Sirenews

Newsletter of the IUCN Sirenia Specialist Group

April 2025 | Funded by CMA Research Institute | Number 81

IN THIS ISSUE:

- Study integrates traditional knowledge and biological knowledge of Antillean manatees in Brazil, carried out by ICMBio in the states of Piauí and Maranhão (SEE PAGE 3)

- Inaugural Workshop to Launch the Wider Caribbean Manatee Alliance: "Manatees of the Wider Caribbean: Building a Regional Alliance for Conservation" (SEE PAGE 9)

- Key Findings: Seagrass and Dugongs as Indicators of Ecosystem Health on the Andaman Coast of Thailand (SEE PAGE 16)

Dr. Eric Angel Ramos conducting drone surveys in Brazil

UNION INTERNATIONALE POUR LA CONSERVATION DE LA NATURE ET DE SES RESOURCES
INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES
Commission de la souvegarde des especes - Species Survival Commission

SSC Species Survival Commission

Sirenews (ISSN 1017-3439) is published in April and October and is edited by
James A. Powell and Anmari Alvarez Aleman
CMA Research Institute, 249 Windward Passage, Clearwater, FL 33767 USA
Sirenews is available online at http://cmaresearchinstitute.org/sirenews/

CLEARWATER MARINE AQUARIUM RESEARCH INSTITUTE

IMPORTANT CONTENT

Eric Angel Ramos In Memoriam
By Beth A. Brady and Nataly Castelblanco-Martinez

On December 6, 2024, we lost a gifted scientist, mentor, and friend far too soon. Eric Angel Ramos touched the lives of many around the world through his work and his generous spirit.

Eric was a prolific researcher with over 46 peer-reviewed publications—23 of which focused on manatees. Eric's journey into marine mammal research began with bottlenose dolphins. Before long, he discovered his ability to apply that expertise to other species of dolphins, whales, sea turtles, pinnipeds, octopuses, and most notably, manatees. He developed a deep passion for manatees, often spending hours in a kayak or onshore capturing videos and audio of them. Later, he would spend countless days in front of a screen analyzing their movements, social interactions, and vocalizations, his mind constantly exploring the mysteries of their behavior. Eric conducted research on Greater Caribbean manatees in Belize, Mexico, Brazil, and the Dominican Republic, worked with Florida manatees in the U.S., and studied African manatees from Senegal. His ultimate dream was to travel to the Amazon and study the elusive Amazonian manatees. He used drone technology to study body condition, natural and drone-influenced behaviors, photo identification, and foraging preferences. His acoustic research explored ultrasonic calls, geographic vocal variations, responses of captive manatees to structured feeding times, and playback experiments testing the function of calls to wild and captive individuals. His work offered new insights and advanced conservation strategies.

Beyond his scientific contributions, Eric was a connector of people—a friend to all he met. He had an extraordinary talent for fostering collaboration, and many of us continue to build partnerships thanks to his influence. He was widely known for his warmth, his mentorship, and his ability to inspire. Eric also had a deep love for all animals. He delighted in giving any puppy he met a good scritch and was devoted to his beloved dog, Bella. He also had a remarkable talent for whistling, often mimicking the calls of birds he heard. I sometimes felt the birds believed he was one of their own and would respond to him.

Eric earned a Bachelor of Arts in Psychology and Italian from the University of Arizona, followed by a Master of Arts in Animal Behavior and Conservation and a Ph.D. in Animal Behavior and Comparative Psychology from the City University of New York. He completed a postdoc at Rockefeller University studying sleep patterns in octopuses, and another at the University of Vermont where he used small drones to study manatee behavior in Placencia, Belize. Most recently, Eric had begun a three-year postdoctoral fellowship at Mote Marine Laboratory, serving as the Manatee Postdoctoral Fellow.

Eric leaves behind a legacy of curiosity, compassion, and connection. With Eric, we had countless plans to continue exploring and deepening our understanding of manatees—numerous research papers in progress and a wealth of exciting scientific ideas taking shape. It feels as though we only caught a glimpse of the remarkable researcher he was destined to become. But he taught us to remain in awe of the wonders of animals and ecosystems, to cherish the sea and its mysteries, and to continue working together as a team to pursue the highest quality science. Eric, you are deeply missed. Rest easy, my barefooted friend.

LOCAL NEWS

BRAZIL

Study integrates traditional knowledge and biological knowledge of Antillean manatees in Brazil, carried out by ICMBio in the states of Piauí and Maranhão

The Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), through the Centro Nacional de Pesquisa e Conservação da Sociobiodiversidade (CNPT), the Centro Nacional de Pesquisa e Conservação de mamíferos aquáticos (CMA), and APA Delta do Parnaíba, is conducting a groundbreaking study involving fishing communities in Maranhão and Piauí to advance the conservation of the manatee. While these two states are key to the species' survival, their Antillean manatee populations remain understudied. Historically, Maranhão experienced widespread hunting, but conservation initiatives, environmental education, and stricter regulations have reversed much of this impact. In Piauí, despite the presence of well-preserved mangroves, the number of young manatee strandings has increased in recent years. Additionally, manatees released in Ceará have begun frequenting these areas, reinforcing their ecological significance.

The study engages fishermen from the Ilha do Gato community, Maranhão, through the PEMOPE (Pescadores Monitores de Peixe Boi) Project, where they collaborate with ICMBio by recording manatee sightings, including location data and the presence of calves. These observations are collected opportunistically during fishing activities and contribute to mapping the species' distribution. This data will support future population estimates and inform public policy, while also fostering a sense of stewardship among local communities as guardians of the species.

Figure 1. Activity by PEMOPE. A: PEMOPE fishing family home, with manatee graffiti, identifying that they are guardians of the species; meeting PEMOPE and ICMBio; C: Simplified form template for PEMOPE participants to identify manatees in the community.

In October 2024, an expedition brought together PEMOPE members from Maranhão and fishermen from Cajueiro da Praia, Piauí, for an exchange of monitoring strategies. Alongside community efforts, biological data—such as food remnants, fecal samples, and water quality data—were collected for further analysis. Hydrophones were also experimentally deployed to capture manatee vocalizations, offering insights into their acoustic behavior. The project will expand to additional states, including Pernambuco and Alagoas, with activities that started in January 2025. This approach is expected to improve manatee population estimates in areas where aerial surveys are ineffective, such as dark-water regions in northern and northeastern Brazil.

Figure 2. Expedition in Cajueiro da Praia, Piauí. A: PEMOPE fisherman learning how to use a hydrophone to record manatee vocalizations; B: Model of hydrophone used during the expedition, kept in manatee feeding and breeding area; Manatee food items collected for further laboratory analysis; D: Team of expedition 2024.

On Ilha do Gato, where the PEMOPE project is firmly established, fishermen have taken a more active role in species protection and developed a deeper understanding of the manatee's importance to local ecosystems. The biological and acoustic data collected will further scientific knowledge and guide public policies to mitigate threats to manatees throughout Brazil.

-Anna Karina Araújo Soares[1], Fernanda Loffler Niemeyer Attademo[2], Fábio Adônis Gouveia Carneiro da Cunha[2], Bruno Vinícius da Silva Sousa[3], Louiziane Gabrielle Souza Soeiro[1], Adriano Ricardo Damato R de Souza[3], Matheus da Silva Oliveira[4], Wallace Rodrigo Moreira Campos[1], Luzanira do Nascimento Pereira[3], Rubem Jayron dos Santos Sousa[5], Geylson Antonio de Sousa Paiva[5], José Ribamar Sa Menezes[6], Jozieth Meneses Marques[6], Fábia de Oliveira Luna[2]

[1] Instituto Chico Mendes de Conservação da Biodiversidade / Centro Nacional de Pesquisa e Conservação da Sociobiodiversidade (CNPT)
[2] Instituto Chico Mendes de Conservação da Biodiversidade/ Centro Nacional de Pesquisa e Conservação de mamíferos aquáticos (CMA)
[3] Instituto Chico Mendes de Conservação da Biodiversidade / APA Delta do Parnaíba (APA Delta)
[4] Universidade Federal do Maranhão
[5] Instituto Chico Mendes de Conservação da Biodiversidade / Coordenação de comunicação (CCOM)
[6] Pescadores Monitores de Peixe Boi – Ilha do Gato, Maranhão

CAMEROON

Conservation in action: A field visit to Lake Ossa, Cameroon by international sirenian scientists

Following the African Marine Mammal Conservation Organization's (AMMCO) Street Whale conference, held during the first week of December in Kribi, Cameroon, Drs. Ellen Hines and Sarah Farinelli joined Dr. Aristide Takoukam Kamla, founder and Executive Director of AMMCO, for an immersive two-day field visit to Lake Ossa.

Covering 4,000 hectares, Lake Ossa forms 90% of the Lake Ossa Wildlife Reserve and provides a critical refuge for threatened and elusive African manatees (*Trichechus senegalensis*) (Takoukam Kamla et al., 2021) (Figure 1).

Figure 1. A view of Lake Ossa, Cameroon from the boat.

Lake Ossa is not only a sanctuary for manatees but also supports livelihoods of local communities who rely on it for fishing, transportation, and cultural practices (Takoukam Kamla, 2012; 2019; Herbert et al., 2014).

