



Marine Conservation Laws & Policies



Pescadero Marsh Natural Preserve

Photo: Janet Clark

Exploring MPAs: Are They Effective in Protecting Our Big Blue?

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12 Years Old

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Although many people don't realize it, our oceans play an extremely important part in our everyday lives. They give us food to eat, air to breathe and add to our sense of happiness and well being, but for all of the things they give us, how are we treating them? Sadly, not very well.

We pollute them with plastic, we overwhelm them with greenhouse gases, we spill oil in them, and we take too many of their creatures for our food and entertainment. While we've started protecting vast swaths of land, we're not doing as good a job for our oceans. According to *MPAtlas*, "Today, only 3% of the world's oceans are protected in implemented and actively managed marine protected areas (MPAs), and of that only 1% of the ocean is strongly protected in no-take marine reserves."¹

Why don't more people know about these problems and about marine protected areas? Thomas Gibson, Undersecretary of the California Natural Resources Agency, offers this possible explanation: "Sometimes, on an individual level, we don't see the cumulative effect of all of our collective behaviors on the environment over time. So on an incremental basis, my own personal behavior might seem like that should just be left to me, but if you multiply that over

¹"How much of our ocean is protected?" *MPAtlas*. Marine Conservation Institute. Web. April 28, 2017.

hundreds of millions of people and decade after decade, we're starting to see the impact that can have on the environment in which we live."²

Ocean Legislation Matters

There *are* ways to stop this kind of thinking that doesn't see the big picture impacts and to get everyone together working to improve the health of our oceans. Ocean legislation—making and enforcing laws to protect the marine environment—plays a big part in creating solutions.

How do we make new policies and pass the necessary laws when people don't see the impact they're having on the ocean's health? It's not impossible. Every

change starts with a small number

of people who see the impact first.

For example, in California, some

people started recognizing that

there were lots of plastic bags

floating along the highways, ruining

beaches, and creating problems in

waterways and for wildlife, so they started bringing reusable bags to the grocery

store. It might have seemed a bit weird at first, but nowadays, you get strange looks



Photo: magazine.promomarketing.com

² Gibson, Thomas. Personal interview. November 23, 2016.

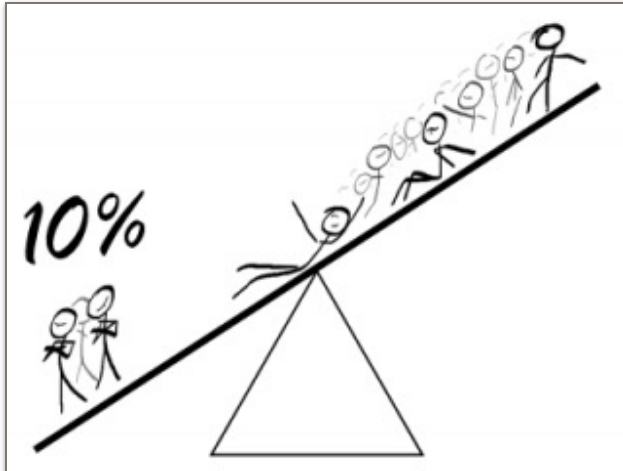


Photo: *Psychology Today*

if you use a single-use plastic bag rather than take your own reusable one to the store.

Once a certain number of people recognize the cumulative impact they're having, things start to change.

According to J. Xie, et al. at Rensselaer

Polytechnic University, the tipping point for this critical mass is 10%.³ That means that when roughly 10% of the population changes, it is only a matter of time before the rest of the society changes, too. Once a critical mass of people adopt a new way of thinking or behaving, this public pressure means legislators are more likely to start listening to the voice of the people and making new laws and policies. Then, when a new law is created, the rest of the people are compelled to change, too. For example, when California passed a plastic grocery bag ban in November 2016, it required that everyone start using reusable or paper bags, a change that may have a positive influence on the health of our oceans and the environment.

Enforce Those Laws!

