CARIBBEAN CETACEAN SOCIETY

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Scientific Expedition Report

Ti Whale An Nou program 2024

Fraser's dolphin (*Lagenodelphis hosei*), South of Dominica

Expedition date: 15th-30th April

Expedition number: 2nd of 2024

Islands monitored : Dominica

Project Yon Sèl Vwa Pou Baleyn

This project has been funded by the Regional Cooperation Fund (FCR) of the Prefecture of Martinique. It aligns with the FCR's objectives to strengthen regional cooperation and support environmental and biodiversity protection.

The Yon Sèl Vwa Pou Baleyn project aims to enhance cooperation among the French islands, the Organization of Eastern Caribbean States, and the Dutch territories. Its general objectives include fostering collaboration across the northern and central Caribbean as well as addressing gaps in knowledge about marine mammals and supporting their conservation. The project also seeks to strengthen regional capacity by developing skills, promoting responsible conservation policies, and building networks among stakeholders. It is part of the Ti Whale An Nou program initiated by the Caribbean Cetacean Society.

The project reaches the objectives through research expeditions that contribute to the collection of critical data on cetaceans, improving our understanding of their ecology, the threats they face, and the conservation measures needed for their protection. It supports long-term monitoring efforts while enhancing the technical skills and knowledge of local stakeholders in cetacean monitoring and identification. Importantly, the project fosters regional capacity building by connecting professionals and interested individuals, involved as crew members, creating an inter-island network dedicated to the conservation of cetaceans, marine ecosystems, and biodiversity.

The Ti Whale An Nou program

Meaning “our own little whales” in a creole mix, Ti Whale An Nou (https://www.ccs-ngo.com/ti-whale-an-nou?lang=fr) is a program started in 2021 focusing on cooperation, research, education and conservation of whales and dolphins. It is the largest scientific survey dedicated to obtaining essential information for conservation of cetaceans in the Caribbean region. It is a locally driven initiative led by Caribbean people, ensuring its longevity in our regions.

A minimum of 33 species of cetaceans have so far been documented in the Caribbean region, which is more than a third of the species known in the world.

The goal of each expedition is to address the lack of knowledge throughout the Caribbean region regarding the diversity, distribution, relative abundances and movement patterns of cetacean species, as well as learning about the threats they face. The missions have welcomed participants from all islands in the region to participate in training, building local capacity and experience in the field.

During the months of March to September of 2024 , six scientific expeditions of 15 days are programmed throughout all the islands of the Lesser Antilles. Each expedition starts in Martinique and expeditions are grouped by regions: North (Montserrat - Anguilla), Center (Martinique - Guadeloupe) and South (Grenada - Saint-Lucia).

This report is focused on the second expedition of the year which took place in April, the first one in the Center area. The crew of 8 people included marine biologists, staff from the Martinique Regional Nature Park and representatives from other organizations (OFB, Biotope, Natiguard).

List of crew and affiliation

Expedition leader :

- **Louise Simon :** Marine biologist and project manager for the CCS in Martinique.

Captain :

- **Carla Arozerana :** Experienced professional skipper who has already completed several expeditions with CCS.

Scientific observers :

- **Matthieu Norden :** Environmental consultant at Natiguard.
- **Xavier Mauvois :** Environmental warden at the Parc Naturel Régional de Martinique
- **Lucie Godin :** Retired former environmental expert at BIOTOPE Martinique
- **Zoé Guislain** : Head of communications and international cooperation, OFB Guadeloupe
- **Lucas Bernier :** project manager for the CCS
- **Romain Thibault :** Internship with the association, “Preliminary study of the distribution and habitat use of Globicephalinae in the Lesser Antilles.”

Standardized scientific protocol

During our surveys, acoustic detection with a towed hydrophone array was combined with visual observations from at least two observers on deck, allowing both methods to complement each other for effective cetacean presence / absence monitoring. This protocol is the same applied in all the islands of the Lesser Antilles since 2021 and may be applied in other islands of the Caribbean over the next years for better regional cooperation.

Survey Protocol

The visual observer effort was limited by daylight, from 06:00 to 18:00. Boat tracks were decided by the scientific expedition leader the day before, taking into consideration the weather conditions, the navigation time and the target arrival point. The crew was divided into three teams of at least two people. Each team performed a different role, which changed every two hours in the following order: (1) data entering, (2) visual observation, and (3) logistical support and resting.

