XPRIZE RAINFOREST | alana

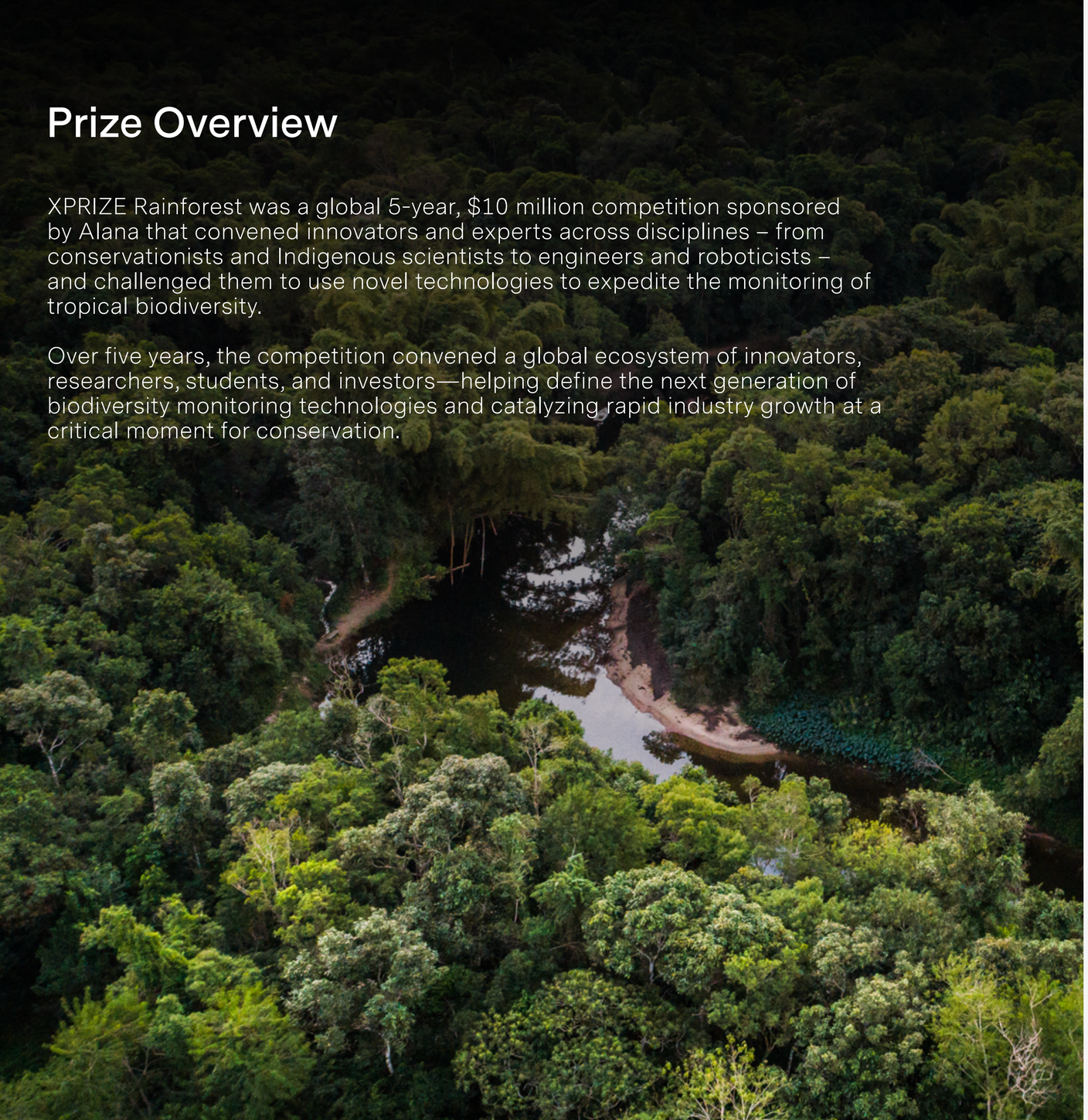
POST-PRIZE IMPACT REPORT

2026

Prize Overview

XPRIZE Rainforest was a global 5-year, $10 million competition sponsored by Alana that convened innovators and experts across disciplines – from conservationists and Indigenous scientists to engineers and roboticists – and challenged them to use novel technologies to expedite the monitoring of tropical biodiversity.

Over five years, the competition convened a global ecosystem of innovators, researchers, students, and investors—helping define the next generation of biodiversity monitoring technologies and catalyzing rapid industry growth at a critical moment for conservation.



Prize Purse	**$10M**
Competition Duration	**2019–2024**
Registered Teams	**300**
Countries Represented	**60**
Biodiversity Monitoring Technologies Represented	· AUTONOMOUS ROBOTICS AND UNCREWED AIRCRAFT · BIOACOUSTICS · IMAGERY · MOLECULAR BIOLOGY · LIDAR · AI · REMOTE SENSING · PHYSICAL SAMPLING

AT A MEETING OF THE XPRIZE INNOVATION BOARD, I PROPOSED THE IDEA OF A PRIZE DEDICATED TO PROTECTING THE AMAZON AND OTHER TROPICAL FORESTS.

At the time, the XPRIZE Foundation team had already been developing an in-depth study on this topic, highlighting the transformative potential of emerging technologies for biodiversity mapping and understanding. It was clear that realizing this vision would require a bold commitment, one that embraces risk and challenges conventional approaches.

XPRIZE Rainforest Tropical Forests was born from this ambition, at a moment when biodiversity loss represents one of the most urgent crises in humanity's relationship with nature. By mobilizing innovation and technology, the prize is opening new pathways to understand, value, and protect the Amazon and other tropical forests around the world. It is helping expand scientific knowledge while also creating bridges between research, local knowledge, conservation, health, bioeconomy models and future generations.

More than a competition, XPRIZE Rainforest is helping bring the future into the present by making once-distant solutions viable. For Alana, investing in this work is, above all, a commitment to children and to our collective future, because protecting biodiversity today is a concrete way to expand the possibilities for life tomorrow.

Ana Lucia Villela, Alana
Founder and President

Peter Diamandis, XPRIZE Founder, is joined by title sponsor Ana Lucia Villela and Marcos Nisti Co-Founders of the Alana Foundation, Harrison Ford, XPRIZE Rainforest Advisory Board Member and Wesley G. Bush, Former Chairman and Chief Executive Officer Northrop Grumman Corporation

Winner Dashboard

GRAND PRIZE WINNER

Limelight Rainforest (USA)
$5M

1ST RUNNER-UP

Map of Life Rapid Assessment (USA)
$2M

2ND RUNNER-UP

Brazilian Team (Brazil)
$500K

BONUS PRIZE

ETH BiodivX (Switzerland)
$250K

Impact Dashboard

170K
R&D Hours

8.5TB
of Biodiversity Data

237
Patents

4,006
Publications

1,217
Species Identified During Prize

75+
Conservation Pilots

27X
Prize Purse ROI

35.8M+
DNA Sequencing Reads

$163M
Invested in Teams

5M+
Hectares of Land Protected and Monitored

42
IPLCs Engaged

3,498
Prize Media Mentions

$94M
Press Ad Equivalency

XPRIZE Impact Framework

Every XPRIZE competition is designed around a proven impact framework that transforms bold philanthropic capital into scalable, real-world outcomes. This framework centers on four key pillars of impact—Innovation, Awareness, Technology Readiness, and Capital—through which we track the downstream ripple effects of a prize far beyond its award date. At the core of this model is Prize-Purse Return-on-Investment (ROI): the ratio of philanthropic dollars awarded to measurable outcomes unlocked. Across XPRIZE's 30-year history, this model has consistently delivered exponential returns, validating incentive prizes as one of the most effective levers for solving global challenges. For XPRIZE Rainforest, this framework has already generated an estimated 27X return on philanthropic investment.

