Fishing Pier vs. Snorkel Reef: Which Gets the Most Diverse Floral and Faunal Communities

By Catheline Froehlich

Dauphin Island Sea Lab

NSF Postdoctoral Research Fellow in Biology

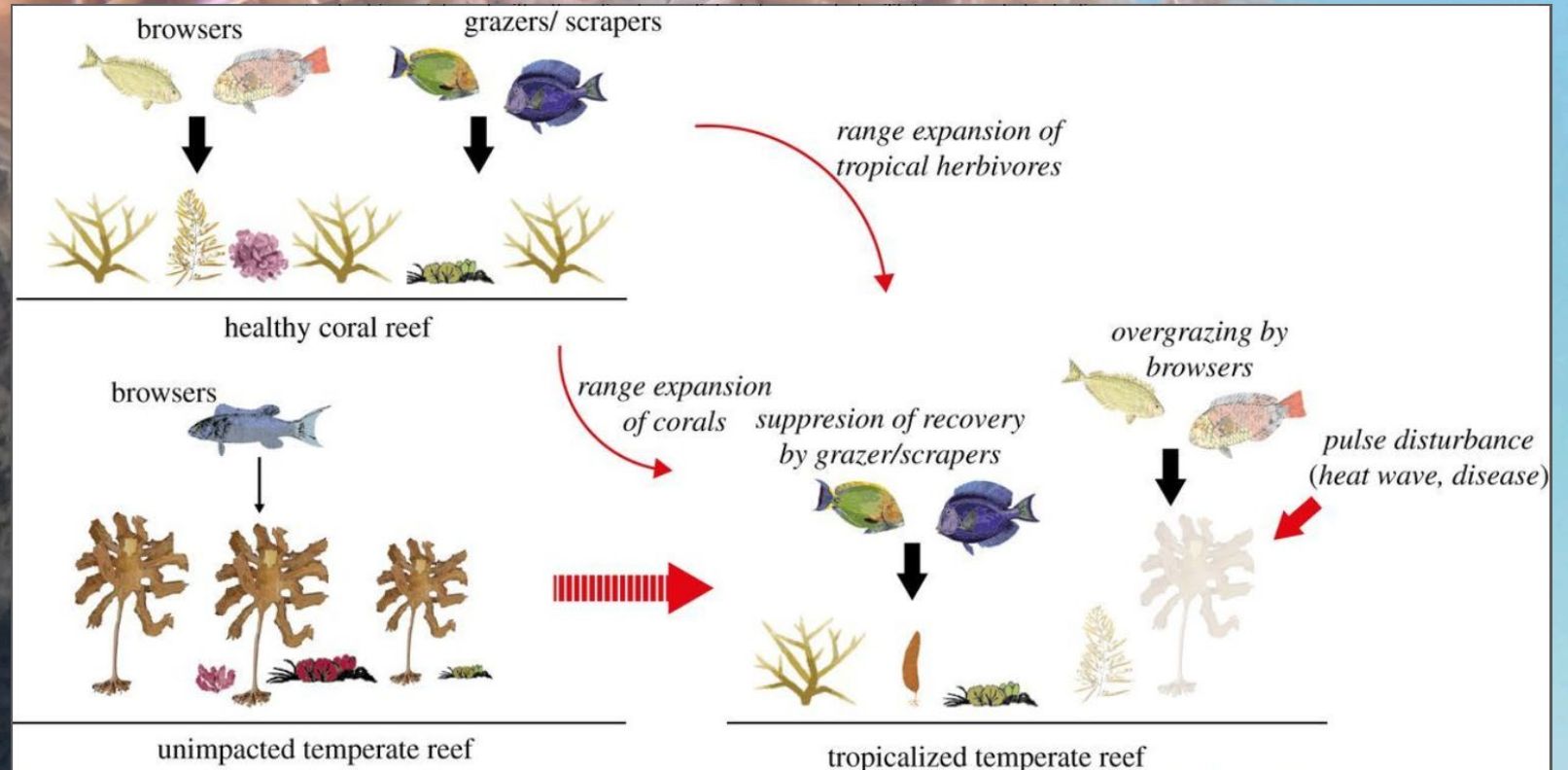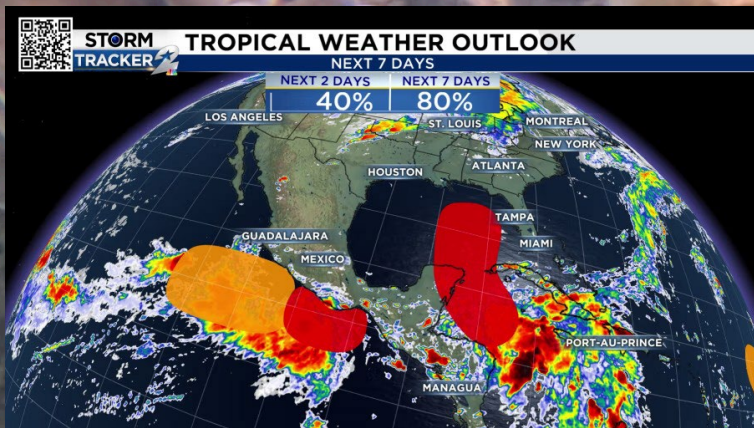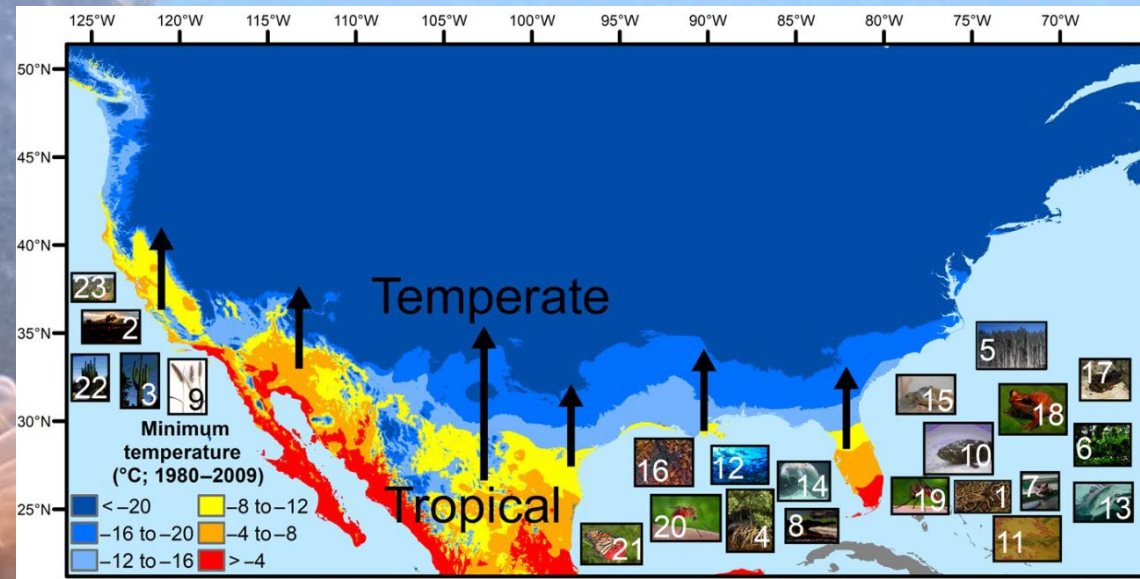# **Artificial Reefs:** why are communities different?

-     Location
-     Depth, type of ocean floor
-     Type of microhabitat, material
-     Spacing between reefs
-     Vertical relief
-     Fishing pressure
-     Tourism pressure
-     Etc.

