

# An *Integrated Forest Monitoring System for Central Africa* "INFORMS"

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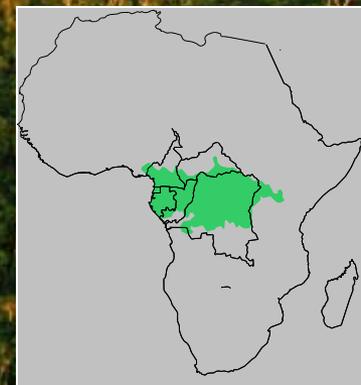
[www.whrc.org/africa](http://www.whrc.org/africa)

In- country main collaborators:

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Olivier Desmet, Dominique Paget (Congolaise Industrielle des Bois)

Patrice Gouala, Jean Francois Bizenga, Laurence Nsoyni (OSFAC)



## Questions ?

- How can we best develop remote sensing networks in Central Africa to monitor forest cover ?
- What are the gaps in environmental information & appropriate RS tools to fill those ?

## Goals/ Approaches

- Better characterisation of tropical forest land surfaces and processes
- Develop multi-scale multi-sensor data integration methods and appropriate validation tools
- Develop operational monitoring system to support environmental policies
- Integrate central African research scientists in regional sciences activities (e.g. GOFC)

# Introduction



# Results

## Understanding and protecting African rain forests

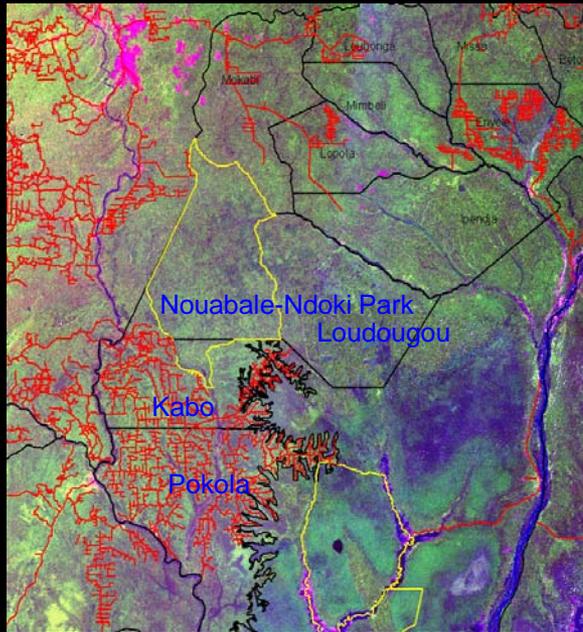
- Mapped forest cover in 5 countries
- Estimated rate of LCC for 13 protected areas
- Mapped forest habitat for biodiversity conservation in 13 protected areas

## Helping policy makers towards effective, responsible forest management

- Mapped progress of industrial logging in central Africa and associated impacts on flora
- Contributed to the development of sustainable forest management plans for more than 1.5 million ha of northern Congo forest
- Helped build capacity for
  - Establishing national operational logging monitoring systems
  - Improved forest management within the private sector [www.tt-timber.com](http://www.tt-timber.com)
  - Training and support for long-term institutional partnerships - through the development of the GOFC/OSFAC network