Innovation

Awareness

Technology Readiness

Capital

Executive Summary:
Rainforest Prize Impact

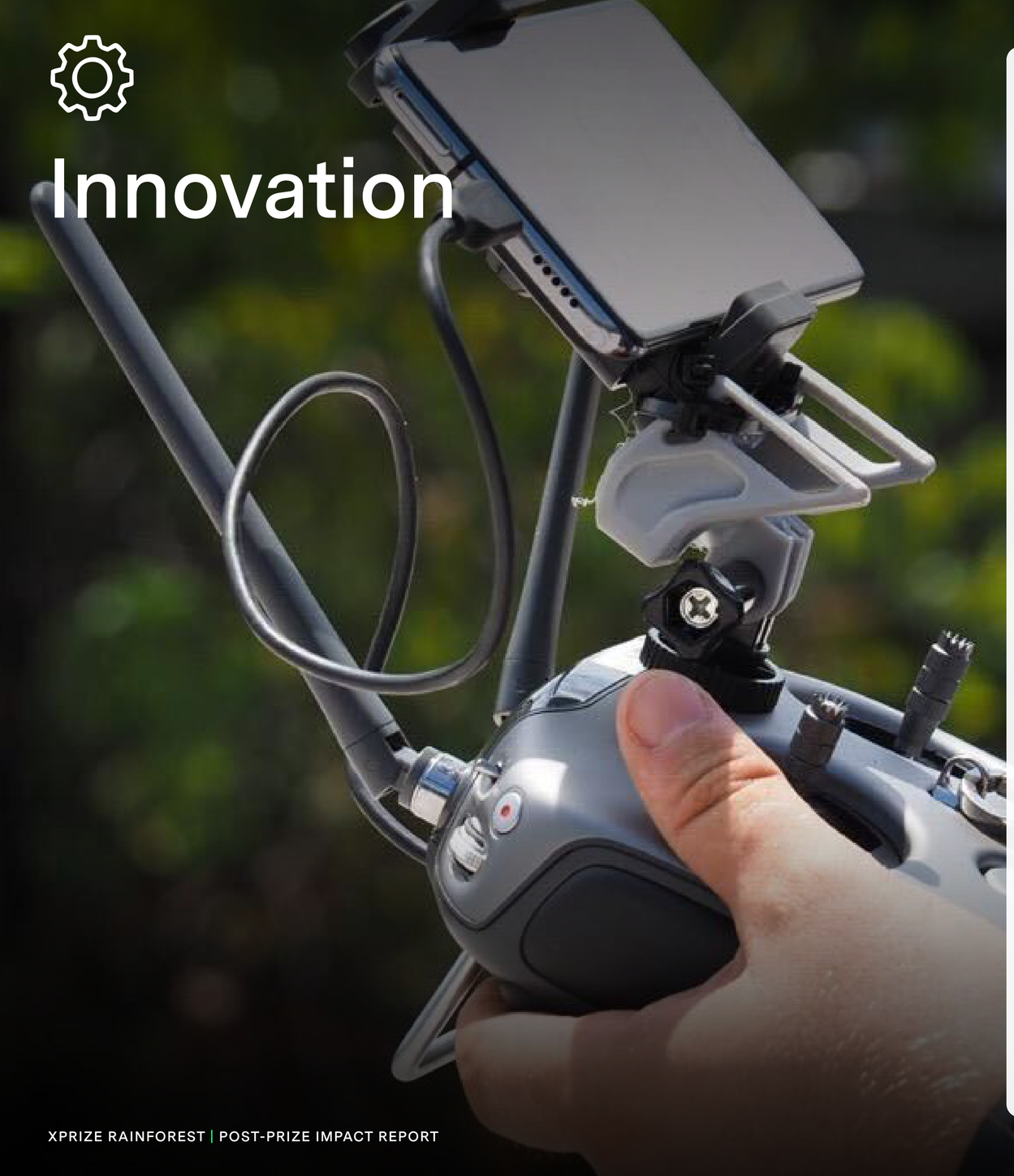
The $10M XPRIZE Rainforest competition has catalyzed the emergence of a new biodiversity intelligence sector—mobilizing over $163M in disclosed capital (16.3X the prize purse), generating 237 active and pending patents, contributing to 4,006 peer-reviewed publications with 248,493 citations, launching 75+ conservation pilot deployments across 5M+ hectares, and advancing technologies from mid-stage prototype (TRL 5–6) to operational field demonstration (TRL 7–8) within real rainforest environments. In aggregate, these outcomes already represent an estimated 27X return on the $10M prize purse.

More than half of participating teams were founded after the prize launched—evidence that the competition did not simply accelerate existing actors, but helped create new ones. Today, teams are operating commercial deployments and conservation pilots across five continents, integrating biodiversity intelligence into carbon markets, regenerative agriculture, restoration, and national monitoring strategies.

At a critical inflection point for global conservation, XPRIZE Rainforest served as a tipping point—validating breakthrough technologies, expanding investor participation from 16 to over 100 unique funders, generating 820+ net new jobs, and transforming biodiversity monitoring from a fragmented, grant-dependent research activity into emerging deployable infrastructure.

The impacts outlined in this report represent early signals of a structural shift. As capital deepens, deployments scale, and ecosystem coordination strengthens, the ripple effects catalyzed by this competition are positioned to compound for decades to come.

Innovation



The initial design of XPRIZE Rainforest recognized that protecting tropical forests requires more than incremental improvement—it requires a fundamental transformation in how biodiversity is measured, valued, and acted upon.

From the outset, the competition prioritized technologies capable of autonomously surveying complex rainforest ecosystems and delivering rapid, scientifically credible insights at scale. At its core, the prize was designed to bring cutting-edge technology into a field still largely reliant on manual surveys, fragmented datasets, and slow, labor-intensive workflows—accelerating the shift from traditional biodiversity fieldwork to autonomous, data-rich ecosystem intelligence.

By establishing audacious and measurable performance criteria—remote deployment, comprehensive species detection across taxa, and a 48-hour analytical turnaround—the prize accelerated innovation under real-world conditions. Teams were challenged not simply to collect data, but to demonstrate scalable, field-ready systems integrating drones, bioacoustics, imaging, eDNA, and artificial intelligence. Critically, teams were required to compress workflows that have traditionally taken months of expert-led fieldwork into a 24-hour survey window followed by a 48-hour analytical turnaround—an unprecedented reduction in time-to-insight for tropical biodiversity monitoring.

This rigorous structure catalyzed breakthroughs in autonomous sensing, multimodal data fusion, and AI-driven species identification. The result is a new generation of biodiversity monitoring technologies that dramatically reduce the time, cost, and logistical burden of traditional field surveys—unlocking faster, more comprehensive ecosystem intelligence to inform conservation, empower local communities, and incentivize the protection of standing forests.

Industry Formation & Growth

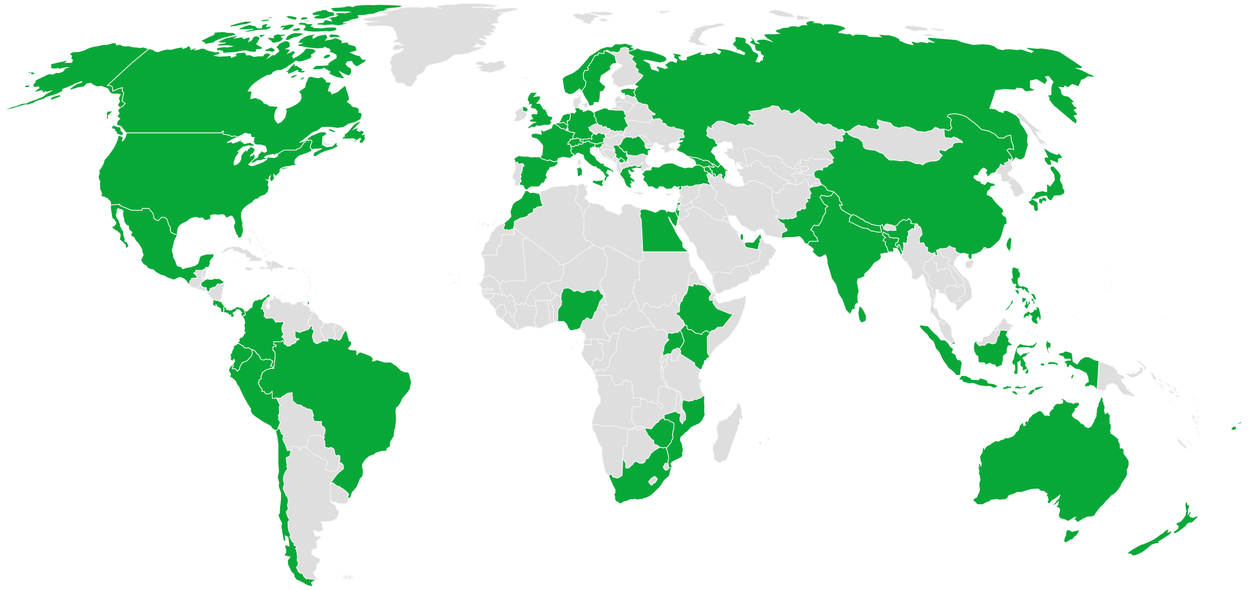
Catalyzing the Next Generation of Biodiversity Intelligence

When XPRIZE Rainforest launched in 2019, biodiversity monitoring was largely fragmented—dominated by labor-intensive field surveys and siloed research, with limited scalable technology solutions. While conservation science was well established, the market for autonomous, rapid, decision-grade biodiversity intelligence was still emerging.

Since then, the broader enabling markets—environmental sensing, monitoring systems, and Earth observation—have expanded significantly. The global environmental sensor and monitoring market grew from approximately **$17.6 billion in 2019 to $29.7 billion in 2023**, with continued growth projected this decade. The broader environmental monitoring market is expected to exceed **$43 billion by 2030**, reflecting accelerating investment in automation, remote sensing, and environmental data infrastructure.

Within these expanding sectors, biodiversity monitoring has become a fast-growing subsegment—driven by nature-positive commitments, biodiversity disclosure frameworks, ecosystem valuation, and emerging biodiversity credit markets. Demand is shifting from periodic surveys toward scalable, autonomous ecological intelligence.

MAP OF THE 300 REGISTERED TEAMS



XPRIZE Rainforest helped accelerate this shift.

By convening **300 teams from 60 countries** and requiring rigorous real-world validation—remote deployment, 24-hour autonomous surveys, and 48-hour data analysis—the prize created a global proving ground for next-generation biodiversity technologies. Teams advanced multimodal sensing platforms integrating drones, bioacoustics, imaging, eDNA, and AI-driven species identification.

Through structured milestones, non-dilutive funding, and global visibility—alongside partnerships with governments and local communities in Singapore and the Brazilian Amazon—the competition helped transform biodiversity monitoring from a primarily research-driven discipline into an emerging technology-enabled industry defined by deployable systems, cross-sector collaboration, and scalable conservation impact.

Cross-Industry Collaboration

A defining innovation outcome of XPRIZE Rainforest was its ability to catalyze cross-disciplinary collaboration—bringing together actors that do not traditionally operate within the same conservation or technology value chains to solve complex biodiversity challenges. The competition required teams to integrate hardware, AI, molecular biology, ecological science, and community partnership into cohesive, deployable systems.

