

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

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# Artificial Reefs: why are communities different?

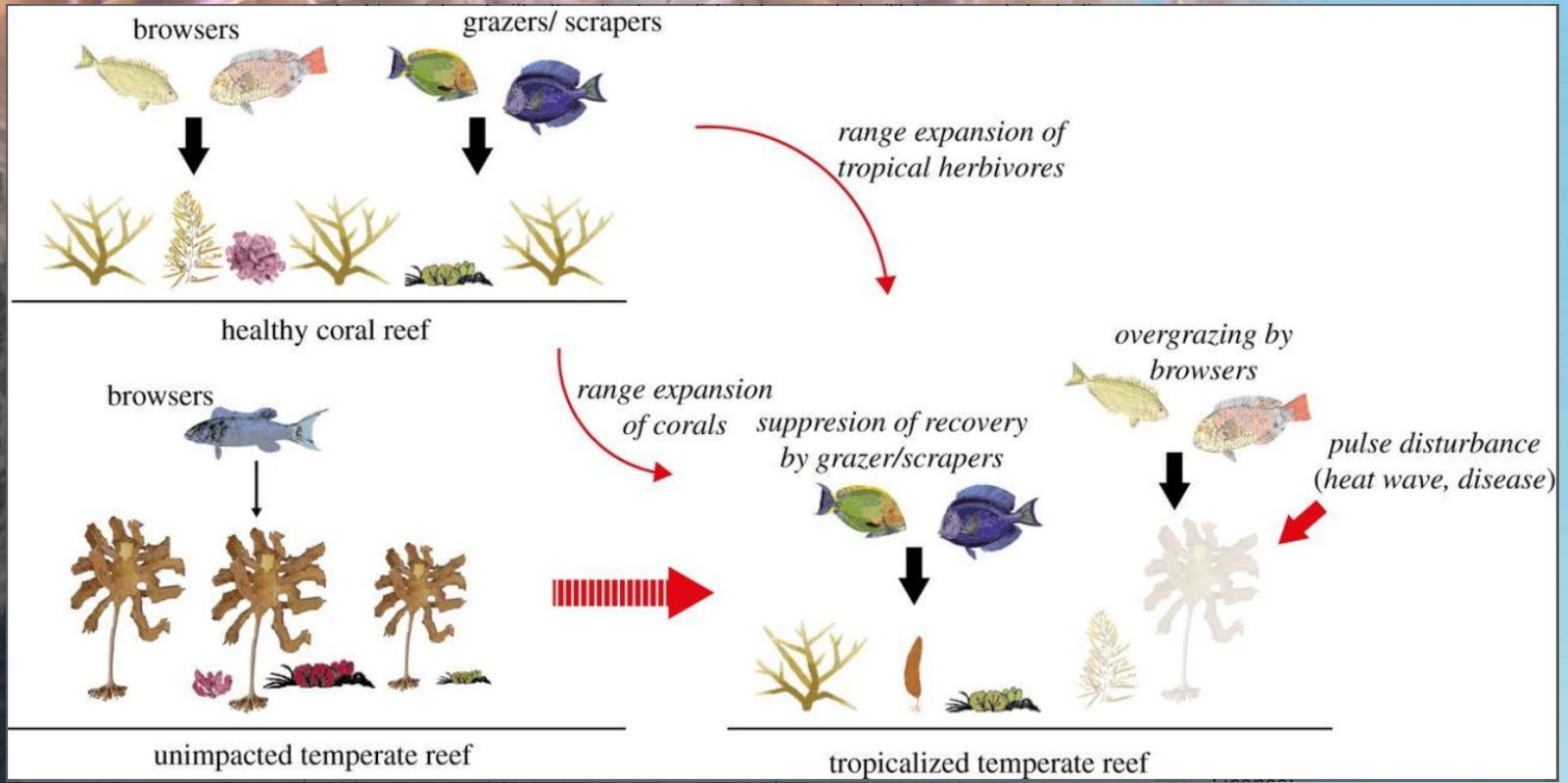
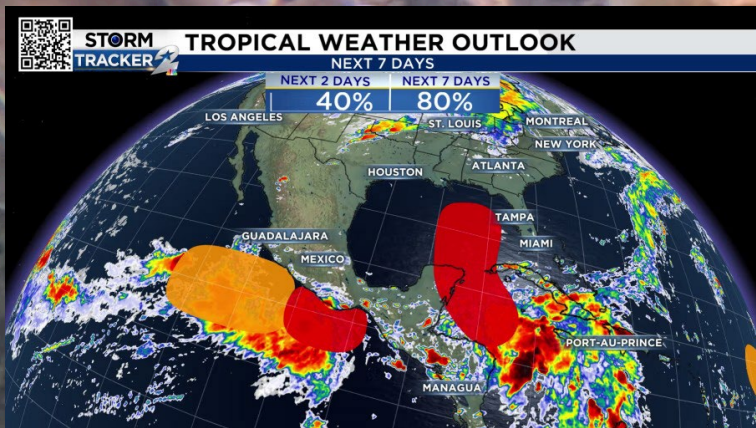
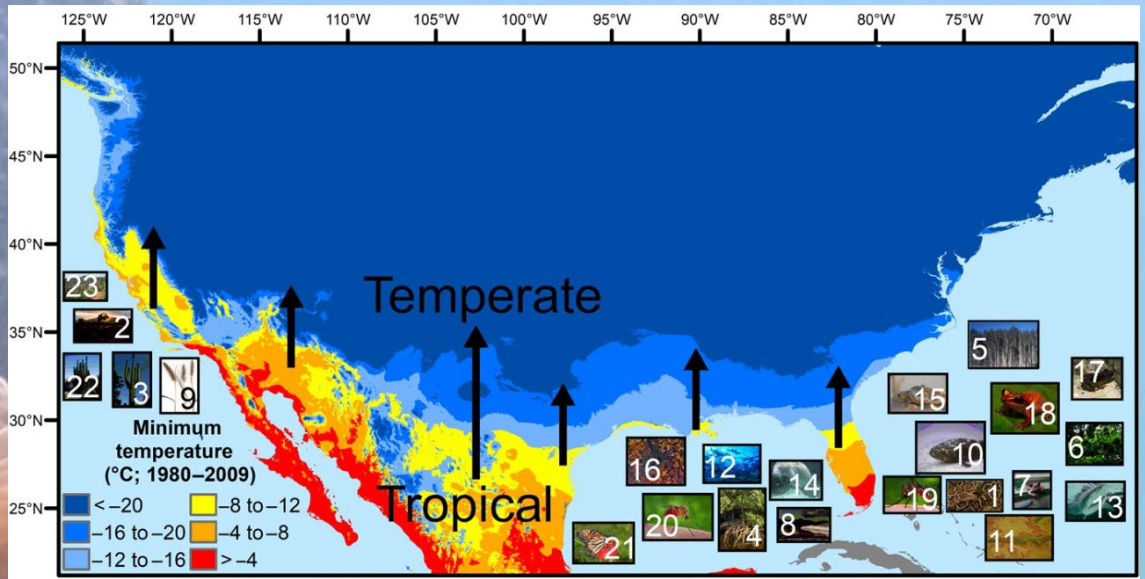
- Location
- Depth, type of ocean floor
- Type of microhabitat, material
- Spacing between reefs
- Vertical relief
- Fishing pressure
- Tourism pressure
- Etc.



Most studies focus on fish  
only



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



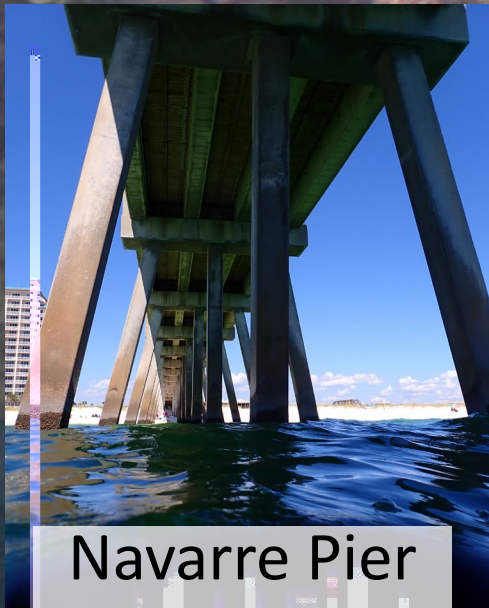
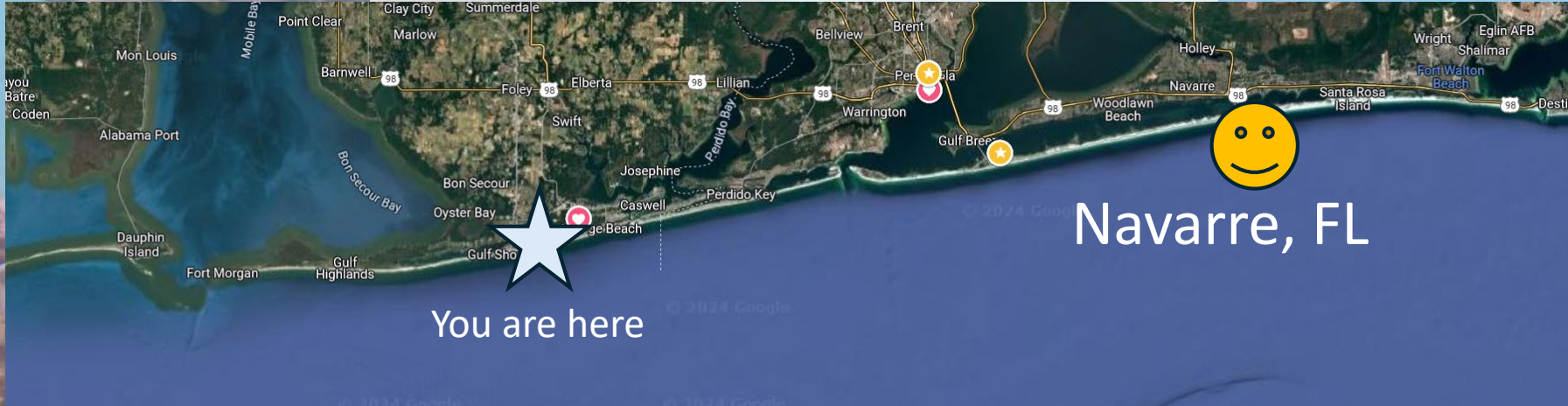