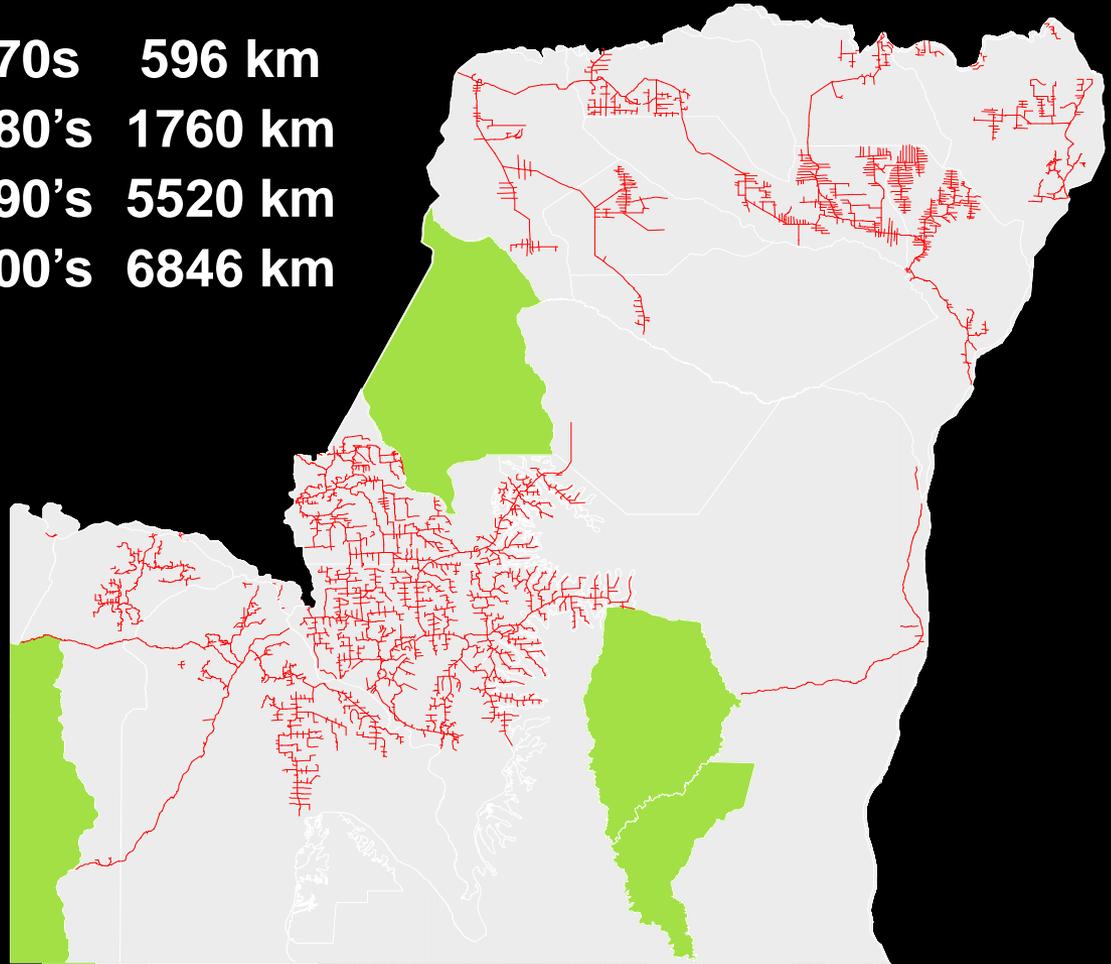


# OPERATIONAL MONITORING OF LOGGING



30 km

**1970s 596 km**  
**1980's 1760 km**  
**1990's 5520 km**  
**2000's 6846 km**



## Annual rate of road construction

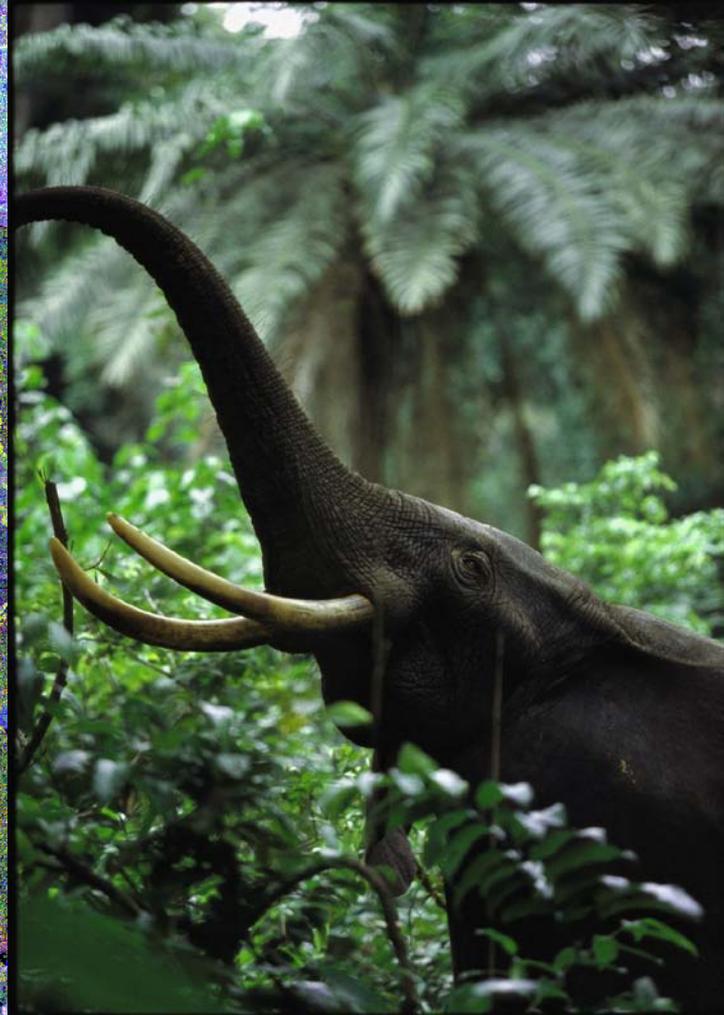