Data Entering

During the expedition, two crew members used the ObsEnMer software (altitude creation company, release 3.08) in expert mode on an iPad 8th generation. The use of this software made it possible to record, in real time, the location of the boat during the survey and to locate every data point in space and time. Every hour, on the hour, from the beginning of the survey effort, the environmental conditions and the maritime traffic were recorded, as well as an acoustic point when the hydrophone was towed. Firstly, in situ environmental parameters are recorded in order to monitor and control the detection probability of cetaceans, as certain conditions may limit the detection of species at the surface. Secondly, vessel presence or absence is recorded, as well as the numbers and types of vessels, for a future co-occurrence study between cetaceans and maritime traffic. Lastly, each hour an acoustic point sample is conducted. During an acoustic point, biological and anthropogenic information was collected to determine the quality of the recordings, the intensity of the anthropogenic noise and the presence of certain characteristic species. An acoustic point was defined with ten minutes of at least two people listening with headphones. While listening, the team would also try to visually identify any cetacean vocalization by observing the spectrogram and/or the click detector module on the screen using PAMGuard software version 2.02.07 (Gillespie et al., 2008).

Visual observations

During the daylight effort, two observers were placed at the front of the boat on either side of the mast in order to have the highest position without being hindered by the sails. Each observer covered an observation angle between 0° and 90° on each side, considering 0° the front of the boat. They observed the environment between these two angles and between the boat and the horizon. Their objective was to detect cetaceans by direct identification (e.g., dorsal fin, fluke, blows, breach) or to locate indicators that could potentially indicate the presence of cetaceans (e.g., splash, group of birds)

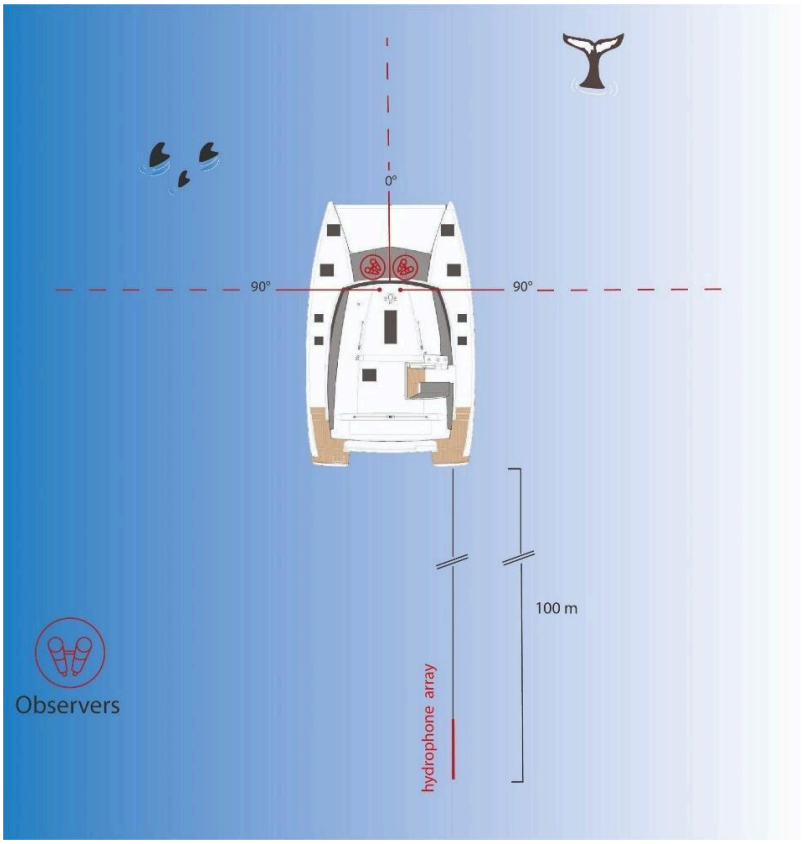

Figure 1: Layout of the research vessel and the area observed during the effort.

Logistical support

The team who were neither observing nor collecting data served as logistical support. They were responsible for several tasks: launching or removing the hydrophone, keeping watch on the maritime traffic to avoid boats crossing the path of the hydrophone and preparing the cameras so that they were available for photo identification when cetaceans were detected.