Most studies focus on fish only

Tropicalization:
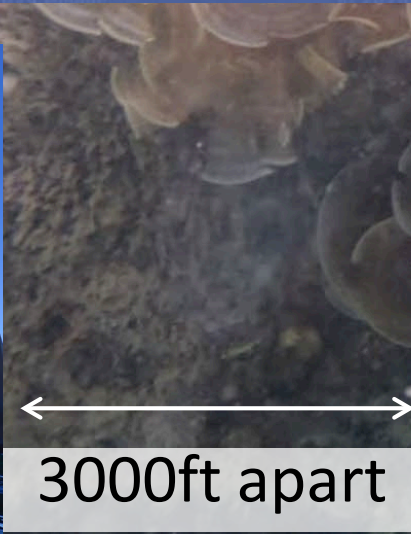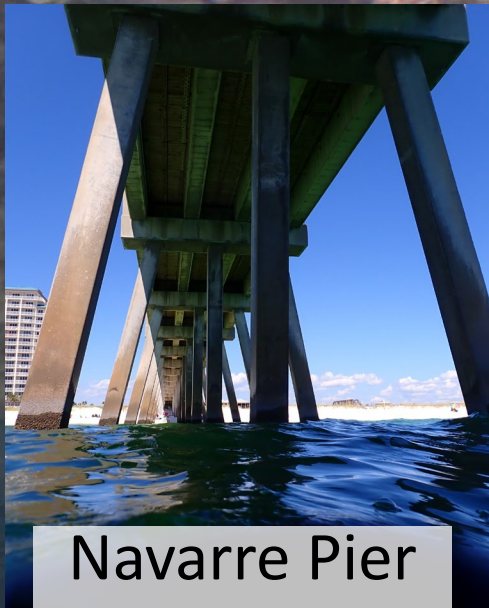tropical organisms moving to temperate areas
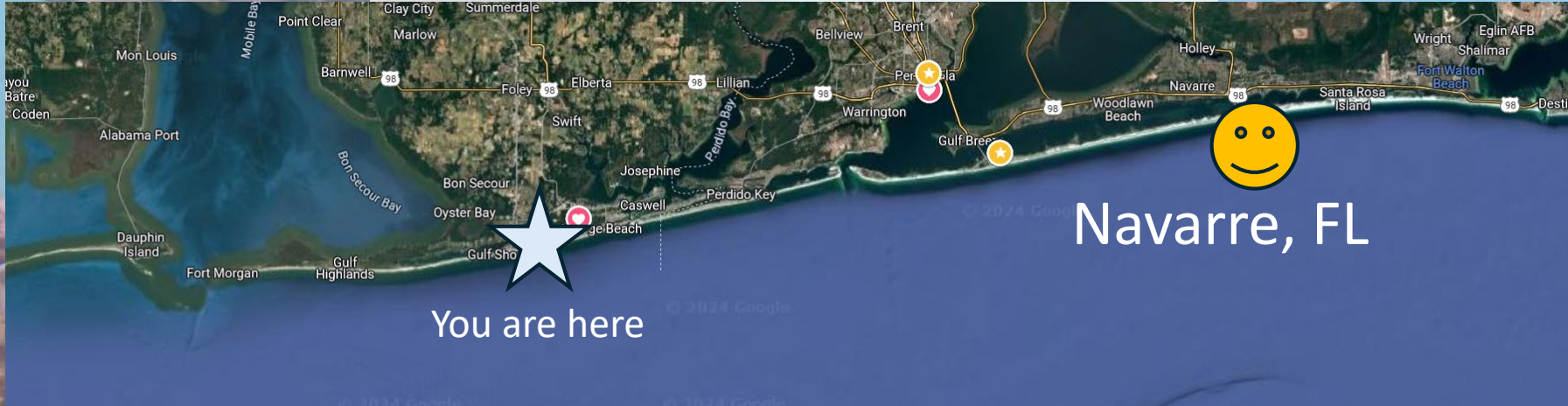(not just juveniles)

STUDY AIMS

- Compare two different reef types at the same location
  - Are vertebrate and invertebrate communities the same?
- Determine if tropicalization is occurring
- Compare sampling methods

STUDY LOCATION

You are here

Navarre, FL

3000ft apart

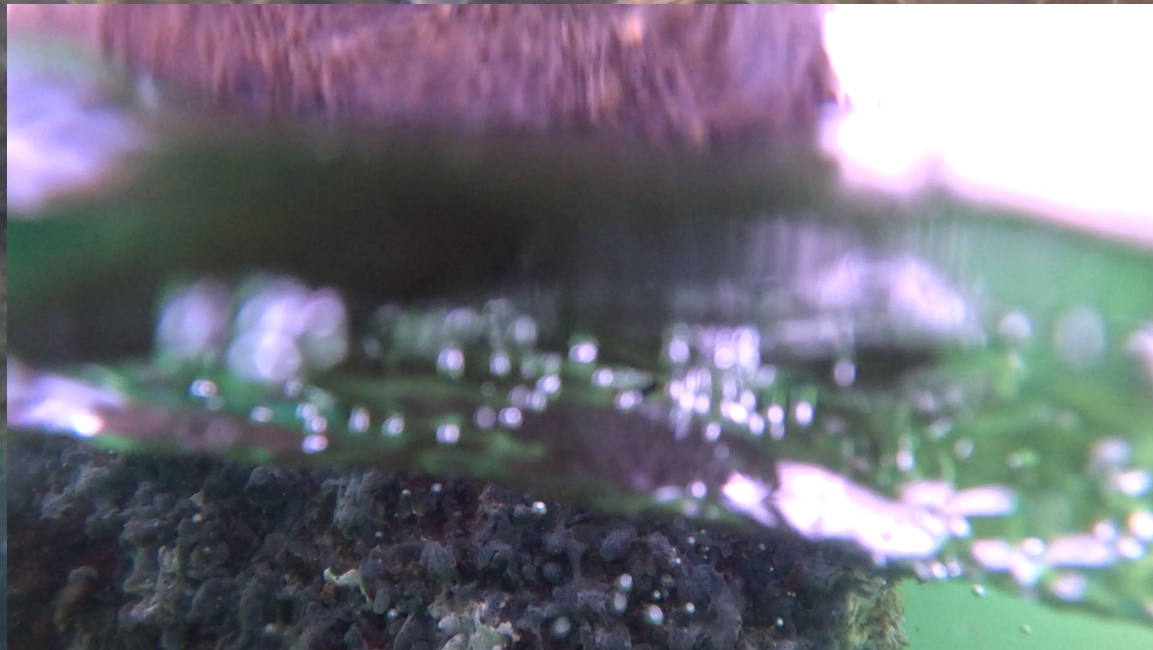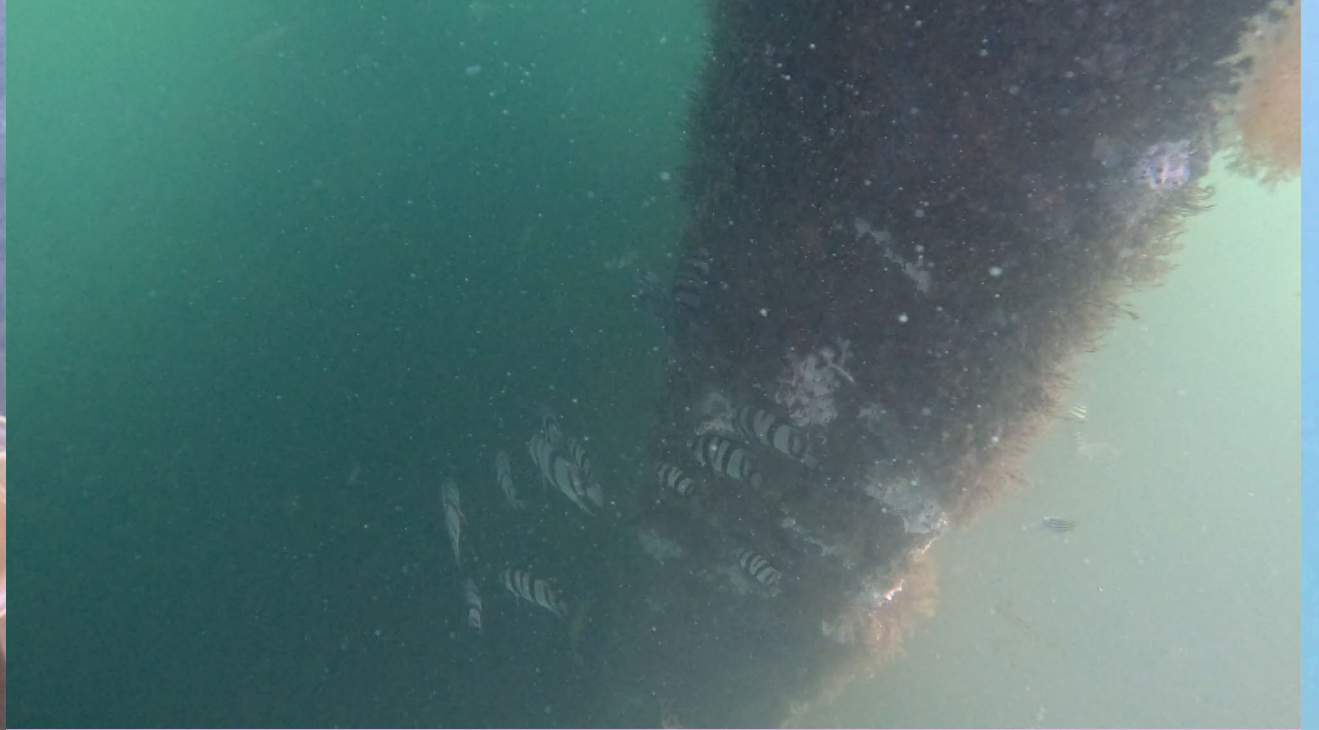Navarre Pier

Snorkel Reef: 2017 & 2021

Snorkel reef:

- Navarre Beach Marine Sanctuary
- No fishing allowed, but swimming
- 300-400ft offshore
- 10-15ft deep, submerged
- sometimes a surface buoy

Navarre Pier:

