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Institute

Expanding a Decision Support System to Inform Conservation Actions with Local Communities and Governments in Tanzania and Uganda Using OPERA Land Surface Disturbance Alerts and Planet Data

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July 14, 1960, Gombe, Tanzania





“Now we must redefine ‘tool’, redefine ‘Man’, or accept chimpanzees as humans.” Louis Leakey



- October 6, 1960 - the first formal observation of its kind of tool-use by a non-human animal.
- It challenged the definition which separated humans from other animals – formerly “human the tool-maker.”



the Jane Goodall Institute:

by protecting chimpanzees and inspiring people to conserve the natural world we all share, we improve the lives of people, animals and the environment.

Animal Welfare - 1992



Roots & Shoots - 1991



Chimpanzee Conservation - 1986



Gombe Long-Term Research - 1960



Tacare Community-Led Conservation - 1994

EO data and geospatial technologies since 2000



Most of the World's Biodiversity is Under the Care of Local People

- Indigenous territories and local communities hold most of the world's remaining biodiversity (UN WCIP 2014, World Bank 2018, National Geographic 2018)
- 65% of the world's land is under indigenous or local community customary ownership and use (Rights and Resources Initiative, 2015)
- To be effective, conservation efforts should be owned by local communities in partnership with local governments to address the needs of people, wildlife and their shared environment



Smallholder forest owner in western Uganda
(Source: Community Forest Monitoring, JGI Uganda)



Protected Areas in Chimpanzee Range in 1994

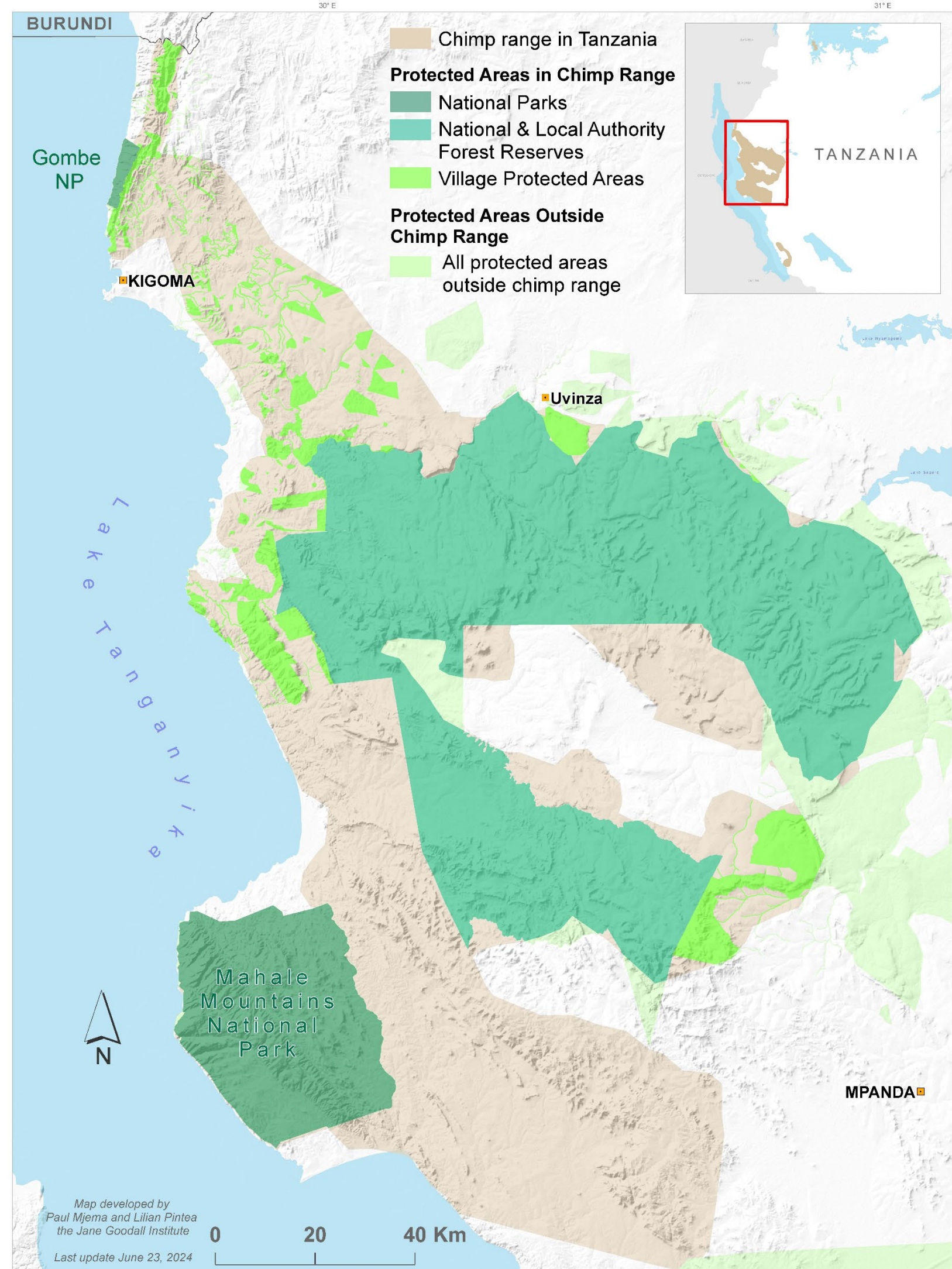


Before Tacare
9% of the chimpanzee range was protected in 1994 in Gombe and Mahale National Parks





Protected Areas in Chimpanzee Range in 2024



Using Tacare
52% of the remaining chimpanzee range in Tanzania is designated as protected at the village, district and national levels

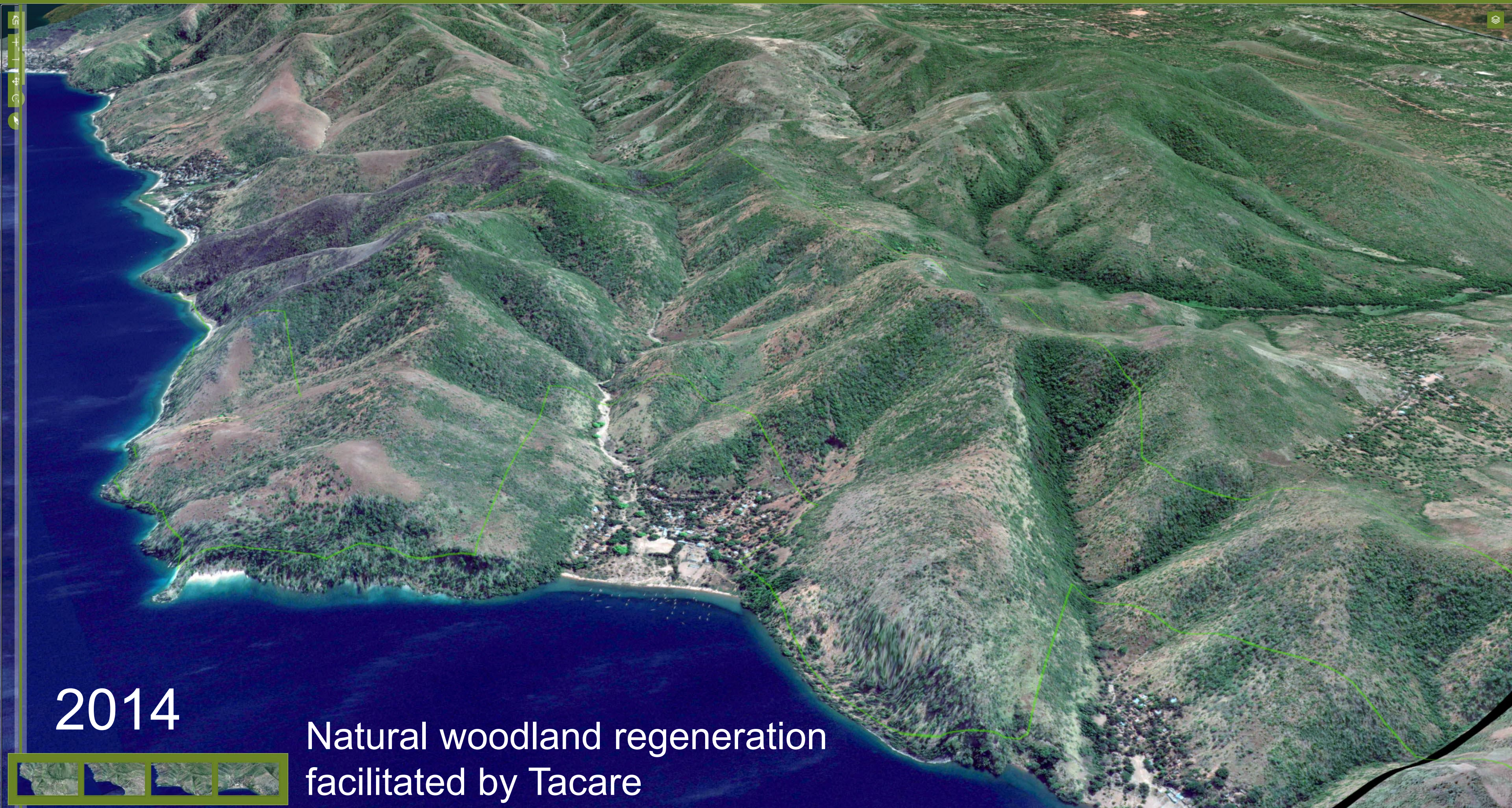




2005

Deforested watersheds and land degradation





2014

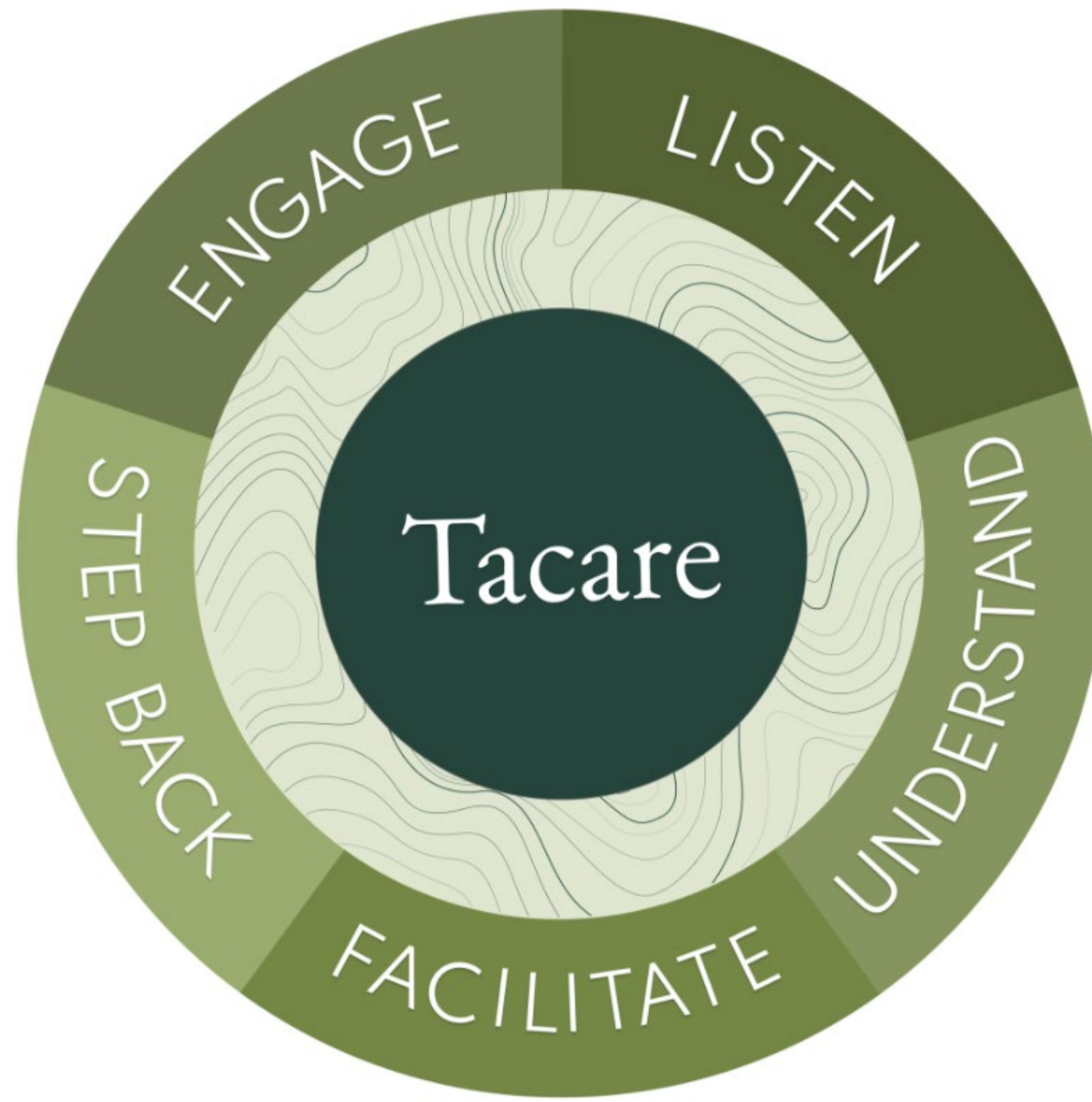
Natural woodland regeneration facilitated by Tacare





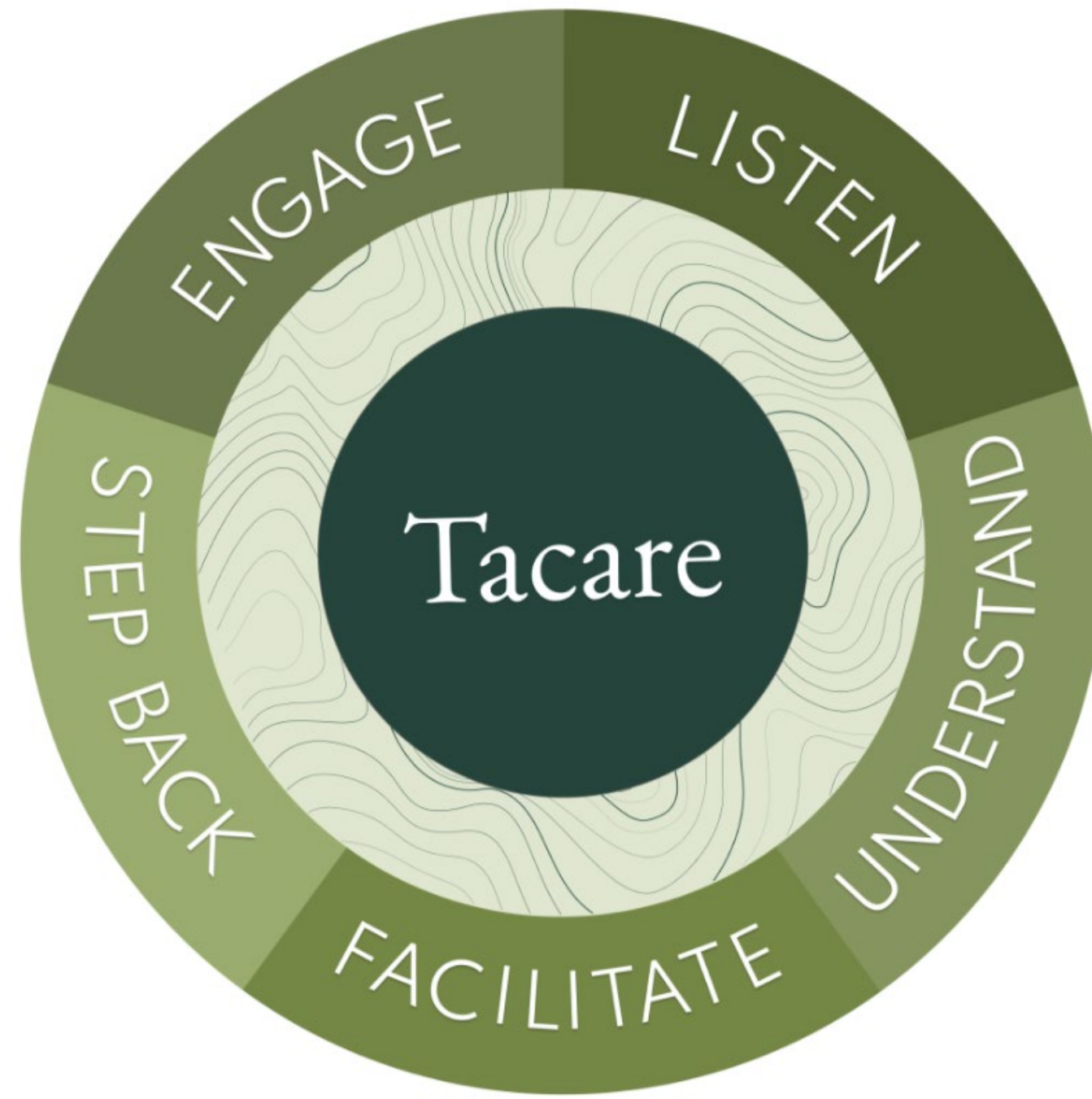
What is Tacare?

Tacare not only engages but strives to assure that local people and institutions own and drive development and conservation decisions in their landscapes.





Tacare uses a geographic approach, EO data and appropriate geospatial technologies WITH the local communities to connect conservation needs with people livelihoods





