



ANOTHER WARM AND STICKY AFTERNOON PRESSED AGAINST THE SOUTHERN COAST OF THE SEA OF CORTEZ AS I HELD TWO SEA TURTLE HATCHLINGS IN THE PALM OF MY HAND. AS THE SUPPLE UNDERBELLY OF THEIR NEWLY FORMED SHELLS LAY GENTLY AGAINST MY WRIST, I WONDERED IF THEY COULD SENSE THAT I'D GUIDE THEM SAFELY TO MOTHER OCEAN. AS THE TINY TURTLES PUSHED THROUGH THE SURE, ANOTHER THOUGHT OVERCAME ME. WILL THE HUMAN ASSAULT ON MOTHER OCEAN MAKE HER INCAPABLE OF NURTURING THESE CREATURES TO MATURITY? SINCE THAT DAY, THE GRAVITY OF WHAT IT MEANS TO BE AN ENDANGERED SPECIES CONTINUES TO PULL ME CLOSER. ARE HUMANS NEXT?

THE HUMAN FACTOR: EUTROPHICATION, DEAD ZONES AND THE FUTURE OF OUR OCEANS

I contemplate the extirpation of species that make the California Peninsula, the Sea of Cortez, and the greater Pacific Ocean their home. We are undeniably connected after all. So many extraordinary creatures – humpback whales, stellar sea lions, hawksbill sea turtles, hammerhead sharks, Southern sea otters, the Pacific walrus, Chinook salmon, California condors and kangaroo rats – to name a few. Not just animals but plants too. I consider the fate of the kelp forests and I imagine the remaining moments just before the humpback enters its final fight, the holding on, the ending breath and then extinction. Will it be pollution, habitat destruction, ocean warming or human predation? Will the last walrus drown as a warming sea melts the ice sheet it clings to? Will the Southern sea otter be able to withstand the top-down pressures of an ever-tightening food chain? Will a break in this food web allow sea urchins to completely wipe out kelp forests? Is any of this reversible?

EUTROPHICATION: OXYGEN-POOR OCEAN ZONES

With so many factors driving endangered species to the brink of extinction, the last thing anyone wants to read about is another terrifying phenomenon. I never planned to be an alarmist, but hey, this is alarming stuff. Especially alarming is “eutrophication”, a process which has produced a “dead zone” that expands all the way from mainland Mexico, across the Gulf of California to the desert shores of the Baja peninsula. This dead zone is one of about 150 that have surfaced globally over the past 40 years according to the U.N. Environment Program.

A eutrophication zone is an area in the ocean (or any aquatic habitat) that is oxygen depleted, thus leading to low productivity and ultimately, no life at all. While a dead zone is exactly what it sounds like (dead), its prelude (eutrophication) is not as straightforward. How does eutrophication happen? To understand this, we need to head to a source.

“The greatness of a nation and its moral progress can be judged by the way its animals are treated.”
~ Ghandi



The Yaqui River Valley is located on the eastern side of the Sea of Cortez opposite the cities of Loreto, Mulegé and Santa Rosalia. This river valley, which drains directly into the Sea of Cortez, is one of Mexico's most productive coastal farming regions. The agricultural area boasts 556,000 acres of irrigated wheat and is fertilized about four times a year. Here, phosphate and nitrate-rich runoff from animal waste and the leaching of chemical fertilizers overload rivers, streams and estuaries. This concentrated effluent eventually makes its way to the Sea of Cortez where the eutrophication process begins.

Once at sea, the “enriched” slurry causes massive algal and photosynthetic bacterial blooms, observed to stretch 19 to 223 square miles and last for days. Soon, a eutrophic zone is created wherein algae and phytoplankton, whose growth becomes limited by available phosphorus and nitrogen, cannot sustain their exploding population. As the photosynthetic organisms die-off, decomposition occurs, using up all the remaining oxygen. These low-oxygen, or hypoxic, zones may become so depleted that nothing can survive, creating the “dead” zone. Most fish and other animals cannot survive in this environment; anything that cannot crawl or swim away fast enough will perish.

INCONVENIENT CHOICES

It all comes down to what we value the most. Financial security? Health? Family? Survival as a species? What will happen to civilization as we know it if the life-sustaining resources we depend on are destroyed from chemical fertilizers and runoff? I know that most people aren't going to have as hard of a time saying good-bye to the kangaroo rat as I will, but what about clean water and edible food? If we don't change soon, we may be forced to say good-bye to our livelihood with the same degree of ease and comfort as we would a pesky rodent.

