

Preserving Haiti's marine ecosystems and endangered marine megafauna through community-based conservation, education, research, and ecotourism initiatives in the Baraderes-Cayemites Marine Protected Area

Preservar los ecosistemas marinos de Haití y la megafauna marina en peligro de extinción a través de iniciativas comunitarias de conservación, educación, investigación y ecoturismo en el Área Marina Protegida Baraderes-Cayemites

Préserver les écosystèmes marins d'Haïti et la mégafaune marine menacée grâce à des initiatives communautaires de conservation, d'éducation, de recherche et d'écotourisme dans l'aire marine protégée de Baraderes-Cayemites

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ABSTRACT

The Baraderes-Cayemites Marine Protected Area is an ecologically diverse part of southern Haiti, which includes habitats like coral reefs, mangroves, and seagrass beds. These ecosystems support diverse marine life, including a deep-water nursery for the critically endangered oceanic whitetip shark and nesting sites for the critically endangered hawksbill sea turtles, and are key natural environments for other endangered species such as sperm whales and spotted eagle rays. These ecosystems and species are at great risk due to a combination of unsustainable fishing and poverty, which has led to a significant strain on marine resources. The direct use of charcoal production is responsible for large-scale mangrove removal and degradation, which damages fish nurseries and feeding areas. To preserve, better manage and restore the marine ecosystem in the Baraderes-Cayemites MPA, we established a multi-level approach that includes conservation, education, research, and ecotourism activities involving locals who live in the targeted communities. These activities include education about the value of healthy marine biodiversity, training fishers to identify and document marine megafauna through a monitoring network, and bringing local stakeholders together to develop a community-based management plan for the MPA. Through a realistic and holistic approach, we work alongside local community leaders, fishers, women, and children to facilitate community-led sustainable solutions that protect endangered marine megafauna and their ecosystems while empowering local communities and enhancing their quality of life. Engaging community members in these conservation efforts help to increase their capacity, encourages environmental stewardship, and engages their long-term support for marine biodiversity protection.

KEYWORDS: Haiti's marine ecosystems, endangered marine megafauna, community-based conservation, education, research, and ecotourism, MPA

A review on the effect of fisheries on the population dynamics of multispecies Caribbean parrotfish (Scaridae) populations.

Una revisión sobre el efecto de las pesquerías en la dinámica poblacional de poblaciones de peces loro del Caribe (Scaridae) multiespecies.

Un examen de l'effet de la pêche sur la dynamique des populations de populations multispécifiques de poissons perroquets des Caraïbes (Scaridae).

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ABSTRACT

Achieving an equilibrium within the harvest of keystone species is a delicate balance especially within highly competitive tropical reef environments where conditions fluctuate. Organisms that adopt slightly flexible life histories like Caribbean Parrotfish (Scaridae) can help us acknowledge how population dynamics shift in the face of selective fishing pressures. But as of present there is little focus in the literature on quantifying the rate of harvesting and the correlative effects it has on the local population. Here, we systematically reviewed 164 studies to find consistent relationships between the level of fisheries harvest and fish abundance, terminal phase adults and sex ratios. Across the entire Caribbean region selective fishing has reported to make large individuals rare with the exception of MPA and characteristic species like *Scarus Coelestinus* locally extinct and exceptionally rare in selected locations. We anticipate that this work contributes to future discussions surrounding the ICUN classifications of the Scaridae family especially in conjunction with changing fishery regulations. As, understanding the current state of parrotfish populations can ensure both resilient stocks and ecosystem services for the future.

