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UN CORAL REEF COMMUNITY OF OCEAN ACTION  
**VOLUNTARY COMMITMENT #15440**  
REEF LIFE RESTORATION  
INTELLIREEFS: CORAL MINERAL HABITATS ELEVATE  
REGENERATION SUCCESS

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Reef Life Restoration has pioneered the science of IntelliReefs: intuitive coral regenerative substrates with bio-inspired designs and architecture. IntelliReefs are made with Oceanite, a complex matrix of minerals specifically engineered to establish robust, healthy and highly diverse marine habitats and aggregates developed specifically to accelerate varied coral species growth. In addition to facilitating the four stages of proficient coral growth, IntelliReefs establish the backbone of a multi-trophic coral expansion strategy, aquaculture farm, or ART dive reefs, which double as coastal wave breaks.

Proprietary nanotech engineering facilitated the creation of “Oceanite”; the vital component to coral acceleration, pH correct environments containing minerals which rapidly grow full sized, fused, massive corals in lab-nurseries, optimizing ocean outplanting. The developed system is perfect for the attachment of micro-fragments or larger corals in the field while stabilizing coastlines and islands with IntelliReefs, which fully attract fish species, coral spawn and larvae, maximizing genetic diversity. These are perfectly poised for “Coral Seed Bank” populations, while guarding MPA, Marine Protected Areas.

***Globally positive environmental impacts include the technological breakthrough of modular “smart” IntelliReef structures that are compatible to corals and coastlines while production efficiencies expedite massive reef restoration “at scale” which is economically feasible.***

### **The Demise of Coral Reef Systems Guarantees Entire Ocean Failure**

The restoration and strategic rebuilding of existing reefs, through engineering of new biocompatible materials and structural implementation with the latest coral growth strategies within a tactical system that can be implemented globally, is the main objective. Island to island, coastline to deep ocean, these infrastructure capabilities provide multiple problem solving advantages which have never been combined, until now: Fastest Path to THRIVE from Shock, Stressors and Impacts.

<https://www.reefliferestoration.com/>

The main ocean risk impacts include food security, geopolitics, extreme weather and many other factors. These are real concerns for business and government policymakers which cannot be ignored. It is critical that the viability and sustainability of investment in the ocean ensures stability; for example the expected cost of hurricane damage to Miami alone is set to increase from 255 billion in 2020 to 3.5 trillion in 2050, such factors cannot be ignored.

Reef Life Restoration's IntelliReefs Eco Solution decreases the risk of coastal failure as healthy reefs protect the shoreline properties; bringing employment and tourism with improvements of oceanic farming of beneficial algae, seaweed and improved oysters, fish and other seafoods.

The health of coral reefs depends directly upon sustainable corporate and coastal development practices that protect sensitive territories which have "million-dollar" reefs, the reefs that generate approximately 1 million per square kilometer, up to 70 million; adding dive and scuba trips each year. These monetary attributes are directly related to healthy coral reefs. Oceans are considered to be the 7th largest economy and continuing to lose healthy ocean systems will destroy our capacity to thrive.

### **Action From Advanced Science Aids Rapid Coral Recovery**

Coral micro-fragmentation methods have been expanded and proven with massive coral species in the tens of thousands, by Dr. David E. Vaughan and many other coral labs, yet require Reef Life's diverse material matrices and structural substrate platforms for expanding into millions of adult scale coral systems required by degrading reefs globally. Reef Life brings futuristic structures which perform multiple functions from enhancing each facet of the coral reproductive stages to upgrading coastline stability. *Phase two developments from X Prize: coral larvae coatings for drone spawn distribution as many coral larvae can "seed" a reef at once in a "larval cloud" that can blanket an entire damaged area of a reef, OR a completely new IntelliReef system.*