Passing a new law isn't the end of the story, though. For laws to be effective, they have to be enforced. Not everyone follows the rules; there's always that one kid who

³ Xie, J. Sreenivasan, S., et al. "Social influence through the consensus of committed minorities." *Physical Review E*. 84(1). American Physical Society, July 2011. Web. April 28, 2017.

tries to break the playground equipment or yells in libraries. The same is true with ocean legislation—except violators aren't being rambunctious children. Violators of ocean-protecting laws are doing things like fishing in no-take zones or whaling despite a global ban on it. To prevent this, you need funding to enforce the new laws and regulations. For example, you need to pay people to make sure that fishermen aren't taking too many fish, fishing in no-take zones, using illegal fishing gear, or catching endangered species.

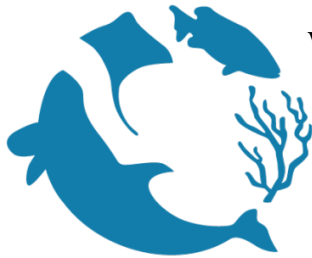
Ocean legislation is a broad topic, but you can break it down into five distinct areas that cover a great number of the marine issues: (1) Fisheries management, (2) endangered species, (3) marine pollution, (4) marine protected areas (MPAs), and (5) climate change. In this paper, I will be sharing my research about the problems of protecting our oceans, and how MPAs can help.

Enter, the MPA

According to the International Union for Conservation of Nature, “Marine Protected Areas (MPAs) involve the protective management of natural areas so as to keep them in their natural state. MPAs can be conserved for a number of reasons, including economic resources, biodiversity conservation, and species protection. They are created by delineating zones with permitted and non-permitted uses within that zone.”⁴ They are also a very important part of ocean

⁴ “Marine Protected Areas.” *IUCN.org*. International Union for Conservation of Nature. Web. April 28, 2017.

legislation. MPAs go by many names, such as national marine sanctuaries, marine



wildlife refuges, ocean parks, marine reserves, and many more. However, the generic term for each of these is simply “marine protected area.”



As well as going by many names, MPAs can be created by all levels of government—local, state, and

national. Although there are no international MPAs yet, there have been international efforts to protect our oceans based on the use of MPAs. Most are initiatives started by nonprofits, like the Marine Conservation Institute’s Global Ocean Refuge System (GLORES) initiative and Mission Blue’s Hope Spots. Both programs are trying to create a global network of MPAs.

Mission Blue’s Dr. Sylvia Earle wants “to ignite public support for a network of global marine protected areas, hope spots

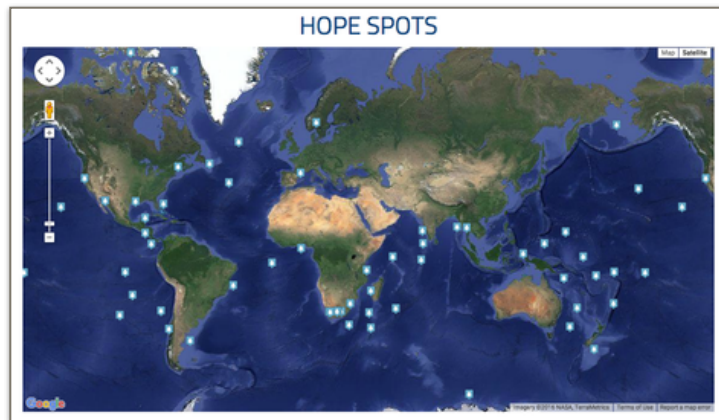


Photo: Mission Blue

large enough to save and restore the ocean.”⁵ The GLORES initiative is “designed to catalyze strong protection for 30% of the ecosystems in each marine biogeographic region of the world’s oceans by 2030.”⁶

5 “Hope Spots.” *Mission Blue*. Sylvia Earle Alliance/Mission Blue. Web. May 1, 2017.

6 “Home.” *Global Ocean Refuge System*. Marine Conservation Institute. Web. May 1, 2017.

Several questions remain, though: Are MPAs working? What makes an MPA successful? What can we do to support and enforce their protection?

According to a *Nature* journal study, there are five things that make a successful MPA.⁷ Let's take a look at these:

- 1.) All fishing is banned in that MPA. This allows fish populations to recover from previous fishing, or for fish populations to remain plentiful.
- 2.) The rules of the MPA are effectively enforced. If you don't enforce the rules of an MPA, then it's not really a protected area.
- 3.) The MPA has been in existence for more than 10 years. This allows animals to collect there, building a healthy ecosystem.
- 4.) The MPA covers a large area (at least 100 square kilometers or 39 square miles). If the MPA is big enough, it can sustain a healthy level of biodiversity and enough population to allow for reproduction.
- 5.) The MPA is geographically isolated or easily identifiable. In the study, isolated MPAs were described as ones that had features that were different from the rest of the nearby ocean. For example, MPAs that are surrounded by deep water or have sandy instead of rocky bottoms are more distinct from the rest of the ocean, and fishermen will recognize those areas as illegal fishing zones.

