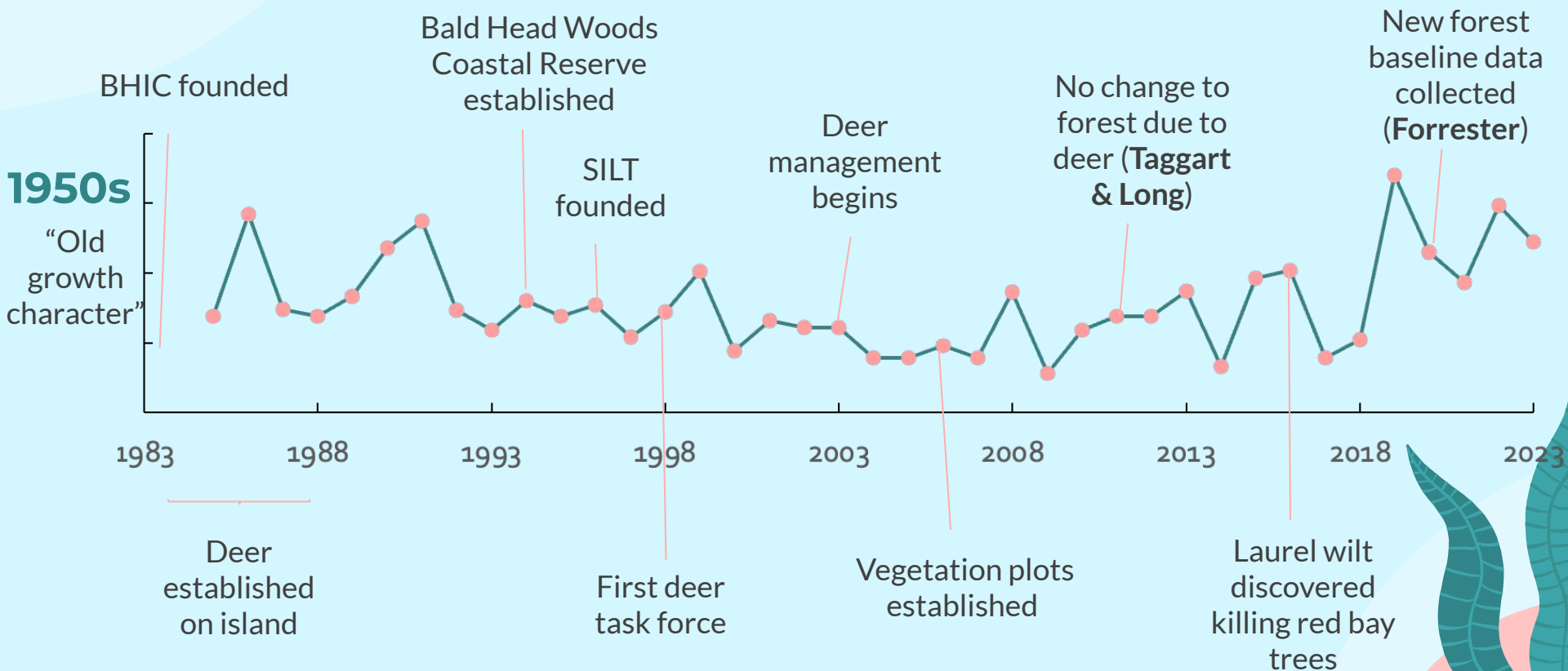
02

Preserving what is unique



Bald Head Woods is a protected maritime evergreen forest – south Atlantic subtype. It has a G2 rank – meaning it is a globally imperiled community.

