



CARIBBEAN CETACEAN SOCIETY



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Scientific Expedition Report

Ti Whale An Nou program 2024



Orca (*Orcinus orca*), St Pierre, Martinique.

Expedition date: 5th-19th July

Expedition number: 5th of 2024

Islands monitored : Martinique, Dominica, Guadeloupe

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 fifth expedition of the year which took place in July along the islands of Martinique, Dominica and Guadeloupe. The crew consisted of representatives from Martinique, Guadeloupe, Dominica, Trinidad y Tobago, Hawaiï, United Kingdom and France. This diverse crew was composed of marine biologists, students in marine biology and conservation, passionate people involved in local ocean initiatives and members of the Guadeloupe National Park.

List of crew and affiliation

Expedition leader :

- **Lucas Bernier:** Marine biologist and project manager for the CCS in Martinique.

Scientific observers :

- **Myrtille Dupin:** Master's student in Marine Biology, interning at the CCS, French Polynesia. Originally from France.
- **Mélissa Haddad:** Volunteer at the CCS, Graduate in MSc Marine Biology at Sorbonne Université Paris. Originally from Martinique.
- **Alexis Agathine:** Master's student in Biodiversity and Ecology in Valence, France. Originally from Martinique.
- **Shivani Goberdhan:** Language pathologist in Hawaiï, ocean passionate and locally involved in marine conservation. Originally from Trinidad y Tobago.
- **Sarah Merle:** Coordinator for marine project support at Guadeloupe National Park. Originally from France
- **Elise Giraud:** Coordinator for Municipal Biodiversity Atlas at Guadeloupe National Park. Originally from France
- **Pauline Weckel:** Turtle Intern at Aquasearch, Martinique and former intern at Bottlenose Dolphin Research Institute, Spain. Originally from France
- **Clara De la Cruz:** Project coordinator at Ride in 971 for youth engagement and education in Guadeloupe. Originally from France

Captain :

- **Masao Mangatalle:** Skipper, Martinique

Cooperation crew:

- **Kacey St John:** Research project on turtles at Ocean Forward, Dominica. Originally from the UK
- **Martinique's prefecture cooperation service:** Team members of Martinique's prefecture cooperation service including the prefect Jean-Christophe Bouvier joined the crew for half a day in Martinique.



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, fluk , blows, breach) or to locate indicators that could potentially indicate the presence of cetaceans (e.g., splash, group of birds)

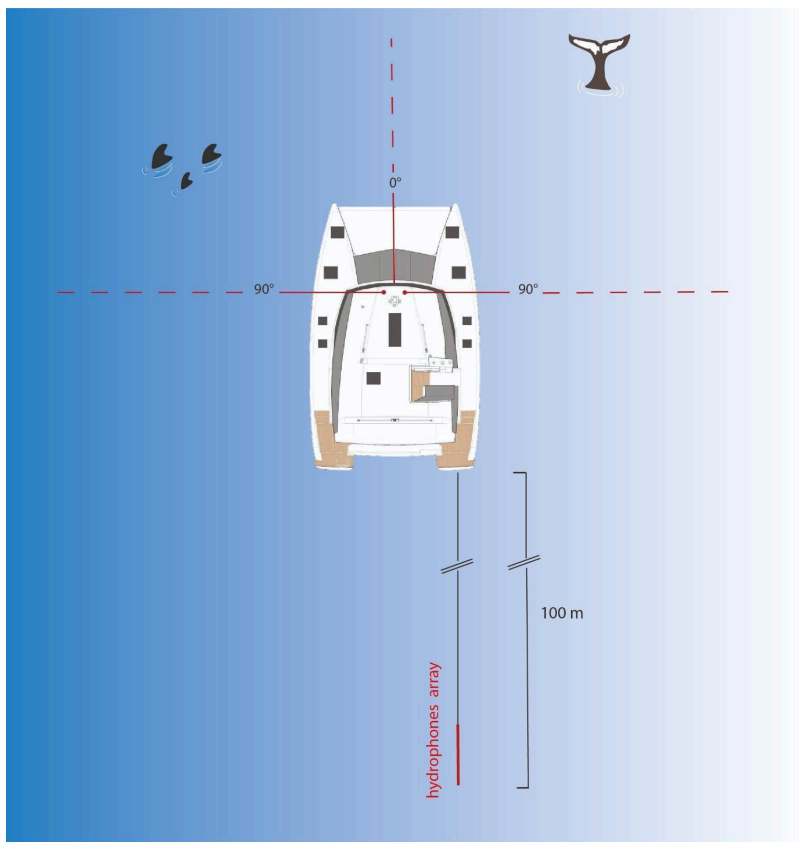


Figure 1: Layout of the research vessel and the area observed during the effort.

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 50m 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.

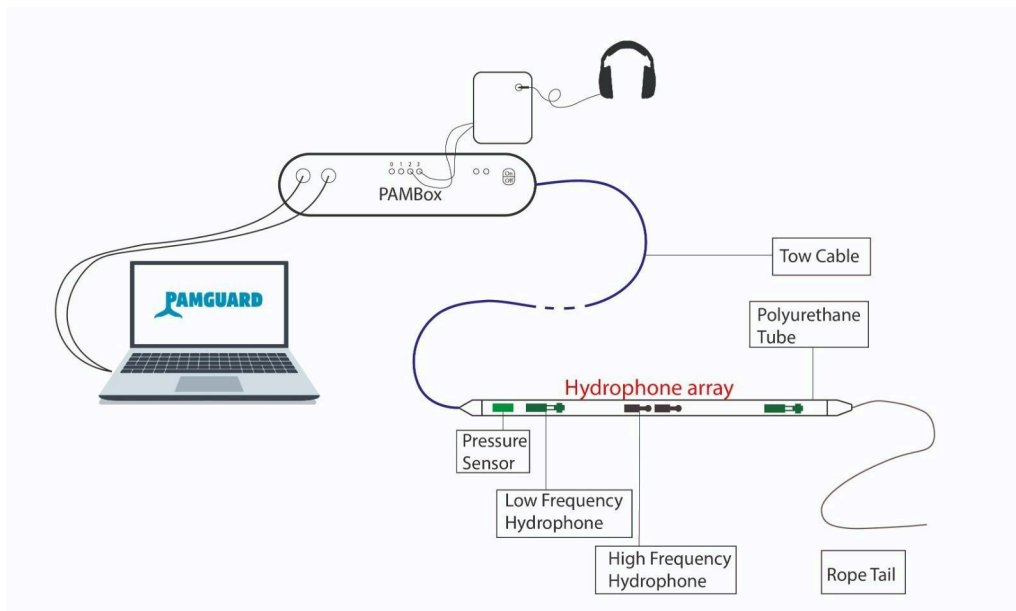


Figure 2: Diagram of the Acoustic Configuration

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: a Canon 5D, a Canon 90D and a Sony A7RIV with a 70-300 mm and 100-400 mm 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

