

SPOTLIGHTING
KONSERVASI
INDONESIA

STAR PROJECT
THAILAND
TAKES SHAPE

VET TRAINING
WITH OCEAN PARK
HONG KONG

the ReSharker

INTERNAL COMMUNICATIONS · AUGUST 2024



ReShark



An international, collective effort
to recover threatened sharks
and rays around the world

ACTIVE PROJECTS



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Nesha Ichida (Co-Chair)
Abraham Sianipar
Dr. Alistair Dove
Dr. Caitlin Hadfield
Dr. Christine Dudgeon
Leah Neal
Dr. Mark Erdmann
May Metavee Chuangcharoendee
Mochamad Iqbal Herwata

COVER

RARCC aquarist Maryrose Tapilatu releases Marshal into the sea pen, where she continued maturing and adapting to the environment before being released into the wild. Photo by Nathaniel Soon.

EDITOR

Nathaniel Soon

PHOTOGRAPHY

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GET IN TOUCH

media@reshark.org
recruitment@reshark.org

RESHARK COUNCIL

Abraham Sianipar
Dr. Erin Meyer
Hap Fatzinger
Dr. Lisa Hoopes
Dr. Mark Erdmann
Dr. Rima Jabado

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**FROM IDEATION TO
IMPLEMENTATION:
SPOTLIGHTING
KONSERVASI INDONESIA**

The journey to get leopard sharks nationally protected in Indonesia has begun — find out what it is going to take



One of the most crucial elements that Konservasi Indonesia brings to our coalition is our long history working in Raja Ampat and our positive relations with local and national government agencies which we can leverage on. Our reciprocal trust with the government, who are often the linchpin in any in-country execution, is hard to come by and hence vital to maintain.

Mochamad Iqbal Herwata

Focal Species Conservation Senior Manager, Konservasi Indonesia
StAR Project Steering Committee



Representatives from local and national government agencies, academia, conservation organizations and businesses gather in Depok on May 20, 2024 for a workshop to initiate the protection of leopard sharks in Indonesia

BEFORE LEOPARD SHARKS CAME WALKING SHARKS

Fondly known as walking sharks due to their notable ability to use their pectoral and pelvic fins to 'walk' across reef and seagrass habitats, the genus *Hemiscyllium* comprises nine recognized species of small, nocturnally-active sharks. These epaulette sharks are endemic to the shallow coastal environments in the Sahul region of the Indo-Australian archipelago, with each species occupying adjacent, non-overlapping distributions around New Guinea, northern Australia, and the satellite islands west of New Guinea, including the Raja Ampat archipelago, Halmahera, and Aru. Six of these nine species have been recorded in Indonesian waters.

These sharks are unique in more ways than one. They are currently the most recently evolved group of sharks with the genus *Hemiscyllium* arising only nine million years ago, a mere stride in evolutionary time. Their limited ranges are also a stand-out. As Conservation International's Dr. Mark Erdmann explains, "To have a shark species that is found only in one relatively small bay is unheard of in shark biogeography."

Species with such limited ranges are more vulnerable to localized threats such as diseases and overfishing, which could wipe them out in entirety. Their perilous reality is exacerbated by rising ocean temperatures and the decimation of critical habitats where walking sharks live and hunt for food, coupled with their inability to migrate over deep waters and long distances.

"Walking sharks tend to spend their entire lives on the same reef. When that gets degraded, they have nowhere else to go," Mochamad Iqbal Herwata points out. The need for stringent protection of Indonesia's walking sharks quickly became apparent.

Enter [Konservasi Indonesia \(KI\)](#) — as the local affiliate of Conservation International, KI has long been working toward the sustainable development and protection of critical ecosystems in Indonesia. Presently leading KI's [Focal Species Conservation Program](#) is Iqbal, who is part of the StAR Project Steering Committee. Back in 2022, his team sprung into action, leading the push for the protection of walking sharks at a national level.

What would encompass a long and often tedious process is started with an 'initiative proposal', and followed by five other broad steps laid out in [35/PERMEN-KP/2013](#), a regulation issued by Indonesia's Ministry of Marine Affairs and Fisheries (MMAF) or Kementerian Kelautan dan Perikanan Republik Indonesia (KKP).

On June 7, 2022, KI brought together key stakeholders for an expert workshop to initiate the protection of walking sharks in Indonesia. A resulting report was submitted to the Minister of Marine Affairs and Fisheries on Aug. 2, 2022. This was followed by public consultation and further scientific recommendations by Indonesia's National Research and Innovation Agency (BRIN). Later on, KI assisted the government in the formulation of a national action plan for walking shark conservation and identification of habitats for protection.

“Indonesia declares walking sharks as protected species,” the national headlines would soon read, following the stipulation of [Ministerial Decree No. 30/2023](#) on Jan. 30, 2023 by MMAF, and a culmination of years of effort by KI and partners. Responding to the good news, Iqbal expressed hope that “walking sharks will be ambassadors for the conservation of their toothier cousins”.

Fast forward to over a year later and thanks in large part to the implementation of the StAR Project in Raja Ampat, leopard sharks (*Stegostoma tigrinum*) now occupy a similar spotlight.





Hiu Appendik CITES



Karang Hias



Hiu Berjalan



Sidat



Duyung



Banggai Cardinal Fish



Teripang



Bilih



Bambu Laut dan Akar Bahar



Terubuk



Pari Appendix CITES



Hiu Paus



Arwana



Belida



Napoleon



Pari Perlindungan Penuh



Cetacean



Kima dan Lola



Penyu



Kuda Laut

20 groups of or individual species designated as national priorities by MMAF for the 2020-2024 period

Roadmap Spesies Prioritas Perlindungan & Pelestarian Jenis Ikan 2020 – 2024



Roadmap for priority fish species protection for 2020-2024, from MMAF

ROADMAP FOR PRIORITY SPECIES PROTECTION

Guiding MMAF's work in species protection is a national priority species conservation roadmap. Walking sharks were selected as one of 20 groups of or individual species designated as national priorities for the 2020-2024 rendition. Others included sea turtles (comprising six species), the Napoleon wrasse (*Cheilinus undulatus*), as well as 13 species of seahorses.

Specific management targets were set out for each group and based on a range of factors, categorically assigned various periods of attention. These management targets varied, but for most of the taxa that had yet to be protected on a national level, that was set out as the main priority.

Based on recommendations from BRIN, two types of national protection status can be granted – 'partially protected' (*dilindungi terbatas*) perhaps seasonally or geographically or 'fully protected' (*dilindungi penuh*) – which was what the walking sharks received. Several other marine species, such as *Isis hippuris* (*bamboo coral*) and the near-threatened *Tenualosa macrura* (*longtail shad*), were also successfully protected.

As the next cycle (2025-2029) fast approaches, it is of paramount importance that leopard sharks are included in the new priority species roadmap, which will expedite the process of attaining national protection status. While still undetermined, work has already begun, starting with the first step – an initiation workshop recently held in Depok, just south of Jakarta.

INITIATING THE PROTECTION OF LEOPARD SHARKS IN INDONESIA

On May 20, 2024, representatives from local and national government agencies, academia, conservation organizations, and businesses gathered for a workshop aimed at initiating the protection of *Stegostoma tigrinum* in Indonesia.

Support was bolstered by the attendance of a delegation from MMAF, who jointly organized the workshop with KI, along with key experts, including the StAR Project Steering Committee's Dr. Christine Dudgeon (Senior Research Fellow at the University of the Sunshine Coast and The University of Queensland) and Dr. Fahmi (Senior Researcher at BRIN). The global conservation status assessment for leopard sharks was first presented by Dudgeon, who is also the Oceania regional co-vice chair for the IUCN SSC Shark Specialist Group (SSG). This was followed by a deeper dive into the population status of the species in Indonesia by Fahmi, who also serves as the Asia regional co-vice chair for the SSG. Insights on trade data, protection policy and specific recommendations by various speakers were next on the agenda.

After wide-ranging and constructive exchanges, the workshop culminated in attendees signing a collective agreement. This agreement, which forms the basis of support for species protection, will be included as an appendix to a larger scientific proposal consolidated and published by KI, following the workshop. This would mark the end of the first step, and pave the way for subsequent public consultation, policy analysis, and further scientific recommendations.

The signing of the collective agreement in Depok calls for celebration, but it is also a drop in the ocean of work that has led up to this point. Much of the progress thus far has been catalyzed by the success of the StAR Project and the tireless dedication of the Indonesian Implementation Working Group. Chaired by Head of the West Papua Province Regional Research and Innovation Agency (BRIDA), Prof. Charlie Heatubun, the Working Group is made up of representatives from various local partners including BRIDA, BRIN, KI, Thrive Conservation, RARCC, and Misool Foundation. From managing the acquisition of various permits and ensuring smooth imports of the eggs, release of pups and research work to all forms of logistical coordination, the Working Group spearheads all things in-country.



