



SEASTATES 2013

HOW WELL DOES **YOUR STATE** PROTECT **YOUR COASTAL WATERS?**





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Cover Photo by Kip Evans.

California is a leader in protecting biological diversity and abundance in giant kelp forests and other marine ecosystems along its coast (photo by Carolina Dratva).



EXECUTIVE SUMMARY

Here, using publicly available information, the Marine Conservation Institute and Mission Blue present the first scientifically rigorous quantitative account of no-take marine reserves in the waters of US coastal states and territories.

All people depend on services and goods that living oceans provide, but human activities now threaten marine life and, hence, our lives. Marine biologists recommend creating strong **marine protected areas (MPAs)** to safeguard life within them and to benefit people outside them. Many coastal states and territories have established at least some protected areas, but this protection is often weak or temporary, with fewer benefits to people. In contrast, **no-take marine reserves**—MPAs free from fishing, mining and oil & gas development—are the gold standard. They allow places in the sea to recover biodiversity and abundance, and export marine life to surrounding and remote areas.

Our finding: Few states provide strong protection for marine ecosystems. There is much room for improvement.

The best-protected states and territories are Hawaii, California and the US Virgin Islands. Hawaii protects 22.94% of its state marine waters as no-take reserves; California 8.74% and USVI 5.69%. These states and territories deserve our appreciation and our business. A few protect very small amounts of their coastal waters, roughly 1% or less (Florida, Puerto Rico, Oregon, CNMI, Guam, Washington, North Carolina, Virginia and Maine). Fifteen coastal states, including Alaska, Mississippi, South Carolina, Delaware and Massachusetts, don't yet strongly protect any of their marine waters. Citizens deserve to know which states are leaders and which aren't doing enough to protect our beaches, coastal waters and seafood.

Red groupers are one of the thousands of species protected by no-take marine reserves in Florida. They play a key role in some ecosystems by removing sediments from reef rock, improving habitat for corals and sponges. No-take marine reserves allow females of a number of grouper species to grow old enough to become males (photo by NOAA).



WHY YOU SHOULD CARE ABOUT OUR OCEANS

Many people feel thrilled when they see dolphins, catch fish or find seashells on the beach. Those are benefits of marine biodiversity we can feel. Scientists who study Earth systems also tell us that living oceans—the Earth’s largest ecosystems—are essential to human survival and well-being. They’re our life support systems. They:

- generate half of the oxygen we breathe
- contain 97% of the Earth’s water
- provide more animal protein in our diets than chicken or beef, and
- maintain climates we can live in.

Healthy oceans keep us alive. They also provide us livelihoods: Coastal areas generate far more of America’s income (GDP) per mi² than non-coastal areas. That means millions of jobs.

But the sea is in deep trouble. Marine biologists see that almost everywhere. The sea’s in trouble because some human activities harm the public’s interests, interests we entrust our states to protect. Overfishing, habitat damage, marine pollution, alien species and acidification/climate change threaten the diversity and productivity of our oceans. They are ruining it for us and our grandchildren.

The sea is rapidly losing big things: manta rays, hammerhead sharks, groupers and monk seals. Coral reefs, oyster beds, mangrove forests and seagrass meadows are disappearing. It’s not in our interests to let anyone drown sea turtles, wreck fishing grounds or pollute places where we get our seafood. We need to do better.

Unhealthy oceans are symptoms of governments failing to protect our interests. We need them to do what’s best for the public, now and for future generations. That means doing what’s best for the sea.



WHY YOU SHOULD CARE ABOUT OUR OCEANS

Happily, it's not too late to save our oceans. Marine life is resilient. In places where people don't kill things, they usually recover, benefiting our health and economy decade after decade. Healthy oceans generate protein and omega-3 fatty acids we use to maintain our hearts and brains, oxygen we breathe, climates we can live with and coastal economies with abundant jobs and tax revenues. Whether your greatest concern is protecting nature or having a healthy economy, everyone wins when fishes and other marine life are abundant.