Acoustic Monitoring

During the survey, whenever possible, a towed hydrophone array was used to detect cetacean vocalizations and clicks. The hydrophone was towed by the boat at a distance of 100m and deployed when the waters were at least 50 m deep and with no more than moderate vessel traffic. The array is connected to a Data Acquisition Unit and a laptop with PAMGuard software. The PAMGuard software allows us to monitor cetacean vocalizations not only in real time, but also to inspect and confirm the detections and species offline after the survey.

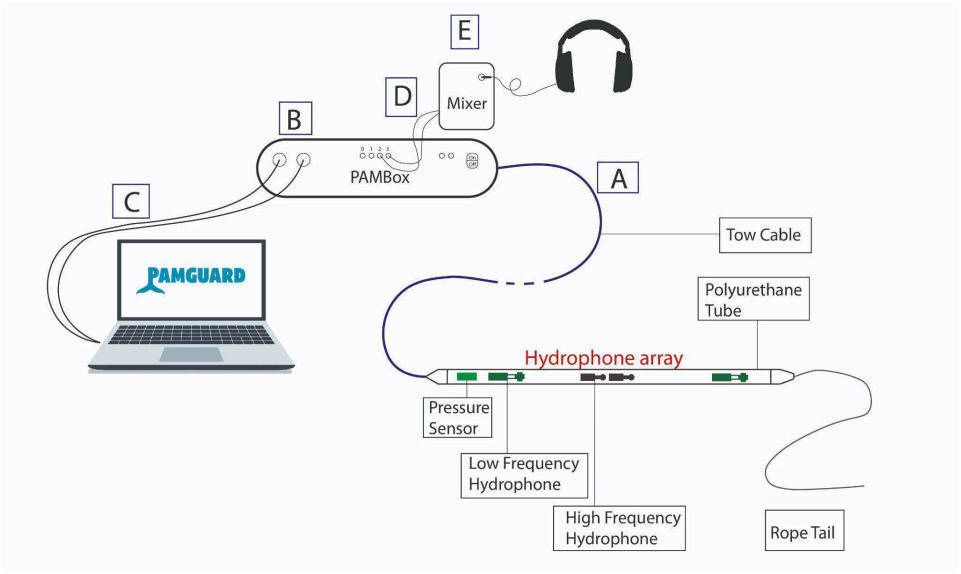

Figure 2: Diagram of the Acoustic Configuration

When cetaceans were visually detected, the observer signaled the presence of the animal(s) to the crew and continued the observation. The expedition leader would evaluate if the observation marked the start of a cetacean survey, where additional information such as photo-identification pictures would be collected. In either case, we recorded the GPS position at the time of the observation and entered the following data: identification of the species, distance to sighting, direction of individuals, estimated number of individuals, estimated number of juveniles and number of boats around the group.

If the decision was made to collect additional information, the logistics team would then undertake photo-identification. To do this, three cameras were used across the surveys: two Canon 5D, and a Canon 7D Mark II with a 70-300 mm, 100-400 mm et 150-600mm lens. The objective was to take photos of the underside of the fluke for humpback whales and sperm whales and the dorsal fin for all other species. Approach of the animal would always be done with respect.

RESULTS

The effort was carried out over a 6-day expedition over an area covering only the island of Dominica, the only island for which we had search permits. This visual and acoustic effort covered 564 km, with an average of 94 km covered per day at an average speed of 4.7 knots (Figure 3).

