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Dr. James “Buddy” Powell during a manatee health assessment in Belize

UNION INTERNATIONALE POUR LA CONSERVATION DE LA NATURE ET DE SES RESOURCES
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WORDS FROM THE EDITOR

Dear readers,

Putting together *Sirenews* Issue 82 has been, without question, the hardest task I have ever faced as editor, for my beloved co-editor, mentor, and friend, Dr. James "Buddy" Powell, is not here beside me. Buddy stepped in as co-editor of Sirenews in 2005, when Dr. Daryl Domning concluded 21 years of remarkable service (1984–2005). For two decades, Buddy helped shape the spirit, quality, and continuity of this bulletin.

Losing Buddy broke my heart. These past months, I have moved through anger, disbelief, and numbness, unable to fully accept a world where he is no longer just a call, a message, or an encouraging word away. Working on this issue has made the nightmare painfully real.

Issue 82 includes Buddy's *In Memoriam*, something I never imagined I would have to compile, but it also carries something beautiful: contributions from many of the places where Buddy pioneered efforts to advance manatee conservation and understanding. From West Africa to the United States, Central America, and the Greater Antilles, this issue reflects the breadth of his life's work and the global community he nurtured.

These pages are filled with the voices of students, colleagues, and conservation leaders whom Buddy mentored, guided, and inspired with his characteristic kindness, humility, and compassion. Today, they represent the future of manatee conservation, because with Buddy, it was never about personal success or recognition, but about the collective good, shared progress, and the wellbeing of the animals and communities he cared for so deeply.

My hope is that this issue not only honors Buddy's extraordinary legacy but also inspires all of us to continue the journey he began. May we carry forward his generosity, his scientific rigor, his love for manatees, marine conservation and science, and his unwavering belief that we can achieve more when we work together.

With deep gratitude,
Anmari Álvarez-Alemán
Editor, Sirenews

IN MEMORY OF DR. JAMES (BUDDY) POWELL
1954-2025

Loving Tribute to my Friend
Dr. James A. Powell (Buddy)

My journey with Buddy began in Crystal River in 1978 and ended in Crystal River in 2025. It was a long journey. Buddy was compassionate, well-liked, articulate, diplomatic, an outstanding biologist, and I was fortunate to have him as a mentor, colleague, and a dear friend. We shared many adventures while studying manatees in Florida, Puerto Rico, Belize, Costa Rica, Jamaica, and Cuba. He transformed my life and made me a better person. When Cathy and I moved to Florida in 1978 to join the USFWS Sirenia Project we were welcomed by Buddy and he eagerly helped us settle in. He took us on our first dive with manatees in Crystal River, and that same year I heard him give a presentation on manatees at the UF Wildlife Department. I listened to him speak about their general biology – lessons that stay with me to this day.

In those early years Buddy had a black Labrador Retriever named Bahia. He had trained this dog to jump off the research boat, swim to the bottom, fetch a stone he had tossed into the water, and bring it back to the boat. I vividly remember when I was in the water photographing manatees; Bahia, without my noticing, swam down about 10 feet, looked me in the eye through my face mask, then darted further to the bottom to retrieve the stone. Buddy was also an accomplished pilot, which prepared him for observing details and recording information in the wild. I always felt comfortable flying with Buddy, with sweet Bahia curled up asleep in the small cargo compartment of the Cessna 152.

Figure 1. Buddy Powell and Woddie Hartman (to the right of the photo) during the manatee surveys in Crystal River. Photo shared by Jodi Hartman.

Buddy was a major influence in shaping my 47-year career in sirenian research and he ignited my passion for conservation. Notably, Buddy holds the record as the longest researcher to study manatees – 58 years – beginning with his work with Dr. Daniel Hartman (Woodie) in Crystal River in 1967 (Figure 1). With Buddy's help, Woodie published the first article "Manatees in Peril" for National Geographic in September 1969. At 17 years old, a young Buddy consulted on the 1972 famous Undersea World of Jacques Cousteau Odyssey documentary "The Forgotten Mermaids". The publication and that program alone brought the plight of the manatees to the attention of the general public and set the stage for future protection efforts. In fact, on 15 April 1969 the Tampa Tribune reported that Buddy had proposed the establishment of the first manatee protection areas for Crystal River. Unfortunately, the idea was not adopted by the local governing bodies and it was not until 1981 that the first refuges for manatees were enacted in Crystal River. Today the educational and conservation programs in Florida are deemed a successful model for the utilization of manatee ecotourism and awareness in other countries.

Figure 2. Manatee Health Assessment at Blue Springs, January 1979. Buddy Powell, Cathy Beck and Bob Bonde. Photo credit: Suse Shane.

Buddy was perpetually positive, friendly, charismatic, loyal to his family (wife Maureen and daughter Morgan), and dependable. His education began as a teenager working with Woodie in Crystal River (Figure 1), followed by undergraduate studies at Stetson University and a BSc in Wildlife Biology from the University of Florida, a Master's degree in Marine Affairs from the University of Washington, and a Doctorate in Zoology from Cambridge University, England. But Buddy was sure to not let schooling interfere with his education; he was a true field biologist. Swimming with manatees for the first time at five years old, he chose to spend much of his early years in his small boat on the water in Crystal River.

He had an eye for observing wildlife and an innate ability to understand the value of conservation. In 2000 he was awarded a distinguished Pew Fellow for his enduring work across Belize, Brazil, Cameroon, Colombia, Cuba, Guatemala, Guinea-Bissau, Ivory Coast, Mexico, and Senegal. He would always question "why are we here and what are we doing?" to aid in his conservation ethic. Additionally, he was just recently recognized, along with Sylvia Earle, for his outstanding efforts to protect our fragile oceans.

Buddy wore many hats: he was a one of the founding members in 1976 of the Sirenia Project of the USFWS, a Manager of Glover's Reef Marine Preserve in Belize for the Wildlife Conservation Society in 1996, Director for Marine Mammals at the Florida Fish and Wildlife Conservation Commission in 1997, a researcher and Vice President for Wildlife Trust in 2001, editor of IUCN Sirenews in 2005, and co-chair of the SSC-IUCN Sirenia Specialist Group. He was the founder of Sea to Shore Alliance in 2008, and finally, merged Sea to Shore Alliance with Clearwater Marine Aquarium as the Chief Zoological Officer and Director of the newly formed CMA Research Institute in 2019. He served on many graduate student committees - Nicole Auil Gomez, Jamal Galves, and Celeshia Guy Galves in Belize; Lucy Keith Diagne in Senegal; Daniel Gonzalez-Socoloske in Central America; and Anmari Alvarez-Alemán in Cuba. Buddy had an open-door policy by inviting many students and professionals to our manatee captures in Belize that resulted in no less than 16 dissertations and theses, plus numerous publications and reports. Most notably were his loyal staff: Monica Ross, Martha Wells, Susan Kahraman, Julie Hughes, Cyndi Taylor, Nicole Auil Gomez, Lucy Keith, Jamal Galves, Nicole Bartlett, Celeshia Guy Galves, Anmari Alvarez-Alemán, Jennifer Galbraith, Melanie White, Sarah Farinelli, Kerry McNally, and countless others that provided support for this remarkable man and his innovative ideas.

Figure 3. Buddy during his last two expeditions in Belize. Top: Belize expedition participants. Bottom: Buddy teaching his colleagues to prepare satellite tags.

Figure 4. CMARI staff during a research institute retreat in 2023.

Buddy received numerous awards, including the prestigious Pew Fellowship in 2000, and achieved many of his lifelong goals. While in Africa in 1986, he successfully caught, radio-tagged, and tracked manatees, then studied the ecology of African forest elephants in the Ivory Coast using similar telemetry tools for his doctoral research. In Belize, his ability to think like a manatee enabled him to master catching them with nets in open water, and he invited and trained many international researchers to join the project. Those that were enriched by the experiences shared by Buddy are some of the most recognized sirenologists and conservationists in the field today. Buddy was also an integral part of the conservation efforts for studying the endangered Atlantic right whales and coordinated much of the aerial survey detection and monitoring efforts for this species.

His talent for story-telling and vivid descriptions made his communication engaging and effective. He lived the life of a hero and championed the many challenges he encountered with strategic, sound scientific approaches. Throughout our careers, we always kept in touch, and with his passing I lost a piece of my soul that I will never recover. Buddy passed away at 70 of cancer in Crystal River, close to where he was born. I will miss my dear friend and always cherish our time together. Until we meet again, my friend, I will hold close your kindness and friendship. May you now rest in peace and find solace in the oceans of heaven.

Bob Bonde

IMPORTANT NEWS

Report on 'A global assessment of dugong status and conservation needs'

The Convention of Migratory Species/UNEP/Dugong MOU report: 'A global assessment of dugong status and conservation needs' was launched at the World Conservation Congress in Abu Dhabi UAE on October 12. The 342-page report synthesizes the science, expert knowledge, and field data to guide conservation actions to protect dugongs and their seagrass habitats across the species' range.

The report contains 11 chapters: 9 regional chapters bookended by an introductory chapter and a final chapter summarizing its Key Learnings. The report is the work of more than 70 dugong scientists. Between 5 and 11 regional experts co-authored each of the regional chapters, which all have separate citations as indicated at the beginning of each chapter.

The take-home message of the report is that the status and conservation needs of the dugong vary greatly throughout its range. Co-operation within regions is vital. The Dugong MOU developed under the Convention on the Conservation of Migratory Species of Wild Animals is key to facilitating regional cooperation to guide the development and delivery of practical conservation initiatives for dugongs and their habitats.

