



Preserving ocean life:
How sustainable fishing supports biodiversity

Ocean life: facing an uncertain future

The ocean sustains life on earth and underwater, yet the richness of its biodiversity remains threatened. The latest science indicates that biodiversity is declining faster than at any time in history.

Extinction rates are currently 100 to 1,000 times higher than the natural baseline rate, a trend that is accelerating¹. Critical marine resources are being rapidly depleted by overfishing, habitat loss and pollution, putting the resilience, stability and environmental health of marine ecosystems and the services they provide at risk.

A key report by the International Union for Conservation of Nature² highlights that more than 40% of reef-building coral species face extinction, while nearly a third of sharks and rays are at risk, the latter driven primarily by overfishing³. This stark reality is underscored by further findings that some marine species could struggle to survive if human-induced global warming worsens⁴.

The threat of overfishing

Unsustainable and unregulated fishing are prominent threats to ocean biodiversity and can have a negative impact at multiple points during their operations. For example, bycatch (the catch of non-target species), depriving species of their primary food source, harming their habitat, and using bait species that are endangered or have the potential to harm the wider ecosystem can all be detrimental.

Overfishing has disrupted food webs, diminished fish stocks, and led to the loss of biodiversity⁵. If overfishing and poor fishing practices remain unchecked, they will continue to threaten the survival of marine species and the health of ocean ecosystems. The latest figures from the Food and Agriculture Organization of the United Nations (FAO) show the number of stocks that are overfished continues to rise, now at 37.7%, meanwhile landings from stocks identified as biologically sustainable accounted for 76.9% of total global landings.

A growing global appetite

This harm from human activities is partly driven by a surge in the global consumption of aquatic animals from 9.1kg per capita in 1961 to 20.7kg in 2022, according to the FAO's 2024 State of World Fisheries and Aquaculture Report⁶. This includes aquaculture production, which has grown rapidly in the 21st century. With the global population due to reach almost 10 billion by 2050, meeting this demand for seafood leaves significant pressure on wild fish stocks.

The world's appetite for 'blue foods', which includes farmed and wild seafood, is growing⁷. These aquatic foods are important sources of protein and nutrients helping to meet the food and health needs of a rising global population. In addition, sustainably caught wild seafood has a much lower carbon footprint⁸ when compared to other animal proteins such as beef and pork. As the need to lower carbon emissions to tackle climate change grows, how 'blue foods' are produced will become an even more important part of a sustainable future.



A coral reef. © iStock.

Extinction rates are currently
100 to 1,000
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40%
of reef-building coral
species face extinction

37.7%
of fish stocks
are overfished

20.7kg
average global consumption
of aquatic animals per capita
in 2022

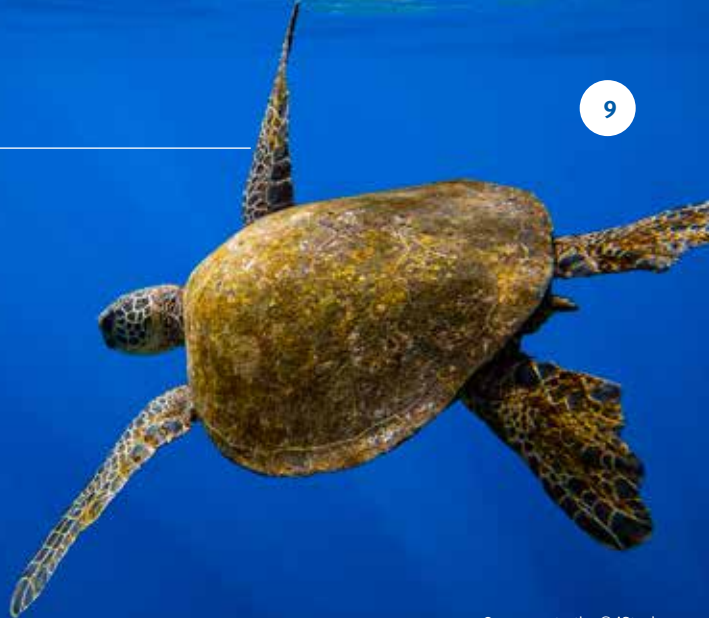
10 billion
projected global
population by 2050

