



Florida Artificial Reef Updates: Program Overview, Deployment Summaries, Recent Trends

Presented by Keith Mille, Biological Administrator
FWC Division of Marine Fisheries Management,
Artificial Reef Program
March 8, 2023



FWC Artificial Reef Program Staff



Keith Mille
Program Administrator



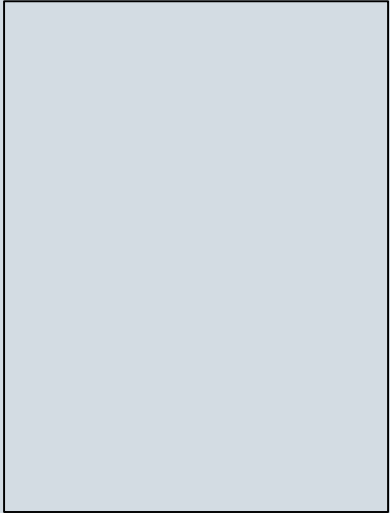
Carolyn Kalinowski
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Fisheries Biologist IV
Grant Manager (NRDA)



Eli Myron
Fisheries Biologist III
Grant Manager (NRDA)

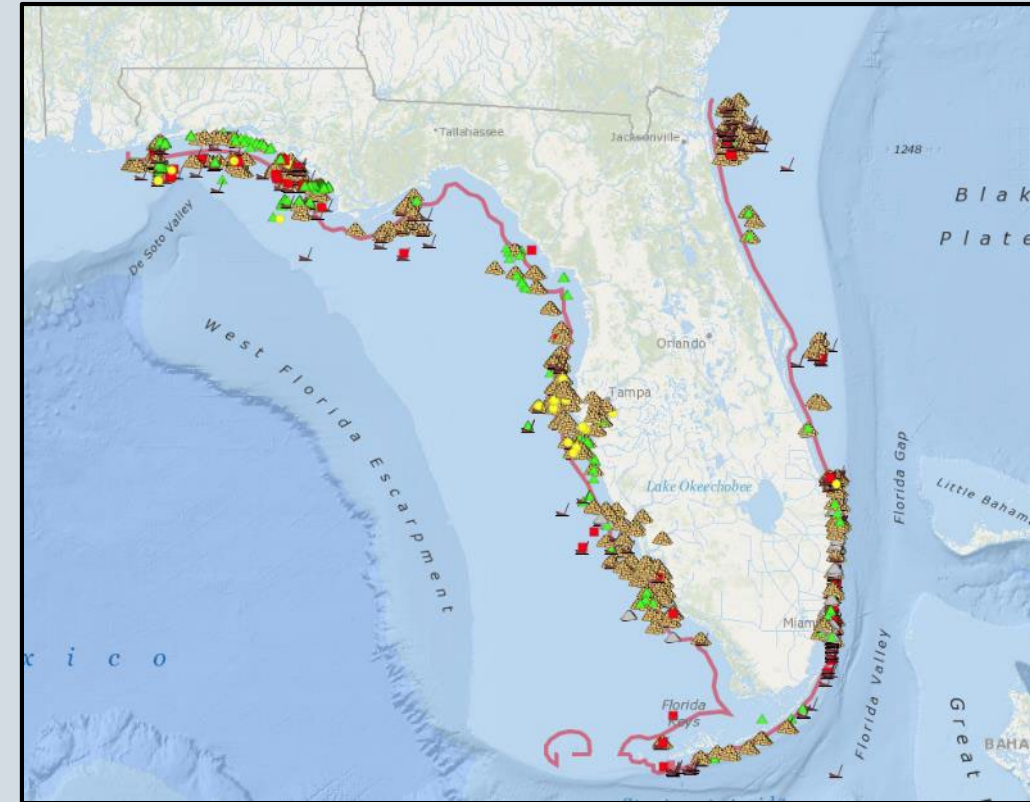


Vacant
Fisheries Biologist IV
Grant Manager (SFR)



FWC Artificial Reef Program Goals

1. Foster coordination between public & private organizations for artificial reef development to assure long-term economic and social benefits for the State of Florida.
2. Understand the function of artificial reefs and use them as a component of fisheries management.



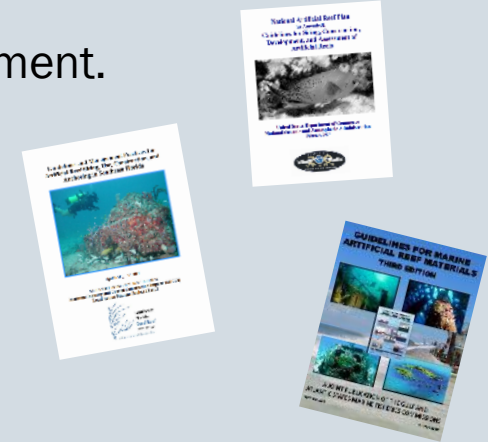
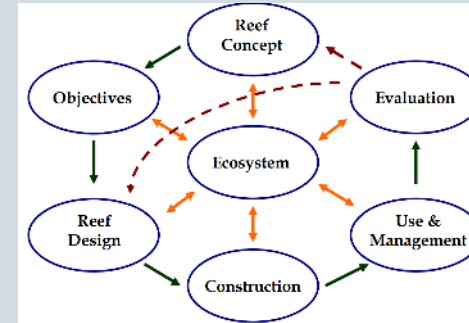
FWC Artificial Reef Program Goals

1. Foster coordination between public & private organizations for artificial reef development to assure long-term economic and social benefits for the State of Florida.
2. Understand the function of artificial reefs and use them as a component of fisheries management.

Provide **financial** and **technical assistance** to coastal governments, nonprofits and state universities to construct and assess artificial reefs.

