



SEA TURTLE CONSERVATION CAMPAIGN



Technical Report Nesting Season 2023

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Summary of the project

Program	Marine Turtle Conservation Fund
Project Title	Protection of Loggerhead Turtles in Cabo Verde
Organization	Associação Projeto Biodiversidade (APB)
Location	Sal Island, Cabo Verde (Africa)
Primary species	Loggerhead Turtles (<i>Caretta caretta</i>)
Summary	<p>Loggerhead turtles are an endangered species according to the IUCN Red List of Threatened Species. Cabo Verde is, probably, the largest nesting site in the world for this species; nevertheless, many threats are compromising the survival of this sub-population. Poaching of nesting females and in-water mortality due to by-catch and marine pollution, are the main direct threat to adult turtles. While loss of habitat, artificial lighting, predation, and Climate Change are also risking the long-term survival of the species in Sal Island and Cabo Verde in general. Through our Marine Turtle Conservation Campaign, we ensure the survival of the Loggerhead turtles of Sal Island by reducing its more direct and urgent threats. At the same time, we increase the awareness of the local population, especially the coastal communities and the tourism sector.</p> <p>In 2023, we registered the third highest number of nests in Sal Island since 2008. The total nest number was 25,193, representing an estimated 5,039 nesting Loggerhead turtles. A total of 130 people participated in the monitoring of over 25km of nesting beaches, from which 49 were directly employed by the organization. In addition, a total of 125 members of the army joined the patrols at any point. 106 turtles were registered poached, from which “only” 3 were taken in monitored beaches. Mortality rate of nesting turtles on monitored beaches was below 0.1%, while on the entire island was 2.1%. Both the mortality rate and the total number of poached turtles are the lowest numbers recorded to date. For the first time, no turtles were taken in the beach of Costa Fragata, one of the main nesting beaches of the island of Sal. Drones continued to show its efficiency deterring poachers, with a clear decrease of turtles taken after joint missions with the military and the drone team. Only 7,8% of all the nests of the island were protected in hatcheries, with a combined median of 81,1% of success.</p>

