



CARIBBEAN CETACEAN SOCIETY



## Scientific Expedition Report

### Ti Whale An Nou program 2023



Pantropical spotted dolphin (*Stenella attenuata*)

**Expedition date :** 6th October - 5th November 2023

**Expedition number :** 7th of 2023

**Islands monitored :** ABC - Dutch Caribbean - Aruba, Curacao, Bonaire

## Summary

Ti Whale An Nou is a collaborative program launched in 2021, dedicated to the research, education, and conservation of whales and dolphins in the Caribbean region. The program emphasizes local leadership and involves participants from various Caribbean islands in scientific expeditions to gather essential information for cetacean conservation. Six expeditions were conducted from March to September 2023, covering the islands of the Lesser Antilles. This report describes the findings of the seventh expedition of 2023, the first standardized cetacean survey in the ABC islands (Aruba, Bonaire, Curacao).

### Key results & findings:

- In total 29 observations of 8 cetacean species were recorded: Atlantic spotted dolphin, Bottlenose dolphin, Kogia sp., Pantropical spotted dolphin, Pygmy killer whale, Short-finned pilot whale, Sperm whale, and Spinner dolphin.
- Valuable data was collected on species diversity, distribution, relative abundance, human threats, calf presence, social clan distribution, and more.
- Significant observations were made, including the discovery of 13 new sperm whales in Bonaire and Curacao. Further research is needed to identify to which Sperm whale clans these individuals belong.
- Several juveniles of various species were identified, suggesting the ABC islands function as a crucial nursery habitat.
- The observations of Bryde's whales contribute to understanding distribution and migration patterns of this understudied species.
- Photo ID evidence highlighted human impacts on these species, emphasizing the need for conservation measures.
- The expedition contributed to mapping offshore distribution of seabirds. A total of 12 seabirds species were recorded: Royal Tern, Sooty Tern, Common Tern, Unidentified Tropicbird, Brown Pelican, Brown Noddy, Laughing Gull, Magnificent Frigate bird, Masked Booby, Brown Booby, Red-footed Booby, and Unidentified Shearwater.
- A total of 26 island residents participated, representing each of the three islands and brought together governments, biodiversity conservation NGOs, island development organizations, marine park authorities, and fisheries cooperatives. Fishermen and local marine park rangers were trained, enhancing their knowledge of cetaceans and conservation efforts.

### Future perspectives:

The findings of this expedition can inform the development of a management plan for the Yarari Marine Mammal and Shark Sanctuary in Bonaire, with potential implications for extending the sanctuary to include Aruba and Curacao. In addition, these findings, combined with the findings of the previous expedition of CCS, can help inform regional species assessments and push for the creation of a Caribbean regional IUCN red list.

## 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 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.

According to the latest Marine Mammal Action Plan, the region has documented at least 33 cetacean species, representing over a third of the world's diversity. The Wider Caribbean Region serves as a crucial habitat, especially for reproduction and foraging, for the majority of these species. While some are already classified as endangered, data remains largely insufficient for many, suggesting that some populations might be in critical need of conservation without our knowledge.

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 2023 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 - Montserrat) and South (Grenada - Martinique).

This report is dedicated to the seventh expedition of 2023, which is the first standardized cetaceans survey in the ABC from CCS. The total crew of this expedition encompassed 35 people, including 2 captains and 6 volunteers assisting the crossings between the islands as well as the crossing from Martinique to the ABC islands and back. The crew participating the expedition for each respective island was composed of biologists, nature policy officer, fishers, marine park rangers, conservation manager, sailors, environmental consultants, representatives of Birds Caribbean, marine biology student, and representatives of the outdoor industry. Overall five island nations were represented (Martinique, Sint Maarten, Aruba, Curacao and Bonaire).



## List of crew

### Expedition leader :

- **Stacey MAC DONALD** - CCS regional coordinator and WWF program advisor
- **Jeffrey BERNUS** - Director and founder of the CCS

### Skippers:

- **Carla AROZARENA**
- **Kofane ANDRIEUX**

### CCS crossing crew:

- **Lucas BERNIER** - CCS Science project manager
- **Louise SIMON** - CCS Science project manager
- **Ainara LEEMANS** - Bioengineer, Martinique
- **Aurélie BRUNETTA** - Psychologist, Martinique
- **Coralie BRIVAL** - Antilles - Guyane referent at Akuo, Netherlands
- **Martin GARCÍA PÉREZ** - Architect, Netherlands

### ABC Crew for capacity building:

#### Aruba

- **Dilip Ramrattan** – Corporate Security Manager
- **Oriana Wouters** - Policy advisor Directie Natuur en Milieu Aruba
- **Aurora Jurado** – Electrical engineer & Photographer
- **Tadzio Bervoets** - CCS policy advisor



## Curaçao

- **Pieter van Baren** - Environmental consultant
- **Terence Ching** - Outdoor industry tour guide & conservationist
- **Lutson Lucas** - Fisherman, president fisheries cooperative Curacao
- **Cisca de Lijster** - Representative Birds Caribbean
- **Eric de Brabander** - Author, seafarer, dentist
- **Catherine Martijn** - Marine Biology Student
- **Jean Marc Claessens** - Sailor
- **Karen Claessens** - Sailor
- **Rob Wellens** - Representative Birds Caribbean
- **Boudino de Jongh** - Entrepreneur



## Bonaire

- **Gwenaëlle Versteegh** - Active volunteer
- **Duncan Versteegh** - Dive instructor
- **Kaile Finies** - Tourguide
- **Jessica Johnson** - Biologist, environmental consultant
- **Enchomar Wanga** - STINAPA Marine park ranger
- **Arthur Domacasse** - STINAPA Marine park ranger
- **Wessel van Berge** - Graphic designer
- **Quirijn Coolen** - Biologist, environmental consultant
- **Roxanne Liliane Francisca** - STINAPA senior conservation manager,
- **Deangelo Martijn** - STINAPA Marine park ranger
- **Gideon Cecilia** - STINAPA Marine park ranger
- **Rens Jonker** - Entrepreneur



