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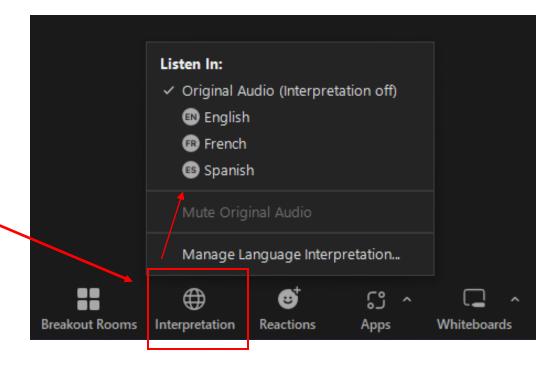
IN PARTNERSHIP WITH



### Join in English, Spanish or French

Interprétation en français // Interpretación en español

- 1. Pulse sobre el símbolo del globo terráqueo.
- 2. Seleccione Español.
- 1. Cliquez sur le symbole du monde.
- 2. Sélectionnez l'audio français.





### Housekeeping

### Now:

- Rename yourself (Name, Affiliation)
- 2. Use the chat to say hello, tell us where you're joining from and why you're interested in this topic.

### **During Talks & Panel:**

- Use the chat to ask questions, debate and share resources
- We will keep track of the questions you ask. During Q&A and Panel discussion we'll call on you to switch on your mic and join the conversation

### After:

If you need to follow up anything after the event, email Stephanie at sodonnell@worldbank.org



### Agenda

Time (EST)	Topic
8:00 AM	Welcome & Opening Remarks
8:10 AM	Lilian Pintea: 'Converting Data into Local Conservation Action'
8:25 AM	<b>Yanira Pop</b> & <b>Heron Moreno</b> : 'Delivering Conservation-Tech Initiatives Through Public-Private Arrangements in Belize'
8:40 AM	<ul> <li>Panel Discussion: 'Challenges and Opportunities: Pathways to the Future'</li> <li>Paul Bunje, President and Co-Founder, Conservation X Labs</li> <li>Nagaraja Rao Harshadeep, Global Lead (Disruptive Technology), Global Environment Department, the World Bank</li> <li>Sara Beery, Assistant Professor, EECS' Faculty of Al and Decision Making &amp; CSAILMIT, MIT</li> </ul>
9:25 AM	Closing remarks 4







### **Stephanie O'Donnell**

Knowledge Management & Partnership Coordinator, Global Wildlife Program, the World Bank

The Global Wildlife **Program:** 38 countries across Africa, Asia & Latin



## **WILDLABS** is your doorway into the conservation technology sector













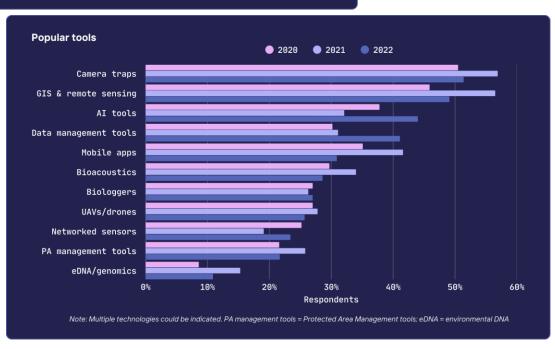
**NOVEMBER 2023** 

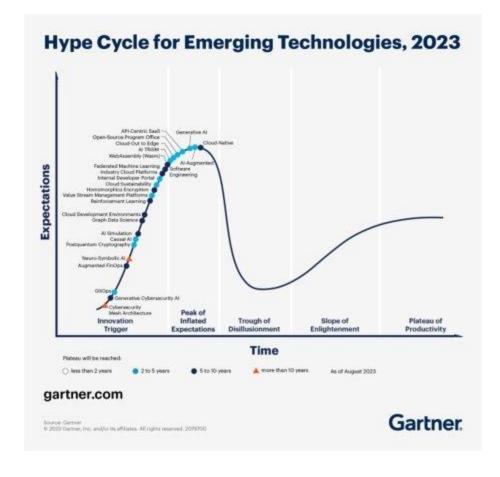
# THE STATE OF CONSERVATION TECHNOLOGY

first multi-year, global assessment capturing community insights on the evolution of technology for nature