Protecting key habitats is good public policy. Since 1872, national parks have protected America's grandest places from extractive uses. In 2010, 281 million people visited them. They spent billions in nearby communities, generating large numbers of jobs (Stynes 2011). Many went to breathe clean air, enjoy nature's beauty and see big animals and trees you can't see elsewhere. Oceans generate huge economic benefits for similar reasons.

Safe havens where life is diverse and abundant give us resilience as the climate changes and oceans become more acidic. They are life insurance for our oceans.

LOWER 48 STATES	GDP/MI ²	GDP/PERSON
Shore adjacent counties	\$31,245,378	\$56,898
Non-shore adjacent counties	\$3,523,092	\$48,906

VALUE OF OCEANS TO OUR ECONOMY

What's the best available indicator of oceans' economic importance? Adding sums generated by industries such as fishing, whale-watching and shipping underestimates oceans' importance because so many people visit and live in coastal areas for reasons that don't get included in those numbers. Some come to visit aquaria, watch seabirds or find shells on the beach. Some sell meals, hotel rooms or accounting services. People attracted to oceans create strong economies and jobs, as data from www.oceanconomics.org show.

You can see that by comparing coastal (marine) and non-coastal (including Great Lakes) counties. The 48 contiguous states, with 2,973 counties and equivalents, generated a 2011 gross domestic product (GDP, the total production of economic goods and services) of \$14.86 trillion. The 326 counties having marine shorelines include only 5.71% of the area but generated 35.54% of the GDP. Indeed, coastal counties generate 8.86 times as much GDP per square mile as inland and Great Lakes counties, and 16.34% more GDP per person.

Oceans are powerful generators of wealth and jobs. People who visit or live near the coast are drawn there for many reasons, including the many benefits that healthy oceans provide.



WHY PROTECT MARINE AREAS

From the frozen seas to the tropics, estuarine, coastal and oceanic ecosystems are home to millions of species, from great whales to tiny things scientists haven't discovered yet. These living things are essential to our well-being, now and in the future.

Each marine species occurs mainly in certain kinds of places (their usual habitats). Some migrate to special places at certain times to feed, socialize or produce young. These patterns make the sea a mosaic of different kinds of places, each kind having its characteristic conditions and species. Biologists call these places ecological systems, or ecosystems for short. ***The sea is a living ecosystem mosaic.***

Protecting enough of each kind of "tile" in the mosaic has 2 great benefits. 1) When people don't kill animals, they live longer, grow larger and reproduce more, so populations build up. And 2) adults or young often travel beyond protected areas. That's why scallops, lobsters and fishes are often more abundant and bigger at and beyond MPA borders. Protected areas make the fishing better outside them.

Sharks, seabirds, tourists and fishermen all benefit when enough marine ecosystems are protected. We can save our fish and eat them too.

States play a key role. Citizens deserve governments that benefit the public's interest, not just special interests.

Because ecosystems have so many species, it's often uneconomic to conserve them one-by-one. The needs and life histories of many remain a mystery. ***Protecting all species in their habitats is far less knowledge-intensive and costly*** because they feed and reproduce themselves without needing our help. Give them suitable habitat, stop killing them and many populations will recover.

No-take areas in the sea are like seed banks on land. They save species we'll need as things get rougher, as the climate changes and oceans acidify. Those changes are already happening (Cheung et al. 2013). Marine life will help us survive them.



WHY PROTECT MARINE AREAS

Protecting life that keeps our oceans working is a life insurance policy for them and us. Used, as appropriate, with other tools for saving marine life, strongly protected areas are the most effective way to conserve species in our rapidly changing world.

How can citizens know whether our states are doing what's best for us? The simplest, clearest measure is "What percent of waters is no-take marine reserve?" Protection has to be strong to be effective.

There are thousands of places governments call "marine protected areas" that aren't really protected much. Some MPAs prohibit mining or oil & gas drilling, but many allow the biggest impact on marine life: fishing.

Fish are wildlife, and their abundance has huge effects in their ecosystems. A coral reef or kelp bed lacking abundant fishes is like a ghost town. Unfortunately, fishing has reduced many coral reefs, kelp forests and undersea banks to ghost towns.

