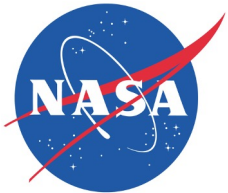


A.39 Advancing tools for an integrated biodiversity monitoring system for Colombia's protected areas



**PARQUES NACIONALES
NATURALES DE COLOMBIA**



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American Museum
of Natural History

Center for Biodiversity and Conservation



Background

- Colombia is the second most biodiverse country in the world and is therefore of strategic importance for global conservation efforts.
- Colombia is also home to some of the rarest and most highly threatened ecosystems in the world including paramo and tropical dry forest, which are experiencing even greater threat due to recent surges in land conversion rates.



Project Motivation & End User Need

- Colombia has made important progress in the use of Earth Observations, processing tools, and information systems for monitoring change in ecosystems and species in the last decades.
- Yet, the integration of existing capabilities into an integrated biodiversity monitoring system can improve access to up-to-date biodiversity indicators for timely decisions on biodiversity conservation.

NASA A.39 Integrated Biodiversity Monitoring System

Goal:

- *To support the implementation of a dynamic biodiversity monitoring system that integrates available processing tools and Earth Observation capabilities for biodiversity decision-making in Colombia.*

Objectives

We are leveraging existing modeling and information capabilities from three previously funded NASA A.50 projects in Colombia to:

- Expand technical capabilities for the integration of Earth Observation Products into Biodiversity Conservation Indicators
- Integrate existing workflows to facilitate timely access to biodiversity indicators for decision-making.

Data sources

Products

Indicators

Infrastructure

Outcome

NASA Earth
Observation products

- Forest vertical structure
- Landsat time series
- Corine Land-cover

Ecosystem change maps

- Pressure
- Transformation
- Recovery

Species distribution
models

National Biodiversity
Information System

- SIB-Colombia
- I2D
- GBIF, eBird

- Human footprint
- Ecological integrity

- Species connectivity
- **Species/ecosystem
representativeness**

Supported by
NASA A.50



BioTablero



BioModelos



wallace

SINAP
Sistema Nacional de Áreas Protegidas

Biodiversity
conservation
decisions

Current activities, progress and next steps:

Activity

Integration of Earth Observation products for improved/automated ecosystem change assessment

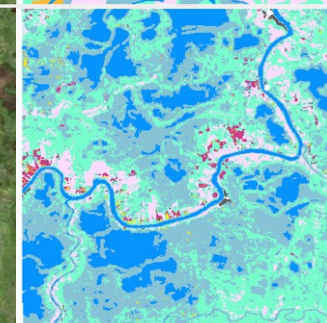
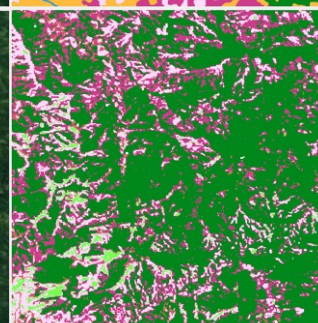
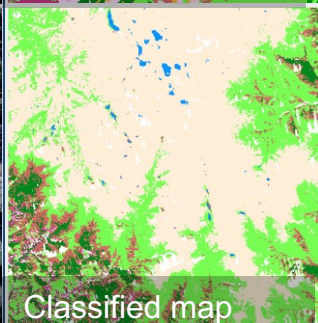
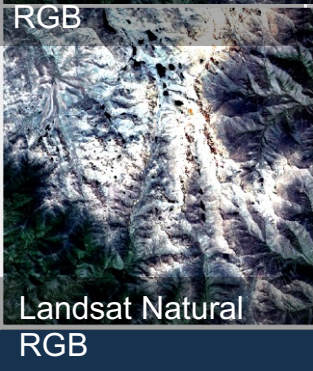
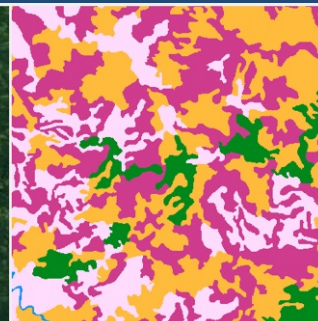
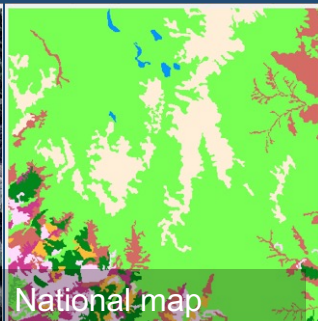
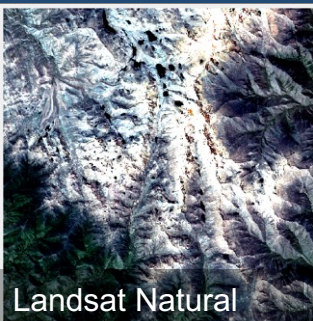
New/improved inputs/outputs for producing biodiversity indicators