## 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 with standardization.

### 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

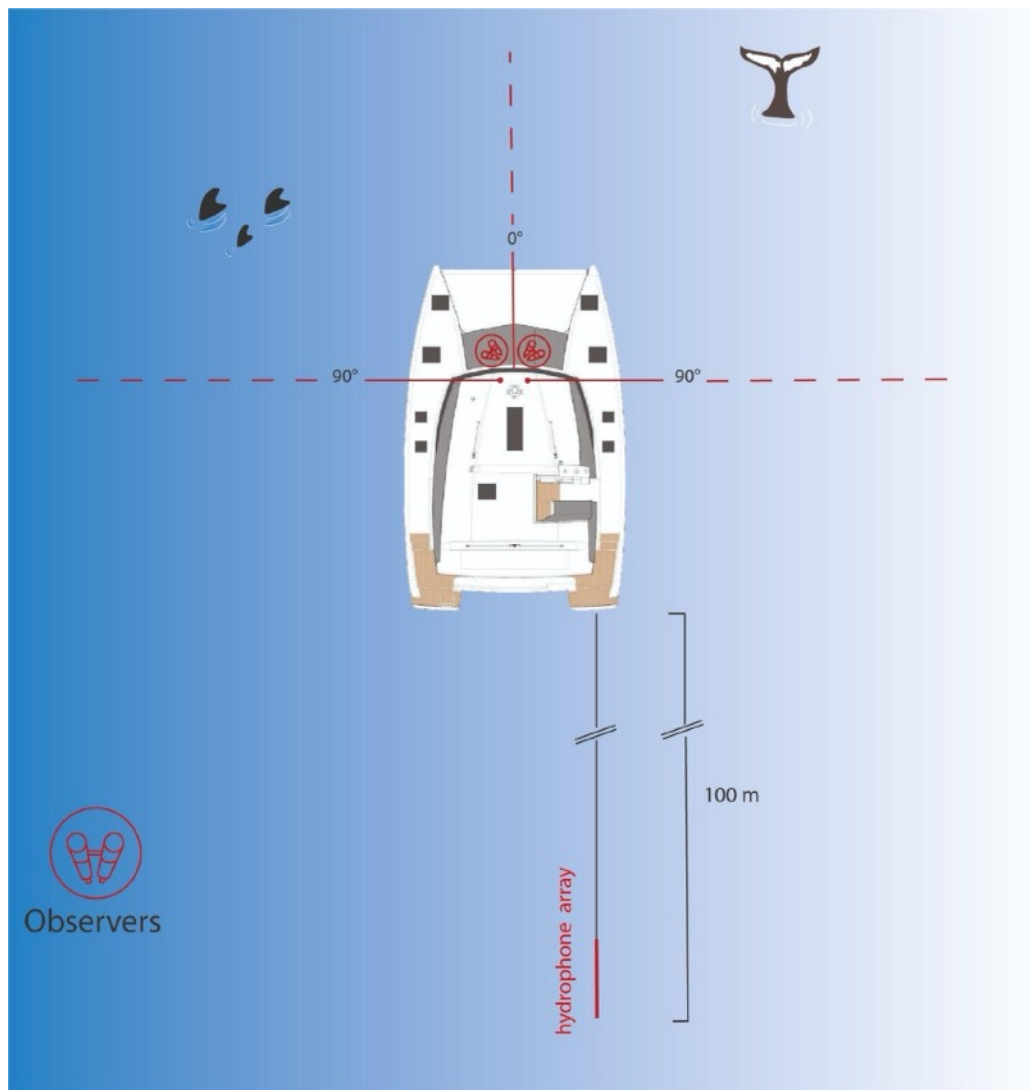
During the expedition, two crew members used the ObsEnMer software (altitude creation company, release 3.08) in expert mode on an iPad 8th generation. The use of this software made it possible to record, in real time, the location of the boat during the survey and to locate every data point in space and time. 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).



Pilot whales (*Globicephala macrorhynchus*)

## 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  $0^\circ$  and  $90^\circ$  on each side, considering  $0^\circ$  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.

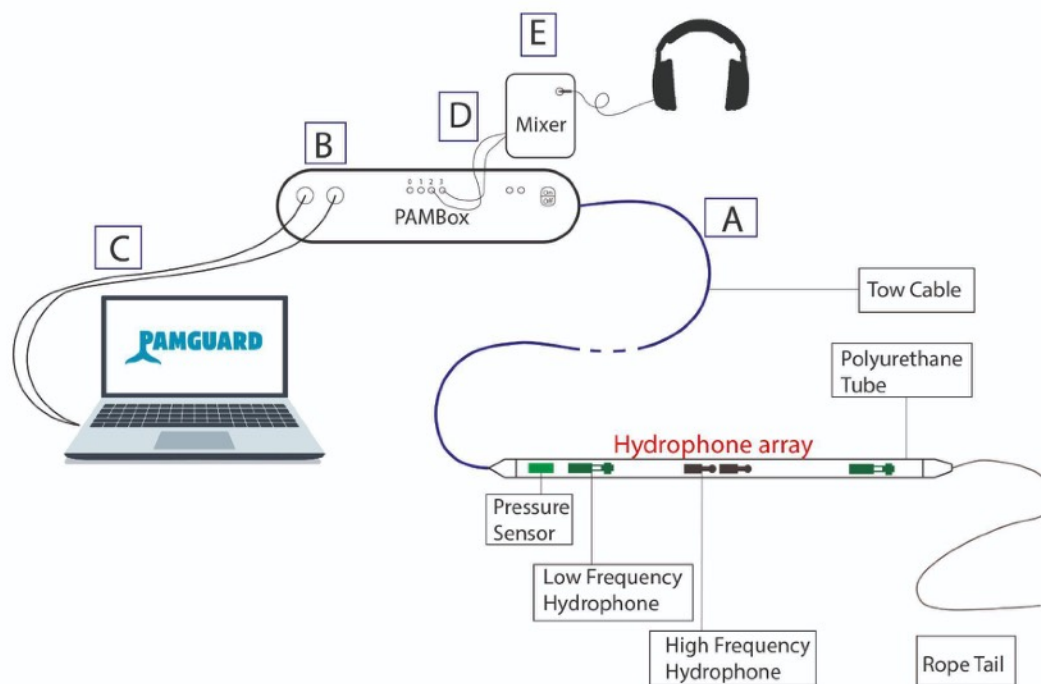
## Logistical support

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 100 m 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.



