

# TRANSCRIPT

## POST CARDS FROM THE 6TH MASS EXTINCTION



### **Bluefin Tunas and the Problem of Overfishing**

Hi I'm John Rafferty, I am the editor for Earth Sciences at Encyclopaedia Britannica, and today we are talking about the decline in fish stocks, specifically that of the Atlantic and Pacific Bluefin tunas. These are commercial fishes, which were once considered to be the same species. Bluefin tunas are arguably overfished (meaning that more of them are being netted than their reproductive rate can replace). We will also get into the problem of overfishing in general.

Spend some time with us today, and we'll explore the natural history of Bluefin tunas, the threats to their long-term survival (how their populations today are but a tiny fraction of what they once were), and overfishing as an unsustainable practice that threatens these species but also several others around the globe.

By the way, if you miss something during this talk, you can find it again our website.

### **PROLOGUE: Natural History:**

The genus *Thunnus* is made up of seven species of oceanic fishes, some very large, and these are the ones that possess a great commercial value as food.

Tunas are elongated, robust, and streamlined fishes; they have a rounded body that tapers to a slender tail base and a forked or crescent-shaped tail. In colour, tunas are generally dark above and silvery below, often with an iridescent shine.

Another notable feature is a well-developed network of blood vessels below the skin that acts as a temperature-regulating device associated with long-term, slow swimming. Because of this vascular system, tunas are unique among fishes in their ability to maintain the temperature of their bodies above that of the surrounding water, often between 5 and 12 °C (or 9 and almost 22 °F) above ambient water temperature. Some muscles may even be up to 21 °C (almost 39 °F) higher than the surrounding water. And so, for some fish their blood may be as warm as our own. In this audio story, I'll be focusing on two closely related species, the Pacific Bluefin and the Atlantic Bluefin.

The Pacific Bluefin, which can be found throughout the whole Pacific basin, grows up to 3 meters (or nearly 10 feet) long and weighs up to 450 kg (or roughly 1,000 pounds), although some sources note that they can weigh up to 650 kg (about 1,400 pounds). In contrast, the Atlantic Bluefin, found throughout the North Atlantic from the Caribbean eastward to the Norwegian and Mediterranean Seas, is even larger, reaching some 4.5 meters (or nearly 15 feet) in length and weighing up to a whopping 684 kg (or just over 1,500 pounds)!

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Tunas are predatory fishes. They feed on other smaller fishes, squid, shellfish, and a variety of planktonic organisms. They spawn in the open sea over very large areas. Bluefin tunas are hunted by killer whales, sharks, and other large fish, but their greatest source of mortality over the last 50 years has been the commercial fishing industry, and to a lesser extent the recreational fishing industry—because of their importance as both a food fish and as a trophy fish.

### **Both species have been overfished over the last 70 years.**

The Pacific Bluefin, which spawns in the Sea of Japan and in the Western Pacific near Japan's Ryuku Islands and disperses across the Pacific, underwent a significant population decline from 1996 to 2010. By 2017, the population stood at only about 3 percent what it would have been if it had never been fished. That's extremely low, and it should make you wonder how and why we would cut so deep into such a popular food source. The International Union for the Conservation of Nature and Natural Resources (or IUCN) lists the species as vulnerable.

Today, some 50 percent of the Pacific Bluefin catch is harvested by Japan. Since 2010, however, there are signs that the population has stabilized and has been recovering slowly. This is good news, but the species has a very long way to go to reach anything resembling its former numbers.

Atlantic Bluefins also have a checkered history. They are divided into two groups—the Western Atlantic population (which spawns in the Gulf of Mexico) and the Eastern Population (which spawns in the Eastern Atlantic and the Mediterranean Sea). Atlantic bluefins have been caught by anglers of all stripes for thousands of years, but with the advent of intensive commercial fishing after World War II, fish stocks declined.

For Western population, this began in the 1950s, rising until about 1964 when some 18,000 metric tons were caught. By about 1970, however, the catch had fallen by 80. For the eastern population, intensive commercial fishing began in earnest in the 1990s. Fishing pressure increased, and by 2007 some 60,000 metric tons were being caught annually—with some 80% bound for markets in Japan.