During Expedition 5 of 2024, 8 cetaceans species were monitored. The studied species include the Atlantic spotted dolphin (*Stenella frontalis*), Bottlenose dolphin (*Tursiops Truncatus*), Fraser's dolphin (*Lagenodelphis hosei*), Gervais's beaked whales (*Mesoplodon europaeus*), Killer whale (*Orcinus orca*), Pantropical spotted dolphin (*Stenella attenuata*), Sperm whale (*Physeter macrocephalus*), Undetermined Kogia (*Kogia spp.*). 136 hours of research effort were conducted over a 14 days expedition monitoring from Martinique to Guadeloupe. The visual and acoustic effort covered 1260 km, with an average of 90 km covered per day at an average speed of 5.0 knots, depicted by the blue lines in Figure 3 below.

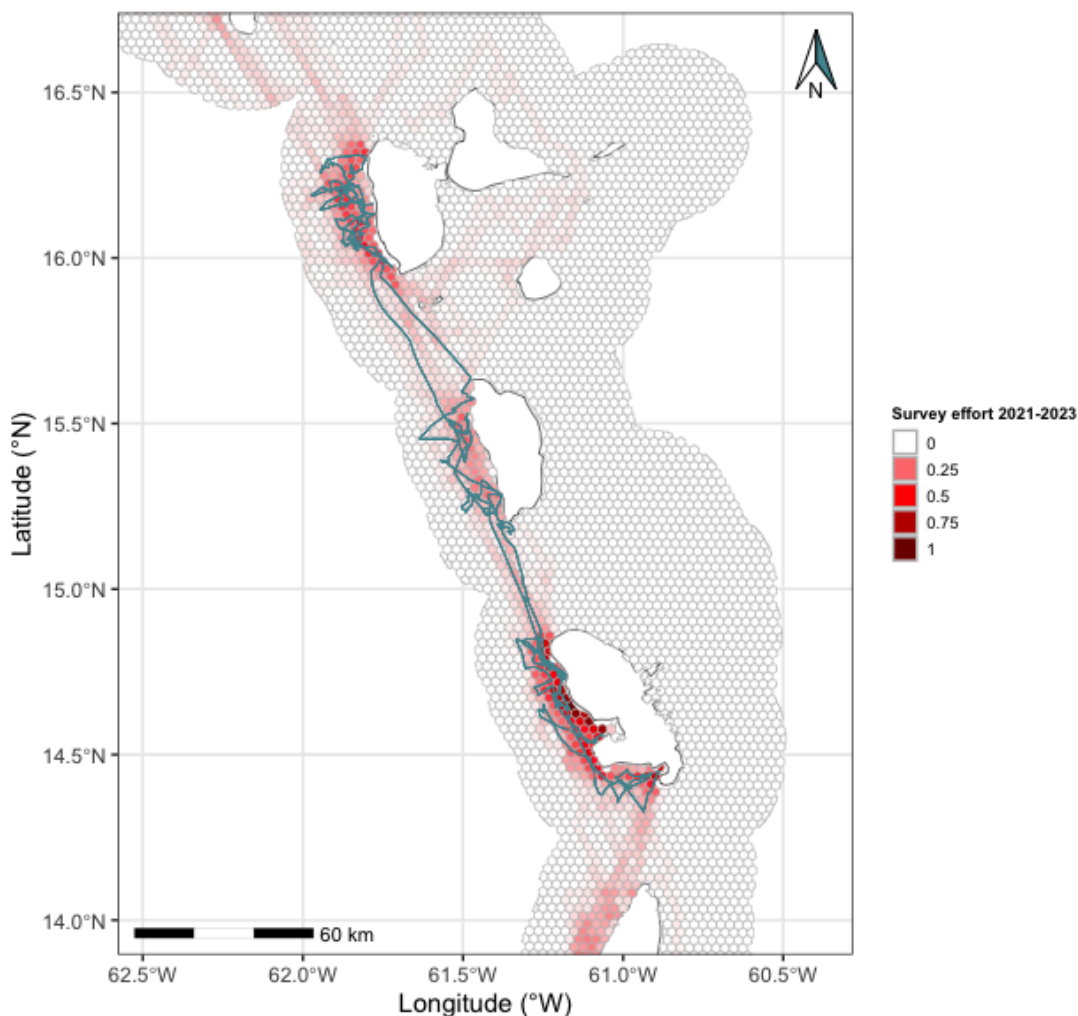


Figure 3: Track of boat surveys effort of expedition 5 of 2024

During the surveys, research effort was balanced as much as possible between unexplored and well surveyed areas (Figure 3) to improve the research coverage while allowing comparison with previously collected data.

Cetacean Species monitored

- Atlantic spotted dolphin (*Stenella frontalis*)
- Bottlenose dolphin (*Tursiops truncatus*)
- Fraser's dolphin (*Lagenodelphis hosei*)
- Gervais's beaked whales (*Mesoplodon europaeus*)
- Killer whale (*Orcinus orca*)
- Pantropical spotted dolphin (*Stenella attenuata*)
- Sperm whale (*Physeter macrocephalus*)
- Undetermined Kogia (*Kogia spp.*)

Cetaceans sightings table :

The data collected on these species is summarized in Table 1, which provides details on their localization, identification certainty, group size estimates, calf presence, and other relevant information. This data serves as a valuable resource for understanding the distribution and behavior of these cetacean species in the surveyed regions.

Table 1: Cetacean sightings recorded during expedition 5 of 2024.