Several finalist teams emerged as multi-party collaborations spanning universities, startups, research institutes, Indigenous communities, and conservation organizations. **Limelight Rainforest**, for example, combined drone engineering, canopy robotics, bioacoustic sensing, machine learning, and university research partnerships to create a multimodal biodiversity platform capable of real-time species identification. Their work bridged nonprofit innovation, startup collaboration, and academic science to operationalize canopy-level biodiversity intelligence.

Similarly, **Map of Life Rapid Assessments**, a Yale University–based initiative, integrated autonomous UAV fleets, on-site eDNA processing, and AI-driven geospatial analytics—linking conservation informatics, field robotics, and molecular ecology into a unified system designed to deliver actionable biodiversity insights at scale.

ETH BiodivX demonstrated another model of cross-sector integration, combining university research, startups, Indigenous community collaboration, and AI-enabled dashboards to collect and interpret eDNA, imaging, and acoustic data in near real time. Their approach connected frontline conservation actors with advanced computational infrastructure, illustrating how biodiversity monitoring can evolve into an interoperable data ecosystem.

Beyond the finalists, the broader cohort of 300 teams from 60 countries represented an unprecedented convergence of engineers, roboticists, ecologists, data scientists, and community leaders. Partnerships with national agencies in Singapore and Brazil further linked regulatory authorities, local governments, research institutions, and conservation practitioners in support of real-world validation.

Together, these collaborations illustrate how the prize model fosters the formation of interoperable, cross-sector biodiversity intelligence ecosystems—an essential ingredient for scaling conservation impact beyond isolated technologies and toward globally deployable monitoring infrastructure.

Research & Development Effort

Mobilizing Large-Scale Biodiversity Innovation

This innovation effort was not simply about incremental scientific advancement; it introduced advanced robotics, artificial intelligence, molecular biology, and autonomous sensing technologies into biodiversity monitoring at a level of integration and speed the field had not previously achieved.

Data reported by competing teams shows that participants collectively invested:

170,256 R&D hours developing solutions for the competition.

Using the median wage for Natural Sciences Managers this yields[1]:

$13,193,137 in R&D labor value mobilized through the competition model — a significant multiplier on innovation.

Compared to the $10M prize purse, this investment represents a **1.3× multiplier on innovation**, demonstrating how the structure, incentives, and global visibility of the XPRIZE model mobilized coordinated R&D across multiple disciplines.

The scale of research mobilized is also notable. Across all competing teams, the prize engaged approximately:

2,100+
Innovators

600+
Institutions

60
Countries

Whereas most biodiversity monitoring studies are conducted by a single university or small research consortium, the Rainforest XPRIZE mobilized a globally distributed innovative effort, bringing together technologists, ecologists, engineers, and molecular scientists to develop new approaches to biodiversity intelligence.

Furthermore, this estimate is conservative; many teams included higher-wage roles such as software engineers, UAV specialists, and AI developers, suggesting the true R&D value likely exceeds this baseline calculation.

Equally significant, the competition attracted expertise from fields not traditionally associated with biodiversity monitoring—including artificial intelligence, robotics, autonomous aerial systems, bioinformatics, genomics, and sensor engineering. This convergence accelerated the modernization of biodiversity monitoring, introducing automation, machine learning, and multimodal sensing into a field historically dominated by manual surveys and small-scale academic field studies.

1. Bureau of Labor Statistics, U.S. Department of Labor, “Natural Sciences Managers,” Occupational Outlook Handbook, May 2024 median wage data, https://www.bls.gov/ooh/management/natural-sciences-managers.htm (accessed February 1, 2026).

Patent Generation[2]

Accelerating Biodiversity Monitoring Innovation

Using third-party verified data from PitchBook Data, Inc. we identified **237 active and pending patents** across five prize-participating companies. This analysis excludes inactive patents and reflects only companies with verified profiles—making it a conservative estimate of intellectual property generation across the broader team landscape.

The biodiversity monitoring sector represented in the competition is relatively young. The earliest active patent dates to **May 2018—just 1.5 years before the prize launched**—underscoring the nascency of the field at competition start.

Patent activity accelerated materially during the prize period:

Pre-Prize	72 PATENTS
During Prize	156 PATENTS
Post-Prize thru 12/25	9 PATENTS

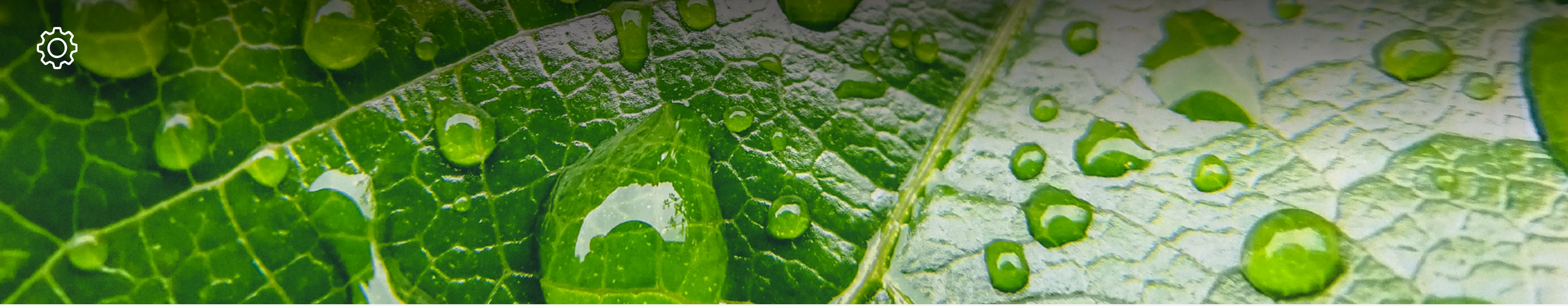
Of the 237 total active and pending patents, **two-thirds (156) were filed during the competition alone**, more than doubling pre-prize activity. This represents a significant increase in the annual rate of protectable innovation following prize launch.

By introducing rigorous performance benchmarks and global visibility to a historically under-capitalized sector, the Rainforest XPRIZE concentrated technical effort around scalable biodiversity monitoring technologies—including advanced sensor systems, AI-driven analytics, and integrated field-deployable platforms.

In other words, the prize did not simply accelerate invention within an existing paradigm—it helped shift biodiversity monitoring toward a technology-led model defined by automation, interoperability, and rapid decision-grade outputs.

While absolute patent volume differs from more mature industries, the acceleration relative to the field's age demonstrates meaningful ecosystem formation and the rapid formalization of defensible, scalable technologies in biodiversity intelligence.

2. PitchBook Data, Inc. Accessed December, 2025. Data has not been reviewed by PitchBook analysts.



Research Publications & Scientific Influence[3]

The Finalist teams of the XPRIZE Rainforest competition represent an exceptionally accomplished global research cohort, collectively producing more than 4,000 peer-reviewed publications, conference papers, and books. Their body of work has been cited over 248,000 times between 1968 and 2025, underscoring both the depth and sustained influence of their scientific contributions.

The Rainforest XPRIZE generated a substantial scientific footprint through the scholarly output of its finalist teams and the broader academic ecosystems in which they operate.

Analysis of six finalist teams identified:

78
Contributing Authors

4,006
Peer-Reviewed Publications

248,493
Cumulative Citations

Importantly, this dataset includes only finalist teams and does not account for publications from semi-finalists, other competitors, affiliated institutions, or researchers influenced by the prize. As such, it represents a highly conservative estimate of the competition's full scientific impact.

The scale of this output reflects deep integration within the global biodiversity, conservation science, remote sensing, ecology, and AI research communities. These publications have:

- Advanced methods in biodiversity monitoring and ecological modeling
- Validated emerging technologies for real-time species detection and ecosystem assessment
- Informed conservation policy, climate frameworks, and environmental governance

Beyond direct outputs, the Rainforest XPRIZE helped strengthen an open innovation ecosystem—where academic research, applied technology development, and field deployment increasingly converge. This is the multiplier effect of a well-designed incentive competition: not only accelerating product development, but amplifying scientific knowledge that continues to shape the field long after prize milestones are achieved.

3. Scopus data as of March 6, 2025 reflect a Scopus Author ID search of the 6 Finalist Teams and their indexed members, yielding 4,006 publications and 248,493 citations. These figures demonstrate the significant scholarly output and impact of participating teams.

Comparative Scientific Footprint Across Prize Domains

The $100M Carbon Removal prize catalyzed 472 publications and 34,600 citations during its competition window—demonstrating that incentive prizes can stimulate meaningful scientific output alongside market development in emerging fields.

By contrast, the $10M Rainforest XPRIZE finalist cohort reflects 4,006 publications and 248,493 citations across only six teams—an order of magnitude greater academic footprint from a significantly smaller prize purse. This contrast highlights a different, but equally powerful, mechanism of incentive competitions: while the XPRIZE Carbon Removal competition demonstrated that prizes can help catalyze new industries, the Rainforest XPRIZE shows how competitions can mobilize entire scientific disciplines—channeling decades of ecological, molecular, and computational research into measurable, deployable impact. The resulting body of work represents a foundational knowledge base that will underpin the continued advancement of biodiversity monitoring technologies and the emergence of nature-based data markets.

XPRIZE
CARBON REMOVAL

Publications
472

Citations
34,600

XPRIZE
RAINFOREST

Publications
4,006

Citations
248,493

WHAT MADE XPRIZE RAINFOREST TRANSFORMATIVE FOR ME WAS THE CONVERGENT SYNTHESIS IT ENABLED.

The competition brought together roboticists, academic ecologists, Indigenous leaders, AI researchers, molecular biologists—even neuroscientists—around a single, measurable performance goal. It pushed us to integrate disciplines that rarely intersect and to operate as one cohesive system under real-world constraints. That integration strengthened our architecture, improved our deployment efficiency, and ultimately allowed Limelight to deliver the performance that secured the Grand Prize.