- Fishing pier
- No swimming
- Shore to 1500ft out
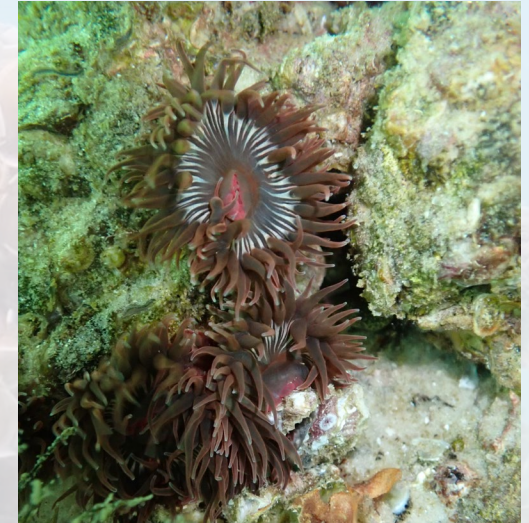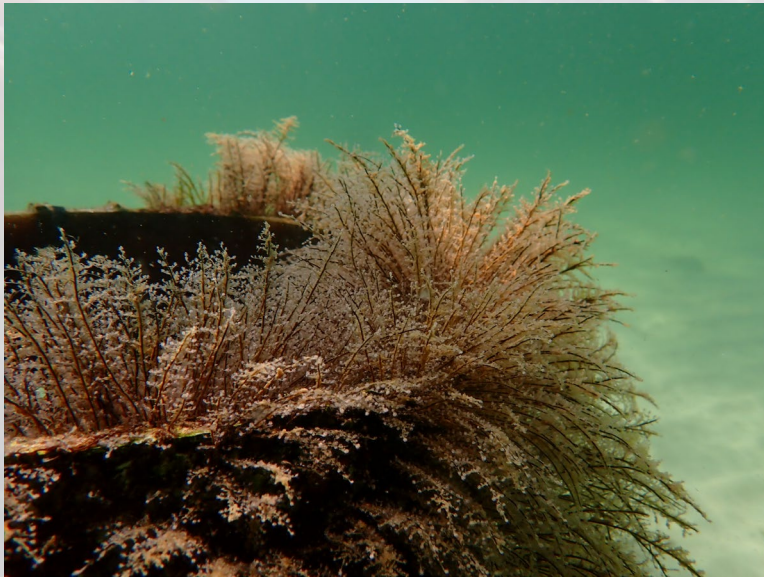- From surface down to 30 ft deep

VERTEBRATES (fish, sharks, mammals, etc.)

METHODS

INVERTEBRATES (snails, sponges, crabs, jellyfish, etc.)

METHODS

Snorkel surveys
- 45 min at structure
- sand control 100m away

iNaturalist
- free, everyone can post
- Citizen science: help with IDs
- Research grade IDs

VERTEBRATES
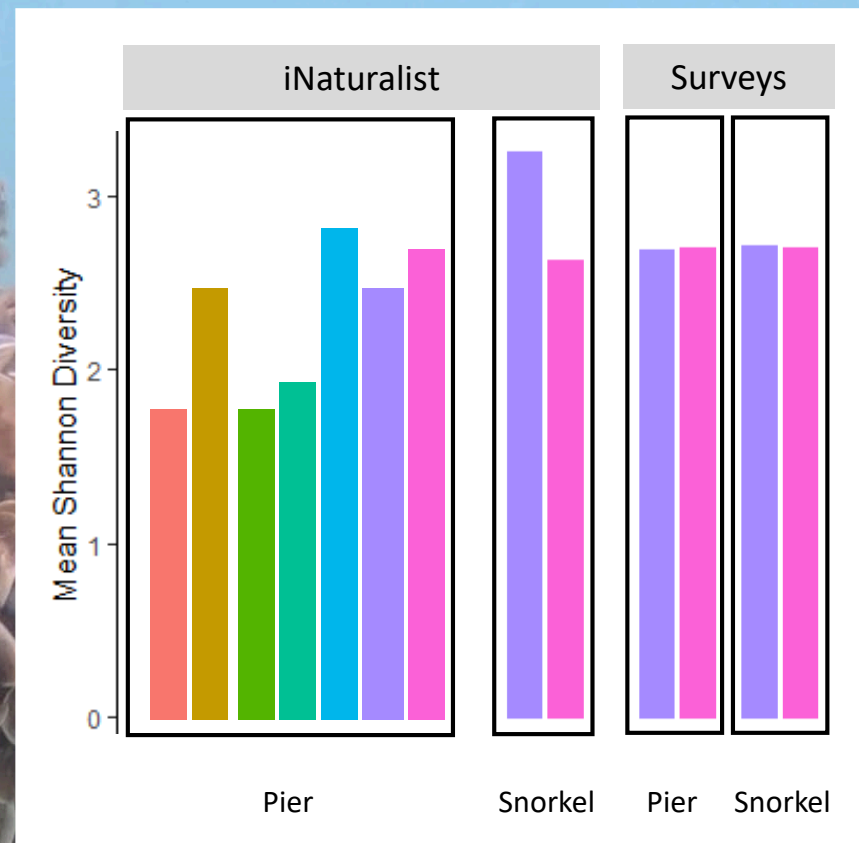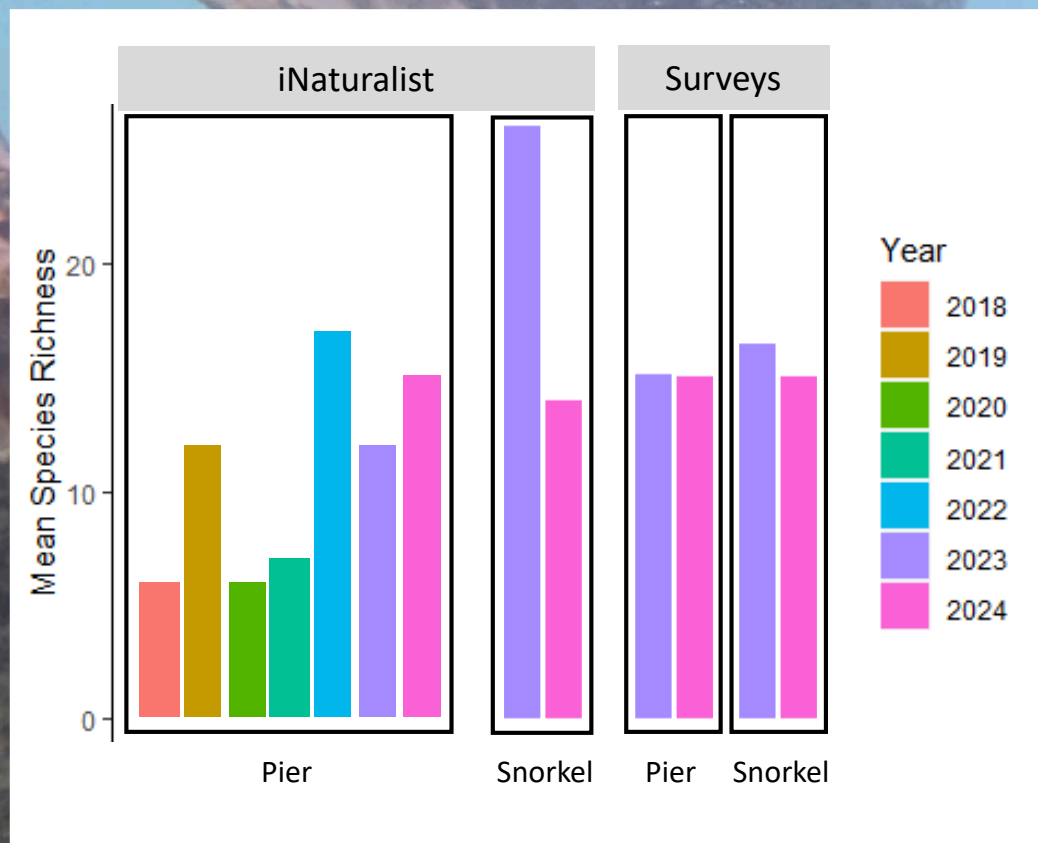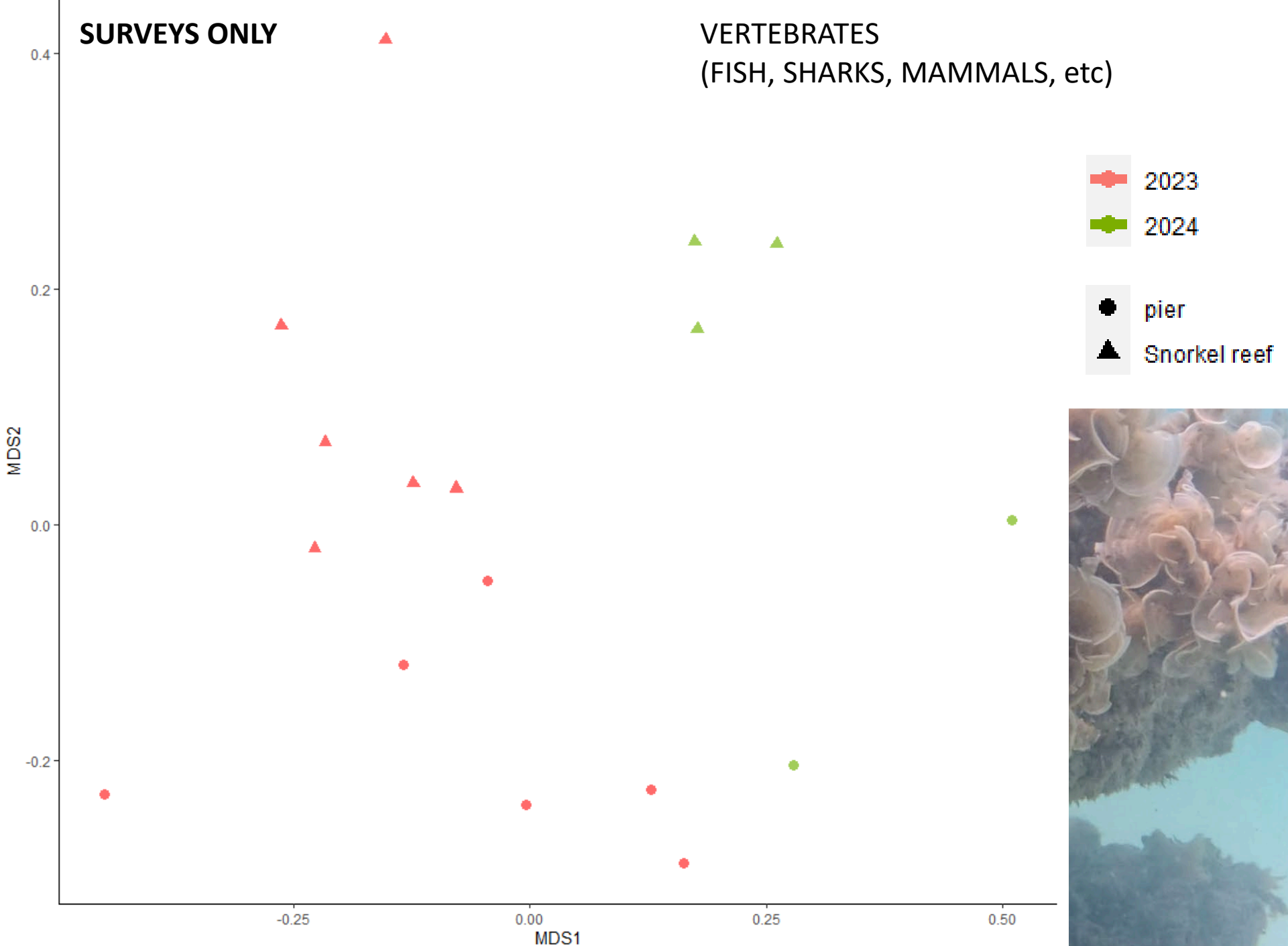(fish, sharks, mammals, etc)