Localization	Species Name	Identification certainly	Group size estimate	Max. estimate	Min. estimate	Juv. presence	Juv. estimate
Martinique	Gervais's beaked whales	Certain	1	1	1	No	0
Martinique	Killer whale	Certain	6	8	5	Yes	2
Martinique	Undetermined Kogia	Certain	2	2	2	Do not know	NA
Dominica	Sperm whale	Certain	6	8	5	Yes	2
Dominica	Sperm whale	Certain	14	16	12	Yes	2
Dominica	Pantropical spotted dolphin	Certain	20	26	17	Yes	4
Dominica	Sperm whale	Certain	14	16	12	Yes	2
Dominica	Pantropical spotted dolphin	Certain	250	325	175	Yes	15
Dominica	Fraser's dolphin	Certain	50	60	40	Yes	1
Dominica	Pantropical spotted dolphin	Certain	275	350	200	Yes	15
Dominica	Atlantic spotted dolphin	Certain	1	1	1	No	NA
Dominica	Pantropical spotted dolphin	Certain	320	400	200	Yes	25
Guadeloupe	Pantropical spotted dolphin	Certain	275	350	200	Yes	15
Guadeloupe	Fraser's dolphin	Certain	25	40	15	Do not know	NA
Guadeloupe	Pantropical spotted dolphin	Certain	50	80	35	Yes	7
Guadeloupe	Sperm whale	Certain	7	7	7	Yes	1
Guadeloupe	Pantropical spotted dolphin	Certain	60	80	40	Yes	5
Guadeloupe	Sperm whale	Certain	4	5	4	Yes	1
Guadeloupe	Pantropical spotted dolphin	Certain	200	300	100	Yes	2
Guadeloupe	Pantropical spotted dolphin	Certain	30	40	20	Yes	1
Guadeloupe	Sperm whale	Certain	6	7	5	Yes	2
Guadeloupe	Pantropical spotted dolphin	Certain	275	350	200	Yes	10
Guadeloupe	Fraser's dolphin	Certain	125	150	100	Yes	1
Guadeloupe	Pantropical spotted dolphin	Certain	100	125	75	Yes	2
Guadeloupe	Fraser's dolphin	Certain	200	250	150	Yes	20

Localization	Species Name	Identification certainly	Group size estimate	Max. estimate	Min. estimate	Juv. presence	Juv. estimate
Dominica	Sperm whale	Certain	8	9	8	Yes	1
Dominica	Gervais's beaked whales	Certain	1	2	1	Do not know	NA
Martinique	Pantropical spotted dolphin	Certain	120	140	80	Yes	5
Martinique	Fraser's dolphin	Certain	250	300	200	Yes	20
Martinique	Undetermined Kogia	Certain	3	6	3	Yes	1
Martinique	Pantropical spotted dolphin	Certain	NA	NA	NA	No	NA
Martinique	Pantropical spotted dolphin	Certain	70	80	50	Yes	2
Martinique	Bottlenose dolphin	Certain	20	25	15	Yes	1
Martinique	Pantropical spotted dolphin	Certain	70	80	50	Yes	1
Martinique	Fraser's dolphin	Certain	250	300	200	Yes	15



Gervais's beaked whale (*Mesoplodon europaeus*)

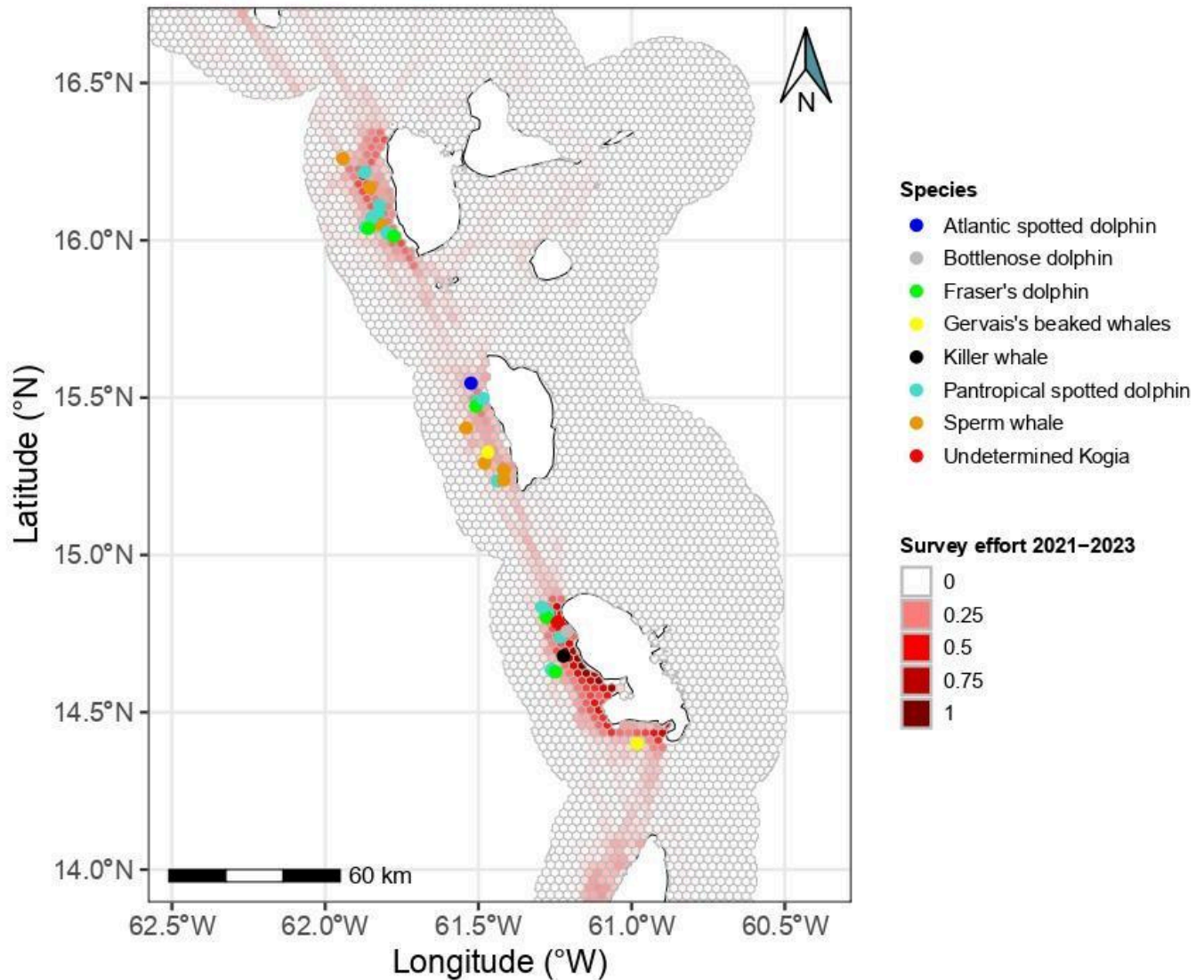


Figure 4: Map of the confirmed cetacean sightings with survey effort depicted in red shading for 2021-2023

Hydro acoustic sightings :

During this expedition, 149 listening points were conducted with active listening while the hydrophone was towed, representing a total of at least 25 hours of listening. Of these, 66 featured the presence of cetaceans. 35 detections were of Delphinidae and 31 of sperm whales. Species detection was based on listening and visual detection using the spectrogram and click detector of

the PAMGuard software for potential whistles, clicks, songs, and other characteristic sounds of certain cetacean species. They are each recorded and depicted in Figure 5 below.

