



## The humpback whales (*Megaptera novaeangliae*) of El Salvador: Investigating the seasonal occurrence and identity of this endangered population

### Executive summary

As humpback whale research developed worldwide, El Salvador was in civil war. It is well established that humpback whales visit El Salvador seasonally, however, little is known of the species' habitat use, distribution and abundance. In 2016, NOAA classified the humpback whales of Central America as one of the few “Endangered” population segments left today. Dedicated, systematic vessel surveys following line distance sampling methodology will therefore be conducted along the entire Salvadorian Pacific coastline, to provide baseline information on the seasonal occurrence of this endangered humpback whale population, and to evaluate current threats to inform management and mitigation policies.

### Review of Fieldwork and community work in 2020

This year we started the first dedicated surveying for humpback whales in El Salvador with the support of the Society of Marine Mammalogy. It was a true pleasure to actually start the work that we have been planning for several years. The support and response that we have had, both in El Salvador and internationally, has been incredible. On my first day in San Salvador we had meetings with several members of the Environment Ministry, including the Minister of Environment himself, Alex Hasuban. Their enthusiasm, support and joy in our planned work was completely unexpected and greatly appreciated.

Secondly, the principle investigator of a new project planned throughout the North Pacific Ocean basin for humpback whales, John Calambokidis, was pleased to hear of our new project, and has enlisted us as the representatives for their project SPLASH 2 in El Salvador. SPLASH 1, led by John and NOAA, is the largest ever collaborative project studying large whales to date, and we are very proud to be the national representatives for El Salvador. Other biologists in Central America and Mexico have also contacted us, congratulating us and saying how important our new initiative is.



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Below I will list the achievements of the project so far. However, as for everyone, 2020 has been a year full of unexpected complications and although we completed all planned work in February, we were unable to proceed with the work we had planned for March (teaching cetacean classes in two local schools and finishing half of planned research trips). This in no way will be hindering us in continuing this season. We were able to build such a great foundation in 2020, that without doubt the season in 2021 will be successful and productive. For this reason, though, we will not be applying for any more funding until we have completed the next seasons planned work.

### Team

Through the shared passion for cetaceans and an ambition for a successful new project in El Salvador, we have formed a very effective new team. Prior to arrival in El Salvador, I had made contact with Melvin Castaneda (Salvadorian biologist) and Marlenne Vazquez Cuevas (Mexican biologist, Melvin's partner, who resides in El Salvador). Melvin had written his undergraduate thesis on whale watching in El Salvador in 2015, and both he and Marlenne were keen to start a project on humpback whales but had limited experience in cetacean research in the field. It was a pleasure to be able to go to help train these two ambitious early career biologists in cetacean research. Melvin was incredible in logistics throughout our work, organizing transport and vessels to be used. Prior to my arrival, he had also already organized an additional three people to accompany us on our research trips, who are all students of biology at the Universidad de San Salvador (Raul, Monica and Marvin).

As a team of six, we worked, ate, slept and travelled between field sites together for several weeks (Fig. 1). For the three students it was the first time for them seeing whales, for Melvin and Marlene it was the first time to be able to listen and record the whales, to learn how to do transects, record the data, collect sloughed skin samples and to take and process the photos for identification. Additionally, I showed them how important it was to look



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after the equipment daily. Washing and cleaning all equipment used on the ocean, downloading all information collected from the day, storing and copying data sheets and charging and/or replacing batteries every night.



Figure 1. Research team in La Libertad and Los Cobanos (Photos: Monica Pacas).

From this seasons work, the side project “Proyecto Megaptera El Salvador” has been formed (Fig. 2). We have now cemented our relations as a team dedicated to cetacean research, and we now have a proper title for our research group, dedicated to researching the Salvadorian humpback whales.



Figure 2. Logo of our new research initiative.





## Research – Systematic Surveys

We undertook the first-ever dedicated cetacean surveying in El Salvador by using a systematic design of 21 transects, along the whole Salvadorian coast (Fig. 3). In 2020, we were able to complete just under half of these transects (n = 9).