iNaturalist had fewer species observed until 2023.
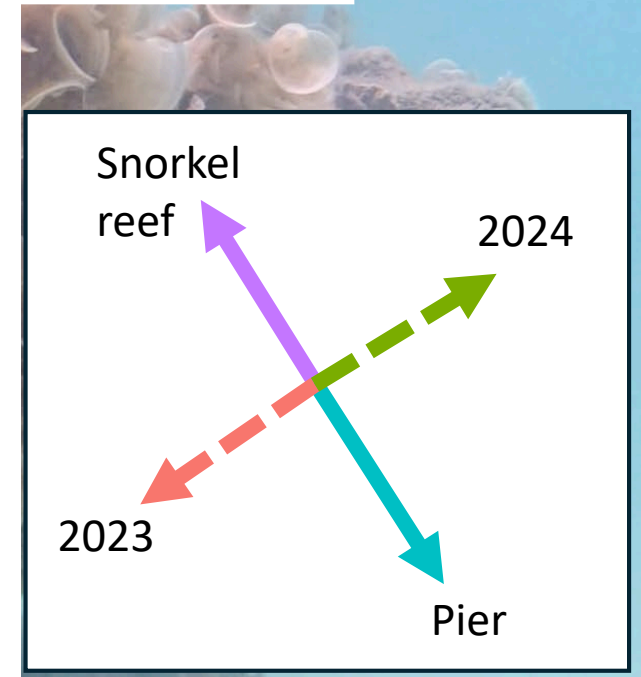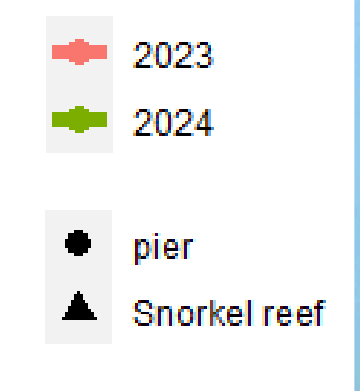The snorkel reef had more species in 2023 than 2024.

