SAC·TUN

2020 Sustainability Report

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CONTENTS

ABBREVIATIONS

CECyTE
Quintana Roo College of Technological and Scientific Studies

CEMEFI
Mexican Center for Philanthropy

CICY
Yucatán Scientific Research Center

COBI
Comunidad y Biodiversidad, AC

CONACYT
National Science and Technology Council

CONAFOR
National Forestry Commission

CONANP
National Commission for Natural Protected Areas

CONAPESCA
National Aquaculture and Fishing Commission

ECOSUR–Chetumal
El Colegio de la Frontera Sur—Chetumal

FGRA
Fundación Gonzalo Río Arronte

Grupo ICA
Grupo Ingenieros Civiles Asociados

INAH
National Institute of Anthropology and History

INAPESCA
National Fishing Institute

EIA
Environmental Impact Assessment

NOM
Official Mexican Standard

OSHA
Occupational Health and Safety Administration

PPY
Pronatura Península de Yucatán, AC

PROFEPA
Federal Environmental Protection Agency

SEDESO
Quintana Roo Department for Social Development

SEMA
Quintana Roo Secretariat of Ecology and the Environment

SEMARNAT
Secretariat of the Environment and Natural Resources

UNAM
National Autonomous University of Mexico

WHC
Wildlife Habitat Council

KEY ACHIEVEMENTS AND CONTRIBUTIONS IN 2020

The Wildlife Habitat Council certified SAC-TUN's new Environmental Strategy, which is part of our Mesoamerican Reef Environmental Services and Biodiversity Conservation program.

5.08 million total hours worked with no disabling accidents.

Zero fatalities.

Certified for the second consecutive year as a Socially Responsible Company by CEMEFI.

ESR Empresa Socialmente Responsable ®

Certified for the first year as a company that spends 1% on social investment by CEMEFI.

ESR Empresa Socialmente Responsable 1% Inversión Social

SAC-TUN volunteers have contributed more than 36,500 service hours to the community thanks to the participation of about 2,650 volunteers in 166 activities. On average, there have been 11 activities per year over the past 10 years.

MESSAGE FROM THE PRESIDENT OF THE INTERNATIONAL DIVISION OF VULCAN MATERIALS COMPANY AND PRESIDENT OF SAC-TUN

More than 30 years have passed since Vulcan Materials Company arrived in Mexico as CALICA. From that moment on, our company – today known as SAC-TUN – made a commitment to our people and the communities where we live and work, as well as deep-rooted respect for nature and our planet. This unbreakable commitment continues today as the basis for every decision we make and every action we take.

For us, sustainability means having a positive social, environmental and economic impact on our people, our communities, and our environment and its biodiversity. This is our way of doing things – The Vulcan Way – and it reflects not only what we do, but also our desire to strive, over the long term, to go beyond our prior achievements.

In this report, we highlight our achievements, values and beliefs. At SAC-TUN, we aspire to continue serving as the benchmark for corporate social and environmental responsibility, and for partnering with others to raise awareness and community engagement to better understand and protect the environment.

Since our arrival in our beloved state of Quintana Roo, we have strived to be a company that creates well-being for our people, for the communities where we live and work, for our value chain and for Mexico.

We are part of a community comprising the cities of Cozumel and Solidaridad. Our employees, their families and our neighbors are most important to SAC-TUN. Together, we are helping create a better future for all.

We collaborate with a wide range of stakeholders – communities, civil society, scientists and authorities at various levels – in order to reach agreements that benefit each other and the environment. In 2019, we reaffirmed our commitment through a long-term working agreement with prestigious environmental institutions and organizations to further establish our environmental sustainability vision. Our sense of responsibility and our values drive us to continue working to contribute to the conservation and protection of our natural resources.

2020 was a year full of challenges, but it was also a year in which we strengthened ourselves as a company and as a community. The COVID-19 pandemic changed the way in which we interact personally and professionally. It also changed our working environment and the way in which we go about our day-to-day activities.

Thanks to the hard work of our people, all of us at SAC-TUN have been able to face the challenge with courage and co-responsibility. I would like to express my gratitude and recognize our team for consistently following the health and safety recommendations necessary to protect their personal health and their families in order to continue our operations. This is something for which our company has become well known. During these difficult times, we have also supported vulnerable communities within our region.

At SAC-TUN, we will continue working every day to create opportunities for all. We will drive the well-being of our communities to conserve, protect the biodiversity and richness of our environment. And together, we will grow alongside and for our people.

ERNESTO ENRÍQUEZ CASTILLO
President of the International Division of Vulcan Materials Company and President of SAC-TUN.

ABOUT THIS REPORT

Our 2020 Annual Sustainability Report encompasses the results, actions and advances made by SAC-TUN from 2019 to 2020 in the following areas: our sustainability model; our response to the COVID-19 pandemic; our environmental strategy and performance; and activities with our employees and the communities in which we operate.

This is the first comprehensive sustainability report that we have published. It is a great source of pride for us to present the achievements and goals we have reached during a year that has been particularly difficult and challenging for all.

To determine the materiality of this report, we engaged an internal research and analysis process to examine themost relevant issues to SAC-TUN's activities. Our review areas included:the economy, society; the environment; and the relationships and impact the companyhas on its stakeholders.

All the information and figures contained in this report focus on SAC-TUN's operations during 2020. For the compiling of this report, we undertook interviews with employees, field visits, and a review of all areas. This report reflects the hard work of every single person at the company.

We would like to highlight the fact that 2020 was the year when the Wildlife Habitat Council certified SAC-TUN's Environmental Strategy as part of our Mesoamerican Reef Environmental Services and Biodiversity Conservation program. We also received an award for our social investment and the Socially Responsible Company certification from CEMEFI.

This is the first report of many that SAC-TUN will continue publishing to present the efforts we are making to create opportunities for everyone. We are committed to making the world a better place today and for future generations.

OUR MISSION

Be an international producer of construction materials essential to the standard of living of advanced and developing societies.

At SAC-TUN we strive to:
•Provide quality products and services that consistently exceed our customers' expectations.
•Be responsible stewards with respect to safety and the environmental impact of our operations and products.
•Drive value and superior returns for our customers, employees, communities and shareholders.

We recognize that success in all our activities is related directly to the talents, dedication and performance of our employees throughout the company.

OUR VISION

Be a successful, profitable and attractive company for both our partners and employees, producing and marketing high-quality stone aggregates while focusing on customer service and safety performance, in addition to protecting the environment and promoting socio-economic development within the region and well-being within the community.

VALUES

• Integrity:
We work constantly to earn the respect and trust of all parties we interact with by acting fairly and honorably. We observe high ethical standards and obey all laws and regulations.

• Excellence:
We are committed to ensuring excellence and high quality in all our activities. We promote innovation and new ideas and technologies as tools for growth and development, striving to maintain a position of leadership in each of our activities by setting quality, service, technical support, safety and environmental standards.

• People:
We respect the dignity and interests of each of our employees and treat them fairly. We strive to maintain an environment that encourages our employees to develop their talents, exercise creativity and achieve superior performance. We keep our compensation programs at fair and competitive levels. Employment and advancement are based on qualifications, performance and organizational needs. We maintain a firm commitment to employee health and safety.

OUR TRANSFORMATION

6 agosto 1986

Vulcan Materials Company and a Mexican partner, *Ingenieros Civiles Asociados, S.A. (ICA),* incorporate Crescent Market Companies to produce high-quality limestone close to Playa del Carmen, Quintana Roo. *Calizas Industriales del Carmen, S.A. de C.V. (CALICA)*, as the company was called back then, was set to become the biggest quarry in the Americas and Vulcan's largest. In 2019, CALICA changed its name to SAC-TUN (which means 'white stone' in Mayan).

SAC-TUN's four sites are located 70 kilometers to the south of Cancún, in the communities of Solidaridad and Cozumel.

The limestone produced is sent to numerous markets, mainly to the U.S. Gulf of Mexico coastline, and is also available for high-quality local use. The distribution chain includes a maritime transport company (Vulica Shipping Company) and a sales company in the United States.

1986

The National Institute of Anthropology and History (INAH) begins exploring, mapping, recording and preserving Mayan archaeological vestiges located in the areas in which the project is planned.

The Environmental Impact Assessment (EIA) is authorized, allowing SAC-TUN to begin operations.

1986-1990

Construction begins on a stone crushing plant; a crushed limestone storage area; a fuel, lubricant and material/special waste storage area; other infrastructure and roads; and a five-kilometer, high-speed conveyor belt to transport the limestone to the marine terminal and transport ships. All the land to be used is earmarked for future rehabilitation and reforestation.

1986-1989

Construction begins on an 11.9-hectare marine terminal in *Punta Venado*, an area covering 179 hectares and located eight kilometers to the south of Playa del Carmen. SAC-TUN's central offices and other facilities are built in *Punta Venado*.

1988-1989

Hurricanes and fires destroy extensive areas of forest surrounding the company's properties in *La Adelita, La Rosita* and *El Corchalito*.

1990

Shipments of limestone aggregates are sent to the United States from the *Punta Venado* Marine Terminal, totaling approximately 1.8 million tons during the first year.

186 hectares of land in *La Rosita* (20% of the total) are earmarked as a conservation area and buffer zone, which also includes the archaeological remains registered by the INAH and several cenotes. Through 2020, the company planted 18,500 trees over 18.41 hectares.

With the support of the local community, the SAC-TUN forest nursery is created to identify, collect, protect and, in some cases, transplant threatened native species. This nursery is certified by the Secretariat of the Environment and Natural Resources (SEMARNAT) as an Environmental Management Unit (UMA, for its acronym in Spanish). The 23 threatened plant species propagated in the nursery are used to reforest the areas from which the limestone has been extracted and are also donated to the local community, including schools, parks and public spaces.

1993

At the request and with the authorization of the Federal Government, SAC-TUN builds another marine terminal for public ferries to transport people and goods to the island of Cozumel. SAC-TUN covers all construction and operating costs for this public ferry terminal. This terminal becomes one of only two ports on the Yucatán Peninsula where two boats can dock at the same time.

1996

The first cruise ship docks in SAC-TUN's *Punta Venado* Marine Terminal. These cruise ships will continue docking at this terminal until 2011.

In the first 20 years since its construction, this marine terminal has transported approximately 116,000 people and 512,000 tons of goods to and from the island of Cozumel per year. *Punta Venado* is ranked as the sixth largest terminal in Mexico in terms of payload.

2000

SEMARNAT authorizes SAC-TUN's new EIA, which allows the company to expand its operations, including extracting limestone from below the water table. These parts of the quarry will eventually be covered by water, creating artificial lakes and wetlands which, in conjunction with the surrounding areas that the company has reforested and rehabilitated, will benefit the local community and flora and fauna in the area.

The EIA stipulates that 20% of SAC-TUN's properties must be covered by forest. This represents a total of 434 hectares of protected forest within the company's properties.

2001

Vulcan acquires ICA's (its Mexican partner) stake in Crescent Market Companies, becoming the sole owner of CALICA.

2005

A reforestation campaign begins in *El Corchalito*. Over an initial 12-year period, approximately 2,885 seedlings are planted per hectare.

2019

In February, the *Donald M. James* (a ship named in honor of the retired Vulcan CEO), with a capacity of 68,000 tons, is formally christened at SAC-TUN's Marine Terminal. This ship, which was built at the same time as the *Ireland*, becomes the third in the fleet of the Vulica Shipping Company, a subsidiary of Vulcan.

2019

In September, CALICA changes its name to SAC-TUN and presents the first phase (2019-2021) of its Environmental Strategy, confirming our long-term commitment to environmental sustainability and to our communities, in addition to refocusing some of our activities to better contribute to overcoming the challenges and leveraging the opportunities in the region.

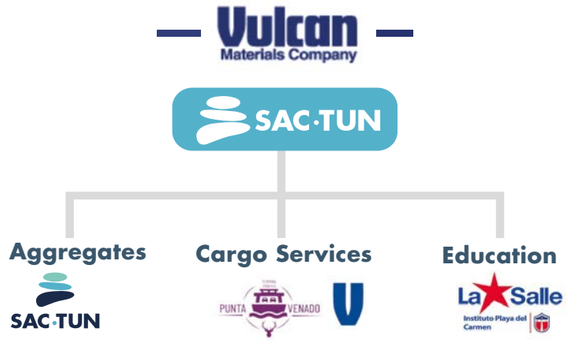
2020

In December, the Wildlife Habitat Council (WHC) certified SAC-TUN's Environmental Strategy as part of our program "Conservation of Biodiversity and Environmental Services in the Mesoamerican Reef." This certification recognizes the specific efforts of our new Environmental Strategy and SAC-TUN's commitment towards environmental conservation.

SAC-TUN
MEANS
"WHITE STONE"
IN MAYAN

SAC-TUN AT A GLANCE

Vulcan Materials Company is the leading producer of aggregates for the construction sector, primarily crushed stone, sand and gravel, in the United States. Vulcan's subsidiary in Mexico, SAC-TUN (previously known as CALICA) was created in 1986 close to Playa del Carmen in the state of Quintana Roo, and it is now our largest quarry. SAC-TUN is divided into three strategic components:



AGGREGATES – SAC-TUN QUARRY

SAC-TUN produces aggregates that have been used in the construction of most highways, toll roads and numerous hotels that now form the backbone of the Mayan Riviera's tourist industry, including the airports in Cancún and Cozumel. Equally important, we also ship aggregates by boat to major markets along the Gulf of Mexico coastline in the United States, areas that do not have enough high-quality stone available for quarrying.

MATERIAL TYPE	EXAMPLES OF USE
Concrete aggregate	Ready-mixed concrete
Asphalt aggregate	Asphalt mixtures
Base material	Foundation underneath highways
Stones larger than two inches	Industries including chemical, electricity, cement and steel
Stone powder	Concretes, masonry mortars, asphalt mixtures
Washed sand	Concretes, asphalt mixtures
Filler	Platform leveling

PUNTA VENADO MARINE TERMINAL

Our facilities include a public terminal and a private terminal. At the private terminal, we receive cargo vessels carrying bulk cargo, with a draft of 13.80 meters, the largest draft along the Mexican Caribbean coast. The terminal is used to transport the materials produced by SAC-TUN and we also receive cargo vessels transporting cement from other parts of the country.

The marine terminal is certified by the International Ship and Port Facility Security Code in Mexico, issued by the International Maritime Organization (IMO) in 2004.

Vulica, Vulcan's transport subsidiary, operates three Panamax vessels, each with a cargo capacity of more than 60,000 tons, which transport construction materials to markets along the Gulf of Mexico. These vessels use Dupont's Advanced Marine Scrubber System, a cutting-edge technology that minimizes air and sea pollution using approximately 40% less liquid fuel, and complies with regulations governing CO_2 emissions, ballast water and discharge, and suspended particles issued by the United States Coast Guard, the United States Environmental Protection Agency (EPA) and the IMO.

In 1993, we built a second public marine terminal at *Punta Venado* for use by passenger, vehicle and cargo vessels moving between the island of Cozumel and the mainland. This had a major positive impact on social and economic development in Quintana Roo and was, without a doubt, a significant factor in positioning Cozumel as one of Mexico's leading tourist destinations.

Since 2002, the *Punta Venado* Public Terminal (TPPV) has offered port services to companies transporting cargo and people to the island of Cozumel. The companies that currently have an operating permit from the federal authorities to offer cargo and people transport services are *Carga Más Por Menos* and *Transbordadores del Caribe*. These companies transport an average of 116,000 passengers per year, in addition to having transported 9.25 million tons of food and provisions over the past decade, helping to inject millions of dollars into the local and regional economies.

Our terminal is efficient and governed by the highest safety and environmental standards, demonstrated by the fact that we have operated for almost 30 years with zero incidents.

PLAYA DEL CARMEN - LA SALLE INSTITUTE

In 1989, the Playa del Carmen - La Salle Institute was founded, the first bilingual school on the Mayan Riviera. Every year it offers educational services to more than 540 preschool, elementary and middle school students. It is part of the La Salle Antillas-Southern Mexico community – one of more than 80 La Salle community groups throughout the world.

The construction of this Institute began in 1989 with the school opening its doors that same year to welcome its first 80 students. Since then, the Institute has continued to grow. It is managed by SAC-TUN as a non profit organization and is operated by the Salesian Society of Catholic Schools. SAC-TUN continues carrying out investments, maintenance and operational costs if and when necessary.

The Institute is currently recognized as one of the best elementary and middle schools in Quintana Roo. Its educational quality, the experience and dedication of its faculty, and its facilities offer students access to a cutting-edge multidisciplinary program. Its English programs are coordinated with Cambridge University's assessment system in the United Kingdom.