mid-1970s to mid-1980s ~ 150 km

2001-2002 > 650 km

— Logging road development between 1970-2002 derived from Landsat

# Biodiversity Monitoring / Modeling

## Impacts of Road Building

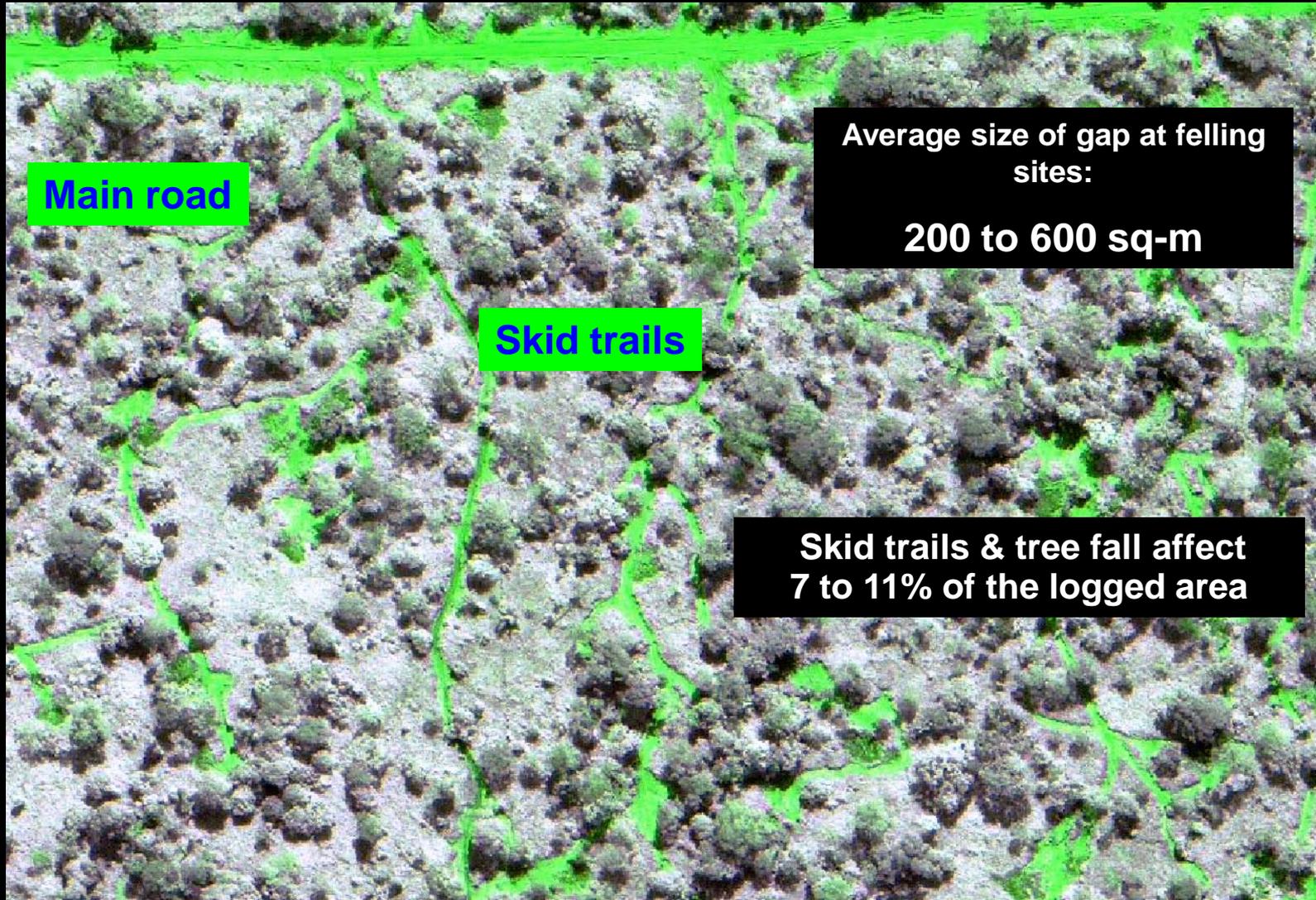