The report can now be found in several places on the internet.

CMS has uploaded both the full report and its Executive Summary only to:
https://dugong.cms.int/publication/global-assessment-dugong-status-and-conservation-needs

The DOI link is via JCU at:
https://researchonline.jcu.edu.au/86161/

A 7-minute video about the report is on YouTube at
https://youtu.be/9qhsW0-dYfU and can also be accessed via the DOI link.

All the authors hope that the report is used to make a difference to dugong conservation.

Helene Marsh
helene.marsh@jcu.edu.au

Membership of Sirenia Specialist Group

Thanks to all of you who managed to apply to join the Sirenia Specialist Group 2025-29 before membership applications were paused to enable a refresh of the IUCN Commission System. This System has temporarily shut down for setting up the necessary administrative and governance structures to ensure a smooth transition into the new cycle.

This means that it is not possible to add members to the Sirenia Specialist Group until February 2026. In contrast to how it worked in the past, all members registered in the Commission System by 8 August 2025, will automatically roll over for 2026-2029, unless members select to opt-out. We will review the membership again when the system opens and call for new nominations in the April 2026 Edition of *Sirenews*.

Helene Marsh and Anmari Alvarez
Co-Chairs

LOCAL NEWS

BELIZE

Longitudinal study of the Greater Caribbean Manatee (*Trichechus manatus manatus*) identifies a 28-year-old female as the oldest known living and longest studied manatee in Belize

Health assessment, tagging, and satellite tracking represent critical methodologies widely employed by scientists to evaluate population structure, status, health, genetic diversity, threats, movement patterns, behavioural ecology, and habitat utilization of the Greater Caribbean manatee (*Trichechus manatus manatus*), a subspecies of the American manatee (*Trichechus manatus*). Belize is home to the longest-running longitudinal study of this subspecies within the Greater Caribbean region.

The Belize Manatee Health Assessment, Tagging, and Tracking Project was pioneered by Dr. James "Buddy" Powell, Dr. Robert Bonde, and Nicole Auil Gomez in collaboration with the Belize Coastal Zone Management Authority and Institute. During the early phases of the research program, biannual expeditions were conducted to investigate seasonal variation in manatee distribution. The first formal capture and health assessment expedition in Belize commenced on 20 November 1997 in Gales Point, Southern Lagoon. During this inaugural expedition, three individuals were captured and health assessed, marking the initiation of the Belize Manatee Capture Log. Each manatee assessed was implanted with a Passive Integrated Transponder (PIT) tag to enable future identification and monitoring. Individuals were also assigned a unique identification code using the following format: [Country Abbreviation – Year – Sex – Sequential Number]. Where appropriate, manatees were also given names for ease of reference.

The first individual assessed in Belize was an adult male designated BZ-97-M-01. The other two were a cow-calf pair captured concurrently within Southern Lagoon: an adult female BZ-97-F-02, named "Maureen," and her dependent calf BZ-97-F-03, named "Morgan," both named in honor of Dr. Powell's wife and then infant daughter.

The male manatee BZ-97-M-01 was subsequently recaptured in Southern Lagoon in 2002, 2003, and 2004, but has not been documented since. The female, BZ-97-F-02 (Maureen), and her calf, BZ-97-F-03 (Morgan), were recaptured together on 18 February 1999, approximately 15 months after their initial capture. On 15 August 1999, the adult female was again recaptured; but this time in the absence of her calf suggesting that natural weaning had occurred. Maureen was recaptured twice in 2000 and annually from 2001 through 2004, with her final documented recapture occurring in June 2010.

Figure 1. BZ97F03 (Morgan) recaptured in Southern Lagoon on November 21, 2004.

Figure 2. BZ97F03 (Morgan) recaptured in Southern Lagoon on May 27th, 2025.

Morgan was first recaptured without her mother in March 2002. She was subsequently recaptured multiple times; twice in 2004 and 2005, and annually in 2006, 2007, 2009, and 2012. Following a 12-year period without sightings, Morgan was fortuitously recaptured during the most recent health assessment expedition in Quashie Trap, Southern Lagoon, Belize on 27 May 2025. This year's recapture marks Morgan's 12th health assessment. At present, Morgan is estimated to be 28 years old but is smaller than other individuals in her age class. While her recent straight and curved lengths of 277 cm and 280 cm are the longest measurements recorded for her over the years, her current weight of 288 kg is less than her 2012 weight of 329 kg. Despite being thin, Morgan was deemed to be in generally "good" condition. Her small size may be attributed to a recent record of limited foraging resources in the area. Throughout the duration of this longitudinal study, Morgan has never been documented outside the Southern Lagoon system, supporting her classification as a resident individual. In 2025, Morgan was satellite tagged, and initial tracking data confirms her localized movement within the Southern Lagoon system.

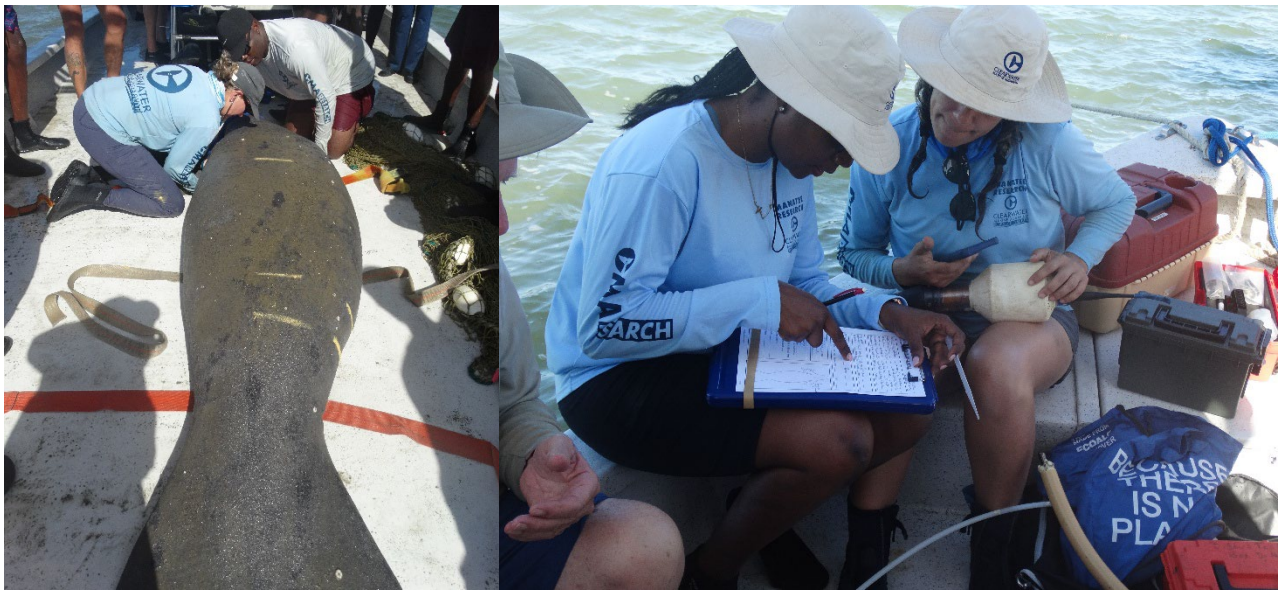

Figure 3. BZ97F03 (Morgan) being health assessed in 2025 by Drs. Adrienne Atkins and Aristide Takoukam Kamla (left to right); and tagging data being recorded from a previous capture in Southern Lagoon on November 21, 2004 Celeshia Guy and Dr. Anmari Alvarez Aleman.

The recapture of Morgan highlights: (1) the scientific and conservation value of these long-term research and monitoring efforts, and (2) the importance of the Gales Point Wildlife Sanctuary as a haven for resident manatees. Morgan is currently recognized as the oldest known living and longest-monitored manatee in the Belize Manatee Capture Log, representing a key case study for understanding long-term site fidelity, health status, and survival within this critical habitat. Since the inception of this research project, 209 manatees have been health assessed and included in the Belize Manatee Capture Log.

This year's Belize Manatee Health Assessment and Tagging Research expedition was the first to be conducted in the absence of Dr. Powell. The success of the 2025 Belize Manatee Health Assessment and Tagging Research, including the notable recapture of Morgan, stands as a testament to the exemplary mentorship and capacity-building efforts of Dr. James "Buddy" Powell, who effectively trained and empowered his research team to independently sustain and advance this long-term study in Belize. The team is committed to continuing the Belize Manatee Health Assessment and Tagging research program as a tribute to Dr. James "Buddy" Powell's pioneering legacy.