KEYWORDS: Impact, fisheries, population dynamics, multispecies Caribbean parrotfish (Scaridae) populations

Collaborative acoustic telemetry networks are critical to monitoring movement patterns of migratory elasmobranchs: Case study with whitespotted eagle rays and Western Atlantic pygmy devil rays in the Gulf of Mexico

Las redes colaborativas de telemetría acústica son fundamentales para monitorear los patrones de movimiento de los elasmobranchios migratorios: estudio de caso con rayas águila de manchas blancas y rayas diablo pigmeas del Atlántico occidental en el Golfo de México

Les réseaux collaboratifs de télémétrie acoustique sont essentiels pour surveiller les schémas de déplacement des élasmobranches migrateurs : étude de cas avec des raies aigles à points blancs et des raies pygmées de l'Atlantique Ouest dans le golfe du Mexique

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ABSTRACT

National and regional acoustic telemetry networks with collaborative data-sharing platforms have greatly increased our capacity to monitor migratory elasmobranch movements. The Sarasota Coast Acoustic Network (SCAN), off the west coast of Florida, USA is nested within the collaborative iTAG and FACT array networks which span the Gulf of Mexico (GOM) and US Atlantic coast. The SCAN study area includes estuarine creeks, bays, passes, and coastal waters out to 85 km from shore. Several shark (*C.leucas*, *C.limbatus*, *S.mokarran*, *S.lewini*, *C.plumbeus*, *G.cuvier*, *S.tiburo*) and ray (*A.narinari*, *M.hypostoma*) species as well as snook (*C.undecimalis*) and whelk (*S.sinistrum*) were tagged in the SCAN array between 2016 and 2022 with Innovasea-Vemco acoustic transmitters. Shark species showed patterns of seasonal residency and were also detected outside the SCAN array, while snook and whelk were year-round residents. Data from 80 *A.narinari* and four *M.hypostoma* rays showed seasonal migratory patterns in the GOM. A majority of *A.narinari* detections in spring, summer, and autumn months ranged from Charlotte Harbor through the northern GOM while winter detections ranged south of the SCAN study area to the Florida Keys. Three of the four *M.hypostoma* tagged during summer and autumn months were detected in the northern GOM in winter months. The seasonal differences in movements between these two ray species were likely related to temperature preferences and food availability. Data shared via iTAG and FACT were important in informing seasonal presence and movement patterns, information which is critically needed to effectively manage these endangered ray species.

KEYWORDS: Collaborative, acoustic telemetry networks, monitoring, movement, migratory elasmobranchs, whitespotted eagle rays, Western Atlantic pygmy devil rays, Gulf of Mexico.

Ecosystem and Habitat Restoration in the Caribbean with Nature-Based Solutions, the case study of the Carib-Coast Project**Restauración de ecosistemas y hábitats marinos en el Caribe con soluciones basadas en la naturaleza, el caso del proyecto Carib-Coast****Restauration des écosystèmes et habitats marins dans la Caraïbe avec des solutions basées sur la nature, l'étude de cas du projet Carib-Coast**

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ABSTRACT

"The Regional Activity Center for Specially Protected Areas and Wildlife (SPAW-RAC) supports signatories Countries to the SPAW Protocol with regard to preservation of marine and coastal habitats as well as protection of endangered species (fauna and flora) and listing of established Protected Areas playing a key role in the Caribbean. As part of its work, SPAW-RAC is involved in the EU-funded Carib-Coast Project (2019-2022) led by the French Geological Survey (BRGM). This project aims to gather, build, and broadcast knowledge about coastal erosion risk management in the Caribbean. Indeed, coastal erosion is expected to intensify in the future due to continuous human impacts and climate change effects putting Caribbean States at risk. As part of this project, SPAW-RAC and the French Forestry Office (ONF) launched various pilot projects across the Caribbean (Puerto Rico, Trinidad and Tobago, the Bahamas, Guadeloupe) to restore coastal ecosystems including coral reef, sea grass beds, mangrove and upper beach which are key habitats towards coastal protection and erosion mitigation. These pilot projects are concrete examples of nature-based solutions (NBS) and can serve as best practices for other Caribbean territories facing similar challenges.