In 1998, the International Commission for the Conservation of Atlantic Tunas (or ICCAT) placed restrictions on the size and age of Atlantic tunas that could be harvested, but even as late as 2013 the Atlantic Bluefin populations had not recovered significantly. In 2011, IUCN considered the Atlantic species “endangered,” and its conservation status has not changed since then despite more recent reports suggesting that Atlantic bluefin's population and status ranged from “uncertain” to “not currently overfished.” A more comprehensive assessment is needed.

The recent history of Bluefin tuna stocks highlight a common problem taking place in today's oceans: Overfishing. Overfishing, like its land-based counterpart called overhunting, is harvesting more fish than can be replaced by natural reproduction.

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Fishes are accessible sources of protein for many people in the world, and thus they make up popular dishes. Those of us in the west frequently indulge in tuna salad and the ever-popular tuna-fish sandwich. Tuna in particular is widely sold in restaurants and in grocery stores. Because of this demand, the commercial fishing industry knows that there is money to be made. (It should be noted that the recreational fishing industry also targets tunas, and it contributes to overfishing in general, but to a far lesser extent than commercial fishing.) Commercial fishing is tricky, however. It takes place within the sea zones off the waterfront of coastal countries, and fishing rules and regulations differ from country to country—with some authorities strictly enforcing their laws while others do not. Migrating fish species such as Atlantic and Pacific Bluefin tuna might pass through the waters of several countries, facing intense fishing pressure in some areas and little or none in others.

In international waters, regulating commercial fishing is even more difficult, since fishing fleets large and small tend not to be under the monitoring of law enforcement. In international waters—that is, areas of the ocean that do not fall within the boundaries of one country or another—there are few if any rules, and thus fishing fleets seeking to maximize their profits are only limited by their harvesting intensity.

Add to this unreported fishing, problems in customs and importation (where fish of one species may be called something else [the species “bait and switch,” if you’ll forgive the pun]), fishing subsidies (which staff up fishing fleets to higher levels than they are needed, resulting in 2-4 times the ships needed to harvest the oceans sustainably), and that just over 2 percent of the oceans are designated as marine protected areas where strict fishing rules apply, and it’s no wonder that more fishes are being pulled from the sea than are being replaced.

As a species’ stock declines, the commercial demand for often rises—unless the consumer decides to switch to a different, more-abundant species. Rising demand creates an incentive for fishing fleets to expand their catch from large adults to smaller adults and younger fishes, such as juveniles. The fleets calculate that consumers will pay more for that fish than they had before. The problem with harvesting juveniles (or even adults at the wrong time of year) is that these fishes are captured before they have had a chance to breed.

As a result, fewer members of the population are capable of reproducing, so fewer young are produced and the population declines further.

One of the most famous historical examples of overfishing is the Atlantic cod, whose population declined by 96 percent between 1850 and the 1990s. When the fishery collapsed during the 1990s, several fishing communities dependent on the cod catch in New England and Canada’s Maritime Provinces declined as well, and many small-time fishermen lost their livelihoods.

Government officials added regulations—specifically fishing moratoriums—to prevent harvesting and give the chance for the species to recover. Despite great hopes, the cod’s recovery has been painfully slow. Atlantic cod, like tuna, migrate across the Atlantic through unpoliced international waters, where many are caught. The Atlantic cod is currently listed as vulnerable by the IUCN.

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Fishing fleets often capture non-target animals called bycatch. Marine fishing nets and longlines ensnare target species, such as tuna, but they may also capture other animals of similar size, such as sharks, other fishes, and sea turtles.

A previous episode of this podcast series explored the plight of the vaquita, a porpoise on the brink of extinction in the Northern Gulf of California. The vaquita population is rapidly declining because these mammals became ensnared and quickly drowned in fishing nets designed to capture a fish called the totoaba.

So, what can be done about overfishing.

Well, we could stop fishing so much, and let fish stocks recover on their own. During World War II, fishing stopped in large parts of the North Atlantic, because fishing companies and small-time fishermen weren't going to risk their boats and, well, death catching fish in the middle of a war zone. Studies conducted at the time and after the war noted that haddock, cod, and whiting populations rose dramatically—in part due to reduced fishing pressure.