# Perceived high potential tools 2020 Current performance Impact Impact

### The State of Conservation Tech





### Movement Ecology Horizon Scan

### **INNOVATION PRIORITIES**

10 YEARS

**5 YEARS** 

### **OUTCOMES**



**CHRISTIAN RUTZ** 



SARAH DAVIDSON



**SARA BEERY** 



**ROLAND KAYS** 

	:	:
• Improved power systems • Alternative energy harvesting • Novel sensor integration	Miniaturized transmitters     Non-invasive attachment methods	Lifetime tags
Novel sensor integration     Sensor data compression	Onboard processing for real-time data     Automated, location-based data sharing     Low-cost data collection solutions beyond GSM coverage     Spaceborne receivers for long-term monitoring	
Scale from individual to population-level analyses	Al to predict future movements	Advancement of movement ecology informatics
Improved habitat suitability models     Detector array modeling method     Statistical tools for connectivit     Monitoring physiology and disease	• Open-source infrastructure and tools for model	
Global tag metadata registry	<ul> <li>New remote sensing data layers</li> <li>Data archiving and discoverability</li> <li>Interoperable and user-friendly tools</li> <li>Collective data labeling</li> <li>Collaborative infrastructure to match data growth</li> </ul>	Large-scale     collaborative     tracking of many     animals
COORDINATION	Data coverage and engagement from Global South     Accessible statistical software and documentation     De-risking technology transfer	

Functional nextgeneration bio-loggers

Improved data retrieval and processing

Scaled data insights

Advanced analysis tools

Effective data sharing and integration

Increased global accessibility



I think people think ML is the hot thing and so we tend to concentrate on that. But in order to have real impact there's a long way to go in terms of the engineering, and even just thinking about the UX of making your ML results usable for people. It's not like you write software once and it solves that problem—it needs maintenance.

- Focus group participant, ML & Computer Vision



"

I think it's incredibly important that we really solidify some metadata standards and platforms for data sharing. There's so much data out there and it could be exponentially more powerful if we can share it with other people.

- Focus Group Participant, Camera Trapping





I think there's kind of a technology paralysis, from what I've seen. There needs to be more just basic foundational capacity building and instruction to demystify all the hype and just say, well, this is what it is. This is what it's good for. I think that's when there can be a lot of really interesting things happening with the technology.

Focus group participant, Networked Sensors







**Lilian Pintea** 

Vice President of Conservation Science, Jane Goodall Institute





Yanira Pop
Forest Officer, Belize Forest
Department



Heron Moreno
Executive Director, Corozal
Sustainable Future Initiative







# Delivering Conservation-Tech Initiatives Through Public-Private Arrangements in Belize

September 24<sup>th</sup>, 2025

Presented by: Mrs. Yanira Pop, Forest Officer, FD Mr. Heron Moreno, Executive Director, CSFI

# National Protected Areas System North-eastern **Biological Corridor** VE SiologicalCorridor

# Quick snapshot of Belize's PA System:

- Over 40% of Belize's territory is under some form of protection.
- Belize boasts almost 60% of it's forest cover
- Belize is recognized as one of the global leaders in conservation.











