

FLORIDA KEYS NATIONAL MARINE

SANCTUARY

MAGAZINE

BABES IN
SHORELAND

Lifeline

NEW WORK PLATFORM FOR NOAA

RESTORATION
BLUEPRINT

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NATIONAL MARINE SANCTUARY

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Florida Keys
National Marine
Sanctuary Foundation



SATURDAY, MARCH 26, 8:21 P.M.

200 years after Navy Admiral Matthew Perry planted the stars and stripes on what is today known as Key West, claiming the island a territory of the United States, city residents celebrated the bicentennial with a drone fireworks show at Truman Annex. The computer-programmed light show flew right above Florida Keys National Marine Sanctuary headquarters on East Quay Drive, illuminating many of the treasures that make our waters worth protecting. Photo by Kaleb McEwen/Sky Elements.

THE MOMENT





Aquarius Reef Base is an underwater habitat in 60 feet of water near Conch Reef. Its main purpose is to provide support for scientists who wish to live underwater, in saturation, so that they can continue their work without having to worry about decompressing and returning to the surface after each dive. But, it also serves as an artificial reef and provides refuge for a broad spectrum of sea life, including this school of great barracuda (*Sphyraena barracuda*). Photo by Stephen Frink.

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**FLORIDA KEYS
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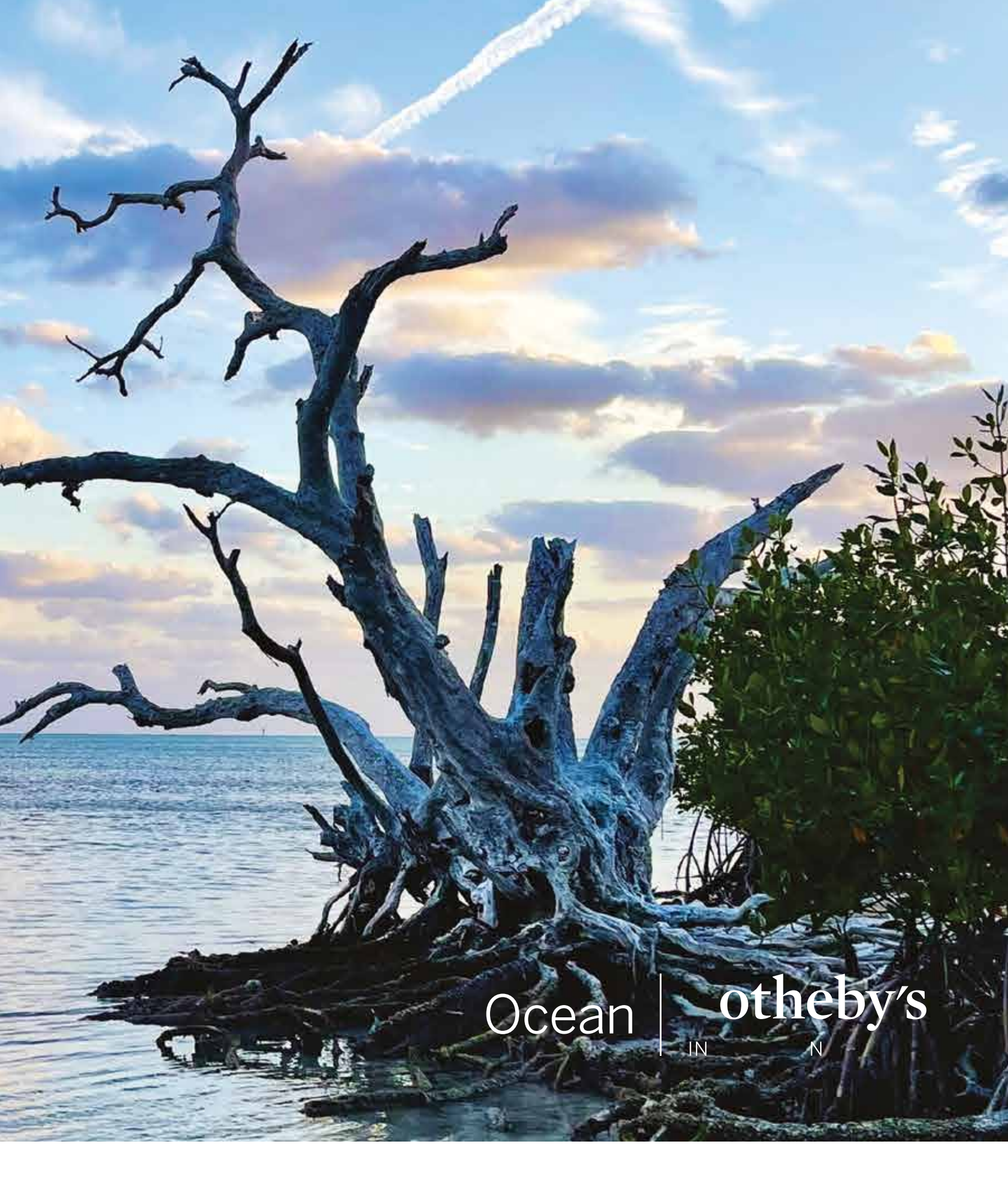
On the cover: Alligator Reef Light House. Photo by Jack Fishman.



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IN N

Pictured front row l-r; Rob Bleser, Sara Rankin, Stephen Frink, Stephanie Scuderi. Back row l-r; Steven Smith, Russell Post, Kurt Tidd, Ian Koblick, Tom Davidson, Jr., Jodi Zifferer, Sarah Fangman, Nick Davies, Les Burke. Not pictured: Piper Smith.



**VOLUNTEERS
DO NOT NECESSARILY
HAVE THE TIME;**

**THEY
HAVE
THE
HEART**

The Florida Keys National Marine Sanctuary Foundation is governed by an impactful Board of Directors, representing Keys communities and industries, with a mission to foster stewardship of the Florida Keys marine ecosystem by engaging private, public and governmental entities, promoting advocacy, and supporting Florida Keys National Marine Sanctuary's programs and partnerships.

At the Florida Keys National Marine Sanctuary Foundation, we invite people with a stake in our ocean to work with us to conserve it. The Florida Keys National Marine Sanctuary sustains miraculous species, our coastal communities, and our way of life. Working in close partnership with NOAA, the many people and businesses in our communities who depend on and care for the sanctuary support programs to restore the marine ecosystem and advocate for its health.

Currently, the chapter supports marine debris removal through Goal: Clean Seas Florida Keys and the Blue

Star Program for diving and snorkeling tour operators and fishing guides as well as funding towards Mission: Iconic Reefs. Another key area of funding focus for the foundation is expanding the Florida Keys National Marine Sanctuary's pioneering buoy and marker infrastructure to support sustainable recreational and commercial use, as well as facilitate use by our coral restoration partners. Increasing awareness and developing stakeholder support for the Keys' marine environment and management is a priority as well. As the advocacy arm of the sanctuary, we actively participate in congressional visits and interactions.

Community involvement is vital to us! Please join us as we celebrate and support our pristine sanctuary at Save Spectacular, a memorable evening recognizing achievement and resilience of our Keys Community. (See information on page 67).



**Florida Keys
National Marine
Sanctuary Foundation**



**FLORIDA KEYS
NATIONAL MARINE
SANCTUARY**



Like most people in the Keys, I am frequently out enjoying the waters of our sanctuary. The boundary begins at the mean high tide water line on land and extends outward, capturing 3,800 square miles in all. Nearly all of it is accessible for our enjoyment, which is by design, as national marine sanctuaries are not meant to be museum pieces observed from a distance. They are here to be enjoyed and envied.

Visitors are lured to the Keys, in one way or another, by the beauty and bounty of our sanctuary, and their economic impact is estimated at \$2.9 billion annually. When you add commercial seafood revenue and local spending on recreational water activities, that figure tips beyond \$3 billion. Literally, figuratively and financially, there's a lot on the line.

Small areas of sanctuary waters need additional protection for specific reasons, and are managed by zone regulations. NOAA's Restoration Blueprint, the next generation of sanctuary regulations, will propose adding more of these small places while also returning some to general use. We are walking a tightrope, balancing compatible use with sustainability to ensure this irreplaceable resource is available for future generations.

Recently retired Florida Marine Patrol Officer Bobby Dube was on the beat in the Keys when the sanctuary was established in 1990, and remembers the grumblings on the street and at the docks about the government coming to take over the Keys' way of life. As he rode off into retirement last year, Dube says he can't imagine where the Keys would be today without the efforts of the sanctuary.

Partners like the Florida Fish and Wildlife Conservation Commission are critical to administering such a large area and, in many ways, it's a community effort. While Florida Keys National Marine Sanctuary co-manages the sanctuary with the State of Florida, our family includes a "village" of practitioners who are raising and outplanting corals; stewards like the sanctuary's Foundation Chapter and United Way of Collier and the Keys distributing funds and educating our children; community champions who make up the Sanctuary Advisory Council; and you.

Welcome to the family. Welcome to your sanctuary.



Sarah Fangman
Superintendent

“In some instances, entire rookeries have been abandoned due to disturbance issues.”

—Kristie Killam

By Scott Atwell

It happened 32 years ago, shortly after Jerry Lorenz was dispatched to Florida Bay as a grad student to study the food supply of Roseate Spoonbills. “Once I was working in Florida Bay and the Keys I knew I was home,” he says today, armed with a Ph.D. and firmly established as one of the foremost experts on how the necessities of food, water and shelter drive all other elements of what we shorthand as the ecosystem.

As director of research for Audubon Florida, Lorenz works at the nexus of water management and food sources, but ultimately in support of birds, more than 250 species of which are either full-time residents or part-time visitors to our area.

“Just think about how desolate these islands would feel without the ubiquitous presence of birds,” Lorenz says. “Go outside and look for a minute and you’ll see or hear birds no matter where you are in the Keys. It gives us a feeling of peace and well-being when we see a flock of pelicans fly by at sunset when we are relaxing at a waterfront venue, for example. This relaxing ambiance is why the Keys are so popular, driving our tourist-based economy.”

There is irony in the ambiance, of course: a cause and effect that places added pressure on the attraction itself. In the decade before Lorenz’s arrival, as public use and ease of accessing the backcountry increased, there was increased scientific evidence that regulations dating back to the early 1900s were not adequate to protect birds and their habitats from human disturbance.

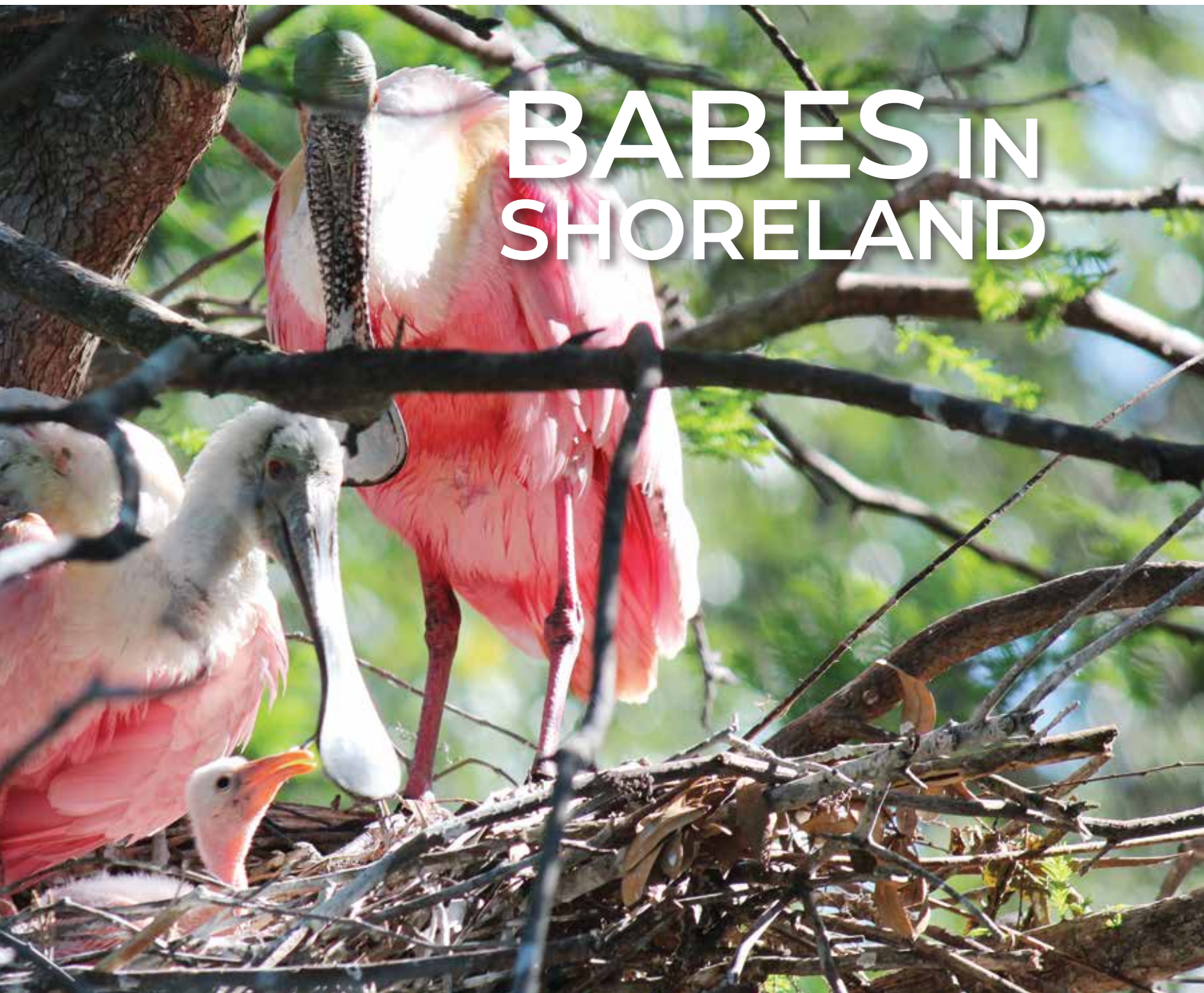
“If parents get frightened off their nests, it exposes fragile youngsters to harsh weather, falls, and even predation,” says Kristie Killam, who recently retired as an officer with the U.S. Fish and Wildlife Service. “The more frequently a disturbance happens, the greater the potential impacts. In some instances, entire rookeries have been abandoned due to disturbance issues.”



Undisturbed feeding places attract Great White Herons and Reddish Egrets. Photos by Kristie Killam.