• Elephant Movement/ Steve Blake WCS

Photo by Mike Fay

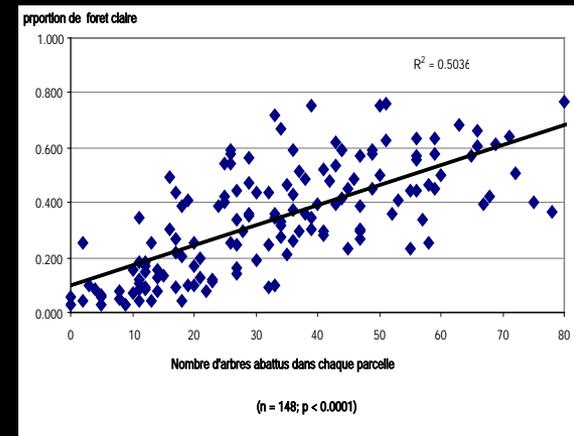
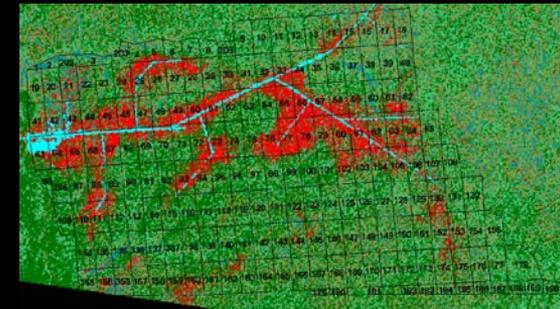
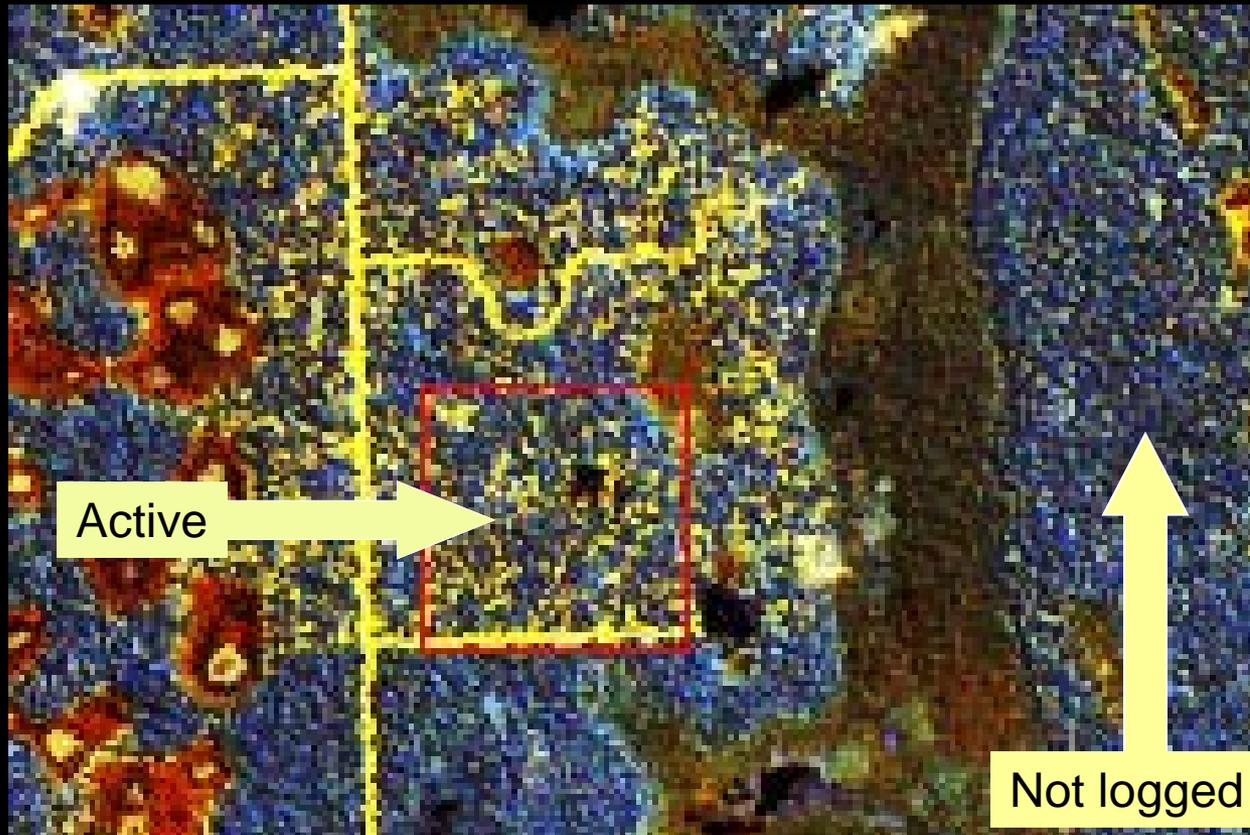
— New road 2003

