South Carolina Aquarium

Arnold Postell

Curator of Large Exhibits/Dive Safety Officer/Manager of Reef Research

South Carolina Aquarium

Reef Research Program

- Phase 0 Assessment of Artificial vs Natural Reefs (2007-2009)
- Phase 1 Marine Protected Area (MPA) Project (2018-2019)
- Phase 2 Statewide Lionfish Derby (2022-2024)
- Phase 3 Reef Ball Construction (2023 – present)
- Phase 4 Deep Reef (In Discussion)





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MPA Lionfish Project

- We studied the effects of removing lionfish from the MPAs to determine changes to the abundance and diversity of other species.
- We removed lionfish from 2/4 corners for both MPA 51 and 53 over a two-year period.
- Data collected using Roving Diver Technique coupled with Stationary Video surveys



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Reef Environmental Education Foundation (REEF)

Roving Diver Technique

- During RDT surveys, divers swim freely throughout a site and record every observed fish species that can be positively identified.
- Species and abundance scores are recorded on an underwater slate.
- Survey lasts as long as the dive
- Survey data is stored on REEF website



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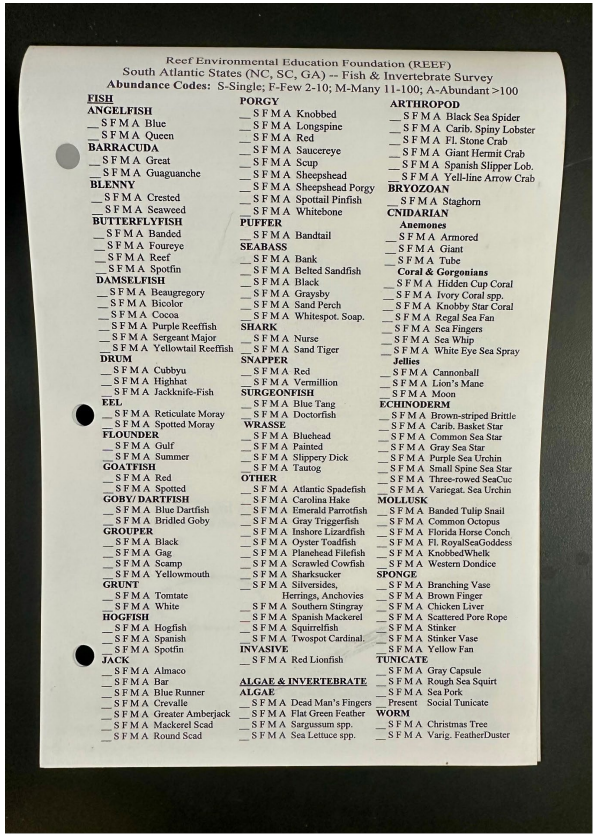
https://www.reef.org/db/reports/comp

Abundance Score/Density

- 1 Single (1)
- 2 Few (2-10)
- 3 Many (11-100)
- 4 Abundant (>101)

Sighting Frequency (%)

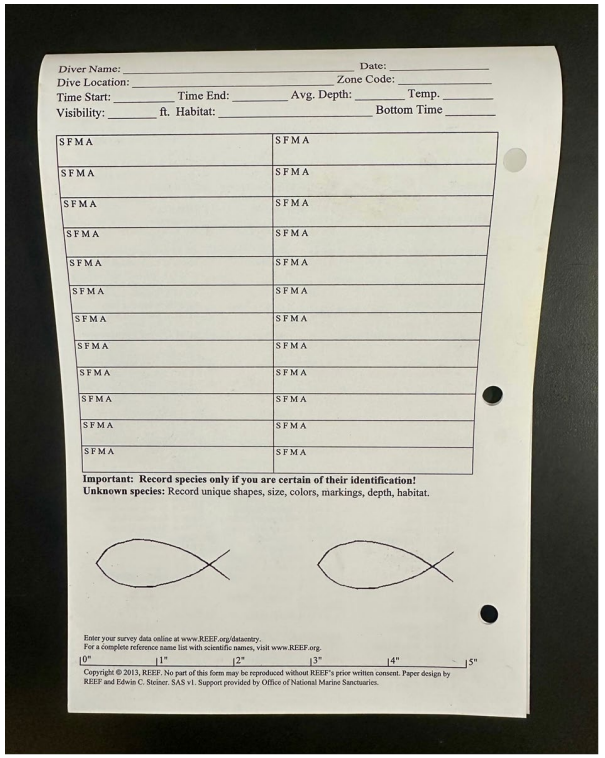
= #times reported/#Dives x 100



Reef Environmental Education Foundation (REEF)
South Atlantic States (NC, SC, GA) -- Fish & Invertebrate Survey
Abundance Codes: S-Single; F-Few 2-10; M-Many 11-100; A-Abundant >100

