CARIBBEAN CETACEAN SOCIETY

Scientific Expedition Report

Ti Whale An Nou program 2024

Sperm whales (Physeter macrocephalus) off of St. Vincent

Expedition date : 15th - 29th March 2024

Expedition number : 1st of 2024

Islands monitored : Southern islands - Martinique, St. Vincent and the Grenadines and Grenada

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) is a program that was launched 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 been documented to date in the Caribbean region, which is more than a third of all the species recorded in the world. The Caribbean Cetacean Society has observed 22 of these species, so far in the lesser Antilles.

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 research missions welcome participants from all the Caribbean islands to participate in training, building local capacity and partake in field work gaining hands-on experience.

From March through to August of 2024 six scientific expeditions of 15 days are scheduled to occur throughout all the waters surrounding the islands of the Lesser Antilles. Each expedition starts in Martinique and expeditions are grouped by their regions: North (Montserrat - Anguilla), Center (Martinique - Montserrat) and South (Grenada - Martinique).

This report is dedicated to the first Ti Whale An Nou expedition of 2024 which launched on the 15th of March in the Southern region of the Lesser Antilles. A crew of eight individuals represented five island nations (Martinique, St. Lucia, St Vincent and the Grenadines, and Grenada) as well as from mainland France and Canada. This crew was composed of biologists, fisheries officers, sea turtle specialists, and non-governmental organisation (NGO) representatives, including two Country Coordinators from the Wider Caribbean Sea Turtle Conservation Network (WIDECAST).

List of crew and affiliations

Expedition Leader

- **Raven Hoflund :** Regional coordinator of the Caribbean Cetacean Society, founder of Ripples to Waves (NGO), Country coordinator of the Wider Caribbean Sea Turtle Conservation Network (WIDECAST), St. Vincent and the Grenadines

Scientific observers

- **Louise Simon -** Project manager and sperm whale specialist of the Caribbean Cetacean Society, Martinique
- **Kate Charles -** Marine biologist and Project director of Ocean Spirits, Country coordinator and Conservation outreach officer for WIDECAST, Director of Ripples to Waves (NGO) and our expedition sea bird specialist, Grenada
- **Lucie Queffelec -** Caribbean Cetacean Society civic service volunteer and communications (social media), from mainland France based in Martinique
- **Délisse Delannay -** Biologist and Environmental conservationist, Guadeloupe
- **Leah Schwartzentruber -** Sea turtle conservationist and educator, Canada and USA
- **Jose Fontenelle -** Fisheries assistant at the St. Lucia Fisheries Division, Saint Lucia

Captains

- **Canyon Duncan - Captain and founder of Nirvana Yacht Charter, SVG**
- **Carla Arozarena - CCS trained captain from Martinique**

Expedition crew

Standardized scientific protocol

During our scientific surveys, acoustic detection is combined with a towed hydrophone array and visual observations by two observers on deck, allowing both methods to complement each other for effective cetacean presence / absence monitoring. This is the same protocol applied in all the islands of the Lesser Antilles since the 'Ti Whale An Nou' program started in 2021.

Survey Protocol

The visual observer's effort is limited by daylight, from 06:00 to 18:00. The boat transect is 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 is divided into three teams of at least two people. Each team performed different roles that rotated every two hours in the following order: (1) data entering, (2) visual observation, and (3) logistical support, chores on the boat and rest.

Data Entering

During the expedition, two crew members use the ObsEnMer software in expert mode on an iPad for data recording. The use of this software makes 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 are recorded, as well as an acoustic point when the hydrophone is being 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, the quantity and types of vessels, for a future comparative 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 is defined with ten minutes of listening with headphones. While listening, the team would also try to visually identify any cetacean vocalisation by observing the spectrogram and/or the click detector module on the screen using PAMGuard software version 2.02.07 (Gillespie et al., 2008).

Pantropical spotted dolphin (*Stenella attenuata*) in the Grenadines

Visual Observation

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).

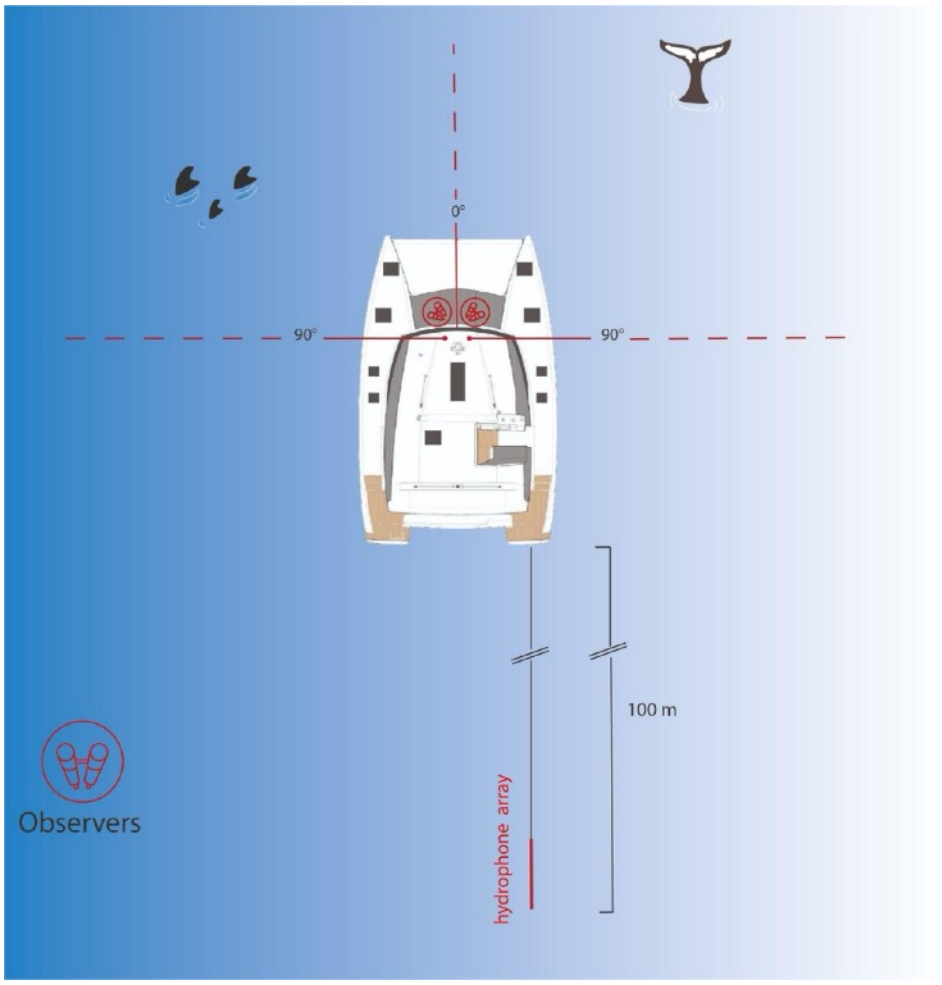

Figure 1: *Layout of the research vessel and the area observed during the effort.*

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 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.