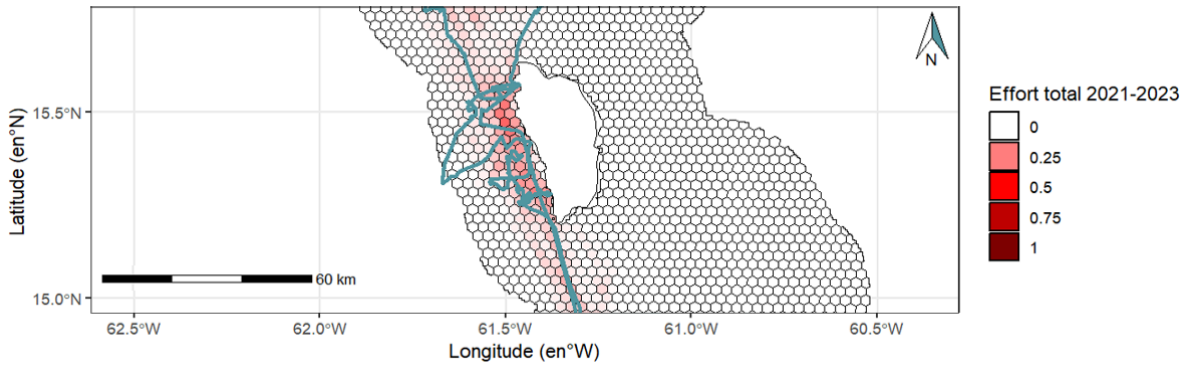

Figure 3 : *Track of boat surveys effort of expedition 2 of the TIWAN 2024.*

The aim of this expedition was to sample areas that had been little explored, if at all, by the CCS. These are areas further from the coast, on the edge of our study area, or more entrenched and difficult to access due to often unfavorable weather conditions. These areas are shown in light red or white in Figure 3, whose search effort per hexagon has been calculated on the basis of data collected from 2021 to 2023. In this case, the objective has been partly achieved, with sampling of the channel between Guadeloupe and Dominica, as well as off the island of Dominica. However, the effort was not limited to these areas, as it is also important to return to previously explored areas in order to identify whether or not the species/individuals encountered are similar from one time to the next.

However, as we had not obtained permits for the French islands, only spot data were collected in Martinique, on our way to Dominica, and no effort data were collected in either Guadeloupe or Martinique.

Cetacean Species monitored

Twelve different species were observed during the expedition:

- Gervais' beaked whale (*Mesoplodon europaeus*)
- Cuvier's beaked whale (*Ziphius cavirostris*)
- Sperm whale (*Physeter macrocephalus*)
- Melon-headed whale (*Peponocephala electra*)
- False killer whale (*Pseudorca crassidens*)
- Pygmy killer whale (*Feresa attenuata*)
- Short-finned pilot whale (*Globicephala macrorhynchus*)
- Fraser's dolphin (*Lagenodelphis hosei*)
- Pantropical spotted dolphin (*Stenella attenuata*)
- Atlantic spotted dolphin (*Stenella frontalis*)
- Bottlenose dolphin (*Tursiops truncatus*)
- Dwarf sperm whale (*Kogia sima*)

For each of these observations, the number of individuals was estimated with a maximum and minimum range. The presence and number of juveniles were also recorded, along with the exclusive economic zone where the sighting took place (Table 1). The sightings are spatially represented in figure 4.

Table 1 : *Summary of information gathered during cetacean sightings.*

Species Name	Group size estimate	Max estimate	Min.estimate	Juv.presence	Juv.estimate	ZEE
Undetermined dolphin	2	3	2	Do not know	NA	Martinique
Atlantic spotted dolphin	200	250	150	Yes	20	Martinique
Dwarf sperm whale	2	2	2	Do not know	0	Martinique
Pantropical spotted dolphin	275	350	200	Do not know	NA	Martinique
Undetermined dolphin	2	3	2	No	0	Dominica
Cuvier’s beaked whale	1	1	1	No	0	Dominica
Pantropical spotted dolphin	10	15	5	Yes	1	Dominica
Pantropical spotted dolphin	450	500	400	Yes	70	Dominica
Fraser’s dolphin	25	30	20	Yes	2	Dominica
Pantropical spotted dolphin	20	25	15	Yes	1	Dominica
Pseudorca	250	300	200	Yes	3	Dominica
Fraser’s dolphin	350	400	300	Yes	40	Dominica
Melon-headed whale	100	130	80	Yes	15	Dominica

Undetermined dolphin	5	5	5	Do not know	NA	Dominica
Fraser's dolphin	125	150	100	Yes	5	Dominica
Pantropical spotted dolphin	20	25	15	Do not know	NA	Dominica
Fraser's dolphin	100	150	80	Yes	NA	Dominica
Pantropical spotted dolphin	15	20	10	Do not know	0	Martinique
Short-finned pilot whale	30	40	25	Yes	5	Martinique
Undetermined dolphin	1	1	1	No	0	Martinique
Gervais's beaked whale	2	2	2	Do not know	NA	Martinique

Thus, of the 21 sightings made during our expedition, 13 were located in Dominica, and 8 punctually collected in Martinique, on our way to Dominica or back to Le Marin, for an overall average of around two sightings per day. The average group size for all species was around 78 individuals, or 94 for delphinids alone.