Given the importance of GCFI Annual Meetings, it would be an outstanding opportunity to present the results from the Carib-Coast project and share knowledge and skills developed on climate-change adaptation with regional partners."

KEYWORDS: Ecosystem, Habitat Restoration, Caribbean, Nature-Based Solutions, Carib-Coast Project

Vertical habitat use of greater amberjack (*Seriola dumerili*) around artificial structures in the Gulf of Mexico**Uso vertical del hábitat del medregal (*Seriola dumerili*) alrededor de estructuras artificiales en el Golfo de México****Utilisation verticale de l'habitat de la sériole (*Seriola dumerili*) autour des structures artificielles dans le golfe du Mexique**

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ABSTRACT

Studying how fish utilize artificial structures is a key component to understanding anthropogenic effects on the marine environment. Greater amberjack (*Seriola dumerili*) is an overfished reef-associated species that is commonly associated with high-relief artificial habitats such as petroleum platforms. Unfortunately, our understanding of greater amberjack habitat use remains relatively limited. While it is well recognized that greater amberjack utilize petroleum platforms, many decommissioned petroleum platforms are converted to artificial reefs once they are decommissioned, and our understanding of how this process impacts greater amberjack habitat use is not well understood. The present study uses acoustic telemetry with pressure transmitters to examine vertical habitat use of greater amberjack at both a petroleum platform and artificial reef site off the coast of Louisiana in the northern Gulf of Mexico. A single acoustic receiver (Innovasea Systems Inc.; VR2Tx and VR2AR) was deployed at each study site. Greater amberjack (n = 22) were captured by hook and line and tagged internally with transmitters in June 2022 (Innovasea Systems Inc.; V16P-4h; nominal transmission delay 90 seconds, battery life ~2806 days, resolution 0.6 m). Our data will allow us to estimate site fidelity and compare vertical habitat use between a site with continuous vertical relief and one with moderate vertical relief. In addition, we will evaluate how vertical habitat use is influenced by temporal (diel, seasonal) and environmental (flow, temperature) variables. With this information we hope to draw conclusions regarding the importance of petroleum platforms to greater amberjack, and whether artificial reefs provide functionally similar habitat.

KEYWORDS: Vertical habitat, greater amberjack (*Seriola dumerili*), artificial structures, Gulf of Mexico

Increasing post-release survivorship of stone crab and engaging fisher networks to implement best practices

Aumentar la supervivencia del cangrejo moro después de la liberación e involucrar a las redes de pescadores para implementar las mejores prácticas

Accroître la survie du crabe de pierre après la remise en liberté et mobiliser les réseaux de pêcheurs pour mettre en œuvre des pratiques exemplaires

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ABSTRACT

Commercial and recreational stone crab (*Menippe mercenaria*) fisheries primarily occur along the Gulf of Mexico and Atlantic coasts of the southeastern United States and the northeastern Caribbean. This unique claw-only fishery operates under the premise that harvested crabs that are returned to the ocean alive may survive to regenerate their claws and potentially re-enter the fishery, however, a wide range of survival rates casts doubt on the true sustainability of this fishery. We conducted a lab experiment to test two different methods of claw removal- the traditional and most commonly used method against a new induced autotomy (self-removal) method- and found a 28% increase in survival (up to 92% survival throughout the study) when using the new method, compared to the typical method of claw removal (64% survival throughout the study). Most notably, our results suggest that our new method of claw removal significantly increases post-release survival of stone crabs independent of harvester and whether one claw or both claws are removed, meaning it could be implemented into commercial or recreational fisheries with similar outcomes. Following the experiment, we ran a series of training workshops for commercial harvesters and fishery managers in The Bahamas to discuss best practices, the feasibility of implementation and tool design to facilitate this new claw removal method.