Forty years of **forest preservation & research**



Effects of **deer herbivory**

- Paired fenced & unfenced plots
- 2011: No effect (Taggart & Long)
- 2020: New baseline (Forrester & BHIC)
- Evaluate other threats: development, storms, fragmentation, disease
- Major change: Loss of red bay



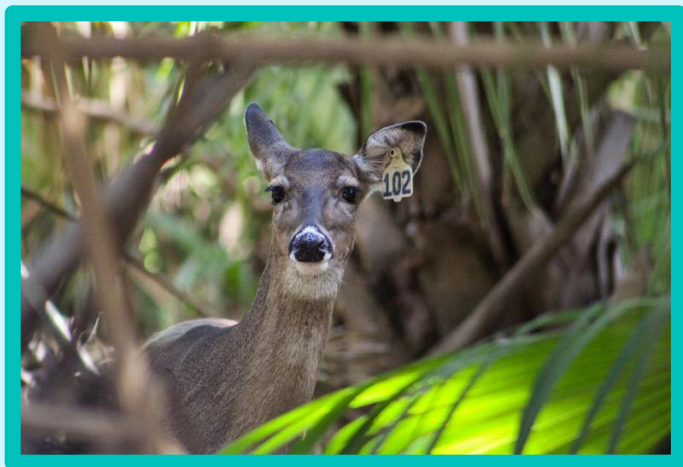