Tom Walla, Limelight Rainforest
Founder & CEO

Awareness

Beyond technological breakthroughs, the Rainforest XPRIZE also elevated biodiversity monitoring within the global conversation on climate, conservation, and nature-based solutions. Through global media coverage, scientific engagement, and high-profile field deployments, the competition helped move biodiversity intelligence from a specialized scientific practice toward a widely recognized priority for protecting tropical forests.

Elevating Biodiversity Monitoring from Scientific Niche to Global Priority

Protecting tropical rainforests at scale requires more than technological innovation—it demands global awareness, policy attention, and sustained public engagement. Through strategic media coverage, storytelling, and global convenings, the XPRIZE Rainforest competition helped elevate biodiversity monitoring from a largely academic and conservation-focused domain into a visible, technology-enabled solution central to climate resilience, ecosystem protection, and planetary health.

Since its launch in 2019, the prize has generated **3,498 media mentions**, reaching a global audience of **9.72 billion impressions** across major national outlets and leading environmental trade publications. Using press ad equivalency as a conservative proxy for value, this visibility represents **$93.91 million in earned media exposure**—equating to approximately **9.4X the $10M prize purse in awareness return on investment**. This broad, high-impact coverage significantly amplified global visibility and built sustained momentum for the XPRIZE Rainforest competition, culminating in its winners announcement in November 2024.

Coverage extended beyond traditional press into leading environmental journalism and academic outlets. *Mongabay*, one of the world's most respected conservation news platforms, featured multiple in-depth stories on the competition—from semifinal deployments to finalist technologies—bringing global attention to biodiversity innovation in action. University outlets including **Duke University**, **Colorado Mesa University**, **Yale University**, and **Michigan State University** highlighted how their research teams moved from laboratory models and peer-reviewed theory to real-time rainforest deployment—testing, validating, and refining biodiversity monitoring systems under rigorous field conditions. The competition became a visible bridge between academic discovery and operational conservation infrastructure.

This sustained awareness strengthened the credibility of competing teams, expanded engagement among conservation NGOs, multilateral institutions, Indigenous partners, technologists, and policymakers, and helped shift biodiversity monitoring from a specialized research activity to a deployable, data-driven infrastructure essential to conservation finance, ecosystem accountability, and long-term climate strategy.

In parallel with global media attention, the competition also elevated biodiversity monitoring through direct engagement with international policy and conservation forums. XPRIZE Rainforest was featured at convenings including **UN World Wildlife Day**, **New York Climate Week**, and **São Paulo Climate Week**, while large-scale field testing was enabled through collaboration with the **Governments of Singapore** and **Brazil**. Together, these engagements positioned biodiversity intelligence as a practical tool for governments, investors, and conservation organizations working to protect tropical ecosystems.

BIOFLORE WAS PART OF THE BRAZILIAN TEAM, AND FOR US, XPRIZE RAINFOREST WAS A TURNING POINT IN HOW THE WORLD SEES OUR WORK.

The competition validated, on a global stage, the technologies and expertise we had been building for years. The Impact Phase then connected us with key players in conservation and restoration, accelerating partnerships that continue to grow. That visibility was fundamental in positioning Bioflore as a reference in nature-based solutions, not just in Brazil, but internationally.

Heitor Filpi, Brazilian Team / Bioflore
CEO

Technology Readiness & Validation

From Field Experiment to Operational Biodiversity Infrastructure

Improving global understanding of rainforest biodiversity requires more than novel sensing technologies—it requires systems capable of delivering accurate, repeatable, and decision-grade biodiversity intelligence under real-world conditions.

From its inception, XPRIZE Rainforest was designed not only to identify innovative biodiversity monitoring tools, but to elevate those capable of operating at scale in complex rainforest environments—across canopy layers, under extreme humidity, within aviation constraints, and against the clock.

To achieve this, XPRIZE implemented one of the most rigorous field-validation programs ever applied to biodiversity technology.

Expert-Led Technical Review

Central to this validation process was a substantial commitment of independent expert oversight.

Across the competition, judges and technical reviewers devoted **8,139 hours** to evaluating team submissions, reviewing data outputs, assessing species identification methodologies, verifying statistical models, and scrutinizing system integration across sensor platforms.

Using the U.S. Bureau of Labor Statistics 90th percentile wage for Natural Sciences Managers **($99.37 per hour)**—reflecting director- and VP-level scientific leadership—these hours represent approximately:

$808,772 in expert labor value mobilized through the prize model.

This represents a significant concentration of high-level scientific and executive validation—channeling senior domain expertise into structured evaluation moments that advanced technology readiness across the field.

In addition to biodiversity and ecological experts, XPRIZE engaged Cambridge Consultants to independently evaluate the use of AI across competing systems—assessing model performance, scalability, and deployment readiness to ensure that species identification outputs met rigorous technical standards.

Arda Informatics Consulting, LLC played a critical role in validating competitor submissions for the XPRIZE Rainforest competition, conducting an independent bioinformatics audit and pipeline assessment to evaluate each team's data, analytical strategy, and resulting products.

Structured Field Validation Moments

Beyond expert review hours, the Rainforest XPRIZE deployed intensive, real-world testing environments designed to stress-test systems under operational conditions.

SINGAPORE SEMI-FINALS:

Thirteen Semi-Finalist teams deployed technologies in Singapore's rainforest over a multi-week testing period, culminating in a compressed 24-hour biodiversity survey window across a 60-hectare site.

Teams Integrated:

- Autonomous Robotics and Uncrewed Aircraft
- Bioacoustics arrays
- Molecular Biology (DNA, eDNA)
- Hyperspectral and LiDAR imaging
- AI-driven species identification
- Imagery - RGB/EO, Hyper/Multispectral
- Artificial Intelligence
- Physical Sample Collection - autonomous/remotely deployed traps (light, malaise, vacuum, bait), no-harm insect traps
- Remote Sensing

Teams overcame harsh tropical rainforest conditions—heat, moisture, and humidity stressing electronics and optics, and dense canopy and rugged terrain degrading GNSS and communications—proving their technologies are rugged, fit-for-purpose, and capable of reliable real-world deployment under strict time limits.

BRAZIL FINALS:

Six Finalist teams underwent even more intensive testing in Brazil. Despite fewer teams competing, aggregate biodiversity observations and validated outputs exceeded those of the Semi-Final round—demonstrating measurable gains in operational efficiency and system integration as the field narrowed to its most advanced competitors.

In just 24 hours, Finalist teams produced biodiversity assessments that traditionally require months of survey effort—representing a compression of ecological data collection timelines through integrated sensing and AI systems.

Collectively, XPRIZE invested approximately **$2,787,770** in travel, logistics, technical infrastructure, site coordination, peer review processes, bioinformatics validation, and structured judging summits to ensure rigorous, third-party performance verification.

When combined with expert judging hours, these investments represent approximately **$3,596,541 mobilized toward independent biodiversity technology validation**—a substantial portion of the overall prize purse directed toward de-risking technical performance.

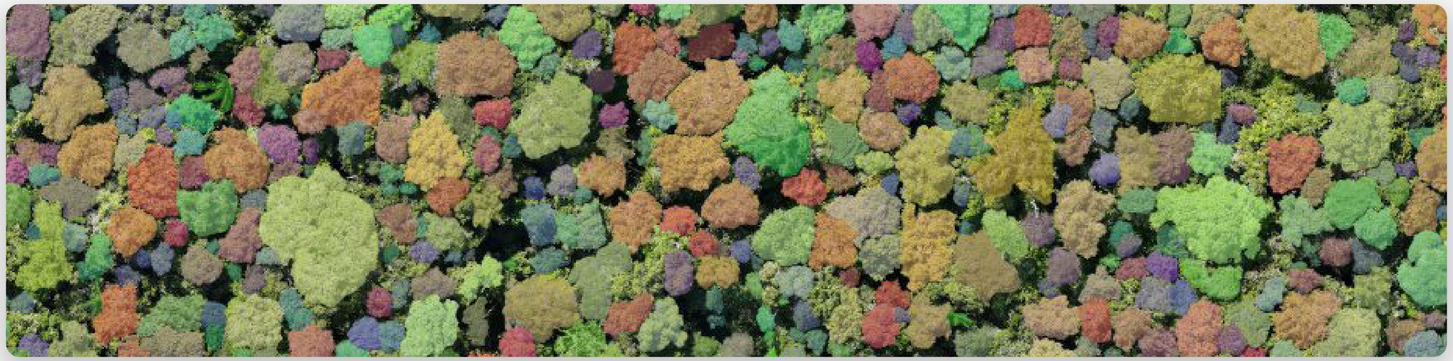
This represents a significant concentration of independent scientific validation—channeling expert biodiversity, ecological, and AI expertise into rigorous field assessments that advanced technology readiness across the sector.

Quantified Field Outcomes

The validation moments produced substantial biodiversity outputs under compressed operational timelines.

Across Semi-Finals and Finals testing:

SEMI-FINALS	**1,458** **Total Observations Recorded**	**407** **Species Identified**
FINALS	**11,492** **Total Observations Recorded**	**810** **Species Identified**



Despite fewer teams competing in the Finals (6 vs. 13), total observations increased nearly eightfold, while validated species identifications nearly doubled.

The near eightfold increase in biodiversity observations—achieved with less than half the number of teams—reflects rapid gains in system integration, deployment efficiency, and analytical maturity between competition stages.

During the finals in Brazil, teams surveyed a 100-hectare rainforest plot in 24 hours and produced a validated biodiversity report within 48 hours. By comparison, conventional biodiversity studies typically require ~30 days of field survey followed by up to 12 months of analysis and reporting.