In 2017, the Lake faced a serious challenge when Salvinia (*Salvinia molesta*), an invasive plant, overtook nearly half of the Lake's surface area in 2021 (Factheu et al., 2023), threatening both the manatees' habitat and the livelihoods of local communities (Akua, 2021). With the dense mats of Salvinia smothering native plants that the manatees depend on (Factheu et al., 2023), sightings of these gentle giants became alarmingly rare (Takoukam Kamla et al., 2024). Thanks to AMMCO's innovative biological control program, which introduced the Salvinia weevil (*Cyrtobagous salviniae*), the invasive plant now covers less than 10% of the Lake's surface (Takoukam Kamla et al., 2024). This successful intervention has already led to an encouraging increase in manatee sightings (Takoukam Kamla et al., 2024), showing the resilience of both the ecosystem and the species it supports.

Over the two-day trip to Lake Ossa, Drs. Hines and Farinelli were fortunate enough to witness firsthand the remarkable recovery of this unique habitat. Over the course of several hours each day, they encountered approximately 5-10 manatees each day, including a mom/calf pair (Figure 2). Most sightings were made possible through the detection of bubble trails, revealing the hidden movements of manatees beneath the water's surface (Figure 3). The boat then slowly navigated, following the manatees at a safe distance until they surfaced, often only exposing their nostrils above the water's surface for a few seconds before disappearing again.

News reporters from Agence France-Presse (AFP), one of the three leading global news organizations, covered the field visit to showcase Dr. Takoukam Kamla's conservation efforts to protect the species, which have garnered international attention. As a result, several news outlets have picked up the story. Links to these reports can be found at the end of this article.

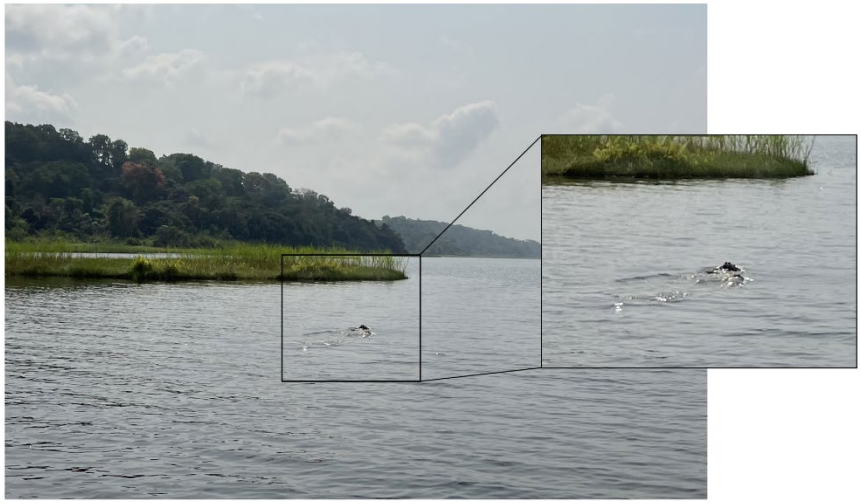


Figure 2. Mom/calf pair surfacing in Lake Ossa, Cameroon.

In addition to these informal boat surveys, Dr. Takoukam Kamla also showed Drs. Hines and Farinelli the northernmost part of the African manatee's range in the Sanaga River, marked by the Gorge of Edea (Figure 4), with a dam and rapids preventing manatees from further ascending up the river (Powell, 1996). This trip also facilitated informal discussions with Dr. Takoukam Kamla about the future of African manatee research and conservation in Lake Ossa.

This visit to Lake Ossa highlights the successful recovery of a critical ecosystem and underscores the importance of collaborative conservation efforts. It serves as a clear example of the positive outcomes that can result from effective, science-based interventions.

Figure 3. A bubble trail (outlined in red) formed by an African manatee as it swims beneath the water's surface in Lake Ossa, Cameroon.

Figure 4. Drs. Ellen Hines, Aristide Takoukam Kamla, and Sarah Farinelli (from left to right) at the Gorge of Edea along the Sanaga River in Cameroon.

Links:

1. https://phys.org/news/2024-12-mysterious-african-manatee-cameroon-hotspot.html
2. https://www.straitstimes.com/life/travel/saving-the-mysterious-african-manatee-at-cameroon-hot-spot
3. https://information.tv5monde.com/afrique/video/cameroun-un-chercheur-veut-sauver-le-lamantin-dafrique-2754095
4. https://www.youtube.com/watch?v=KU6ACaoLhSU
5. https://www.youtube.com/watch?v=oWcX-sSGrUk

Literature cited:

https://www.bbc.com/future/article/20210329-the-humble-beetle-that-could-rescue-a-town

Factheu, C., Rycyk, A. M., Kekeunou, S., Keith-Diagne, L. W., Ramos, E. A., Kikuchi, M., & Takoukam Kamla, A. (2023). Acoustic methods improve the detection of the endangered African manatee. *Frontiers in Marine Science*, *9*, 1032464.

Herbert, L., Zanga, A., Kinsler, D., Ayala, V., Kamla, A. T., & Diaz, R. (2024). Optimizing aquatic weed management in Lake Ossa, Cameroon: Harnessing the power of biological control and real-time satellite monitoring. *Biological Control*, *199*, 105650.

Powell, J. A. (1996). The distribution and biology of the West African manatee (*Trichechus senegalensis* Link, 1795). United Nations Environmental Program, Regional Seas Programme, Ocean and Coastal Areas.

Takoukam Kamla, A. (2019). *Activity center, habitat use and conservation of the West African manatee (Trichechus senegalensis, Link 1795)* [Master's thesis, University of Dschang].

Takoukam Kamla, A. (2019). *Genetic diversity, diet, and habitat quality of the African manatee (Trichechus senegalensis) in the downstream of the Sanaga River Watershed, Cameroon* [Doctoral dissertation, University of Florida].

Takoukam Kamla, A., Gomes, D. G., Hoyer, M. V., Keith-Diagne, L. W., Bonde, R. K., & Francis-Floyd, R. (2021). African manatee (*Trichechus senegalensis*) habitat suitability at Lake Ossa, Cameroon, using trophic state models and predictions of submerged aquatic vegetation. *Ecology and Evolution*, *11*(21), 15212-15224.

Takoukam Kamla, A., Factheu, C., & Ada, A. Z. (2024, November 10). Biological control of Giant Salvinia to restore manatee habitat in Lake Ossa. The Tenth International Sirenian Symposium. 25th Biennial Conference on the Biology of Marine Mammals, Perth, Australia.

-Sarah M. Farinelli[1], Aristide Takoukam Kamla[2], and Ellen Hines[3]

[1]Clearwater Marine Aquarium Research Institute, Clearwater, Florida, United States
[2]African Marine Mammal Conservation Organization, Dizangue, Cameroon
[3]San Francisco State University, San Francisco, California, United States

DOMINICAN REPUBLIC

Inaugural Workshop to Launch the Wider Caribbean Manatee Alliance: "Manatees of the Wider Caribbean: Building a Regional Alliance for Conservation"

The Wider Caribbean Manatee Alliance (WCMA) emerged as a collaborative partnership between Columbus Zoo and Aquarium and Clearwater Marine Aquarium Research Institute to unite regional experts and build a strong network dedicated to manatee conservation and resilience across the Wider Caribbean region. The inaugural workshop to launch this initiative took place in the Dominican Republic from February 26-28, 2025. Hosted by Clearwater Marine Aquarium Research Institute and FUNDEMAR, the event gathered 32 regional participants from 17 Caribbean countries (out of the 20 with permanent manatee populations in this region) and 27 institutions, including Aquariums, NGOs, government agencies, and universities. The workshop was made possible thanks to the generous support of the Columbus Zoo and Aquarium and contributions from WELL/BEINGS, Grupo Piñeiro, and Eco Bahías.

During the three-day event, participants shared knowledge on the status of manatee populations, key threats, and ongoing conservation efforts across the region. The group also worked to identify regional priorities, define the vision and mission of WCMA, and develop a strategy to strengthen the network in the future.

During the workshop, we collectively identified our vision and mission as:

Vision: A thriving and interconnected manatee population across the Wider Caribbean, sustained by effective conservation, regional collaboration, and community engagement. By 2040, manatees will coexist harmoniously with local communities, their key habitats will be protected, and their ecological, cultural, and economic significance will be recognized and valued across the region.

Mission: To coordinate regional efforts for the conservation and recovery of the Greater Caribbean manatee by supporting research, monitoring, information sharing, education, and sustainable management of key habitats, while building national and regional capacities to ensure effective action across the Wider Caribbean.

Additionally, we identified 35 regional conservation needs across six categories:

1. Governance, Planning and Institutional Capacity
2. Promote Regional Collaboration
3. Protection of habitats and individuals
4. Research and monitoring
5. Education and Awareness
6. Institutionalize the network/sustainability

The knowledge and insights shared during the workshop will directly inform the development of a strategic plan to strengthen manatee conservation efforts across the Wider Caribbean, where everyone can collaborate and act.

Figure 1. Presentations, group work and participants during the workshop: "Manatees of the Wider Caribbean: Building a Regional Alliance for Conservation".