Sharing insights on leopard shark trade data, protection policy and recommendations



Pingkan Roeroe signing the agreement on behalf of the Fish Species Protection and Preservation Team, Directorate General of Marine Space Management, KKP



Dr. Christine Dudgeon and Prof. Charlie Heatubun present a joint keynote on the StAR Project during the 4th Indonesia Sharks and Rays Symposium, following the expert workshop

Stegostoma tigrinum
 Ikan hiu belang, Indo Pasifik, Lisipato Shark, Zofira shark

- Indian-Ocean and West Pacific
- >2.5m TL
- Oviparous, hatch out >20cm TL, 40-80 eggs/year
- Mature ~7 years
- Oldest in wild >30 years, oldest in aquarium >40 years
- Eat mollusks, crustaceans, small benthic fish

4th INDONESIA SHARKS AND RAYS SYMPOSIUM 2024
 21-22 May 2024 | FMIPA Universitas Indonesia, Depok
 Science Techno Park

Critical Habitats for Sharks and Rays
 Managing Emerging Challenges, Population Recovery, and Conservation Strategies in Multiple Dimensions



Prof. Charlie Heatubun, George Yarangga (Acting Mayor of Sorong), Meizani Irmadhiany (Senior Vice President & Executive Chair of Konservasi Indonesia) and Dr. Erin Meyer (left to right) at the launch of the StAR Project, Nov. 2022



KI staff assisting with the release of Mali in Misool



Meity Mongdong, Nesha Ichida, Dr. Erin Meyer, Harrison Ford, Dr. Mark Erdmann, Iqbal Herwata and Prof. Charlie Heatubun (left to right) witnessing the first zebra shark releases



SPOTLIGHTING KONSERVASI INDONESIA

As nascent as the StAR Project still is, the roles of each partner remains ever dynamic yet always complementary. “While our staff, such as our Bird’s Head Seascape Shark Science and Management Coordinator Abdi Hasan, do regularly assist with things like egg shipments and post-release monitoring, KI primarily manages relations with multiple levels of government to not only ensure strong local ownership of the StAR Project but also sustained national-level support,” Iqbal explains. “One of the most crucial elements that KI brings to our coalition is our long history working in Raja Ampat and our positive relations with local and national government agencies which we can leverage on. Our reciprocal trust with the government, who are often the kingpin in any in-country execution, is hard to come by and hence vital to maintain.”

BRIDA was brought on board in the early stages as the lead government agency for the StAR Project’s work in Indonesia.

This important partnership was fronted by Iqbal and his predecessor Abraham Sianipar (who now leads Elasmobranch Institute Indonesia and is part of the ReShark Council).

“From the get-go, we were deliberate in engaging Prof. Charlie and his team, the Governor of West Papua, as well as other stakeholders such as the special staff to the President of the Republic of Indonesia, and representatives from various departments of MMAF at the maiden high-level meeting in May 2021 and later on at the gala launching ceremony in Nov. 2022, which included a tour of our RARCC nursery at Kri Island,” Iqbal shares.

“Our partnership with the government is in fact a virtuous circle – prior to the StAR Project, the state of leopard sharks in Indonesia was hardly at the forefront of anyone’s minds. We brought it to the government’s attention. In turn, they appreciated the importance of the project and helped to elevate the species into a conservation icon. We are once again working with them to build on the StAR Project’s momentum and secure national protection for the threatened species.”

Indeed, the progress of the StAR Project in Raja Ampat, a region with well-established Marine Protected Areas offering full protection for sharks and rays, begs the question – what is the point of rewilding if the species is not accorded similar levels of protection nationwide?

In reality, leopard sharks are still being fished out in significant numbers from places like neighboring Fak Fak and Kaimana. According to trafficking data obtained by the Serang Coastal and Marine Resources Management Agency (LPSPL) and presented by Santoso Audi Widiarto, exports of leopard sharks have proliferated since 2021. That year, 26 live animals and 3,513.9kg of dried skin were exported from Indonesia. In 2023, 98 live animals and a whopping 10,503.2kg of dried skin (which roughly translates to more than 4,000 animals) were exported. It remains unclear what the specific locations and genetic origins of these animals are.

Looking ahead, if a law to fully protect the species is passed, there will surely be tangible effects. Indonesia's 2014 legislation ([4/KEPMEN-KP/2014](#)), which fully protects oceanic and reef manta rays, is a case in point.

Fishing of the animals throughout Indonesia was immediately banned, effectively establishing the world's largest manta ray sanctuary. Even places like Lamakera which had longstanding manta-hunting traditions saw a drastic reduction of catch. By 2018, existing supply chains of manta products were significantly broken and overall manta catch in Lamakera had fallen by 91.7%, as reported by [Misool Foundation](#).

National protection of leopard sharks, which have [likely become locally extinct throughout much of Indonesia](#), is the final piece of the puzzle in guaranteeing maximum efficacy of the StAR Project's recovery efforts in Raja Ampat and beyond.

"The StAR Project, which sets a high bar through our stringent and credible selection criteria, protocol and post-release monitoring, has been and will continue to be a good avenue for KI to familiarize the concept of rewilding with the government," Iqbal emphasizes. "Whether we are thinking of the next species or location for rewilding, I do foresee the need to adopt parallel actions of project implementation as well as policy push, like what we're currently doing with the StAR Project, to be successful."



A sample of dried exported leopard shark skin obtained by the Serang Coastal and Marine Resources Management Agency (LPSPL)



Aerial view over Wayag Lagoon — the site where Audrey, Charlie and Kathlyn were released



STAR PROJECT THAILAND TAKES SHAPE

*Expanding the StAR Project beyond Indonesia —
how our new team in Thailand is getting things going*



Taking the stage at the Thailand Dive Expo to present about leopard shark conservation and citizen science opportunities in Thailand



How to...
The...
identification
body and dor...
leopard shark
photo captur...

ถึงแม้ว่าบริเวณข้าง
กระโดงหลังจะเป็น
ในการระบุฉลามเสือ
เข้าใจพฤติกรรมแล
ดาวมากที่สุด เรายัง
ว่าจะเก่า จะใหม่



by **MAY METAVEE CHUANGCHAROENDEE**
Program Manager for StAR Project Thailand, WildAid & Thai Sharks and Rays