1. Dasgupta Review, 2021. 2. IUCN, 2024. 3. IUCN, 2021. 4. <https://www.sciencedaily.com/releases/2024/11/241113123222.htm>. 5. UN.org, 2019. 6. <https://www.fao.org/publications/fao-flagship-publications/the-state-of-world-fisheries-and-aquaculture/en>. 7. Blue Food Assessment, 2021. 8. <https://www.nature.com/articles/s41558-018-0117-x>

Preserving biodiversity in practice

Fisheries around the world are innovating and making the improvements needed to protect ocean biodiversity. Their success and impact are often the result of collaboration between research scientists or NGOs and fishers whose shared knowledge results in deeper insights. The following examples show the impact they are having across the globe.

Keeping turtles at sea



Green sea turtle. © iStock

Turtle interactions down 99% thanks to the introduction of Turtle Exclusion Devices.

Australia Northern prawn fishery (certified Nov 2012) NORTHERN AUSTRALIA



The country's largest wild prawn fishery, Australia Northern Prawn, has been fishing 771,000 square kilometres of extreme wilderness for more than 60 years. In 2012 it became the world's first MSC certified sustainable tropical prawn fishery.

While the fishery's endeavours in sustainability began long before its MSC certification, it is continually improving to mitigate adverse impacts on the wide variety of marine life in this "high biodiversity region".

One of the ways the fishery has done this is to focus efforts on reducing negative impacts on sea turtles, which can become entangled in fishing gear and injured or killed as a result. Currently, six of the seven sea turtle species worldwide are classified as vulnerable or endangered on the IUCN Red List¹⁷.

Since 2000, when Turtle Exclusion Devices (TEDs) were fitted to all nets in the fishery, turtle interactions are down 99% with zero turtle mortalities caused by fishery activity in 2023. TEDs act as sorting grids, allowing prawns to be kept while turtles can swim out of an escape hatch in the net unharmed. These devices have not only had a positive impact on turtles but have also reduced the number of interactions with larger sharks and rays over one metre, which are down 86% and 94% respectively¹⁸.

To build on their work, the fishery has been awarded \$86k AUD, through the MSC's Ocean Stewardship Fund¹⁹, to carry out research to support reductions in sawfish and sea snake interactions with fishing gear.

The grant will enable the analysis of existing data to identify differences in bycatch rates between individual vessels, fishing grounds, and fishing times and seasons. It will also support the development and design of sawfish bycatch mitigation trials – a unique challenge given the fish's long toothed rostrum or "saw".

\$86kAUD

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Identifying cost-effective solutions to reduce impacts of fishing on ETP species will have positive benefits for populations in the Northern prawn fishery and potentially other fisheries which impact on ETP sawfish and sea snake species through knowledge sharing.

Annie Jarrett, CEO, NPF Industry Pty Ltd.

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Sawfish swimming. © iStock



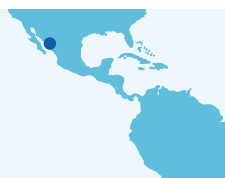
17. <https://www.iucn-mtsg.org/statuses> 18. <https://www.sciencedirect.com/science/article/abs/pii/S0165783606002797>.
19. <https://www.msc.org/what-we-are-doing/our-collective-impact/ocean-stewardship-fund>

“Little deer” help pelicans to thrive

Brown pelicans in water. © Ernie Enkelaar/MSC

Smart vessel modifications help to reduce accidental deaths of protected pelicans from 46 in one year to just six across five years.

Southern Gulf of California Thread Herring fishery (certified Oct 2016) SINALOA, MEXICO



The Gulf of California was once described by the marine explorer Jacques Cousteau as “the world’s aquarium”. It’s a rich ecosystem that is home to 900 fish species and 170 different types of seabird.