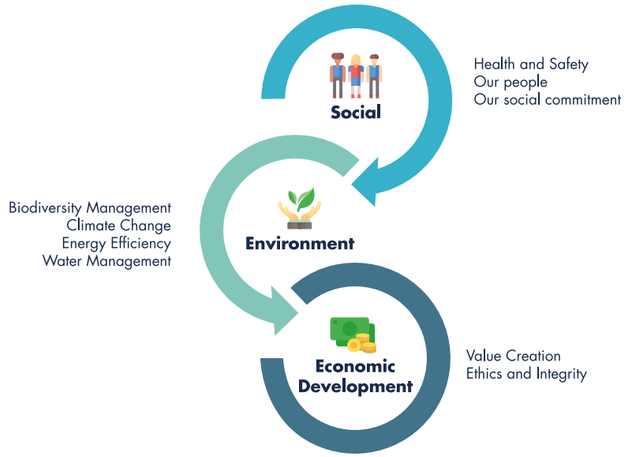
The Institute offers services to both the children and grandchildren of SAC-TUN employees and to the community of Solidaridad. It has 55 teachers and administrative employees. For more information, please visit: *http://www.ipclasalle.edu.mx/*

SUSTAINABILITY MODEL

SAC-TUN's commitment to the community, economic development, and environmental conservation has been reaffirmed through its Sustainability Model, which is an integral part of our philosophy and the company's strategies. And we strive to involve our stakeholders and work with them closely.

We continue driving ethical decision-making in all our operations, integrity among our employees, environmental conservation, and the holistic development of our community and our stakeholders. We achieve this through a focus on integrity and excellence.

Our Sustainability Model is based on three pillars:



In 2019, we undertook a materiality assessment, which allows us to identify and better understand strengths, opportunities, challenges and risks for the industry and for SAC-TUN. This study establishes the lines of action of our sustainability model and is allowing us to adjust our strategy. As a result of this assessment, we determined the relevant issues, and we are defining the objectives, actions and performance indicators that will be detailed during the coming years.

STAKEHOLDERS

- Employees
- Suppliers
- Customers
- Civil Society Organizations
- Regulators and Authorities
- Communities
- Educational Institutions
- Media

OUR RESPONSE TO COVID-19

SAC-TUN responded to the public health emergency and the impacts on its employees, customers, suppliers and the community through its COVID-19 Rapid Response Program, implementing a range of measures to safeguard people's health and safety, and ensure responsible business continuity.

Given its role as an essential service, SAC-TUN continued operating and focused on rapidly adapting to the circumstances, implementing a range of specific measures to avoid the spread of the virus based on both federal and state guidelines. Some of the measures we have taken in terms of health provisions include: the creation of a permanent Response Committee; the drafting and implementation of COVID-19 protocols; ongoing internal communication and training; safety measures and safe spaces; and a response plan to contain, mitigate and eliminate outbreaks. **The direct investment in COVID-19 measures in 2020 reached USD $431,217, which was used to adapt our operations to the conditions dictated by the pandemic. Furthermore, we supported our communities in the municipalities of Cozumel, Solidaridad and Othón P. Blanco through donations of personal protective equipment to healthcare professionals, specialist equipment for hospitals, and pantries and food supplies through an investment of USD $77,607.**

OUR PEOPLE

Apart from the tourism industry, SAC-TUN is the leading source of employment in Quintana Roo. In 2020, our team was composed of 409 workers and professionals, who, alongside their families, represent around 1,400 people who depend on SAC-TUN.

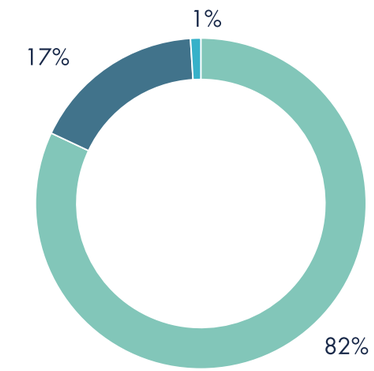
Every single person who is part of SAC-TUN's workforce represents a significant number of consumers who bolster and stimulate the local economy and society in general.

**Only SAC-TUN Quarry collaborators are included*

The members of our large SAC-TUN family all live what is called "The Vulcan Way" — doing the right thing, the right way at the right time. We love, we value, and we are passionate about our jobs; we are extremely proud of our company and what we have achieved; we always honor our commitments; and, most importantly, we enjoy what we do, and we hope that our children, our grandchildren and the generations to come will continue this legacy.

José María Xacur
Human Resources Manager

Employees by category



Employee Diversity

Age	Men	Women
20-29	114	1
30-39	111	2
40-49	97	6
50-59	62	6
60-69	8	1
70-79	1	0

Turnover Rate (By age)

Age	Men	Women	Total	Percentage
20-29	9	1	10	38%
30-39	7	0	7	27%
40-49	7	0	7	27%
50-59	2	0	2	8%

HEALTH AND SAFETY

Safety is paramount for SAC-TUN because our employees are what is most important to us. We recognize the responsibility we have to them, their families and to every member of our team. Therefore, our operations go beyond ensuring compliance to make our workspaces safe. We follow an Occupational Health and Safety Self-Management System, which helps detect and prevent any risks to which our employees are exposed. By detecting risks early, we work together to ensure that what we are doing is safe and complies with Official Mexican Standards (NOM, for its acronym in Spanish). We also comply with other applicable standards, including those mandated by MSHA (United States Mine Safety and Health Administration) and OSHA (United States Occupational Safety and Health Administration).

We respond to questions and comments about risks, and we promote ongoing improvements that will drive safer processes and facilities. To do so, we rely on the active participation and commitment of our employees.

In compliance with regulations, we created a Health and Safety Commission, which is composed of employee and employer representatives. Our major goal is to avoid accidents and illnesses in the workplace by proposing solutions and resolving conflicts.

The Commission has a coordinator, a secretary, an employee's leader or worker representative, and spokespersons. All members of the Commission are volunteers. The Commission's functions include:

- Investigating the causes of accidents and illnesses
- Proposing prevention measures
- Monitoring proposed measures and ensuring compliance

The Commission has an annual inspection plan covering different areas within the company. Inspections are undertaken monthly, and all comments are recorded and tracked in a report which designates the responsible persons for each item.

5.08 million accumulated man-hours with no disabling accidents

We prioritize the promotion of a culture of safety and, thanks to the shared commitment, dedication and teamwork of our workforce, we have successfully achieved excellent safety levels.

We strive to communicate our culture of safety and prevention not only among our employees, but also among their family members. We achieve this through the Safety Week that we have held every year since 1995, during which we organize training and team-building activities. As part of our 26th Safety Week, we focused on sharing preventive measures to ensure a safe return to work under the COVID-19 pandemic. Regular guests during Safety Week include the Mexican Red Cross, firefighters, Civil Protection brigades, suppliers, and employees and their families.

We monitor employee exposure to noise and dust, through an annual medical checkup. We believe that having healthy employees and a positive and safe work environment benefits everyone.

Employee training, development and benefits

We focus on promoting opportunities to ensure that each employee prospers and develops his/her full potential. Through our Annual Training Program, we ensure that our employees receive the training needed for their posts. In 2020, we offered an average of 24 training hours per employee, both face-to-face and online.

Personnel	Training hours
Administrative	1882
Operations	7676
Management	103
Suppliers	589

THE BENEFITS AND ALLOWANCES THAT WE OFFER OUR EMPLOYEES, DEPENDING ON THEIR POST, INCLUDE:

- Benefits required by law
- Savings fund
- Life insurance
- Major medical insurance
- Scholarships for their children and grandchildren at the Playa del Carmen-La Salle Institute
- Transport
- Subsidized food services (breakfast and lunch)
- Financing for medical services
- Production, attendance, safety and management bonuses, among others
- Tuition reimbursement
- Company cars for managers, superintendents and supervisors
- Vacation bonus above that required by law
- Christmas bonus above that required by law
- Rent support
- Filler material for construction
- Sports facilities
- Medical treatment
- Fuel

Furthermore, SAC-TUN has 112 two-bedroom housing units for our employees in a residential complex that has recreational facilities. It is located in the center of Playa del Carmen, adjacent to the Playa del Carmen - La Salle Institute, and only eight kilometers from the company's facilities. Nearly 30% of our employees (in families of four on average) live in these residential units.

As part of our hiring policy, SAC-TUN clearly states that only adults will be hired, meaning that no form of child labor is used. We also respect our employees' right to freedom of association and collective bargaining, and we focus on safeguarding their fundamental rights.

Photo by: VictorTaurus / shutterstock.com

OUR ENVIRONMENTAL PERFORMANCE

It is our conviction and commitment that our sustainable and responsible operations benefit our communities and produce positive long-term results. At SAC-TUN, we focus specifically on using natural resources and raw materials responsibly, in addition to safeguarding biodiversity through a variety of conservation efforts on our properties and throughout the Yucatán Peninsula. We collaborate with civil society organizations, educational and research institutions, and local, state and federal authorities to protect nature and water resources, in addition to mitigating the impacts of our operations.

ENVIRONMENTAL BEST PRACTICES IN OUR OPERATIONS MANAGEMENT

At SAC-TUN, we focus specifically on conserving areas within our property and ensuring clean and organized operations that guarantee maximum efficiency and a risk-free working environment to ensure the safety and health of our employees, visitors and the community.

The environmental regulations and standards that we comply with exceed those established for the industry in Mexico (NOM-120-ECOL-1997 and NOM-120-SEMARNAT-2011). We follow the standards developed by the American Conference of Governmental Industrial Hygienists in the United States and the Best Practices of the National Stone Industry: Quarry Site Maintenance and Closure from the Center for Clean Products at the University of Tennessee, in collaboration with the Natural Stone Council in the United States.

On six occasions, we have received the Clean Industry Certification issued by the Mexican Environmental Protection Agency (PROFEPA). This certification is valid for two years and recognizes the company's strict compliance with national and international standards in the areas of management and best environmental practices.

We are also constantly exploring new technologies that allow us to further reduce our environmental impact.

We ensure strict compliance with best workplace and environmental practices to minimize our impact, including:

- Regular maintenance in all operational areas
- Dust management
- Noise and vibration reduction
- Waste management
- Fuel and emissions management
- Soil and ecosystem sound management

Photor: New Africa / shutterstock.com

ON-SITE CLEANING AND MAINTENANCE

At SAC-TUN, we focus on ensuring the rigorous application of good maintenance practices at all our facilities. Our team is tasked with:

- Maintaining all building, facilities and equipment in optimum conditions
- Maintaining gardens and green areas
- Maintaining roads and paths. All paths within our properties and on quarry access roads are regularly covered with recycled and compacted gravel and limestone fragments
- Watering down the roads to minimize dust. We have dust control trucks that spray water on the gravel roads during operating hours
- Installing and maintaining signposts for road safety measures and animal crossings
- Collecting and recycling waste from our facility for off-site disposal in an environmentally-responsible manner
- Applying strict safety protocols
- Disposing of engine oil, lubricants, grease and other waste in strict compliance with environmental regulations. We focus specifically on maintaining fuel and lubricant storage areas, taking all necessary safety measures to avoid spills and accidents that could damage the environment
- To keep fuel and lubricant consumption down and limit CO_2 and other gas emissions, SAC-TUN's quarry has been designed to reduce the distances that trucks drive to haul limestone to the stone crushing plant. We also closely monitor the state of our fleet of trucks and machinery, and we regularly replace them to increase energy efficiency and decrease our carbon footprint
- Replacing and recycling (when possible) obsolete equipment and used machinery parts. Obsolete equipment and machinery parts are stored in specially designated areas before being sold for scrap to certified clients.

Thanks to the maintenance we undertake at our facilities, we ensure a safer workplace and a lower risk of accidents, in addition to decreasing the impact we have on the environment and increasing our efficiency and overall performance.

DUST MANAGMENT

Besides watering down both on-site and quarry access roads to prevent it from spreading, we also protect the natural forests around the perimeter of our quarries and reforest the slopes on the quarry edges. The structures created by the roots of smaller vegetation help ensure soil stability and prevent erosion, while taller trees act as filters, creating a physical barrier against dust that could be spread by the wind.

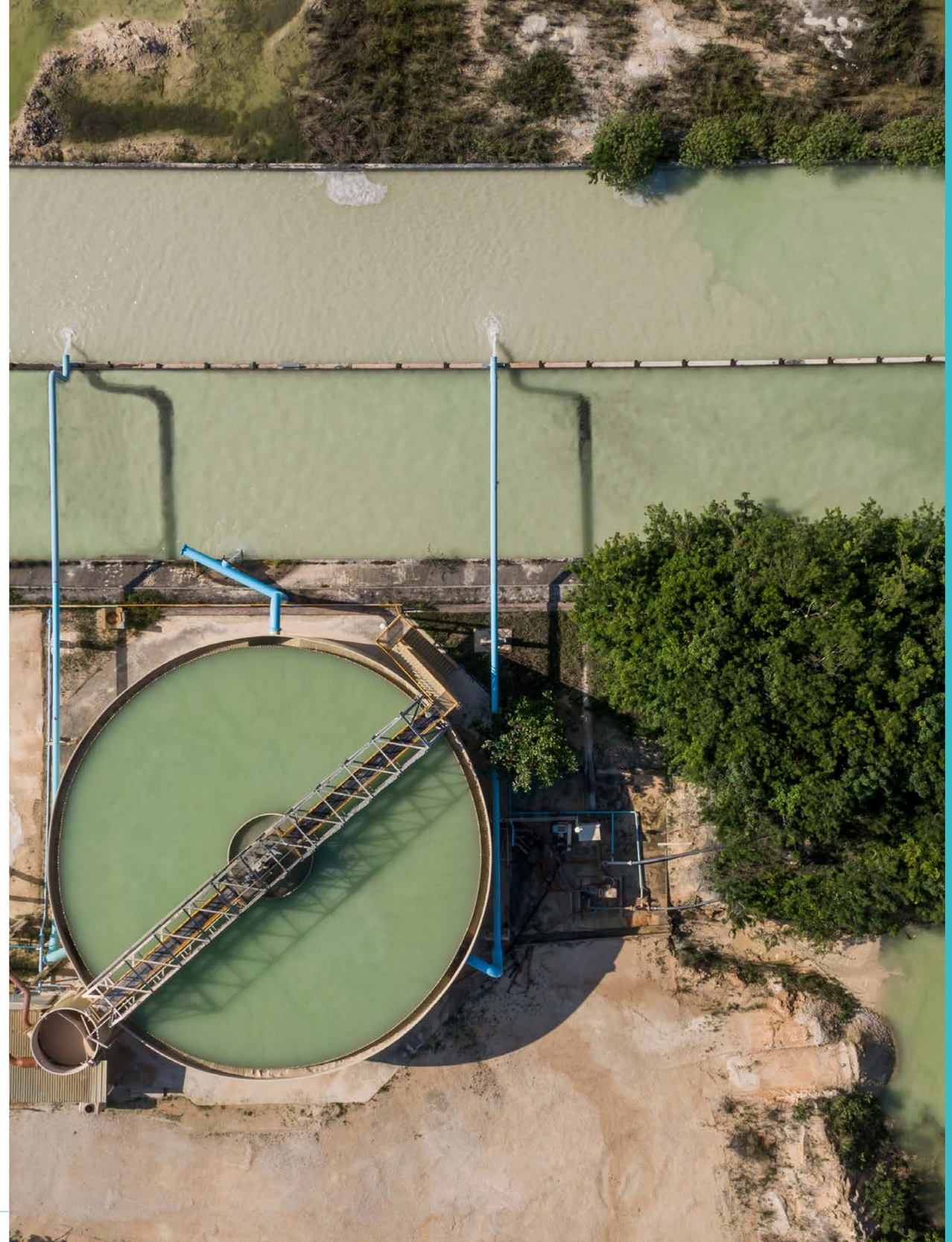
NOISE AND VIBRATION REDUCTION

To limit the impact of noise and vibrations on neighboring communities, local fauna and the Mayan archaeological sites, we have implemented best practices in all our operations, including:

- Using sirens to forewarn people ahead of scheduled and controlled blasts, which are undertaken under military supervision
- Using the least possible amount of explosive material and micro-sequencing detonations to reduce vibrations, depending on the hardness and location of the limestone
- Blasting when there are few employees working in the quarry
- Requiring that all people stay at least 500 meters away from the detonation area (Mexican law stipulates that the minimum distance is 300 meters)

Thanks to these measures, preliminary observations during blasting indicate that the birds found in the conservation and reforested areas within SAC-TUN's properties are not affected. We commonly observe a wide variety of fauna in the surrounding areas, including Central American spider monkeys (*Ateles geoffroyi yucatanensis*), brocket deer (*Mazama pandora*), Yucatan coati (*Nasua narica yucatanica*), the eastern chachalaca (*Ortalis vetula*) and the black spiny-tailed iguana (*Ctenosaura similis*).

There has been no recorded damage to the Mayan archaeological sites as the result of SAC-TUN's operations. We spare no effort to protect these sites, and they are regularly inspected by experts from the INAH to guarantee their optimal conservation.