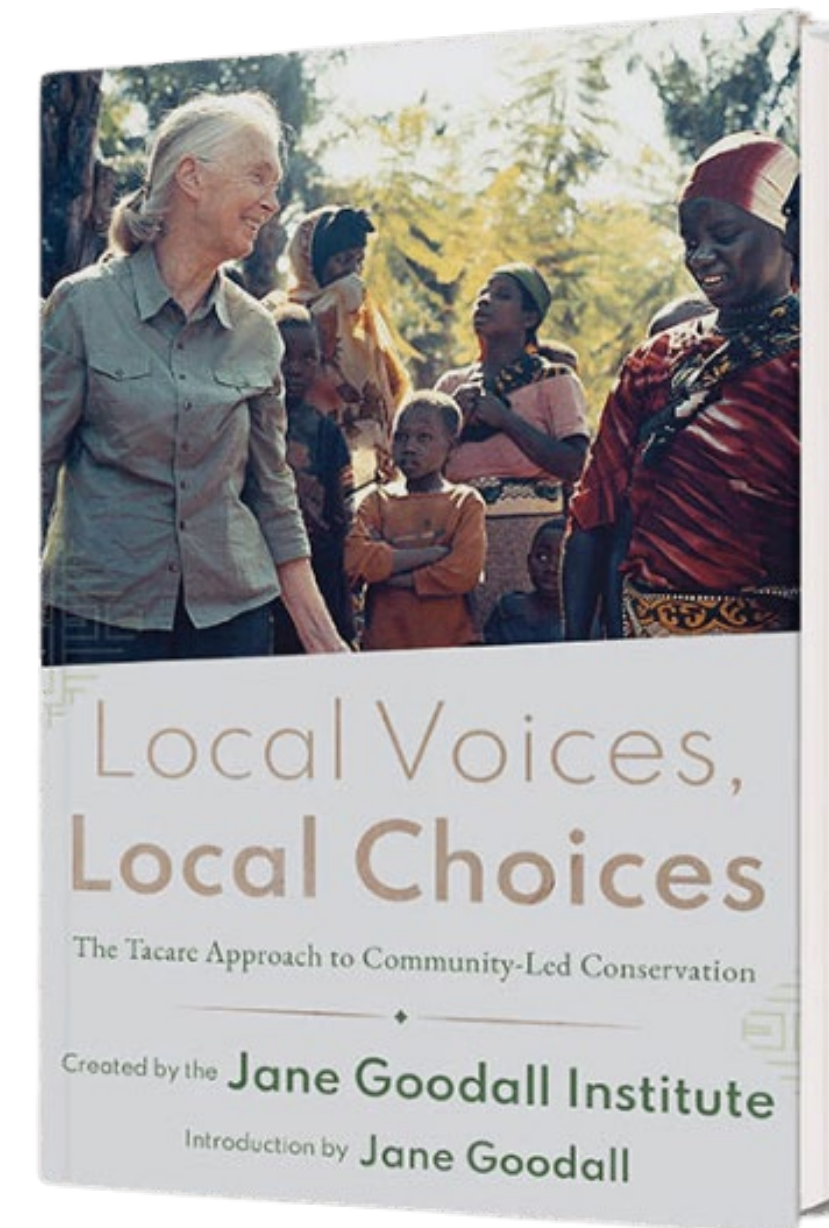
Tacare Community-Led Process & EO Data

Tacare Story Map

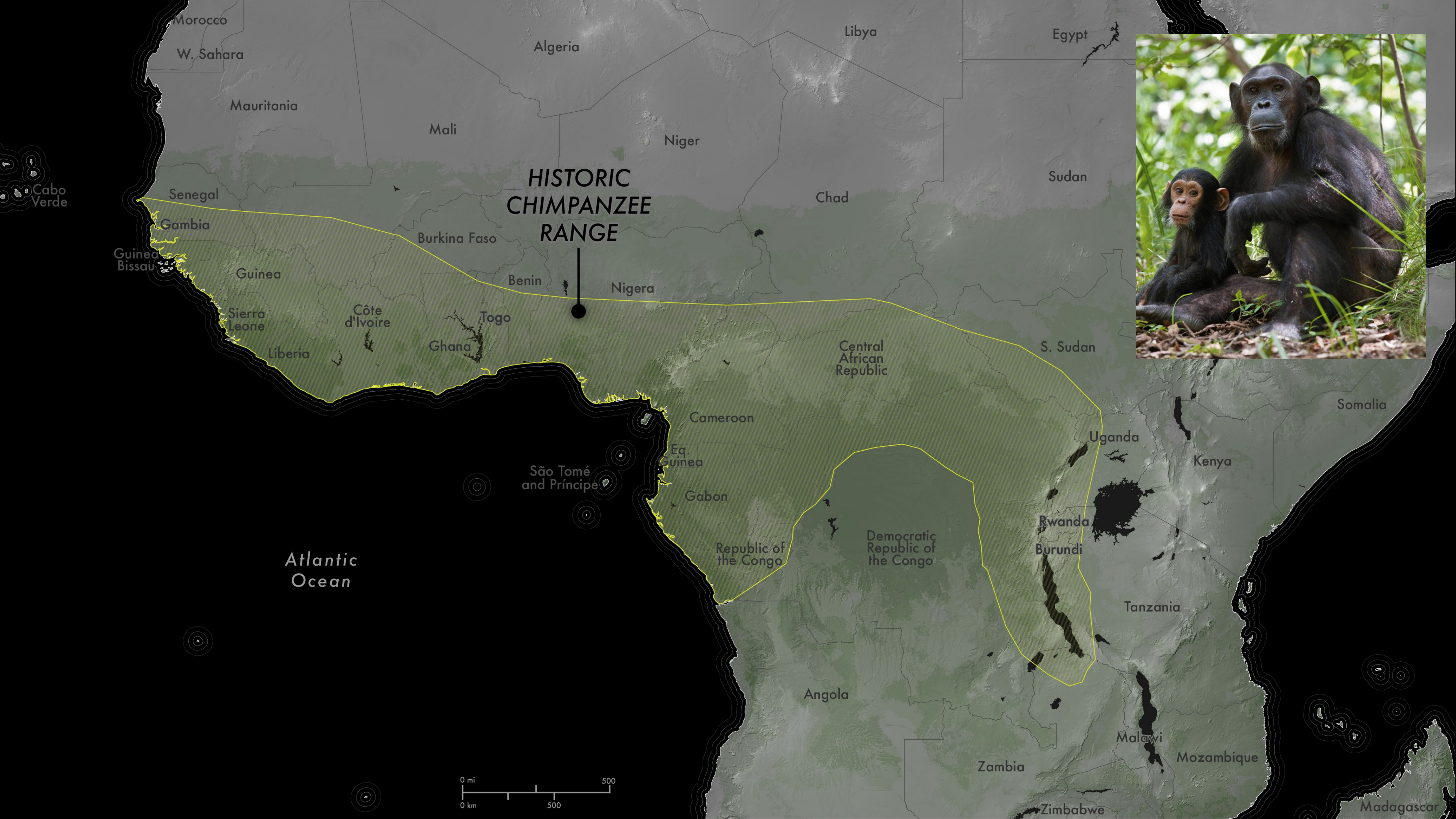


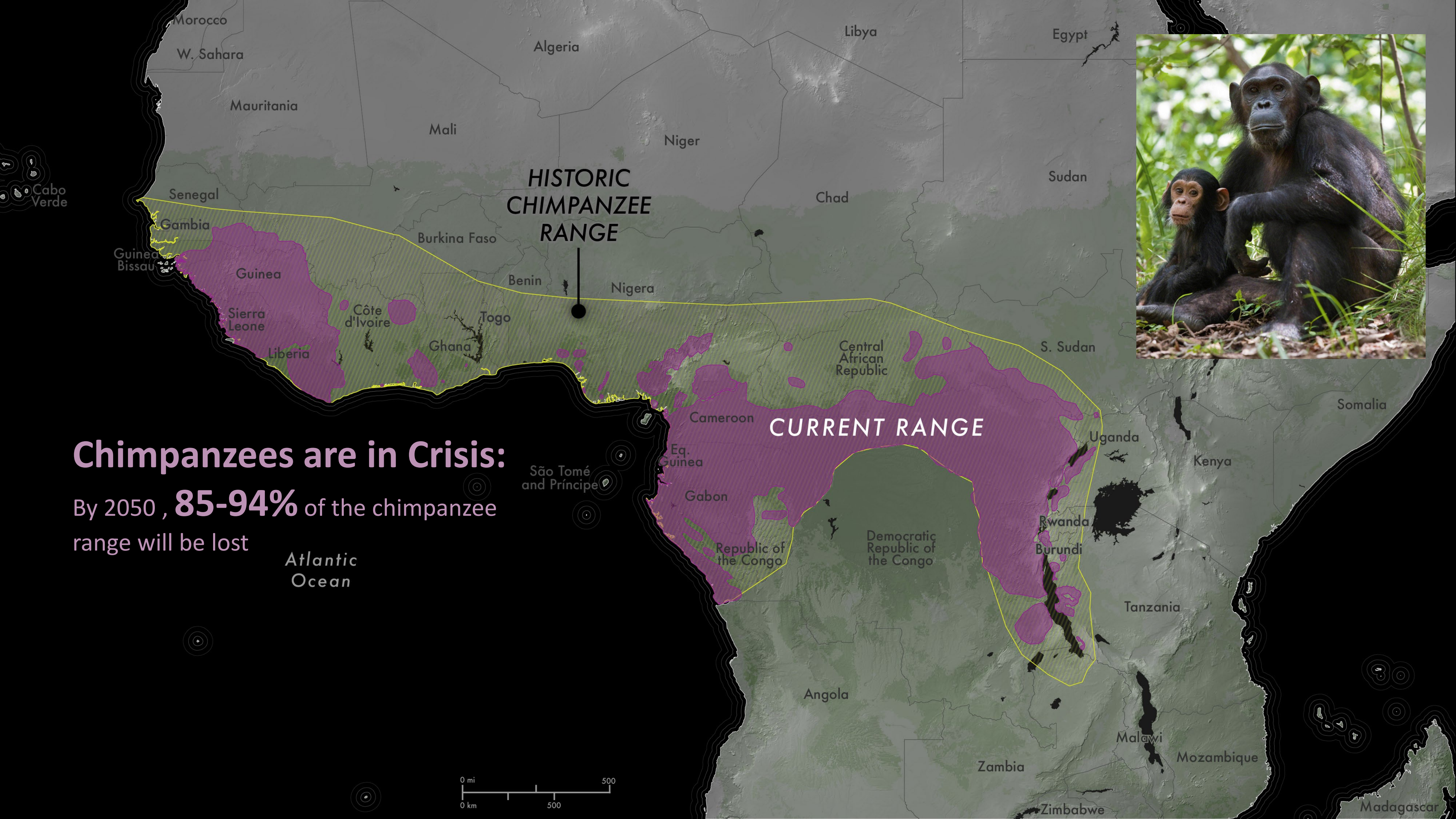
<https://storymaps.arcgis.com/collections/4bb4a82e722f497dbd55d8649018d3b3?item=1>

Tacare Book



<https://shop.janegoodall.org/product/local-voices-local-choices/jgi408>





Chimpanzees are in Crisis:

By 2050 , **85-94%** of the chimpanzee range will be lost

Atlantic Ocean



Threats to chimpanzees



Agriculture



Insecurity



Bushmeat hunting



Unregulated Mining



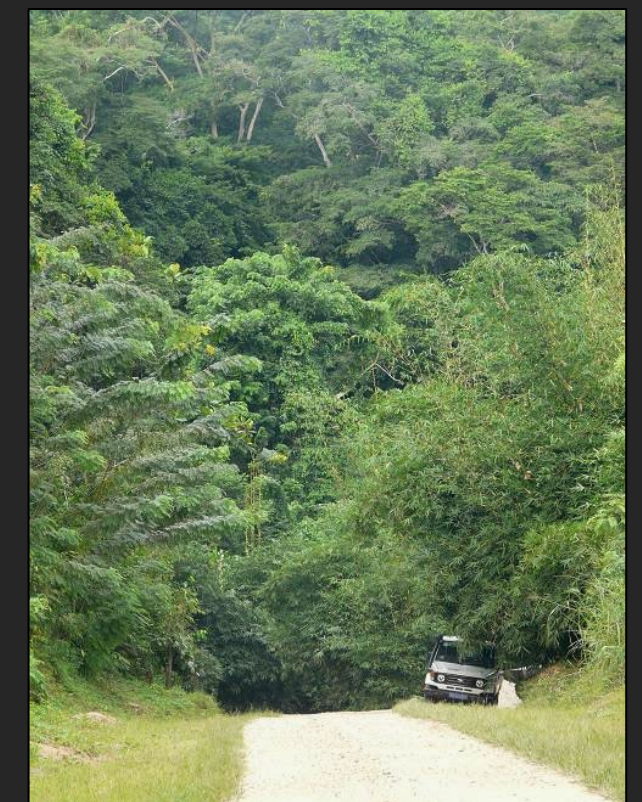
Logging



Low protection capacity



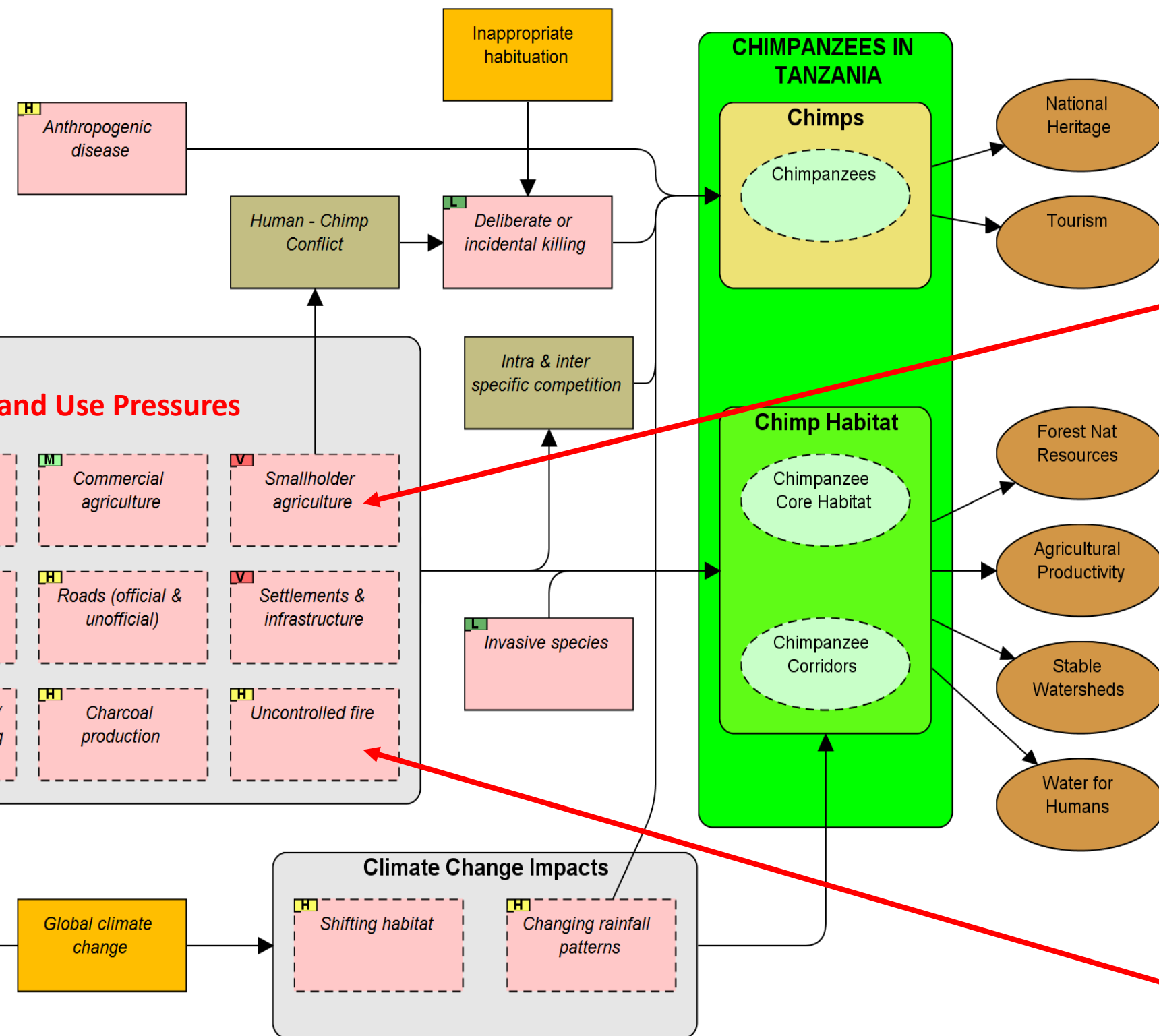
Live infant capture

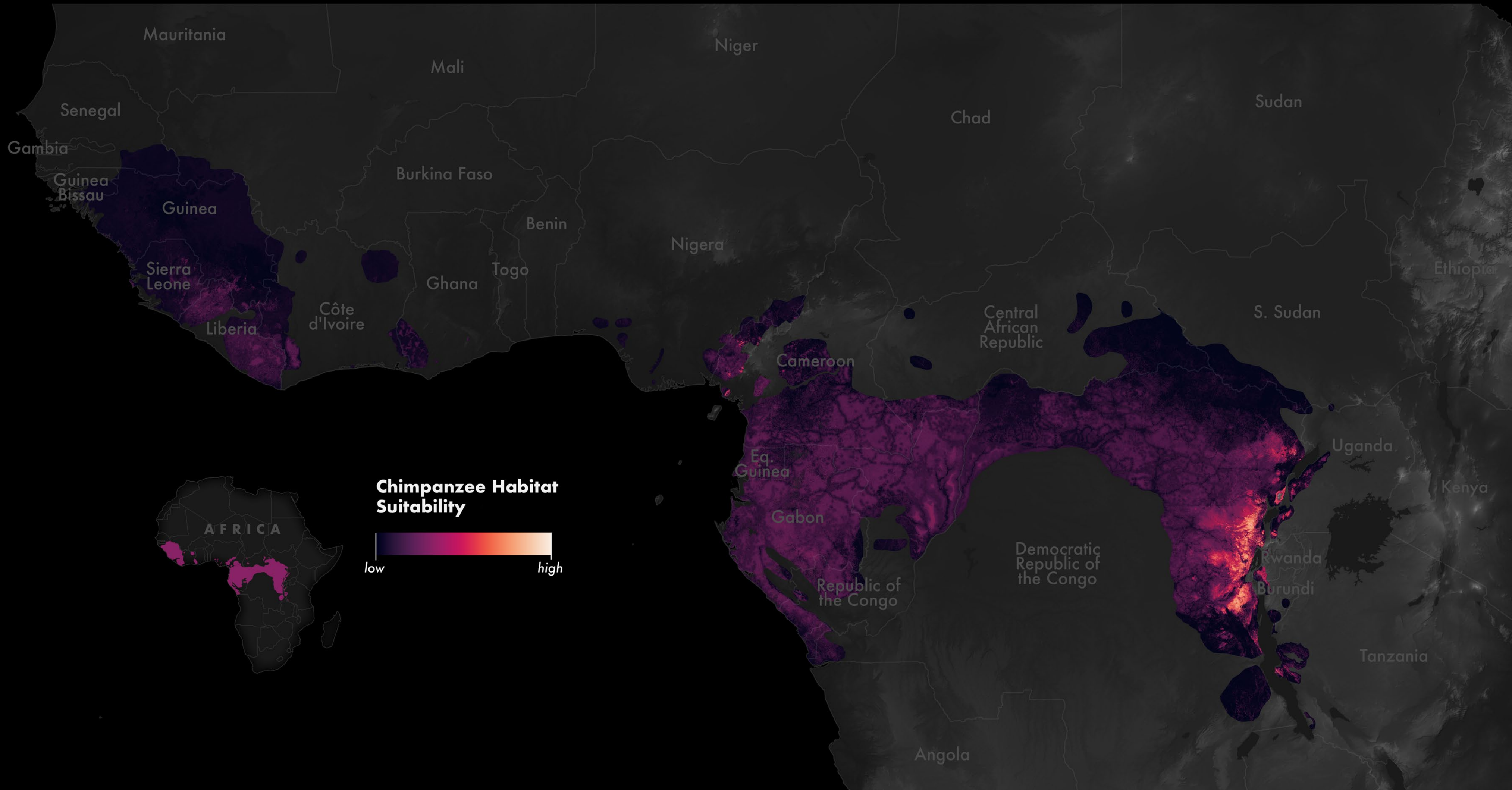


Roads

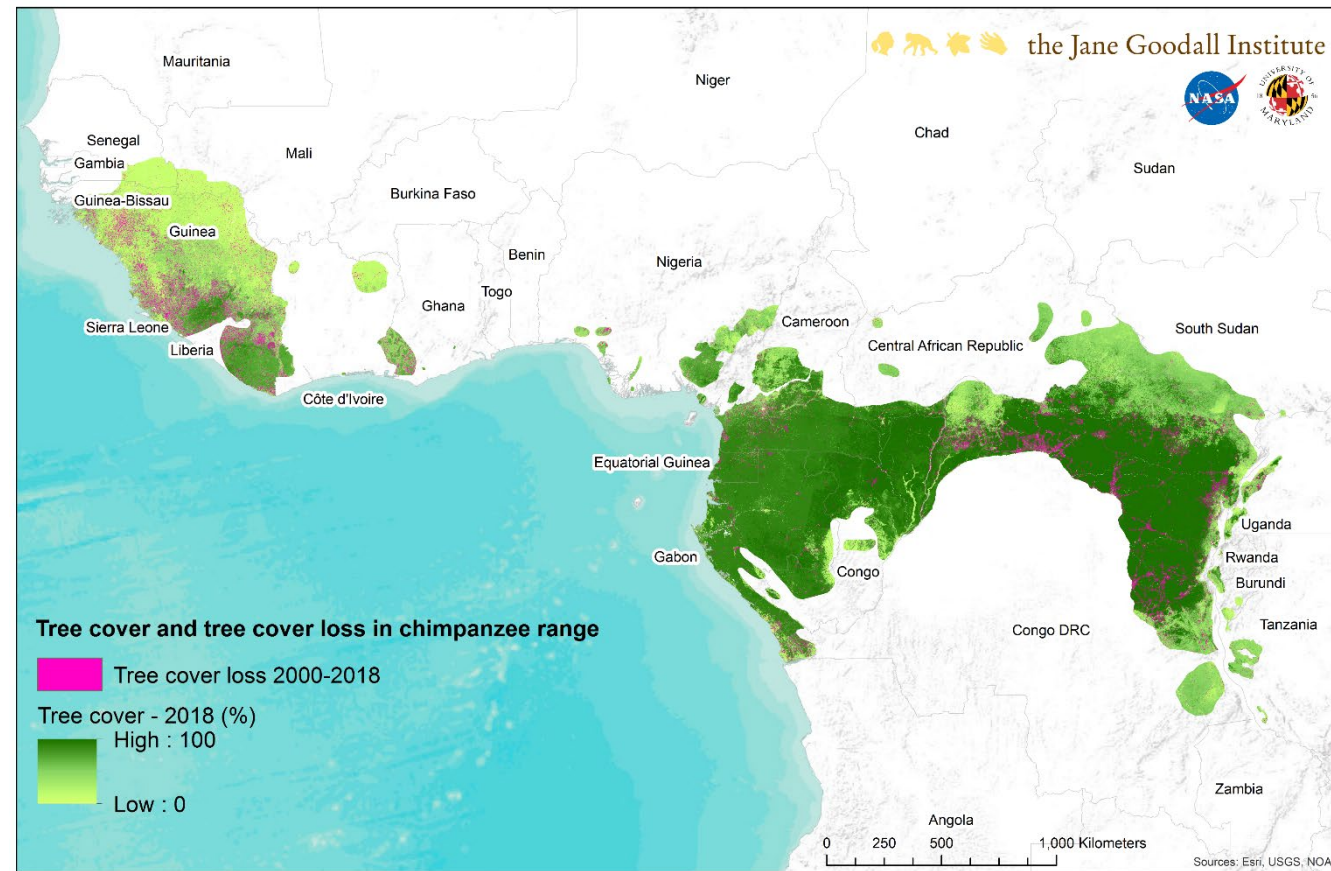


Conservation Standards: Prioritize Threats, Identify Strategies and Actions and Measure Conservation Success