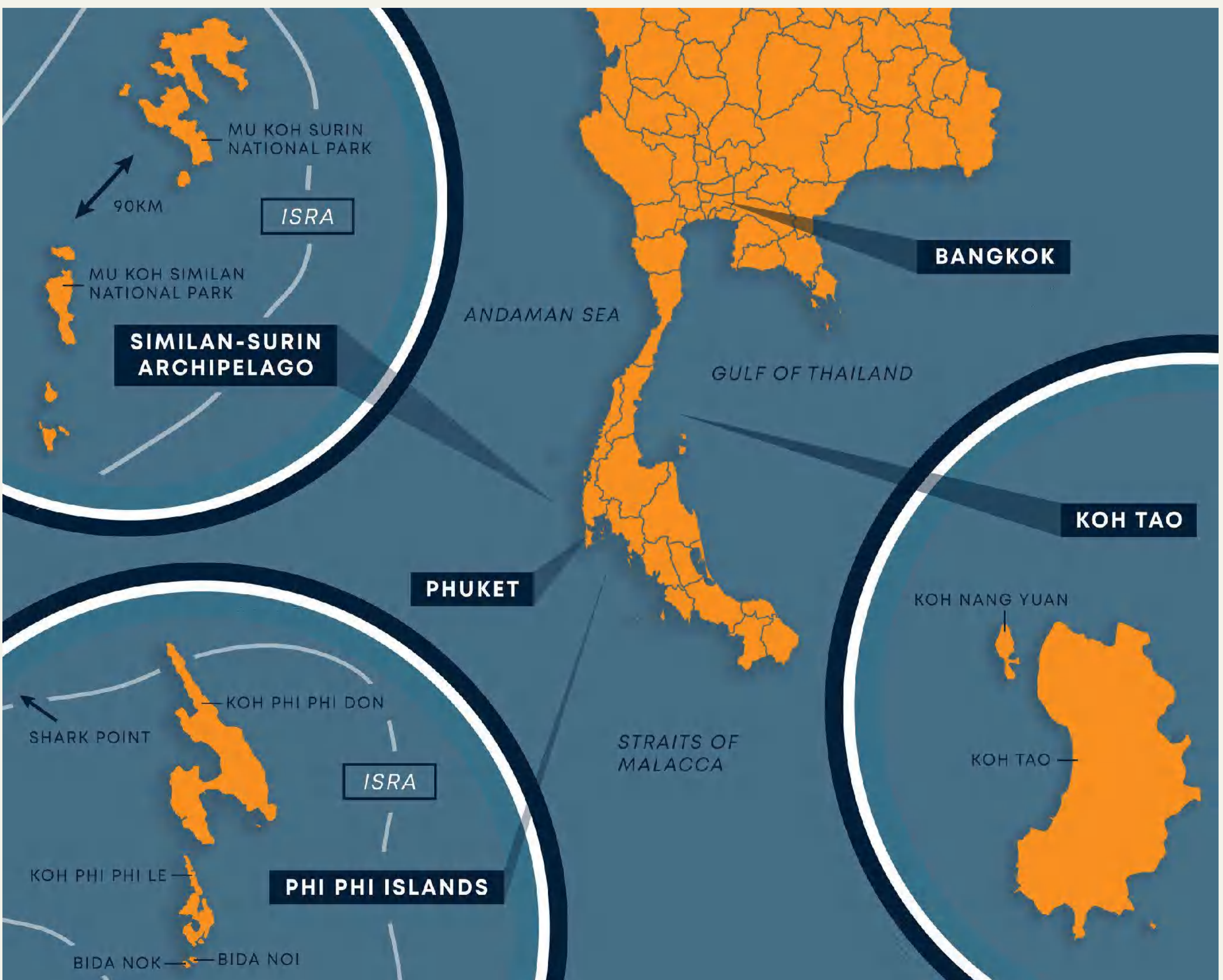
LEOPARD SHARKS IN THAILAND

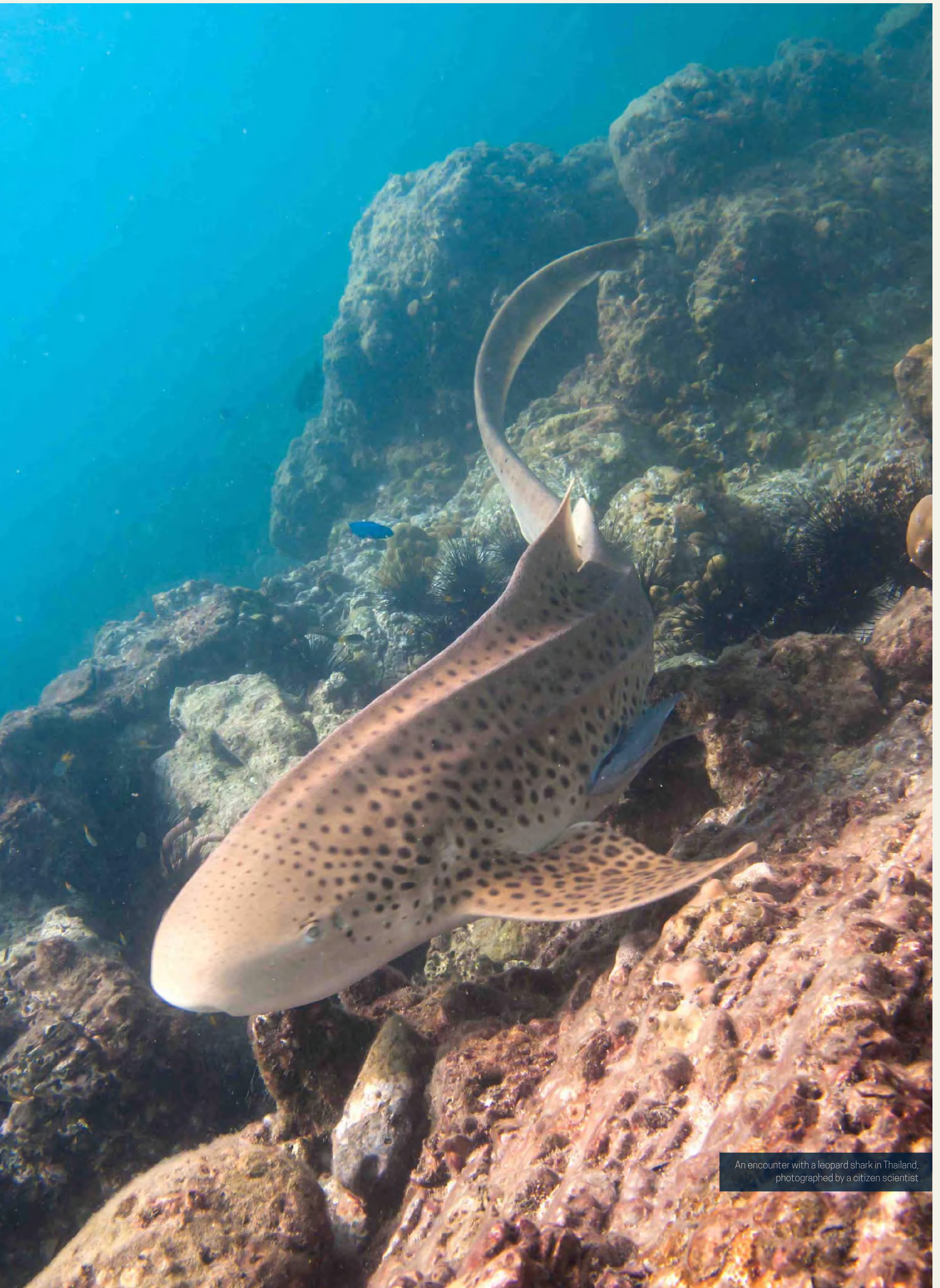
Thailand is famous worldwide for its tourism, a sector that contributed approximately 11-12% of the country's annual GDP before the COVID-19 pandemic. The pristine natural environment is crucial for sustaining tourism revenue, with sharks being among the iconic species that attract visitors globally.

Of notable appeal are Thailand's many diverse dive sites. Among the various shark species encountered, leopard sharks are particularly emblematic to both locals and visitors. However, anecdotal reports from the diving community indicate a significant decline in leopard shark sightings in Thai waters over recent decades.

Sites like Shark Point near the Phi Phi Islands as well as around the Similan Islands, where divers once had a 70-90% chance of seeing a leopard shark more than 10 years ago, now offer only a slim chance of encountering one. Koh Tao, once known for reliable leopard shark sightings, has reported none in the past decade, suggesting a possible local extinction of the species in the wider Gulf of Thailand.

Although sharks in Thailand are generally caught as bycatch, seasonal shark fisheries operating longlines across the country continue to pose a serious threat. According to landing statistics from the Ministry of Agriculture and Cooperatives' Department of Fisheries (DOF), the number of sharks caught has dropped by 90% over the last decade, indicating a sharp decline in the native shark population.





An encounter with a leopard shark in Thailand, photographed by a citizen scientist



CONSERVATION OF LEOPARD SHARKS GATHERS PACE

While many shark hotspots are currently protected through the [National Parks Act](#), [Act on the Promotion of Marine and Coastal Resources Management](#), and [Enhancement and Conservation of National Environmental Quality Act](#), recent surveys suggest that shark populations in Thailand remain critically low.

This decline has prompted the Thai government to propose listing several shark species under the [Wildlife Conservation and Protection Act](#). Currently, only whale sharks, manta rays, and sawfish are protected nationally. With local shark research and monitoring efforts still limited — consisting mainly of annual landing surveys by DOF and occasional citizen science reports collected by the Ministry of Natural Resources and Environment's Department of Marine and Coastal Resources (DMCR) — there is a pressing need for comprehensive research to support species protection.

On May 21, 2024, the Thai government announced that leopard sharks, along with four species of hammerhead sharks, had passed the initial approval stage to be added to the list of protected species under the Wildlife Conservation and Protection Act. The amendment is now undergoing the legal process to be officially gazetted, marking a momentous step forward for leopard shark conservation in Thailand.

Following an [expert workshop in Bali](#) in January, the IUCN SSC Shark Specialist Group published a [regional compendium of Important Shark and Ray Areas \(ISRAs\) for Asia](#). Detailed information on shark and ray data, research, and monitoring from each country's focal points were gathered. Shark and ray hotspots throughout the region that met specific criteria were also approved and designated as ISRAs. Out of the six ISRAs in Thailand, two in particular were designated in part due to leopard shark sightings — the [Phi Phi Islands ISRA](#) and the [Similan-Surin Archipelago ISRA](#) — a testament to the ongoing conservation efforts of the species.



The StAR Project is a wonderful continuation of WildAid's commitment to promoting shark conservation in Thailand. After a successful campaign aimed at reducing the demand for shark fin consumption, site-based conservation of threatened shark species like the leopard shark will provide a concrete example of how we can protect and restore shark populations in our waters.

Dr. Petch Manopawitr
Technical Advisor, WildAid

CITIZEN SCIENCE AND LAUNCHING StAR PROJECT THAILAND

The [Spot the Leopard Shark \(STLS\)](#) initiative, founded by Dr. Christine Dudgeon and Dr. Kongkiat Kitiwattanawong (Phuket Marine Biological Center), aims to assess leopard shark populations in Thailand through photo-identification. Since its inception in 2013, the project has identified 230 unique individuals from the west coast of Thailand, providing critical data for our ISRA proposals and longer-term research.

However, this initiative came to a standstill as the COVID-19 pandemic swept across the globe and lockdowns kept us all home.

In 2022, Montse Amores from Ocean Blue Tree (OBT) proposed reviving STLS and establishing StAR Project Thailand, funded by an OBT grant. The team, including Shin Sirachai Arunrugstichai from Thai Sharks and Rays and Dr. Petch Manopawitr, an experienced conservation scientist and technical advisor to WildAid, agreed on the need for this repopulation effort. I was appointed as the Program Manager under WildAid, working closely with Program Director Nuch Nuthatai Chotechuang and the WildAid Thailand team.



Dr. Kongkiat Kitiwattanawong (left) and Dr. Christine Dudgeon (right) in 2014



Attendees at TDEX stop by the Spot the Leopard Shark booth



Nancy Gibson, Sirachai Arunrugstichai, Nat Sumanatemeya, Metavee Chuangcharoendee and Dr. Petch Manopawitr (left to right) at the Thailand Dive Expo



Since relaunching STLS at the recent Thailand Dive Expo (TDEX), interest from stakeholders, including recreational divers, dive shop owners, boat operators, and underwater photographers, has been encouraging. Many of them attended our TDEX Divers Talk titled "The Search for Leopard Sharks: The Path Toward Understanding and Conservation" and visited our STLS booth.

Over the short four-day event, we received close to 100 submissions of leopard shark photos and videos from citizen scientists. Early anecdotal reports also suggest a possible resurgence in leopard shark sightings since the pandemic. Our team will soon be analyzing the data in greater detail, as we prepare to conduct a Population Viability Analysis (PVA) of leopard sharks in Thailand.

In an ongoing effort to bolster governmental support for the StAR Project, we have secured meetings with both DOF and DMCR and are seeking similar arrangements with the Department of National Parks, Wildlife and Plant Conservation (DNP). Both DOF and DMCR have shown enthusiasm for the StAR Project, and we are working on a memorandum of understanding.

Additionally, we are collaborating with 15 local dive shops and boat operators to enhance citizen science involvement through STLS and we are exploring partnerships with aquariums in Phuket for shark nurseries and genetic testing of potential breeders. Next steps include coordinating with the StAR Project Indonesia team and relevant agencies in Thailand to identify potential release sites for the sharks.

I believe this is an ideal year to launch StAR Project Thailand. With multiple ISRAs established around Thailand, the initial approval of national protection for leopard sharks secured, and increased public attention through our citizen science efforts, our team is well-positioned to capitalize on this momentum and work toward restoring these remarkable animals to our waters.

The StAR Project Thailand team comprises:
 Metavee Chuangcharoendee
 Montse Amores
 Nuthatai Chotechuang
 Dr. Petch Manopawitr
 Sirachai Arunrugstichai

Dr. Jaya Ratha and the Ocean Park Hong Kong veterinary team conducting ultrasound on a blotched fantail ray (*Taeniurops meyeri*)



A man with dark, wavy hair, wearing a light blue patterned short-sleeved shirt and a black harness, is leaning over a large, dark, perforated metal tank. He is holding a white object, possibly a piece of equipment or a small animal, in his hands. The background shows the interior of a facility with blue metal railings and a white bucket. The overall scene suggests a marine conservation or research environment.