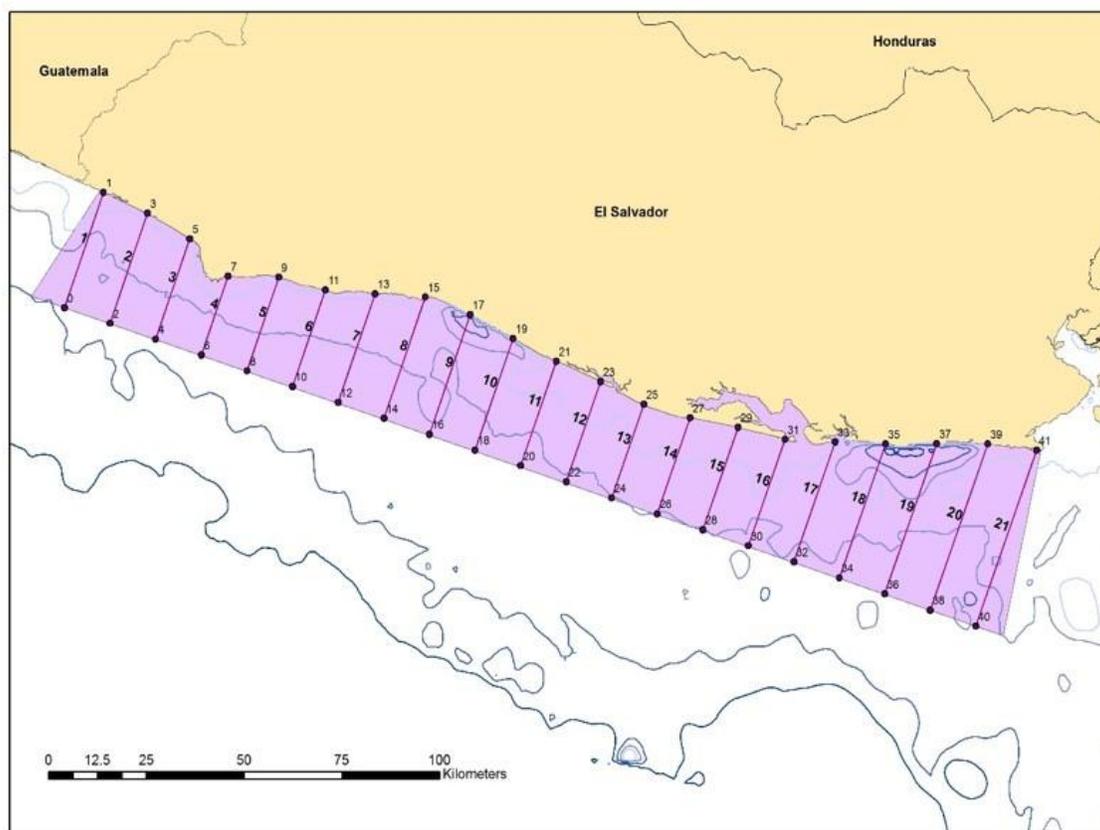


Figure 3. Study design of 21 transect stretching the whole Salvadorian coastline.

We used distance sampling methodology, travelling the transects at a speed of 15km/h. Each transect varied from 23 – 56 km in length. At the start, middle and end of each transect we recorded environmental data and 5 min of audio, using a hydrophone and hand-held audio recorder. With each cetacean sighting, we left transect and approached the species for identification record. In the case of humpback whale sightings, we then used photo-identification and where possible took sloughed skin samples of individuals, as well as checking for vocalizations with the hydrophone.



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In total we recorded 17 cetacean sightings, of four different species. The most common species encountered was the pantropical spotted dolphin (*Stenella attenuata*) (n = 14) (Fig. 4). On transect we had just one sighting each of humpback whales, bottlenose dolphins (*Tursiops truncatus*) and striped dolphin (*Stenella coeruleoalba*).

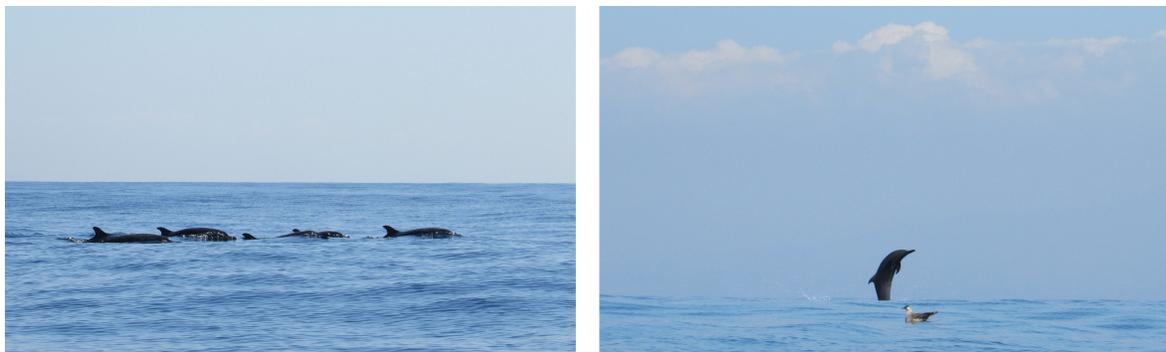


Figure 4. Pantropical spotted dolphins of El Salvador (Images: Monica Pacas).

### Research – Trips from Los Cobanos

We also undertook six independent research trips from Los Cobanos, as it is thought that humpback whales aggregate around this area and as it was our base for some of the social aspects of the project. We encountered humpback whales four more times on these trips, and below I will report the specific information we were able to collect on this species.

### Humpback whales of El Salvador

#### *a) Photo-Identification Catalogue*

The aim of our project is to increase knowledge of humpback whale presence in El Salvador. Prior to us beginning this work in 2018, there were only two photo-identification images available of humpback whale' flukes in the country. Our aim is to construct the first "Humpback whale fluke photo-identification catalogue of El Salvador". I am very happy to share that today we now have 29 individual humpback whales identified by their unique tail flukes in El Salvador (Fig. 5)!