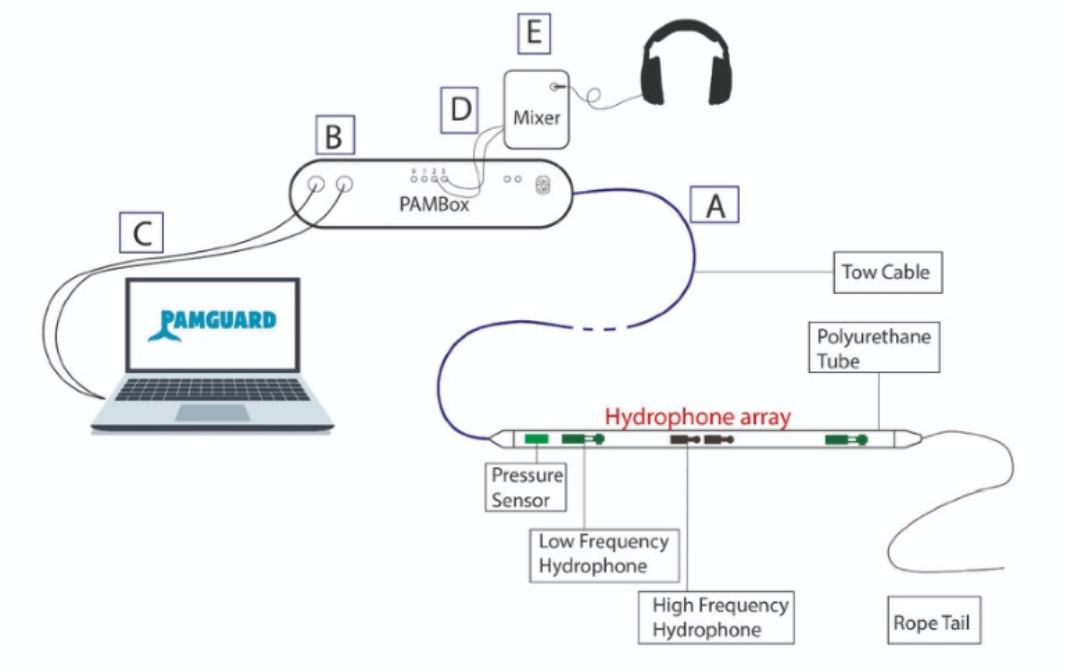

Figure 2: *Diagram of the Acoustic Configuration*

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 one 2024, eight cetacean species were monitored. The research effort was conducted over a 12 day expedition monitoring from SaintVincent and the Grenadines to Grenada. The visual and acoustic effort covered 1,310 km, with an average of 109 km covered per day at an average speed of 5.4 knots, depicted by the blue lines in Figure 3.

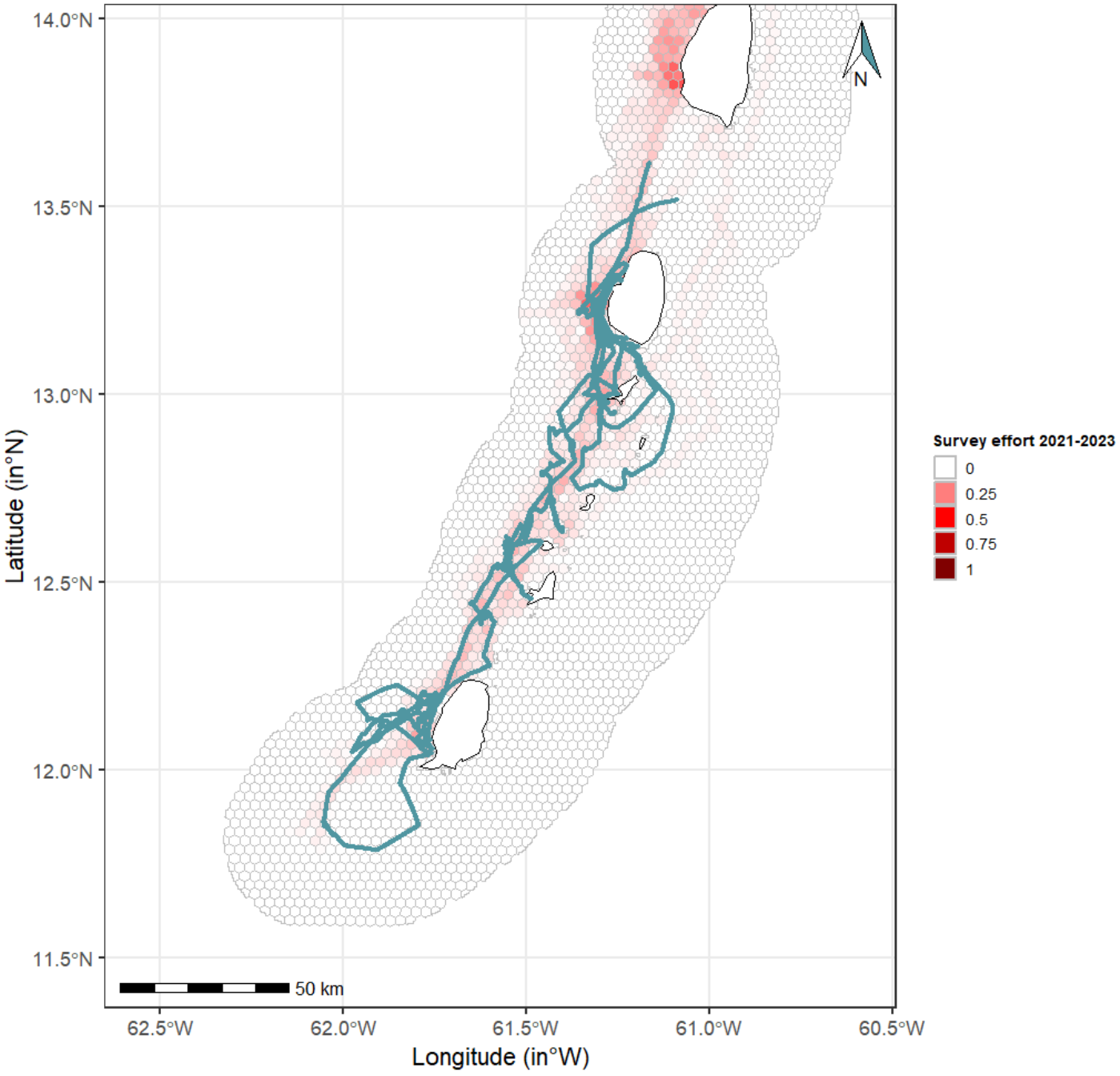

Figure 3: *Boat tracking (in blue) from Expedition one of the Ti Whale An Nou program 2024 with 2021-2023 survey efforts (in red)*