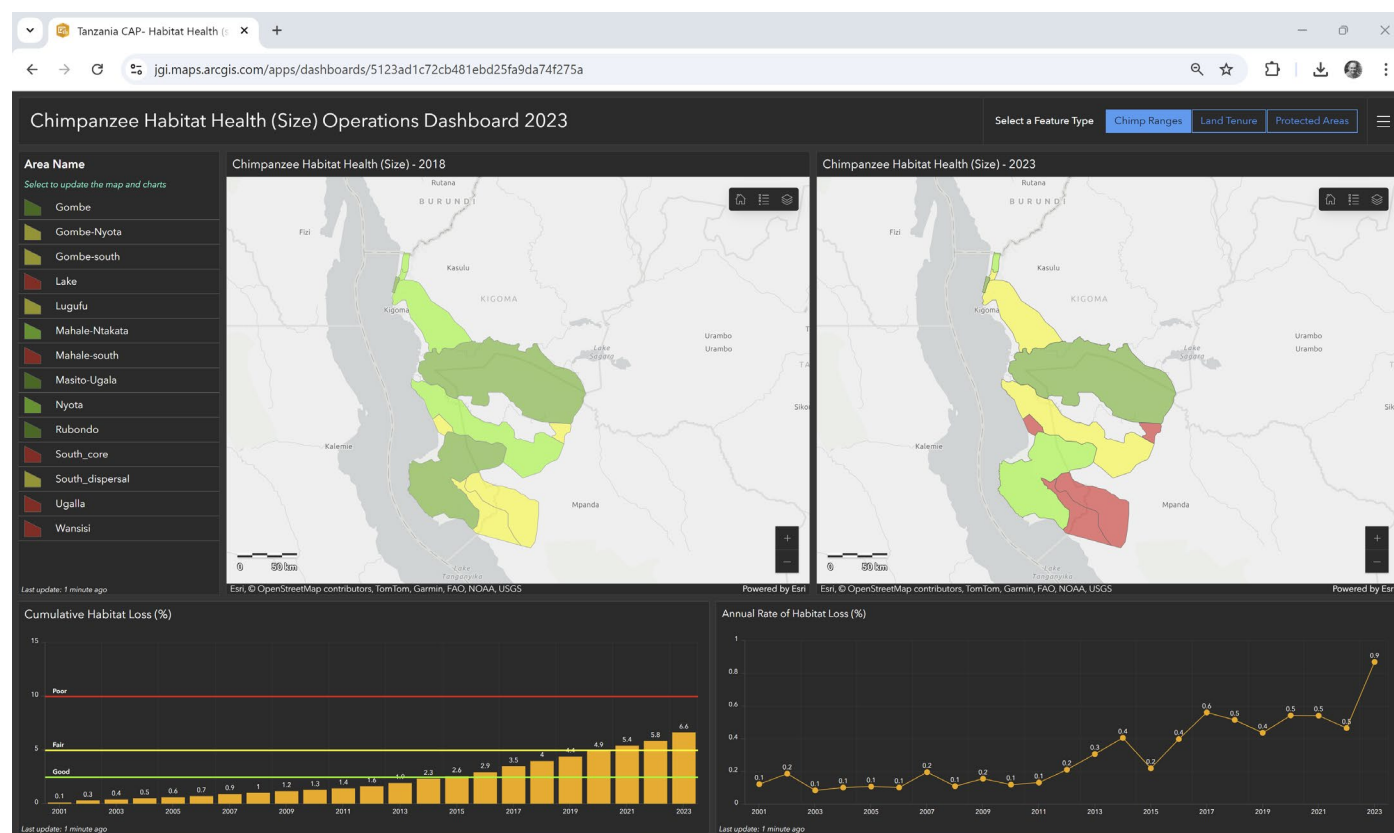




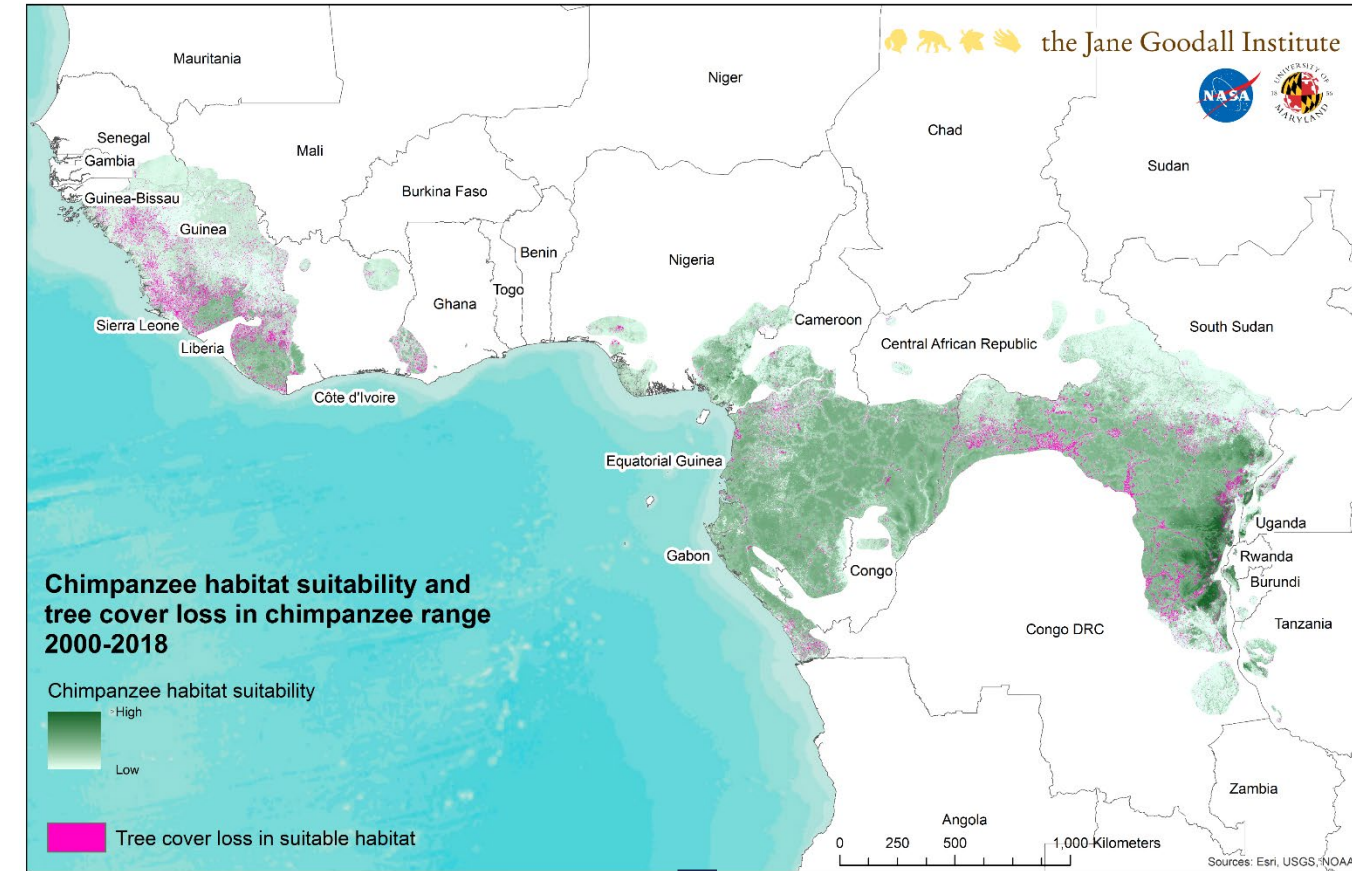
Satellite Data & Derived Products



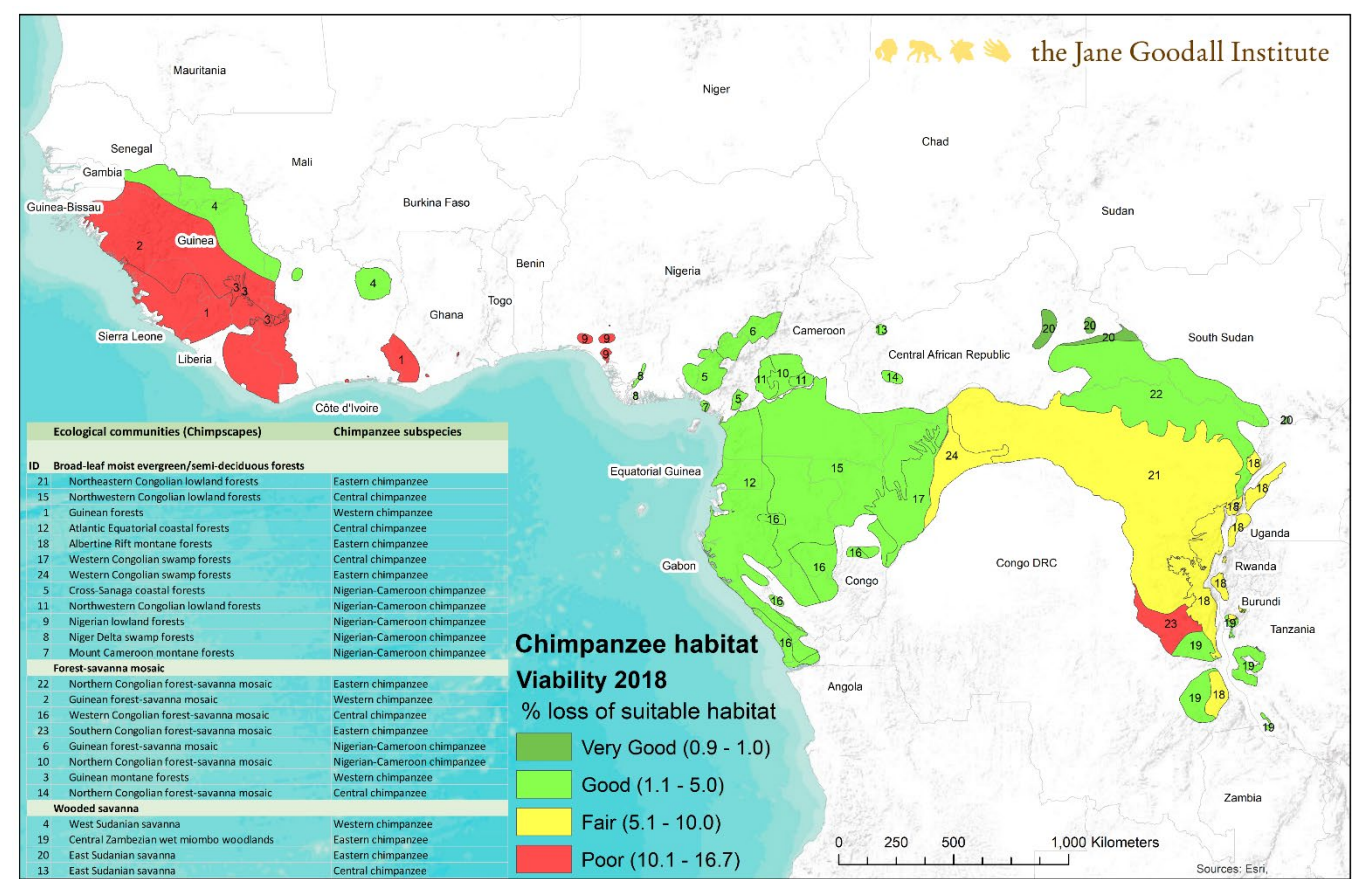
Dashboards for Decision Making
(e.g. Tanzania National Chimp Conservation Plan)



Chimpanzee Habitat and Threat Models



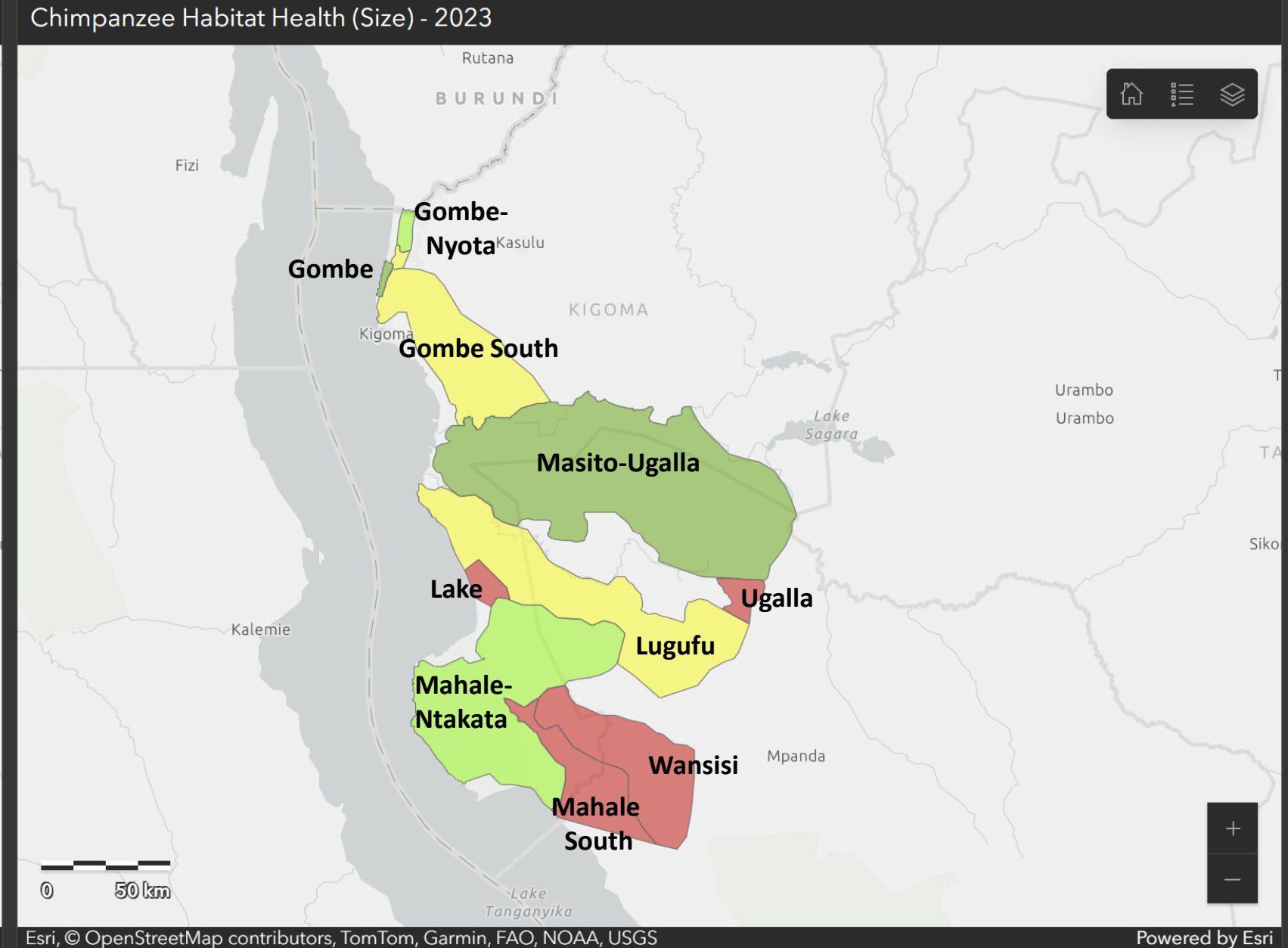
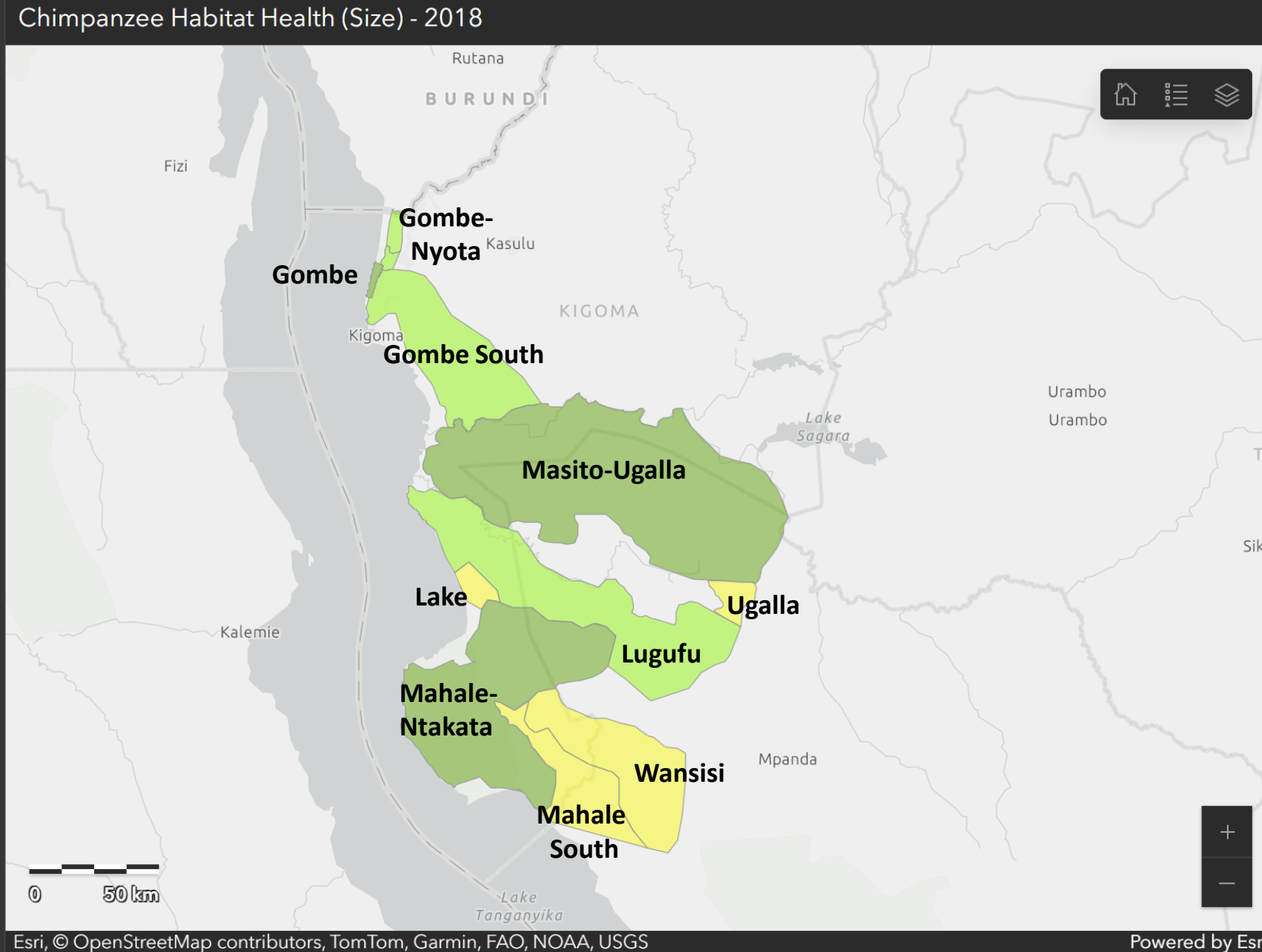
Conservation Standards Viability & Treats



Chimpanzee Habitat Health (Size) Operations Dashboard 2023

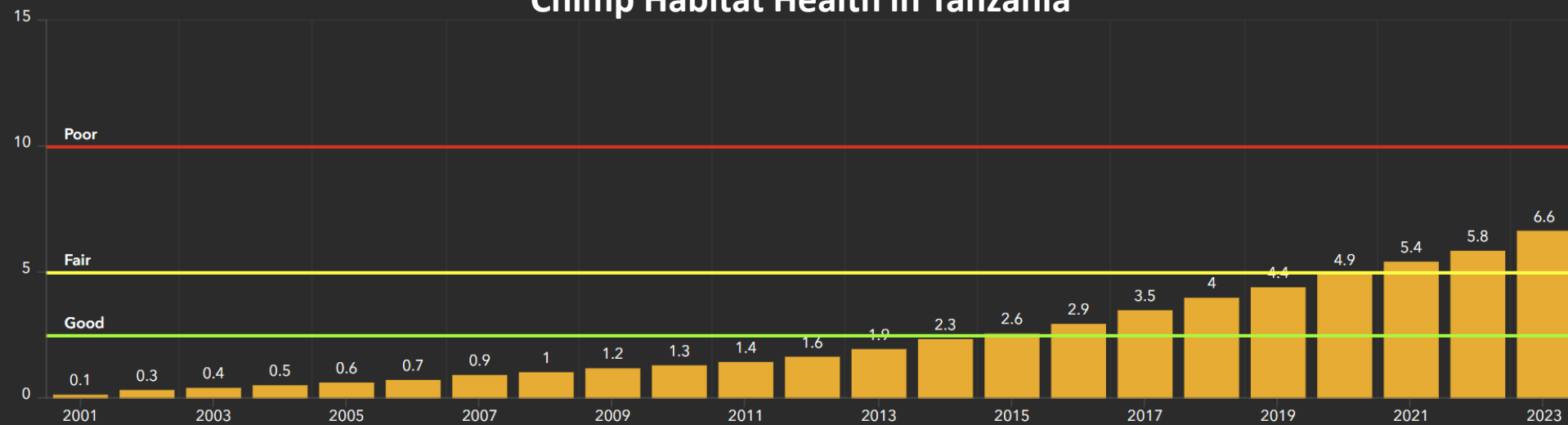
Select a Feature Type **Chimp Ranges** Land Tenure Protected Areas

- Area Name**
Select to update the map and charts
- Gombe
 - Gombe-Nyota
 - Gombe-south
 - Lake
 - Lugufu
 - Mahale-Ntakata
 - Mahale-south
 - Masito-Ugala
 - Nyota
 - Rubondo
 - South_core
 - South_dispersal
 - Ugalla
 - Wansisi



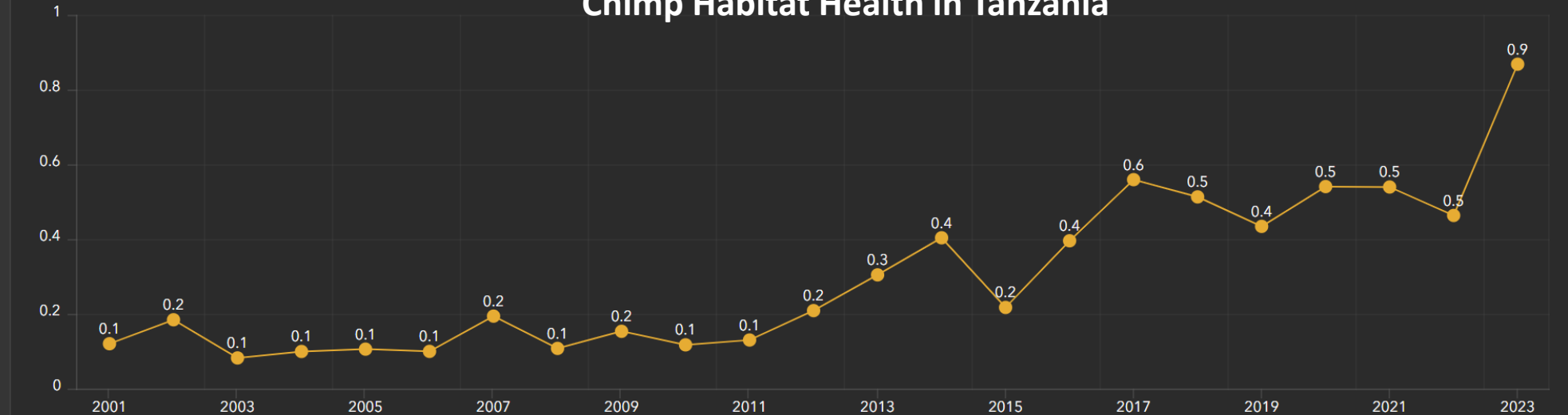
Cumulative Habitat Loss (%)

Chimp Habitat Health in Tanzania



Annual Rate of Habitat Loss (%)

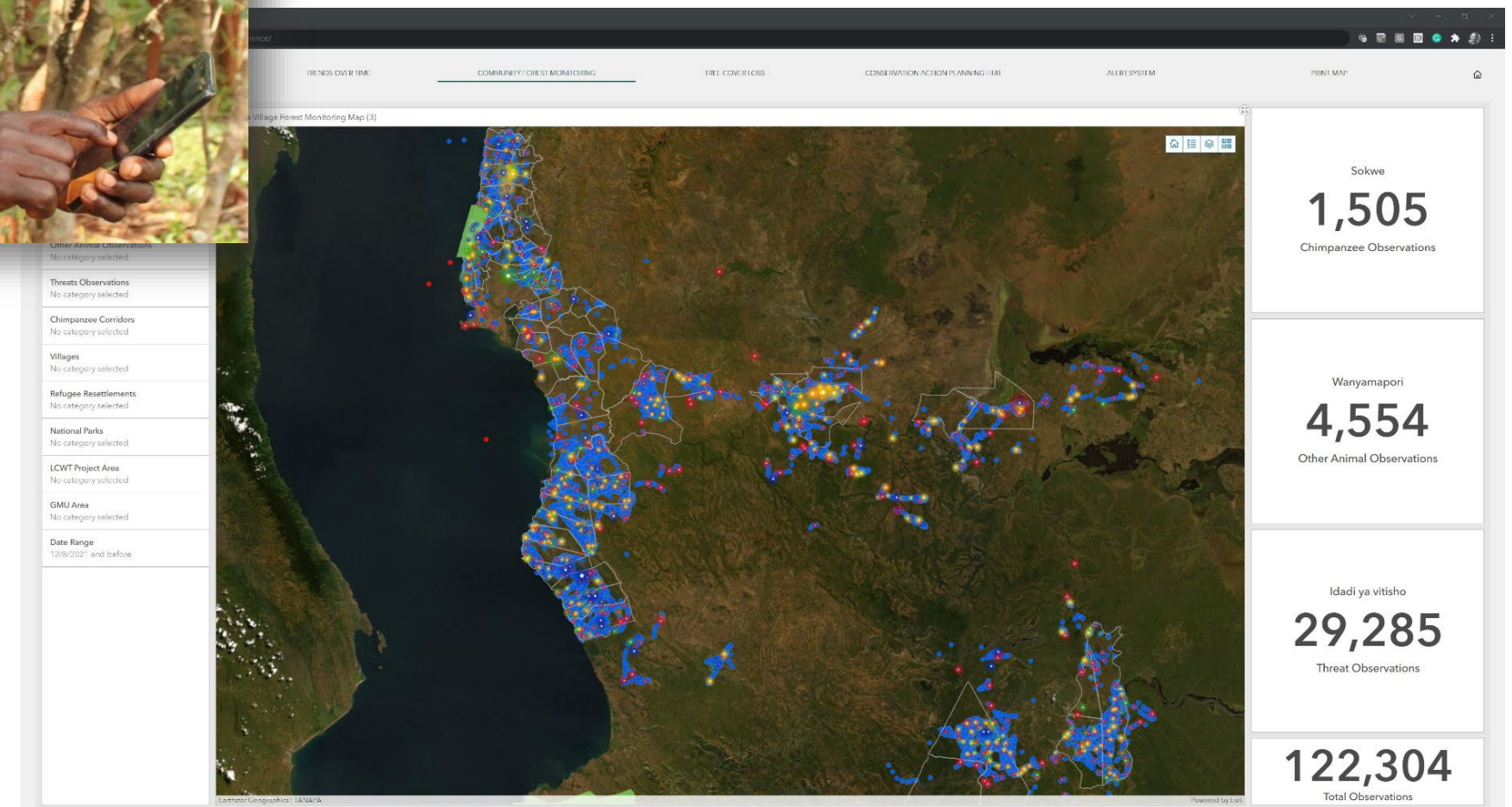
Chimp Habitat Health in Tanzania





Key Challenges

- Data inputs from multiple sources
 - Village Forest Monitors
 - Satellite imagery
 - Fire detection systems
 - Ecoacoustics
 - Camera traps etc.
- From Pixel to Management Units
- “Last mile” conservation challenges
 - Access
 - Infrastructure
 - Resources etc.





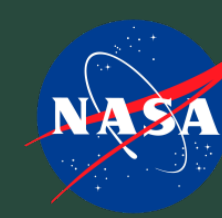
The ArcGIS Solution



- ArcGIS Online
- ArcGIS Survey 123
- ArcGIS Pro
- ArcGIS Dashboards
- ArcGIS Experience Builder
- ArcPy and ArcGIS API for Python
- Jupyter Hosted Notebook



Decision Support System – Satellite Imagery



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FROM THE AMERICAN PEOPLE



STATUS OF CHIMPANZEES, FORESTS & THREATS

TRENDS OVER TIME

COMMUNITY FOREST MONITORING

DISTRICT FOREST MONITORING

TREE COVER LOSS

CONSERVATION ACTION PLANNING HUB

PRINT MAP

ALERT SYSTEM



Data Filters

Use the parameters below to filter the map and infographics.

Year

2001 - 2023

Forest Type

No category selected

District

No category selected

Chimpanzee Ranges and Corridors

No category selected

Village

No category selected

Village Forest Reserve

No category selected

District Forest Reserve

No category selected

Refugee Settlement

No category selected

National Park

No category selected

GMU

No category selected

Zone

No category selected

Tree Cover Loss By Habitat Type



Riverine

17,233

Riverine Forest Tree Cover Loss



Woodland + Riverine

256,252

Woodland and Riverine Tree Cover Loss



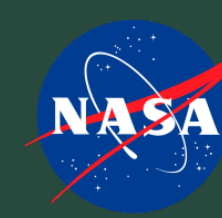
Total

322,828





Decision Support System - Forest Monitors



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Data Filters

Use the parameters below to filter the map and infographics by observation type, geography, and date.