One of these birds, known for its impressive plunge diving abilities and capacious throat pouch, is the brown pelican (*Pelecanus occidentalis*). Brown pelicans are protected under the US Migratory Bird Treaty Act. They feed primarily on small schooling fish, such as anchovies and thread herring, and can consume almost 2kg of fish per day.

Squadrons of brown pelican often follow fishing vessels along the coastline, diving for fish when the shoals become concentrated, gorging themselves and not flying away immediately. This puts the pelicans right at the heart of fishing operations, preventing nets from being lifted until they have departed or risk them being entangled in fishing gear.

As such, operating in these waters full of wildlife can be challenging for fisheries. In the thread herring fishery’s 2013-2014 season, 46 pelican deaths were recorded in 201 fishing trips, the equivalent of about one death every five trips. During that time, observer coverage was only present on 6% of the vessels’ trips.

As part of its engagement with the MSC program, the Southern Gulf of California thread herring fishery has adopted mitigation measures and modified its vessels to include a “T” fronted metal structure protecting the pulleys. The fishermen call it “el venadito” for its resemblance to a little deer. This was developed by the fishery to avoid pelicans getting caught in the pulleys during the net recovery.

From 2015 to 2020, observer coverage increased more than five-fold to between 34.4% and 57.6%, ensuring best practice in monitoring and contributing towards a significant reduction in pelican mortalities. In this period, only six pelican deaths were recorded, despite more than 64,000 sightings being reported.

The mitigation measures implemented by the fleet are applied when birds are interacting with the fishing operation. This accounts for around 25% of the fishing trips, as other outings, such as at nighttime, do not involve interactions with birds. The actions are a mix of the innovative and improvised, including water sprayed from the boat to form a “curtain” that deters the birds, sounding horns, and flapping rain jackets when the net is closed. These visual and audio deterrents prevent seabirds from becoming entangled or injured during the setting or hauling of fishing gear on purse seine vessels.



Fisher deters birds with water. © MSC

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It is a source of pride for the entire Mexican fishing industry that we have achieved this certification.

Armando Coppel Azcona,
General Director of Maz
Sardina S.A. de C.V.
(assessment client)

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el venadito. © Maz Sardina S.A. de C.V.

Sound waves of success



Harbour porpoise swimming. © iStock

Bycatch of harbour porpoise down 80% after banana pingers installed on all vessels.

Cornish hake gillnet fishery

(certified June 2015)

CORNWALL, UK



The harbour porpoise (*Phocoena phocoena*) is the smallest cetacean seen in UK waters and the only member of the porpoise family living around British coasts. Marine mammals like porpoises take a long time to mature and reproduce slowly. This means their populations are particularly vulnerable and high levels of bycatch can lead to numbers declining faster than they're able to grow.

During the MSC certification of the Cornish hake gillnet fishery²⁰, the independent assessors suggested stronger data were required to show the fishery was managing impacts on local marine mammal populations. It was also noted that the fishery needed to implement a management strategy to reduce interactions with endangered, threatened and protected (ETP) species.

The use of pingers is one method that fishers can use to modify their nets and help reduce bycatch. Pingers can be fitted onto gillnets or trawl nets to deter marine mammals. They work by sending underwater acoustic waves or "pings" that signal to marine mammals that nets are in the water. This helps to prevent entanglement.

Legislation in the UK stipulates that all fishing vessels longer than 12 metres, fishing in specific locations and using certain gear, must be fitted with these devices. The Cornish hake gillnet fishery, however, has made pingers mandatory for all its vessels – even those not required by law.

By using pingers the fishery reduced bycatch of harbour porpoise by 80% and in 2019 reported zero interactions with marine mammals. Porpoises are particularly sensitive to quieter sounds, which is why pingers seem to be more effective with them than with other species.

Research published in March 2020²¹ tested whether porpoises became habituated to a specific product, the "Banana Pinger", an acoustic deterrent device developed by Fishtek Marine²². After an eight-month study the researchers found no decrease in effectiveness and no habituation from porpoises, who appeared to return to the area as soon the pingers were switched off.