In practical terms, these integrated sensing platforms—combining UAVs, bioacoustics, eDNA, imaging, and AI-driven analytics—compress timelines from months or years into days, signaling a transition from experimental approaches to operational, deployment-ready rainforest monitoring systems.

Open Data Contributions & Scientific Reuse

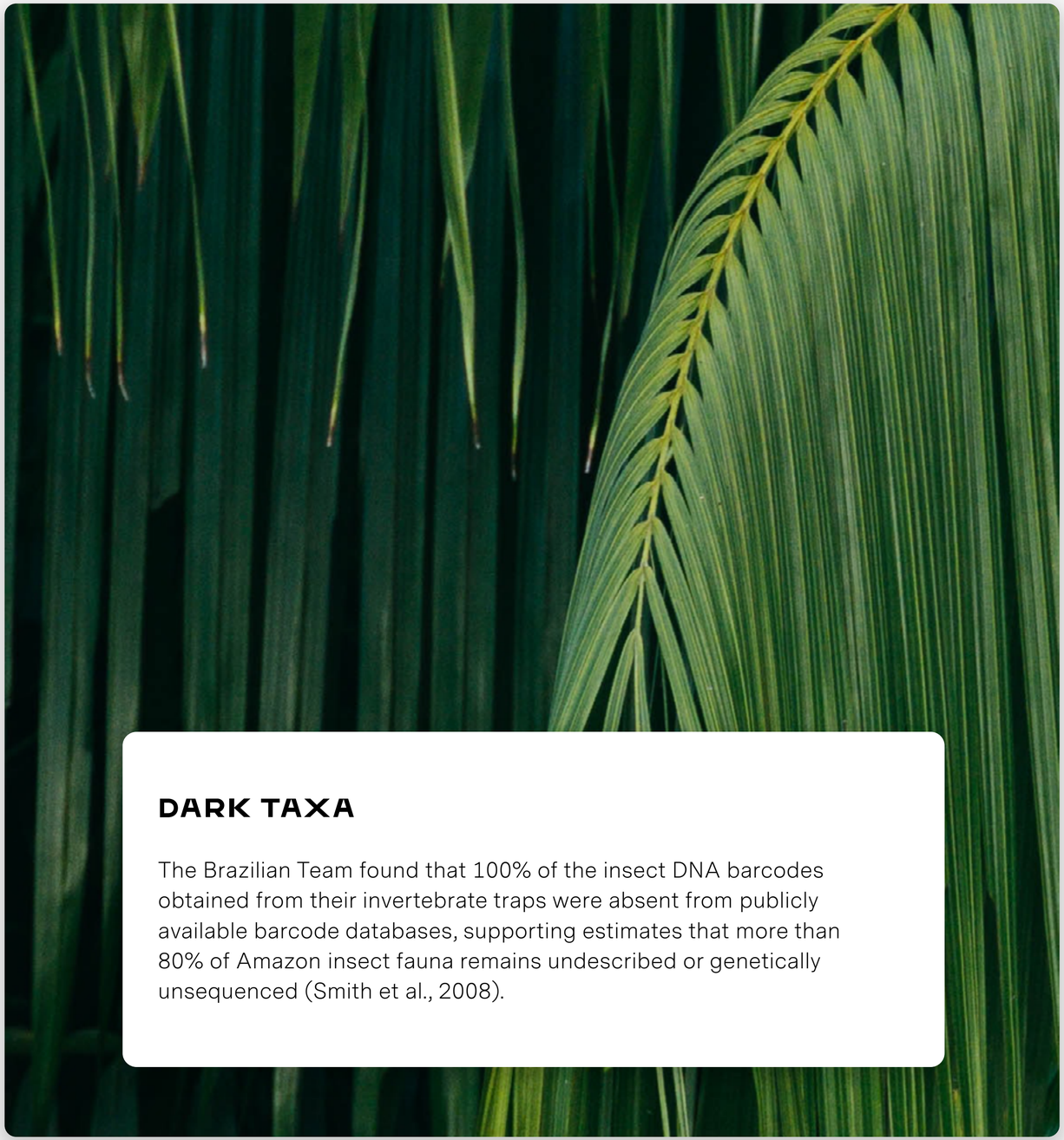
A defining feature of the Rainforest XPRIZE validation architecture was not only the rigor of field testing, but the scale of biodiversity data generated—and its value to the broader scientific community.

Across the Finals testing period, teams collected and processed **6.2 terabytes of multimodal biodiversity data**—representing a nearly threefold increase over the semifinals (2.3 TB)—including bioacoustics, high-resolution imagery, and molecular outputs. This volume of data is roughly equivalent to **more than 1.5 million high-resolution photographs**, all captured, processed, and analyzed within compressed 24-hour survey windows and rapid analytical turnarounds.

In total, teams contributed substantial volumes of research-grade biodiversity data to publicly accessible repositories, including **3,838 eDNA barcodes (337 novel barcodes), 126,330 labeled bioacoustic segments, and 1,802,614 images**. Because these datasets were collected under controlled, expert-validated competition conditions, they provide particularly robust reference material for species identification, AI model training, and benchmarking future biodiversity monitoring systems.

To maximize downstream scientific value, teams submitted validated observations through open, research-grade repositories. Providence+ data submitted to GBIF has already received **7 direct citations in academic publications**. More broadly, because finalist observations were contributed via iNaturalist and incorporated into the **iNaturalist Research Grade dataset**, these submissions connect into a global open biodiversity corpus that has been cited **2,385 times in scientific papers since 2024**.

In practical terms, the competition created a multiplier effect: biodiversity discoveries generated during prize validation moments continue to compound through reuse by researchers, conservation practitioners, and AI model developers—extending the impact of each field survey far beyond the competition itself.



DARK TAXA

The Brazilian Team found that 100% of the insect DNA barcodes obtained from their invertebrate traps were absent from publicly available barcode databases, supporting estimates that more than 80% of Amazon insect fauna remains undescribed or genetically unsequenced (Smith et al., 2008).

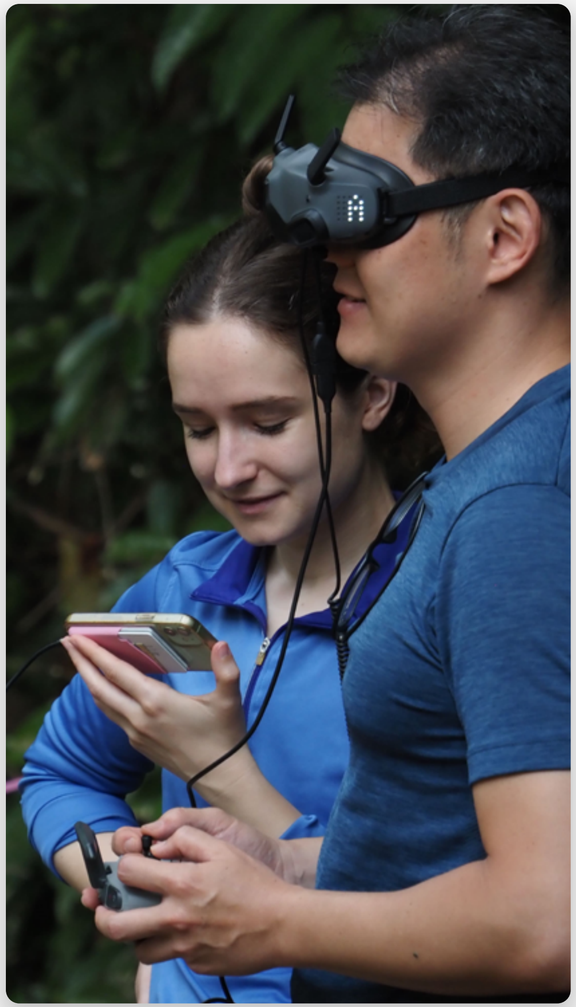
4. Smith, M. Alex, et al. (2008). Extreme diversity of tropical parasitoid wasps exposed by iterative integration of natural history, DNA barcoding, morphology, and collections. PNAS 105(34): 12359–12364. DOI: 10.1073/pnas.0805319105.

Technology Readiness Progression

Technology Readiness Levels (TRLs) are a standard measure of technology maturity, ranging from TRL 1 (basic principles observed) to TRL 9 (proven in operational use). In the XPRIZE Rainforest context, TRLs help distinguish between systems that show promise in relevant conditions and those able to deliver reliable, end-to-end performance in remote tropical rainforest operations.

At the Semi-Final stage, advancing teams typically operated at TRL 5–6—meaning key subsystems were validated in relevant conditions, but end-to-end performance was not yet consistently demonstrated under full operational constraints. Solutions often showed strong capability in parts (e.g., sensing, analytics, autonomy, or data handling), but still relied on some combination of: partial manual intervention, limited runtime robustness, constrained comms, or laboratory/near-field processing pipelines.

By the Finals, solutions had progressed to **TRL 7–8**, reflecting integrated system prototypes demonstrated in operational rainforest conditions, delivering repeatable performance across the full mission cycle: rapid, autonomous surveying of 100 hectares in 24 hours, followed by data processing, analysis, and biodiversity reporting within 48 hours. Hardware, software, and workflow components matured into an operationally coherent “field-to-report” stack.



What matured in practice from Semi-Finals → Finals

System integration: Sensors, platforms (UAV/UGV/ground), and software pipelines evolved from modular components into tightly integrated operational systems.

Autonomy & orchestration: Increased mission autonomy (planning, navigation, tasking, failover) and reduced dependence on expert operators for day-to-day execution.