-Anmari Alvarez-Aleman
Clearwater Marine Aquarium Research Institute

GUATEMALA

Let's get back on track! Guatemala begins updating the National Strategy for Manatee Conservation

Guatemala is taking a crucial step towards the conservation of the Greater Caribbean manatee (*Trichechus manatus manatus*), one of the most emblematic species of the Caribbean, by updating its National Strategy for Manatee Conservation (ENCOM, for its acronym in Spanish) after more than 20 years without updating (CONAP, 2004). This effort is made possible thanks to the support of the French Global Environment Facility (FFEM) and is led by the Foundation for Ecodevelopment and Conservation (FUNDAECO) in coordination with the National Council for Protected Areas (CONAP) and other key institutions.

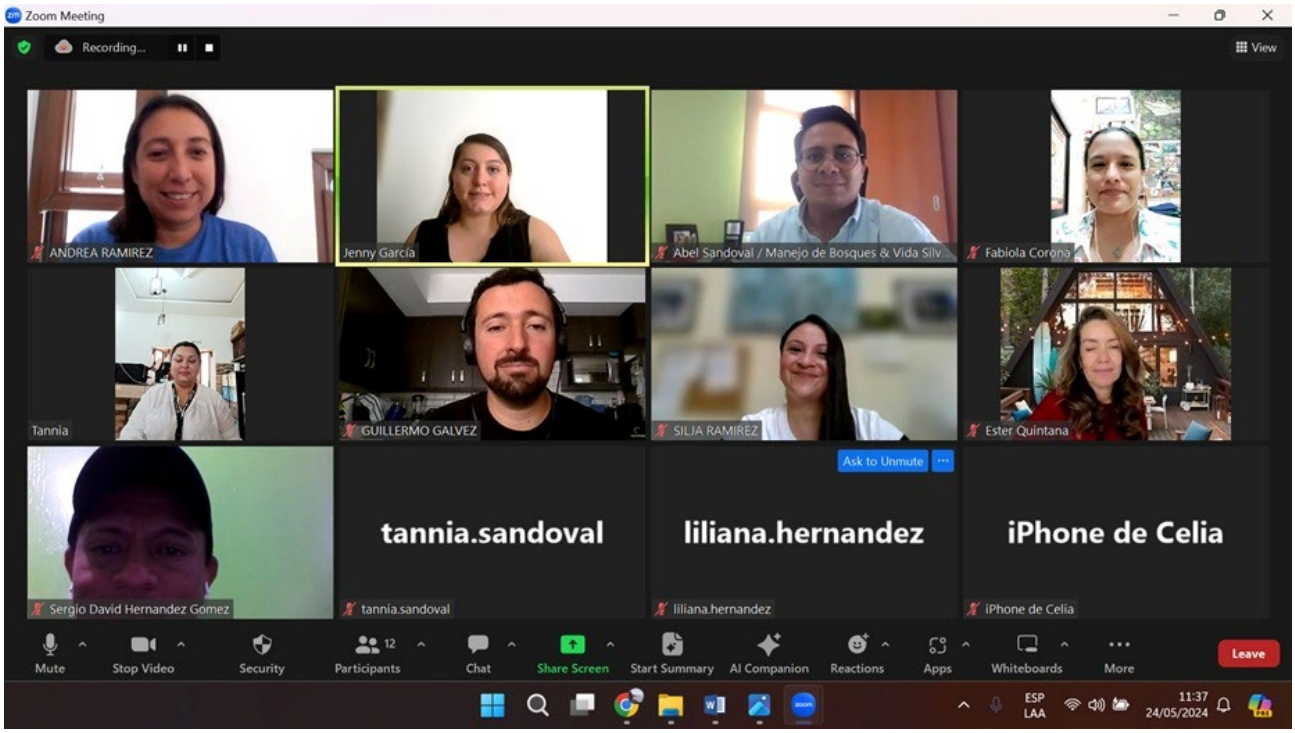


Figure 1. Virtual meeting held with manatee specialists and key stakeholders to coordinate efforts to update ENCOM.

The manatee is an endangered species (DCA, 2021) and faces numerous threats, including poaching, bycatch, boat strikes and habitat loss (Machuca-Coronado et al., 2023). Its conservation is essential not only for its ecological value but also for its cultural and touristic significance in the region. Updating the ENCOM will allow for the standardization of monitoring protocols, strengthening conservation actions, and improved management of the natural areas where this species inhabits.

The process will include an evaluation workshop with the participation of institutions such as CONAP, FUNDAECO, the Ministry of Environment and Natural Resources (MARN), local organizations, and species experts. The workshop aims to review progress, identify gaps, and establish new strategic guidelines for the Action Plan.

Additionally, the initiative seeks to integrate local knowledge and create coordination spaces with fishing communities and key stakeholders in the Caribbean coast, ensuring that conservation measures are both effective and sustainable.

With the support of the FFEM, this effort will reinforce Guatemala's commitment to marine biodiversity and help secure a promising future for the manatee in the country.

Figure 2. Meeting held between representatives of FUNDAECO and the Executive Secretary of CONAP to inform the importance of updating the ENCOM. Photo: Jennifer García

Literature cited

CONAP. 2004. Documento Técnico No. 13(02-2004). Estrategia Nacional para la Conservación del Manatí (*Trichechus manatus manatus*) y su hábitat en Guatemala. CONAP. Guatemala.

DCA. 2021. Consejo Nacional de Áreas Protegidas. Resolución 04-09-2021 sobre la Actualización de la Lista de Especies Amenazadas en Guatemala (No. 04-09–2021; p. No. 53. Tomo CCX-VII. 2-8).

Machuca-Coronado, O., Quintana-Rizzo, E., Sandoval, T., Corona-Figueroa, M. F. & García, H. A. 2023. Characteristics and spatial identification of Antillean manatee (*Trichechus manatus manatus* Sirenia: Trichechidae) strandings in Guatemala. Revista de Biología Tropical, 71(S4), e57274. https://doi.org/10.15517/rev.biol.trop.v71iS4.57274

Acknowledgments: To Lcda. Tannia Sandoval and Ing. Iván Cabrera from the National Council of Protected Areas (CONAP) for their immense support and collaboration in facilitating the update process. And to PhD. Fabiola Corona and PhD. Ester Quintana for their support, valuable contributions, and guidance throughout every step of the process.

-Jennifer García[1,*]

[1]Fundación para el Ecodesarrollo y la Conservación (FUNDAECO).

*Corresponding author: j.garcia@fundaeco.org.gt

PHILIPPINE

Philippine dugong conservation priority areas (*sensu* Ong et al. 2002) affected by the 2024 Typhoon season

Twenty-three dugong conservation priority areas were identified during the Philippine Biodiversity Conservation Priority-setting Program as published in the "Final Report of the Philippine Biodiversity Conservation Priorities: A second iteration of the National Biodiversity Strategy and Action Plan" (Ong et al. 2002). Four areas were included in the Philippine leg of the UNEP-CMS Dugong Catch and Bycatch Questionnaire Survey, namely: (1) Polillo Island (designated as area #183 from among all the species/species groups conservation priority sites for the Philippines); (2) Honda Bay (#200); (3) Aurora Province (#321); and (4) Puerto Princesa (#393). Results of the UNEP CMS survey of these areas are reported in Pilcher et al. (2017). The 2024 typhoon season included four supertyphoons within 24 days (Table 1): a first for the Western North Pacific since the 1950 start of reliable meteorological data (Gallagher Re 2025). A list of the Philippine dugong conservation priority areas affected by these typhoons is provided in Table 1.

Table 1. Characteristics of selected typhoons which made landfall in the Philippines during the 2024 season and the corresponding affected dugong conservation priority areas (sensu Ong et al. 2002). Sources: Wikipedia 2025; Ong et al. 2002

Duration	International Name	Philippine Name	Peak intensity 10-min max sustained wind (in k/hr)	Peak Category (Saffir-Simpson)	Philippine landfall	Dugong conservation priority area affected
May 23 -30	Ewinar	Aghon	140	Tropical storm	Patnanungan Island, Polillo (PAGASA-DOST, 2024)	#183
August 31 – September 9	Yagi	Enteng	195	Category 5 Supertyphoon	Casiguran, Aurora	#321
September 15 - 20	Soulik	Gener	65	Tropical Depression	Palanan, Isabela	None
October 18 - 29	Trami	Kristine	110	Tropical Storm	Divilacan, Isabela (Lacuata 2024)	None
October 24 – November 1	Kong-rey	Leon	185	Category 4 Supertyphoon	Gonzaga, Cagayan (not landfall just near miss)	None
November 2 - 12	Yinxing	Marce	185	Category 4 Supertyphoon	Santa Ana, Cagayan	None
November 7 - 20	Manyi	Pepito	195	Category 5 Supertyphoon	Dipaculao, Aurora	#321
November 8 - 15	Toraji	Nika	130	Category 2 Typhoon	Dilasag. Aurora	#321
November 9 - 16	Usagi	Ofel	175	Category 4 Supertyphoon	Baggao, Cagayan	None

All landfalls listed in Table 1 are located in the northwestern section of the Philippines' largest island, Luzon. Only the Polillo Islands and Aurora Province dugong conservation priority areas were affected. Note that Aurora Province was hit three times – twice by Category 5 Supertyphoons!

Two other locations were included in Table 1, although neither is part of the dugong conservation priority areas or the UNEP-CMS dugong survey sites. For Cagayan Province, the reason for inclusion was that the UNEP-CMS questionnaire was carried out in Santa Ana, Cagayan in 2019 as partially reported in Sirenews No 80 (Torres 2024). With pre-2024 data, it may be possible to identify the effects of intense, consecutive typhoons on dugongs in Cagayan.