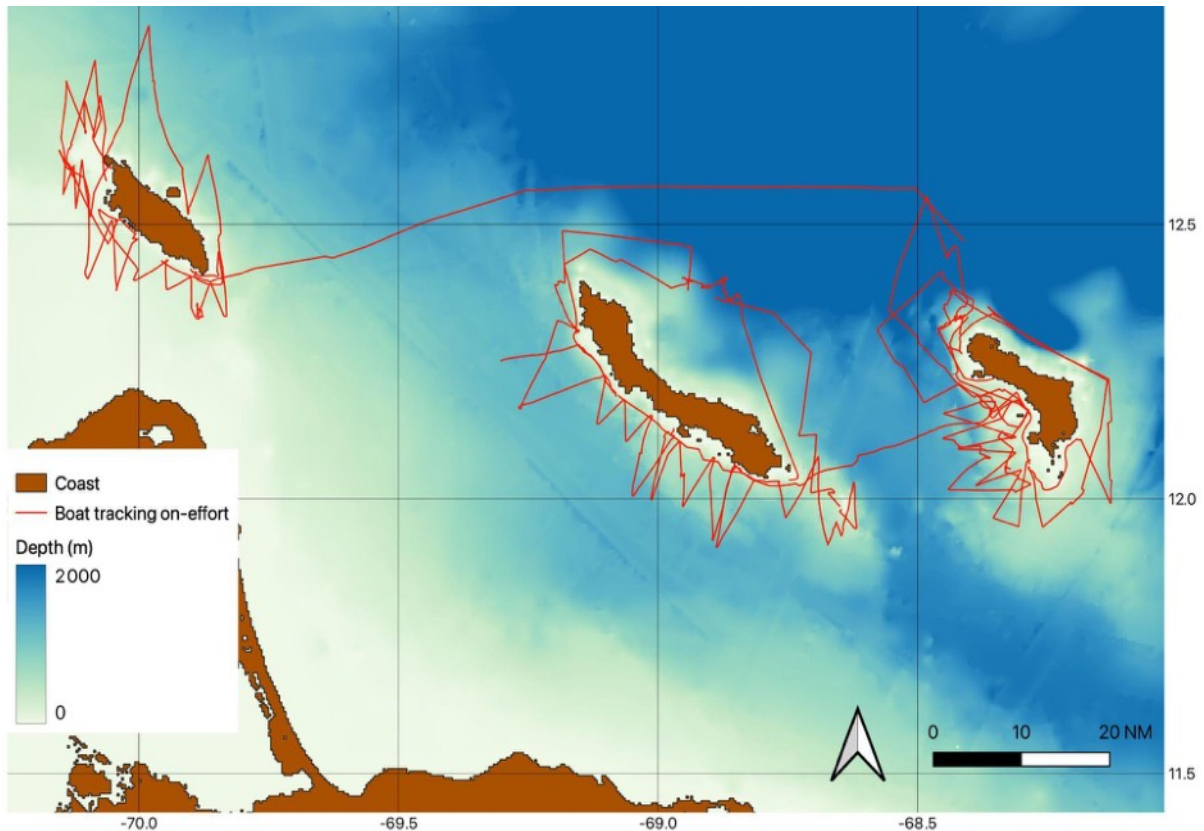
**Figure 2:** *Diagram of the Acoustic Configuration*

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 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 sperm whales and the dorsal fin for all other species. Approach of the animal would always be done with respect, our skippers have been trained for cetacean research and approach to ensure the security of the crew and the animals.

## RESULTS

During Expedition 7 2023, eight cetaceans species were studied. 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 ecology of these cetacean species in the surveyed regions.



**Figure 3:** Track of boat surveys with positive observation effort for expedition 7 of 2023.

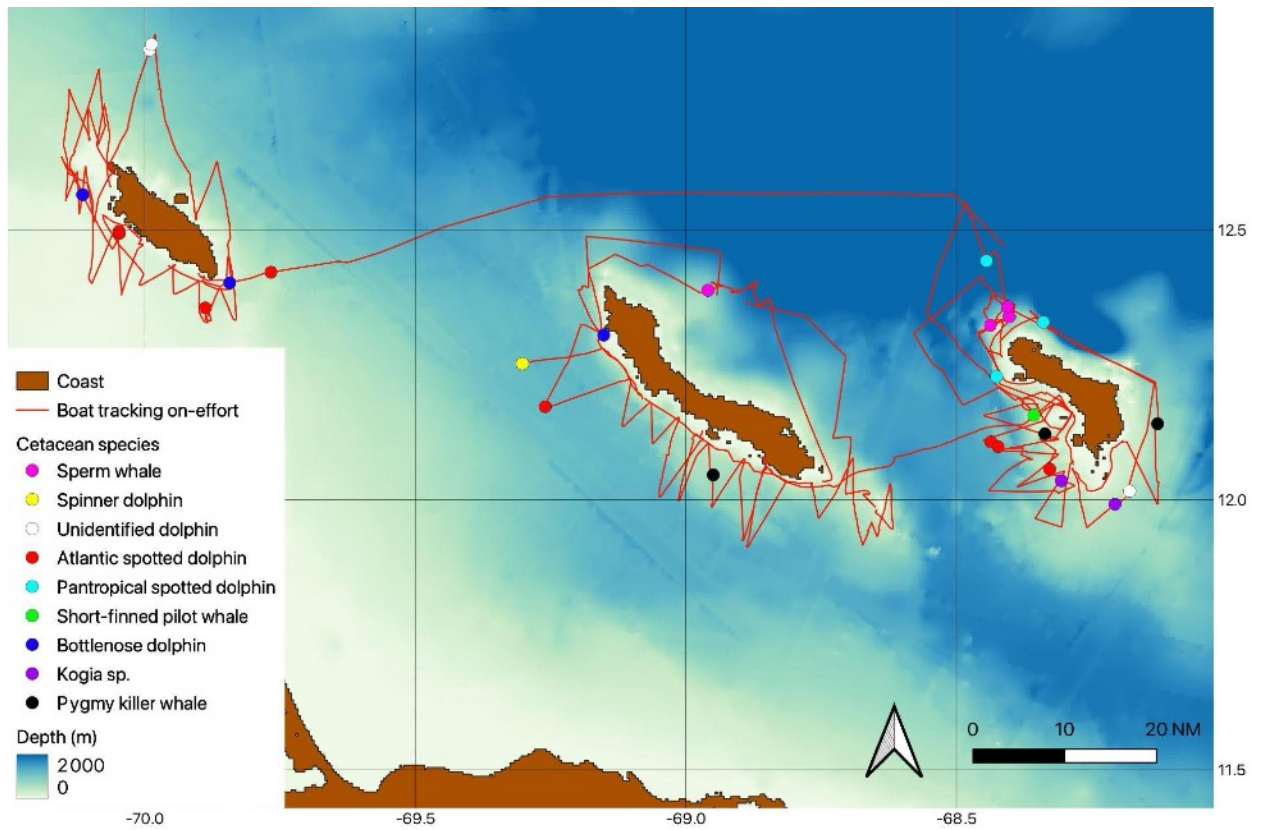
### Cetacean Species studied:

- Atlantic spotted dolphin (*Stenella frontalis*)
- Bottlenose dolphin (*Tursiops truncatus*)
- Dwarf/Pygmy sperm whale (*Kogia* sp.)
- Pantropical spotted dolphin (*Stenella attenuata*)
- Pygmy killer whale (*Feresa attenuata*)
- Short-finned pilot whale (*Globicephala macrorhynchus*)
- Sperm whale (*Physeter macrocephalus*)
- Spinner dolphin (*Stenella longirostris*)

## Cetaceans sightings table :

Table 1: Cetacean sightings recorded during expedition 7 of 2023.

