Why Americans are letting the oceans die
...and why there is still hope

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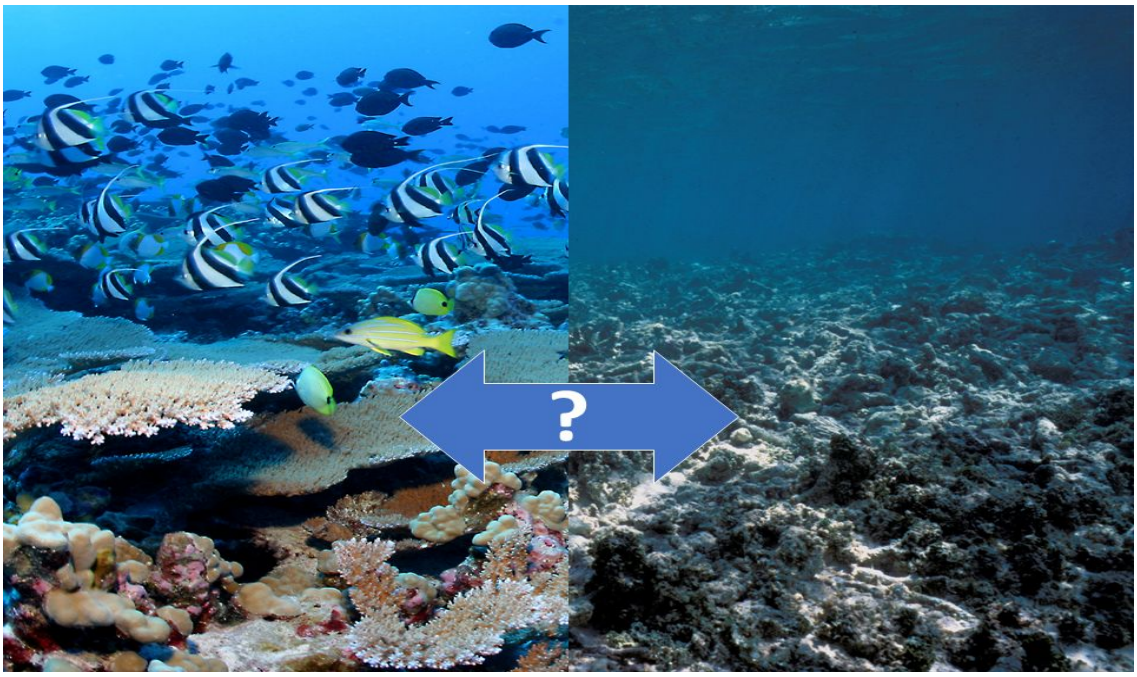

Photo credits: James Watt (left), Wolcott Henry (right)

My facemask flooded with tears. Before me lay a cemetery of pure white tombstones -- formerly colorful coral heads -- the pallid remnants of what had been my favorite coral reef in the Bahamas. It was 1998, then the warmest year on record (presently merely the ninth warmest). The stress of unusually warm seawater had caused corals through much of tropical seas to lose their mutualist microbes that both fed them and gave them their rich colors. Without their symbionts, many of the "bleached" corals died, some 10% globally that single terrible year [1].

Now, two decades after my reef died and despite the efforts of myself and many colleagues to turn America's attention to the plight of our ocean, the status of the seas has gone from bad to far worse. The protracted coral bleaching events of 2014-2017 killed a substantial portion of the remaining coral reefs, including much of Australia's Great Barrier Reef [2], and living coral is now difficult to find on many reefs in the Caribbean region and elsewhere [3]. Plastics and other pollutants choke the warming, acidifying, deoxygenating seas [4-7]. Hundreds of species are unwittingly transported in the ballast tanks of thousands of ships, introduced to new seas where many become invasive [8]. While there has been some progress in some fisheries, overfishing -- both legal and illegal -- is still rampant [9].

Optimists would celebrate that the number of marine protected areas has nominally increased in recent years to cover some 7% of the world ocean [10], yet half this "protection" is on paper only [11], and even where effective, is far less than the 15% of land protected. And conservation leaders now warn that we must protect at least 30% of the ocean (and the land) by 2030, and 50% by 2050, to limit environmental destruction [12].

Every single day, new scientific reports document prolonged and agonizing assaults on our mother ocean, the original cradle of life on this planet, the producer of at least half the oxygen we breathe, and the buffer to global warming. Why is this happening? Why won't we in the United States act decisively and lead the world to stop this madness? Importantly, are there any reasons for hope in the face of such dire threats?

General reasons for inaction

Superficially, the ocean crisis is a failure of national and international policy and politics, but what lies beneath that failure?

The ultimate causes of degradation of the global biosphere are, of course, human overpopulation and overconsumption – especially the latter in America – born of the unholy trio of ignorance, shortsightedness, and greed. And the seas are the ultimate commons of tragedy. Adding to this unholy cocktail, one can include what psychologists call the "finite pool of worry" [13]. Any emotional response to the plight of nature is often displaced by focus on more immediate concerns. There is so much other bad news these days that worrying about the environment is pushed to the sidelines. Emotional numbness often prevails.