25.3 m

Height of forest
canopy

26%

Canopy openness



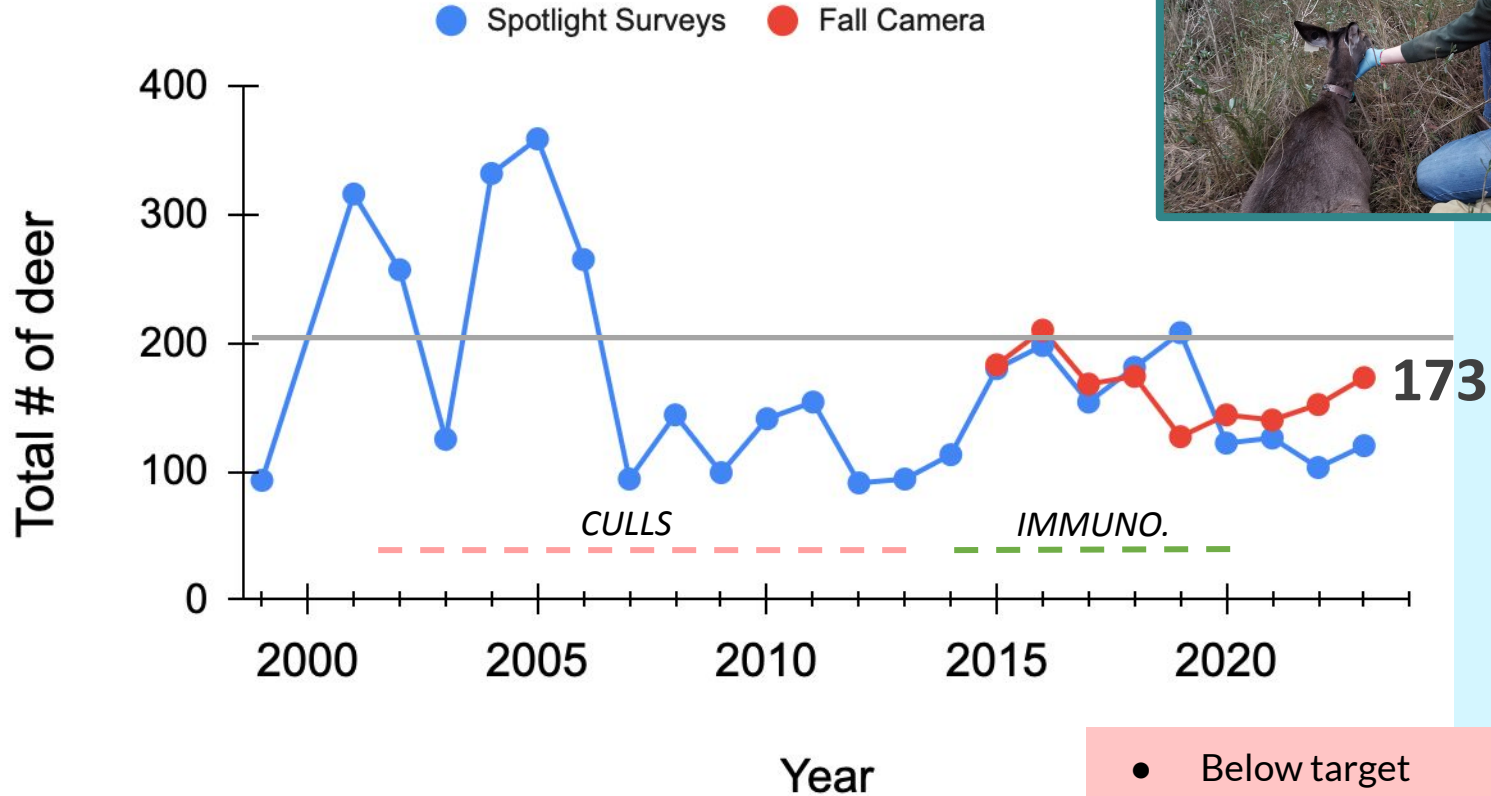


Deer **population surveys** & **immunocontraception** research

Regular spotlight surveys since 1999

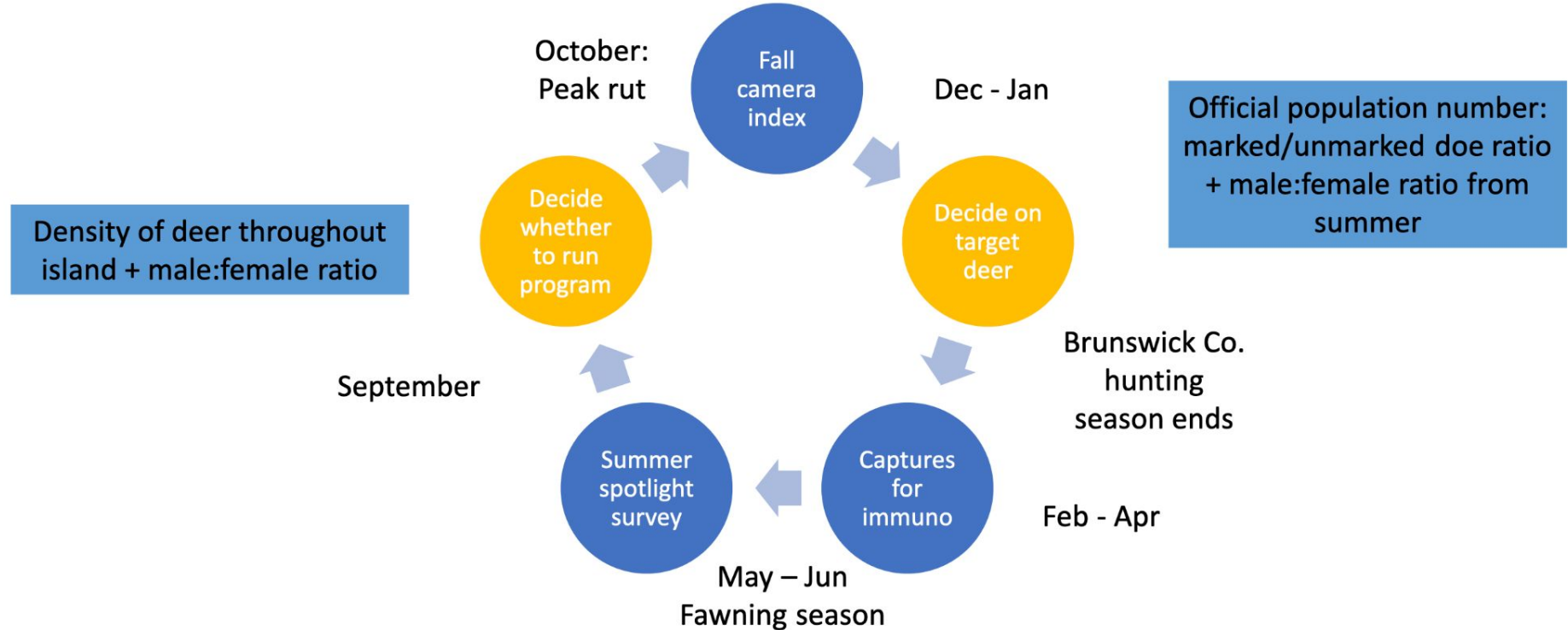
First deer immunocontraception program in
North Carolina: 2014 - 2020