For Isabela Province, Danielsen et al. (2000) reported pre-2000 dugong presence in the Northern Sierra Madre Natural Park. Using this park as one of three pilot sites, Danielsen and his colleagues (2000) developed a Biodiversity Monitoring System, which Protected Area Management Boards could use throughout the Philippine National Integrated Protected Areas System. Access to this particular dugong data is difficult because these remain unpublished and the Protected Area Management Office is located in a rugged, mountainous area about 310 kilometers from the Philippine capital of Manila. In this case, effects of the "unusual" typhoon 2024 season might be quantified by comparing future Biodiversity Monitoring System data with those available from 2000.

This step of collating typhoon-dugong conservation area data for 2024 can become a journey where more systematized efforts identify/quantify the effects of typhoons which are growing in intensity and frequency.

Literature Cited

Cassidy E (2024) Typhoons line up in the Western Pacific. Accessed from https://earthobservatory.nasa.gov/images/153575/typhoons-line-up-in-the-western-pacific on March 15, 2025.

Danielsen F, Balete D, Poulsen M, Enghoff M, Nozawa C, Jensen A (2000). A simple system for monitoring biodiversity in protected areas of a developing country. Biodiversity and Conservation. 9. 1671-1705. 10.1023/A:1026505324342. Accessed from https://www.researchgate.net/publication/226353806_A_simple_system_for_monitoring_biodiversity_in_protected_areas_of_a_developing_country on March 15, 2025.

Gallagher Re (2025). Natural catastrophe and climate report: 2024. Accessed from https://www.ajg.com/gallagherre/-/media/files/gallagher/gallagherre/news-and-insights/2025/natural-catastrophe-and-climate-report-2025.pdf on March 15, 2025.

Lacuata RC (2024) "'Kristine' makes landfall in Isabela: PAGASA". ABS-CBN News. Accessed from https://www.abs-cbn.com/news/2024/10/23/isabela-braces-for-impact-as-kristine-nears-landfall-2346 on March 15, 2025.

Pilcher NJ, Adulyanukosol K, Das H, Davis P, Hines E, Kwan D, Marsh H, Ponnampalam L, Reynolds J (2017). A low-cost solution for documenting distribution and abundance of endangered marine fauna and impacts from fisheries. PLOS ONE. 12. e0190021. 10.1371/journal.pone.0190021. Accessed from https://www.researchgate.net/publication/322108062_A_low-cost_solution_for_documenting_distribution_and_abundance_of_endangered_marine_fauna_and_impacts_from_fisheries on March 15, 2025.

Pilcher, NJ, Kwan, D (2012) Dugong Questionnaire Survey Project Manual. CMS-UNEP Abu Dhabi Office. United Arab Emirates. September 2012. 44 pp. Accessed from URL: https://www.cms.int/dugong/sites/default/files/publication/standardised-dugong-questionnaire_project-manual_sep2012.pdf on March 15, 2025.

PAGASA-DOST (Philippine Atmospheric Geophysical and Astronomical Services Administration; 2024) TROPICAL CYCLONE BULLETIN NR. 35F Typhoon AGHON (EWINIAR) Issued at 5:00 PM, 29 May 2024. Accessed from https://pubfiles.pagasa.dost.gov.ph/tamss/weather/bulletin_aghon.pdf on March 15, 2025.

Torres D (2024) Preliminary information on dugongs in Palaui Island, northern Philippines. Sirenews No 80. Accessed from https://mission.cmaquarium.org/app/uploads/2025/03/Sirenews-80-November-2024.pdf on March 15, 2025.

Wikipedia (2025) 2024 Pacific typhoon season. Wikimedia Foundation. Accessed from https://en.wikipedia.org/wiki/2024_Pacific_typhoon_season on March 15, 2025. Last edited on 16 March 2025.

- **Daniel Torres**
Independent researcher, E-mail: dantuors@gmail.com

THAILAND

Key Findings: Seagrass and Dugongs as Indicators of Ecosystem Health on the Andaman Coast of Thailand

A recent evaluation of the global status of dugongs concluded that the Andaman coast of Thailand is of high global significance for dugongs as one of only six locations with confirmed populations of more than 100 dugongs outside of Australia. In response to government and community concern about the recent loss of seagrass and increase in the number of dead and emaciated dugongs along the Andaman Coast, WWF Thailand organized and supported a fact-finding mission with the cooperation of the Department of Marine and Coastal Resources (DCMR). The Mission Team of 13 comprised two international experts, a local expert, seven staff of WWF Thailand and three DMCR staff. The Mission Team spent five days on the Andaman Coast (19-25 January 2025), bookended by briefing sessions with DCMR in Bangkok on January 18 and 27th. The team inspected the condition of seagrass meadows, was briefed on attempts

at seagrass restoration, observed the use of drones to monitor the distribution, abundance and behavior dugongs at local (bay) scales, and met with local experts from universities and DMCR, NGOs and community groups.

At least 10 species of seagrass occur along the Andaman coast. They vary in their physiological traits and ability to either resist disturbances, or to recover following loss (Figure 1).

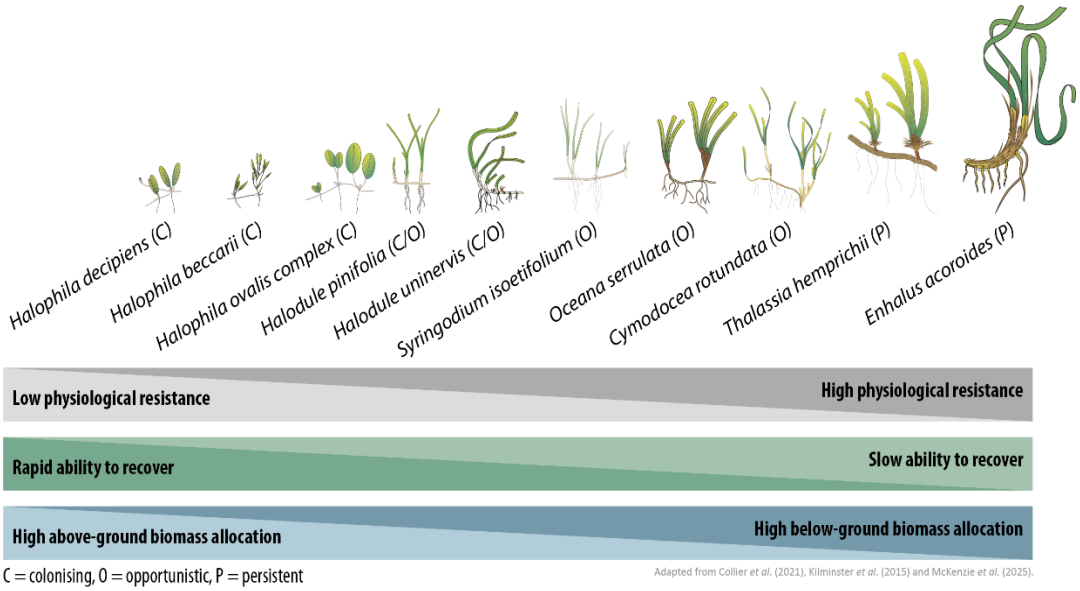


Figure 1. The seagrass species known to occur along the Andaman coast of Thailand and their physiological traits and ability to either resist disturbances, or to recover following loss.

The Mission concluded that the root cause of the recent seagrass loss along the Andaman coast is unknown. The impacting factors are unclear and cumulative, but are summarized in the conceptual model in Figure 2 and appear to be:

- reduced light availability from siltation
- chronic and diffuse land runoff/river discharge
- acute and point source human activities, e.g., dredging, reclamation, etc.
- elevated sea temperatures
- elevated daytime tidal exposure
- elevated dissolved nutrients
- Green turtle herbivory of remaining shoots

Different parts of the Andaman coast are at different stages of the continuum in Figure 2. The seagrass meadows inspected in Trang were at the stage depicted at the right hand of Figure 2. In contrast seagrass appears in fair to good condition in Krabi and Phang Nga- Phuket and dugongs are still present, some in good condition and breeding is still occurring. A very young dugong (which later died) stranded in Krabi in August 2024 and dugongs were videoed from a drone mating in Tangken Bay, Phuket in January 2025.