HOW THE SANCTUARY AND PARTNER ORGANIZATIONS SAFEGUARD NESTING BIRDS AND OTHER CREATURES THROUGH WILDLIFE MANAGEMENT AREAS



BABES IN SHORELAND

The roseate spoonbill is protected by the U.S. Migratory Bird Treaty Act and as a state-designated threatened species by Florida's Endangered and Threatened Species Rule. Photo by Kristie Killam.



What's the gripe with Snipe? A "no entry" proposal (in red) will not impact traditional sandbar activity to the north. Most boaters are unaware of existing "no motor" zones (in yellow) and "idle speed/no wake" (in black), which are unchanged in the Blueprint proposal.

As a consequence, in 1992, U.S. Fish and Wildlife Service and the State of Florida entered into a formal agreement known as the Backcountry Management Plan. This agreement allowed for site specific zoning regulations in areas important for birds. These included the no entry, no motor, and idle speed only areas that currently exist today. When Florida Keys National Marine Sanctuary was up and running, these marine zones were designated as sanctuary Wildlife Management Areas to complement refuge enforcement efforts. More than twenty-five years later, as part of its first update of regulations known as Restoration Blueprint, NOAA is proposing to modify some of the existing Wildlife Management Areas and add 23 to protect sensitive habitats and wildlife.

"All recommendations were informed by ongoing research by U.S. Fish and Wildlife, Florida Fish and Wildlife Conservation Commission, and partners organizations, who have identified roosting, nesting and foraging areas used by a number of imperiled bird species," says Killam.

Wildlife Management Areas are applied to manage, protect, preserve, and minimize disturbance to sanctu-

ary wildlife resources, including but not limited to endangered or threatened species, or the habitats, special places, or conditions on which they rely. Three Wildlife Management Areas are proposed to be eliminated, while some existing could have their spatial proportions slightly expanded. In all, 47 Wildlife Management Areas are proposed in the Restoration Blueprint.

"We're not trying to encroach on places that people gather," says Lorenz, "it's the places they don't gather currently that have become critically important to nesting water birds and other things, and we just want to keep it that way."

By example, Pigeon Key on the bay-side near Key Largo (not to be confused with Pigeon Key on the Seven Mile Bridge), is proposed as a new Wildlife Management Area with no entry provisions that would decrease disturbance to mangrove terrapins, mangrove salt marsh snakes, and important nesting wading birds. Lorenz, who has had to wade through Pigeon Key muck on bird-counting assignments, calls the Key "inhospitable" to humans.

Proposed changes to Snipe Keys received a lot of attention during the first rollout of the Blueprint, even

though the recommendation for closing off two small interior islands would not impact traditional boating activities on the northern point. The Wildlife Management Areas at Snipe Keys are an example of the sanctuary's focus on balancing protection of the most critical habitats for resident bird populations with the least restrictions necessary, while leaving other areas of the beautiful backcountry islands open to responsible, recreational enjoyment.

"Birds have to work hard to stay healthy," says Killam. "They don't build up unnecessary fat reserves like other animals. Every ounce of energy a bird spends stressed or fleeing are calories burned that have to be replaced. Nesting birds have additional requirements. They have to find food for themselves and their young."

The complexity of the ecosystem becomes evident in the close examination of the White-crowned Pigeon, a full-time resident of the Keys. More than a pretty face, this bird is credited with literally planting the seeds for growth.

"These pigeons are the primary dispersers of West Indian Hammock tree seeds," explains Lorenz. "In the U.S., this habitat can only be found in southern Florida, particularly in the Keys and

the Everglades. Without the pigeons, our unique forests would literally be lost to hurricanes and other disturbances because there would be nothing to disperse the seeds back to the damaged areas.”

TURTLE CRAWLS

Just west of Key West, between April and September each year, loggerhead and green sea turtles return to Boca Grande, Woman Key and Marquesas Keys to lay as many as 10,000 eggs. It’s a homecoming of sorts, as DNA surveys reveal that many of the nesting females were born on these very shores a quarter century earlier.

The sanctuary has carved out small slices of the islands with no entry buffers to ensure these moms have adequate space to rear the next generation. “They don’t always nest when they come up, it’s a 50/50 chance,” says Florida Fish and Wildlife Commission Biologist Sue Schaf. “If they sense something’s not right, they’ll turn right back around. We’ve seen turtles dig holes for an egg chamber and before they start laying they turn around and leave it. If the turtle is not comfortable it’ll abandon the nesting attempt, what we call a ‘false crawl.’”

Restoration Blueprint proposes adding slight no entry expansions to the existing Wildlife Management Areas at Boca Grande, Woman Key and Marquesas, not only to protect the endangered turtles, but also nesting and feeding birds and shallow seagrass and hardbottom habitat. Other proposed Wildlife Management Areas with “no motor” regulations provide buffers for crocodiles and manatees, in addition to protecting nesting and feeding bird populations.

The sanctuary overlaps with the Florida Keys National Wildlife Refuge Complex, which includes four National Wildlife Refuges that are managed by the U.S. Department of Interior’s U.S. Fish and Wildlife Service.

“Wildlife is what makes the backcountry so special and unique,” says Florida Keys National Marine Sanctuary Superintendent Sarah Fangman. “Balancing protection of wildlife with the public’s compatible use is the eye of the needle we’re threading.”



*A newly-hatched turtle is ready for a brave new world.
Photo by Will Benson.*



*Rulers of the roost: Double crested cormorants, protected under the
Migratory Bird Treaty Act, hanging out on a back country mangrove.
Photo by Matt McIntosh/NOAA.*



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flowers vanish,
but grass is
immortal.*

— Brian Ingalls

When NOAA established Florida Keys National Marine Sanctuary in 1990, protection of coral reefs garnered most of the fanfare. After all, a pair of large ships had just slammed into the delicate reefs, jolting Congress into expanding protections that were already in place at Key Largo and Looe Key National Marine Sanctuaries. Since then, many of the reefs have been safeguarded as Sanctuary Preservation Areas, 18 small locations with special protections and mooring fields to ward off anchoring on coral.

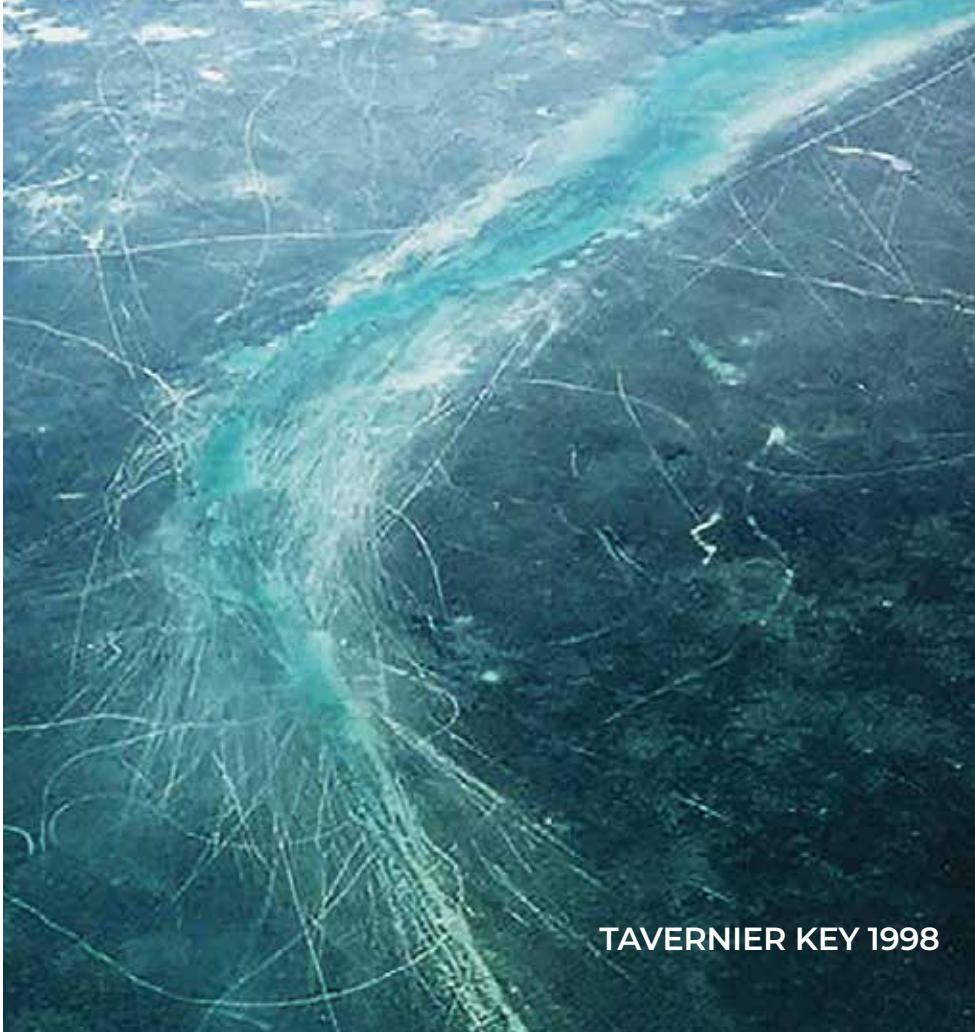
Though lesser known, seagrass has quietly served as a natural defense for those reefs (not to mention the entire ecosystem), an added layer of protection that has reaped greater appreciation over time. Though the poet suggests the immortality of grass, the oceangoing variety faces many perils, not the least of which is an exponential increase in the number of registered boats skimming just over its out-reached blades.

“Disturbance and direct impacts to these shallow areas by vessels of all types are believed to be major contributing factors to a decline in the Keys of birds, fish, and other animals dependent on these habitats,” says conservation consultant Curtis Kruer, who has publicly advocated for greater seagrass protections. He cites the number of

boat registrations in Monroe County, which have increased by almost 44% between 1993 and 2020. “And when you include the boaters out of Miami and Ft. Lauderdale areas, the numbers are scary and there’s no doubt the severe damage seen now is the result of many more boats, and importantly larger, more powerful boats.”

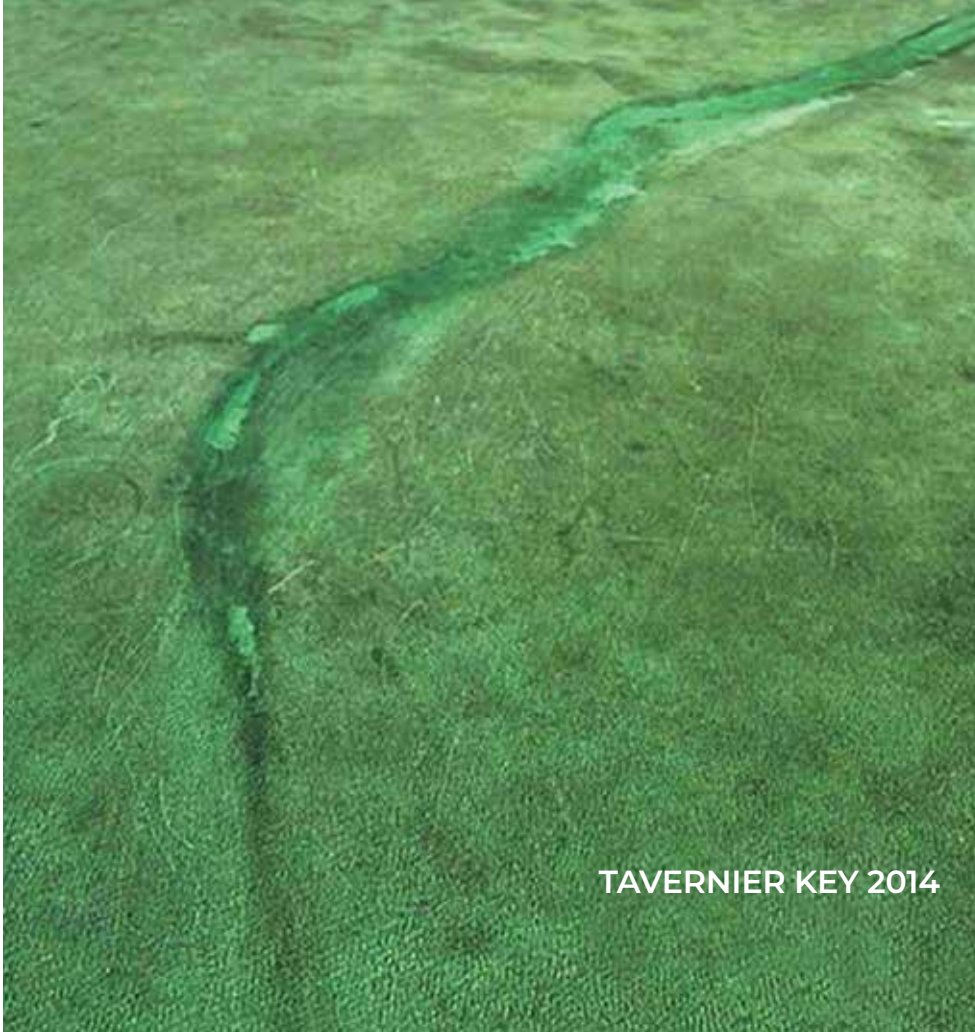
NOAA and the sanctuary have taken notice. The latest iteration of Restoration Blueprint, the organization’s first major update of rules since it was established, will increase by nearly 25 square miles the area of protection for seagrass habitat. Mostly, this protection will come in the form of no-motor and idle-speed zones, virtual speed bumps that alert boaters to shallow bottom and critical habitat.

“Establishing idle-speed and no-motor zones have been a recommended, and successful, management tool to reduce prop scarring since the 1990s,” says sanctuary Enforcement Coordinator Stephen Werndli. “These types of zones allow us to achieve sanctuary resource protection goals, while still allowing compatible uses to occur. Seagrass is a resource that is underrepresented in our current zoning scheme, and this additional protection should provide areas with moderate to severe prop scarring a chance to recover.”



TAVERNIER KEY 1998

Tavernier Key Wildlife Management Area was established in 1997. "No motor" regulations on tidal flats have proven worthy of their implementation. Images courtesy of Curtis Kruer.



TAVERNIER KEY 2014

A BLUEPRINT FOR ADAPTATION

There's a lot we can learn from seagrass, including, for instance, how to adapt. These gardens of the ocean evolved from terrestrial plants and recolonized in the ocean 70 to 100 million years ago, where today they hold a distinction as the only plants that flower underwater. Even more, seagrass has the potential to be a powerful weapon in our battle against climate change.