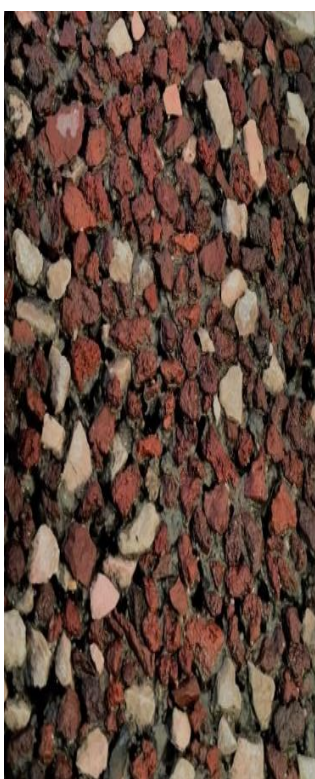
#### **PROJECT OVERVIEW:**

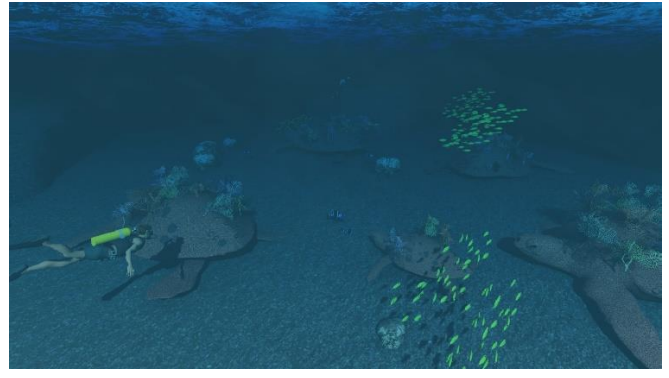
An interdisciplinary team of expert scientists has joined their efforts to develop these technologies, with the common vision of rapid deployment world-wide to protect and recover global coral populations. Reef Life's nanotechnology team created the surfacing compounds, mineral striations which provide the coral spawn seeking elements of colour and mineral diversity for the manifold functionality of the structural units designed for multiple use deployments in shallow or deep waters.

The pozzalanic nano materials used in the oceanite formulations enable the precise control of pH required for landing and growth of coral embryos. The oceanite materials family provides exceptional strength, durability and unlimited service life in marine environments. The formulation of large and small void, cellular structures with open surfaces of incorporated carbonic and iron rich silicate rocks provide natural habitat conditions required for massive deployment of proposed technology for reef habitation. The research team with extensive experience in mass construction and prefabrication of intricate units will extend this experience to marine environment and massive reef restoration. The proposed technology is flexible to the design and manufacturing of individual habitats from minimal cubic feet to cubic yards (meters) and with the help of connecting elements expand to limitless extensions of the reef structures, maximizing every dollar spent for multiple levels of Return on Investment.



We have lost corals to climate change, storms and many more stressors, yet many strains still thrive that are resistant to these detrimental environmental conditions from coal to industrial runoff and warming water temperatures. We need to grow coral species faster than the normal rate that mother nature can provide. Many areas of reef restoration have been grappling with different technologies from branching coral fragmentation, massive coral micro-fragmentation, coral fusion, sexual reproduction. All have had some success on a relatively small scale with varied equipment and inefficient ways to maintain and manually outplant. Reef Life's newly engineered marine materials can be used to design a dome shape module that can be the substrate for all of these types of coral reef growth strategies and lend itself to engineered scalability and precision speed of recovery tools for reef managers. Parts of these different challenges have been accomplished at an increasing level of scale, but not coordinated within a singular mission including the diverse substrate materials, structural substrate casting for massive coastal reef infrastructure units which better facilitate the four growth modules, from fragmentation through spawn capture, outplanting, and substantial protection physically from storm/wave impact as structures surrounding sensitive corals provide a buffer.