-Celeshia Guy[1], Jamal Galves[1], Cathy Beck[3], Sarah M. Farinelli[2], Anmari Alvarez Aleman[2], Robert K. Bonde[3]

[1]Clearwater Marine Aquarium Research Institute Belize, Belmopan, Belize
[2]Clearwater Marine Aquarium Research Institute, Clearwater, Florida, United States
[3]U.S. Geological Survey, Wetland and Aquatic Research Center, retired

BRAZIL

Alliance for Manatees convenes during ENCOPEMAQ (June 2025, Brazil)

The Alliance for Manatees is a South America–wide collaborative initiative coordinated by Dr. Carol Meirelles (Marine Mammal Research Unit/University of British Columbia) that brings together American manatee knowledge holders to co-develop data-driven tools, such as habitat models, priority area maps, and outreach strategies to support the species' conservation. Between 2024 and 2025, the Alliance received financial support from Nuremberg Zoo, Pairi Daiza Foundation, Yaqu Pacha e.V., and IUCN Species Survival. While attending the Brazilian Aquatic Mammal Conference (IX ENCOPEMAQ, June 2025), organized by Aquasis, some of the Brazilian members of the Alliance met to review model results and coordinate upcoming deliverables (Figure 1). During the event, habitat-model results for six Brazilian areas were presented, refined with contributions gathered at the 2024 workshop, and shared preliminary priority-area maps for conservation (Figure 2). Participants discussed the findings, raised questions about avenues for future refinement, and, after considering methodological limitations, endorsed the products presented. The next step is to compile the results into a concise report to be shared with decision-makers, aimed at informing municipal planning, protected-area management, and other conservation actions. The group also reviewed the continuity of Alliance activities, anchored to the action points identified in 2024, and explored funding opportunities to sustain collaborative actions, field training, outreach, and data mobilization across countries. The meeting emphasized the importance of standardized workflows and the integration of expert knowledge with model outputs to produce management-ready, cross-border products.

Figure 1. Brazilian members of the Alliance for Manatees at ENCOPEMAQ 2025 — First Brazilian Alliance meeting, Fortaleza (Ceará), 18 June 2025, hosted by Aquasis.

Figure 2. Alliance for Manatees session at ENCOPEMAQ 2025 — Presentation of Brazil's six-area habitat models and preliminary conservation-priority maps.

-Carol Meirelles [1,2,3,4], Danielle S. Lima[3,5], Claudia Funi [3,6], João C. G. Borges [3,5,7], Vitor L. Carvalho [2,3,4], Katherine F. Choi [2], Bruno Stefanis [8], Iran C. Normande [9,10], Miriam Marmontel [3,4,11], Sávia Moreia [3,12], M. Danise de O. Alves [4,13], Letícia Gonçalves[2], Aline Ramos[2], Renata S. Sousa-Lima[14]

[1] Marine Mammal Research Unit, The University of British Columbia, Vancouver, British Columbia, Canada
[2] Associação de Pesquisa e Preservação de Ecossistemas Aquáticos – Aquasis, Iparana, Ceará, Brazil
[3] Network for Research and Conservation of Sirenians in the Amazon Estuary – SEA, Tefé, Amazonas, Brazil
[4] Sirenia Specialist Group, IUCN
[5] Projeto Viva o Peixe-Boi-Marinho, Fundação Mamíferos Aquáticos, , São Cristóvão, Sergipe, Brazil
[6] Instituto de Pesquisas Científicas e Tecnológicas do Estado do Amapá – IEPA, Macapá, Amapá, Brazil
[7] Programa de Pós-Graduação em Ecologia e Sustentabilidade, Universidade Federal da Paraíba, Rio Tinto, Paraíba, Brazil
[8] Instituto Biota de Conservação, Maceió, Alagoas, Brazil
[9] Instituto Chico Mendes de Conservação da Biodiversidade, Jequiá, Alagoas, Brazil
[10] Laboratório de Ecologia e Conservação no Antropoceno, Universidade Federal de Alagoas (UFAL), Maceió, Alagoas, Brazil
[11] Instituto de Desenvolvimento Sustentável Mamirauá (IDSM), Tefé, Amazonas, Brazil
[12] Instituto Bioma, Belém, Pará, Brazil
[13] Secretaria de Meio Ambiente e Sustentabilidade de Pernambuco e Fernando de Noronha (SEMAS/PE)
[14] Laboratory of Bioacosutics, Universidade Federal do Rio Grande do Norte (UFRN), Natal, Rio Grande do Norte, Brazil.

Brazilian News – Part II: The *Antillean manatee* (*Trichechus manatus manatus*) listed as "Endangered" in the state of Maranhão, North Brazil

As of May 7, 2025, the official list of vertebrate fauna threatened with extinction in Maranhão state, Brazil, was published. Seven marine mammals, including the Antillean manatee (*Trichechus manatus manatus*) and the Araguaian dolphin (*Inia araguaiaensis*), had their conservation status evaluated by a team of experts, stakeholders, and local officials during regional workshops held in 2024 and 2025. The manatee has been listed in the state Official List: https://sema.ma.gov.br/noticias/governo-do-maranhao-publica-lista-de-especies-da-fauna-de-vertebrados-ameacadas-de-extincao. In Maranhão, the Antillean manatee is expected to occur all along the mangrove fringed coastline, penetrating bays and inlets, including important Conservation Units, such as the Baía do Tubarão, Cururupu, and Arapiranga-Tromaí Extractive Reserves, but with discontinuity in the coastal zone of the Lençóis Maranhenses National Park. In the Bay of São Marcos, near São Luís, the capital of the state, the species was opportunistically sighted during efforts aimed at studying Guianan dolphins (*Sotalia guianensis*) in areas close to port terminals, highlighting the need for targeted efforts and methodologies to protect the species in the region. Despite historical records and occasional strandings (Figure 1), there is no recent reports of hunting directed at the consumption of the species in more than 400 ethnobiological questionnaires applied in the municipalities of the Reentrâncias Maranhenses (Ristau, personal communication; AMARES Institute collection). However, along the coast of Maranhão, several individuals have already been rescued, alive or dead, which reinforces the need for constant monitoring of the species' populations. Due to the continued population reduction, habitat degradation, and decreased connectivity among the populations, the Antillean manatee (*Trichechus manatus manatus*) was classified as Endangered" (EN) based on the IUCN A4ce criteria.

Figure 1. Dead calf of Antillean manatee rescued on Baía do Tubarão Extractive Reserve, coast of Maranhão, Brazil. Photo by M.D. Vidal.

-Attademo, FLN[1]; Costa, AF[2]; Emin-Lima, R[3]; Filgueira, CHMS[4]; Moreira, H[3].; Ristau, N[5]; Siciliano, S[6]; Vidal, MD[7] (in alphabetical order)

[1]Universidade Federal Rural do Semi-Árido (UFERSA), Programa de Pós-Graduação em Ciências Animais and Instituto Chico Mendes de Conservação da Biodiversidade, Centro Nacional de Pesquisa e Conservação de Mamíferos Aquáticos (ICMBio/CMA)

[2]GEFMAR – NGI ICMBio APA Costa dos Corais and Grupo de Estudos de Mamíferos Aquáticos da Amazônia (GEMAM), Museu Paraense Emílio Goeldi (MPEG)
[3]Instituto Bicho D'água: Conservação Socioambiental and Grupo de Estudos de Mamíferos Aquáticos da Amazônia (GEMAM), Museu Paraense Emílio Goeldi (MPEG)
[4]Programa de Pós-Graduação em Ecologia e Recursos Naturais – PPGERN, Universidade Estadual do Norte Fluminense Darcy Ribeiro – UENF
[5]Instituto Amares – Pesquisa e Conservação de Ecossistemas Aquáticos
[6]Departamento de Ciências Biológicas, Escola Nacional de Saúde Pública/Fiocruz and Grupo de Estudos de Mamíferos Marinhos da Região dos Lagos (GEMM-Lagos)
[7]Centro Nacional de Pesquisa e Conservação da Sociobiodiversidade Associada a Povos e Comunidades Tradicionais (CNPT/ICMBio)

The manatee and the history of Brazil: a 525-year dive

Few animals are as deeply linked to the historical and cultural formation of Brazil as the Sirenians. Since the first reports of the arrival of the Portuguese, these aquatic mammals appear in travelers' chronicles, descriptions of missionaries, and even in classic literature. Sometimes seen as a source of food and oil, sometimes confused with mythical beings such as mermaids, sometimes revered as a cultural symbol, manatees cross centuries of our history (Figure 1).

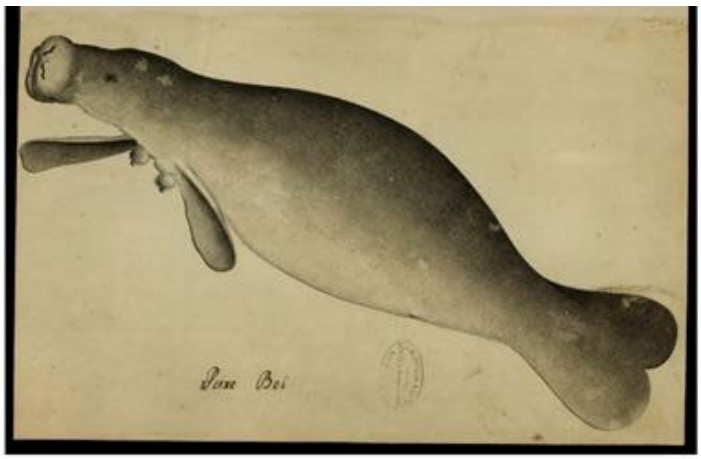

Figure 1: Ink illustration of a manatee (*Trichechus* sp) obtained during Alexandre Rodrigues Ferreira's trip to Brazil.