These general issues have worsened in the United States as our political landscape has become more polarized and tribal, combined with growing distrust of factual news media and science in general, distrust that is funded and fueled by those whose vested interests fly in the face of scientific reality. Confirmation bias, the deep-rooted psychological tendency to seek only evidence that supports one's existing beliefs and deny contrary evidence, reigns supreme. Objectivity and truth suffer. Yet, as Aldous Huxley cautioned, "Facts do not cease to exist because they are ignored" [14].

Special challenges facing the ocean

As if general reasons for inaction are not bad enough, the ocean is also burdened by an insidious trio of special challenges.

(1) *The myth of the infinite sea*

Because of their immensity relative to individual human beings, the seas have long been viewed simultaneously as an infinite source of food and a limitless garbage dump. Yet, as large as they are compared to us as individuals, the ocean is neither inexhaustible nor infinite. If all the water in the world was combined into a single sphere, it would be only about 850 miles in diameter, virtually a drop in the bucket of a planet nearly 8000 miles in diameter. The seas are in fact a thin layer covering the Earth, averaging only about 2.3 miles deep.

Remarkably, we have now flooded the Earth with so much carbon dioxide from burning fossil fuels and clearing native forests that the acidity of the ocean is measurably increasing as the gas reacts with seawater and forms carbonic acid. This ocean acidification process is inhibiting the ability of corals and other shelled sea life to grow their skeletons [15]. And what about the warming greenhouse effect caused by all that excess carbon dioxide in the atmosphere? Fortunately for us, the ocean has absorbed over 90% of the extra heat [5], temporarily saving the atmosphere from catastrophic warming.

(2) *The invisible sea*

Because we are land creatures, most of us never see what is happening below the surface of the ocean. Most citizens would be appalled to witness bottom trawlers scraping the seafloor to capture one species of targeted bottom fish, akin to clear-cutting a forest to capture the deer. Or surface longlines and drift nets that kill more seabirds, dolphins, and sea turtles than food fish. Or the many invasive species transported in the ballast water of ships from one port to another. Or the amount of garbage, mostly plastic, dumped by ships on the high seas. Or the sheer volume of junk and pollution that flows to the seas from land. Most insidiously, few can directly witness the rapidly growing killers of ocean warming and acidification, just as the increasing concentration of carbon dioxide in the atmosphere that causes these ultimate assaults cannot be perceived by our senses. For most of humanity, the ocean and its threats remain out-of-sight and out-of-mind.

(3) *The shifting baseline syndrome*

Even those who work on and under the sea are limited in our ability to personally perceive environmental change because of the relatively short duration of our professional lifespans. Talk to any older fisherman and he'll tell you how fish used to be more abundant and larger when he was a kid. But how much more? Trouble is, each successive generation enjoys less opulent and pristine "good old days" compared to the previous generation. That is, the baseline shifts and humanity steadily loses track of how much the ocean has changed.

Popularized by fisheries biologist Daniel Pauly [16], the shifting baseline syndrome is the fact that the perceived state of the sea in our youth is further and further from truly unspoiled with each passing generation.

Why there is still hope

Václav Havel reminds us that "Hope is definitely not the same thing as optimism. It is not the conviction that something will turn out well, but the certainty that something makes sense regardless of how it turns out" [17]. It makes sense to save our oceans, if for no other reason than to save ourselves. Fortunately for humanity, there is still time to steer away from the approaching precipice. Yet, we must act far more decisively and quickly than we have to date if we are to avoid severe consequences [18-21].

Can we do it? Can we change our lifestyles and prevent much suffering? I believe so. Despite the despicable state of American politics, positive change is in the air. The youth of America are rejecting the path of denial and divisiveness chosen by their elders, along with their ridiculous assertions that a healthy economy and a healthy environment are incompatible.

At long last, the special challenges facing the ocean are also starting to dissolve. Thanks to fantastic cinematography by dedicated media and scientists, sea life and their ecosystems are more visible to the public than ever before. Watch BBC's Blue Planet series and visit NOAA's Office of Ocean Exploration and Research. Human assaults on the seas are increasingly uncovered by investigative reports and films, such as *The Cove*, *Chasing Coral*, and *Sea of Shadows*. Recent scientific explorations are revealing past states of the seas, thereby casting light on shifting baselines.

Increasingly, many now reject blind consumerism. As consumers, we have the power to dictate what the corporations sell us, the power of advertising notwithstanding. Thanks to programs such as Seafood Watch and the Marine Stewardship Council, we now know which seafood to avoid, so fisheries are starting to clean-up their acts. And marine environmental organizations, from Greenpeace to Oceana to the Ocean Conservancy, along with global environmental groups, are leading the way in educating the public, exposing those who defile the seas. There are even some tangible reasons for optimism, as documented by the Ocean Optimism program.

Ultimately, American politicians respond when their constituents demand action. If the politicians fail, then they can be voted out of office by a solid majority, despite insidiously anonymous campaign donations that push our democracy toward plutocracy. It is time for all of us, young and old, to insist in no uncertain terms that the United States become the paragon of protecting our seas, and in turn, our collective future. The world will follow.

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