ADVANCED VETERINARY TRAINING WITH

OCEAN PARK HONG KONG

Leveraging the latest veterinary innovations and expertise as we recover threatened sharks and rays

by **DR. JAYA RATHA**
Indonesian Director, Thrive Conservation



Armed with expertise in elasmobranch care, breeding, transport, and field-ready veterinary skills, the StAR Project Veterinary Working Group (VWG) manages disease assessments and the overall health of our breeders, eggs, and pups. Aside from serving as the Indonesian Director for Thrive Conservation, I am a seasoned veterinarian who performs the acoustic tag surgeries for our sharks before their release. Based in Indonesia, I also respond to emergency concerns at our nurseries in Raja Ampat.

Within the VWG, I am privileged to work alongside my talented veterinarian colleagues from Indonesia, Hong Kong, and the United States, all of whom play important advisory roles to the nurseries, Steering Committee, and other Working Groups. The VWG includes our chair Dr. Caitlin Hadfield (Seattle Aquarium), and our members Dr. Lance Adams (Aquarium of the Pacific), Dr. Michael Hyatt (Wildlife Conservation Society's New York Aquarium), Dr. Paolo Martelli (Ocean Park Hong Kong), Dr. Allyson McNaughton (Virginia Aquarium & Marine Science Center), and Dr. Matt O'Connor (Georgia Aquarium).

ReShark's sizable and ever-growing network of aquarium partners presents excellent opportunities for us to leverage each other's veterinary expertise and innovations through knowledge exchange and capacity-building. One such opportunity presented itself earlier this year. Dr. Mark Erdmann (Conservation International), Program Manager for StAR Project Indonesia Nesha Ichida (Thrive Conservation) and I were graciously hosted by [Ocean Park Hong Kong \(OPHK\)](#) for a week of advanced veterinary training.

During my time at OPHK, I gained crucial insights into the management and care of various species of sharks and rays, especially the conduct of routine health assessment of zebra sharks (*Stegostoma tigrinum*). The training included hands-on experiences in sampling, ultrasound, artificial insemination and egg examination under the guidance of the aquarium's medical team. I was also exposed to necropsy techniques and data collection. Additionally, I observed sample processing in the lab and learned about the pharmaceuticals and specific dosages used for the animals.



Dr. Jaya Ratha prepares Mali for her internal acc operation, with the assistance of Misool Foundation



Performing ultrasound on an adult leopard shark (*Stegostoma tigrinum*)



Extracting semen from a brownbanded bamboo shark (*Chiloscyllium punctatum*) for the purpose of artificial insemination



Endoscopy of a cownose ray (*Rhinoptera jayakari*) to examine the health of its gills



Dr. Mark Erdmann sharing about ReShark and the StAR Project with the Ocean Park Hong Kong team



Presenting a token of appreciation to Josephine Wong (Deputy Director of Ocean Park Conservation Foundation, Hong Kong) for the team's hospitality and support



Whether it is through their contributions of veterinary expertise, artificial insemination, or as an eventual breeder of zebra sharks and other elasmobranch species, Ocean Park Hong Kong has been and continues to be a prominent partner for ReShark.

Dr. Mark Erdmann

Vice President of Asia Pacific Marine Programs, Conservation International

From bowmouth guitarfish (*Rhina ancylostoma*) to blotched fantail rays (*Taeniurops meyeri*), OPHK boasts a wide collection of elasmobranchs and has developed an effective management system to care for them. The medical team works closely with other departments to ensure prompt responses to health issues that may arise, and they are proactive in sharing their expertise with students and external parties like us.

The aquarium's impressive capabilities have been derived from decades of experience. The team prides itself on prioritizing proper recording and documentation, as well as investing in personnel and innovative technology – all of which have proven imperative in enhancing overall management.

I'm looking forward to outlining both the challenges and successful methods used by OPHK in raising baby sharks, from egg handling to eventual release, as well as the commonly used drugs and equipment, to the VWG. As a Working Group, I also feel the need for us to continuously enhance our integrated recording system to improve future management, especially as the StAR Project continues to expand.

Come August, Dr. Paolo Martelli (Director of Veterinary Services, OPHK) from our VWG will be at our nurseries to conduct veterinary assessments and additional capacity-building on acoustic tagging surgeries with our aquarists and me. There is indeed much to look forward to in our partnership with OPHK.

We wrapped up our productive week in Hong Kong with a presentation of the StAR Project. The staff were particularly excited to hear about the progress with StAR Project Thailand. "Once the infrastructure there is up and running, OPHK will likely be one of the first breeders for Thailand given that they have the appropriate breeders from the Indian Ocean-Southeast Asian (or western) subpopulation," shares Dr. Mark Erdmann. "In the future, OPHK is likely to be a breeder for other species of interest too."



We would like to express our heartfelt gratitude to our supporters – AZA SAFE, Katrine Bosley, MAC3 Impact Philanthropies, and Ocean Park Conservation Foundation, Hong Kong for generously making this exchange possible.

Shannon Latumahina, Leah Neal, Candice Latini, Mardia Sultan and Maryrose Tapilatu pose for a selfie in front of the RARCC nursery

OUR BUSTLING NURSERIES: HUSBANDRY, RESEARCH AND RECENT UPGRADES

*Back-to-back visits, new hatchings and upgraded sea pens
— here's the latest scoop straight from Raja Ampat*

“

Systems checks, troubleshooting and tailoring protocols — we had a full agenda during our recent stop at the nurseries, and it was incredibly productive! The icing on the cake? We witnessed the births of Ethan and Wooly, both originating from Georgia Aquarium.

Leah Neal

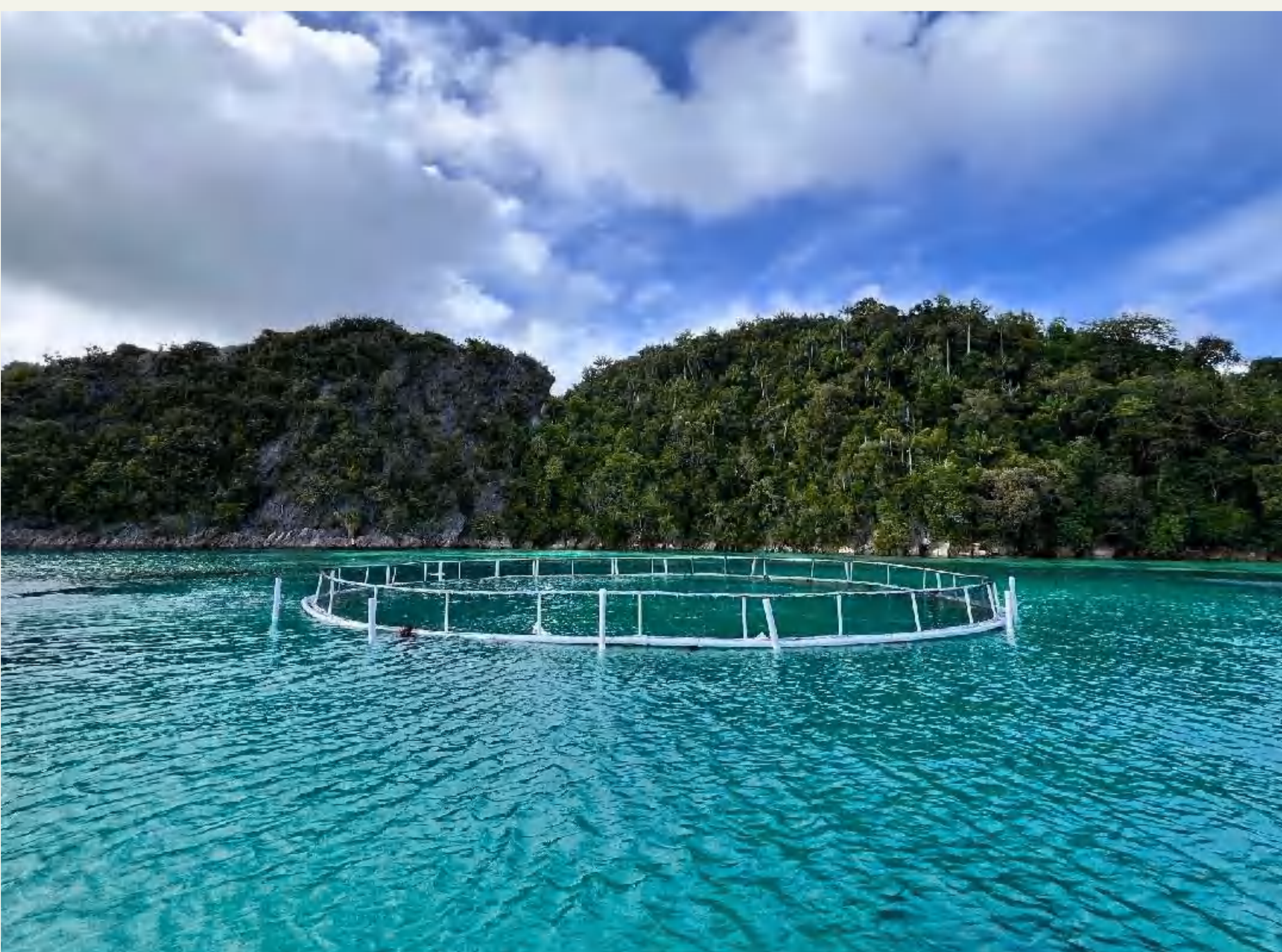
Curator of Fishes and Invertebrates, Georgia Aquarium
Chair, StAR Project Husbandry Working Group
StAR Project Steering Committee



Benthic surveys were conducted early on at a blue hole in South Misool, which was eventually selected as the site for the new sea pen



Candice Latini (right) assists RARCC aquarists Maryrose Tapilatu (left) and Mardia Sultan (center) with measurements of the pups



The new sea pen of the Misool Foundation nursery is now up and running



Misool Foundation aquarist Aisya Ramadhani Alpien takes measurements of a zebra shark pup at the new Misool Foundation sea pen



At the Misool Foundation nursery, the team cleaned the egg tanks, rearranged the live food more optimally, and labeled each tank properly to facilitate seamless data gathering and input. The aquarist team also received additional training on feeding techniques and, working with the HWG, updated their daily checklist.