System development for timely access to biodiversity indicators

1. Improve land cover information with higher temporal and spatial resolution
2. Update and expand inputs to improve information for biodiversity indicator calculations (representativeness, connectivity)
3. Develop biodiversity information system by connecting existing tools & generating new ones

Current activities, progress and next steps:

Activity	Progress	Next steps
Integration of Earth Observation products for improved/automated ecosystem change assessment	<ul style="list-style-type: none">• Suitability evaluation of existing products for change assessment• Completed analytical workflow• Accuracy tested in five pilot conservation areas with end-users	<ul style="list-style-type: none">• Iterative workflow refinement and implementation for change assessment and expansion to country level
New/improved inputs/outputs for producing biodiversity indicators		
System development for timely access to biodiversity indicators		

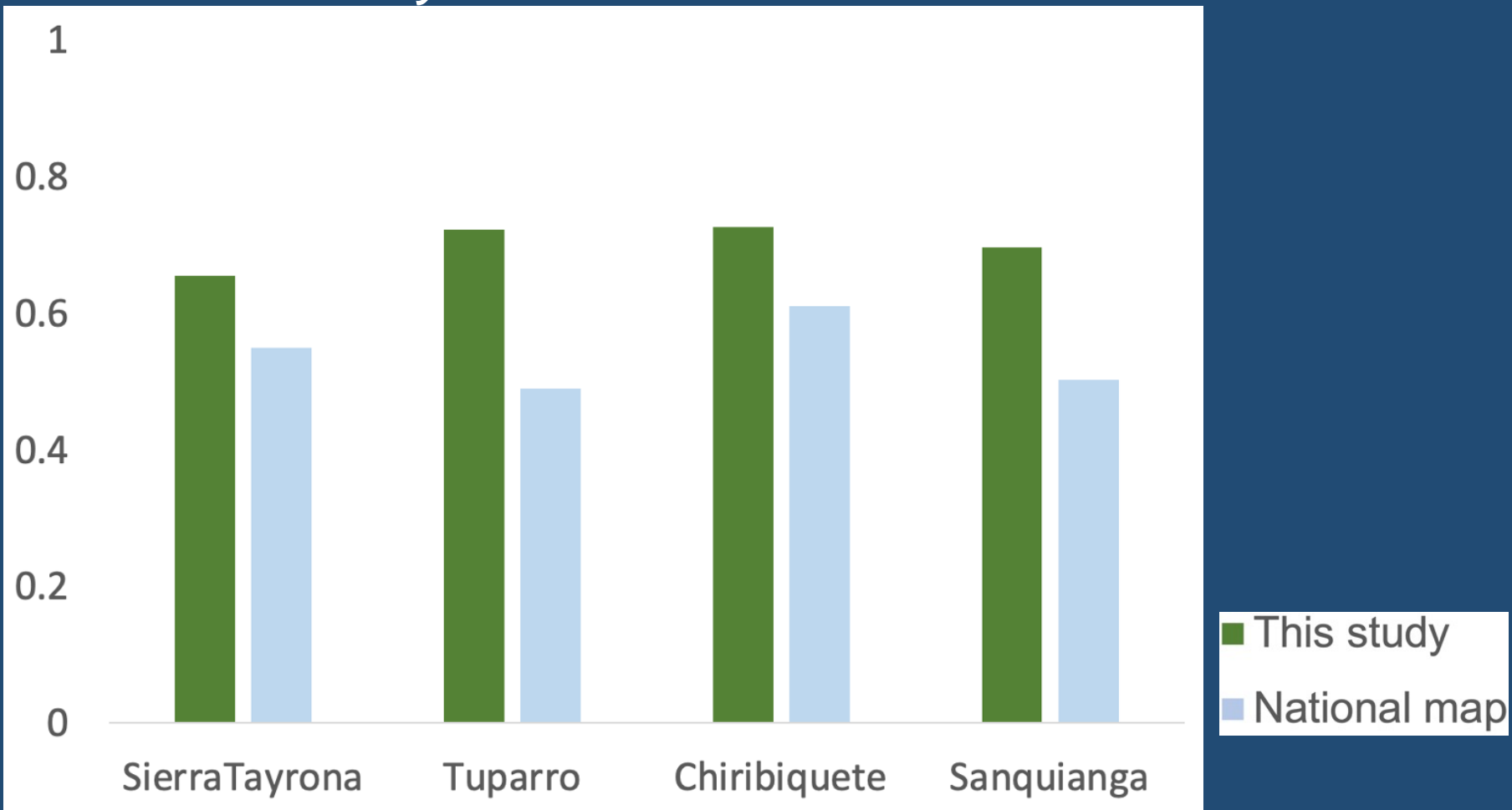