WASTE MANAGEMENT

WASTEWATER MANAGEMENT

The water we use to wash the crushed stone is recycled and reused after passing through two tanks: one in which we reduce the number of suspended solids, and the other in which fine sediment is removed using a centrifuge system. Stormwater runoff is slowed in contoured, low-gradient drains and channels, as well as in retention ponds that are used to remove sediment before discharging the water into natural channels. Sanitary wastewater is transported to septic tanks where it is filtered. Water samples are collected regularly to confirm that the quality of the freshwater in the cenotes and artificial lakes remains in optimum conditions.

Dismantling and recycling obsolete equipment, used parts, infrastructure and machinery that will no longer be used.

We attempt to recycle or reuse as much of the waste generated as possible, including used machinery parts, packaging materials, water and engine oil.

Waste recycling.

We recycle waste and store it in designated areas until we can send it to an off-site recycling plant. Furthermore, we regularly take all waste that cannot be recycled and store it, following all necessary safety measures, at designated collection points until it can be transported off-site.

Environmentally friendly disposal and use of quarry waste to reclaim land.

Scrap stone and limestone waste are used to refill the slopes of our artificial lakes, are crushed to be used as road surfacing or are sold to local buyers.

FUEL AND EMISSIONS MANAGEMENT TO MINIMIZE OUR ENVIRONMENTAL IMPACT

We strictly monitor the management of fuels, lubricants and chemical storage sites, taking all precautions to prevent spills and accidents and implementing strict management protocols to control any incident that could cause spills to reach waterways and affect aquatic life, terrestrial fauna or damage the environment.

The locations where we carry out vehicle maintenance are designed with appropriate storage areas for used engine oil and other lubricants storage until they are recycled (when possible) or properly disposed in strict compliance with federal laws.

To reduce fuel and lubricant use and limit emissions, SAC-TUN's quarry has been designed to minimize the distance that trucks travel to transport rock to the crushing plant. Furthermore, to reduce fuel waste and emissions, we switch off machinery and vehicle engines when not in use. All roads are properly signposted, and drivers are instructed to always remain on designated roads, helping avoid erosion of the areas around the roads.

We also have a strict maintenance schedule for our fleet of trucks and machinery, and we replace them with more advanced equipment on a regular basis to increase energy efficiency and limit our carbon footprint.

SOIL MANAGEMENT AND ECOSYSTEM CONSERVATION

To preserve the environmental resilience and stability of our properties, including the Mayan archaeological sites they contain, we implement detailed conservation plans as required by our Environmental Impact Assessment (EIA).

We have also suspended all extraction operations at *Punta Venado*. We will designate it as a natural forest conservation area that is 20% larger than required by the EIA. The area also includes three Mayan archaeological sites and four cenotes.

Application of best environmental practices in SAC-TUN's operational management and the reforestation of degraded land

We apply best environmental practices to maintain and improve the environmental resilience and firmness of the land in our properties and at the protected Mayan archaeological sites. These include restoration and reforestation plans to transform the quarried area and their perimeters into an interconnected area of artificial lakes and wildlife corridors.

Since 2005, we have been working to reforest and restore the slopes that connect forest conservation areas and these lakes. Additional hectares will eventually be contoured and reforested to be transformed into an interconnected forested ecosystem linking the lakes, cenotes, and other water sources. This will allow the region's fauna to move freely between different sources of freshwater.

Figure 1. The forest on the right of the path is part of the conservation area. The forest on the left was planted by SAC-TUN in 2003 on the slopes that lead to one of the artificial lakes and which already have trees that are as tall as those found on the natural forest. This may be due, in part, to the more than one meter of topsoil that was re-applied to these slopes, compared with the 10-cm-deep layer that originally existed. Natural soils in our properties are rich in organic matter but thin, highly porous and permeable due to their granular structure. They are easily eroded by wind and heavy rain.

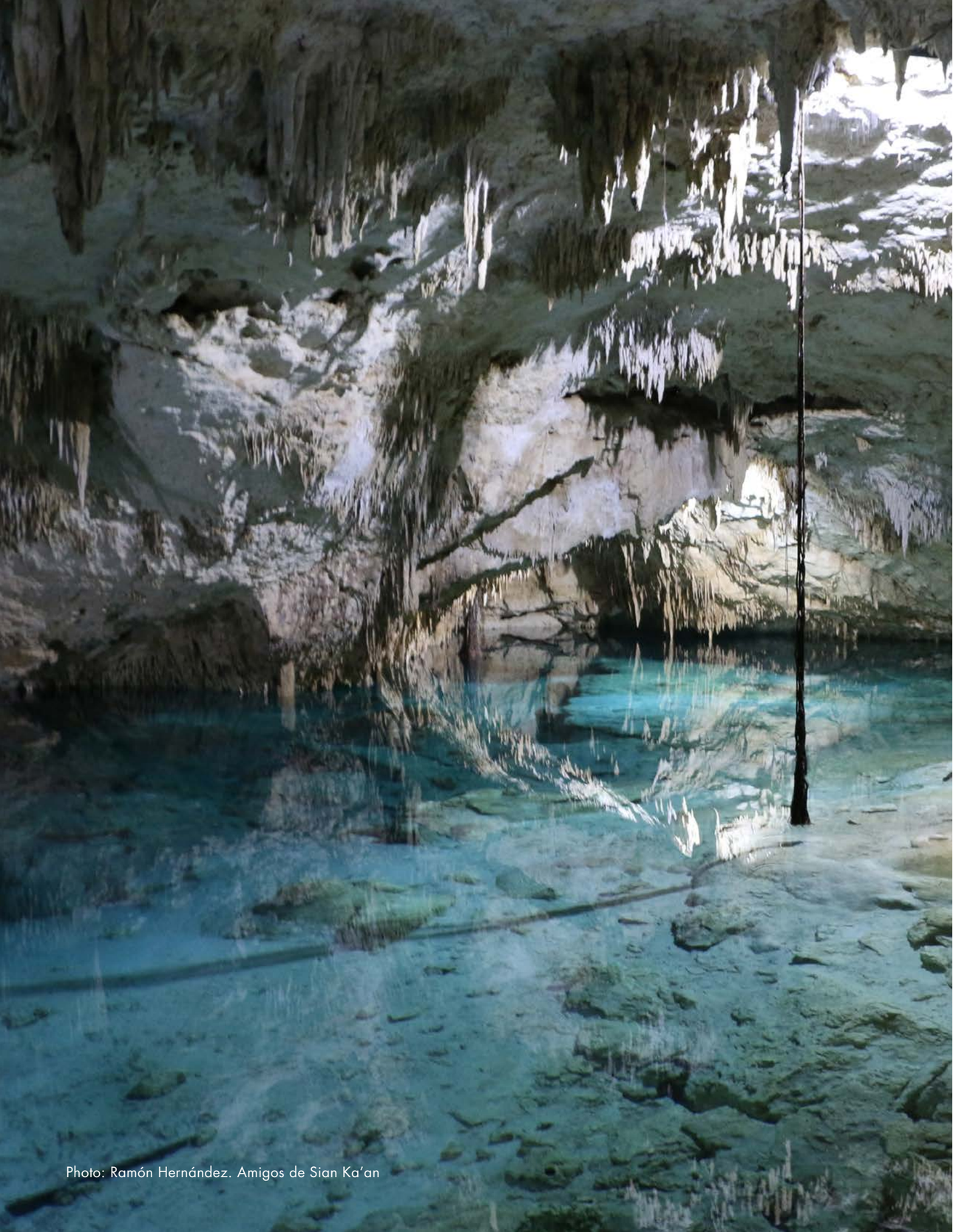


Photo: Ramón Hernández. Amigos de Sian Ka'an

The best practices we follow prior to quarrying include:

- Carrying out an assessment to identify safety and environmental risks that would need to be addressed when rehabilitating and restoring bodies of water and land. This risk assessment encompasses parameters such as hazardous alterations to the landscape (wells, deep holes, etc.), gradients, geological features, the potential for erosion, and the groundwater system responsible for maintaining water quality (helping to avoid water and soil pollution)

- Researching local wildlife populations to identify any threatened or endangered species in the areas in which the limestone will be extracted

- Ensuring that downstream ecosystems and water bodies will not be affected

- Applying strict measures to avoid contaminating the soil with oil, grease, fuels, etc

- Maintaining the maximum amount of existing vegetation possible, especially on both sides of the roads

- Reducing, as much as possible, the extraction of superficial and endemic vegetation and avoiding damage to trees and other protected vegetation in the areas in which the limestone will be extracted

- Relocating (to the extent possible) any native plants with ecological importance and young trees from the areas to be quarried, and using them to reforest or restore our properties

- Extracting a layer of topsoil of approximately 10 cm, conserving it in specific areas to avoid damage or erosion, and using it to restore and reforest quarried areas

- Removing underlying layers of soil from planned quarrying areas and storing it in locations where it will not be affected by stormwater, obstruct the natural flow of bodies of water, or affect the natural vegetation

During quarrying operations, we halt all activities in any areas where we detect any new Mayan archaeological sites and inform INAH of these findings.

Post-quarrying, the best practices we follow include:

- Using limestone waste, in addition to the soil and organic residue extracted at the beginning of quarrying operations, to shape the perimeter of the land surrounding artificial lakes, on top of which we put a layer of topsoil to create stable slopes leading down to the artificial lakes so animals can access the water.

- Engineering the slopes to an angle of approximately 26.5° or less to reduce erosion and sedimentation. This is more environmentally favorable than the angle of 30° to 45° as mandated in the EIA and has the added advantage of allowing wildlife to move easily between the forested areas and the lakes

- Reapplying the removed topsoil as soon as reforestation and restoration activities take place. This helps ensure that the plants can better establish themselves and facilitate the survival of invertebrates, such as worms and other important soil fauna. When this layer of soil is placed on small areas that are undergoing rehabilitation, the soil depth is significantly higher than it was before the limestone was extracted. This thicker layer of topsoil may be one of the reasons why the trees in these reforested areas grow faster, allowing us to successfully generate forests in a relatively short period of time.

- Reforesting the slopes with native vegetation, including trees, bushes, seedlings, grasses and other vegetation that were extracted prior to operations. This includes the planting of seedlings that we grow in our tree nursery, in addition to using cuttings (branches that have been cut from older trees). Based on our experience, this is one of the best techniques for reforesting degraded areas. When we began reforesting degraded areas in 2005, we exclusively used seedlings from native tree species reproduced in our tree nursery. We then learned that cuttings from various species – with regular and careful maintenance – can be successfully used for reforestation.

- Planting an average of 2,885 trees per hectare, a much higher number than the 500 recommended by the National Forestry Commission (CONAFOR). Our inventory of reforested areas shows a survival rate of about 90% (about 2,539 trees per hectare), although some of these trees may have grown from seeds that were spread naturally by animals or the wind.

- Implementing a specially designed program to protect and maintain trees and plants used in reforestation and restoration activities, including spraying seedlings and cuttings regularly until they are well established.

- Monitoring and evaluating the success of previous reforestation activities using native species and applying the lessons learned to our current efforts.

- Establishing corridors to connect different quarried sites with the artificial lakes, cenotes and other aquatic ecosystems on SAC-TUN's properties for the benefit of the region's fauna.

SAC-TUN's tree nursery

The trees used for reforestation come from the tree nursery that we established in 1990 and which currently produces 23 native species, including four endangered species that are protected by Mexican wildlife legislation. The goal is to identify, collect, relocate and protect species of flora that are at risk, using them in reforestation and restoration activities, both for our properties and to be donated to communities in Quintana Roo to help enhance schools, parks, local gardens and public spaces. Thanks to the efforts of all those involved, the tree nursery was certified as an Environmental Management Unit (UMA, its Spanish acronym) by SEMARNAT.

Over the years, we have compiled a large amount of data about local endangered tree species and the environmental conditions they need to thrive, as well as data on other flora and fauna on our properties. We have also supported scientific research on endangered tree species of the Yucatán Peninsula and the methods used to maintain reforested areas to ensure the survival of the trees planted.

We are currently expanding the tree nursery as part of the *Wakah Chan* (Tree of Life) Botanical Garden, which focuses on scientific research and educational activities, in addition to increasing seedling production to 200,000 per year.

Photo: Jeo Riis. Amigos de Sian ka'an

Wildlife Habitat Council Certification

In December 2020, the Wildlife Habitat Council (WHC) certified our SAC-TUN Environmental Strategy as part of our Mesoamerican Reef Biodiversity and Environmental Services Conservation program. This certification recognizes SAC-TUN's specific efforts and commitment to environmental conservation both on our properties and within the region.

In 2016, our tree nursery received the prestigious Species of Concern Project Award from the WHC, which recognizes excellence in corporate conservation. This was awarded to SAC-TUN for its efforts to save species protected by Mexican wildlife legislation (NOM-059-SEMARNAT-2010), as well as for our long-term commitment to environmental conservation.

Our tree nursery is currently home to 23 native plant species, including the cedar, *chit, kuka* and *nacach* palms, which are all endangered. At the nursery we also have a large kapok tree to remind us of the sacred role that this tree plays in Mayan communities and for collection of its seeds for use in our local reforestation projects.

We are transforming the tree nursery to become part of the *Wakah Chan* (Tree of Life) Botanical Garden, a space dedicated to scientific research and education. As the botanical garden grows, our goal is to increase production of seedlings used for reforestation. These will be used in reforestation efforts both on SAC-TUN's properties and in other areas within the region.

When the botanical garden is in place, it will be open to the public and we will be organizing guided tours for local schools and our neighboring communities.

Figure 2. SAC-TUN's tree nursery currently houses 23 different species of trees, four of which are endangered: the cedar and *chit, kuka and nacach* palms. Many of the trees that we produce are donated to the local community, while the rest are planted on the 20% of our properties that are designated conservation areas. We will expand our tree nursery to include it as part of our Wakah Chan (Tree of Life) Botanical Garden. The photograph shows a large kapok tree that we conserve to highlight the sacred role that this tree plays in Mayan communities. According to Mayan mythology, the kapok tree is the tree of life, connecting the underworld and the spiritual world. The Mayans believed that the kapok provided protection, and they were seen as a symbol of eternal life and prosperity.

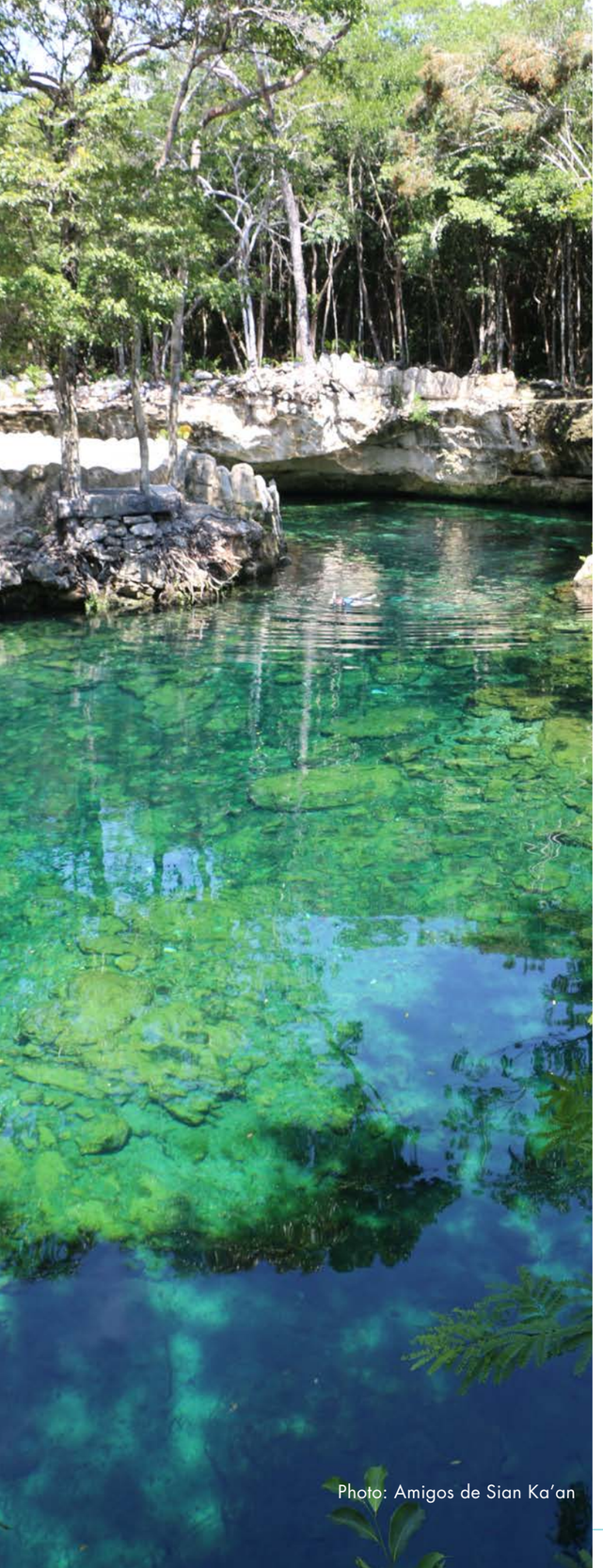


Photo: Amigos de Sian Ka'an

SOIL MANAGEMENT AND ECOSYSTEM CONSERVATION

Transforming artificial lakes into functional aquatic ecosystems

The extraction of limestone from our quarry has created artificial freshwater lakes, and we have devoted important efforts to turn these into viable aquatic ecosystems. In the years to come, these lakes will become extremely valuable areas for conservation, scientific research and, eventually, recreational purposes. The Yucatán Peninsula does not have many large bodies of water or rivers, which is why, in the future, these lakes could become recreational areas for local communities and used for ecotourism.

