CoralX

Problem Statement

Florida's only barrier reef is dying. The 2023 marine heatwave pushed cumulative heat stress in the Florida Keys to nearly three times the previous record. Less than 22% of staghorn corals and less than 5% of elkhorn corals survived. On some sites, live coral cover dropped to near zero. And Florida is not alone. From January 2023 to September 2025, bleaching-level heat stress impacted 84.4% of the world's coral reef area across 83 countries, making this the largest bleaching crisis in recorded human history.

The problem is that no financial system is wired to act on that data in time. The data is available as NOAA satellites detect bleaching-level heat stress on Florida's reef every single day, for free. However, the intervention window when treatments like probiotics and coral relocation can actually prevent death is measured in days, while the traditional grant funding takes months. This means that by the time money arrives, the coral is already dead.

Current solutions cover the wrong threat. Every existing reef insurance programme, including TNC's Hawai'i policy and the MAR Fund programme underwritten by AXA Climate and Munich Re, triggers on hurricane wind speed only. Not one of them activates during a thermal bleaching event, which is what is actually killing Florida's reef.

This matters beyond ecology. Florida's reef generates $3.4 billion annually in ecosystem services, provides $1.8 billion in annual flood protection, and supports the livelihoods of fishing and tourism communities across the Florida Keys. Globally, reefs support 500 million people through fisheries and protect 200 million from storm surges. When reefs bleach and die, those protections and those economies go with them.

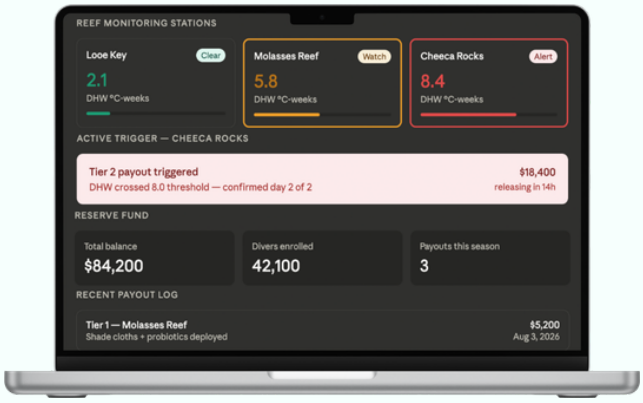
Proposed Solution

CoralX is the world's first parametric financial instrument wired directly to NOAA's thermal bleaching satellite data, solving a problem no existing programme has addressed: the complete absence of automatic emergency funding when coral reefs are dying from heat stress.

The system works in three tiers based on NOAA's Degree Heating Week metric. At DHW 4, funds release within 48 hours to deploy shade cloths and probiotic treatments proven to reduce coral tissue loss from 35% to 7%. At DHW 8, a full emergency payout funds coral fragment rescue and relocation to deeper, cooler water before permanent mortality sets in. At DHW 12, a catastrophic insurance layer funds mass coral transfer to land-based gene banks to preserve genetic diversity.

Every payout is automatic. The satellite crosses a threshold, confirmed over two consecutive days to prevent false triggers, and money reaches response teams within 48 hours. No grant applications, no committee reviews, no delays.

The fund is sustained through a $1 to $3 per diver micro-levy collected from Florida Keys dive operators, the industry that loses everything when reefs die. A reserve fund covers frequent lower-severity bleaching, while a parametric insurance policy purchased by the fund covers catastrophic events beyond the reserve's capacity. This two-layer structure solves the affordability problem that has blocked bleaching insurance from existing commercially until now.



Communication Plan

Through Girl Scouts and my government position there, I bring the issue to Board of Governors, where I can influence institutional support and awareness at scale. Through the G100 Advisory Council as Country Advisor, a global network of 100 women leaders, ands with International Chamber of Commerce, I host workshops explaining coral bleaching and how CoralX works, and publish social media content reaching policymakers, students, and advocates worldwide. Since I am already affiliated with these organisations, they are at no cost.

Stakeholders

Rachel Mageean, my oceanography teacher, validates the bleaching thresholds. I engage her directly in person at school. Dive operators and tourism boards across the Florida Keys fund the CoralX Reserve Fund through the micro-levy. I engage them by going in person to dive shops and tourism offices to pitch enrollment. Reinsurers AXA Climate and Munich Re are the natural partners for the catastrophic insurance layer. I engage them through direct email outreach with operational data they need to price bleaching coverage. ESG and impact investors are engaged through direct email outreach with quarterly impact reports showing verified reef health outcomes. Through the G100 Advisory Council, Girl Scouts board of governors, and International Chamber of Commerce, I reach policymakers and business leaders through in-person meetings and workshops at events I already attend.