The three most frequently sighted species were the pantropical spotted dolphin, Fraser's dolphin and bottlenose dolphin, with 6, 4 and 2 sightings respectively over the 15 days. The first two were seen 3 times in association. They also hold the record for total number of individuals, all sightings combined, with 1110 and 600 estimated individuals respectively. For both species, the proportion of calves or juveniles to adults was around 10%, which gives reason to hope for the growth and health of their populations. The third most numerous species was the false killer whale, with around 250 individuals in a single observation.

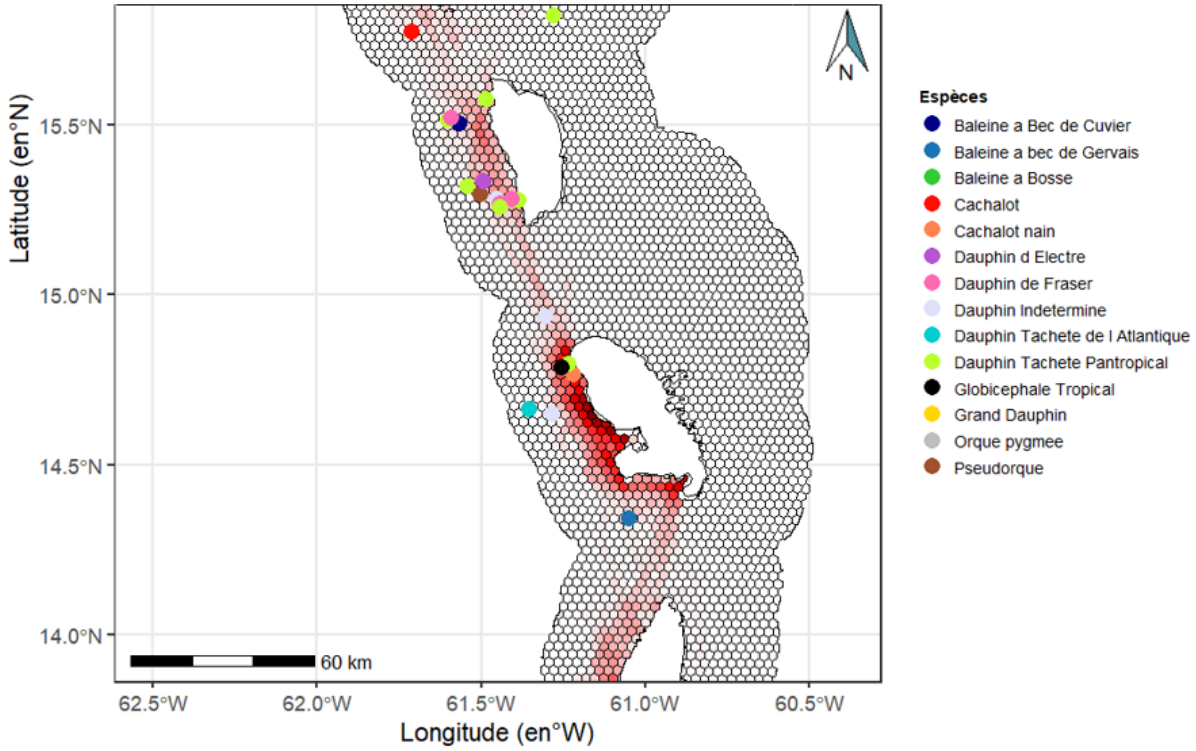

Figure 4: *Map of the confirmed cetacean sightings*

Seabird monitoring:

Since 2023, CCS has decided to develop its objectives in terms of identifying bird species encountered during its expeditions. Throughout the year, small workshops are organized to practice species recognition outside expedition periods. This gives everyone a little mental guide to identification and what to look out for in order to differentiate one species from another. Photos are also taken by the people using the tablets to help identify the species a posteriori, given the difficulty of discerning them or simply seeing them well because of the distance.

The spatial position of seabird sightings is shown in figure 5.