Banana pinger in action. © Fishtek Marine

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The results show that there is a practical solution that is both effective and does not impact or change the animals' behaviour – a positive result for both conservation and fishermen alike.

Conservation manager at Cornwall Wildlife Trust and co-author, Ruth Williams

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Fisher shows a banana pinger © Fishtek Marine

20. <https://www.msc.org/uk/what-we-are-doing/uk-irish-fisheries/cornish-hake-gillnet-fishery>.

21. <https://www.msc.org/media-centre/news-opinion/news/2020/06/15/banana-pinger-device-could-help-reduce-porpoise-bycatch>

22. <https://www.fishtekmarine.com>

Sparkling innovation leads to fewer crabs used as bait

Fishing with the gareteo method. © Arturo Lopez/MSC

Sparkly lures prevent wildlife entanglement and save thousands of crabs.

Red and common octopus fishery (MSC Improvement Program)* YUCATAN PENINSULA, MEXICO



In fisheries science, small changes can have a big impact. At the red and common octopus fishery in Mexico's Yucatan Peninsula, coloured crabs, made using epoxy resin, are being used as bait in place of real crabs. This lessens the impact on crab populations, as an estimated 1,000-1,500 tonnes of crabs were being used as bait for octopus fishing annually.

The octopus fishery is one of the most important in Mexico and one of the largest worldwide, supporting more than 15,000 jobs. To catch red octopus, fishers use the traditional "gareteo" fishing method, where a boat drifts with two rods; each rod has up to five lines with just bait and no hooks. As demand for the catch has increased – landings have doubled over the past decade – there has been a rise in demand for crabs used as bait.

However, the use of crab baits can have an environmental impact. The crab baits are only good for around two days and after that they are regularly disposed of on beaches, along with the rope that secures them whilst fishing. In an area of rich biodiversity, this can entangle birds and other local wildlife as well as pollute beaches.

As part of its work in the MSC's Improvement Program – which offers a structured, measurable path towards certified

sustainability – the fishery is seeking to minimise its environmental impact and ensure the protection of Endangered, Threatened and Protected (ETP) species. To support with this, the fishery was set a goal of gathering information relating to its choice of bait. DNA analyses were introduced to identify bait species and their origins. This enabled the fishery in the Improvement Program to confirm that it was not using any ETP species as bait.

The development of the artificial lures enables fishers to bypass the need for any testing. The artificial lures replicate the shape, structure and weight of live crustaceans and boast greater longevity, lasting a whole season or more. During the 2024 fishing season, as part of a pilot trial, more than 2,500 lures were used along the Yucatan coast, benefitting both the fishers and the coastal ecosystem. These sparkly lures are now being sold to other fisheries and efforts are underway to create biodegradable models to further reduce waste in case they get lost.



Fishing with artificial crabs. © Ana Pozas / Ocean Nexus

Fisher holding octopus. © Arturo Lopez/MSC



“ Our octopus fishery is highly selective thanks to the fishing method, which consists of drifting baits, and the design of the fishing season. However, we rely on large quantities of crabs as bait, which creates an ecological impact. By using artificial lures, we aim to reduce this impact while also increasing our profitability and improving the food safety of our catches.

Carlos Novelo, a fisherman from Celestún and active member of the Fishery Improvement Project (FIP)

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*The MSC Improvement Program offers fisheries support and incentives, provided they make measurable improvements over a five-year period, with the goal of helping them achieve MSC certification.

Saving birds with “scarecrow” streamers

Tori lines in action. © Otto Whitehead.

Albatross mortalities down by 99% in South Africa’s most important sustainable fishery.

South Africa hake trawl fishery

(certified April 2004)

SOUTH AFRICA



The South Africa hake trawl fishery is a vital industry in the Western Cape. Together, the inshore and deep-sea operations are responsible for half of South Africa’s commercial fishing exports, directly and indirectly employing around 14,000 people.