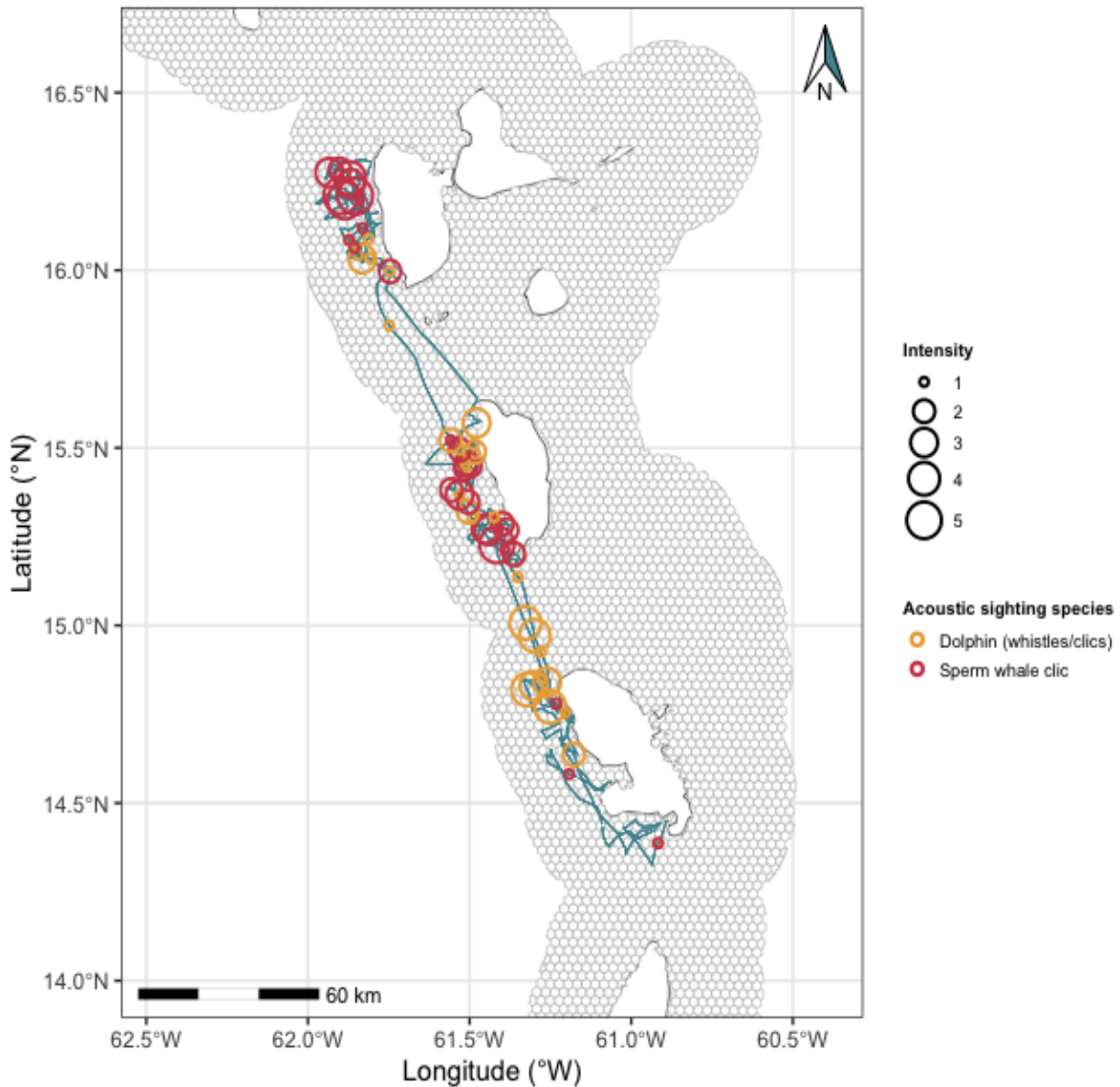


Figure 5: Study area of the acoustic sightings of Delphinidae whistle and clicks (orange circles), and sperm whale click (red circles). The active acoustic survey is represented by the blue line.

Marine traffic :

A total of 511 boats were observed during the visual survey of this expedition (Fig. 6.1), with sailboats accounting for the majority (52% of observations) evenly across the study area (Fig.6.2

C). An unusually high number of boats was observed in Martinique as surveys correlated with the annual race “Tour des yoles”, attracting an important marine traffic activity.