KEYWORDS: Post-release survivorship, stone crab, fisher networks, best practices

Leveraging funding to facilitate management: NDNP's Biopama project.**Aprovechamiento de la financiación para facilitar la gestión: proyecto Biopama de NDNP****Mobiliser des financements pour faciliter la gestion: le projet Biopama du NDNP**

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One of the greatest challenges faced by SIDS in marine management is identifying and procuring sufficient financial and technical capacity to enact real-world management initiatives. Marine managed areas are often criticized for their lack of effectiveness. Several tools exist for assessing the effectiveness of management, such as the Management Effectiveness and Tracking Tool (METT), which not only helps managers to assess the effectiveness of the management, but also allows for the identification of gaps which may be prohibiting the improvement of these assessment scores. While the identification of these gaps is extremely useful, there is still a need to secure adequate resources to address these gaps. Many funding sources exist, however, finding ones willing to supply funding for needs specific to the locality can often be difficult; with projects often being written to suit the donor's objectives, rather than the requirements of the management authority. The Biodiversity and Protected Area Management (BIOPAMA) programme provides an opportunity to suitably identify and leverage funding to address specific needs which have been identified as priority areas by management organizations. Here, we demonstrate how, through the use of funding, to address priority needs identified in a METT assessment. Primarily through the procurement and acquisition of a marine patrol and research vessel, the Nelson Dockyard National Park (NDNP) is able to target specific gaps in management, respond to environmental pressures and promote healthier marine ecosystems.

KEYWORDS: funding, management, Nelson Dockyard National Park (NDNP), Biopama project

Multiple new records of the ragged-tooth shark, *Odontaspis ferox*, from the western North Atlantic Ocean**Múltiples nuevos registros del tiburón de dientes irregulares, *Odontaspis ferox*, del oeste del Océano Atlántico Norte****Plusieurs nouvelles mentions du requin à dents en lambeaux, *Odontaspis ferox*, de l'ouest de l'océan Atlantique Nord**

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The ragged-tooth shark, *Odontaspis ferox*, is a circumglobal species inhabiting subtropical and tropical marine waters and is often associated with continental and insular shelves. Although the range for this species is expansive, it is driven by infrequent, isolated observations from disparate regions, resulting in a paucity of biological data. Within the western North Atlantic Ocean there have only been a total of 13 observations of the ragged-tooth shark since first reported in 1989. Through collaboration with recreational and commercial stakeholders we report four new records of the ragged-tooth shark, from the western North Atlantic Ocean and provide additional biological data lacking from this region. Two specimens of unknown sex were caught in the recreational swordfish, *Xiphias gladius*, fishery in the northern Gulf of Mexico (~225 and ~250 cm total length (TL)), a mature male was caught in the South Atlantic Bight (~200 cm TL) by an angler targeting barrelfish, *Hyperoglyphe perciformis*, and another mature male was caught in the Sargasso Sea off Bermuda (~275 cm TL) by a commercial fisher targeting Atlantic wreckfish, *Polyprion americanus*. All four specimens were incidentally caught on rod-and-reel and released alive. The Gulf of Mexico and South Atlantic Bight specimens reported herein contribute to the limited number of ragged-tooth shark interactions in these regions while the observation in Bermuda is the first documented record for this locality. These new records highlight the importance of fostering stakeholder collaborations as fishery dependent observations can help provide a better biological and ecological insight of rare and uncommon species.

KEYWORDS: new records of the ragged-tooth shark, *Odontaspis ferox*, western North Atlantic Ocean

Assessment of the potential raw materials available in Haiti, for a sustainable aquaculture**Evaluación de las materias primas potenciales disponibles en Haití, para una acuicultura sostenible****Evaluation du potentiel des matières premières disponibles en Haïti, pour une aquaculture durable.**

GEORGES JEFF

*Cooperative of Fishermen of Caracol, PN3B, Haiti**georgesjeff1@gmail.com***ABSTRACT**