⁷ Edgar, Graham J., et al. "Global conservation outcomes depend on marine protected areas with five key features." *Nature*. 506. Nature Research. February 13, 2014. Web. April 25, 2017.

The study also found that if the established MPA used four of the five key features, then fish biomass increased substantially. The scientists reported that “Effective MPAs also had twice as many large (>250 mm total length) fish species per transect, five times more large fish biomass, and fourteen times more shark biomass than fished areas.”⁸



Photo: gilisharkconservation.com

MPA Networks: Are They Working?

Even though separate marine protected areas are showing signs of success in helping some species and ecosystems recover, individual MPAs alone aren't an effective strategy for restoring the entire ocean. As Dr. Steven Woodley, an ecologist and Chief Scientist at Parks Canada explains, “If you chop an ecosystem up, it's immediately in trouble. It will lose biodiversity, guaranteed. We know this as much as we know anything in conservation biology.”⁹

To enhance the success of MPAs, some states and countries are beginning to use a networked approach. The network effect is simple, creating multiple MPAs

⁸ Edgar, Graham J., et al. *Nature*. 506. Nature, February 13, 2014. Web. April 25, 2017.

⁹ *Wild Ways: Corridors of Life*. Dir. James Brundige. First Light Films, 2016. Film.

that work together in protecting a certain region or ecosystem. In their 2014 study, “Marine Protected Area Networks: Assessing Whether the Whole is Greater than the Sum of Its Parts,” Kirsten Grorud-Colvert, et al. found that the networked approach is actually helping. They compared populations of yellow tang in a single MPA in Maui with those in a network of MPAs on the western side of the island of Hawai’i and concluded that, “Our data illustrate results consistent with a network effect that is greater than the sum of individual MPA effects.”¹⁰

In California, the Marine Life Protection Act of 1999 (MLPA) is ensuring that California’s MPAs are forming a network of protected areas along the state’s coast. The MLPA has six main goals. One of them is to “ensure that the state’s MPAs are designed and managed, to the extent possible, as a network.” According to Cyndi Dawson, California Ocean Protection Council (OPC) Marine Protected Areas Policy Advisor, this approach seems to be working. “What we’ve been seeing is that inside the MPA, the fish are more plentiful and bigger,” Ms. Dawson said when I interviewed her in January 2017. “In the Northern Channel Islands since they’ve come under protection, there are more lobsters and bigger ones, too, inside the MPA,” she reports. “But the fish are always circulating in and out of an MPA. Therefore, we’re not just protecting one small area, it benefits the surrounding area, too. Research is also showing that fish populations are healthier outside

¹⁰ Kirsten Grorud-Colvert, et al. “Marine Protected Area Networks: Assessing Whether the Whole Is Greater than the Sum of Its Parts.” *PLOS-One*. PLOS. Web. <https://doi.org/10.1371/journal.pone.0102298>. April 26, 2017.

MPAs. Both inside and outside MPAs their numbers are going up, but inside, there are more fish and they are bigger.”¹¹

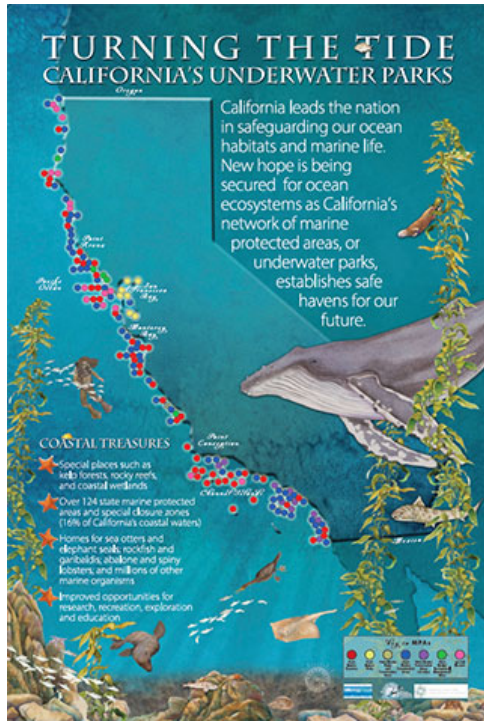


Photo: californiampas.org

The California Marine Life Protection Act of 1999 requires that MPAs are networked when possible.

