TURTLES UNDER THREAT

Why the world's ultimate ocean wanderers need protection

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Hawksbill turtle in Indonesia
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Baby leatherback sea turtle in French Guiana
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FOREWORD

After millions of years on this planet, it is scarcely believable that time is running out for sea turtles. But so it is. And our generation is pivotal in deciding their future.

The seven species of sea turtles are some of the most mysterious and charismatic inhabitants of the oceans. Their ancestors shared the planet with dinosaurs, and they have thrived ever since. It has been my fortune and privilege to spend many years studying these magnificent creatures, including in my role as head of the research program on sea turtles at the Institut Pluridisciplinaire Hubert Curien (IPHC) of Centre National de la Recherche Scientifique (CNRS).

I have observed nesting turtles on the tropical sandy beaches of Suriname, French Guiana and the Caribbean, and GPS and Argos tracking has allowed me and fellow French Guiana-Caribbean collaborators to follow their paths as they cross the ocean on epic migrations to find the best foraging grounds.

Turtles are difficult to observe for much of their life, since they spend so much of it in the open ocean: international waters far from the coast. In concert with the efforts of other turtle researchers around the world, studies like those we carried out by have helped understand this nomadic life. In turn, it has shown how important sea turtles are to so many different habitats around the world, and how these habitats are so dependent on one another. Turtles occupy a crucial niche in many ecosystems - green turtles graze tropical seagrass beds, while adult hawksbills make their homes on coral reefs, and enormous leatherbacks dive hundreds of metres below the surface in the cool waters of the North Atlantic in search of jellyfish.

Sadly, dedicating one's life to researching and observing turtles means that we, as a scientific community, are also witnesses to the serious and growing threats to these incredible animals. I have observed first hand the steep decline in the number of turtles nesting on the beaches where we carry out our work. Turtles have always been prized by humans for their meat, their eggs and their beautiful shells, which led to them being over-hunted for hundreds of years. The pressure on turtles has not abated in recent times, and now the number of eggs laid on beaches in French Guiana is 250 times smaller than in the 1990s. Today, turtles are threatened by humans in even more ways. Industrial fishing. Plastic pollution. And looming over all of this: the twin catastrophes of ocean acidification and climate breakdown, as they alter habitats, ecosystems and the very chemistry of the ocean.

In 2019, I collaborated with Greenpeace[1] to tag ten leatherback turtles at their nesting beaches in French Guiana. We were thrilled to learn that nine of them proceeded to swim thousands of kilometres north across through the Atlantic ocean: staggering distances, even reaching as far as Nova Scotia in Canada and France. Tragically, we also saw how one of them was found washed up just 120km from the nesting beach, drowned in a fishing net. It was a stark reminder of humanity's impact on the natural world. Ocean wildlife is being rapidly degraded around the globe, with thousands of animal and plant species threatened with extinction, including sea turtles.

But this information must galvanise us to action. We must create sanctuaries for wildlife to recover and thrive. This year, governments have a critical window of opportunity to do just that. A global treaty for our oceans is on the table at the UN, and its agreement is essential if we are to introduce marine protected areas of the scale needed to avert calamity for the oceans and the communities and creatures that depend on it. I am proud to back the call of many scientists globally, and to stand with Greenpeace, in calling for at least 30% of the world's oceans to be fully protected by 2030. Turtles have travelled the world's oceans for over 100 million years, but the stark truth is that if things continue as they are, they may not survive another century. We need urgent action to protect the oceans now.

By Damien Chevallier

[1] Where Greenpeace is referenced in this report it refers to Greenpeace International unless otherwise stated.

An Olive ridley turtle in the Pacific
© Paul Hilton / Greenpeace

KEY FINDINGS

- Turtles have traversed the world's oceans for more than 100 million years, ranging in large numbers across the globe and occupying a crucial niche within the marine ecosystem.
- Today, six of the seven marine turtle species are on the red list of the International Union for Conservation of Nature (IUCN) and are threatened with extinction.
- The last 500 years have seen alarming declines in turtle populations, historically through hunting by humans. The existential threats facing turtles today are industrial fishing, plastic pollution and climate change.
- Marine turtles live in a wide variety of habitats and migrate thousands of kilometres across the seas to travel between nesting beaches, mating grounds and foraging areas.
- Greenpeace has collaborated on a research project tagging female leatherback turtles nesting on beaches in French Guiana with Argos tags, revealing their incredible journeys to feeding grounds as far away as Nova Scotia and France.
- These turtles have travelled almost twice as far as previously observed groups, indicating how patterns of behaviour are modifying to cope with new currents and sea temperatures. The extra effort expended on finding food is likely to reduce the number of eggs laid each season.
- One of the turtles tagged during the project was found washed up on a beach in Suriname just 120km away from the tagging site. It had died after becoming entangled in a gill net, highlighting the dangers to turtles posed by industrial fishing.
- Global turtle conservation efforts have had successes, with some populations showing trends of increasing abundance. However, overall the picture is less optimistic: historical losses have been very high and the threats currently facing turtles are severe.
- Sanctuaries, or Marine Protected Areas (MPAs), have been shown to provide significant benefits to turtle populations. Sea turtles are highly migratory, so a network of MPAs that protect 30% of the world's oceans, including international waters, is needed to give them the best chance of recovery.
- To achieve this goal, a new Global Ocean Treaty must be agreed at the UN that will enable the protection of marine life and habitats outside of national jurisdiction.

TURTLES UNDER THREAT

Turtles have existed for more than 100 million years, once sharing the world with dinosaurs. Yet human activity is driving them to extinction.

Sea turtles are close relatives of tortoises, having traded their legs for flippers, and there are seven species alive today: leatherback, green, loggerhead, hawksbill, Olive ridley, Kemp's ridley and flatback.[1] Turtles have existed for more than 100 million years, once sharing the world with the dinosaurs and appearing in the stomachs of fossilised ichthyosaurs.[2] The dinosaurs were wiped out 65 million years ago during the last great extinction, but turtles survived, forming huge populations and becoming a crucial part of the ocean's ecosystem.[3] However, the tide started to turn for turtles once they began interacting with humans. Turtle populations in the Americas and Australia were decimated after coming into contact with European colonists who fished them relentlessly,[4] and global numbers continued to fall over the following centuries.