FISH
ANGELFISH
__ S F M A Blue
__ S F M A Queen
BARRACUDA
__ S F M A Great
__ S F M A Guaguanche
BLENNY
__ S F M A Crested
__ S F M A Seaweed
BUTTERFLYFISH
__ S F M A Banded
__ S F M A Foureye
__ S F M A Reef
__ S F M A Spotfin
DAMSELFISH
__ S F M A Beaugregory
__ S F M A Bicolor
__ S F M A Cocoa
__ S F M A Purple Reeffish
__ S F M A Sergeant Major
__ S F M A Yellowtail Reeffish
DRUM
__ S F M A Cubbyu
__ S F M A Highhat
__ S F M A Jackknife-Fish
EEL
__ S F M A Reticulate Moray
__ S F M A Spotted Moray
FLOUNDER
__ S F M A Gulf
__ S F M A Summer
GOATFISH
__ S F M A Red
__ S F M A Spotted
GOBY/ DARTFISH
__ S F M A Blue Dartfish
__ S F M A Bridled Goby
GROUPER
__ S F M A Black
__ S F M A Gag
__ S F M A Scamp
__ S F M A Yellowmouth
GRUNT
__ S F M A Tomtate
__ S F M A White
HOGFISH
__ S F M A Hogfish
__ S F M A Spanish
__ S F M A Spotfin
JACK
__ S F M A Almaco
__ S F M A Bar
__ S F M A Blue Runner
__ S F M A Crevalle
__ S F M A Greater Amberjack
__ S F M A Mackerel Scad
__ S F M A Round Scad
PORGY
__ S F M A Knobbed
__ S F M A Longspine
__ S F M A Red
__ S F M A Saucereye
__ S F M A Scup
__ S F M A Sheepshead
__ S F M A Sheepshead Porgy
__ S F M A Spottail Pinfish
__ S F M A Whitebone
PUFFER
__ S F M A Bandtail
SEABASS
__ S F M A Bank
__ S F M A Belted Sandfish
__ S F M A Black
__ S F M A Grayaby
__ S F M A Sand Perch
__ S F M A Whitespot. Soap.
SHARK
__ S F M A Nurse
__ S F M A Sand Tiger
SNAPPER
__ S F M A Red
__ S F M A Vermillion
SURGEONFISH
__ S F M A Blue Tang
__ S F M A Doctorfish
WRASSE
__ S F M A Bluehead
__ S F M A Painted
__ S F M A Slippery Dick
__ S F M A Tautog
OTHER
__ S F M A Atlantic Spadefish
__ S F M A Carolina Hake
__ S F M A Emerald Parrotfish
__ S F M A Gray Triggerfish
__ S F M A Inshore Lizardfish
__ S F M A Oyster Toadfish
__ S F M A Planehead Filefish
__ S F M A Scrawled Cowfish
__ S F M A Sharksucker
__ S F M A Silversides, Herrings, Anchovies
__ S F M A Southern Stingray
__ S F M A Spanish Mackerel
__ S F M A Squirrelfish
__ S F M A Twospot Cardinal
INVASIVE
__ S F M A Red Lionfish