SURVEYS ONLY

VERTEBRATES
(FISH, SHARKS, MAMMALS, etc)
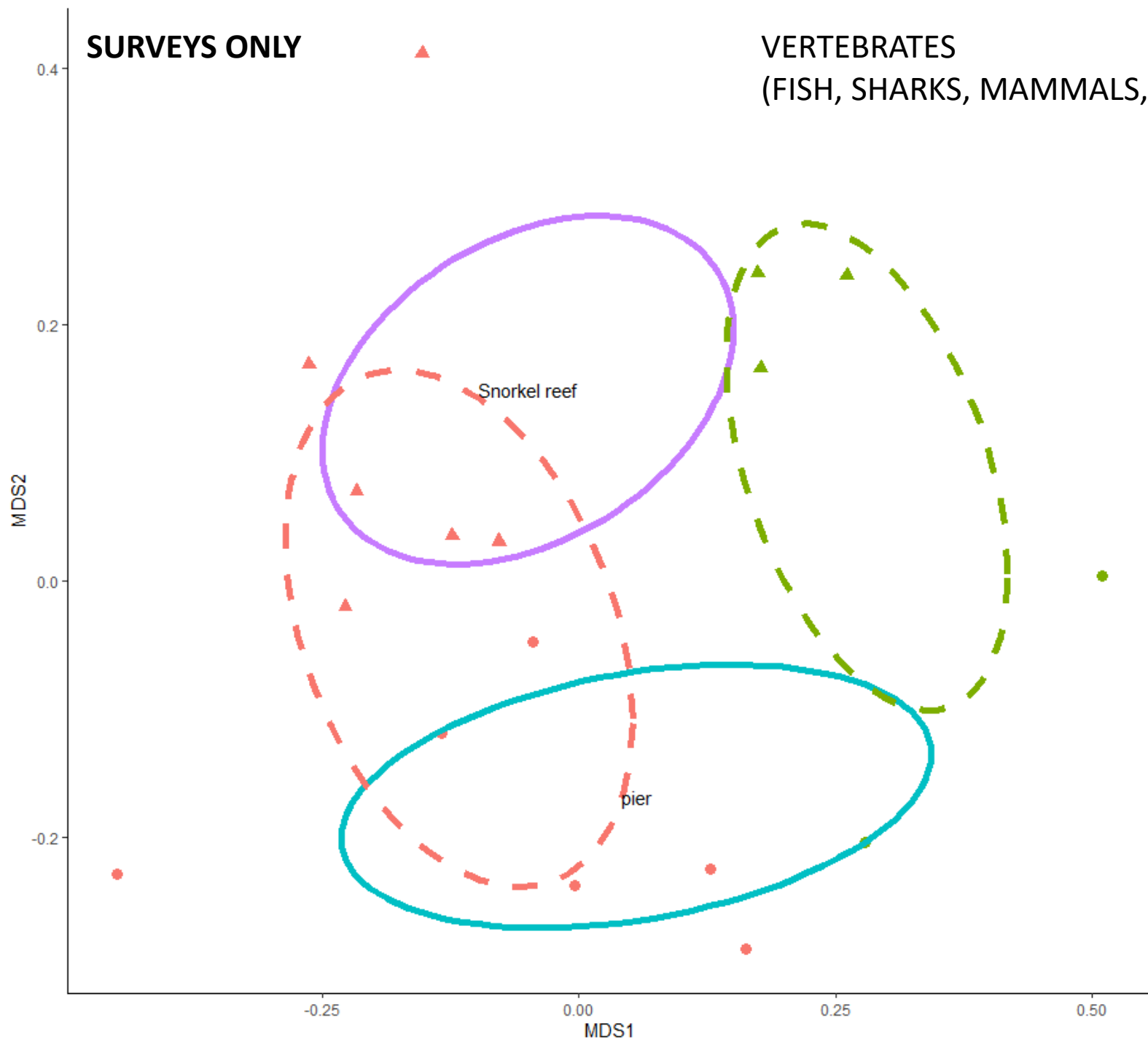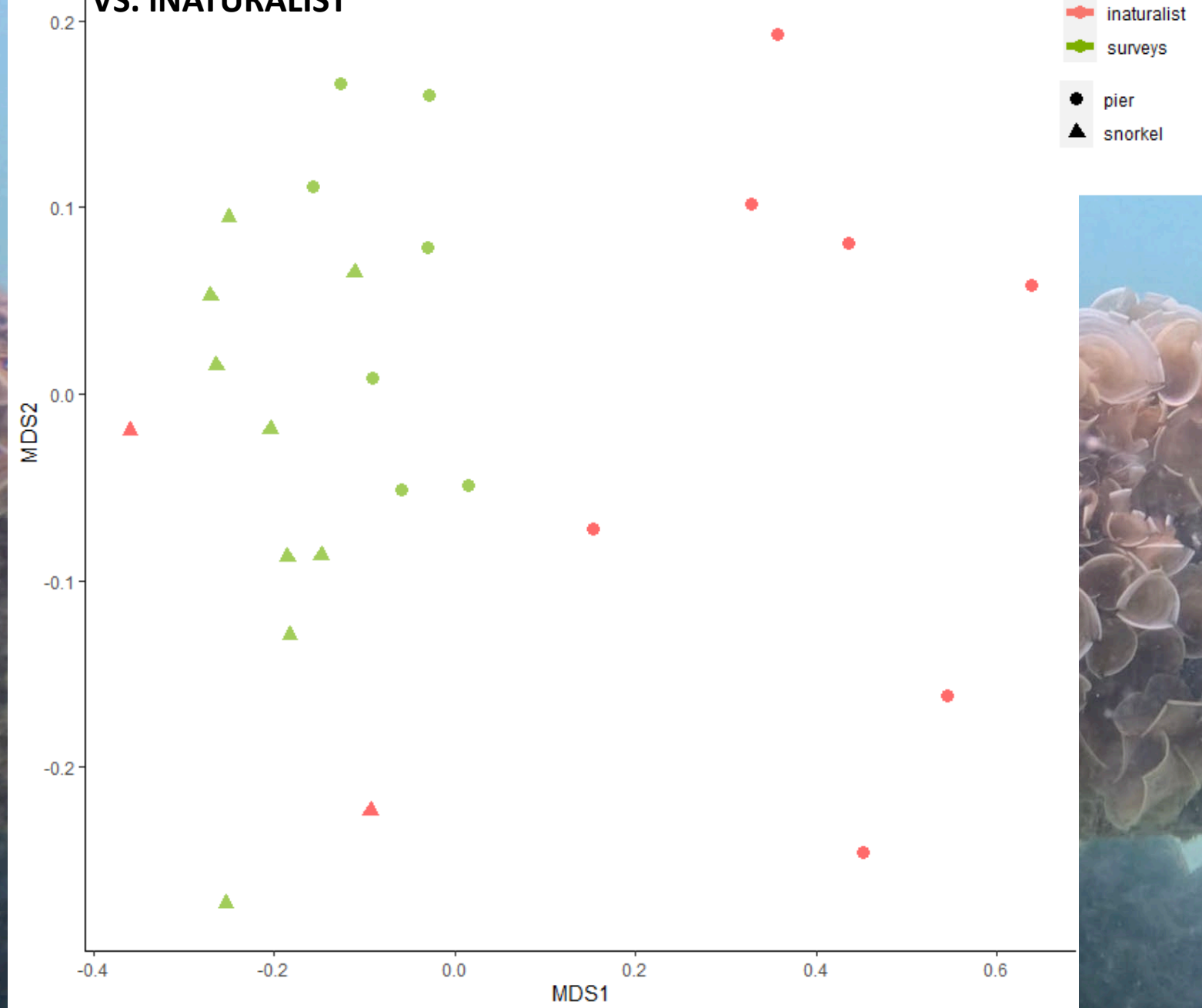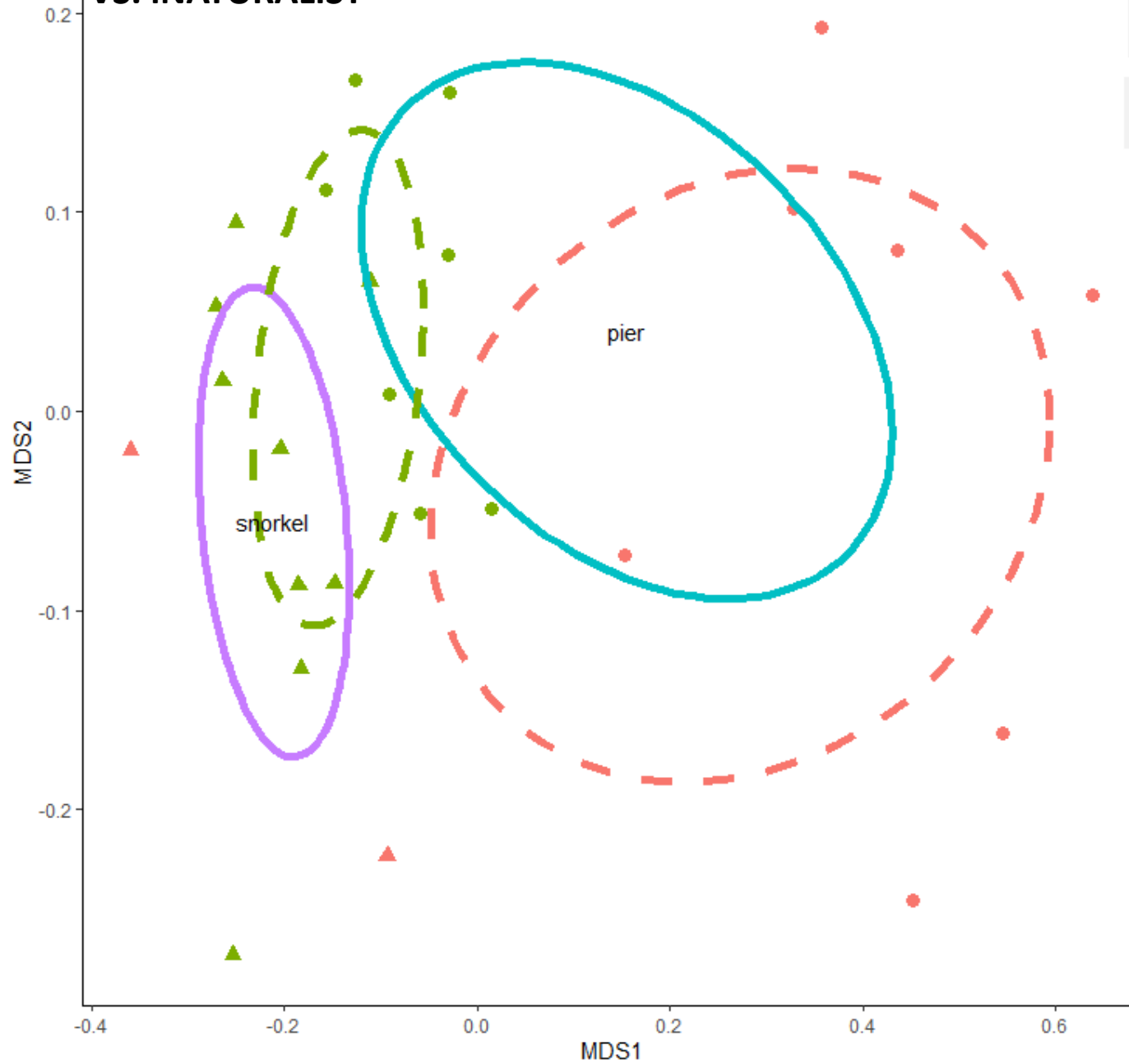
SURVEYS ONLY

VERTEBRATES
(FISH, SHARKS, MAMMALS, etc)

SURVEYS ONLY

VERTEBRATES
(FISH, SHARKS, MAMMALS, etc)

**SURVEYS
VS. iNATURALIST**

VERTEBRATES (FISH, SHARKS, MAMMALS, etc)

inaturalist
surveys

pier
snorkel

MDS2

MDS1
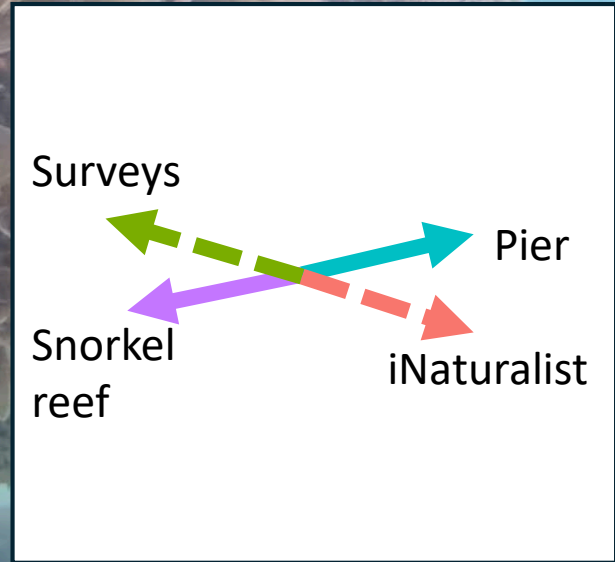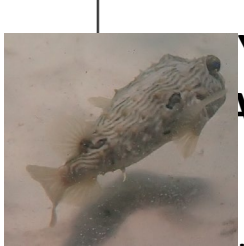
SURVEYS
VS. iNATURALIST

VERTEBRATES (FISH, SHARKS, MAMMALS, etc)

VERTEBRATES (FISH, SHARKS, MAMMALS, etc)