Deer Population Management



- Below target
- Increased 20% since 2020

Deer Immunocontraception



GonaCon was effective (86% 2 doses, 33% 1 dose, population < 200) but not very economical (Walker et al. 2021)



84

Deer given contraceptive drug

173

Current estimate of deer population size



25.3 ha

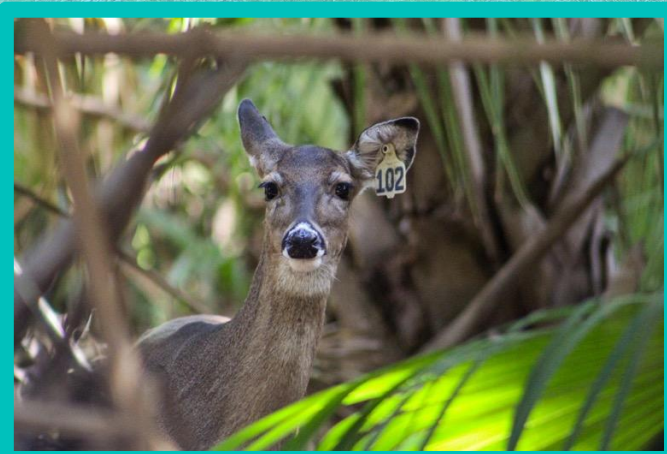
Loss of deer habitat to development 2019 - 2023

Future plans

Prioritize efforts on data collection & preservation of the maritime forest

2025 forest plot surveys

Possibly re-start immuno



03

Bald Head Creek Water Quality

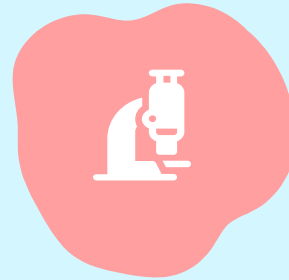
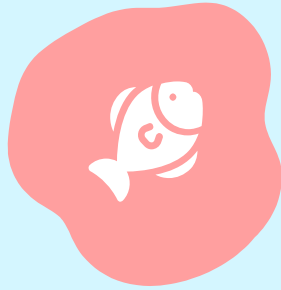
Our link to the Cape Fear
Region



BHIC water quality monitoring

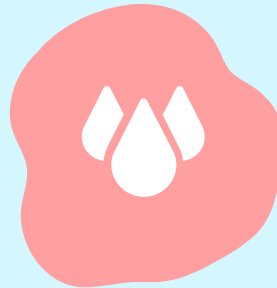
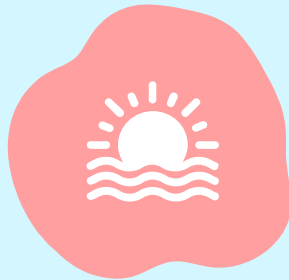
Creek

Weekly sampling for physical parameters, nutrients, chlorophyll
Quarterly 24h sampling