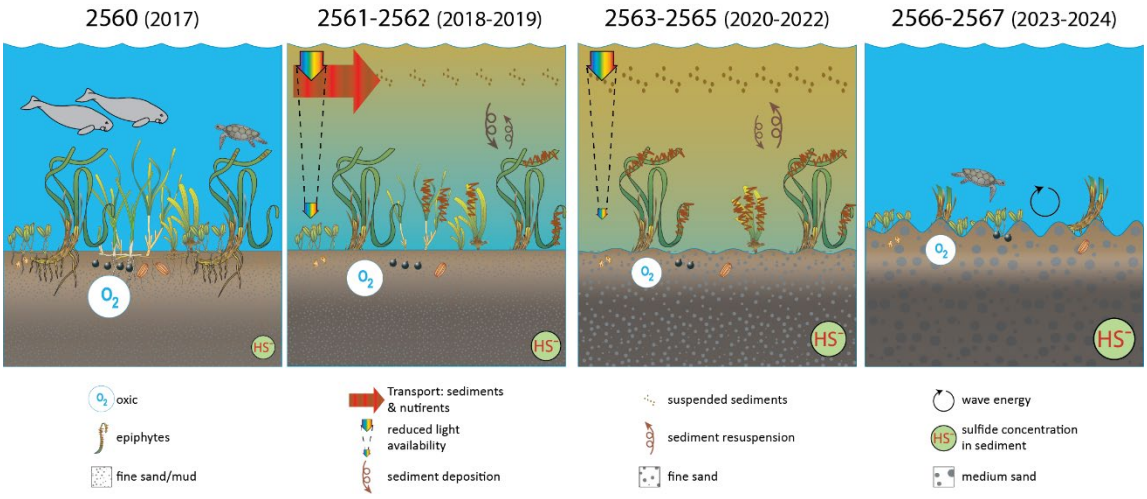


Figure 2. Conceptual model of the progression of seagrass loss along the Andaman coast of Thailand from 2017 to January 2025. The years starting with 256 are from the Buddhist calendar

Dugongs are responding to seagrass dieback along the Andaman coast in a manner similar to that observed in 10 seagrass diebacks recorded in Australia, since the 1970s with increased strandings, reduced breeding and moving from the area of dieback as follows. Dugong strandings along the Andaman Coast in 2023-24 averaged 42 per year compared with an average of 20 per year in 2019-22; 40% of strandings were in an emaciated state, especially along the Trang coast.

- Calf counts on aerial surveys have declined from 9% in 2020-2023 to 3% in 2024 .
- The Mission Team received consistent reports that the dugongs are no longer sighted in the waters of Trang Province.

The Mission Team was told that there is no evidence of reports of unusual numbers of Green turtles in poor condition or dead, a situation unlike that reported in Australia e.g., Figure 3. This difference is likely due to greater opportunities in Thailand for turtles to feed on surviving Enhalus (which is rare in or absent from several of the locations where seagrass dieback has occurred in Australia) and eat fish in nets. Anecdotal reports of increased turtle sighting are likely the results of local movements, rather than population increase as a result of head-starting, the effects of which may not be evident for several years.

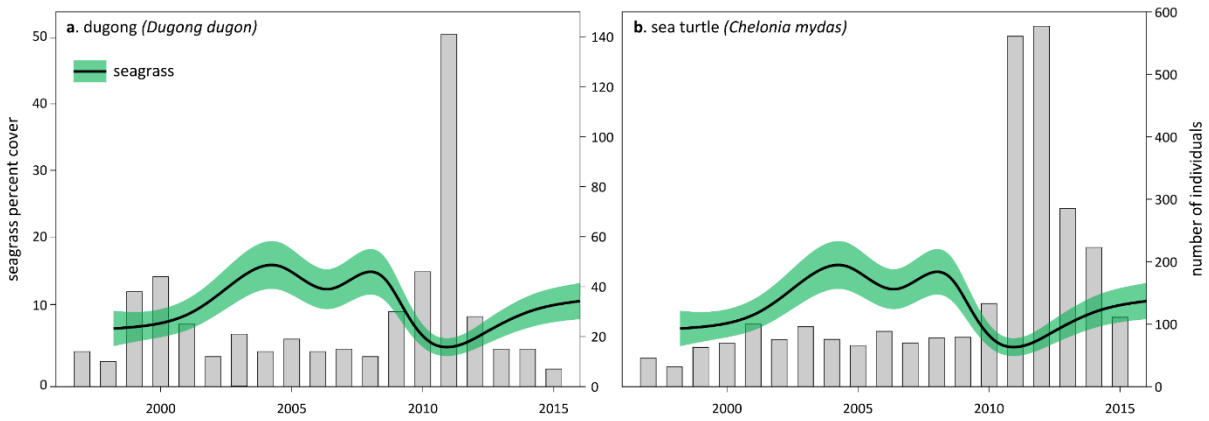


Figure 3. Relationship between seagrass condition and strandings of: (a) dugongs and (b) Green turtles on the urbanized coast of Queensland 1997-2015 (Len McKenzie unpublished data).

The recovery time for seagrasses and dugongs along the Andaman coast of Thailand will depend on several unknowns: (1) identifying and ameliorating the root cause of the dieback; (2) what proportion of the dugong population has died rather than undertaken temporary migration. Experience in Australia, where dieback has usually been a response to extreme weather suggests that seagrass recovery and the return of migrating dugongs may be possible within 5-10 years.

Suggestions.

The Mission Team was advised by DCMR Director General, that a Strategic Plan would be developed for the response to the seagrass-dugong situation on the Andaman Coast. The international experts made the following suggestions: (a) based on their understanding of the proposed responses to the seagrass-dugong situation on the Andaman Coast (Table 1); and (b) as possible ideas to address key unknowns for consideration by DMCR: Table (2) seagrass and (3) dugongs.

Table 1: International experts' comments on the proposed responses to the seagrass-dugong situation on the Andaman Coast of Thailand.

Proposed response	Comments	Suggestions
High priority		
Increase protection from human-caused mortality: net entanglement and vessel strike	Adult mortality main driver population change	Possibly increase size of go-slow zones and netting restrictions
Maintain necropsy program	Vital to understand causes of death	Publish results in international literature as soon as possible[1]

[1] Marsh has offered to help DMCR scientists with publication of this work

Maintain count surveys for dugongs using both aircraft and drones	Vital to understand distribution, relative abundance and behavior	Also monitor areas where dugongs not seen before Coordinate with drone seagrass mapping and monitoring Develop Standard Operating Procedures with expert international review
Low priority		
Continue program of artificial feeding stations	Unlikely to work at population level Expensive Increases nutrients in water at local scale Risk of dugongs becoming dependent, if successful	Only attempt at sites where risk of other human-caused mortality is low Use cultivated seagrass only Do not link to tourism
Not recommended at this time		
Catch and rehabilitate wild dugongs in poor condition	Risk of capture mortality	
Satellite track dugongs	Risk of capture mortality Need to track at least 20 animals for meaningful results as dugong movements are individualistic.	Use reports of known naturally marked individuals Postpone satellite tracking at least until seagrasses recover and dugongs in good condition

Table 2: Key unknowns regarding seagrass on the Andaman Coast and suggestions for addressing them.

Key unknowns: seagrass	Suggestion for consideration
What caused the loss? Impacting factor unclear, but likely cumulative pressures. Unknown how long-term data (rainfall, river discharge, sea temperature, tidal height, water color) compares with each year in the last decade. Do local seed banks persist and what is fragment movement potential from north to south *(Halodule, Cymodocea + Thalassia)*? *Limited restoration success if key impacting factor persists*	Examine long-term data (rainfall, river discharge, sea temperature, tidal height, water color) compares with each year in the last decade. • Map seagrass <6m depth annually by satellite, (field validate every 3-4 years) • Monitoring annual/biannual at sentinel sites (replicated) + more locations (3-4?) • Include additional measures (e.g., leaf height, epiphytes, seed banks) • Include continuous pressure data logging (light + temperature) • Include participation of community • Citizen Science, e.g.https://www.eyeonwater.org/
What is the extent and condition of deeper subtidal (>6m) meadows?	Enhance monitoring + mapping: • Map seagrass >6m depth every 3-4 years • Monitoring annual/biannual at sentinel sites (replicated) + more locations (3-4?) • Include additional measures (e.g., leaf height, epiphytes, seed banks) • Include continuous pressure data logging (light + temperature) • Include participation of community • Citizen Science, e.g.https://www.eyeonwater.org/

What are the optimum techniques for seagrass recovery on the Andaman coast?	Continue to develop Andaman coast seagrass recovery plan: • Convene international working group • Develop best practices for restoration (peer review)

Table 3: Key unknowns regarding dugongs on the Andaman Coast and suggestions for addressing them.

Key unknowns: dugongs	Suggestion for consideration
How serious is the current crisis? The current situation offers valuable insights into dugongs along Thailand's Andaman coast. Current surveys provide a strong foundation but there are opportunities for improvement by expanding habitat coverage and refining methods to address water turbidity, leading to a more accurate understanding of population size and distribution.	• Convene international working group to design survey to estimate size of the dugong population along the Thai Andaman coast to 20m contour line (8640 km$^{2)}$ using aircraft or large fixed-wing drone(s)
Have some Thai dugongs temporarily migrated to Myanmar or Malaysia	• Work with local NGOs and WWF to conduct interview surveys along Thai coast and adjacent areas in Malaysia and Myanmar (if possible)[2]
What is national importance of Gulf of Thailand dugong population?	• Conduct further work on dugong distribution, abundance in the Gulf of Thailand[3]. • Establish additional highly protected MPAs in key dugong areas in the coastal waters of the Gulf of Thailand and the Andaman coast based on comprehensive distribution and abundance surveys.

If published in the peer-reviewed, international scientific literature, well-designed research on dugongs and seagrasses in Thailand has the potential to make key contributions to informing dugong and seagrass conservation across the ASEAN region, especially in the fields of research summarized in Table 4.

Table 4: Field of research in which Thailand has the potential to develop and implement best practice techniques for the ASEAN region.