Area of Implementation

Sal Island, Cabo Verde
16.625490° / -22.899434°

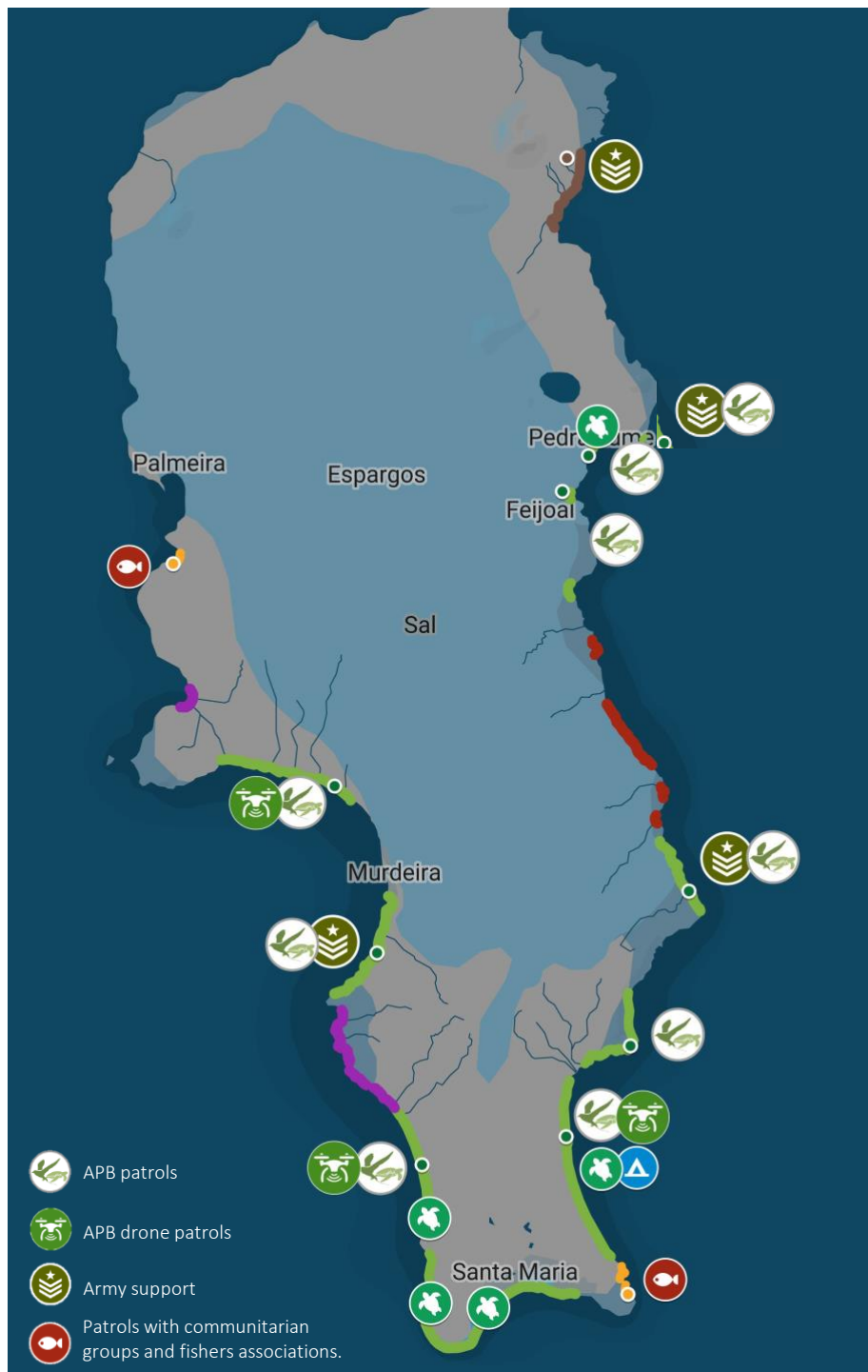


Figure 1 – Map of intervention areas: regular night patrols (green), communitarian patrols (orange), areas with only drone coverage (purple) and beaches visited only during weekly census (red).

Project Objectives 2023

- Maintain poaching levels near zero on the three main nesting beaches (Serra Negra, Costa Fragata, Algodoeiro).
- Maintain protection coverage and reduce poaching levels in Monte Leão, Madama and Murdeira.
- Maintain coverage and reduced poaching levels in Praia Chano.
- Consolidation of a committed and motivated team of local staff and strengthen their performance skills and capacities.
- Consolidation of the communitarian team of guards and volunteers in Pedra de Lume.
- Empower and support communitarian initiatives in Palmeira to protect the beaches of Fontona and Palmeira. Support the local fisheries community of Santa Maria to protect the local beach of Igreja.
- Protection of endangered nests in the southern beaches of Sal and Pedra de Lume.
- Implementation of educational activities with schools, high schools, children associations and other communitarian groups.
- Continue training on good practices for turtle watching activities for tour guides on Sal Island.
- Support marine turtle conservation in Santo Antão.

Main Goals

- Reduce poaching of nesting females on the main nesting beaches and beaches with highest poaching levels and, therefore, reduce consumption of turtle meat.
- Increase hatchling recruitment.
- Incite participation of the community and local stakeholders in the turtle protection strategy
- Strengthen local capacity building on turtle conservation competencies.
- Support marine turtle conservation on other islands of Cabo Verde.
- Strengthen the national network for marine turtle conservation (TAOLA).

Methods and Activities

- Direct protection of nesting females through beach patrols. 25.2km of beach was patrolled by foot nightly, covering 77% of nesting beaches. Two smaller beaches (Fontona and Igreja) were patrolled nightly but lasted for the first half of the night.
- Drone patrols assisted foot patrols and covered unpatrolled, isolated beaches nightly. Drone patrols also conducted random night missions on unpatrolled beaches to deter poaching.
- Doomed nests were relocated and protected in one of five hatcheries throughout the island.
- Outreach campaign and awareness activities with schools, high schools, youth associations, fishermen associations and public and local businesses were conducted throughout the nesting season.
- Capacity building with local authorities, namely the military and national police, both of whom support the protection campaign.
- Employment and capacity building of local staff from all communities on the island.
- Support funding of the protection campaign in Santo Antão

Results and Highlights

- **Nesting trend**

- The first turtle activities of 2023 was a track recorded on the 17th of February in Serra Negra, followed by another track in Costa Fragata on the 21st of February. The first nest recorded was on the 13th of April in Costa Fragata, with the main nesting season beginning with two nests in Algodoeiro on the 9th of June.
- The 2023 nesting season started and finished earlier than 2022, with activities showing similarity to nesting trends recorded in 2021, with one nesting peak in August.
- In total **25,193 nests were recorded on Sal Island in 2023** and is the third highest recorded season to date with 57% more nests than 2022.
- The main nesting beach in 2023 was Serra Negra (6,839 nests: 27.1% relative nests), closely followed by Costa Fragata with 20.1% of nests (5,066 nests). Baía Negra, a group of small bays located between these two beaches represented 3.5% of nesting (874 nests).
- Algodoeiro was the third main nesting beach with a 11.8% relative percentage of nests (2,975 nests).
- Closely following Algodoeiro, Monte Leão and Madama recorded 2,574 nests, a relative percentage of nests of 9.9%. Relative percentage of nesting continues to increase on this beach thanks to sustained coverage and protection.
- In Pedra de Lume, 329 nests were recorded (1.3% relative nests).
- On the majority of beaches, both tracks and nests were recorded with the exception of Serra Negra, with a density of 5 nests per m², only successful nesting activity was recorded.
- Weekly surveys on unpatrolled beaches were performed throughout the season with the final survey completed on November 9th. An extrapolation of nests on these unpatrolled beaches was calculated based on the weekly nest numbers (with R² values between 0.6 and 0.7). It was estimated that the total nests laid on non or partially protected beaches was approximately 3,568.
- 2023 continued to see the application of PIT tags without the use of metal tags.
- 1,934 turtles were tagged with PIT tags in 2023.
- 296 turtles were found with PIT tags from previous years, this data is still under analysis to know the original date of tagging. One turtle was found with a metal tag which originated from 2017.
- 5,039 females are estimated to have nested on Sal Island in 2023 (estimation accounting for 5 nests per turtle).