# STUDY AIMS

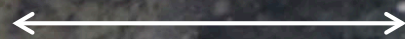
- Compare two different reef types at the same location
  - Are vertebrate and invertebrate communities the same?
- Determine if tropicalization is occurring
- Compare sampling methods



# STUDY LOCATION



Navarre Pier



3000ft apart



Snorkel Reef: 2017 & 2021





# Snorkel reef:

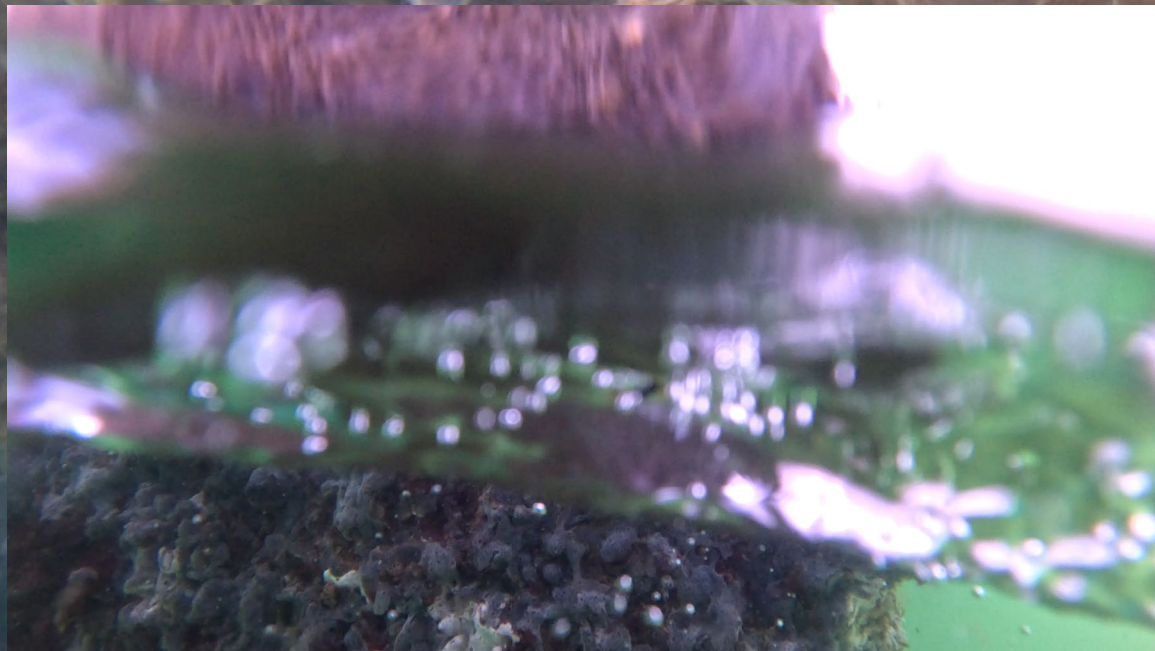
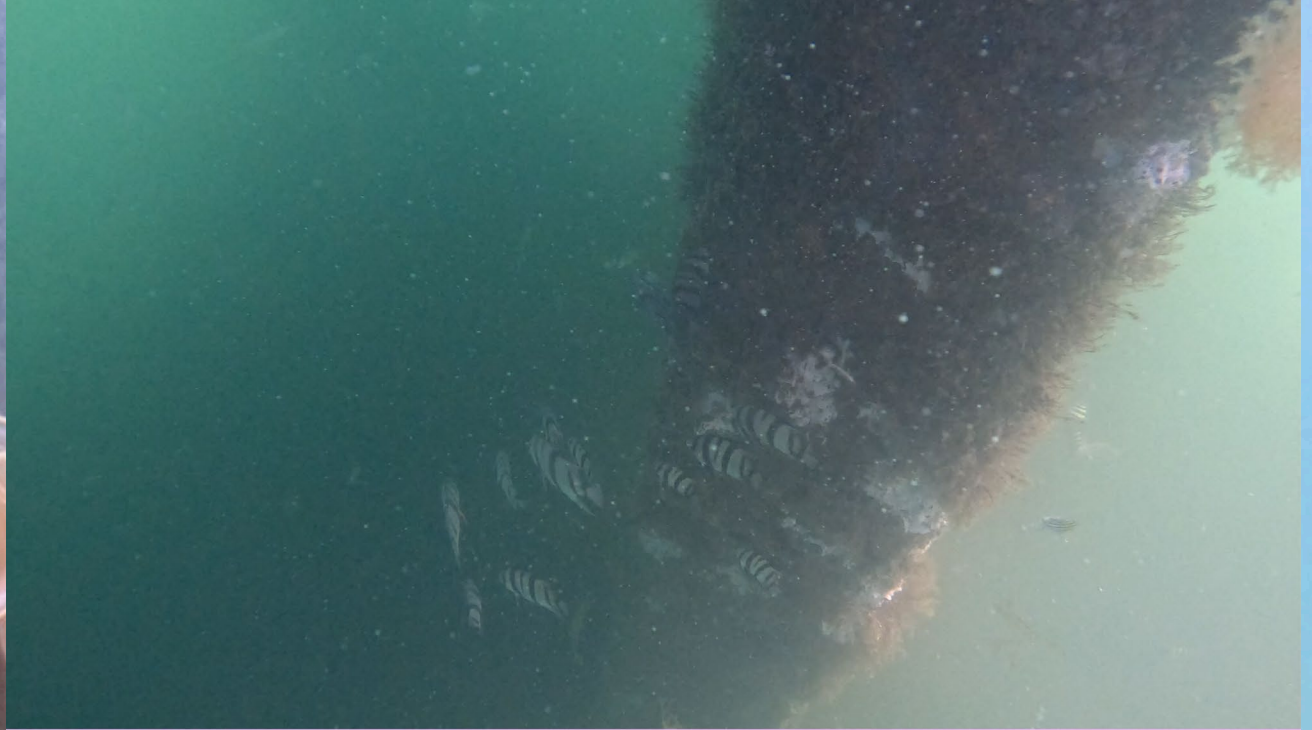
- Navarre Beach Marine Sanctuary
- No fishing allowed, but swimming
- 300-400ft offshore
- 10-15ft deep, submerged
- sometimes a surface buoy





# Navarre Pier:

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

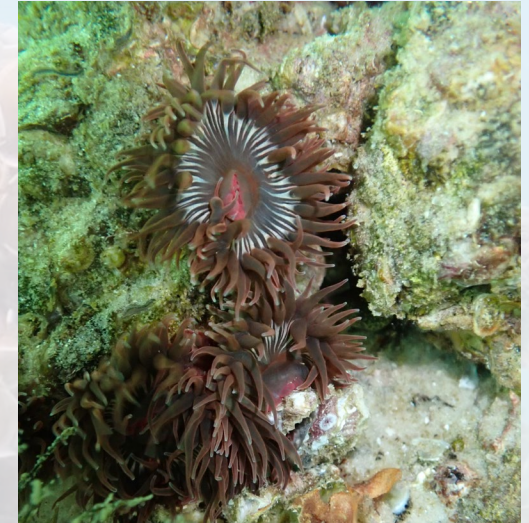
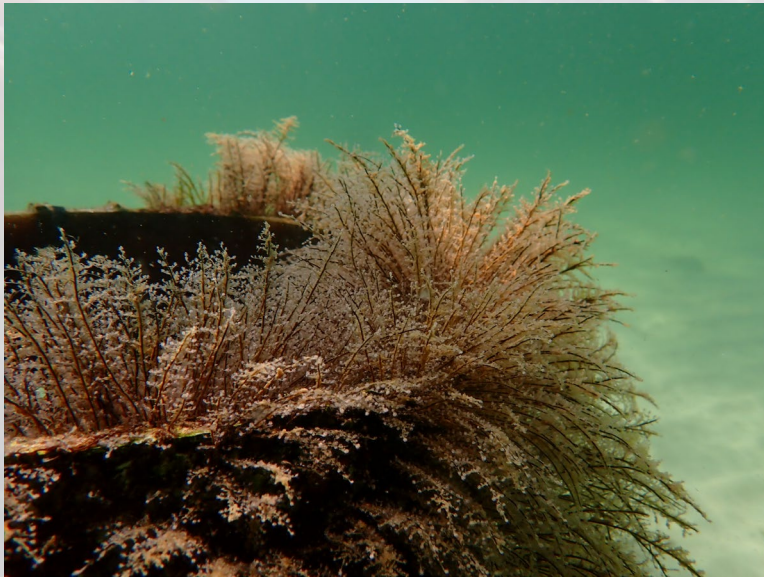




VERTEBRATES (fish,  
sharks, mammals, etc.)