- Bush
- Wet area
- Settlement
- Flooded forest
- Unflooded forest
- Water body

- Banana crop
- Oil palm
- Other crops
- Flooded grassl.
- Unflooded grassl.
- Pasture

- Forest plantation
- Secondary forest
- Bare ground

Overall accuracy



Current activities, progress and next steps:

Activity	Progress	Next steps
Integration of Earth Observation products for improved/automated ecosystem change assessment		
New/improved inputs/outputs for producing biodiversity indicators	<ul style="list-style-type: none">● More than 8000 new species distributions completed, including marine species for the first time● Updated human footprint completed and a marine human footprint completed for the first time	<ul style="list-style-type: none">● Add remaining gaps for high-priority PNN species● Complete calculation of updated indicators with new information
System development for timely access to biodiversity indicators		

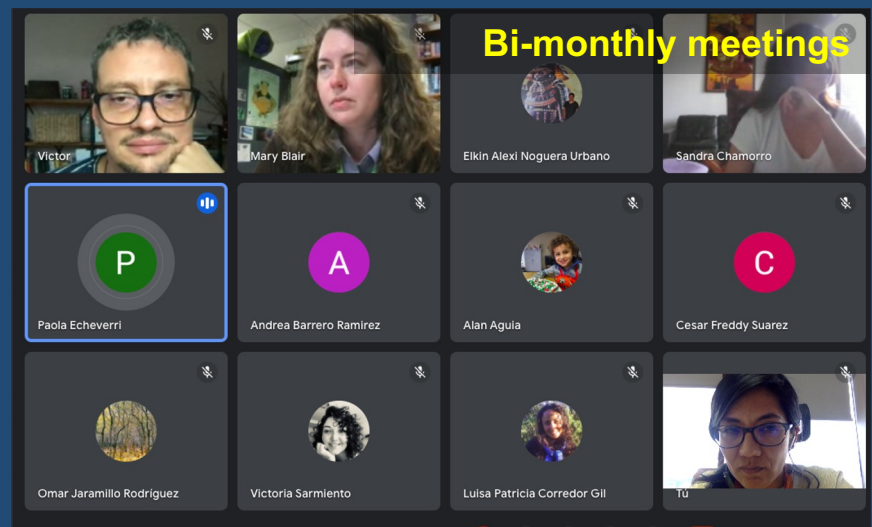
Current activities, progress and next steps:

Activity	Progress	Next steps
Integration of Earth Observation products for improved/automated ecosystem change assessment		
New/improved inputs/outputs for producing biodiversity indicators		
System development for timely access to biodiversity indicators	<ul style="list-style-type: none">● Development plan completed, pre-processing and other needs identified● Two new system components in progress● Formal cross-institutional collaboration agreement among Colombian institutions (SIAC) to share and access inputs/outputs	<ul style="list-style-type: none">● Test new system components● Visualization improvements● Use/usability assessment

Bogotá, May 2022



Bi-monthly meetings



Bogotá, May 2022

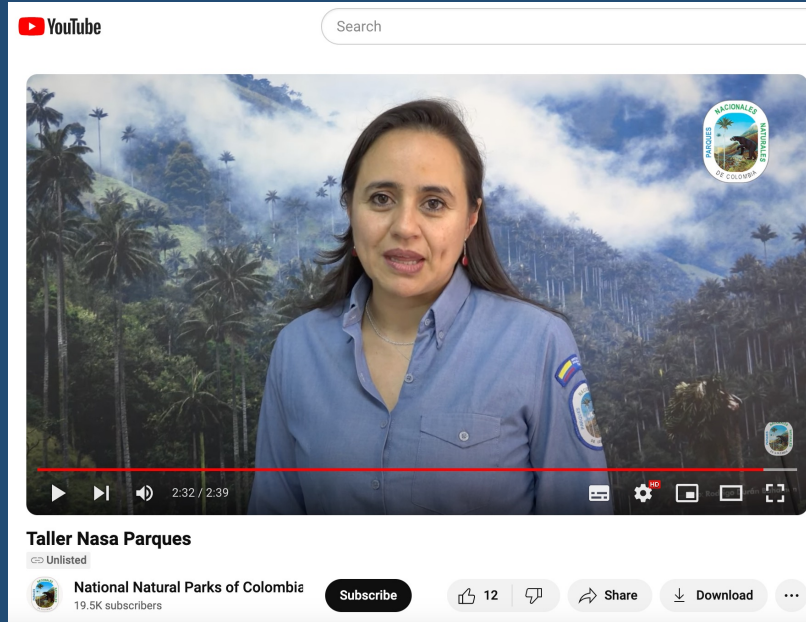


NYC, Nov 2022





End User Video



- <https://www.youtube.com/watch?v=4Yp4z5PgbWk>



Thank you!