- **Poaching**

- A total of **122 dead turtles were recorded on Sal Island in 2023**. This number relates only to deaths with evidence and therefore is considered to be below the real count.
- 106 of those deaths were due to **poaching**. 1 turtle was killed by **dog attacks** and the remaining were from natural or unknown causes.
- 92 of the 106 killed turtles were on beaches without night patrols. Of those 92, 58 were recorded on the beach of Cadjetinha and neighbouring beach Água Doce, on the Northeast coast of Sal.
- 11 turtles were taken on beaches with partial patrols. This beach was patrolled by volunteers from the local community where the patrol did not last the entire night.
- 3 of the 106 killed turtles were taken on beaches with night patrols. Of these, 1 was taken in Monte Leão, 1 in Baía Negra which may have been killed in the ocean and 1 was taken in Murdeira during which the poachers were encountered but managed to escape without any turtle meat.
- A total of 66 turtles were saved during patrols. Seven of those were saved directly from poachers, that is poaching events that were disturbed by our patrols. 43 of those saved were found disorientated and lost behind nesting beaches and were subsequently returned to the ocean. Seven were saved from natural causes such as being trapped in rocky areas.
- 2023 saw a continued dog presence on the beaches however less dog attacks on nesting turtles were recorded. The remaining 9 turtles saved were from dog attacks, with the severity of attack ranging from small injuries to life threatening wounds, particularly on the neck/shoulder area. Such attacks resulted in those turtles' needing treatment by the local veterinarian or project personnel before release. In total 10 dog attacks on adult turtles were recorded in 2023, a big reduction in comparison to the 31 attacks in 2022.

- The mortality rate of females (dead turtles / total estimated females) as a result of poaching in 2023 was 2.1%, compared to 4.2% in 2022. Both number of turtles killed and mortality decreased in comparison to 2022. This is the lowest level of mortality recorded for Sal Island.
- The continuation of a drone patrol in Monte Leão and Murdeira contributed to the continued low mortality on those beaches (1 turtle taken, 0.4% mortality rate). This drone patrol also covered the beach of Joaquim Petinha, which has no foot patrol, where no turtles were killed in 2023.
- On the beach of Prainhas, 21 turtles were killed by poaching, a drastic increase from the 7 killed in 2022. This beach will be targeted in 2024 for more drone coverage and random patrols to deter hunting.
- On the beach of Fontona 11 carapaces were found, a slight increase from the 7 found in 2022. This was due to the volunteer beach patrols by the local fishermen only covering part of the night. A mission was executed on this beach with drone team during which two poachers were encountered, one of which was apprehended and arrested. After this, no fresh carapaces of turtles killed were encountered on this beach.
- Similar missions were conducted in Prainhas, Cadjetinha and Agua Doce in an attempt to deter poaching on these unpatrolled beaches. In total 14 missions were conducted throughout the season, during which 9 suspected poachers were encountered, 2 of which were arrested, and the rest were removed or fled from the nesting area.
- For the first time since our organisation started patrolling, no turtles were poached on the beaches of Costa Fragata and Joaquim Petinha.

