Baby shark project

Annual report [2nd year]

DECEMBER 2020

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OCEAN BLUE TREE | Baby Shark Project | MIGRAMAR

Background

Hammerhead sharks are very sensitive to over-exploitation. These sharks possess ecological characteristics that increase their vulnerability, such as low birth rates, late reproduction and selectivity in their feeding habits. Hammerhead shark species are widely threatened globally, mainly because of their consumption. The characteristics of their population dynamics highlight the need to establish conservation strategies for the adequate protection of this species at a global level.

In 2017 within the Galapagos Marine Reserve (GMR), one of the main aggregation sites of the common hammerhead shark (Sphyrna lewini) was detected in the neonatal and juvenile stages in the northern sector of Santa Cruz at the site called El Edén. This discovery laid the foundation for monitoring a breeding area used by this highly threatened species in the GMR. Natural populations of sharks must be monitored in order to know the recruitment levels of the species, and the contributions that the species has to nature. Likewise, the migratory characteristics of S. lewini increase the need to extend this research to the continental region and other countries in the region.

The monitoring and follow-up program of hammerhead shark breeding areas managed in GMR has been able to extend to the continental Ecuadorian area, with the support provided by Ocean Blue Tree. The aim of this extension is to implement effective and efficient management measures throughout the region, which will help to conserve this highly threatened species, hoping to give this critically endangered species a chance.

Project Aims, Objectives and Goals

Outline the original aims, objectives and goals of the project and discuss the extent that they have been achieved. If some goals were not met, please explain why.

The ultimate goal of this 3-year project is to implement conservation strategies in key nursery sites for hammerhead sharks in four countries of the Eastern Pacific.

Some potential nursery grounds have been identified within coastal habitats spanning from Mexico to Peru. There is a need to establish whether these areas can be defined as nursery grounds, in order to develop a community-based conservation approach.

Goals of the second year of the project include the identification of at least one additional shark nursery area in mainland Ecuador, maintain the monitoring of the sites already identified (Puerto Cabuyal-Ecuadorian coastal), (El Eden and Venecia-Galapagos), development of the conservation plan for shark nursery areas, define and share a standardized monitoring methodology with other Eastern Pacific countries, socialize a potential MPAs in the Cabuyal region and maintain the ocean literacy program and capacity building of fishers communities.


Baby
Shark
Project
Conservation for the future

Objectives Stated

1. Identify and protect hammerhead shark nursery habitat.

1.A
Maintain the monitoring of the sites already identified. (Puerto Cabuyal-Ecuadorian coastal) (El Eden and Venecia-Galapagos).

Monitoring in Galapagos (Venice) and in continental Ecuador (Puerto Cabuyal) has been constant, this despite the limitations caused by the presence of the COVID pandemic19 . The activities based on the project objectives were fulfilled, with certain modifications in the face of the problem of the pandemic; In the case of Galapagos, it was not possible to carry out monitoring between March and June, as the restrictions on field trips were stricter on the islands than on the continent.

The experience gained during the first year of the project made it possible to establish a monitoring protocol. The monitoring protocol provided the application of a standardized methodology for the continental region of Ecuador, likewise the monitoring protocols have been shared with other colleagues in the region who work in similar programs in breeding areas in Punta Chame (Panama) and in the Gulf of Tibuga (Colombia). In addition, monitoring was extended to the landing ports of the fishing coves of San Vicente, Canoa and Bahía de Caráquez. These areas are close to Puerto Cabuyal, and have become potential breeding grounds for hammerhead sharks sampled in the area.

1.B
Identify at least one additional shark nursery area in mainland Ecuador.

The presence of hammerhead shark hatchlings and juveniles was identified this year in the fishing ports of San Vicente, Leonidas Plaza and Bahia de Caraquez, with a background of the 2019 explorations. The fishing ports are considered a potential breeding area for this species. Similarly, Puerto Cabuyal has been identified as a breeding area for juvenile hammerhead sharks.

Information on these sites come from fishermen's reports (Figure 2) and will be useful to know sites predilection of hatchlings and juveniles of these species and to confirm "breeding area" status.

2. Develop an ocean conservation community outreach campaign.

Several environmental education activities were planned for 2020, but due to the declaration of an emergency in the country, these were re-planned and adapted to be developed virtually and as far as possible in person, taking into account the biosafety measures established at the national level for these cases.

In order to fulfill this objective, the first activities were developed through the Zoom platform and Facebook Live with virtual chats for the general public; however, for the last quarter of the year, recreational activities were planned for children and adults of the community of Puerto Cabuyal known as hammerhead shark breeding areas.

Implementation of Planned Activities and Outputs.

These where the planned activities for 2020 according to the annual workplan:

1. Identify and protect hammerhead shark nursery habitat

A. Identify at least one additional shark nursery area in mainland Ecuador.

B. Maintain the monitoring of the sites already identified (Puerto Cabuyal-Ecuadorian coastal) (El Eden and Venecia in Galapagos).

C. Have regular meetings with fishing communities in Ecuador and with 2 other countries. Promote peer to peer workshops with fishermen.

D. Meetings with key actors for the development of the conservation plan for shark nursery area.

2. Develop an ocean conservation community outreach campaign.

A. Promote the development of Ocean Literacy programs in primary and secondary schools along the Eastern Tropical Pacific, with particular focus on raising awareness regarding migratory marine species. These programs will engage teachers, children, youth and local community members.

B. Produce educational materials focused on elasmobranchs (e.g. storybooks, activity booklets, etc.) and disseminate to coastal com munities across the ETP.

C. Conduct 10 fishermen workshops at coastal communities across the ETP to raise awareness regarding migratory marine species, share key findings and recommendations for conservation and management.