Up north at RARCC, Neal and Latini worked with the aquarist team to streamline nursery operations. The sea pen beneath the nursery also received an upgrade.

An additional 1.5-meter skirt was added to the bottom of the existing net, and the perimeter was completely buried in sand and weighted down with cement blocks to fortify the entire sea pen from unwanted predators. Plans were made to further extend the sea pen down the slope to provide deeper habitats for the pups in case of waves in the lagoon. It was a true Georgia Aquarium affair, marked by the timely back-to-back births of Wooly and Ethan. Neal and Latini witnessed their hatchings just before departing Kri.

FACES OF THE HUSBANDRY WG

Jack Jewell

is General Curator at Shark Reef Aquarium at Mandalay Bay, overseeing the animal husbandry department which includes more than 2,000 animals. His extensive marine background spans 30 years of animal care, breeding and training, as well as service in wide-ranging aquarium community roles.



Lise Watson

is Assistant Director of the Animal Operations and Habitats at Shedd Aquarium. Shark and ray husbandry has been the focus of her career, which spans nearly 40 years. For a decade, she served as an AZA studbook keeper and SSP coordinator for *Stegostoma tigrinum*.

Assisting our Husbandry WG with organizing egg transits and domestic permits for US breeders are Seattle Aquarium's **Andrew Sim, Tim Carpenter, Riley Pollom** and **Dr. Caitlin Hadfield** (not pictured)

Staghorn coral exposed at low tide
backdropped by the RARCC nursery

Laura Simmons

is the Australia and New Zealand Regional Curator for SEA LIFE and WILD LIFE attractions. She leads Merlin's ANZ curatorial teams in conservation, welfare and education, and has worked on aquatic projects and species recovery worldwide for over 33 years.



UPDATE FROM THE RESEARCH WORKING GROUP

The Research Working Group (RWG), co-chaired by Dr. Christine Dudgeon (University of the Sunshine Coast and The University of Queensland) and Dr. Lisa Hoopes (Georgia Aquarium), is one of five active StAR Project Working Groups. Its primary function is to develop innovative post-release monitoring tools and techniques to evaluate the movement, habitat use, and survivability of tagged juvenile sharks post-release.

The monitoring tools employed include active and passive acoustic telemetry, new predator tag technology, eDNA monitoring and photographic identifications supported by citizen science engagement. Drawing on the broad expertise of its members from aquaria, academic institutions, government, and conservation organizations, the RWG also provides guidance and conducts research in areas such as pup growth, nutrition, parthenogenesis, and reproduction of adult animals.

Outside of Indonesia, partner organizations are conducting research on wild and *ex-situ* leopard sharks in Australia, the United States, and New Caledonia to fill important knowledge gaps for the continued enhancement of the StAR Project.

Representing the RWG, Dudgeon visited both nurseries between May and June to check on the progress made. Setting foot in the RARCC nursery at Kri Island after over six years of ideation and remote work on the StAR Project and over [two decades of her career](#) researching *Stegostoma tigrinum*, she finally laid eyes on all the groundwork for the first time. ‘Surreal’ would be an understatement.

Dudgeon recounted how the world’s first shark rewilding initiative came to be. Leading the [2015 IUCN Red List assessment](#) for the species (see [latest 2024 update](#)), she saw the pressing need to utilize citizen science data from divers (through the [Spot The Leopard Shark](#) initiative she started in Thailand during her postdoctoral studies), in addition to fisheries data, to get a more comprehensive view of the status of leopard sharks in regional waters.

Early conversations with Dr. Mark Erdmann (Conservation International), who had conducted tens of thousands of dive surveys around Indonesia, Papua New Guinea, and East Timor, raised the question of whether the significant depletion of leopard shark numbers in Thailand was similarly observed in Indonesia, including within Raja Ampat.

“He could count on two hands the number of leopard shark encounters he had made over the past decade or so,” Dudgeon recalls Erdmann saying. These insights gave her a more comprehensive understanding of the species’ vulnerability and this exchange became the catalyst for an *ex-situ* conservation initiative. The rest is history.



Dr. Christine Dudgeon spending time with Buddy in the RARCC sea pen at low tide

Radio Frequency Identification (RFID) Tagging

Upon reaching 60cm, the pups are RFID tagged. As they continue maturing post-release, their spot patterns start to stabilize. RFID tags allow scientists and divers to identify individual sharks and match their spot patterns.



Blood and Cloacal Sampling

Blood samples are extracted from the pups to obtain a genetic profile for parentage analysis and stable isotope analysis to study diet changes over time. Cloacal samples are collected for metabarcoding analysis to determine the pups' dietary composition.



Measurements

Morphometric measurements, including total length (TL), weight (W), and girth (G), are taken weekly to provide a real-time update of each pup's growth rate.



Sampling

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Looking at the tens of juvenile zebra sharks swimming in their tanks, the aquarist teams going about their day, and the engineering marvel of the ReShark nurseries, Dudgeon quipped, “All these were made possible due to the collective vision and hard work of our global coalition. It’s now our job as researchers to advance our understanding of threatened sharks and rays, in order to conserve them for generations to come.”

Hitting the ground running, Dudgeon worked with the aquarists to prepare the shark pups (from the ‘Cairns Cohort’) for the sea pen.

Most of the pups had reached or were nearing 60cm (TL). It was a good chance to refine various protocols, including RFID tagging, cloacal swabs, blood samples, and morphometric measurements, all done before the pups moved to their new homes.

Stressing the importance of having robust and easily replicable protocols, Dudgeon shared, “Never before have we been able to study these animals from birth to adulthood. The controlled environment presented to us through the StAR Project now allows us to, and we should capitalize on it.”

FACES OF THE RESEARCH WG

Dr. Hugo Lassauce

(Aquarium des Lagons) currently spearheads the Zebra Shark Project New Caledonia. His work, which includes genetic examinations, post-release monitoring, and research into egg-laying behaviors and site fidelity, greatly informing the StAR Project in Raja Ampat.



Dr. Lisa Hoopes

(Georgia Aquarium) is the co-chair of the RWG and an expert in feeding ecology and aquatic nutrition. She coordinates the RWG and the broader community on all things diet and nutrition.



Dr. Fahmi and Selvia Oktaviyani (BRIN), **Iqbal Herwata** (Konservasi Indonesia), and **Abraham Sianipar** (Elasmobranch Institute Indonesia) facilitate the groundwork in Indonesia. This includes genetic work, shark and ray expertise, and additional logistical support for research.



Julia Tapilatu
(Texas A&M University) is a former aquarist at RARCC and first graduate student coming out of the StAR Project. For her master's degree, she is researching growth rates of zebra sharks across open versus closed water systems, and their associated life histories.



Dr. Mark Erdmann
(Conservation International) and **Neshia Ichida** (Thrive Conservation) oversee the fieldwork in Raja Ampat, particularly acoustic and RFID tagging and post-release monitoring. They also play a leading role in fundraising for research activities and training local aquarists and interns.



Dr. Steven Kessel
(Shedd Aquarium) specializes in the spatial ecology of elasmobranchs, and runs a multi-faceted shark and ray research program. He advises the RWG in particular on acoustic and satellite telemetry for post-release monitoring.



Dr. Kady Lyons
(Georgia Aquarium) oversees the genetic screening of samples sent from potential breeders for the StAR Project. The samples are forwarded to **Dr. Kevin Feldheim** (Field Museum, not pictured) who conducts further genetic analyses.



Dr. Kevin Feldheim
(Field Museum) is the geneticist and an expert in shark and ray biology and advises the RWG on genetic screening and

REFRESHED AQUARIST TEAMS AT OUR NURSERIES

We are excited to announce that we have officially commenced our StAR Project internships. They are aimed at providing hands-on conservation experience to Indonesian youths, who will be supporting our aquarists in nursery operations.

We would like welcome our first batch of StAR Project interns — Anggi Aenun (RARCC), Annisa Fathya (Misool Foundation), and Faccettarial Marlissa (Misool Foundation), as well as our new aquarists Mardia Sultan (RARCC) and Aisya Ramadhani Alpian (Misool Foundation).

“The StAR Project has allowed me to collaborate with individuals who share a common goal of working toward a sustainable future for sharks. I’m glad I get to combine my academic and conservation interests with novel experiences each day.”

Maryrose Tapilatu

“I get to see sharks each day, and that keeps me excited! With our nursery near the lagoon, I can just jump into the water to swim and snorkel. I do hope all the sharks we release will thrive in the wild.”

Mardia Sultan

“The best part about being a StAR Project intern is having boundless opportunities to learn more about shark conservation. I’m proud and heartened to be part of a team who is spearheading this project. I’ve become acquainted with the unique behaviors of our pups, and of course it’s great to meet lots of cool folks in the marine conservation world.”

Anggi Aenun



Presenting our RARCC aquarist team — StAR Project intern Anggi Aenun (left) joins full-time aquarists Mardia Sultan (center) and Maryrose Tapilatu (right)

“There is nothing more soothing than scuba diving in the sea pen, looking up and admiring all the sharks that we’ve taken care of since from birth swim around you. I’m committed to our mission of ReShark-ing our waters!”

Agi Zalma

“It is my hope that conservation projects like the StAR Project will succeed in restoring leopard shark populations in Indonesia, and through them, we can educate the public about these endangered animals and stop any form of destructive practices.”

Aisya Ramadhani Alpian

“I hope that through the StAR Project, we can increase the populations of endangered sharks which shall go on to surround the beautiful seas around Indonesia. I also wish that what we’re doing inspires everyone else to play their part to conserve our natural environment.”