Districts

No category selected

Chimpanzee Corridors and Ranges

No category selected

Chimpanzee Observations

No category selected

Other Animal Observations

No category selected

Threats Observations

No category selected

Villages

No category selected

Village Forest Reserve

Selection required

District Forest Reserve

No category selected

Refugee Settlements

No category selected

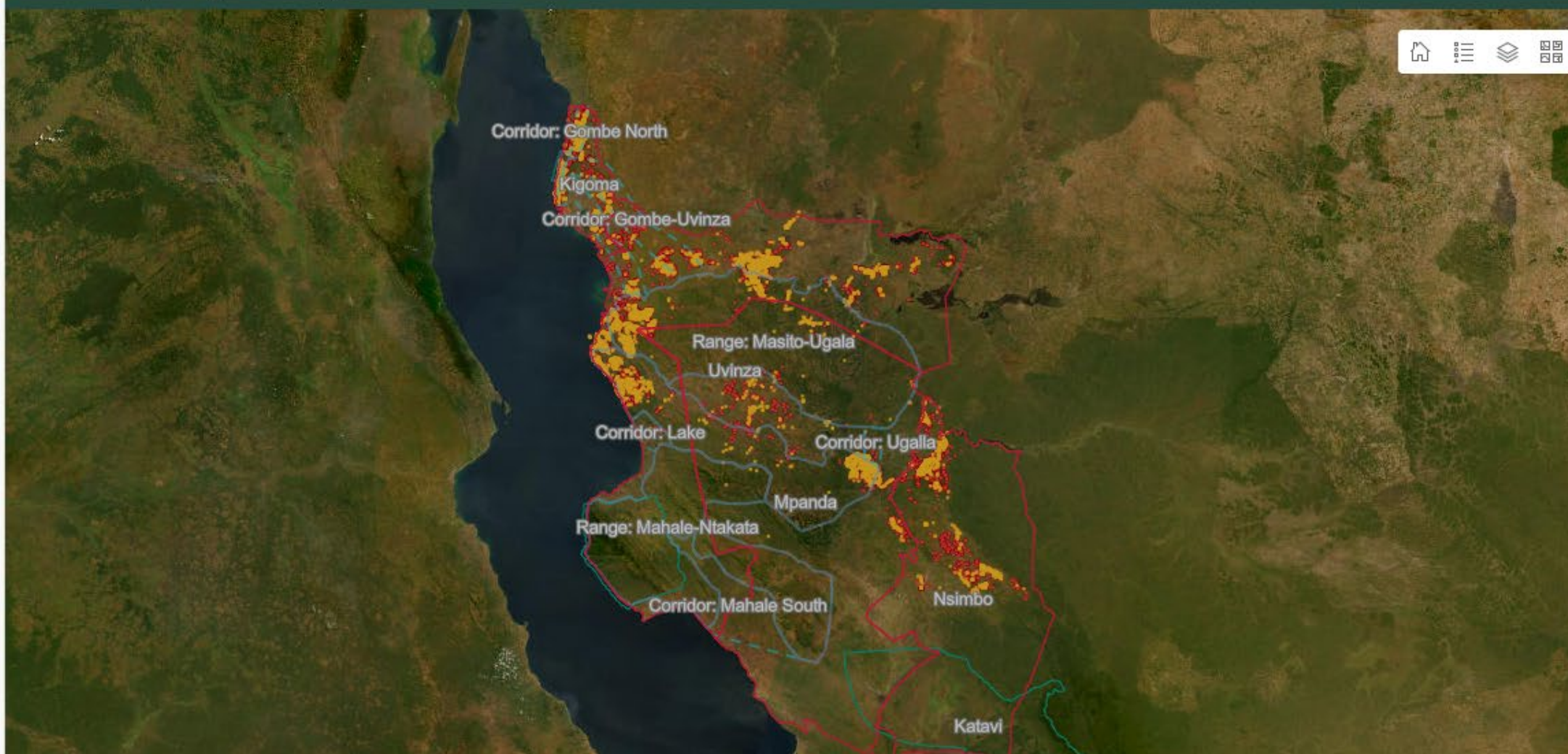
National Parks

No category selected

LCWT Project Area

No category selected

Status of Chimpanzees, Their Forests, and Their Threats



Earthstar Geographics | TANAPA | The National Bureau of Statistics, Districts, The Jane Goodall Institute (JGI)

Powered by Esri

Chimpanzee Observations

2,493

0.06 Observations / km Patrolled

Other Animal Observations

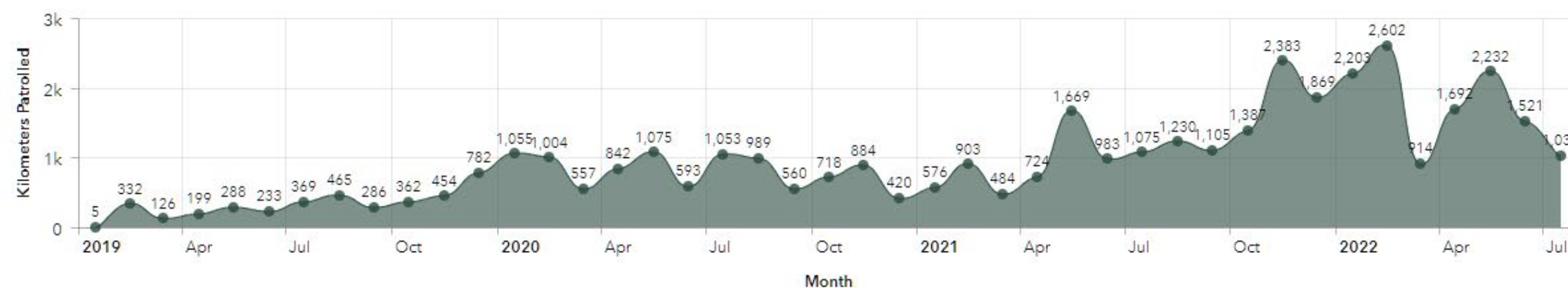
16,720

0.41 Observations / km Patrolled

Threat Observations

33,694

0.83 Observations / km Patrolled



Kilometers Patrolled

40,449

Total Observations

63,107

Data Sources



Scheduled Processes



One Dataset



Multiple Views & Applications



Various End-Users



All Data → One Place



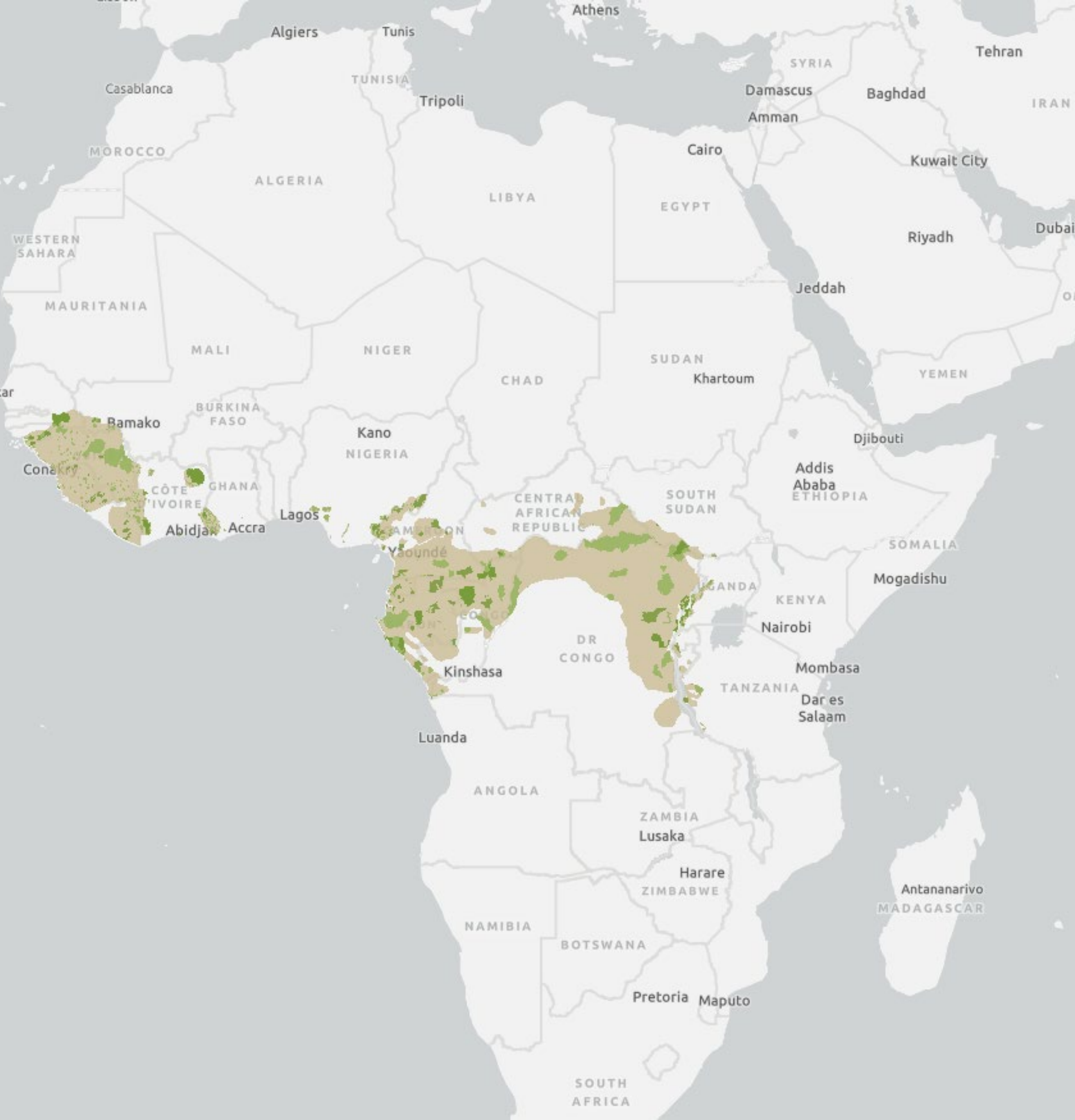
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Community-Centered Technology Adaptation



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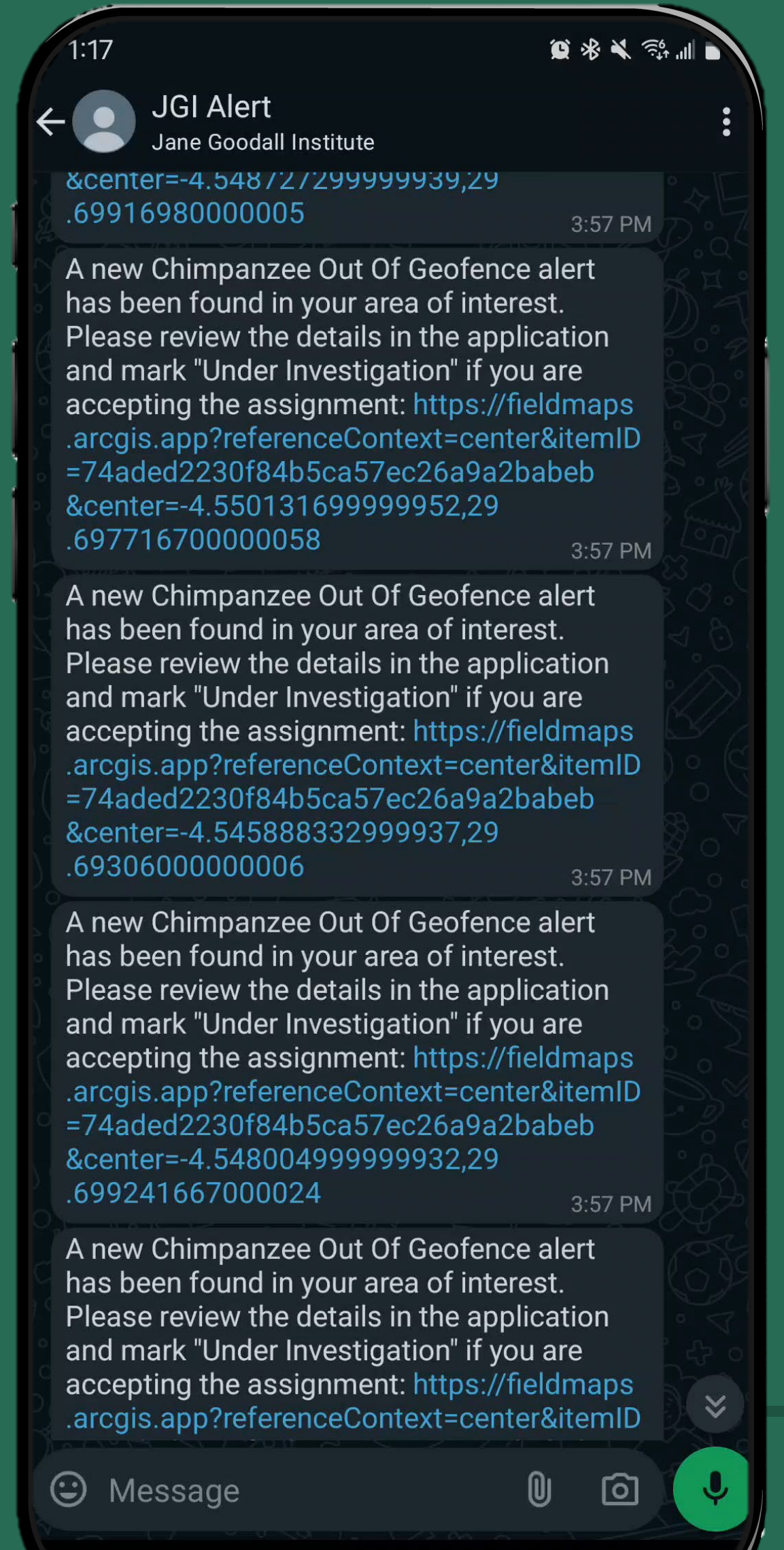
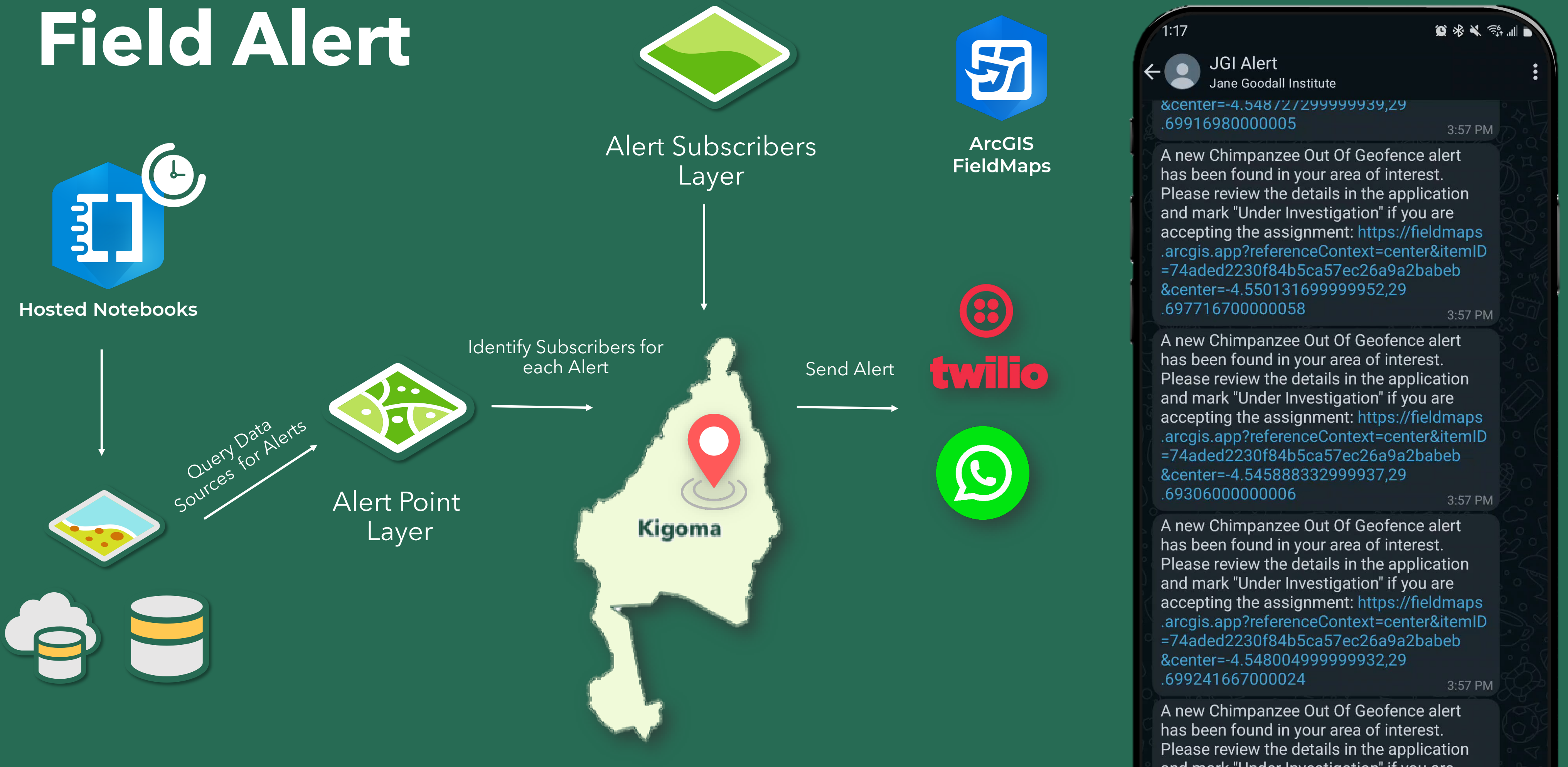


Scalable and Adaptable



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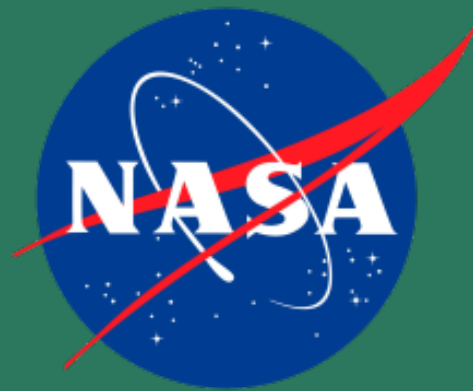
Field Alert



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Next Steps

- Text Message (SMS)
- Swahili
- NASA OPERA Alerts + Planet Project Centinela



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PROJECT CENTINELA

Project Centinela



OSA Peninsula
Bolivia



Val do Javari
Brazil



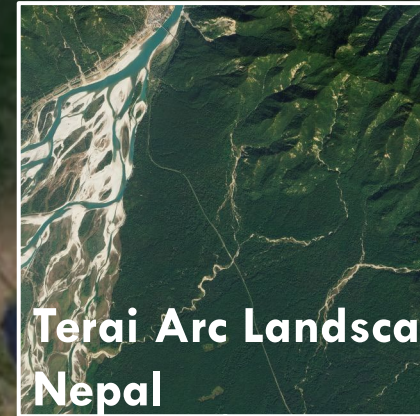
Rios Matos
RAMSAR Site
Bolivia



Virunga Nat'l Park
DRC



Eastern Chimpanzee
Conservation Areas
East Africa



Terai Arc Landscape
Nepal



Blue Future
Mozambique



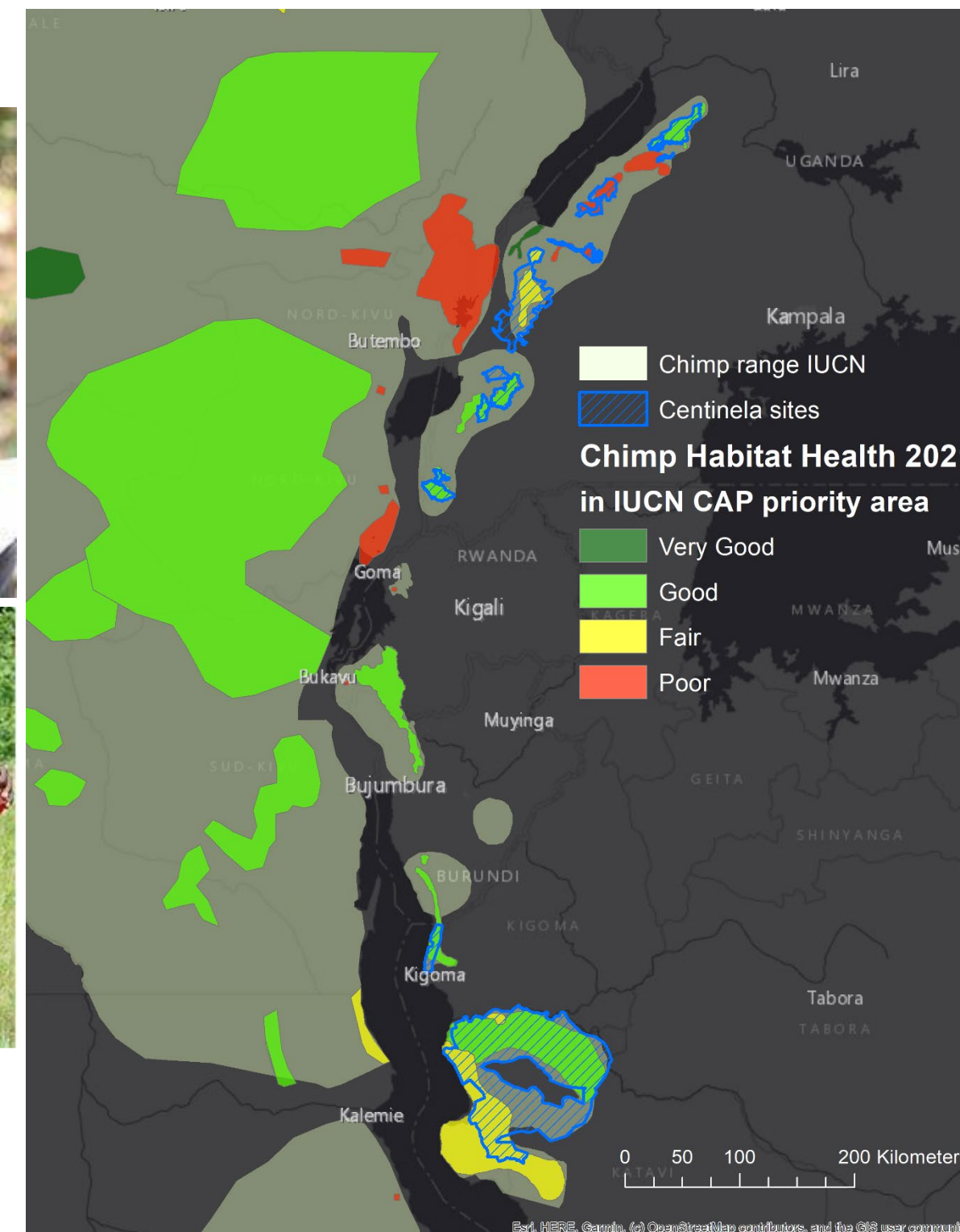
Gunung Naning
Protection Forest
Indonesia

Eastern Chimpanzee Conservation Areas, Uganda and Tanzania



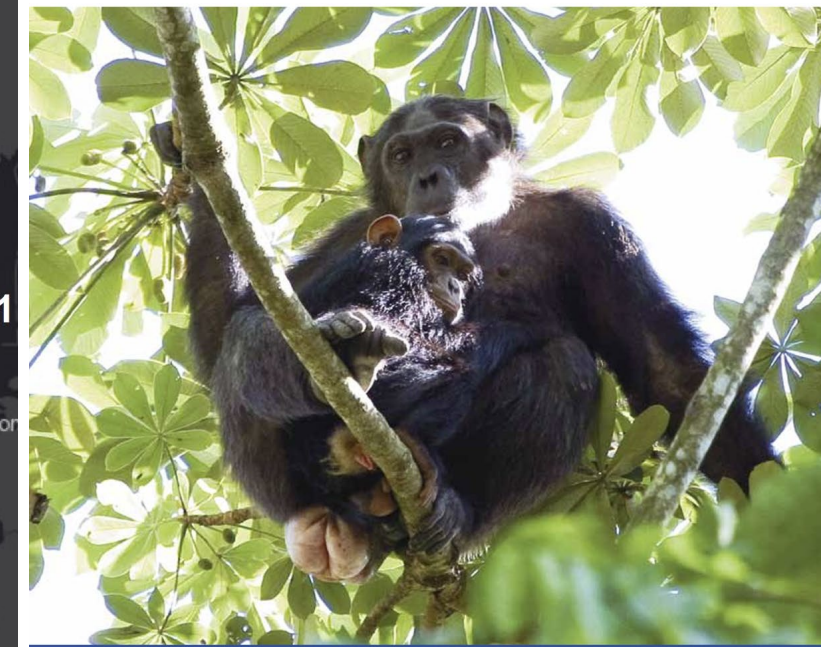
Core habitat for chimpanzees and essential natural resources for local communities

- Understanding chimpanzee behaviour, ecology and human evolution
- Monitoring threats to chimpanzees and their habitats across core populations in their eastern range
- Supporting village and district land use planning, local payment for ecosystem services programs, and protected area law enforcement
- Tracking progress and success of forest and habitat restoration efforts
- Integrates Planet data into implementation of National Chimpanzee Conservation Action Plans