Gray Snapper

Florida Pompano

Scrawled Cowfish

Yellow Jack

Molly Miller

Ladyfish

Atlantic Spanish Mackerel

Pinfish

Bottlenose Dolphin

Doctorfish

Sand Perch

Pigfish

Hardhead Catfish

Surveys

Pier

Snorkel reef

iNaturalist

Legend:
- inaturalist
- surveys
- pier
- snorkel

Axis labels: MDS1, -0.4, -0.2, 0.0, 0.2, 0.4, 0.6, -0.2
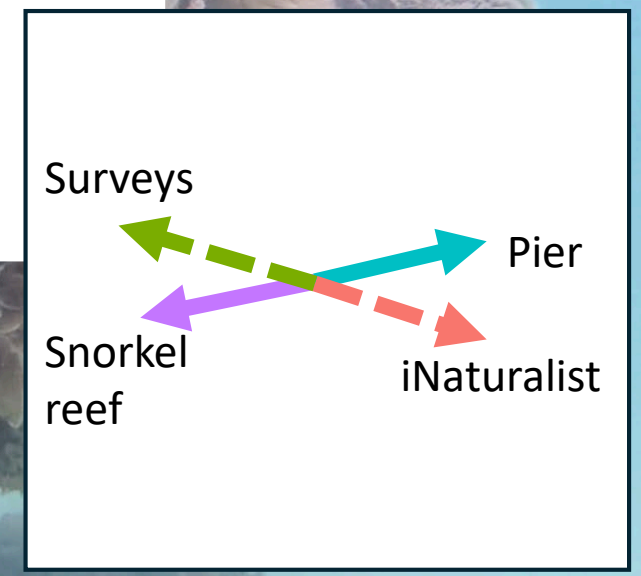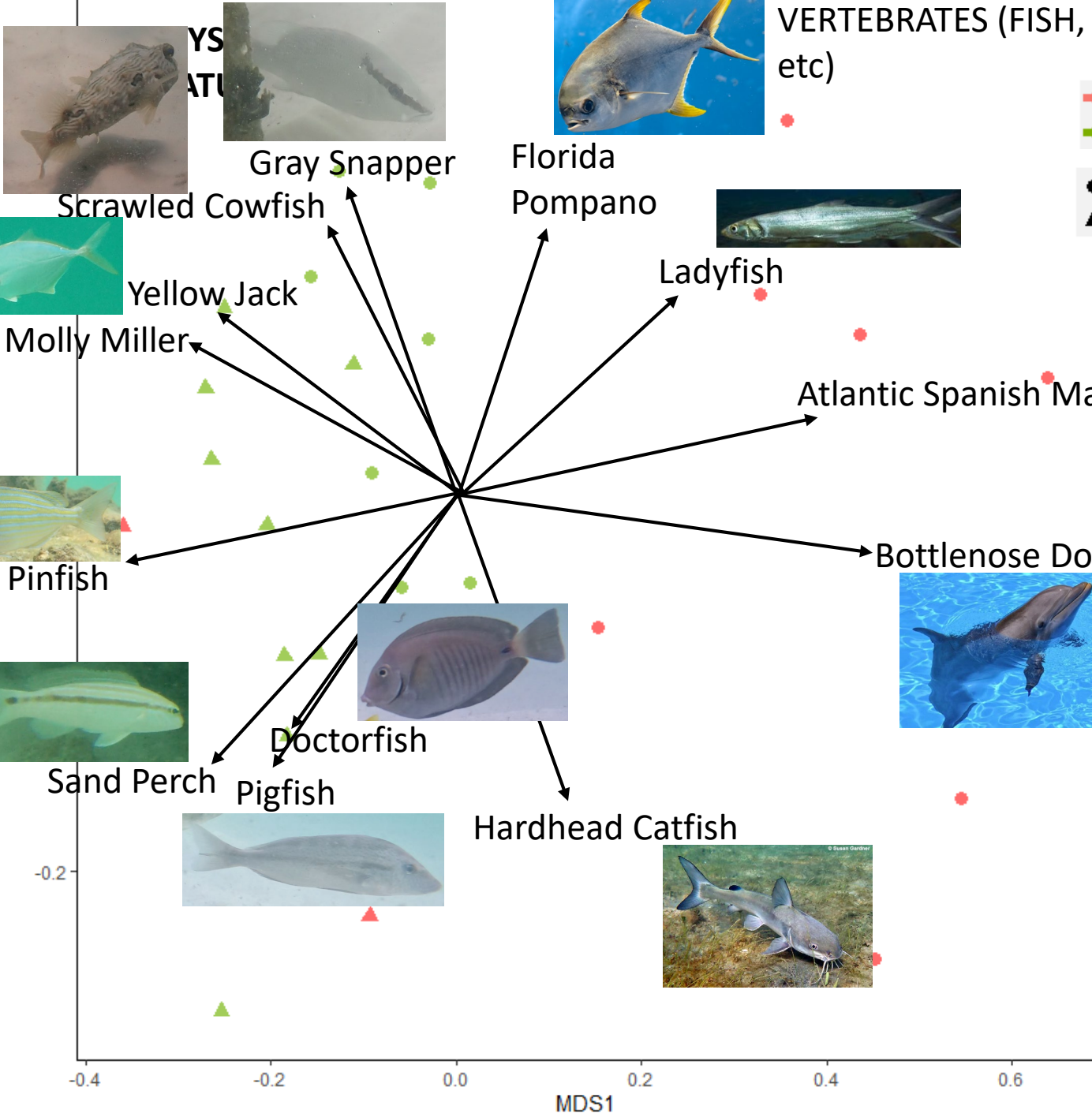
TROPICALIZATION?

2023:
Juvenile blue tang

Juvenile/adult
cocoa damselfish

Adult doctorfish

Juvenile/adult
planehead filefish

2024:

Juvenile
cocoa damselfish

Juvenile/adult doctorfish

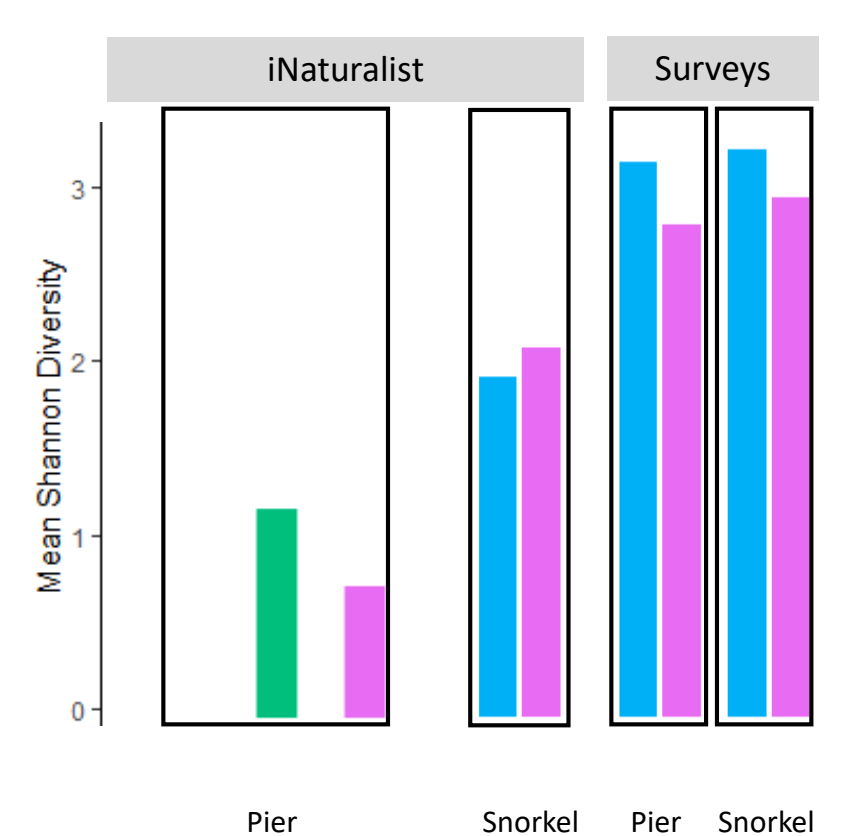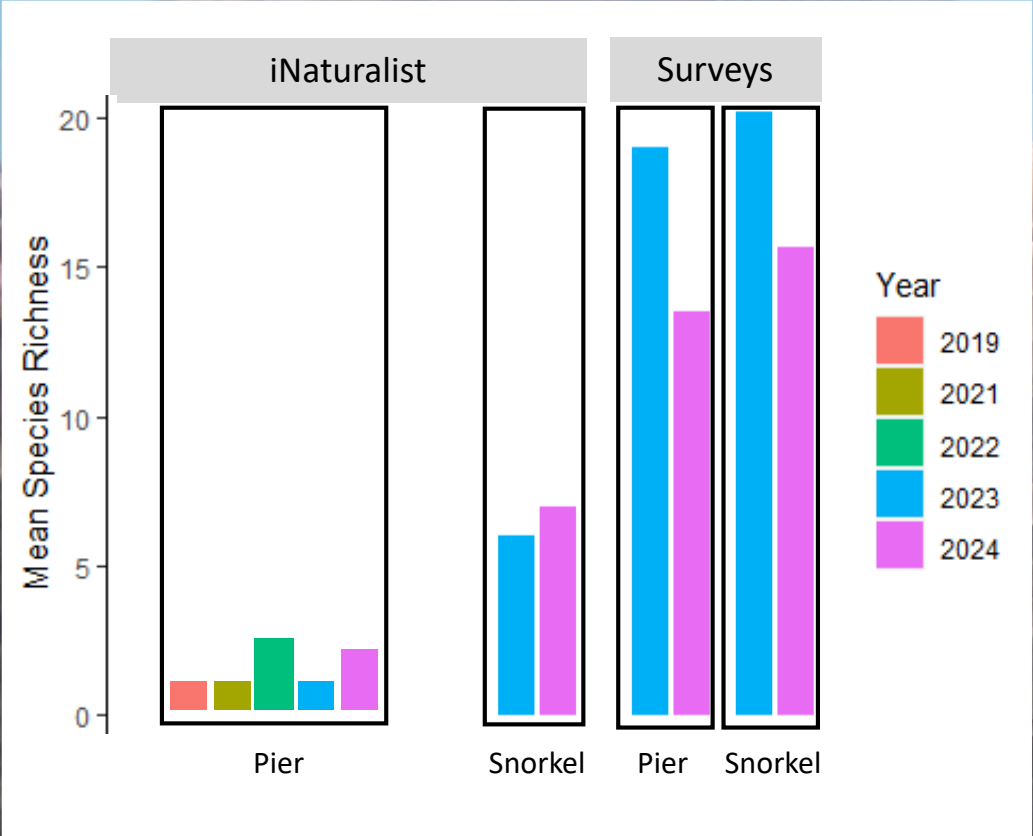Juvenile planehead filefish