"Reefs surrounded by seagrass have less risk from ocean acidification than a reef that's sitting by itself," says sanctuary chief scientist Dr. Andy Bruckner. "Even Stony Coral Tissue Loss Disease was less of a problem in patch reef environments surrounded by seagrass." Each square meter of seagrass uses photosynthesis to generate 10 liters of oxygen each day. If you're calculating, just half a football field of seagrass can provide you with all the oxygen you need in a day.



HOME SWEET HOME

The grasses also help lessen the effects of strong currents, and also provide concealment and a place for eggs and larvae to attach. They improve water quality by trapping sediments, absorbing nutrients, and stabilizing sediment with their roots.

“When stuff comes off land, seagrass prevents it from getting on the reef,” says Bruckner, also acknowledging efforts of the sanctuary’s Water Quality Protection Program that helps keep seagrasses healthy. “It absorbs a lot of nutrients that come out of septic systems, using it for their growth. They provide an important food source for a lot of organisms like sea urchins, parrot fish, and a really important juvenile habitat. Reef fish and invertebrates, when they settle out from the plankton, they will colonize seagrass habitats. It provides shelter for those juveniles until they are large enough to safely move out to the reef environment.”

ENFORCEMENT

Kruer, the conservation consultant, has a list of potential solutions for mitigating seagrass damage, beginning with adding additional zones in shallow water, and ending with increased enforcement. “Agencies are well within their legal authority to limit the type of boating activity in shallow water, while still allowing public access,” he has said in public comment.

NOAA was not shy about enforcement after the *Big Cat Express*, a 136-foot jet-powered catamaran ferry, ran aground in the sanctuary north of Key West harbor in December 2016. The boat captain, with 171 passengers aboard, powered off the grounding, leaving behind even more impact in the form of large blowholes in the seafloor. The incident resulted in a \$2.2



million settlement with NOAA, and the bulk of the money is being used to restore the damaged habitat.

When construction unavoidably impacts natural resources in U.S. waters, property owners must offset the impacts. In the Keys, one option is through the Keys Restoration Fund In-Lieu Fee Mitigation Program, managed by a not-for-profit organization called Coastal Resources Group. Laura Flynn's team has just wrapped up a \$400,000 project near Lignumvitae Key, adding new channel markers and no-motor signs at Indian Key Channel, Yellow Shark Channel and Shell Key Bank, and restoring 960 square meters of seagrass in an area that was impacted.

"Everything we're doing is to keep boaters in the channel and off seagrass shoals so damage that has occurred can begin to heal," says Flynn, president of

Coastal Resources Group. "We're not just putting signs out and saying this is good enough, we're investing in high-resolution satellite imagery for five years and tracking progress of the project."

Florida Keys National Marine Sanctuary was built in part, on the promise of the coral reefs. Its triumph may very well be linked to the seagrass. "The sight of South Florida's lush turtle grass flats teeming with aquatic life, rays, sharks, tarpon and shimmering schools of pinfish feels almost surreal when explored on a flat calm day," says flats captain Will Benson, a member of the sanctuary's advisory council. "For those visitors who have witnessed this majestic scene they are left with a profound sense of connection to our undersea world, instilling a love and respect for wilderness and the reasons we should protect it."

1. Almost 25 square miles of lush seagrass meadows would come under added protections in the sanctuary's Restoration Blueprint. Photo by Stephen Frink.

2. Where Florida Bay meets the Everglades, seagrass and mangroves work jointly to keep water clean. Photo by Stephen Frink.

3. This no-motor sign is one of nearly 90 that have been added near Lignumvitae Key. Photo by Laura Flynn.

4. Seagrass is the only plant to flower underwater, as evidenced by this *Thalassia*. Photo by Andy Bruckner.

5. A turtle glides above its namesake grass. Photo by Tiffany Duong.

6. A permit skimming over a seagrass meadow. Photo by Will Benson.

7. A pufferfish rests among seagrass. Photo by NOAA.



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A QUEST FOR QUALITY

Last week, a farmer in southern Indiana applied manure as fertilizer to his soybean field. While the product fuels growth of the crop, excess nutrients like nitrogen and phosphorus will slowly seep into the nearby Ohio River and carry south until they reach Cairo, Illinois, where the Ohio merges into the mighty Mississippi. The farmer's soybeans will make their way to your Keys grocery in the form of tofu, soy milk and soy sauce, among many other products — and the fertilizer will reach you as well.

Waters of the Mississippi River deposit into the Gulf of Mexico, where the nutrients will slowly continue their southerly trek until they're caught up in the Gulf's Loop Current, an e-ticket, roller coaster ride that dips below the Keys along the Florida Straits. From there, the nutrients make their way to our nearshore waters, where they will disrupt the delicately balanced ecosystem in the form of harmful algal blooms, hyped up like the soybeans by excess nutrients, and ready for their moment in the sun.



WATER, WATER

Left: Like a diamond, color and clarity are vital measures of value in sanctuary waters. Photo by Jack Fishman. Right: There is a delicate interchange of water where the Everglades meet Florida Bay. Photo by Stephen Frink.

This is a fictional story, of course, a story of fictional facts that illustrate the complexity and interconnectivity of a challenge we shorthand with the words “water quality.” We don’t know the name of the farmer (you probably didn’t even know *about* the farmer) but his story represents the far-reaching consequences of pollution that originates well outside the islands of the Keys. This is just one of many sources that affect water quality locally, including many that are closer to home: Everglades outflows, vessel sewage, wastewater discharges, canals and stormwater runoff from development, among others.

“We end up pointing fingers at a bunch of people,” says Kelly Cox, Audubon’s Director of Everglades Policy and a member of the Sanctuary Advisory Council. “We say this is the problem, that’s the problem, and this is the problem, when in reality it’s all a problem.

We all need to work together across industries, agencies and regions to improve water quality up and down the watershed.”

When the sanctuary was established in 1990, authors of the legislation knew of the importance of good water quality for a healthy ecosystem — and the long-term success of an overall management plan — and included language in the bill requiring the establishment of a Water Quality Protection Program. For 30 years, guided by an interagency steering committee, this program has cooperatively worked to understand and address sources of pollution and maintain water quality to protect coral reefs, seagrasses and marine wildlife populations in the Florida Keys. A variety of tools are at their disposal, including research and monitoring, corrective actions such as regulations and pollution control measures, plus education and outreach.

“Our Water Quality Protection Program was the first of its kind in the nation,” says Karen Bohnsack, Associate Director of Water Quality for the sanctuary. “It was designed to foster collaboration among the different agencies with responsibility for water quality and also to allow community participation. This is a unique arrangement that provides an opportunity to achieve water quality improvements beyond what an individual agency or organization could accomplish alone.”

Recognizing the need to better engage across regional boundaries to improve water quality locally, in 2020 the steering committee and the Sanctuary Advisory Council formed a working group called the Florida Keys and South Florida Ecosystem Connectivity Team, charged with providing a platform for collaboration on regional water quality issues, primarily Everglades restoration. Last summer, when the U.S. Army Corps



EVERYWHERE

of Engineers was working on a new operating manual for regulating water flows out of Lake Okeechobee, the connectivity team asked the Sanctuary Advisory Council to pass a resolution calling for additional southernly flows through the Everglades and into Florida Bay. The Corps ultimately followed the recommendation. In February of this year, the Biden administration announced the largest Everglades infrastructure investment in history, and portions of the \$1.1 billion project will benefit the northern reaches of sanctuary waters in Florida Bay.

“Everglades restoration will improve our water quality,” says Jerry Lorenz, chair of the Ecosystem Connectivity Team. “People might be concerned that increased flow south from the Everglades to Florida Bay will bring more nutrient-rich water with it. But, the re-

ality is that Everglades restoration includes a plan to store and clean water before sending it south.”

Meanwhile, local water quality partners have been at work on home-based solutions. Monroe County is close to completing its septic-to-sewer conversion, an advancement that will prevent sewage from seeping into the limestone and, ultimately, sanctuary waters. Beaches in Monroe County still regularly test positive for fecal bacteria, but James Rachal, who conducts bi-weekly testing for the Florida Department of Health, believes birds are a likely source. The natural process of old seagrass die-offs can also trigger poor water quality readings. Municipalities like the Village of Islamorada, where 90% of homes are now on septic, have seen a decline of sucralose readings in water testing.

“Because we eat and drink things that contain sugar, sucralose can be used as a tracer for wastewater loads in the water,” explains Cox. “When sucralose declines in water samples, that means our human waste impact to our local waterways could be declining also. It does suggest that those actions we have taken to reduce water pollution are working.”

The county has also passed an ordinance prohibiting the use of lawn fertilizers during rainy summer months when runoff is more likely to carry unneeded nutrients into the water. Pump out stations for liveaboard boaters are being established up and down the Keys, and those liveaboards have to keep records of pump out activity.

The water quality program also funds research and restoration, and one



Left: Glove sponges growing in a nursery near Sandfly Key, prior to being outplanted by FWC. Below: Multiple habitats interconnect inside the sanctuary. Photo by Jack Fishman.

project that has absorbed a lot of attention is sponges, which provide shelter and habitat for myriad fishes and invertebrates, including the economically valuable spiny lobster. “Sponges that dominate hard-bottom animal biomass afford more than biogenic structure,” says Bill Sharp, research administrator with the Florida Fish and Wildlife Conservation Commission. “They are prolific biological filters. It’s estimated that the sponge community of Florida Bay could filter the water column every three days, making it the intrinsic link between the benthos and water column.”

What’s more, the sponges are natural chemists, using symbiotic bacteria to break down nutrients and turn them into a form that’s bio available for seagrasses and other organisms. Unfortunately, algal blooms over the past decade have taken a toll on these in-water chemists. But Sharp and his team have

embarked on a bayside restoration project not unlike the coral restoration work taking place on the ocean side of the sanctuary.

“Like corals, sponges are clonal animals that reproduce both sexually and asexually through breakage and reattachment of fragments or by budding,” Sharp writes in a research paper. “This clonal life history favors the creation of sponge transplants via “cuttings”: transplantable sponge fragments cut from wild or nursery stocks without sacrificing the original animal that can be left to heal and regrow.”

“The nearshore hardbottom north of Marathon has been outplanted with 15,000 sponges from among six different species. We have a chance to keep at least part of this system functioning while these larger stressors are addressed,” says Sharp. “What we’re doing is outplanting sponges strategically so

hopefully we have at least part of the ecosystem functioning as we begin to ameliorate the effects of altered water flow and algae blooms.”

Meanwhile, the sanctuary’s Restoration Blueprint proposes to protect an additional 11 square miles of hard-bottom habitat, where water-filtering sponges thrive.

“For me, more than anything, it’s part of our culture, our way of life,” says Cox, when asked how she maintains enthusiasm in the face of so many challenges. “We have to protect and improve if we want to maintain our quality of life down here. I think that’s a shared view across the board from all Keys residents and Keys visitors. That’s why people are coming here, that’s what the economy is built on and if this isn’t worth fighting for, then what is?”



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By Sarah Fangman

RESTORATION BLUEPRINT

A PROPOSAL FOR RESTORING FLORIDA KEYS NATIONAL MARINE SANCTUARY

Our journey to restore the Florida Keys marine ecosystem began with the release of a condition report that asked 17 distinct questions about the health of the sanctuary's resources. All but three of the answers indicated they were in fair to poor condition. Since that assessment, the waters and habitats of Florida Keys National Marine Sanctuary have been further degraded by harmful algae blooms, Stony Coral Tissue Loss Disease, several hurricanes, and record levels of human use. There is not much we can do about the past, but we can own the present and help plan for a more sustainable future.

The *Restoration Blueprint* proposes the first major update to our regulations since the sanctuary was established more than 30 years ago. Back then, Florida had 700,000 registered boats. Today, there are more than one million. The Blueprint also includes an updated management plan that features non-regulatory

strategies to address a myriad of threats and issues, like water quality and enforcement. Together, the regulations and management plan provide a focused design for how we can rebuild an ecosystem that is, without exaggeration, the very heartbeat of the Florida Keys.

Our history here dates to 1975, when NOAA established Key Largo National Marine Sanctuary. Since then, we have monitored the health of the resources, conducted cutting-edge science, shared our knowledge with students and teachers, and worked with partners to help protect this special place for all. And the public has responded well to our call for help. About 98% of the recommendations for this new plan were generated through public input from partners, stakeholders and recreational and commercial users, whose thoughtful suggestions were informed by science and their own direct experience and knowledge of the Keys.

Public comment has refined the Restoration Blueprint and feedback is now needed for the new proposed rule. Photo by Gena Parsons/NOAA



CAN YOU HEAR ME NOW?

You might recall the 2019 draft *Restoration Blueprint* featured four options for the public to consider. This latest iteration, which we call the “proposed rule,” has a single recommendation that was distilled from public comment and updated by economic and environmental data. Options that were considered but removed illustrate more than anything the impact of public feedback.

You will note large contiguous areas are absent from the proposal, as well as limited-use suggestions for Carysfort, Sombrero and Sand Key reefs. A recommendation that would

have prohibited overnight use of mooring buoys was also tabled. While these ideas would provide necessary protection for vulnerable sanctuary resources, we are pausing our consideration at this time to ensure they are fully crafted in the best places to achieve those protections, while balancing user access. Public input also helped us modify some original ideas, leading to recommendations for greater access and use of channels at Steamboat Creek, Tavernier, Marathon oceanside and Marquesas Keys, among others.

The proposed rule does include an expanded emergency regulation to better address issues like ship ground-

ings on coral reefs, or an as-yet-unknown disease invasion of our underwater habitats. This provision allows managers to have a more flexible tool to react quickly — even if temporarily — to mitigate new and emerging threats. In response to public requests to have more details around this emergency proposal, we have provided new context about how it might be used, along with a process for implementation.

NO SILVER BULLET

It's a natural human instinct to confront challenges in their simplest form; to distill complex problems into single solutions. But there is no simple solution for what is happening to the complex issues affecting the Florida Keys, and certainly no miracle cure that will return our ecosystem to what it was like, or how it functioned 50 years ago. What is needed is a multi-disciplinary approach, one where the "whole is greater than the sum of the parts."

The preceding stories in this magazine outlined many of our challenges, providing context around *Restoration Blueprint's* proposals. You can explore even more detailed content of the proposed rule and management plan by visiting our online resource page.

The single largest source of new, proposed protections targets seagrass. History shows idle speed zones to be an effective tool for protecting shallow habitat, and under *Restoration Blueprint*, these regulations would expand from one square mile to 21 square miles in total. In addition, we propose increasing no-motor zones by a total of three square miles. Vessels with combustion engines may still enter a no-motor zone by using push pole, paddle, sail, electric motor, or some other means.