Seagrass	Dugongs
• Successful nursery culture of tropical species *(e.g., Enhalus, Halophila, Thalassia, Oceana)* • Restoration methods and engagement of broader community, including fishers	Use of rotor drones with LIDAR to develop and implement best practice techniques for: • Monitoring dugongs at local (bay) scales • Studying dugong behavior and health status • Better estimating local-scale dugong population size and carrying capacity

[2] Dr Petch Manopawitr also has Myanmar contacts

[3] If techniques are developed to estimate the size of the dugong population along the entire Andaman coast of Thailand accurately, similar techniques could be used to estimate the absolute abundance and distribution of the Gulf of Thailand population.

Literature cited

Marsh, H, Loates, PJ & Schramm, L (eds.). [In press]. A global assessment of dugong status and conservation needs. Bonn: United Nations Environment Program.

Marsh, H, Albouy, C, Arrau, E, Castelblanco-Martínez, DN, Collier, C, Edwards, H, James, C & Keith–Diagne, L (2022). How might climate change affect the ethology and behavioral ecology of dugongs and manatees? In 'Ethology and Behavioral Ecology of Sirenia'. Marsh, H (ed.). Springer. Chapter 8.

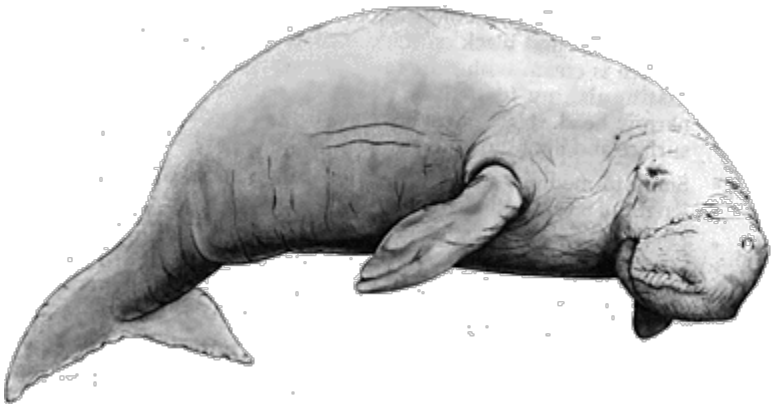
Hodgson, A, McMahon K, Sobtzick S, Grech A, Loneragan N, Lavery P, Smith J (2024) Regional movements of dugongs as an indirect response to climate change and the importance of alternative critical habitat. Abstract, 25th Biennial Conference on the Biology of Marine Mammals Perth, Western Australia / November 11-15

Musick, J.A. and Limpus, C.J. 1997. Habitat utilization and migration in juvenile sea turtles. In: P.L. Lutz and J.A. Musick (eds), The Biology of Sea Turtles, pp. 137-164. CRC Press, Boca Raton, Florida, Book.

-Helene Marsh [1] and Len McKensie[2]

[1] Co-Chair IUCN Sirenia Specialist Group

[2] Seagrass-Watch



Sirenews – Dugong

(End of Local News)

UPCOMING SYMPOSIA/CONFERENCES

SOMEMMA-SOLAMAC-SILAMA 2025

HOLD THE DATE!

COMUNICACIÓN DE SOMEMMA y SOLAMAC

Estimados Colegas de SOMEMMA y SOLAMAC:

Tenemos el honor de invitarles a participar en la II Reunión Internacional para el Estudio de los Mamíferos Acuáticos que se llevará a cabo en Mazatlán, México del 8 al 12 de diciembre de 2025. A su vez, es la XXXIX Reunión Internacional para el Estudio de los Mamíferos Marinos (SOMEMMA), 20 Reunión de Trabajo de Especialistas en Mamíferos Acuáticos de América del Sur, XIV Congreso de la Sociedad Latinoamericana de Mamíferos Acuáticos (SOLAMAC).

La Segunda Reunión conjunta de la Sociedad Latinoamericana de Especialistas en Mamíferos Acuáticos (SOLAMAC) y la Sociedad Mexicana de Mastozoología Marina (SOMEMMA), que se celebrará en 2025 en la ciudad de Mazatlán, México, representa un hito relevante para el fortalecimiento de la cooperación científica regional orientada a la conservación de los mamíferos acuáticos y sus hábitats. Esta edición especial retoma y celebra la histórica colaboración iniciada en 2006, en la "Primera Reunión Internacional para el Estudio de los Mamíferos Acuáticos SOMEMMA-SOLAMAC" realizada en Mérida, México, que consolidó vínculos institucionales y científicos entre especialistas latinoamericanos. En un contexto de crecientes amenazas a los ecosistemas marinos, el reencuentro de ambas sociedades reafirma el compromiso con el intercambio de conocimientos, la capacitación de profesionales y el desarrollo de estrategias integradas y sostenibles para la investigación y conservación. La elección de Mazatlán, reconocida por su relevancia ecológica y cultural en el contexto marino, refuerza la importancia de dialogar entre ciencia y sociedad. Este encuentro busca no sólo impulsar el avance técnico-científico, sino también fomentar colaboraciones interinstitucionales duraderas, enfocadas en soluciones compartidas para los desafíos que enfrentan los mamíferos acuáticos en toda la región. La II Reunión Internacional para el Estudio de los Mamíferos Acuáticos 2025 será, por tanto, una plataforma estratégica para consolidar avances y planificar el futuro de la conservación marina en América Latina.

El Tema de la Reunión es "Los Mamíferos Acuáticos y la Conservación de los Océanos de América Latina para la Humanidad" que está alineado con el objetivo 14 de la agenda 2030 sobre el Desarrollo Sostenible de la Organización de las Naciones Unidas (ONU) para la protección del medio ambiente.

El logo de la Reunión se compone de elementos representativos de la región. En la lengua indígena "nahuatl", Mazatlán significa "Tierra de venados". El mar de Mazatlán es un hábitat clave para varios mamíferos acuáticos como las ballenas jorobadas, que migran desde las frías aguas del Ártico hasta el Pacífico Mexicano, y frente a las costas de Mazatlán encuentran las condiciones idóneas para reproducirse y dar a luz a sus crías. La temporada de avistamiento de ballenas jorobadas en Mazatlán va de diciembre a abril, por lo que esta Reunión 2025 brinda una gran oportunidad para observar a estos cetáceos.

La fecha para enviar resúmenes para participar con ponencias orales y carteles se encuentra abierta hasta el 30 de junio de 2025. Les exhortamos a preparar muy bien sus propuestas ya que no se planea extender la fecha límite de envío de resúmenes. La información detallada y la plataforma para enviar resúmenes se puede consultar en: https://resumen-somemma.com/Registro.php

Talleres o cursos Les invitamos a proponer talleres o cursos pre-congreso que se realizarán del 6 al 7 de diciembre de 2025. Los talleres pueden ser de uno o dos días, según las necesidades del tema y los proponentes. Favor de enviar sus propuestas a más tardar el 30 de julio a los correos siguientes: megapterax@yahoo.com, secretario.somemma@gmail.com .

Hemos desarrollado una página Web de la Reunión donde podrán consultar información importante sobre transporte local, nacional e internacional, hospedaje, atractivos, lugares para visitar, recomendaciones y más. Estaremos añadiendo información sobre estos y otros temas para que cuenten con toda la información posible y puedan planear mejor su viaje y estancia. La página principal se encuentra disponible en varios idiomas y se puede seleccionar el idioma junto a los logos de SOMEMMA y SOLAMAC: https://resumen-somemma.com

Ambas Sociedades estamos conscientes las limitantes económicas tanto de los estudiantes como de los investigadores en Latinoamérica, por lo que estamos comprometidos en brindarles una Reunión de calidad con un bajo costo. Los miembros vigentes ya sea de SOMEMMA o de SOLAMAC gozarán de descuentos especiales. La fecha límite para el pago anticipado es hasta el día 30 de agosto de 2025. Después de esa fecha, se aplicarán las tarifas de pago tardío. Los costos de las diferentes modalidades se pueden consultar en: https://resumen-somemma.com/inscripcion.php.

La ciudad de Mazatlán se encuentra en el estado de Sinaloa en México. Se ubica en la costa del Pacífico Mexicano y es un bello puerto lleno de historia y tradición, donde se conjugan la magia de sus bellezas naturales, riqueza cultural, música, gastronomía y mucho más, lo que le distingue desde hace muchos años con el sobrenombre de "La Perla de Pacífico".

Nuestro principal patrocinador es el Museo Nacional de la Ballena (MUNBA). El MUNBA se erige como un centro de referencia en México para la educación, la conservación, la investigación y la protección de las ballenas en nuestras aguas, ofreciendo un enfoque integral que conecta la ciencia con la

sensibilización pública. El rompehielos se llevará a cabo en las magníficas instalaciones del MUNBA, ¡por lo que no se lo pueden perder!
Las mesas directivas de SOLAMAC y SOMEMMA estamos trabajando unidos con el Comité Organizador y seguiremos afinando los detalles de esta II Reunión Internacional conjunta para el Estudio de los Mamíferos Acuáticos, por lo que próximamente les haremos llegar un tercer comunicado con más información.
Sin más por el momento, reciban un cordial saludo y esperamos verles pronto en Mazatlán.