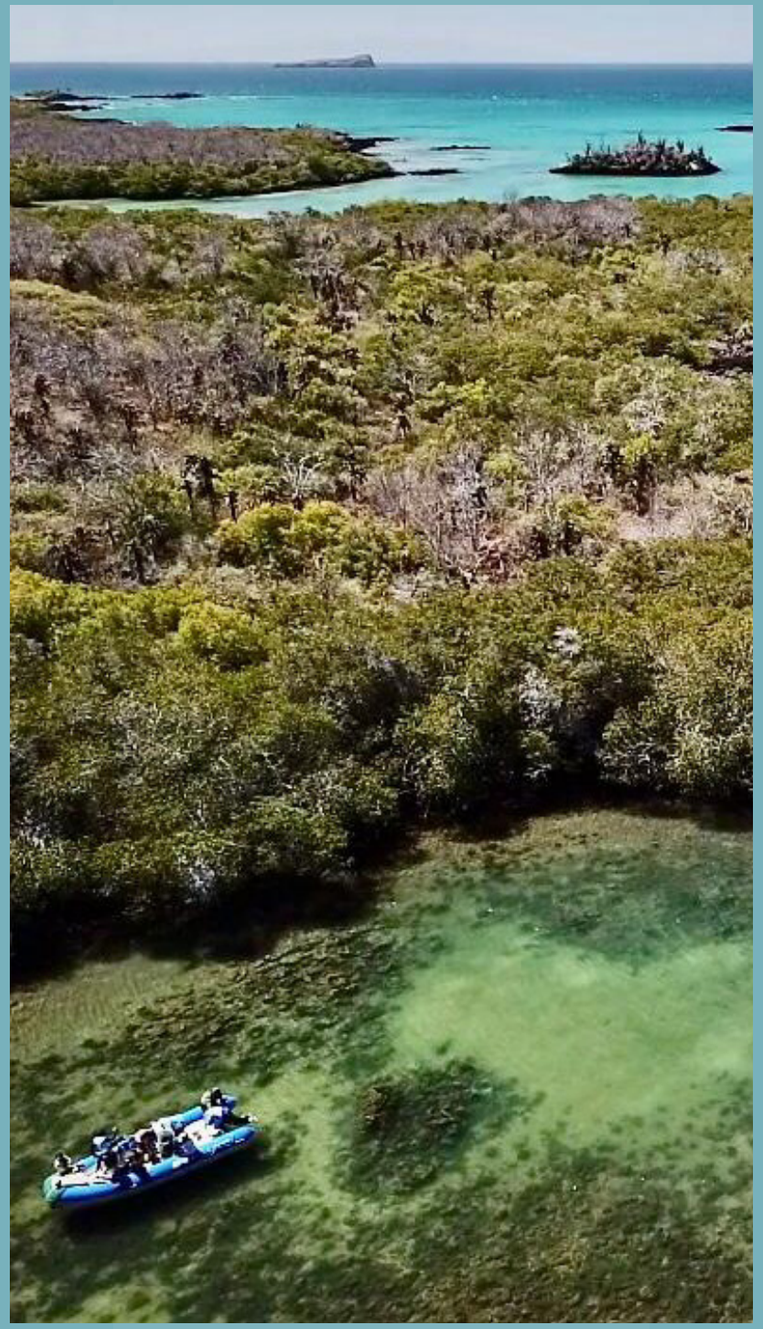
D. Pilot a community-exchange program, in which 5 selected fishermen, teachers or youth are selected to visit another conservation project in the ETP in order to build capacity and inspiration for conservation.

E. Design and develop an impacting social network campaign aimed at raising awareness regarding migratory marine species in the region.

Activity	Year 2	Year 3
1A		
1B	X	X
1C	X	X
1D		
2A	X	X
2B	X	X
2C	X	X
2D	X	X
2E	X	X

Table 1. Timeline of planned activities

The health emergency caused by the Global COVID19 pandemic modified the development of the project in the current year (2020). This pandemic halted many activities of different types worldwide, for a period of almost three months. The activities proposed in the initial project schedule were completed in this second year, despite the pandemic. Many activities, such as talks and meetings, were changed to a virtual format, and field trips had to be adapted to the restrictions imposed for the safety of everyone's health.



1.
Identify and protect hammerhead shark nursery habitat

1.A
Identify at least one additional shark nursery area in mainland Ecuador.

As mentioned before, hammerhead shark hatchlings and juveniles where identified in Caleta Tortuga Negra and Bahia Borrego in Galapagos, as well as other areas in the fishing ports of San Vicente, Leonidas Plaza and Bahia de Caraquez behind Puerto Cabuyal where this year newborns and juveniles of hammerhead sharks were found. The results of these studies in Mainland Ecuador has served to propose the creation of a broader Marine Protected Area based on these findings.

Image 1: Potential hammerhead shark breeding areas in Galapagos (Black Turtle Cove and Borrero Bay)

1. B
Maintain the monitoring of the sites already identified (Puerto Cabuyal-Ecuadorian coastal) (El Eden and Venecia-Galapagos).

During the second year of the project, we continued to monitor the breeding areas already identified, such as Venecia in Galapagos and Puerto Cabuyal in mainland Ecuador.

Field monitoring was carried out in each area in accordance with the restrictions imposed by the authorities in the face of the health emergency. Monitoring was constant throughout the year in Puerto Cabuyal. Field trips were prohibited in Galapagos from March, for a period of three months. Project activities resumed in June with several limitations.
The total number of hammerhead sharks (Sphyrna lewini) monitored was 178 in continental Ecuador, mainly in the ports of Puerto Cabuyal, San Vicente, Canoa and Bahía de Caráquez in the Manabí province. 85 of the 178 individuals monitored were from Puerto Cabuyal, these findings are based on the protocol established in 2019.
Catch information in areas of the Rio Chone mouth shows the presence of juvenile hammerhead sharks in areas surrounding Puerto Cabuyal this year. These areas represent important sites for the protection of this species (Image 2).

In Puerto Cabuyal during monitoring it was possible to determine that the predominant species corresponds to *S. lewini* with 85 individuals registered for 2020 which represents 78% of the capture, these results are consistent with the results of 2019 where this species was registered in 75%; on the other hand, for the species *S. tiburo* an increase in captures is registered for this second year with 27individuals. With these records, the presence of the predominant species *S. lewini* in the sector is confirmed (Figure 1).