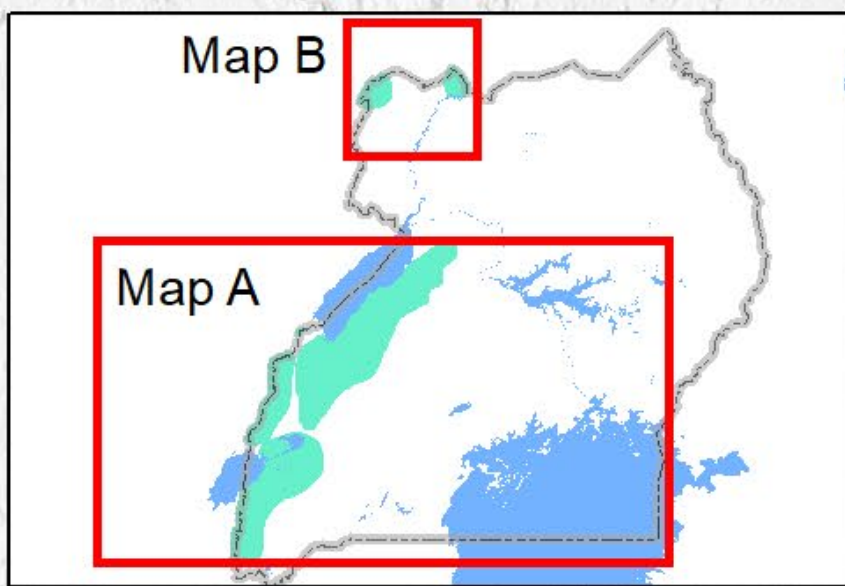


Eastern Chimpanzee
(*Pan troglodytes schweinfurthii*)

Status Survey and Conservation Action Plan
2010–2020

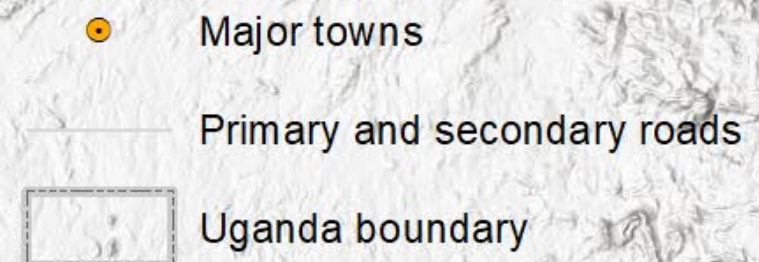


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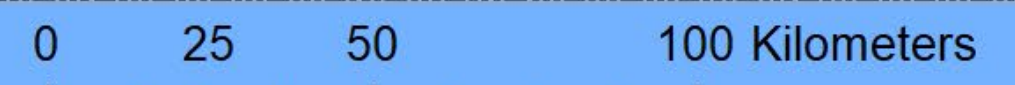
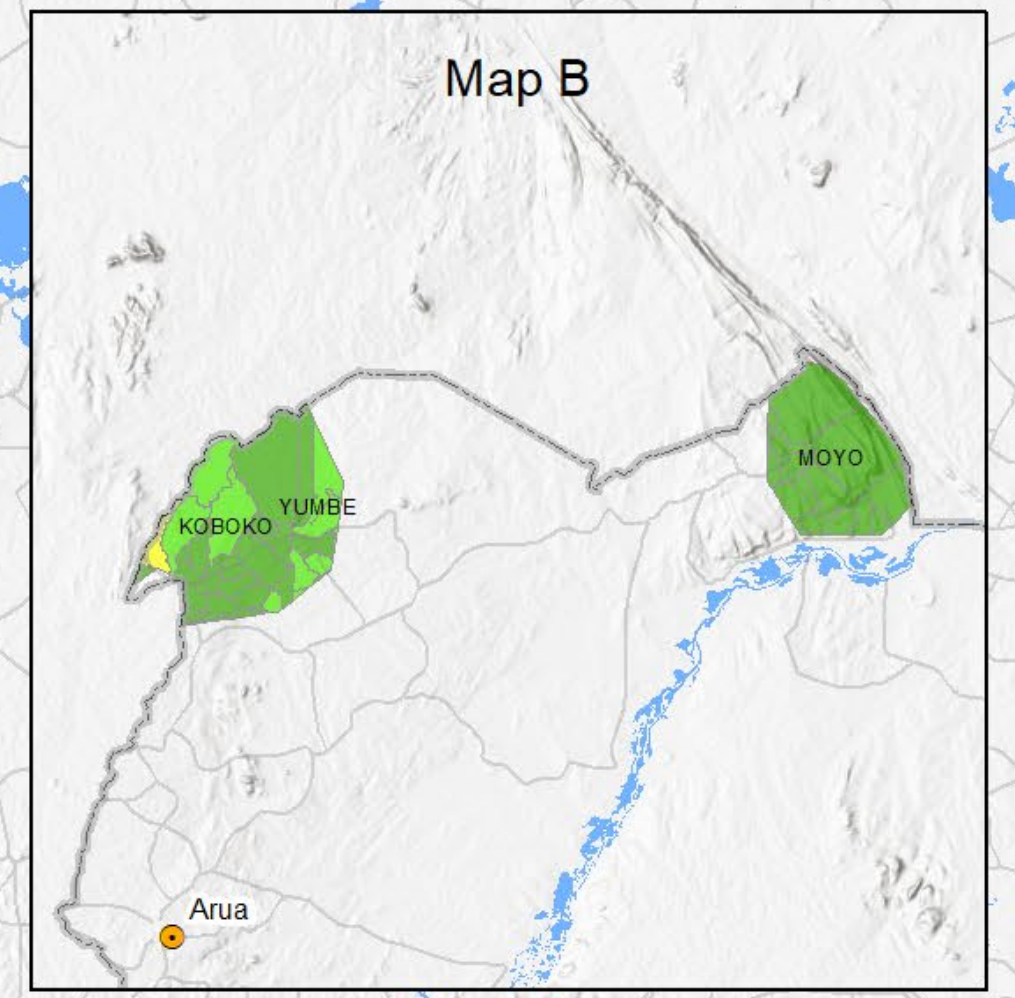
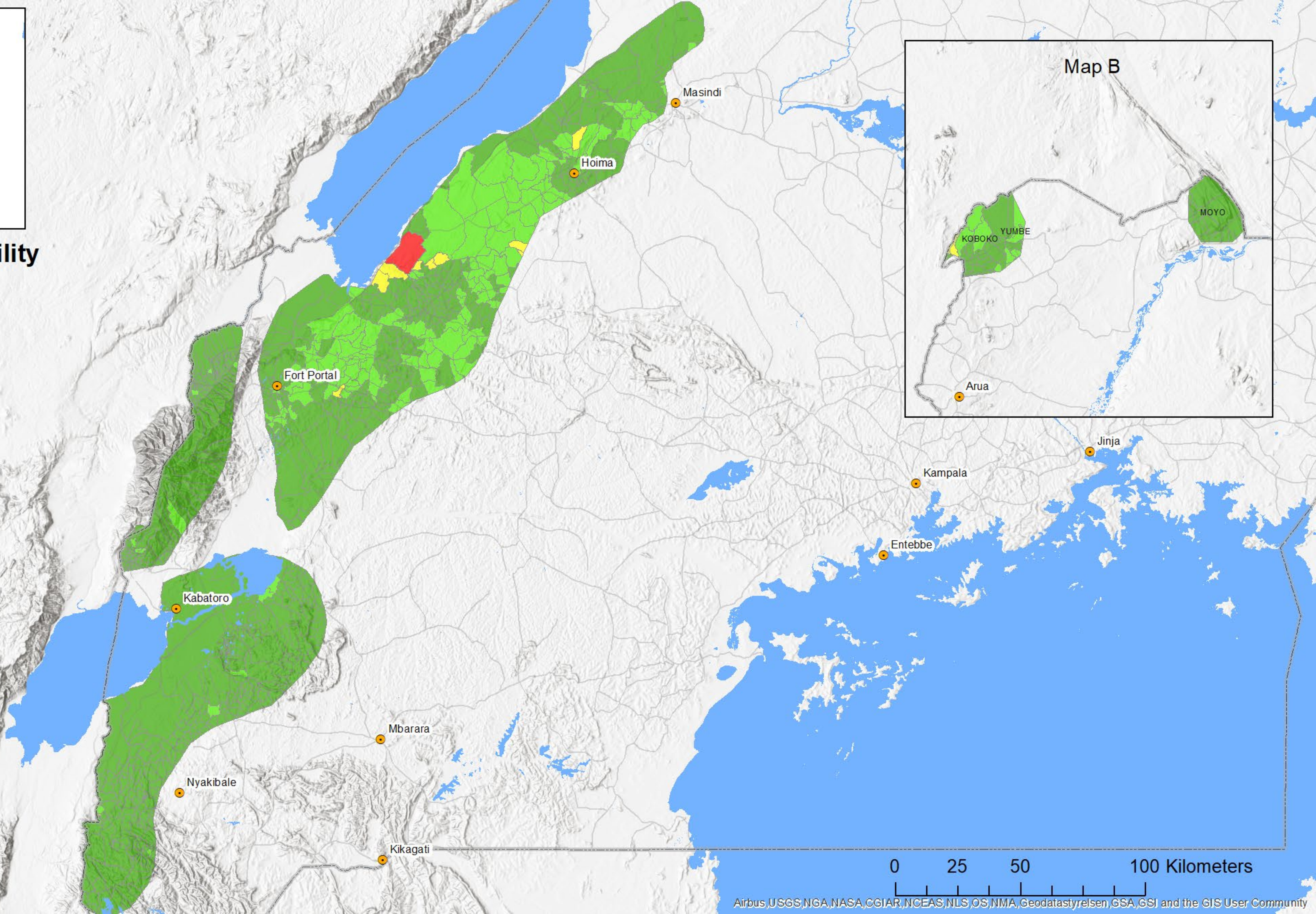


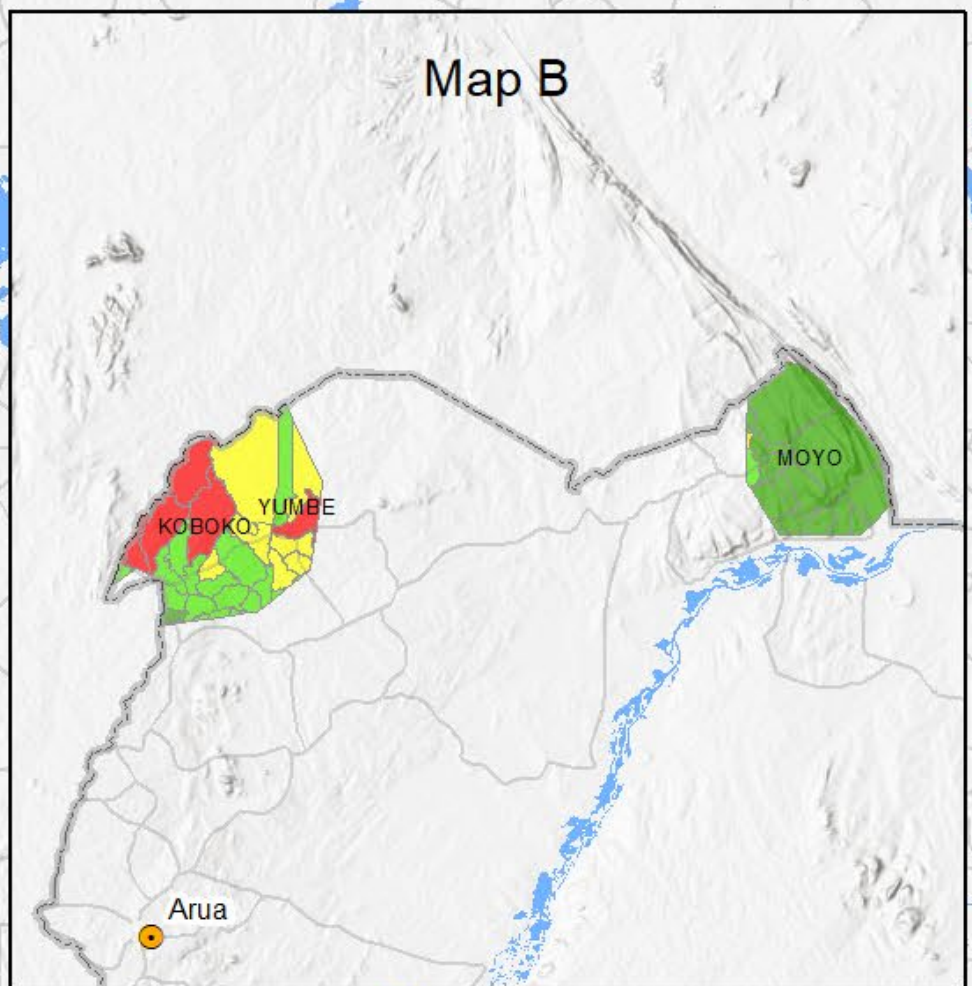
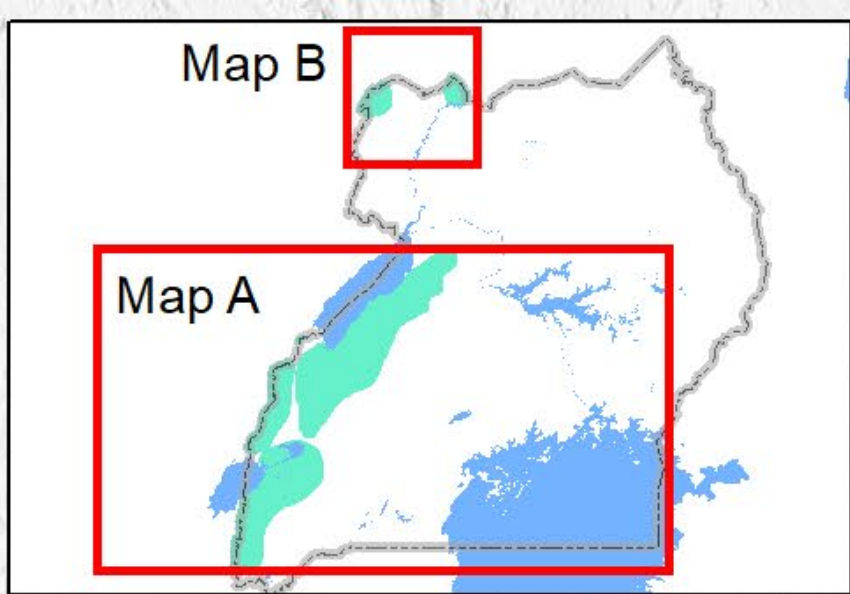
2003 Chimp Habitat Viability by Parish

Habitat loss 2000 baseline (%)



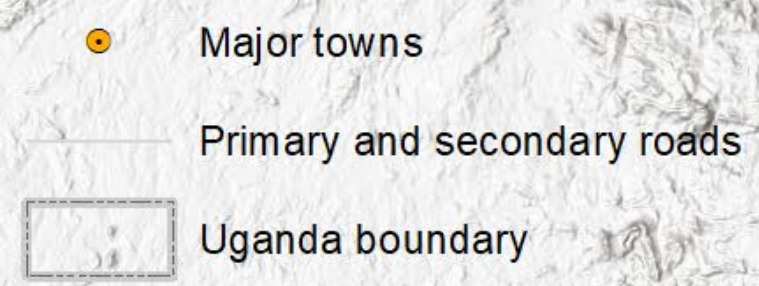
Map A



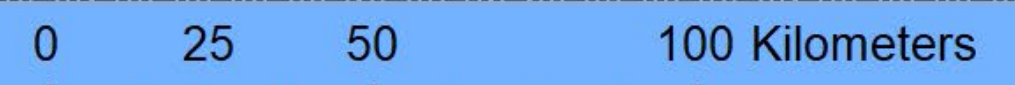
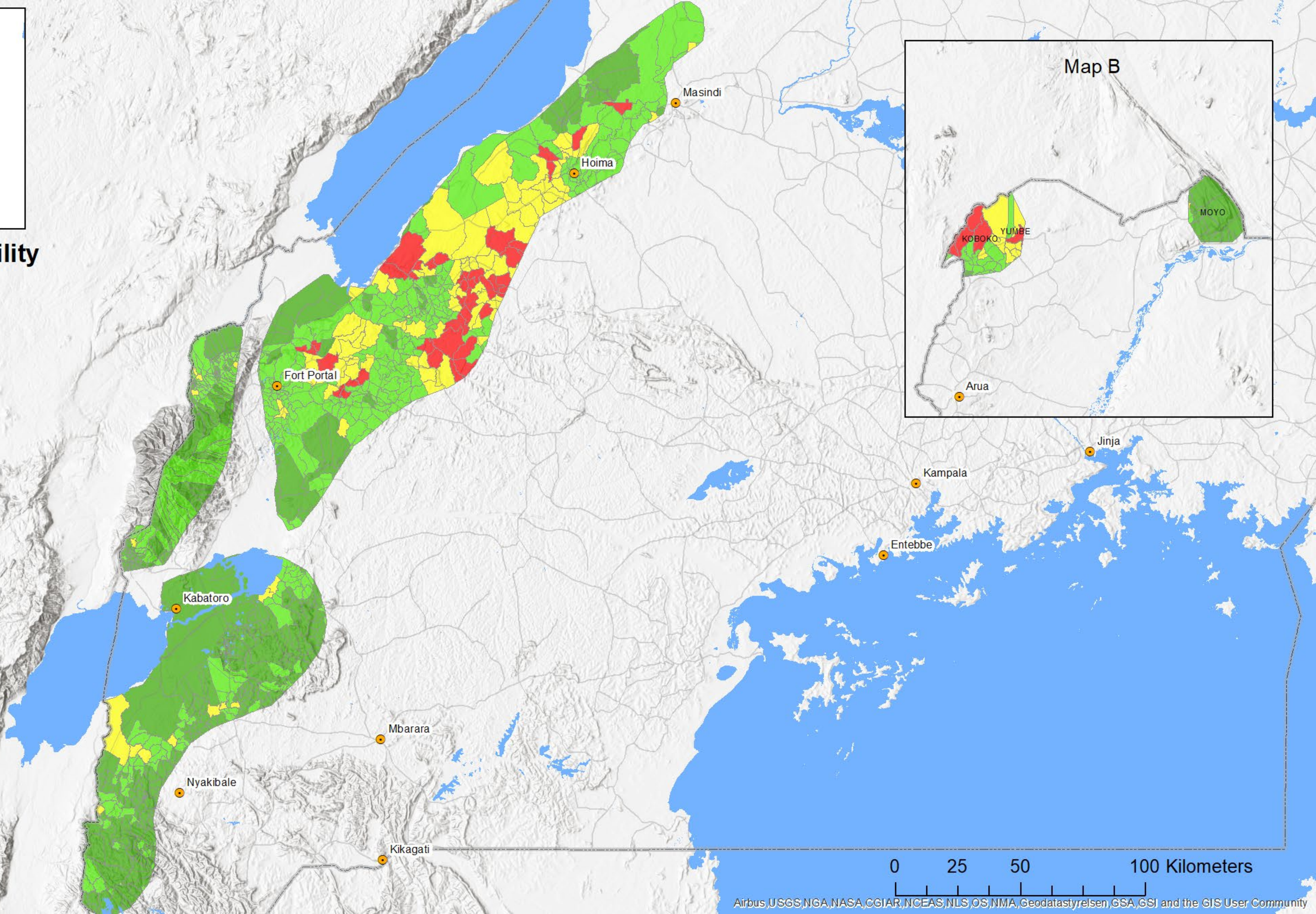


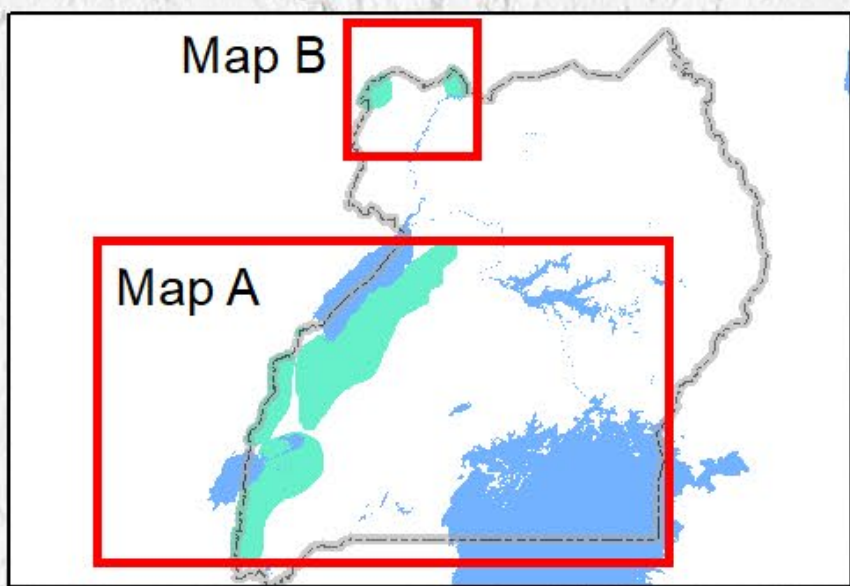
2010 Chimp Habitat Viability by Parish

Habitat loss 2000 baseline (%)



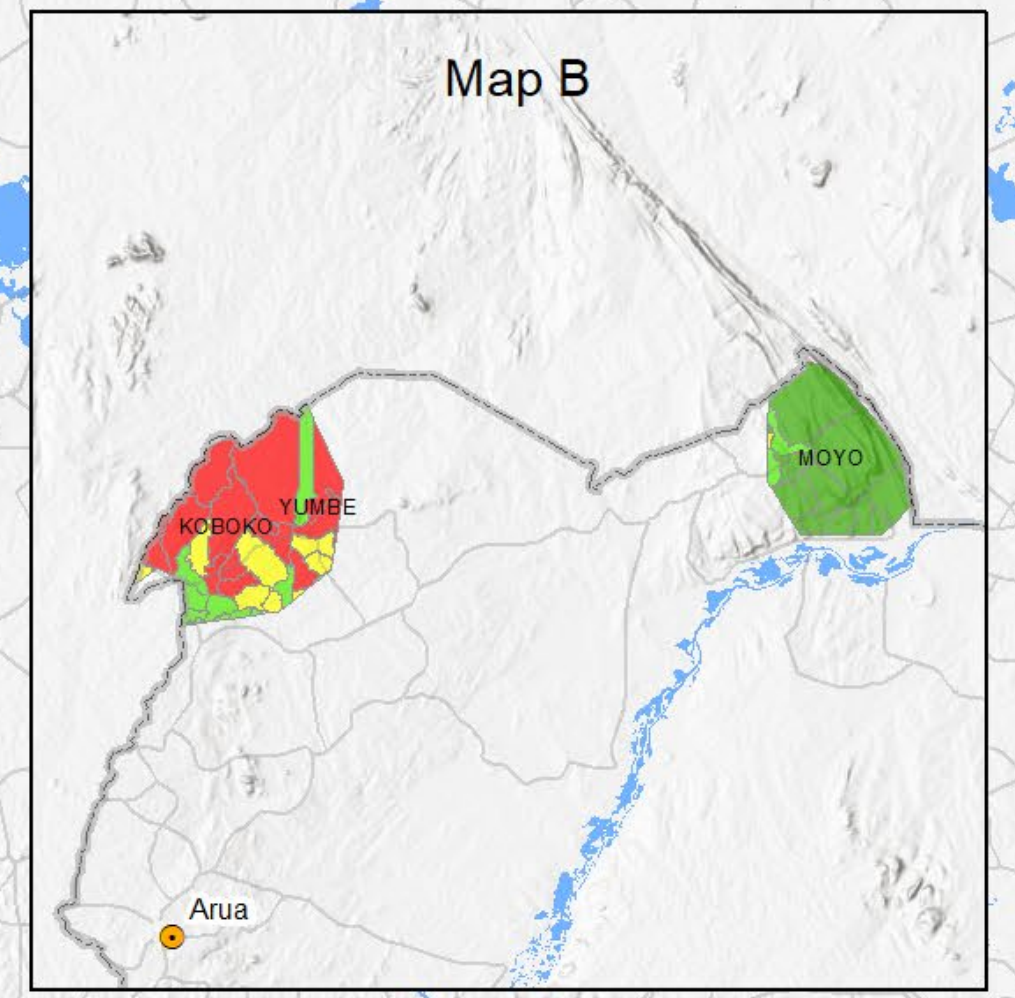
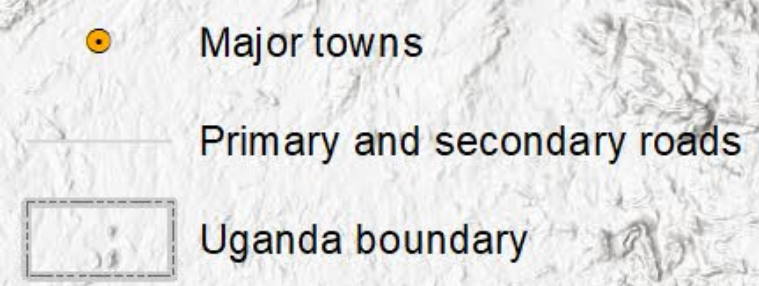
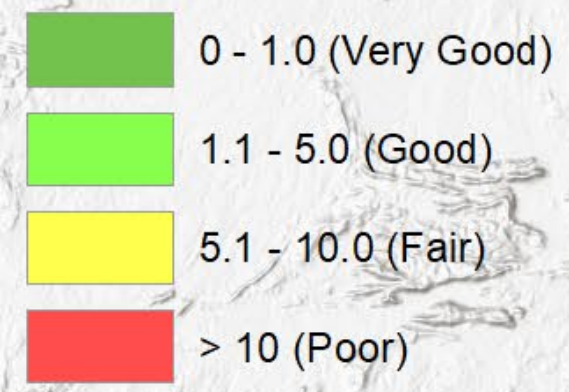
Map A