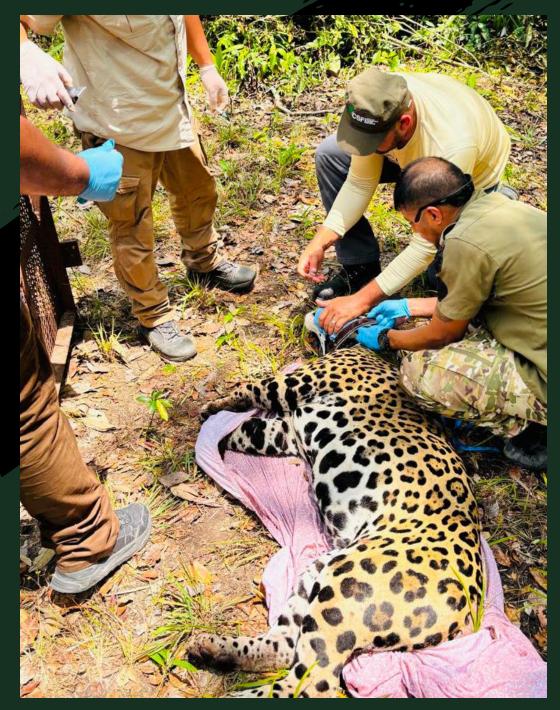




### First - Brief Background

- Project: "Enhancing Jaguar Corridors and strongholds through improved management and threat reductions
- TPRP was signed between the FD and CSFI
- Implementation of Component 2 " Promoting a more Wildlife-Friendly Economy
- Main Objective: address human- jaguar conflict





### **Jaguar Protection Program**

The Belize Jaguar Program is a national program spearheaded by the Government of Belize through the Forest Department with the official support of the Corozal Sustainable Future Initiative — CSFI, designed to address the growing challenges of human-wildlife conflict.



### Official Certification of the Jaguar Capture Team

- A major accomplishment for the Jaguar Protection Program was the official certification of the National Jaguar Capture Team.
- The training program was designed to mirror real-life capture operations and conflict response scenarios. It covered the following subject areas:
- 1. Darting and firearm safety.
- 2. Anaesthesia and recovery procedures.
- 3. Clinical examination and biological sample collection.
- 4. Emergency response and first aid.
- This certification has significantly strengthened the country's capacity to respond to human-jaguar conflict in a professional and humane manner, while laying the foundation for advanced research and conservation work through telemetry and health monitoring.









- Successfully collared several jaguars, enabling real-time tracking to better understand movement patterns, conflict zones, and priority areas for protection.
- Safely translocated several conflict jaguar, a first-of-its-kind operation in the region, demonstrating Belize's technical capacity and ethical response to human-wildlife conflict.
- Established a credible system at the national level and an evolving wildlife conflict response system.
- Helped shape the future of wildlife management in Belize, with field-tested protocols, data systems, and on-theground capacity becoming a model for national replication.
- Solidified partnership with the Forest Department ensuring proactive, policyaligned action on a growing national issue.