In the early 2000s, the fishery made great strides to improve its sustainability, and in 2004 it became the first hake fishery in the world to achieve MSC certification. However, it was still required to make further improvements related to seabird bycatch mitigation and data collection as birds continued to be killed as accidental catch.

Birds that forage behind fishing boats can get caught up in the trawl cables or become entangled in the mesh of the net as it is hauled out of the water. As part of MSC certification the fishery was set a goal of both understanding the impact of interactions with seabird populations and implementing an effective management strategy to reduce mortalities.

Collaborating closely with Birdlife South Africa, the local branch of an international NGO that has been working to conserve birds in the country since the 1970s, the fishery introduced bird-scaring lines or “tori” lines. These consist of brightly coloured streamers attached to a top rope at the back of the boat. The streamers deter seabirds – like a scarecrow – and prevent them from coming into contact or colliding with the trawl cables. As a result, overall seabird mortalities were reduced by 90%, while albatross deaths decreased by 99%.

The fishery’s success in putting these low-tech, cost-effective strategies in place paved the way for another hake fishery in neighbouring Namibia to deploy similar tactics to avoid seabird mortalities. “With Namibia putting bird mitigation measures in place, regionally we’ll be saving about 40,000 birds annually from dying as a result of collision with trawl cables,” says Andrea Angel, Manager of the Albatross Taskforce programme at Birdlife South Africa.

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Today I have a love of birds because of the birds we encounter.

In the old days, tori lines weren’t put on the offshore vessels; birds were getting injured in trawl cable interactions. Since the tori lines have been there and used properly, many birds aren’t getting caught anymore. They’re wonderful and keep the birds alive.

John Simmons, Vessel quality coordinator for Viking Fishing

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Birdlife representative with a tori line.
© MSC/Albatross Task Force

Training to identify and avoid a “living fossil”

Fishing with a trammel net. © MSC

Bespoke training sessions and the introduction of an app help fishers to avoid endangered species.

Indonesian Kotabaru prawn fishery (MSC Improvement Program) SOUTH KALIMANTAN, INDONESIA



On a good trip, in season with favourable currents, fishers in small boats can harvest more than 5kg of shrimp in South Kalimantan. White prawn and spot prawn are caught by traditional fishers across the region often fishing in pairs using large mesh trammel nets, which consist of three layers of netting.

Fishers have operated in this way for years often not formally recording catch information around primary target species, bycatch, and endangered, threatened and protected (ETP) species. Working closely with national and local authorities, industry and the wider fishing community, the fishery is improving the collection of data, including vital information on the different species caught and levels of bycatch.

This project involves strong collaboration between parties around data collection, including a recent partnership with the local Brawijaya University and PT Sahabat Laut Lestari, the company hosting an app where ETP species are logged.

Alongside this app, training and awareness raising is taking place on importance of catch documentation and effective ETP

identification, handling and release. The horseshoe crab (*Limulidae*), for example, is a vulnerable bottom dweller in local waters that has been around since before dinosaurs and is often referred to as “the living fossil”²³. To date over 110 fishers across different villages in the region have taken part in learning programs relating to horseshoe crabs and other ETP species.

On-board time-lapse cameras have also been installed to help identify whether the fishery is interacting with ETP species, and confirm release when caught incidentally.

Accurate data collection enables continuous monitoring of fish populations, helping determine whether fish stocks remain sustainable or if stricter regulations are necessary to prevent overfishing. This data is also shared with management authorities, both local and national, to be used for government databases and considerations. The project also supports the registration of hundreds of vessels operating in the fishery and ensures each vessel can be formally identified. This enables catch to be segregated and identified, allowing suppliers to provide food manufacturers with information on the catch’s provenance. The fishery aims to meet the MSC Fisheries Standard and enter assessment in 2026.

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Sourcing seafood sustainably will have a positive impact for all stakeholders in the fishery and supply chain and will help us to secure sustainable livelihoods. By carrying out this research, we can collect data which will help us to benchmark long-term changes in the fishery.

