

Currents of Change: Insights from Shark and Turtle Conservation in Costa Rica

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Introduction or Background

With the ocean covering over 71% of Earth's surface, it stands as the largest and most vital component of our planet, calling us to safeguard a dynamic part of the world we call home¹. Through my internship with Rich Coast Diving in Costa Rica, I participated in hands-on initiatives to contribute to the advancement of conservation research on key ocean species, such as hawksbill sea turtles and whitetip reef sharks.

Citizen science connects individuals to conservation efforts by collecting scientific data and promoting awareness. Through capture-recapture tagging and longitudinal data, the research being conducted can predict growth rates, maturity, and habitat changes over time².

Purpose and Objectives

Through SCUBA diving, I assisted Daniel and Randall Arauz in the collection of hawksbill sea turtles and whitetip reef shark tissue samples. Long-term “capture–recapture” turtle monitoring can track growth rates, health, habitat use, and residency patterns of hawksbills in the region. Whitetip reef shark tissue samples determine how connected or isolated Pacific reef shark populations are for better conservation strategies.

In addition to these data, we studied how citizen science projects engage local and international participants. These citizen science initiatives in Costa Rica demonstrated that hands-on participation not only generates critical ecological data on sharks and turtles but also creates a deep, lasting commitment to ocean conservation among local and international volunteers.

Methods or Procedures

Alongside their sea turtle research, I assisted with diver-led identification and tagging through citizen programs, which involved volunteer divers. To collect the hawksbill sea turtles, I guided citizen science expedition dives to locate these turtles. Randall and Daniel both possess permits from the government of Costa Rica that allow them to interact with the wildlife for the purposes of scientific research, so they had the rights to maintain contact with the turtles. When a diver would locate a turtle, Randall or Daniel would carefully secure it by its rear fins and shell. Then, I would control the underwater ascent of the researcher back to the surface.

Once at the surface, I established positive buoyancy for the researcher handling the turtle, and we gently brought the turtle onto the boat where we would check him for tags, weigh him, and measure the length of his carapace. On the boat, we keep a small bandana over the turtle's head and eyes to reduce his stress. If the turtle had a preexisting tag, we would check if it was relevant in our database, and we would update the body measurements to reflect the current date. If the turtle had not been tagged, we would place a small metal tag on its right rear flipper. The goal was to collect these data as efficiently as possible to reduce animal stress and minimize time out of the water.

Other data included tissue samples of whitetip reef sharks and spotted eagle rays. Tissue samples were collected using a modified pole spear equipped with a biopsy tip. The tip acts like a tiny cookie cutter that takes only a small layer of tissue from the shark's dorsal area, allowing

divers to obtain small tissue samples with minimal disturbance³. These samples are preserved and sent to the University of Costa Rica for genetic and isotopic analysis.

Alongside these quantitative data, I also collected qualitative data from interviews and conversations with marine biologists Randall and Daniel Arauz. I asked about the ethics of animal handling, and I was assured that with the strict government permits to perform research and the efforts to acknowledge and minimize animal stress through safety precautions and handling protocols, animal welfare is their top priority.

Results or Findings

Citizen participation directly contributed to data collection efforts that supported long-term monitoring. Collecting data for the hawksbill sea turtles and whitetip reef sharks is valuable to see positive change in ecosystems and long-term solutions. Randall said “These animals are turning into ambassadors for their species. They generate the information that’s needed so we can help save the population as a whole.”

Through the citizen science expeditions, volunteers increased their understanding of marine species’ behavior and threats. Local dive shops such as Rich Coast Diving act as access points connecting tourists to science and conservation. Citizen divers help collect data through non-invasive tasks and build global awareness and engagement.

In a two-week period of field collection, we collected 33 samples, including eight from turtles, nine from spotted eagle rays, and fourteen from whitetip reef sharks. Of these eight individual turtles brought back, four were recaptures and four were new records, which is evidence of site fidelity.

Conclusions and Recommendations, or Implications and Application

The species-specific insights showed whitetip reef sharks had possible isolated populations, and hawksbill sea turtles are showing site fidelity and growth tracking in the Eastern Pacific. Citizen science bridges the gap between scientific research and public understanding of marine conservation (Bonney et al., 2014). Daniel said, “people think they can’t help because they’re not scientists, but everyone can contribute to conservation.” Through his contribution to marine conservation with his father Randall, they are working to turn awareness into advocacy. Randall said that their work goes beyond data collection. Field work becomes peer-reviewed science, which informs policy change. Daniel said, “It’s not just collecting data. It’s understanding that every turtle or shark you work with represents an entire species you’re trying to protect.” They work to protect sharks and turtles by translating research into conservation laws and regulations⁴.

Citizen science helps people understand that ocean issues are interconnected. Through my participation with Randall and Daniel, with divers from around the world, and the extraordinary animals of the ocean, I understand first-hand how curiosity and compassion for the ocean can turn observers into protectors of marine life. If nearly 71% of our world is ocean, it is vital that we spend time investing in research across species and ecosystems to understand their interconnections and to protect the health of our planet.

References

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