The proposed rule would also reopen existing no-access areas, including the tidal flat south of Marvin Key and the interior channels at Mud Keys, recommendations based on updated data about bird populations in these areas. Throughout the *Restoration Blueprint*, our intent is to shift regulations and zones to the areas where they will have the greatest impact. All of these

proposals are the result of a compromise between the need for resource protection and sustainable use, as evidenced by the small increase in no-entry areas, which would expand by less than one square mile.

Sanctuary Preservation Areas, originally established to separate competing uses, are places where you find most of our mooring buoys, placed strategically at the most popular dive and snorkel sites. Currently, if all of the moorings are occupied, boaters are allowed to anchor on the sandy bottom. However, data shows that anchoring at these sites has been less than accurate, resulting in damage to critical coral reef resources. Because of this, we recommend a no-anchor regulation for all Sanctuary Preservation Areas.

DON'T FEED THE BEARS

Taking a cue from our colleagues at the National Park Service, who understand the perils of feeding wild animals, the proposed rule would prohibit the feeding and attracting of fish, including sharks, from any vessel or while diving. Simply put, this is a safety issue—for humans and the animals—and a host of data demonstrate the damages this practice can have on the behavior and health of fish. The proposal does not affect current exceptions for chumming and incidental bait produced by traditional fishing activities. Existing operators who feed fish may apply for a special permit to continue, as we take these first steps to curtail the practice. NOAA carefully considered extending the prohibition to shore-based operations, but is not proposing to regulate that activity at this time.



Fish feeding is getting out of hand and the proposed rule would limit this activity, which alters the natural feeding cycle of sea life. Photo: Tiffany Duong/Ocean Rebels.

Derelict vessels are damaging habitat and the proposed rule takes aim at the crisis.

KEEP YOUR BOTTOM OFF THE BOTTOM

Even from land you can witness the impact of derelict vessel groundings, and their removal costs our local government hundreds of thousands of dollars each year. However, the cost to the sanctuary's habitat is even greater. Recognizing a need for action, the proposed rule prohibits anchoring, mooring, or occupying a vessel at risk of becoming derelict, with definitions that align with existing state regulations.

Some of you may recall the sanctuary was born in the wake of disastrous groundings of large vessels on the reef, and one of the most important protections that resulted was the Area to Be Avoided (ATBA) designation, which restricts large ship traffic in the shallowest and most sensitive parts of the sanctuary. To enhance this protection, we propose expanding the sanctuary's boundaries, which will result in a net increase of approximately 1,000 square miles. The majority of this expansion includes a distinct unit at Pulley Ridge in the Gulf of Mexico, the deepest known coral reef off the continental U.S. In addition, we propose becoming the first marine sanctuary in the country to prohibit discharges of all kinds from cruise ships, except those for necessary cooling water.

Even with the boundary expansion, zone additions and zone modifications, only 15% of the sanctuary's proposed 4,800 square miles would fall within managed zones (most of which allow access), leaving plenty of space for users of every kind.



PLAN FOR A PLAN

The new sanctuary management plan was developed to complement the proposed rule, and both will allow us to meet the ambitious goals of the *Restoration Blueprint*. I hope you will take the time to read it. The plan rests on six pillars of priority management themes: Management Effectiveness/Adaptive Management; Water Quality; Restoration; Visitor Use Management; Enforcement; and Stewardship and Engagement. I will be the first to admit the plan is ambitious, and aspirational, but if we don't plan for success today, we won't achieve it tomorrow. By committing our goals to paper we set the stage for pursuing a level of funding on par with our ambition.

Another pillar of the plan underscores our responsibility to monitor managed zones to evaluate the impact of our management actions over time.

We have already demonstrated a willingness to pivot our management activities based on habitat monitoring, as evidenced by the proposed removal of French Reef and Rock Key as Sanctuary Preservation Areas. We will also design a management effectiveness strategy to evaluate the impact of site-specific management techniques and strategies. Examples of this approach could include monitoring the success of coral outplanting, or changes in habitat conditions where no-motor or no-anchor regulations are proposed.

The visitor use management strategy will help us understand ways in which we can balance resource use with protections. We have convened a new Sanctuary Advisory Council Mooring Buoy Working Group to help us identify locations for future mooring buoys and manage existing sanctuary mooring fields.

NOAA Office of Law Enforcement
in Key West augmenting the coverage of
FWC. Photo by Chad Stolka/NOAA.



The mere presence of law enforcement leads to compliance. Just ask the City of Layton in the Upper Keys, where an unmanned patrol car on the side of U.S. 1 has been triggering brake lights for decades. That empty patrol car is a reminder that law enforcement can't be everywhere, but the absence of ticket-writing officers doesn't mean we should abandon speed limits. Likewise, while the sanctuary's current law enforcement budget trails historic highs, thoughtful observers would never suggest we abandon our efforts to protect sanctuary resources through regulations.

Instead, we should redouble our efforts to increase capacity. A critical component of the management plan formalizes a commitment to develop a strategy with enforcement partners at NOAA and FWC to obtain additional investments for enforcement capacity and technologies.

Scan for more
information
Restoration
Blueprint.

Consistency is a critical condition for enhancing compliance, and this is the primary reason we propose removing a fishing exception in four Sanctuary Preservation Areas (SPA). Anglers are already burdened by a complex set of rules and it only increases confusion when most SPAs are no-take, while a handful allow catch and release. Consistency of regulations will improve compliance and, even with this change, less than 5% of sanctuary waters would be closed by no-fishing regulations.



Even with changes, less than 5% of sanctuary waters would have no fishing regulations.
Photo by Matt McIntosh/NOAA.

The *Restoration Blueprint* is nearing the end of a lengthy conversation that began with us asking 17 questions about the health and condition of our sanctuary resources. But the conversation is not quite finished. We want — and need — your feedback on this newly refined proposal, and have scheduled ample opportunities for you to provide public comment. The QR code displayed below will lead to a website with dates and venues.

As you educate yourself on *Restoration Blueprint*, we ask that you consider the latest proposal from a variety of vantage points. The sanctuary serves many users, which means everyone must come to the table with some measure of compromise or willingness to hear other sides of the story. I recall an analogy that seems fitting: "We're trying to protect an entire solar system — not just a single planet."

Let's go boldly, together.



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April 15, 2022

Ms. Sarah Fangman
Superintendent
Florida Keys National Marine Sanctuary
Florida Keys Eco-Discovery Center
33 East Quay Road
Key West, FL 33040



Dear Ms. Fangman:

On behalf of the Florida Fish and Wildlife Conservation Commission (FWC), I want to thank you for your continued efforts to work towards a final Rule for the Florida Keys National Marine Sanctuary (FKNMS) Restoration Blueprint. As Co-Trustees in the management of marine resources within FKNMS, we recognize the challenges our resources are facing; and, we know that you believe, as we do, that a strong partnership is needed to address those challenges. FWC appreciates the partnership we have with you and the open dialogue between our respective agencies.

We have had many questions throughout the process, many of which have been answered, and we look forward to working with you to resolve the remaining issues upon release of the next version of the Rule. Even though there is still work to do, we want to thank you, and the entire FKNMS team, for your dedication to the FKNMS.

We look forward to continuing our work together in the conservation of our marine resources for future generations to enjoy.

Sincerely,

Sincerely,

Robert A. Spottswood

Robert A. Spottswood



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FLORIDA KEYS
NATIONAL MARINE
SANCTUARY



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10 QUESTIONS



Andy Bruckner's official title is "Research Coordinator," but those words fall short of describing the comprehensive scope and impact of his work inside the Florida Keys National Marine Sanctuary. With a doctoral dissertation that focused on understanding the distribution, abundance and impact of

a coral disease, and the development of methods to eradicate it, Bruckner is uniquely qualified to be called our chief scientist.

1. You have worked all over the world. Why did you want to come to the Keys? I was very fortunate to develop and lead a Global Reef Expedition. The intent of this was to map and characterize reefs around the world, evaluate their condition and work with local and national agencies in each country on adaptive management approaches. The hands-on experience conducting field surveys, research and restoration provided me with a firsthand knowledge of strategies that have worked to mitigate stressors and restore reefs. By gaining this understanding, I wanted to apply lessons learned to Florida, where reefs have been severely degraded. There is an extensive network of partners who are serious about reversing these trends, and the sanctuary has adopted a new philosophy that I believe is the key to successful restoration. My interest is to

Photo by Greg McFall

be on the front line working with all of the partners to demonstrate that it is possible to bring Florida's reefs back to their former vibrance and vitality.

2. What's the most interesting science taking place in the sanctuary? We are evaluating fish movement patterns, fish migration and recovery of spawning aggregations by tagging fish with acoustic transmitters and deploying a series of acoustic receivers that record when the fish pass. This is being supplemented with the use of hydrophones that record sound production on the reefs. Concurrently, the sounds produced on a healthy reef are being transmitted on reefs with active restoration to promote colonization by fishes and motile invertebrates.

3. What are the biggest threats to the sanctuary? Climate change, degraded water quality and unsustainable fishing practices.

4. What's your favorite diving spot? Cheeca Rocks, as this has the healthiest and most resilient coral populations in the Florida Keys today and it also supports a diverse assemblage of fish, turtles and other organisms.

5. What takes up most of your time as chief scientist? I spend most of my time working with partners on development and implementation of key research, monitoring and restoration activities. This includes ensuring the permitted work provides answers to

critical management questions, there are minimal risks to the resources as a result of the work, and it addresses conservation and restoration priorities.

6. What's the most important, unanswered question about the sanctuary? Because of the challenges in addressing climate change, a key conservation strategy is to assist corals in adapting to climate stressors. This involves a detailed examination of the genetic structure of these species to identify possible genetic strains of a coral that increase their resistance to disease, temperature perturbations and bleaching and sedimentation. In addition, scientists are manipulating the symbiotic algae associated with corals (zooxanthellae) with species (clades) that can better tolerate changing environmental conditions, with the intent to propagate these and use them in our coral reef restoration activities.

7. How do you describe the complexity of this sanctuary? FKNMS is the most complex sanctuary in the National Marine Sanctuary System due to the combination of the large number of interlinked species, multiple habitat types, the extent of human uses within the sanctuary and the challenges in addressing water quality and other issues that are largely regional and global problems.

8. Aside from the Florida Keys, what's the most interesting sanctuary site in your view? The National Marine

Sanctuary of American Samoa is one of the most remote sanctuaries and it includes Rose Atoll. This sanctuary contains the only true tropical coral reef ecosystem and is also the most diverse in terms of the numbers of different organisms found there.

9. If you could change one thing about the oceans, what would it be? Improve the global understanding of the importance of oceans to the health of our planet and the health of humans, such that humans are more responsible in their everyday activities, including making more responsible seafood choices, conducting more sustainable fishing practices, and taking steps to reduce plastic waste and pollution entering the oceans.

10. Why are sanctuary protections necessary? Sanctuary waters support a diverse assemblage of marine species, complex habitats that are critical to the survival of these species, and unique cultural resources. When protected, sanctuaries can continue to provide numerous ecosystem services including coastal protection, sustainable fisheries, sites for education, research and recreation, and support the livelihoods of local communities. Without protection, the sanctuary will continue to decline and these benefits will be lost forever.

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By Megan Fraser, Mission: Iconic Reefs Implementation
Manager, National Marine Sanctuary Foundation in support
of Florida Keys National Marine Sanctuary



MISSION: ICONIC REEFS

RESTORING NATURAL WONDERS
OF THE FLORIDA KEYS



Flagler's railroad; Dr. Gorrie's air conditioning invention; Kennedy's moon shot. Now more than ever, our Florida Keys coral reefs are in need of the same ingenuity that fueled Florida's progress in the past, and must now drive the forward trajectory of our reefs into the future.

Mission: Iconic Reefs is one of the largest collaborative coral reef restoration efforts the world has ever seen, made possible through years of resto-

ration practice, research, and innovation that have laid the comprehensive foundations for the mission's success. In short, the mission is an unprecedented restoration effort to pair the immediately feasible with the progressively possible so the Florida Keys can have restored and thriving reefs. Launched in December 2019 by the U.S. National Oceanic and Atmospheric Administration (NOAA), *Mission: Iconic Reefs* (M:IR) is a multi-partner effort bringing mem-

bers of the local Florida Keys community alongside coral restoration organizations, personnel from across NOAA programs, nonprofit funding entities, multiple Florida state agencies, and researchers from various local, national, and international institutions.

Collectively, our partners are coming together to support the future of the reefs and the communities who depend on them.

The seven iconic reef sites will receive more than 120,000 corals as part of Phase 1A, which covers the first 5-7 years of the project.



Page 40: Corals are grown *in situ*, a Latin phrase that means on-site. Photo by Catlin Seaview Survey.

Page 41: Mote Marine Laboratory places coral fragments onto the reef typically in arrays of five. Branching corals like these staghorn will grow into much larger thickets.



TO RESTORE THE REEF, WE MUST BE ACTIONABLE WORKERS

M:IR will add over 450,000 mature corals, utilizing more than half of the native stony coral species found in Florida, to seven iconic reefs spread across the sanctuary. The work is divided into two implementation phases across more than 20 years, developed following decades of local restoration work, and kick-started by Phase 1A in which

acroporids (staghorn and elkhorn corals) are the initial mission focus. Total numbers of required corals for the mission overall were calculated with species-specific growth rates, based on ground-truthed measures of restorable area at each reef site. The result is a comprehensive plan that sets the stage for a hefty amount of work. Thankfully, M:IR's current coral restoration partners — Coral Restoration Foundation™, Mote Marine Laboratory, and Reef Re-

newal USA — are true leaders in the coral restoration field, engaging in outplanting that is both innovative in form and impressive in scale.

For the mission, every good weather day is a fieldwork day — something Florida Keys locals can appreciate. In addition to coral outplanting, our dedicated M:IR Field Team will conduct monitoring activities within 130 permanent monitoring stations across the seven reef sites, as detailed in a recently

PROGRESS IN PHASE 1A



Left: Trays of elkhorn fragments await outplanting at Eastern Dry Rocks. Photo by Mote Marine Laboratory.

Right: Off Key Largo, Coral Restoration Foundation's in situ nursery. Photo by Jack Fishman.



developed M:IR Monitoring & Research Plan. From fish and invertebrate surveys to coral coverage and health monitoring with high-resolution photomosaics, the M:IR Field Team's monitoring work is critical to understanding the restoration progress over time.