One of the goals of this expedition was to sample areas that had not been explored in depth by the CCS previously, consisting of the areas further from the coastline. These areas are shown in light red or white in Figure 3, where the search effort per hexagon has been calculated based on sightings data collected between 2021 to 2023. Unfortunately, due to the unfavourable weather conditions during our expedition, it was not possible to go as far from the coast as it was planned due to the decrease of the sighting visibility when we tried. However, it was possible to survey the southern part of Grenada that has not been well sampled previously as well as on the Atlantic side of some of the Grenadine's islands which was a first for the CCS.

List of Cetacean Species monitored :

- Sperm whale (*Physeter macrocephalus)*
- Dwarf sperm whale *(Kogia sima)*
- Pantropical spotted dolphin (*Stenella attenuata)*
- Clymene dolphin *(Stenella clymene)*
- Humpback whale (*Megaptera novaeangliae*)
- Melon-headed whale (*Peponocephala electra*)
- Pygmy killer whale (*Feresa attenuata*)
- Cuvier's beaked whale (*Ziphius cavirostris*)
- Undetermined beaked whale
- Undetermined kogia

The data collected on the distribution of cetacean species sighting (Figure 4) is summarised in Table 1, which provides details on their localisation, group size estimates, calf presence, and other relevant information. This data serves as a valuable resource for understanding the distribution and behaviour of these cetacean species in the surveyed regions.

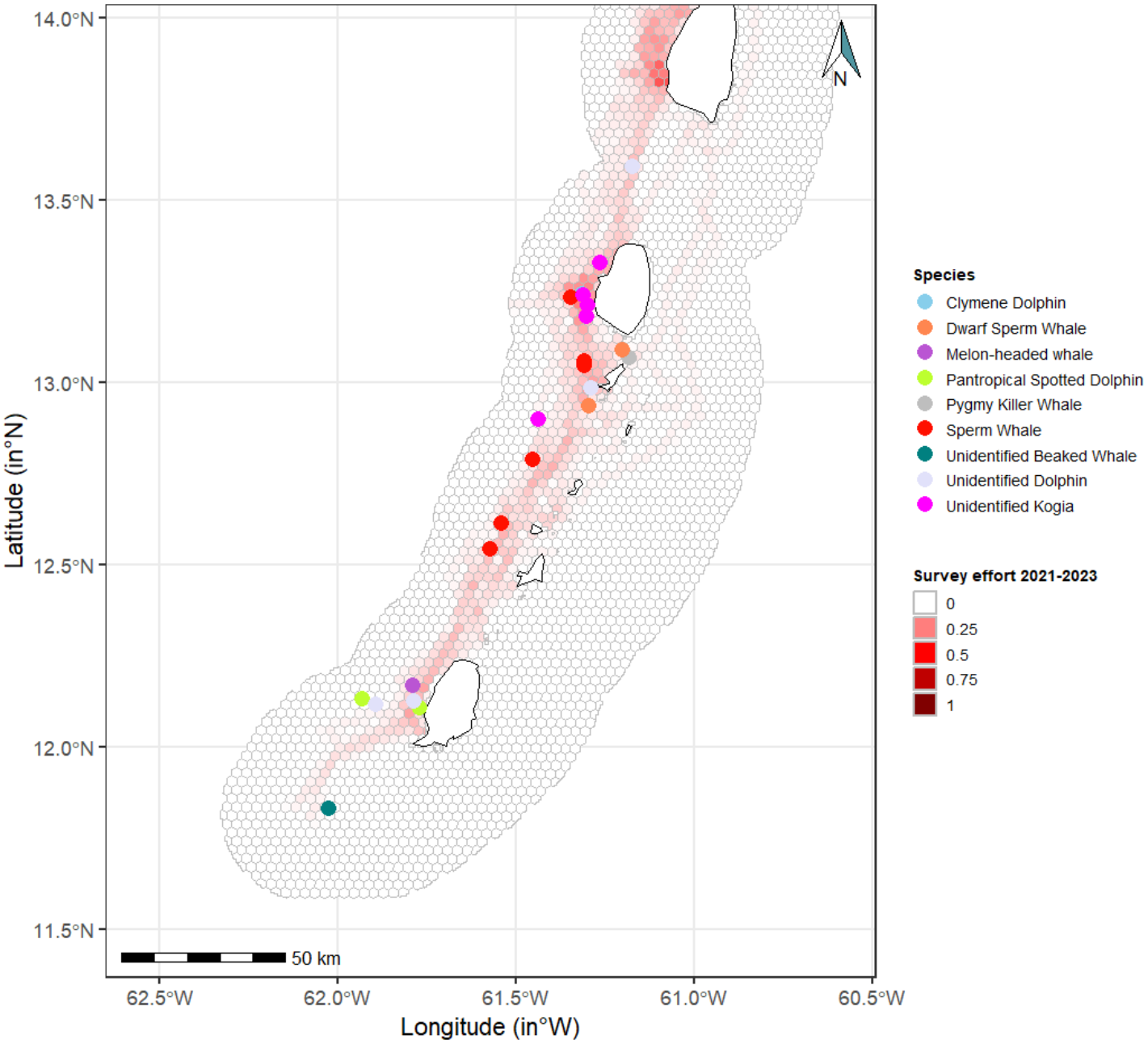

Figure 4: *Map of the confirmed cetacean sightings during the 2024 expedition with survey efforts depicted in red shading for 2021-2023*

Table 1: Cetacean sightings recorded during expedition one of 2024 (with duplicates removed)

Species Name	Group size estimate	Max. estimate	Min. estimate	Juv. Presence	Juv. estimate
Sperm whale	3	4	3	Do not know	NA
Pantropical spotted dolphin	200	300	150	Yes	60
Pantropical spotted dolphin	30	40	20	Yes	5
Melon-headed whale	35	40	30	Yes	2
Unidentified beaked whale	1	1	1	Do not know	NA
Unidentified dolphin	NA	NA	NA	Do not know	NA
Sperm whale	6	7	5	Yes	2
Sperm whale	5	6	5	Yes	2
Sperm whale	NA	NA	5	Yes	NA
Unidentified Kogia	1	1	1	No	0
Unidentified Kogia	1	1	1	No	NA
Clymene dolphin	30	40	25	Do not know	NA
Dwarf sperm whale	2	3	2	Do not know	NA
Sperm whale	2	3	1	Do not know	NA
Unidentified Kogia	2	2	2	Do not know	NA
Pygmy killer whale	2	2	2	No	NA
Dwarf sperm whale	NA	NA	NA		NA
Sperm whale	8	NA	NA	Yes	3
Unidentified Kogia	3	3	3	Do not know	NA

Of the 27 sightings made during expedition one Ti Whale An Nou (Figure 4), 11 sightings were in Saint Vincent, eight in the Grenadines and eight in Grenada, for an overall average of approximately two sightings per day.