Once the limestone reserves found in SAC-TUN's properties have been exhausted, ensuring these ecosystems remain viable requires a comprehensive approach that encompasses the interaction between the forested lands and lakes, as well as their use for scientific research, cultural preservation, ecotourism, cultural tourism and recreation. To achieve this, we are considering a landscape planning approach while assessing and designing the environmental restoration of this land and its sustainable use in the future.

SAC-TUN AS A SUPPORTER OF ENVIRONMENTAL RESPONSIBILITY

Our parent company, Vulcan Materials Company, has 37 sites that are certified as wildlife habitats by the Wildlife Habitat Council (WHC). This is the fourth largest number of certified sites of any industrial company in the U.S.

In Quintana Roo, SAC-TUN is striving to achieve this same legacy. In December 2020, the WHC certified our SAC-TUN Environmental Strategy as part of our Mesoamerican Reef Biodiversity and Environmental Services Conservation program. This certification recognizes SAC-TUN's specific efforts and commitment to environmental conservation on our land and within the region.

SAC-TUN aims to be a leader in environmental responsibility, both within our industry and across the Mesoamerican Reef.

We are aware that our success and sustainability depend on our commitment to the environment. We know that we are privileged to be working in some of the most outstanding landscapes in Quintana Roo, the Yucatán Peninsula, Mexico and the world.

Figure 3. The Mesoamerican Reef is the second largest coral reef in the world. It is home to unique and valuable ecosystems, such as coastal mangrove forests, coastal lagoons, seagrasses, and cenotes.

We fully recognize the value of the Mexican Caribbean Biosphere Reserve and its associated protected areas, given the natural beauty, unique biodiversity, and environmental services they provide for the population, including freshwater harvesting, CO_2 capture and the protection of coastlines and people against extreme climate events and rising sea levels.

The Mesoamerican Reef covers more than 1,000 kilometers along the coast of the Caribbean Sea, from the Yucatán Peninsula in Mexico to Belize, Guatemala and Honduras. It is the world's second largest coral reef and is home to a wide range of flora and fauna, as well as feeding and breeding grounds for species of environmental and economic importance. It is also home to unique ecosystems such as coastal mangrove forests, coastal lagoons, seagrasses, cenotes and more than 66 species of coral.

SAC-TUN AS A SUPPORTER OF ENVIRONMENTAL RESPONSIBILITY

At SAC-TUN, we value the cultural significance of the areas in which we work. Therefore, for decades we have been committed to preserving the unique Mayan archaeological remains found on our properties. We know that it is our ethical duty and responsibility to continue preserving and respecting these ancestral sites.

For the 34 years that SAC-TUN has been working in Quintana Roo, we have followed strict codes and standards related to safety, environmental and operational measures as required by Mexican laws and regulations. In fact, our operating standards have been designed to go beyond what is required by environmental regulations to limit the impact we have and better protect the natural environment.

We are proud that, on six separate occasions, PROFEPA has awarded us the *Clean Industry Certification*, highlighting our strict compliance with national and international standards and operational and management best practices.

We are committed to restoring and reforesting quarried areas with natural vegetation to recreate the ecosystems on which our local flora and fauna depend. As we continue our quarrying operations, we have built a team of environmental specialists, biologists, hydrologists, geologists and forestry experts to help us design strategies to establish corridors of forested land between the quarried lakes and the cenotes so that fauna can roam freely and have ample access to these freshwater sources.

Figure 4. The Yucatán Peninsula is well known for its cenotes, which are formed when the limestone collapses to reveal underwater caverns. Cenotes are an important source of freshwater in the region. On SAC-TUN's properties, we will be establishing biological corridors to allow wildlife to roam freely and access these sources of freshwater.

SAC-TUN'S ENVIRONMENTAL AWARDS

Wildlife Habitat Council award

In 2016, SAC-TUN's nursery was certified by the Wildlife Habitat Council (WHC) as a Species of Concern Project focusing on conservation. This award highlights SAC-TUN's efforts to identify, relocate and propagate plant species that are native to the region.

In December 2020, the WHC certified SAC-TUN's Environmental Strategy as part of our Mesoamerican Reef Biodiversity and Environmental Services Conservation program. This certification recognizes SAC-TUN's specific efforts and commitment to environmental conservation on our properties and the region.

SEMARNAT Certification

SAC-TUN's nursery was also certified by SEMARNAT as an Environmental Management Unit (UMA), recognizing our work to conserve species included on the list of flora and fauna that are endangered, threatened and at-risk (NOM-059-SEMARNAT-2010).

Figure 5. At SAC-TUN, we are committed to restoring and reforesting with natural vegetation the land we have quarried, helping recreate the ecosystems on which the flora and fauna depend.

We have always planned to keep one-fifth of our properties covered in natural vegetation, and we have now established an additional 6.5 hectares. The new area is being transformed into a botanical garden that will be open to the public, offering visitors the opportunity to learn more about the ecology of Playa del Carmen, Quintana Roo and the Mesoamerican Reef.

We are also transforming our current tree nursery to be part of *Wakah Chan* (Tree of Life), SAC-TUN's Botanical Garden, an innovative community center that will provide a space for education and an area for meetings and workshops. These facilities will also enable us to work more closely with our neighbors to help raise awareness of social and environmental issues, as well as involving our employees, their families and the community as a whole in our environmental and social projects and activities.

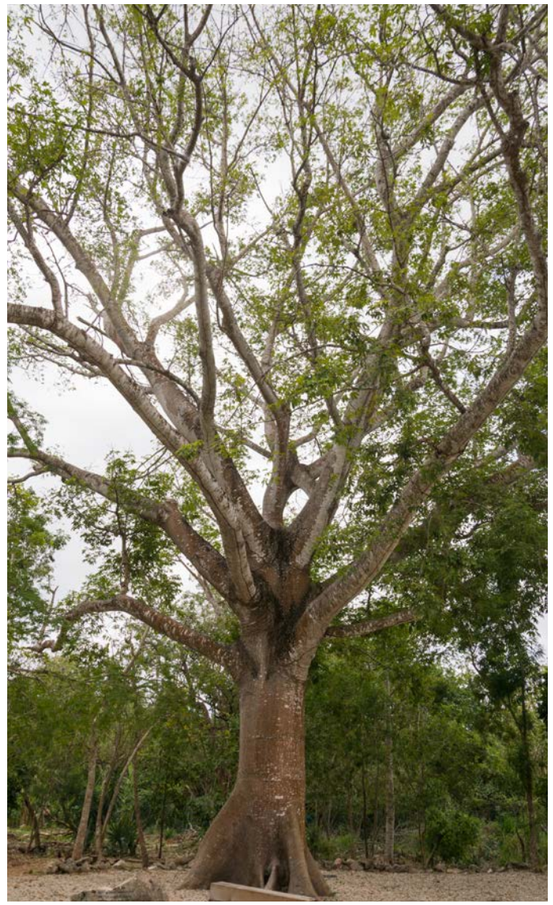


Figure 6. *Wakah Chan* (Tree of Life) at SAC-TUN.

Beyond the limits of our properties, we are also working with prestigious environmental civil society organizations, scientific research and educational institutions, government agencies and local communities to develop programs that conserve, protect and restore flora and fauna within the Mesoamerican Reef. We work closely with the National Commission on Natural Protected Areas (CONANP) of the Mexican Secretariat of the Environment and Natural Resources (SEMARNAT) and the Quintana Roo State Secretariat of Ecology and the Environment (SEMA) to enhance the management and conservation of numerous federal and state natural protected areas.

These projects are grouped into four programs that support the conservation of endemic, threatened or endangered plant and animal species: the conservation of priority environmental services and ecosystems that help strengthen the adaptation of humans and nature to climate change; environmental education and citizen science; sustainable fishing communities; and special projects such as addressing the challenge of sargassum seaweed influx along the Mayan Riviera and the negative effect it has on ecosystems and the tourism industry.

These four programs directly support the management of protected areas and the conservation of species of local, national and global importance. They have also been designed to contribute to social and economic development and the well-being of local communities.

This is just one of the many ways in which SAC-TUN strives to contribute to the long-term sustainability of the Mesoamerican Reef, one of the most wonderful regions on the planet.

SAC-TUN'S VISION: DRIVING ECONOMIC DEVELOPMENT AND LEADING BY EXAMPLE IN SOCIAL AND ENVIRONMENTAL SUSTAINABILITY

As part of its focus on long-term sustainability, in 2018 SAC-TUN commissioned an external and independent assessment of our activities with a view to exploring opportunities for new environmental initiatives and further mitigating the impact of our quarrying operations. Based on this assessment and on our years of operational experience, we devised a long-term environmental strategy and vision, which is considered by state authorities and civil society organizations as a benchmark for other companies and industries in Mexico. Our strategy is the continuation of the corporate environmental vision we have had for more than 100 years, one that has guided the operations of our parent company, Vulcan Materials Company.

Figure 7. "For all of us at SAC-TUN, the health and safety of everyone who works at, or visits, our company are of the utmost importance, highlighting our role as leaders within a framework of ethical values and honesty to drive the efficient production of high-quality stone aggregates. We feel proud of what we do.". ***Carlos Lesser - Operations Manager.***

Vulcan has always prioritized environmental and social responsibility in all its operations, striving to go beyond what is required by environmental standards and regulations. Its operations in California, U.S., are a benchmark for energy efficiency and the reduction of greenhouse gas emissions, and one of its plants in Louisiana has implemented new standards to limit water use and maintain the quality of this vital natural resource. Vulcan strives to protect the environment at its sites and the surrounding areas and has supported the establishment of wildlife sanctuaries in California, Florida and Georgia, as well as numerous scientific studies, scholarships for marine science students, and the construction of artificial reefs. As part of these activities, Vulcan works closely with a multi-disciplinary team of specialists, including geologists, hydrologists and environmental experts, who work on designing and applying environmental best practices in all aspects of the company's operations.

At SAC-TUN, we follow the same philosophy and commitment to environmental and social responsibility in all our operations in Playa del Carmen and Solidaridad. This is what has led us to design and implement the first three-year phase of the SAC-TUN Environmental Strategy, which we launched in 2019.

SAC-TUN ENVIRONMENTAL STRATEGY

THE FIRST PHASE (2019-2021) OF OUR ENVIRONMENTAL STRATEGY *(https://sactun.com)*

Focuses on four tiers:

First, we are increasing our environmental conservation activities that focus on restoring and reforesting the areas of our properties from which we have quarried limestone, with an emphasis on the long-term benefits for wildlife and the local community.

Second, we are taking measures to limit the impact that new quarrying operations have on the fauna and flora, and we have allocated additional forest zones to function as biological corridors that allow species such as jaguars and other felines to move freely within our properties and cross into neighboring properties.

Third, we aspire to become one of the leading companies that supports scientific research and the conservation of the Mesoamerican Reef (the second most important barrier reef on the planet), specifically the Mexican Caribbean Biosphere Reserve and associated priority protected areas.

Fourth, we are expanding our scope to encompass areas such as environmental and cultural education, scientific research, capacity-building and volunteering projects to promote sustainable human communities and motivate our neighbors to join these efforts and actively participate to protect the emblematic and beautiful landscapes of Quintana Roo.

"This program represents several months work, but it is also a long-term commitment between Vulcan Materials Company and the Quintana Roo state government. SAC-TUN's commitment and work deserves our profound gratitude and recognition and is part of its vision to remain in Quintana Roo and foster environmental and social sustainability." – Alfredo Arellano, Head of the Quintana Roo Secretariat of Ecology and Environment (SEMA) on September 29, 2019, during the ceremony to launch SAC-TUN's environmental strategy and new vision, with its partners from civil society, academia and scientific research institutions.

Photo: Adalbert Dragon / shutterstock.com

Our plan of action

During the first three-year phase, we are focusing on Quintana Roo where the state government currently coordinates the conservation of 312,860 hectares in 10 protected areas, reserves and conservation zones that are home to immense biodiversity in the state's forests, wetlands and marine ecosystems.

We believe that we can be most effective by offering our resources and support to educational institutions, civil society organizations, government agencies and scientific institutes, as well as fishing cooperatives and other stakeholders who have spent a number of years working on projects and programs that have an impact on the components of the management plan for the Mexican Caribbean Biosphere Reserve and associated protected areas, coordinated by the National Commission for Protected Natural Areas (CONANP): Research, Manage, Conserve, Restore and Protect natural resources.

SAC-TUN'S ADDED VALUE

Mexico is the fourth most biodiverse country and the second in diversity of ecosystems. Despite only occupying 1% of the Earth's surface, our country is home to 10% of the planet's animal and plant species, 40% of which only exist in Mexico.

We have identified four priority areas in which we believe that SAC-TUN's resources will be particularly useful at a local, state, national and global level:

1. Conservation of endemic, threatened, and endangered species of flora and fauna.
2. Conservation of ecosystems and priority ecosystem services to strengthen the adaptation of humans and nature to the impacts of climate change.
3. Support for environmental education, citizen science and sustainable fishing communities.
4. Special priority projects (for example, contributing to address the sargassum seaweed challenge in the Mesoamerican Reef).

To drive our quest for tangible and demonstrable results, and through an initial investment of USD $1.5 million for the first phase of this strategy, SAC-TUN directly supports the work of a number of civil society organizations, scientific institutions and environmental state and federal authorities.

Figure 8. In September 2019, SAC-TUN signed an agreement with the government of Quintana Roo, civil society organizations and scientific and academic institutions to join efforts to protect the environment. We are joining our effort and resources with those from other sectors of society to foster the conservation of the Mesoamerican Reef.

SAC-TUN'S ADDED VALUE

We invited *Amigos de Sian Ka'an, Comunidad y Biodiversidad, Pronatura Península de Yucatán,* the Autonomous University of Querétaro, *El Colegio de la Frontera Sur – Chetumal,* and the Quintana Roo State Secretariat of Ecology and the Environment (SEMA) and its Institute of Biodiversity and Natural Protected Areas (IBANQROO) to meet in Playa del Carmen, Quintana Roo, in January 2019 to jointly create a roadmap on how to best use our first financial contribution.

With these partners, we identified the priority projects we are supporting, in addition to agreeing to specific goals for the first three-year phase of the strategy. Given the importance that protected areas play in safeguarding biodiversity and ecosystem services, we decided to focus our efforts on these areas and forge partnerships with CONANP and SEMA. Together, we are strengthening the management and conservation of federal and state protected areas along the Yucatán Peninsula.

Our first four projects, spearheaded by our partners, focus on protecting priority species:

- Jaguars and other felines (Autonomous University of Querétaro)
- Manatees *(El Colegio de la Frontera Sur – Chetumal)*
- Whale sharks *(Pronatura Península de Yucatán)*
- Sea turtles *(Pronatura Península de Yucatán)*

SAC-TUN'S ADDED VALUE

Another two projects focus on the conservation of priority ecosystems and the support of sustainable communities:

- Protection of aquifers and cenotes in the Mayan Riviera *(Amigos de Sian Ka'an)*
- Design of protected fishing zones in coral reefs with the participation of communities and citizen scientists *(Comunidad y Biodiversidad)*

In our seventh project, we are working with SEMA to strengthen management plans, technical and legal studies and projects and strategies for the following protected areas:

- *Laguna Manatí* Natural Protected Area and other coastal lagoons between Cancún and Isla Mujeres
- *Laguna de Bacalar* State Park
- *Laguna Chacmochuch* Flora and Fauna State Sanctuary and Conservation Area (Benito Juárez-Isla Mujeres)

Our eighth project supports SEMA's public consultations and scientific research for the establishment of new protected areas:

- Puerto Morelos Wetlands State Park
- *Majahual* Wetland (Othón P. Blanco)
- The Zone Subject to Ecological Conservation of Xcacel-Xcacelito (Tulum)

Our ninth project supports joint efforts in the search for solutions to the persistent problem of the seasonal sargassum seaweed influx that impacts the state´s beaches, affecting both the tourism industry and our invaluable biodiversity and ecosystems.

A fundamental element in SAC-TUN's Environmental Strategy is driving participation of many partners and local communities in the implementation of these projects.