Ruggedization & reliability: Improved environmental tolerance (heat, humidity, moisture ingress) and more stable performance of optics/sensors, compute, and power systems over long field days.

Connectivity-aware operations: Better resilience to canopy/terrain impacts on GNSS and radio links—through buffering, store-and-forward approaches, mesh/relay strategies, and workflow designs that assume intermittent connectivity.

Edge + pipeline performance: Faster, more reliable handling of high-volume data in the field—data triage, compression, QA/QC, automated ingestion, and scalable processing to meet the 48-hour reporting window.

Repeatability & validation: More robust calibration, metadata capture, and traceable outputs—supporting confidence in results, comparability across sites, and clearer auditability of biodiversity products.

This maturation—from mid-stage prototypes to operational demonstrations—was driven by the competition’s structured validation architecture and time-bound mission constraints. The Rainforest XPRIZE didn’t just surface promising approaches; it forced real-world integration, revealing failure modes early and accelerating teams along the deployment-readiness spectrum toward technologies that are fit-for-purpose in demanding rainforest environments.

Methodological Innovation & Standards Advancement

Beyond advancing hardware and software readiness, the Rainforest XPRIZE catalyzed the development of 71 new biodiversity monitoring methodologies across the six Finalist teams—spanning AI algorithms, sampling indices, sensor architectures, molecular techniques, and field-deployable laboratory systems.

These innovations included:

- New biodiversity indices such as the Species Habitat Index (SHI), Species Indication Index (SII), and Species Protection Index (SPI)
- Airborne and field-expedient eDNA collection and rapid extraction protocols
- Chemical preservation methods enabling DNA stability without refrigeration
- Fully automated bioacoustic survey methodologies
- Massive multisensory sampling integration frameworks
- Rapid tree-crown segmentation AI algorithms
- Collaborative AI systems incorporating live input from Indigenous citizen scientists
- UA-mounted robotic sample collection systems
- Field-deployable molecular laboratories capable of real-time sequencing

Collectively, these methodological advancements represent more than incremental improvements—they establish new operational standards for biodiversity intelligence in tropical forest environments.

In effect, the competition did not merely test existing tools; it accelerated the creation of new scientific and technological frameworks that will shape how biodiversity monitoring is conducted globally.

Real-World Biodiversity Breakthroughs

During the Singapore Semi-Finals, Team ACT NOW Amazonas captured the first known images of two living specimens—Overbeckia subclavata and Clydonodozus multistriatus.

Notably, this discovery occurred in a well-researched and heavily visited recreation area, underscoring the capacity of integrated sensing and AI-driven methodologies to surface biodiversity signals previously undetected by conventional survey approaches.

This breakthrough illustrates a broader implication of the competition: biodiversity intelligence systems are not merely digitizing existing knowledge—they are expanding it. If novel detections are possible in highly studied ecosystems, the potential impact in less explored rainforest regions is substantial.

Clydonodozus multistriatus iNaturalist

Overbeckia subclavata iNaturalist

Validation Ecosystem & Deployment Enablement

The rigor of the Rainforest XPRIZE validation moments extended far beyond technical testing. Delivering first-of-its-kind biodiversity field trials at national forest scale required building and coordinating a multi-layered ecosystem spanning government, policy, science, logistics, and local communities.

In addition to structured field trials and independent scientific review, XPRIZE mobilized:

- National and regional government agencies to secure testing permits and temporarily suspend routine forest operations
- Aviation and regulatory authorities to enable advanced drone operations and navigate evolving UAV regulations
- State-level leadership, including engagement with the Governors of Acre and Amazonas
- Indigenous communities who hosted and partnered in month-long field deployments
- Federal protection and security agencies to safeguard personnel and infrastructure
- Robotics and AI specialists to oversee complex sensor deployments
- NGOs and biodiversity experts to observe and verify methodologies
- Philanthropic partners, including the Alana Foundation, to support on-the-ground activation

Coordinating these stakeholders was not incidental—it was foundational. Without regulatory alignment, sovereign permissions, aviation clearances, and local partnership, real-world deployment at this scale would not have been possible.

The prize did not merely validate technology—it validated the feasibility of deploying biodiversity monitoring within sovereign rainforest jurisdictions. In doing so, the competition reduced regulatory, operational, and geopolitical uncertainty for future deployments—providing a powerful de-risking signal to investors, governments, and conservation finance institutions.

This ecosystem orchestration represents a critical but often underappreciated component of technology readiness. By aligning policy, governance, security, and community stakeholders alongside scientific validation, the Rainforest XPRIZE transformed experimental technologies into systems capable of operating within real-world legal, social, and environmental constraints.

Preliminary estimates indicate that the in-kind governmental coordination, regulatory support, site access, and security infrastructure mobilized for these validation moments represent approximately **$1.1M in additional ecosystem value**, further amplifying the effective leverage of the prize purse.

In doing so, the competition did more than test biodiversity technologies—it demonstrated that large-scale rainforest monitoring can be operationally, politically, and socially viable.

Together, these validation efforts demonstrate that biodiversity monitoring systems can operate under real rainforest conditions and deliver actionable ecological intelligence within operational timeframes—marking an important step from experimental research toward deployable biodiversity infrastructure.

XPRIZE RAINFOREST SUBJECTED OUR TECHNOLOGY TO ONE OF THE MOST RIGOROUS FIELD VALIDATIONS IMAGINABLE—COMPLEX TERRAIN, EXTREME BIODIVERSITY, AND INDEPENDENT EVALUATION.

The competition forced us to stress-test our models, refine our data pipelines, and demonstrate performance under real-world constraints. That level of scrutiny accelerated our path from promising research to operational, field-ready biodiversity intelligence.

Chrissy Durkin, Map of Life
Chief Commercial Officer

$ Capital & Market Formation Impact

Converting Biodiversity Innovation into Investable Infrastructure

Scaling rainforest biodiversity monitoring requires more than scientific excellence—it requires sustained capital capable of transforming research outputs into operational, field-deployed infrastructure. Historically, biodiversity monitoring has been funded primarily through academic grants and conservation programs rather than venture or growth-stage capital markets.

XPRIZE Rainforest introduced milestone-based validation and global visibility to this emerging field—creating clearer de-risking signals for venture investors, institutional funders, and national research agencies. In doing so, the competition helped shift biodiversity intelligence from research activity toward investable infrastructure.

Capital Mobilization

To assess capital formation associated with XPRIZE Rainforest, we analyzed third-party funding data from PitchBook Data, Inc. for prize-participating teams with active company profiles[5]. This dataset represents a substantial share of the commercialized cohort; however, it does not capture teams without PitchBook profiles or undisclosed deal sizes and should therefore be considered a conservative estimate of capital mobilization.

Across the tracked dataset, teams completed **70 total funding deals**, with 65 tied to a confirmed time period.

Collectively, teams raised approximately **$163.56M during and after the competition — representing a 16.3x multiple of the $10M prize purse.**

This capital acceleration marks a structural shift in how biodiversity monitoring is financed. Prior to the competition, fundraising was limited, episodic, and largely grant-dependent. During the prize period alone, disclosed capital increased nearly eightfold relative to pre-prize levels, and deal frequency more than doubled—signaling emerging investor conviction in biodiversity intelligence as a scalable technology category.

As in other XPRIZE domains, progression through competition milestones functioned as a validation signal—reducing perceived technical and execution risk and enabling greater capital formation. Notably, capital formation extended beyond prize winners, reinforcing that the competition catalyzed an ecosystem—not just individual victors.

Importantly, these figures represent a floor, not a ceiling. A substantial portion of recorded deals do not disclose funding amounts, several recent rounds remain unreported in third-party databases, and the analysis includes only teams with verified company profiles. Actual capital mobilization across the broader competition landscape is therefore likely higher.

DEAL ACTIVITY	DISCLOSED CAPITAL RAISED
Pre-Prize: 17 DEALS	Pre-Prize: $17.79M
During Prize: 39 DEALS	During Prize: $113.99M
Post-Prize: 9 DEALS	Post-Prize: $49.57M

5. PitchBook Data, Inc. Accessed December, 2025. Data has not been reviewed by PitchBook analysts.

Institutional Capital Validation

The composition of capital evolved significantly over time.

Pre-prize funding was largely limited to small seed rounds, accelerator participation, and early-stage backing. During and after the competition, teams attracted participation from institutional venture firms, impact-focused growth funds, corporate venture arms, global financial institutions, and national research agencies.

For example, **NatureMetrics' $28.6M post-prize Series B round** was led by **EDF Pulse Ventures**, **Just Climate**, and **ReOcean Fund**, with participation from **2150**, **Ananda Impact Ventures**, **BNP Paribas**, and **SWEN Capital Partners**—a syndicate spanning corporate venture, climate growth equity, impact investing, and major asset management.

In parallel, **Echo Labs—founded immediately following competition participation—secured a £7M award from the UK's Advanced Research and Invention Agency (ARIA)**, a national advanced R&D body comparable in mandate to DARPA. This award represents government-level strategic validation of biodiversity monitoring as a breakthrough technology priority.

Together, these transactions demonstrate diversified institutional engagement: venture capital, corporate venture, impact funds, asset managers, and sovereign-backed innovation agencies participating in the same emerging category.

Commercial Deployment & Customer Adoption

Capital formation is only one signal of market formation. A stronger signal is real-world customer adoption.