The three most frequently sighted species were *Kogia sp*., sperm whale, and pantropical spotted dolphin, with eight, six and two sightings respectively over the 12 days.

The record of the total number of individuals is, with no surprise, pantropical spotted dolphins with an estimation of 430 individuals over the two sightings. The second and third species with the higher number of individuals were melon-headed whales and the Clymene dolphins, with respectively 35 and 30 individuals estimated in one sighting each.

We also had some opportunistic sightings, two Cuvier's beaked whales (one sighting), humpback whales (two) and pantropical spotted dolphins (one) on our departing and arriving transects of the expedition whilst crossing between Martinique and Saint Vincent.

Seabird species monitored

In 2023 CCS started monitoring seabirds with some pretty exciting sightings. We continue to monitor seabirds, though they are not the main focus of the expedition and the data collection protocol is still developing. We did find challenges with seabird identification with only one avid birder onboard but by the end of the expedition everyone was able to name most of the common species seen and were photographing any species that were unsure about. During cetacean tracking seabird sightings are not carried out. In the results the observation numbers are an underestimation and possibly some occasions of misidentification occurs but there is still valuable data to have preliminary data of species diversity, and distribution.

Figure 5: *White-tailed tropicbird (Phaethon lepturus)*

All the bird species sighted are listed below; 1023 out of 1059 identifications are certain. The most frequently encountered species are Red-footed boobies, the Brown boobies, and Laughing gulls, with 454, 197, 130 sightings, together accounting for over 76% of the total sightings. Red-footed boobies had the highest number of individuals for a species with 4000 individuals counted. Magnificent frigate birds, Royal terns and Red-billed tropicbirds accounted for 15% of the sightings, and the 9% remaining are represented by rarer species such as the Brown noddies species. The average group size was around six individuals.

List of Seabird species monitored

- Royal tern (*Thalasseus maximus)*
- Sooty tern (*Onychoprion fuscatus)*
- Bridled tern *(Onychoprion anaethetus)*
- Roseate tern *(Sterna dougallii)*
- Red-billed tropicbird (*Phaethon aethereus)*
- White-tailed tropicbird (*Phaethon lepturus)*
- Laughing gull (*Leucophaeus atricilla)*
- Magnificent frigatebird (*Fregata magnificens)*
- Masked booby (*Sula dactylatra)*
- Brown booby (*Sula leucogaster)*
- Red-footed booby (*Sula sula)*
- Brown noddy *(Anous stolidus)*
- Audubon's shearwater *(Puffinus lherminieri)*
- Wilson's storm-petrel *(Oceanites oceanicus)*

Due to the quantity of individual birds sighted, maps have been created for each genus of seabirds to make it clearer. They are presented in the Figures from 6 to 12.