Fortunately, strongly protecting areas from extractive activities allows life to recover.

Caribbean spiny lobsters reach much larger sizes in marine reserves, where they are protected from fishing pressure. Many of these individuals are caught when they leave marine reserves, aiding local fisheries. And the larger lobsters produce more eggs and larvae, which replenish populations far from the reserves (photo by Kip Evans).



WHY NO-TAKE RESERVES

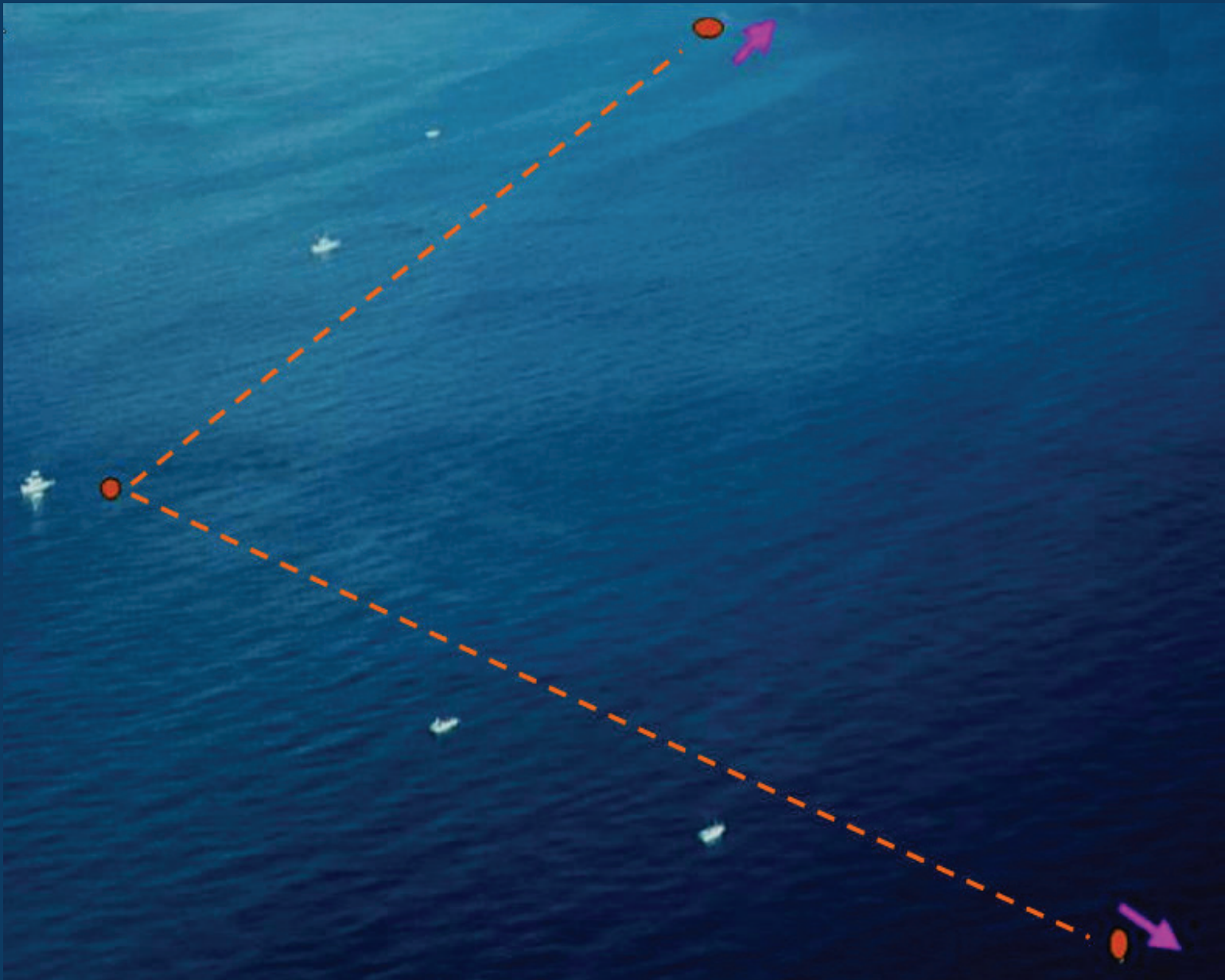
Of the many kinds of MPAs, no-take reserves are the ones that governments give the strongest protection. No-take reserves safeguard life within them—seaweeds, dolphins, sea turtles, fishes, corals—from fishing, which has long been the most important human impact on the sea (Jackson et al. 2001). No-take reserves also protect against other extractive uses, such as oil & gas drilling.