### **Managing Conflict: Jaguar Captures and**

### **Translocations**



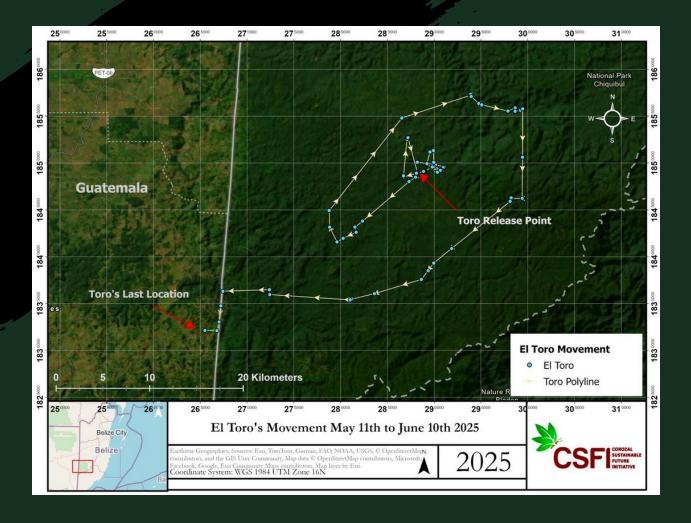


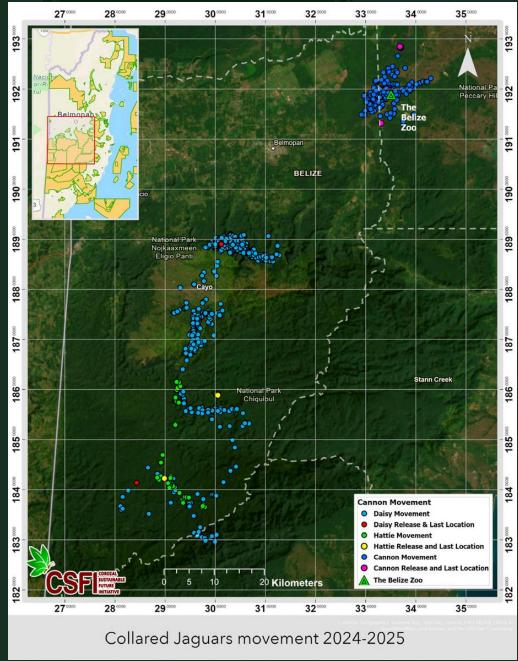






# Tracking Progress: Collecting Vital Data





# Legend Field Bases SCMA Camera Stations NeBC Camera Stations 15 Kilometers **Acoustic Devices CSFI's Wildlife Monitoring Network 2025**

# RESEARCH AND MONITORING



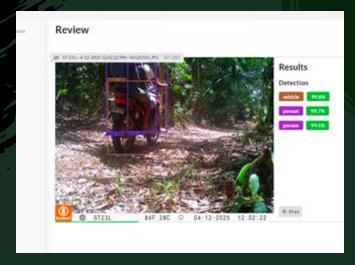
- An extensive network of camera traps across several PA's in Belize.
- For example, in SCMA and the Northeast Biological Corridor support one of the densest camera/acoustic-trap arrays in Belize, which feeds long-term data on jaguar presence, prey diversity, and human-wildlife conflict.

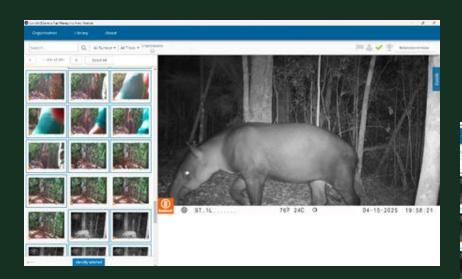


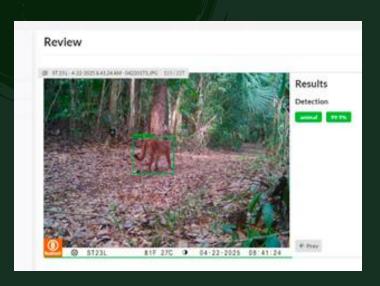


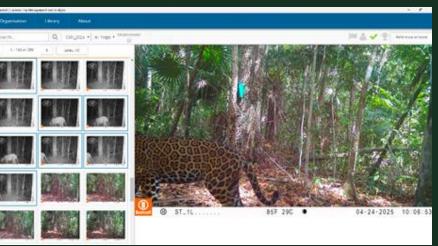
## RESEARCH AND MONITORING

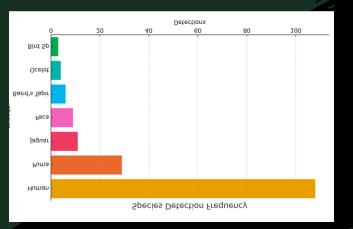
- The Wildlife Monitoring program remains one of the most dynamic and data-rich initiatives. Thus far, 2025 has already seen significant progress in the use of technology to enhance conservation outcomes.
- One of the most noteworthy developments has been the integration of Artificial Intelligence (AI) into research workflows. These tools such have been successfully adopted to streamline the processing and analysis of field data.
- Additionally, the team has made significant strides with the National Data Base that will not allow for the development of species protection strategies but will also contribute to other pressing national priorities infrastructure development, land use, etc.

