



PROJECT LAUT



**HAWSKBILL TURTLE CONSERVATION
INFO BROCHURE**

January 2023

203 TURTLES IDENTIFIED



Project Laut has been identifying Hawksbill sea turtles since August, 2021. As of now, we have identified 203 individual turtles and logged over 400 sightings across the Nusa islands.

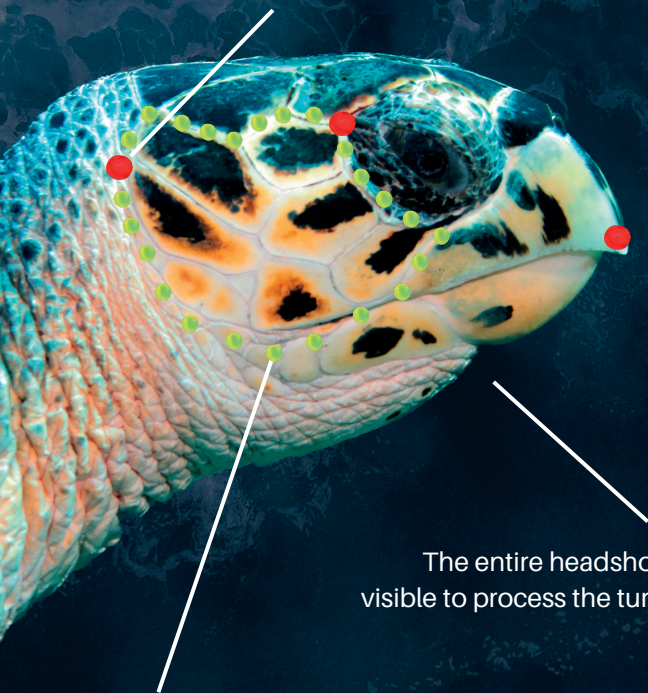
Batumulapan - located on the eastern side of Penida - has been our top turtle hotspot, followed by Pura Ped & Sental on the north.



TOTAL SIGHTINGS: 408

HAWKSBILL TURTLE IDENTIFICATION

(1) The first markings are reference points for the software to understand the orientation of the head. Three reference points are needed: Tip of the beak, back edge of the eye, and the end of the facial scutes



The entire headshot of the turtle has to be visible to process the turtle through the pattern recognition software

(2) Once the reference points are created, the facial scutes are outlined as shown in the image. Exclude the scutes of the bottom jaw and any scutes beginning above the top edge of the eye. Exclude the beak & any markings on the beak.

Hawksbill sea turtle individuals can be identified by the scute pattern on the sides of their head. Together, the pattern on the left and right side form a unique fingerprint. The pattern can get worn at times, and slight changes can occur over time, but the overall geometry remains the same throughout their life cycle.

Using non-invasive photography methods, we are able to reliably generate high-quality shots of the left & right side of the turtle's head. Once these images are produced, we run them through a pattern recognition software that compares the image to all previously generated images.

We then go through the top 50 most similar scute patterns manually before logging the turtle as a re-sighting or a new individual.



OUR RESIDENT TURTLES



408 TOTAL SIGHTINGS
115 SINGLE SIGHTINGS
20 RESIDENT TURTLES

NP0048 GIUSEPPE **RESIDENT PURA PED - SENTAL**

Of the turtles we have identified, there have been 20 that we have identified as residents. This means they were sighted & logged on 5 separate months throughout the study period.

By investigating the occurrence rates of resident and single-sighting turtles, we can begin to understand the role the coral reef ecosystem plays within the life cycle of the turtle. Through long-term photo-identification, we can understand how many turtles call Penida home, how long on average they remain before continuing on, and we can also see if & when they return.

In the future, it will be possible to take accurate measurements of the turtle's carapaces and get a more accurate estimate of the life stage of the turtles that frequent Penida. From what we have seen so far in our study using the eye test, most turtles seem to be in the sub-adult phase, with only a few being large breeding individuals.



NP0055 GANDALF **RESIDENT KARANG SARI**



RESIDENTS: 10%
SINGLE SIGHTINGS: 56%
REPEAT SIGHTINGS: 34%

GUIDELINE FOR TURTLE ID DIVES

When generating the turtle ID shots, there are some guidelines & recommendations that can help make sure the data is of high enough standard to be used in the database.

✚ You want to be using a GoPro 7 Black or higher. When shooting with your GoPro, you want to be using the highest resolution possible, and have the lens setting to linear to avoid distortion.

✚ You want to approach the turtle in a calm and slow manner. How you initiate the approach will drastically affect the ability to generate a high-quality video. If you move too quickly or aggressively, the turtle will be spooked and no data will be generated.