● **Nest Protection**

- Five hatcheries were constructed for the 2023 season. Four of those hatcheries were in the South of the island: two around Santa Maria town (Santa Maria and Ponta Sino), one directly on the beach of Algodoeiro (Tortuga) and one in Kite Beach. The fifth was in Pedra de Lume, on the North-Eastern coast.
- Due to the expected increase in nest numbers, the strategy to relocate only those nests affected by light pollution was used.
- A total of 843 nests were found in the areas of Ponta Preta, Santa Maria and Ponta de Sinó. 100% of these nests were affected by light pollution from the town and hotels so were relocated one of the nearby hatcheries.
- Of the 2,975 nests located in Algodoeiro, 857 were relocated to one of the hatcheries due to threat of light pollution. 11 nests were relocated transitu to another safer beach, that is those nests at the beginning and end of the nesting season, which were not relocated to the hatchery for logistical reasons.
- The hatchery of Ponta Sinó, the largest of the five, held 1151 nests, from which 67,950 hatchlings were released. This hatchery was split into two structures, one shaded and the other unshaded. The median nest success of the shaded and unshaded areas was 88.3% and 83.9% respectively.
- The hatchery of Santa Maria was moved to a new location after being flooded in 2022, this hatchery held 180 nests, from which 10,055 hatchlings were released, with a median nest success of 84.7%.
- The Kite Beach hatchery hosted a total of 413 nests (183 from Algodoeiro, Santa Maria and Ponta Preta and 230 from Kite Beach). From this hatchery 20,656 hatchlings were released with a median nest success of 69.7%.
- In the Tortuga Beach hatchery, 163 nests were protected from which 4,349 hatchlings were released (44% median nest success).
- The Pedra de Lume hatchery held nests from that beach which are threatened by light pollution as it is an isolated urban area. In total 61 nests were protected from which 1,999 hatchlings were released with a median nest success of 48.3%.
- In total 105,009 hatchlings were released from all hatcheries with a combined median nest success of 81.1%.
- In Costa Fragata 1,253 nests were relocated to other sites on the same beach (Tran-Situ), 24.7% of nests on this beach. 94% were relocated due to light pollution and the remaining for natural causes. A further 21 nests were relocated for natural causes in Serra Negra (0.3% of nests).

- In total, 1,968 nests were moved into the hatcheries, which represents 7.8% of the total nests on the island, and 1,308 nests were relocated Tran-Situ (5.2%). That is, 3,276 nests across the island had to be relocated to other more secure locations (13% of the total nests).
- The average nest success for Kite Beach increased from 47.2% in 2022 to 69.7% in 2023 despite using the same location and relocation strategy.
- The average nest success increased in the main hatchery at Ponta Sinó in 2023 (87.1% overall) compared to 2022 (81.6%). Both shaded and unshaded nests showed a higher nest success in comparison to 2022.
- 2023 continued to see dog predation recorded on all beaches of Sal. With such a high level of predation covering a vast area, relocations and hatcheries are an unsustainable and unrealistic solution for all beaches. Alternative mitigations will continue to be explored to reduce the dog population and the threat of predation throughout the island.

- **Patrol Logistics**

- The main camp maintained its location since 2016 in the Mitu&Djo Kite School, on Kite Beach (Costa Fragata), facilitating camp logistics and living conditions.
- Night patrols started the June 10th in Costa Fragata, Serra Negra and Algodoeiro.
- The patrols of Murdeira, Monte Leão and Madama started on June 20th. The patrol of Murdeira was supported by the military.
- Night patrols in Pedra de Lume ran from June 20th to the October 16th involving a team of employees from the local community.
- The patrol of Praia Chano ran from June 20th to October 19th, involving a driver, two patrollers and two military.
- Night patrols of Fontona and Igreja beach continued, consisting entirely of volunteers from the local fishermen community of Palmeira and Santa Maria.
- A total of 25.2kms of beach were protected by foot patrols in 2023.
- The drone patrols continued on the beaches of Costa Fragata, Algodoeiro, Murdeira, Monte Leão, Madama and Joaquim Petinha. Over the season an estimated total of 120 hours during 540 flights were recorded, covering an approximate length of 25.6 kms.
- Drone patrols continued to play a key role in detecting both poacher and dog presence on the beaches, preventing attacks on nesting females.

- **Staff**

- The permanent patrol team was comprised of five coordinators (three local and two international), 39 local field assistants, five international field assistants, nine interns (biology students from Cabo Verde University), 3 drivers and 2 drone pilots.
- In 2023, the turtle protection activities were supported by 52 international volunteers.
- A total of 15 fishermen volunteers from Santa Maria and Palmeira joined the nesting season, mainly on the beaches of Fontona and Igreja.
- Up to 125 members of the military joined the night patrols, including participating in one of our drone teams. They participated in a presentation of the results and received a certificate of participation in the nesting season campaign.

- **Turtle watching excursions and related impacts**

- With the return of the tourism industry, there was a huge increase in numbers of turtle watching excursions throughout the season, particularly in Costa Fragata and Algodoeiro, in comparison to the previous two years.
- The relationship between the project and tour guides continued to be mainly positive during encounters between patrols and tour groups.
- A new strategy introduced by the Delegation of the Ministry of Agriculture and Environment aimed to reduce the numbers of tours taking place, limiting the number of guests per tour, number of tours

per hour per beach and checking licences of those to ensure they are permitted to conduct turtle watching tours. This strategy will continue into 2024.

- In 2023 we placed new information panels on the beach exits of the three largest touristic resorts of the island, also located on nesting beaches. The panels share information about the nesting beach and ask tourists not to visit the beach at night. This initiative was implemented together with the hotels and the environmental authority.