OceanSpaces, “the online community that tracks the health of California’s oceans,” has divided the California coast up into four parts. The north coast, the central north coast, the central coast, and the south coast. They have compiled baseline monitoring research for each of these sections over five-year spans and released reports of their findings. In total, California MPAs cover approximately 5,285 square miles. The network includes 124 MPAs and protects roughly 16% of California’s state

waters¹². So far, they have published three reports covering the north central, central, and south coast regions. Data is still being collected for the north coast report.

In OceanSpaces’ latest report on the MPAs of the south coast, they found that, “Consistent with other regions, marine communities are responding to older

¹¹ Dawson, Cyndi. Personal interview. January 11, 2017.

¹² “Regional MPA Statistics.” California Department of Fish and Wildlife. *State of California Department of Fish and Wildlife*. Web. April 25, 2017.

MPAs: Biomass of targeted fish species has increased in kelp and shallow rock ecosystems inside and outside of the northern Channel Islands MPAs (established in 2003). Biodiversity in rocky intertidal ecosystems is significantly higher in ‘old’ MPAs (established before 2012) than outside, while ‘new’ MPAs show intermediate and highly variable biodiversity.”¹³

According to Cyndi Dawson of California’s OPC, the network approach to MPAs may be one of the best ways to protect our oceans. As she explains, “My work is focused in state waters [from mean high tide to three miles offshore], but fish and other animals don’t see that imaginary line. Increasing the number, size, and connectedness of MPAs is going to be a very important thing.”¹⁴

When asked about international initiatives like the Global Ocean Refuge System initiative, she said, “The trick with MPAs is a balance. We need to understand these spots. This [GLORES] sounds like a great idea.” However, she also said that “it’s more about having a smaller spot that creates a bigger benefit than having a certain percentage. We humans get caught up in our numbers sometimes.”¹⁵

Keeping track of numbers can be important at times, though, especially when it involves helping reestablish healthy fish populations. For instance, threats

13 Benét, Duncan, et al. “The State of the California South Coast (State of the Region).” *OceanSpaces*. California Ocean Science Trust. Web. April 26, 2017.

14 Dawson, Cyndi. Personal interview. January 11, 2017.

15 Dawson, Cyndi. Personal interview. January 11, 2017.

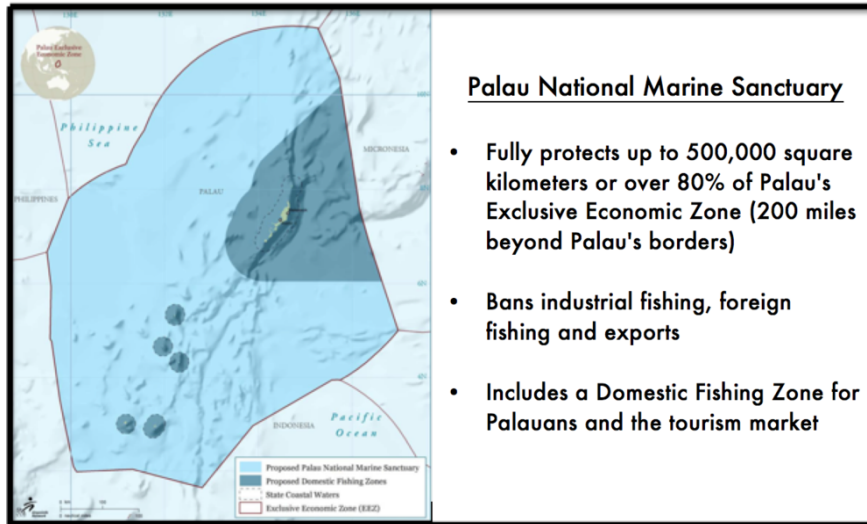


Photo: Palau National Marine Sanctuary Campaign

from diminishing fish populations led the island nation of Palau in Micronesia to enact the Palau National Marine Sanctuary Act in October 2015

(PNMS).¹⁶ The PNMS sets aside 80% of their nation's maritime territory as a protected ocean area. The remaining 20% is outside of the MPA and can still be used by local fishermen. Whether this MPA will be successful is still to be determined as it is not fully implemented until 2020 due to its five-year stepping-stone structure. We hope that with ample enforcement and its meeting some of the five key elements that create an effective MPA, it will be.