Timotius Defri, Quality Manager, PT Sekar Laut, Tbk

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Fisher measures horseshoe crab. © FIP Shrimp Trammel Net of Kotabaru, South Kalimantan

23. <https://oceanconservancy.org/blog/2020/05/19/11-facts-horseshoe-crabs-will-blow-mind/>

Teaming up for turtles

Turtle underwater. © Alefa Production.

Fishers and scientists join forces to hatch a plan, helping 80% of incidentally caught turtles to be saved and released.

Réunion Island swordfish longline fishery

(certified July 2022)

LA RÉUNION, INDIAN OCEAN



Turtles have been in the waters around Reunion Island for 230 million years. Over 400 miles east of Madagascar, this remote tropical setting is visited by many different species, including endangered loggerhead turtles.

The Save Turtle Run²⁴ project has a goal to reduce incidental catch of sea turtles in the Indian Ocean. Stakeholders recognise the importance of protecting the turtles. As a result, fishermen, scientists and turtle experts work together to limit bycatch and guarantee the survival of captured turtles until they are released back into their natural environment.

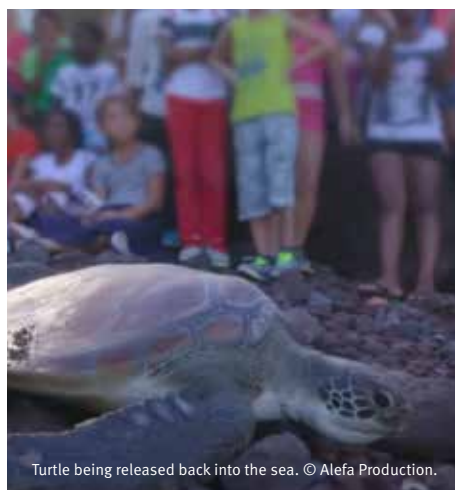
This team of local experts has put in place essential tools and procedures to get Save Turtle Run project up and running. These include training for fishermen to identify and handle accidentally caught turtles and specialised rescue kits such as a prototype net/spinner designed to carefully remove caught turtles from the water, without pulling on lines or hooks.

Data on areas such as frequency, species and GPS position is collected through voluntary declarations by fishermen. This information enhances the understanding of turtles' migratory behaviour, making it possible to model their presence in fishing areas and to make management decisions based on scientific data.

To date, 80% of injured turtles survive thanks to care provided by Kelonia, a local sea turtle rescue facility, proving that sustainable fishing and the protection of marine biodiversity can be reconciled.

The fishermen have taken the initiative in this project to reduce bycatch. They are passionate about looking after the marine ecosystem. "Without the fishermen, we have no information. We would be totally blind," says Mathieu Barret, Head of Department at Kelonia.

Ultimately, the objective is to identify predictive indicators of the presence of turtles that will make it possible to avoid areas at risk and protect these species from future captures.



Turtle being released back into the sea. © Alefa Production.

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Through all the scientific data we collect, we hope to be able to identify migration corridors for food or for reproduction.

The long-term objective is to be able to advise fishermen to avoid certain areas where they risk catching turtles.

Pierre-Yves Brachelet,
co-ordinator at the Réunion
Interprofessional Association
of Fishing and Aquaculture
(ARIPA).

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Handling turtles at the rescue centre. © Alefa Production.

24. <https://www.msc.org/fr/OSF2023-ARIPA>

Saving and surveying silky sharks

Shark swimming. © iStock.

91% of silky sharks released alive after training and introduction of bespoke gear.

Eastern Pacific Ocean tropical tuna purse seine fishery with TUNACONS Foundation (certified July 2022) MANTA, ECUADOR



Silky sharks are considered vulnerable in this region by the IUCN Red List, due to overfishing, risk of entanglement in Fish Aggregating Devices (FADs) - floating structures used to attract fish - and demand for shark fins.

It gets its name from its velvety skin. This “smooth” predator is also known as the “net-eater shark” because it often attacks tuna seine nets. If a plan by the Eastern Pacific Ocean tropical tuna fishery to improve shark bycatch survival rates was going to work, then ensuring crew members were on board was essential.