ALGAE & INVERTEBRATE
ALGAE
__ S F M A Dead Man's Fingers
__ S F M A Flat Green Feather
__ S F M A Sargassum spp.
__ S F M A Sea Lettuce spp.
ARTHROPOD
__ S F M A Black Sea Spider
__ S F M A Carib. Spiny Lobster
__ S F M A Fl. Stone Crab
__ S F M A Giant Hermit Crab
__ S F M A Spanish Slipper Lob.
__ S F M A Yell-line Arrow Crab
BRYOZOAN
__ S F M A Staghorn
CNIDARIAN
Anemones
__ S F M A Armored
__ S F M A Giant
__ S F M A Tube
Coral & Gorgonians
__ S F M A Hidden Cup Coral
__ S F M A Ivory Coral spp.
__ S F M A Knobby Star Coral
__ S F M A Regal Sea Fan
__ S F M A Sea Fingers
__ S F M A Sea Whip
__ S F M A White Eye Sea Spray
Jellies
__ S F M A Cannonball
__ S F M A Lion's Mane
__ S F M A Moon
ECHINODERM
__ S F M A Brown-striped Brittle
__ S F M A Carib. Basket Star
__ S F M A Common Sea Star
__ S F M A Gray Sea Star
__ S F M A Purple Sea Urchin
__ S F M A Small Spine Sea Star
__ S F M A Three-rowed SeaCuc
__ S F M A Variegat. Sea Urchin
MOLLUSK
__ S F M A Banded Tulip Snail
__ S F M A Common Octopus
__ S F M A Florida Horse Conch
__ S F M A Fl. RoyalSeaGoddess
__ S F M A KnobbedWhelk
__ S F M A Western Dondice
SPONGE
__ S F M A Branching Vase
__ S F M A Brown Finger
__ S F M A Chicken Liver
__ S F M A Scattered Pore Rope
__ S F M A Stinker
__ S F M A Stinker Vase
__ S F M A Yellow Fan
TUNICATE
__ S F M A Gray Capsule
__ S F M A Rough Sea Squirt
__ S F M A Sea Pork
__ Present Social Tunicate
WORM
__ S F M A Christmas Tree
__ S F M A Varig. FeatherDuster



Diver Name: _____ Date: _____
Dive Location: _____ Zone Code: _____
Time Start: _____ Time End: _____ Avg. Depth: _____ Temp. _____
Visibility: _____ ft. Habitat: _____ Bottom Time _____

S F M A	S F M A
S F M A	S F M A
S F M A	S F M A
S F M A	S F M A
S F M A	S F M A
S F M A	S F M A
S F M A	S F M A
S F M A	S F M A
S F M A	S F M A
S F M A	S F M A
S F M A	S F M A
S F M A	S F M A

Important: Record species only if you are certain of their identification!
Unknown species: Record unique shapes, size, colors, markings, depth, habitat.

Enter your survey data online at www.REEF.org/dataentry.
For a complete reference name list with scientific names, visit www.REEF.org.

|0" |1" |2" |3" |4" |5"

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South Carolina Aquarium

Area 51-A

Common Name (Scientific Name)	%SF	DEN
Great Barracuda, (Sphyraena barracuda)	100	1.33
Atlantic Spadefish, (Chaetodipterus faber)	100	3.67
Spottail Pinfish, (Diplodus holbrookii)	100	2.33
Black Sea Bass, (Centropristis striata)	100	3.33
Gray Triggerfish, (Balistes capriscus)	100	2.33
Tomtate, (Haemulon aurolineatum)	100	3.67
Blue Angelfish, (Holacanthus bermudensis)	100	2
Greater Amberjack, (Seriola dumerili)	100	3
Gray Snapper, (Lutjanus griseus)	83.33	2
Gag, (Mycteroperca microlepis)	83.33	1.6
Red Snapper, (Lutjanus campechanus)	83.33	2.4
Sheepshead, (Archosargus probatocephalus)	66.67	1.25
Vermillion Snapper, (Rhomboplites aurorubens)	50	2.67
Cocoa Damselfish, (Stegastes variabilis)	50	2.33
Seaweed Blenny, (Parablennius marmoreus)	50	1.67
Slippery Dick, (Halichoeres bivittatus)	50	3.67
Longspine Porgy, (Stenotomus caprinus)	33.33	2
Sheepshead Porgy, (Calamus penna)	33.33	1.5
Cubbyu, (Pareques umbrosus)	33.33	2.5
Almaco Jack, (Seriola rivoliana)	33.33	2
Bridled Goby Complex (Bridled/Sand-Canyon/Patch-Reef), (C. glaucofraenum/C. bol/C. tortugae)	16.67	2
Whitespotted Soapfish, (Rypticus maculatus)	16.67	1
Cobia, (Rachycentron canadum)	16.67	1
Painted Wrasse, (Halichoeres caudalis)	16.67	1
Twospot Cardinalfish, (Apogon pseudomaculatus)	16.67	1
Belted Sandfish, (Serranus subligarius)	16.67	2
Reticulate Moray, (Muraena retifera)	16.67	1
Southern Stingray, (Hypanus americanus)	16.67	1
Gulf Flounder, (Paralichthys albigutta)	16.67	1
Beaugregory, (Stegastes leucostictus)	16.67	2
Townsend Angelfish, (Holacanthus sp. (Hybrid))	16.67	1
Nurse Shark, (Ginglymostoma cirratum)	16.67	1