Aquaculture represents a growing sector worldwide, in 2018, approximately 88 percent (156 million tons) of global fish production was used for direct human consumption. In addition, global aquaculture production reached a new all-time high of 114.5 million tons of live weight in 2018 (The State of World Fisheries and Aquaculture 2020, 2020). All this shows the economic and nutritional importance of this sector, especially in small-scale fisheries where local communities live directly or indirectly from fishing and are forced to fish both to supply the local market, but also to feed their families (Measuring the Contribution of Small-Scale Aquaculture, n.d.). But due to overfishing, in some Caribbean countries like Haiti, the coastal fish biomass is dropping, especially for fish species like parrotfishes, snappers, and groupers, and currently some new invertebrate marine species such as: Holothuroidea. In this context, sustainable aquaculture could be one of the alternatives to fighting overfishing. But aquaculture sector is less developed, even though potentialities of marine areas and freshwater areas are available. Some vegetable and non-vegetables raw materials in terms of aquafeed are already available in Haiti, two of them are: worms and Moringa leaves rich in proteins. The main objective of this poster is to present the nutritional values of some raw materials available in Caribbean countries to help to produce feed for fish in marine or freshwater aquaculture.

KEYWORDS: raw materials, Haiti, sustainable aquaculture

Using growth band counts from gastric mill ossicles to estimate age of Caribbean spiny lobster, *Panulirus argus* (Latreille, 1804), in Bermuda

Uso de recuentos de bandas de crecimiento de huesecillos de molinos gástricos para estimar la edad de la langosta espinosa del Caribe, *Panulirus argus* (Latreille, 1804), en Bermudas

Utilisation du nombre de bandes de croissance des osselets des usines gastriques pour estimer l'âge du homard épineux des Caraïbes, *Panulirus argus* (Latreille, 1804), aux Bermudes

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Size-at-age data are critical for understanding the life history of marine organisms, with relevance for fisheries management. Direct aging of crustaceans has been difficult, as they grow by ecdysis of their exoskeleton and it was believed that this process resulted in the complete loss and replacement of all hard structures. Recently, the discovery of banding in the gastric mill ossicles of several decapod crustacean species suggested a promising method for direct aging, and case studies of the Caribbean spiny lobster, *Panulirus argus*, have shown correlation of band numbers with size and known age. We therefore applied this method to *P. argus* sampled from the local fishery in Bermuda. Banding was consistently identified in all ossicle structures of the gastric mill plate, however the zygo-cardiac ossicles had more distinctive banding than the ptero- and meso-cardiac ossicles. Band counts were reliably reproduced by independent readers, and banding patterns give a plausible estimate of age when compared to carapace length. The highest band count observed was 11, in a female with a carapace length of 138 mm. The data indicate larger size at age and faster growth for males relative to females, concurring with established research and observations of size dimorphism in the landed catch. Importantly, there appears to be considerable variation in size-at-age for both male and female lobsters, implying that size-frequency is not necessarily a reliable proxy for demographics. This study suggests that directly aging *P. argus* in Bermuda using ossicle band counts is feasible, and can be used to inform local fisheries management.

KEYWORDS: growth band counts, gastric mill ossicles, age, Caribbean spiny lobster, *Panulirus argus*, Bermuda

Voices from the Shore Theatre Collective: women fisherfolk learning to apply popular theatre to transform small-scale fisheries

Voces del Colectivo de Teatro costero: mujeres pescadoras aprendiendo a aplicar el teatro popular para transformar la pesca en pequeña escala

Voix du Shore Théâtre Collective: les femmes pêcheurs apprennent à appliquer le théâtre populaire pour transformer la pêche artisanale