Many MPAs protect against only a few threats, and most allow people to fish in them. No-take marine reserves—the strongest MPAs—are the only areas people can count on to produce the protected area benefits we need. No-take marine reserves work better than less-protected areas (Sciberras et al. 2013) because when people don't kill things, those things tend to make more of themselves. Areas that don't protect against all extractive uses can be useful, but have fewer conservation benefits.

Divers, scientists and fishermen start seeing changes within just a few years following full protection. Dozens of scientific studies show increases in diversity, in the sizes of individuals and the overall abundance of animals in no-take reserves (Lester et al. 2009). Reserves also replenish fish and invertebrate populations outside their boundaries (Roberts et al. 2001; Sala et al. 2013), a good outcome for both fish and fishermen.

Marine reserves work for several reasons that might not seem obvious. They allow female fishes and invertebrates to live longer and grow larger. Such “big mamas” produce far more eggs than the same weight of younger females, and they are better at having those eggs fertilized. In a number of cases young from big mamas are more likely to survive because they're bigger and received more food energy from their mothers, which helps the young withstand periods of food scarcity (Berkeley et al. 2004).

Corals provide habitat for reef fishes, and reef fishes keep corals from being overgrown by algae in healthy coral reef ecosystems, including these ones in Papahānaumokuākea Marine National Monument in the Northwestern Hawaiian Islands. The Marine Conservation Institute and Mission Blue founder Sylvia Earle played key roles in President Bush's designation of this colossal no-take marine reserve in 2006, setting a precedent for very large marine reserves worldwide (photo by James Watt).



WHY NO-TAKE RESERVES

Marine reserves benefit some big grouper species in a different way. Many of these fishes change from female to male as they age and grow larger. Fishing can kill many individuals before they have a chance to become male. It's not good for populations to lose all their males or their largest, most productive females, which can easily happen when vulnerable species are fished heavily, especially on their spawning sites.

Our colleagues warn us that the world will experience more unexpected changes as our oceans warm and acidify. Now they are telling us that ecosystems that are aren't fished are more resilient and healthier, recovering faster after unexpected changes happen in the sea (Micheli et al. 2012). Devastating storms, spreading dead zones, oil disasters, disappearing marine life, toxic algal blooms and stinging jellyfish outbreaks can all cause terrible harm to marine ecosystems and people in coastal communities. Keeping all the species that keep oceans healthy improves our security and our children's security in changing times.

The most effective way to save marine life is for people to stop killing them in some places and to pay attention to species' relationships with each other. Simply slowing overall fishing mortality or bycatch rates is not as foolproof as protecting places from fishing. No-take marine reserves are the strongest management tool for saving thousands of species and recovering their habitats.

Further, recovering ecosystems that support fish production can only help sustain fishing. Marine biologists report that adult yellow tang, an important Hawaiian fish for the aquarium trade, send their young to grow up in areas as far as 114 miles away (Christie et al. 2010). And, rather than harming commercial and recreational fisheries, as some had feared when Tortugas Ecological Reserve in Florida was established in 2001, the region's fisheries have remained viable and some have thrived (Jeffrey et al. 2012). As scientists pay more attention to marine reserves, we will likely discover more benefits

The science is compelling.

To take advantage of fishes that “spill” over boundaries of no-take reserves, recreational and commercial fishermen often “fish the line” at the edges of these areas, such as this marine reserve in Florida Keys National Marine Sanctuary (photo by David McClellan, NOAA Fisheries).