Additionally, recently announced Capacity Building Grants through NOAA's Office of Habitat Conservation, NOAA's Coral Reef Conservation Program and the National Marine Sanctuary Foundation have provided over \$1 million to current and new M:IR partners, providing the means to upscale internal operations to continue contributing to M:IR goals in meaningful ways.

TO SUPPORT THE REEF, WE MUST BE INNOVATIVE RESEARCHERS

Restoring a reef takes more than reviving the corals themselves. To that end, M:IR includes the intentional distribution of herbivorous grazers — animals like Caribbean king crab and the long-spined sea urchin — that consume enough algae to keep the reef clean enough to promote coral health and growth. Over 200,000 grazers are part of planned reintroduction for each phase of the mission.

To meet this demand, upscaled mariculture of both of these grazers is ongoing. For Caribbean king crab, cur-

rent work at the College of the Florida Keys, Mote Marine Laboratory and Florida International University is enabling identification of the key factors necessary for nursery-based growth of these animals at large scale. Similar research for the historically abundant long-spined sea urchin is occurring at the University of Florida/Florida Aquarium and Florida State University.

Additional work on rebuilding coral populations through genetic management is key to ensuring restoration success. Partners at the Smithsonian Institution are developing an *Acropora palmata* (elkhorn coral) population management strategy that will be ac-

Left: Students from the College of the Florida Keys conduct site maintenance and monitor stewardship activity at Eastern Dry Rocks off Key West. Photo by Jason Spadaro.

Right: Outplanted elkhorn corals take shape at Carysfort Reef in the Upper Keys.



tionable by the end of the calendar year. Data from previous Keyswide genotyping of corals is continuing to provide guidance on how best to design outplanting events. And while there's intentional diversification of the species-specific genotypes that are outplanted, we are paying attention to the more resilient individuals — those corals that seemingly do well when other corals don't. But the question remains: Can we seed our reefs with those corals best prepared to withstand future climatic conditions or other unforeseen events? This work — with partners like The Florida Aquarium, among others — is ongoing in order to say a confident yes.

TO SERVE THE REEF, WE MUST BE RESPONSIBLE STEWARDS

For the reef, site preparation and maintenance are critical activities as part of the restoration process, in much the same way as weeding and

pruning serve gardening work. Site preparation enables a reef to receive outplants through the initial removal of nuisance species, like *Palythoa*. Maintenance tends to the outplanted corals over time in order to increase survival. To accomplish these activities at all seven sites, we propose to leverage the involvement of the local dive community, facilitated through such programs as *Iconic Reef Guardians*, a partnership that enables Blue Star dive operators to engage clients in M:IR-focused maintenance and stewardship dives. This program is currently being piloted with two upper Keys dive operators and will be open for additional Blue Star dive operator involvement in 2023. The College of the Florida Keys is also piloting certain aspects of M:IR site maintenance work, which helps build the greater *Iconic Reef Guardians* program, while also engaging local college students in active restoration work.

Jobs from ocean recreation and tourism constitute nearly 60% of the local Keys economy. Recognizing this interdependency, United Way of Collier and the Keys is supporting both tangible restoration work, as well as student scholarships, funding awards for local schools and a handful of other community programs still in development. This stewardship investment strengthens residents' connection between reef restoration and their true well-being.

TO SUSTAIN OUR KEYS' COMMUNITY, WE MUST RESTORE THE REEFS

We can be bold in this unprecedented restoration endeavor, not because we inherently know the solutions to every challenge that will inevitably arise on this decades-long journey, but because we have to be a shared community whose choices tell the story of renewal, redemption and restoration.



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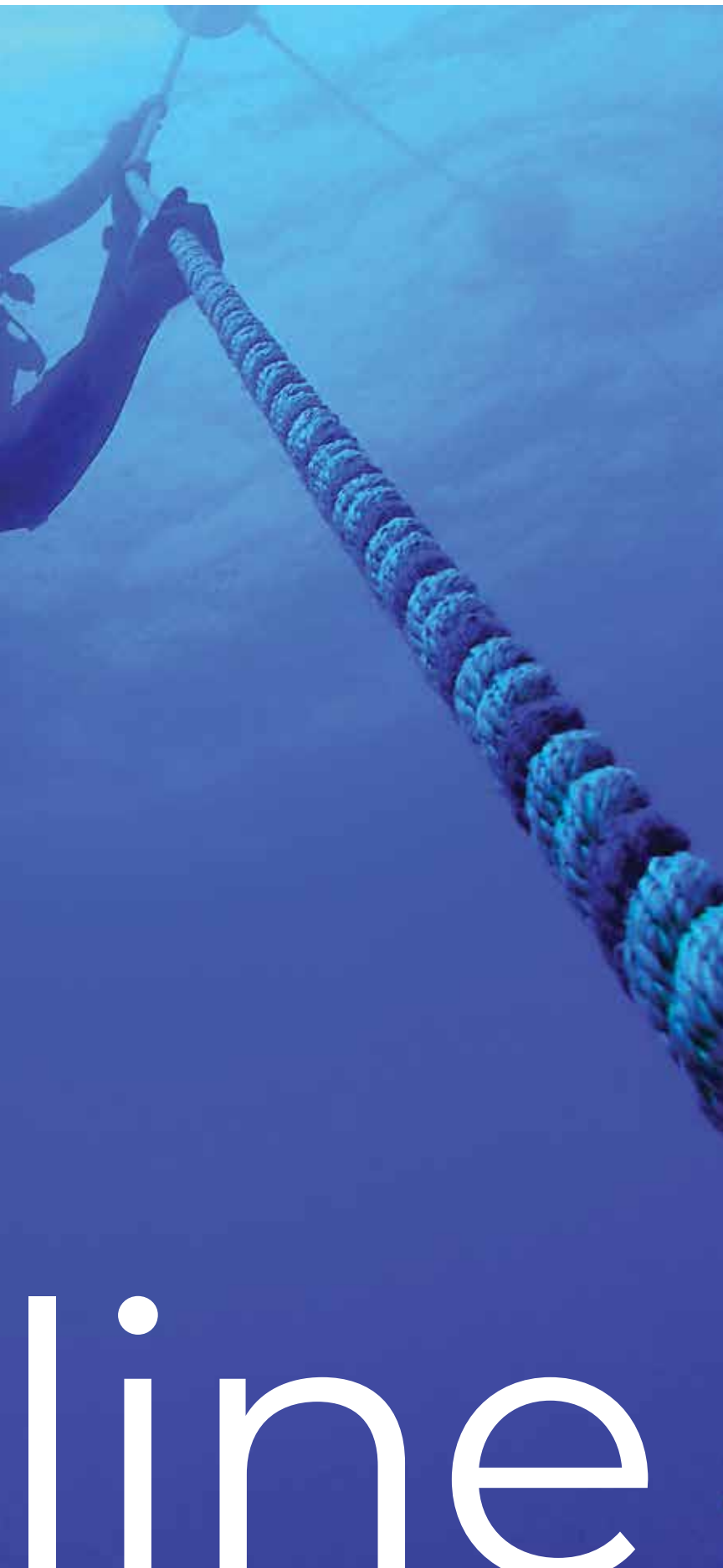
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A diver in silhouette is working on a mooring system underwater. The diver is wearing a wetsuit, a BCD, and fins. They are holding a tool and appear to be adjusting or securing a component of the mooring. Bubbles are visible around the diver, and the background is a clear blue water. Another diver is partially visible in the background.

HOW A
NEW WORK
PLATFORM
IS HELPING
THE BUOY TEAM
MAINTAIN
THE LARGEST
MOORING
NETWORK IN
SANCTUARY
HISTORY.

Photo by Benjamin D'Avanzo.

Life



By Scott Atwell

In March of 2020, as COVID-19 began to ravage the world, NOAA, the sanctuary's parent organization, issued a mandatory telework requirement for its more than 12,000 employees. It was a difficult, but necessary order, one that uniquely impacted NOAA's diving community, which includes the sanctuary's dynamic buoy team. After all, you can't phone in maintenance of a 140-mile long buoy system.

"It was discouraging because part of the key to success of this system is maintenance," says Brady Booton, a Marine Operators Supervisor and leader of the buoy team. "Basically we have three words: Mooring. Buoy. Maintenance. If you can't get out there to do the maintenance, then your work naturally compounds with each passing day."

At the same time, the buoy team found a bright spot on the horizon. A thousand miles from the Keys, at a boatyard in Louisiana, the team's next generation work platform was being built: a 36-foot Newton research vessel customized with tools that would make the team more efficient once diving resumed. For the better part of a generation, the Key West buoy team had worked off an ancient, hand-me-down boat acquired from the State of Florida. Its six-foot draft was only the beginning of the challenge.

"There would be times on the Rachel Carson where we couldn't even get off the (Bahia Honda) dock because of the tide," says Marine Operations Specialist Patrick Vandenabeele. "It would be a beautiful day outside, perfect weather conditions, but the tide would not allow us to get underway and get work done so we would lose a day, two, sometimes a whole week of operational days on the water."



That all changed when the Newton was delivered in 2021. With a shallow, two-foot draft, the buoy team would be able to motor to their work location unbridled and, once there, utilize customized tools that were built-in for efficiency and safety.

"Our pressure washer and hydraulic tool power pack are integrated into the machinery below deck," explains Vandenabeele, "versus having to carry a standard pressure washer and hydraulic pack that run off gasoline. They were loud, they were noisy, we had to deal with exhaust. This allows it to be quieter on deck and we don't have to load and unload those two things each time depending on the assignment."

Before the boat departed its Louisiana birthplace, NOAA was required to assign it a moniker, and FKNMS turned to the school children of Monroe County who enthusiastically accepted the assignment: Name the Newton. The vote was close, but *Leatherback* rose to the surface as the winning entry, a nod to the ocean's largest turtle species, and one that had recently returned to the Keys.

"The first time I heard of a leatherback sighting was about 12 years ago from a crew in the Dry Tortugas, and

that gave me hope because no one had witnessed a leatherback in these waters for many, many generations," says Marine Operations Technician Adam Brynes, who first suggested the name. "Then about three years ago, we had our first leatherback nest discovered at Bahia Honda State Park, and so I thought it was a wonderful testament to what the sanctuary has done, and befitting that we name the vessel leatherback because it's iconic."

While the buoy team acclimated to its new work platform, more good news arrived in the form of funding to hire an outside dive contractor to help catch-up on COVID-delayed maintenance of the system. Aqua-Nautik drilled almost 60 new anchors the length of the Keys, from which the team has been connecting a variety of buoys: large yellow markers that identify managed zones; pencil-shaped spar buoys that mark Wildlife Management Areas; and mooring buoys that allow divers and snorkelers to enjoy delicate reefs without damaging corals with an anchor throw.

The system includes more than 800 buoys in all, with white and blue mooring buoys accounting for more than half the total. The concept of a cor-

al-saving mooring field was born in the Keys, and remains an icon for its ingenuity as much as its effectiveness.

"The mooring system is absolutely vital for the conservation of Florida Keys reefs," says Mike Papish, a diver and photographer whose video and still images of sea life attract an attentive online audience. "Far too often I have removed discarded anchors from the reef, as well as fixed improper anchorings. The mooring system provides boaters an easy way to enjoy our reefs, and a necessary safety precaution for the reef itself."

Two separate, three-person teams are required to maintain the sanctuary's buoy network: one based in the Lower Keys and the other out of the sanctuary's Key Largo office. The teams follow an annual schedule that includes regular power washing of mooring buoys and down lines, with certain months of the year set aside for drilling new anchors and cleaning marker buoys. The work takes them as far west as the Dry Tortugas. Booton wonders if technology will one day render the yellow marker buoys unnecessary.

"The way the system was designed, the boundaries were helpful in establish-



ing the zones when we began because the public had visual cues,” says Booton, who is based in the Upper Keys. “But everyone pretty much has a smart phone and the new app is available. All the GPS software has the boundary buoys marked as if they were there. The mooring field is a critical aspect of what we’re doing because it physically protects corals by keeping anchors off the bottom, and we’re going to do a lot more good in that regard if we’re not spending time working on boundary buoys.”

Under Booton’s leadership, the program has switched to the use of nylon through-lines on mooring buoys, which cost more but last longer. In addition, the team has partnered with a bio-fuels company that will recycle downline waste into renewable energy. Upwards of 2,000 pounds of downline that would have gone into the landfill each

year, will be turned into ultra-low sulfur diesel, food-grade wax, and new plastics made from the remains of the old.

And more good news is on the way. A second Newton boat is being built in Louisiana, a near carbon-copy of the Leatherback, which could be on the water with the Upper Keys team by October. Given the setbacks of the last two years, the future is as bright as the horizon at mid-day.

“I’m hopeful for our potential,” says Booton, sounding a lot like a coach. “We have a team almost fully trained up. As long as we can remain healthy, we have the potential to be out there this summer kicking some butt.”

1. *The RV Leatherback in all its glory.*

2. *In addition to mooring and marker buoys, Brittany Nguyen and team maintain spar buoys.*

3. *The Leatherback’s engines power an integrated hydraulic system that allows drilling for new downline anchors.*

4. *The buoy team can clean and pressure wash up to 20 buoys a day.*

5. *White dots illustrate the presence of mooring buoys over popular Looe Key.*

6. *Buoy work is sometimes achieved with mask and snorkel. Photo by Matt McIntosh.*

WHAT'S APP?

MARINE SANCTUARY EXPLORER, THAT'S WHAT.

Florida Keys National Marine Sanctuary is a vast marine ecosystem, but its 3,800 square miles can now fit into the palm of your hand thanks to a new mobile application called Marine Sanctuary Explorer. The free app will help users of the sanctuary do their part to protect the unique Keys environment by promoting responsible recreation and providing real-time information about sanctuary rules and regulations, as well as points of interest.

"It's as if a sanctuary team member is riding along with you as a guide," says Florida Keys National Marine Sanctuary Superintendent Sarah Fangman. "Users of every experience level will find this tool invaluable for safely exploring the sanctuary's protected waters, whether they've been here for years or planning their first visit."

Packed with facts, Marine Sanctuary Explorer describes the more than 50 marine zones located within the sanctuary, with easy-to-read guidelines that communicate activities allowable in each managed area. The project was funded by the National Marine Sanctuary Foundation.