Atentamente
Dr. Raúl E. Díaz Gamboa
Presidente SOMEMMA

Dr. Artur Andriolo
Presidente SOLAMAC

Comunication from SOMEMMA and SOLAMAC

Dear Colleagues from SOMEMMA and SOLAMAC,
We are honored to invite you to participate in the 2nd International Meeting for the Study of Aquatic Mammals, which will take place in Mazatlán, Mexico, from December 8 to 12, 2025. This event also marks the 39th International Meeting for the Study of Marine Mammals (SOMEMMA), the 20th Working Meeting of South American Aquatic Mammal Specialists, and the 14th Congress of the Latin American Society of Aquatic Mammals (SOLAMAC).
The second joint meeting of the Latin American Society of Aquatic Mammal Specialists (SOLAMAC) and the Mexican Society for Marine Mammalogy (SOMEMMA), to be held in 2025 in the city of Mazatlán, Mexico, represents a significant milestone in strengthening regional scientific cooperation aimed at conserving aquatic mammals and their habitats.
This special edition revives and celebrates the historic collaboration initiated in 2006 at the "First International Meeting for the Study of Aquatic Mammals SOMEMMA-SOLAMAC," held in Mérida, Mexico, which established institutional and scientific ties among Latin American specialists.
In a context of growing threats to marine ecosystems, the reunion of both societies reaffirms their commitment to knowledge exchange, professional training, and the development of integrated and sustainable research and conservation strategies.
The choice of Mazatlán—recognized for its ecological and cultural relevance in the marine context—underscores the importance of fostering dialogue between science and society.
This meeting aims not only to promote technical and scientific advancement but also to encourage lasting inter-institutional collaborations focused on shared solutions to the challenges faced by aquatic mammals across the region.
The 2nd International Meeting for the Study of Aquatic Mammals 2025 will therefore serve as a strategic platform to consolidate progress and plan the future of marine conservation in Latin America.

Theme of the Meeting

The theme of the meeting is: “Aquatic Mammals and the Conservation of Latin America’s Oceans for Humanity,” which aligns with Goal 14 of the United Nations 2030 Agenda for Sustainable Development, focused on environmental protection.

The logo of the Meeting is composed of elements representative of the region. In the Indigenous Nahuatl language, “Mazatlán” means “Land of Deer.” The sea off Mazatlán is a key habitat for several aquatic mammals, such as humpback whales, which migrate from the cold Arctic waters to the Mexican Pacific. Off the coast of Mazatlán, they find ideal conditions to breed and give birth to their calves. The humpback whale watching season in Mazatlán runs from December to April, making the 2025 Meeting a great opportunity to observe these cetaceans.

The call for abstract submissions for oral presentations and posters is open until June 30, 2025. We strongly encourage you to prepare your proposals carefully, as there are no plans to extend the submission deadline. Detailed information and the submission platform can be found at: ☞ https://resumen-somemma.com/Registro.php.

We invite you to propose pre-conference workshops or courses to be held from December 6 to 7, 2025. Workshops may be one or two days long, depending on the topic and the organizers’ needs. Please send your proposals no later than July 30 to the following emails: 🖂@ megapterax@yahoo.com, 🖂@ secretario.somemma@gmail.com.

We have developed a Meeting website where you can find important information about local, national, and international transportation, accommodations, attractions, places to visit, recommendations, and more. We will continue to update it with additional information to help you plan your trip and stay. The main site is available in several languages, which can be selected next to the SOMEMMA and SOLAMAC logos: 🌐 https://resumen-somemma.com.

Both Societies are aware of the financial constraints faced by students and researchers in Latin America, and we are committed to offering a high-quality meeting at a low cost. Active members of SOMEMMA or SOLAMAC will receive special discounts. The deadline for early registration payment is August 30, 2025. After that date, late fees will apply. Details on all registration options can be found at: ☞ https://resumen-somemma.com/inscripcion.php

The city of Mazatlán is located in the state of Sinaloa, Mexico, on the Pacific coast. It is a beautiful port city full of history and tradition, where the magic of its natural beauty, cultural richness, music, cuisine, and much more have earned it the nickname “The Pearl of the Pacific” for many years.

Our main sponsor is the National Whale Museum (MUNBA). MUNBA stands as a national reference center in Mexico for education, conservation, research, and protection of whales, offering a comprehensive approach that connects science with public awareness.
The icebreaker event will take place in MUNBA's magnificent facilities—an experience not to be missed!
The Boards of SOLAMAC and SOMEMMA are working together with the Organizing Committee and will continue refining the details of this 2nd Joint International Meeting for the Study of Aquatic Mammals.
We will be sending you a third announcement with more information very soon.
With nothing further for now, we send our warmest regards and look forward to seeing you in Mazatlán!

Sincerely,
Dr. Raúl E. Díaz Gamboa
President, SOMEMMA

Dr. Artur Andriolo
President, SOLAMAC

SILAMA

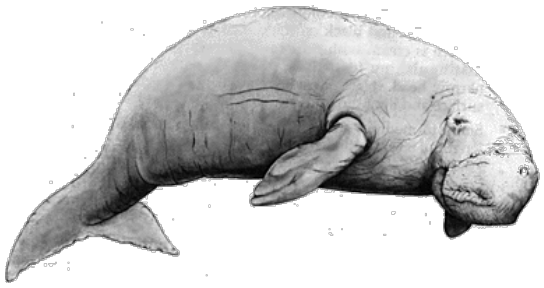
5th Latin American Manatee Symposium

The SILAMA (Latin American Manatee Symposium) will be held as part of the Second International Meeting for the Study of Aquatic Mammals (SOMEMMA-SOLAMAC) in Mazatlán, 2025.

Registration is now open. If you would like your work on manatees to be presented at SILAMA, don't forget to check the appropriate box when submitting your abstract to the conference.

Abstract submissions are open until **June 30**.

https://resumen-somemma.com/Registro.php



Sirenews – Dugong
(End of upcoming conferences)

SOMEMMA

SOLAMAC

Silama

V Simposio Latinoamericano de Manatíes

Foto: V. Cucchiara

En el marco de la Segunda Reunión Internacional para el Estudio de los Mamíferos Acuáticos SOMEMMA-SOLAMAC (Mazatlán, 2025) se organiza el V SILAMA.

Las inscripciones ya están abiertas. Si deseas que tu trabajo sobre manatíes se presente en el SILAMA, no olvides marcar la casilla correcta a la hora de enviar tu resumen a la conferencia.

Información:
nataly.castelblanco@ecosur.mx

¡Envío de resúmenes hasta el 30 de junio 2025!

Organización

ECOSUR

FINS

Instituto de Desenvolvimento Sustentável Mamirauá

CLEARWATER MARINE AQUARIUM RESEARCH INSTITUTE

CECON USAC

Wider Caribbean Manatee Alliance

REQUEST FOR CONTRIBUTIONS
Sirenian Bibliography

For those who may be new to the sirenian research and conservation community, or who may not have the current address for the online Bibliography and Index of the Sirenia and Desmostylia, here it is:

https://sirenianbiblio.org

I am trying to keep it up to date, so I would appreciate it if those of you who publish new papers on these groups would send me copies or links to them. Also, if you notice mistakes in the existing online database, or know of publications that should be included and aren't, please let me know that too. (NOTE: I do not generally include abstracts; other limitations are outlined on pp. 5-6 of the Introduction.) Thanks for your help!

Daryl Domning

RECENT LITERATURE

Lü, L., Yang, C., Liu, Z., Jiang, Y., Wang, X., Xia, T., Kittiwattanawong, K., & Zhang, X. (2024). Characteristics of four call types of dugongs in Thailand. Marine Mammal Science, e13216. https://doi.org/10.1111/mms.13216

May-Collado, L. J., Kiszka, J. J., Castelblanco-Martínez, D. N., Brady, B., Rieucau, G., Gonzalez-Socoloske, D., Sousa-Lima, R., Reiss, D., Magnasco, M., & Mast, R. (2025). Dr. Eric Angel Ramos-a shooting star that inspired marine mammalogists and beyond (1987–2024). Latin American Journal of Aquatic Mammals. https://www.lajamjournal.org/index.php/lajam/article/download/1729/645

Sanchez-Galan, J. E., Contreras, K., Denoce, A., Poveda, H., Merchan, F., & Guzmán, H. M. (2025). Drone-based detection and classification of Greater Caribbean manatees in the Panama Canal Basin. Drones, 9(4), 230.

Brightwell, K. K., Bassett, B. L., Mezich, R., Schueller, P., Valade, J. A., & Frohlich, R. K. (2025). Evaluating the effectiveness of retrofitting water control structures with manatee protection systems to reduce mortality. The Journal of Wildlife Management, 89(4), e70002. https://doi.org/10.1002/jwmg.70002

Newton, C. N. (2025). Evaluation of myoglobin levels in the locomoter muscles of Florida manatees. Georgia Journal of Science, 83(1), 23.

Paniagua, A., Agustín-García, C., Pardo-Palacios, F. J., Brown, T., De Maria, M., Denslow, N. D., Mazzoni, C. J., & Conesa, A. (2025). Evaluation of strategies for evidence-driven genome annotation using long-read RNA-seq. Genome Research. https://doi.org/10.1101/gr.279864.124

Bertolesi, G. E., Heshami, N., & McFarlane, S. (2025). Evolutionary Adaptations of TRPA1 Thermosensitivity and Skin Thermoregulation in Vertebrates (p. 2025.03.31.646411). bioRxiv. https://doi.org/10.1101/2025.03.31.646411

Patel, S., Wong, J. M., Tapales, K., & Al-Maslamani, I. (2025). First photographic evidence of probable twin dugongs and 2024 dugong population structure study in Qatar. Journal for Nature Conservation, 126838.