Obs ID	Localiza tion	Species Name	ID certainty	Group size estimate	Max. group size estimate	Min. group size estimate	Juv Pres	Juv Nb
1	Aruba	Atlantic spotted dolphin	Certain	12	15	10	Yes	4
2	Aruba	Bottlenose dolphin	Certain	10	15	7	Yes	1
3	Aruba	Atlantic spotted dolphin	Certain	50	70	30	No	0
4	Aruba	Bottlenose dolphin	Certain	40	60	30	Yes	6
6	Aruba	Pan. spotted dolphin	Uncertain	4	4	2	Unk	
7	Aruba	Pan. spotted dolphin	Uncertain	24	30	8	Unk	
8	Aruba	Atlantic spotted dolphin	Certain	200	300	100	Yes	10
9	Curaçao	Spinner dolphin	Certain	30	40	20	Unk	
10	Curaçao	Pygmy killer whale	Certain	4	4	2	Unk	
11	Curaçao	Atlantic spotted dolphin	Certain	80	120	50	Yes	1
12	Curaçao	Sperm whale	Certain	15	20	12	Yes	3
13	Curaçao	Bottlenose dolphin	Certain	6	8	4	Yes	1
14	Bonaire	Short finned pilot whale	Certain	40	60	30	Yes	10
15	Bonaire	Sperm whale	Certain	5	5	5	Yes	1
16	Bonaire	Pan. spotted dolphin	Certain	60	80	40	Yes	4
17	Bonaire	Pygmy killer whale	Uncertain	4	6	3	Unk	
18	Bonaire	Atlantic spotted dolphin	Certain	50	60	40	Yes	5
19	Bonaire	Atlantic spotted dolphin	Certain	50	60	40	Yes	2
20	Bonaire	Atlantic spotted dolphin	Certain	200	250	150	Yes	15
21	Bonaire	Undetermined Kogia	Certain	1	2	1	No	
22	Bonaire	Pygmy killer whale	Uncertain	3	5	2	No	
23	Bonaire	Sperm whale	Certain	6	8	5	Yes	1
24	Bonaire	Atlantic spotted dolphin	Certain	75	100	50	Unk	0
25	Bonaire	Pan. spotted dolphin	Certain	150	200	100	Yes	15
26	Bonaire	Sperm whale	Certain	5	8	4	Unk	
27	Bonaire	Undetermined dolphin	Certain	1	2	1	Unk	
28	Bonaire	Undetermined Kogia	Certain	2	2	1	Unk	
29	Bonaire	Pan. spotted dolphin	Certain	20	25	15	Yes	2