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victorhugo@temple.edu

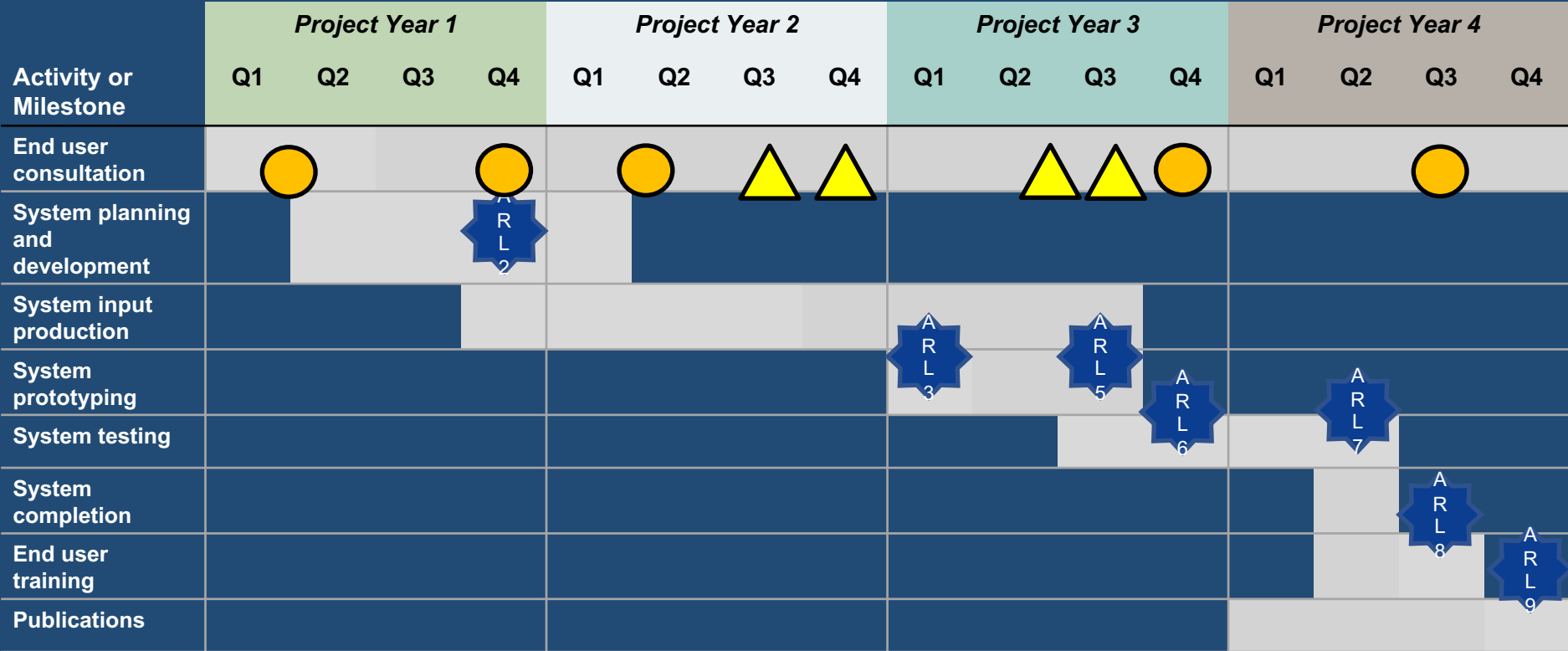
- Additional slides if helpful/for questions