A 2011 study found that a Pacific leatherback population had declined by 78% since the 1980s,[5] and it is no surprise to find that six of the seven turtle species are on the International Union for Conservation and Nature (IUCN) red list.[6] In many parts of the world, sea turtles are now at risk of going extinct because of their interactions with humans. These threats come in many different forms. For example, juvenile hawksbill and green turtles make mangrove swamps their home,[7] [8] but these ecologically valuable trees are reportedly being uprooted to make room for coastal resorts.[9] Meanwhile, industrial pollution like that resulting from BP's Deepwater Horizon oil spill can potentially impact turtles over vast areas.[10] The dangers posed by industrial fishing, plastic pollution and climate change are placing turtle populations under severe stress.

Olive ridley turtle caught in China
© Paul Hilton / Greenpeace

A Kemp's Ridley turtle rescued from the BP Deepwater Horizon oil spill
© Louisiana Department of Wildlife and Fisheries

Turtles often mistake plastic for food
© Troy Mayne / Oceanic Imagery Publications

Industrial fishing

Turtles are primarily caught by three fishing methods: gill nets, longlines and trawls. These are used to target a wide variety of economically valuable fish, such as tuna and swordfish, but inadvertently take turtles as so-called 'bycatch'. A 2010 study of global sea turtle bycatch rates found that 85,000 turtles were observed to have been caught by fishing boats between 1990 and 2008. However, observer oversight of fishing activity is so scant that it estimated the actual number of turtles was likely to be at least two orders of magnitude larger, meaning that potentially 8.5 million turtles[11] were pulled out of the water. Once turtles come into contact with fishing gear, they are at high risk of dying.[12] Gill nets are meshes used to trap fish, but they can also entangle the flippers and necks of turtles, holding them underwater and causing them to drown.[13] Longliners trail a very long cable behind the boat with hundreds or even thousands of baited hooks, with a hook spaced every few metres. These can drown loggerhead and leatherback turtles that come to eat the bait and get caught on the line,[14] and even more suffer a slow death because of injuries caused by the hook itself.[15] Meanwhile, turtles that are scooped up in trawl nets can suffer traumatic injuries and decompression sickness,[16] alongside the danger of drowning as they become caught in the net.[17]

"It is estimated that a minimum of 8.5 million turtles were caught as bycatch between 1990 and 2008."

Plastic pollution

The global economy produces a staggering amount of plastic, and between 4.8 and 12.7 million tonnes of it enters the oceans each year.[18] Plastic waste has now been found in the most remote parts of the world, from the frozen Antarctic to the Mariana Trench, more than 10km below sea level.[19]This is having a catastrophic effect on marine organisms, as debris that is ingested or that entangles their bodies prevents them breathing and eating successfully.[20] Sea turtles are particularly at risk, with a recent report finding that once a turtle has consumed as few as 14 pieces of plastic it suffers a 50% chance of mortality.[21] Leatherback turtles hunt using sight alone, and plastic shopping bags drifting on the ocean's currents look remarkably similar to jellyfish, their main prey.[22] It is estimated that 52% of all sea turtles have ingested plastic,[23] but some populations are at a significantly higher risk, with the juvenile green turtle population in coastal Brazil and the South West Atlantic showing a rate of 90%.[24] Despite the soaring awareness of plastic pollution as a major environmental issue, the global accumulation of mismanaged plastic waste is projected to triple by 2060.[25]

"The natural survival rate of turtles from birth to adulthood is estimated at one in 1,000 and these odds are getting worse because of the severe threats presented by human actions."

Climate change

The threat posed to turtles by plastic is likely to grow significantly in the coming years, as are the potentially devastating impacts of climate change. The ocean has warmed continuously since 1970, absorbing 90% of the excess heat in the climate system, and the rate of warming has doubled since 1993.[26] Coral reefs, which are an important food source for hawksbill turtles, are experiencing coral bleaching events with increasing frequency as temperatures rise, leaving large areas devoid of life.[27] Extreme weather events are also more likely as the seas heat up, and tropical storms can devastate the seagrass beds that provide sustenance for green turtles. Leatherback turtles roam for vast distances across ocean basins, hunting through pelagic waters and diving as deep as 1200m, but a study has predicted that the leatherback's habitat in the Eastern Pacific will shrink by 15% over the next century.[28]

The dangers from climate change outlined above are shared by many of the world's marine animals; however, sea turtles face a particular tragedy of their own. The sex of an individual is not determined at fertilisation, but instead during incubation of the egg on the beach where it was laid, and the mix of males and females depends on the temperature of the sand. High temperatures make females more likely, and there is already documented evidence of an Australian green turtle population where females outnumber males by 116 to one.[29] Clearly, this warping of the gender ratio can make future breeding and nesting unsustainable in these areas.

Where breeding is still possible, a newborn turtle must contend with raccoons, birds, crabs and foxes just to make it to the sea, and once in the water they need to escape the attention of fish, sharks and seabirds until they are fully grown. The natural survival rate of turtles from birth to adulthood is estimated at one in 1,000[30] and these odds are getting worse because of the severe threats presented by human actions. Major conservation efforts are needed to give sea turtles the chance they deserve of surviving another 100 million years.

High temperatures make female hatchlings more likely
© Jacques Fretey / Greenpeace

A sea turtle eats seagrass in Coron, Palawan
© Steve De Neef

WHY IS TURTLE CONSERVATION IMPORTANT?

Turtles are magnificent creatures which are distributed throughout much of the world's oceans, from the warmest coastal waters in the tropics to the cold high seas in the Northern Pacific and Atlantic. Their unique physiology and nesting habits mean that they occupy a crucial niche in the ecosystem, acting as important predators and prey.