# METHODS

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





## Snorkel surveys

- 45 min at structure
- sand control 100m away

# METHODS

## iNaturalist

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



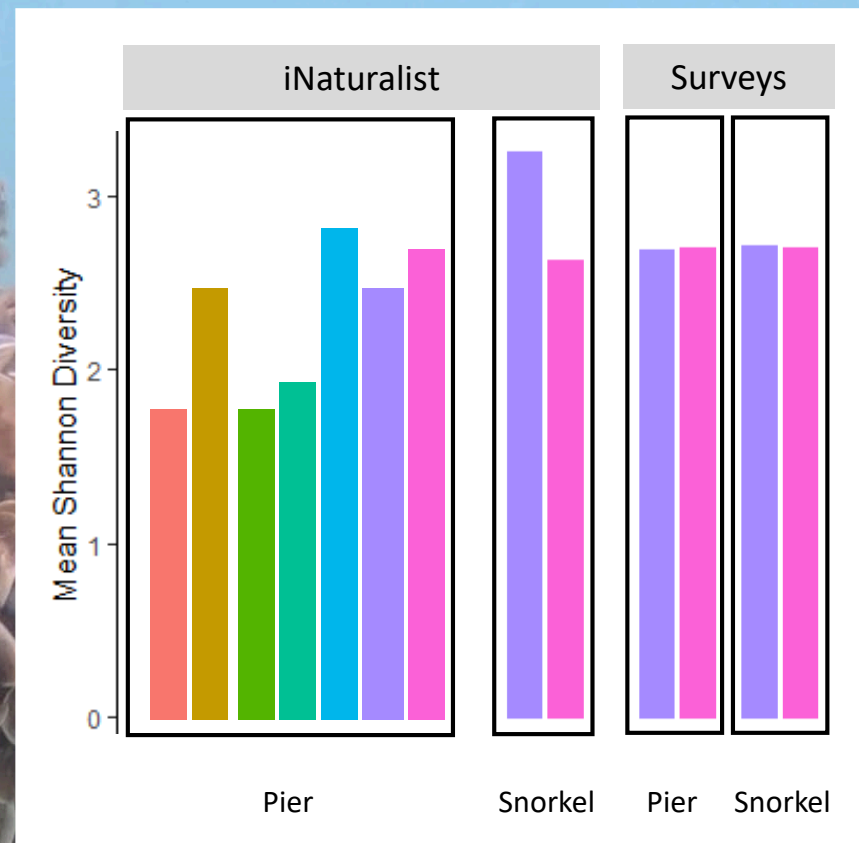
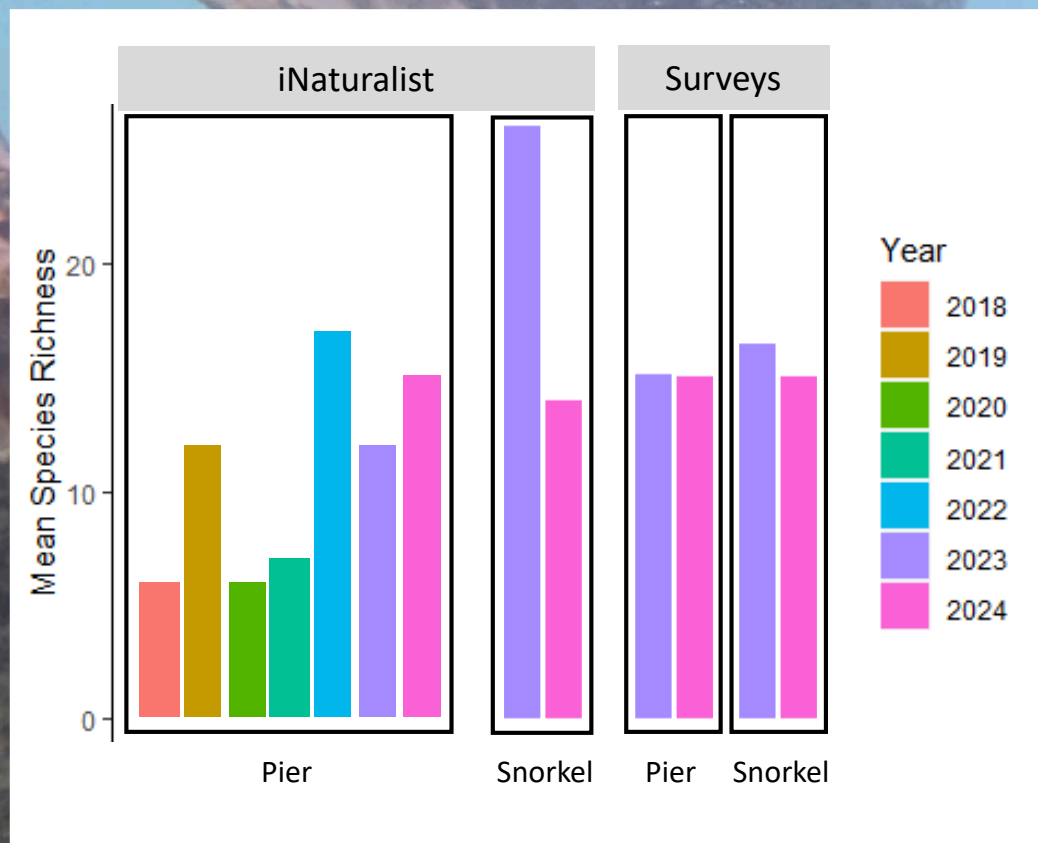
The screenshot shows the iNaturalist website interface. At the top, there is a search bar and navigation links for 'Explore', 'Your Observations', 'Community', 'Identify', and 'More'. A green 'Upload' button is in the top right corner. The main content area features a large image of a coral reef structure with the text 'Navarre Marine Life, Navarre, Florida, USA' overlaid. To the right of this image is an 'About' section with a 'Members' count of 3, a description of the project, and buttons for 'Read More', 'Your Membership', 'Edit Project', and 'Project Journal'. Below the main image is a list of three observations:

Image	Species Name	Genus	Grade	Time
	Sharksucker	<i>Echeneis naucrates</i>	RG	1 23 days ago
	Moon Jellies	Genus <i>Aurelia</i>	RG	2 23 days ago
	Indo-Pacific Swimming Crab	<i>Charybdis hellerii</i>	RG	2 23 days ago

On the left side of the observation list, there is a search form with fields for 'Species name', 'Date' (2024/09/24 1:41 PM), 'Location', and 'Notes'.



# VERTEBRATES (fish, sharks, mammals, etc)

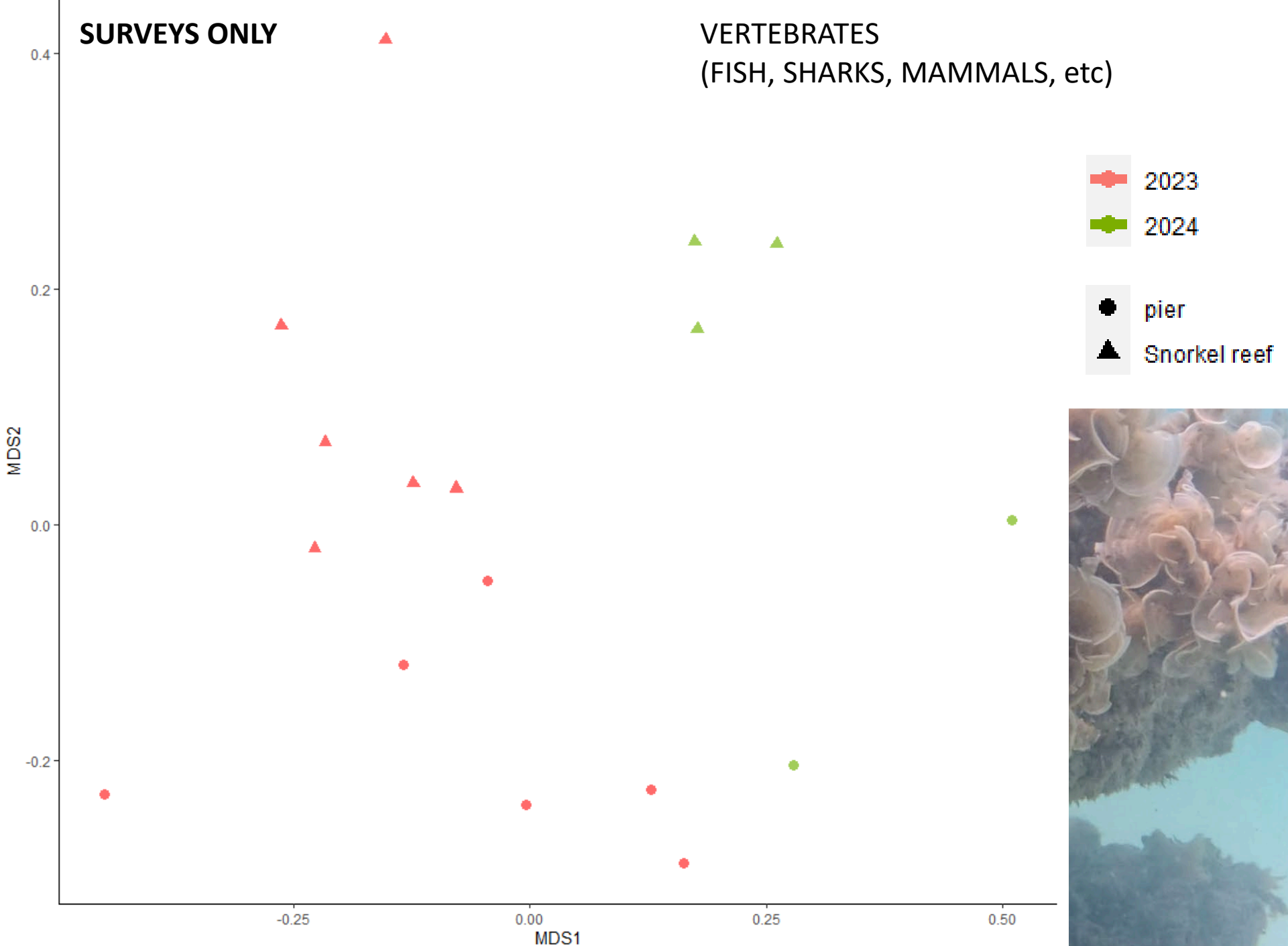


iNaturalist had fewer species observed until 2023.  
The snorkel reef had more species in 2023 than 2024.

