

Critical Conservation – Coral bleaching

What is your name, role and involvement in marine conservation?

My name is Nick Ireland, and I am one of the Curators of SEA LIFE San Antonio. I contribute to marine conservation, as the manager of our captive animal collection team, working to care for the collection. Much of what we do is showcasing marine species in a way that looks after their welfare in our care and showcases them to the public, so they act as ambassadors of their species. We also contribute to conservation by participating in hands on conservation work that saves individual species from harm, such as supporting the corals for the Florida Reef Tract Rescue Project.

How are sea creatures being affected by human interactions with the sea?

1. Humans use the sea for natural resources.

- Crude oil is harvested by drilling into the seafloor under the sea. This impacts the sea in multiple ways, including pollution from oil spills and leaks, noise pollution from drilling and undersea exploration and increased greenhouse gas emissions from burning fossil fuels contributing to climate change.
- Global production of seafood, including wild-caught seafood and ocean farmed seafood affects sea creatures.
- Wild-caught seafood may result in overfishing of the target species, leading to population decline.
- Through wild seafood fishing, other species are also often harmed by bycatch – this is where creatures that are not meant to be caught in the fishing process are caught accidentally and harmed by mistake.

2. Humans dump pollution and waste into the sea.

- Land-based waste (or rubbish) often makes it to sea through river systems.
- Fishing equipment is often left or lost at sea, which then continues to capture and harm wildlife.
- Fertilisers and pesticides used on farming are washed into the waters by run off (when rainfall on the land washes from the surface), flowing into river systems and into seas, resulting into negative effects on creatures and their habitats.

3. Humans themselves can physically affect the seas by being in them.

- Swimmers and scuba divers can cause physical damage to coral reefs and other marine environments.
- Boaters can cause damage to reefs by setting anchors on top of reefs or striking reefs with their boats.

Which of these issues are impacting coral reefs? In what way?

All of these issues have direct impacts on coral reefs. The most significant ones, in my opinion, are related to climate change, where the warming ocean temperatures and changes to the ocean's water chemistry (acidity and PH levels) and pollution are affecting creatures.

One of the most significant pollution concerns for coral reefs is agricultural runoff. This is because these chemicals in the water cause changes to the amount of algae growth on the ocean floor, increasing it significantly and these algae then smother the corals.

As well as this, increased water temperatures can cause coral bleaching. There is a relationship between climate change and rising sea temperatures. Coral bleaching is when the coral starts to physically change. It starts releasing and expelling something called symbiotic algae, which is its primary source of energy. Corals struggle to recover from bleaching and often die as a result.

How is coral bleaching affecting the biodiversity of wild sea environments / habitats?

Algae produces large amounts of oxygen, caused by higher temperatures and/or increased sunlight. This causes the oxygen levels inside the coral tissue to become toxic to the coral. After bleaching, corals rely entirely on what plankton they can capture, which may not be enough to survive. They must eventually re-ingest the algae they depend on. Once this has gone, there is nothing left for it to survive on and so it dies.

The effect that coral bleaching has on biodiversity is massive. Dead coral skeletons do not last very long, and they do not regrow after storm or wave damage. This means the coral reef becomes washed away, so the opportunity for fish to shelter within corals is significantly reduced. As well as shelter, many species rely on the corals for food; without the coral being alive, there is less for these creatures to eat. Coral reefs are naturally among the most biodiverse on Earth, so the loss of the corals causes a near total loss of the biodiversity of the reefs.

Can you give a specific example of a creature that you have within the SEA LIFE aquariums that would be particularly affected?

Typical SEA LIFE sites have a large amount of the animal collection composed of tropical fish from the Indo-Pacific and Atlantic reef. The Blacktip Reef Shark is a species we keep at most, if not all SEA LIFE sites. Its diet primarily consists of smaller reef fish and cephalopods, like squid, and small octopus. Without the coral reefs in the Indian Ocean and Pacific Ocean, these creatures could not exist. There are other shark species in the Atlantic that are equally as reliant on coral reefs for survival.

What changes need to be made in the world to ensure that coral is not affected?

A lot of our daily actions can make a positive impact on preserving the future of coral reefs, including using coral-safe sunscreens when at the beach, cleaning up litter in rivers, lakes and beaches, and reducing greenhouse gas emissions any way we can, so these don't continue to contribute to the increasing sea temperature. Over time, all of us should find ways to coexist with nature more and cause less harm, which is a challenge, but worth our time and energy.

How are the United Nations' Sustainable Development Goals aligned to combatting coral bleaching?

One of the Sustainable Development Goals sets out that we should conserve and sustainably use the oceans, seas and marine resources. The goals feature specific targets for countries, but we can all make small changes to help this. Anything that each of us, as individuals and collectively, can do that reduces waste, reuses items, and uses and produces cleaner energy, helps combat coral bleaching. The ways to slow changes to the ocean's chemistry and temperature are likely most to come from a combination of us all doing our part as stewards of nature, combined with larger-scale efforts to improve sustainable energy and environmental recovery.

Are there any particular projects that SEA LIFE is involved in to support the conservation of coral ecosystems?

We are an active partner in the Florida Reef Tract project, which is an ambitious partnership between the Florida Wildlife Commission, the Association of Zoos and Aquariums (AZA), numerous public aquariums and coral research and conservation partners. The project is focused on protecting coral ecosystems, particularly saving corals from a disease, whose exact cause remains unknown, which was discovered in 2014 along Florida's reef tract. The project involves extracting corals from reefs before the disease arrives and housing them in land-based coral facilities, throughout the United States, so that they can be studied and, in some cases, so that facilities can reproduce the corals in their aquariums. The eventual goal is to restore the reef by reintroducing the corals when the issue of the disease has been resolved. So far, there are 215 different rescue sites, which house 2,359 corals and counting.