Coral Research Grants

Fact sheet for release June 2, 2021 by the Paul G. Allen Family Foundation

Coral reefs are being lost at an unprecedented rate. In the last 50 years, half of the world's corals have died. If global temperatures increase by 1.5 ˚C from pre-industrial levels, 70% of the world's reefs will be lost by 2100.

The Paul G. Allen Family Foundation's Coral Reefs Program is focused on the conservation and restoration of coral reefs in the context of the climate crisis. Four new grants and support totaling $7.2M over the next three years will provide field deployable solutions to identify naturally heat tolerant corals, accelerate the evolution of corals, and scale up restoration strategies.

Cracking the coral thermal tolerance code

Global Search for Genetic Regulators of Coral Resilience to Thermal Stress
Professor Christian Voolstra, Konstanz University, Germany with Dr. Daniel Barshis, Old Dominion University; Dr. Nitin Baliga and Dr. Jake Valenzuela, Institute for Systems Biology; Dr. Iliana Baums, Pennsylvania State University; Dr. Line Bay, Australian Institute of Marine Science

This project is looking for "super corals" that have evolved naturally to be more heat tolerant and resilient. To find them, researchers are using an on-deck, portable experimental system, the Coral Bleaching Automated Stress System (CBASS) assay, that functions as a "cardiac stress test" for corals. Coral species are simultaneously exposed to varying temperatures to test their bleaching response, allowing researchers to identify resilient coral colonies. Researchers will analyze the entire coral holobiont using an integrated Systems Biology approach to detect which corals can better survive high temperatures. These naturally resilient "super corals" can then be prioritized for conservation efforts and studied to understand what makes a coral more heat tolerant.

Paul G. Allen Family Foundation grant: $4,000,000. Additional co-funders include Fondation Pacifique, National Oceanic and Atmospheric Administration (NOAA), German Research Foundation, University of Konstanz, and the Reef Restoration and Adaptation Program, funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation (RRAP).

Human Assisted Evolution of Corals

Human Assisted Evolution, Phase 2 (Australia)
Professor Madeleine van Oppen, Australian Institute of Marine Science
This project focuses on manipulating the single-cell symbiotic algae that line the coral polyp's gut. Researchers grow the algae, expose it to rising ocean temperatures, and reintroduce it to corals to determine if it increases their overall heat tolerance in both the lab and field. Researchers will also assess if the new algae transfer to wild corals, which would allow for natural scaling up in field implementation.

Paul G. Allen Family Foundation grant: $1,200,000. Additional co-funder: RRAP.

Human Assisted Evolution, Phase 2 (Hawaii)
Dr. Crawford Drury, Hawaii Institute of Marine Biology

This project aims to speed up the natural evolution of heat resilient corals. Researchers identify heat resilient corals in the field, breed them in the lab, and expose them to anticipated future climate conditions to see how they fare. The most resilient corals will then be out-planted to degraded reefs in Hawaii and the results of this selective breeding process will be monitored in the field.

Paul G. Allen Family Foundation grant: $950,000. This project is leveraged by funding from the NOAA Ruth Gates Coral Restoration Innovation Grant and the National Fish and Wildlife Foundation.

Scaling restoration

Larval Restoration of Coral Reefs, Phase 2
Professor Peter Harrison, Southern Cross University, Australia

Degraded reefs around the world are being overtaken by seaweed and do not typically recover on their own. Most baby coral polyps die in their first year of life. This project aims to increase the rate of survival for juvenile corals in degraded reefs by first collecting coral larvae from mass coral spawning, holding and settling them in seapens, then clearing degraded reefs of seaweed and supplying the cleared reefs with the coral larvae. Settling will be done both directly on the reefs and using innovative designs such as 3D tiles.

Paul G. Allen Family Foundation grant: $1,000,000. Additional co-funder: RRAP.