Beginning with the sands where turtles make their nests, the nutrients provided by the eggs that fail to hatch help to grow plants on the dunes, which in turn protect against erosion of the beach.[31] From there, as the turtles mature to adulthood they spread out and cover a wide variety of different habitats. Young turtles are a food source for many types of seabirds and fish, and even fully-grown adults can be prey for the largest sharks, which makes them valuable components of many food webs.[32]

Turtles play an even more important role in the environment because of what they eat. Green turtles eat seagrass, which few other animals do,[33] so they are crucial for the maintenance of healthy seagrass meadows around the world.[34] In turn, this mitigates against climate change, since seagrasses are one of the most efficient ecosystems at storing carbon per unit area, burying it 35 times faster than tropical rainforests.[35] Meanwhile, warming oceans may be contributing to making jellyfish blooms more common.[36] Since they are the main prey of leatherback turtles, a healthy leatherback population will be crucial in keeping jellyfish numbers under control, in turn helping to avoid adverse effects on the broader ecosystem.[37]

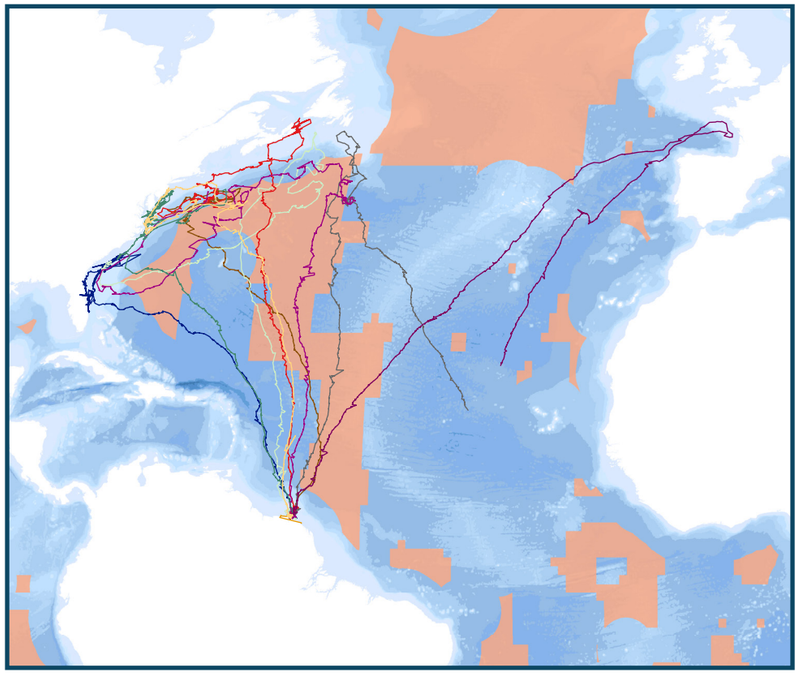
"Green turtles are crucial for the maintenance of healthy seagrass meadows. This helps to mitigate climate change as seagrasses are one of the most efficient carbon storage ecosystems."

Turtle tagging in French Guiana

Since April 2019, the Greenpeace ship Esperanza has been voyaging from pole to pole, from the Arctic to the Antarctic, as part of a campaign calling for an ambitious Global Ocean Treaty that could pave the way to protecting at least 30% of the world's oceans by 2030. Over the course of this year-long expedition, the Esperanza is exposing the many various threats facing the world's oceans and undertaking scientific research to document and build the case for protection of ecosystems in international waters. As part of this expedition, from 3–10 June 2019, Greenpeace accompanied a team of scientists from the Institut Pluridisciplinaire Hubert Curien (IPHC) of Centre National de la Recherche Scientifique (CNRS) to carry out research on sea turtles in French Guiana.

In the 1990s, French Guiana was a major nesting site for leatherbacks, with eggs being laid in 50,000 nests per season. Today the average is less than 200 per season, indicating the steep decline suffered by leatherbacks in this area over the last thirty years.[38] Greenpeace's research team bore witness to this when it visited the beaches of Yalimapo and Rémire-Montjoly, in French Guiana, to participate in a mission of the IPHC alongside Damien Chevallier, a marine turtle specialist with many years of experience in the region. This was part of the French Guiana Marine Turtle National Action Plan (PNA), bringing together many partners including French Guiana DEAL, Kwata, World Wildlife Fund for Nature(WWF), Office National de la Chasse et de la Faune Sauvage (ONCFS), Amana Nature Reserve, Groupe d'Étude et de Protection des Oiseaux en Guyane (GEPOG) and Grand Connétable Nature Reserve.

The goal of the mission was to attach Argos beacons to leatherback turtles, in order to follow their journeys after leaving the nesting site. For ten nights in a row, the team scouted along the beach to find a nesting female. Then, while the turtle lay on the beach, the tags were attached to the dorsal ridge of the shell.[39] Over the course of their work, the team was able to attach beacons to 10 females, and each was given a name. Then over the coming days and weeks, people around the world were able to track Arya, Stella, Augustine, Charlotte, Frida, Lucie, Donatella, Meiko, San and Chani as they began their remarkable journey from French Guiana through the North Atlantic, swimming to places as far away as Canada and even to France itself.



Paths of the leatherback turtles tagged during 2019. The orange areas indicate an example MPA network design for 30% coverage of ocean conservation features

Sea turtles swim for thousands of kilometres across the seas in order to reach the best sites for nesting, feeding, mating and maturing from juveniles to adults. Beaches in Suriname and French Guiana are the nesting grounds for significant populations of green and leatherback turtles. Over the years, the work of Damien and his team has shown that female green turtles carry out an incredible migration against the ocean current to reach feeding grounds in Brazil after nesting, while juvenile green turtles carry out multidirectional migrations between the Caribbean, Brazil, Florida and West Africa. Their studies of female leatherbacks have revealed that they swim even further distances, journeying to relatively cool waters far to the North after nesting as they search for areas rich in the jellyfish they feed on. With changing oceans, leatherback turtles will have to adapt their behavior to cope with new currents and sea temperatures. These behavioral modifications imply traveling longer distances to feed, and therefore a greater energy expenditure, which will likely reduce the number of spawnings per season. For example, the distances traveled by leatherback turtles equipped in June 2019 in French Guiana are almost twice as long, for a similar duration, as those traveled by leatherback turtles equipped in French Guiana in the last 10 years.[40] Patterns of behaviour are altering to fit the new conditions, as was illustrated recently in the UK when a leatherback weighing a quarter of a tonne washed up on the bank of a river in Essex, far from its usual habitat.[41]

Frida

A couple of weeks after she was tagged on the beach in French Guiana, the team received some sad news about the turtle named Frida: she was found washed up dead on a beach in Suriname, just 30km from her starting point. She had become caught in a gill net, which was still visible on her right shoulder, and this caused her to drown – stark evidence of the dangers that turtles face from industrial fishing.

