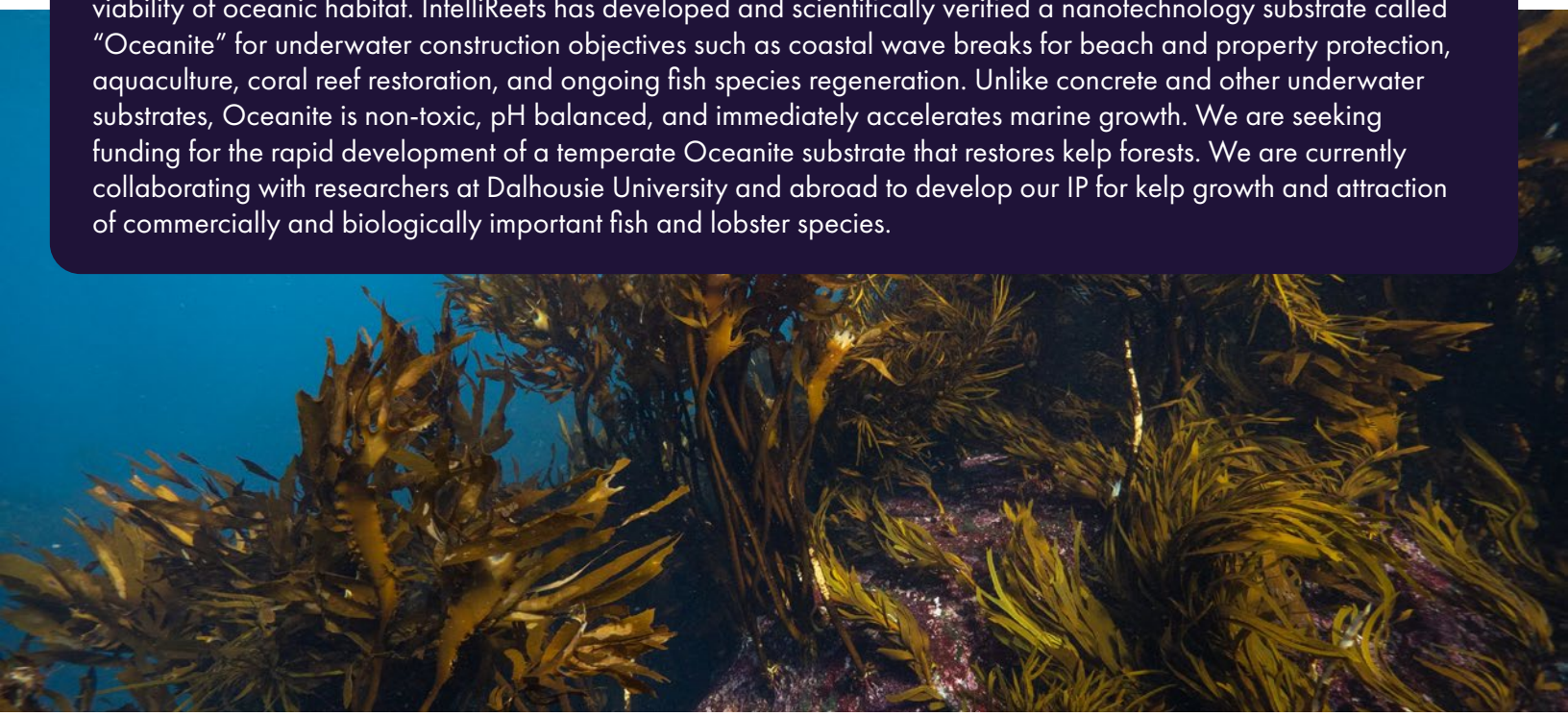
IntelliReefs

Sustainable Marine Solutions

Building Sustainable Kelp Habitat for Nova Scotia's Blue Economy

About Us:

We are bioengineering a climate change solution for oceans. As the world's first science-driven, nanoengineering marine restoration company, IntelliReefs (a division of Reef Life Restoration, LLC) creates large-scale, biomimicking artificial reefs to increase biological and economic resilience, biodiversity, coastal protection, and ongoing viability of oceanic habitat. IntelliReefs has developed and scientifically verified a nanotechnology substrate called "Oceanite" for underwater construction objectives such as coastal wave breaks for beach and property protection, aquaculture, coral reef restoration, and ongoing fish species regeneration. Unlike concrete and other underwater substrates, Oceanite is non-toxic, pH balanced, and immediately accelerates marine growth. We are seeking funding for the rapid development of a temperate Oceanite substrate that restores kelp forests. We are currently collaborating with researchers at Dalhousie University and abroad to develop our IP for kelp growth and attraction of commercially and biologically important fish and lobster species.