Annisa Fathya

“I’ve grown to love taking care of the sharks, and sharing about our work with Misool Resort guests and visitors. It brings me joy to see them enthused by what we’re doing. I hope our work will inspire people around the world to protect these animals.”

Faccettarial Marlissa



Rounding out our Misool Foundation team are our full-time aquarists Agi Zalma and Aisya Ramadhani Alpian, and StAR Project interns Annisa Fathya and Faccettarial Marlissa (left to right)

VIABLE EGGS SHIPPED:

36



3

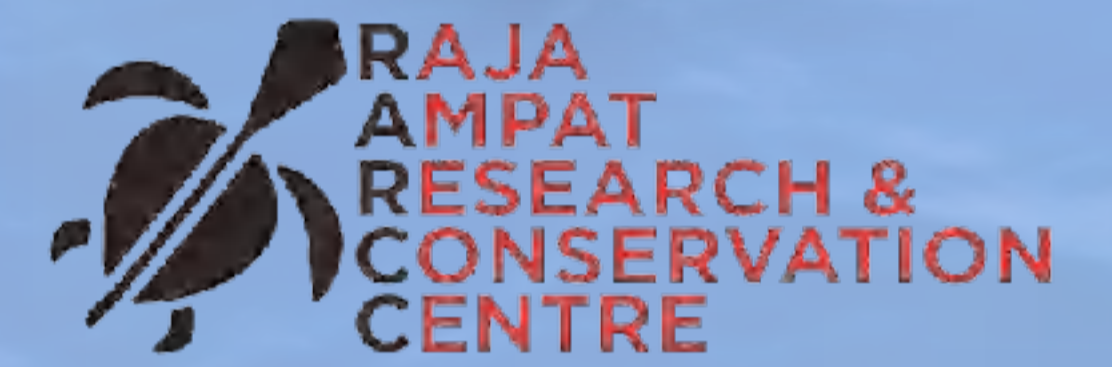


5



7

21



15



21



SNAPSHOT

RAJA AMPAT, INDONESIA • CAA AUG 2024





TOTAL SHARKS RELEASED:

5

CURRENTLY IN SEA PEN:

20

CURRENTLY IN JUVENILE STAGE (PUP TANK):

1

CURRENTLY IN EMBRYONIC STAGE:

0

UNHATCHED EGGS:

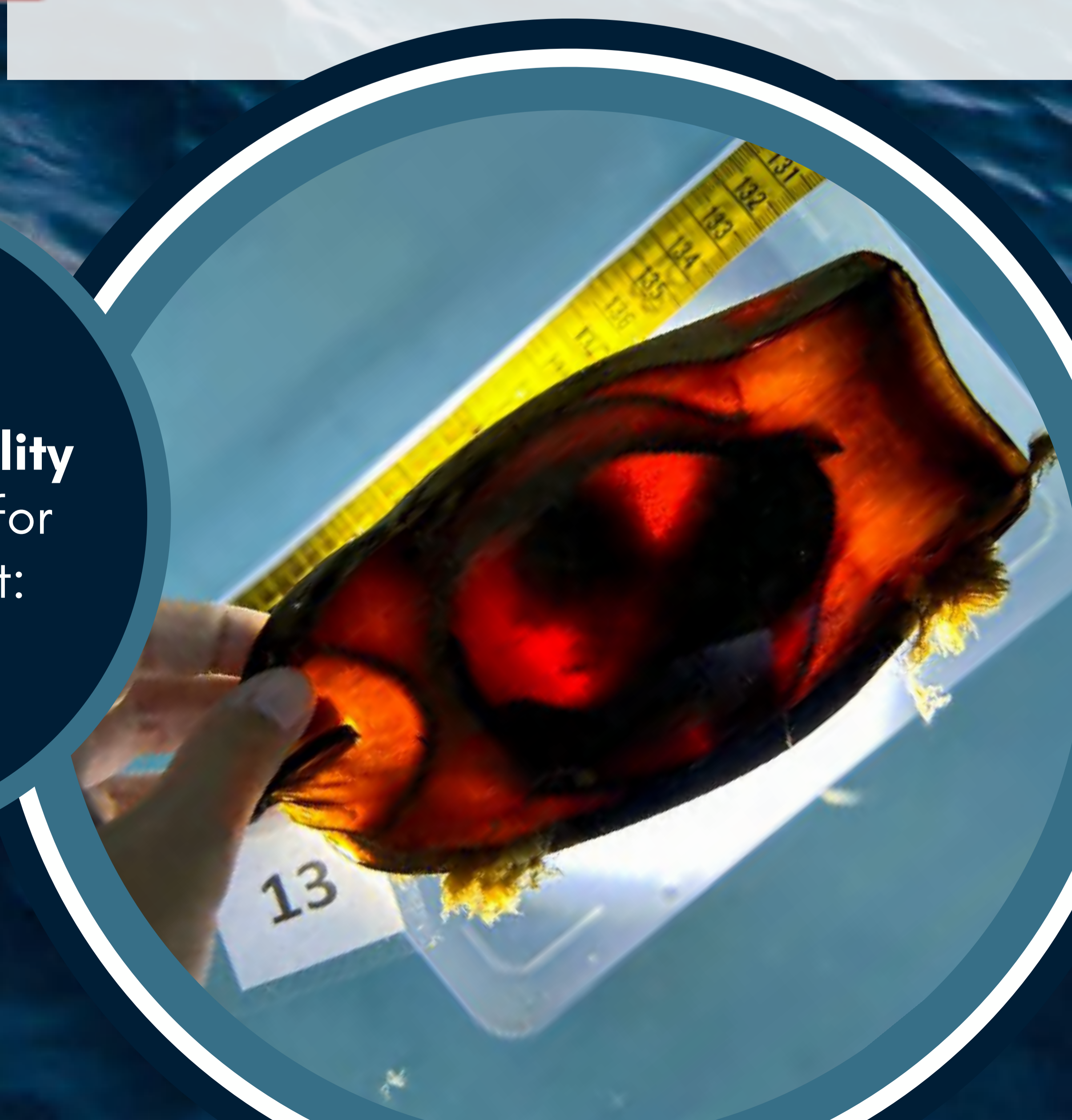
3

MORTALITIES:

7



Check out the **Population Viability Analysis** report for the StAR Project:



MEET THE PARENTS

SEA LIFE SYDNEY AQUARIUM

Sydney, NSW, Australia

SEA LIFE Sydney boasts three breeders, originating from the Great Barrier Reef. The trio lived at the Manly Sea Life Sanctuary before being transferred to SEA LIFE Sydney in 2012:

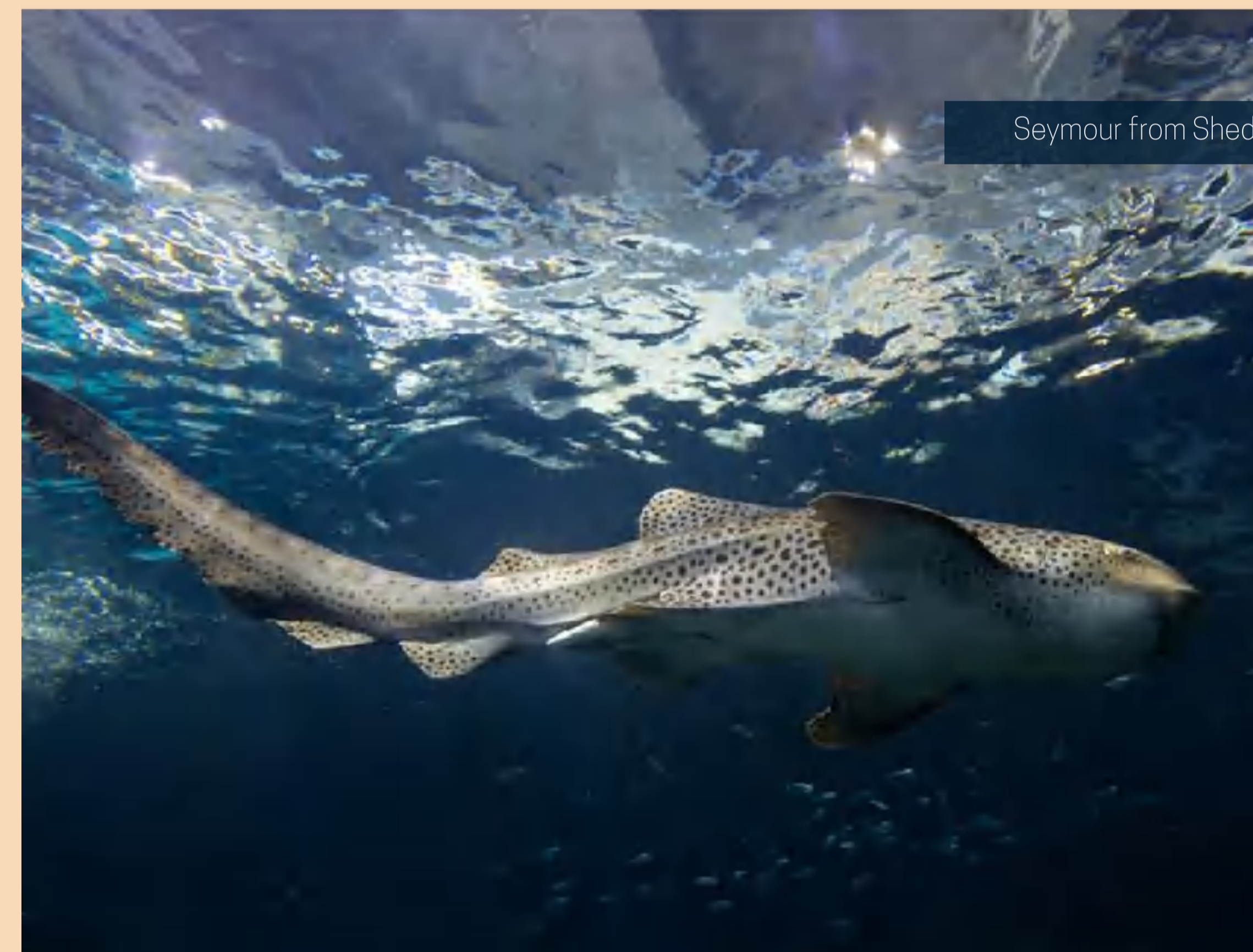
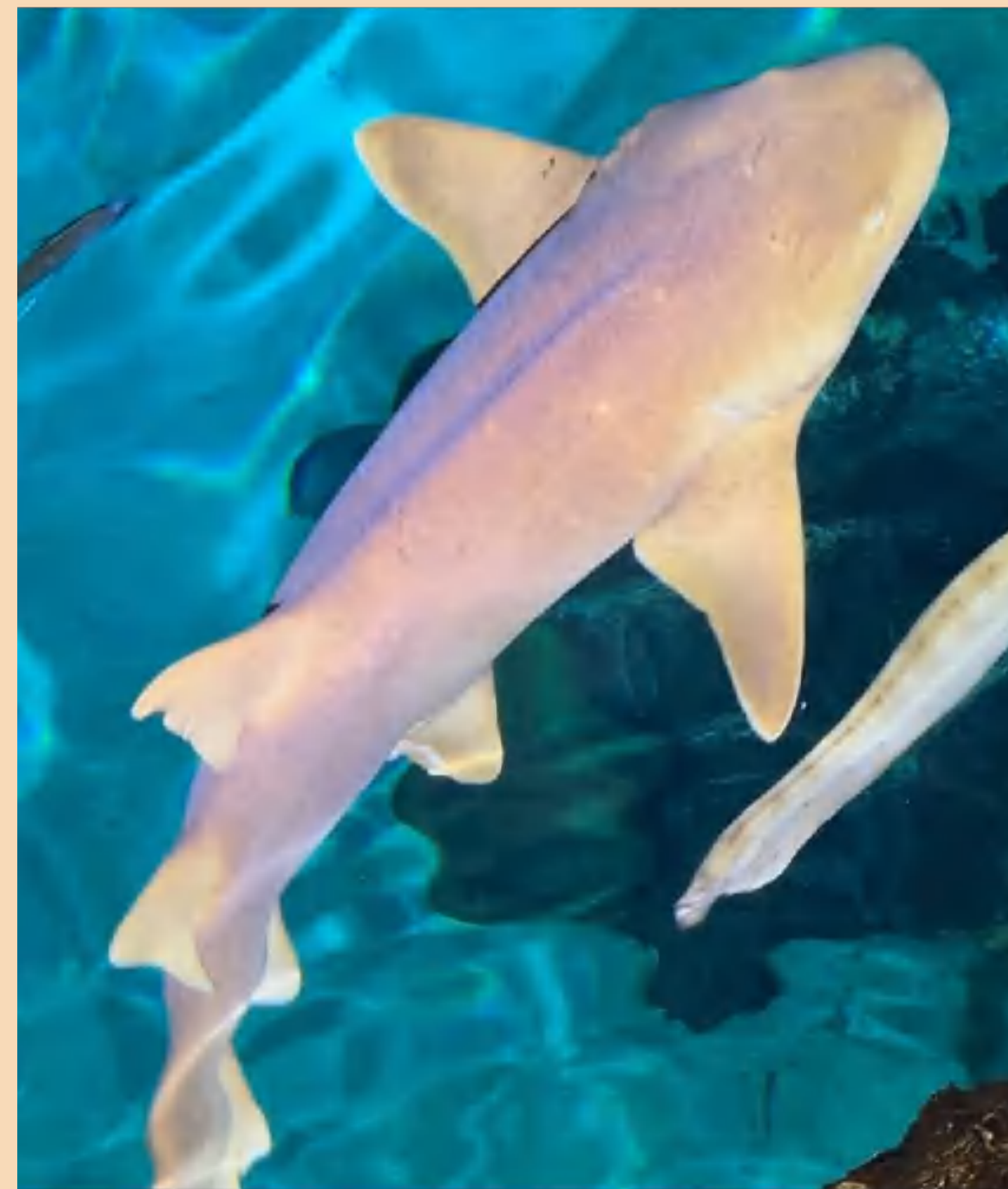
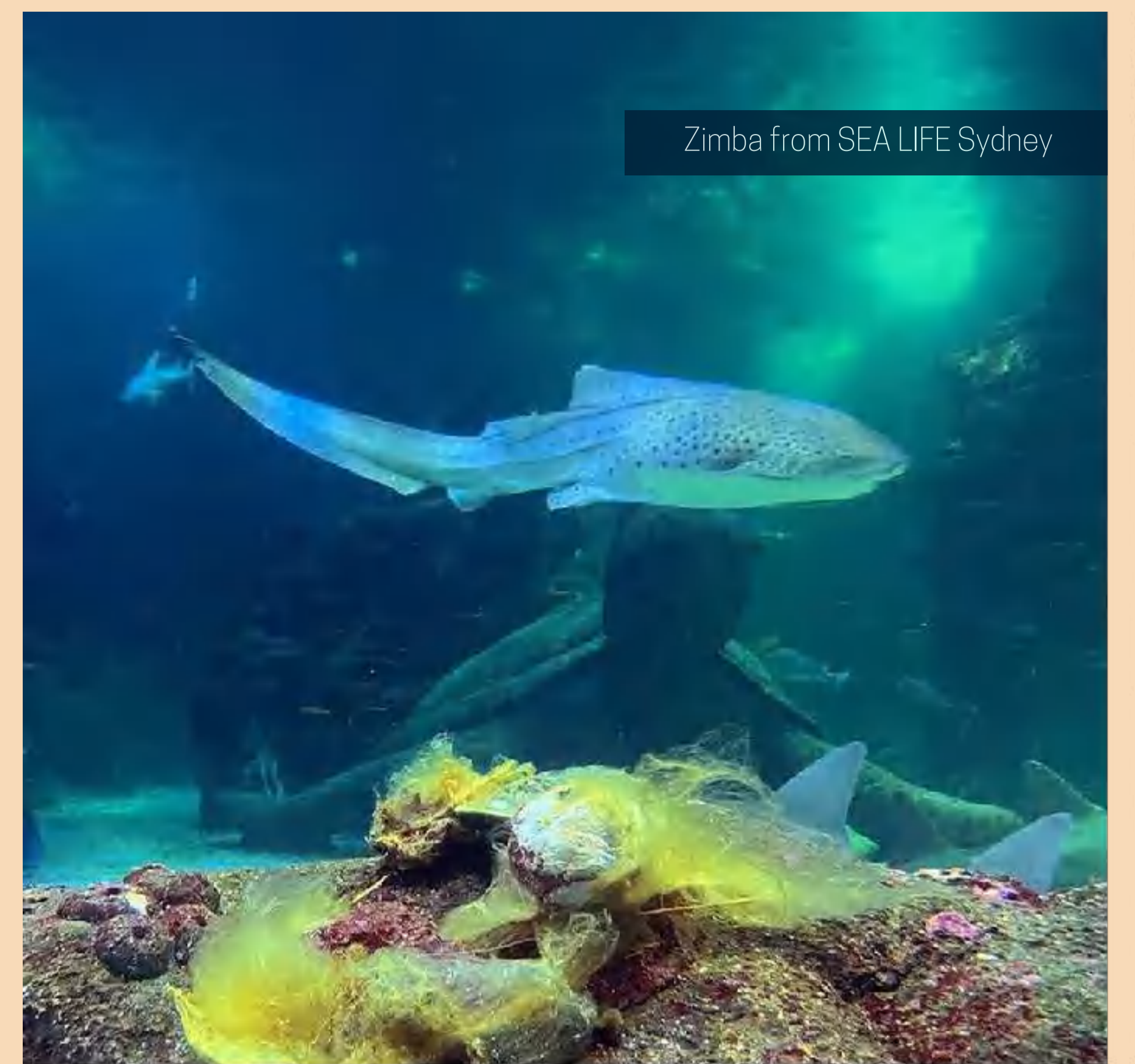
- **Kaya** (♀) and **Gohan** (♂) are the parents of the first four leopard sharks ([Audrey](#), [Charlie](#), [Kathlyn](#) and [Mali](#)) to be hatched and released in Raja Ampat for the StAR Project.
- **Zimba** (♀).

SHARK REEF AQUARIUM AT MANDALAY BAY

Las Vegas, NV, USA

Shark Reef Aquarium at Mandalay Bay has a trio of breeders, all having been acquired in 1999. They have produced multiple offsprings for various AZA-accredited aquariums and the StAR Project:

- **#233** (♀, 25 yo) and **#229** (♀, 25 yo) were part of one of the first successful captive births in the country at Omaha's Henry Doorly Zoo and Aquarium. Either of them would be the mother of [Marshal](#), [Buddy](#) and [Myra](#).
- **#237** (♂, 25 yo) originated from Cairns Marine and is the father of [Marshal](#), [Buddy](#) and [Myra](#).





Kaya from SEA LIFE Sydney



#233 and #229 from Shark Reef Aquarium at Mandalay Bay



Cleo from Shedd Aquarium



Giraffe from Georgia Aquarium

SHEDD AQUARIUM

Chicago, IL, USA

Shedd Aquarium is home to five adult leopard sharks. Plans to expand the aquarium's breeding population with younger animals are in the works:

- **Cleo** (♀, 28+ yo) is the matriarch of the group and the most prolific breeder, having started producing offspring shortly after arriving. Her offspring are already being planned as future breeders for the StAR Project.
- **Vera** (♀, 21 yo) is the mother of Valentine.
- **Bubbles** (♀, 20 yo) is Cleo's first brood.
- **Valentine** (♀, 10 yo) is the offspring of Vera, and was recently returned to Shedd to help with breeding efforts for the StAR Project.
- **Seymour** (♂, 24 yo) is Shedd's very first leopard shark, having arrived in 2000.