Turtles are not constrained by national boundaries, with one group of ten tagged juvenile green turtles found to cross the exclusive economic zones (EEZs) of 25 different countries as well as international waters.[42] The fact that turtles spend so much of their life at sea and range over such large areas makes them difficult to study, yet they demonstrate clearly the degree to which different ecosystems are interconnected. Work like that carried out by Damien and his team is vital to understanding and conserving sea turtle populations around the world.

"The goal of the mission was to attach Argos beacons to leatherback turtles, in order to follow their journeys after leaving the nesting site. For ten nights in a row, the team scouted along the beach to find a nesting female. Then, while the turtle lay on the beach, the tags were attached to the dorsal ridge of the shell."

Above: Damien installing the GPS tracker on a leatherback turtle, Awala Yalimapo Beach, French Guiana
© Jody Amiet / Greenpeace

Left: A leatherback turtle fitted with the tracking device
© Jody Amiet / Greenpeace

TRACKING TURTLE MIGRATION

Last year, Greenpeace accompanied a team of scientists to carry out research on sea turtles in French Guiana. By attaching Argos beacons to leatherback turtles, we were able to track their journeys and witness the immense lengths sea turtles travel to reach their feeding grounds.

For photo credits see the back of the report.

Legend

- Leatherback turtle tracked between May and December 2019
- Leatherback turtle tracked between June 2015 and January 2016
- An example MPA network design for 30% coverage of ocean conservation features, based on 'best' solutions identified by Marxan (see methodology in *30x30: A Blueprint for Ocean Protection* by Greenpeace, Oxford University and York University)

Turtle migrations

After tagging by Greenpeace in 2019 on their nesting beaches in French Guiana, the female leatherbacks were observed to swim as far as Canada and France in order to reach their optimal feeding grounds, crossing thousands of kilometres of the high seas in the process. The distances travelled were almost twice those of other leatherbacks tagged during the last ten years, showing how turtle behavioural patterns are adjusting to changing ocean currents and temperatures.

The 30x30 campaign

Scientists are calling for at least 30% of the world's oceans to be protected as ocean sanctuaries. The orange markings on this map demark a potential MPA network that shows how this 30% figure could be achieved. The network is designed to cover the most important conservation features of the high seas, such as seamounts, trenches, oceanic fronts, and the distributions of sharks, whales and turtles.

Frida

Damien Chevallier and his team have spent several years in French Guiana tagging turtles, in order to track their migrations across the world's oceans. Greenpeace collaborated on this in 2019, tagging 10 leatherback turtles. Tragically, one of the turtles, named Frida, was found washed up dead in Suriname, just 120km from its nesting beach. She had drowned after getting entangled in a fishing net.

A global MPA network

Ocean sanctuaries are a key tool for protecting habitats and species, and helping the recovery of vital ecosystems. A planet-wide network of high seas protected areas would cover a large range of habitats and conditions, building resilience in the face of changing ocean temperatures and chemistry. Crucially, the large area would safeguard connections between sites, providing a continuous shelter for highly mobile and migratory species like sea turtles.

A Marine Protected Area on Apo Island, The Philippines
© Steve De Neef / Greenpeace

TURTLE CONSERVATION AND OCEAN SANCTUARIES

The story of turtles over the last 30 years has not been entirely gloomy and looking to the future, there are reasons for cautious optimism. Recognition of declining numbers led to attempts at conservation beginning as far back as the 1950s, and there are now many turtle protection programs in action around the world.[43] Turtles typically return to the same small set of nesting beaches again and again, and out of the water they are at their most vulnerable to people who are hunting for their shells and eggs. Accordingly, the initial attempts to protect their habitat focused on guarding nesting beaches against poachers, before expanding to try and prevent buildings encroaching onto the sands,[44] and the banning of artificial light sources that confuse baby turtles and lure them away from the sea.[45] [46]

Where implemented, these efforts have had some significant successes around the world,[47] [48] with measurable increases in the number of turtles hatching when hunting is prevented. Subsequently, conservation of sea turtles moved some of its focus from the land to the marine environment, after it became clear that fishing bycatch was killing so many turtles each year. Modifications have been made to fishing gear that reduce the likelihood of turtles being ensnared,[49] and some fisheries have reported greatly reduced turtle mortality after introducing safeguarding measures.[50] However, it remains a major problem that these turtle-saving protocols are not obligatory in many countries. Alongside this, the Regional Fishery Management Organisations (RFMOs) that manage fish populations on the high seas have repeatedly demonstrated an inability to conserve their target stocks,[51] let alone bycatch species such as turtles. As recently as 2013, only one of the five RFMOs tasked with managing tuna longline fleets obliged its members to follow one of the three main turtle mitigation methods,[52] and countries that belong to the International Commission for the Conservation of Atlantic Tunas (ICCAT) rejected their introduction at the most recent meeting in 2019,[53] despite the evidence from its own scientific team that the mortality rate for turtles is high among its vessels.[54]

Marine species are afforded the greatest protection when sections of their habitat are designated as Marine Protected Areas (MPAs), which either limit or entirely prohibit fishing and other forms of harmful human activity. Since the designation of the first MPAs in the early 20th century, a spotty patchwork of reserves has grown all over the world, to the extent that practically all coastal states provide some form of protection to a fraction of their waters. Some of these reserves are tiny, protecting only a couple of square kilometres, while others are vast. The level of protection afforded to marine life in these MPAs varies wildly. Strict no-take zones, or 'ocean sanctuaries' where fishing and other forms of human activity are prohibited provide the best opportunity for marine life to recover, but unfortunately many MPAs still allow industrial fishing, and in many instances enforcement of regulations and prosecution of transgressors leaves much to be desired. These so-called 'paper parks' do little to improve the lot of marine life.