Dewi, C. S. U., Wahyudi, S., Tarno, H., Wiadnya, D. G. R., Iranawati, F., Sukandar, S., Martinah, A., Sani, L. M. I., Subhan, B., & Herandarudewi, S. M. (2025). Genetic of stranded Dugong dugon (Müller 1776) in the Java Sea, Indonesia, through COX1-based DNA barcoding. Biodiversitas Journal of Biological Diversity, 26(2). https://smujo.id/biodiv/article/view/20857

Ratheesh Kumar, R., Durga, V., & Zainul Abid, P. M. (2025). Giants of the sea: Diversity and taxonomy of marine mammals in India. https://eprints.cmfri.org.in/19318/

Khalifa, M. A., Saad, M., Santoso, P., Prabowo, N. W., Jasmine, A. S., & Dewantara, E. C. (2024). Identification of the presence of dugong, seagrass habitat, and threats in the waters of Banten Province. Aurelia Journal, 6(2), 295–314.

Daochai, C., Sornying, P., Keawchana, N., Manmoo, S., Khumraksa, P., Kaewmong, P., Ninwat, S., Upanoi, T., Sukkarun, P., & Suyapoh, W. (2024). Investigation into the causes of mortality in cetaceans and sirenian populations in the Andaman Sea, Thailand: A retrospective analysis spanning 2018–2023. Veterinary World, 17(12), 2889.

Scolardi, K. M., Wilkinson, K. A., & Aeberhard, W. H. (2025). Long-term aerial monitoring of Florida manatees *Trichechus manatus latirostris* in a diverse Gulf Coast environment. Endangered Species Research, 56, 213–230. https://doi.org/10.3354/esr01394

Cook, P., Bauer, G. B., & Reep, R. L. (2025). Manatee cognition and behavior: A neurobiological perspective on an unusual constellation of senses and a unique brain. Frontiers in Behavioral Neuroscience, 19. https://doi.org/10.3389/fnbeh.2025.1576378

Vieira, N., Garcia, A. C., & Brito, C. (2025). Manatees and turtles in Colonial Brazil (16th-18th centuries): Appropriation, extractions, consumption and oceanic teleconnections. Anais Do Museu Paulista: História e Cultura Material, 32, e29. https://doi.org/10.11606/1982-02672024v32e29

Vieira, N., Garcia, A. C., & Brito, C. (2025). Manatins e tartarugas no Brasil colonial (XVI-XVIII): Apropriação, extrações, consumos e teleconexões oceânicas. Anais do Museu Paulista: História e Cultura Material, 32, e29. https://doi.org/10.11606/1982-02672024v32e29

Vedharajan, B., Royce, E., Thomas, K., Barbara, J., Scaria, J., & Khangembam, S. (2025). Mapping and restoration potential of seagrass habitats in Palk Bay, India: An integrated acoustic and ground truthing approach. Journal of the Indian Society of Remote Sensing, 53(1), 5–10. https://doi.org/10.1007/s12524-024-02054-2

Alawy, F., Saifimar, C., Firdamayanti, A., Wijaya, K., & Rachmat, H. H. (2025). Marine conservation in Indonesia's Senayang Islands: Addressing threats to dugongs and hawksbill turtles within the coral triangle. Oryx, 1–1.

Moreira, S., Meirelles, A. C. O., Carvalho, V. L., Rêgo, P. S., & Araripe, J. (2025). Molecular evidence supporting a recurrent stranding event in West Indian manatees. Brazilian Journal of Biology, 85, e285381. https://doi.org/10.1590/1519-6984.285381

Boughattas, S., Ayed, L. B., Mirjalali, H., Marangi, M., Albatesh, D., ElGamal, A., Al-Shaikh, I., Al-Neama, N., Althani, A. A., & Karanis, P. (2025). Molecular identification and characterization of waterborne protozoa among stranded Dugong dugon. Marine Pollution Bulletin, 211, 117454.

Santos, T. F., Moura, M. A., Tavares, G. S., Siqueira, J. S., Sarmento, N. M., Prado, R. G., Costa, A. F., Amaral, T. M., Emin-Lima, R., & Sousa, M. E. (2025). Neonatal abandonment and hydrocephalus in Antillean Manatees (*Trichechus manatus manatus*): Is there a causal relationship? Animals, 15(2), 161.

Long, R. B., Persky, M. E., Jafarey, Y. S., & Stacy, N. I. (2024). Profound hypoglycemia and blood glucose testing methodologies in Florida manatees (*Trichechus manatus latirostris*) presented to a critical care center. Journal of Zoo and Wildlife Medicine, 55(4), 915–925.

Donprasri, S. (2025). Prototype of a marine animal sculpture from plastic waste: Role in promoting the image of Thai tourism. Humanities, Arts and Social Sciences Studies, 67–77.

Leugger, F., Lüthi, M., Schmidlin, M., Kontarakis, Z., & Pellissier, L. (2025). Rapid field-based detection of a threatened and elusive species with environmental DNA and CRISPR-Dx. Global Ecology and Conservation, 59, e03518.

de Mello, D. M., Lourinho, C. P., & da Silva, V. M. (2024). Renal function parameters of healthy captive and semicaptive Amazonian manatees (*Trichechus inunguis*). Journal of Zoo and Wildlife Medicine, 55(4), 1005–1018.

Cossa, D., Cossa, M., Nhaca, J., Timba, I., Chunguane, Y., Vetina, A., Macia, A., Gullström, M., & Infantes, E. (2025). Restoring *Halodule uninervis*: Evaluating planting methods and biodiversity. Restoration Ecology, 33(3), e14382. https://doi.org/10.1111/rec.14382

Meilana, L., Fang, Q., Rahmadya, A., Ilham, M., Hakim, L. G., & Nelson, B. R. (2025). Revisiting the actual diversity of vulnerable megafauna using spatial information. Biodiversity and Conservation, 34(2), 447–466. https://doi.org/10.1007/s10531-024-02980-0

Smoll, L. I. (2024). Sirenian conservation physiology: An integrated approach to evaluate the health of dugongs and manatees [PhD Thesis, The University of Queensland]. https://espace.library.uq.edu.au/view/UQ:abb2936

Said, N. E., Cleguer, C., Lavery, P., Hodgson, A. J., Gorham, C., Tyne, J. A., Frouws, A., Strydom, S., Lo, J., & Raudino, H. C. (2025). Sparse seagrass meadows are critical dugong habitat: A novel rapid assessment of habitat-wildlife associations using paired drone and in-water surveys. Ecological Indicators, 171, 113135.

da Silva, R. H. P. D., Sá, M. J. C., Ferreira, J. V. A., Munn, C., & Barnett, A. A. (2025). The river at night: Nocturnal foraging of the Amazonian manatee on the riverside plant maracarãna (Polygonaceae). Journal of Tropical Ecology, 41, e4.

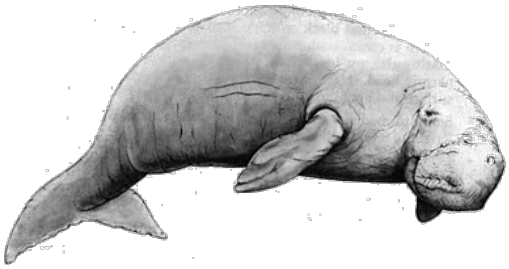
Digdo, A. A., Astari, E., Arinda, B. R., & Cahyono, T. (2025). The use of drones and Artificial Intelligence for dugong sighting detection in a limited resource scenario. BIO Web of Conferences, 156, 01004. https://www.bio-conferences.org/articles/bioconf/abs/2025/07/bioconf_icfaes24_01004/bioconf_icfaes24_01004.html

Lanyon, J. M., Dawson, L. C., & Baublys, K. (2025). Validation and application of stable isotope analysis of dugong tusks to determine long-term shifts in foraging patterns. Marine Mammal Science, 41(2), e13202. https://doi.org/10.1111/mms.13202

Ntiamoa-Baidu, Y., & Taye, E. N. A. (2025). Wetlands of Ghana. In Wetlands of Tropical and Subtropical Asia and Africa (pp. 241–264). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781394235278.ch11

Niyomsilpchai, T., Subsinserm, S., Kornkanitnan, N., Khumraksa, P., Kaewmong, P., & Chantra, R. (n.d.). กรด โด โม อิก ใน สัต ว์ ที่ะ เล้ เสี่ ยง สั้ ก ด้ วัย นม เกย ตี น ใน น่าน น ำ ไที่ ย Domoic Acid in Stranded Marine Mammals in Thai Waters. Retrieved April 10, 2025, from https://doi.nrct.go.th/admin/doc/doc_644998.pdf

<END OF CITATIONS>



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: October 15, 202** ⇦

Material should be submitted
(in Microsoft Word format, 500-word limit,
using formatting examples from last issue) to:
https://www.seewinter.com/research/sirenews/

Back Issues of ***Sirenews*** are available at:

http://cmaresearchinstitute.org/sirenews/

(then go to Archives at bottom of page)

Join our distribution list to receive ***Sirenews*** directly
(please email **sirenews@cmaquarium.org** to be added to the list)