End-user retreat/workshop

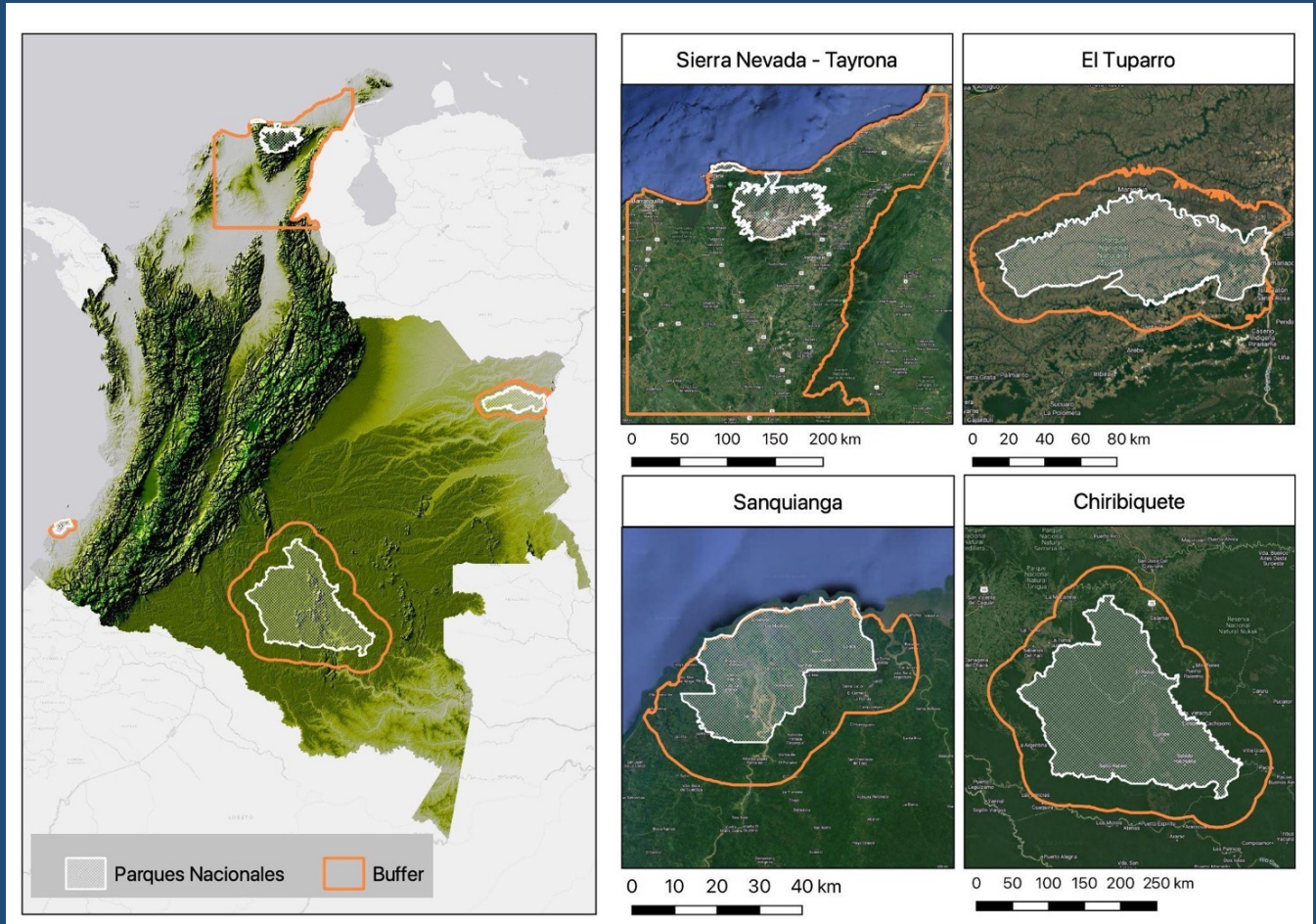
System input workshop

Project Schedule

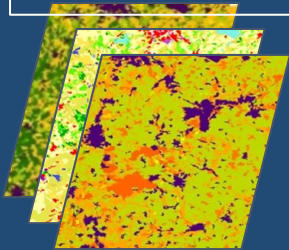


Pilot in 5 buffered protected areas representing ecological diversity and LULC types in the county.

Extent = ~14% of continental area of Colombia.



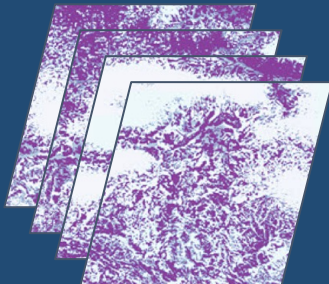
1. Synthesis of existing LULC products



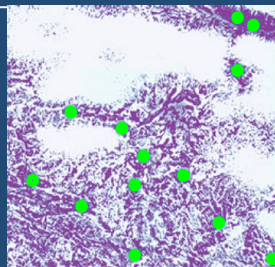
2. Legend homologation



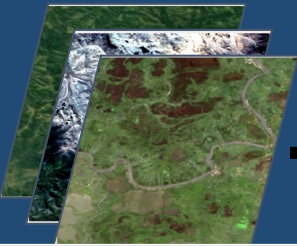
3. Extent masks per LULC



4. LULC extent overlay and training data collection



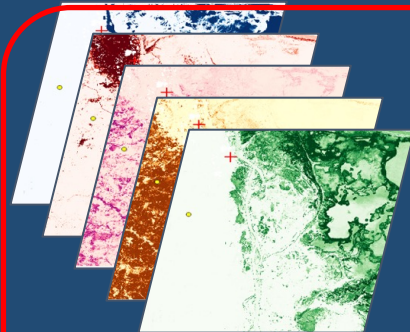
5. Landsat phenological metrics, A-P SAR mosaics