**Figure 4 : Map of the confirmed cetacean sightings**



*Sperm Whale (Physeter macrocephalus)*

## seabird species studied

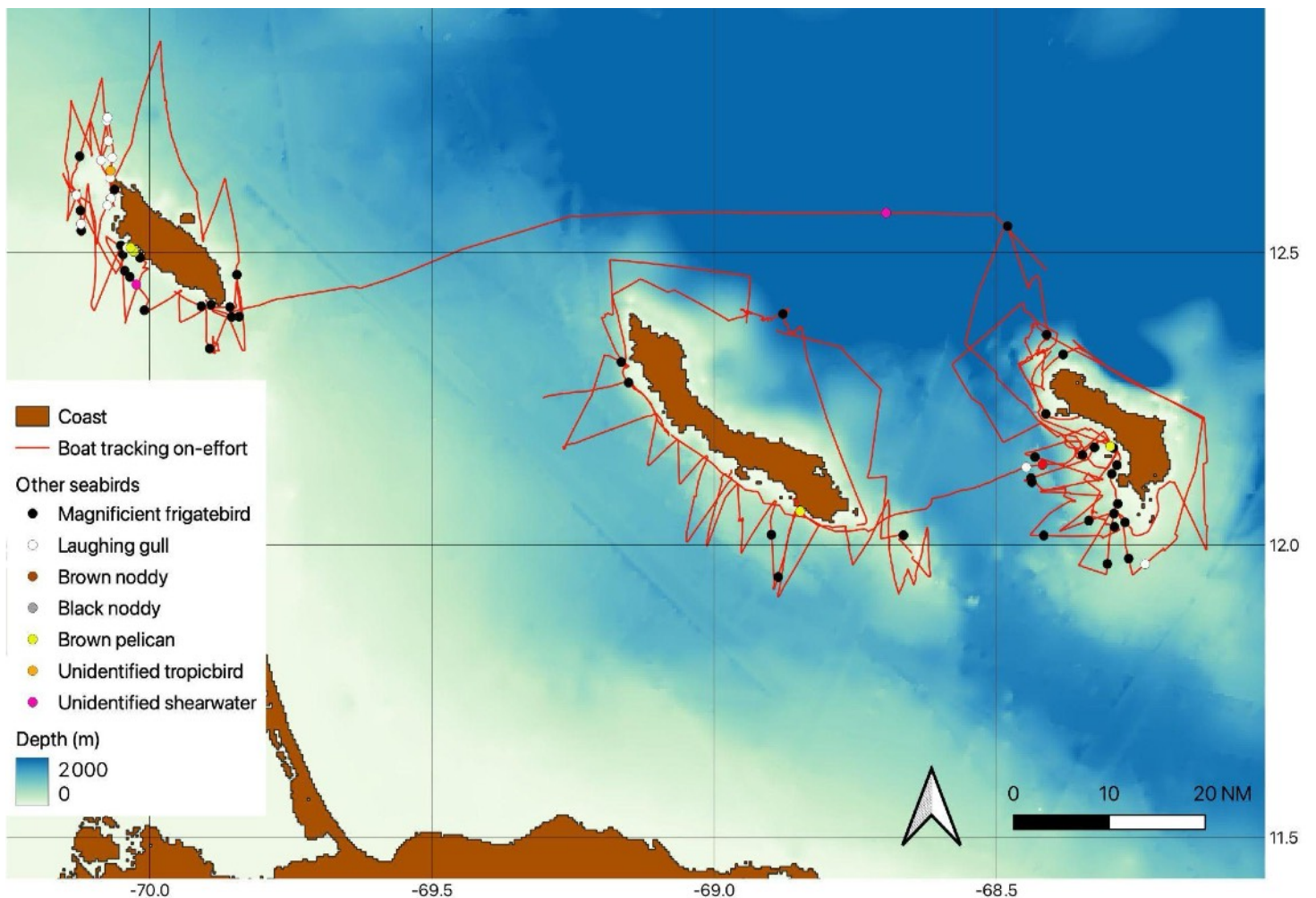
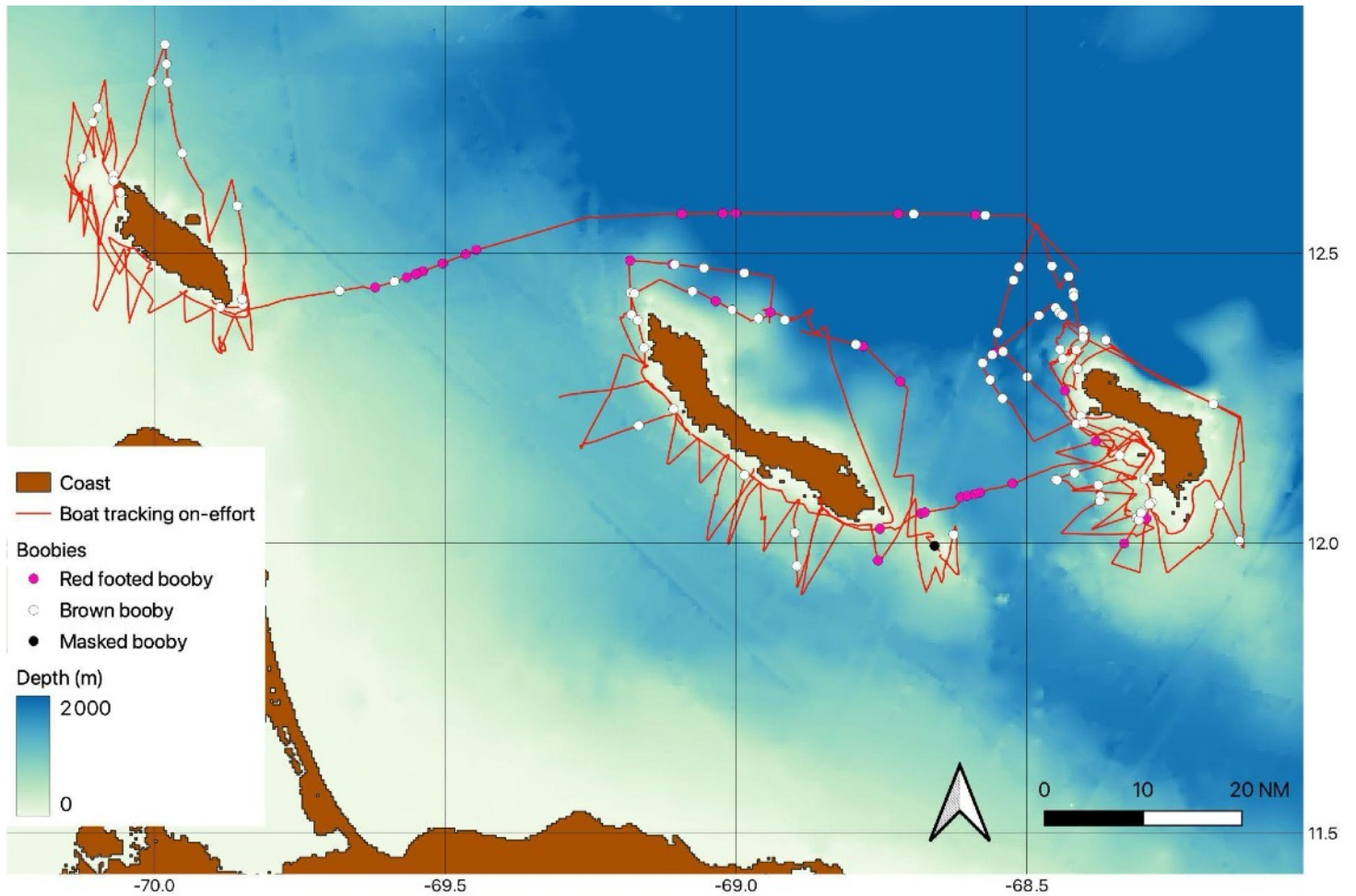
- Royal Tern (*Thalasseus maximus*)
- Sooty Tern (*Onychoprion fuscatus*)
- Common Tern (*Sterna hirundo*)
- Unidentified Tropicbird (*Phaethon Sp.*)
- Brown Pelican (*Pelecanus occidentalis*)
- Brown Noddy (*Anous stolidus*)
- Laughing Gull (*Leucophaeus atricilla*)
- Magnificent Frigatebird (*Fregata magnificens*)
- Masked Booby (*Sula dactylatra*)
- Brown Booby (*Sula leucogaster*)
- Red-Footed Booby (*Sula sula*)
- Unidentified Shearwater