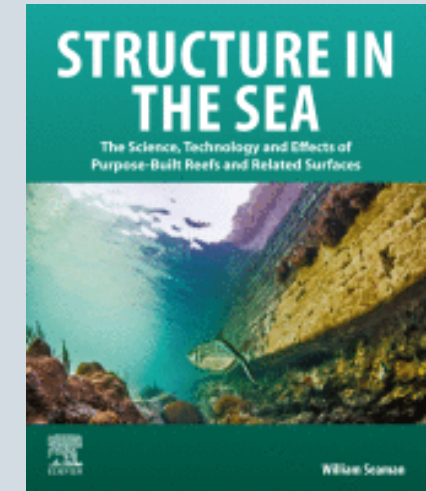
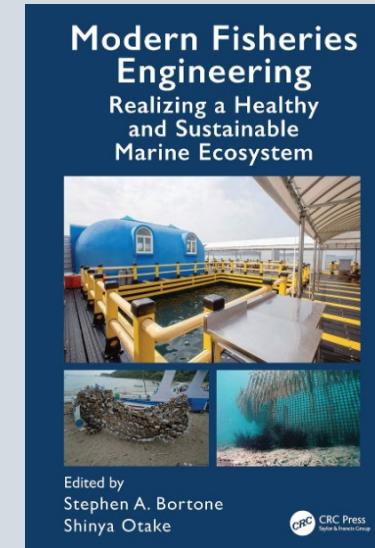


- Grant administration for construction and monitoring
- Manage the Florida Artificial Reef Database
- Host regional and statewide artificial reef workshops
- Environmental permit planning and review
- Liaison with the Gulf and Atlantic State Marine Fisheries Commission on artificial reef issues



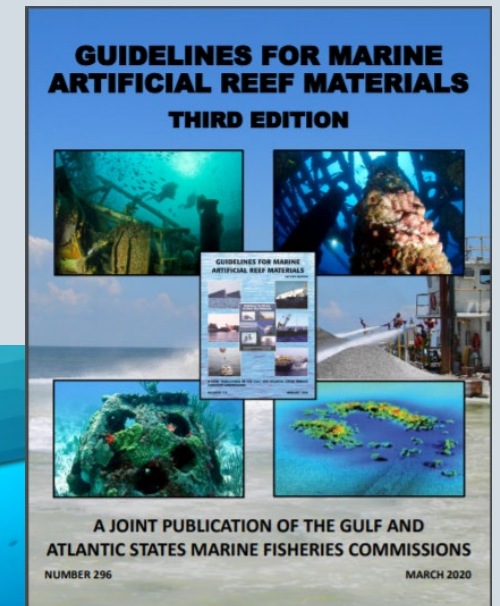
International Updates

- Steve Bortone and Shinya Otake. 2020. Modern Fisheries Engineering: Realizing a Healthy and Sustainable Marine Ecosystem.
- Bill Seaman. 2022. Structure in the Sea: The Science, Technology and Effects of Purpose-Built Reefs and Related Surfaces
- 12th International Conference on Artificial Reef and Related Aquatic Habitats (CARAH)
 - France 2024, tentative



National Updates

- GSMFC & ASMFC Guidelines for Marine Artificial Reef Materials - 3rd Edition (March 2020)
- ASMFC Profiles of State Artificial Reef Programs and Projects (July 2021)
- D’Amy Steward, Avery Paxton, et al. Quantifying spatial extents of artificial versus natural reefs in the seascape. *Frontiers in Marine Science* (Sept 2022)
- GSMFC & ASMFC Habitat Coordinator Vacancies



Quantifying spatial extents of artificial versus natural reefs in the seascape

D’arry N. Steward¹, Avery B. Paxton^{2*}, Nathan M. Bacheler³, Christina M. Schobernd³, Keith Mille⁴, Jeffrey Renchen⁴, Zach Harrison⁵, Jordan Byrum⁵, Robert Martore⁶, Cameron Brinton⁷, Kenneth L. Riley², J. Christopher Taylor² and G. Todd Kellison³

¹ Duke University Marine Lab, Duke University, Beaufort, NC, United States
² National Centers for Coastal Ocean Science, National Ocean Service, National Oceanic and Atmospheric Administration, Beaufort, NC, United States
³ Southeast Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Beaufort, NC, United States
⁴ Division of Marine Fisheries Management, Florida Fish and Wildlife Conservation Commission, Tallahassee, FL, United States
⁵ North Carolina Division of Marine Fisheries, North Carolina Department of Environmental Quality, Morehead City, NC, United States
⁶ Marine Resources Division, South Carolina Department of Natural Resources, Charleston, SC, United States
⁷ Coastal Resources Division, Georgia Department of Natural Resources, Brunswick, GA, United States

With increasing human uses of the ocean, existing seascapes containing natural habitats, such as biogenic reefs or plant-dominated systems, are supplemented by novel, human-made habitats ranging from artificial



What is an artificial reef?

Artificial Reef - objects of natural or human origin intentionally placed on the seafloor for the purpose of enhancing marine life for human use



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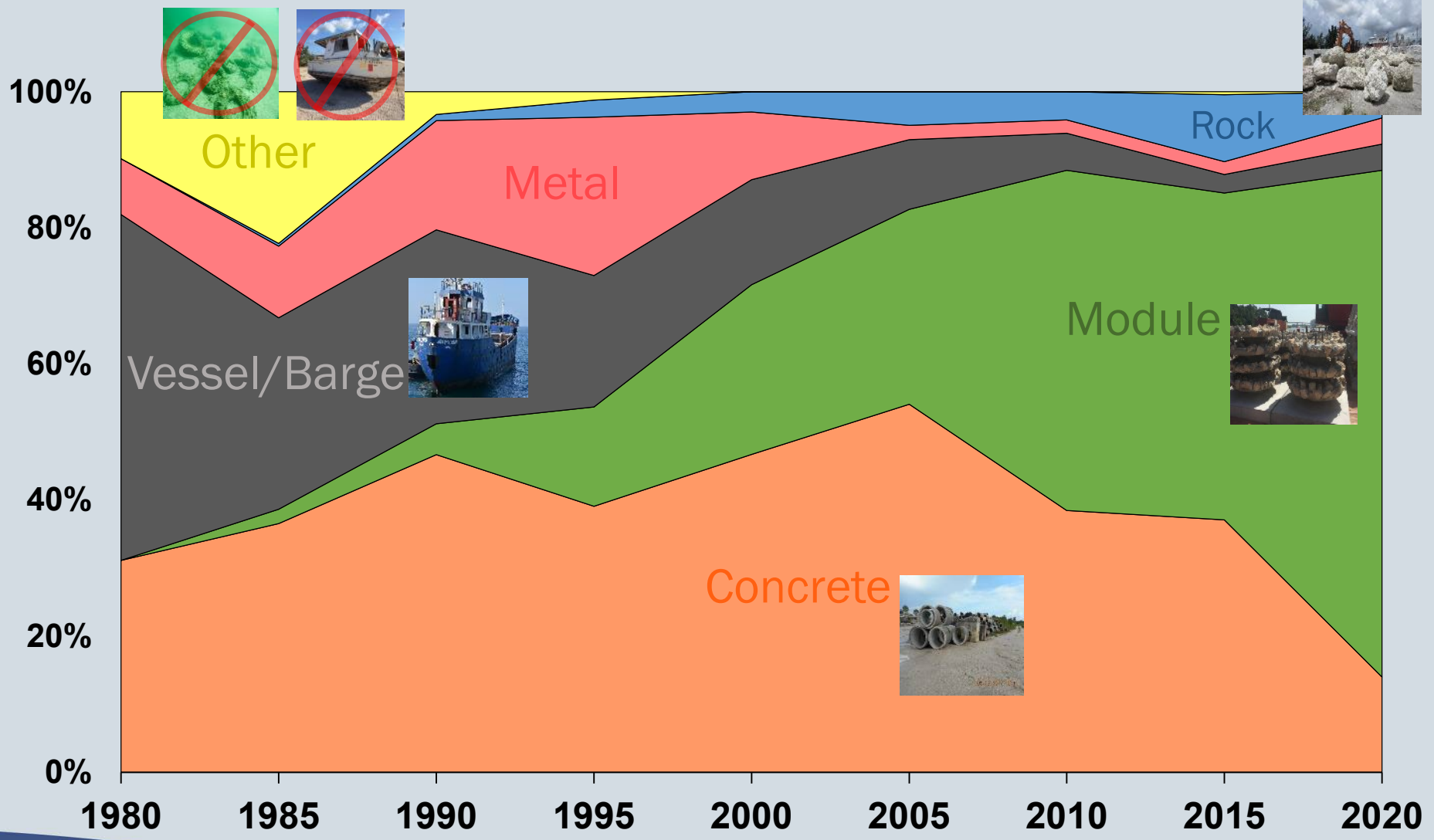