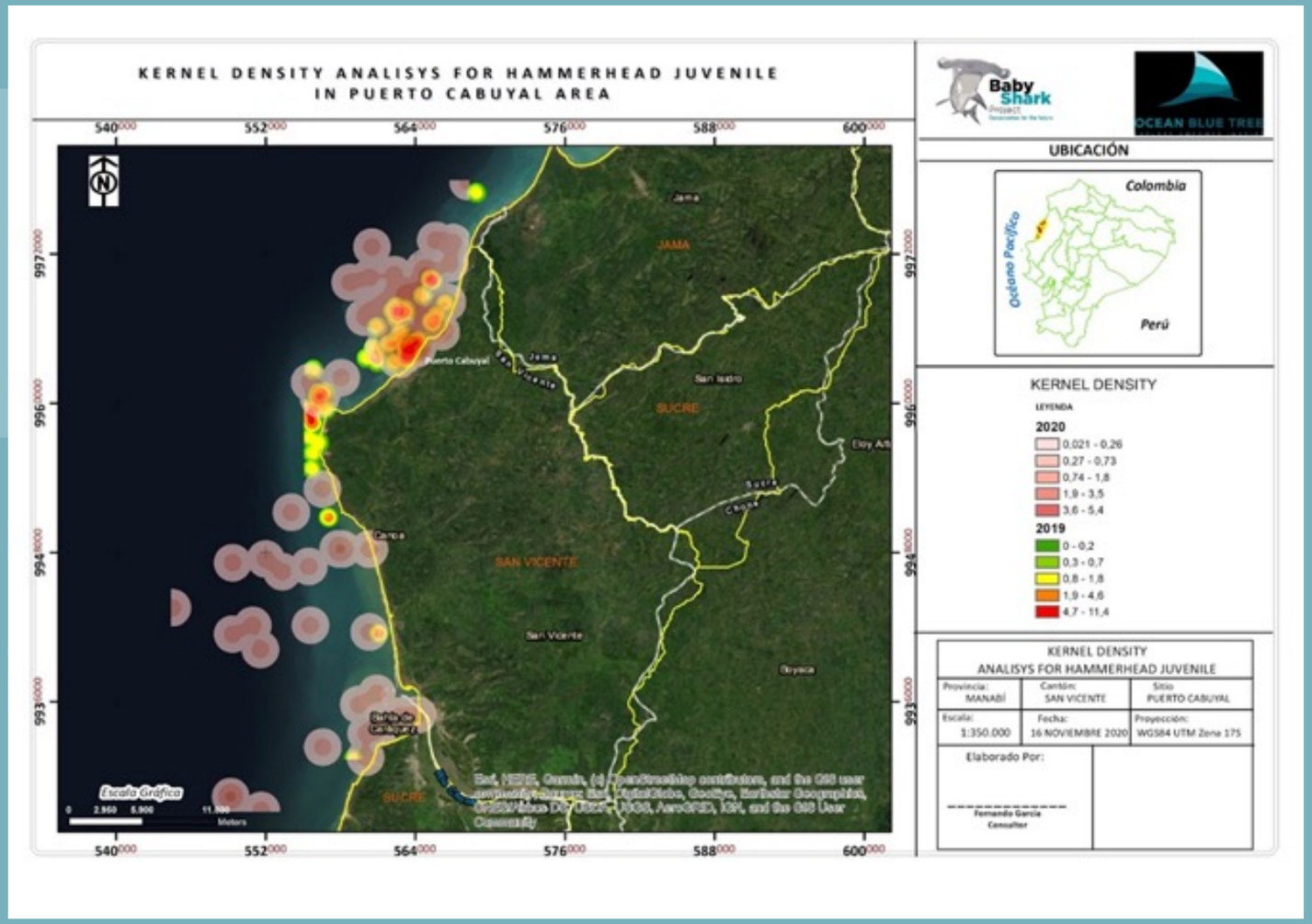


Image 2: Heat map of capture density of juvenile hammerhead sharks in the breeding area of Cabuyal.

During the 2019 monitoring, it is recorded that 44% of the individuals sampled correspond to females of the *S. lewini* species; however, in 2020 the proportion of sexes in individuals of this species varies only by 1%.

A comparison of the average sizes of hammerhead sharks monitored in Puerto Cabuyal for both years shows a similar trend, smaller sizes are between the months of March and May, which coincides with the abundance in capture of this species, and larger sizes between July and August, when the number of captures decreases, assuming that the individuals captured are no longer neonates but juveniles.

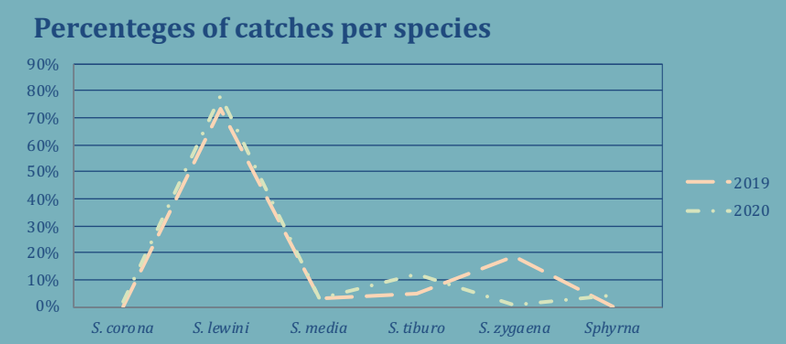


Figure 1: Percentage of individuals captured by species in Puerto Cabuyal (mainland Ecuador)

By 2020 the number of sharks that could be monitored in the Galapagos was quite low; only 13 hammerheads in the site called Venice, the reason for this was that only January and March were the months of capture. Monitoring could not be conducted during the months of April through July due to the restrictions established in the Galapagos for field trips for any investigation of the pandemic; however, to resume monitoring in the months of August onwards, hammerhead sharks could not be recorded during the monitoring, despite conducting monitoring trips on several occasions.