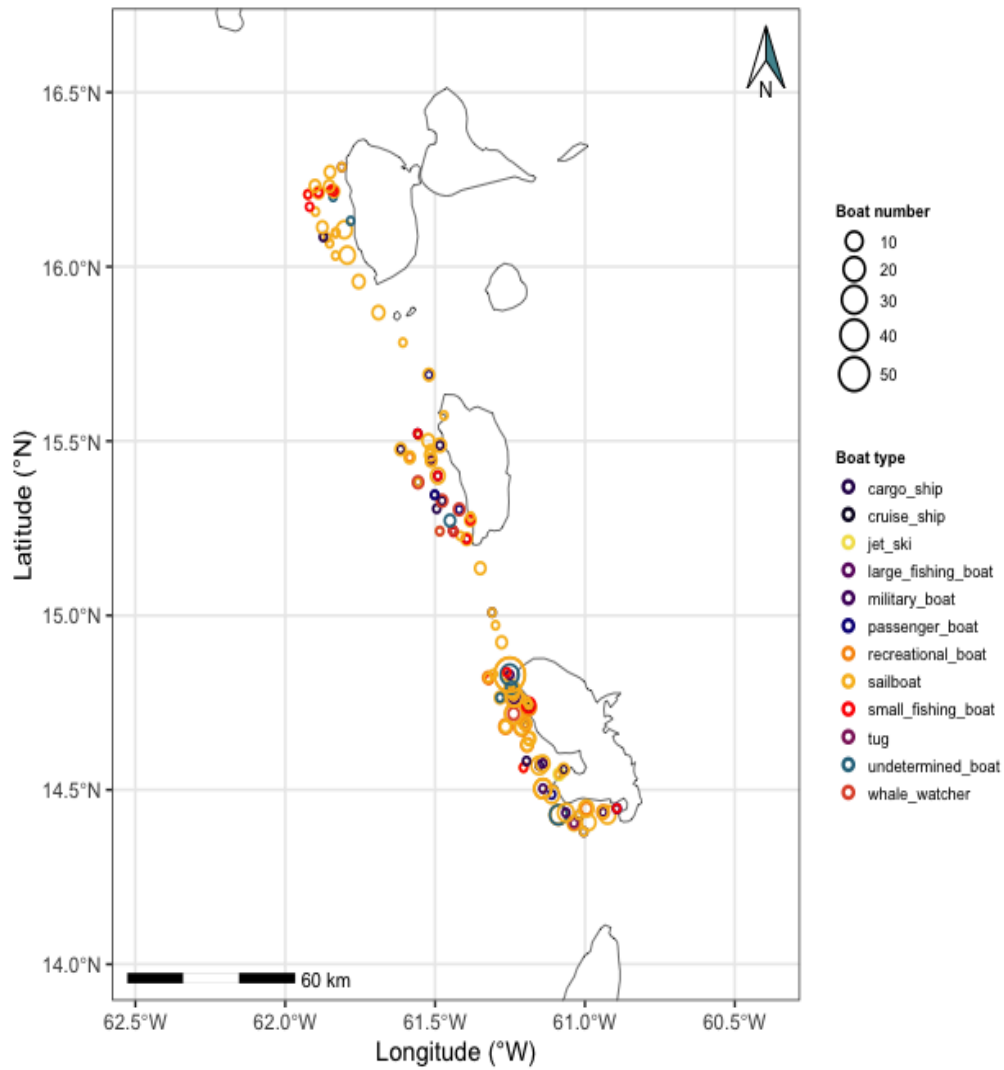


Figure 6.1 : Map of the number and type of boats observed during visual survey

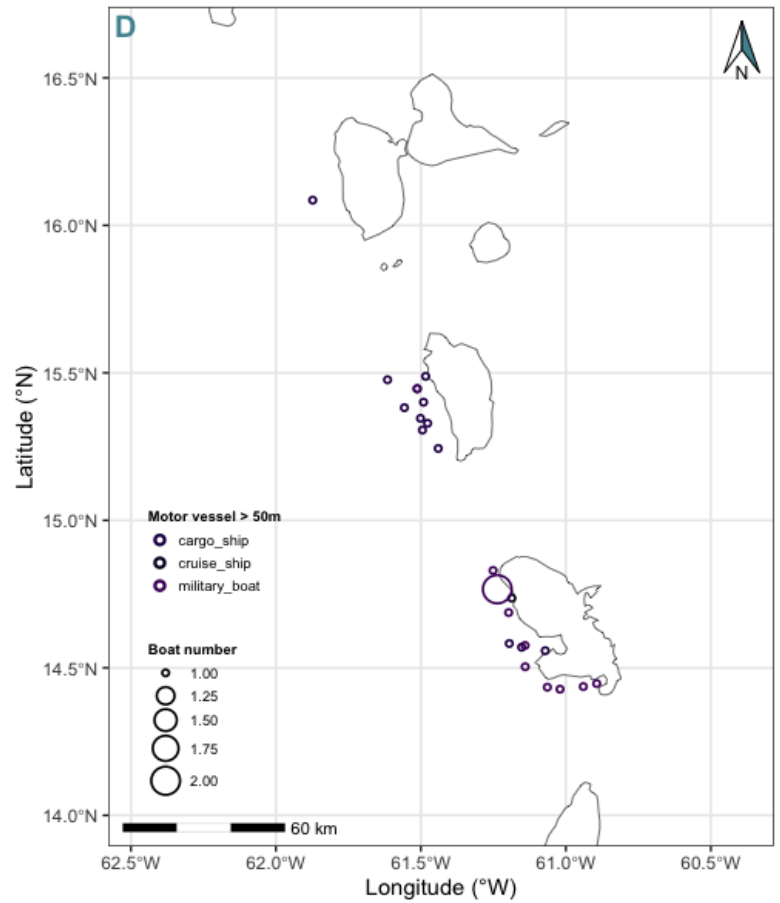
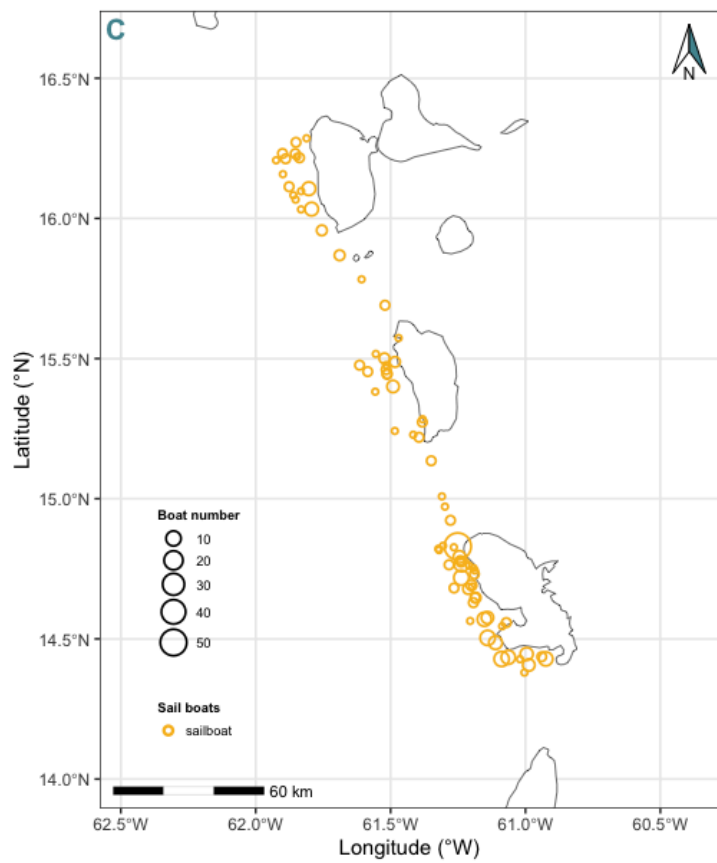
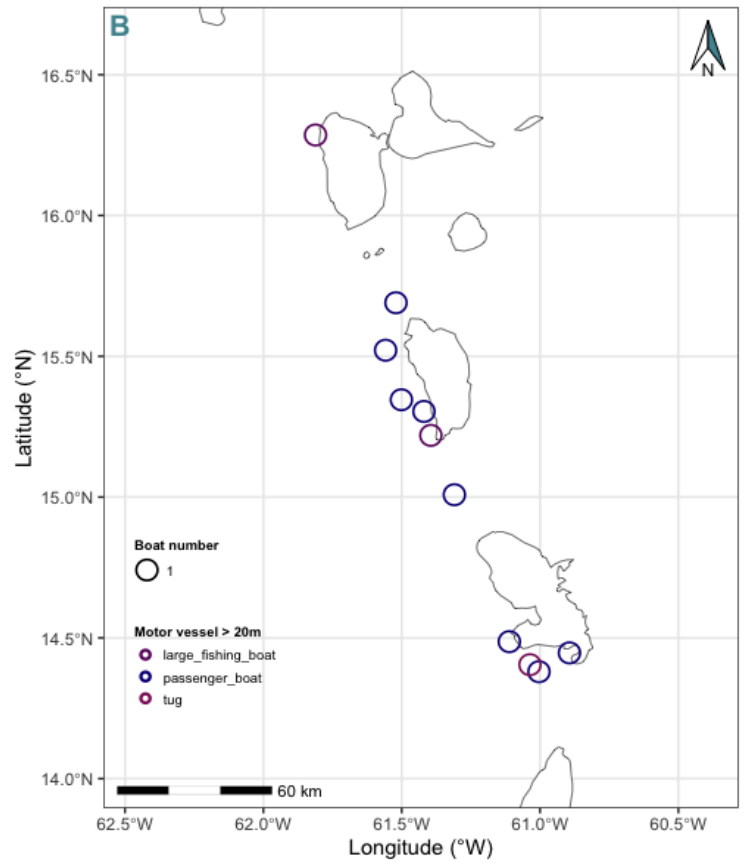
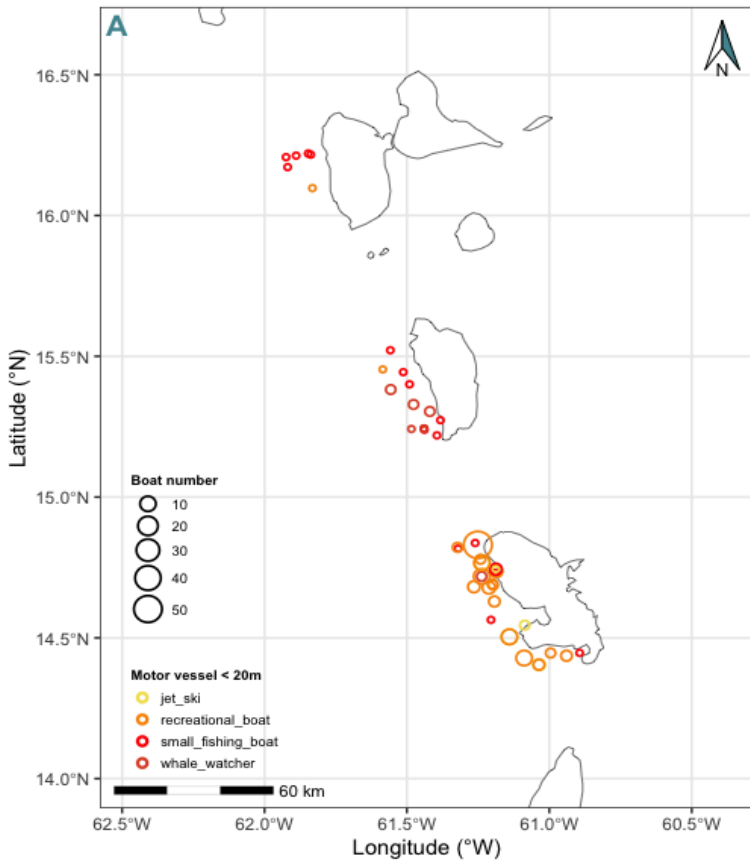