Material Trends

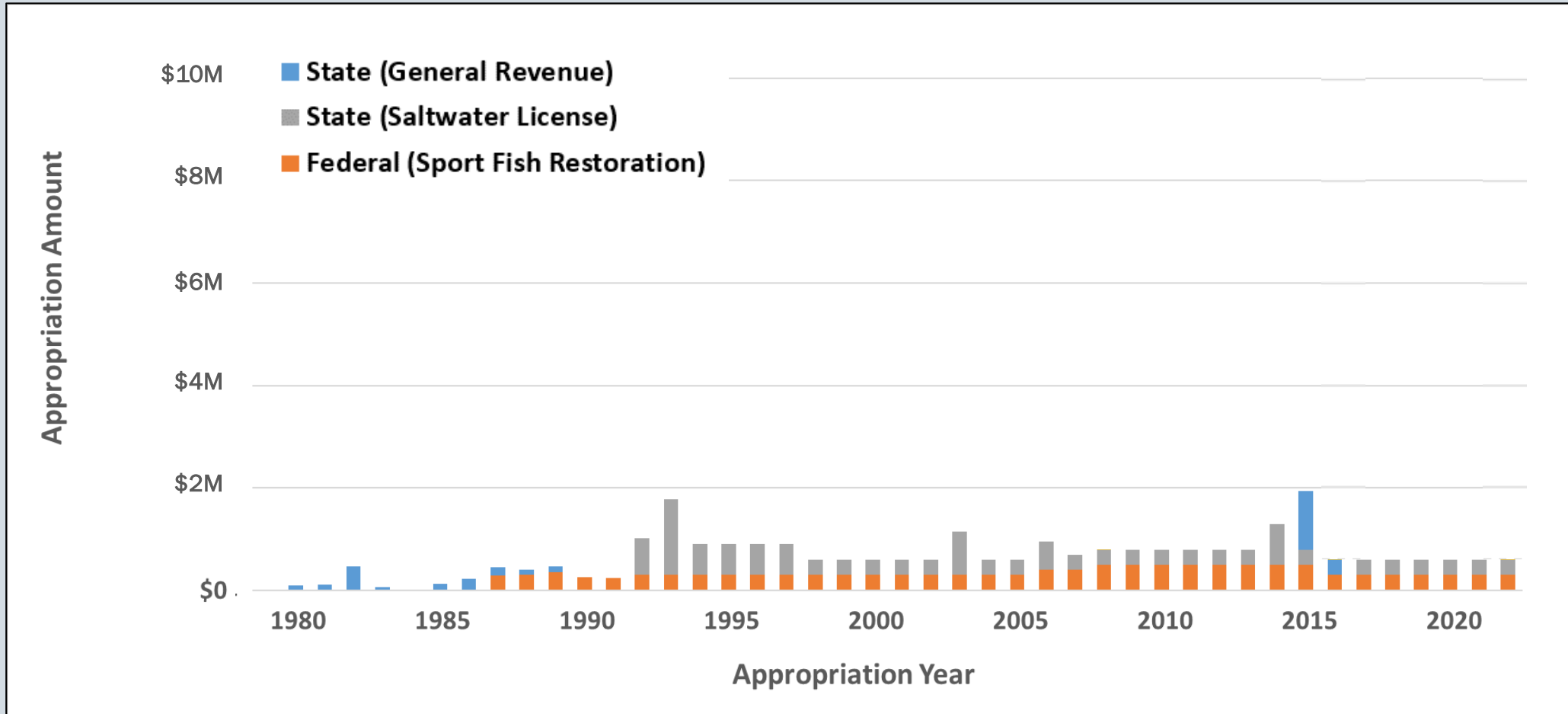
Material Type Percent Distribution (1980 - 2020)