- **Protection on the other Islands**

Support to Terrimar NGO, in Santo Antão. With the funding provided allowed the organization to monitor 10 isolated nesting beaches in the northwest of the island. This year, the surveys were increased thanks to the purchase of Terrimar's own boat. The funding was also used to fund the capacity-building activities for Terrimar technicians and volunteers prior the nesting season campaign, including data collection protocols and ecology and biology of sea turtles.

Challenges

- Regular protection of isolated beaches is a challenge in terms of logistics and security. Currently, several of these beaches are covered either by irregular volunteer patrols or drone patrols.
- Dog predation, of both nests and nesting turtles, is an increasingly grave problem on Sal Island. Dog predation occurs on all nesting beaches throughout Sal, isolated beaches included, on some of which predation is destroying 100% of the nests.
- Nest protection is challenging due to the reduction of suitable nesting beaches (through both coastal development and dog predation) and the unavailability and unsustainability of nest relocations. Where possible, threatened nests are relocated to a hatchery, at a great cost financially, logistically, and energetically. Hatcheries require specific suitable locations relatively close to the targeted beach area, of which few are available. With dog predation occurring on 100% of the beaches on Sal Island, relocation to hatcheries is an unrealistic solution to this problem.

Project Impact

- 25.2km of beach fully or partially patrolled by foot nightly for 4.5 months (full nesting season).
- Full island census conducted weekly covering all nesting beaches (32.8km total).
- 25,193 nests recorded in total, an estimate of 5,039 nesting females.
- 66 turtles directly saved through patrols.
- 3,276 nests relocated to a safer location, 1968 of which went to one of five hatcheries, from which 105,009 hatchlings were released.
- 130 total people involved in the protection campaign, including 15 local fishermen and volunteers from the Fishermen's Association involved in voluntary patrols, 52 international volunteers and 63 employees and interns.
- Pre-season presentation to the National Police and Military. 125 Military personnel involved throughout the season in active patrols.

Collaboration and Stake Holders

Projeto Biodiversidade has established strong partnerships with the local and national governmental institutions: The National Directorate of Environment, the Delegation of the Ministry of Agriculture and Environment of Sal (responsible of the Protected Areas), the City Hall in Sal, the Delegation of Education in Sal, the National Police, the 2nd Regiment of the Army based in Sal, and the Maritime and Ports Agency. APB is also led during the first half of the year a joint national initiative with other conservation NGOs

called “Dialogo sobre Políticas” with the aim to improve the synergies with and between public institutions. As a result, the national network for nature conservation has been officially created (TALOA+) and now has a professional team coordinating its initiatives.

We have a positive and dynamic collaboration with many local businesses that play a direct or indirect role in conservation on Sal Island, and we have succeeded in establishing a cooperative partnership with three of the biggest resort companies and tour operators in the island. These kinds of partnerships set an example of sustainable tourism on the island that supports conservation activities.

We also work closely with tourism companies, hoteliers, developers, and property rental agencies. Local businesses also participate in and sponsor activities and events.

Discussion and Way Forward

Although 2023 saw a decrease on dog attacks to nesting turtles, it is still a serious threat. Predation of nests continues as well and is spread in the whole island. Sterilisation campaigns are conducted, and although have some impact, they tend to target the domestic dog population.

In anticipation that the reduction of the dog population is a long-term process, in response to injured turtles attacked by dogs, a rehabilitation centre continues to be under discussion in partnership with the Olive Ridley Project and Sea Turtle Rescue Alliance. This centre would also allow treatment of turtles found injured from attempted poaching attacks, or stranded turtles that have been trapped in fishing line or other marine debris. Vet facilities and their capacity to treat turtles is currently extremely limited, therefore, it is anticipated that a trained vet will be available during the nesting season to respond to injured turtles, as well as assist in dog sterilisation, until the centre is in place.

Alternative solutions are being explored in regard to the loss of suitable nesting habitat, both through the turtle protection campaign and in collaboration with other campaigns run by Project Biodiversity working within the coastal protected areas. Dune protection and regeneration are already underway on Costa Fragata, regularly the main nesting beach of Sal. Trails are marked to limit vehicle use through the dune ecosystem, barriers and parking areas have been created, and native vegetation has been replanted to support the dune ecosystem. At the beginning of 2023, another beach was fenced off to avoid the entrance of vehicles, reducing the degradation of the beach. During 2024, new initiatives will start to restore dunes with sand retainers. The same retainers will be installed in key areas of the nesting beach to reduce the incidence of light pollution.