Marine turtle habitats have been covered by several MPAs around the world, from corals in the Great Barrier Reef in Australia to nesting sites in the Bijagos Archipelago in Guinea Bissau, and studies have shown that turtle populations can benefit greatly from their presence.[55] Turtles are eight times more likely to be found in MPAs than would be expected in unprotected areas, and their population density is larger in MPAs with the highest grade of protection. Furthermore, the longer an MPA has been in existence, the larger the number of turtles that aggregate within its borders.[56]

Global efforts to study and conserve marine turtles are showing some positive results, with a study in 2017 finding 12 populations with a trend of increasing abundance.[57] These include the green and leatherback turtle populations in the North Atlantic, some of which nest in French Guiana. However, five populations in the Pacific and Atlantic Oceans showed a trend with decreasing abundance, and some sets of leatherbacks are critically endangered. The pattern of recovery and decline is complex, and data remain deficient in many areas, showing the vital necessity of the work such as that carried out by Greenpeace in partnership with Damien Chevallier and his team.

Evidence of increasing abundance in some turtle populations is extremely welcome news, but it is important to recognise that global population levels are at a low base after so many years of over exploitation. Moreover, the threats posed by climate change and plastic pollution are likely to grow dramatically in the near future. In response to these dangers, a new network of ocean sanctuaries is needed that protects marine turtles from incubation on the nesting beach right through to maturity and mating, across their entire lifecycle and migratory range.[58] Scientists estimate that to restore wildlife in the ocean, at least 30% of the world's oceans should be put completely off limits to harmful human activities by 2030.

Olive Ridley Turtle in China
© Paul Hilton / Greenpeace

2020:
A YEAR FOR ACTION

The benefits of MPAs to turtles are manifold, but designing sanctuaries for such widely distributed migratory species is a complex task[59] requiring political action. While there are difficulties in creating MPAs of sufficient size and protection in national EEZs, the problems are even larger in international waters. The high seas cover 43% of the world's surface and 70% of the living space on the planet, including land and sea. Yet there is currently no mechanism for protecting these waters with MPAs. In April 2019, Greenpeace collaborated with scientists from York, Edinburgh, Oxford and Salford universities to demonstrate that using best available science it is possible to design a network of large scale MPAs covering 30% of representative ecosystems in the global ocean. The design of these sanctuaries could encompass nursery, breeding and feeding grounds as well as paths between these areas, allowing migratory species like sea turtles and the creatures and ecosystems that depend on them the best possible conditions for survival and recovery.

"Scientists estimate that to restore wildlife in the ocean, at least 30% of the world's oceans should be put completely off limits to harmful human activities by 2030."

Key recommendations:

→ States must agree a strong UN Global Ocean Treaty by 2020:

The Treaty must enable the establishment, effective management and enforcement of a global network of fully protected areas in areas beyond national jurisdiction and ensure that proper environmental impact assessments are carried out. The treaty must also be supported by a global decision-making body in the form of a Conference of Parties (COP), through which states would act collectively to establish ocean sanctuaries and agree necessary conservation measures. This must be supported by an independent scientific committee and adequate financing.

→ The Convention on Biological Diversity (CBD) must agree a '30x30' target:

At CBD COP15 in China in October 2020, states will negotiate new protection targets for the next decade. The target for marine biodiversity should be to protect at least 30% of the ocean through the implementation of ocean sanctuaries, with the remaining 70% of the ocean sustainably managed.

→ States must establish networks of strongly protected areas within their national waters:

National networks of ocean sanctuaries must be established and these should cover at least 30% of national waters by 2030. Priority should be given to preserving coastal blue carbon habitats. To ensure the effectiveness of these national networks, they must be established in consultation with stakeholders and especially the Indigenous and coastal communities that depend on the ocean for their livelihoods. Establishing national networks will not be sufficient to protect the marine environment alone and activities, including fishing outside the protected area network, must be managed sustainably.

CITATIONS

1 Leatherback (Dermochelys coriacea); green (Chelonia mydas); loggerhead (Caretta caretta); hawksbill (Eretmochelys imbricata); Olive ridley (Lepidochelys olivacea); Kemp's ridley (Lepidochelys kempii); flatback (Natator depressus)

2 **Nature (2003)**. Ichthyosaurs ate turtle soup. By Helen Pearson, 23rd July 2003. https://www.nature.com/news/2003/030721/full/news030721-4.html

3 **Jackson, J. (1997).** Reefs since Columbus. Coral Reefs 16(Suppl 1): S23. https://doi.org/10.1007/s003380050238 https://link.springer.com/article/10.1007/s003380050238

4 **Jackson J.B.C., Kirby M.X., Berger W.H., Bjorndal K.A., Botsford L.W., Bourque B.J, Bradbury R.H, Cooke R., Erlandson J., Estes J.A., Hughes T.P., Kidwel S., Lange C.B., Lenihan H.S., Pandolfi J.M., Peterson C.H., Steneck R.S., Tegner M.J. and Warner R.R. (2001).** Historical Overfishing and the Recent Collapse of Coastal Ecosystems. Science, Vol. 293, Issue 5530, pp. 629-637, DOI: 10.1126/science.1059199 https://science.sciencemag.org/content/293/5530/629?ijkey=e094347a620c0af7f50ed5ed65b4fc03ff2da445&keytype2=tf_ipsecsha

5 **R.F. Tapilatu, Dutton P.H., Tiwari M., Wibbels T., Ferdinandus H.V., Iwanggin W.G. and Nugroho B.H. (2013).** Long-term decline of the western Pacific leatherback, Dermochelys coriacea: a globally important sea turtle population. Ecosphere 4(2):25. http://dx.doi.org/10.1890/ES12-00348.1

6 **IUCN (2020).** The IUCN Red List of Threatened Species, search: sea turtle. Version 2019-3, https://www.iucnredlist.org/search?query=sea%20turtle&searchType=species Accessed 4th January 2020.