Shoreline

Biweekly & event-based bacteria sampling



Aquifer

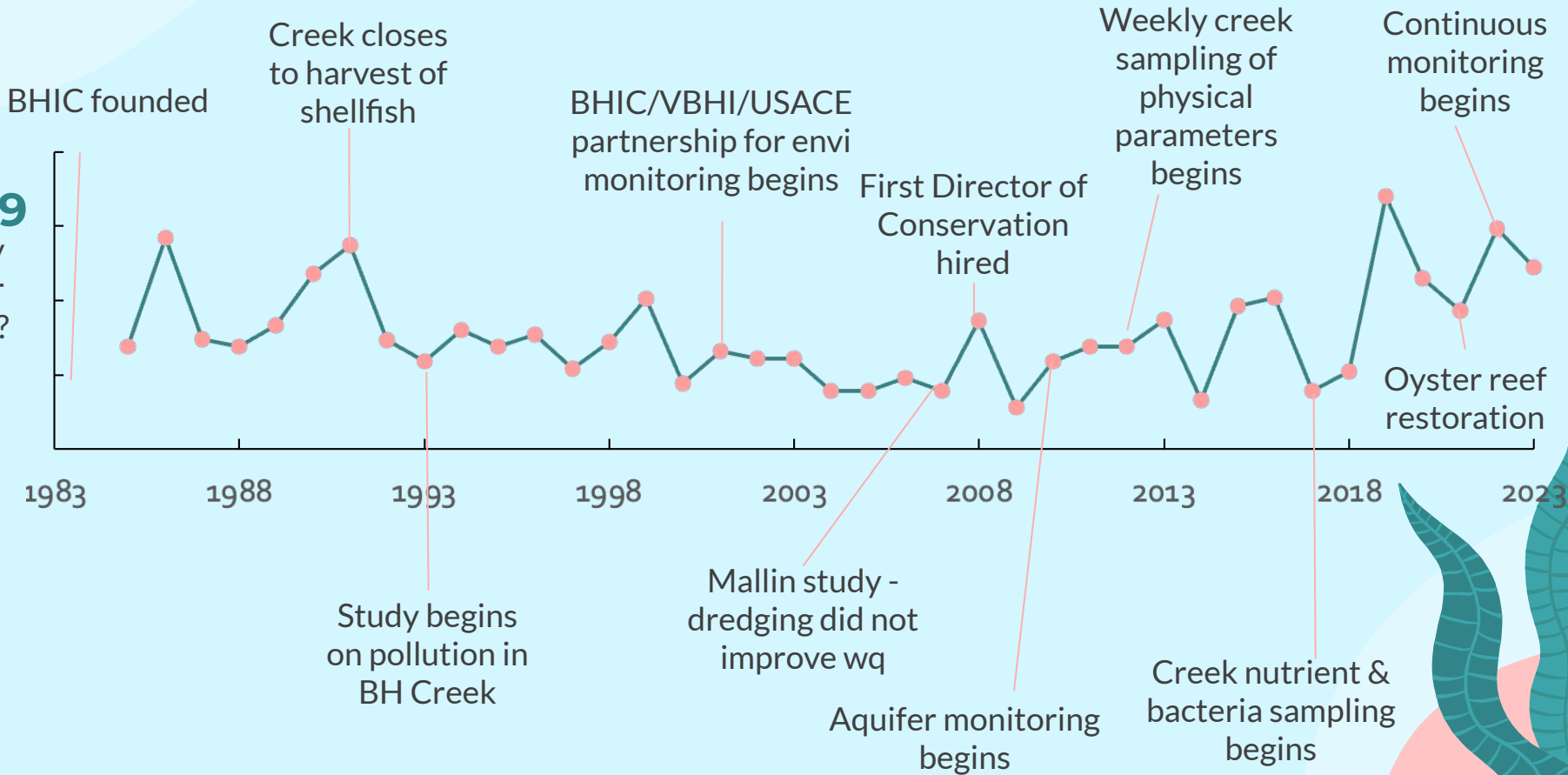
Quarterly groundwater sampling for physical parameters, nutrients