In February 2023, a new national initiative was started, targeting the social and economic side of turtle product trade and consumption. This project is led by Project Biodiversity with the collaboration of Biosfera I (NGO in São Vicente Island), Fundação Tartaruga, Queen Mary University of London, and with funds from the Illegal Wildlife Trade Challenge Fund from the UK Government. We tested detection dogs in the port and airport of Sal with the aim to tackle illegal trade of turtle meat between islands. More than 4,500 questionnaires were collected in different communities of the nine inhabited islands of the archipelago. The information will be analysed at the beginning of 2024 to map turtle meat trade, social profiles, and drivers. We will then design a large social behaviour change marketing campaign.

Also starting in 2023, in collaboration with the TUI Care Foundation and other turtle conservation NGOs from Greece, Turkey and Kenya, we are piloting new approaches to beachfront hotels and tourism businesses aimed at reducing their impact on nesting turtles and their habitats. We started to implement a Turtle Tourism Friendly Certification with two large resorts, located both on nesting beaches.

**F21AP02723 AWARD
FINAL REPORT YEAR 3**

ANNEXES



Figure 1 - Aerial image of the field camp and the hatchery at Costa Fragata Nature Reserve (also known as Kite Beach).



Figure 2 - Serra Negra beach, one of the most important nesting beaches of Cabo Verde, and the busiest nesting beach of Sal Island.



Figure 3 - Aerial view of part of the dunes of the Nature Reserve of Ponta Sinó with our main hatchery. Here the hatchery is split into two, one shaded and one unshaded, to compare sex-ratio production in different heat conditions.



Figure 4 - Hatchery at the community of Pedra de Lume.

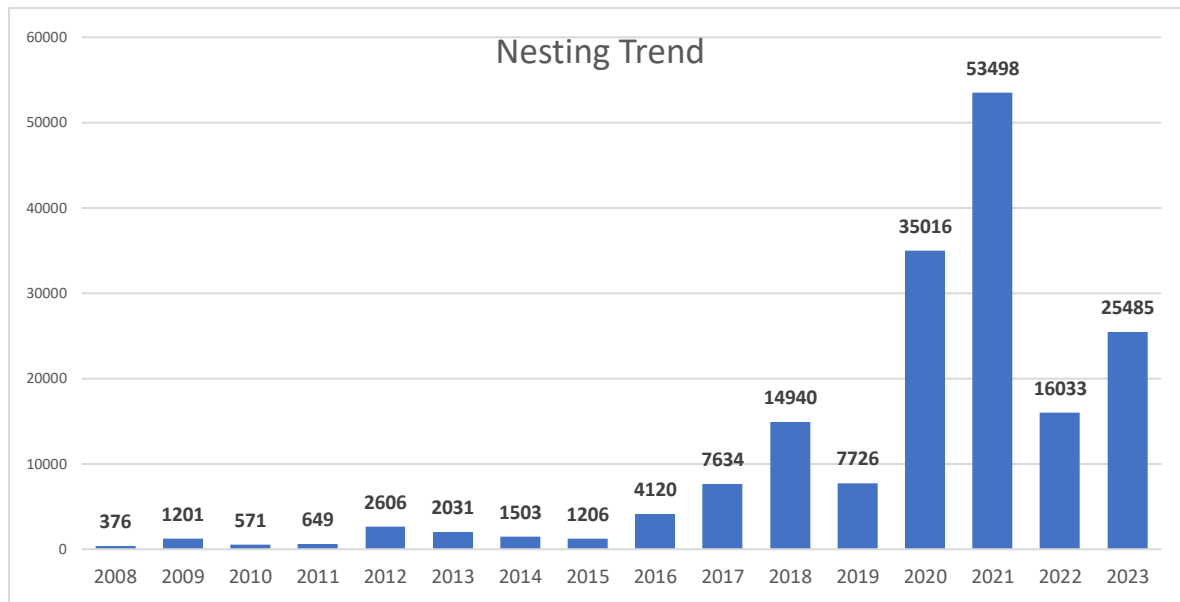


Figure 6 - Comparative graph of the number of nests per season in Sal Island (2008-2023). 2023 was the third highest year on record with 25,193 nests, an increase of 55% from the previous season.