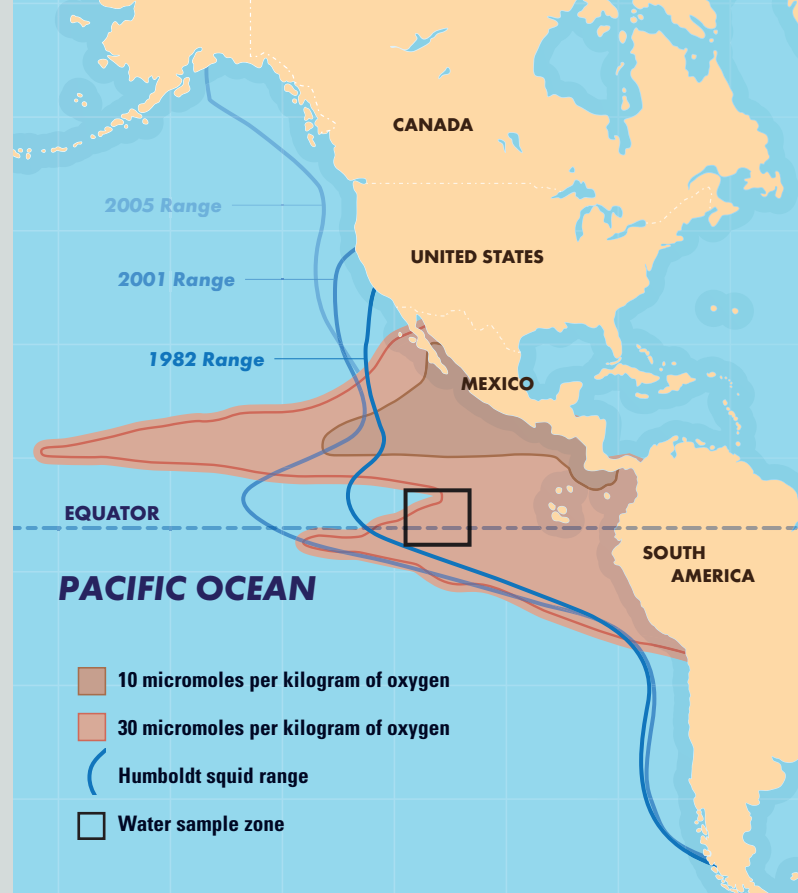
Dead zones don't just threaten endangered species and biodiversity, but also the health of the public and the global economy. For example, red tides can cause outbreaks of life-threatening diseases, such as paralytic shellfish poisoning, which will shut down mussel and clam harvesting. In Mexico, recreational and commercial fishing, both major industries in the Sea of Cortez, face potential collapse. These problems are not limited to local Baja waters; they touch the shores of every single continent on the planet. The environmental and economic impact is being felt everywhere as environmentalists and economists alike agree that rising food prices will continue to climb well into the future. If dead zones increase at the current rate, we can expect greater price surges, greater seafood shortages and greater toxicity. Evidence linking global agribusiness to ocean health is irrefutable.

As a direct result of global warming, some scientists believe mass extinctions of terrestrial animals will probably happen first. Any scientist will tell you that our rivers and oceans are headed for a disaster so great that humans too, could face extinction. Today's average extinction rate is between 1,000 to 10,000 times faster than it was 60 million years ago. Back then, new species evolved faster than existing species disappeared. This is why humans witnessed so much biodiversity when they arrived on the scene. But evolution is falling behind. It is estimated that 30 million different species inhabit the planet and each year thousands of those species, ranging from tiny microorganisms to huge mammals, are forever lost. Many are gone before they are discovered.

Many migrating marine species are increasingly exposed to eutrophication. Is this the final factor that will finish them off? It would be foolish of me to pretend that most people in the world share my affinity for baby sea turtles or any other animal for that matter. When I look out at our civilization, I see that most people's feelings toward nature do not mirror my own. My father once told me, "Jennifer, if you want to know what matters most to people, look to the state of their environment and that will tell you all you need to know. It reminded me of my favorite quote by Ghandi, "The greatness of a nation and its moral progress can be judged by the way its animals are treated."

Here are some things we all can do to mitigate damage to our rivers and oceans:

- 1) **Buy and eat local foods.** Try to avoid foods that produce agricultural runoff. Buying organic (biodynamic is even better) and local foods, or even better still, growing your own food, will ensure your food isn't contributing to the problem. If you are purchasing food that is imported from countries and continents other than where you live,



Oxygen-starved waters are expanding in the Pacific and other oceans, creating vast, underwater deserts. The range of the Humboldt squid, able to tolerate low oxygen levels, has been growing as subsurface currents draw these hypoxic waters up and down the coasts.*

you can rest assured that it is factory farmed, which contributes to runoff and pollution. The price savings may seem worth it in the short run, but as you are probably beginning to see, it all comes back around and ultimately we get what we pay for.

- 2) **If you do choose to grow your own food, don't use artificial fertilizers and pesticides.** Try composting and using chickens or organic manure and compost for mulch. You'd be surprised how many nurseries sell eco-friendly fertilizers and organic compost. Also, plant drought tolerant, native species in your garden whenever possible and avoid fertilizing the landscaping as well. Pick up the book *Permaculture in a Nutshell*, a concise, no-nonsense approach to home gardening that yields eco-friendly food without much cost or time. It is available for under \$10 on www.chelseagreen.com or www.amazon.com.
- 3) **Avoid putting food items down the garbage disposal that can be composted instead.** This will reduce pressure on the treatment plant to remove all this waste from the water and the compost can be reused as a natural fertilizer.
- 4) **Keep reading, discussing and coming up with solutions.** Try new things. Keep what works and change what doesn't. But most importantly, approach it all from an honest place as author Derrick Jensen points out in his compelling book *Endgame* where he quotes psychologist, Roianne Ahn, "You know, if we're going to do this much damage, the least we can do is tell the truth." I highly recommend this and all books by Derrick Jensen for further reading. Check out www.DerrickJensen.org for more information. ■

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