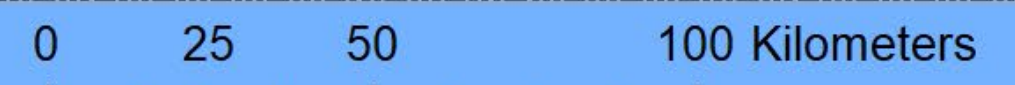
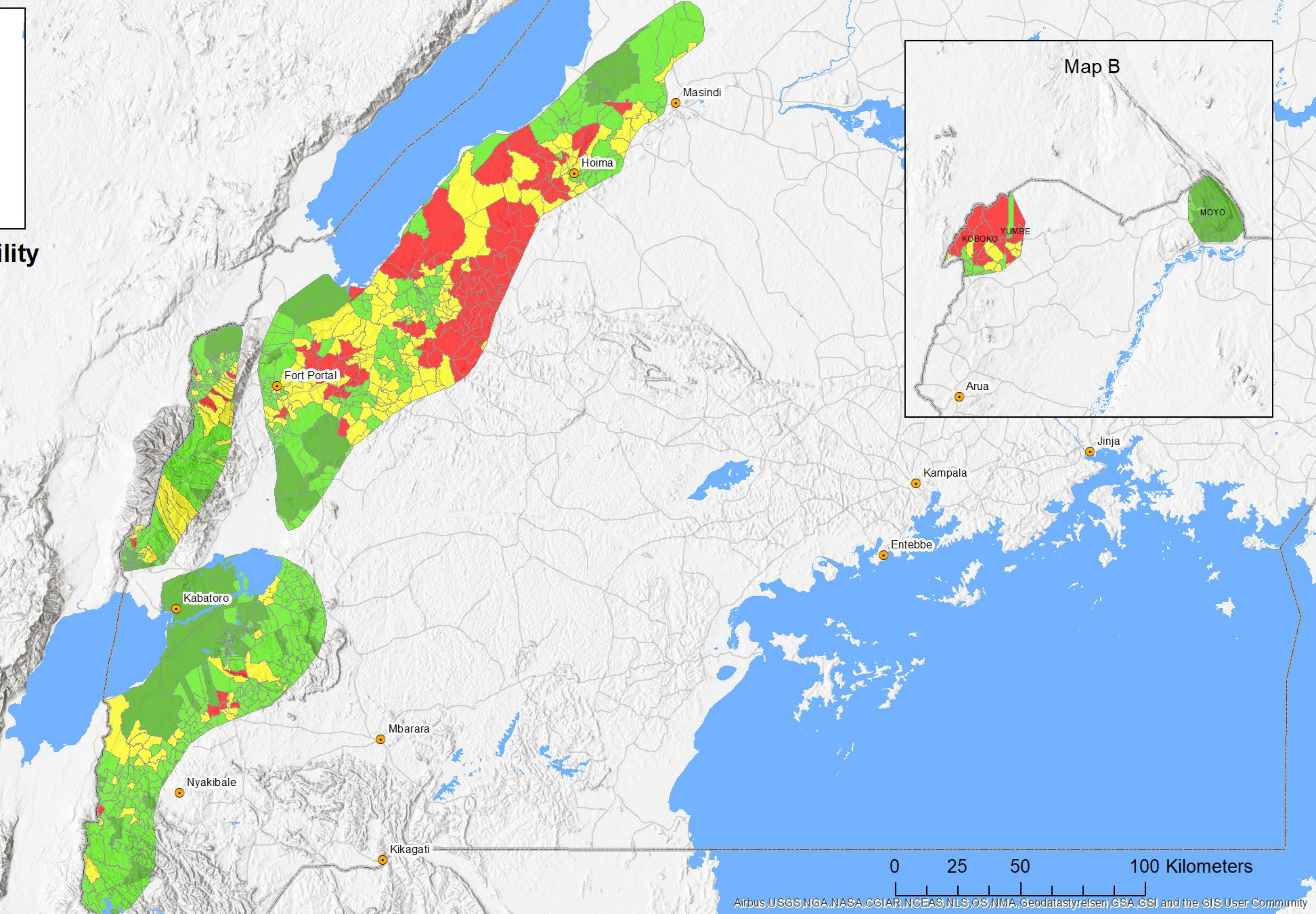


2016 Chimp Habitat Viability by Parish

Habitat loss 2000 baseline (%)



Map A



Map B

Map A

Map B

2021 Chimp Habitat Viability by Parish

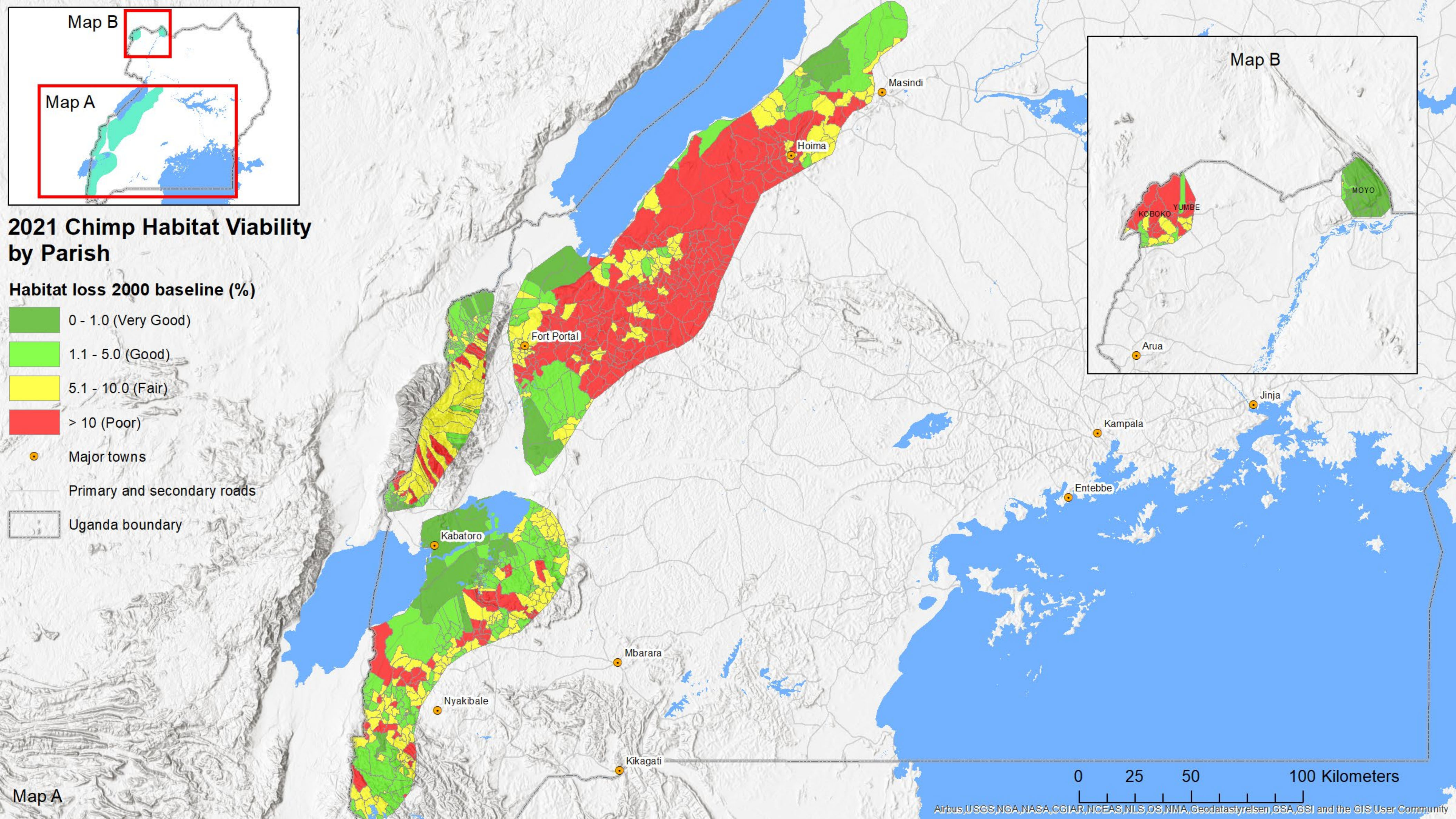
Habitat loss 2000 baseline (%)

- 0 - 1.0 (Very Good)
- 1.1 - 5.0 (Good)
- 5.1 - 10.0 (Fair)
- > 10 (Poor)

- Major towns
- Primary and secondary roads
- Uganda boundary

Map A

0 25 50 100 Kilometers



Map B

Map A

Map B

2003 Chimp Habitat Viability in Protected Areas

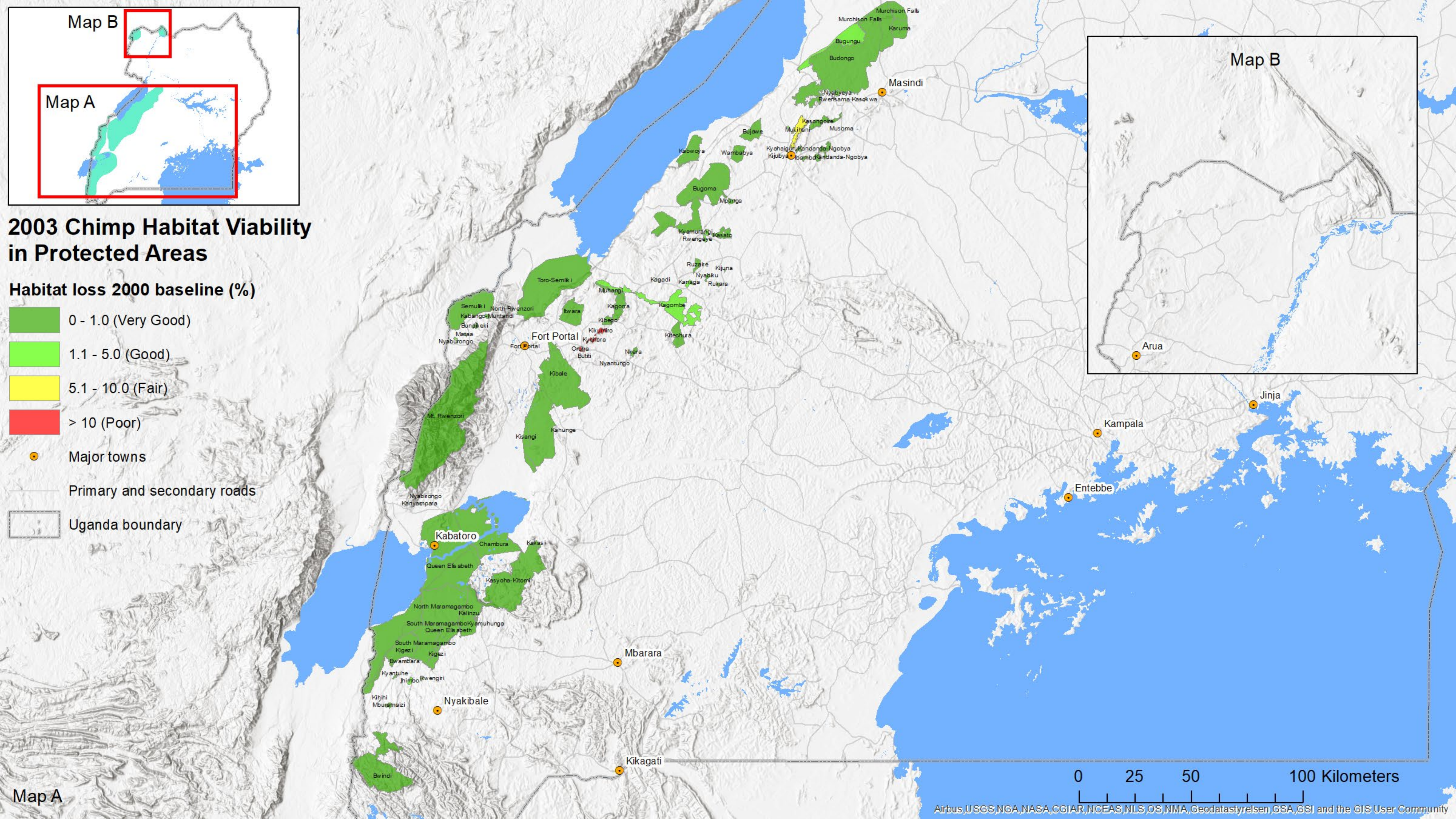
Habitat loss 2000 baseline (%)

- 0 - 1.0 (Very Good)
- 1.1 - 5.0 (Good)
- 5.1 - 10.0 (Fair)
- > 10 (Poor)

- Major towns
- Primary and secondary roads
- Uganda boundary

Map A

0 25 50 100 Kilometers



Map B

Map A

Map B

2010 Chimp Habitat Viability in Protected Areas

Habitat loss 2000 baseline (%)

- 0 - 1.0 (Very Good)
- 1.1 - 5.0 (Good)
- 5.1 - 10.0 (Fair)
- > 10 (Poor)

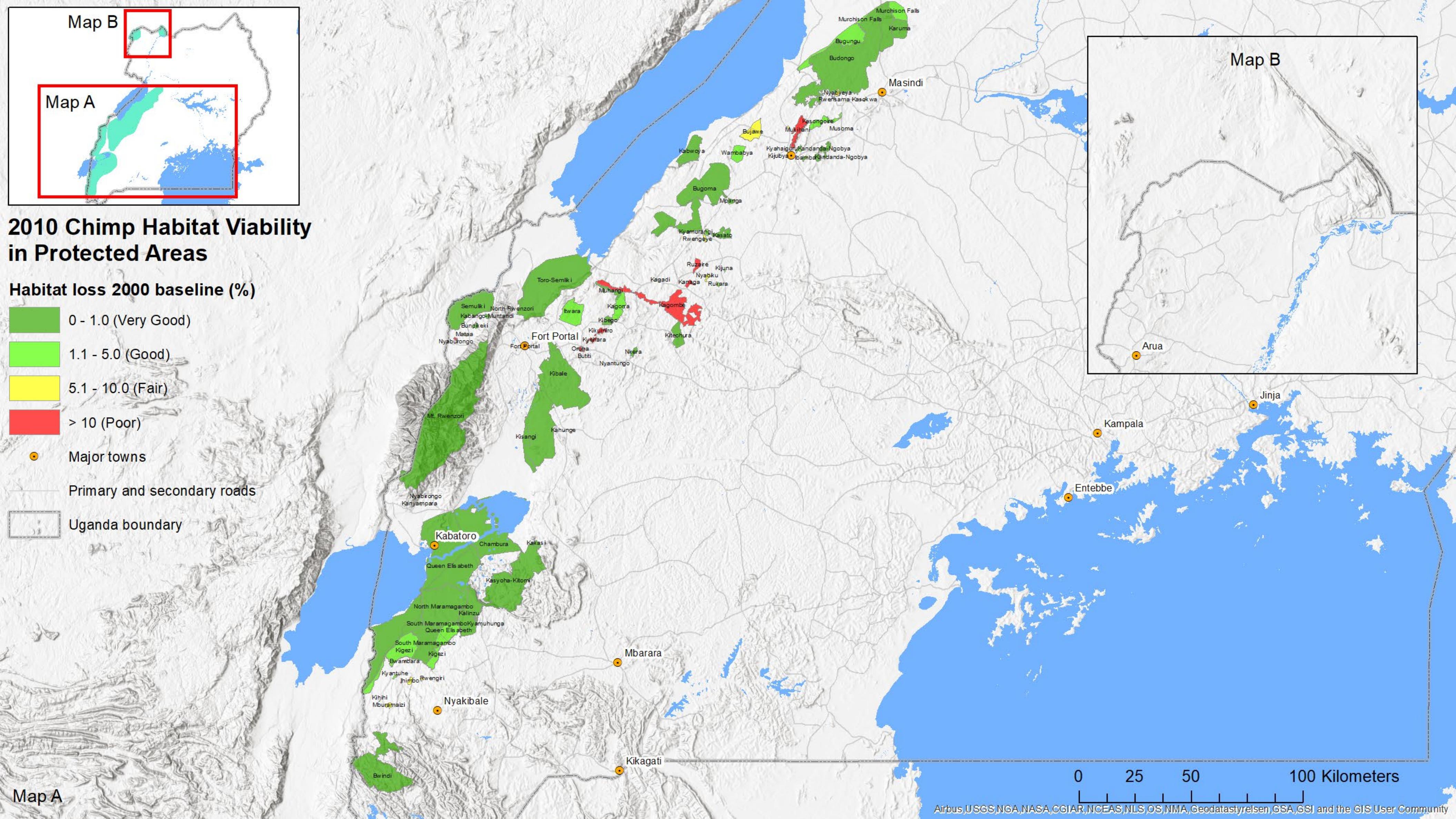
Major towns

Primary and secondary roads

Uganda boundary

Map A

0 25 50 100 Kilometers



Map B

Map A

Map B

2016 Chimp Habitat Viability in Protected Areas

Habitat loss 2000 baseline (%)

- 0 - 1.0 (Very Good)
- 1.1 - 5.0 (Good)
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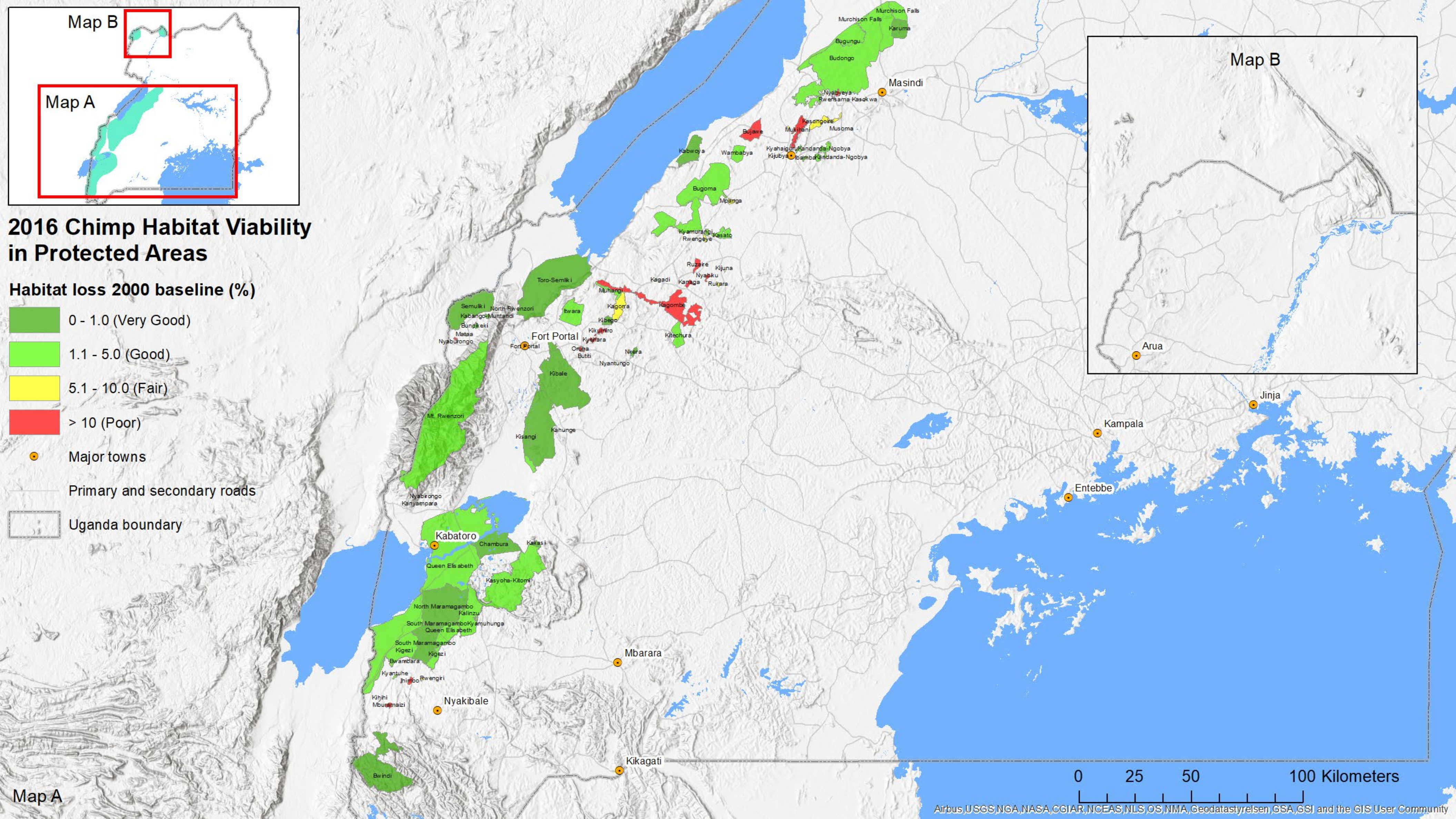
Major towns