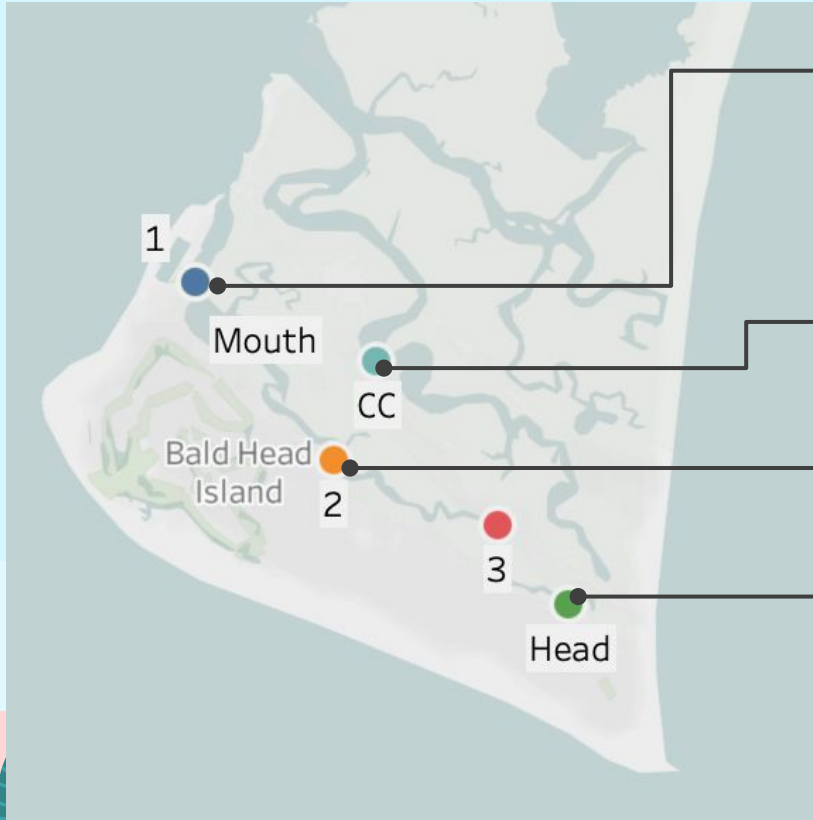
Forty years of **water quality monitoring & research**

1979

Why poor WQ?