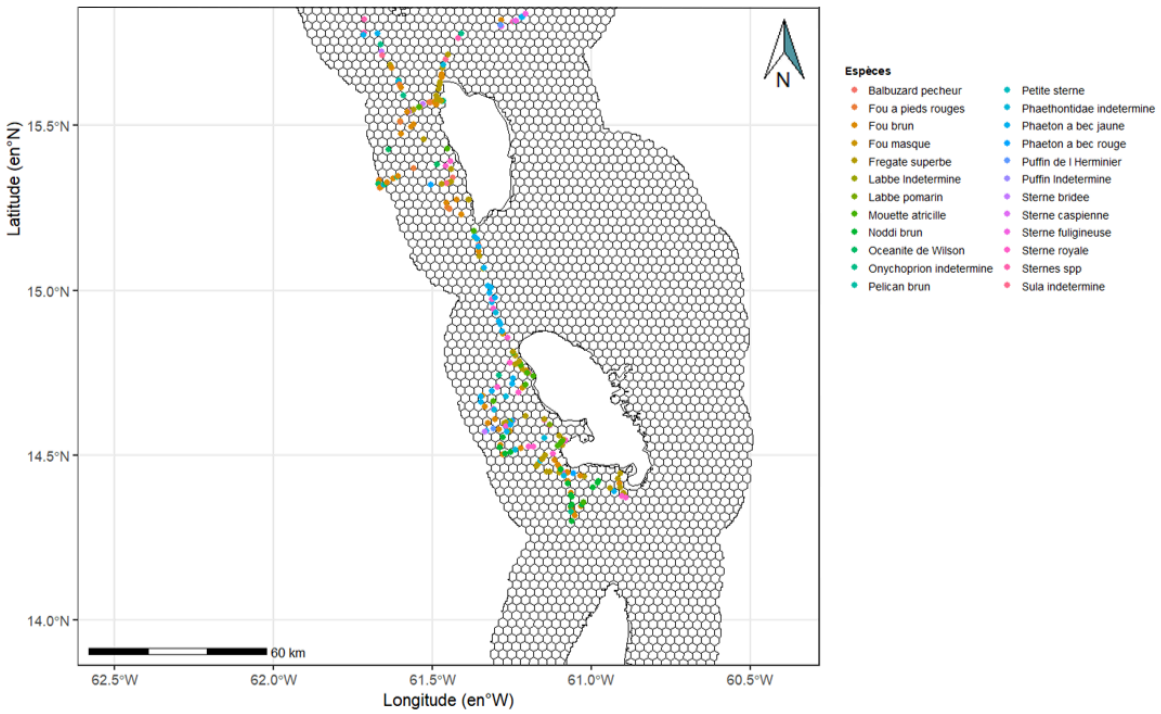

Figure 5 : *Position des observations d'oiseaux marins lors de l'expédition 2 - 2024*

On this expedition, the observers had intermediate experience in bird identification, with some experienced ornithologists. As a result, 17 species were identified: Brown Booby (*Sula leucogaster*), Masked Booby (*Sula dactylatra*), Red-footed Booby (*Sula sula*), Magnificent Frigatebird (*Fregata magnificens*), Wilson's Storm-Petrel (*Oceanites oceanicus*), Red-billed Tropicbird (*Phaethon aethereus*), White-tailed Tropicbird (*Phaethon lepturus*), Brown Noddy (*Anous stolidus*), Royal tern (*Thalasseus maximus*), Bridled tern (*Onychoprion anaethetus*), Sooty tern (*Onychoprion fuscatus*), Little tern (*Sternula antillarum*), Caspian tern (*Hydroprogne caspia*), Pomarine jaeger (*Stercorarius pomarinus*), Laughing gull (*Leucophaeus atricilla*), Brown pelican (*Pelecanus occidentalis*), Audubon's shearwater (*Puffinus lherminieri*).

Of all these bird species, 390 identifications are certain. The most frequently encountered species are the magnificent frigatebird, brown boobies and white tailed tropicbird, closely followed by the royal tern with 97, 79, 32 and 29 sightings respectively, together accounting for over 60% of observations. The rest of the species are fairly evenly represented, except for the more coastal species such as the brown pelican. It is also interesting to note that some of the species seen were able to do so because our expedition took place during the winter period, when certain migratory species can be observed in the region. This is particularly true of the storm-petrel, the jaeger and the caspian tern, which, although not represented in the total number of sightings, nevertheless account for around 4% of the total.