7 **Pendoley K. and Fitzpatrick J. (1999).** Browsing of mangroves by green turtles in Western Australia. Marine Turtle Newsletter, 84:10. http://www.seaturtle.org/mtn/archives/mtn84/mtn84p10.shtml

8 **Gaos, A.R., Lewison, R.L., Liles, M.J., Gadea, V., Altamirano, E., Henríquez, A.V., Torres, P., Urteaga, J., Vallejo, F., Baquero, A., LeMarie, C., Muñoz, J.P., Chaves, J.A., Hart, C.E., Peña de Niz, A., Chácon, D., Fonseca, L., Otterstrom, S., Yañez, I.L., LaCasella, E.L., Frey, A., Jensen, M.P. and Dutton, P.H. (2016).** Hawksbill turtle terra incognita: conservation genetics of eastern Pacific rookeries. Ecol Evol, 6: 1251-1264. doi:10.1002/ece3.1897

9 **The Bahamas Weekly (2014).** Marine Biologist: Research Shows Significant Effects of Bimini Development on Marine Environment. By Diane Phillips & Associates, 21st March 2014. http://www.thebahamasweekly.com/publish/local/Marine_Biologist_Research_Shows_Significant_Effects_of_Bimini_Development_on_Marine_Environment33944.shtml

10 **Putman N.F., Abreu-Grobois F.A., Iturbe-Darkistade I., Putman E.M., Richards P.M. and Verley P. (2015).** Deepwater Horizon oil spill impacts on sea turtles could span the Atlantic. Biol. Lett. 11. http://doi.org/10.1098/rsbl.2015.0596

11 **Wallace, B., Lewison, R., McDonald, S., McDonald, R., Kot, C., Kelez, S., Bjorkland, R., Finkbeiner, E., Helmbrecht, S., & Crowder, L. (2010).** Global patterns of marine turtle bycatch. Conservation Letters, 3(3), 131–142. https://doi.org/10.1111/j.1755-263X.2010.00105.x

12 **Hays G.C., Broderick A.C., Godley B.J., Luschi P. and Nichols W.J. (2003).** Satellite telemetry suggests high levels of fishing-induced mortality in marine turtles. Mar Ecol Prog Ser, Vol. 262: 305 – 309. https://www.int-res.com/articles/meps2003/262/m262p305.pdf

13 **NOAA Fisheries (2019).** Fishing Gear: Gillnets. https://www.fisheries.noaa.gov/national/bycatch/fishing-gear-gillnets#risks-to-sea-turtles Accessed 4th January 2020.

14 **Duke Today (2004).** Measuring Sea Turtle Casualties by Longline Fishing. By Duke Today Staff, 9th March 2004. https://today.duke.edu/2004/03/seaturtle_0304.html

15 **Williard A., Parga M., Sagarminaga R. and Swimmer Y. (2015).** Physiological ramifications for loggerhead turtles captured in pelagic longlines. Biol. Lett. 11. http://doi.org/10.1098/rsbl.2015.0607

16 **Maxwell, S.M., Witt, M.J., Abitsi, G. et al. (2018).** Sea turtles and survivability in demersal trawl fisheries: Do comatose olive ridley sea turtles survive post-release?. Anim Biotelemetry 6, 11. doi:10.1186/s40317-018-0155-1 https://animalbiotelemetry.biomedcentral.com/articles/10.1186/s40317-018-0155-1

17 **Scientific American (2011).** Trawls and Trash Represent One-Two Punch for Threatened Turtles. By Melissa Gaskill, 15th July 2011. https://www.scientificamerican.com/article/trawls-and-trash-represent-threats-for-sea-turtles/

18 **Jambeck J.R., Geyer R., Wilcox C., Siegler T.R., Perryman M., Andrady A., Narayan R. and Law K.L. (2015).** Plastic waste inputs from land into the ocean. Science, Vol. 347, Issue 6223, pp. 768-771, DOI: 10.1126/science.1260352 https://science.sciencemag.org/content/347/6223/768

19 **Greenpeace UK (2018).** Plastic pollution reaches the Antarctic. By Louisa Casson, 7th June 2018 https://www.greenpeace.org.uk/news/plastic-pollution-and-the-antarctic/

20 **Wilcox C., Mallos N.J., Leonard G.H., Rodriguez A. and Hardesty B.D. (2016).** Using expert elicitation to estimate the impacts of plastic pollution on marine wildlife. Marine Policy, Volume 65, Pages 107-114, ISSN 0308-597X, https://doi.org/10.1016/j.marpol.2015.10.014

21 **Wilcox, C., Puckridge, M., Schuyler, Q.A. et al. (2018).** A quantitative analysis linking sea turtle mortality and plastic debris ingestion. Sci Rep, 8, 12536. https://doi.org/10.1038/s41598-018-30038-z

22 **Schuyler, Q.A., Wilcox, C., Townsend, K. et al. (2014).** Mistaken identity? Visual similarities of marine debris to natural prey items of sea turtles. BMC Ecol, 14, 14. https://doi.org/10.1186/1472-6785-14-14

23 **Schuyler, Q.A., Wilcox, C., Townsend, K.A., Wedemeyer-Strombel, K.R., Balazs, G. van, Sebille, E. and Hardesty, B.D. (2016).** Risk analysis reveals global hotspots for marine debris ingestion by sea turtles. Glob Change Biol, 22: 567-576. https://doi.org/10.1111/gcb.13078

24 **Carman V.G., Acha E.M., Maxwell S.M., Albareda D., Campagna C. and Mianzan H. (2014).** Young green turtles, Chelonia mydas, exposed to plastic in a frontal area of the SW Atlantic. Marine Pollution Bulletin, Volume 78, Issues 1–2, Pages 56-62, ISSN 0025-326X. https://doi.org/10.1016/j.marpolbul.2013.11.012