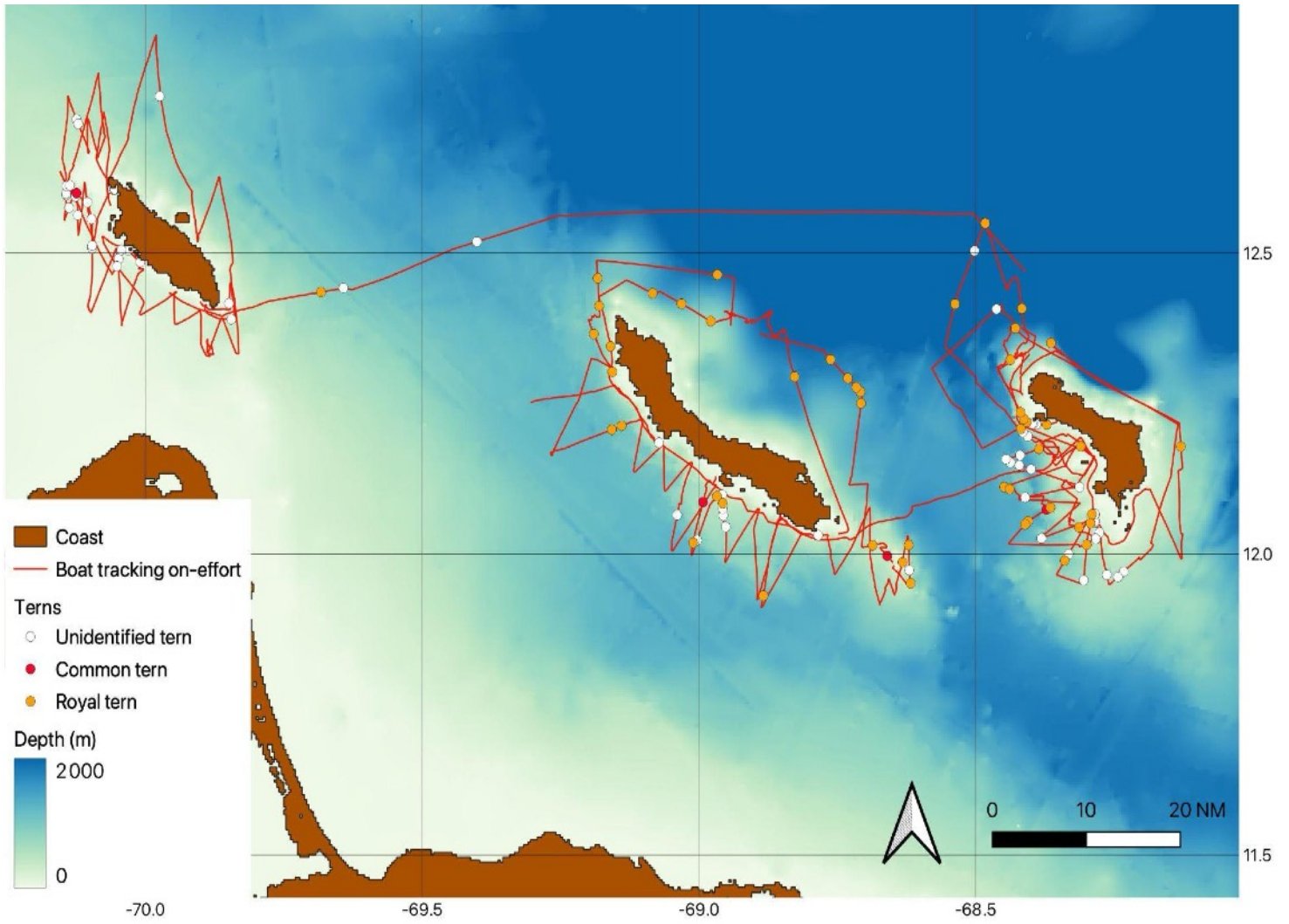
**Table 2:** Seabird sightings recorded during expedition 4 of 2023.

Species	Nbr of observation (Obsenmer)
Royal tern	53
Common tern	4
Unidentified tern	61
Sooty tern	2
Unidentified Shearwater	2
Unidentified Tropicbird	1
Brown pelican	5
Laughing gull	14
Magnificent frigatebird	49
Masked booby	1
Brown booby	90
Red footed booby	22
Brown Noddy	1



Brown Booby (*Sula leucogaster*)





Juvenile magnificent frigatebird (*Fregata magnificens*)

## IMPACT :

### Impact on cooperation :

Embracing a commitment to collaboration, the Caribbean Cetacean Society ensured active participation of representatives from the ABC islands, fostering enhanced capabilities within individuals and their affiliations. The impact on cooperation within the Caribbean region has been profound. The dedicated 26 participants not only represented each of the three islands but also brought together governments, biodiversity conservation NGOs, island development organizations, marine park authorities, and fisheries cooperatives, creating a vibrant synergy.

In the backdrop of diverse backgrounds, these volunteers engaged in fruitful discussions, identifying common goals, addressing issues, and exploring opportunities for future cooperation. Notably, the fisheries cooperative representative collaborated with grassroots nature organizations, sharing insights on the presence of whales and dolphins in Curacao's waters. Beyond the exchange of knowledge, these interactions underscored the significance of cultural exchanges, paving the way for effective actions in marine mammal conservation.

One key takeaway from these discussions was a unanimous call for collective action and collaboration, emphasizing the imperative to not just expand but crucially enforce and manage a sanctuary for marine mammals in the Dutch Caribbean and beyond. Recognizing the complexity of marine conservation in the Caribbean region, there was a shared acknowledgment that knowledge, experience, and resources must be exchanged.

This collaborative effort lays the groundwork for locally led expeditions in the ABC islands, all adhering to standardized protocols and data-sharing agreements. The aim is to ensure the seamless continuity of data collection, translating it into actionable insights for effective management of marine mammals. Through this cooperative approach, we are not just envisioning change but actively working towards a sustainable future for marine conservation in the Caribbean.



Local capacity building by the ABC regional coordinator



## **Impact on research:**

In total, 29 observations of 8 different species were recorded during the expedition which can be considered as high. During our recent expedition, we had several noteworthy findings. Significant strides were made in understanding the distribution of Atlantic spotted dolphins in the Antilles, marking a substantial improvement in our knowledge of these marine mammals' habitats. This species was encountered in higher proportion than other islands of the Lesser Antilles.

Large groups with calves and juveniles were spotted numerous times in all three islands. While these findings indicate that the ABC islands function as a crucial nursery habitat, further research is needed as a single survey is not sufficient to verify that this is not a seasonal effect. In addition, the sightings of the pygmy orca can be considered rare, making it of great value. This also accounts for the Kogia - a species considered as cryptic and with high sensitivity to noise pollution.

In Bonaire and Curaçao, 13 new sperm whales have been discovered. Those have been seen on three different days. It is too early to know exactly the nature of the relationship between these individuals, since at least two sightings of individuals together in two different years allow to say that they belong to the same social unit. However, the acoustic analysis has revealed that already known vocal clans have been heard as the EC1 clan on the 27th for example.

Moreover, on the 22th, the most heard coda was 7R (stand for 7 regular clicks), as we believed to be new or to belong to the category of the non-identitarian codas, which are not specifically emitted by one vocal clan but several. On this date, a lot of different codas have been heard (EC1, EC2, EC3, 3R,4R,6R,7R,8R). This makes it difficult to say to which clan those individuals belong, especially if they are finally not part of an already existing vocal clan.