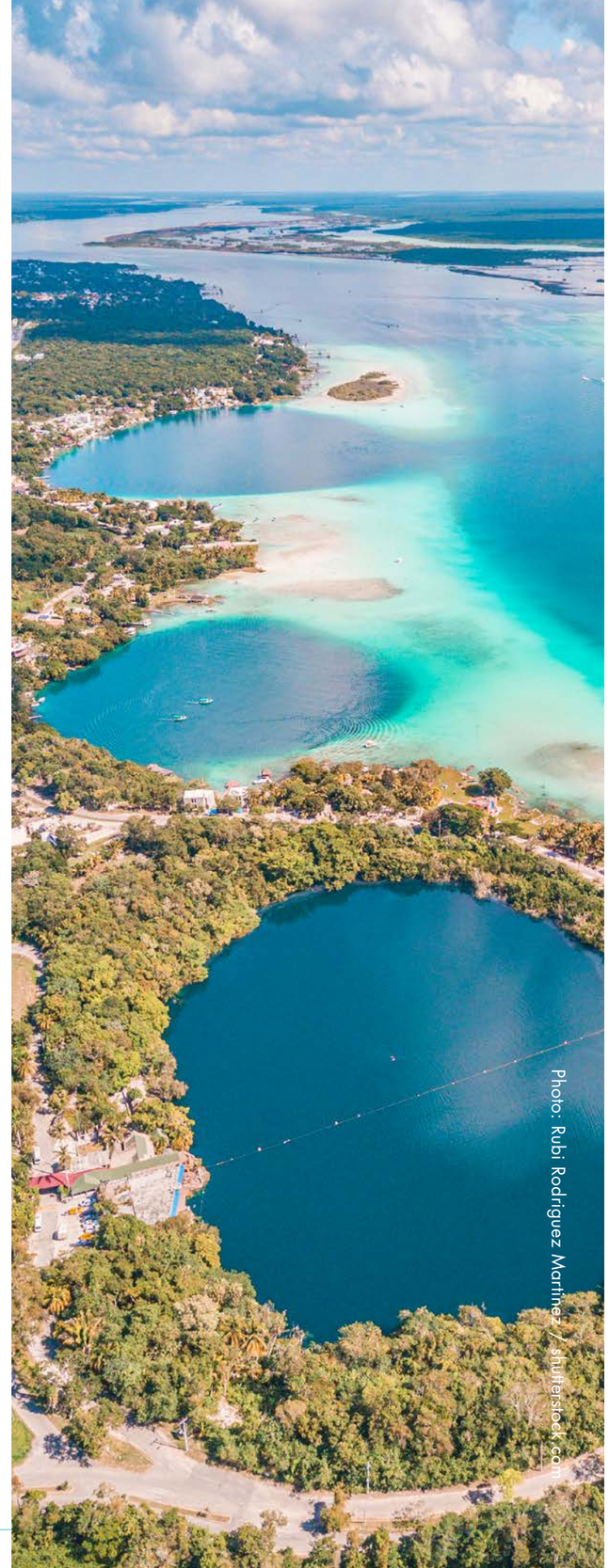


Photo: Rubi Rodriguez Martinez / shutterstock.com

SAC-TUN's Partners in its 2019-2021 Environmental Strategy

PARTNER	ENVIRONMENTAL STRATEGY COMPONENT
Instituto Nacional de Antropología e Historia	***Rehabilitation and reclamation of impacted natural resources*** Scientific research and preservation of archaeological sites
CONANP Comisión Nacional de Áreas Naturales Protegidas; SEMARNAT Secretaría de Medio Ambiente y Recursos Naturales; SEMA Secretaría de Ecología y Medio Ambiente; IBANQROO Instituto de Biodiversidad y Áreas Naturales Protegidas del Estado de Quintana Roo; amigos de Sian Ka'an Acciones por la Naturaleza; pronatura península de yucatán, a. c.; Universidad Autónoma de Querétaro; El Colegio de la Frontera Sur ECOSUR; COBI Comunidad y Biodiversidad	***Supporting environmental protection in Quintana Roo and the Mesoamerican Reef*** Conservation of key federal protected areas in Quintana Roo and the Yucatán Peninsula Strengthening of network of protected areas in Quintana Roo Strengthening of Laguna Manatí Protected Area Community management and conservation of aquifers and cenotes in Maya Ka'an and the Mayan Riviera, Quintana Roo Conservation of critical nesting habitats for sea turtles in the north-east of the Yucatán Peninsula Whale shark conservation and sustainable tourism in the Mexican Caribbean Jaguar habits and movements in a landscape dominated by humans in the Yucatán Peninsula Ecology and conservation of manatees in Quintana Roo Sustainable small-scale fisheries and community participation in the Mesoamerican Reef
Los Salesianos UDLAP Universidad de las Américas Puebla; Más y Mejores Oportunidades; SEQ Servicios Educativos de Quintana Roo; La Salle Instituto Playa del Carmen; **Fundación Flora y Fauna**	***Supporting long-term socio-economic development within the region of influence of SAC-TUN operations*** Instituto Playa del Carmen de La Salle Teacher Seminars SAC-TUN Volunteers

WAKAH CHAN, SAC-TUN'S BOTANICAL GARDEN, A SPACE FOR SCIENTIFIC RESEARCH AND EDUCATION

The process of transforming the forest nursery into the *Wakah Chan* (Tree of Life) Botanical Garden is underway. Our intention is for the Botanical Garden to be a center for innovation and education for the community and a place to hold workshops and seminars relating to scientific research and environmental conservation. The Botanical Garden offers SAC-TUN the opportunity to consolidate its social and environmental responsibility initiatives and activities, together with the local authorities, our volunteers and neighbors.

We are finalizing a comprehensive strategy, work plan and business plan for the Botanical Garden, and we have already identified the ideal spot to build a research and education center in the heart of the garden. Once completed, the Botanical Garden will offer a unique opportunity to learn about the vegetation of the region, including a collection of orchids and bromeliads, a butterfly garden, trees, archaeological vestiges and cenotes, and a space to relocate threatened or endemic plant species that are removed prior to operations.

Tree production at the tree nursery will be increased to approximately 200,000 plants per year, which will be used in SAC-TUN's reforestation and restoration activities, both on our properties and in other projects in neighboring communities. These efforts include expanding our current inventory of 23 indigenous plant species, including other native species, that can be planted in areas of Quintana Roo and the Yucatán Peninsula.

The *Wakah Chan* Botanical Garden will employ best practices in renewable energy (solar and wind), water recycling and waste management, and it will provide a space for education, capacity-building and outreach activities.

It will also house the administrative heart of the SAC-TUN Environmental Sustainability Strategy, in addition to offering a forum to our environmental allies to meet and exchange knowledge on the different projects within the Mesoamerican Reef.

SUPPORTING ENVIRONMENTAL RESEARCH AND MANAGEMENT IN PRIORITY PROTECTED AREAS, ECOSYSTEMS AND WILDLIFE IN QUINTANA ROO AND THE SURROUNDING MESOAMERICAN REEF REGION

The first nine environmental projects that SAC-TUN is supporting during the first phase (2019-2021) of its Environmental Strategy are advancing well and the majority are being implemented in coordination with CONANP, an institution that manages 182 federal natural protected areas, encompassing almost 91 million hectares throughout Mexico.

"Understanding the movements of these wild cats help us design better tools to ensure their conservation." — ***Carlos López, professor and researcher at the Autonomous University of Querétaro.***

Figure 9. This project continues contributing to our understanding of jaguar's behavior and habitat. Our efforts also focus on working with our neighbors to ensure these felines and their prey are protected, allowing them to move between their land and ours. ©Photograph by Carlos López.

HABITAT AND MOVEMENTS OF JAGUARS IN A LANDSCAPE DOMINATED BY HUMANS IN THE YUCATÁN PENINSULA, 2019-2021

UNIVERSIDAD AUTÓNOMA DE QUERÉTARO

HABITAT AND MOVEMENTS OF JAGUARS IN A LANDSCAPE DOMINATED BY HUMANS IN THE YUCATÁN PENINSULA, 2019-2021

THIS PROJECT IS UNDERTAKEN IN COLLABORATION WITH THE AUTONOMOUS UNIVERSITY OF QUERÉTARO https://fcn.uaq.mx/.

The jaguar *(Panthera onca)* is considered a Near Threatened species by the International Union for Conservation of Nature (IUCN). The goal of this first three-year phase of the project is to gather more information about jaguars, their movements, behavior and their habitat, which has been impacted and fragmented by human activities. We are also gathering data on other wildlife that live or move through these areas.

Based on studies supported by SAC-TUN in 2018, which used hidden cameras located around the company's properties, we identified four jaguars: two adult females, one adult male and one young male. The diet of these jaguars comprises white-nosed coatis *(Nasua narica)*, Central American coatis *(Dasyprocta punctata)*, agoutis *(Cuniculus paca)*, collared peccaries *(Pecari tajacu)*, brocket deer *(Mazama* spp.*)* and white-tailed deer *(Odocoileus virginianus)*. Jaguars had been seen crossing the main highway (although we are unsure as to how often this happens), putting them at risk of being injured.

The project's goals for 2019 and 2020 were to capture five jaguars and tag them with radio collars to monitor them, place 23 hidden cameras during a month in the community of *Manuel Antonio Ay* (who are supporting the project), and install 23 more cameras on SAC-TUN's properties.

Findings

A total of 843 photographs were taken by the hidden cameras in *Manuel Antonio Ay,* as well as samples of jaguar excreta and field observations, through which we identified 38 species of wildlife (3 reptile, 19 bird and 16 mammal species), including two jaguars, in addition to pumas, ocelots and margays. Eleven of these species are protected by Mexican Standard NOM-059.

During almost the same period as that of the cameras installed in *Manuel Antonio Ay,* the 23 cameras installed on SAC-TUN's properties took a total of 5,758 photographs that, together with field observations, confirmed the presence of 78 species of wildlife (8 reptile, 46 bird and 24 mammal species), including four jaguars, pumas, ocelots, margays and jaguarundis (the latter is the least studied of the Mexican felines). More than a quarter of the species are protected by NOM-059, including the anteater, which is in danger of extinction, and the jaguarundi, which is threatened.

The jaguars identified on SAC-TUN's properties between 2019 and 2020 included an adult female, two adult males and one young male. The photographs revealed spot patterns that allow us to identify individuals. This information was used to confirm that the four jaguars photographed between 2019 and 2020 were different to those photographed in 2018. We were also able to prove that the jaguars seen around *Manuel Antonio Ay* did not visit SAC-TUN's properties, and vice-versa. The reason for this could be the distance that separates the two areas. In the future, we hope to install cameras in other communities to enable us to compare these observations and better understand the behavior of jaguars.

Five individuals (three pumas and two jaguars) were captured in 2020 and fitted with satellite transmitters to monitor their movements, which cover an area between Akumal and the outskirts of Playa del Carmen. These transmitters continue to send out information. Two male pumas were captured (PM01 and PM02) and one young female (PH3), as well as an adult female jaguar (JH01), that had been identified previously using the photographs taken by the hidden cameras, and an adult male jaguar (JM02). Experienced veterinarians checked the jaguars and found they were both in good health.

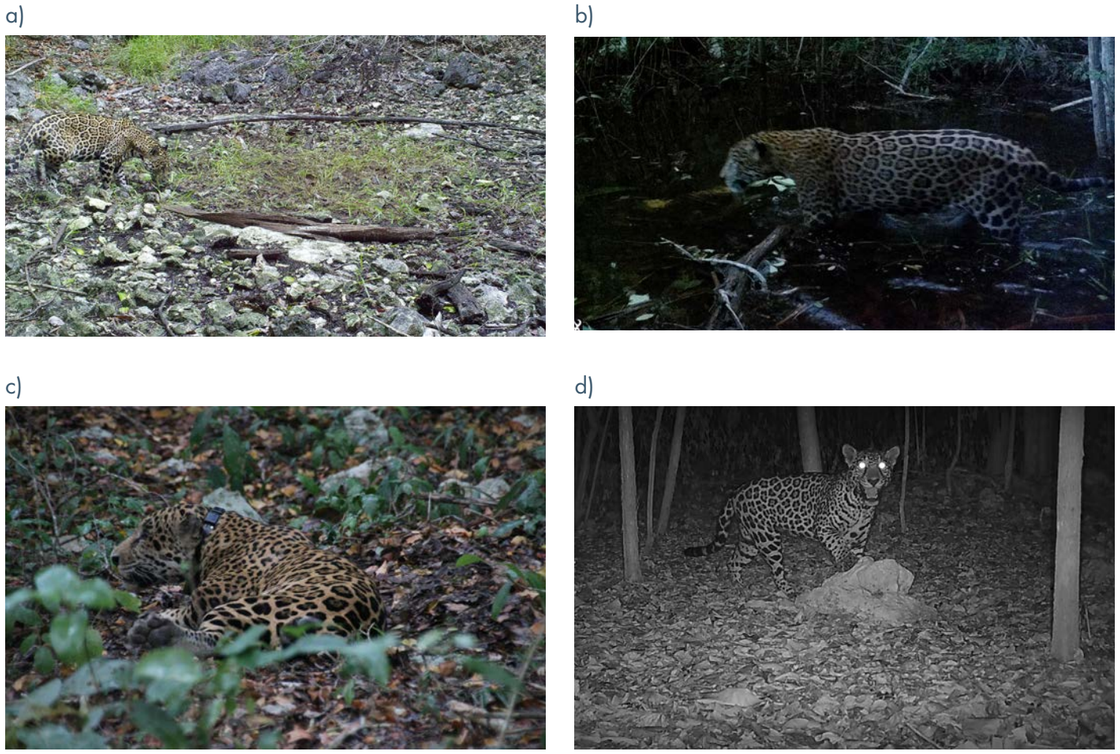


Figure 10. Four different jaguars identified on SAC-TUN's properties between 2019 and 2020. A female (a), two males (b and c) and a young jaguar (d). ©Photographs by Carlos López.

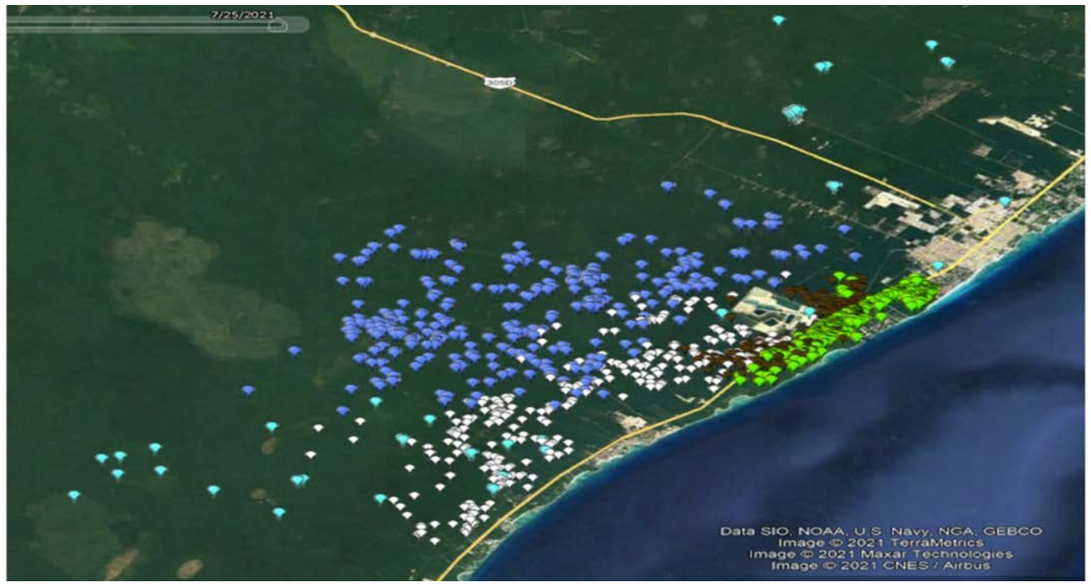


Figure 11. Locations of the five felines equipped with radio transmitters. The colored symbols show the areas in which they were detected during 2020: white (Puma M01), blue (Puma M02), brown (Puma H03), yellow (Jaguar H01) and light blue (M02).

HABITAT AND MOVEMENTS OF JAGUARS IN A LANDSCAPE DOMINATED BY HUMANS IN THE YUCATÁN PENINSULA, 2019-2021

Jaguar prey

The photographs obtained in *Manuel Antonio Ay* and on SAC-TUN's properties show that the numbers of species of jaguar prey are similar in both areas. However, there was a greater abundance of these species on SAC-TUN's properties compared to the community of *Manuel Antonio Ay* – which could be the result of hunting that takes place around the latter area. For example, the cameras took only 12 photographs of deer on the community's land, while 102 deer were photographed on SAC-TUN's properties during the same period.

The information obtained to date confirms that the preferred prey of jaguars and pumas are white-tailed and brocket deer. Other prey found in the two areas include white-nosed coati, lowland pacas and agoutis, in addition to armadillos. A much higher number of animals were photographed on SAC-TUN's properties (102 white-tailed deer) compared to the neighboring land (12 white-tailed deer), although it is not clear if this affects the diet of these felines.

The radio collars continue transmitting data and show that some of the five animals were beyond the limits of SAC-TUN's properties, in an area spanning 19 km by 39 km between Akumal and the outskirts of Playa del Carmen. However, the size and location varies from animal to animal. The female jaguar has been using an area of approximately 1,920 hectares between *Punta Venado*, where SAC-TUN's offices are located, the *Xcaret* ground spark and the green areas to the south of Playacar. The male jaguar (JM02) roams a much larger area (6,768 hectares), and the last radio signals received showed his location as being 17.7 km to the west of the main highway to Akumal.