A new study, published in the Brazilian Journal of the Environment, revisits 525 years of records on the sirenians, reveals how the trajectory of manatees is intertwined with colonization, the economy and the social transformations of the country. The article is entitled "Sirenians in Brazil: The history from the arrival of the Portuguese in the country to the present day" and can be accessed at the link.

https://www.revistabrasileirademeioambiente.com/index.php/RVBMA/index

The research brought together historical sources, legal documents, news reports and scientific literature to reconstruct the relationship between humans and manatees in Brazil (Figure 2). The work shows how systematic hunting, intensified since the colonial period, drastically reduced their populations. On the other hand, from the second half of the twentieth century, conservation initiatives emerged, such as the Manatee Project of ICMBio/CMA, which transformed manatees into flagship species for the protection of Brazilian biodiversity. More than a historical survey, the article sheds light on current challenges: habitat fragmentation, pollution, and increasing

Figure 2: 100 cruzeiros coin, made of stainless steel by the mint in the 1990s.

pressures from human activity in coastal and Amazonian areas. The authors highlight that effective conservation depends on the continuity of protection actions, the strengthening of inter-institutional public policies, and the engagement of local communities.

Throughout the narrative, manatees emerge not only as witnesses to the history of Brazil, but also as protagonists of a journey that goes from exploration to hope for conservation.

Do you want to know how the manatee went from being a food for colonial expeditions to being an icon of national biodiversity conservation? Download our article.

-Fernanda Loffler Niemeyer Attademo[1,2], Salvatore Siciliano[3,4], Fábia de Oliveira Luna[2]

[1] Universidade Federal Rural do Semi-Árido / Programa de Pós-Graduação em Ciências Animais (UFERSA/PPGCA)
[2] Instituto Chico Mendes de Conservação da Biodiversidade / Centro Nacional de Pesquisa e Conservação de Mamíferos Aquáticos (ICMBio/CMA)
[3] Fundação Oswaldo Cruz / Escola Nacional de Saúde Pública (FOC / ENSP)
4GEMM-Lagos

CUBA

Integrating Citizen-Science, Visual Transects and Drone Surveys to Study Manatees in "Ciénaga de Zapata" National Park, Cuba

Cuba harbors substantial areas of suitable manatee habitat, but the distribution, abundance, and status of Cuban manatees remain poorly documented. The country's complex coastal and inland lagoon systems contribute both to habitat availability and to survey difficulties for the species (Alvarez-Alemán et al., 2018). Zapata Peninsula on Cuba's southern coast is a vast and complex wetland system that includes riverine channels and coastal lagoon systems, such as the Hatiguanico River, "Salinas de Brito" habitat, and Tesoro Lagoon, all of which comprise key elements of potential habitat for the Greater Caribbean manatee (*Trichechus manatus manatus*). The Hatiguanico River and adjacent "Ensenada de la Broa", a shallow inlet with a significant abundance of seagrass beds, have been repeatedly identified as important habitats for manatee occurrence and conservation focus in the Zapata Peninsula (Figure 1) (Alvarez-Alemán et al., 2018).

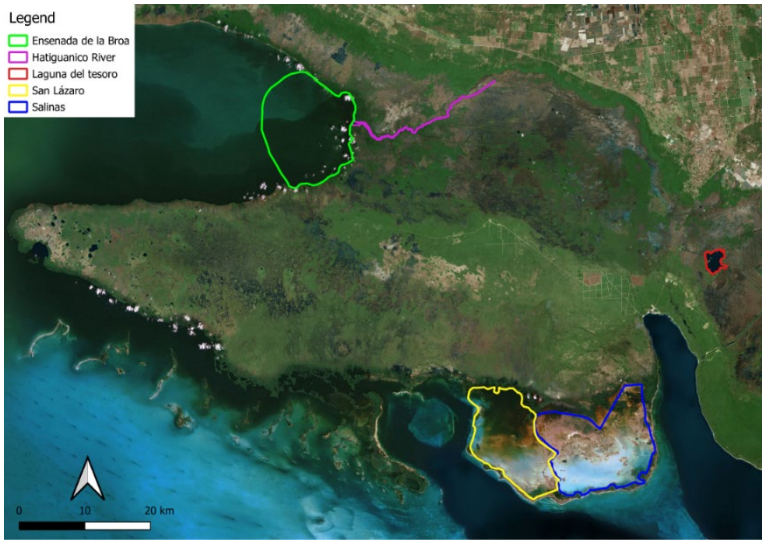

Figure 1: Map showing a satellite view of Zapata Swamp, signaling "Salinas de Brito", San Lázaro, "Lagunna del Tesoro", Hatiguanico River, and "Ensenada de la Broa", Areas which comprise key elements of potential habitat for the Greater Caribbean Manatee (*Trichechus manatus manatus*).

The "Salinas de Brito" sector comprises extensive shallow saltwater flats and lagoon

systems typical of the region, but manatees are now very rarely seen there, despite one of its lagoons being historically known as the “Laguna de los Manatíes” because sightings were once common. Meanwhile, the Tesoro Lagoon is a large inland freshwater body not connected to the sea; therefore, manatees do not naturally access it. Historical records indicate that six individuals were translocated there in 1964 from nearby habitats, and two additional animals in 1990, but the population has since decreased drastically, due to poaching, entanglement in fishing nets, and boat collisions.

The area is a National Park (NP) (since 1995), UNESCO Biosphere Reserve (since 2000) and RAMSAR Site (since April 12 2001), due to its unique biodiversity features. However, there is a significant concern with the risk that anthropogenic activities pose for the species in the area, the limited understanding of manatee distribution in the Hatiguanico River and adjacent areas of the NP, and as consequence the effectiveness of conservation measurements that are required within the MPA. With the imminent pressure of intense commercial fishing development by the government, and other local initiatives, it is crucial to understand manatee usage within the different habitats of this MPA, which will translate in better protection.

We started a conservation project to implement multi-technique approaches in order to describe the spatio-temporal dynamic of manatee presence within the NP, describe habitats and detect any remnant individuals from the translocated population. At the same time, we developed actions to improve conservation and increase awareness.

This study aims to compare three complementary survey methods to improve manatee detection and to better understand habitat use across the “Cienaga de Zapata”NP: (1) Citizen science, via standardized sighting log sheets distributed to recreational fishing guides; (2) Systematic boat-based visual transects, covering accessible channels, the Tesoro lagoon, the river and the seagrass beds ecosystems from “Ensenada de la Broa”; and (3) Aerial drone (UAV) surveys, sampling the same area sampled with the visual transects, adding some channels in the case of the lagoon.

Citizen-science surveys and low-cost community monitoring have proven useful for manatee detection elsewhere and can provide broad temporal coverage when integrated with formal surveys (Cubero-Pardo et al., 2024). Drone-based approaches and UAVs have increasing evidence of high detection ability for *Trichechus* species and can substantially improve detection in complex shallow systems when properly flown and analyzed (Farinelli et al., 2024; Sánchez-Galán et al., 2025).

Two groups of recreational fishing guides: Enridan and Avalon, access the area all year. Enridan has 16 fishing guides who work in the Hatiguanico River and Las Salinas, while Avalon has a separate group of guides operating in San Lázaro, an area of the ''Salinas de Brito'' located west of where Enridan's guides work, characterized by deeper lagoons. Recreational fishing guides from Enridan completed standardized daily log sheets in the period (June- August).

Over 23 days of work—13 in Salinas and 10 in the river—they reported four sightings in the Río Hatiguanico: one group of five adults with a calf, one adult with a calf, one single adult, and one group of two adults. Visual boat transects carried out concurrently failed to record any manatees in surveyed transects despite extensive effort, covering a total distance of 45.1 nautical miles between the river and the lagoon. In contrast, drone surveys confirmed one sighting, consisting of two adults—one of which was a mother accompanied by a calf and a juvenile (Figure 3), for a total of four individuals observed.

Figure 2. Manatee sighting reported by recreational fishing guides

Figure 3. Cow-calf pair and an accompanying juvenile observed during a drone-base survey in Zapata Swamp National Park.

During the next year, this work will be expanded by adding local fishermen to the citizen-science program, in addition to the fly-fishing guides, and by conducting monthly visual and drone surveys in the Río Hatiguanico and “Ensenada de la Broa”. This effort will allow validation of a practical monitoring methodology for manatees in Cuba and generate baseline information on habitat use by the species in the area. These results will later form part of a master’s degree thesis.

In addition to this study, a three-day environmental education activity, the Manatee Festival, was held from 6 to 8 September in the ‘’Ciénaga de Zapata’’ National Park. The participants, including children, youth and local community members, engaged in workshops, field visits and cultural activities aimed at increasing awareness for manatee conservation and promoting sustainable local development. The program included visits to the Hydrobiological Station, where endemic species such as the Cuban gar (manjuarí) are managed, and to the San Agustín Local Development Project, which showcases community-based initiatives linked to resource management, ecotourism and traditional livelihoods. Overall, the event strengthened local engagement in conservation and highlighted the role of education in supporting biodiversity protection in the region.

Figure 5: Environmental education activity that took place during the workshop on the design, production and installation of interpretive signage in natural areas in San Agustín, October, 2025.

Figure 4: Two days’ workshop with children from Playa Larga community during the Manatee Festival in September 2025.

A workshop on the design, production, and installation of interpretive signage in natural areas was held at the San Agustín Local Development Project in the community of La Lanza. The activity aimed to equip local participants with basic skills for creating educational signs, using the facilities of the hosting enterprise and tools provided by the "Libre Imagen, Arte y Conservación" initiative. Three large signs encouraging boat operators, guides and fishers to reduce speed in manatee areas and release or report manatees in cases of stranding or accidental capture were produced, along with six additional signs to be installed along the Hatiguanico River, La Lanza channels, and the Guamá-''Laguna del Tesoro'' channel.