"Marine Sanctuary Explorer makes the Florida Keys more accessible to visitors while helping them recreate responsibly and protect its resources for future generations," says Kris Sarri, the foundation's president and CEO. "The app highlights points of interest such as the famous shipwreck trail and allows visi-

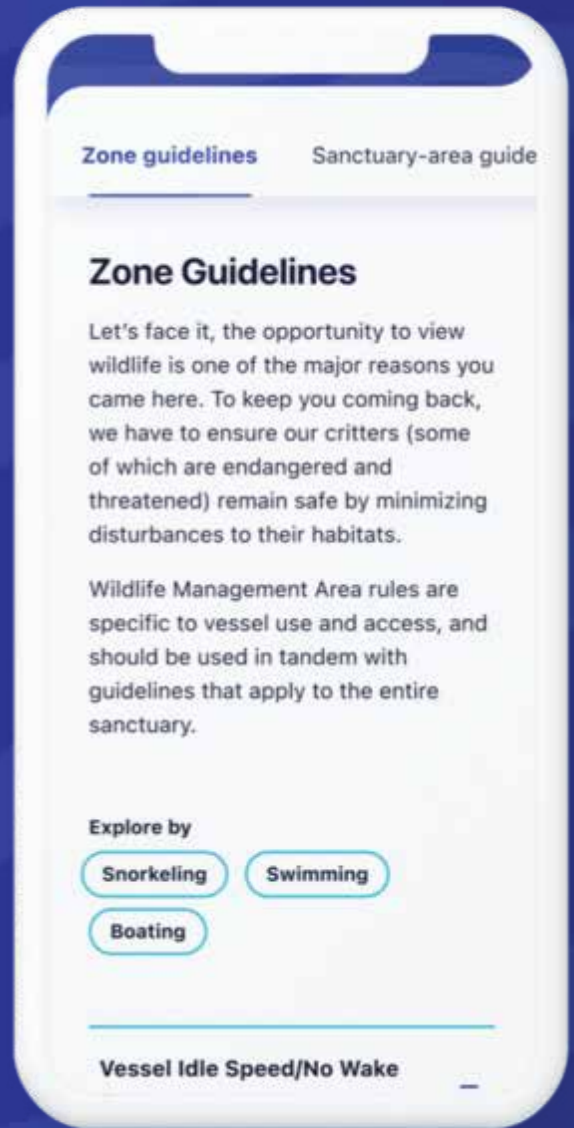
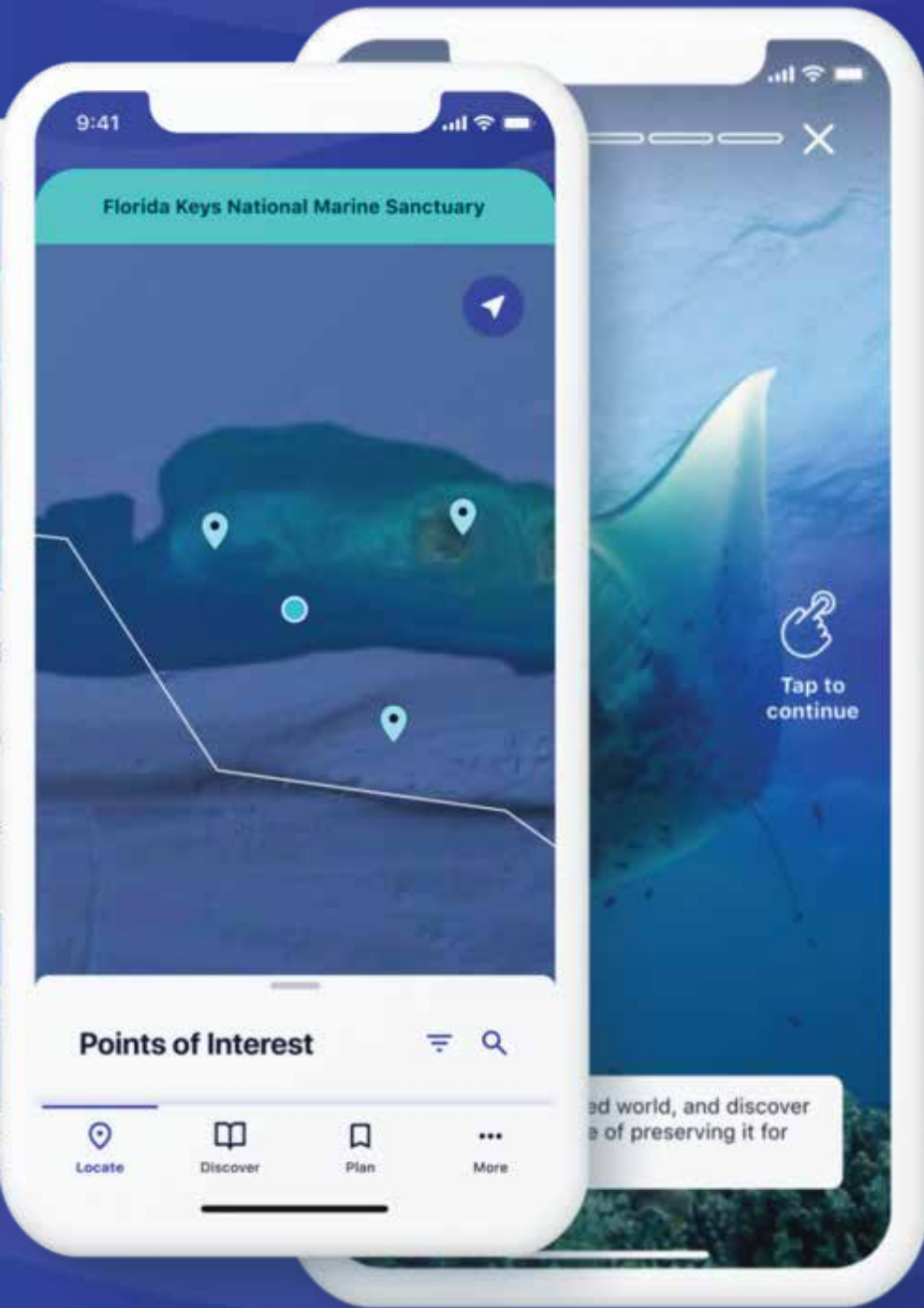
tors to tag destinations by their activities such as snorkeling, swimming, fishing or boating. It features animals and habitats commonly found in the Florida Keys and interpretive stories build a learning connection to protecting them."

Residents and tourists can use the app before, during and after a sanctuary visit, with features that include:

- Allowing devices to access locations for customized exploration
- Using an interactive map to geo-locate current position and points of interest
- Bookmarking favorite and new points of interest to explore
- Identifying experienced Blue Star guides who lead sanctuary experiences
- Browsing a library of resources on animals and habitats specific to the sanctuary
- Guidelines on how to safely explore the protected waters of the sanctuary
- Accessing content for viewing offline

"We have long heard constituent desires for a solution to navigating our complex set of regulations," says Fangman. "This app is a handy educational tool that will protect cherished resources that fuel the Keys' economy, providing a layer of safety for boaters and also the sanctuary we're here to protect."





Marine Sanctuary Explorer is free to download and available for iOS (Apple) and Android devices through your app store.



National Parks Conservation Association is proud to partner with the **Florida Keys National Marine Sanctuary Foundation** to enhance protection and restoration of treasured Sanctuary resources and the connected ecosystems of three iconic national parks, **Biscayne, Everglades, and Dry Tortugas.**

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LET'S BE SOCIAL



LOWER KEYS GUIDES ASSOCIATION

Lower Keys Guides Association is a non-profit organization of professional fishing guides dedicated to working for a sustainable resource through wise management practices, while recognizing the importance of sport fishing to the economy and cultural heritage of the Florida Keys.

The Florida Keys is a place like no other. We are fortunate to have an ecosystem in the United States that includes coral reefs, turtle grass, and sand flats that are constantly fed by currents from the Gulf of Mexico and the Atlantic Ocean. These currents and habitat provide us with the most unique fishery in the world. As we are all so lucky to call the Keys ours, it is also our responsibility to protect it.

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NEW DISCOVERY



THE SANCTUARY'S EDUCATIONAL FRONT DOOR IS REVAMPED FOR THE FIRST TIME IN 15 YEARS

Like many other museums, March 2020 saw the doors of Florida Keys Eco-Discovery Center close to visitors, as staff headed into a lockdown of unknown length. Fashioning the closure as an opportunity, sanctuary teams began setting into motion plans to remodel the inside of EDC, its first major update since opening in 2007. Utilizing a combined \$1 million from the federal government, the National Marine Sanctuary Foundation, and the Monroe County Tourist Development Council, this two-phase remodel is inching closer and closer to completion.

The new Eco-Discovery Center will look very different from the one you might remember. The diorama in the center of the main hall has been replaced with a large circular structure that tells the story of the sanctuary and how visitors and locals can help protect it. The flat panels with text along the walls have been replaced with images, text, videos, sounds and items to touch

and play with. Leveraging current research on museum education, the center has been designed so guests will experience fresh features on every visit. New museum manager Emily Kovacs will be able to easily update and curate new content for many of the exhibits, with a focus on families to have conversations about the content, encouraging children to play, and challenging visitors to commit to solving the sanctuary's most pressing problems.

"Our focus has shifted toward making connections between our visitors and the sanctuary," says Lindsey Crews, the sanctuary's Science and Outreach Coordinator. "This practice, called interpretation, looks to make meaningful connections through text, images and experiences. It's through these connections that we hope to inspire our visitors to take action to protect this special place we all love."

1. The Eco-Discovery Center's exterior was updated several years ago. Interior updates are the first since 2007.
2. Emily Kovacs guides sanctuary leadership through the shipwreck hallway.
3. A new center tower allows visitors to address solutions to the challenges facing our waters.



In addition to the remodel, partners from Mote Marine Laboratory are re-vamping their living coral display. New, colorful exhibits about coral restoration and Mission: Iconic Reefs, one of the largest coral restoration projects in the world, will explore coral reproduction and the science behind restoration.

Maritime heritage will have a pair of locations in the revamp, including a shipwreck hallway with a ship's wheel that turns to reveal details of famous wrecks buried in sanctuary waters. Another section will feature a history of shipwrecking that once made Key West among the richest cities in the United States, with replica artifacts that visitors will be able to hold in their hands.

"The sanctuary holds a rich collection of underwater archaeological sites that provide windows into the past and sustainable recreational opportunities," says Matt Lawrence, the sanctuary's maritime archaeologist. "We hope to engage visitors in an exploration of Florida

Keys history through presenting stories that connect people with the ocean."

Another hallmark of the Eco-Discovery Center remodel is a renewed commitment to accessibility. "We want to go above and beyond the minimums required of us," says Crews. In addition to including multi-sensory experiences in the exhibits for visitors who may have different vision or hearing abilities, the center is also exploring ways to make the facility accessible for neuro-diverse guests through the use of sensory kits, social stories and other tools. This may include translation into other languages, including American Sign Language, reducing the number of videos and sounds during certain times of day, and offering a safe and quiet space for a neurodivergent community, and mothers with small children. "We are still exploring different tools and will be striving to work with these communities to identify what we can provide to enhance their experience in the center."

Recently, National Marine Sanctuary Director John Armor and Regional Director Matt Brookhart toured the ongoing renovations, marveling at the attention to detail that went into the design and layout. The Florida Keys Eco-Discovery Center is one of four museums in the sanctuary system.

"The tour provided the chance to interact with some of the new state-of-the-art exhibits and see why the Eco-Discovery Center is an important tool to communicate information about the Sanctuary to our local and visiting communities," says Kovacs. "Joining the FKNMS team during the renovations has enabled me to become very involved with the development and construction of the new exhibits. Knowing the ins and the outs of the exhibits will allow our volunteers and myself to provide a great visitor experience."



Ibis

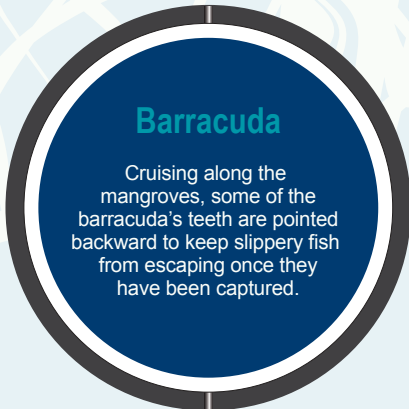


Ibis

Look for ibis in the tops of mangroves! Ibis use their bills to feel around grass flats and shorelines for small crabs to eat.



Barracuda



Barracuda

Cruising along the mangroves, some of the barracuda's teeth are pointed backward to keep slippery fish from escaping once they have been captured.

This 3D mangrove display will allow kids to explore one of the most important habitats inside the sanctuary.



More updates are on the horizon in a planned Phase III. "There are more interactive experiences that we would like to provide in the center," says Crews, "including an immersive paddleboard experience in the back room, a tablet to manipulate 3D image files of maritime artifacts, and more. We also have plans to improve the Aquarius Reef Base experience with interactive games and to explore adding outdoor exhibits with the assistance of our partners. Many exhibits have the option of expansion with new content as we create it."

When the Eco-Discovery Center reopens sometime in the fall of 2022, programming will also return. Discovery Saturdays, fueled by local partners, will be back in the line-up, after volunteers advance their training, knowledge and skills in personal interpretation. "We will also offer a Paint and Sip class that combines art and education," says Kovacs. "It will be a paid program with the revenue turned right around to support education initiatives at the Eco-Discovery Center and sanctuary as a whole."

Volunteers and partners are integral to the center experience: creating content, staffing the docent desk and providing programs for visitors and school groups. If you're interested in becoming a volunteer at the Eco-Discovery Center, or for other outreach programs, contact Liz Trueblood at elizabeth.trueblood@noaa.gov.

You can also play an important role in curating a heritage exhibit that will collect oral history from residents and visitors throughout the Keys, including diverse audiences and user groups. If you have a story to share about the history of the Florida Keys, please reach out to Emily Kovacs at emily.kovacs@noaa.gov.

FUNDING THE FUTURE OF FLORIDA'S CORAL REEF



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An upper Keys haul by
Quiescence Diving Services
is headed back to land.
Photo by Sean Davis.

SEA-WORTHY

GOAL: CLEAN SEAS FLORIDA KEYS IS REALIZING ITS LOFTY AMBITION

By Scott Atwell

It wasn't so much an idea as it was a response — a visceral reaction to the site of refrigerators, sofas and lobster traps scattered across the seafloor, and the need to resuscitate the legendary, pristine waters of Florida Keys National Marine Sanctuary. Goal: Clean Seas Florida Keys (GCS) arrived in the wake of 2017's Hurricane Irma, a sea-change event in Keys history that damaged docks and homes and sank vessels, depositing significant amounts of debris in sanctuary waters. After the Category 4 storm departed, the lost and damaged remains, compounded by other forms of persistent marine debris, posed a high risk for damaging critical benthic habitats such as reefs and sea-grass beds. Wildlife like dolphins, manatees and sea turtles were in danger of entanglement.