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ABSTRACT

This poster documents the almost year-long capacity development of a small group of women fisherfolk in Barbados in the use and application of Popular Theatre. This type of theatre makes use of individual and community participation to highlight social issues and promote transformation. The approach integrates entertainment with the examination of issues and attitudes, knowledge sharing and ultimately initiating action for positive social change. Although used to address several issues within the Caribbean including gender and decent work, women's health, intimate partner violence, HIV and AIDS, and community-building, the application of Popular Theatre to small-scale fisheries has been underutilised but could be valuable to the promotion of social justice for Caribbean fisherfolk; this is critical for achieving sustainable and viable small-scale fisheries. We outline the training process and techniques used; highlight examples of social justice issues that the women recognise from their daily lives and want addressed; and provide observations on the uptake of learning. Women fisherfolk capacity in the use and application of Popular Theatre is being developed by The University of the West Indies Centre for Resource Management and Environmental Studies (UWI-CERMES) Gender in Fisheries Team (GIFT) and the Social Justice Team of Regenerate Barbados, a national environmental network.

KEYWORDS: women fisherfolk, popular theatre, small-scale fisheries

From CARI'MAM project to a sustainable Caribbean network for marine mammal conservation**Del proyecto CARI'MAM a una red caribeña sostenible para la conservación de los mamíferos marinos****Du projet CARI'MAM à un réseau caribéen durable pour la conservation des mammifères marins CARI'MAM**

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ABSTRACT

“Caribbean Marine Mammals Preservation Network” was a regional cooperation project funded by the EU and covering the period 2018-2022. It was led by the Agoa sanctuary (French Antilles) and the Regional Activity Center for the Specially Protected Areas and Wildlife Protocol (SPAW RAC) of the Cartagena convention. Its aim was to strengthen marine mammal conservation in the Wider Caribbean Region through an enhanced cooperation among countries and territories. Its major outputs were: the development of networking tools, a review of current threats and regulations related to marine mammals in the region and the identifications of priority areas for action, capacity building for species monitoring, propositions for a sustainable whale watching, and knowledge enhancement. The project is now concluded but the network is still active, with 273 participants, from 78 organizations and 31 Caribbean territories. We are now aiming to integrate these first steps in a sustainable Regional Activity Network (RAN) to be endorsed by the Caribbean countries through the SPAW protocol governance. The RAN tasks will be defined in the new version of the SPAW Marine Mammal Action Plan currently being developed by the SPAW Species Working Group. We are also raising funding to work on areas identified as a management priority for the region: knowledge enhancement on species distribution and densities, assessment of major threats, and awareness raising.

KEYWORDS: CARI'MAM, sustainable, Caribbean, network, marine mammal conservation

Economic impacts of sargassum inundations are poorly understood: suggested next steps**Los impactos económicos de las inundaciones de sargazo son poco conocidos: próximos pasos sugeridos****Les impacts économiques des inondations de sargasses sont mal compris : prochaines Etapes Suggerees**

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ABSTRACT

Financing the management of pelagic sargassum inundations in the Caribbean remains problematic despite a decade of witnessing significant negative impacts to tourism, coastal ecosystems and the welfare of coastal populations. A key policy constraint to justifying management costs appears to be the dearth of information on the true economic costs of sargassum impacts, especially on ecosystem services of coral reefs, seagrasses and mangroves. This study begins to address this knowledge gap, by drawing insights from a comprehensive review of literature related to (1) measuring the economic losses from sargassum events in the Caribbean, as well as other similar ‘natural hazard’ events such as harmful microalgae blooms and beach-cast macroalgae events, (2) the economic value of coastal and marine ecosystem goods and services in the region and (3) the theoretical foundations of quantifying non-market economic value. Our findings suggest that most studies focus on the value of coastal recreation and tourism whilst underestimating or omitting the value of other ecosystem services provided by coastal ecosystems. As such, potentially important revenue sources or negative economic impacts are being missed. We conclude by providing several key recommendations for future efforts to fill knowledge gaps for measuring economic losses and thus assist policy makers in formulating appropriate and efficient economic policy responses to address the continuing sargassum inundations at both the national and regional scale.