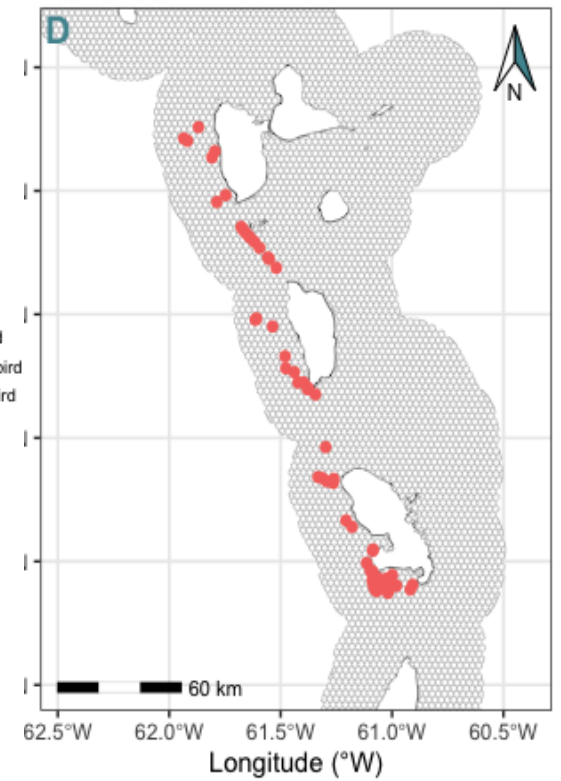
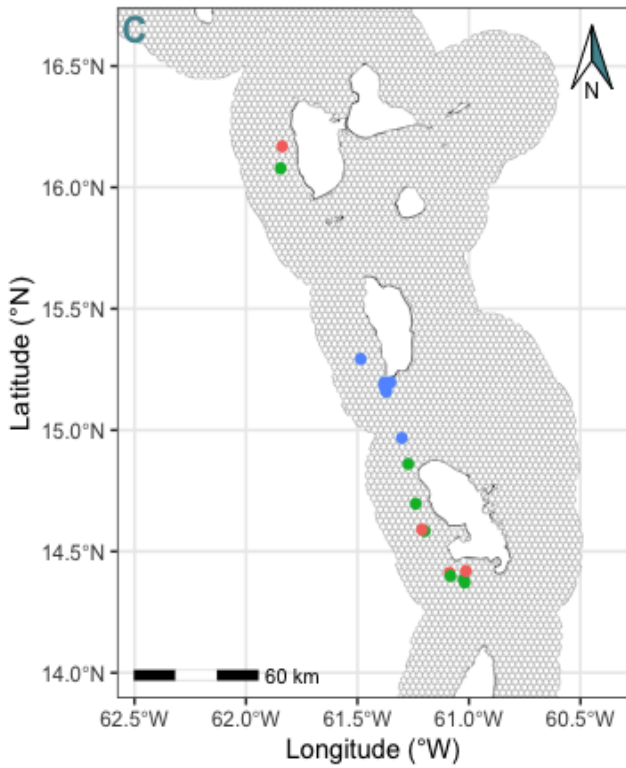
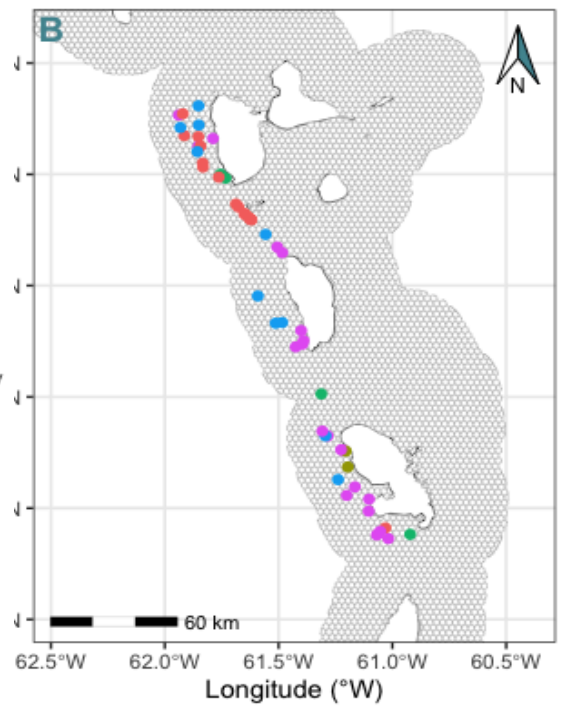
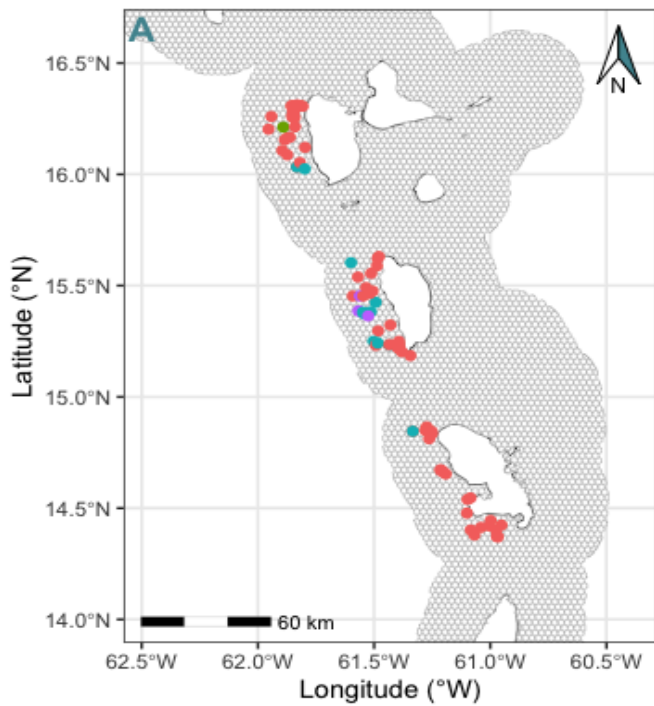
Figure 6.2 : Maps of the different categories of boats observed during the visual survey with A) Motor vessel < 20m; B) Motor vessel > 20m; C) Sail boats; D) Motor vessel > 50m