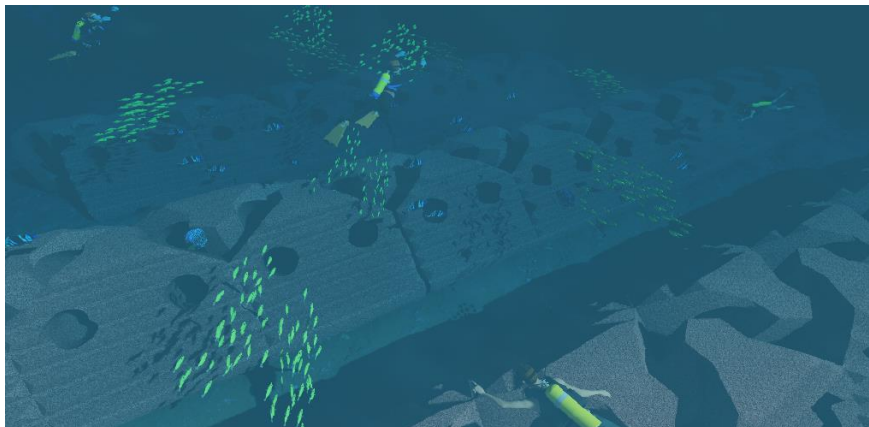
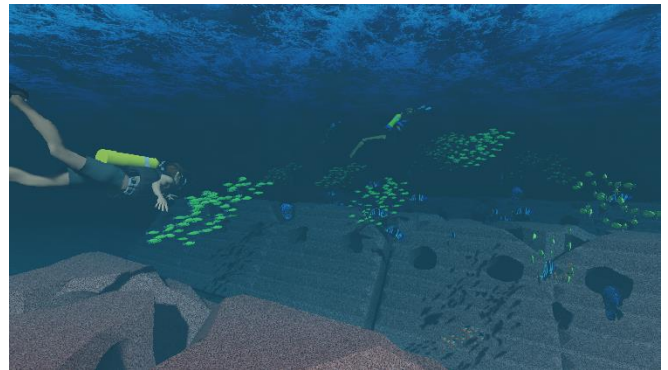
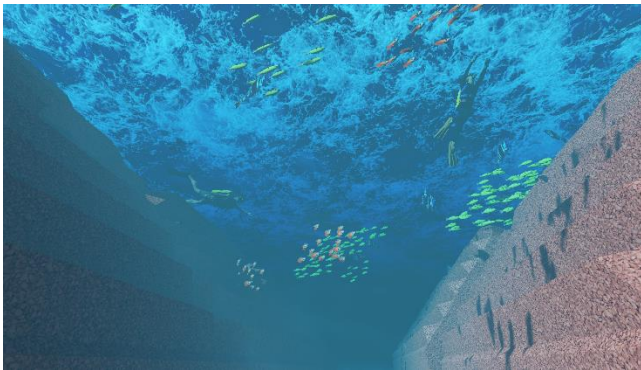
# Dive Sculpture



IntelliReefs  
Powered by Oceanite

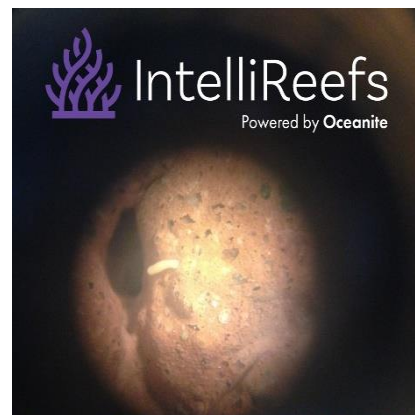
## Meets Coral Reef Science

The central image is a large underwater scene featuring a large, textured sea turtle sculpture on the seabed. The water is filled with schools of yellow fish and various coral structures. The text 'Dive Sculpture' is written in large, light blue letters at the top. The IntelliReefs logo, a stylized coral reef structure in purple and pink, is positioned to the right of the turtle. Below the logo, the text 'IntelliReefs' is written in white, with 'Powered by Oceanite' in smaller white text underneath. At the bottom, the text 'Meets Coral Reef Science' is written in large, white letters.