KEYWORDS: Economic impacts, sargassum inundations, next steps

Insights Into Sea Turtle Population Composition Obtained With Stereo-Video Cameras in situ across Nearshore Habitats in the Northeastern Gulf of Mexico**Información sobre la composición de la población de tortugas marinas obtenida con cámaras de video estéreo in situ en hábitats cercanos a la costa en el noreste del Golfo de México****Aperçu de la composition des populations de tortues marines obtenues avec des caméras stéréo-vidéo in situ dans les habitats côtiers du nord-est du golfe du Mexique**TABITHA SIEGFRIED¹, CHRISTOPHER NOREN¹, JACKSON REIMER¹, MATTHEW WARE²,
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Population size estimates are one of the key parameters used in population assessments to evaluate and determine species' conservation status. Typically, sea turtle population estimates are made primarily from nesting beach surveys, which capture only hatchling and adult female life stages and can display trends opposite of the full population. In-water studies are critical to improve our understanding of population dynamics of declining and recovering species as they can target the full range of in-water life stages. This study aims to expand sea turtle population studies within the northeastern Gulf of Mexico (neGOM) by collecting data on sea turtles in-situ using a stereo-video camera system (SVCS). Dive surveys were performed weekly with the SVCS which permits 3D measurements to be extracted from video footage. Straight carapace length (SCL) was measured digitally, and photo-identification was used to document all individuals. Our in-water study observed three species of sea turtle (*Chelonia mydas*, *Caretta caretta*, and *Lepidochelys kempii*) and all neritic life stages (juvenile, sub-adult, and adult) inhabiting artificial habitats. Thirty-three sea turtles were recorded and measured using the SVCS. *Chelonia mydas*, green sea turtles, size ranged from 28.55 – 66.96 cm (mean 43.07 cm ± 11.26 cm standard deviation; SD) and *Caretta caretta*, loggerhead sea turtles (n = 19) ranged from 59.71 – 91.77 cm (mean 74.50 cm ± 11.35 cm SD). Size distribution was impacted by habitat type and species of sea turtles. Our results indicated that artificial reefs may be an important developmental habitat for juvenile green turtles. Filming per unit effort was on average 1.17 turtles/hr. Overall, our novel methodology contributes to an enhanced understanding of the population structure of sea turtle species within the neGOM.

KEYWORDS: Sea Turtle Population , Stereo-Video Cameras, Nearshore Habitats, northeastern Gulf of Mexico

Experiences and Opportunities as an Intern with Okaloosa County Coastal Resource Team**Experiencias y oportunidades como pasante con el Equipo de Recursos Costeros del Condado de Okaloosa****Expériences et opportunités en tant que stagiaire avec l'équipe des ressources côtières du comté d'Okaloosa**

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Internships provide a brief but valuable insight into the diversity of future opportunities and help young adults explore aspects of a career that they may not have known existed. As a high school student, the Okaloosa County Coastal Resource team has provided me with a multitude of experiences and opportunities.

During my nine-week internship, I participated in events that highlight both local and international values such as an annual pier cleanup at the Okaloosa Island Pier and the International Coastal Cleanup Day. Through these events I learned how global issues, like pollution, are managed at the local level and got to experience a day of community contribution to an international cause.

I participated in experiences surrounding the protection of sea turtles and marine life. In particular, a weekly event at the Gulfarium called C.A.R.E.ing for Turtles, which provides outreach and education to the public about sea turtle conservation. I observed a sea turtle nest evaluation where I learned about sea turtle nesting trends in northwest Florida. Additionally, I joined the team on an artificial reef deployment. These experiences were eye-opening to what efforts are being implemented by the Coastal Resource team to enhance and protect the marine environment.

Each of these opportunities provided me with valuable knowledge and experience that can be applied to future environmental and marine science careers I hope to pursue. While being fun and engaging, internships also provide insight into aspects of a career field that may be a better fit to future desires than others.