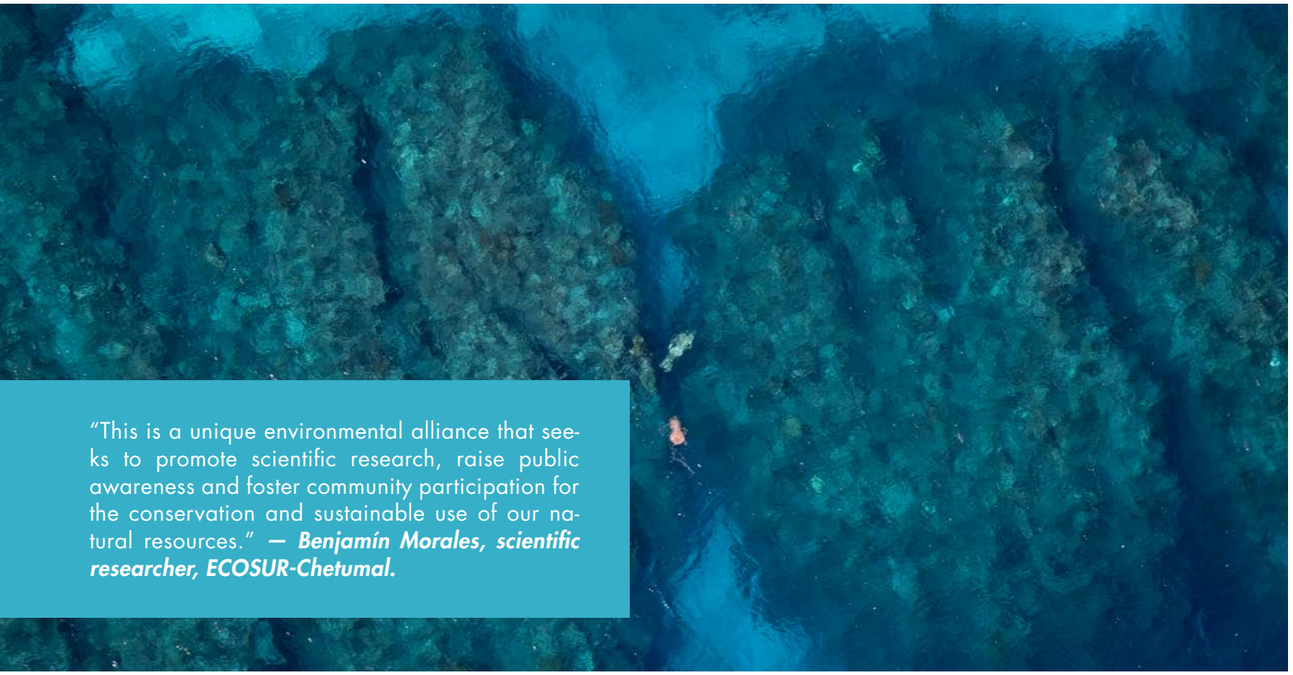
One of the male pumas (PM01) roams across 4,790 hectares from *Río Secreto* to *Xpu* ha; the other male (PM02) travels within an area of 4,861 hectares, mainly across land located to the west and north of SAC-TUN's properties; and the female puma (PH03) roams an area comprising 2,430 hectares between *Paamul* and *Río Secreto*. To date, the female puma (PH03) has crossed the federal Cancún-Tulum highway 14 times, possibly as a result of decreased vehicle movement on the highway stemming from the COVID-19 pandemic.

SAC-TUN is particularly proud of the progress shown in this project, and it hopes to continue learning more about jaguars, other felines and the fauna that roams its properties and that of its neighbors. We are focusing our efforts on collaborating with the owners of the neighboring lands so that we can work together to protect these felines and their prey.

"This conservation alliance highlights how Mexican environmentalists, scientists and private companies can collaborate and join forces for the common good." — ***Carlos López, professor and researcher at the Autonomous University of Querétaro.***

Photo: UAQ

CONSERVATION STATUS OF MANATEES IN QUINTANA ROO AND THE CONNECTIVITY OF ITS POPULATIONS ALONG THE COAST, 2019-2021



"This is a unique environmental alliance that seeks to promote scientific research, raise public awareness and foster community participation for the conservation and sustainable use of our natural resources." ***— Benjamín Morales, scientific researcher, ECOSUR-Chetumal.***

Figure 12. The Caribbean manatee is an endangered species, and the project will develop recommendations for its conservation in Quintana Roo. ©Photograph by Humberto Bahena/ECOSUR.

THIS PROJECT IS BEING DEVELOPED IN COLLABORATION WITH EL COLEGIO DE LA FRONTERA SUR (ECOSUR –Chetumal https://www.ecosur.mx/unidad/chetumal/).

ECOSUR is a scientific research institute within the National Council on Science and Technology (CONACyT). It is a network of public centers that drive basic and applied research to promote the sustainable use of natural resources and social and economic development along Mexico's southern border.

The Caribbean manatee *(Trichechus manatus manatus)* is considered an endangered species by the International Union for Conservation of Nature (IUCN). Our project has three key goals:

- Gather information about the manatees in Quintana Roo, focusing on spatial distribution, population density, ecology, female-calf proportion, group size and their movements along the coastline.
- Evaluate the threats to manatees stemming from growing tourism and maritime developments along the coastal zone, particularly in lagoons, bays and caves historically used by manatees.
- Use the information generated to make recommendations that promote the conservation of manatees and their habitat in Quintana Roo, including guidelines to protect their areas of concentration.

To achieve the above, we are monitoring manatee distribution and recording both their distribution and density through aerial monitoring of the coastline. With the support of CONANP, local communities, fishing cooperatives and other institutions interested on manatee conservation, we plan to temporarily capture 12 manatees and fit them with radio collars to register their movements over time.

We also recorded the number and location of fishing boats, fishing nets, boats, tourist excursions, coastal constructions and other activities that could pose a risk to manatees.

All this information will be used to design a strategy that offers greater protection in the areas that the manatees frequent.

Findings

With the support of SAC-TUN, in 2019 we conducted a series of monitoring flights along a total of 1,200 km of coastline in Quintana Roo, flying at an altitude of 200-250 meters and up to 600 meters offshore. The zones covered include the Protected Areas of *Yum Balam, the Sian Ka'an* Biosphere Reserve, *Xcalak* Reef National Park, the Manatee Sanctuary at Bahía de Chetumal, and parts of the coastline of the Mexican Caribbean Biosphere Reserve. In total, we invested 11.29 hours researching and counting manatees. During these flights, we counted a total of 150 manatees, 11 of which were mothers with their calves, representing a population with healthy reproduction levels. We now have a baseline of the minimum number of manatees that gather in these waters.

At the Manatee Sanctuary at Bahía de Chetumal, we located the largest number of manatees (98 individuals or 65%), followed by the *Sian Ka'an* Biosphere Reserve (46 individuals or 31%) and the remaining 4% were found in the *Yum Balam* Flora and Fauna Protection Area and the *Xcalak* Reef National Park. We believe that the 98 manatees that we saw at the Manatee Sanctuary are just part of the total number of manatees, which also congregate in the neighboring waters in Belize, at the Bahía de Corozal Wildlife Sanctuary, which was established in 1998 as part of a cross-border strategy to protect manatees on the Chetumal and Corozal bays. It is important to mention that the large number of manatees that we observed in front of Chetumal and the *Río Hondo* estuary could be the result of the cold weather during that time. Manatees react to cold temperatures by modifying their distribution and take temporary shelter in warmer waters. No manatees were observed within the Mexican Caribbean Biosphere Reserve. Surprisingly, they were also absent from the coastal zone between Playa del Carmen and Tulum where, historically, there had been regular sightings.

Photo: Por Thierry Eidenweil / shutterstock.com

CONSERVATION STATUS OF MANATEES IN QUINTANA ROO AND THE CONNECTIVITY OF ITS POPULATIONS ALONG THE COAST, 2019-2021

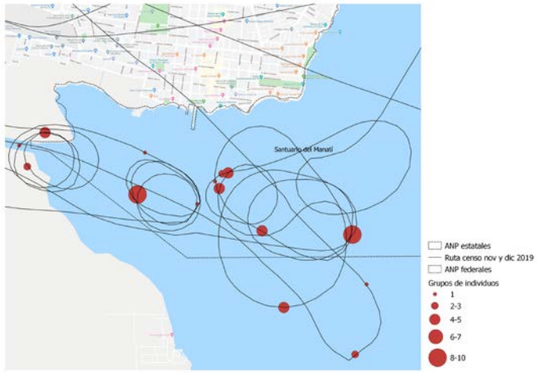


Figure 13. Flights and manatee counting at the mouth of the Río Hondo and in the Bahía de Chetumal.

We recorded the distribution and location of manatees on three maps to analyze the data and provide CONANP park directors with a quick visual aid of priority conservation areas. We also recorded the location and counted and photographed ports, commercial and fishing docks, coastal constructions and other human activities along the coastline that could pose a threat to manatees. All of these data were analyzed and enable us to classify the areas into risk categories: high, medium or low.

The areas with the human activities that pose the highest risk to manatees are the protected areas of *Sian Ka'an,* the Manatee Sanctuary at Bahía de Chetumal and Bahía Corozal on the border between Belize and Mexico. All these maps and information have been shared with park directors to help them design management strategies and search for solutions to ensure that these human activities can continue without threatening the manatee population.

Our work to date highlights the need for a greater amount of basic educational materials to keep local communities informed and involved, demonstrating the value, importance and mutual benefit of working with us to protect the manatees and their habitat. This becomes even more relevant in areas with human activities such as speedboats, water taxis and gillnets that pose a major threat to manatees. Runoff of pesticides into bays and caves can also impact the manatees.

In the next phase of the project, we will play a more active role in ensuring the participation of the local community, involving them to a greater extent in our activities. Their support and willingness to cooperate as citizen scientists is of crucial importance to implementation of the protected area management plan.

Figure 14. "It is essential that we redouble efforts to better understand and protect endangered species such as the Caribbean manatee, which has an important population along the coast of Quintana Roo." – ***Benjamín Morales, ECOSUR-Chetumal.***

CONTRIBUTION TO SUSTAINABLE WHALE SHARK TOURISM MANAGEMENT IN THE MEXICAN CARIBBEAN, 2019-2021

"Collaboration between organizations has more impact because, together, we can do things we are unable to do alone." ***María Andrade, , Executive Director,*** *Pronatura Península de Yucatán***.**

Figure 15. Over the past decade, more and more tourists have visited the Mexican Caribbean to watch and swim with whale sharks in their natural habitat. Little is known about the impact that the rapid increase in this type of tourism has had on the number and behavior of the sharks that visit Mexico. ©Photograph by *Pronatura Península de Yucatán*.

THIS PROJECT IS UNDERTAKEN IN COLLABORATION WITH *PRONATURA PENÍNSULA DE YUCATÁN* **(PPY) HTTP://PRONATURA-PPY.ORG.MX/** *a non-profit organization with six regional offices in Mexico. Its mission is to protect the flora, fauna and priority ecosystems while promoting social development in harmony with nature. Its offices on the Yucatán Peninsula opened in 1987, and it has a team of more than 20 professionals in the areas of anthropology, biology, engineering and geomatics (compiling, distributing, storing, analyzing, processing and visually presenting geographical data).*

The whale shark (*Rhincodon typus*) is considered an endangered species by the International Union for Conservation of Nature (IUCN). In 2016, *Pronatura Península de Yucatán* began designing a model to estimate the carrying capacity (i.e., the number of boats that there can be in a given area without affecting the sharks) for tourist boats in areas in which visitors watch or swim with whale sharks. The project combines two components: on the one hand, ensuring that whale sharks continue to generate employment for many years to come and, on the other hand, preventing the negative impacts that tourism may have on these sharks, while contributing to their conservation and that of their habitat.

There is currently a lack of data on whale sharks (their numbers, movements, behavior and habitat), information which is needed to design an effective model for tourism carrying capacity. Furthermore, there is also little information on the number of boats and tourists who come to the region to watch or swim with these sharks. This project is filling in the gaps and contributing to designing a model that will promote the development of a sustainable whale shark tourism industry.

Over the past decade, more and more tourists have visited the Mexican Caribbean hoping to see whale sharks and swim with them in their natural habitat. However, little is known about the impact that this rapid increase in tourism in the most widely visited areas has had on the number, groups, behavior and habitat of this species.

The goal of this project is to gather information on whale shark numbers and distribution, and of tourist boats in the Mexican Caribbean. We will refine a model to estimate the tourist carrying capacity for this species in the different areas and for different times of the year. This model will be used as a tool to plan and implement sustainable whale shark tourism.

The analysis of the data available regarding the carrying capacity show that the number of sharks and their location varies considerably throughout the year, that the data available are not always a clear reflection of the actual situation, that this information is not accurate enough to be used to make decisions, and that the conditions vary in different areas, which means that the potential tourist carrying capacity for sustainable tourism could vary between the different zones and at different times of year.

CONTRIBUTION TO SUSTAINABLE WHALE SHARK TOURISM MANAGEMENT IN THE MEXICAN CARIBBEAN 2019-2021

Findings

With the support of SAC-TUN, researchers have carried out five aerial surveys in areas where whale sharks have historically been found - the area known as *El Azul* in the north of the Mexican Caribbean Biosphere Reserve and part of the Whale Shark Biosphere Reserve.

A total of 6 hours and 40 minutes was spent in this area, and we covered more than 1,883 km2 between July and September 2019. We saw 425 whale sharks, an average of 84 sharks spotted per flight, the highest average sighting in the last four years. Most (97%) whale sharks were spotted in *El Azul*, some in schools of more than 100 individuals. Outside *El Azul*, there were sightings of schools of three or less.

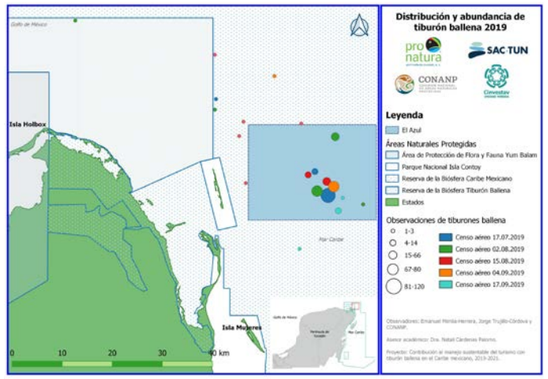


Figure 16. Whale shark distribution and abundance (June-September 2019) in the north-east of the Mexican Caribbean.

A significantly higher number of sharks were spotted in July (133 sharks) than in September (16 sharks). Furthermore, the highest number of tourist boats (128) was recorded in July, an amount that exceeds the maximum number of tourist boats (120) permitted by the Mexican Caribbean Biosphere Reserve Management Program. Between July and August, these tourist boats focused on two or three different areas within *El Azul*, which indicates that there are different groups of whale sharks. The lowest number of tourist boats was observed in September (37), when these boats focused on just one area, indicating that there was only one group of whale sharks at that time. An average of 79 tourist boats were spotted during each flight.

This information was included in a map to show the distribution of whale sharks between July and September 2019, along with another map containing nine polygons that highlight the borders of the main zones visited by tourists during this period, ranging from 1.6 km2 to 5.9 km2, with an average of 4.3 km2. These maps will be refined using additional information obtained during the project, and these data will be cross-referenced to better understand how whale shark tourism responds to the presence of sharks in different zones and at different times of year.

To design an effective carrying capacity model, we need to obtain more information from the other months of the year. We also need a better understanding of the movements of whale sharks throughout the season. Moreover, additional information on the location and size of the areas being used for whale shark tourism is, or may potentially be, needed, as well as data on other factors that affect the development of sustainable tourism, including institutional capabilities, and the role and responsibilities of stakeholders. Consultations are being carried out with stakeholders to discuss and agree on which variables will be used to define the carrying capacity model, in addition to how and by whom this model should be evaluated.

©Photo: *Pronatura Península de Yucatán*

CONSERVATION OF CRITICAL SEA TURTLE NESTING HABITATS, CONNECTIVITY AND POPULATION PARAMETERS IN THE NORTH-EAST OF THE YUCATÁN PENINSULA, 2019-2021

THIS PROJECT IS BEING IMPLEMENTED IN CO-LLABORATION WITH *PRONATURA PENÍNSULA DE YUCATÁN* **(HTTP://PRONATURA-PPY.ORG.MX/),** *a civil society organization that has spent more than three decades working with many partners on the conservation of sea turtles in the north east of the Yucatán Peninsula.de Yucatán.*

Figure 17. Sea turtles live for more than 100 years and reach sexual maturity between the ages of 15 and 25, which is why it is important to design long-term research programs that produce data to help develop effective strategies that ensure the turtle's successful reproduction. ©Photograph by *Pronatura Península de Yucatán*.