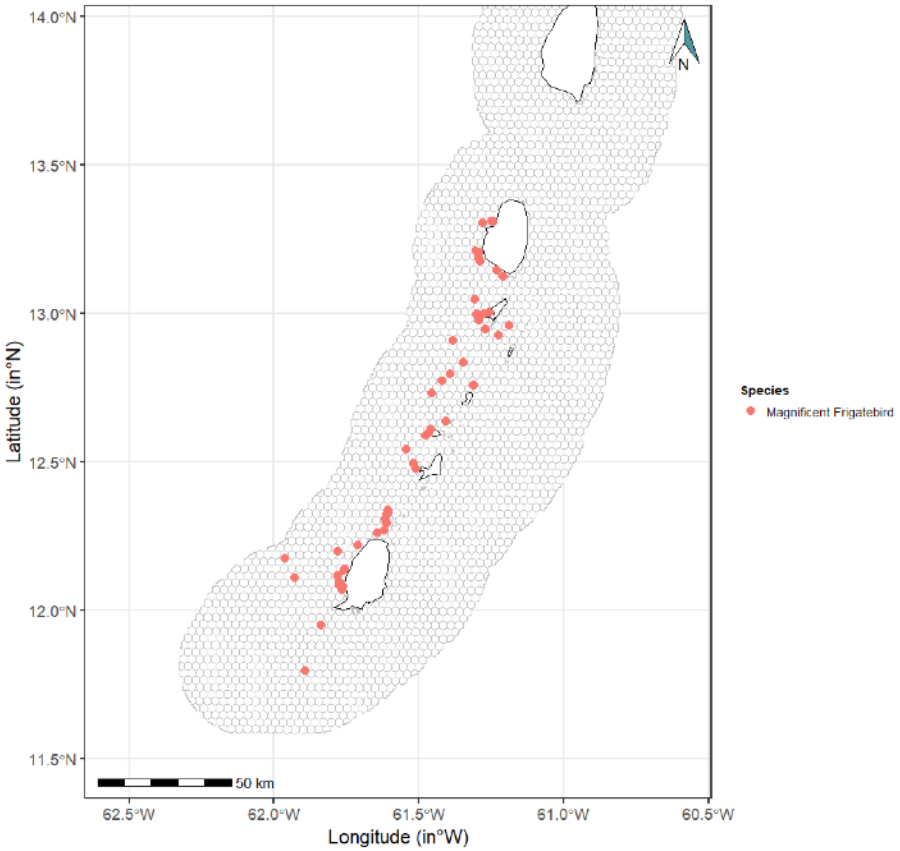

Figure 6: *Magnificent Frigatebird sightings*

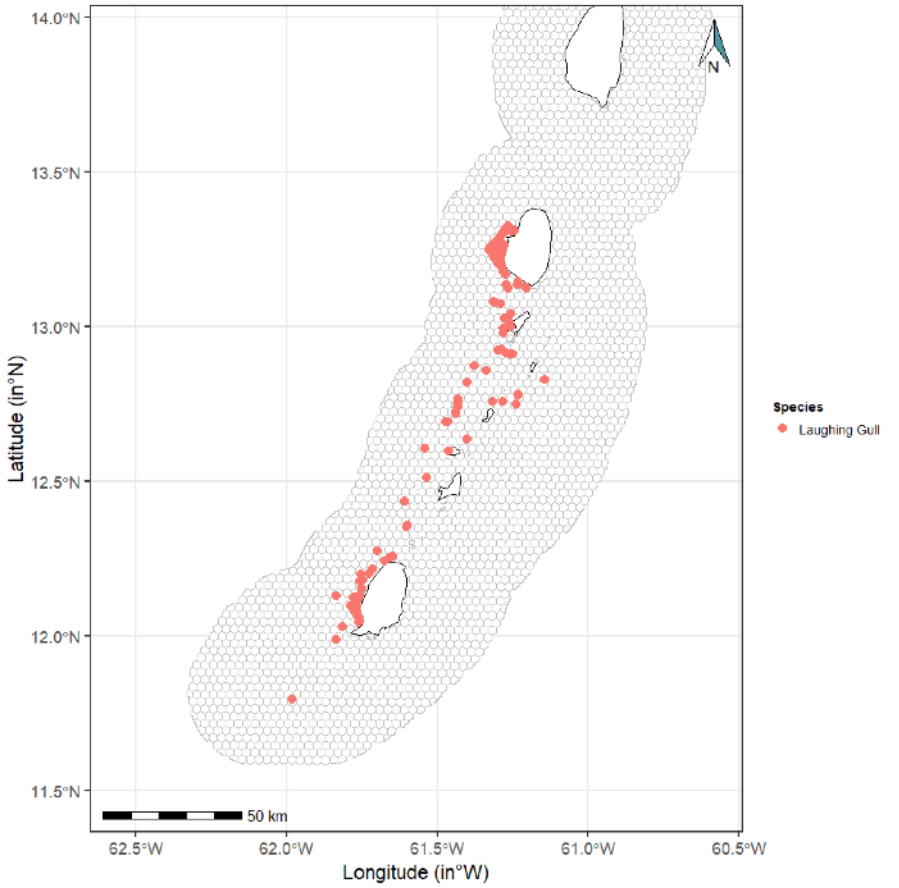

Figure 7: *Laughing Gull sightings*

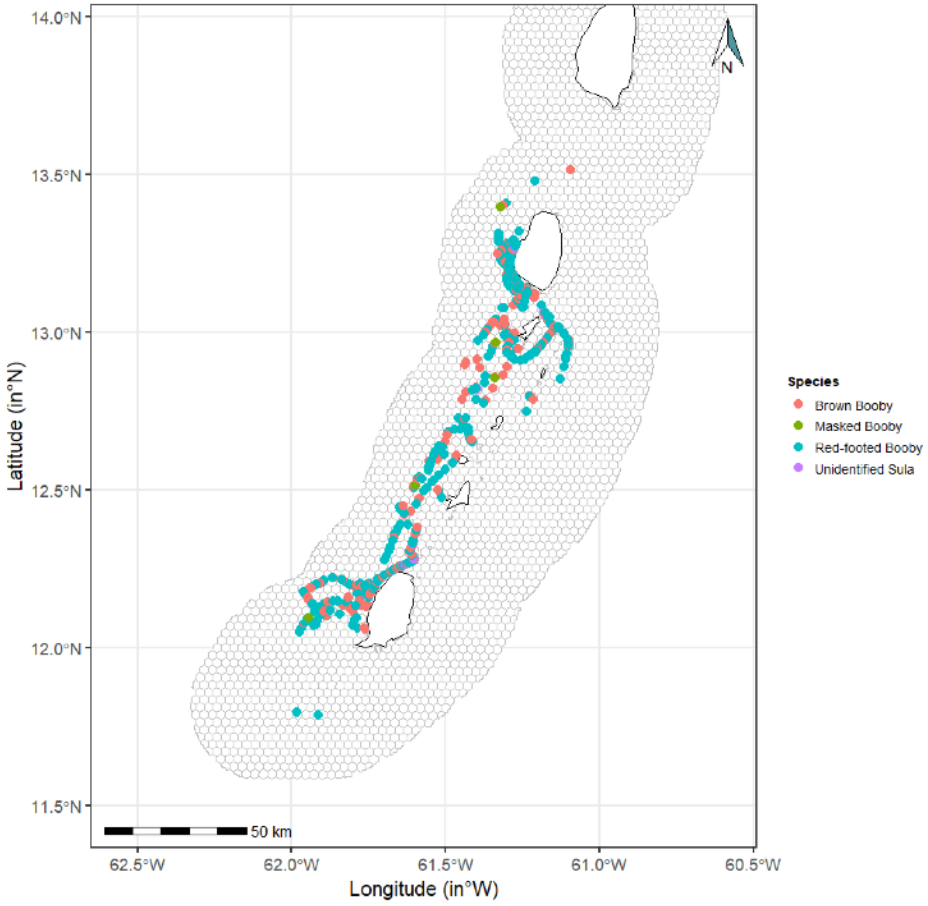

Figure 8: *Boobies sightings*

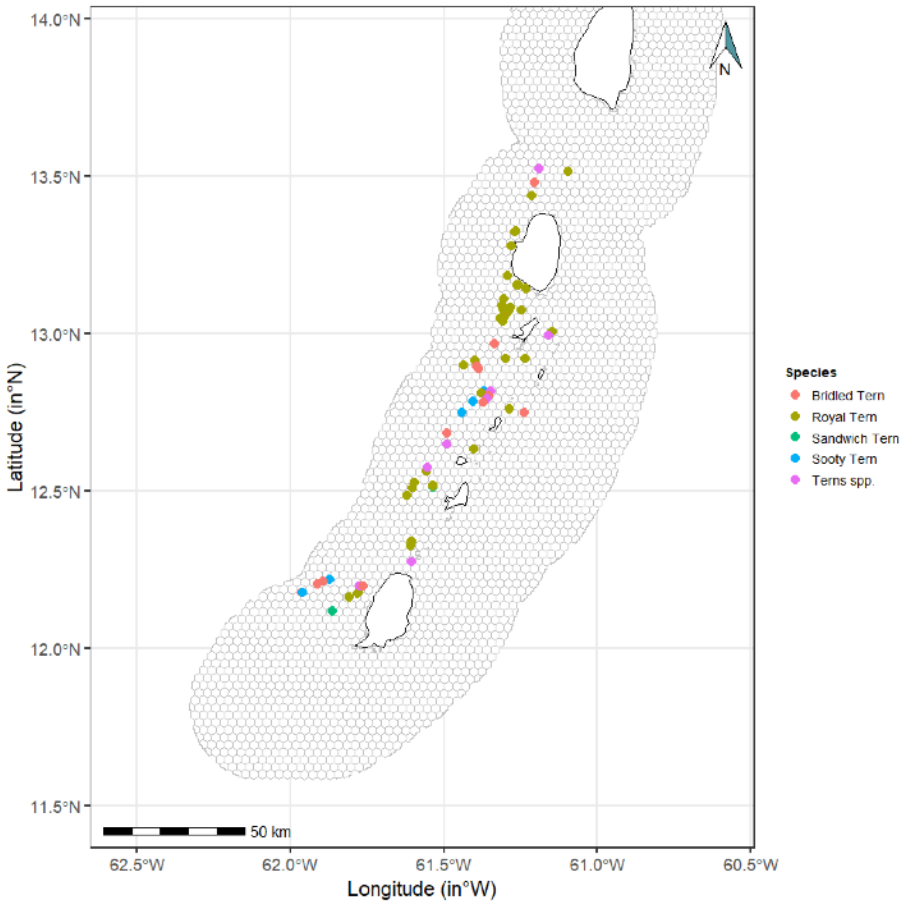

Figure 9: *Tern sightings*

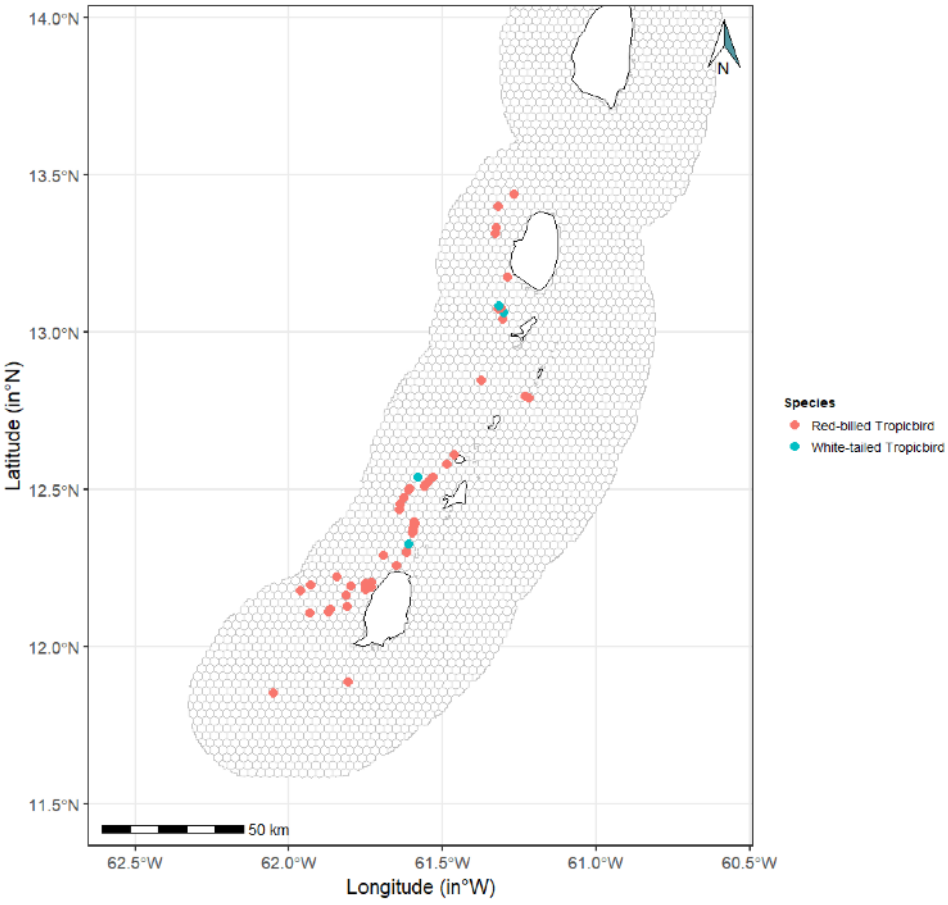

Figure 10 : *Tropicbirds sightings*

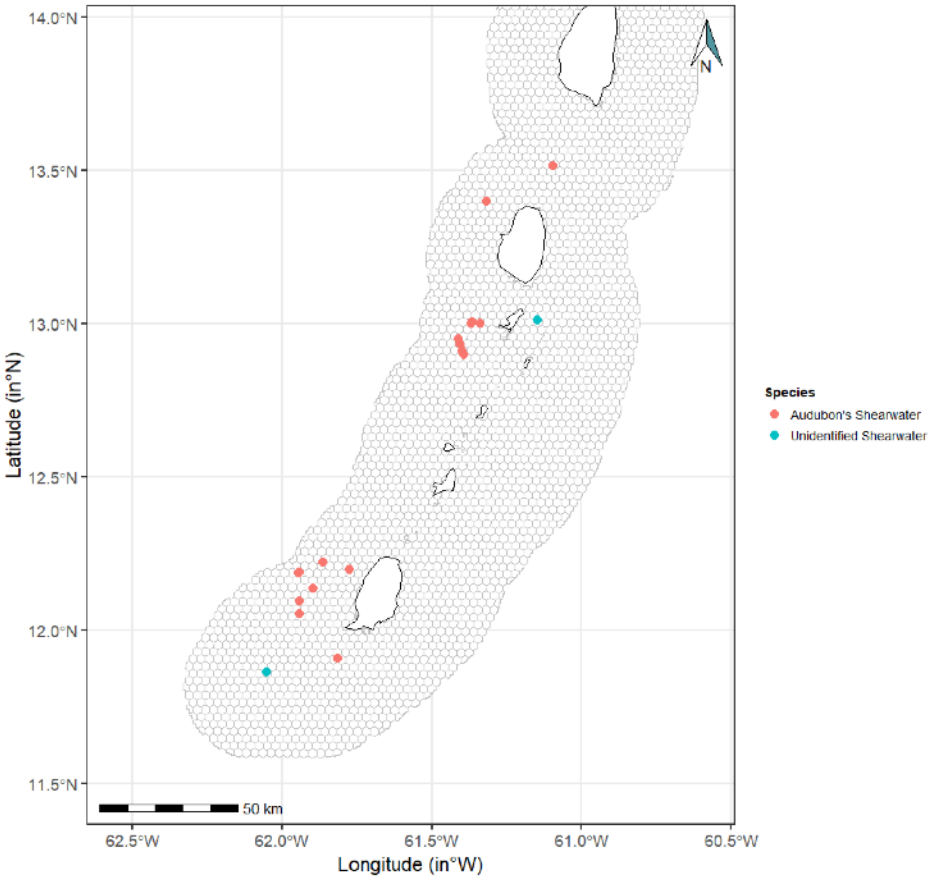

Figure 11: *Shearwaters sightings*

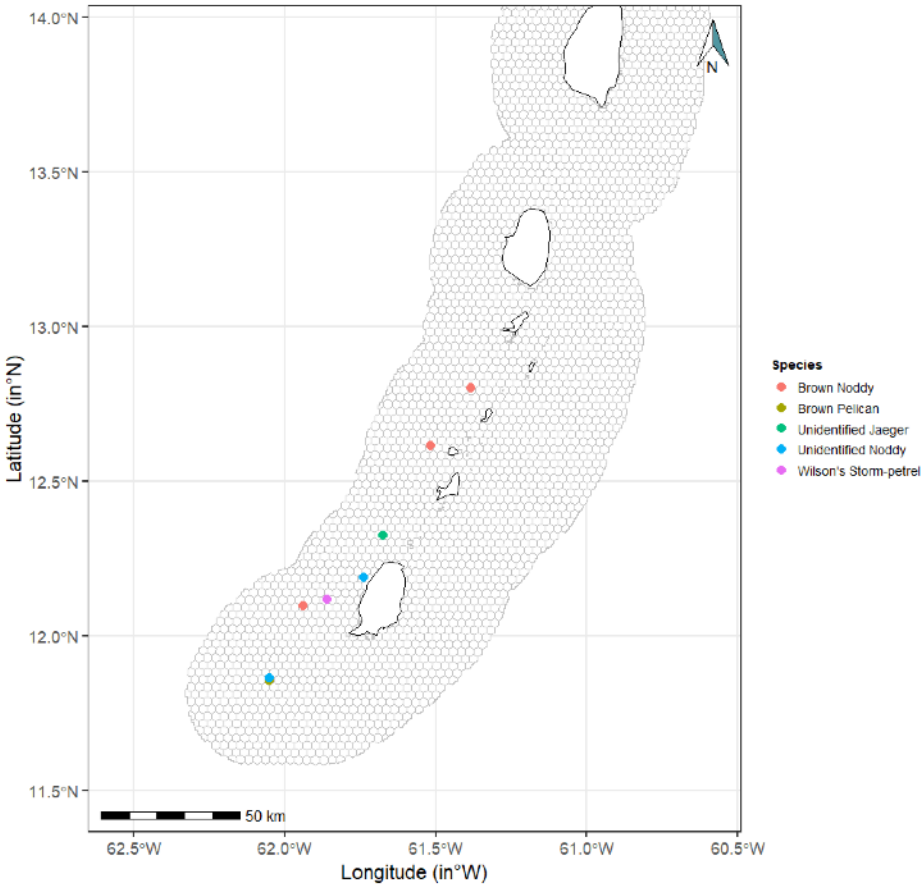

Figure 12: *Other birds species sightings*

Sea turtle species monitored

Sightings of three species of sea turtles ; leatherback turtle *(Dermochelys coriacea)*, hawksbill turtle (*Eretmochelys imbricata)* and green turtle (*Chelonia mydas),* were recorded during the expedition. During one unusually calm day over thirty green and hawksbill sea turtles were sighted.

IMPACT

Impact on cooperation

As part of the Caribbean Cetacean Society's commitment to cooperation, it is imperative that representatives of the Caribbean islands being monitored are actively involved in the research efforts which lends to improving capacity amongst the individuals and their respective affiliations. Representatives from five Caribbean island nations as well as from mainland Canada and France came together to work collaboratively. This cooperative effort fosters a sense of synergy between government officials, representatives from various countries, educators and NGOs involved in biodiversity conservation and small island development. Invaluable knowledge sharing and discussions took place also with representatives that joined us on day surveys, we hosted one of Grenada's Senior Fisheries officer & Marine Protected Area's Manager, Mr Megil Vincent, and two members of the St Vincent Fisheries Division, who actively participated for a