"In the aftermath of Hurricane Irma the Keys community was coming together and looking towards recovery," says Marlies Tumolo, who administers the GCS program. "We saw the devastation and debris above and below the water and recognized an opportunity to work with local businesses to clean it up and support the recovery of both our community and ecosystem through one program."

Irma's aftermath provided a unique nexus of challenge and opportunity for the National Marine Sanctuary Foundation, the non-profit partner of the sanctuary system whose goal is to protect and conserve legendary marine resources. With its financial resources, the foundation supported creation of GCS and incentivized debris cleanup, providing grants to Blue Star dive op-

erators who had already pledged their ecological support to the sanctuary.

"From our perspective, the program is a complete success," says Mike Goldberg, owner of Key Dives in Islamorada. "This has helped bring the diver community together for a common purpose, one where the folks here, the reef, and the dive operators all win."

When Cortney Benson was hired by Goldberg four years ago, she had a vested interest in debris cleanup: her job title is Marine Conservation Coordinator. Benson was tasked with organizing two GCS dives each month for the first two years, carrying 18 divers and up to four crew.

"The program is flexible in how you can use grant money," explains Benson. "We wanted to involve customers because we have a lot of regulars, peo-



*Leave the bubbles, take the flag.
Photo by Kurt Tidd/Key Dives.*

ple who want to take care of their home and are excited about the opportunity to dive for free to clean up their own backyards.”

Blue Star operators are trained on protocols for safely removing seafloor debris, and each dive is conducted under permit from the sanctuary. While derelict lobster traps, monofilament line and derelict anchors make up the bulk of their finds, Benson says her divers also encounter the unusual. One day, a pair of pink BB guns were found on the seafloor—more than a mile apart. Key Dives is now averaging one clean-up per month, as their lifetime total passes 70 dives and logs more than 15,000 pounds of debris.

“What makes it special is that the community divers are involved,” said Benson. “You share that feeling with them. They have a sense of responsibili-

GOAL: CLEAN SEAS 2022 GRANT RECIPIENTS

Amoray Dive Center
(Key Largo)

Florida Keys Dive Center
(Tavernier)

Dive Shop at Ocean Reef
DiveN2Life (Big Torch Key)

Finz Dive Center
(Key West)

Key Dives (Islamorada)
Quiescence (Key Largo)

Rainbow Reef Dive Center
(Key Largo)

RED Hospitality
at the Bungalows Key Largo
Sail Fish Scuba (Key Largo)

Sea Base (Islamorada)
Sea Dwellers (Key Largo)

ty and it gives them a sense of environmental stewardship. They enjoy diving and if they want their kids and grandkids to enjoy it, they’re out here taking care of the reefs.”

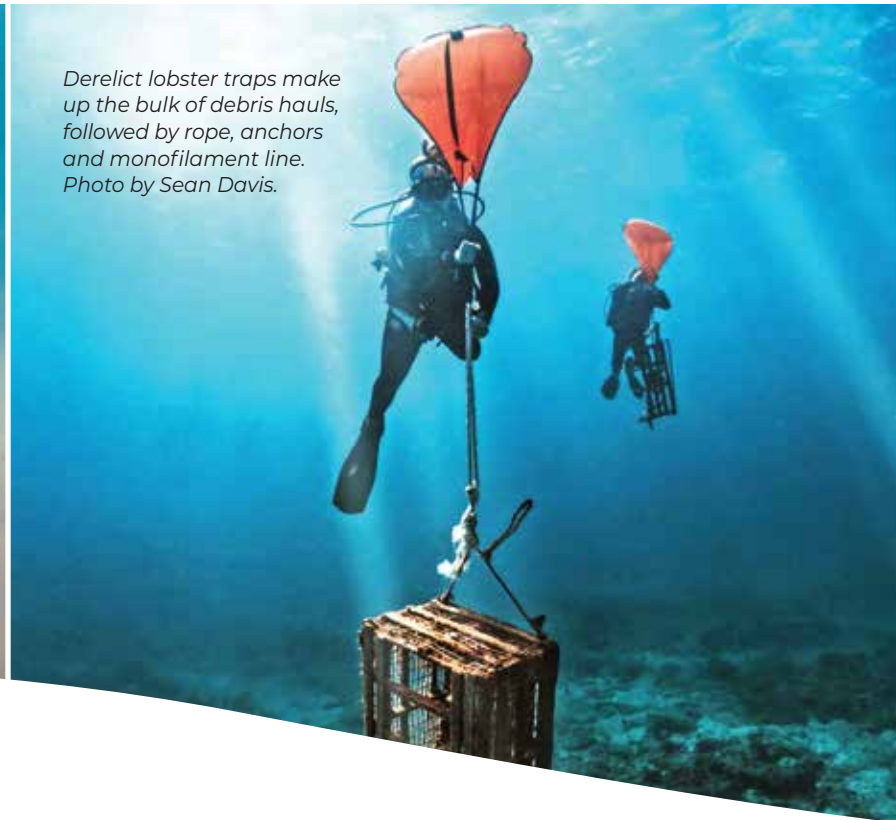
YOU NEVER KNOW WHAT YOU WILL FIND

Dive instructor Sean Davis is a GCS veteran, having launched debris clean-up dives with a number of upper Keys operators. “It’s actually one of my favorite ways to dive,” said Davis. “It’s fun to have a purpose while diving but, unfortunately, every month you clean up and a month later it has stuff all over it again.”

One day, Davis got a call from Pirates Cove Watersports in Key Largo to help with a unique discovery inside Grecian Rocks Sanctuary Preservation, where more than a dozen, large ma-



Derelict lobster traps make up the bulk of debris hauls, followed by rope, anchors and monofilament line. Photo by Sean Davis.



Pirates Cove came across an unexpected find off Grecian Rocks: more than a dozen discarded marine batteries. Photo by Sean Davis.

rine batteries were found at the base of a mooring ball. “That’s the worst part about it: they just tied up on the mooring ball and started chucking the batteries over the side,” said Davis. “They were in a pretty nice pile and they were there for a decent amount of time because a lot of them were buried with a decent amount of growth.” The batteries, weighing hundreds of pounds, were floated to the surface and taken to Miami for proper disposal.

Davis, who has personally raised more than 3,000 pounds of debris, is also known to document the effort with his underwater camera. “I didn’t think enough people took enough pictures of cleanup dives so I started taking my camera to document the process. People were interested so I decided I wanted to start showing them.”

Key Largo operator Quiescence has been around since 1977, but only recently joined GCS. Lead instructor Luke Durso, who participated in the program with a different operator, has an eye for the not-so-obvious. “Mono-

filament line doesn’t produce large amounts of weight totals but is still detrimental and something that we like to make sure we’re removing,” says Durso. “It gets wrapped around fragile sea fans and will continue to constrict as currents change and switch there’s more pull in different directions.”

SOMEWHERE OVER THE RAINBOW

Rainbow Reef of Key Largo is among the largest PADI dive centers in all of the Americas, but chooses to utilize its cache of professional divers to conduct GCS events. “With professional staff we are able to dive sites that are not normally accessible to our regular customers because of current, proximity or depth,” says Jen Pollum, Director of Conservation at Rainbow Reef. “It makes us a lot more effective in removing debris because every one of our pros is highly trained in how to use lift bags, so removing heavy objects is done with more efficiency.”

Fueling efficiency even more is a new type of GCS funding that pays for

scouting trips, where 3-4 divers provide advance reconnaissance to identify the most needed locations. The staff dives are scheduled one day each month and feature as many as 15 professionals (“They’re lined up around the building to sign up,” says Pollum) canvassing two sites on each trip. “We’ve gotten to point where we could have picked up a lot more debris but we ran out of lift bags and people. In those instances we would just dive that same site again.”

Pollum says Rainbow Reef has its sights on being a conservation dive center, with at least one boat per day on the water running a debris cleanup, coral restoration, fish survey or mangrove cleanup.

WORLD-WIDE RECOGNITION

Last year, The Dive Shop at Ocean Reef Club recruited the grandson of legendary underwater explorer Jacques-Yves Cousteau to take part in a pair of GCS cleanup dives off Carysfort Reef in Key Largo. Fabien Cousteau and his team from the Fabien Cousteau

Fabien Cousteau, grandson of Jaques Cousteau, took part in a clean-up dive in 2021 off Turtle Reef. Photo by Tiffany Duong/Ocean Rebels.



Ocean Learning Center, along with locals, pulled up nearly 700 pounds of debris. “The only way we’re getting out of this is if we fill the proverbial bucket together one drop at a time — one action at a time,” Cousteau told to KeysWeekly reporter Tiffany Duong. “We’re all responsible for what we see today, so the solution isn’t from one source like myself or an individual doing their best, it’s all of us pitching in.”

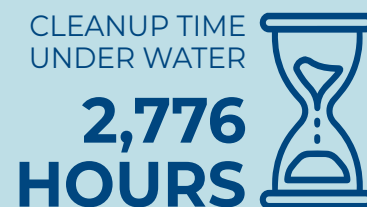
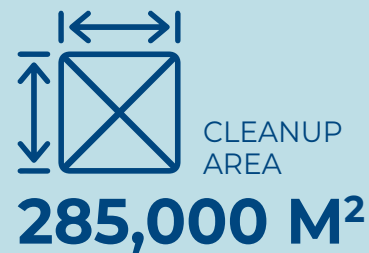
THE NEXT GENERATION

DiveN2Life is an extracurricular enrichment program based in the lower Keys that utilizes SCUBA diving and scientific research diving as tools to attract and engage children as young as eight years old to STEM curriculum and active citizenship. The organization was in the first group to sign up for GCS after the program was launched and has scheduled a cleanup dive every month since the summer of 2018.

“The students are the ones who said we need to clean this up, there’s so much debris,” said Kama Cannon, Ed.D., DiveN2Life’s Director of Education and Diving Safety Officer. “We’re not just cleaning the ocean of debris we’re facilitating passion within our kids. They’re not the leaders of tomorrow, they’re leaders right now.”

Maddie Chalnoky, the sanctuary foundation’s stewardship coordinator, is in charge of keeping track of GCS metrics. By every measure, the program has been an extraordinary success, engaging almost 2,500 divers and removing over 36,000 pounds of debris. “I have had the opportunity to watch this program grow and build not only solutions to submerged marine debris,” she says, “but also create a network of caring organizations that join together to make a difference.”

BY THE NUMBERS SINCE 2018



FORGOTTEN STORIES

OF THE SPANISH STEAMSHIP VALBANERA



7

West of Key West, between the Marquesas Keys and Dry Tortugas lies a hazardous sand bank known as the “Quicksands.” This shoal is a ship trap; it has captured many vessels with its shallow shifting sands. Famous shipwrecks in the area include the Spanish galleons *Nuestra Señora de Atocha* and *Santa Margarita* sunk in a 1622 hurricane. While the stories of these famous vessels have sparked many adventurers’ imaginations, another Spanish shipwreck lost to the Quicksands almost 300 years later deserves as much attention. In September 1919, the Spanish steamship *Valbanera* de-

parted Spain carrying passengers migrating to Cuba. Like the 1622 galleons, a tremendous hurricane drove the steamship into the shallows. All 488 persons onboard perished. Surprisingly, the tragedy has received little public attention. NOAA and University of Miami researchers have recently set out to reveal more about this shipwreck.

VALBANERA'S CONSTRUCTION

Launched in November 1906 by the shipbuilding firm Charles Connell and Co. from its Clyde River shipyard at Glasgow, Scotland, this 399-foot-long steel steamship had accommodations

for slightly more than 100 first- and second-class passengers, and 1,000 passengers in steerage. At 48 feet wide with 21-foot deep holds fore and aft of the deckhouse, *Valbanera* also had considerable cargo capacity. Built to the highest insurance standard of the day, its triple-expansion steam engines turned twin propellers and an electric lighting plant lit the cabins throughout. Pinillos Izquierdo and Co. of Cadiz, Spain contracted with the builder for the vessel to service their transatlantic routes between Spain, the Canary Islands, Cuba, Puerto Rico and New Orleans.



2



3



4

LAST VOYAGE

Valbanera began its last voyage in Barcelona early in August 1919. Traveling westward it stopped at several of Spain's Mediterranean ports where passengers boarded and stevedores stowed a cargo of wine, olives, and dried fruit in its holds. After passing through the Straits of Gibraltar, it reached Cadiz. At that port, 521 passengers joined the ship, most of whom planned to emigrate to Cuba. From Cadiz, *Valbanera* departed for the Canary Islands to collect another large contingent of emigrants. After stopping at the islands of Gran Canaria and Tenerife, *Valbanera*

set off for San Juan, Puerto Rico with 1,142 passengers and 88 crew onboard. In San Juan, the steamship dropped off garlic and onions before continuing on to Cuba. On September 5, the steamship reached Santiago de Cuba and disembarked 742 passengers. Reportedly, many passengers had booked passage to Havana, but instead chose to disembark at the first Cuban landfall. Continuing on to Havana brought *Valbanera* into the path of a hurricane. Captain Ramón Martín Cordero sought to bring his vessel into Havana Harbor on September 9, but the harbormaster had closed the port after its harbor

1. *Valbanera* in the Connell and Co. shipyard prior to its launch (Museu Marítim de Barcelona).

2. Pinillos Izquierdo and Co. steamship line poster advertising its trans-Atlantic Service (Museu Marítim de Barcelona).

3. Track of the 1919 hurricane that sank *Valbanera*. Tropical storm winds in Key West lasted 38 hours.

4. Key West residents amidst the destruction wrought by the 1919 hurricane (Monroe County Public Library).



pilots could not safely reach ships offshore due to the mounting seas. With little choice, Captain Cordero turned the steamship towards deep water to ride out the storm that evening.

The events that transpired next on *Valbanera* can only be surmised. Undoubtedly, the 488 remaining passengers and crew experienced a horrific ordeal as the hurricane battered their steamship. The approximately 90-mile stretch of water separating Cuba and the Florida Keys was not nearly large enough to run from the storm. Tossed around by ferocious seas, the steamship intersected with the hurricane's eye and strongest winds during the overnight hours of September 9 and into the morning of September 10 as the storm slowly crept westward. Forensic meteorology estimates that the storm attained Category 4 intensity with maximum sustained winds of

130 miles per hour. Tropical storm and hurricane winds lasted 38 hours in Key West, where the highest windspeed recorded during the storm reached 110 miles per hour before the weather station's instruments blew away. The storm's ferocity can be judged by its impact on Key West, where buildings collapsed, ships sank in the harbor and storm surge inundated the southern half of the island.