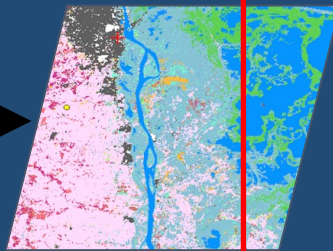
6. Supervised classification

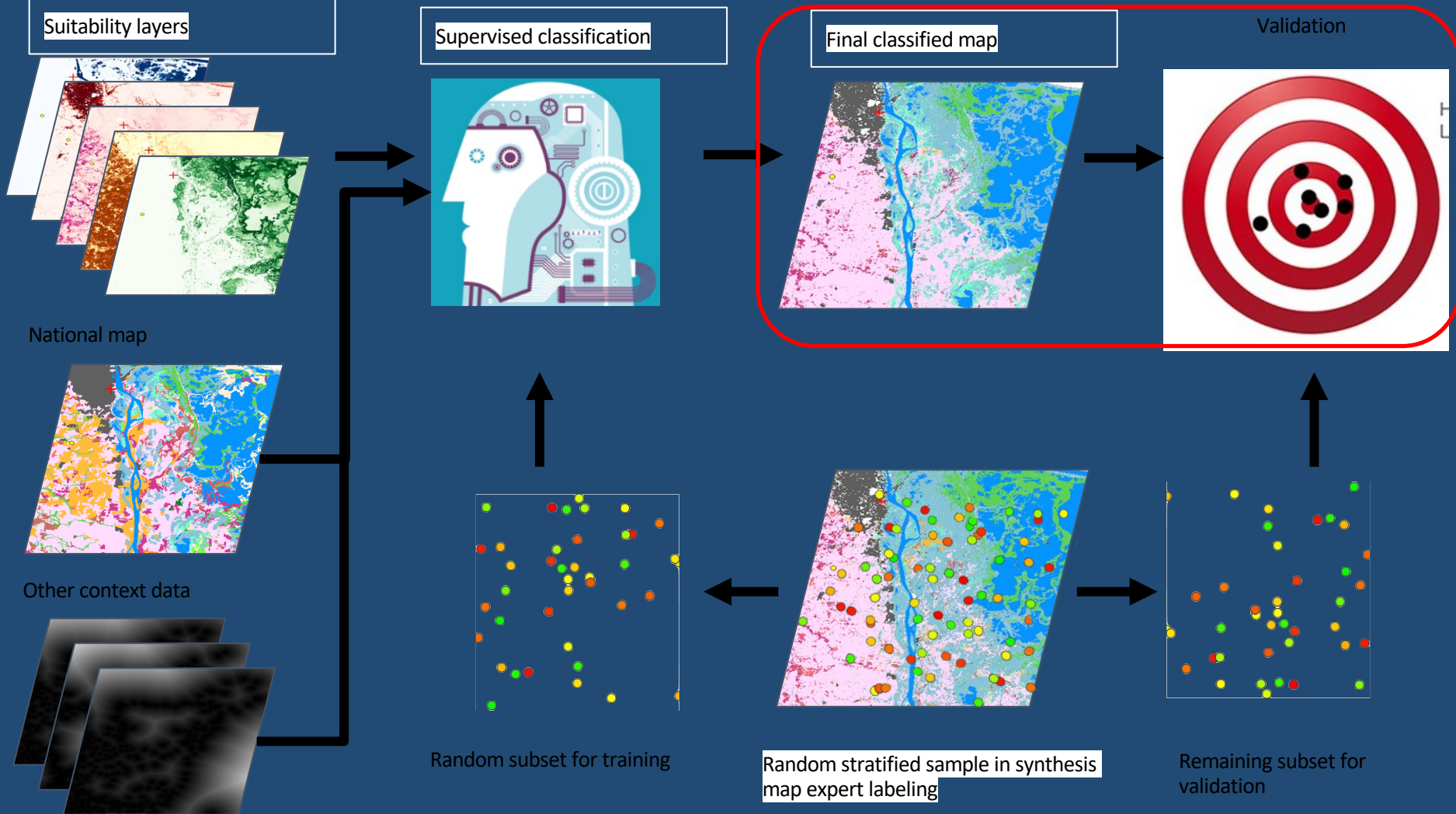


Suitability layers