This project demonstrates that combining citizen-science, visual transects, and drone surveys is essential for accurately detecting manatees and understanding their habitat use in the complex wetland systems of the ''Ciénaga de Zapata'' National Park. While systematic boat-based transects recorded no manatee sightings despite extensive effort, both citizen-science reports from recreational fishing guides and aerial drone surveys successfully detected multiple individuals, including calves. These results show that local observers provide valuable, continuous coverage, and drones overcome the visibility limitations of traditional surveys, offering reliable detection in shallow and vegetated habitats. Together, these methods establish the first validated, practical monitoring framework for manatees in Zapata, generating critical baseline information to guide conservation actions in a region facing intensifying human pressures.

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-Gabriel Cotayo Ojeda[1], Anmari Alvarez-Alemán[2], Félix Raúl Figueroa Morales[1], Noel Enrique Lopez Fernandez[3], Lázaro Ramón Sosa Morell[4,5,6] and Susana Guvara Barrero[5,7]

[1] Empresa para la Conservación de la Ciénaga de Zapata (ECOCIENZAP), Ciénaga de Zapata, Matanzas, Cuba.
[2]Clearwater Marine Acuarium Research Isntitute, 249 Windward Passage, Clearwater, FL 33767, United States
[3]Naturaleza Secreta de Cuba
[4]Centro de Servicios Ambientales de Matanzas (CSAM Matanzas), Ciénaga de Zapata, Matanzas, Cuba.
[5] Enviromental education program Herederos, Ciénaga de Zapata, Matanzas, Cuba.
[6] Filial Universitaria Municipal Ciénaga de Zapata, Ciénaga de Zapata, Matanzas, Cuba
[7]Centro Cultural de Playa Larga, Ciénaga de Zapata, Matanzas, Cuba

DOMINICAN REPUBLIC

A Journey Toward the Wild: Manatee Jean Pedro Moves Closer to Release

The rehabilitation process for Jean Pedro, the young manatee rescued in June 2023 off the coast of San Pedro de Macorís, has reached a critical and encouraging stage. After more than a year of specialized care at the National Aquarium of the Dominican Republic, preparations are now underway for his transfer to a dedicated rehabilitation bay in Bayahibe. This move, scheduled for early December, represents an important step toward his eventual reintegration into the wild, provided he continues to demonstrate strong health and behavioral progression. Jean Pedro will become the fourth manatee rehabilitated in the Dominican Republic, following the reintroduction of Juanita, Pepe, and Lupita in 2020–2021.

Before approving the transfer, a team of veterinarians and marine mammal specialists conducted a comprehensive medical evaluation to ensure that Jean Pedro is fit for transport and ready for the next stage of rehabilitation. The exam included a full set of blood tests to assess internal health indicators, a body-weight assessment to confirm appropriate growth and nutritional status, and detailed monitoring of respiratory and cardiac function. These measures help ensure that the stress of transport will not compromise his well-being. Additionally, the team placed PIT tags for long-term identification and tracking. The medical team confirmed that Jean Pedro shows stable parameters across all metrics and continues to progress as expected, giving confidence that he is ready to move to the more naturalistic environment offered by the Bayahibe bay.

As part of the pre-release preparation, the FUNDEMAR team installed a custom-fit belt designed to hold the tracking tag system built by the Clearwater Marine Aquarium Research Institute (CMARI). The tag will be deployed upon his arrival at the rehabilitation bay. This step is essential to monitoring his movements, behavior, and adaptation once he transitions into a semi-natural environment and later, if conditions allow, into the wild.

The soft-release place in Bayahibe bay has undergone extensive conditioning to replicate the environmental conditions required for a manatee's recovery and gradual rewilding. The site features access to natural freshwater inputs along the shoreline. Floating barriers have been installed to delineate the rehabilitation space, allowing the animal to acclimate while remaining protected from

external disturbances such as vessel traffic (Figure 1). The bay also includes thriving natural seagrass beds, which play an essential role in encouraging natural foraging behaviors. Reintroducing manatees to a habitat where they can graze freely supports both physical strengthening and behavioral development, key components of a successful rehabilitation.

Figure 1. Bayahibe bay, the soft release site for Jean Pedro.

During the installation and testing process at the bay, the rehabilitation team received an unexpected visitor, Romeo, a well-known wild adult male manatee frequently seen in the Bayahibe area. Romeo has previously been documented interacting with other wild manatees, including the female Remi and her calf Esperanza, as well as another resident female, Rosita. His approach to the outer perimeter of the rehabilitation bay suggests natural curiosity and highlights the healthy use of this coastal habitat by the local manatee population. Romeo's presence is a positive sign, demonstrating that the site selected for Jean Pedro's rehabilitation lies within an active manatee corridor, which will be essential for his future reintegration.

The transfer of Jean Pedro is planned for the first days of December, timed strategically to ensure favorable weather conditions and the availability of the multidisciplinary team overseeing the operation. Upon arrival to the bay, the final phase of his rehabilitation will begin, focusing on strengthening, natural feeding, and controlled exposure to a wild-like environment. Once Jean Pedro successfully completes this period and meets all health, behavioral, and independence criteria, specialists will evaluate the possibility of releasing him back into his natural habitat.

This collaborative effort between FUNDEMAR, the Ministry of Environment, the National Aquarium, and CMARI underscores the Dominican Republic's commitment to marine conservation and to

safeguarding the Great Caribbean manatee, one of the region's most emblematic and vulnerable species.

-Rachel Plekaniec [1], Rita Sellares [1] and Anmari Alvarez Aleman[2]

[1]FUNDEMAR
[2]CMARI

INDONESIA

Balikpapan Bay at a Crossroads: Protecting Tropical Seagrass and Dugongs in Indonesia's Path to Progress.

This article covers a summary of PhD research of Anugrah Aditya Budiarsa on dugong seagrass interactions in Balikpapan Bay at Leiden University, The Netherlands.

Indonesia hosts extensive seagrass ecosystems, once estimated at around 30,000 km² in 1994, possibly the largest coverage worldwide (Kuriandewa et al., 2003). These ecosystems play a vital role in supporting biodiversity, storing carbon, and protecting coastlines, yet recent assessments reveal alarming discrepancies and signs of decline. The Indonesian Institute of Sciences (Hermawan et al., 2017) reported only 1,507 km² of remaining seagrass, suggesting a dramatic reduction of more than 90% from earlier estimates, more rigorous validations identified just 2,934.64 km², most of which covers eastern Indonesia, with an estimated 16-35% of Indonesia's seagrass potential. Based on this, Fortes et al. (2018) estimate the area of seagrass in Indonesia to be 8,385 - 18,344 (Syafrie et al., 2018; Rahmawati S., Hermawan U., 2021). while other studies have calculated 8,812.9 km² of coverage along Indonesia's 80,791 km coastline. In terms of ecological conditions, Indonesia's seagrass meadows are generally in moderate condition (mean SEQI 0.68 ± 0.02; percent cover 39 ± 4%) (Hermawan et al., 2021), though these figures come from sites presumed to be relatively intact, meaning the true condition may be worse. These uncertainties and declines underscore the urgent need for stronger protection, particularly in Balikpapan Bay, a critical seagrass and dugong habitat that also serves as the maritime corridor to Indonesia's new capital, Nusantara. This dual role places the bay at a decisive crossroads: balancing national ambitions for development with the equally vital imperative of conserving one of the archipelago's most fragile and irreplaceable coastal ecosystems.

Figure 1. Intertidal seagrass bed in Balikpapan bay

Balikpapan Bay is one of many tropical bays in Indonesia, a bay that has a central role for human development, as a major commercial port, supporting industrial developments, with an oil refinery and mining activities near the bay, and with a major residential center (the city of Balikpapan). Balikpapan Bay is also a buffer for the new capital city of Indonesia called 'Nusantara', which is being constructed in the Central part of Kalimantan. It is certain that in the future Balikpapan Bay will become the center of further major developments due to the construction of the new capital. Balikpapan Bay is also home to many important and protected marine organisms, including dugong (*Dugong dugon*, Muller 1776), porpoise (*Orcaela brevirostris*, Owen 1886), Pacific bottlenose dolphin (*Tursiops aduncus*, Ehrenberg, 1833), and others. This marine biodiversity is supported by the presence of mangrove, seagrass, and coral reef habitats.

Figure 2. Kariangau Industrial estate established in Balikpapan Bay

Seagrass and mangrove habitats still survive in this area while coral reef habitats have declined due to high turbidity and increased sedimentation loads. Seagrasses in Balikpapan Bay generally only survive in the intertidal area. In the subtidal areas, seagrasses are absent or very scarce due to the lack of light penetration due to sedimentation. Seven seagrass meadows were included in this research which were comprised of five species; 1*) Halodule pinifolia* (Cymodoceaceae), 2) *Halophila minor* (Hydrocharitaceae), 3) *Halophila ovalis* (Hydrocharitaceae), 4) *Thalassia hemprichii* (Hydrocharitaceae), and 5) *Enhalus acoroides* (Hydrocharitaceae). Of these species, the typically colonizing and opportunist seagrasses of the genus *Halodule* and *Thalassia* dominated the intertidal seagrass meadows while the subtidal zone was dominated by *Enhalus* spp (only found in Kariangau). These seagrass meadows support the survival of the only marine herbivorous mammal, the dugong (*Dugong dugon*). Seagrass is the main food for dugongs. Rotational cultivating grazing of seagrass by dugongs is known to increase

Figure 3. Dugong tracks in intertidal seagrass meadows in Balikpapan Bay, Indonesia

the productivity of seagrass in absorbing carbon in marine waters and enhances the presence of pioneer species such as *Halodule* spp and *Halophila* spp.