This lack of shark presence could have been caused because this year the sea temperature was colder than normal; this was detected by the data logger (temperature sensors) installed in the nursery area, in addition to what was reported by NOAA in its oceanographic bulletin that mentions the presence of the La Niña event for this year in the Tropical Eastern Pacific region.

In the Monthly Forecast Bulletin submitted by NOAA shows the Central and Eastern Pacific Upper-Ocean (0-300 m) Weekly Average Temperature Anomalies Subsurface temperature anomalies were positive from October 2019- March 2020. During April and early May, negative anomalies strengthened. Starting in mid-July, negative anomalies strengthened and then persisted through early October. Since early October, negative anomalies have strengthened again.

This anomalous event denotes the presence of the natural phenomenon called “La Niña” which could be causing an oceanic condition that could cause the absence of hammerhead shark hatchlings in the Galapagos breeding areas.

On the other hand, from the biological data collected so far in the Galapagos breeding area, it was possible to determine the size frequency of the individuals captured, resulting in an average size of 67.3 the maximums and standard deviation of these individuals are shown in the following graphs.

Standard deviation	7,33
Mode	61
Minimun	51
Maximum	89
Sample size	51
Average	67,33

Table 2. Descriptive statistics of the total length of hammerhead sharks measured in Galapagos

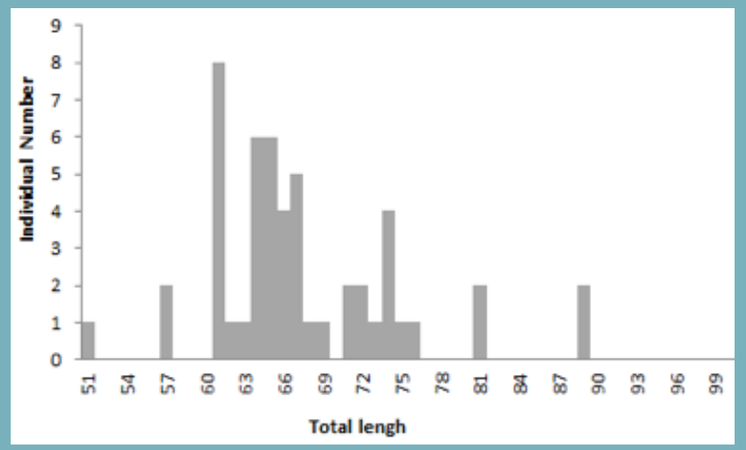


Figure 6: Size frequency of juvenile hammerhead sharks in Galapagos Venice

In Venecia, the hammerhead shark breeding area that has been monitored since 2017 in the Galapagos, there is a constant presence of this species, a summary of biological data gives us a total of 51 individuals sampled with 17 females 30 males and 14 indeterminate, the frequency of size indicates that the largest size range is between 60 and 62 cm. Individuals up to 70 cm in total length (LT) are considered neonates, from 71 cm onwards they are juveniles (Alejo Plata, Ahumada-Sempoal, Cerdenares, & Gómez-Márquez, 2018). 38 hammerheads in this study were neonates and 13 juveniles (Figure 6), these data are totals of hammerheads monitored in Venice from the beginning of the project to the present.

According to the total sizes (Alejo Plata, Ahumada- Sempoal, Cerdenares, & Gómez-Márquez, 2018) who mention that they are considered neonates up to 70 cm in total length and thereafter are juveniles, according to graph No. 6 we have 38 hammers are neonates and 13 juveniles; these data are totals of the hammers monitored in Venice since the beginning of the project until today.

Of the 61 hammerhead sharks (*S. lewini*), they presented intervals of 51 to 89 cm of total length (LT), with a mode of 61 cm of LT and an average size of 67.33 cm (according to the Table What shows us that the individuals sampled in its totality are of neonatal or juvenile stages.