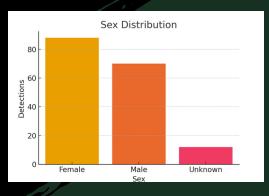


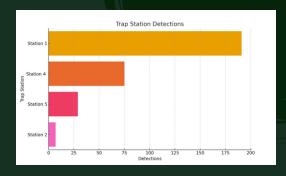




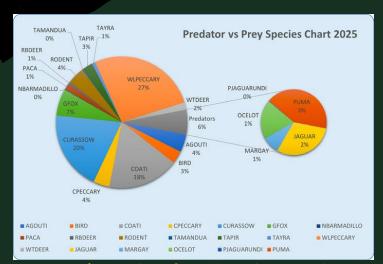


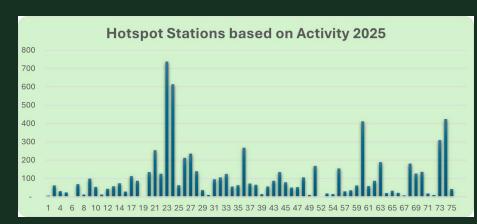






Trap Station ID 🔻 Trap Station Name 🔻	Genus 🔽	Species	✓ Presence	Independent Observations 🔻	Nights Elapsed 💌	Abundance Index 💌
1 Station 1	Bird	Bird	X	1	1 42	2.381
1 Station 1	Cuniculus	Paca	-	-	42	
1 Station 1	Homo	Human	X	11	1 42	26.19
1 Station 1	Leopardus	Ocelot	X	1	1 42	2.381
1 Station 1	Panthera	Jaguar	X	1	1 42	2.381
1 Station 1	Tapirus	Baird's Tapii	ır X	1	1 42	2.381
1 Station 1	concolor	Puma	X	4	4 42	9.524

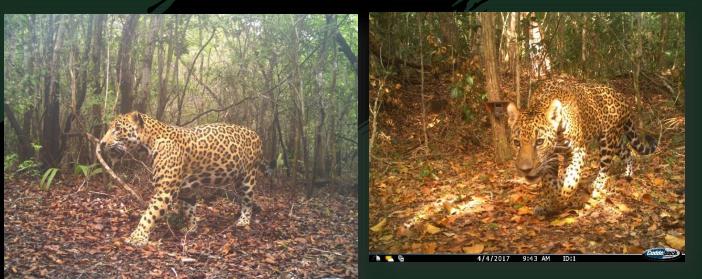




- New models of AI have also been incorporated into the Wildlife Monitoring Program to further manage the already cleaned camera trap images within a customized database built specifically for Belize's wildlife.
- This powerful tool has the ability to automatically tag metadata such as date, time, and station name, ensuring consistent and accurate data organization and the generation of detailed reports such as occupancy matrices based on species count or presence, station-level statistics, etc.
- Best of all, these new tools really allow the team to push the limits beyond simply collecting information but really understand the FUNCTIONALITY of the system by providing a visual image of what is happening on the ground.

### It is estimated that Belize has a jaguar

### population of approximately 600 individuals



























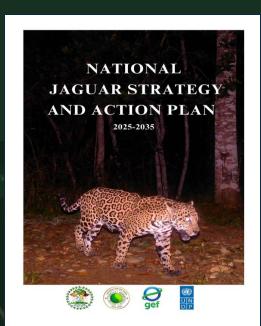
### Delivering Tech Projects in Government: Challenge & Opportunity

### Challenge:

- National Initiative
- Bureaucracy & rigid procurement processes slow progress
- Culture of doing things
- Rapid change in technology evolves faster than government structures and policies
- Limited capacity
- High risk under public scrutiny

### **Opportunity:**

- Potential for nationwide impact
- Enables smarter, data-driven policies and decisions
- Builds citizen trust & transparency
- Create new policies and expand or develop programs









The Belize Forest Department of the Ministry of Sustainable Development and Climate Change and Solid Waste Management (hereinafter referred to as "the Forest

The Corozal Sustainable Future Initiative (hereinafter referred to as "CSFI")

The Implementation of a national program for wildlife conflict response, wildlife health

This Memorandum of Understanding (MOU) sets out the terms and understanding between the Belize Forest Department (FD) and The Corozal Sustainable Future Initiative (CSFI) to collaboratively implement a national program for wildlife conflict response, wildlife health monitoring, and systemic resilience in Belize. This MOU is grounded in CSFI's established presence and operational capacity in Northern Belize, and its field implementation will remain ocused within this region during the initial phase. The intent is to formalize CSFI's role as a trusted operational partner with the mandate to act in the field under an agreed national framework

In recent years, wildlife conflict incidents have increased in frequency and complexity across Belize, creating challenges for both rural communities and conservation systems. In response, CSFI has developed significant field-level capacity through long-standing collaboration with government and international partners. Recognizing both the increasing demand for timely, technical field response and the institutional limitations within public service structures, the Forest Department and CSFI agree to jointly develop and operationalize a national program.