Seabird species monitored :

- Audubon's shearwater (*Puffinus lherminieri*)
- Bridled tern (*Onychoprion anaethetus*)
- Brown booby (*Sula leucogaster*)
- Brown noddy (*Anous stolidus*)
- Cory's shearwater (*Calonectris borealis*)
- Great shearwater (*Ardenna gravis*)
- Laughing gull (*Leucophaeus atricilla*)
- Least tern (*Sterna antillarum*)
- Magnificent frigatebird (*Fregata magnificens*)
- Masked booby (*Sula dactylatra*)
- Red billed tropicbird (*Phaethon aethereus*)
- Red footed booby (*Sula sula*)
- Royal tern (*Thalasseus maximus*)
- Sooty tern (*Onychoprion fuscatus*)
- White tailed tropicbird (*Phaethon lepturus*)

Table 2: Seabird sightings recorded during expedition 5 of 2024 .

Species	Scientific name	Nbr of observation
Audubon's shearwater	<i>Puffinus lherminieri</i>	1
Bridled or Sooty tern	<i>Onychoprion spp.</i>	113
Bridled tern	<i>Onychoprion anaethetus</i>	41
Brown booby	<i>Sula leucogaster</i>	378
Brown noddy	<i>Anous stolidus</i>	243
Cory's shearwater	<i>Calonectris borealis</i>	1
Great shearwater	<i>Ardenna gravis</i>	1
Laughing gull	<i>Leucophaeus atricilla</i>	10
Least tern	<i>Sterna antillarum</i>	6
Magnificent frigatebird	<i>Fregata magnificens</i>	329
Masked booby	<i>Sula dactylatra</i>	1
Red billed tropicbird	<i>Phaethon aethereus</i>	4
Red footed booby	<i>Sula sula</i>	22
Royal tern	<i>Thalasseus maximus</i>	6
Sooty tern	<i>Onychoprion fuscatus</i>	20
Unidentified tern	<i>Sterninae spp.</i>	60
Unidentified booby	<i>Sulidae spp.</i>	7
Unidentified shearwater	<i>Procellariidae spp.</i>	1
Unidentified tropicbird	<i>Phaethontidae spp.</i>	7
White tailed tropicbird	<i>Phaethon lepturus</i>	9