As the sperm whales were not the only species studied here, we do not have any other information regarding these questions. Future exploration of the area would allow potential rematch and more recordings to learn more about the relationship and culture that gather these individuals.

What is sure is that these individuals have not been studied before and bring new insight of the potential distribution of the Eastern Caribbean vocal clans, not only in the Lesser Antilles but at the Caribbean scale. As a new MPA has been created in Dominica to protect these giants, it seems urgent to keep the research going on this peculiar region, to extend their preservation area to all the Caribbean chain.

Pilot whales were observed in Bonaire and first analyses show a match of the same group was later spotted 125 km away from Bonaire within one week. This underscores the importance of protecting these species along their migration routes.



Scars on the dorsal fin of Kogia Sp.

The photo ID taken shows many scars due to the human impact on the different species observed, emphasizing the need for extending the sanctuary, have an adapted management plan using our data, and an enforcement to limit threats and enhance the conservation of these endangered species. An in-depth scars analysis will be conducted in a later phase, however, a first analysis shows the presence of the following threats present in the waters of the ABC islands. First, a lot of marine traffic was observed, in particular in Aruba, including the presence of large oil platforms. High density shipping traffic can lead to collisions and like oil platforms can cause noise pollution if not regulated.

Other threats shared with CCS during the period of the expedition are irresponsible encounters and harassment of species. This seems to primarily take place by boat owners and tourist operators. However, encounters in regards to research were reported as well. This is an important indicator of the need to increase awareness about the need to protect and respect the species.



Oil platform

Prior and during the expedition locals shared their knowledge of what they believed to be the common areas and movement patterns of cetaceans. While some observations matched the knowledge shared, we did not encounter dolphins known to be close to shore as observed by the local community. This is also due to the limited time spent near shore and on each island as well as the weather conditions of certain days.

Moreover, our efforts contributed to progress in mapping the offshore distribution of seabirds, with observations of numerous black noddys—an occurrence that is considered rare in the Lesser Antilles.

These findings underscore the importance of ongoing research efforts shedding light on their ecological role in the offshore environments of the Caribbean and provide a foundation for informed conservation measures.

We also gained valuable preliminary insights into the distribution and migration patterns of Bryde's whales, shedding light on their presence in the region. Bryde's whales are common to the Southern Caribbean which matches CCS observations thus far. Even though their presence is not a surprise around the Leeward Dutch Antilles, to our knowledge there are no publications yet on their seasonality. However, based on local knowledge and shared observations, it is believed that there would be a season for the Bryde whale presence around the ABC. Our observation of Bryde's whales offshore is therefore a first milestone to understand their presence, potential seasonality, or even migration pattern at the Southern Caribbean Scale (and potentially beyond). We were also able to collect photo identification which will shed a light on the movement pattern of the individuals when we realize our future expeditions.



Mother and calf bottlenose dolphin (*Tursiops truncatus*)

## **Impact on conservation:**

A central element of the Ti Whale An Nou program revolves around enhancing the capabilities and knowledge of participants with diverse backgrounds and experiences throughout the Caribbean. These initiatives aim to empower new leaders, fostering collaborative conservation efforts across the islands. The capacity-building efforts extend beyond individuals engaged in marine environment monitoring or management; they also encompass training for captains in boat-handling skills, minimizing disruptions to cetaceans. This not only ensures the well-being of these marine mammals but also cultivates responsible captains.

During expeditions, we conscientiously manage our ocean footprint, utilizing ocean-safe products. All onboard products, from sunscreens to soaps and cleaning agents, adhere to simple and environmentally friendly ingredients such as Savon de Marseille and white vinegar. Additionally, we uphold a no-canned-tuna policy to address bycatch issues, including dolphins, often associated with this fishery.

The data derived from our research initiatives plays a crucial role in shaping adaptive conservation measures. By providing valuable insights into the behaviors, habitats, and threats faced by marine mammals, this information forms the basis for tailoring conservation strategies to meet the specific needs and challenges of the Caribbean region. The implementation of actions grounded in scientific evidence enables stakeholders and managers to select measures that effectively achieve the desired conservation goals.

For Bonaire, a management plan for the Yarari Marine Mammal and Shark Sanctuary on Bonaire is still in development. The data gathered from this expedition holds the potential to shape necessary management measures and advocate for the extension of the sanctuary's scope to include Aruba and Curacao.

Lastly, these findings, combined with the findings of the previous expedition of CCS, can help inform regional species assessments and push for the creation of a Caribbean regional IUCN red list.



Bryde's whale (*Balaenoptera brydei*)

### **Impact on education:**

Through the Ti Whale An Nou program, fishermen have undergone training sessions focused on educating them about the diverse cetacean species present in the Caribbean and how to identify sightings. This initiative extends to Bonaire, where local marine park rangers actively participated in the expedition, acquiring essential skills. Given the extensive hours spent at sea by both groups, this knowledge proves exceptionally beneficial, increasing their chances of encountering cetaceans. The acquired expertise empowers these representatives to comprehend and safeguard marine mammals effectively.

Furthermore, the program has dedicated efforts to provide comprehensive training on cetacean research and ecology for local representatives on each participating island. This broader training initiative ensures that a wider spectrum of individuals is equipped with the necessary expertise to contribute effectively to the conservation and understanding of cetaceans in the Caribbean region.



Photo identification training

## **Limitations/ challenges:**

Despite these fruitful outcomes, there were some challenges encountered in terms of cooperation, logistics and weather conditions.

Like in other areas of the Caribbean, Aruba, Curacao and Bonaire although being part of the Dutch Kingdom, each have divergent rules and regulations regarding the protection of marine megafauna as well as the way the waters around the islands are managed. This has implications for the management landscape on each island and the acquiring of research permits. Consequently, the involvement of local government and organizations looked different and presented some challenges. On Aruba, the long established Aruba Marine Mammal Foundation (AMMF) and the National Parks Foundation (Fundashon Parke Nashonal Aruba; FPNA) work closely together regarding conservation and management of marine mammals in Aruba's marine parks and surrounding waters. Due to conflicting schedules and cultural and political challenges, Aruba faces in regards to nature conservation, collaboration was initially complicated to establish. In addition, Aruba has a lot of cases of harassment and strandings of cetaceans - an ongoing, and growing challenge amongst others due to the large tourism driven economy of the island. This context complicates the execution of and communication around cetacean research interactions which need to be taken in account accordingly. While permission and support for the research were granted by the local government authorities, additional permission was required (i.e., CITES Aruba, MoU FPNA). While communication was set up early on in the preparation of the expedition, all permits and permissions were obtained several days prior to the start of the expedition. In addition, the active participation of the AMMF and FPNA was not possible due to conflicting schedules. In future expeditions, stronger agreements and more involved participation of AMMF and FPNA are desired to be realized to ensure the fruitfulness of the data collection and with that the conservation of cetaceans in Aruba waters. Cetacean conservation must be a cooperative work and we encourage strongly for the use of Caribbean standardized protocol.