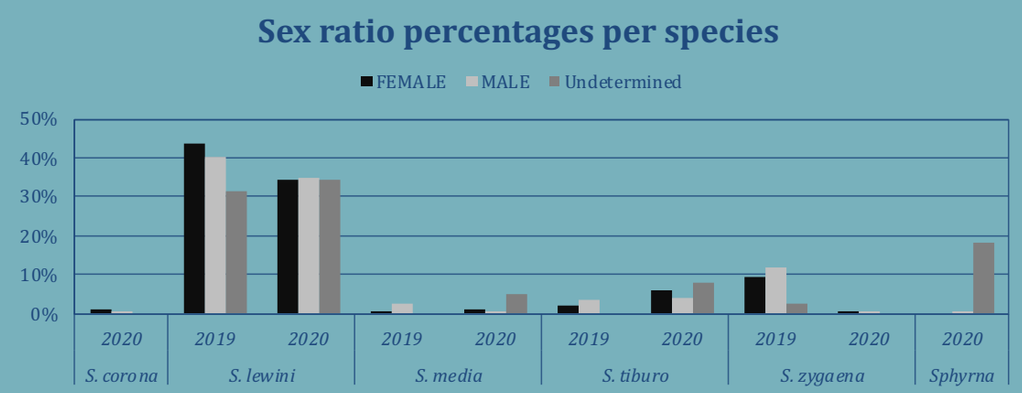


Figure 2: Percentage of sex range by species

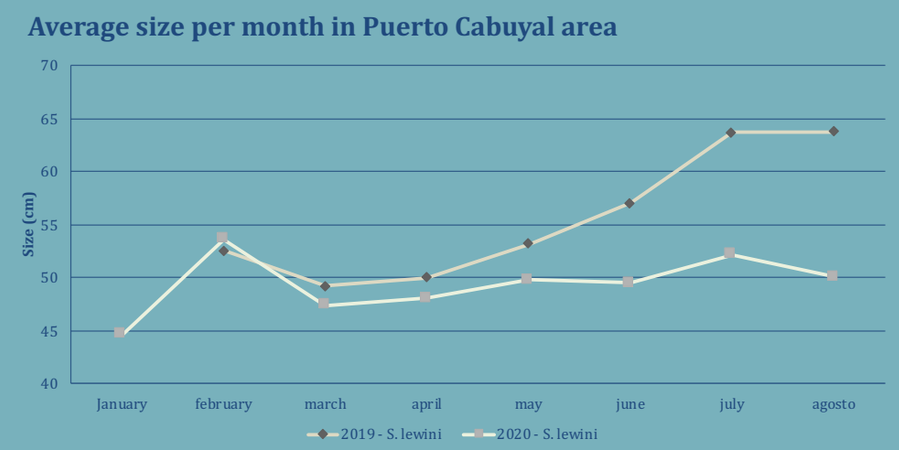


Figure 3: Average sizes per month in Puerto Cabuyal for the species *S. Lewini*

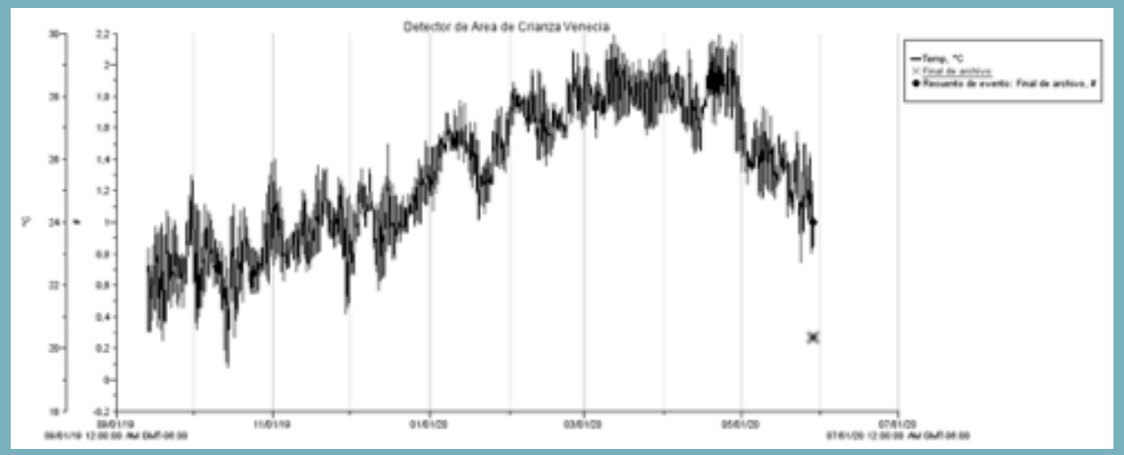


Figure 4: Average temperature of the breeding area in Venice Santa Cruz

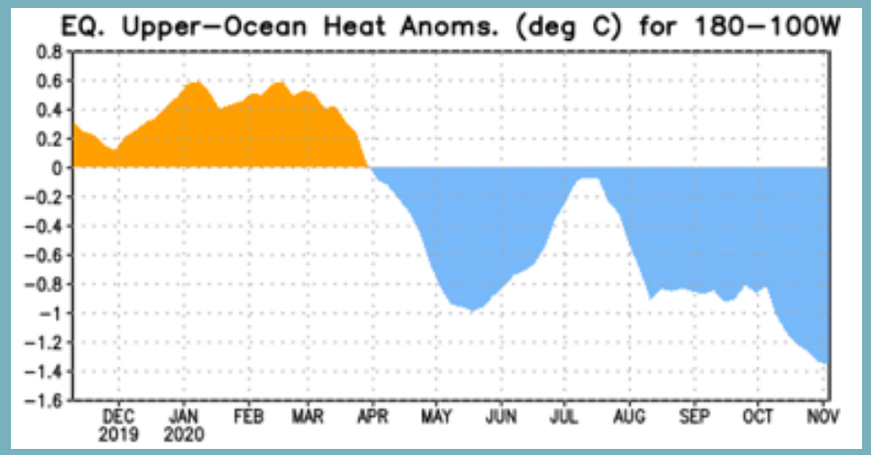


Figure 5: Sea surface temperature anomalies for the last 12 months (Source NOAA)

1.C

Have regular meetings with fishing communities in Ecuador and with 2 other countries. Promote peer to peer workshops with fishermen

The community leaders and representatives of the Association of fishing production and mariculture ASOPROCABUY participated in a socialization space that was given (Figure 10). In this working space, the results obtained during hammerhead shark monitoring in Puerto Cabuyal were presented. This meeting allowed the strengthening of relations with the community and the planning of actions in view of a possible declaration of a marine protected area in the area (Images 3).

Awareness program for fishing communities with an impact on shark nurseries developed and implemented in Ecuadorian coastal waters and two more countries of the ETPS.

Environmental education activities are among the actions to be developed by the project. In this second period, the work with children and adults in the fishing communities within the hammerhead shark breeding areas was proposed, but due to the declaration of emergency in the country, this activity was restructured to be carried out virtually during the sanitary emergency declaration in the country and to gradually start the face-to-face activities to achieve the proposed objectives.

The development of the virtual talks was carried out through the Zoom and Facebook Live platforms; therefore, in the first semester of this year two talks were held called "Hammerhead shark breeding areas, important habitats for the conservation of this species", with the participation of 200 people (Image 4).

Image 4: Virtual talks about hammerhead shark breeding areas.

Image 5: Giving incentives to fishermen who support conservation actions in the community.

The fishermen of the area have joined the work of hammerhead shark monitoring throughout the two-year project in the community of Puerto Cabuyal. These fishermen contribute by taking data, photos and releasing individuals of *Sphyrna* sp. that are found during fishing operations. The project allowed to grant a certificate and clothing to the fishermen, as an incentive to their collaboration (Image 5).

1.D
Meetings with key actors for the development of the conservation plan for shark nursery area.