When we look at the number of individuals estimated across all observations, the species at the top of the rankings are no longer quite the same, with red-footed boobies and brown noddies topping the list with a total of 660 and 494 individuals respectively. The average group size was around 7 individuals, much larger in the case of agglomerations of birds during hunting, or for certain genera such as Sula, where species are often mixed (average number of individuals in a group = 36).

IMPACT

The CCS Ti Whale An Nou program aims to act towards cetacean protection acting on four axes:

Cooperation, Education, Research and Conservation.

Impact on Research :

This expedition is a continuation of the “Ti Whale An Nou” research program launched in 2021. This is the 4th consecutive year that this program has collected data on all cetaceans present in the Lesser Antilles, across the wide diversity of territories that make them up. This expedition completes the data still lacking on all these species, especially those considered “rare” because they are less abundant or at least less represented in the Lesser Antilles. This is the case, for example, of the 4 species of the Globicephalinae family seen during this expedition, namely: the melon-headed whale, the false killer whale, the pygmy killer whale and the short-finned pilot whale. Those observations are important as it is becoming crucial to know the status of these populations. Data were also collected on species considered the most difficult to spot visually (Gervais' beaked whale, Cuvier's beaked whale and dwarf sperm whale), partly due to their discreet, fearful behavior and their very limited time at the surface (between 1 and 3 minutes). This year, humpback whale sightings were less frequent than in previous years, echoing the observations made by other organizations in the Caribbean, with the hypothesis of a less consistent migration in the islands of the Lesser Antilles, where the rise in average water temperature would have led to an agglomeration of these whales at higher latitudes (in the Bermuda area, for example).

The analysis of GPS and acoustic data will specifically help to refine and update the distribution of various species in the Lesser Antilles, allowing for better predictions of critical areas for each species. This will facilitate the implementation of tailored conservation strategies in collaboration with the different territories. Even when acoustic data cannot be paired with GPS data, they hold significant value on their own. Whenever possible, we record the vocalizations of cetaceans we encounter. When only one species is present, these recordings enrich our acoustic database, helping to better understand the fundamental characteristics of their sounds (frequency, intensity, duration, etc.). This is vital, as our understanding of the communication systems of these species remains limited in the Lesser Antilles. This knowledge is currently restricted to a few species that have been more extensively studied in the Caribbean, primarily humpback whales and sperm whales.

The new photographic data will be compared with those collected in previous years to identify potential new individuals not yet cataloged or to highlight recaptures of individuals marked in past years. Additionally, these photographs will be used to document potential injuries and their types, shedding light on the threats faced by cetaceans, which vary by species. By analyzing photographic data alongside other collected information (start/end of tracking, observed behaviors), we can study the relationships between individuals or species more precisely. This contributes to a better understanding of the organization and complexity of interspecies interactions.




By combining these data types, we can gain insights such as the meaning of specific acoustic signals when cross-referenced with behavioral data or understand the uniqueness of these signals within a group of individuals. Ultimately, these observations enhance our understanding of the social dynamics and movement patterns of marine mammals, as well as their habitat use within the Caribbean marine ecosystems.

This expedition was also a success in terms of bird identification, with only 8.7% of observations being uncertain at the species level. This allowed for a clearer picture of the abundance, distribution, and migratory patterns of various bird species around the three islands. Not only did this expedition record the highest number of cetacean species within the *Ti Whale An Nou* program, but it also observed the greatest diversity of seabird species—truly a success on all fronts!

Impact on Cooperation and Education :

During the expedition, residents from all the islands joined the crew. Over the 15 days, participants represented various organizations, including the Parc Naturel Régional de la Martinique (PNRM), the Office Français de la Biodiversité (OFB), and environmental consultancies like BIOTOPE. We were also delighted to host Zethra Baron, an officer from Dominica's Fisheries Department, aboard for two days.

The involvement of such a diverse group of stakeholders allowed us to showcase our activities and strengthen individual skills across the islands in the Central Lesser Antilles, with each represented by at least one participant. This is essential to foster local engagement in marine conservation and ensure the long-term sustainability of our efforts. It also provided an opportunity for participants to connect with conservation professionals and marine life enthusiasts from neighboring islands, forging both professional and personal relationships.