Today a similar effort to recall fishing fleets en masse would not be realistic, because of the demand for fish. so we will need to put stronger regulations in place to protect the fishes we need to catch—specifically regulations that govern the size and timing of the harvest that can be standardized across countries and enforced not only close to shore, but further out in the most remote parts of the oceans.

Many fishing regulations often specify the age and number fish of a given species can be harvested and by whom. You may have run into similar types of bag limits at your local fishing pond. Rules like these prevent too many fish (as well as younger fishes with their whole reproductive lives ahead of them) from being harvested.

Many scholars also suggest expanding marine protected areas (or MPAs), which are essentially no-take zones or reduced fishing zones, to protect breeding and spawning areas as well as migration routes. Recent history shows that MPAs are a fairly popular conservation strategy.

Between 2014 and 2015, more than 3,000,000 square km (that is, nearly 1.2 million square miles) of ocean were designated as MPAs with varying degrees of protection by the governments of Chile, New Zealand, Palau, the United Kingdom, and the United States. Later, the United Nations reiterated their commitment to protect at least 10% of Earth's coastal and marine areas by 2020.

For some species, Aquaculture (that is, fish farming) is a real solution – For Pacific Bluefins, some 3 percent of the stock are raised in fish farms. Atlantic Bluefins are also farmed, mostly in the Mediterranean. Bluefin fish farming needs to be increased to help augment wild populations, and farm-raised bluefins could provide consumers with a non-wild Bluefin tuna option while their wild ocean-going cousins increase their numbers.

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At the individual level, you and I can skip tuna-fish sandwiches and other dishes made from Bluefin tuna until their stocks recover, opting instead for fishes and other seafood that are not under threat. If enough consumers get involved, a boycott can reduce the economic demand for tuna overall, and thus tuna fishermen have less of an incentive to fish them so aggressively as well as engage in bad behavior (like illegal fishing, masking one species for another, etc.) because there's less money in it for them.

Ideally, we want to make it more profitable for the commercial fishing industry to shift their attention from Bluefin tunas and other threatened species to other, more-abundant fishes and sealife—such as Atlantic and Pacific skipjack tuna, porgies, Pacific albacore, and Atlantic mackerel—which we as consumers can also seek out and purchase instead of Bluefin tuna. In fact, you can look for the label “light tuna” on cans of fish, which often signals skipjack tuna, in your grocery store if you just can't live without your tuna-fish sandwich.

Many scientists, government officials, and fishery advocates say that the way to protect Bluefin tuna, other fishes, and other forms of sea life is through aggressive management. They note that enforcement of existing laws must be better to prevent the wrong fish from being caught at the wrong times, reduce and prevent the “species bait-and-switch” and other trickery at customs checkpoints, and weed out corrupt officials. Many parts of the world take fisheries management seriously, so there is certainly hope, but illegal fishing, overharvesting, and “ghost fishing gear” (that is, lost, abandoned, or discarded fishing nets, traps, pots, lines, etc. that are left in the ocean) are still serious problems.

Bluefin tunas are being managed, that's true, but their success so far has been sporadic and unclear at best. Can Bluefin tunas recover to healthy levels in our life time? I have no doubt that they can.

Can the problem of overfishing in general be solved? Yes! But only if we make a conscious decision to act by demanding laws that make fishing more sustainable and shifting our own buying habits away from threatened fishes. Unfortunately, this is not a do-it-later problem. We need to act soon. In a world of 7.5 billion people and climbing, many of whom are hungry for tunas and other fishes, we have few moments to waste.

### **CREDITS:**

Thanks for listening today. I hope you learned something new. Most importantly, I hope that you learned about the Bluefin tuna, the plight of harvested fishes, and the ever-present problem of overfishing. Don't forget, you can review anything you might have missed on Britannica.com. Learn more about extinction and its causes from our article located at [www.britannica.com/science/extinction-biology](http://www.britannica.com/science/extinction-biology).

There you can also find other parts of this podcast series. Bluefin Tunas and the Problem of Overfishing.

Story by John Rafferty. Produced by Kurt Heintz. This is the third part of the “Postcards from the 6th Mass Extinction” series. This program is copyrighted by Encyclopaedia Britannica Incorporated. All Rights Reserved.



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