South Carolina Aquarium

Area 51-A

Common Name (Scientific Name)	%SF	DEN
Great Barracuda, (Sphyraena barracuda)	100	1.33
Atlantic Spadefish, (Chaetodipterus faber)	100	3.67
Spottail Pinfish, (Diplodus holbrookii)	100	2.33
Black Sea Bass, (Centropristis striata)	100	3.33
Gray Triggerfish, (Balistes capriscus)	100	2.33
Tomtate, (Haemulon aurolineatum)	100	3.67
Blue Angelfish, (Holacanthus bermudensis)	100	2
Greater Amberjack, (Seriola dumerili)	100	3
Gray Snapper, (Lutjanus griseus)	83.33	2
Gag, (Mycteroperca microlepis)	83.33	1.6
Red Snapper, (Lutjanus campechanus)	83.33	2.4
Sheepshead, (Archosargus probatocephalus)	66.67	1.25
Vermillion Snapper, (Rhomboplites aurorubens)	50	2.67
Cocoa Damselfish, (Stegastes variabilis)	50	2.33
Seaweed Blenny, (Parablennius marmoreus)	50	1.67
Slippery Dick, (Halichoeres bivittatus)	50	3.67
Longspine Porgy, (Stenotomus caprinus)	33.33	2
Sheepshead Porgy, (Calamus penna)	33.33	1.5
Cubbyu, (Pareques umbrosus)	33.33	2.5
Almaco Jack, (Seriola rivoliana)	33.33	2
Bridled Goby Complex (Bridled/Sand-Canyon/Patch-Reef), (C. glaucofraenum/C. bol/C. tortugae)	16.67	2
Whitespotted Soapfish, (Rypticus maculatus)	16.67	1
Cobia, (Rachycentron canadum)	16.67	1
Painted Wrasse, (Halichoeres caudalis)	16.67	1
Twospot Cardinalfish, (Apogon pseudomaculatus)	16.67	1
Belted Sandfish, (Serranus subligarius)	16.67	2
Reticulate Moray, (Muraena retifera)	16.67	1
Southern Stingray, (Hypanus americanus)	16.67	1
Gulf Flounder, (Paralichthys albigutta)	16.67	1
Beaugregory, (Stegastes leucostictus)	16.67	2
Townsend Angelfish, (Holacanthus sp. (Hybrid))	16.67	1
Nurse Shark, (Ginglymostoma cirratum)	16.67	1

South Carolina Aquarium

Area 53-A

Common Name (Scientific Name)	%SF	DEN
White Grunt, (Haemulon plumieri)	100	1.6
Gag, (Mycteroperca microlepis)	100	2
Spotfin Butterflyfish, (Chaetodon ocellatus)	100	2
Gray Snapper, (Lutjanus griseus)	100	2.2
Black Sea Bass, (Centropristis striata)	100	3.2
Scamp, (Mycteroperca phenax)	100	2
Red Lionfish (exotic), (Pterois volitans)	100	2.4
Cubbyu, (Pareques umbrosus)	100	2.4
Blue Angelfish, (Holacanthus bermudensis)	100	2.2
Tomtate, (Haemulon aurolineatum)	100	3.2
Gray Triggerfish, (Balistes capriscus)	100	3
Red Snapper, (Lutjanus campechanus)	100	3.6
Atlantic Spadefish, (Chaetodipterus faber)	80	3.5
Greater Amberjack, (Seriola dumerili)	80	3.25
Cocoa Damselfish, (Stegastes variabilis)	80	2.25
Nurse Shark, (Ginglymostoma cirratum)	60	1.33
Bicolor Damselfish, (Stegastes partitus)	60	1.33
Slippery Dick, (Halichoeres bivittatus)	60	1.33
Whitespotted Soapfish, (Rypticus maculatus)	60	2
Sharpnose Puffer, (Canthigaster rostrata)	60	1.33