Bald Head Creek **monitoring sites**



Mouth

Highly influenced by Cape Fear; new continuous sonde

Cape Creek

Control site for Cape Fear vs. BHI-specific inputs

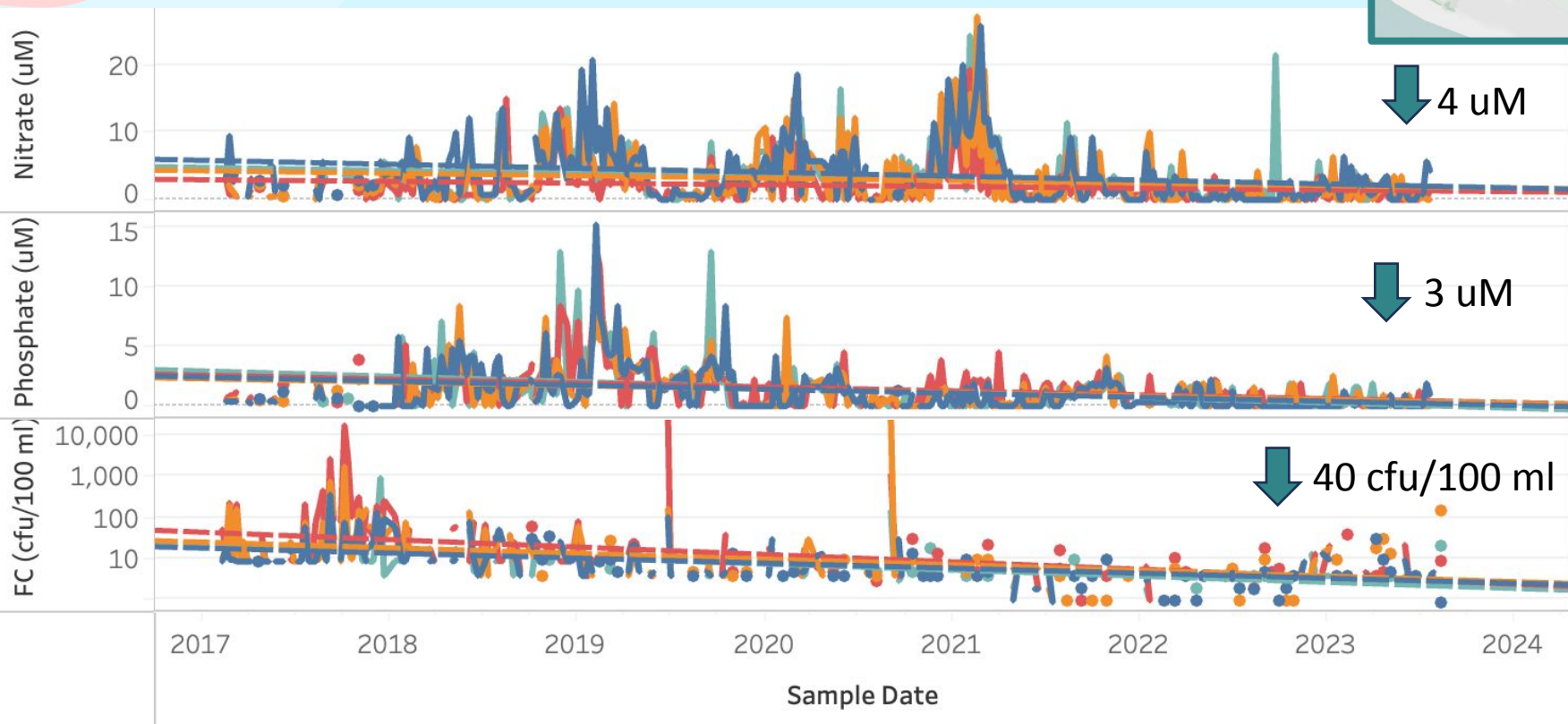
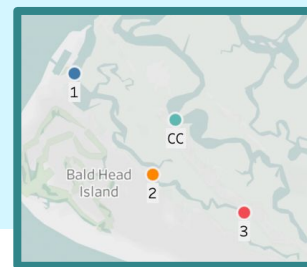
Mid-creek

Most bacteria issues; near stormwater & lift stations

Head

Freshwater source is mostly groundwater

Water quality is **improving**



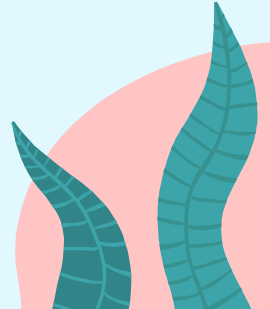
Future **plans**



Continue **water quality sampling** & investigate pollution sources

Continuous water quality station & SET table

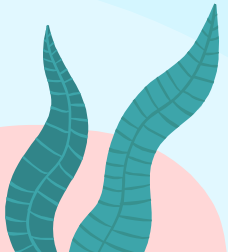
Install living shorelines



40 YEARS OF (future) DISCOVERY

What do we not yet know?

- Flows of energy between ecosystems
- Carrying capacity of the island
- Tipping points for ecological change
- Similarities & differences with other islands



“We are still running, sustained by shared dreams, powered by creative energy, provoked by our ‘outrageous ambitions’, guided by thoughtful planning and fully aware of our traditions. Indeed this heritage is our beacon still...
to live in harmony with nature.”

—Dr. Thad B. Wester
Founding President
2003
20th anniversary of BHIC



Thank You!

Questions?

darrow@bhic.org | 910-338-0942 | bhic.org

BHI Conservancy



DISCOVER·LEARN·CONSERVE·PRESERVE

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