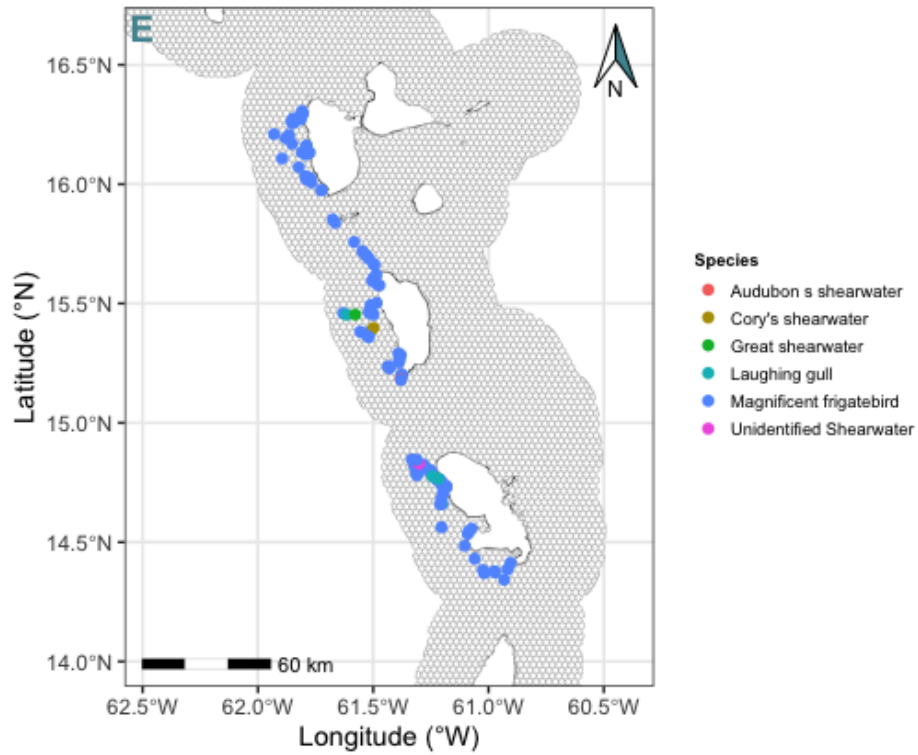


Figure 7 : Maps of sightings of seabird families recorded during expedition 3 of 2024 with A) the Booby sightings; B) Terns sightings; C) Tropicbirds sightings; D) Noddy sightings; and E) Others sightings.



White tailed tropicbird (Phaethon lepturus), Dominica.

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 Cooperation :

This expedition was made possible through funding from the Regional Cooperation Fund of the Prefecture of Martinique. As part of this initiative, we hosted volunteers from each of the surveyed islands—Martinique, Dominica, and Guadeloupe—as well as Trinidad & Tobago. The primary goal was to foster connections between conservationists, policymakers, and ocean enthusiasts across the Lesser Antilles, promoting long-term regional cooperation and conservation efforts.

All volunteers received training in field-based cetacean data collection, following a standardized research protocol. They were introduced to both visual and acoustic monitoring techniques and gained a comprehensive understanding of the challenges facing cetacean conservation in the Caribbean. Notably, two officers from Guadeloupe National Park participated, including a representative from the Marine Department. This expedition has laid the groundwork for future collaborations with established organizations working towards biodiversity conservation in the region

On July 17th, we had the honor of welcoming representatives from the Prefecture of Martinique, including the Prefect himself (the island's highest administrative authority). The purpose of their visit was to witness our actions and objectives while being in the field, in light of the expedition's funding by the Prefecture. During their time on board, we demonstrated various research techniques, discussed respectful approaches to interacting with cetaceans, and highlighted threats such as marine traffic. This visit represented an important step toward fostering cooperation. TV and radio media were present to cover the objectives of the expedition and the Prefect's and his cooperation team visit.



Impact on Research :

This expedition provided the CCS first visual confirmation of both the Atlantic spotted dolphin and Gervais's beaked whale in Dominica. The Atlantic spotted dolphin was observed within a group of pantropical spotted dolphins and was photographed due to its distinctive appearance compared to the other individuals. It is possible that this dolphin became separated from its original group of Atlantic spotted dolphins and chose to stay with the pantropical spotted dolphins. This observation likely suggests the presence of Atlantic spotted dolphins in Dominican waters.



Atlantic spotted dolphin, Dominica.

While beaked whales have been previously recorded in Dominica, visually identifying the species can be challenging due to their elusive nature, as clear views of the head are not always possible. On this occasion, however, we were able to confirm the species with certainty. These records represent a significant step forward in documenting the diversity of insular cetaceans in the Lesser Antilles.



Notably, another rare species was encountered on the first day of the expedition: a pod of orcas off the coast of Martinique. Although orcas are present in the Caribbean, they are rarely observed. The extended sighting and the collection of photo identification data will aid in understanding the species' dynamics, as they appear to make annual visits to the Lesser Antilles.

Additionally, Kogia species were detected acoustically on several occasions, though only a few individuals were visually observed. These species are particularly difficult to detect visually, but we hope the future analysis of the collected acoustic data will provide valuable insights into their presence and distribution in the region.

Throughout the expedition, sperm whales, pantropical spotted dolphins, bottlenose dolphins and Fraser's dolphins were observed frequently, which is common around these islands. The data gathered from these sightings will be compared with observations from 2021 to enhance our understanding of the species' ecology, distribution, and movement patterns. The preliminary results have already been analyzed, and the current observations will help push these analyses

further (<https://www.ccs-ngo.com/reports-publications>). This is essential for determining the conservation needs of these species.

In their own ways, the 35 cetaceans observations provided important information for research purposes and will help to understand the regional diversity, movements, distribution, habitat use and threats relative to those species.

Impact on Conservation :

During this expedition, we crossed the path of the boat race “Tour des Yoles” in Martinique. This event attracts many boats following the participants. We were able to record the ambient noise generated by such boat aggregation and share how noise pollution can disturb highly communicative animals such as cetaceans in front of the prefecture representatives and the media. Also while observing bottlenose dolphins, a jet ski cut the road of the group and was filmed on regional TV cameras, a great highlight of the risk marine traffic represents. This was an important opportunity to sensitize stakeholders and viewers to this matter.

The expedition allowed to raise awareness and create connections between stakeholders, organizations dedicated to conservation, students and ocean enthusiasts representing different islands of the Lesser Antilles. This capacity building is crucial and establishes regional cooperation with efficient and harmonized cetacean conservation strategies.

Impact on Education :

The presence of media on board and the communication efforts by the CCS team surrounding the expedition and its observations played a key role in raising awareness among a wide audience. This outreach is essential in fostering a connection between local communities and the rich marine life surrounding each island.

Marine biology students also participated as volunteers, gaining valuable skills and knowledge that will be instrumental in their future careers. We believe that their experience on this expedition will not only enhance their expertise but also enable them to promote conservation values and apply their skills in the future.

Limitations and Challenges

Obtaining the necessary permits proved particularly challenging for the French islands. To meet the research permit requirements, we had to switch to a smaller vessel, which was less suitable for accommodating the crew and research equipment. This adjustment was unavoidable, as the most modern and efficient boats do not qualify for the permitted category. These constraints significantly complicated the logistical and financial aspects of the project in the French islands. This complexifies the critical need to address substantial data gaps and the difficulty in securing permits does little to mitigate threats, as these islands continue to have the highest concentration of boats observed around cetaceans.

Acknowledgements

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

The Caribbean Cetacean Society thanks Skipper Antilles for its commitment to the association and for the partnership regarding the rental of this catamaran.

Finally, we thank all the participants in the mission; the mission leader, the skipper and the volunteers, for their motivation and good spirits.

The Caribbean Cetacean Society team

Science & conservation together !

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