Shifts over time

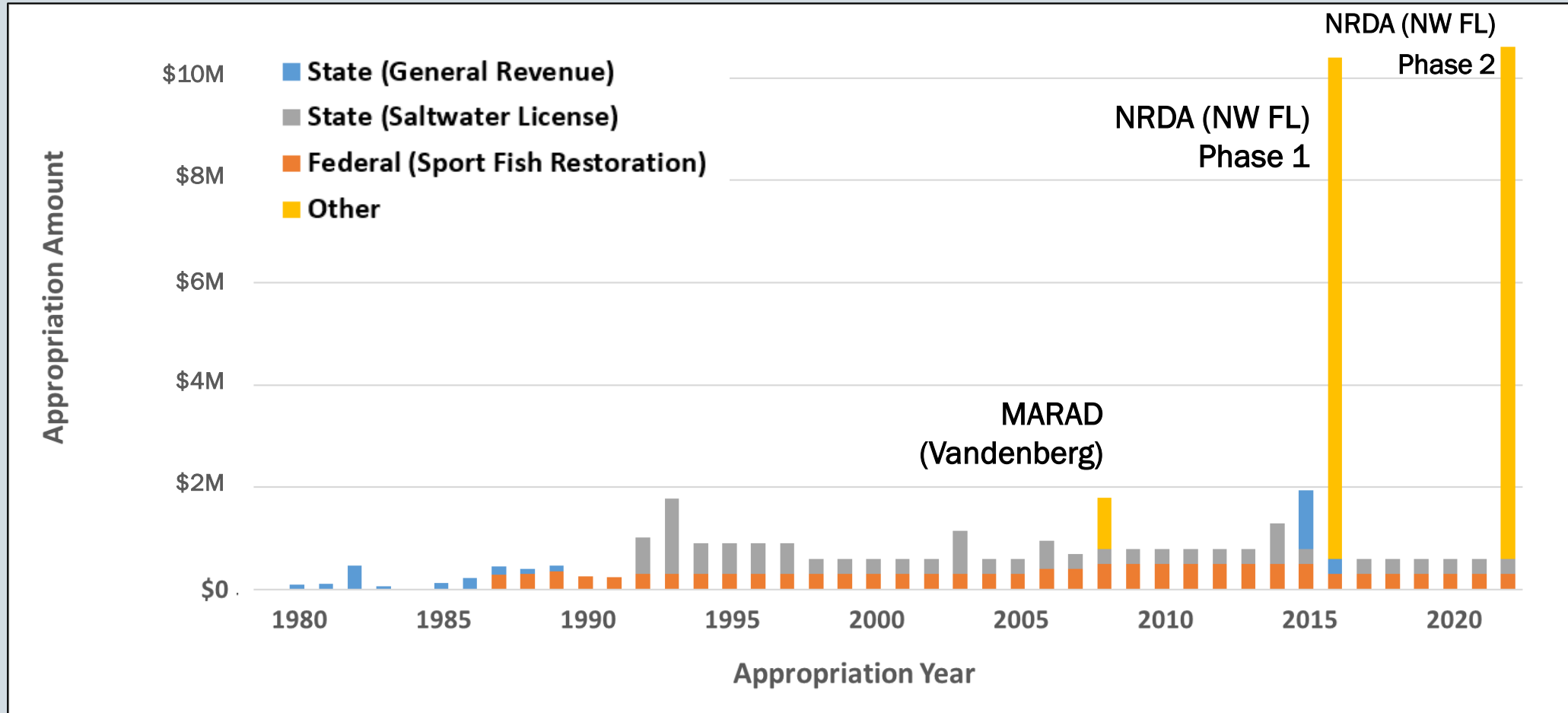
- Reduced availability of secondary-use materials
- Preference for limestone
- More modules
 - Large NRDA contribution
- Limited large vessel availability
 - No Navy or US Maritime vessels
 - Renewed partnership with US Customs
 - Increased local funding



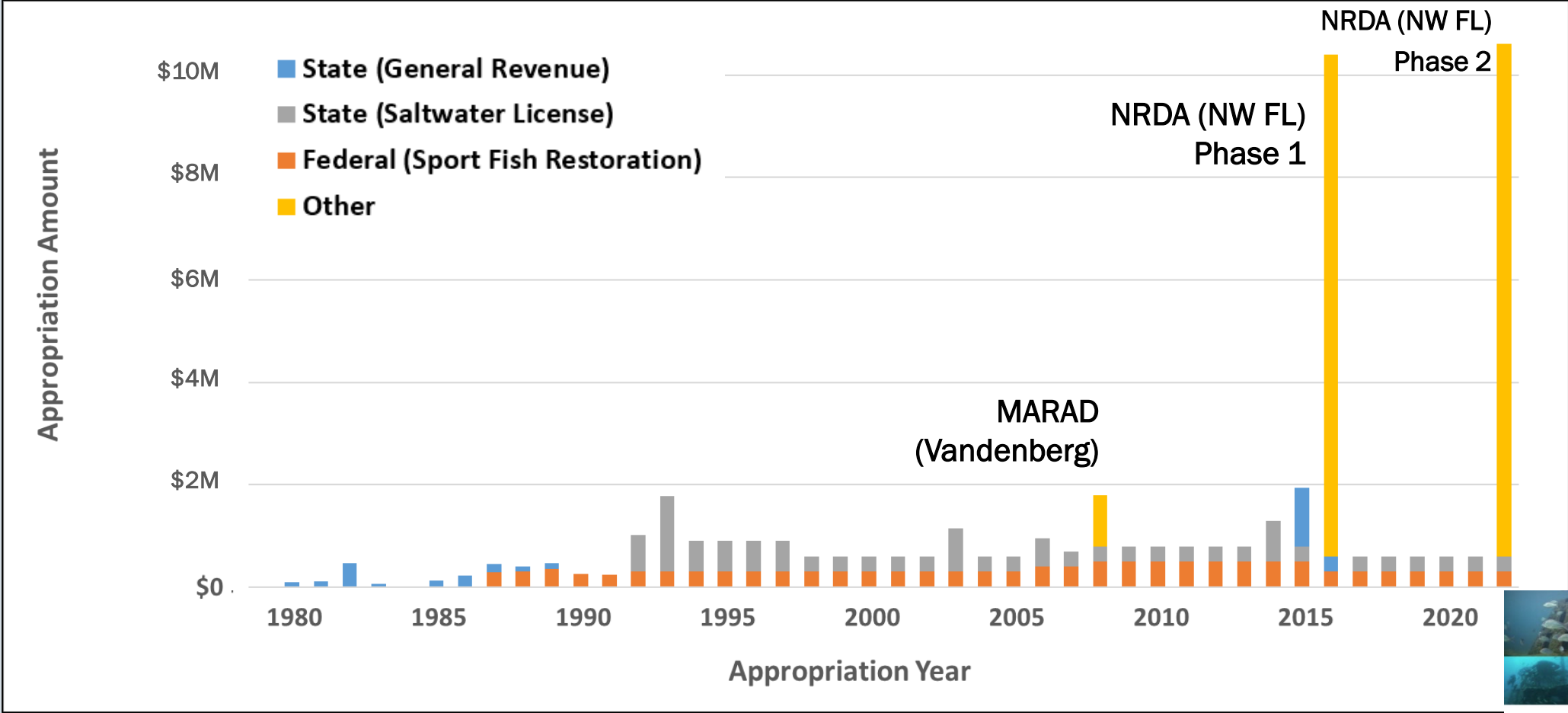
State Grant-in-Aid Funding



State Grant-in-Aid Funding



State Grant-in-Aid Funding



FY 23/24 FWC Artificial Reef Grant Applications Due April 21, 2023!

