Lost Years Project

Yields Surprises about Eastern Pacific Hawksbills

By Felipe Vallejo and Cristina Miranda

All sea turtles hatch on a beach somewhere in the world and "run" as quickly as they can to the ocean before a predator can eat them. Then, they are lost. Lost, that is, to the researchers trying to study their lives, who generally will not see them again until they return as juveniles and subadults to their foraging areas several years later. That gap of time is called the *lost years* and has proven to be a challenging life stage to study. New technologies, in particular smaller acoustic and satellite tags, are making it easier for researchers to chip away at this mysterious sea turtle life stage. And as we've begun to uncover the lost years of hawksbills in the eastern Pacific, we've found surprises at every step of the way.

From Conversation to Collaboration

In 2016, at the 36th Annual Sea Turtle Symposium, in Lima, Peru, the two of us learned about the existence of new acoustic transmitters that were so tiny they could be attached to newly hatched sea turtles. The small transmitters allow researchers to follow the turtles during their first movements in the ocean. We also began a dialogue with the nonprofit organization Upwell, which had been using the transmitters to study baby leatherback turtles. That dialogue evolved into a multiyear, multicountry project to decipher the lost years of the critically endangered eastern Pacific hawksbill turtle, a project that has begun to bear fruit.

Hawksbills are one of the most endangered sea turtle species globally. The eastern Pacific population, in particular, was thought to be extinct until just over a decade ago. Around 2007, researchers throughout the eastern Pacific began to discover previously unknown hawksbill nesting activity in several places, particularly Ecuador, where we work; El Salvador; and Nicaragua. Our shared interest in this poorly known population led to the first regional meeting of what later became ICAPO, the Eastern Pacific Hawksbill Initiative, which managed to unite more than 70 people and organizations with one unique objective: to bring the hawksbill back from the brink of extinction in the eastern Pacific region.

At that time, our organization, Equilibrio Azul, was doing what most sea turtle conservation organizations start off doing: nesting beach research and conservation. That is where organizations typically begin because it is both easier and cheaper to work on land, when nesting females come out of the water to nest, than it is to study and protect turtles at sea. But after more than a decade of nesting beach research and protection, we decided to embark on a new and more complicated challenge: our Lost Years Project.

Following Baby Turtles, Rain or Shine

After attaching acoustic transmitters made by Vemco/Innovasea that weigh less than 2 grams to the carapaces of hatchlings using tiny Velcro patches (a method developed by Upwell), we rowed our inflatable boat following 52 hawksbill hatchlings right after they left the beach. During two nesting seasons, we spent 12-hour days under the blazing hot sun and tropical rain, following along behind these beautiful babies. Our goal was to map their first swims and understand how they disperse from La Playita (inside Machalilla National Park, Manabí, Ecuador), our most important index nesting beach, where hawksbills lay an average of 30 nests per year.

At the same time, we placed drifters in the ocean to track the local ocean currents and compare their movements with those of the hatchlings. The individual turtle tracks that we were able to record through that work lasted from two to eight hours, and they represented movements ranging from only a few meters to as much as 2 kilometers (1.2 miles) from the original release site. As we tracked more individuals, we came face to face with our first surprise: The hatchlings were actively swimming with a defined and similar bearing, not simply being carried by the currents as we had expected.

To learn where newly hatched hawksbill turtles travel, researchers in Ecuador fitted hatchlings with acoustic transmitters and followed them to record their movements. © Equilibrio Azul; **AT LEFT:** The availability of smaller satellite tags enabled new research on neonate hawksbill turtles in Ecuador, yielding surprises about the turtles' lost years. © Equilibrio Azul

Another coincidence, or just a stroke of plain luck, took place soon after. About 10 months earlier, while excavating two nests at La Playita, we had a few hatchlings in the nest that were too weak to get to the ocean. Because this population of hawksbills is so endangered, we took them to the local marine life rehabilitation center to grow and gain strength. While still rowing behind the final hatchlings from our first phase, we learned that those turtles were still at the rehabilitation center, yet to be released. Though they were now neonates and larger than the hatchlings we were studying, we assumed that they were still too small to equip with satellite transmitters. But as it turned out, newly developed satellite tags by Wildlife Computers could indeed be fitted to those young hawksbills. And unlike the acoustic transmitters we were using, the satellite transmitters would not require us to follow along in a boat to receive their transmissions, meaning that we could track the young turtles for much longer and farther than we were previously able.

Tiny Satellite Tags Unlock New Knowledge

We have now attached a total of six small satellite transmitters to neonate hawksbills (less than a year old), and the surprises keep coming. Judging from what we had already learned from tracking adult female hawksbills, we assumed that this population did not travel far, staying close to their breeding grounds even when not reproducing. But these turtles have shown us that just when you think you may know the whole picture, nature can still surprise you.

As soon as the satellite-tagged neonates were released (from the furthest location that the hatchlings took us), they gathered a bearing and began swimming north following the coast of South America. One of them, Julián, visited the waters of four countries—Ecuador, Colombia, Panama, and Costa Rica—traveling more than 2,000 kilometers (1,240 miles) and debunking our belief that these animals don't travel far. Moreover, previous genetic analysis had determined that the Ecuadorian hawksbill population does not mix with the populations up north, so the movements of these animals into waters shared with other populations has opened new questions for us to explore.

Collaborations Expand beyond Ecuador

As we began to share news about the preliminary results of our Lost Years Project, we were contacted by a team at ProCosta and ICAPO in El Salvador that was interested in undertaking similar research. So we traveled to El Salvador to beautiful Bahía de Jiquilisco—the place that likely receives the most hawksbill nests annually in the eastern Pacific. There we helped launch a similar project that is studying the dispersal and migrations of neonate hawksbills in that part of Central America, where a different ecosystem—mangrove estuaries—has begun to yield even more surprises.

Studies of the hawksbill's lost years are still ongoing in both Ecuador and El Salvador and have involved participation or sponsorship by Equilibrio Azul, Upwell, ICAPO, ProCosta, NOAA (the National Oceanic and Atmospheric Administration), Wild Earth Allies, the National Fish and Wildlife Foundation, Machalilla National Park, and the Ministry of Environment of Ecuador. We are preparing to publish our findings soon and look forward to sharing more complete results. In the meantime, one thing is certain: Eastern Pacific hawksbills will continue to surprise us every step of the way. •