Crew at the fishery would have to step up to be thoroughly trained and ready for action. Among other things, the fishers are required to learn technical aspects of handling and release. They must also acquire competence using advanced tools, such as specialised stretchers to manage marine species in an efficient and safe manner, reducing the risk of injury.

TUNACONS, a group of eight sustainable tuna companies working together in the Eastern Pacific Ocean, created the “Crew Members To The Rescue” group – a key team focused on the release process.

Reducing release times is an important factor in decreasing stress and possible physiological complications in rescued animals.

TUNACONS has implemented effective coordination between rescue teams and boat operators, in addition to continuous analysis to identify bottlenecks in the procedures.

Ongoing best practice training at the fishery has helped to ensure more sharks are released alive when accidentally caught. Likewise, electronic tagging of silky sharks has helped to improve data collection and inform post-incidental catch survival rates, providing information for 60 days post-catch.

The impact of these combined actions has been significant. The number of silky sharks released alive after incidental catch has increased from 76% in 2018 to 90.6% in 2023 from future captures.

Building on the existing progress in this area, research funded by the MSC’s Ocean Stewardship Fund could support the development of more effective handling and release practices, further reducing silky shark mortality rates.

On-board observers will record the size of silky sharks caught, how they have been handled and their condition at the time of release. Blood samples will be taken and analysed for stress markers, whilst satellite tags will add to a wealth of information that helps to show if a release has been successful. All data gathered will be analysed by Inter-American Tropical Tuna Commission (IATTC) scientists and used to estimate survival rates and identify factors that may influence whether a shark is likely to survive.

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We have dedicated a great effort through training and technical assistance to crew members and captains to apply a code of good practices to reduce the impact on the ecosystem.

It’s been necessary to work with science and technology, but above all, with the fishermen.

Guillermo Moran, executive director, TUNACONS

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Fishers use a shark stretcher.
© TUNACONS Foundation

Sustainable fishing helps fuel birds for migration

Migrating birds on the Great Salt Lake. © Utah Division of Wildlife Resources.

Careful fishery management is helping bird populations to thrive in a harsh environment.

Great Salt Lake brine shrimp fishery (certified in 2023) UTAH, USA



Perhaps best known to most people as Sea Monkeys sold in miniature toy aquariums, brine shrimp thrive in the waters of the Great Salt Lake. The lake produces around 45% of the world's brine shrimp, also known as Artemia. Most of the brine shrimp cysts collected on the lake are dry processed as feed for aquaculture, an important pillar in food security for the world's growing population.

Located in northern Utah, the Great Salt Lake is the largest saline lake in the western hemisphere and a vital ecosystem for many different types of wildlife. According to the Utah Division for Wildlife Resources (UDWR), more than 10 million birds, representing 250 species, pass by the lake annually.

It's an important stop for birds on the Pacific Flyway route between Mexico and Alaska, where many depend on brine shrimp to fuel their long migrations.

Each autumn, over one million eared grebes (*Podiceps nigricollis*), small waterbirds identified by their golden ear tufts, forage almost exclusively on brine shrimp during their staging, or preparation for migration. Wilson's phalaropes (*Phalaropus tricolor*), small wading birds, gain as much as two grams per day, doubling their weight before flying off.

The brine shrimp fishing industry started in 1952, but it wasn't until the 1990s that concerns were raised about the potential impact harvesting the brine shrimp might have on the thousands of migratory birds.

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A good harvest benefits both the industry and the birds that rely on brine shrimp as a food source. For example, eared grebes, which depend exclusively on brine shrimp during their time at Great Salt Lake in the fall, have seen their numbers increase at the lake due to this consistent and reliable food supply. If there is a better example of industry working with wildlife anywhere in the world, I've never heard of it.

**John Luft, Great Salt Lake
Ecosystem Program Manager**

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45%

of the world's brine shrimp, also known as Artemia, is produced in the waters of the Great Salt Lake

Harvesting brine shrimp on the Great Salt Lake. © Great Salt Lake Artemia.