Common Name (Scientific Name)	%SF	DEN
Vermillion Snapper, (Rhomboplites aurorubens)	40	3
Carolina Hake, (Urophycis earllii)	40	2
Bandtail Puffer, (Sphoeroides spengleri)	40	1
Reticulate Moray, (Muraena retifera)	40	1
Sandbar Shark, (Carcharhinus plumbeus)	40	1
Almaco Jack, (Seriola rivoliana)	40	2.5
Sheepshead, (Archosargus probatocephalus)	40	2
Spotted Moray, (Gymnothorax moringa)	40	1
Remora, (Remora remora)	20	2
Spottail Pinfish, (Diplodus holbrookii)	20	1
Queen Triggerfish, (Balistes vetula)	20	1
Sheepshead Porgy, (Calamus penna)	20	2
Longspine Porgy, (Stenotomus caprinus)	20	2
Yellowtail Reeffish, (Chromis enchrysura)	20	1
Doctorfish, (Acanthurus chirurgus)	20	1
Rainbow Runner, (Elagatis bipinnulata)	20	2
Sharksucker, (Echeneis naucrates)	20	2
Townsend Angelfish, (Holacanthus sp. (Hybrid))	20	1
Beaugregory, (Stegastes leucostictus)	20	1
Great Barracuda, (Sphyraena barracuda)	20	2

South Carolina Aquarium

Area 53-A

Common Name (Scientific Name)	%SF	DEN
White Grunt, (Haemulon plumieri)	100	1.6
Gag, (Mycteroperca microlepis)	100	2
Spotfin Butterflyfish, (Chaetodon ocellatus)	100	2
Gray Snapper, (Lutjanus griseus)	100	2.2
Black Sea Bass, (Centropristis striata)	100	3.2
Scamp, (Mycteroperca phenax)	100	2
Red Lionfish (exotic), (Pterois volitans)	100	2.4
Cubbyu, (Pareques umbrosus)	100	2.4
Blue Angelfish, (Holacanthus bermudensis)	100	2.2
Tomtate, (Haemulon aurolineatum)	100	3.2
Gray Triggerfish, (Balistes capriscus)	100	3
Red Snapper, (Lutjanus campechanus)	100	3.6
Atlantic Spadefish, (Chaetodipterus faber)	80	3.5
Greater Amberjack, (Seriola dumerili)	80	3.25
Cocoa Damselfish, (Stegastes variabilis)	80	2.25
Nurse Shark, (Ginglymostoma cirratum)	60	1.33
Bicolor Damselfish, (Stegastes partitus)	60	1.33
Slippery Dick, (Halichoeres bivittatus)	60	1.33
Whitespotted Soapfish, (Rypticus maculatus)	60	2
Sharpnose Puffer, (Canthigaster rostrata)	60	1.33

Common Name (Scientific Name)	%SF	DEN
Vermillion Snapper, (Rhomboplites aurorubens)	40	3
Carolina Hake, (Urophycis earllii)	40	2
Bandtail Puffer, (Sphoeroides spengleri)	40	1
Reticulate Moray, (Muraena retifera)	40	1
Sandbar Shark, (Carcharhinus plumbeus)	40	1
Almaco Jack, (Seriola rivoliana)	40	2.5
Sheepshead, (Archosargus probatocephalus)	40	2
Spotted Moray, (Gymnothorax moringa)	40	1
Remora, (Remora remora)	20	2
Spottail Pinfish, (Diplodus holbrookii)	20	1
Queen Triggerfish, (Balistes vetula)	20	1
Sheepshead Porgy, (Calamus penna)	20	2
Longspine Porgy, (Stenotomus caprinus)	20	2
Yellowtail Reeffish, (Chromis enchrysura)	20	1
Doctorfish, (Acanthurus chirurgus)	20	1
Rainbow Runner, (Elagatis bipinnulata)	20	2
Sharksucker, (Echeneis naucrates)	20	2
Townsend Angelfish, (Holacanthus sp. (Hybrid))	20	1
Beaugregory, (Stegastes leucostictus)	20	1
Great Barracuda, (Sphyraena barracuda)	20	2