RANK	STATE OR TERRITORY	NO-TAKE % IN STATE/TERRITORIAL WATERS
1	Hawaii	22.94%
2	California	8.74%
3	US Virgin Islands	5.69%
4	Florida	1.12%
5	Puerto Rico	0.90%
6	Oregon	0.31%
7	CNMI	0.21%
8	Guam	0.13%
9	Washington	0.09%
10	America Samoa	0.08%
11	North Carolina	0.04%
12	Virginia	0.02%
13	Maine	0.01%
14	Alabama	0.00%
14	Alaska	0.00%
14	Connecticut	0.00%
14	Delaware	0.00%
14	Georgia	0.00%
14	Louisiana	0.00%
14	Maryland	0.00%
14	Massachusetts	0.00%
14	Mississippi	0.00%
14	New Hampshire	0.00%
14	New Jersey	0.00%
14	New York	0.00%
14	Rhode Island	0.00%
14	South Carolina	0.00%
14	Texas	0.00%

STATE RANKINGS

HOW WE RANKED THE STATES

Using publicly available data our scientists determined the areas in estuaries and coastal waters within each US state and territory as defined by the Submerged Lands Act. This area extends 3 nautical miles from each state's coastal baseline, except for Texas, Florida's west coast and Puerto Rico, which have jurisdiction over waters within about 9 nmi from shore. We approximated the lateral boundaries between states using data from the US Census Bureau and the Bureau of Ocean Energy Management. MPA data that are catalogued online at MPAtlas.org and MPA.gov provided the information we used to calculate the total area of MPAs and the areas of no-take marine reserves and no-take zones within larger MPAs. We also confirmed the status of regulations for MPAs by visiting appropriate state agency websites. We calculated the percentage of each state's waters that are no-take and ranked the states and territories from highest to lowest. Maps and data for each state or region are available at SeaStates.us

HOW YOUR STATE RANKS

Different US states and territories show dramatically differing commitment to protecting your marine ecosystems. While all coastal states except New Hampshire have designated some portion of their waters as MPAs, only 2 US states and 1 territory now conserve even 5% of their waters as no-take marine reserves.

Hawaii, California, and the US Virgin Islands are the leaders in strongly protecting their marine waters. 10 other states and territories—Florida, Puerto Rico, Oregon, Commonwealth of the Northern Mariana Islands, Guam, Washington, American Samoa, North Carolina, Virginia and Maine—have strongly protected at least tiny marine areas. 15 states, including Alaska, Alabama, Georgia and Rhode Island haven't yet created **any** no-take marine reserves. By this key measure, they're the bottom of the pack.



WHAT OUR FINDINGS TELL US

With very few exceptions, states aren't doing enough to safeguard their citizens' interest in healthy oceans.

We use the percentage of area in no-take marine reserves as our measure for ranking states, but a number of local, state and federal government agencies have given lower levels of protection to 1,237 MPAs within state waters, an impressive number. MPAs, excluding fishery management areas and seasonal closures, cover about 10% of state and territorial waters. California (which gives some protection to 49% of its waters), Florida (46%) and Hawaii (43%) have done the most.

Protection against some threats can be really meaningful, but most protected areas do **not** preclude fishing. Not protecting against the biggest threat doesn't sound like the best conservation strategy. ***What percentage of waters is no-take marine reserve?*** tells us how committed states are to protecting our marine life.

Hawaii (22.94% no-take) comes out on top. Nearly all that no-take area was designated in 2005-06 when Governor Linda Lingle and, soon after, President George W. Bush, declared protection for state and federal waters in the northwestern Hawaiian Islands, now Papahānaumokuākea Marine National Monument. Sadly, the state has done much less around the main islands, where almost all Hawaiians live. Only 0.03% is no-take marine reserve.



CALIFORNIA'S NETWORK OF MPAs

California deserves special praise for protecting its waters systematically through the Marine Life Protection Act (MLPA) public process. In 1999, it tasked the Department of Fish and Wildlife with creating a comprehensive statewide network of MPAs. To accommodate a wide range of ocean uses, California defined several types of managed areas, including no-take marine reserves. Today our most populous state has designated over 8% of its waters as no-take marine reserves, in places such as the Channel Islands. Strongly protecting ecosystems along its entire coastline benefits marine life and people.