Economic Impacts of an MPA

There are plenty of benefits to the natural environment from having an MPA, but many people might ask: What's in it for humans? We humans don't usually do things if they don't provide some benefit for us.

There are several parties that are interested in MPAs, and when protected areas are designed effectively, all of the parties involved seem to benefit. Fishermen and fisherwomen rely on an abundant supply of fish for their income, and

¹⁶ "About." *Palau National Marine Sanctuary*. Palau National Marine Sanctuary Office. Web. April 25, 2017.

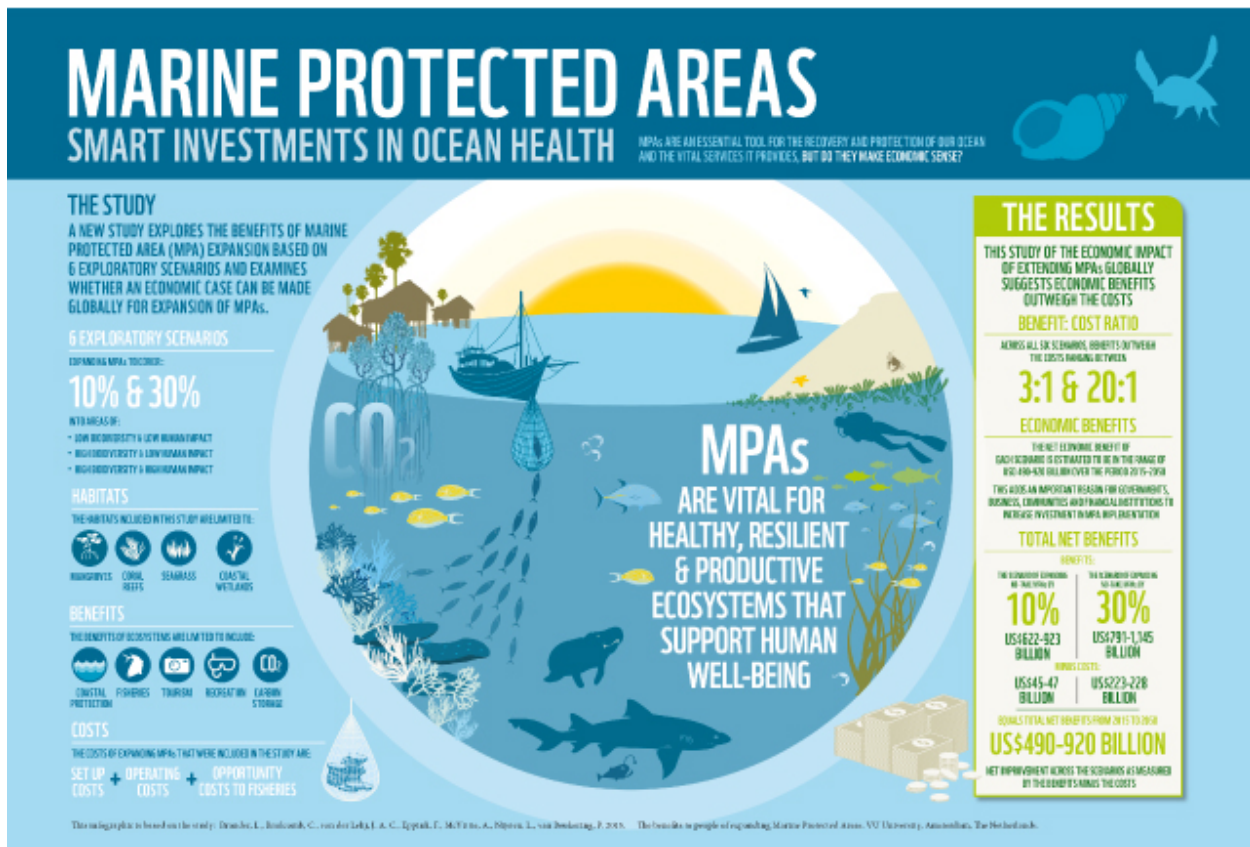


Photo: World Wildlife Fund

successful MPAs maintain those populations both inside and outside of the MPA because of circulating schools of fish. Local residents benefit from MPAs, too.