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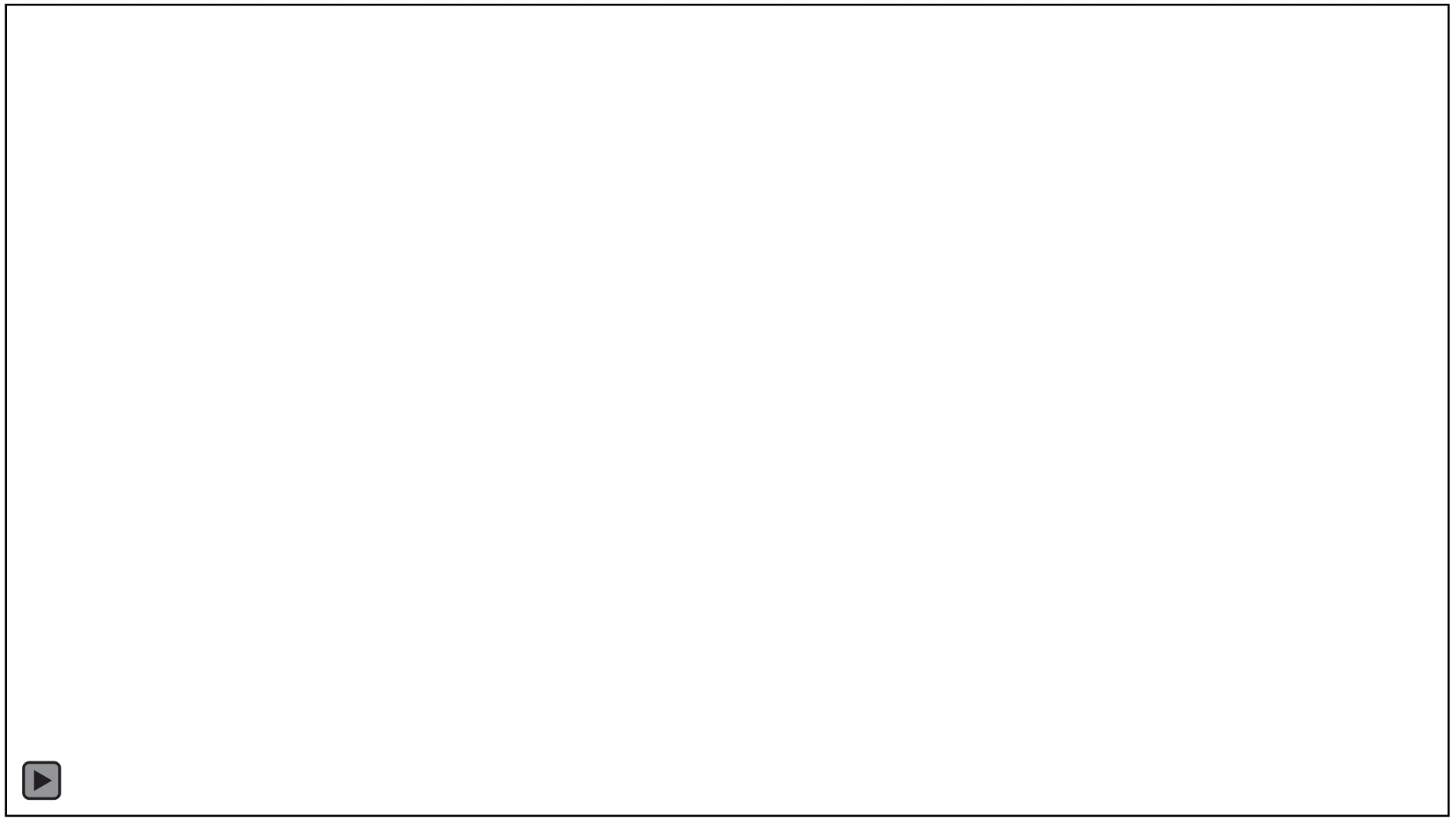

South Carolina Aquarium

Aquarium Story Telling

- Lionfish Exhibit
- Signage
  - Marine Protected Areas
  - Artificial Reefs
  - Conservation Projects







South Carolina Aquarium

Future Work

- ROV Video Surveys
- Deep Water MPA vs Edisto MPA
- MPA vs Non-MPA



Aquarium Resources

- Vessel
- Staffing
- ROV (fundraising now)
- Grad Student (fundraising now)



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