25 **Lebreton, L. and Andrady, A. (2019).** Future scenarios of global plastic waste generation and disposal. Palgrave Commun, 5, 6. https://doi.org/10.1057/s41599-018-0212-7

26 **IPCC (2019).** Summary for Policymakers. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, M. Nicolai, A. Okem, J. Petzold, B. Rama, N. Weyer (eds.)]. In press https://report.ipcc.ch/srocc/pdf/SROCC_FinalDraft_FullReport.pdf

27 **Hughes T.P., Anderson K.D., Connolly S.R., Heron S.F., Kerry J.T., Lough J.M., Baird A.H., BaumJ.K., Berumen M.L., Bridge T.C., Claar D.C., Eakin C.M., Gilmour J.P., Graham N.A.J., Harrison H., Hobbs J-P. A., Hoey A.S., Hoogenboom M., Lowe R.J., McCulloch M.T., Pandolf J.M., Pratchett M., Schoepf V., Torda G. and Wilson S.K. (2018).** Spatial and temporal patterns of mass bleaching of corals in the Anthropocene. Science, Vol. 359, Issue 6371, pp. 80-83. DOI: 10.1126/science.aan8048 https://science.sciencemag.org/content/359/6371/80

28 **Willis-Norton E., Hazen E.L., Fossette S., Shillinger G., Rykaczewski R.R., Foley D.G., Dunne J.P. and Bograd S.J. (2015).** Climate change impacts on leatherback turtle pelagic habitat in the Southeast Pacific. Deep Sea Research Part II: Topical Studies in Oceanography, Volume 113, Pages 260-267, ISSN 0967-0645, https://doi.org/10.1016/j.dsr2.2013.12.019

29 **National Geographic, (2018).** 99% of These Sea Turtles Are Turning Female—Here's Why. By Craig Welch, 8th January 2018. https://www.nationalgeographic.com/news/2018/01/australia-green-sea-turtles-turning-female-climate-change-raine-island-sex-temperature/

30 **Olive Ridley Project (2017).** Life Cycle of Turtles. https://oliveridleyproject.org/life-cycle-of-turtles Accessed 4th January 2020.

31 **CNN (1998).** Loggerhead turtles help sustain delicate dunes. By Environmental News Network staff, 17th November 1998. http://edition.cnn.com/TECH/science/9811/17/loggerhead.enn/index.html

32 **Marine Education Society of Australasia.** Predators and Prey http://www.mesa.edu.au/turtles/turtles02.asp Accessed on 4th January 2020.

33 **Thayer, G.W., Bjorndal, K.A., Ogden, J.C. et al. (1984).** Role of larger herbivores in seagrass communities. Estuaries, 7, 351. https://doi.org/10.2307/1351619

34 **Oceana.** Why healthy oceans need sea turtles: the importance of sea turtles to marine ecosystems. By Wilson E.G., Miller K.L., Allison D. and Magliocca M.. https://oceana.org/sites/default/files/reports/Why_Healthy_Oceans_Need_Sea_Turtles.pdf Accessed 4th January 2020

35 **Macreadie P.I., Baird M.E., Trevathan-Tackett S.M., Larkum A.W.D. and Ralph P.J. (2014).** Quantifying and modelling the carbon sequestration capacity of seagrass meadows – A critical assessment. Marine Pollution Bulletin, Volume 83, Issue 2, Pages 430-439, ISSN 0025-326X, https://doi.org/10.1016/j.marpolbul.2013.07.038

36 **Richardson A.J., Bakun A., Hays G.C. and Gibbons M.J. (2009).** The jellyfish joyride: causes, consequences and management responses to a more gelatinous future. Trends in Ecology & Evolution, Volume 24, Issue 6, Pages 312-322, ISSN 0169-5347, https://doi.org/10.1016/j.tree.2009.01.010

37 **Purcell J.E., Uye S. and Lo W. (2007).** Anthropogenic causes of jellyfish blooms and their direct consequences for humans: a review. Mar Ecol Prog Ser, 350:153-174. https://doi.org/10.3354/meps07093

38 **Chevallier D., Girondot M., Berzins R., Chevalier J., de Thoisy B., Fretey J., Kelle L. and Lebreton J.-D..** Survival and breeding interval of an endangered marine vertebrate, the leatherback turtle Dermochelys coriacea in French Guiana. In prepress. https://doi.org/10.3354/esr01013

39 **Chambault P., Roquet F., Benhamou S., Baudena A., Pauthenet E., de Thoisy B., Bonola M., Dos Reis V., Crasson R., Brucker M., Le Maho Y. and Chevallier D. (2017).** The Gulf Stream frontal system: A key oceanographic feature in the habitat selection of the leatherback turtle? Deep Sea Research Part I: Oceanographic Research Papers, Volume 123, Pages 35-47, ISSN 0967-0637, https://doi.org/10.1016/j.dsr.2017.03.003 .

40 Ibid

41 **BBC (2019).** Leatherback turtle found washed up in Essex. https://www.bbc.co.uk/news/uk-england-essex-50784094 Accessed on 5th January 2020

42 **Chambault, P, de Thoisy, B, Huguin, M, et al. (2018).** Connecting paths between juvenile and adult habitats in the Atlantic green turtle using genetics and satellite tracking. Ecol Evol, 8, 12790–12802. https://doi.org/10.1002/ece3.4708

43 **Hamann M., Godfrey M.H., Seminoff J.A., Barata P.C.R., Bjorndal K.A., Bolten A.B., Broderick A.C., Campbell L.M., Carreras C., Casale P., Chaloupka M., Chan S.-K., Coyne M., Crowder L.B., Diez C.E., Dutton P.H., Epperly S.P., FitzSimmons N.N., Formia A., Girondot M., Hays G.C., Cheng I.J., Kaska Y., Lewison R., Mortimer J.A., Nichols W.J., Reina R.D., Shanker K., Spotila J.R., Tomás J., Wallace B.P., Work T.M., Zbinden N. and Godley B.J. (2010).** Global research priorities for sea turtles: Informing management and conservation in the 21st century. Endangered Species Research, 11, 3, 245-269, 10.3354/esr00279 https://pubs.er.usgs.gov/publication/70197912