The main aims of the proposed research were i) to investigate which factors influence the dugong feeding frequency in space and time in intertidal seagrass meadows, ii) to analyze the impact of anthropogenic disturbances (oil pollution and sedimentation) on tropical intertidal seagrass meadows grazed by dugongs, iii) to analyze the resilience of tropical intertidal seagrass meadows that are grazed by dugongs after these impacts, and iv) to study the contribution of clonality as a strategy of intertidal seagrass meadows to cope with anthropogenic pressure

Our study revealed that 1-2 dugongs graze seasonally in Balikpapan Bay and they play a role as gardeners for seagrass meadows. In Balikpapan Bay, dugongs show a repetitive and rotational feeding pattern at certain locations, and they have a tendency to avoid human presence. In addition, we suspect that Balikpapan Bay acts as a shelter for the dugong, especially when the sea (Makassar Strait) is in bad condition due to strong winds and high waves. Finally, Balikpapan Bay is suspected to be a nursery ground for dugongs, since some fishermen reported regularly observing a dugong with a calf around seagrass meadows.

Balikpapan Bay is one of the centres of the oil industry in Indonesia, with a risk of oil pollution. In 2018, there was a severe oil spill since an undersea pipeline leak caused thousands of barrels of oil polluting the waters of the bay. Fortunately, the spill happened during the tidal shift from high to ebb tide, which allowed much of the oil to be carried out into the more open waters of the Makassar Strait. Nevertheless, the inner bay's ecosystems still suffered significant impacts from the contamination. Our study revealed that the oil spill caused seagrasses in the bay to lose most of the above ground biomass. While shortly after the oil spill some recovery took place of seagrass biomass, probably thanks to below ground storage, we noticed that both total biomass and the ratio of above- to belowground biomass were still affected 13 months after the oil spill. Our research also showed different seagrass recovery responses at different locations after oil exposure. The oil spill also affected the grazing of dugongs in the bay. Shortly after the oil spill, both dugongs and freshwater dolphins were found dead. During 2018, we did not find any dugong feeding tracks in any of the seagrass meadows. New tracks were found only 13 months later, in March and April 2019. We conclude that although the recovery

capacity of pioneer seagrass species such as *H. pinifolia* is relatively high, dugongs need at least one year to return to grazing in polluted seagrass meadows.

Figure 4. Pioneer intertidal seagrass bed affected by oil spill

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-Anugrah Aditya B, Peter van Bodegom and Hans de Iongh

PHILIPPINES

Anticipatory Action in a new Philippine Law: potential for conservation continuity in disasters

In the Philippines, typhoons damage dugong's seagrass habitat although published evidence as a direct cause of dugong deaths is still forthcoming, However, two cases indicate that such weather disturbances are associated with the orphaning of dugong calves (Table 1).

Table 1. Orphaned dugong calves associated with weather disturbances in the Philippines.

Orphan	Month /Day	Year	Calf's Given name	Sex	Municipality/ City	Main Island Group	Associated weather disturbance	REFERENCES
1	Oct 10	1986	"Serena"	F	El Nido	Palawan	Tropical Storm Dom (Philippine name: Oyang)	Embassy of the Republic of the Philippines in Tokyo, Japan, (2009). 1986 Pacific Typhoon Season, (2025)
2	Nov 26	2008	"Zam"	M	Zamboanga City	Mindanao	Severe Tropical Storm Maysak (Philippine name: Quinta-Siony)	City Vet PR, (2009); 2008 Pacific Typhoon Season, (2025)

Simultaneously, typhoons impact adjacent human communities (Torres and Manzanero 2023) as well as protected area staff, field-based concerned citizens and their families who suffer displacement, medical issues, logistics disruption and humanitarian crises, thus disrupting conservation efforts.

Who protects the protectors? Who cares for the carers?

Passed into law on September 25, 2025, the Declaration of State of Imminent Disaster Act (Republic Act No, 12287) provides mechanisms for integrating Anticipatory Action into national and local government plans and actions thus filling-in a gap in the Philippine Disaster Risk Reduction and Management Act of 2010 (RA No. 10121).

This new law opens potential venues where dugongs, their habitats and their caring individuals can be supported at least a step ahead of weather events which are growing in intensity and frequency.

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-Daniel S. Torres[1] and Lea Ivy O. Manzanero [1,2]

[1] Independent Researcher

[2] Professional Humanitarian

SENEGAL

New protection for manatees at Pt St Georges on the Casamance River in southern Senegal

Pt St Georges, a village on the Casamance River in southern Senegal, is a well-known daily aggregation site for manatees, thought to be a place where they come to drink from a freshwater spring or seep within the edge of the hypersaline river. It is the only place in Africa where manatees can be seen daily from land throughout most of the year, and where we can study their behavior because they are mostly unafraid in the presence of humans (Figure 1). The African Aquatic Conservation Fund has been working with the local community there since 2010. An observation tower at Pt St Georges allows people to see the manatees from above. We have observed up to 16 manatees at a time at this site,

unheard of anywhere else in their range, and last year we documented a mating herd that lasted for four days (Keith-Diagne et al. unpublished data). Mating herds are very rarely seen in Africa. Our long-term research at this site includes photo-identification of individual scar patterns to determine the number of manatees using the site (Figure 2), acoustic monitoring for vocalizations, sampling for population genetics (eDNA water samples and tissue from carcasses), recording respiration rates and other behaviors. We have also installed four informational graphics panels in the tower (Figure 3), we are training several local people to be guides (this site receives hundreds of tourists annually), and we lead education programs at the elementary school.

Figure 1. Six manatees surface during mating activities at Pt St Georges, Senegal, May 2024. Photo by L. Keith-Diagne / AACF

Figure 2. Lucy Keith-Diagne and Diana Seck photograph manatees from the observation tower at Pt St Georges, Senegal. Photo by A. Vincent / AACF.

For many years, it has been of great concern that boats pass over the top of the manatee area, sometimes at high speed, resulting in disturbance to the manatees, who often leave the area (Figure 4). We started discussing this with the Conservation Committee of Pt St Georges in 2016, but it took many years to build trust with the community. Last year they agreed that we could place buoys around the manatee area to keep boats out, and on November 13, 2025, in collaboration with the community and the new Ufoyaal Kassa Bandial Marine Protected Area (MPA), we were finally able to place buoys around the manatee use area in front of the observation tower (Figures 5 and 6). We now plan to monitor the area to see if the buoys are effective in keeping boats out,

and several agents from the new MPA will also be stationed at Pt St Georges who will hopefully enforce the protected area. We are grateful to the community and our funders for their support for this long-term study and conservation work.

Figure 3. Three manatee informational graphics panels installed at the top of the observation tower, Pt St Georges. Photo by D. Seck / AACF.

Figure 4. A tourist boat speeds over the top of the manatee spring at Pt St Georges. Photo by L. Keith-Diagne / AACF

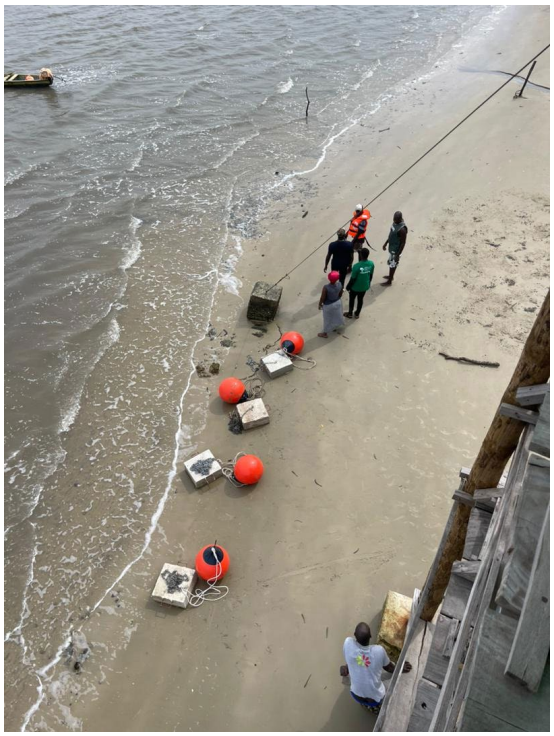


Figure 5. Buoys and moorings ready to be installed at Pt St Georges, Senegal. Photo by D. Seck / AACF.

Figure 6. AACF and MPA staff launch a buoy at the manatee area at t St Georges. Photo by D. Seck / AACF.

-Lucy Keith-Diagne[1], Diana Seck and Clinton Factheu,

[1]African Aquatic Conservation Fund, Joal, Senegal

UNITED STATES

Returning to where it began: Honoring Dr. James "Buddy" Powell through recent research in Crystal River

Declines in aquatic vegetation across Florida have reduced foraging options for manatees (*Trichechus manatus latirostris*), yet individuals in the St. Johns River (SJR) maintain favorable body condition.

Before he became a world-renowned manatee researcher and conservationist, Dr. James "Buddy" Powell spent his childhood on the waters of Crystal River, Florida, often rowing his grandmother, Bessie, while she fished with a cane pole. After her passing, Bessie left funds for Buddy's parents to purchase a small motorboat for him, a gift that became the catalyst for his lifelong career in manatee research and conservation. With that boat, Buddy spent increasing time exploring the river and observing its wildlife, including the manatees that would define his professional career.