day of research and data collection. This exchange of knowledge, experience and resources enhances the participants' collective ability to address the complex issues faced by Caribbean islands, forging a path towards sustainable development and effective practices throughout the region.

Welcoming Grenada's senior fisheries officer and Marine Protected Area's Manager

Impact on research

This expedition is a continuation of the "Ti Whale An Nou" program launched in 2021. This is the fourth consecutive year that this program has collected data on all cetaceans present in the Lesser Antilles). This expedition completes the data still lacking on all these species, especially those considered "rare" because they are less abundant or less represented in the Lesser Antilles. This is the case, for example, of the genus *Kogia sp.* which is made of two species, the dwarf, and pygmy sperm whales. Those are two of the most difficult species to visually spot, partly due to their timid behaviour and their very limited time at the surface (between one and three minutes).

This expedition has been renamed the "Sperm Whale" expedition because we had almost one sperm whale sighting every day. This represents incredibly valuable data. Indeed, very little is known about the sperm whale's social structure in the South of the Lesser Antilles, at the levels of the individuals that are part of social units, groups, and vocal clans. Each vocal clan, identified as EC1, EC2, and EC3, boasts a distinct codas, a form of communication passed down through generations. This unique cultural inheritance influences their distribution patterns within the region. Thus, the EC3 vocal clan seems to be more present in the South of the Lesser Antilles, near Grenada. Quick spectrogram analysis during the expedition allowed us to spot some EC3 codas, which