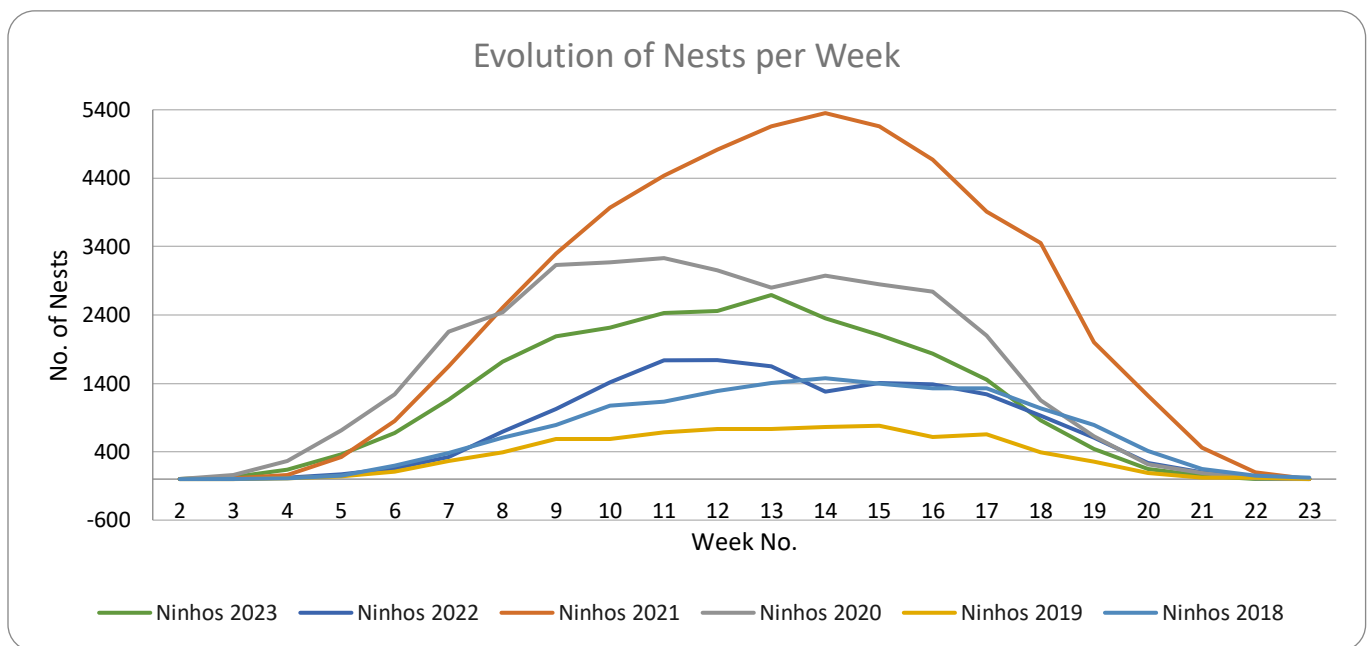


Figure 5 - Evolution of the number of nests per week from 2018-2023. Nests in 2023 showed a similar pattern to that of 2021 with there one peak in nesting in August.

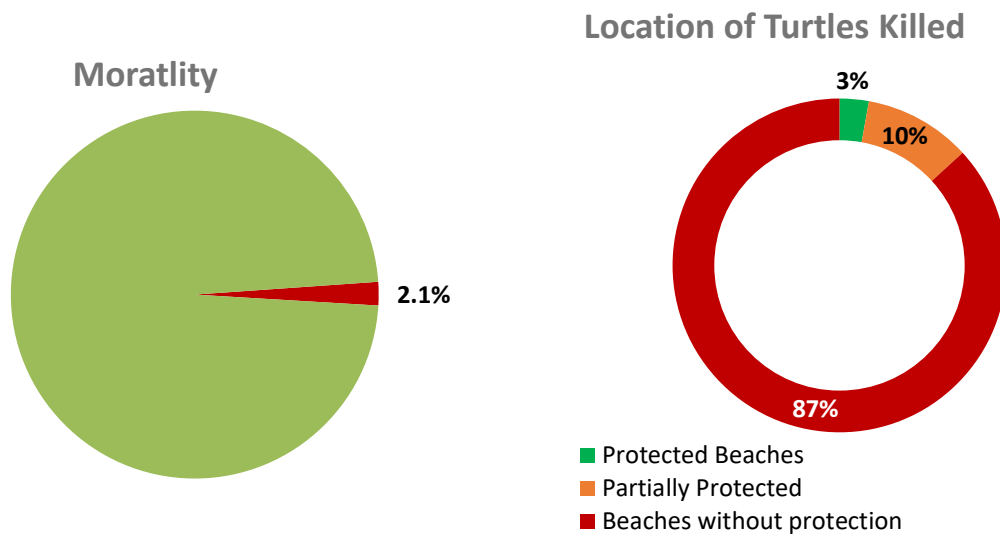


Figure 7 - In 2023, a total of 106 turtles were killed by poaching in Sal, a mortality rate of 2.1%. Of those, 13%, 14 turtles, were taking on beaches with full or partial protection.