Kelp Forest Decline in Nova Scotia

Kelp forests are one of the most productive and biomass-dense ecosystems on the planet and provide food, nutrients, and habitat for commercially important fish and invertebrate animals. Kelp are brown algae that grow in cold, shallow, nutrient-rich waters, and can be found on every continent worldwide. Their root system, called a "holdfast", fastens itself to hard underwater substrates - like boulders and bedrock. Just like trees on land, they use carbon dioxide and light to photosynthesize, creating one of the largest carbon sequestering biomes on Earth. Some species of kelp can grow up to 65m long, and research has shown that kelp forests along the southern coast of Australia sequester over 1.3–2.8 teragrams of carbon per year. This region alone contributes ~3% of the total global carbon sequestration.

Around the world, massive kelp beds are rapidly declining due to coastal development and erosion, warming waters, invasive species, poor water quality, pollution, and overfishing. As a consequence of losing these lush underwater forests, fisheries and ocean-based economies around the world are in serious jeopardy. As with many other regions in the world, Nova Scotia's prolific kelp beds are steadily declining. Researchers from Dalhousie University have documented an 85-99% decline in kelp biomass over the past 4-6 decades along the eastern shore of Nova Scotia.

Project Proposal

Working in collaboration with Innovacorp, the Nova Scotia Underwater Council, the Canadian Artificial Reef Association, researchers at Dalhousie University, and the Department of Fisheries and Oceans (DFO), we will develop and test a nanomaterial substrate that facilitates and enhances kelp reforestation. Following substrate design, we will deploy a large prototype (20 ReefShip units) and monitor wild kelp, fish, and invertebrate recruitment for 6 months in the field at the Centre for Ocean Ventures & Entrepreneurship's (COVE) test site.

Following temperate prototype monitoring, we will conduct any necessary iterations or re-engineering to our Oceanite temperate substrate and finalize designs for temperate artificial reef systems that enhance kelp and provide immediate habitat for commercially important fish and invertebrate species. Oceanite nanotechnology is a durable, high-strength, porous mineral alternative to concrete that attracts a living ecosystem. This in turn provides enhanced coastal protection from storms, prevents erosion, enhances commercial fish and invertebrate fisheries, and sequesters carbon. Living seawalls and blue barriers have been shown to dissipate up to 97% of wave force. By contrast, traditional concrete jetties and seawalls reflect wave force, causing further erosion and scouring of the coastline.

IntelliReefs has developed custom designs for ecotourism, coastal protection, fisheries and aquaculture, and habitat restoration. We are able to cast Oceanite in any shape and size, allowing structures to be specifically engineered to enhance underwater environments immediately to attain biological or economic goals. Our long-term goal is to establish our headquarters out of Halifax, NS and set up a manufacturing plant that employs around 50 full time workers. We plan to operate in Nova Scotia and abroad, building custom ocean-safe infrastructure, ecotourism attractions, nature-based off-sets, and artificial reef habitats.

Goals

- To design an artificial reef material that enhances Nova Scotian ecosystems by enhancing kelp growth.
- To deploy a large prototype in collaboration with local academic, private, community, and governmental partners.
- To gather standardized field data that informs future iterations of IntelliReefs temperate Oceanite.
- To design artificial reef architecture that enhances target kelp, fish, and invertebrate populations.

Our Team

The IntelliReefs' team consists of advanced nanomaterial scientists, artificial reef designers, coral restoration specialists, and business experts. We work with local partners to conduct scientific monitoring of IntelliReefs structures to determine the efficacy and impact of our structures for commercially and biologically important species in each region.

Contact Us

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Read about IntelliReefs' Benefits