GEORGIA AQUARIUM

Atlanta, GA, USA

Georgia Aquarium is currently home to three breeding adults:

- **Giraffe** (♀, 17 yo) and **Oz** (♂, 22 yo) are the parents of **Ethan**, **Wooly** and **Optimus**. Giraffe enjoys visiting broadcast feeds coming to her station and Oz is the sweetest animal who readily participates in his medical care with voluntary blood draws and ultrasounds.
- **Dalmatian** (♀, 17 yo) is very polite when receiving food from the aquarists.

Baby Sharks

How conservationists got these young zebra sharks ready for the wild

WORDS BY CRAIG WELCH AND ALLYSON SHAW
PHOTOGRAPHS BY DAVID DOUBLET AND JENNIFER HAYES

Shark pups swirl around in pens near the islands of Raja Ampat, Indonesia. Baby sharks Kabilyn, Ili, and Audrey will be the first zebra sharks reintroduced into the wild over the next 10 years. Raja Ampat was once a healthy coral reef system with a large diversity of life, including turtles, sharks, rays, and squid in these waters. But destructive methods (like fishing with dynamite and scraping the seafloor) hurt the reef. And fishers often hunted sharks for their meat and fins for food. In 2000, the local government established protected marine areas and other activities. The government completely banned shark and rays across Raja Ampat. Here's how they're getting it done.

White tip, and gray reef shark populations bounced back. But in 20 years of looking, scientists found only three zebra sharks in Raja Ampat. Why? Compared with other species, these slow-moving and gentle sharks had been easy to catch. Plus, the species was already endangered throughout most of its range. Conservationists knew this shark population wouldn't recover without help.

So marine scientist Mark Erdmann had an idea: What if researchers took zebra shark eggs from captivity and released the babies into wild protected habitat? "I thought, 'Oh, that's a fantastic idea,'" Seattle Aquarium conservationist Erin Meyer says.

That's why Erdmann created ReShark with partners in 15 countries, including 44 aquariums. The group's first mission: Bring back zebra sharks to Raja Ampat. Here's how they're getting it done.

First Step: The Aquarium

Zebra sharks, like this female at the Shedd Aquarium in Chicago, Illinois, are common fish in aquariums. So the ReShark team have plenty of captive sharks to breed and choose eggs from. They select eggs that have the healthiest genes to make sure the hatchlings survive.

ADAPTED FROM THE JUNE 2013 NATIONAL GEOGRAPHIC MAGAZINE ARTICLE "A WILD PLAN" COURTESY OF INDO-PACIFIC FILMS (GARDNER)

"Conservationists got these young zebra sharks ready for the wild in Raja Ampat on **Mo**

National Geographic Kids August 2024 issue featuring 'Baby Sharks'



Sharktopia on Discovery's Shark Week spotlights Raja Ampat's sharks and the StAR Project's early stages

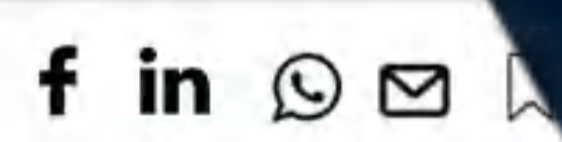


FORESTS OCEANS ANIMALS ENVIRONMENT BUSINESS SOLUTIONS FOR KIDS DONATE IMPACT

To search, type and hit enter

Rewilding program ships eggs around the world to restore Raja Ampat zebra sharks

by Hans Nicholas Jong on 8 April 2024



"Rewilding program ships eggs around the world to restore Raja Ampat zebra sharks" on **Mongabay**



Conservationists upbeat as zebra shark reintroduction in Raja Ampat gathers pace”
Mongabay



Interview with Marit Miners about Misool Foundation, ReShark, and conservation on **Alert Diver**



Misool FOUNDATION

EMPOWERING CONSERVATION
THROUGH LOCAL ENGAGEMENT

BY STEPHEN FRINK

MONGABAY
NEWS & INSPIRATION FROM NATURE'S FRONTLINE

FORESTS OCEANS ANIMALS ENVIRONMENT BUSINESS SOLUTIONS FOR KIDS DONATE IMPACT MORE

Conservationists upbeat as zebra shark reintroduction in Raja Ampat gathers pace

Nicholas Jong on 18 June 2024



Friday/Sunday, April 27 - 28, 2024

THE WALL

ADVENTURE & TRAVEL

An Archipelago to Dive For

One of the world's last pristine reefs perseveres in Indonesia's Raja Ampat. But should we be going?



learned, decades of overfishing had ravished the reefs. In 2004, a newly set up marine park authority began patrolling a protected area. As illegal fishing was virtually eradicated, sharks and rays returned and dive tourism emerged, offering alternative and less-destructive livelihoods.
Visiting Yenbuba village, a 30-minute speedboat ride from my resort, I paid a fee, which funds community projects. Protection seems to be working. Around Yenbuba's jetty, before even masking up, I watched blue fusilier fish congregate in a mega-shoal 200 yards long. When I did take a dip, I saw six hawksbill turtles in an hour, more than I had seen in a lifetime.

REEF MADNESS Some of the thousands of islands that make up Raja Ampat, a mecca for scuba divers, as seen from the Pigeon Point Lighthouse

MARK STRATTON

IT TOOK one plunge to realize that the long trip to get to Raja Ampat was worth it. Staring down at the variety of corals: glowing yellow, purple, and blue, I was in awe.



"An archipelago to dive for" on **The Wall Street Journal** featuring Papua Diving and the RARCC nursery



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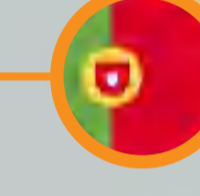


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WildAid



S.E.A. Aquarium



Badan Riset dan Inovasi Nasional (BRIN)
Kementerian Kelautan dan Perikanan (KKP)
Pemerintah Provinsi Papua Barat
Pemerintah Provinsi Papua Barat Daya
Badan Riset dan Inovasi Daerah (BRIDA) Provinsi Papua Barat
Pemerintah Daerah Kabupaten Raja Ampat
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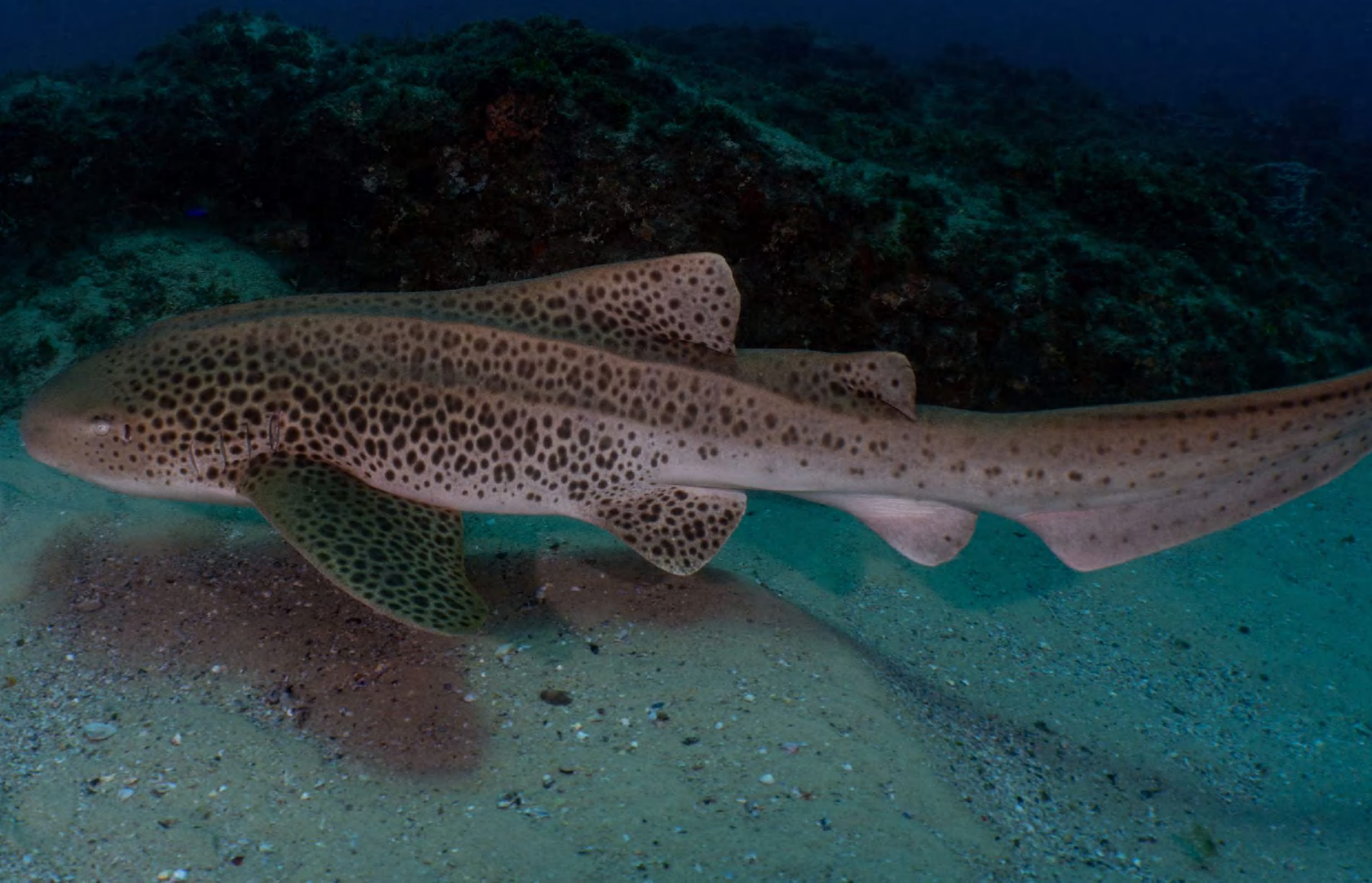


Aquarium des Lagons Nouvelle Calédonie



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ReShark