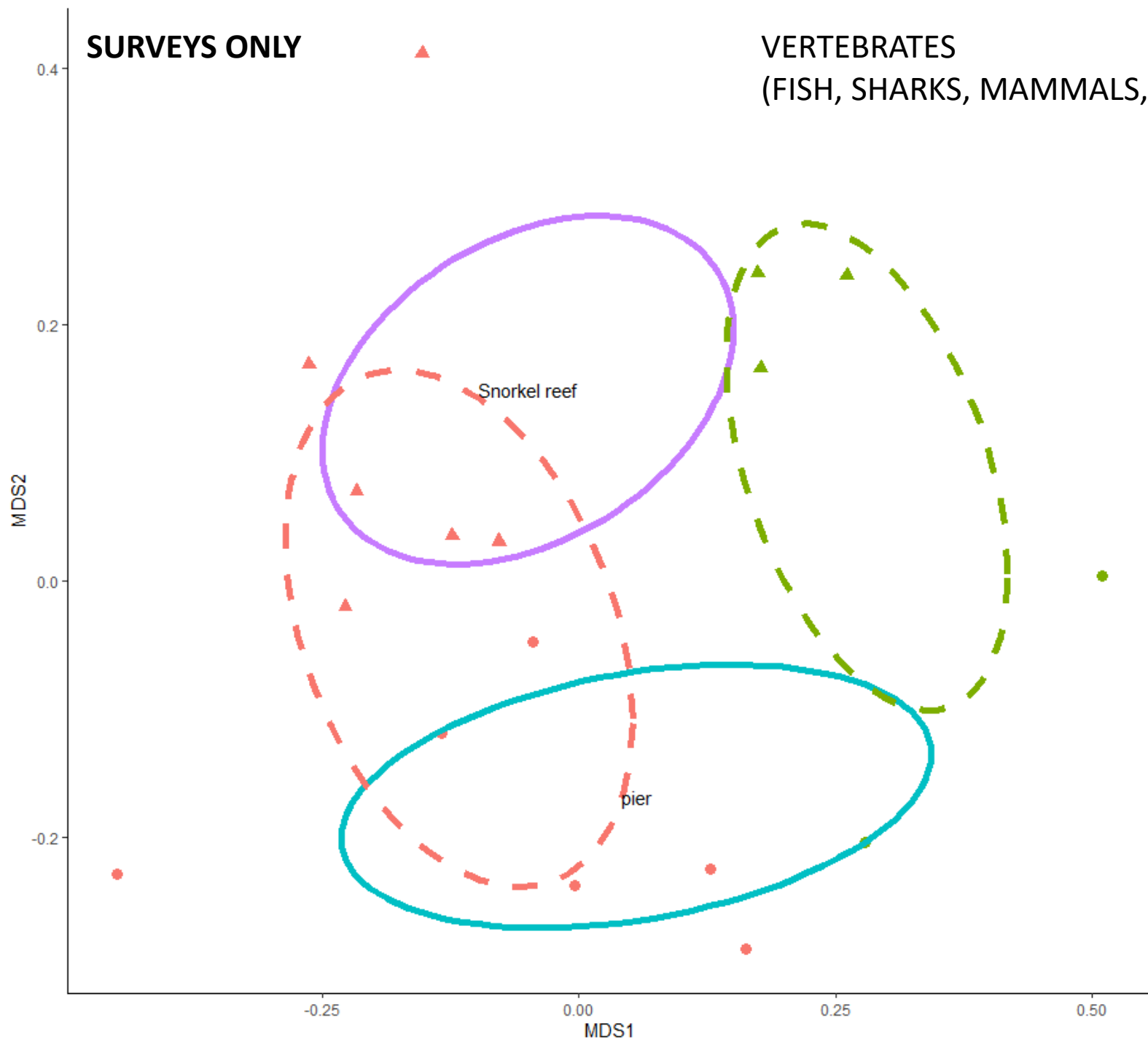


**SURVEYS ONLY**

**VERTEBRATES**  
(FISH, SHARKS, MAMMALS, etc)



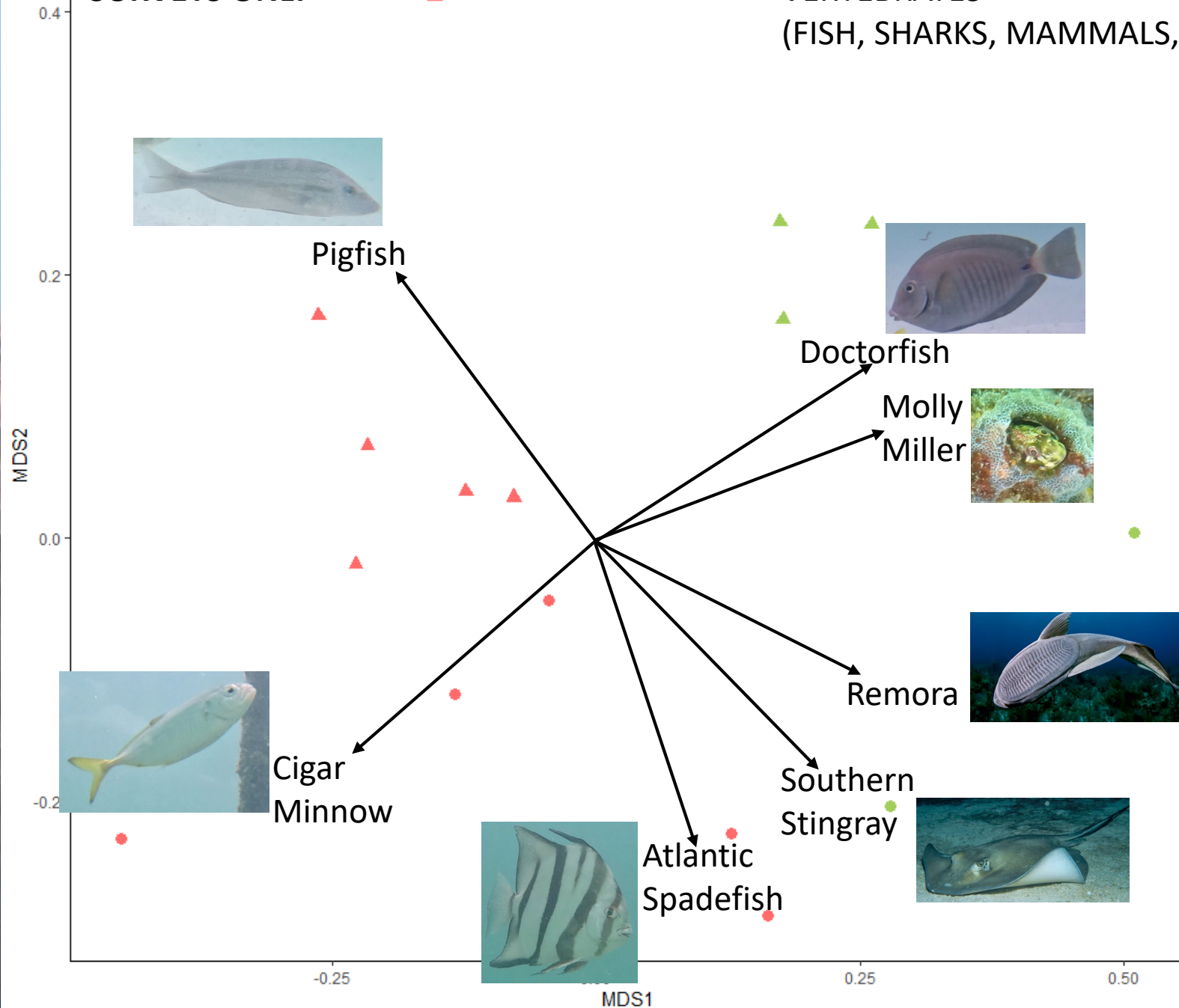




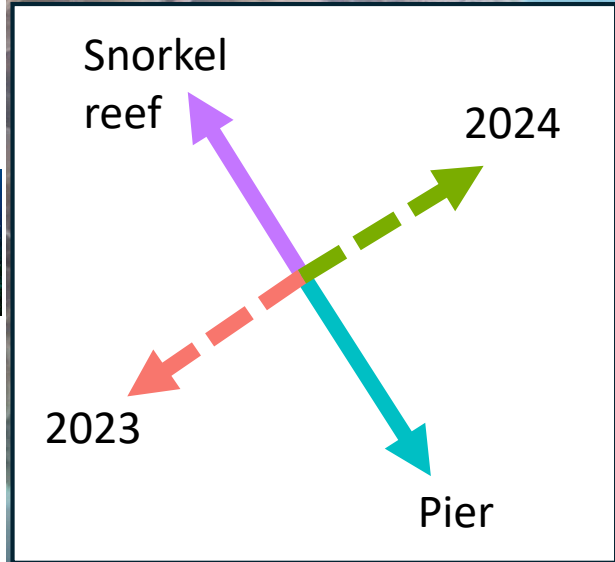


# SURVEYS ONLY

# VERTEBRATES (FISH, SHARKS, MAMMALS, etc)

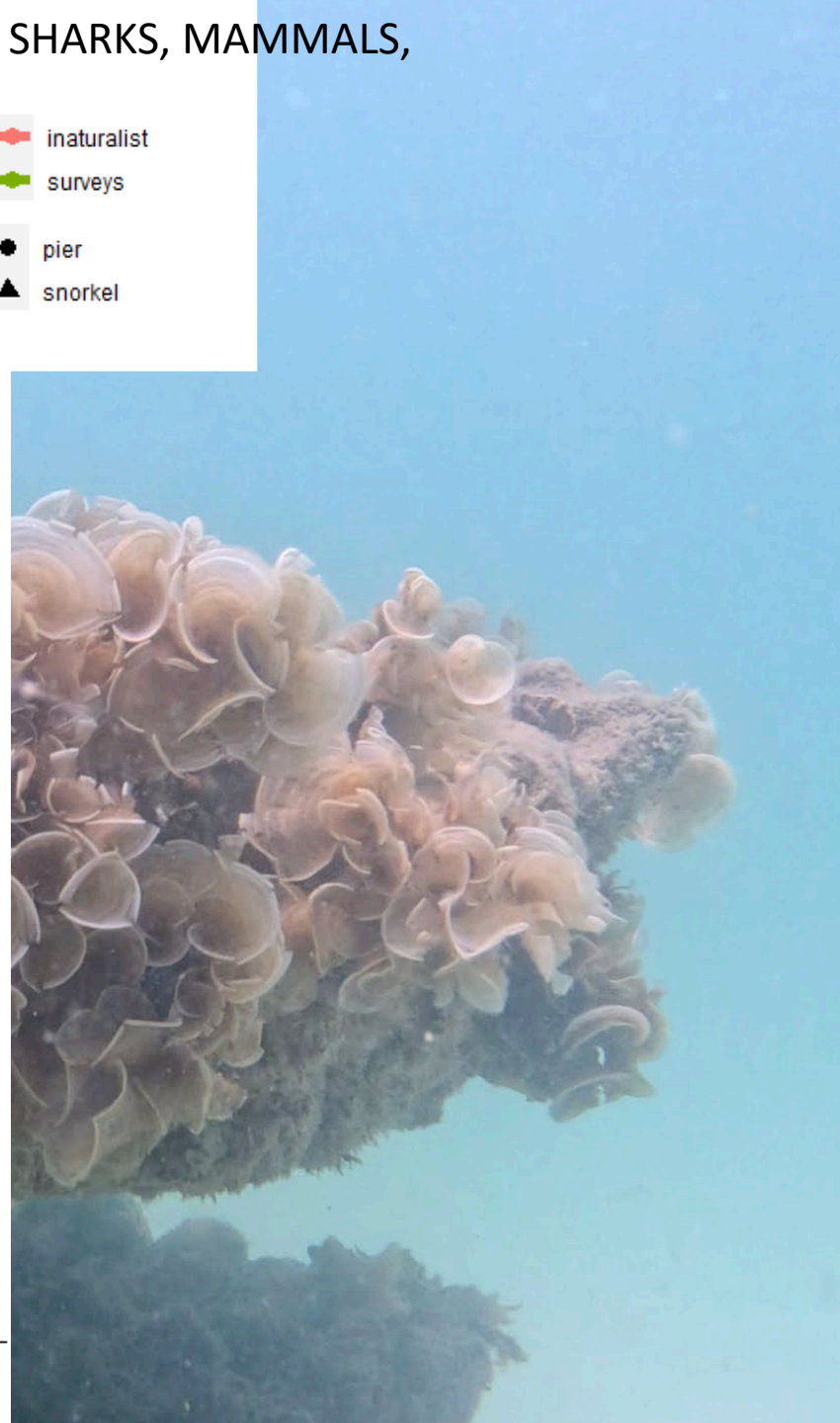