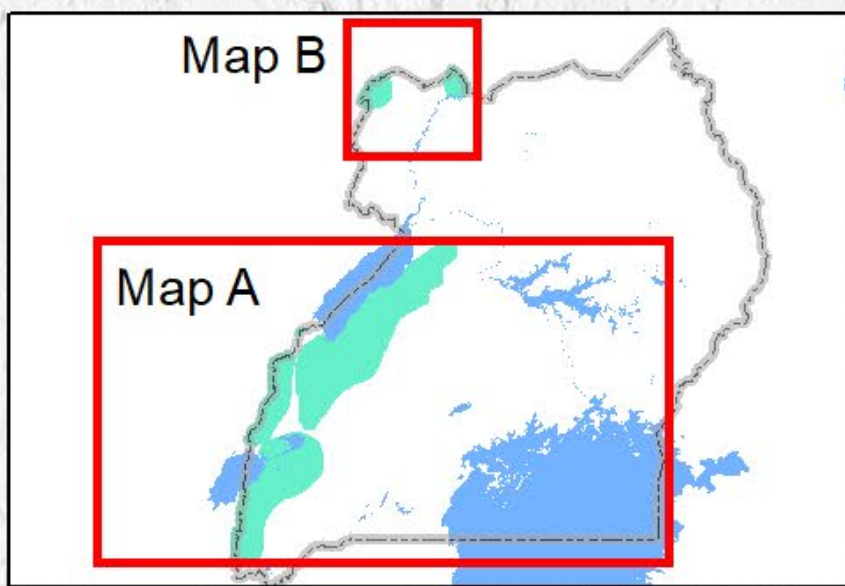
Primary and secondary roads

Uganda boundary

Map A

0 25 50 100 Kilometers



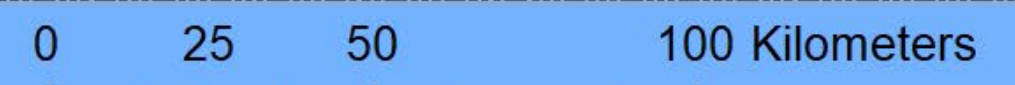
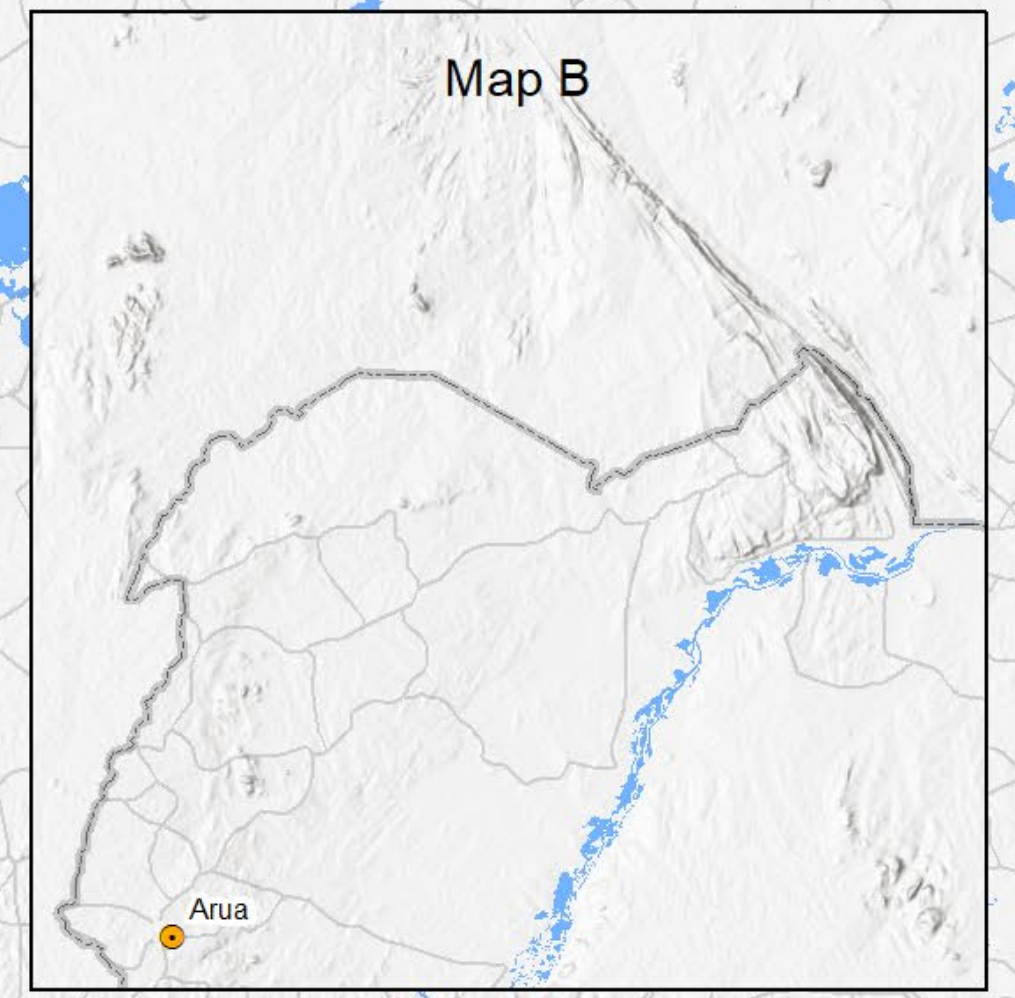
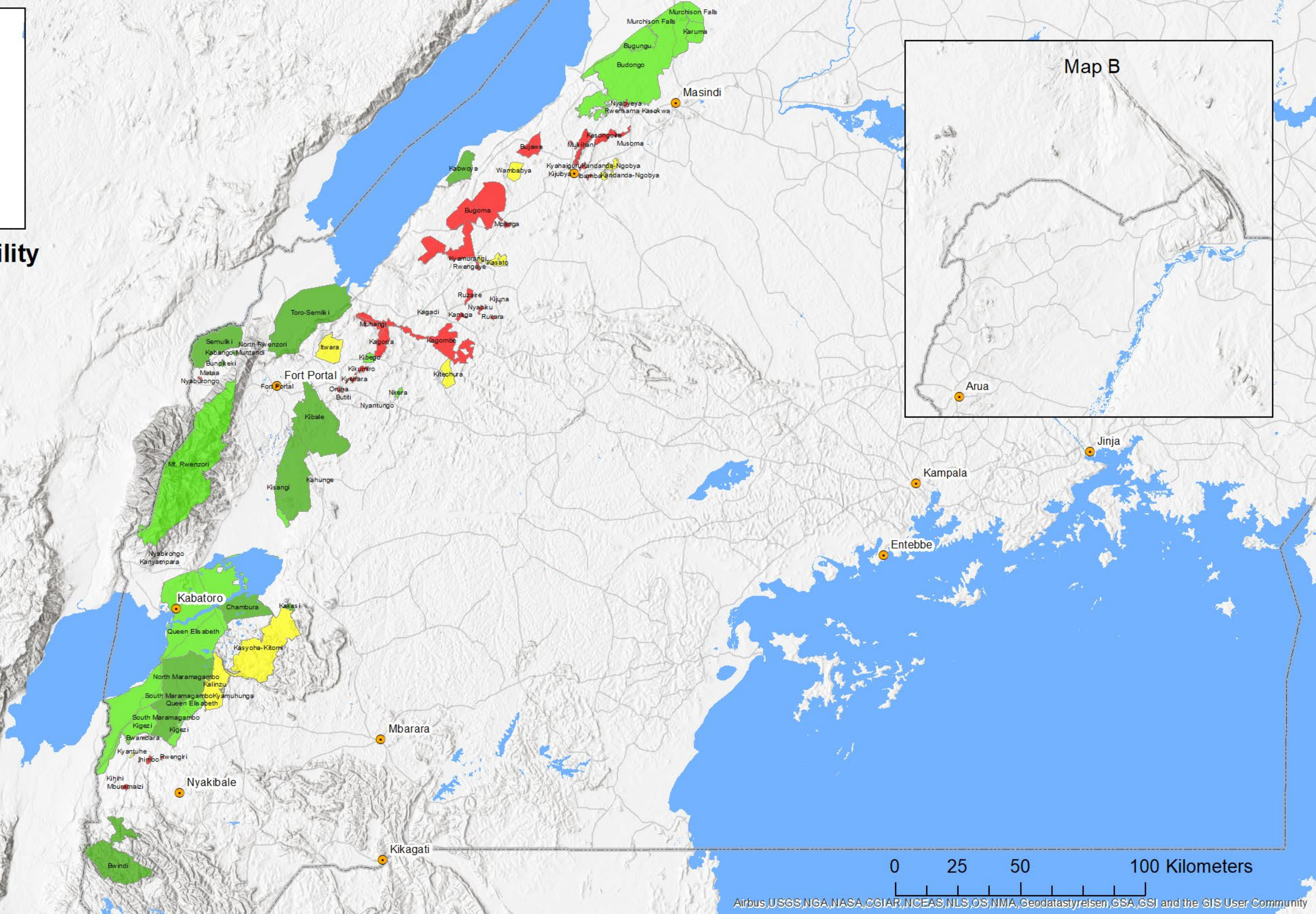


2021 Chimp Habitat Viability in Protected Areas

Habitat loss 2000 baseline (%)



- Major towns
- Primary and secondary roads
- Uganda boundary



Map A

Map B

Map A

Map B

2021 Chimp Habitat Viability in Protected Areas

Habitat loss 2000 baseline (%)

- 0 - 1.0 (Very Good)
- 1.1 - 5.0 (Good)
- 5.1 - 10.0 (Fair)
- > 10 - 25 (Poor)
- > 25 ???

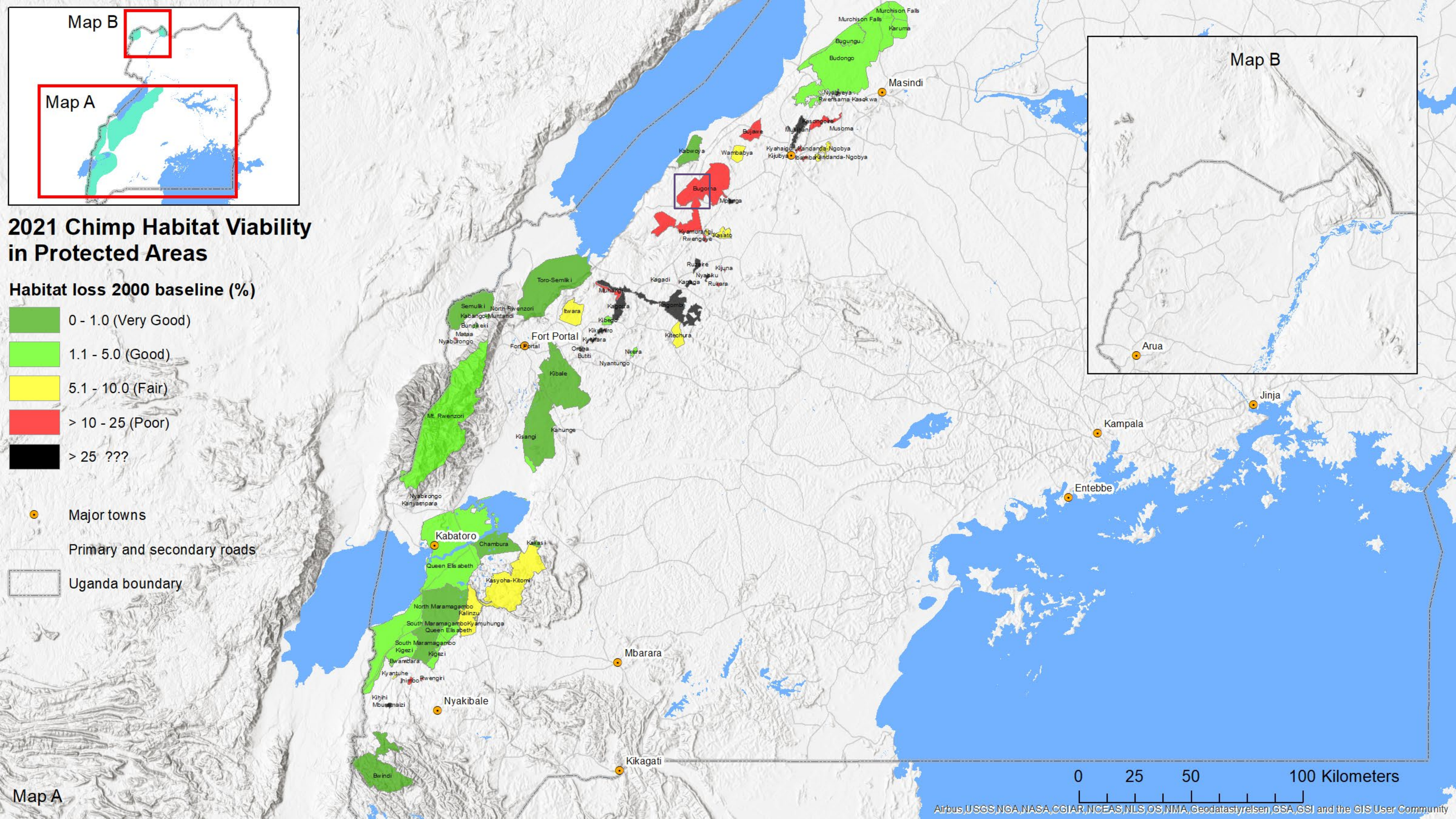
Major towns

Primary and secondary roads

Uganda boundary

Map A

0 25 50 100 Kilometers



Features

Ugandan campaigners vow to keep on fighting for Bugoma Forest

Residents and civil society groups have been waging a legal battle against a sugarcane development project.



Bagyenda Anatole, left, and Charles Twongwire, members of the Save Bugoma Forest campaign [Federica Marsi/Al Jazeera]

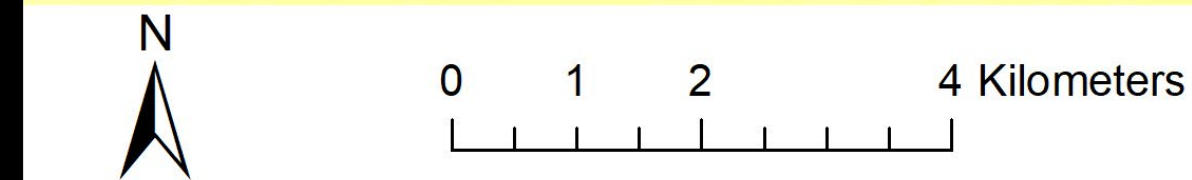
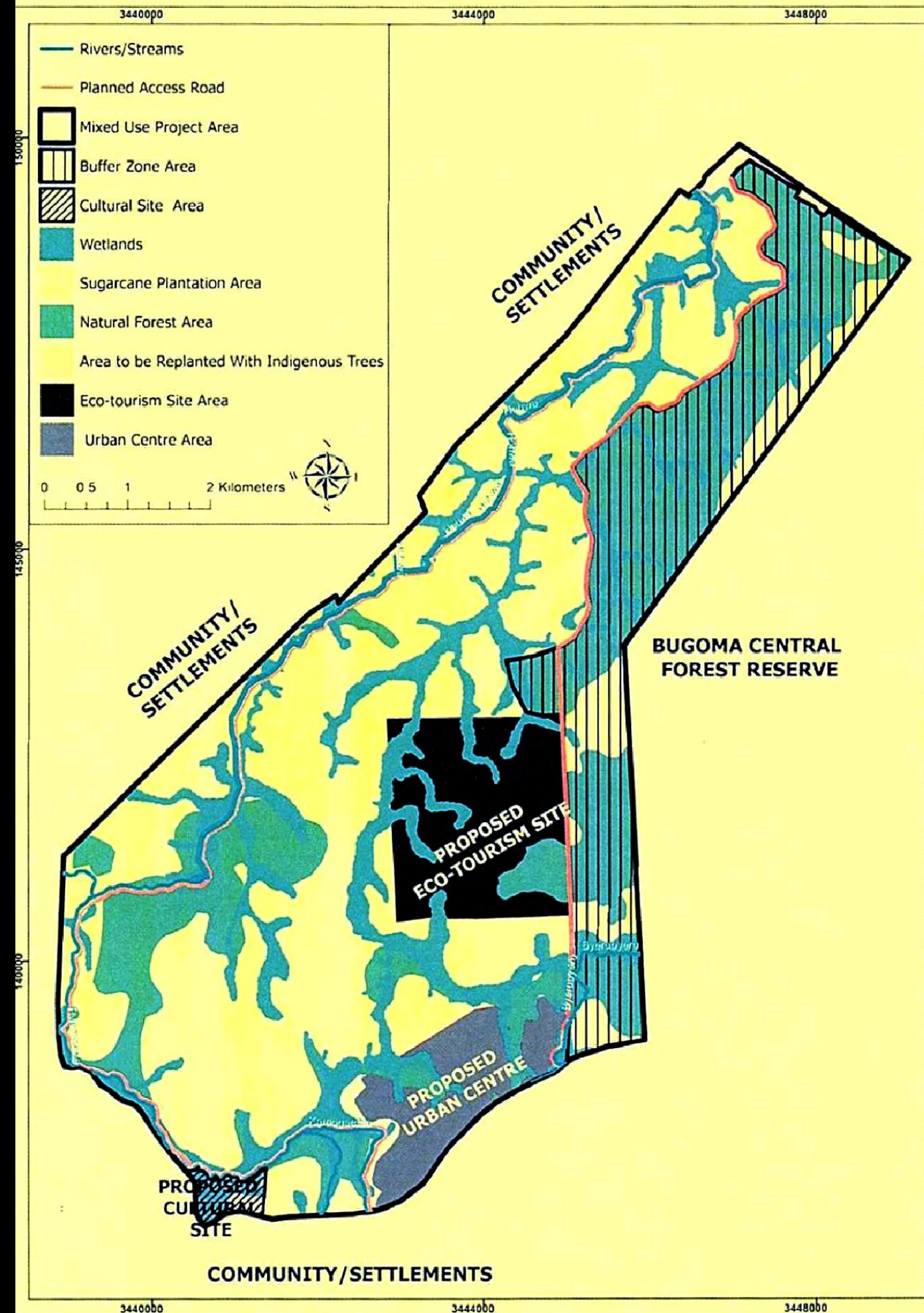
Campaigners lose court case to stop Ugandan forest clearance

Court ruling gives go-ahead for sugar plantation in Bugoma forest, home to endangered chimpanzees

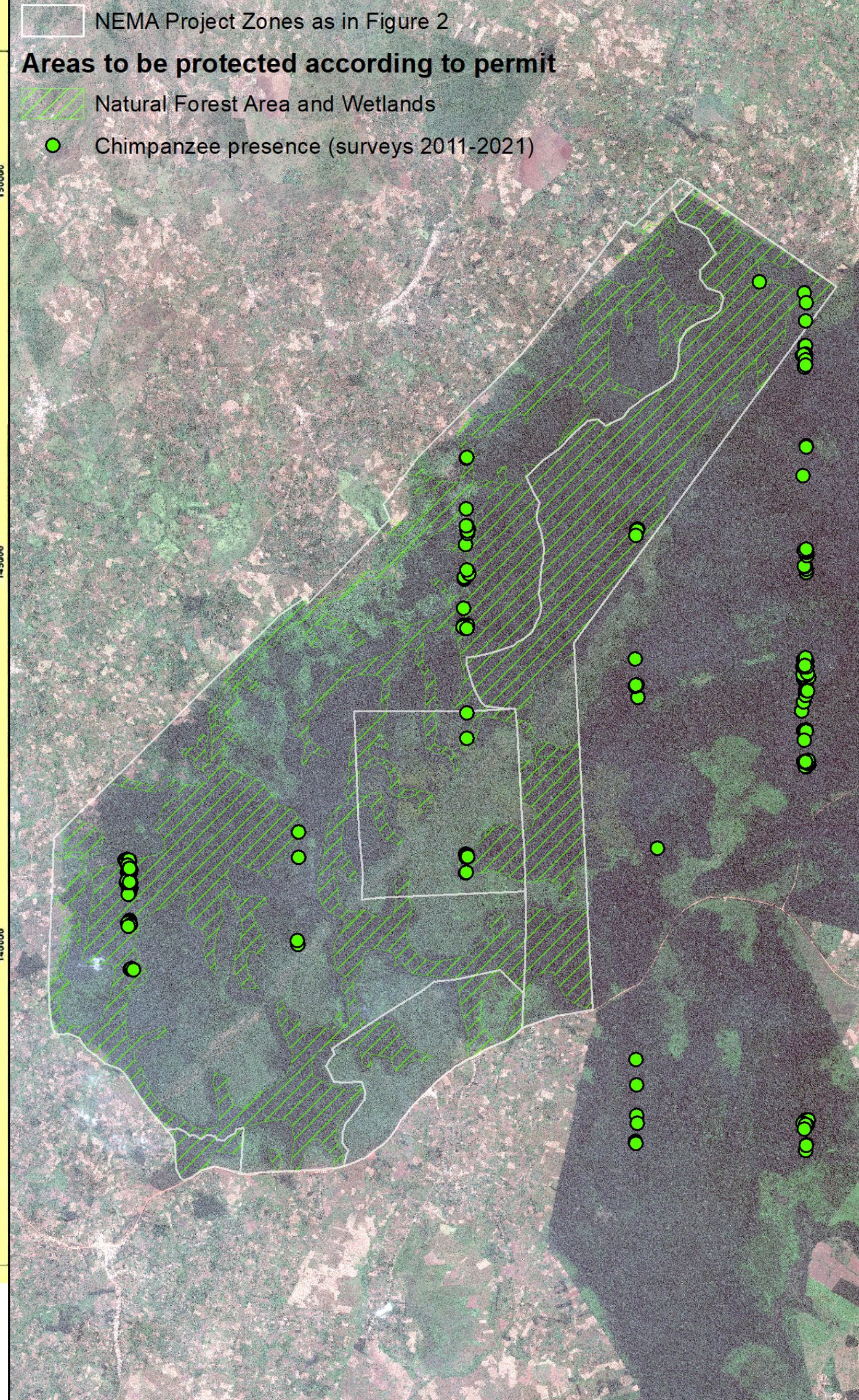


A sugarcane plantation in Uganda. The court ruling allows Hoima Sugar to clear 5,500ha of Bugoma Forest Reserve, home to 23 mammal species. Photograph: Godong/Alamy

Figure 2: Location / site for the Sugarcane Plantation in relation to other Mixed-Use Project Components



July 20, 2018 (Maxar GeoEye satellite imagery)

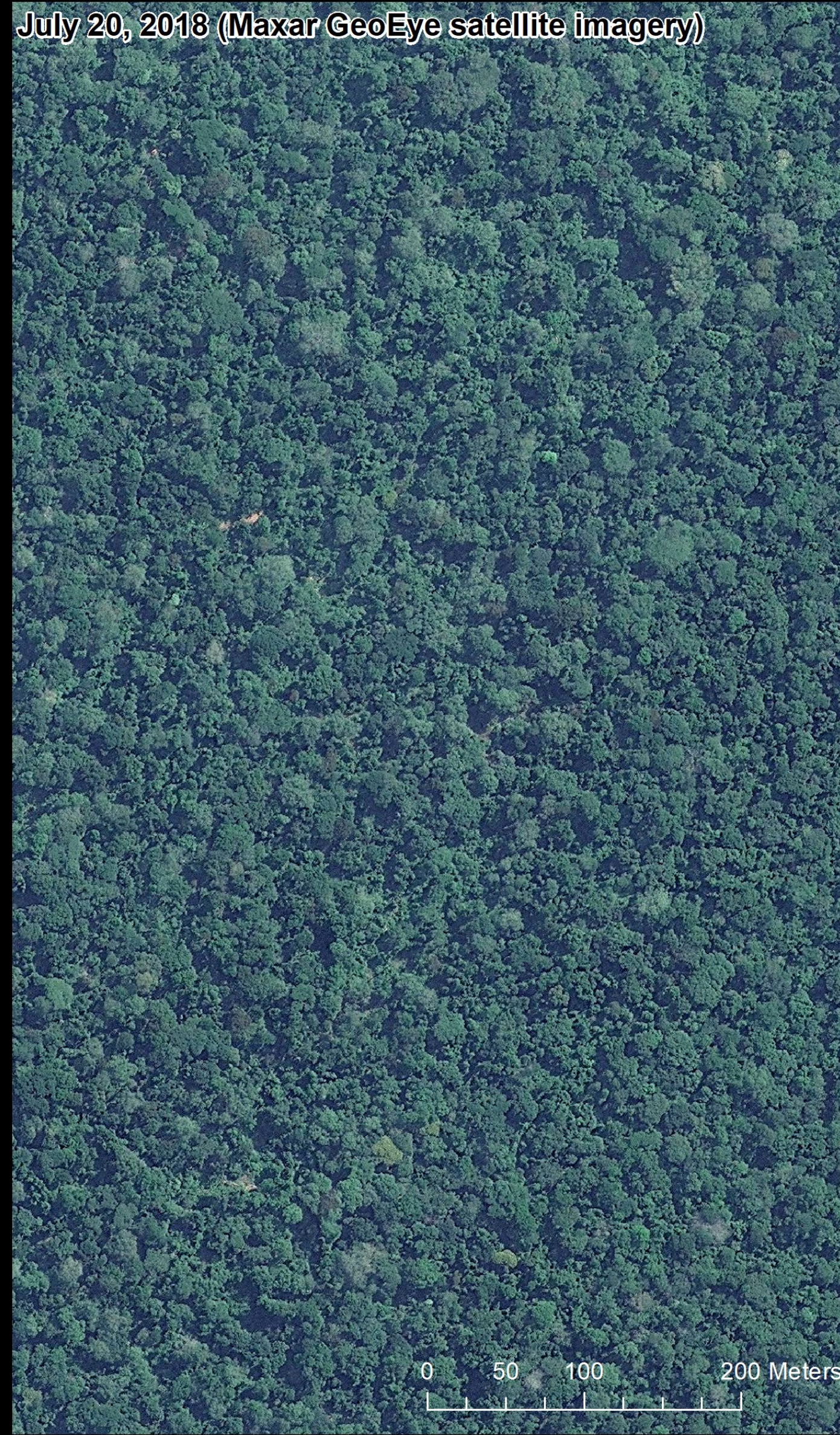




2020.08

July 20, 2018 (Maxar GeoEye satellite imagery)

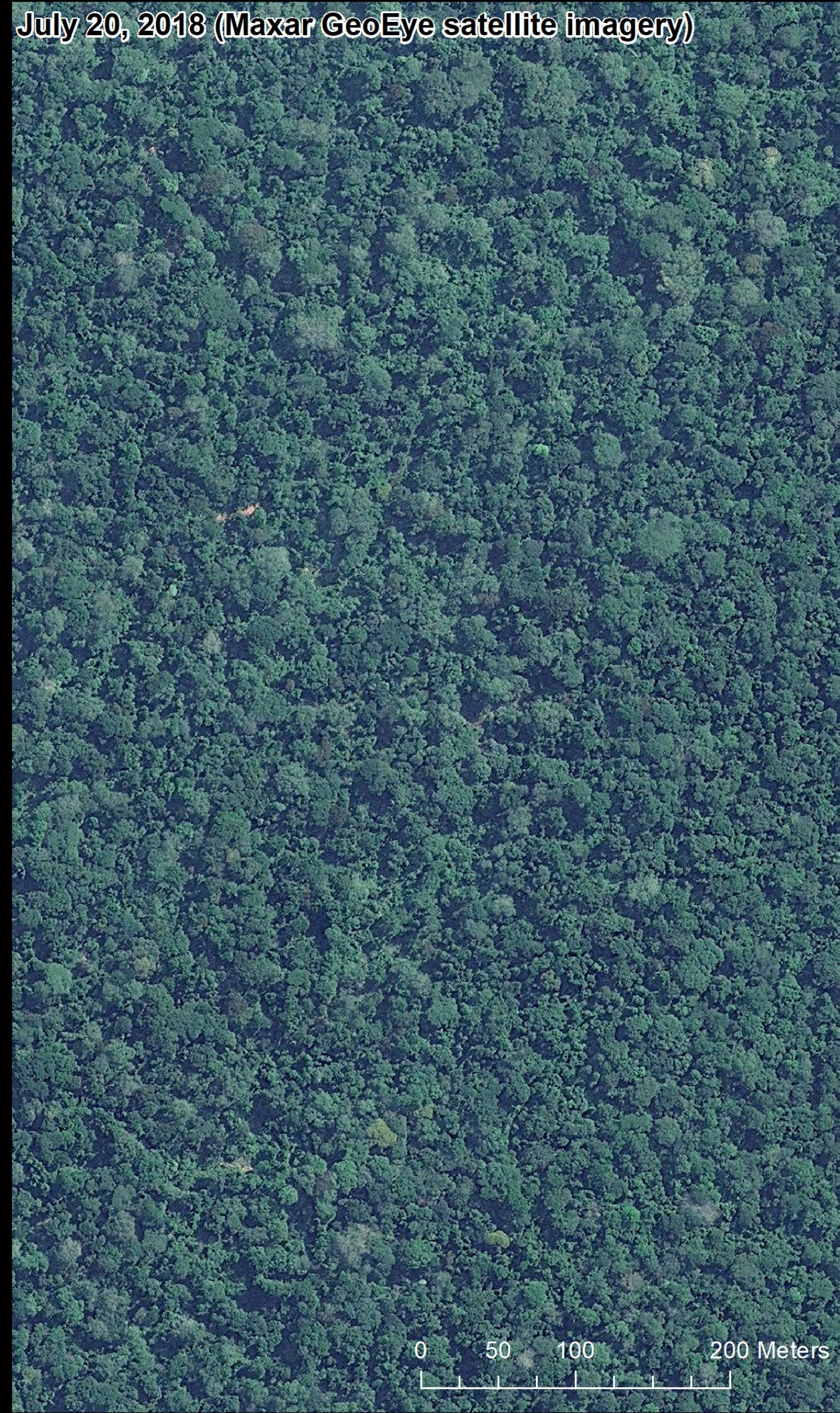
MAXAR



0 50 100 200 Meters

A horizontal scale bar with four segments, marked with the numbers 0, 50, 100, and 200, representing meters.