MyFWC.com



CALL FOR ARTIFICIAL REEF CONSTRUCTION & MONITORING GRANT APPLICATIONS FOR FISCAL YEAR 2023-2024

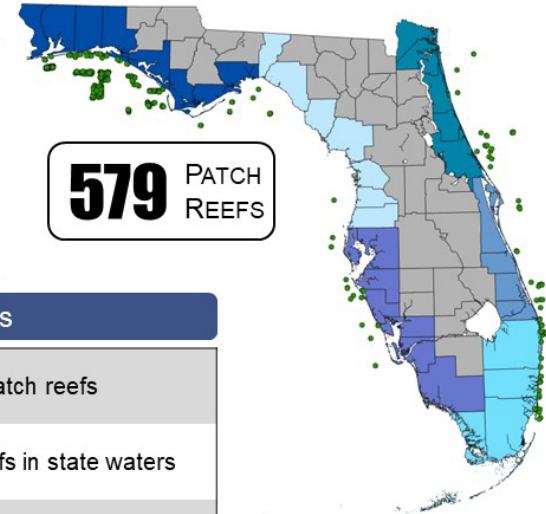
Florida Fish & Wildlife Conservation Commission
 Division of Marine Fisheries, Artificial Reef Program
 1875 Orange Ave. East
 Tallahassee, FL 32311
 (904) 487-0504
<http://myfwc.com/artificialreefs>





5-Year Summary: 2017-2022

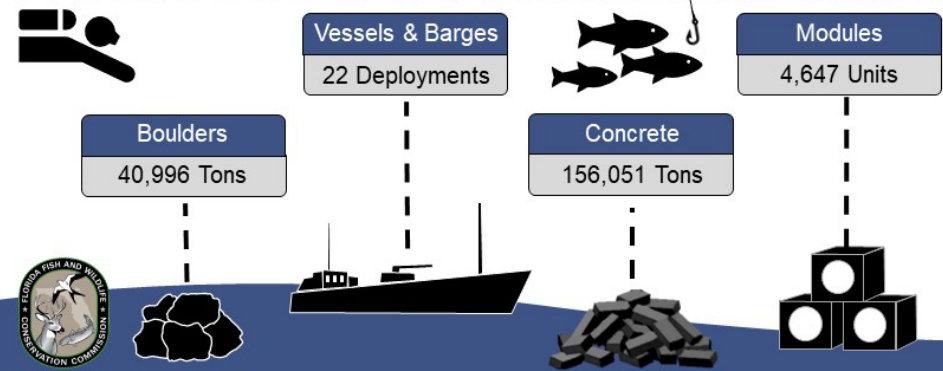
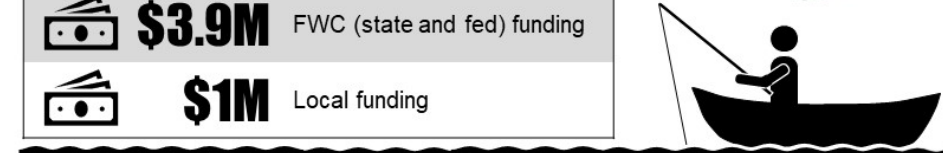
- 579 Patch Reefs
 - Weight average: 361 tons
 - Footprint average: 946 ft²

FLORIDA ARTIFICIAL REEF CONSTRUCTION 5-YEAR SUMMARY: 2018 - 2022

Average Patch Reef	
72' Depth	361 Tons
946 Sq. Feet	12' Relief



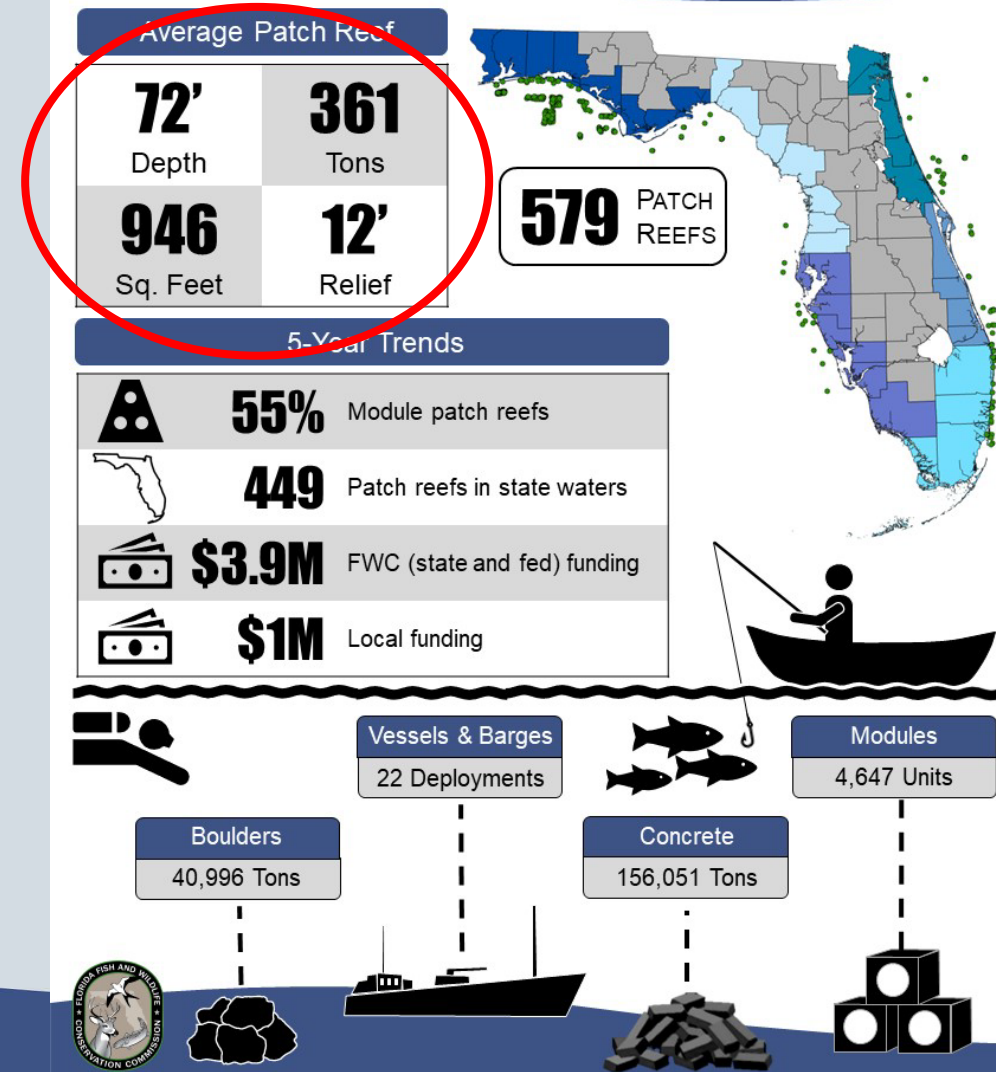
5-Year Trends	
 55%	Module patch reefs
 449	Patch reefs in state waters
 \$3.9M	FWC (state and fed) funding
 \$1M	Local funding