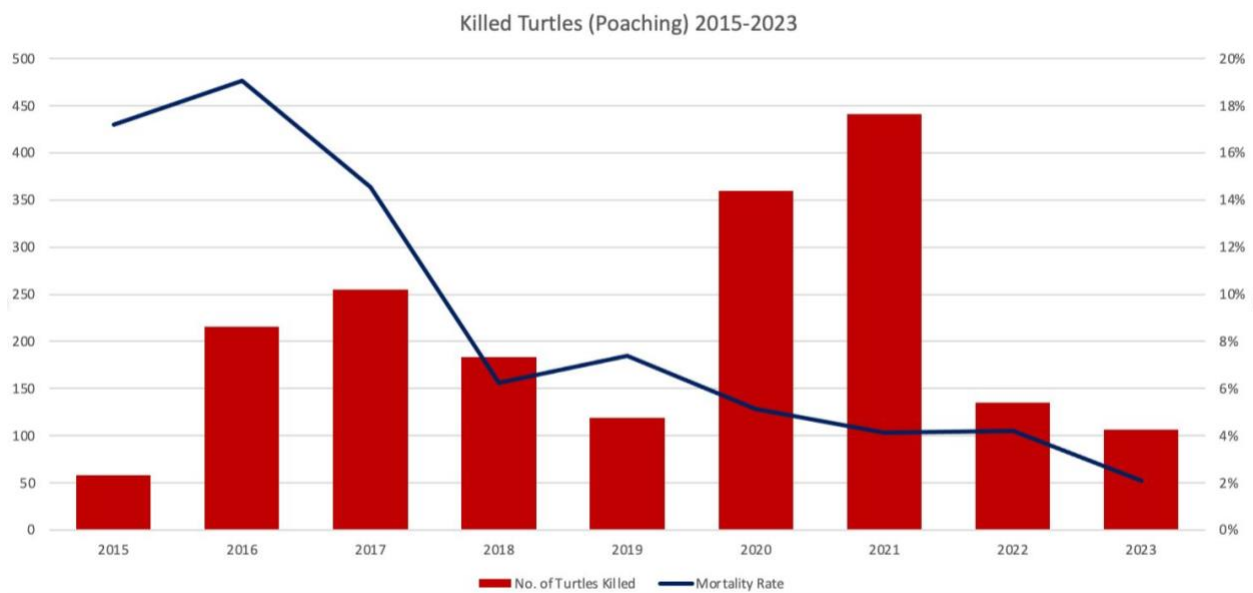


Figure 8 – Mortality rate (nº of turtles poached / estimated nº of nesting turtles) and total number of turtles killed in Sal from 2015-2023. Mortality has decreased from over 4,5% in 2015 to 2,1% in 2023.

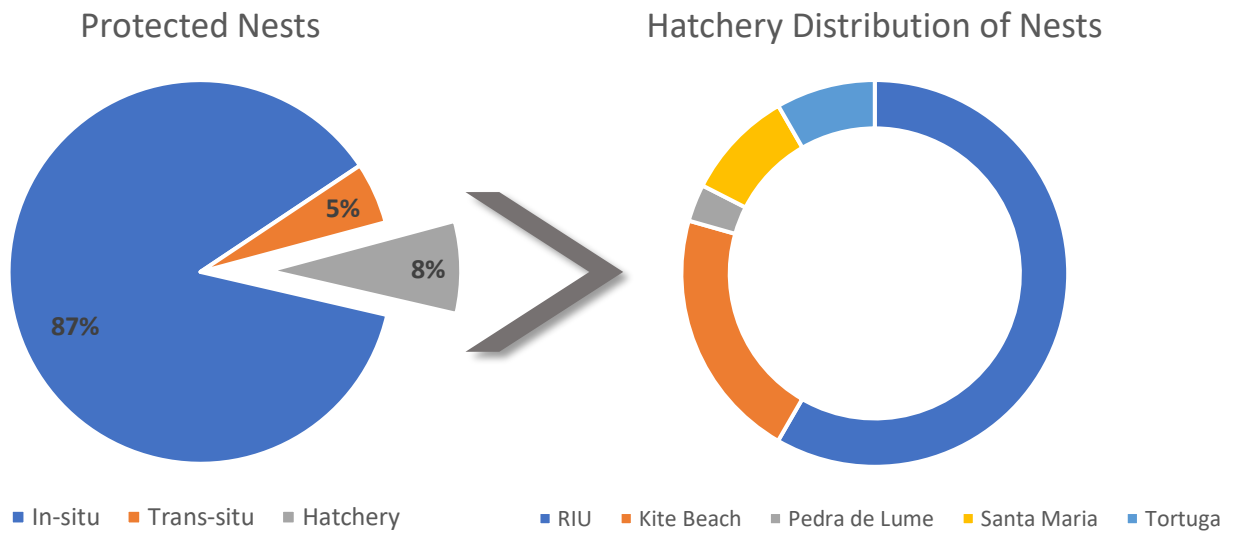


Fig. 1 87% of the total nests on Sal remained in their natural nesting site (In-situ), 5% were relocated to a safer place on the same or adjacent beach (Trans-situ) and 8% were relocated into one of five hatcheries with light pollution being the main motive for relocation.