In 1967, while out on the water in Crystal River, 13-year-old Buddy met Daniel “Woodie” Hartman, a pioneering biologist conducting the first systematic field studies of manatees for his doctoral dissertation at Cornell University. Their meeting marked the beginning of Buddy’s formal involvement in manatee research. Under Hartman’s mentorship, Buddy contributed to the earliest field investigations that formed foundational knowledge of manatee biology and ecology, work that remains central to the scientific literature today. Additionally, some of the initial photos taken by Hartman and Buddy of individual manatees played an important role in the development of the Manatee Individual Photo-Identification System (MIPS), which now provides data on thousands of manatees. Their work was also published in the September 1969 issue of National Geographic, drawing the attention of the famous French oceanographer and filmmaker, Jacques Cousteau. Cousteau subsequently hired Buddy to assist with the production of “The Forgotten Mermaid,” the first documentary on manatees, resulting in widespread public attention to the species.

These formative experiences, from childhood observations on Crystal River to participating in some of the first research efforts for Florida manatees, established Buddy as a leading young expert. At age 20, Buddy was hired by the U.S. Fish and Wildlife Service to join its newly established manatee research program. Many of the protections afforded to Florida manatees, including federal listing under the Endangered Species Act and the creation of Crystal River National Wildlife Refuge (CRNWR) in 1983, which is the only refuge created specifically for the protection of the species, stem directly from the work initiated by Hartman and Buddy, and sustained by Buddy throughout his over five-decade long career.

It is fitting that one of the final field projects Buddy conducted occurred at CRNWR, the same place where his commitment to manatee conservation began more than fifty years earlier. Florida manatees rely on warm-water refuges to avoid cold stress during the winter, and Kings Bay, including CRNWR, supports one of the largest aggregation of manatees at a natural spring system. Between November 2024 and March 2025, we conducted 660 drone surveys to quantify manatee abundance and in-water human activities within five warm-water sanctuaries in the CRNWR. The study assessed how Gulf water temperature influenced manatee use of temporary sanctuaries, which close to in-water recreation when Gulf water temperatures reach 17°C, while accounting for additional environmental drivers (tide stage and time of day) and anthropogenic pressures (human recreation and management status).

Overall, we found that manatee abundance was inversely related to Gulf water temperature and varied across sanctuary, time of day, and human activity. Importantly, preliminary results support that a substantial proportion of manatees continued to aggregate within sanctuaries at temperatures warmer than the current 17°C closure threshold.

During Buddy’s childhood, only about 60 manatees wintered at Crystal River’s natural warm-water refuges. In this study, the highest count within the sanctuaries occurred on 22 January, 2025 during the morning survey, when 492 manatees were recorded (Figure 1). However, hundreds more were likely present within the entire Kings Bay area, as this study only included manatees present within five sanctuaries. While this is a remarkable increase, several threats persist that threaten manatee use of this habitat, with submerged aquatic vegetation loss being a primary concern. We hope that this study

continues Buddy's legacy by supporting informed management and long-term protection of manatees within these sanctuaries.

This work was requested and funded by CRNWR, a federal organization that stewards the management of the natural resources. Conducting this study with Buddy at the site that first inspired his career imparted a special significance to the work. The memories shared by everyone involved in this project will be treasured forever.

Figure 1. A total of 385 manatees aggregating at Idiot's Delight 1 and 2 warm water sanctuaries within Crystal River National Wildlife Refuge, captured in a drone photo taken by Buddy Powell on 22 January 2025.

-Sarah M. Farinelli[1], Julie Hughes[1], Joyce Palmer[3], Tanya Ward[3], Monica Ross[1]
[1]Clearwater Marine Aquarium Research Institute;
[2]Crystal River National Wildlife Refuge
[3]Clearwater Marine Aquarium

Diet selection and nutritional analysis of forage items consumed by Florida manatees (*Trichechus manatus latirostris*) in the upper St. Johns River

Declines in aquatic vegetation across Florida have reduced foraging options for manatees (*Trichechus manatus latirostris*), yet individuals in the St. Johns River (SJR) maintain favorable body condition despite losses in forage availability. To investigate mechanisms underlying this pattern, forage choices and plant nutritional profiles were evaluated.

Opportunistic visual observations from August 2023 to September 2025 were made on 20 occasions near Blue Spring State Park in Volusia County. Manatees were documented feeding on Pistia stratiotes in 55% of observations, *Alternanthera philoxeroides* (25%), *Hydrocotyle* sp. (20%), *Cicuta maculata* (10%), *Pontederia crassipes* (5%), *Sacciolepis striata* (5%), *Tillandsia* sp. (5%), *Typha* sp. (5%), and *Vallisneria americana* or *Hydrilla verticillata* (5%). Feeding occurred on both new and old vegetation growth.

Stomach samples were obtained from 33 carcasses in the SJR between August 2022 and July 2025. Microhistological analysis of stomach contents identified primarily *Salvinia minima* (18%), *Pistia* (15%), *Alternanthera* (15%), *Spartina alterniflora* (15%, only in carcasses from the lower SJR, near Jacksonville), *Najas guadalupensis* (9%), *Pontederia* (6%), *Vallisneria* (6%), *Hydrilla /Egeria densa* (6%), and *Juncus* sp. (6%), as predominant plants consumed by manatees. These species span floating macrophytes, freshwater submerged vegetation, and emergent and estuarine marsh plants.

Nutritional analyses were performed on 10 forage species collected during the dry season (n = 28, March–April 2023) and wet season (n = 32, June–September 2023). Elemental macronutrients (carbon, nitrogen, and phosphorus) and proximate composition varied across sampled species. *Sacciolepis* exhibited the highest % carbon (41.5 ± 0.3%), *Lemna* sp. showed the highest % nitrogen (5.2 ± 0.2%) and % phosphorus (0.6%), and the greatest crude fat (4.2%), crude protein (32.4 ± 1.4%), and total digestible nutrients (TDN, 62.2%). Hydrocotyle contained the highest total nonstructural carbohydrates (TNC, 17.6 ± 2.6%), acid detergent fiber (ADF) was highest in *Salvinia* (38.4 ± 1.2), and ash was highest in *Vallisneria* (18.5 ± 1.2%). Seasonal differences in proximate composition were limited to higher crude fat in *Hydrocotyle* and *Pistia*, and higher nonstructural carbohydrates in *Alternanthera* during the wet season; elemental macronutrients did not vary seasonally.

Selective foraging on *Alternanthera* and *Pistia* was observed when *Hydrocotyle* was also present in the environment, suggesting that manatees may preferentially target these species when they are available. These species have slightly higher TDN in their nutritional profiles. Crude fat, crude protein, and TNC were broadly comparable among analyzed species.

Foraging on diverse taxa with variable but complementary nutrient and energy profiles can help sustain dietary macronutrient supply as manatees adapt to changes in resource availability. This study demonstrates the resilience of manatees in the SJR while also highlighting the importance of ongoing conservation efforts to safeguard their resources. The designation of new Critical Habitat for manatees in this region is a positive step toward ensuring manatees have access to sufficient food resources.

- Cora Berchem[1*] Aarin-Conrad Allen[2] and Cathy A. Beck[3]

[1]Save the Manatee Club
[2]Florida International University
[3]U.S. Geological Survey, Wetland and Aquatic Research Center, retired

Open Access Dataset of Manatee Vocalizations Released

A team of researchers from the United States, Nigeria, and Cameroon has released an open-source dataset of manatee vocalizations to support the development of machine learning tools for conservation. The collaborative effort included Athena Rycyk and Vivian Cargille (New College of Florida), Dunsin Bolaji (Nigerian Institute for Oceanography and Marine Research), Clinton Factheu (University of Yaoundé I), Uzoma Ejimadu (University of Lagos), Cora Berchem (Save the Manatee Club), and Aristide Takoukam Kamla (African Marine Conservation Organization).

The dataset contains more than 18,000 manatee vocalization clips and 23,000 noise clips, representing both African and Florida manatees. Recordings were collected between 2020–2022 at Blue Spring (Florida, USA), Lekki Lagoon (Nigeria), Badagry Lagoon (Nigeria), and Lake Ossa (Cameroon), and each clip was manually verified by experienced researchers. Designed to facilitate the training of machine learning detectors, the dataset provides a foundation for automated monitoring of manatee species. Passive acoustic monitoring offers a powerful tool for manatee research by detecting vocalizations to determine presence (PAM), track distribution, and monitor use of critical habitats. Future applications of PAM may include identifying individuals and detecting calves to strengthen population assessments.

Citation: Rycyk, A., V. Cargille, D. Bolaji, C. Factheu, U. Ejimadu, C. Berchem, and A. Takoukam Kamla. 2025. Bioacoustic Dataset of African and Florida Manatee Vocalizations for Machine Learning Applications, 2020-2022 ver 2. Environmental Data Initiative.