Since the beginning of this project in 2019, the creation of a marine protected area (MPA) has been promoted in the area. This initiative has encouraged meetings with NGOs, local and provincial authorities to establish a conservation area that allows for the sustainable use of resources and the protection of marine species identified in the sector (Image 6). However, constant changes in the authorities of the Ministry of the Environment and Water have delayed the process of reaching working agreements that lead to joint actions for its declaration.

The members of this project, individuals and representatives of NGOs such as Conservation International, the Ministry of Tourism and key actors in the province of Manabí have created a group to support the development of the creation of the marine reserve in the shark breeding area in Puerto Cabuyal. This group includes experts from the area of marine management, administration and conservation, as well as from the tourism sector and specialized consultants. Subsequent planning consists of meetings with political actors in the area showing a solid proposal for the creation of the MPA.

Meeting in the National Assembly to promote the importance of MPA in the tratement of the renewal fishery law.

2. Develop an ocean conservation community outreach campaign.

Image 7: (1) Virtual talks on hammerhead shark breeding areas
(2) Virtual conference with the Alianza Global por el Clima.

2.A

Visit local schools of fishing communities, generate environmental education curricula with teachers. Continue with the connecting school program adding at least one school in each country.

Environmental education activities are among the actions to be developed by the project. During this second period, work was planned with children and adults in fishing communities in hammerhead shark breeding areas, but due to the declaration of an emergency in the country, this activity was restructured to be carried out virtually during the declaration of a health emergency in the country. On-site activities to achieve the proposed objectives are planned to begin gradually.

The development of the virtual talks was carried out through the Zoom and Facebook Live platforms. In the first half of 2020, two talks were held entitled "Hammerhead shark breeding areas, important habitats for the conservation of this species", with the participation of 200 people (Image 7).

Before initiating the environmental education activities, an evaluation was made of the level of perception and knowledge that the fishing communities have in Puerto Cabuyal and in the fishing landing docks: Canoe, San Vicente and Bahía de Caráquez about hammerhead sharks. This was done through the application of 131 surveys in the aforementioned sites, of which 91% of those surveyed were male and 9% female.

Two additional talks were given showing the results of the project and the importance of protected areas, one to more than 50 students from the Universidad Michoacana de San Nicolás de Hidalgo de México, as well as talks given through the MigraMar platform.

On the other hand, environmental education activities began with an evaluation of the level of perception and knowledge that fishing communities have in Puerto Cabuyal and in the fishing landing docks of Canoa, San Vicente and Bahía de Caráquez about hammerhead sharks. The evaluation was carried out through the application of 131 surveys in the aforementioned sites, of which 91% of the respondents were male and 9% female (Table 3).

	Children		Fishermen	
Site	Femenine	Masculine	Femenine	Masculine
Bahía-Leonidas Plaza				33
Canoa				13
Puerto Cabuyal	10	12	2	54
San Vicente				7

Table 3: Surveys conducted by site and gender

Through these surveys it was possible to know the perception and level of knowledge that the community of Puerto Cabuyal has regarding hammerhead sharks and their conservation status. In that sense, the analysis of the surveys in a general way gave the necessary information to know the gaps that exist in the community regarding the knowledge of hammerhead sharks, this analysis is shown in Table 4.

Table 4 shows some of the most relevant questions and answers from the surveys carried out in the community of Puerto Cabuyal. This information is useful to understand the level of knowledge of the community and how to approach strategies to develop environmental education activities that promote awareness in this community.

The differences of opinion between children and fishermen in Puerto Cabuyal is very evident in general. The most direct informational questions were applied to only one group, for example, about feeling threatened by hammerhead sharks was only applied to the fishermen.

The majority (62%) of fishermen surveyed answered "No". On the other hand, the level of community knowledge about some biological aspects of sharks is low; for example, the majority of respondents for both children and fishermen (77% and 88% respectively) did not know how old sharks live. However, 91% of fishermen confirmed that they had eaten sharks at some time.

These responses show the need for information that the community in general has regarding the biology of sharks and the importance of being able to conserve them. Also, both groups (children and fishermen) gave an affirmative answer to the question of whether they would like to know more about hammerhead sharks.

The analysis of the survey results identified the information needs of the community and a methodology was developed to fill these knowledge gaps in the population of children and adults in coastal communities. The methods used for environmental education activities are detailed ahead.

Questions	Children	Fishermen
Do you feel threatened if you see a hammerhead shark?		
No	0%	62%
Non applicable	100%	23%
Yes	0%	15%
How many years does a hammerhead shark live?		
0-10	0%	2%
20-30	18%	2%
30-40	5%	0%
Mora than 50	0%	8%
Do not know	77%	88%
Have you ever consumed hammerhead sharks?		
No	59%	9%
Yes	41%	91%
Do you know why hammerheard sharks are disappearing?		
Global warming	0%	6%
Pollution of the seas	0%	4%
Does not know	100%	24%
Fishing	0%	66%
Do you know why the hammerhead shark is in t danger of extinction?		
No	77%	28%
Yes	23%	72%
Would you like to know more about the hammerhead shark?		
No	0%	7.6%
Yes	100%	92.4%

Table 4: Relevant responses of the level of knowledge and perception of fishermen and children in Puerto Cabuyal

Image 8. Presentation of the puppet show “Las Aventuras de Tollito” in Puerto Cabuyal

Presentation of the puppet work

The puppets are used as a didactic resource that facilitates learning, helps to teach the theme of species conservation in a more entertaining and fun way; Therefore, a work called "The Adventures of Tollito" is being prepared. This story tells the adventures of a hammerhead shark that lives in the sea of Puerto Cabuyal, together with his friends he explores those waters and shows them the importance of marine ecosystems and why protected marine areas must be created to ensure their survival (Image 8 and 9). The presentation of the work was held for the students of the Nueva Esperanza School, children, youth and adults from the community of Puerto Cabuyal 1 with the participation of thirty people.

Presentation of the documentary “El Gran Pacífico” Children and adults of Puerto Cabuyal 2.