July 20, 2018 (Maxar GeoEye satellite imagery)



March 3, 2022 (Maxar WorldView-3 satellite imagery)

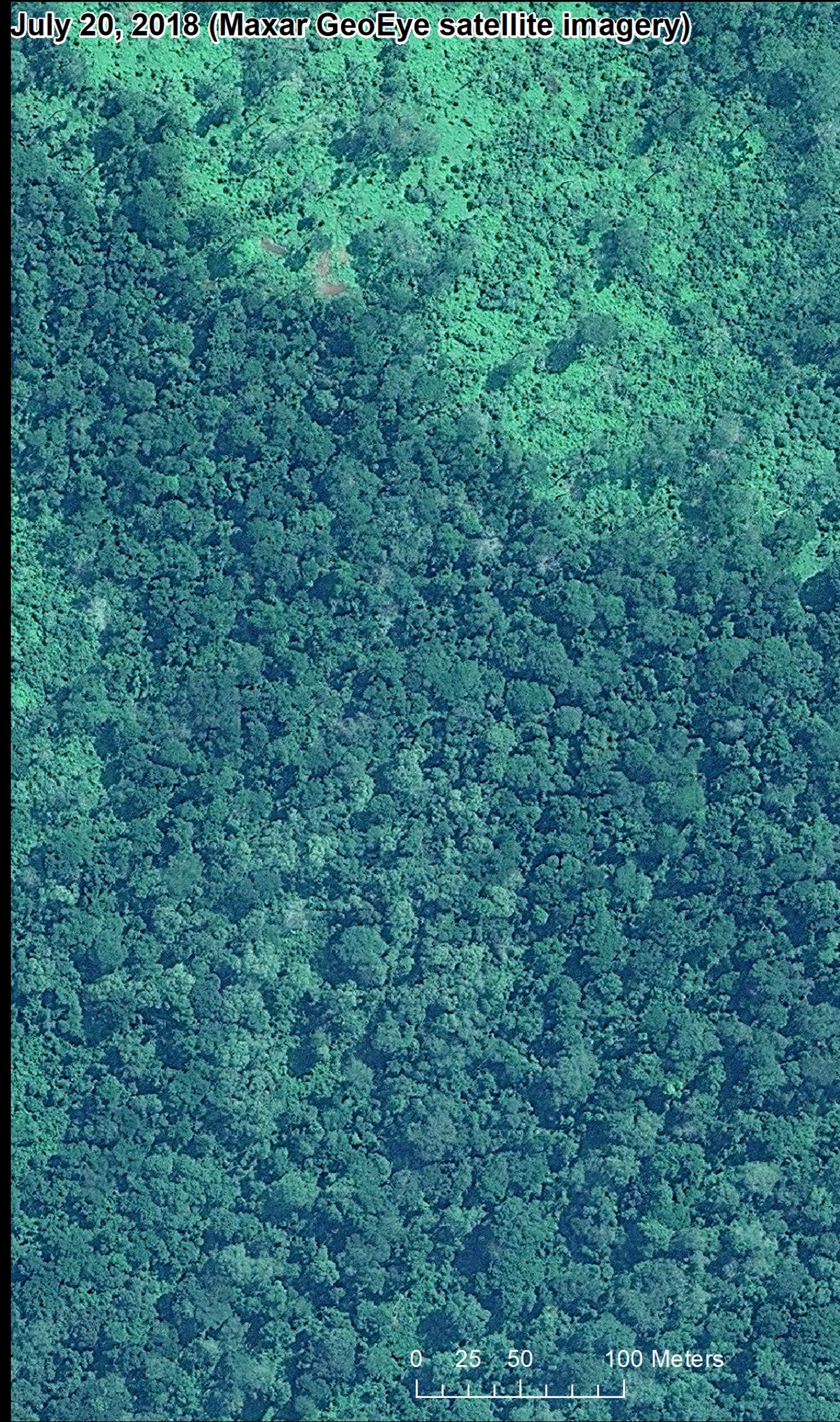


MAXAR



July 20, 2018 (Maxar GeoEye satellite imagery)

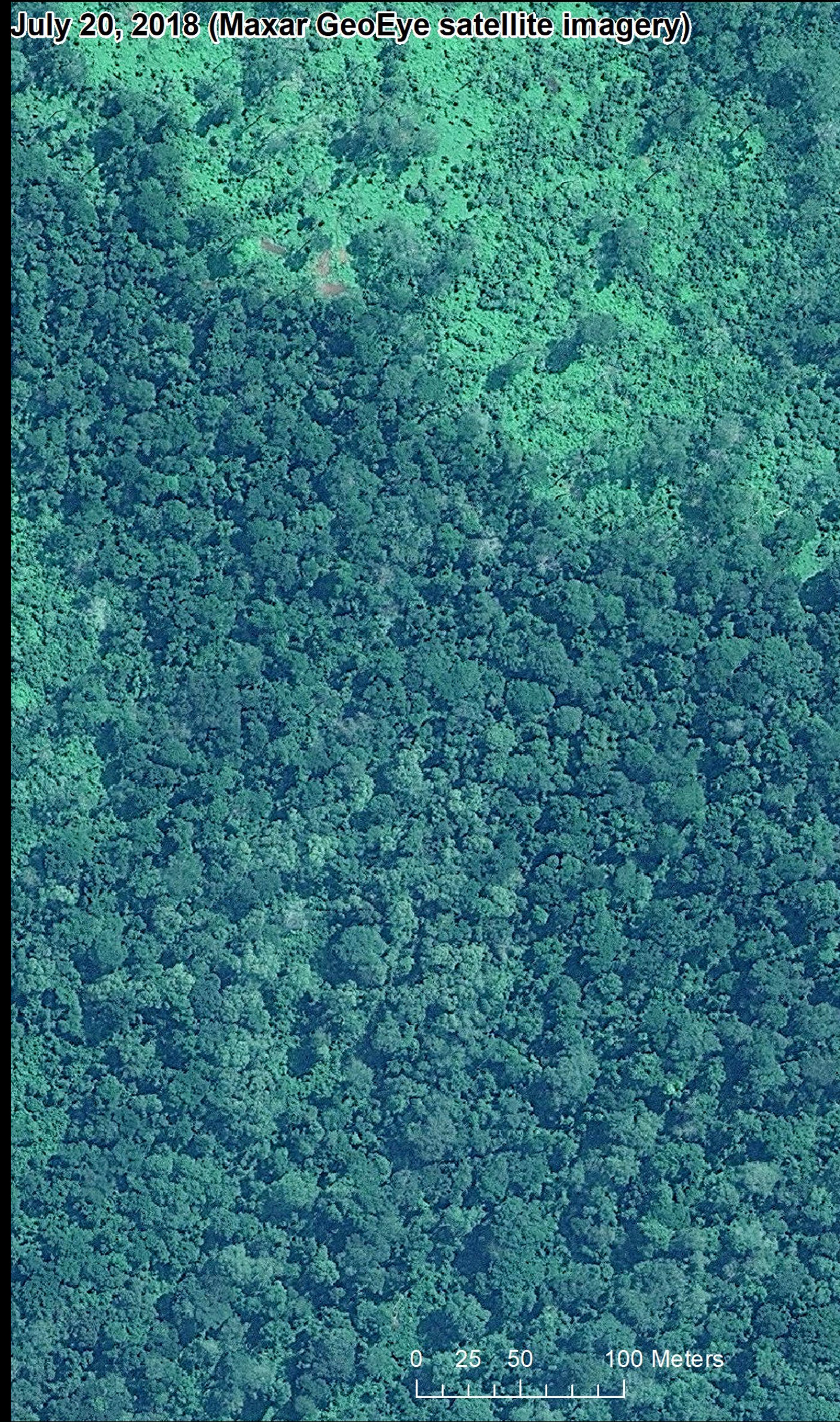
MAXAR



0 25 50 100 Meters

A scale bar with markings at 0, 25, 50, and 100 meters.

July 20, 2018 (Maxar GeoEye satellite imagery)



0 25 50 100 Meters

March 3, 2022 (Maxar WorldView-3 satellite imagery)



0 25 50 100 Meters

MAXAR





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[NEMA orders Hoima Sugar LTD to restore degraded parts of Kikuube mixed land-use project area and cancels approval for urban center development in the ecosystem](#)

Tuesday, September 27, 2022

The National Environment Management Authority (NEMA) issued Hoima Sugar Ltd an Environmental and Social Impact Assessment (ESIA) certificate No. NEMA/ESIA/13709 on 14th August 2020 to implement the above project.

Section 4 of the Certificate indicated specific conditions and components of the project as follows:

- (a) Sugarcane Plantation (9.24 sq. miles / 2,393.8483 ha);
- (b) Urban Centre (1.206 sq. miles / 312.3 ha);
- (c) Eco-tourism Centre (1.97 sq. miles / 510.2277 ha);
- (d) Cultural Site (0.156 sq. miles / 40.4038 ha);
- (e) The natural reserved forest and nature walk-ways/trails (6.17 sq. miles/1,598.023 ha).

Hoima Sugar Limited submitted an environmental and social audit report for the project in June 2022. Review of

July 02, 2024

Planetscope 3.7m imagery



Observations
Area Intact as of July 02, 2024

148000
144000
140000
136000

268000 272000 276000

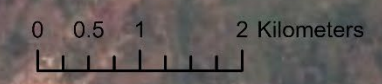
January 04, 2025

Planetscope 3.7m imagery

Observations
Increased Deforestation in the Pristine Forest Area by **253.1 Ha** , from 714.4 Ha in July 2024 to 967.5 Ha in January 2025.

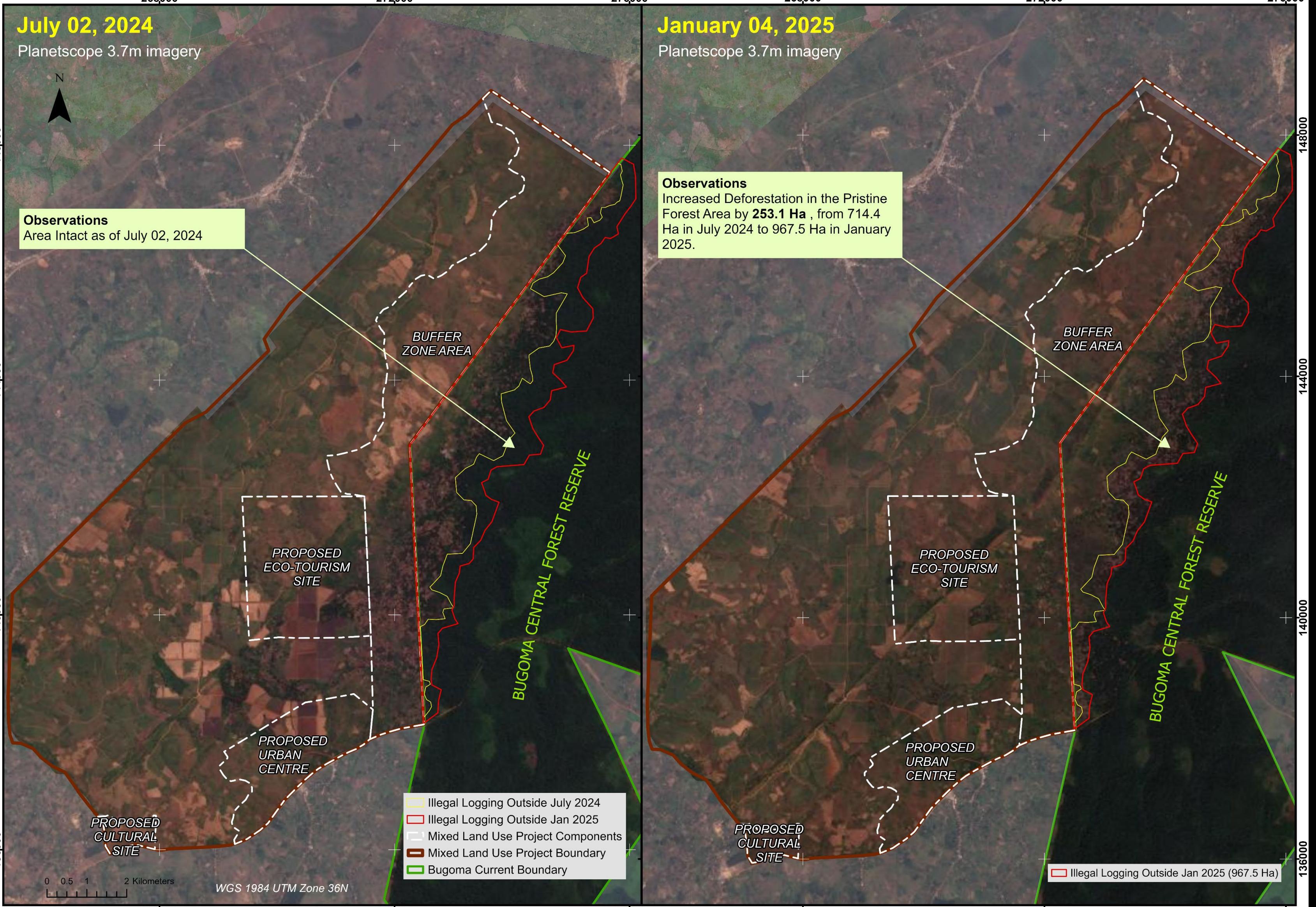
268000 272000 276000

Illegal Logging Outside Jan 2025 (967.5 Ha)



WGS 1984 UTM Zone 36N

- Illegal Logging Outside July 2024
- Illegal Logging Outside Jan 2025
- Mixed Land Use Project Components
- Mixed Land Use Project Boundary
- Bugoma Current Boundary





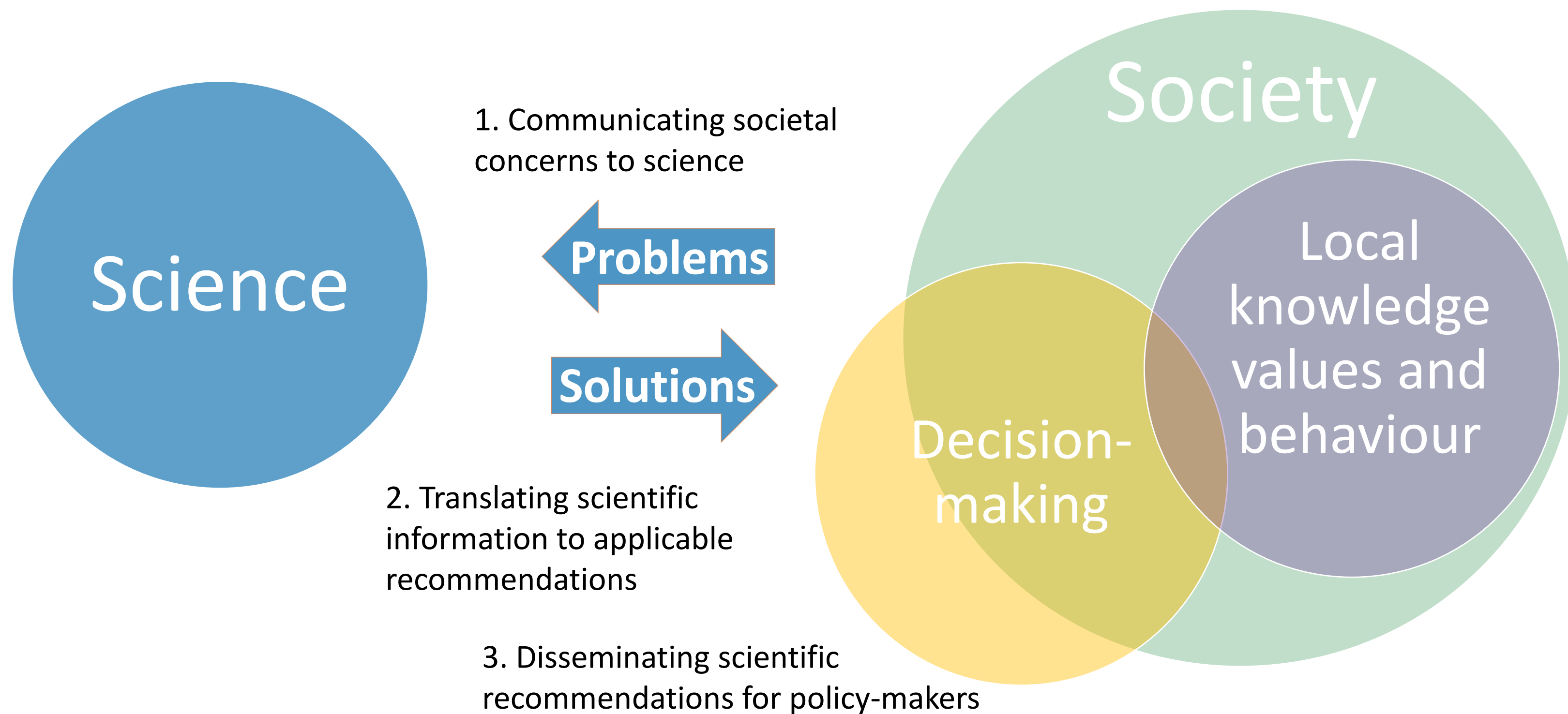
Recommendations

- Focus on converting pixels and data into management polygons with specific decision makers and mandates
- High resolution imagery key to tell a story and connect people hearts and minds



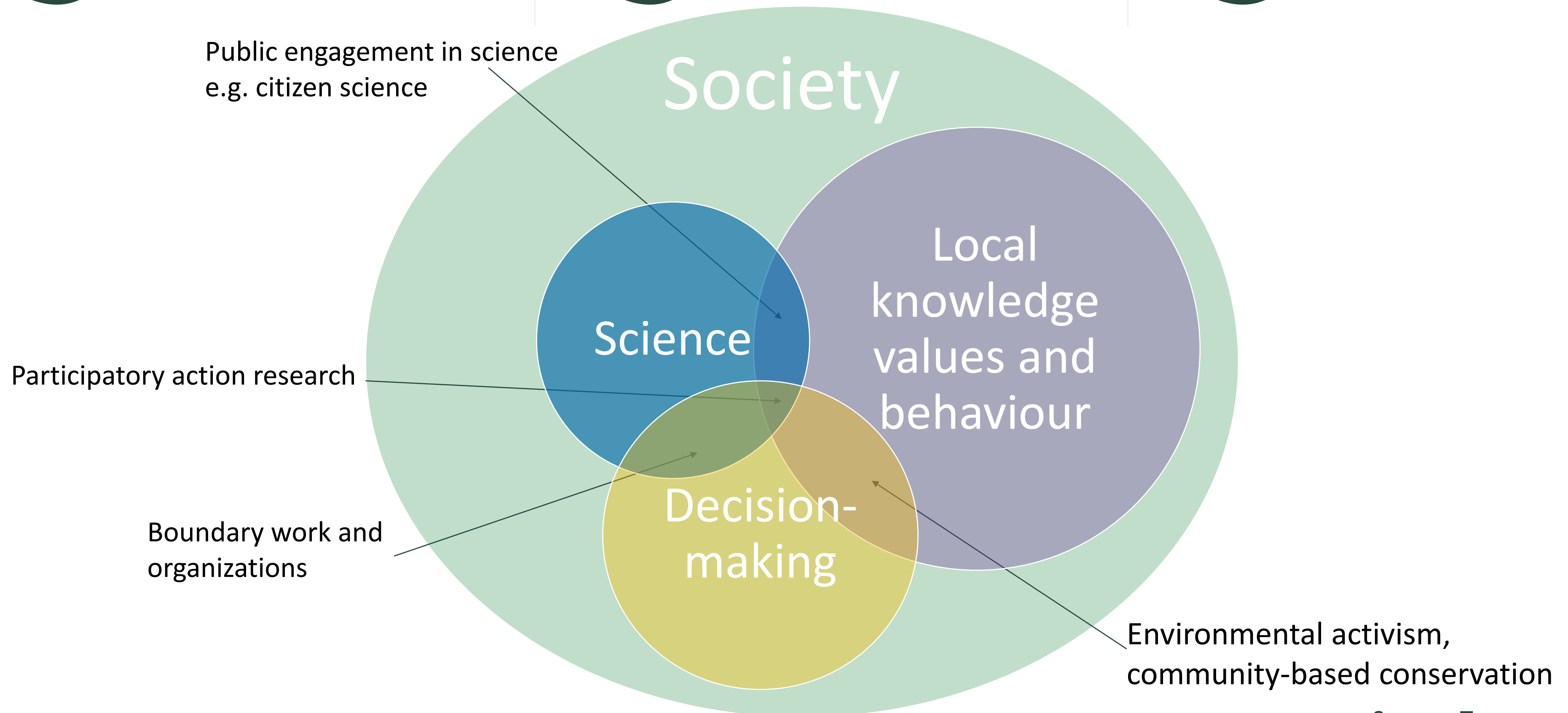


From Research-Implementation Gap...





...to research-implementation spaces where researchers and decision-makers could engage and collaborate





Thank you



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