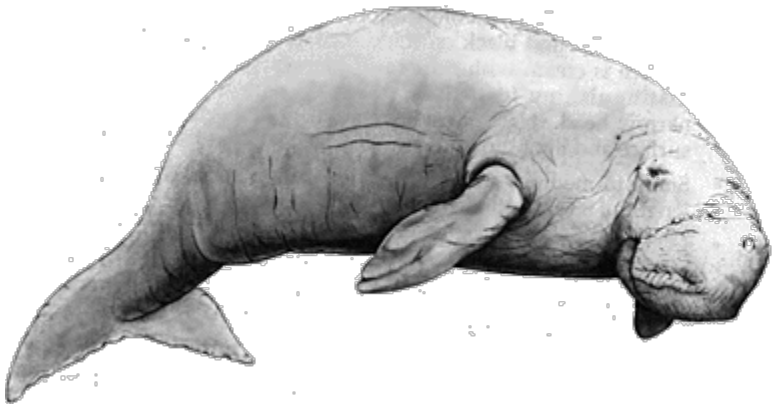
Figure 1. Uzoma Ejimadu (front) and Suru Gbetoyon from the Yafin community deploying an acoustic recorder at Badagry Lagoon, Nigeria (Photo credit: Sarah Farinelli).

https://doi.org/10.6073/pasta/c73edcb4a36ed07aebfbe238a31ceb19.

Acknowledgements: We would also like to acknowledge Buddy Powell and Tom O'Shea, who were the first to record the vocalizations of an African manatee. This milestone took place in the 1980s at a field camp on the Bandama River in Côte d'Ivoire, where they documented the calls of a small orphaned calf. Their pioneering effort laid the foundation for subsequent studies of African manatee bioacoustics. We are deeply grateful to Buddy Powell and Tom O'Shea for their pioneering research, which continues to shape manatee conservation today.

-Athena Rycyk[1], Vivian Cargille[1], Dunsin Bolaji[2], Clinton Factheu[3], Uzoma Ejimadu[4], Cora Berchem[5], and Aristide Takoukam Kamla[6]

[1]New College of Florida
[2]Nigerian Institute for Oceanography and Marine Research
[3]University of Yaoundé I
[4]University of Lagos
[5]Save the Manatee Club
[6]African Marine Conservation Organization



Sirenews – Dugong

(End of Local News)

UPCOMING SYMPOSIA/CONFERENCES

26th Biennial Conference on the Biology of Marine Mammals

HOLD THE DATE!

Dear Marine Mammal Science Community,

We are pleased to announce that abstract submissions for presentations and workshops are now open for **SMM2026**, the 26th Biennial Conference on the Biology of Marine Mammals, to be held **19–23 October 2026** in San Juan, Puerto Rico (with pre-conference workshops on 17–18 October).

Please note that the previously posted submission deadline of Wednesday, 25 February 2026 was incorrect due to a website error. **The correct deadline is Wednesday, 28 January 2026 at 12:00 PM (noon) Atlantic Time (GMT-4)**. This timeline allows us to provide decisions sooner, giving presenters more time to plan travel, accommodations, and other logistics for joining us in Puerto Rico. We encourage you to plan accordingly.

CONFERENCE THEME

One Ocean, One Future: Advancing Marine Mammal Science for Ecosystem Health

This theme reflects our shared commitment to marine mammal science, conservation, and a sustainable future for our oceans. We welcome work from across the discipline that supports evidence-based action, global collaboration, and ecosystem-driven research.

TOPICS AND FORMAT FOR SUBMISSIONS

When submitting your abstract, you'll be asked to choose the topic that best reflects your research.

- Acoustics & Communication
- Anatomy & Physiology

- Animal Behavior & Culture
- Conservation & Management
- Community Science, Social Science & Outreach
- Ecology
- Emerging Technologies & Methods
- Evolution & Molecular Biology
- Marine Mammal–Human Interactions
- One Health

Each topic includes a brief description to help you find the best fit. While many projects overlap multiple areas, please select the one that most closely represents your main topic. This ensures your abstract is reviewed by the most relevant experts.

Submissions may take the form of: long and short presentations, posters, or video presentations — allowing flexibility for traditional research, preliminary results, outreach, or innovative communication formats.

For more information, see the **abstract submission page** or the **workshop submission page**.

HOW TO SUBMIT

To submit an abstract, workshop proposal, and/or sign up as an abstract reviewer, please click the following link:

https://www.xcdsystem.com/smm/login.cfm?uuid=33DB7E9E-F530-DFEC-3604161BCC4CA127&reviewid=254409&token=F5865FFD-0D96-D2AF-8496BC5394714228

You can also access the conference system by signing in through the SMM website first, **HERE**. After signing in, navigate to the "**SMM2026 Conference Registration and Submissions**" option in the left-hand menu.

KEY DATES

Submissions open	Wednesday, 3 December 2025, 12:00 PM (noon) Atlantic Time (GMT-4)
Submission deadline*	Wednesday, 28 January 2026, 12:00 PM (noon) Atlantic Time (GMT-4)
Notifications of acceptance	Wednesday, 18 March 2026, 12:00 PM (noon) Atlantic Time (GMT-4)

Early bird registration deadline Wednesday, 24 June 2026, at 11:59 PM Atlantic Time (GMT-4)

**Please note:* *registration is not required at the time of abstract or workshop submission. However, if your abstract is accepted, you must register (and pay) by the early-bird deadline in order to confirm your presentation slot.*

ABSTRACT REVIEWERS WELCOME

Abstract reviewers play a vital role in supporting the SMM and ensuring the high quality of science presented at SMM2026. We invite qualified individuals to volunteer as peer reviewers for submitted abstracts. **To serve as a reviewer, you must hold a Master's or Doctoral degree in a field of marine mammal science, or have an undergraduate degree plus either five years of relevant experience or ongoing doctoral-level study.** Reviewer sign-up is available through the submission system.

We look forward to your contributions and to gathering in Puerto Rico for what promises to be a vibrant and impactful meeting. Let's chart a course for a healthy ocean — together.

Warm regards,

The SMM2026 Conference Organizing Committee
on behalf of the Society for Marine Mammalogy

Antonio Mignucci-Giannoni, Conference Co-Chair
Anmari Álvarez-Aleman, Conference Co-Chair
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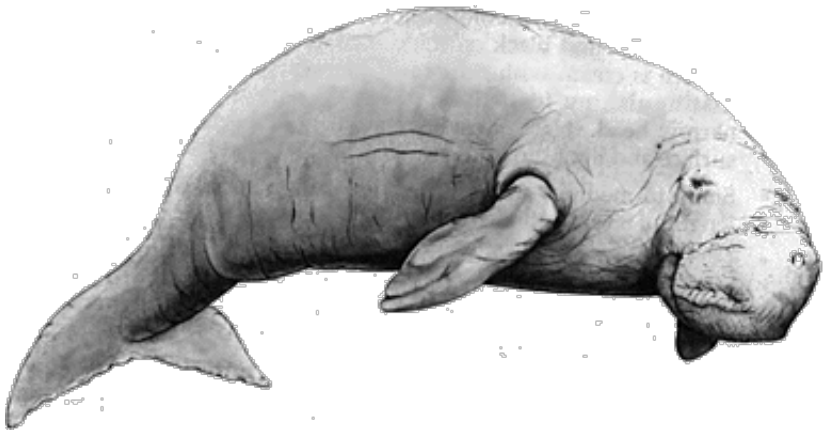

Sirenews – Dugong
(End of upcoming conferences)

SURVEY
Questionnaire from Dr. Daryl Domning

Dear sirenian researchers: please answer the following questions and return your thoughts to me at ddomning@howard.edu

1. Are you acquainted with the online sirenian bibliography accessible at https://sirenianbiblio.org/
2. Have you used it in your work, and if so, how often do you consult it?
3. Have you found it easy to use? If not, what improvements would you suggest?
4. What features of it do you like best? Which features do you like least?

Thank you for your feedback, and best of luck in your work!

Daryl Domning

ANNOUNCEMENT
Wider Caribbean Manatee Alliance

📣The Wider Caribbean Manatee Alliance is pleased to announce two participatory manatee-focused meetings taking place during SOMEMMA–SOLAMAC 2025.

🧑‍🤝‍🧑Both meetings will be held in a hybrid format (virtual and in person).

🙋We warmly invite all researchers and students interested in manatee research, conservation and management to join this collaborative effort.

Meeting 1 — December 9
Toward an Updated Regional Plan: Reviewing Progress in Manatee Conservation Since 2010

Meeting 2 — December 10
Manatees of the Wider Caribbean: Building a Regional Alliance for Conservation

👉More information and the registration form at the link below.

https://forms.gle/c6fzzU1q7rgmcZpFA

Wider Caribbean
Manatee Alliance

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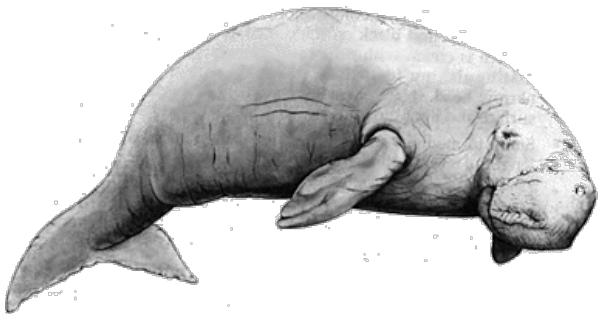

Sirenews – Dugong

NOTES FROM THE EDITORS: We would like to thank all of those who have contributed articles for *Sirenews*. On occasion, we have taken the liberty to make minor edits in an effort to accommodate our formatting style and provide clarity for our readership. However, we have restrained from making all grammatical edits in an effort to preserve the original intent of the submitting author.

We would also like to encourage you to submit any manatee and dugong sketches or old-time prints for publication in future issues!

⇨ **COPY DEADLINE FOR NEXT ISSUE: March 15, 2026** ⇦

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