are made of nine regular clics. This is exciting news, as it is the vocal clan from which we have the least information about. Extracted from the best estimation of each group we encountered, the average number of individuals that we have seen is 24 but the number of distinct individuals is more around 19 as the same group of five have been seen on two consecutive days. For the *Kogia sp.,* even if photo identification is still needed on the individuals we encountered, the total number of sighted individuals is 13, which is the record of this genus spotted in only one expedition. They have been spotted mainly near the coast of Saint Vincent and in the waters between Saint Vincent, Bequia and Mustique.

The analysis of the GPS and acoustic data will make it possible to update and specify the distribution of the different species encountered in the Lesser Antilles, to better predict areas of particular interest for each species and to set up conservation strategies adapted to the different territories. It is even more important for the Southern islands of the Caribbean as the hunting of small cetaceans is still legally ongoing and not regulated by quotas. On this expedition, fewer dolphins were sighted than in previous years. However, we cannot draw any conclusion at this stage and we will have to continue to monitor the evolution for each species in future expeditions

The new photographic data will be compared with data collected previously to identify potential new unmarked individuals, or to highlight recaptures of individuals already marked in previous years. The type of marks that one individual has, could be potential injuries made

by a boat engine. All the photographic data are used to identify injuries and their causes, to highlight threats to cetaceans, which vary depending on the species concerned.