Juvenile
redband parrotfish
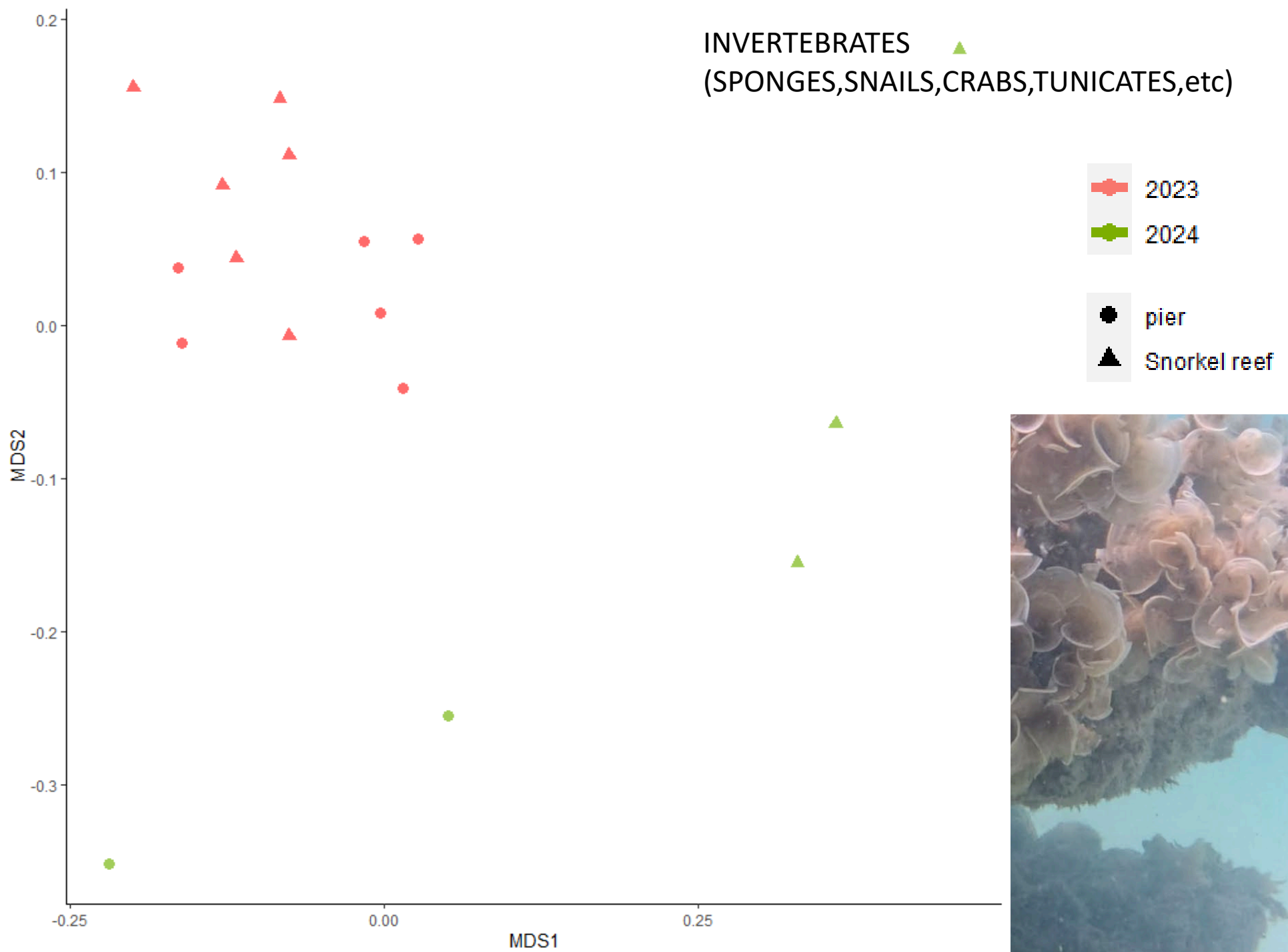
Juvenile lane snapper

INVERTEBRATES
(sponges, snails, crabs, tunicates, etc)

Very few species from iNaturalist. Too few observations.
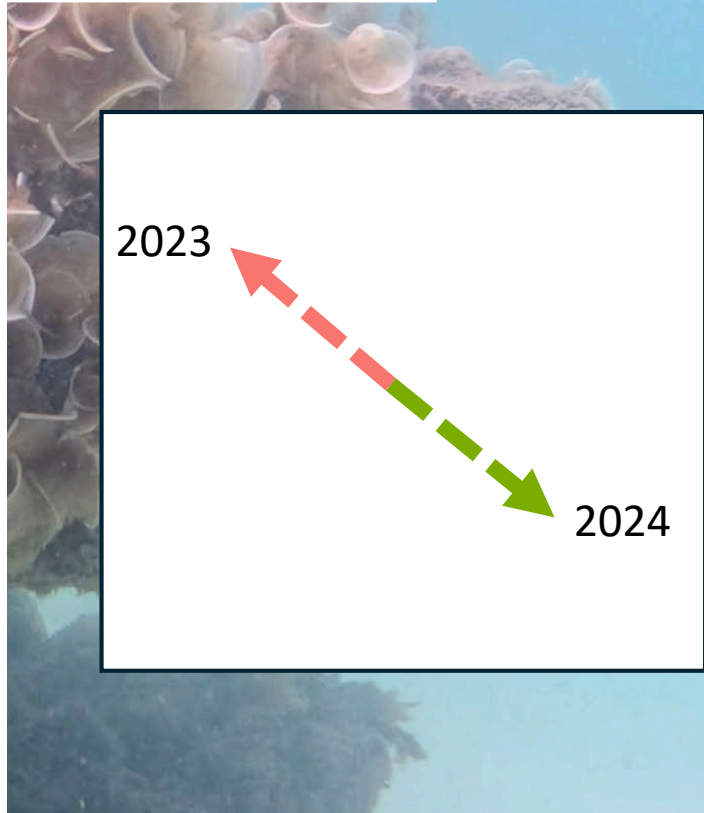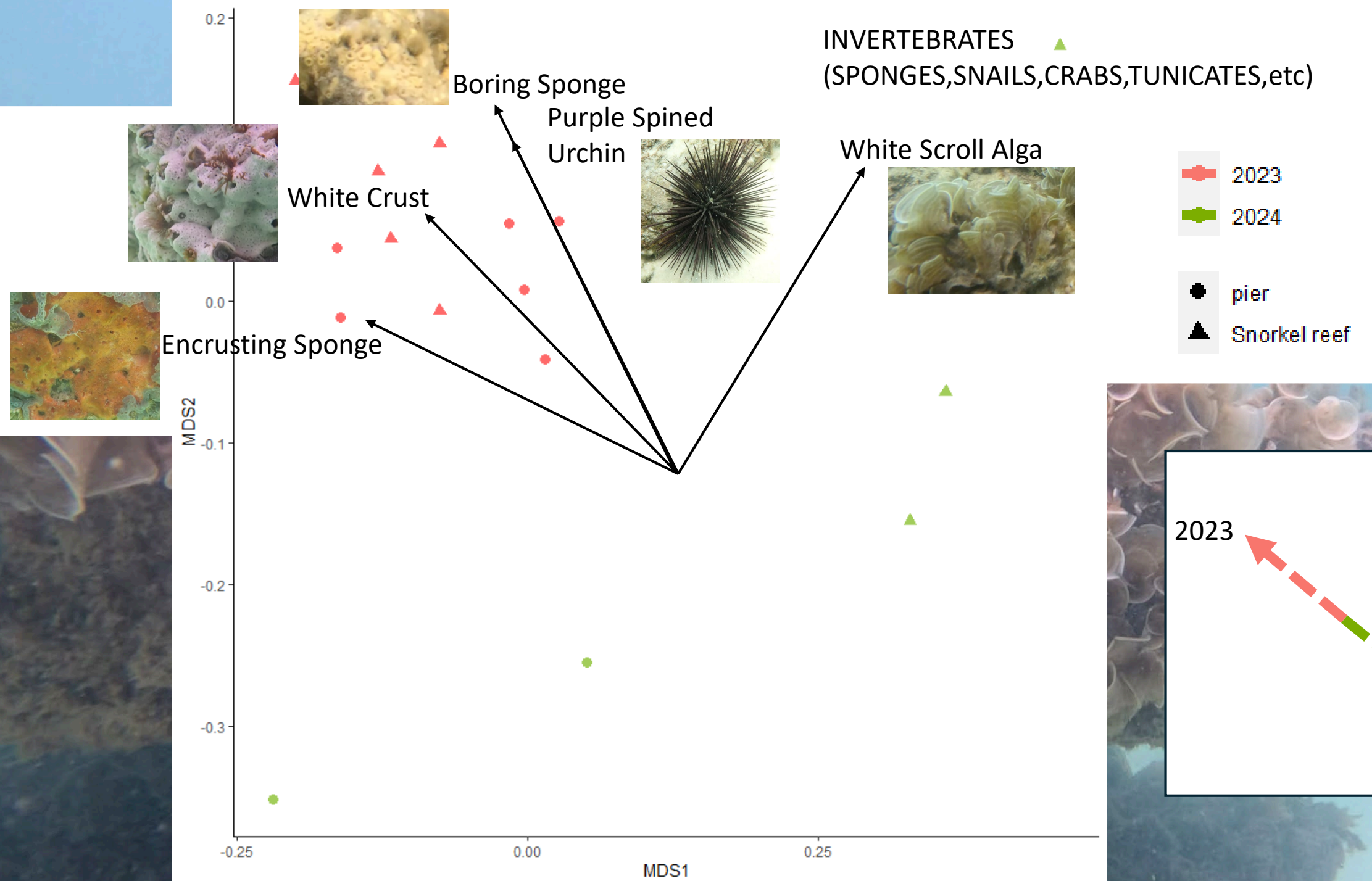More invertebrates in 2023 than 2024.