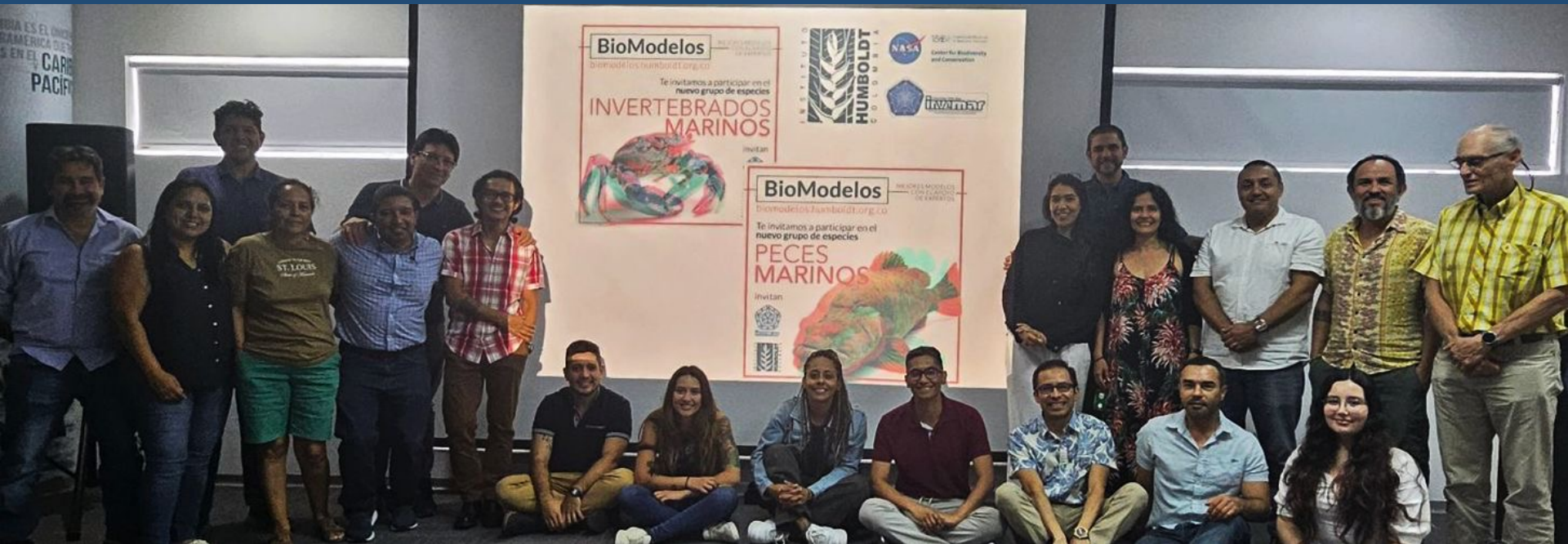


Synthesis map





Adding new marine species information:



March 2024, Santa Marta, Colombia