Bioflore — founded by members of the Brazilian finalist team — demonstrates the transition from competition participation to commercial deployment at scale. Since the competition, Bioflore has:

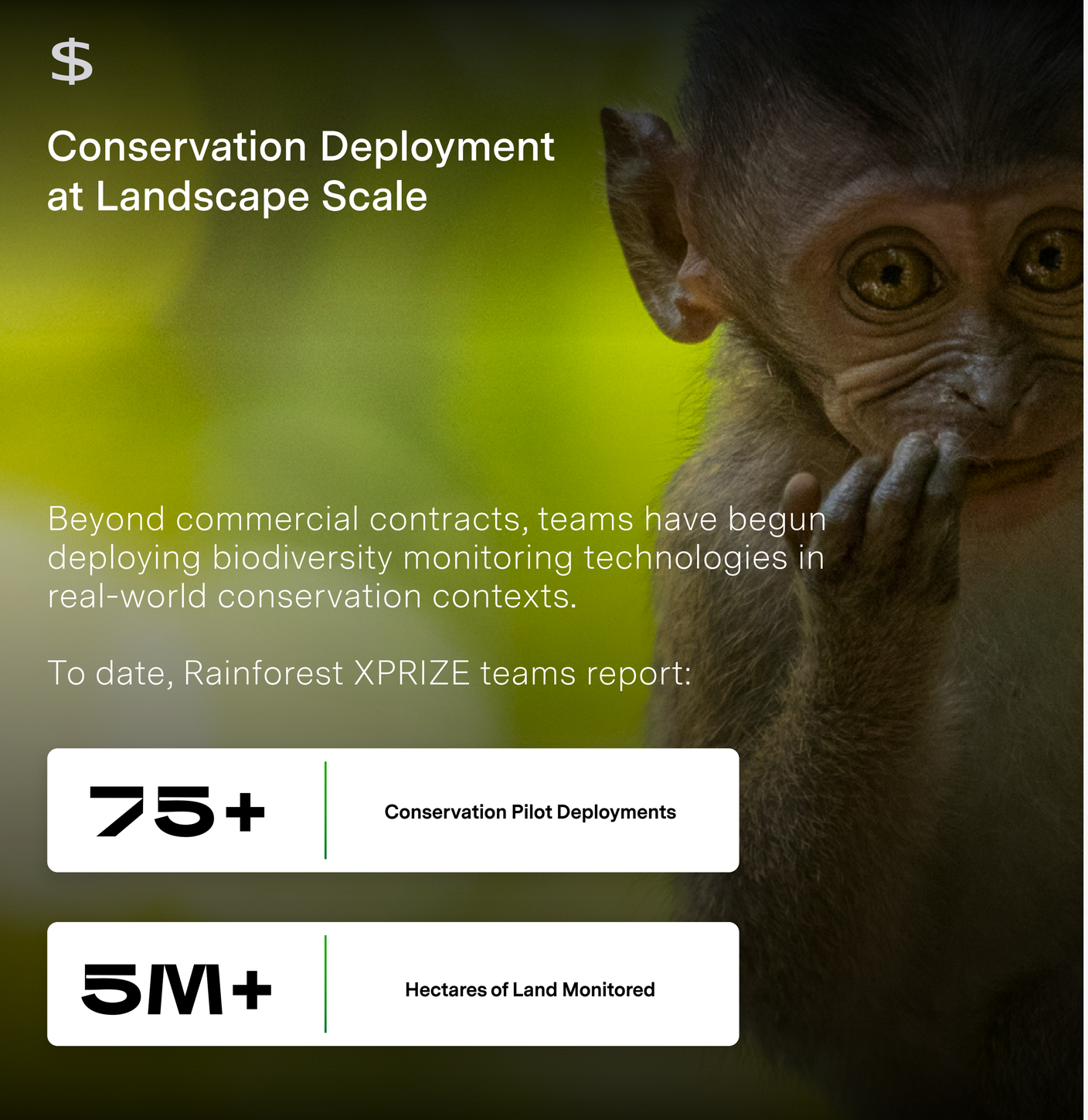
- Completed more than 40 commercial and applied projects in three years
- Published over 100 peer-reviewed scientific articles
- Delivered the first certified carbon project in Brazil using LiDAR-based methodology
- Established partnership status with The Global Biodiversity Standard

Importantly, Bioflore's client portfolio spans regenerative agriculture, carbon markets, environmental certification, and bioeconomy sectors. Clients include global agribusiness leaders (e.g., Cargill), industrial forestry companies (e.g., Klabin, Bracell), multinational consumer brands (e.g., Unilever), restoration-focused entities (e.g., re.green), carbon market actors (e.g., Pachama), and public institutions such as Itaipu Binacional and Embrapa.

This breadth of commercial engagement demonstrates that biodiversity monitoring technologies are moving beyond research validation toward embedded use within carbon markets, supply chains, restoration projects, and certification systems.

The Rainforest XPRIZE did not simply validate technological feasibility — it accelerated the integration of biodiversity intelligence into real economic workflows.

Conservation Deployment at Landscape Scale



Beyond commercial contracts, teams have begun deploying biodiversity monitoring technologies in real-world conservation contexts.

To date, Rainforest XPRIZE teams report:

75+ | **Conservation Pilot Deployments**

5M+ | **Hectares of Land Monitored**

These pilots span partnerships with conservation NGOs, protected area managers, restoration initiatives, carbon project developers, and public agencies across Bolivia, Borneo, Brazil (Amazon, Atlantic Forest, and Cerrado), Colombia, Ecuador, Namibia, Kenya, Peru, Tanzania, and additional sovereign rainforest jurisdictions.

Partner organizations include IPE, Shell, Botanic Gardens Conservation International (BGCI), Landprint, VerdeNovo, re.green, Fundação Florestal (FF-SP), Klabin, Biofílica, and others supporting biodiversity monitoring, restoration tracking, and carbon project validation.

These deployments demonstrate that technologies refined and validated through the competition are already being applied at landscape scale—monitoring forest integrity, informing restoration planning, supporting carbon certification, and generating decision-grade biodiversity intelligence for conservation stakeholders.

Importantly, this activity extends beyond prize winners, reinforcing that the competition catalyzed an operational ecosystem rather than isolated technological breakthroughs.

Cohort-Level Capital Acceleration

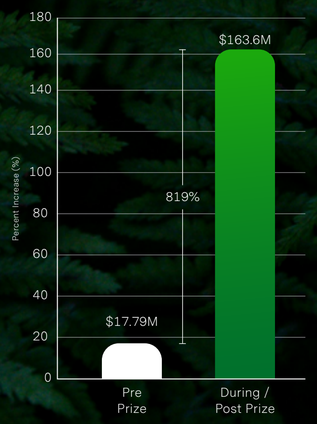
Progression through the competition correlated with capital access.

Capital formation also varied by level of advancement within the competition. Pre-prize, fundraising activity was concentrated among early-qualified teams, while Semi-Finalists and Finalists had collectively raised less than $0.5M in disclosed capital.

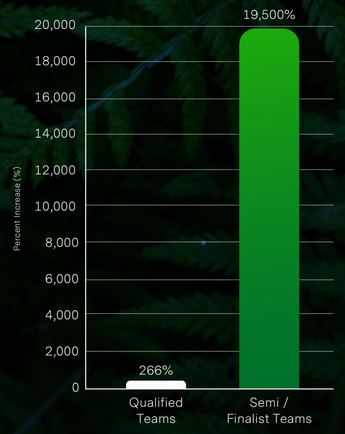
During and following the competition, this pattern shifted materially. Semi-Finalists and Finalists secured more than $50M during the prize period and nearly $48M post-prize (excluding undisclosed rounds), indicating that deeper progression through competition milestones was associated with greater capital access.

This pattern reinforces a core mechanism of the XPRIZE model: rigorous validation stages reduce perceived technical and execution risk, increasing investor confidence in advancing teams.

Total Team Funding



Funding Growth Pre-to-Post Prize



Investor Expansion

Investor participation expanded materially across qualified teams:

- 16 unique investors pre-prize
- 99 unique investors during and post prize
- 112 unique investors total across recorded time periods

The expansion of investors across the competition lifecycle signals the formation of a true capital ecosystem around biodiversity intelligence. What was once a fragmented, research-funded domain is now attracting diversified institutional participation across venture capital, corporate venture, impact funds, asset managers, and national innovation agencies.

First-Raise Signal

A strong indicator of catalytic impact is when teams with no recorded pre-launch funding secure meaningful capital following prize launch.