After the storm departed the area to batter Galveston, Texas, authorities began to take stock of the damage. Several radio calls heard on September 12 and attributed to *Valbanera* gave hope that the steamship escaped the storm in the Gulf of Mexico. As the weather calmed, US Navy and Coast Guard vessels patrolled in search of mariners in distress. On September 19, the US Navy subchaser 203 found the wreck of a large steamship on Halfmoon Shoal at the western end of the Quicksands. The navy returned to the wreck a few days later and confirmed that it was *Valbanera*. The steamship lay at an angle on the shallow sand bank with its portside boat deck and its aftermost mast projecting from the water. The visible portside lifeboat davits were still in a stowed position.

None of the passengers or crew survived *Valbanera's* sinking and no bodies were ever returned to shore for burial, leaving those who lost family or friends doubly bereft. The Florida Keys and local maritime communities, who were surprised that no one found passengers' remains and that the lifeboats had not been launched, considered the disaster mysterious. A Cuban expedition visited the shipwreck a little more than a month later. While they sal-



vaged valuable wines, liquor and merchandise from the steamship's holds, no new answers were found. Further salvage of the shipwreck continued in June 1920 when a specially equipped wrecking tug arrived at the site to remove other valuable components and machinery from the wreckage.

After Ernest Hemingway arrived in Key West in 1928, he likely learned of *Valbanera's* sinking from the watermen with whom he went fishing. Undoubtedly the story stuck with him. While not mentioned by name in the short story "After the Storm," historians believe Hemingway used the sunken ship as the setting for his protagonist's efforts to realize something valuable after his many failures. In the short story, like the reality of *Valbanera's* loss, the ship holds onto its secrets. Divers and fishermen have visited the site over the ensuing decades, but remembrance of



1. A somewhat fanciful depiction of divers exploring the *Valbanera* shipwreck

2. Researchers used underwater scooters equipped with cameras to image the *Valbanera* shipwreck (John Cline, NOAA and UM-RSMAS)

3. Archaeologist Ryan Fochs examining the sunken steamship (Matthew Lawrence, NOAA and UM-RSMAS)

4. Perspective view of the shipwreck's stern created from hundreds of still images meshed together through computer processing (NOAA and UM-RSMAS).

the tragedy faltered until Spanish historian Fernando José García Echegoyen visited the shipwreck with a team of divers in the 1990s. His efforts began re-connecting the shipwreck to its history and community through articles and books published in the Florida Keys and in Spain.

ARCHAEOLOGICAL INVESTIGATION

Lacking baseline information about the *Valbanera* shipwreck, archaeologists and researchers from NOAA's Florida Keys National Marine Sanctuary and the Rosenstiel School of Marine and Atmospheric Sciences at the University of Miami led a team to investigate the shipwreck in June 2021. Supported by a grant from NOAA's Office of Ocean Exploration, the team used advanced underwater archaeological mapping and photographic techniques to create the site's first accurate three-dimen-

sional representations. Investigators determined that *Valbanera* grounded stern-first on Halfmoon Shoal from its orientation. Even in the chaotic, inky-blackness of the storm, Captain Cordero likely recognized he was nearing the shallows and may have tried to anchor to prevent his ship from running aground. Tragically, the shipwreck lies only a short distance from the deeper channel separating Halfmoon Shoal and Rebecca Shoal. Had it entered this channel it would have passed into the Gulf of Mexico unharmed. *Valbanera's* wreckage appears broken into three parts, each section separated by sandy areas devoid of wreckage. In actuality, the salvage that occurred on the shipwreck reduced its overall structure and the sand swallowed much of the remaining wreckage. The shipwreck's 410-foot overall extent still closely matches the steamship's original 399-

foot length. Researchers diving at the site experienced strong currents that nearly overpowered their underwater scooters. These currents made investigations difficult by reducing visibility when they scoured the surrounding sediment and caused the shipwreck to sink into the sands.

The research team intends to return to the shipwreck and continue its archaeological investigations. Further archival research seeks to uncover information about the people who traveled on *Valbanera*. Of interest are the life stories of those who perished in the disaster and the stories of those people whose ancestors traveled on *Valbanera* and may have emigrated to the United States in the years after. Please contact the Florida Keys National Marine Sanctuary if your family has connections to *Valbanera*.



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SAVE SPECTACULAR

FIFTY YEARS OF NATIONAL MARINE SANCTUARIES

A kelp forest teeming with life in NOAA's Monterey Bay National Marine Sanctuary. Photo: Jon Anderson

CELEBRATING A HALF CENTURY OF OCEAN CONSERVATION AND STEWARDSHIP

By Rachel Plunkett and Scott Atwell

Like many great ideas, the National Marine Sanctuary System was forged in the midst of disaster. On the morning of January 28, 1969, workers drilling a new well on Union Oil's "Platform A" had a blowout that resulted in the spill of three million gallons of crude oil into the Santa Barbara Channel, blackening popular beaches and killing thousands of seabirds and countless other fish and marine mammals. President Richard Nixon, who grew up in Southern California, flew in to trod along the tar ball-lined shores of his home state, channeling public outrage that inspired grassroots environmentalists and their movement for stronger stewardship of the nation's ocean resources.

It took another four years after the Santa Barbara oil spill, but in 1972 Nixon signed a suite of environmental laws

that form the foundation of today's conservation efforts, including the Clean Air Act, Clean Water Act, Endangered Species Act, Marine Mammal Protection Act, Coastal Zone Management Act, National Environmental Policy Act, the Magnuson-Stevens Fishery Conservation and Management Act, and, of course, the National Marine Sanctuaries Act.

"The clean air and water we enjoy today," said Office of National Marine Sanctuaries Director John Armor, "the species that have recovered from historically low population levels, the preserved public access to beaches and coastal waters, the processes that inform and solicit input from the public on projects impacting their communities — these are only some of the benefits we can trace back to those historic laws."

A century earlier, Americans were introduced to the idea of setting aside special places for the enjoyment and pleasure of the people with the establishment of Yellowstone National Park. The creation of modern parks became a powerful tool for the conservation and protection of valuable places and, as more and more terrestrial places were set aside for protection, so too were national seashores and wild and scenic rivers. Three years after the ink dried on Nixon's signature, the underwater resting place of the shipwrecked Civil War ironclad USS Monitor became the first national marine sanctuary in the United States.



NATIONAL MARINE SANCTUARIES

CELEBRATING 50 YEARS

Today, under the umbrella of the National Oceanic and Atmospheric Administration, the system has grown into a nationwide network of 15 national marine sanctuaries and two marine national monuments that conserve more than 620,000 square miles of spectacular ocean and Great Lakes waters, an area nearly the size of Alaska. In October, the system will celebrate its 50th birthday.

- **American Samoa** (Pacific)
- **Channel Islands** (Pacific)
 - **Cordell Bank** (Pacific)
 - **Florida Keys** (Atlantic, Gulf of Mexico)
 - **Flower Garden Banks** (Gulf of Mexico)
 - **Gray's Reef** (Atlantic)
- **Greater Farallones** (Pacific)
- **Hawaiian Islands Humpback Whale** (Pacific)
 - **Mallows Bay** (Atlantic)
 - **Monitor** (Atlantic)
 - **Monterey Bay** (Pacific)
 - **Olympic Coast** (Pacific)
 - **Papahānaumokuākea Monument** (Pacific)
 - **Rose Atoll Monument** (Pacific)
 - **Stellwagen Bank** (Pacific)
 - **Thunder Bay** (Great Lakes)
- **Wisconsin Shipwreck Coast** (Great Lakes)



Nixon visits a beach in March 1969 that was slicked with oil during the Santa Barbara oil spill earlier that year in January. Photo: National Archives and Records Administration.



FKNMS grew out of the Key Largo National Marine Sanctuary, where Billy Causey served as superintendent in the 1980s. Photo: NOAA.

SCIENCE AND MARITIME HERITAGE

From lush seagrass beds to slow-growing, deep-sea corals, the habitats protected by sanctuary waters vary greatly from place to place. While Mallows Bay near the Potomac guards the largest shipwreck fleet in the Western Hemisphere, Stellwagen Bank near Boston preserves abundant whale-watching habitats, and Monterey Bay epic kelp forests. Flower Garden Banks is home to northernmost coral reefs in the Gulf of Mexico. Each site has its own unique history and purpose.

A tenet of their creation requires sanctuaries to maintain natural biological communities and to “protect and, where appropriate, restore and enhance natural habitats, populations, and ecological processes.” Many sites serve as a proving ground for new approaches to restoring and managing marine eco-

systems in the face of climate change and other threats. Mission: Iconic Reefs, a massive collaborative effort to restore almost 3 million square feet of reef at seven iconic sites within Florida Keys National Marine Sanctuary to a sustainable state is currently underway, and in California, Greater Farallones National Marine Sanctuary and the Greater Farallones Association are implementing strategies for kelp forest restoration, monitoring, research and public engagement.

“The reefs are home to this community. They are part of our way of life,” said Sarah Fangman, Florida Keys National Marine Sanctuary superintendent. “We hope the Mission: Iconic Reefs effort can be beneficial not just in the Florida Keys, but also in other reefs around the world. We hope we can give back and pay it forward.”



"We're gonna need a bigger boat!" A humpback whale breaches the waters of Stellwagen Bank National Marine Sanctuary. Photo: NOAA, under NOAA Fisheries Permit #14245



A Laysan albatross is about to discover that sanctuary boundaries don't guarantee safety from this tiger shark in Papahānaumokuākea Marine National Monument.

Sanctuaries are a natural destination for members of the dive community, so much so that it is impossible to estimate how many dives occur each year within their boundaries. "Sanctuaries are not meant to be static displays in a museum," said Fangman. "They're meant to be enjoyed by the world. Our job is to manage compatible uses so these resources are here for generations to come." There are regulations that must be followed when diving inside sanctuary boundaries, mostly around collection of natural and cultural items, which is often prohibited or permit-required.

National marine sanctuaries are also great places to research and test approaches for mitigating human impacts on wildlife. Since 2007, NOAA has worked to better understand how ship strikes impact endangered whale populations in national marine sanctuaries on the West Coast. This information was used to create the Blue Whales

and Blue Skies initiative, where they worked with major shipping companies who voluntarily reduced their vessel speeds in key areas to 10 knots or less. The 2020 vessel speed reduction program resulted in cutting over 700 tons of smog-forming emissions, and a 35% decrease in ship strike risk.

This innovative mindset spawned development of a mooring buoy system in the Florida Keys that allows divers and snorkelers to explore legendary coral reefs without launching dangerous anchor throws. Almost 500 buoys are anchored at the most popular dive spots in the Keys, ready for boats to safely moor above the delicate corals. Many commercial dive operators who use the buoys are part of a sanctuary-led Blue Star certification that promotes responsible and sustainable use of the ecosystem, including debris clean-up dives that remove discarded traps, netting and fishing line.

A CONNECTION TO CULTURE AND COMMUNITIES

In addition to protecting natural resources, national marine sanctuaries also preserve cultural history such as shipwrecks and heritage artifacts and locations. Currently there are 1,211 known shipwrecks protected throughout the sanctuary system, with thousands still awaiting discovery in these waters. The program focuses on several key research areas, such as maritime history, site inventory and assessment, and maritime cultural landscapes.

The people who live and work in the communities surrounding national marine sanctuaries care deeply about these places. Sanctuaries have always been tightly woven to the local communities around them, but perhaps the most significant change to the system came in 2014, when the new Sanctuary Nomination Process was implemented, leading to a community-driven process



Inside waters of Monitor National Marine Sanctuary, NOAA personnel explore the shipwreck of the USS Schurz, which sank during World War I off the coast of North Carolina. Photo: Tane Casserley/NOAA

for deciding which special underwater places should be considered for sanctuary designation. It was through this new process that Malloes Bay-Potomac River National Marine Sanctuary officially became designated in 2016, followed by Wisconsin Shipwreck Coast National Marine Sanctuary in 2021.

The National Marine Sanctuary System will surely continue to grow. Currently, there are five nominated sanctuaries in the inventory being considered by NOAA for designation, including Chumash Heritage National Marine Sanctuary in California. The proposed Lake Ontario National Marine Sanctuary is currently in the process of designation, and the public was recently invited to submit comments on the draft management plan. In addition to adding new sanctuaries to the system, several sanctuaries have seen boundary expansions over the years, such as Thunder Bay, Cordell Bank, and Greater

Farallones national marine sanctuaries in 2015, and Flower Garden Banks National Marine Sanctuary in January 2021. Monitor National Marine Sanctuary was also proposed for expansion in 2016 to protect the final resting place for nearly 1,700 men lost in World War II during the Battle of The Atlantic.

SAVE SPECTACULAR

Under the headline banner “Save Spectacular,” the sanctuary system is in the midst of a year-long celebration leading up to the 50th anniversary in October, with a myriad of activities that even includes a stamp series from the U.S. Postal Service. “From the very beginning, the enthusiasm, creativity, and can-do spirit of our staff, partners and volunteers have allowed the sanctuary system to become a global leader in advancing marine protected areas as valuable conservation tools for our planet,” said Armor in announcing the

SAVE Spectacular

Celebrating 50 Years of National Marine Sanctuaries

anniversary celebration. “As we look at the many issues facing our ocean and coasts in the next 50 years, I’m reassured that our staff, and those who work with us, will continue to meet these challenges and ensure that sanctuaries continue to thrive for future generations.”

This story originally appeared in Alert Diver Magazine.



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Photo credit: M. Pappish



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KNOW BEFORE YOU GO

A large school of glass minnows swimming over a coral reef in clear blue water. The minnows are densely packed and appear as a shimmering, silvery cloud. The coral reef below is composed of various types of coral, including large, flat, fan-like structures and smaller, more upright ones. The water is a vibrant blue, and the overall scene is a beautiful underwater ecosystem.

Usually once a year, typically in the summer, large schools of glass minnows congregate on shallow coral reefs throughout the Florida Keys. With them come the attendant predators; like barracuda in this photo, but also grouper, jacks, snook and snapper. They are on the reef for a few weeks, the numbers gradually swelling, and then just as quickly, the school dissipates as the predators take their toll. This is at Banana Reef, just north of the popular snorkel attraction known as Grecian Rocks. Photo by Stephen Frink.

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