Royal tern in Florida. Florida gives some protection to 46% of its waters. But only 1.12% is no-take marine reserve, the strongest kind of protection (photo by John Weller).



WHAT OUR FINDINGS TELL US

There is much room for improvement. While some states have made real progress, 15 states have protected nothing (0.00%). Oregon has designated 3 no-take areas at Whale Cove, Otter Rock and Redfish Rocks through its marine spatial planning process. In 2012, Oregon announced that it would designate 3 more no-take areas at Cape Falcon, Cascade Head and Cape Perpetua. When they are implemented, no-take marine reserves would increase from 0.31% to almost 4% of Oregon's state waters.

American Samoa is also poised to expand its ocean protections. Rose Atoll Marine National Monument will ban all commercial fishing and more tightly manage non-commercial and recreational fishing in its territorial and US waters. The proposal recommends prohibiting all fishing surrounding Rose Atoll itself, potentially raising American Samoa's no-take area to almost 8%.

Massachusetts concluded comprehensive marine spatial planning in 2010. Its current ocean management plan has only 1.9% of Massachusetts waters in MPAs and 0.0% in no-take marine reserves. Massachusetts has not included no-take reserves as part of its marine planning efforts.

Maine and Virginia have only protected tiny areas, while states including Rhode Island, New York and Georgia on the Atlantic Coast and Alabama, Louisiana and Texas on the Gulf Coast have protected none of their waters as no-take marine reserves. Scientists tell us we need to do better for our oceans, for us and our grandchildren.

Knowing that we need healthy oceans and that marine ecosystems can recover much of their key functions tells us what our states must do. But knowing how much area to protect is crucial to save marine life for us and future generations. Only protecting enough of the right areas will deliver the conservation benefits we need. Moreover, we have to do this affordably. Effectiveness and affordability are essential as governments face climate change and shrinking budgets.

Off Swan's island, Maine, soft-bottom ecosystems dominated by worm tubes are devastated by scallop dredging. No-take marine reserves protect against scallop dredging, bottom trawling, oil drilling and other extractive activities. But like Virginia, Maine has scarcely begun to designate no-take reserves to protect its marine life (photos by Peter Auster, University of Connecticut at Avery Point).