Environmental cinema

Two presentations of the documentary “The Great Pacific” were made, the first with students and parents of the Nueva Esperanza School - Puerto Cabuyal and the second with children and adults of Puerto Cabuyal 2. This documentary talks about the main species that inhabit it and the importance of their conservation. With this tool, forty-three people, including children, young people and adults from the community of Puerto Cabuyal, were brought together in a space of coexistence that allowed a reflection to be generated at the end of the activity.

Presentation of relevant information for the conservation of hammerhead sharks

Presentations and talks

Presentation of talks on the conservation of hammerhead sharks with children from Nueva Esperanza School - Puerto Cabuyal and children from Puerto Cabuyal 2.

Flipchart

This material was developed to work with the adult public, especially fishermen, most of whom did not complete their schooling. The flip chart was designed with images in a sequence of sheets that serve as visual support to develop the exposure of highlights, sensitivities and fundamental concepts of hammerhead sharks.

Puppet show at the end of the year

Meeting with fishermen from the Puerto Cabuyal community to socialise the creation of an MPA.

Meeting with representatives of the GAD San Vicente to coordinate actions for the creation of the MPA.

2.B
Publish the Marti the hammerhead in spanish and share with local schools in Galapagos and Coastal Ecuador

Due to the limitations of this year's global pandemic, COVID19 was not able to carry out many face-to-face activities; the story of Marti the Shark in the book initially intended for publication was changed to educational virtual chats and a few restricted face-to-face activities such as the puppet show that was only possible at the end of this year, after evaluating the need for information and the most suitable tools to disseminate information about sharks and raise awareness in local schools.

2.C
Workshops will concentrate on capacity building and socializing potential MPA's in the region

Two meetings and workshops have been held with the fishing community of Puerto Cabuyal, where the results of the project and the importance of the hammerhead shark breeding area have been shown, as well as the importance of conserving these sites. On the initiative of the community representatives, these results were disseminated to the whole community and the need to create a Marine Protected Area (MPA) in the area has been generated. The community will make an official request to the Ministry of the Environment to consider the creation of the MPA, for which project members are creating a technical proposal document based on the results of this project, together with other characteristics of the area that provide important ecological value for the area.

Based on the interest of the community, meetings have been held with local authorities, such as the Mayor's Office of San Vicente and the team of directors (Image 16, 17), who have agreed to support this initiative and to take the request to the levels of the Ministry of the Environment so that a political decision can be taken to create an MPA.

Through this project, an initiative has been created for the creation of the MPA with several local actors and politicians in the area who have expressed a common interest. The last meeting was held with the representative of an association of municipalities in the Bahía de Caráquez area, San Vicente and Jama, who showed his support for this initiative.

2.D

Develop experience exchange activities among fishermen who manage to show the importance of shark nursery areas.

The participation of the Planet Ocean Foundation in this project made it possible to carry out Planet Ocean's Connecting Schools initiative for the second year. This programme seeks to empower young people to create positive environmental change through training and strengthening student leadership. Students from Colegio Euroamerican College (Lima, Peru), Colegio Las Américas (Tumbes, Peru) and Escuela Nueva Esperanza (Puerto Cabuyal- Ecuador) participated in virtual seminars, elaboration and presentation of group works this year. This process allowed students from different backgrounds and contexts to generate dialogue and present on environmental issues in each of their locations (Image 18 and 19). Around 20 students from Puerto Cabuyal in Ecuador were connected with more than 30 students from Peru.

2.E

Design and develop an impacting social network campaign aimed at raising awarness regarding migratory marine species in the region.

Puerto Cabuyal has a "Nueva Esperanza" school that houses children and young people from the community, whose parents and grandparents live and interact with the marine resources. The sense of responsibility for the care of the species and their environment must be created essentially in the children because of their importance in the present and future society. Environmental education activities for schools could only be started from the second quarter due to the pandemic. These activities started with virtual talks and later on with face-to-face activities aimed at finding out about the species, their importance and actions to conserve them (Image 20 and 21).

As part of the recreational activities we developed tours, camps and coastal cleaning with children, youth and parents, in order to create experiences that improve the learning process.

This project promotes community initiatives for the benefit of the environment, one of which is the development of coastal clean-ups. For the second consecutive year, the "International Beach Cleaning Day" was held with the participation of thirty people, including children and parents from the Nueva Esperanza School, and 160 kg of waste was collected in the area (Images 24 and 25).

The activities organized by the community have been supported by the project during the two years of development. Events such as Christmas and Children's Day are used to reach out with the message of the importance of final waste disposal, disposing of single-use plastic and the effects on marine wildlife (Image 26 and 27).

The community of Puerto Cabuyal is located in an area far from population centres and does not have waste collection by local governments; for this reason, those responsible for the project agreed with the community to support the transfer of waste to municipal dumps every fortnight (Image 28).

Collaboration

Since the beginning of this project in 2019, the creation of a marine protected area in the area has been promoted, for which meetings have been held with NGOs, local and provincial authorities to establish a conservation area that allows the sustainable use of resources and the protection of marine species identified in the sector. However, constant changes in the authorities of the Ministry of Environment and Water have delayed the process of reaching working agreements that lead to joint actions for its declaration.

One of the main achievements as a country was the reform and approval of the new fisheries law, which establishes stronger sanctions for the capture of protected species, in the first half of this year. This same law establishes within its articles the creation of protection areas as seed zones and promotes marine research. As part of the project's activities, meetings were held with the assembly members (Image 29b) where the need to strengthen the fisheries law in terms of sustainable fishing and the protection of highly threatened species was demonstrated.

On the other hand, Agreement No. MPCEIP-SRP-2020-0084-A was approved, which prohibits the external commercialization, possession, commercialization or transportation of hammerhead sharks and establishes the return to the sea of these individuals, dead or alive, that have been caught as bycatch.

The results obtained in the project provided technical information in forums and meetings organised by the Undersecretariat of Fishing Resources for the updating of the National Plan of Action for the Conservation and Management of Sharks (PAT-EC) 2020-2024; likewise, work is being done with them for the development of the conservation plan for shark breeding areas (Image 29 a).