KEYWORDS: Experiences, Opportunities, Internship, Okaloosa County Coastal Resource Team, Florida, USA

Sea turtle nesting trends and outreach efforts in Okaloosa County, Florida, USA**Tendencias de anidación de tortugas marinas y esfuerzos de divulgación en el condado de Okaloosa, Florida, EE. UU.****Tendances de nidification des tortues marines et efforts de sensibilisation dans le comté d'Okaloosa, Floride, États-Unis**

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Four species of sea turtles commonly occur in Gulf of Mexico waters and nest on the beaches of northwest Florida. Although sea turtle nesting is less dense in Okaloosa County than areas on the East coast of Florida, sea turtle nests are still observed, documented and protected every year. With these nesting trends comes conservation efforts. The Destin – Fort Walton Beach Coastal Resource Division has started to build a program that focuses on improving sea turtle conservation efforts through public engagement, outreach, and education.

In order to better understand where the most effort is needed, we have been evaluating nesting trends in Okaloosa County since the year 2000. Each morning from May 1 – October 31, Coastal Resource staff look for evidence of sea turtle emergence and nesting. Seasonal nesting data in Okaloosa County has shown a slightly negative nesting trend within the past five years. Another observable comparison is the differences in nests laid between developed and undeveloped beaches. In 2021, only 3 of the 37 (8.1%) nests were laid on the 9-miles of developed beaches that Coastal Resource staff survey.

The Coastal Resource Team has worked to improve conservation efforts in Okaloosa County by increasing the amount of outreach and education being conducted for the public. These initiatives include free turtle-friendly flashlights, providing lectures on sea turtle conservation, developing a library of resources for staff and others to utilize, and the most successful initiative is a weekly event called C.A.R.E.ing for Turtles.

The Coastal Resource Team has new initiatives and programs planned for the upcoming seasons to increase public engagement and awareness. Assessing nesting trends will also allow the team to come up with solutions to increase nesting activity and conservation efforts.

KEYWORDS: Sea turtle nesting, outreach, Okaloosa County, Florida, USA

Warming sea surface temperature trends in the Florida Keys: Implications for queen conch (*Aliger gigas*) metapopulation persistence

Tendencias del calentamiento de la temperatura de la superficie del mar en los Cayos de Florida: Implicaciones para la persistencia de la metapoblación del caracol rosado (*Aliger gigas*)

Tendances du réchauffement de la température de surface de la mer dans les Florida Keys : implications pour la persistance de la métapopulation de lambis (*Aliger gigas*).

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ABSTRACT

The world's oceans are warming which could cause an existential threat to organisms that inhabit shallow marine waters. Our previous research has demonstrated that queen conch (*Aliger gigas*) are reproductively inactive in nearshore areas of the Florida Keys; yet, reproduction occurs normally in offshore, backreef habitats. There is scant evidence for anthropogenic contaminants or endocrine disrupting compounds as the cause of these reproductive anomalies, but our more recent work has implicated extreme water temperatures as a potential cause. Thus, we used the Florida Keys Hybrid Coordinate Ocean Model (FKEYS-HYCOM) to extract sea surface temperature (SST) data on a fine scale for the period 2004-2020. To quantitatively analyze the spatial and temporal components of these data, we used the Emerging Hot Spot Analysis tool in ArcPro 2.8. Mean SST and extreme temperatures (i.e., > 30°C) in the Florida Keys show statistically significant increasing trends. The Emerging Hot Spot Analyses showed extreme temperature areas to be clustered in the shallow nearshore waters of the Keys, but new hot spots emerged along the reef tract as well, especially in the Lower Keys and Marquesas regions. The Upper Keys was the only region that were not subject to extreme temperatures along the reef tract. If SST trends continue their current trajectory, queen conch in the breeding aggregations located along the shallow waters of the reef tract could become negatively impacted like those nearshore. Should this occur, reproductive output and recruitment would be diminished with serious consequences for metapopulation persistence.

KEYWORDS sea surface temperature, Florida Keys, queen conch.