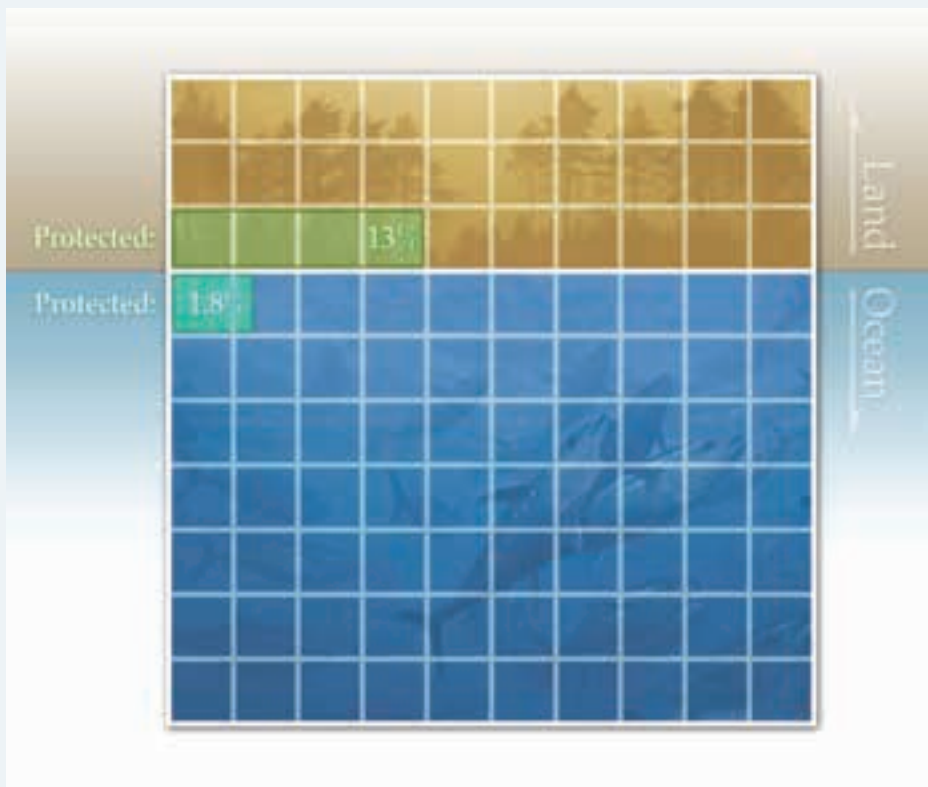


WHAT OUR FINDINGS TELL US

The proportion of habitat needed to achieve conservation goals probably differs for different groups of marine life; abalone and humpback whales use seaspace in very different ways. No precise percentage is “definitive.” Expert scientific opinion is the best guide.

Many marine scientists and conservation experts recommend fully protecting at least 20% (Lubchenco 1997; MCBI 1998; World Parks Congress 2003; Wells et al. 2008) of each marine ecosystem in no-take reserves. Some suggest higher percentages.

Right now, US states and territories protect only 1.27% of our coastal waters in no-take marine reserves. Clearly we have a long ways to go, and globally we aren't faring any better. Currently 1.1% of the sea worldwide is protected in no-take marine reserves. An additional 0.7% is multiple-use, raising global MPA coverage to 1.8% (*MPAtlas.org*). To meet the 20% no-take marine reserve goal, the world needs to strongly protect almost 18 times as much as it already has.



GLOBAL MPA COVERAGE

Around the globe roughly 1.8% of the oceans is protected to some degree (approximately 1.1% is in fully-protected no-take reserves). Although oceans cover more than two times the area of land and are much easier to protect, far less is protected (source: *MPAtlas.org*, graphic credit Russell Moffitt).

Georgia had the vision to get Congress to designate Cumberland Island National Seashore in 1972. But like Mississippi, Maryland, New Jersey and Connecticut, Georgia has not yet designated any no-take marine reserves in its state waters (photo by Gary Davis, *gedapix.com*).



WHAT YOU CAN DO

SeaStates shines a light on marine conservation where you live or visit. The Marine Conservation Institute and Mission Blue want states to designate more no-take marine reserves. We plan to track their progress and show how they're doing each year.

You can help reduce pressure on oceans and encourage your state to protect more marine ecosystems, by:

- Urging our leaders to create more no-take marine reserves
- Making conserving the oceans an important issue, and voting for people who really share our values and act on them (see oceanchampions.org)
- Visiting coastal locations only in states that do the best job of protecting our marine environment
- Eating only sustainably caught seafood (see montereybayaquarium.org) at home and at restaurants, and telling that to those who sell you seafood
- Finding meaningful ways to reduce your family's energy use
- Supporting nonprofit, tax-exempt organizations who work to save marine life

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ABOUT Us / ACKNOWLEDGMENTS

ABOUT THE MARINE CONSERVATION INSTITUTE & MISSION BLUE

The Marine Conservation Institute is a nonprofit organization dedicated to securing protection for the oceans' most important places. Founded by marine ecologist Dr. Elliott Norse in 1996, we see the big picture and use the latest tools in collaboration with scientists, government officials, businesses and conservation organizations to recover healthy, living oceans around the world for us and future generations. Visit marine-conservation.org

Mission Blue is a global initiative formed in response to Dr. Sylvia Earle's 2009 TED Prize wish. Dr. Earle urged people "to use all means at your disposal — films, expeditions, the web, new submarines — to create a campaign to ignite public support for a global network of marine protected areas; Hope Spots large enough to save and restore the blue heart of the planet." Currently, the Mission Blue community includes 60+ respected ocean conservation groups and likeminded organizations. Visit mission-blue.org

WE THANK

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For more information visit SeaStates.us and MPAtlas.org




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