The data collected during this expedition will contribute to our public, online database, which features visual and acoustic illustrations for each species observed in our expeditions. These data will also enrich presentations for schools, the general public, and events such as our Sea Camps.

Impact on Conservation :

All the data collected will expand current knowledge on the species inhabiting Dominican waters. For example, little is known about beaked whales in these waters, yet we were fortunate to encounter two species on two occasions. In Dominica, the acoustic data collected will help better describe the Cuvier's beaked whale (recently renamed as Goose-beaked whale) we observed. Similarly, data on the Globicephalinae species encountered in Dominica are essential and novel, refining our understanding of their movements.

Through our onboard Dominican officer, we learned that the pod of false killer whales we observed is frequently seen in southern Dominica, possibly traveling north towards Guadeloupe. This suggests they may form a resident group between these two islands. We also confirmed a relatively consistent association between Fraser's dolphins and melon-headed whales during a hunting event in southern Dominica. Understanding the movements of one species could provide insights into the potential movements of the other across islands.

This type of information is crucial for understanding inter-island movements and species abundance within this family, especially since many remain victims of hunting in the southern Lesser Antilles.

All photo-identification data will be uploaded to the online AI platform *Flukebook*, where we already collaborate with DSWP project members, particularly for sperm whale studies. Acoustic data from Dominica will be added to our internal database for further analysis through tools such as RavenPro, MATLAB, and Audacity in the context of species-specific studies (e.g., thesis projects).

These data are essential for improving the conservation of species in the Lesser Antilles, particularly as climate change increasingly impacts marine life, altering the limited existing knowledge about these species. The CCS's evidence-based conservation efforts contribute to broader Caribbean-wide protection initiatives, aligning with the 30x30 goal to protect 30% of marine biodiversity by 2030. An increasing number of territories now seek the CCS's internationally recognized expertise to establish MPAs around their islands and advance cetacean protection in the Caribbean.

Challenges:

A significant challenge this year was the public consultation on the new decree regulating cetacean approach distances in French Antilles/Agoa Sanctuary waters. Previously, under DMN permit applications, the Agoa Sanctuary issued equivalency certificates for training, allowing researchers to approach cetaceans within 100 meters for photo-identification. This year, this practice was replaced by an in-person test requirement for skippers.

The Sanctuary implemented this measure during our April expedition, before its public consultation began on April 18—three days after the expedition started. We were informed of this decision two weeks prior, requiring our skipper to quickly take the test, which she successfully passed. The final decree will be submitted for approval by the Government Delegate for Maritime State Action (DDGAEM) after May 10.

Another challenge was the rejection of our research permit applications to sample French islands in the Lesser Antilles due to the classification of our expedition vessel, which did not qualify as a Commercial Pleasure Vessel (NUC). The cost of meeting this classification was three times higher than our current catamaran rentals, making it financially unviable.

As a result, Martinique and Guadeloupe could not be sampled. Only a few data points were opportunistically collected during transits to and from Dominica. This inevitably reduced the scope of our conservation efforts, limiting the chances of encountering certain rare and understudied species, such as Gervais's beaked whale, which we briefly observed in Martinique but could not study further.

These challenges added to the already complex logistical organization of our mission, often dictated by day-to-day weather conditions. Consequently, we spent most of our time in Dominican waters, where we could fully implement our scientific protocol.

A new challenge this year involved qualitative bird data collection with enhanced methodologies. Thanks to the remarkable skills of our two onboard ornithologists, Lucas Bernier and Xavier Mauvois, this challenge was met with great success.

Acknowledgments

This work has been achieved thanks to the financial support of the Regional cooperation fund of the prefecture of Martinique.

The Caribbean Cetacean Society extends its gratitude to Corail Caraïbe for its commitment to the organization. It also thanks its partner, the Martinique Regional Natural Park (PNRM), for its support and the provision of one of its agents during the mission to enhance local skills in MPAs. Lastly, a heartfelt thank you to all mission participants, including the mission leader, the skipper, and the volunteers, for their motivation, good spirits, humor, and all their other interpersonal—and culinary—talents! Thank you for making this expedition possible and turning it into an unforgettable experience.

The Caribbean Cetacean Society team

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