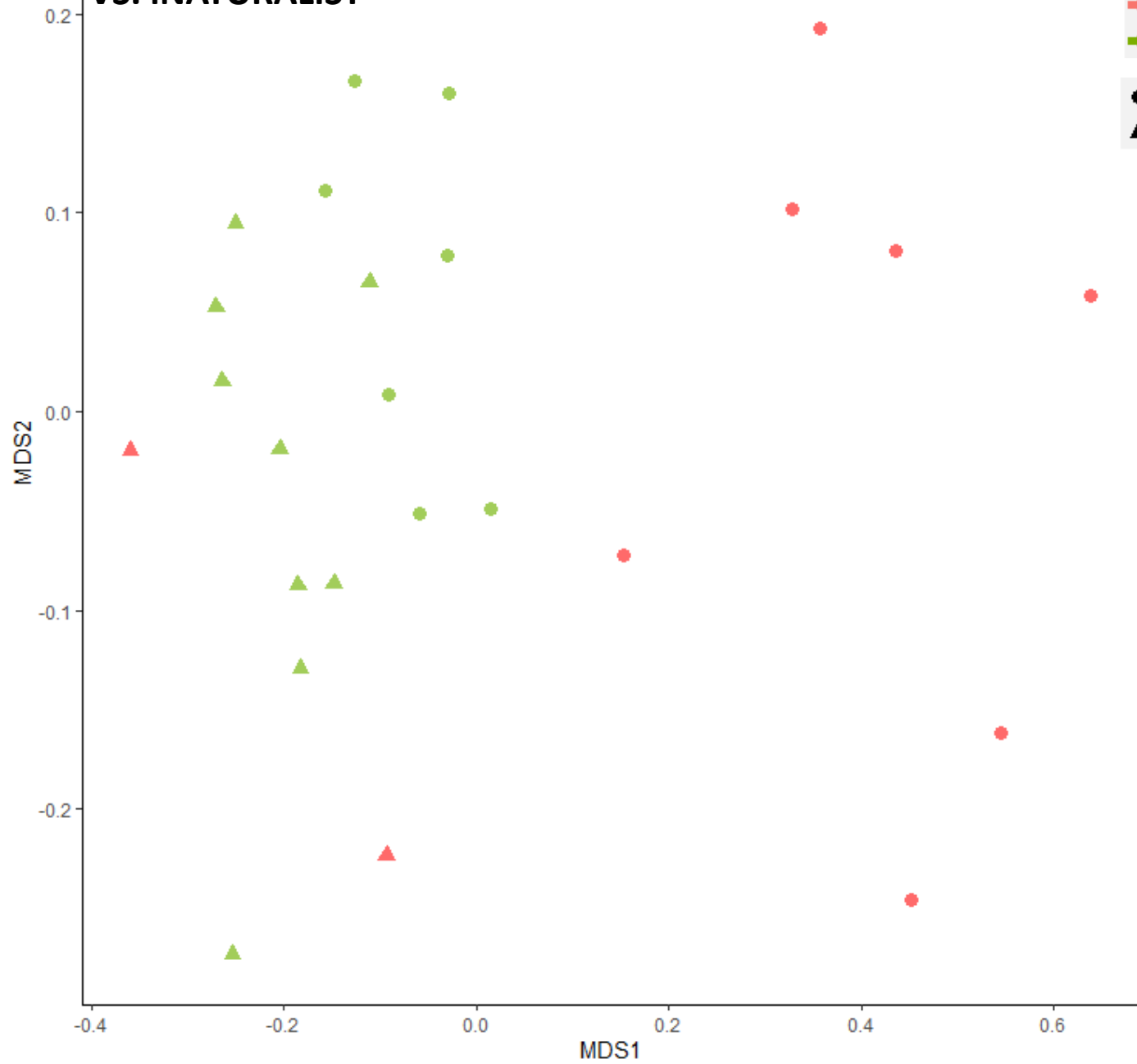


- 2023
- 2024
- pier
- Snorkel reef



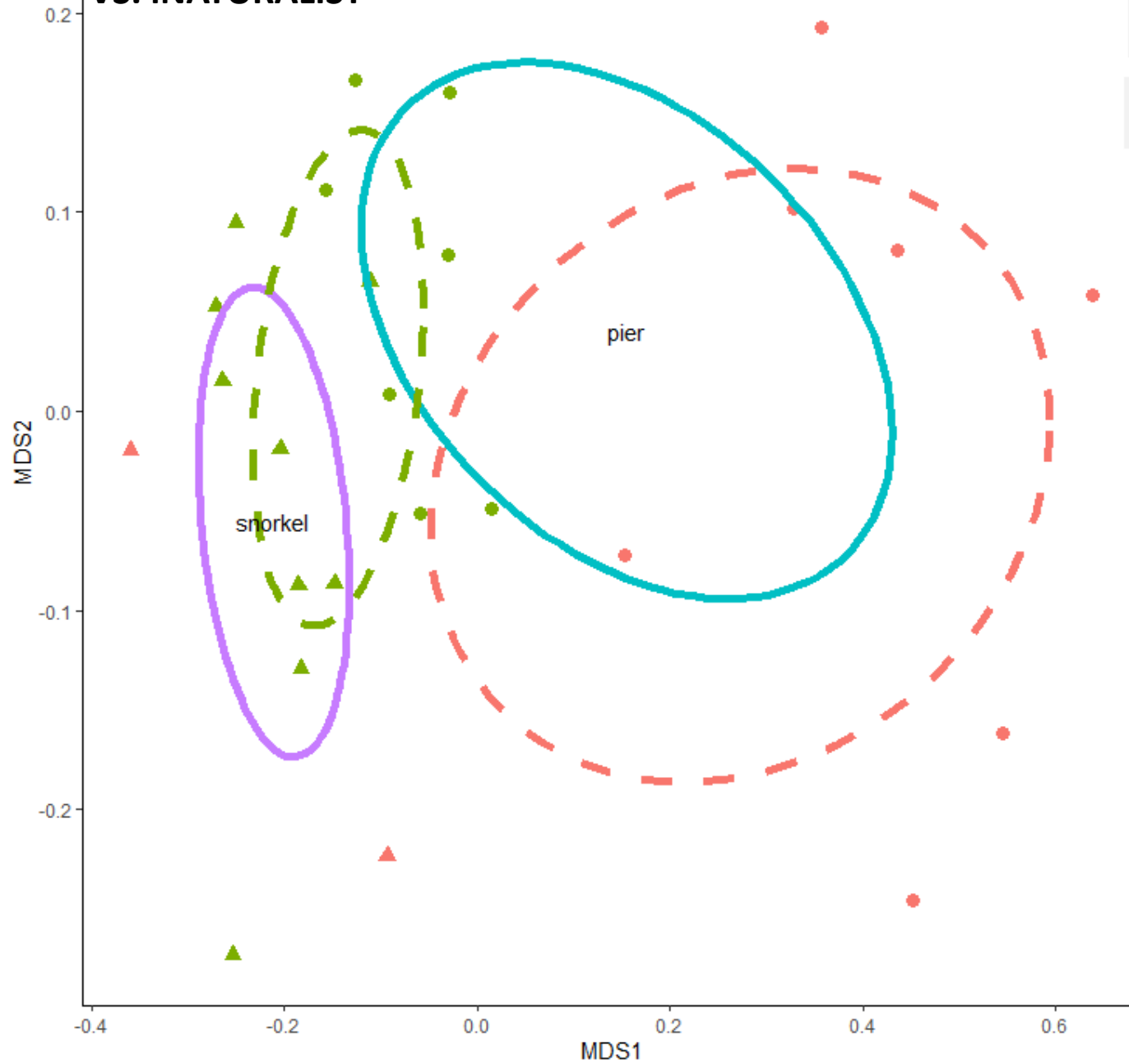


# SURVEYS VS. iNATURALIST



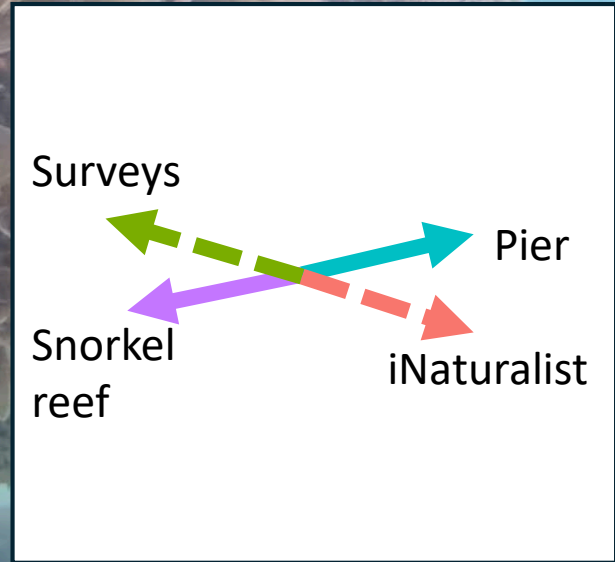


# SURVEYS VS. iNATURALIST



VERTEBRATES (FISH, SHARKS, MAMMALS,  
etc)