# Logging impact monitoring using IKONOS Imagery

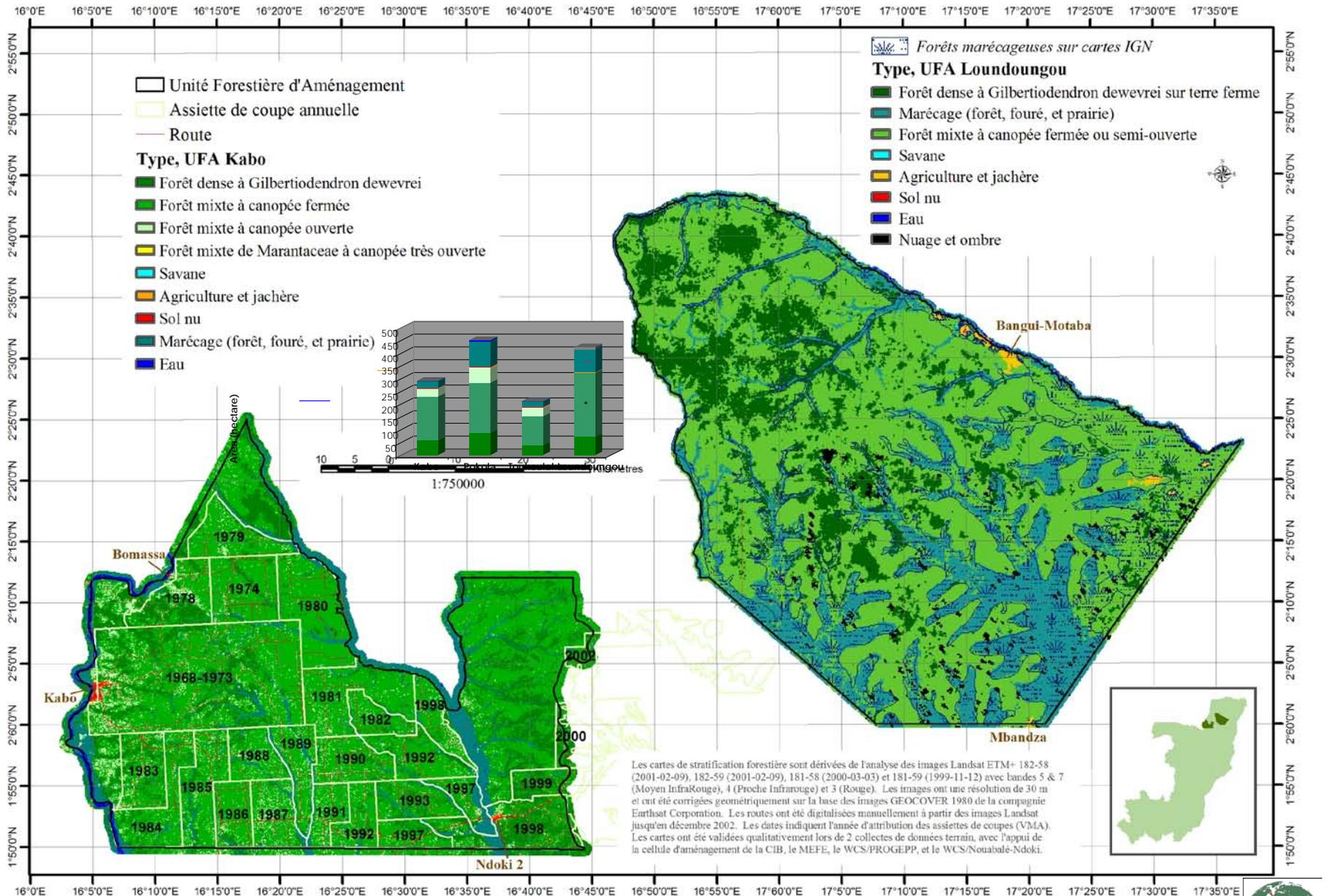


# Logging intensity mapping

Landsat TM - May 2001 - Bands 754 in RGB



# Forest Management Plans



# From land cover mapping to land use zoning

12/28/90 - Raw



2/9/01 - Raw



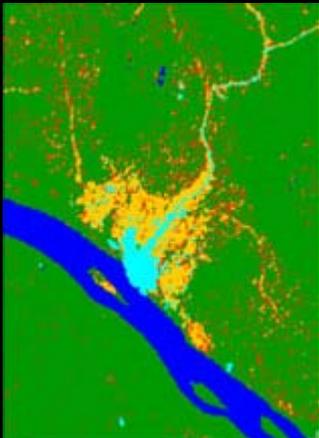
## Land Cover Change for Congo Logging Town of Pokola 1990 to 2001