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We have already shared the identification images on the internet platform “HappyWhale”, where biologist throughout the world upload images and sighting data. Of the 29 individuals of El Salvador, 23 have known history and re-sights in other parts of the North Pacific.



**Figure 5. (LEFT IMAGE) A male humpback whale which was seen over a three-day period in El Salvador. (5/7.2.2020). (RIGHT IMAGE) A female humpback whale seen swimming in a pod of two whales (11.2.2020) (Images: Nico Ransome).**

***b) Sloughed skin samples***

During the surveys we were able to collect two skin samples using the non-invasive technique of sloughed skin sampling.



**Figure 6. (LEFT IMAGE) Sloughed skin in water surface after a humpback whale breached. (RIGHT IMAGE) Simple sieve available throughout the region which can be used to collect samples (Images: Nico Ransome).**

Sloughed skin is the small pieces of skin which are left in the water surface after humpback whales are surface active (Fig. 6). In 2020, we were able to collect skin samples of an adult humpback whale which was caudal slapping, and of a surface-active calf which was seen in



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a mother-calf pod. I am very happy to share with you that these samples will be used by one of our Salvadorian volunteer student, for his undergraduate thesis.

***c) Humpback whale song***

One of our main aims was to be able to record the first humpback whale songs of El Salvador. In total, in 2020 we were able to record five full 20 min recordings of lone male humpback whale songs. These will be used in another of our student's undergraduates' thesis and shared with other researchers in the North Pacific.

**Workshops for Fisherman of Los Cobanos**

As planned, we held two workshops for the fisherman (approx. 25 attendees for each workshop) of Los Cobanos, which is presently the only area in El Salvador with a thriving whale watching industry. One of the workshops focused on providing the fisherman with more information on the cetaceans of the country, and the other on improving whale watching practices in the area (Fig. 7). Their interest, zeal and passion for their growing industry of whale watching was very evident and it was very inspiring to speak first-hand with these pioneers of whale watch activities in El Salvador, and to learn from them. What seemed apparent to me immediately, is that although there may have been some teething problems in previous years, the whale watching in Los Cobanos seems to be being developing well and that the fisherman, after several workshops, are fully aware of international standards in approaching cetaceans. This is not the other case in other countries of the region and very encouraging.



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**Figure 7. A workshop conducted by Melvin and Nico on the best practices of whale watching around cetaceans (Images: Melvin Castenada).**

Additionally, the fisherman of Los Cobanos kindly shared with great fervour, much information that they had on the cetaceans of the region. We will be incorporating this local knowledge to our plans for 2021.

### Extension of our work in El Salvador

Even with the pandemic of 2020, we have continued to work hard on this project and to plan for the future. We have also been able to undertake other work related to the project and to disseminate information about our work both nationally in El Salvador and internationally. In March 2020, the first ever planned conference for cetaceans in Central America was organized in Panama City, Panama, “Congreso Centroamericano de Cetaceos”. Unfortunately, I could not attend due to complications of the pandemic, but both Melvin and Marlene flew down to Panama to present some of the work we had undertaken, and to present the formation of “Proyecto Megaptera El Salvador”. They also took part in a workshop run by the International Whaling Commission to encourage collaboration of humpback whale researchers in Central America, Mexico and the US and Canadian west coast.



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**Figure 8. (TOP LEFT) One of the opening presentations of the Congreso Centroamericano de Cetaceos. (TOP RIGHT) Marlenne presenting our work at the conference. (BOTTOM) Attendees of the IWC workshop for the humpback whales of the Eastern North Pacific.**

Additionally, one of our student volunteers, Marvin, returned to his university and presented to his fellow biology students on the experience he had in accompanying us on the cetacean research trips in 2020 (Fig. 9). Lastly, Marlenne, Melvin and I, recently (24th August 2020) presented a live, online talk about our work in El Salvador with cetaceans (Fig. 9) for the Ministry of Environment of El Salvador. It was listened to by approximately 150 people live, and has since been watched by many more people across the world.



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**Figure 9. (LEFT)** Marvin presented to his fellow students at the University of San Salvador about our work in 2020. **(RIGHT)** The program advertising for the talk that we presented live on the internet about our work in El Salvador for the Environment Ministry of El Salvador.

### Planned publications and collaborations

We are working on a publication of the humpback whales of El Salvador and Nayarit, Mexico. We hope to have that ready for submission in 2021.

We are also planning all of the work for 2021. Two of the same students will be returning to help us in the next season, Raul and Marvin, and we are very excited to include two new research students. We aim to finish all of the transects of the designed study (Fig. 2) and we hope to also continue with independent research trips from Los Cobanos. When we have finished the transects, we will then have sufficient information to prepare a proper scientific report of our findings.

We will be undertaking the humpback whale research for Splash 2, in El Salvador. The basic plan right now being that we will be out undertaking research trips over a one-week period in January and again in February at the same time as researchers in all other countries of Pacific Central America.



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This year we will continue to work conducting workshops for the fisherman of Los Cobanos, and we will also be doing classes for several age groups in some of the local schools for the children of the fishing community.

**We would like to thank the Society of Marine Mammalogy for making this all possible!**