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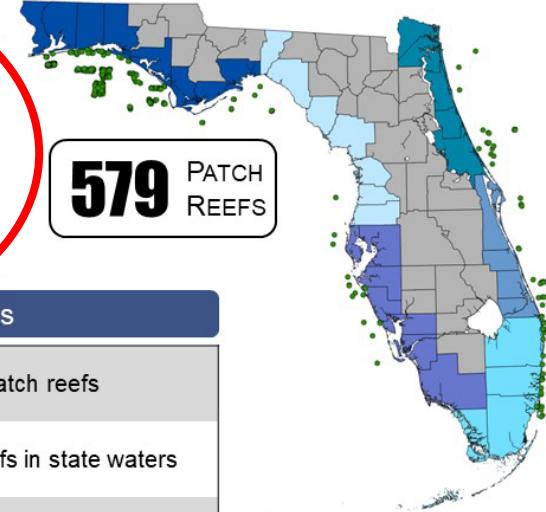
FLORIDA ARTIFICIAL REEF CONSTRUCTION

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Average Patch Reef

72' Depth	361 Tons
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579 PATCH REEFS



5-Year Trends

	55% Module patch reefs
	449 Patch reefs in state waters
	\$3.9M FWC (state and fed) funding
	\$1M Local funding



Vessels & Barges

22 Deployments



Modules

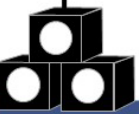
4,647 Units

Boulders


40,996 Tons

Concrete

156,051 Tons

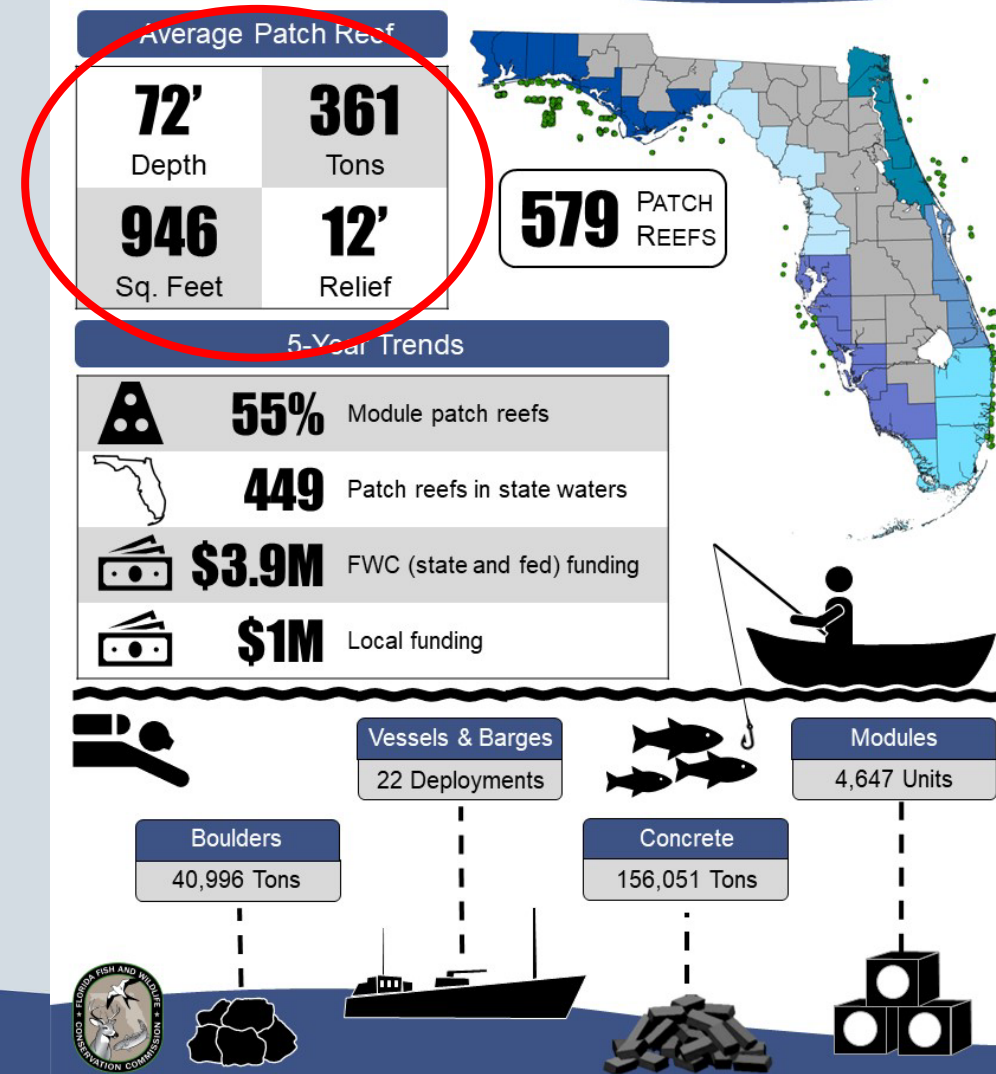


5-Year Summary: 2017-2022

- 579 Patch Reefs
 - Weight average: 361 tons
 - Footprint average: 946 ft² 
- Most tonnage
 - Escambia: Pensacola Bay Bridge (100K+)
- Deepest
 - Palm Beach: Reef Dart Modules (460 – 511 ft)
- Largest vessel
 - St Lucie: Aftersome Reef (418 ft Steel hopper barge)