- Agriculture Increased 38%
- Forest Decreased 12%
- Annual Deforestation 1.1%

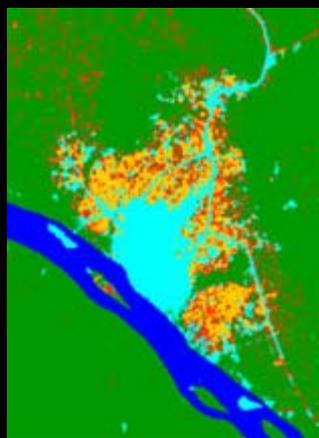
### Legend

- Forest
- Degraded Forest
- Agriculture
- Bare soil – Built areas
- Water

12/28/90 Map



2/9/01 Map

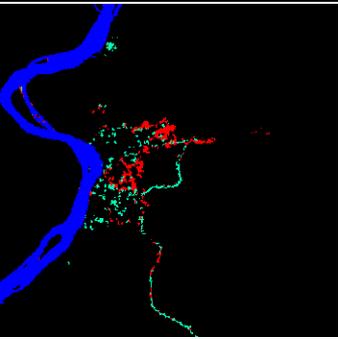


Map Area - 7 by 10 km



# THE DEFORESTATION PROCESS

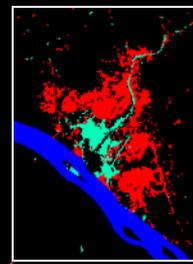
10 by 10 km



Kabo

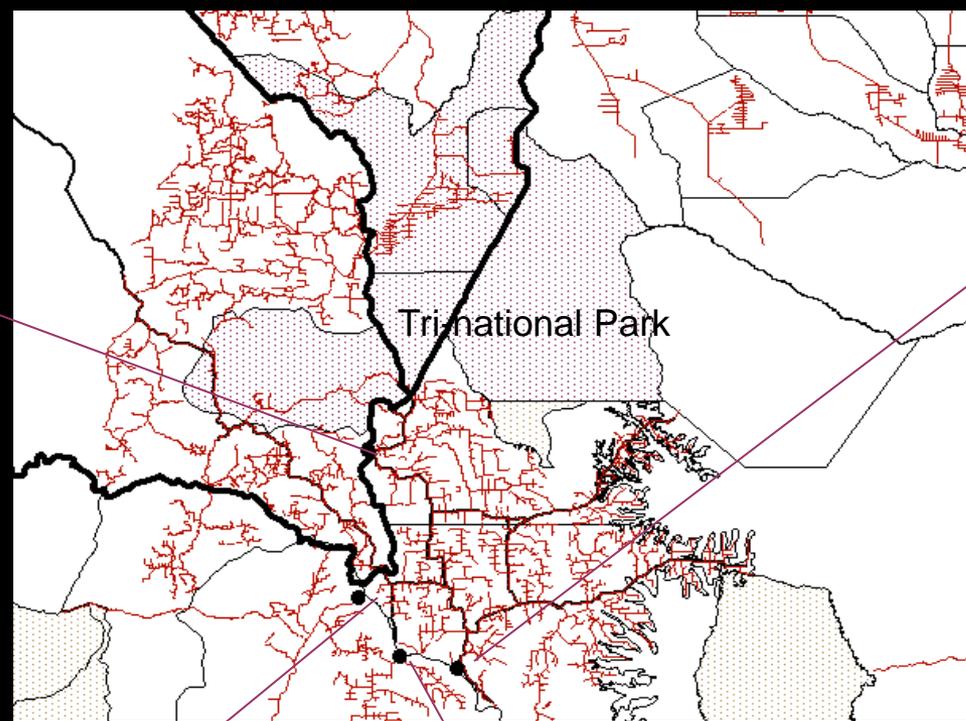
Logging town

7 km X 10 km

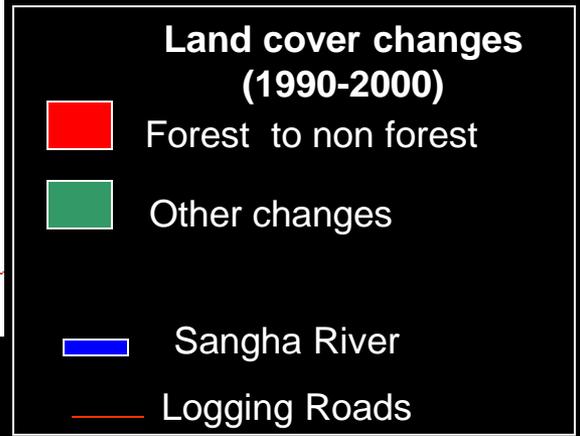


Pokola

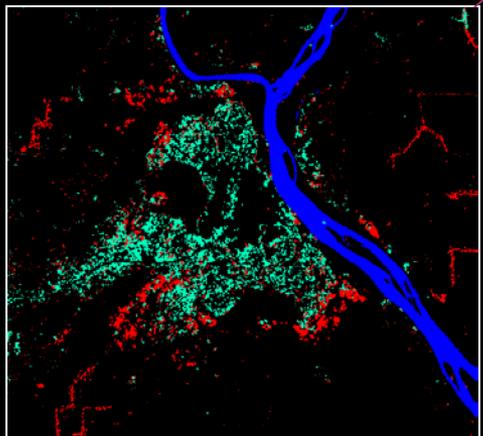