This MOU is intended to support and be guided by the principles and objectives of the forthcoming Wildlife Management Act currently under development by the Government of Belize. The WMA will modernize and strengthen the legal and institutional framework and will provide the enabling environment and regulatory support to CSFI, as a critical partner of GOB, in national wildlife

This partnership builds on work already underway through recent national initiatives, including a UNDP-funded project that has significantly strengthened CSFI's Jaguar response and capture capacity. Over the past years, investments have been made in specialized equipment, team training, and field operations-specifically within CSFI's area of influence in Northern Belize-to lay the foundation for this program. This MOU formalizes and strengthens that progress, aligning it within a nationally coordinated framework while maintaining a focused implementation approach in the

This MOU outlines a framework for active collaboration between the Forest Department and CSFI

- Establishment of a Rapid Field Response Mechanism
   Wildlife Health Surveillance and Monitoring

### Development of Analytical Tools to Assess Jaguar and Prey Dynamics





Produced for Belize Forest Departm







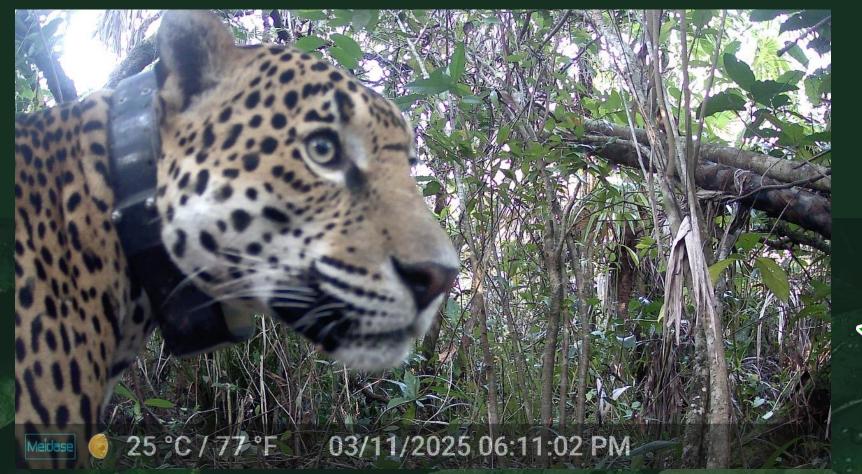
### WHAT HAS IT TAKEN?

- Collaboration
- Partnership
- Adoption to the use of new technology
- Commitment to conservation will allow space and flexibility to understand that GOB alone cannot make this happen.
- Creation of new policies that will permit the use of Al
- Financing
- TRUST





### Thank you!









Stephanie O'Donnell (Moderator) Consultant, Global Wildlife Program, World Bank



Paul Bunje
President and Co-Founder,
Conservation X Labs



Nagaraja Rao
Harshadeep
Global Lead (Disruptive
Technology), Global
Environment Department,
World Bank



Sara Beery
Assistant Professor, EECS'
Faculty of Al and Decision
Making and CSAILMIT, MIT



Thank you all for joining. Please take our 1 minute feedback survey and let us know how we did! Link: <a href="https://www.surveymonkey.com/r/X3BPZVM">https://www.surveymonkey.com/r/X3BPZVM</a>

Gracias a todos por unirse. ¡Responda nuestra encuesta de comentarios de 1 minuto y háganos saber cómo lo hicimos! Link: <a href="https://www.surveymonkey.com/r/X3BPZVM">https://www.surveymonkey.com/r/X3BPZVM</a>

Merci à tous d'y avoir participé. N'hésitez pas à répondre à notre sondage d'une minute et faites-nous savoir comment nous nous en sommes sortis! Link:

https://www.surveymonkey.com/r/X3BPZVM



### To learn more, please:

Visit the GWP Website:

https://www.worldbank.org/en/programs/global-wildlife-program

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