44 **The Guardian (2018).** Saving Turkey's sea turtles - in pictures. By Umit Bektas / Reuters, 5th September 2018. https://www.theguardian.com/world/gallery/2018/sep/05/turkey-sea-turtles-conservation-work-iztuzu-beach-in-pictures

45 **Verutes G.M., Huang C., Estrella R.R. and Loyd K. (2014).** Exploring scenarios of light pollution from coastal development reaching sea turtle nesting beaches near Cabo Pulmo, Mexico. Global Ecology and Conservation, Volume 2, Pages 170-180, ISSN 2351-9894, https://doi.org/10.1016/j.gecco.2014.09.001

46 **Sea Turtle Conservancy (2020).** Information About Sea Turtles: Threats from Artificial Lighting https://conserveturtles.org/information-sea-turtles-threats-artificial-lighting/ Accessed on 5th January 2020

47 **Hamilton RJ, Bird T, Gereniu C, Pita J, Ramohia PC, et al. (2015)**. Solomon Islands Largest Hawksbill Turtle Rookery Shows Signs of Recovery after 150 Years of Excessive Exploitation. PLOS ONE 10(4): e0121435. https://doi.org/10.1371/journal.pone.0121435

48 **Balazs G.H and Chaloupka M. (2004).** Thirty-year recovery trend in the once depleted Hawaiian green sea turtle stock. Biological Conservation, Volume 117, Issue 5, 2004, Pages 491-498, ISSN 0006-3207, https://doi.org/10.1016/j.biocon.2003.08.008

49 **Hamann M., Godfrey M.H., Seminoff J.A., Barata P.C.R., Bjorndal K.A., Bolten A.B., Broderick A.C., Campbell L.M., Carreras C., Casale P., Chaloupka M., Chan S.-K., Coyne M., Crowder L.B., Diez C.E., Dutton P.H., Epperly S.P., FitzSimmons N.N., Formia A., Girondot M., Hays G.C., Cheng I.J., Kaska Y., Lewison R., Mortimer J.A., Nichols W.J., Reina R.D., Shanker K., Spotila J.R., Tomás J., Wallace B.P., Work T.M., Zbinden N. and Godley B.J. (2010).** Global research priorities for sea turtles: Informing management and conservation in the 21st century. Endangered Species Research, 11, 3, 245-269, 10.3354/esr00279 https://pubs.er.usgs.gov/publication/70197912

50 **Finkbeiner E.M., Wallace B.P., Moore J.E., Lewison R.L., Crowder L.B. and Read A.J. (2011).** Cumulative estimates of sea turtle bycatch and mortality in USA fisheries between 1990 and 2007. Biological Conservation, Volume 144, Issue 11, Pages 2719-2727, ISSN 0006-3207, https://doi.org/10.1016/j.biocon.2011.07.033

51 **Cullis-Suzuki S. and Pauly D. (2010).** Failing the high seas: A global evaluation of regional fisheries management organizations. Marine Policy, Volume 34, Issue 5, Pages 1036-1042, ISSN 0308-597X, https://doi.org/10.1016/j.marpol.2010.03.002

52 **ICCAT (2013).** A review of sea turtle mitigation measures across the five tuna RFMO and other fisheries management organizations. By Rui Coelho, Joana Fernandez-Carvalho and Miguel N. Santos. https://www.iccat.int/Documents/CVSP/CV069_2013/n_4/CV069041860.pdf Accessed 6th January 2020

53 **ICCAT (2019).** ICCAT press release. 25th November 2019. https://www.iccat.int/Documents/Meetings/COMM2019/PRESS_RELEASE_ENG.pdf

54 **ICCAT (2019).** Draft recommendation by ICCAT on the by-catch of sea turtles caught in association with ICCAT fisheries. November 21st 2019. https://www.iccat.int/com2019/ENG/PA4_812A_ENG.pdf

55 **Dryden, J., Grech, A., Moloney, J. and Hamann, M. (2008).** Rezoning of the Great Barrier Reef World Heritage Area: Does it afford greater protection for marine turtles? Wildlife Research, 35(5), 477-485. https://doi.org/10.1071/WR07087

56 **Scott R., Hodgson D.J., Witt M.J., Coyne M.S., Adnyana W., Blumenthal J.M., Broderick A.C., Canbolat A.F., Catry P., Ciccione S., Delcroix E., Hitipeuw C., Luschi P., Pet-Soede L., Pendoley K., Richardson P.B., Rees A.F. and Godley B.J. (2012).** Global analysis of satellite tracking data shows that adult green turtles are significantly aggregated in Marine Protected Areas. Global Ecology and Biogeography, 21: 1053-1061. doi:10.1111/j.1466-8238.2011.00757.x

57 **Mazaris A.D., Schofield G., Gkazinou C., Almpanidou V. and Hays G.C. (2017).** Global sea turtle conservation successes. Science Advances, Vol. 3, no. 9, e1600730, DOI: 10.1126/sciadv.1600730 https://advances.sciencemag.org/content/3/9/e1600730

58 **Greenpeace (2019).** 30x30: A Blueprint for Ocean Protection. By Greenpeace International, 4th April 2019. https://www.greenpeace.org/international/publication/21604/30x30-a-blueprint-for-ocean-protection/

59 **Dawson T.M., Formia A., Agamboué P.D., Asseko G.M., Boussamba F., Cardiec F., Chartrain E., Doherty P.D., Fay J.M., Godley B.J., Lambert F., Koumba Mabert B.D., Manfoumbi J.C., Metcalfe K., Minton ., Ndanga I., Nzegoue J., Kouerey Oliwina C.K., Du Plessis P., Sounguet G.-P., Tilley D., Witt M.J. and Maxwell S.M. (2017).** Informing Marine Protected Area Designation and Management for Nesting Olive Ridley Sea Turtles Using Satellite Tracking. Frontiers in Marine Science, 4, 312, DOI=10.3389/fmars.2017.00312 https://www.frontiersin.org/articles/10.3389/fmars.2017.00312/full

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