The seabird sightings data will be used to support the conservation strategies and management plans of Birds in the Caribbean. Seabirds are often considered indicators of marine ecosystem health. Changes in their population size, distribution, and behavior can signal changes in the marine environment, such as pollution levels, availability of prey, and impacts of climate change, so it is important to continually monitor the populations. Reliable data is essential for creating evidence-based policies and for raising public awareness about the importance of protecting seabird species and their habitats.

Kogia Dorsal fin

Impact on conservation

A key aspect of the Ti Whale An Nou program is to build capacity among participants from various backgrounds and experiences within the Caribbean. Through these initiatives, new leaders are empowered to promote collaborative conservation actions across the Caribbean islands. These capacity building improvements are not just limited to those involved in the monitoring or management of the marine environment, but also include training of the captains skills to minimise disturbance to cetaceans. By promoting respectful practices, this ensures not only the wellbeing of cetaceans but also the development of responsible captains.

On our expeditions we aspire to be ocean conscious and mindful of what is used on the boat. Five gallon water jerrycan containers are filled in Martinique for drinking water for the 15 days at sea to lessen our plastic footprint. We try our best to use only ocean safe products e.g. sunscreens without harmful ingredients (Oxybenzone, Octinoxate, Octocrylene and Homosalate) like Badger Balm, who have kindly donated their sunblock products for the last two years on our South expeditions for the crew. All soaps, shampoos and cleaning products onboard contain only simple clean ingredients; Savon de Marseille, white vinegar etc. We try to purchase as much of our produce without plastic. We implement a no canned tuna policy on all our expeditions as this fishery is often responsible for significant bycatch that includes dolphins.

The data collected from this research initiative is key to the creation of adaptive conservation measures by providing valuable insights into the behaviours, habitats and threats faced by marine mammals. Another rare species we encountered was the Clymene dolphin. For example we noticed avoidance behavior from this species as we were trying to get closer to them, a few minutes after witnessing a known whaling boat returning to the shore which could explain this peculiar negative reaction towards the research vessel. This informations can serves as a foundation for proposing conservation measures that are tailored to the specific needs and challenges of the Caribbean region. By implementing actions that are based on scientific evidence, stakeholders and managers can choose actions that are effective at achieving the desired conservation goals.

Sperm whales (Physeter macrocephalus), The Grenadines

Impact for Education

On the June 2023 expedition in the South several meetings were held for the development and creation of a new NGO “Ripples to Waves” based in Saint Vincent and the Grenadines. Earlier this year Ripples to Waves Inc was launched with two members onboard this mission working together with the CCS on their shared goal towards marine biodiversity conservation and education.

The reach of these educational efforts for ocean conservation is also expected to expand as CCS and Ripples to Waves work together on their “Sea Camp” program throughout SVG and the Caribbean islands in the South. Sea Camps is an initiative connecting youths to the ocean through playful learning, experiential education and science, led by volunteers from throughout the region who share a deep understanding and passion of our ocean. Sea Camp seeks to engage and empower the youths of our islands by encouraging a better appreciation for the ocean and its inhabitants. It is envisioned that the sea camps will inspire the next generation of ocean advocates and environmental ambassadors..

There has been an effort to provide training on cetacean research and ecology through the Ti Whale An Nou program for local representatives on each participating Caribbean island. This training will empower representatives with the knowledge and skills necessary to understand and protect marine mammals themselves.

Fraser’s dolphins

Limitations and challenges

Funding posed a significant challenge for the expedition. Running an expedition is costly, including expenses for boat renting, crew food, fuel, logistics, and data analysis, among other things. Understanding the importance of this work for cetacean conservation and with the endorsement from the International Whaling Committee (the global body for cetacean conservation) to continue our efforts, we hope to secure long-term funding to prevent disruptions in future expeditions.

Another challenge we faced was not receiving the research permit for surveying and data collection in St. Lucia's waters, despite submitting the application on December 18, 2023. This prevented the crew from collecting data on several cetacean species sighted in St. Lucia's waters, including humpback whales, beaked whales, and pantropical spotted dolphins. The uncertainty of the permit's approval complicated the planning of daily transect routes, as the expedition leader had to account for the potential approval during the expedition.

Additionally, the crew encountered choppy seas, high winds, and seasickness, which shortened our first few days on the water as individuals adapted. Seabird data collection posed a challenge due to the detailed information required on the tablet and the limited number of experts on board. Seabird data collection will be simplified.

Transportation issues between Martinique and other Caribbean islands further complicated the expedition. The lack of flights and ferries made it difficult for most of the crew to travel to and from Martinique. We had to pick up crew members in St. Lucia, and on the last day, four crew members, including the original captain, disembarked in St. Lucia to travel home without facing a four-day wait in Martinique.

The Tobago Keys

Acknowledgements

This work has been achieved thanks to donations made to the Caribbean Cetacean Society. We are very grateful for all the contributions we have received throughout the years from all of our supporters ! You allowed us to complete this mission.

We would like to express our gratitude to all the crew who joined us from near and far, our expedition leader, and our captain who all gave their time for free, to complete this expedition.

Thank you to the Mustique company for the flights they provided, Corail Caraibes for the logistical support of the expedition and the partnership.

Many thanks to The French Embassy to the OECS Member States in residence in Castries for their support and The Fisheries Division of St. Vincent and the Grenadines and Grenada for providing us permits to conduct research in their waters. We would also like to thank Chief Fisheries Officers of Grenada and SVG, Mr Justin Rennie and Mrs Cruickshank-Howard for inviting Senior Fisheries and MPAs officer Mr Megil Vincent of Grenada and Joelle Thomas and Jamish Roberts of St. Vincent and the Grenadines who not only joined us on a day of surveying but also shared their knowledge of the ocean and cetacean species. This work will be also dedicated for the future project Ti Dolphin An Nou with the French embassy.

Badger Balm for their donation of eco sun protection products. Blue Lagoon for allowing us to dock in their Marina after finishing a very late survey and Mr Junior Joseph of St. Lucia for staying up until the early hours of the morning to bring our second captain to the boat. Thank you Captain Carla for your help, getting to St. Lucia late at night to sail back to Martinique to end the expedition.

Thank you Louise Simon for providing the sighting maps and tables and all her sperm whale expertise and Kate Charles for all her bird knowledge which were both shared so openly on the boat.

A special thank you to our expedition leader, Raven Hoflund who spends many weeks ahead of an expedition on logistics to make sure everything runs smoothly, and ensures all of the research team are well trained, well fed and made to feel like family whilst on expedition.

CARIBBEAN CETACEAN SOCIETY

The Caribbean Cetacean Society team

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