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May 4, 2021

The Honorable Raúl Grijalva
Chairman
Committee on Natural Resources
U.S. House of Representatives
1324 Longworth House Office Building
Washington, DC 20515

The Honorable Bruce Westerman
Ranking Member
Committee on Natural Resources
U.S. House of Representatives
1329 Longworth House Office Building
Washington, DC 20515

The Honorable Jared Huffman
Chairman, Subcommittee on Water, Oceans, and Wildlife
Committee on Natural Resources
U.S. House of Representatives
1324 Longworth House Office Building
Washington, DC 20515

The Honorable Cliff Bentz
Ranking Member, Subcommittee on Water, Oceans, and Wildlife
Committee on Natural Resources
U.S. House of Representatives
1329 Longworth House Office Building
Washington, DC 20515

Dear Chairman Grijalva, Ranking Member Westerman, Chairman Huffman, and Ranking Member Bentz:

Thank you for the opportunity to provide both oral and written testimony in support of H.R. 160, the *Restoring Resilient Reefs Act*. As a coral reef scientist who has studied and worked on coral reefs in Florida and around the world for almost 28 years, I believe that we must take urgent action to ensure they can survive into the future, and **this Act is an essential part of that effort**.

Coral reefs in the United States and around the world are at **a critical turning point**. The combined effects of climate change, disease, declining water quality, habitat destruction, and other impacts all have contributed to these ecosystems suffering tremendous declines that have brought them to an ecological precipice.

Nowhere is this crisis more striking than in Florida, where reefs have lost 70-80% or more of their live coral cover over the last few decades. We are now starting to experience back-to-back annual coral "bleaching" events, caused by summertime temperatures that are so warm that heat-stressed corals turn white and die. Moreover, these reefs are now suffering the additional impacts of stony coral tissue loss disease, a terrifying new disease that first appeared in 2014, and which is now endemic to most of Florida and has spread to US territories in the Caribbean and other neighboring countries.

Healthy coral reefs in South Florida provide extensive value in protecting low-lying coastlines from the devastating effects of storm surge and coastal inundation. In fact, some reefs in SE Florida are **worth tens of millions of dollars per kilometer per year** in terms of coastal protection[1]. The value of these natural coastal defenses is in addition to the direct revenues coral reefs provide to our coastal economies in terms of tourism, recreational and commercial fisheries, and associated jobs and other income. Moreover, the iconic value that coral reefs and marine environments represent to the identity of Florida and other US states and territories is immeasurable. We must face the urgent challenge of reversing these declines, or risk losing the tremendous value and benefits that coral reefs provide to coastal peoples and economies in Florida, the US, and around the world.

Much has changed since the Coral Reef Conservation Act (CRCA) of 2000. Although coral reef health has continued to decline, mainly due to the spiraling effects of climate change and disease, science has made tremendous steps forward in understanding corals and how they respond to these diverse threats. **Many new technologies and approaches are now available to us** that were not available 21 years ago and there are exciting opportunities to bring these to bear in the fight to save coral reefs that were not anticipated in the original CRCA.

For example, when the CRCA was first drafted, we were still several years away from sequencing the complete human genome. The completion of this genome in 2003 ushered in a new field of biotechnology and personalized medicine, and these discoveries have filtered down to all fields of biology, including coral reef science. We now have dozens of coral genomes, and a new understanding of the cellular mechanisms by which reef-building corals respond to heat stress and disease. This understanding helps scientists understand why some corals survive and others do not, and how cutting-edge technologies might be employed to boost coral resilience and coral reef persistence.

Additionally, other discoveries have shown that coral resilience can depend on the tiny microbes that live within corals, helping them to stay healthy in response to stress. Funding is urgently needed to leverage these discoveries and use them to boost climate resilience and disease resistance in the future.

At the same time, **Florida's fledgling coral restoration industry needs to be further scaled up** in order for it to succeed in its aspirations and provide the foundation upon which these new scientific interventions can be built. Advances in coral sexual reproduction – in which corals can now be spawned in the laboratory – allow selective breeding practices to be employed for the first time, ushering in a new era of adaptive potential that coral reef restoration practitioners could tap into to help build more resilient reefs.

[1] Reguero, B.G., Storlazzi, C.D., Gibbs, A.E. *et al.* The value of US coral reefs for flood risk reduction. *Nat Sustain* (2021). https://doi.org/10.1038/s41893-021-00706-6

I recently served on the National Academy of Sciences *Committee on Interventions to Increase the Persistence and Resilience of Coral Reefs*, which was sponsored by NOAA to help determine how these technologies and scientific knowledge could be applied to address the coral reef crisis. The committee reviewed the state of the science, and **identified priority actions** to help us apply the scientific tools of the 21st century to maximize our chances of sustaining coral reefs over the coming decades[2].

A common theme to many of these proposed solutions is that **the time to act is now**, while we still have corals that can provide the basis from which restored ecosystems can be built back. Perhaps **nowhere in the world are these technologies best primed to be tested and applied than in Florida**, which leads the world in coral restoration efforts and which boasts a world-leading community of coral reef scientists and managers. However, there is no time to be lost, and I believe the *Restoring Resilient Reefs Act* represents the best chance for us to take the steps we need to put these plans into action.

The US is not alone in recognizing the magnitude of the threat and the scale of the response that is needed. The Australian government recently approved some US$377 million in funding to support research, management, and restoration to rescue its reef ecosystems from the same threats ours face. **Our coastal economies and infrastructure are equally as valuable as those in Australia, and equally as important to the people who depend on them**.

We must take advantage of this opportunity to invest in the future of our coral reefs, and show leadership in this area, so that our neighbors in the region, particularly in the Caribbean, take note and join us in confronting the challenges that coral reefs face. Florida's reefs are not isolated systems; their resilience contributes to, and is supported by, regional reef health. We must therefore adopt an inclusive, international approach to the conservation of reefs in this region, and I believe **the US must lead that approach**.

Confronting the challenges coral reefs face requires **galvanizing all of our resources**, whether they be federal or state, academic or non-academic, public or private, to bring the nation's best resources and collective expertise to reverse these declines. We must also take effective action on climate change to remedy some coral reef threats at their source. The *Restoring Resilient Reefs Act of 2021* helps us use all the tools in our repertoire, and **efficiently and effectively use those resources** to maximize coral reef survival.

As we work towards giving coral reefs a chance at a resilient future, our worst failure would be a failure to imagine a future in which coral reefs continue to be an iconic and treasured underwater habitat. These ecosystems have dominated the world's shallow tropical seas for the last few tens of millions of years, but now face disappearance as a result of human activities. Supporting the *Restoring Resilient Reefs Act* signals to partners at home and abroad that we will not let coral

[2] National Academies of Sciences, Engineering, and Medicine (2019) *A Research Review of Interventions to Increase the Persistence and Resilience of Coral Reefs.* 258 pp. Washington, DC: The National Academies Press. ISBN 978-0-309-48535-7 | DOI 10.17226/25279

reefs tumble over the edge of the precipice and that we will do all we can to ensure their continued survival.

Sincerely

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