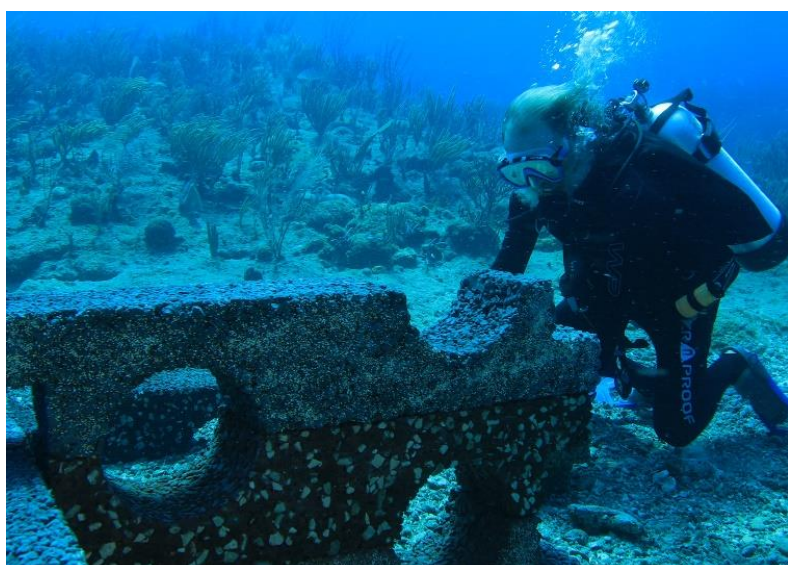


**Great Wall Of Reef Shown Above for MPA Surrounds**

Close collaboration of the team with [Sea Legacy](#) has provided the funding for a collection of 60 Oceanite substrates, proof of concept installations in three initial IntelliReef deployment sites in 2018. Caribbean locations chosen and monitored by The Nature Foundation. Initial results are very strong as local fish gather daily on the IntelliReefs, precursors to acceptance by corals, are high fish aggregation.



**Below: Dr. David E Vaughan IntelliReefs Deployment Caribbean MPA**



UN Ocean Reef Life Restoration: <https://oceanconference.un.org/commitments/?id=15440>

<https://www.reefliferestoration.com/single-post/2018/11/08/How-to-Build-an-IntelliReef-Caribbean-Style> <https://www.reefliferestoration.com/red-sea-reef-city>

<https://www.reefliferestoration.com/marine-growth-cell-matrix>

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Dr. Konstantin Sobolev, Reef Life Co- Founder Director Nano Technology Division - Google Scholar:

<https://scholar.google.com/citations?user=EBwG7kwAAAAJ&hl=en> Citations: 3,713 i10 index-62

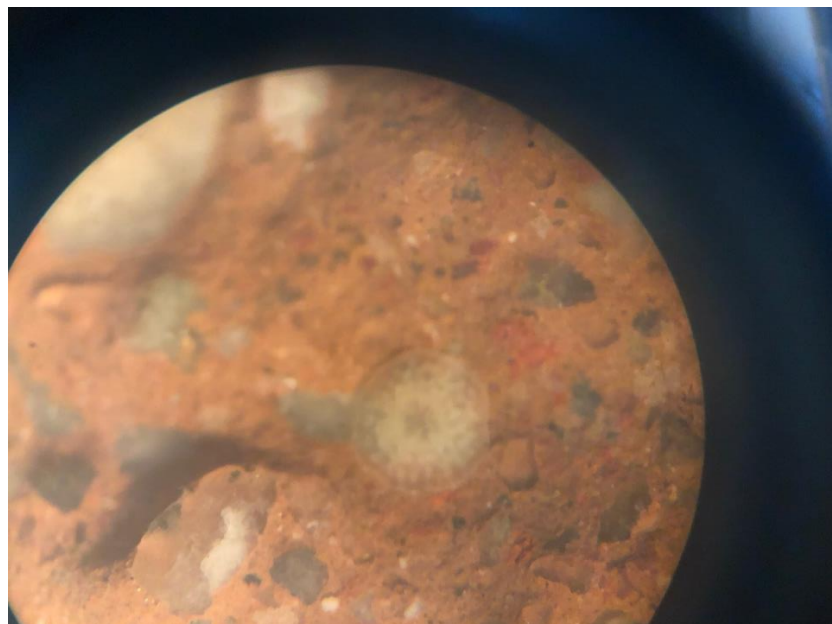
<https://www.reefliferestoration.com/> <https://www.sealegacy.org/>



UN Registry of Voluntary Commitments for SDG14: <https://oceanconference.un.org/coa/CoralReefs>

[Reef Life Restoration Ocean Action: 15440](#)

**Related SDG goals:** SDG13, SDG14



**Coral Larvae Settlement on IntelliReefs 2018 Dr. David Vaughan Lab**