The main challenge encountered on Curacao was the receiving of the permit. Despite permits being requested over 6 months prior to the expedition and the request was being processed, they were received only days before the start of the expedition in the waters of Curacao. While Curacao does not have a large MPA, they recently established an MPA on the most eastern point of the island (Oostpunt). While the local marine park management authority indicated not to have the capacity to participate during this period, we remain hopeful that this will change in the future. A practical challenge on Curacao was the logistics surrounding the clearance and customs procedures. As the offices are located within the city center of the islands, which is far removed from the main harbors for non-industrial or commercial vessels, the procedure is quite a hassle. All passengers entering the islands are required to attend the customs office, which when you have a big crew means arranging taxis or other modes of transport. The procedures are not clearly communicated which resulted in loss of time. Nevertheless, the expedition yielded satisfactory results on Curacao.

Lastly, on Bonaire, the only challenge was the fact that the entire island is surrounded by a well managed and enforced marine park with strong moorings and no-anchoring regulations. However, this was easily surpassed as we received permission from the management authority

STINAPA to use indicated mooring buoys in areas that were required. Moreover, all of Bonaire's waters fall within the Yarari Marine Mammal and Shark Sanctuary. Data collection is vital for the creation of management measures within the sanctuary and this expedition was therefore fully supported.

Other logistical challenges encountered were the arrangements of a suitable boat for the expedition. The availability and rental of catamarans in Aruba, Curacao and Bonaire is limited which increases the price immensely. Thus, financial constraints in combination not having the gear required for the expedition available on one of the ABC islands (hydrophone, cameras, laptops, tablets, etc.), a catamaran was arranged in Martinique to make the crossing to the islands with the required gear on board. While financially beneficial, the logistics were very complex and the journey is time consuming and tiring. This leads to the ABC being an unusually long expedition, leaving the crew exhausted by return in Martinique. If it were possible to rent a boat in one of the ABC islands and if funding is available to have a set of gear better data collection and logistic could be insured.

Unfortunately, materials also went missing or got stolen. The hard drive used during the crossing from Martinique to Aruba was nowhere to be found. In addition, an underwater case of the GoPro used during the expedition disappeared during the expedition in Aruba.

One of the biggest challenges encountered during expeditions is also the boat. There are always parts breaking on a boat, which is a bigger challenge in the ABC as the boat comes from Martinique. The schedule is very tight and the mission is long, fortunately our team was able to overcome all the problems and fix the boat where many would have stopped the expedition. This boat troubles prevented us from working for a couple of days. However these days also were days where the forecast would not allow us to execute research at sea.

Lastly, weather conditions were not always ideal. On Aruba, the weather was on the limit for effective cetacean sighting visibility. On Curacao this weather persisted in the first half of the expedition but drastically improved during the second half. On Bonaire the best weather conditions were encountered. This most likely explains the high number and diversity of sightings on Bonaire compared to Aruba and Curacao.



### **Future perspectives:**

For the past three years, CCS diligently conducted annual expeditions in the Lesser Antilles, establishing a valuable tradition that continues to yield crucial insights into marine life in the region. This was the first standardized cetacean expedition done for the ABC islands which we strive to repeat over the coming years. A future expedition is already in preparation for September 2024. Recognizing the significance of ensuring local continuity, it is essential to build a dedicated local team that can carry forward the work initiated during these expeditions. This is why we encourage local participants to come on board with us and get trained to our standardized protocol.

Additionally, given the movement patterns of various species, there is a compelling case for extending the Yarari Sanctuary. Indeed species are moving between the islands and to ensure the safety of the species in Bonaire, we must also protect them in Aruba and Curacao. Implementing a comprehensive management plan in this expanded scope would be instrumental in safeguarding marine biodiversity. Proper enforcement measures should also be developed to safeguard the endangered species and limit the threats. This extension of the Sanctuary would follow the lead of other islands of the Caribbean who already created or expanded MPA or are on the processes to safeguard new habitat by dedicating new sanctuaries.

To achieve these ambitious goals, it is crucial to strengthen the funding mechanisms supporting our initiatives. By doing so, we can amplify our efforts in regions where data deficiency hampers conservation decisions, ultimately paving the way for the extension of sanctuaries and the protection of important marine ecosystems.



Juvenile bottlenose dolphin (*Tursiops truncatus*)



## **Dediká na Paul Hoetjes**

This expedition in the ABC region is a tribute to Paul Hoetjes, who has played diverse roles in the realms of nature management and conservation within the Dutch Caribbean region. As a co-founder of the Yarari Marine Mammal and Shark Sanctuary, he served as a key figure in the establishment of the Caribbean Cetacean Society, providing inspiration for its creation.

Paul played a proactive role in diverse regional and international multilateral environmental agreements. Through his considerable expertise, unwavering dedication to conservation, and ongoing initiatives to foster collaboration, Paul significantly contributed to the enhancement of nature and conservation efforts in the region.



In memory of Paul

## **Research approach:**

All photos taken during the expedition have been taken with a Tele lens that allows us to zoom in and maintain a safe distance during data collection. Approaching of cetaceans, even for research, should be stopped at any sign of disturbance (change of direction, speed, etc).

Underwater pictures have been taken with a GoPro from the boat when dolphins approached the boat by themselves. We are discouraging any in water activities with cetaceans as it is prohibited by law and could be dangerous.

This document is a scientific expedition report with scientific goals and a standardized protocol. It is in no case a boat trip or whale watching activity.

Our captains and expedition leaders have been trained and would stop the study if signs of harassment would be observed.

All research has been done under permits obtained in each island for the period of the expedition. Local organizations have been included as much as possible and invited to the expedition several months prior to the expedition.



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We would also like to express our gratitude to all the team who joined us, our expedition leader, the regional coordinator Stacey, the crossing team and the captains.

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The Caribbean Cetacean Society team

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