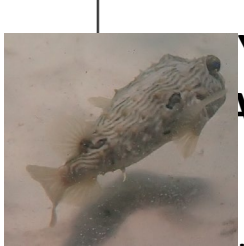
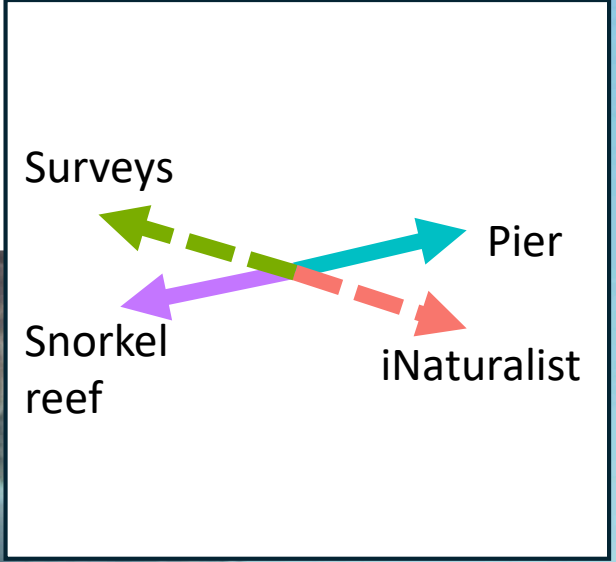
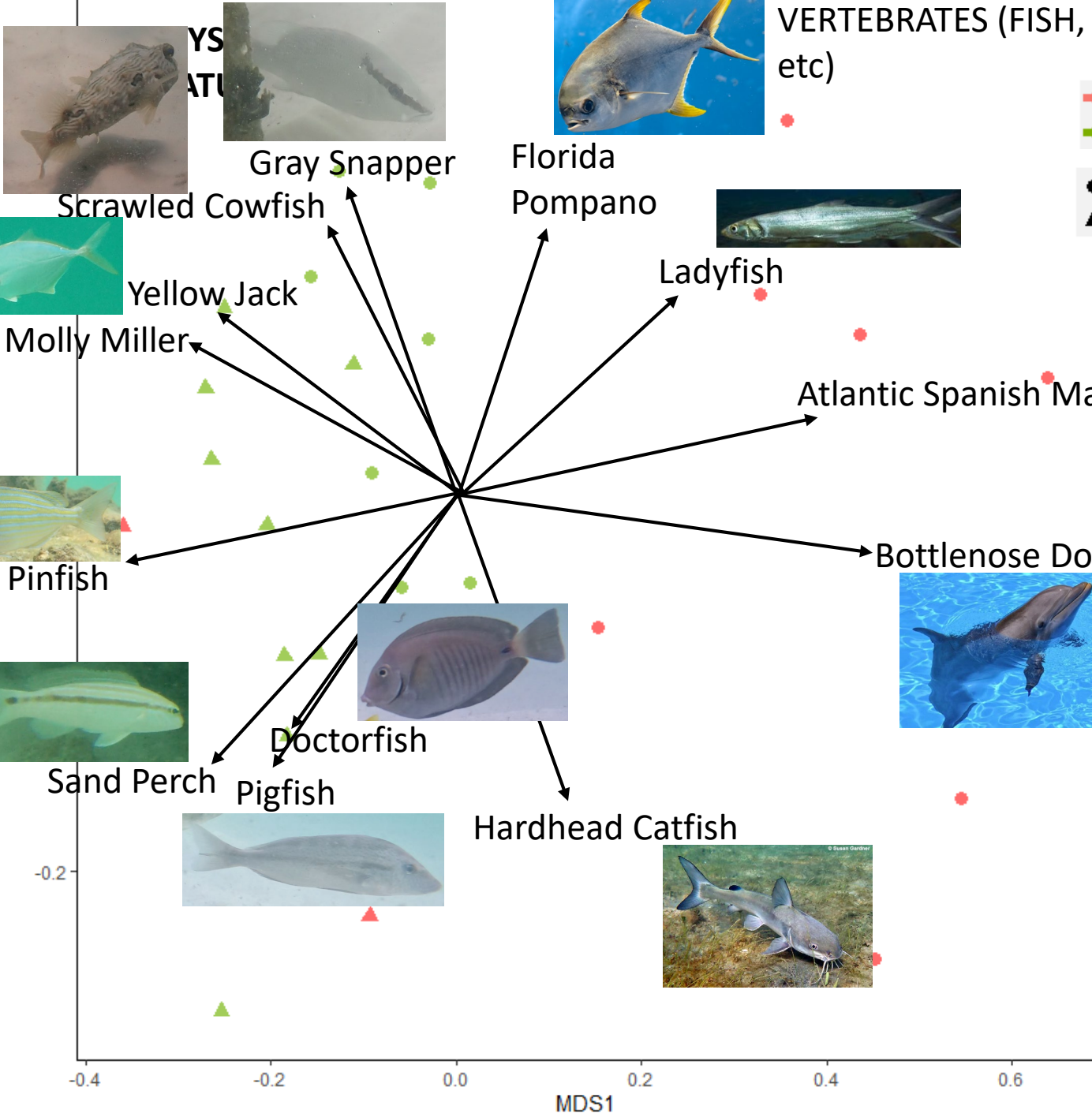
- iNaturalist
- surveys
- pier
- snorkel





VERTEBRATES (FISH, SHARKS, MAMMALS, etc)

- inaturalist
- surveys
- pier
- ▲ snorkel



Scrawled Cowfish

Yellow Jack

Molly Miller

Pinfish

Sand Perch

Pigfish

Doctorfish

Hardhead Catfish

Gray Snapper

Florida Pompano

Ladyfish

Atlantic Spanish Mackerel

Bottlenose Dolphin

-0.2

-0.4

-0.2

0.0

MDS1

0.2

0.4

0.6

Surveys

Pier

Snorkel reef

iNaturalist



# 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



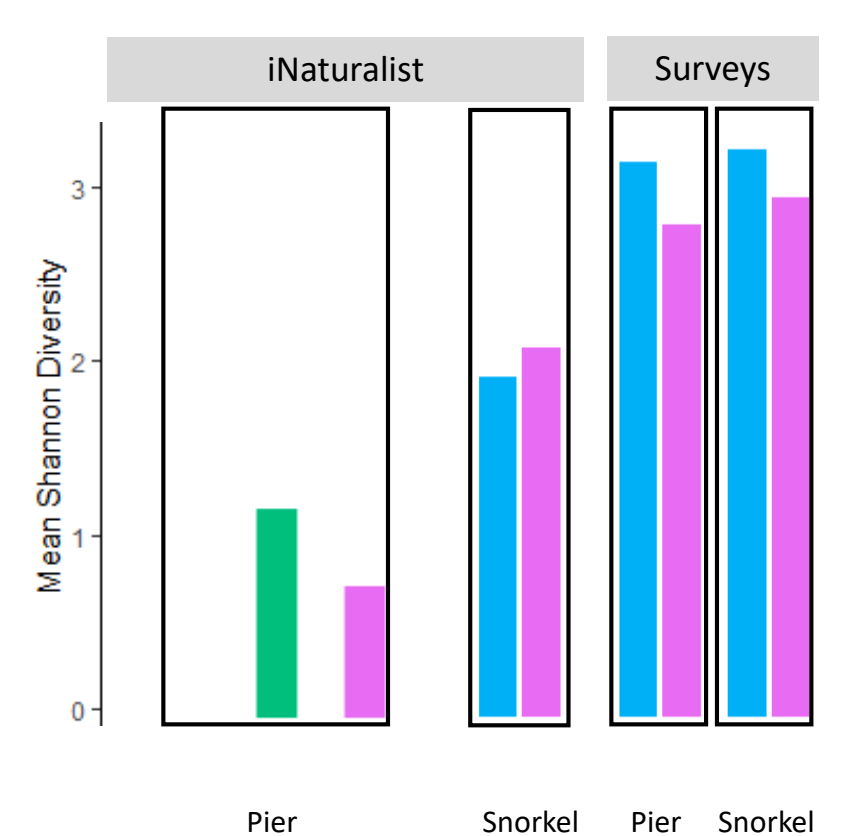
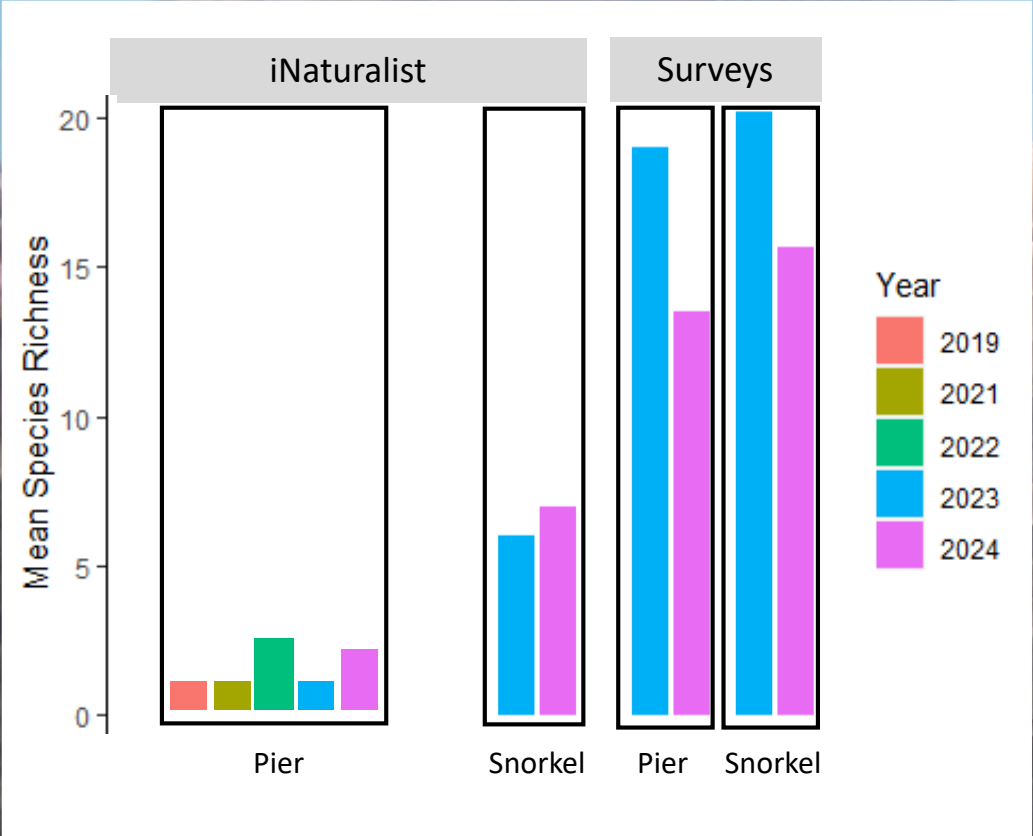
Juvenile lane snapper