The north east of the Yucatán Peninsula is an area of regional and international importance for the nesting of hawksbill sea turtles *(Eretmochelys imbricata)*, a species critically endangered and on the Red List of the IUCN, and the green sea turtle (*Chelonia mydas*), an endangered species. Two of the 14 most important nesting beaches for these turtles are in this region: *El Cuyo*, one of the most important nesting sites for green turtles on the Yucatán Peninsula; and *Holbox*, the most important nesting site for hawksbill turtles in Quintana Roo.

Sea turtles live for more than 100 years and reach sexual maturity between the ages of 15 and 25, which is why it is important to design long-term research programs that produce data to help develop effective conservation strategies that ensure their successful reproduction.

The project represents the continuation of studies of the sea turtles along the beaches of *Holbox* and *El Cuyo*, in addition to gathering data on the number of nests, the number of eggs laid, the number of turtles that hatch and the number of females, especially young females, who nest every season.

Another goal is to tag nesting females and collect tissue samples for genetic analyses to identify the feeding zones that each marked turtle uses and the number of females from each feeding zone that nest on the beach. This will contribute to defining the connectivity between the feeding zones and the nesting beaches, key information for understanding which areas should be a priority for conservation.

This information will be added to that obtained over the past 28 years of studies to better assess population trends and specific conservation activities for each beach.

CONSERVATION OF CRITICAL SEA TURTLE NESTING HABITATS, CONNECTIVITY AND POPULATION PARAMETERS IN THE NORTH-EAST OF THE YUCATÁN PENINSULA, 2019-2021

Findings in 2019-2020

Sea turtles nest along the Yucatán Peninsula every year between April and October. With the support of SAC-TUN, from July to October 2019, researchers spent a total of 326 days and nights monitoring 24 km of beaches in *El Cuyo* and 174 days and nights monitoring 24 km of beaches on *Holbox*. In total, during the 2019 season, 5,581 turtle eggs were registered, representing a 225% increase in the number of eggs recorded in 2018. 85.32% of all eggs were successfully protected in both areas during 2019.

Along the beaches in *El Cuyo*, most of these additional eggs (86.8%) were from green turtles, with 3,009 more eggs (1,189% more) than in 2018 (253 eggs). Similarly, along the beaches of *El Cuyo* there were 192 more hawksbill turtle eggs (63.16%) than the previous year (304 eggs). Along the beaches of *Holbox*, there were 665 more green turtle eggs (588%) than in 2018 (123 eggs). However, there were 50 fewer hawksbill turtle eggs (4.5%) than in 2018 - 1,045 eggs in 2019 compared to 1,095 eggs in 2018.

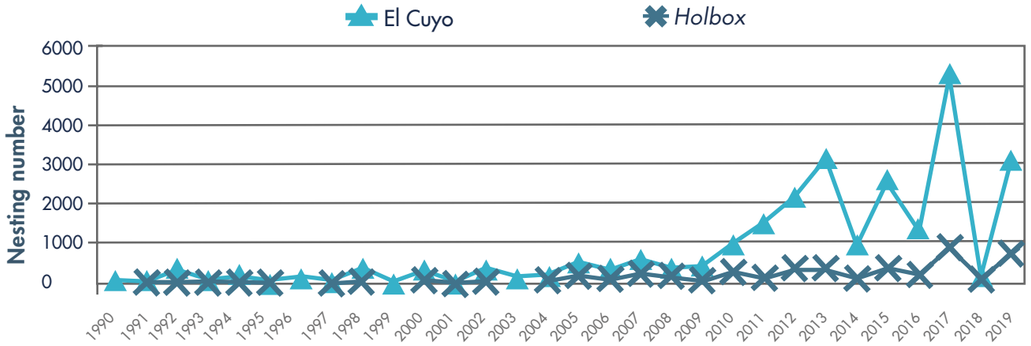


Figura 18. Historical patterns in the number of green turtle nests in *El Cuyo* and *Holbox*

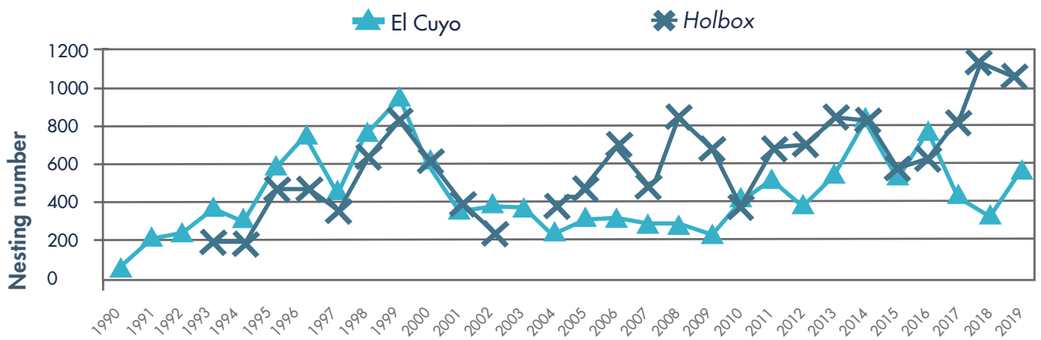


Figure 19. Historical patterns in the number of hawksbill turtle nests in *El Cuyo* and *Holbox*

©Photo: *Pronatura Península de Yucatán*

CONSERVATION OF CRITICAL SEA TURTLE NESTING HABITATS, CONNECTIVITY AND POPULATION PARAMETERS IN THE NORTH-EAST OF THE YUCATÁN PENINSULA, 2019-2021

In 2019, there was a marked increase in the number of nests per square kilometer compared to 2018, particularly of green turtle nests on the beaches of *El Cuyo*, where there was an increase from 10 turtles/km in 2018 to 125 turtles/km in 2019. On the beaches of *Holbox*, the density of green turtle nests increased from 5 turtles/km in 2018 to 32 turtles/km in 2019. However, the density of hawksbill turtle nests decreased from 46 turtles/km in 2018 to 22 turtles/km in 2019. Each species of turtle prefers different parts of the beach, which seems to depend on the slope, vegetation and other physical characteristics.

There were many more young females laying their eggs for the first time than marked females returning to the beaches. Between April and October 2019, a total of 156 egg-laying females were marked and a further 19 were identified as having been marked in previous years, 11 of which had been marked by *Pronatura Península de Yucatán*. On the beaches in *El Cuyo*, 73 of these females that were marked for the first time were hawksbill turtles and 41 were green turtles, while in *Holbox*, 28 females marked for the first time were hawksbill turtles, 14 of which were young females.

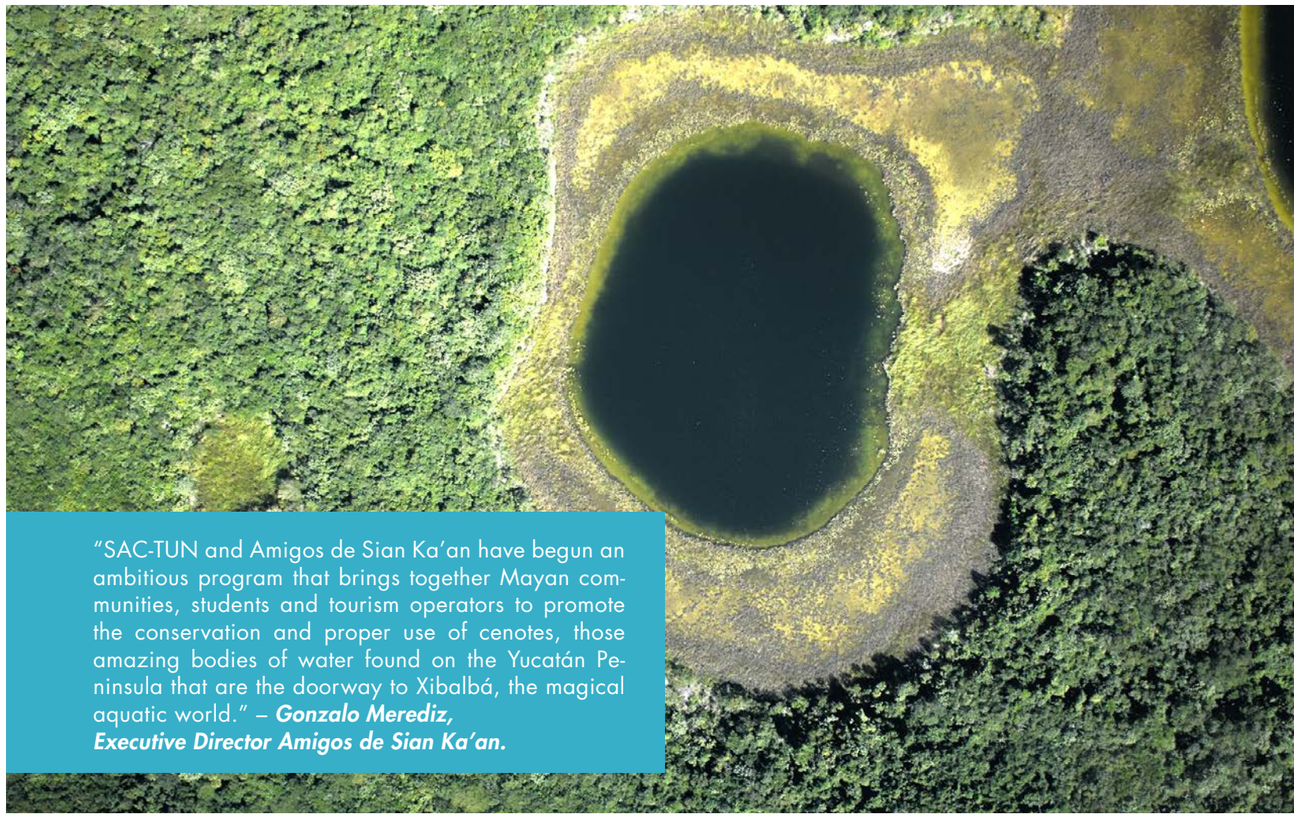
Based on this information, it is estimated that the ratio of young/old hawksbill turtles who nested in 2019 was 7:1 at *El Cuyo* and 5:1 at *Holbox*, while it is estimated that the ratio of young/old green turtles was 20:1 in *El Cuyo*. However, it is surprising that there were no records of marked females coming back to nest on *Holbox*.

Between 2019 and 2020, progress was made on organizing the database that, for 28 years, had underpinned the work of Pronatura and which contains historical data of 10,729 female hawksbill turtles and 4,010 marked female green turtles. Progress was also made in obtaining a new database from information compiled from the current project. These new data will be added to data from 2020 and 2021, as well as to the results of the analysis of the genetic sampling, to define the connectivity between the nesting beaches and other sites of importance, which are the feeding zones for each turtle.

All data are being shared with researchers from the University of Havana in Cuba and the Autonomous University of Carmen as part of a regional project to increase our knowledge of the movements of sea turtles in the Gulf of Mexico. We want to learn more about where turtles migrate in the Yucatán Peninsula after having nested on the beaches of *El Cuyo* and *Holbox*. With the information that we have shared, we know that one of the hawksbill turtles marked on the nesting beach in *Holbox* in 2012 returned in 2015, in addition to the fact that one of the green turtles marked in *El Cuyo* in 2007, which had returned there, was captured (for human consumption) in 2015 in Nicaragua, where exploitation of turtles is still permitted.

COMMUNITY MANAGEMENT AND CONSERVATION OF THE AQUIFER AND CENOTES IN MAYA KA'AN AND THE MAYAN RIVIERA, QUINTANA ROO, 2019-2021

amigos de Sian Ka'an
ACCIONES POR LA NATURALEZA



"SAC-TUN and Amigos de Sian Ka'an have begun an ambitious program that brings together Mayan communities, students and tourism operators to promote the conservation and proper use of cenotes, those amazing bodies of water found on the Yucatán Peninsula that are the doorway to Xibalbá, the magical aquatic world." – ***Gonzalo Merediz, Executive Director Amigos de Sian Ka'an.***

Figure 20. The main threats to cenotes are loss of vegetation, light, chemical contamination, garbage, and lack of environmental education of people who visit the cenotes. ©Photograph Amigos de Sian Ka'an

COMMUNITY MANAGEMENT AND CONSERVATION OF THE AQUIFER AND CENOTES IN MAYA KA'AN AND THE MAYAN RIVIERA, QUINTANA ROO, 2019-2021

THIS PROJECT IS BEING IMPLEMENTED WITH AMIGOS DE SIAN KA'AN (HTTPS://WWW.AMIGOSDESIANKAAN.ORG/), *a non profit civil society organization founded in 1986 that focuses on environmental conservation through finding solutions to strike a balance between social development and the conservation of natural resources through sustainable practices.*

Starting with their initial objective of preserving the newly established Sian Ka'an Biosphere Reserve, a UNESCO World Heritage Site in Quintana Roo, Amigos de Sian Ka'an has since expanded its scope of work to encompass the eastern part of the Yucatán Peninsula in the Mexican Caribbean. They promote public policies such as protected areas, the design of standards, environmental ordinances and urban development plans, and work in collaboration with communities, entrepreneurs, authorities, and students to enhance the participation of society in nature conservation.

Figure 21. Ecotechnologies at a community school. From right to left: dry toilets, cisterns and a biodigester. ©Photograph by Gonzalo Merediz, Amigos de Sian Ka'an.

SAC-TUN is contributing to the second phase of this project, which focuses on improving protection for aquifers and cenotes in 22 communities in *Maya Ka'an* and the Mayan Riviera.

A key goal is to promote community governance for water management, focusing on the construction of sustainable ecotechnologies to supply freshwater to homes and schools, benefitting 847 people. During the first six months, we focused on promoting the participation of all stakeholders. We also assessed the level of ownership of the ecotechnologies built in previous years in 12 communities, which will serve as the basis for designing the ecotechnologies that will be installed in 22 communities over the next years, thanks to the support of SAC-TUN and F*undación Gonzalo Río Arronte*.

At the same time, socio-environmental diagnostics were initiated in five of these 22 communities. The data collected will be used to design a governance strategy that ensures the long-term sustainability of the ecotechnologies that will be built.

Figure 22. The implementation of an educational program at schools has helped raise awareness on the key role that properly managing and conserving water plays, in addition to raising awareness among teachers and students on solutions to environmental problems. ©Photograph by Amigos de Sian Ka'an.

Our educational work began through the You Are Water! Raise Awareness! Program *(Eres Agua. ¡Toma Conciencia!)*, which was rolled out to six elementary schools in *Maya Ka'an* and Playa del Carmen through 17 workshops, in which 396 students and nine teachers took part. To consolidate these educational activities, 30 students from Tulum took part in a citizen science pilot program called *Xibalbá,* implemented by the Geological Survey of Austria and *Amigos de Sian Ka'an* – a call to action to monitor the quality of water in the communities. They found significant levels of nitrate pollution, while laying the groundwork to drive future monitoring among beneficiaries of ecotechnologies. Students from *Yokdzonot Nuevo* in the community of Carrillo Puerto recently joined this program.

Figure 23. Students from CECyTE who took part in the citizen science program in Tulum. ©Photograph by Amigos de Sian Ka'an..

Fifteen members of three tourism cooperatives in Maya Ka'an evaluated the implementation of best practices to protect cenotes, based on the Amigos de Sian Ka'an's Good Practices for Cenotes (Cenote Guide). These cooperatives follow 85% of the practices recommended.

Figure 24. The Siijil Noh Ha lagoon and cenote, one of the ecotourism community initiatives participating in the evaluation and implementation of good practices for the use and conservation of cenotes. ©Photograph by Amigos de Sian Ka'an..

Furthermore, we began a training course for the operation of water treatment plants. Twenty-eight people from hotels, three private companies, nine state and federal government officials, and six members of the public took part in theoretical and practice sessions. This 120-hour course was offered by the Yucatán Center for Scientific Research within the Institute of Engineering at the National Autonomous University of Mexico, and Amigos de Sian Ka'an. The course includes six modules and two sessions per month, given by 31 experts from seven institutions.

"SAC-TUN's sustainability strategy is a pioneering initiative that brings together a private company, civil society organizations, academic institutions, local communities and the state government to strengthen conservation of species and ecosystems within the region." – ***Gonzalo Merediz, Executive Director, Amigos de Sian Ka'an.***

Photo by unsplash.com/@jakobowens

SUSTAINABLE FISHERIES THROUGH COMMUNITY PARTICIPATION IN THE MESOAMERICAN REEF, 2019-2021

COBI
Comunidad y Biodiversidad

"This initiative is unique since it includes different experiences to better understand how nature and humans are connected – from lobsters, bass, snappers and whale sharks to sea turtles, manatees, jaguars, ocelots and humans." ***– Jorge Torre, Director General, Comunidad y Biodiversidad***

©Photograph COBI.

Figure 25. The project aims to demonstrate that when small-scale fishers take sustainability into account and work together to share the resources available, everyone wins – their families and their communities.