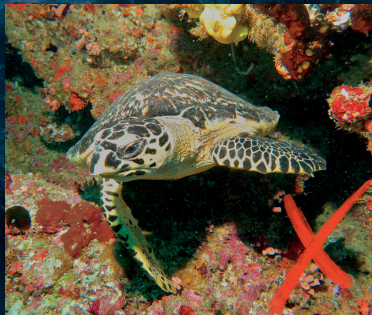
✚ Once you are within 3 meters of the turtle, begin filming and do not stop the video until the entire process is complete.

✚ Try to position the GoPro no more than 1 meter away from the side of the face, and keep the angle to an absolute minimum. You want the full turtle headshot, beak included, so make sure it is centered.

✚ Once you are confident that you have a good still-frame of one side of the turtle, you will want to switch to the next side. But this is where it can get tricky. If you get too close or disappear from view the turtle can become frightened. It is recommended to elevate yourself over the turtle leaving at least 1 meter between it & you, and arc over the turtle until you have arrived at the opposite side.

✚ Once here, generate the 2nd ID shot using the same parameters as before. If you are confident both sides have been obtained, direct the GoPro towards your dive computer so your depth and time are displayed clearly. End the video and continue the dive as normal.

TOO FAR



TOO ANGLED



Larger turtles will be less frightened and more easily ID'd. The smaller the turtle, the more it will be fearful of you. Dealing with a small turtle, it is especially important to move in a non-threatening and calm fashion. If the turtle begins to swim away, it is still possible to generate the ID shot, but it will be much more difficult.

Turtles, once frightened, will keep you in their sights at all cost, so you will have one side available to film; however, to get the turtle to show its other side can be difficult at this point. The best methods we have found so far are:

- Stop the chase & hope as the turtle moves away it may switch which side it is watching you from, then follow it to get the other side
- As it is swimming in a circle keeping you in its sights, try to elevate yourself overtop so the turtle is forced to change the position of its head to keep you in sight

PERFECT SHOT



A CRITICALLY ENDANGERED SPECIES

Bycatch is defined as the accidental capture of a species by fisheries while targeting other commercial species. This can be done while actively fishing, or often results from discarded fishing gear such as nets, lines, and hooks.

Hawksbills often become entangled in nets or ingest lines & hooks and unless a timely intervention is made, these turtles likely will die.

Nets and hooks can also lead to injuries to the eyes, flippers, throats or tails of the turtles and can leave them debilitated for life.

Plastic pollution is another major cause of mortality in Hawksbill sea turtles and comes in two forms, macro and micro.

Macro plastic pollution, such as shopping bags or straws, can be ingested mistakenly by the turtles. When this happens, the plastic cannot pass through the digestive tract and remains in the stomach. This is especially dangerous as this plastic reduces the space available for regular food and also can reduce absorption of nutrients. After enough plastic is ingested, the individual will die from starvation.

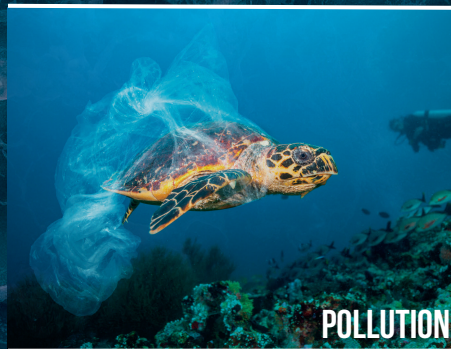
Microplastics are more sinister and don't cause death immediately. However, as they slowly bioaccumulate in the sea turtle's body, they can cause hormonal disruption and can render the turtle more susceptible to disease & predation.

The final major pressure facing Hawksbill today is poaching.

Hawksbills are hunted around the world for a variety of reasons. Their eggs are stolen from nests as a food source, their meat is consumed, their blubber is processed into oils and their hide is used for leather.

But those pressures pale in the face of the exploitation of the Hawksbill turtle shell.

The Hawksbill has the most prized of all sea turtle shells. Because of this, Hawksbill sea turtles have been hunted to near extinction, with many fisheries still operating today. Once harvested, the shell or carapace, can be processed into all manner of trinkets, ranging from hair clips and sunglasses, to tables and dressers.



BALI & SEA TURTLE TRADE

In the years 1969-1999, before turtles were officially protected, an estimated 19,628-30,121 animals were collected per year.



Bali was probably the centre of the largest domestic exploitation of sea turtles in the world, as well as being the leading exporter of sea turtle products

Ornamental Hawksbill Shells and trinkets are still being sold in Souvenir Shops in Bali