# INVERTEBRATES

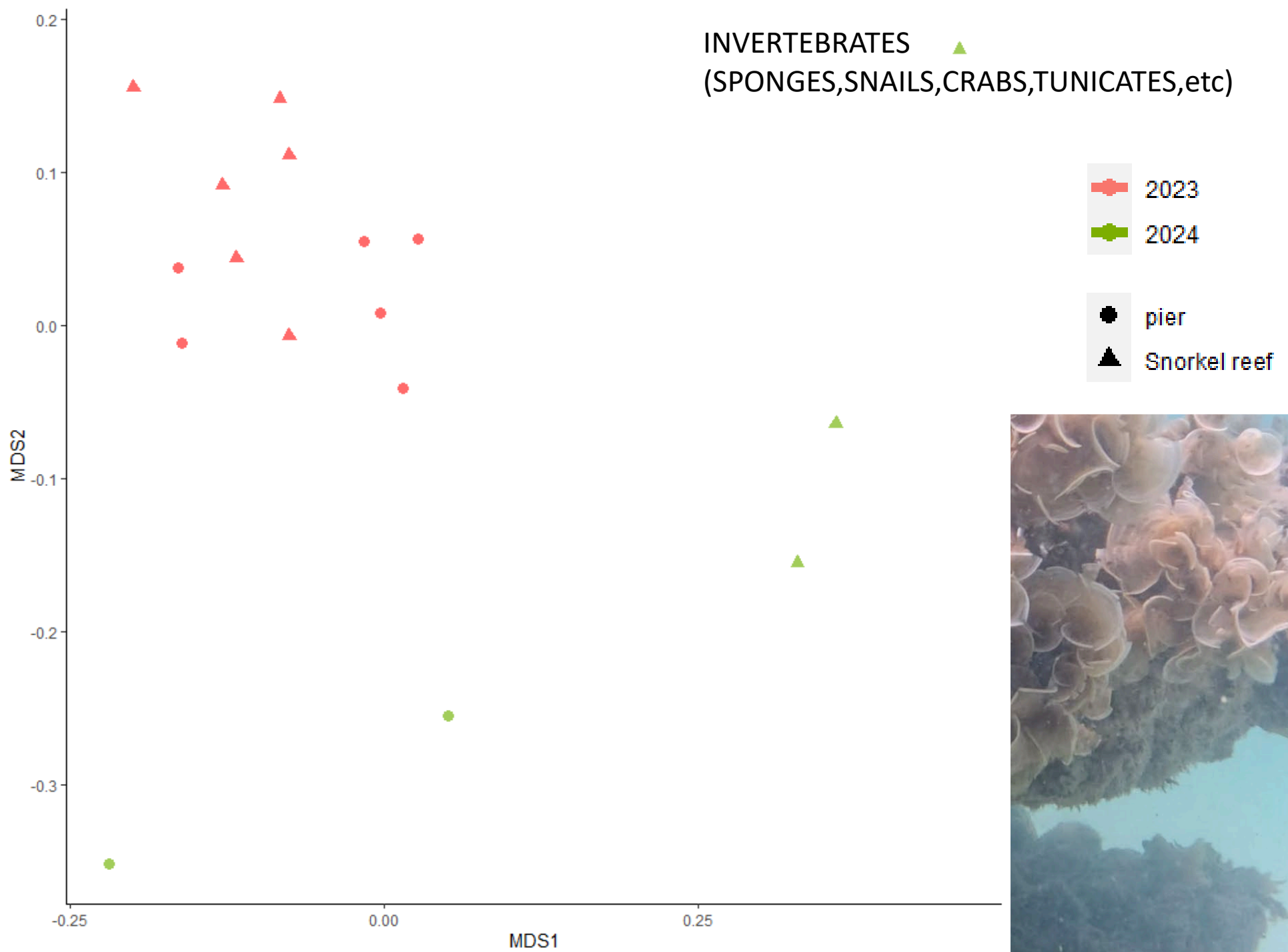
(sponges, snails, crabs, tunicates, etc)



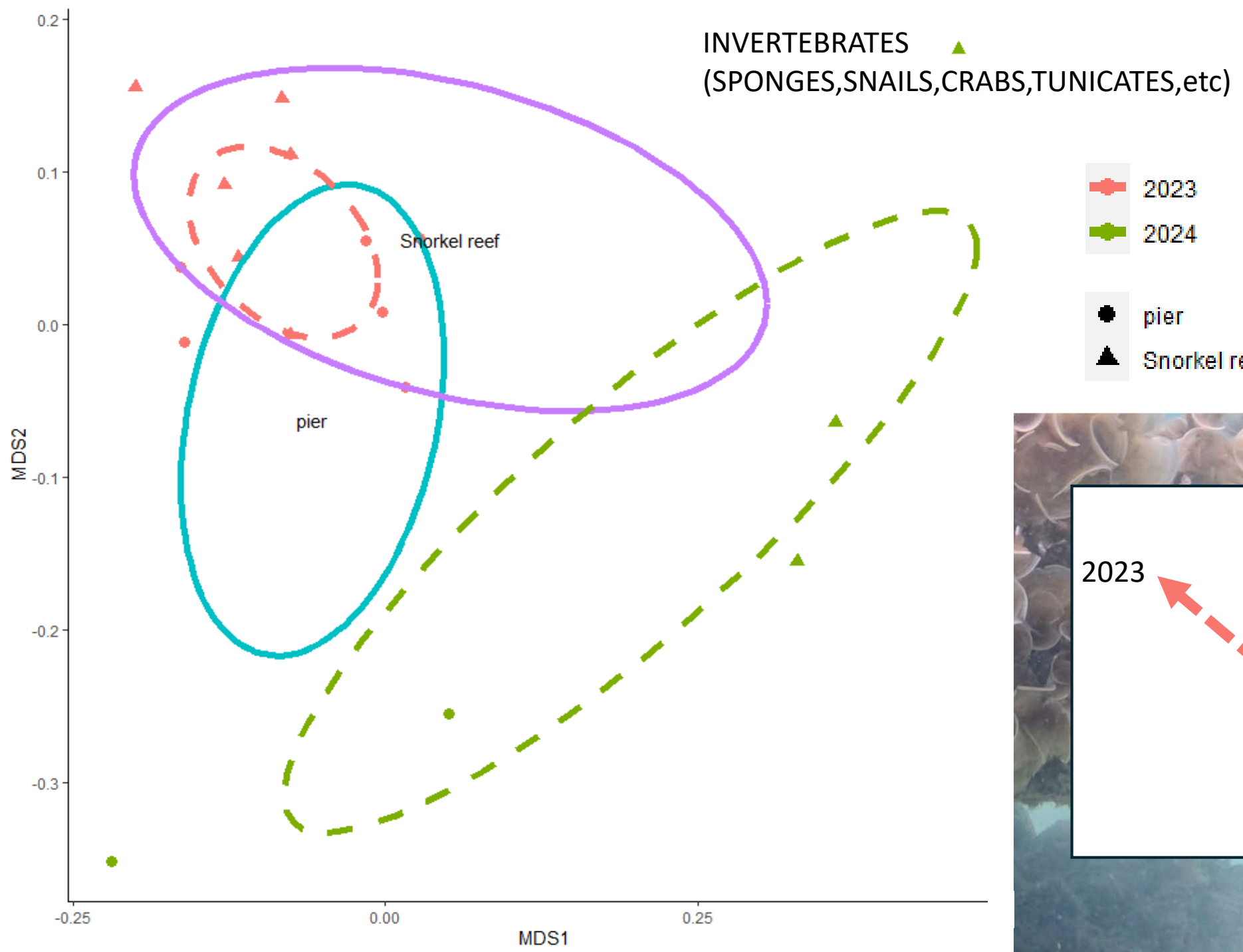
Very few species from iNaturalist. Too few observations.  
More invertebrates in 2023 than 2024.