FLORIDA ARTIFICIAL REEF CONSTRUCTION

5-YEAR SUMMARY: 2018 - 2022



5-Year Summary: 2017-2022

- 20 Patch Reefs
 - Weight average: 1,561 tons
 - Footprint average: 1,133 ft²

SW FL ARTIFICIAL REEF CONSTRUCTION

5-YEAR SUMMARY: 2018 - 2022

Average Patch Reef

30' Depth	1,561 Tons
1,133 Sq. Feet	7' Relief

20
PATCH
REEFS



5-Year Trends

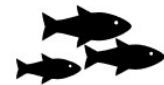
	68% Module patch reefs
	16 Patch reefs in state waters
	\$420K FWC (state and fed) funding
	\$133K Local funding

- Reuse Concrete
- Metal
- Module
- Boulders
- Vessel/Barge



Vessels & Barges

2 Barges



Modules

400 Units

Boulders

26,725 Tons

Concrete

2,612 Tons



5-Year Summary: 2017-2022

- 20 Patch Reefs
 - Weight average: 1,561 tons
 - Footprint average: 1,133 ft²



SW FL ARTIFICIAL REEF CONSTRUCTION

5-YEAR SUMMARY: 2018 - 2022

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30' Depth	1,561 Tons
1,133 Sq. Feet	7' Relief

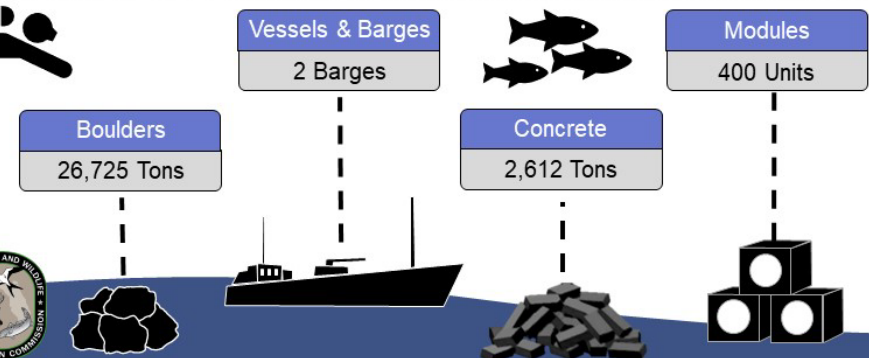
20
PATCH
REEFS



5-Year Trends

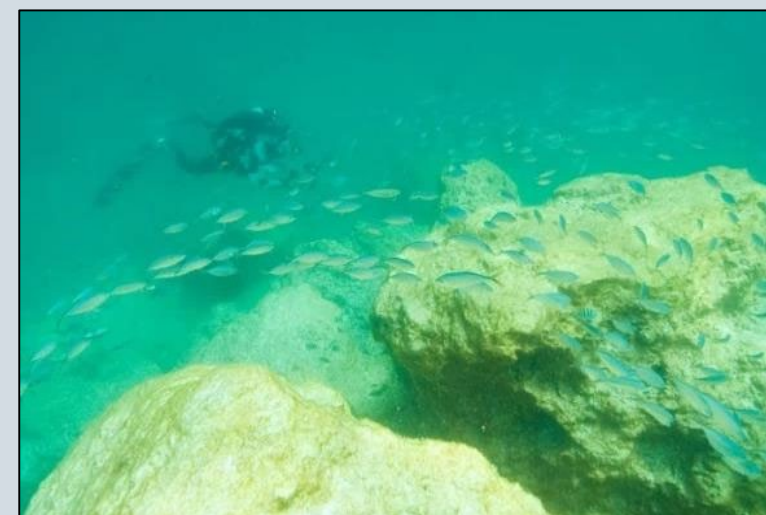
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- Reuse Concrete
- Metal
- Module
- Boulders
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Deployment Trends

- More placement of reefs within state waters
 - Ease of access
 - Snorkel/kayak reefs
 - Desire for locations with less stringent regulations (e.g. red snapper)
- Species-specific and more focused ecological considerations
 - Deepwater “Reef Darts”



Deployment Trends

- Artform and Memorial Reefs



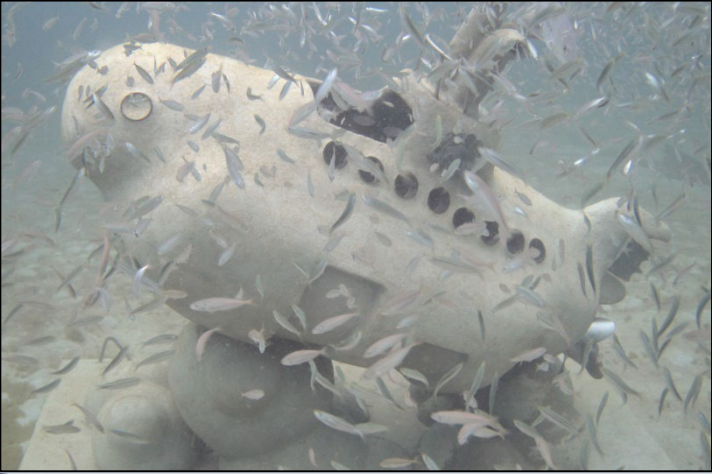
M/V Lady Luck “Steel Robot” (Lauderdale-By-The-Sea, pending)



Circle of Hero's (Pinellas 2019)



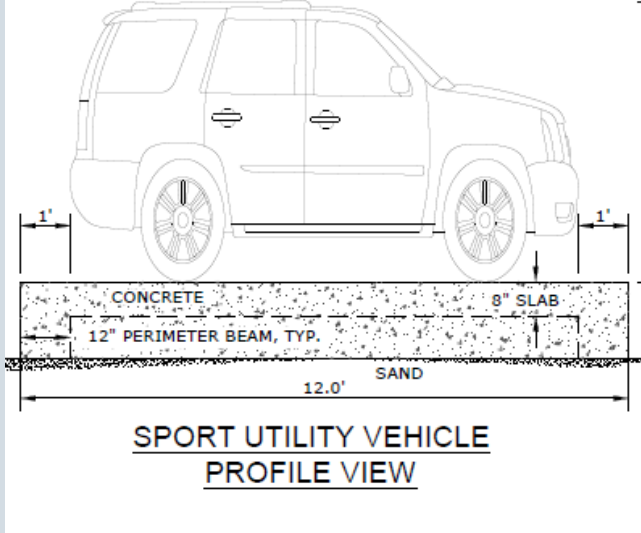
1000 Mermaids (Palm Beach, 2019-)