Implementation

Design the fund structure and payout framework, partnering with marine scientists to validate Florida-specific bleaching thresholds using NOAA DHW data. Define exact trigger levels, payout amounts, and response actions so funding is released at the earliest point intervention is still effective. Build and run the automated NOAA data pipeline, pulling daily DHW data for targeted reef sites and confirming threshold crossings over 2 consecutive days. When triggered, funds are automatically released to pre-authorized response teams within 48 hours, while a public dashboard tracks live heat stress levels and every payout in real time. Enroll Florida Keys dive operators into the micro-levy, securing participation agreements and integrating a $1-3 per diver contribution into existing pricing.

CoralX

Longevity

CoralX requires three core resources to operate. First, marine science expertise to validate Florida-specific bleaching thresholds using NOAA Degree Heating Week data, ensuring trigger levels accurately reflect when intervention is still effective for reefs in the Florida Keys. Second, legal support to structure the CoralX Reserve Fund, draft automatic payout contracts, and formalize agreements with dive operators for micro-levy collection. Third, dive operator partnerships across the Florida Keys to implement a $1–3 per diver levy, creating a consistent funding stream tied directly to reef-dependent tourism activity.

Financials

The main costs are legal consultation to establish the CoralX Reserve Fund, draft automatic payout contracts, and formalize agreements with participating dive operators. The Earth Prize award will be used to cover these initial setup costs, allowing the system to be structured and ready before launch.

CoralX is financed through a tourism micro-levy, with $1 to $3 added per diver across Florida Keys dive operators. This creates a consistent, usage-based revenue stream tied directly to reef-dependent tourism. Even at early pilot scale, this generates enough capital to fund rapid response payouts while building a growing reserve over time, making the model financially self-sustaining without relying on donations or grants.

The first versions of CoralX will be offered free as pilot partnerships to encourage adoption and demonstrate real-world effectiveness. Once the system is fully operational and validated through pilot results, CoralX transitions to a paid model, where operators or partners contribute service or participation fees, enabling long-term revenue generation while maintaining and scaling the reserve fund.

Category	Details	Amount
Startup Cost	Legal consultation and fund structure	$3,000
Revenue Y1	Micro-levy at $2/diver × 50,000 divers	$100,000
Revenue Y2	Micro-levy at $2/diver × 200,000 divers	$400,000
Operating Costs	Dashboard maintenance, premium	20% of revenue

Expected Impact

CoralX's primary impact is speed. Interventions like probiotic treatments and coral relocation are proven to work, but only if deployed in time. CoralX delivers emergency funding to response teams within 48 hours instead of months, giving Florida's reef a real chance to survive bleaching events.

Each reef site protected preserves critical ecosystem services. Fisheries continue to produce, dive tourism continues generating revenue, and coastlines retain natural protection from storm surge and erosion. Coastal communities, fishing families, tourism businesses, and property owners across the Florida Keys benefit directly.

Beyond Florida, CoralX establishes a scalable model for linking real-time environmental data to financial response. This creates a new system where ecosystems can be protected at the speed of the crisis, benefiting reef-dependent communities globally.

Impact Metrics

Reef health: live coral cover percentage at monitored sites before and after each CoralX intervention, tracked by response teams and published on the public dashboard.

Response speed: time from NOAA threshold crossing to funds reaching response teams, measured against the industry standard of grant-based funding to demonstrate the speed advantage.

Financial sustainability: total levy collected, number of dive operators enrolled, and fund balance over time

Negative Impacts

The DHW satellite data may not perfectly capture bleaching conditions, triggering payouts when damage is minimal or missing events where damage is severe. This is addressed by using a two-day confirmation rule before any payout triggers and by working with marine scientists to calibrate thresholds specifically for Florida's reef conditions than global averages.

Scaling Potential

First, the Florida Keys pilot proves the full system works in real conditions: NOAA detects heat stress, CoralX triggers funding within 48 hours, response teams deploy, and reef outcomes are measured. This creates the first real dataset linking satellite triggers to financial response and ecological impact, which is what unlocks credibility.

Second, CoralX expands across high-risk reef sites in the United States and the Caribbean by onboarding more dive operators into the micro-levy and increasing the reserve fund. As participation grows, the model supports larger payouts and brings in reinsurers to cover extreme bleaching events, turning CoralX into a fully capitalized risk system.

Third, CoralX scales globally and across ecosystems. The same model applies anywhere real-time environmental data exists, from coral reefs to mangroves and kelp forests. CoralX becomes a standardized financial layer that moves money instantly when ecosystems are under threat, transforming conservation into rapid-response infrastructure. At scale, this shifts billions of dollars from delayed grants into pre-funded, automatic protection, directly reducing ecosystem loss during climate shocks instead of documenting it after it happens.