INVERTEBRATES
(SPONGES,SNAILS,CRABS,TUNICATES,etc)

INVERTEBRATES
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INVERTEBRATES
(SPONGES,SNAILS,CRABS,TUNICATES,etc)

Boring Sponge

Purple Spined Urchin

White Scroll Alga

White Crust

Encrusting Sponge

2023

2024

pier

Snorkel reef

2023

2024

MDS2

MDS1

INVERTEBRATES
(SPONGES,SNAILS,CRABS,TUNICATES,etc)
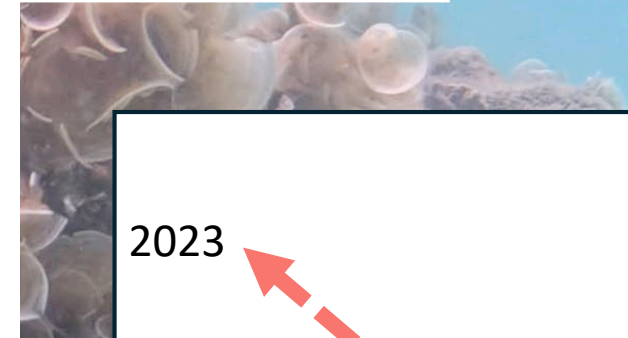
Boring Sponge

Purple Spined Urchin

White Scroll Alga

White Crust
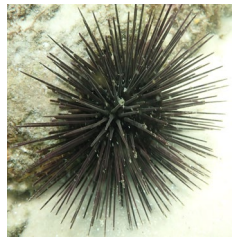
Encrusting Sponge

2023

2024

2023

2024

2023

2024

pier

Snorkel reef

NMDS2

0.2

0.0

-0.3

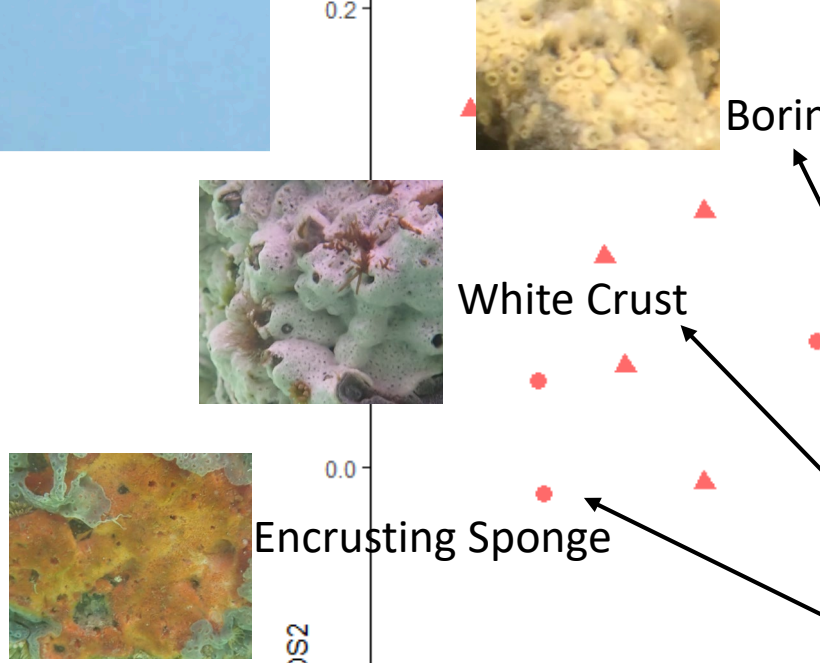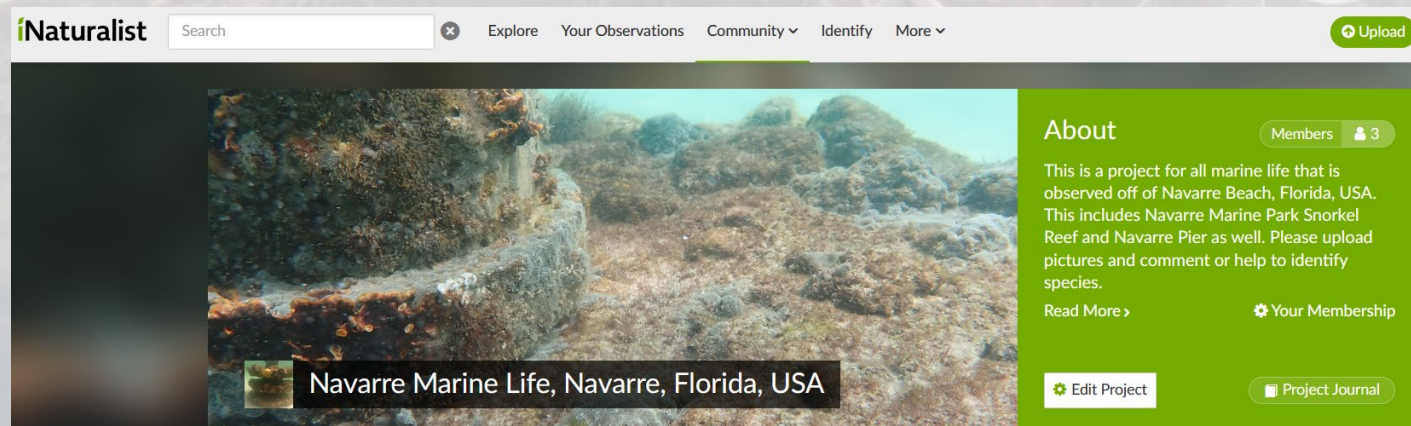-0.25

0.00
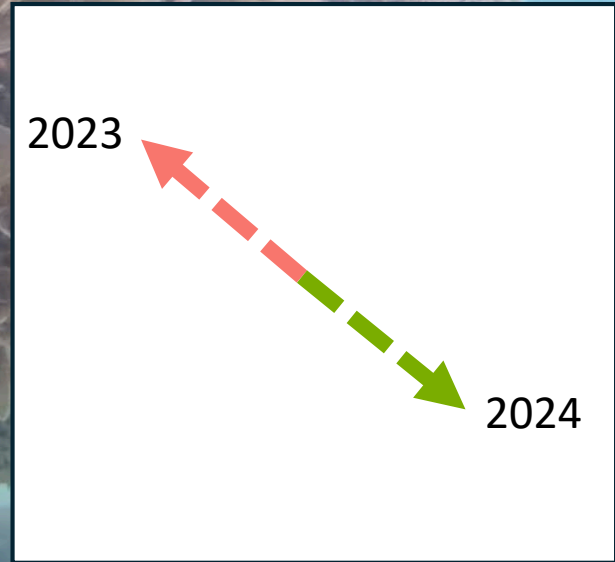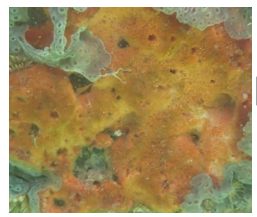
SUMMARY

- Snorkel reef and pier have different communities of vertebrates but not invertebrates

- Different communities & more species in 2023 than 2024

- Tropicalization? Some evidence

- iNaturalist is great for getting vertebrates that we aren't seeing underwater = but need more enthusiasts!!

Thank you

Nina Luckas

Ava Gordon

Josie Pry

Dominik Fretz