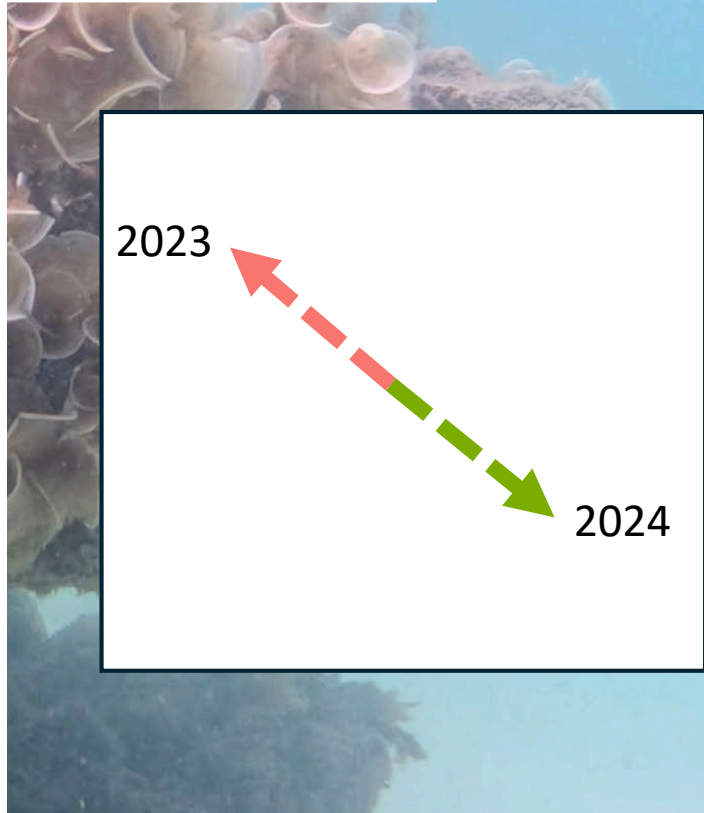
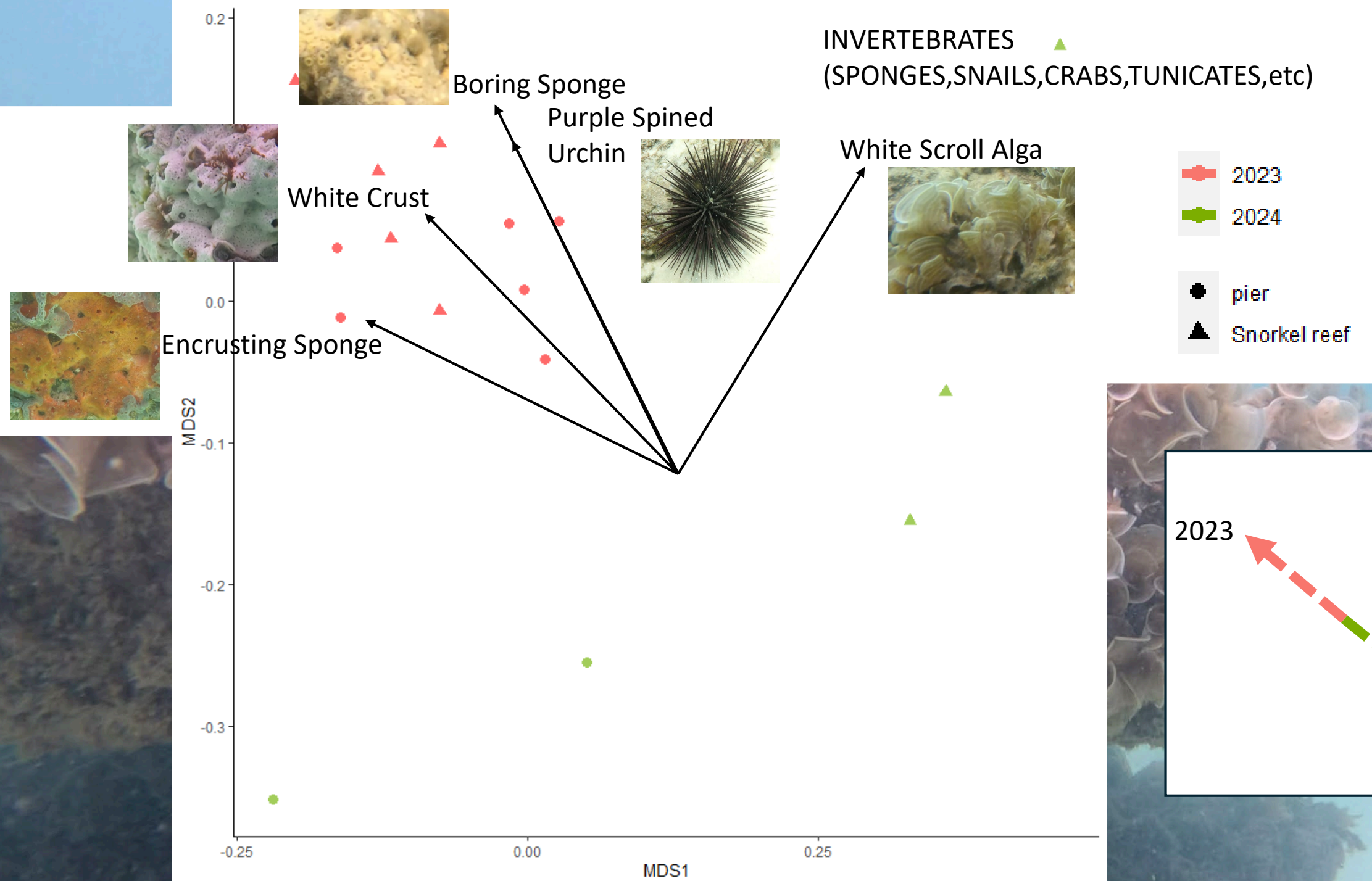
INVERTEBRATES  
(SPONGES,SNAILS,CRABS,TUNICATES,etc)













0.2

0.0

-0.3

-0.25

0.00

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

2023  
2024

● pier  
▲ Snorkel reef

Boring Sponge  
Purple Spined Urchin  
White Crust

White Scroll Alga

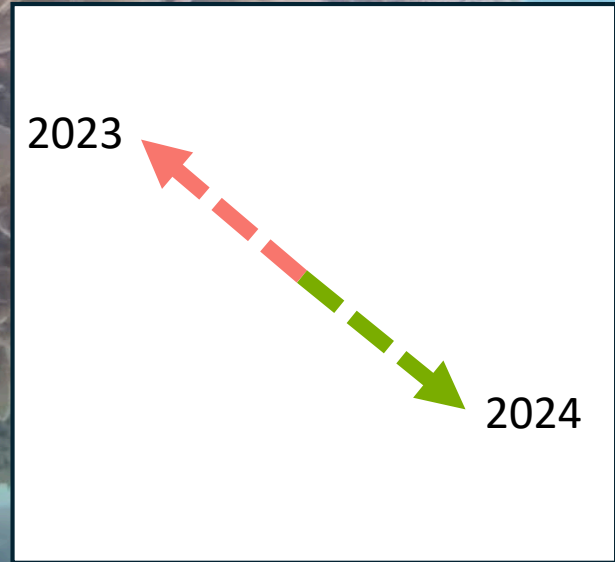
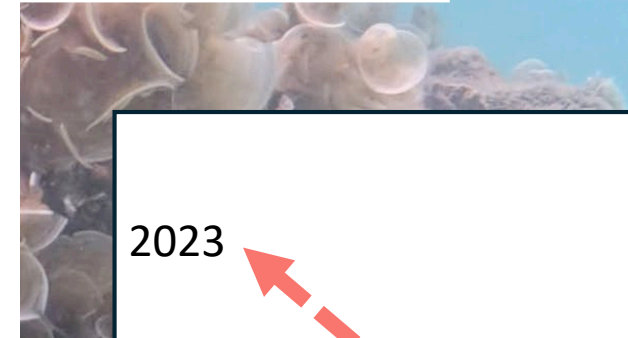
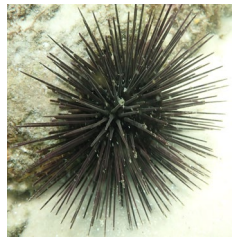
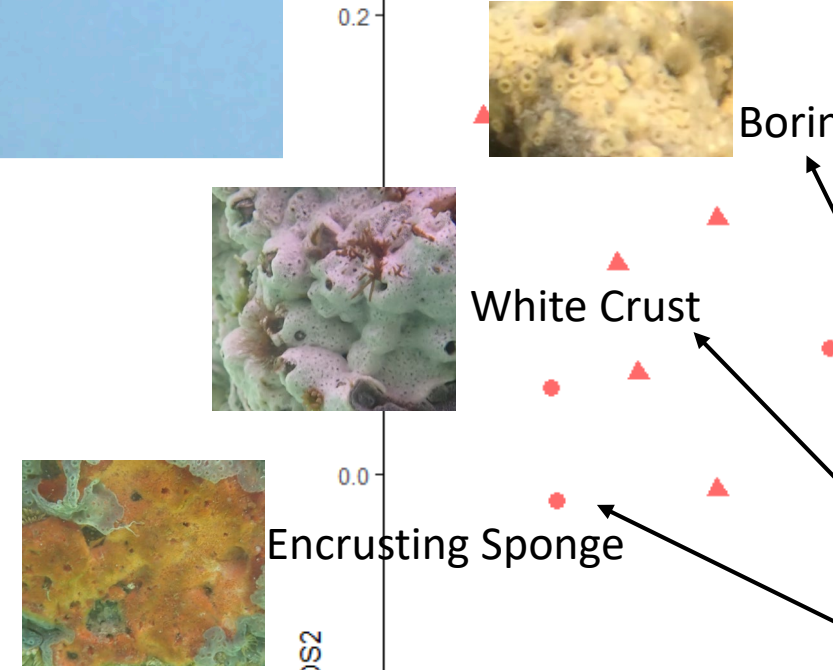
Encrusting Sponge

2023

2024

2023

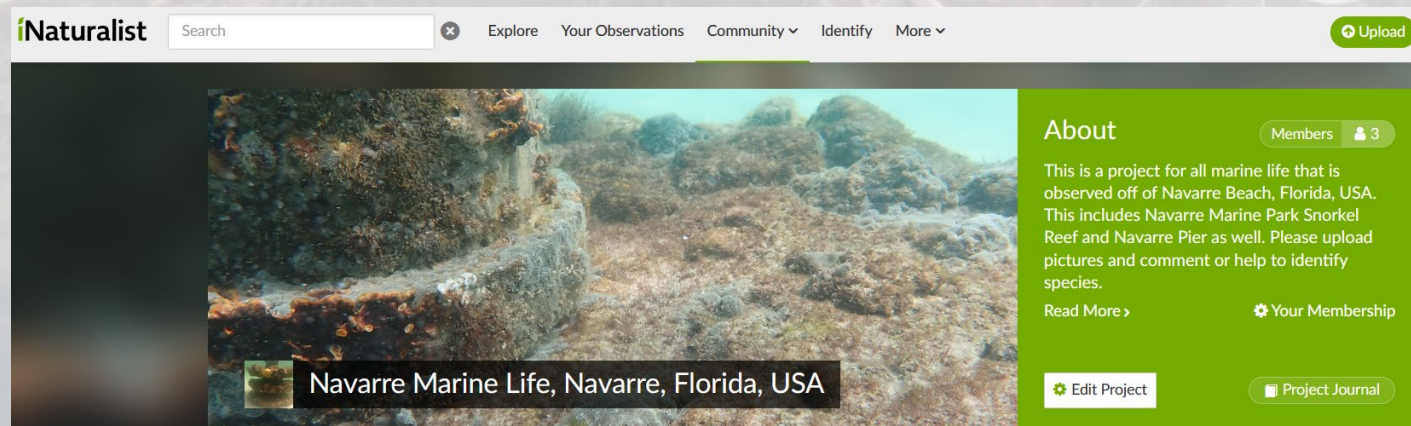
2024





# 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