Wouldn't you much rather look outside and see a beautiful, clean ocean instead of a dying one? The tourism industry also profits from MPAs. A healthy, flourishing coral reef brings in lots of tourists—many more than a reef that has been overfished to the point where very few creatures inhabit it.

Now the question is: How do we get people to realize what benefits they get from creating more effective MPAs? Deborah Halberstadt, Executive Director/Deputy Secretary for Oceans and Coastal Policy at the California Natural

Resources Agency’s Ocean Protection Council (OPC), says of the OPC, “We work with anyone who touches the ocean and are trying to take into account all of the different perspectives.”¹⁷ That way the OPC can ensure that everyone benefits from new MPAs and the regulations they require.

In their study, “Uses of ecosystem services provided by MPAs: How much do they impact the local economy? A southern Europe perspective,” Nicolas Roncin, et al, show that these benefits can be very significant. In fact, they concluded that “yearly local incomes generated by the use of MPA ecosystem services amount approximately to €720,000 per MPA in the commercial fishing industry, and to €640,000 per MPA in the various activities providing services to non-resident recreational users.”¹⁸

Luke Brander, et al. also found that effective MPAs have a very positive impact on human communities in their

study, “The benefits to people of expanding Marine Protected Areas.” They report



¹⁷ Halberstadt, Deborah. Personal interview. November 23, 2016.

¹⁸ Roncin, Nicolas, et al. “Uses of ecosystem services provided by MPAs: How much do they impact the local economy? A southern Europe perspective.” *Journal for Nature Conservation* 16 (2008): 256—270. Web. April 28, 2017.

that, “In the case of the scenario that achieves 10% coverage of total marine area and targets areas with high biodiversity and low human impact, each dollar invested yields a return of around 20 dollars in benefits. On this evidence the expansion of MPA coverage can be recommended from an economic perspective.”¹⁹

My Final Thoughts

Scientists have shown that thoughtfully constructed MPAs are doing a good job of protecting the coastal waters that we love and need—and that they have substantial economic benefits, too. That is why it is important that we work towards goals like the United Nations’ Sustainable Development Goal 14, which says, “By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.”²⁰ It also makes the Marine Conservation Institute’s GLORES initiative important. With a goal of protecting 30% of our oceans by 2030, it could improve the marine environment and provide economic benefits for people around the world.

We Heirs have an initiative of our own, too. We are very concerned about unrecognized threats to MPAs. There are important keystone species being harmed due to land-sea pollution in MPAs. That takes the "protected" out of marine

19 Brander, Luke, et al. “The benefits to people of expanding Marine Protected Areas.” *Institute for Environmental Studies*, May 2015. Web. http://assets.wfn.nl/downloads/mpa_rapport_volledig.pdf. April 28, 2017.

20 “Sustainable Development Goal 14 of the United Nations.” *Sustainable Development Goals: 17 Goals to Transform Our World*. The United Nations, January 1, 2016. Web. April 28, 2017.

protected area! If an MPA bans fishing and oil drilling, those are good steps to protect the area for overfishing, oil spills, and underwater noise. However, that does not protect the important marine life from threats that start on land. Massive amounts of agricultural pollutants, such as fertilizers, pesticides and herbicides, as well as municipal sewage spills and dumping of pollutants by boats are all major issues to consider when attempting to protect marine life and our oceans. Heirs urge their policy makers to consider regulations on land to stop impactful land-sea pollution when drafting an MPA. With the proper policies and legislation behind them, MPAs can play a vital role to the survival of many rare and beautiful ecosystems and improve the health of our oceans. You can be part of protecting our blue planet by supporting or helping to create networks of effective MPAs.

The network effect is like a group of MPAs holding hands, protecting the ocean—and it's been shown to be very effective. So take my hand, stand up for your future, and we can save our oceans together.

Heirs To Our Oceans is inspiring the next generation of environmental leaders.



www.heirstoouroceans.com