Logging Town



Tri-national Park

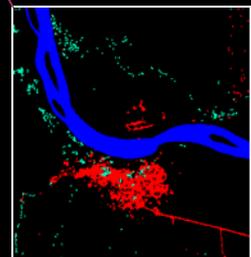


18 by 17 km



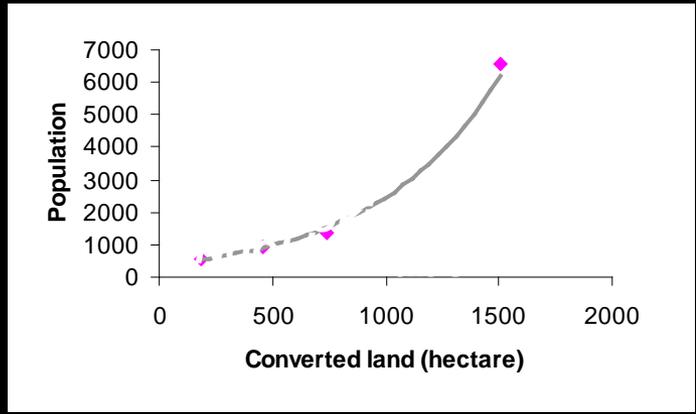
Ouesso – Administrative Town

11 by 10 km

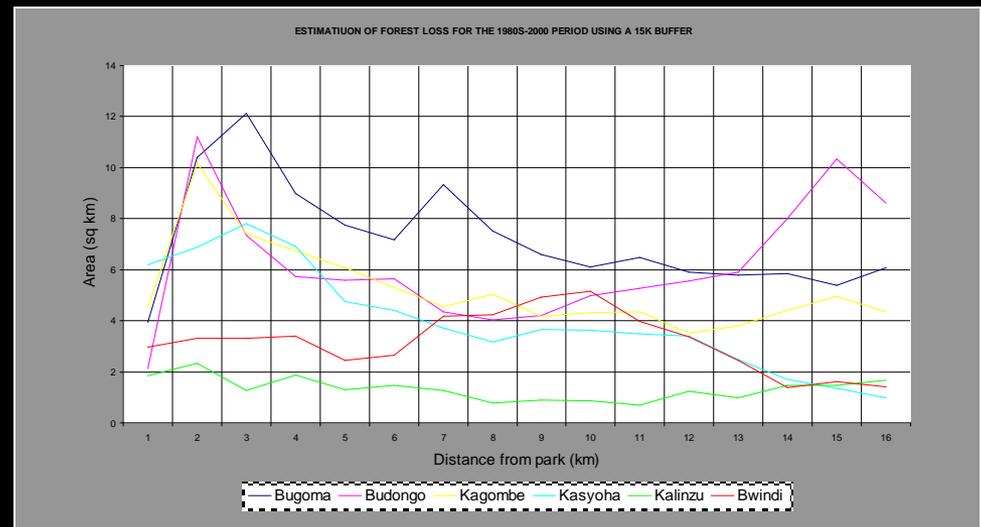
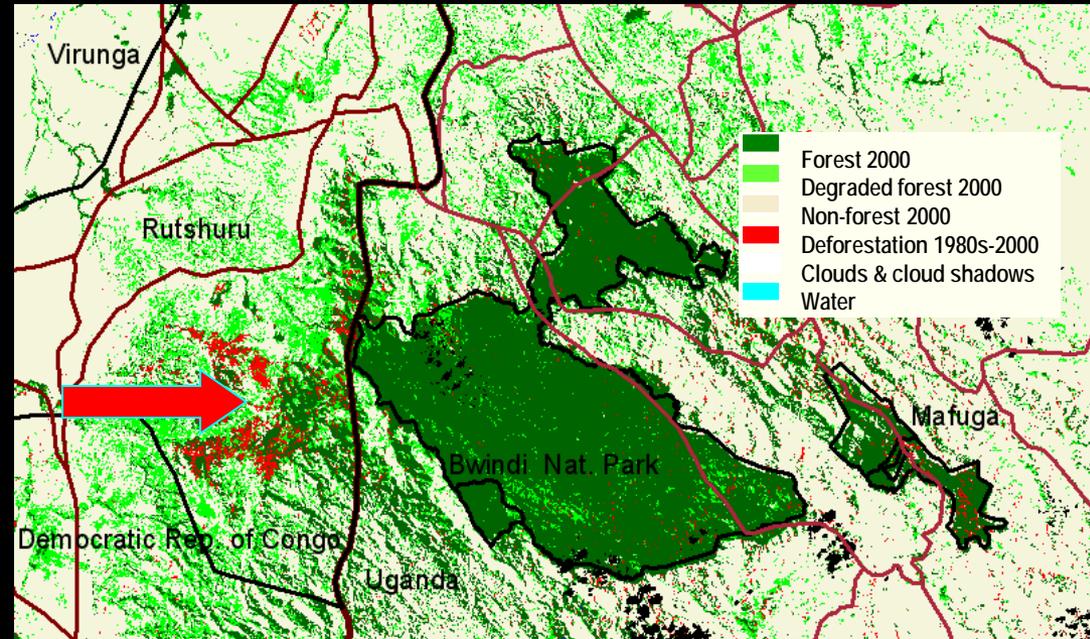
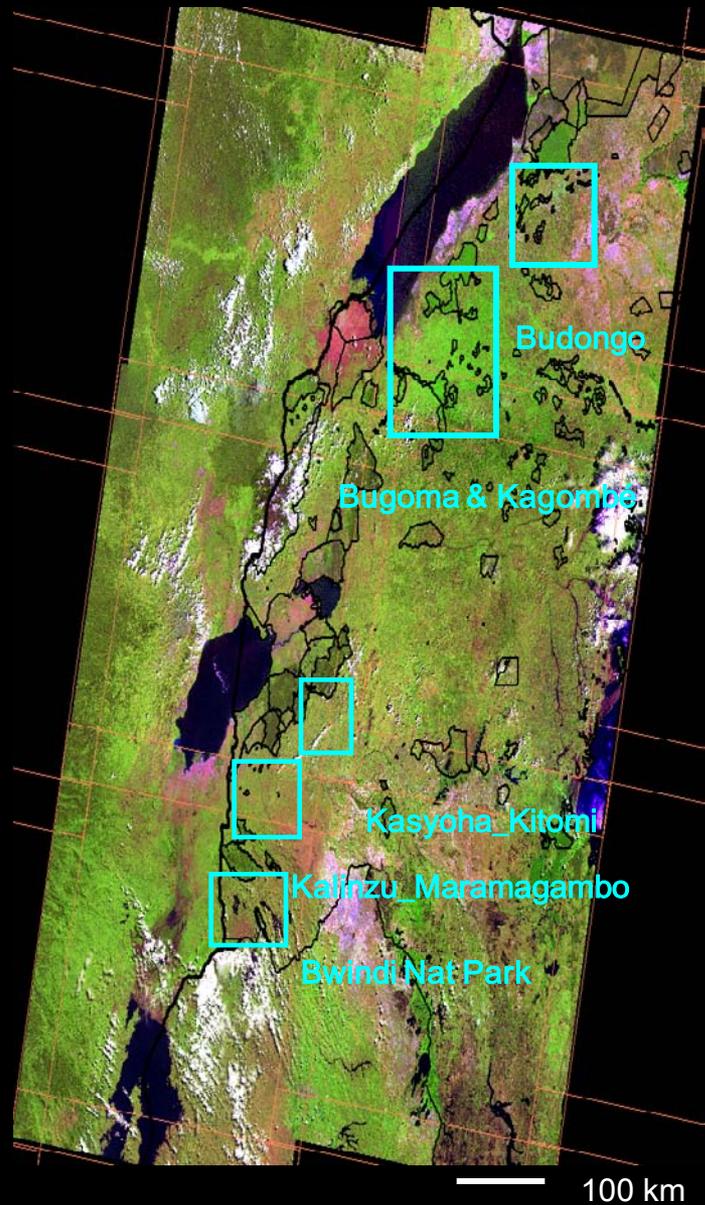


Ngombe

Logging Town



# DEFORESTATION in Protected Area



## CONCLUSIONS

- Network of forest managers, ecologists and remote sensing specialists established
- Satellite RS products (habitat / deforestation & logging maps) distributed in the region (www & CDs)
- Increased participation of Central African scientists in GOFC and NASA/LCLUC goals (e.g. Forest monitoring, carbon, biodiversity)

## NEXT STEPS

- MONITORING
  - Changes in forest carbon stocks monitored using RS and networks of ground based surveys established
  - Carbon and biodiversity ground networks coupled with the RS monitoring
- POLICY
  - Ensure that results are available to decision makers
  - Develop models to support decision making
- CAPACITY
  - Continue to build local capacity (training)

# Conclusions & Next Steps