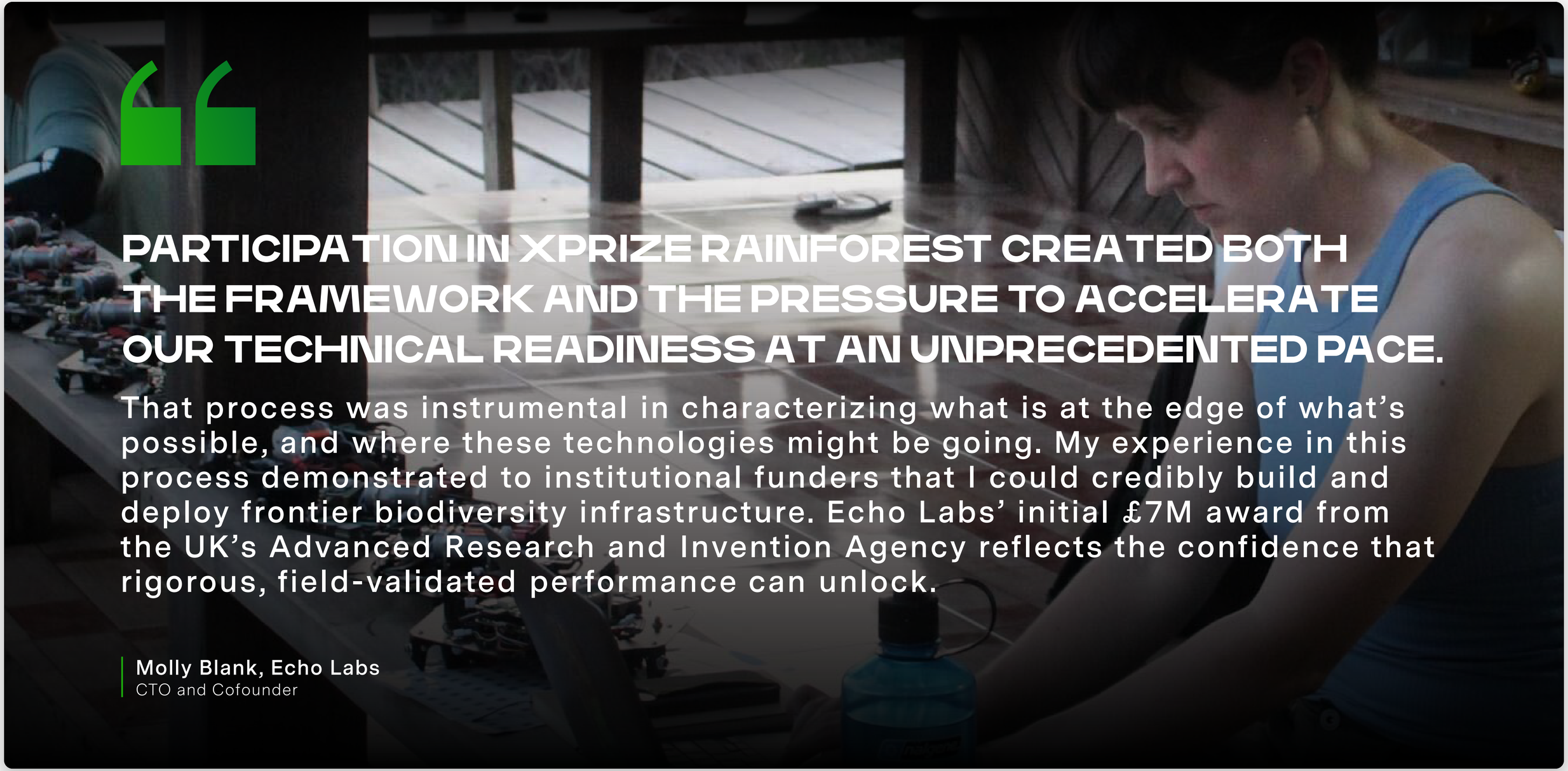
Within the tracked cohort, three companies with no dated funding prior to launch raised a combined $23.1M after the competition began. In a nascent industry, this reflects the conversion of research-stage work into investable enterprises.

Workforce Expansion

Capital formation translated into operational scale. Among teams with available employment data:

- 122 employees pre-prize
- 942 Employees Post-Prize
- +820 net new jobs

This expansion reflects the buildout of engineering, field operations, data science, and commercialization teams—capacity required to deliver biodiversity intelligence as continuous monitoring infrastructure rather than episodic academic research.



PARTICIPATION IN XPRIZE RAINFOREST CREATED BOTH THE FRAMEWORK AND THE PRESSURE TO ACCELERATE OUR TECHNICAL READINESS AT AN UNPRECEDENTED PACE.

That process was instrumental in characterizing what is at the edge of what's possible, and where these technologies might be going. My experience in this process demonstrated to institutional funders that I could credibly build and deploy frontier biodiversity infrastructure. Echo Labs' initial £7M award from the UK's Advanced Research and Invention Agency reflects the confidence that rigorous, field-validated performance can unlock.

Molly Blank, Echo Labs
CTO and Cofounder

Prize Purse ROI

In aggregate, the $10M Rainforest XPRIZE has already generated an estimated **27X return on philanthropic investment**, reflecting a powerful multiplier effect across capital mobilization, scientific advancement, workforce expansion, and global awareness. This return is real, measurable, and immediate—captured shortly after the competition concluded, as teams transitioned from research validation to operational deployment and early-stage commercialization.

Unlike sectors with established capital markets, biodiversity monitoring entered the competition as a largely grant-dependent, academically driven field.

Against that backdrop, catalyzing approximately $163M in disclosed capital—alongside expanded investor participation, institutional validation, and significant job creation—represents a structural shift in how this field is financed and deployed.

Over the last 30 years, XPRIZE has observed that the greatest impacts of our competitions often materialize years after the award, as solutions scale, capital deepens, and markets mature. Viewed in that context, achieving a **27X** return within such a short window underscores the catalytic power of milestone-based incentive design in activating undercapitalized scientific domains.

Importantly, this **27X** figure should be viewed as a floor, not a ceiling. As advancing teams continue to raise capital, secure long-term monitoring contracts, integrate into conservation finance frameworks, and expand global deployment capacity, the downstream effects catalyzed by the competition are expected to compound.

While smaller in purse than some prior competitions, the Rainforest XPRIZE demonstrates that even modest philanthropic capital—when structured around rigorous validation and global visibility—can unlock disproportionate leverage in emerging technology categories. In doing so, it further affirms that outcome-driven prize funding can serve as a high-efficiency mechanism for accelerating solutions to complex global challenges.

THE XPRIZE RAINFOREST PRIZE DID FAR MORE THAN ACCELERATE NEW TECHNOLOGIES AND METHODOLOGIES — IT HELPED LAY THE FOUNDATIONS OF A NEW GLOBAL INFRASTRUCTURE FOR MAPPING AND MONITORING BIODIVERSITY IN TROPICAL FORESTS.

By bringing together scientists and innovators from across disciplines, it created an entirely new field of knowledge and practice. Today, beyond the competition, teams are collaborating worldwide in joint initiatives, as reflected in the Mamirauá Declaration, which seeks to build one of the largest biodiversity monitoring networks in the Amazon. The Prize has been truly transformative, and its legacy will continue to unfold across research, conservation, regeneration, bioeconomy, and data science for years to come.

Pedro Hartung, Alana
CEO

From Competition to Coordination

The Future of Biodiversity Infrastructure

The Rainforest XPRIZE was designed to accelerate technological innovation in biodiversity monitoring. But its most enduring impact may be institutional rather than technical.

As the competition concluded, two structural initiatives emerged that signal the field's transition from innovation to coordinated deployment: the launch of the IPLC Science Fund and the unveiling of the Mamirauá Declaration.

Together, they reflect a shift from isolated breakthroughs to aligned ecosystem architecture.

Indigenous-Led Capital: The IPLC Science Fund

At COP30, XPRIZE supported the public launch of the IPLC Science Fund, established by ETH BiodivX following its Bonus Prize win.

Seeded by prize recognition and unveiled in Belém, the Fund represents a fundamental shift in biodiversity finance: placing Indigenous Peoples and Local Communities (IPLCs) in full governance control of conservation funding decisions.

The initiative:

- Empowers Indigenous communities with authority over capital allocation
- Integrates traditional ecological knowledge with AI, drones, and bioacoustics
- Aligns with UNDRIP and the Kunming-Montreal Global Biodiversity Framework
- Seeks international endorsements to scale globally
- This is not simply a philanthropic vehicle. It is a governance innovation.

By catalyzing the creation of an Indigenous-led conservation finance mechanism, the Rainforest XPRIZE extended its impact beyond technological validation into structural reform of how biodiversity capital flows.

The Mamirauá Declaration

A Shared Roadmap for the Amazon

Also unveiled at COP30, the Mamirauá Declaration—spearheaded by finalist team ProvidenceX and joined by Bioflore, GainForest, Oya Institute, and other Rainforest teams—marks a historic first for the Amazon Basin.

The Declaration establishes a coordinated alliance uniting:

- Amazonian Governments
- Scientific Institutions
- Indigenous Peoples and Local Communities
- NGOs
- Private-Sector Actors

Currently signed by more than 35 organizations—including Instituto Mamirauá, WCS, INPA, Museu Paraense Emílio Goeldi, and the Darwin Foundation—the Declaration calls for:

- A standardized, interoperable biodiversity monitoring system
- Cross-border coordination across Amazonian nations
- Evidence-based decision-making aligned with global biodiversity frameworks
- Integration of traditional knowledge with modern science

What makes this especially notable is that it was formed by teams that were direct competitors just months prior.

The prize did not merely identify winners.

It created the trust architecture necessary for collaboration in one of the world's most complex ecological and geopolitical regions.

The Rainforest XPRIZE did not simply accelerate innovation—it helped lay the institutional foundation for a new era of interoperable, Indigenous-aligned, science-backed biodiversity infrastructure at planetary scale.

Join a global community turning bold ideas into real-world impact—for people, planet, and generations to come.

Follow us on social media to be part of the movement and contribute to the conversation. Watch compelling stories about groundbreaking innovations and the people building them, and tune into the world's foremost experts and thought leaders who are propelling us toward a better tomorrow.

The work we do wouldn't be possible without the contributions of people like you. We offer a number of ways in which you can partner, sponsor, or donate to our foundation. To learn more, simply email us at getinvolved@xprize.org


linkedin.com/company/x-prize-foundation/


youtube.com/@xprize


instagram.com/xprize


x.com/xprize


facebook.com/xprize


tiktok.com/@xprize

We gratefully acknowledge the contributions of all those who made this report possible:

AUTHORS

Elaine Hungenberg, Sr. Vice President, Partnerships and Impact
Kevin Marriott, Sr. Technical Lead, Nature
Michelle Siqueira, Manager, XPRIZE Rainforest

CONTRIBUTORS

Andrew Tauhert, Chief Impact Officer - Editor
Kevin Snyder-Kelly, CRM and Data Insights Director - Data and Analytics
Jordan Giali, Sr. Manager, Partner Engagement and Program Impact - Data and Analytics