SUSTAINABLE FISHERIES THROUGH COMMUNITY PARTICIPATION IN THE MESOAMERICAN REEF, 2019-2021

THIS PROJECT IS DEVELOPED WITH COMUNIDAD Y BIODIVERSIDAD (COBI) (HTTPS://COBI.ORG.MX/EN/) - *a civil society organization founded in 1999. COBI is the result of the inspiration of a group of young people fascinated with marine life and concerned about the levels of poverty in developing countries. Their priority is to promote the conservation and sustainable management of fisheries, working side-by-side with coastal communities.*

COBI's goals are to work with the fishing sector to develop a common vision, promote sustainable fishing practices, contribute to the coordination of efforts to restore marine life, and motivate people to get involved in the sustainable management of marine resources. By focusing on participation, COBI motivates present and future generations of fishers (women and men) to use and share their know-how to design and implement solutions that help drive resilient communities and healthy oceans.

Figure 26. COBI encourages fishers (women and men) to use and share their know-how to design and implement solutions that help drive resilient communities and healthy oceans. ©Photograph by COBI.

One of the major goals of this project is to support an innovative socio-ecological project in which COBI is working alongside six of the largest fishing cooperatives in three of the protected fishing zones on the Yucatán Peninsula. This initiative focuses on developing a sustainable fishing sector that ensures the survival and propagation of the major fish species (sea bass, snapper) and lobster that underpin the fishing industry, while protecting threatened species and their habitats in the Mesoamerican Reef.

The project aims to demonstrate that when small-scale fishers take sustainability into account and work together to share the resources available, everyone wins.

With the support of SAC-TUN, during the first six months of this project (July-December 2019), COBI began working with six cooperatives (representing more than 200 fishers from the *Sian Ka'an* Biosphere Reserve, *Banco Chinchorro* and the *Xcalak* National Reef Park) on the design of a framework for monitoring and gathering data from 14 sites that cover 178 km2 of the protected fishing grounds in the Mesoamerican Reef.

The planned activities include monitoring of behavior and populations of the endangered sea bass (*Epinephelus striatus)* and red snapper *(Lutjanus campechanus);* the capture, marking and release of adult lobsters in protected fishing areas to estimate the number of lobsters moving to other zones; and the recording of external threats that fishers have historically been exposed to, such as sargassum seaweed *(Sargassum* spp.*)*, the economic impacts of globalization, and climate change, in addition to the strategies that they have successfully used to adapt to these threats.

Between August and September 2019, COBI began collaborating with the University of Miami in the United States to improve the methodology to record the experiences of Mexican fishers. Also, between August and December 2019, 30 men and three women were trained on the methodologies to measure temperature and climate change changes, and temperature sensors were installed at eight underwater sites.

The first workshop for documenting the experiences of fishers took place in November 2019. Participants representing five cooperatives identified 83 different situations that had an impact on their fishing activities and recorded how they successfully adapted to those changes.

Figure 27. A fisherman proudly shows a lobster he has caught; two members of the community install a hydrophone; and a fisher takes water samples. These are some of the activities that COBI and SAC-TUN support in collaboration with the communities of Sian Ka'an and the Mesoamerican Reef. ©Photograph by COBI.

SUSTAINABLE FISHERIES THROUGH COMMUNITY PARTICIPATION IN THE MESOAMERICAN REEF, 2019-2021

December marked the beginning of the 2019 sea bass spawning season, a critically endangered fish included on the Red List of the IUCN, mostly as a result of overfishing. Sea bass are generally solitary animals that act as predators in coral reef systems, preventing the overpopulation of other animals and helping to keep the ecosystem healthy. However, when there is a full moon during the spawning season (December), the fish congregate in large schools and in specific areas, and this is when fishers catch them easily and in larger quantities. Sea bass take four to seven years to reach maturity and, due to overfishing, many are caught before they reach sexual maturity, which has led to a rapid decline in their numbers. Most young sea bass are female, while a number of them transform into males as they mature.

To monitor the areas in which sea bass spawn, in addition to recording their behavior, in December 2019 we installed a hydrophone (an underwater microphone) on the seabed close to the fishing community of Punta Allen in Quintana Roo, an area where we know sea bass congregate in large numbers to spawn. The hydrophone recorded the sounds of the movement of the fish, including fights, courting and reproduction, indicating to researchers the periods of the highest density of fish and school movements. The hydrophones are still active and recording the movements of sea basses, and even during poor weather conditions when fishing boats cannot go out, they still provide information on the behavior of these fish.

In December 2019, fishers from the community monitored another two areas where sea bass spawn, encompassing 32 km2 in the protected areas of the Sian Ka'an Biosphere Reserve, providing data for detailed bathymetric maps which, in conjunction with the observations of a team of divers and the hydrophone recordings, helped define the spawning areas that require the most protection.

All the data that were planned to be compiled regarding these reproductive groups were obtained within the planned timeframes (beginning of December 2019), prior to the arrival of two months of bad weather. The weather not only considerably reduced the number of days that the fishers could go out fishing (only 10 days between December 2019 and January 2020), but also affected their willingness to participate in this project. In January, for example, it was only possible to go out on two separate occasions to monitor the protected fishing areas and the areas in which the sea bass spawn.

Despite this, in January 2020, eight experienced divers (two women and six men) from Punta Allen received training to obtain environmental DNA samples from the sea, as well as fish DNA samples.

In February 2020, the planned monitoring activities went ahead, and the divers carried out maintenance work on the hydrophones, in addition to taking tissue samples from three areas where the sea bass had spawned, which were used for subsequent analysis and were added to the DNA databank. In February, schools numbering more than 1,500 fish were observed. Also in February, COBI began collaborating with UNAM in Puerto Morelos on how to measure currents and tidal flow intensity. The data will be used to prepare fish larvae dispersion models in the Mesoamerican Reef and will help define the major conservation sites for the dispersion of the larvae.

In March 2020, COVID-19 posed new challenges for fishers who were already suffering from the impact of not having been able to fish as a result of the bad weather at the beginning of the year. The pandemic severely impacted local demand for fish during Spring Break because the restaurants and hotels that should normally have been full of tourists were empty. It also had a serious impact on international sales, especially lobster exports to China for New Year celebrations, as well as octopus exports to Spain.

COBI is working with *Sphaera* https://oceans.sphaera.world/ to build a social monitoring network that connects fishers, allowing them to share experiences and solutions to environmental, economic and social challenges they face, such as the economic impacts of globalization, sargassum seaweed, and climate change. COBI is also working with the fishing cooperatives, encouraging them to use the pescadata.org app, which they can access via their cell phones. This app was designed to allow fishers to share information about daily catches and monitor their fishing activities in real time.

"We can all do science. We only need to listen to one another and learn together." – ***Jorge Torre, Director General, Comunidad y Biodiversidad.***

©Photo COBI

STRENGTHENING OF LAGUNA MANATÍ NATURAL PROTECTED AREA, QUINTANA ROO, 2019-2021

IBANQROO
INSTITUTO DE BIODIVERSIDAD Y ÁREAS NATURALES PROTEGIDAS DEL ESTADO DE QUINTANA ROO

"Natural protected areas also mean healthy people."
– Elvira Carvajal, Deputy Secretary for Environmental Protection and Technical Planning, Quintana Roo State Secretariat of Ecology and the Environment (SEMA).

©Photo ECOSUR

THIS PROJECT IS BEING IMPLEMENTED WITH QUINTANA ROO'S STATE INSTITUTE OF BIODIVERSITY AND NATURAL PROTECTED AREAS (IBANQROO) HTTPS://QROO.GOB.MX/IBANQROO AND THE CONANP.

The goal of the project is to strengthen the management of this protected area and develop a management plan. The protected area was established in 1999 to promote the conservation of 233 hectares of wetlands and mangrove forests close to Puerto Juárez, in addition to ensuring that untreated wastewater is not discharged into the lagoon, which also pollutes the neighboring lagoon, *Laguna Chacmochuch*, which covers 1,914 hectares.

Figure 28. The project has helped decrease by 60% the number of people illegally entering the Laguna Manatí Protected Area to fish, hunt, collect wood, vandalize and litter. ©Photograph by ECOSUR.

The protected area is under threat from the expansion of the urban area between Cancún and Isla Mujeres, the growth of the tourism industry, and the lack of an institutional presence and a management plan. All of this, plus pollution from landfill sites and other waste, the deliberate or natural blockage of water flows, illegal deforestation of mangroves, illegal fishing, reptile hunting, and the introduction of invasive species have had a negative impact on the zone. All have led to the fragmentation and interruption of ecological connectivity within the *Manatí-Chacmochuch* lagoon system, which has led to the obstruction of the flow of water, a situation that now affects a wide-ranging area, especially the highways system between Cancún-Isla Mujeres, Puerto Cancún and Puerto Juárez.

During the first months of this project, employees and volunteers from 10 monitoring teams received 120 hours of training, built three entry control points, put up signage and acquired equipment for the park rangers. Thanks to these efforts, we successfully reduced by 60% the number of people illegally entering the *Laguna Manatí* Protected Area to fish, hunt, collect wood, vandalize and litter.

PUBLIC POLICY DEVELOPMENT FOR CONSERVATION AREAS IN THE STATE OF QUINTANA ROO, 2019-2021

"By working alongside SAC-TUN, we help protect nature." – ***Elvira Carvajal, Deputy Secretary for Environmental Protection and Technical Planning, Quintana Roo State Secretariat of Ecology and the Environment (SEMA).***

©Photo IBANQROO

SAC-TUN IS ALSO WORKING WITH SEMA HTTPS://QROO.GOB.MX/SEMA AND AMIGOS DE SIAN KA'AN to strengthen the management of state protected areas and support the establishment of new natural protected areas, including their management plans.

The goal of this project is to design management plans and produce the supporting technical studies to provide the basis for declaring the *Chacmochuch* and *Bacalar* lagoons as protected areas.

During the first few months, we made significant advances in the preliminary studies for 5,500 hectares of wetlands that will be part of the new protected areas, which will be known as the Laguna de *Bacalar* State Park and the *Laguna Chacmochuch* State Flora and Fauna Sanctuary and Ecological Conservation Zone. We are also progressing on the studies for the Puerto Morelos State Wetlands Park, the Majahual Wetlands and the Xcacel-Xcacelito Ecological Conservation Zone.

The lessons learned during this first phase will allow SEMA and *Amigos de Sian Ka'an* to strengthen their environmental programs and increase their collaborative networks.

Figure 29. Laguna Manatí Protected Area, the jewel in the crown of Quintana Roo.

CONTRIBUTION TO THE SEARCH FOR SOLUTIONS TO MASS SEASONAL SARGASSUM SEAWEED INFLUX IN THE MESOAMERICAN REEF

Considering the economic, social and environmental impact of the seasonal sargassum seaweed influx on a local, regional and national scale, our ninth priority is joining local, state and federal efforts to tackle this challenge. SAC-TUN and its environmental partners have established a technical working group to assess the situation and support the authorities in finding solutions.

Figure 30. Sargassum along Playa del Carmen coastline, Quintana Roo.

OUR SOCIAL COMMITMENT

Since it was founded in 1988, SAC-TUN has been a major source of employment and a catalyst for driving social and economic growth in Quintana Roo. When the quarry and port were created, Playa del Carmen was a fishing community of less than 5,000 inhabitants. Today, it is a city with more than 250,000 people.

The population has grown mainly as a result of the expansion of the local economy, driven in part by SAC-TUN, which supported the construction of major infrastructure projects and was a catalyst for the installation of water and electricity supplies. Our limestone products have provided the backbone for the construction of most roads and highways, in addition to numerous hospitals, public schools, parks, churches, hotels and the airport.

At SAC-TUN, our priority is social responsibility, and we are committed to reinvesting in the social and economic development of Quintana Roo. We know that the investments we have made, and will continue to make, will last for a long time after we have completed operations at our quarry.

Figure 31. Since its establishment, SAC-TUN has supported public infrastructure projects. We are committed to further strengthening our relationships with the local community, society, and the government.

PUBLIC INFRASTRUCTURE

Since its establishment, SAC-TUN has contributed to the development of public infrastructure projects in the areas surrounding our properties. We have also donated more than one million tons of limestone aggregate for the construction of public schools, hospitals, highways, parks and emergency services infrastructure. We will continue our support to help drive improvements to these services.

OUR SOCIAL COMMITMENT

In 2020, the Mexican Center for Philanthropy recognized SAC-TUN's Social Investment Policy of earmarking at least 1% of pre-tax profit on social programs and, for the second consecutive year, we were recognized with the Socially Responsible Company (ESR, its Spanish acronym) award for our social and environmental commitment to our stakeholders.

Empresa Socialmente Responsable®

Empresa Socialmente Responsable
1% Inversión Social

SAC-TUN has implemented and promoted three major regional programs:

- SAC-TUN Volunteers – a program that has been active for 10 years and is recognized by the Quintana Roo state government. It has more than 2,600 volunteers who have contributed more than 36,500 hours to a range of community projects.
- Teacher Seminars – a program that, for almost 25 years, has benefitted more than 7,000 teachers and 260,000 students.
- Material Donations Program – A program that has provided more than one million tons of limestone aggregates for the construction of public schools, hospitals, highways, parks and emergency services infrastructure.

SAC-TUN VOLUNTEERS

SAC-TUN Volunteers (previously known as CALICA Volunteers) is a program that brings together employees, families and friends to support projects on the environment, education, arts and culture, community, health and wellness, and social development. These are the pillars of the volunteering program.

At SAC-TUN, we put our philosophy — doing the right thing, the right way, at the right time — into practice: establishing social projects that are driven by our service mission and our goals of supporting responsible economic development and ensuring the well-being of the communities in which we operate.

As part of these programs, we partner with social and community groups, as well as with companies from the private and public sectors that share our philosophy of working together for the benefit of all.

AT SAC-TUN, WE ARE UNITED BY THE FUNDAMENTAL VALUES OF:

- **Respect**
- **Equity**
- **Honesty**
- **Solidarity**
- **Empathy**

Since this program began in 2011, more than 2,650 SAC-TUN volunteers have worked on numerous community initiatives, including:

- Support for three Mayan communities, home to approximately 3,000 people, on environment, health and education.
- Providing 36,500 hours of community service as part of 166 different activities to promote health, education and environmental conservation in Playa del Carmen and Cozumel, as well as the Mayan communities of *Yaxche* and *Sahcab Mucuy* in the town of Tulum.
- Through our volunteering programs, for five years we have taught music to Mayan communities, benefitting more than 300 children.
- Thousands of athletes have been supported through the SAC-TUN Volunteers program during major sporting events in the Mayan Riviera and Cozumel.

The activities undertaken as part of the volunteer program range from the reforestation of areas outside the company's properties, trash collection at beaches and parks, infrastructure improvement, donation of sporting equipment to local groups and support for local sporting events, and donation of construction materials for hospitals and concrete flooring for indigenous communities to safeguard child health. We are particularly proud of our efforts to support local programs involving the Red Cross and Fire Department.

In 2014, SAC-TUN received the State Volunteering Award from the Quintana Roo State Department of Health Services, recognizing the exceptional volunteering work done by the company and its employees.

TEACHER SEMINARS

The popular SAC-TUN Teacher Seminars have been held since 1997, offering hundreds of local teachers, mainly from public schools in northeastern Quintana Roo, a forum for exchanging experiences and learning new teaching practices to motivate their students and help them learn.

The Teacher Seminars are organized by *Universidad de las Américas de Puebla* (UDLAP) and the Quintana Roo State Secretariat of Education. Every year, six to nine national and international experts in the field of education are invited to give conferences, in addition to coordinating workshops on the latest advances in educational technology, educational psychology and teaching skills. The topics covered in recent years include self-reflection on emotional intelligence, teaching through virtual platforms, and holistic student development through a humanist approach.

MATERIAL DONATIONS PROGRAM

In 1995, we began our material donations program which supports civil society organizations, schools and churches, among others, benefiting members of the community in which we operate. By the end of 2020, we have donated 1.17 million tons of backfill material.

The Teacher Seminars, the SAC-TUN Volunteering Program and the Material Donations Program are just three examples of the programs of which we are extremely proud, and which demonstrate our long-term commitment to education and sustainable development in Quintana Roo.

PROTECTION OF ARCHAEOLOGICAL SITES

As required in our Environmental Impact Assessment (EIA), all conservation plans encompass protecting the Mayan archaeological sites found on our properties. All archaeological sites found to date have been explored, mapped and registered by the National Institute of Anthropology and History (INAH), and all are under protection. The INAH has always had unfettered access to these sites, which were described in detail in a book written by Luis Alberto Martos López, entitled *Por las tierras Mayas de Oriente: Arqueología en el área de CALICA*, Quintana Roo, which was published in 2002 by INAH and CALICA (now SAC-TUN).

For years, SAC-TUN has supported, and will continue to support, the preservation and protection of these archaeological sites. We work closely with the INAH on research and other activities relating to these sites, including educational activities. In coordination with the INAH, the spiritual leaders of the indigenous Mayan communities continue using the P-1 complex located on our *Punta Venado* property for their religious ceremonies.

SAC·TUN

2020 SUSTAINTABILITY REPORT