MINISTERIO DE PRODUCCIÓN, COMERCIO EXTERIOR, INVERSIONES Y PESCA

ACUERDO Nro. MPCEIP-SRP-2020-0054-A

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SUBSECRETARIO DE RECURSOS PESQUEROS

Que, la Constitución de la República del Ecuador acoge el principio precautorio en su artículo 73, y establece; *"El Estado aplicará medidas de precaución y restricción para las actividades que puedan conducir a la extinción de especies, la destrucción de ecosistemas o la alteración permanente de los ciclos naturales. Se prohíbe la introducción de organismos y material orgánico e inorgánico que puedan alterar de manera definitiva el patrimonio genético nacional"*;

Que, la Constitución Política de la República, en su artículo 396 determina; *"El Estado adoptará las políticas y medidas oportunas que eviten los impactos ambientales negativos, cuando exista certidumbre de daño. En caso de duda sobre el impacto ambiental de alguna acción u omisión, aunque no exista evidencia científica del daño, el Estado adoptará medidas protectoras eficaces y oportunas"*;

Que, la Constitución de la República en su artículo 406 establece; *"El Estado regulará la conservación, manejo y uso sostenible, recuperación, y limitaciones de dominio de los ecosistemas frágiles y amenazados; entre otros, los páramos, humedales, bosques nublados, bosques tropicales secos y húmedos y manglares, ecosistemas marinos y marino-costeros"*;

Que, la Constitución de la República del Ecuador en su artículo 408 determina, *"El Estado garantizará que los mecanismos de producción, consumo y uso de los recursos naturales y la energía preserven y recuperen los ciclos naturales y permitan condiciones de vida con dignidad"*;

Lessons learned

The main lesson learned is that you have to know how to adapt continuously in order to achieve the proposed objectives. During this period of the Project, in spite of the fact that the world is going through a critical situation due to an event that has changed the activities of humanity, the proposed objectives were achieved.

The opportunities to strengthen the protection of hammerhead shark nursery areas have been seen and exploited throughout the year. One of the challenges and concerns for the future is the change of government next year, which could cause a delay in the creation of the MPA or in promoting the protection of MPAs. However, work with key stakeholders and the coastal communities surrounding the breeding area has increased and if they continue to take an interest in the MPA and develop conservation activities this will be supported by any government.

On the other hand, field activities will be an ongoing challenge for the duration of the pandemic. In the face of this challenge the activities will be carried out with the respective safety protocols and we will wait to have the vaccine that can resume normal activities worldwide.

Action plan for next year

Activities	January	February	March	April	May	June	July	August	September	October	November	December
Monitoring in the nursery grounds in Ecuadorian coastal waters in Galapagos.												
Monitoring of the fishing landing in the main fishing coves of Bahia de Caraquez.												
Environmental education activities on the fishing communities with an impact on shark nurseries in Ecuadorian coastal waters.												
Meeting with authorities and hey actors to promote the creation of the Marine Protected Area.												
Pilot a community-exchange program to visit another conservation project in the ETP in order to build capacity and inspiration for conservation.												
Technical support to the fishing authority in Ecuador for the preparation of the conservation hammerhead shark nursery grounds conservation plan.												
Preparation of technical reports.												
Presentation of the final results.												

Activities for 2021

El helicóptero que movilizó a la imagen de la Virgen de Guadalupe por El Carmen.

SAN VICENTE

PROPONE CREAR UNA RESERVA MARINA EN PUNTA CABUYAL

La fundación Migramar realizó una exposición de un proyecto denominado Baby Shark, que busca la creación de una reserva para especies migratorias en peligro de extinción. Eduardo Espinosa, técnico de la fundación, presentó el proyecto que se desarrolla a través de la red de investigación inter-nacional. La idea es que el Municipio de San Vicente establezca una ordenanza municipal para la creación de una reserva, que estaría ubicada en Punta Cabuyal, en el límite con Jama, donde se podrían generar actividades alternativas, como un atractivo para especialistas en la observación de especies.

La exposición

• Sustainability of Project Outcomes

During the last few months it has been confirmed that the results of the Project tend to be maintained over time, since the intention is to develop a Marine Protected Area based on the results of the baby shark project, which will generate continuous conservation actions not only for the community of Puerto Cabuyal but also as an example for the other nearby communities. This environmental awareness that has been generated by the development of this project in a coastal community with scarce resources is expected to be maintained over time with the inclusion of these activities in the operational programmes of the park rangers of the area with the creation of the MPA.

• Unintended Outcomes

The health emergency caused by COVID19 during this period led to the cessation of activities. The restrictions could have meant a delay in the normal development of the project; however, significant progress was made in aspects that were not expected to be made until the end of this project. Among the products obtained are:

- The involvement of the Puerto Cabuyal community.
- Creation of community development initiatives related to the conservation of the oceans, the fishermen of the community have begun to release live sharks,
- Sea turtle monitoring programme in the area initiated by school children, support and training has been provided
- The project has generated a positive attitude among fishermen in Puerto Cabuyal to be able to take care of the sharks, they have started to be more concerned about relesing the newborn sharks, not only of the target species of the study (hammerhead sharks) but of other shark species and protected species such as sea turtles, likewise the need for the creation of a Marine Protected Area has been planted in the community.

To generate impact at a national level, increasing public pressure so that the government takes measures for the protection of sharks, thus achieving the creation of an updated fishing law and laws that prohibit hammerhead shark fishing in the country.

The local authorities are convinced that the creation of a Marine Protected Area will not only help to conserve natural resources but will also assist the development of coastal communities so an effort will be maintained in the next period to create the MPA.

The establishment of laws and regulations that protect sharks this year has been a great achievement that this project has helped to achieve based on the participation in the meetings to elaborate the National Plan of Action for the Management of Sharks, where the results of the project have been shown to the Undersecretary of Fisheries.

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Baby shark project

Annual report [2nd year]

DECEMBER 2020

Photo: Edwar Herreno

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