Underwater Art Museum (Grayton Beach, 2018-)



M/V Manta “Christ of the Gulf” (Destin, 2023)



Reefline Cars (Miami, pending)

Deployment Trends

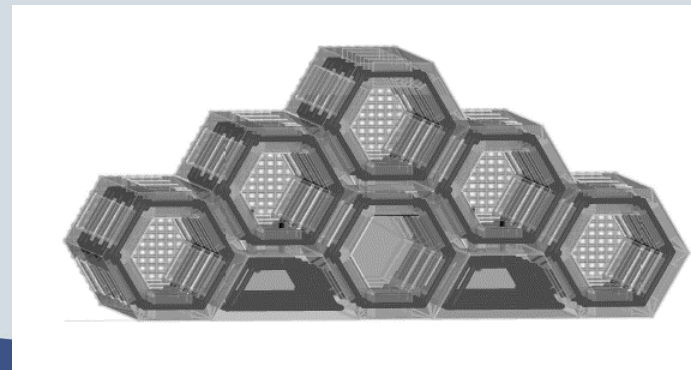
- Mitigation and Shoreline Protection Reefs



Lauderdale-by-the-Sea Mitigation
(4,000 modules, 2021-)



Sunshine Skyway Wave Attenuation Units (WADs)
(2023)

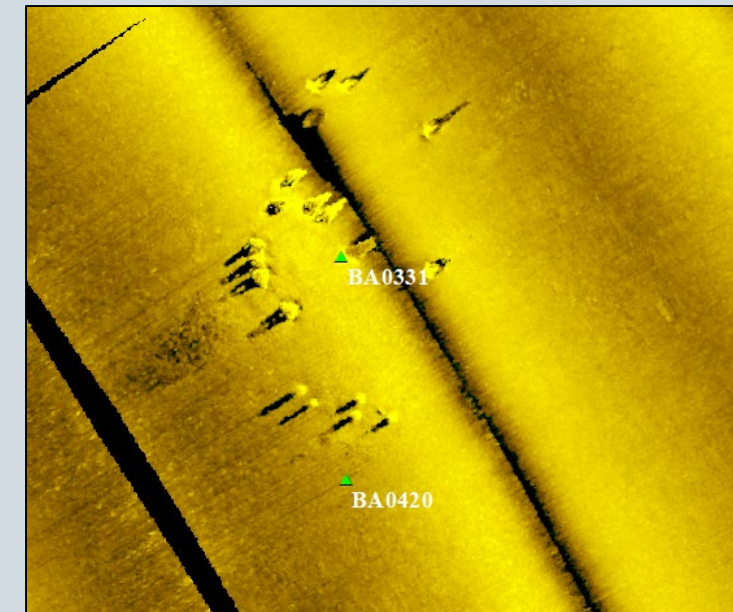
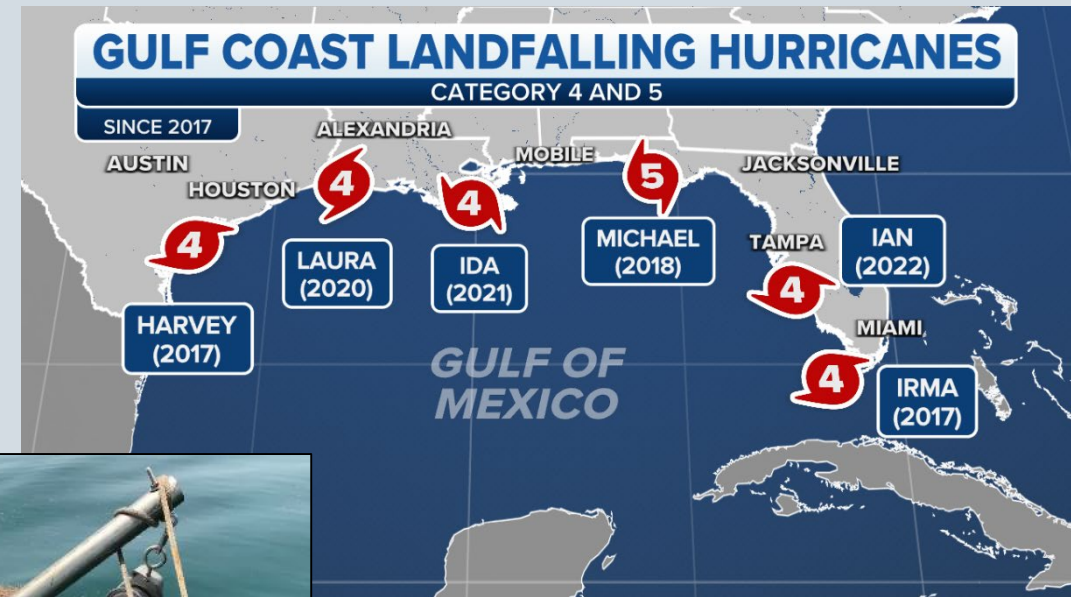


Miami U-Link "Seahive" units
(Miami Beach, 2023)



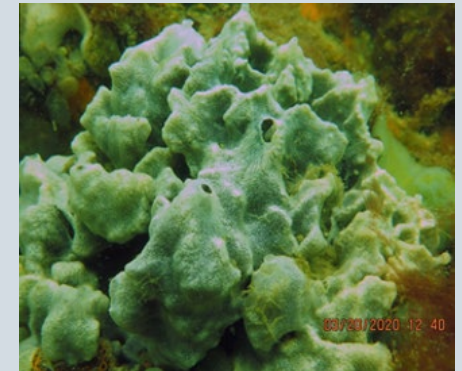
Deployment Trends

- Increased storm activity
 - Multiple major hurricanes since 2017 (Irma, Michael, Dorian, Sally, Ian)
 - Material durability/stability tested
- Improved use of technologies
 - High accuracy pre- and post-surveys
 - Greater data availability for permit applications and review
 - Increased database accuracy



FWC-Funded Research: 2017-2022

- Seek to improve the best available science for management
- Projects include:
 - Assessment of fish and benthic communities (offshore and estuarine)
 - Southeast FL artificial reef economic study
 - Invasive lionfish on artificial reefs
 - Comparing predator/prey interactions at natural and artificial reef habitats
 - Oriskany PCB's
- Learn more online
www.MyFWC.com/ArtificialReefs



Questions



Walton County snorkeling reef installation, 2017

Photo credit: Walt Hartley & Jesse Brewer, Blue Door Video



