

The background image shows a steep, eroded hillside in a tropical or subtropical environment. The top of the hill is covered with dense green forest, but the lower slopes have been cleared, exposing a network of large, light-colored tree roots. Several workers in hard hats and safety vests are visible on the hillside, engaged in what appears to be a construction or reforestation project. The ground is a mix of brown soil and debris. The sky is overcast.

# Mitigation for One & All

## *Towards An Integrated Framework for Biodiversity and Ecosystem Services*

**Josh Goldstein**, The Nature Conservancy

**Lisa Mandle**, Natural Capital Project

**Nicholas Miller**, The Nature Conservancy

**Christina Kennedy**, The Nature Conservancy

**Graham Watkins**, Inter-American Development Bank

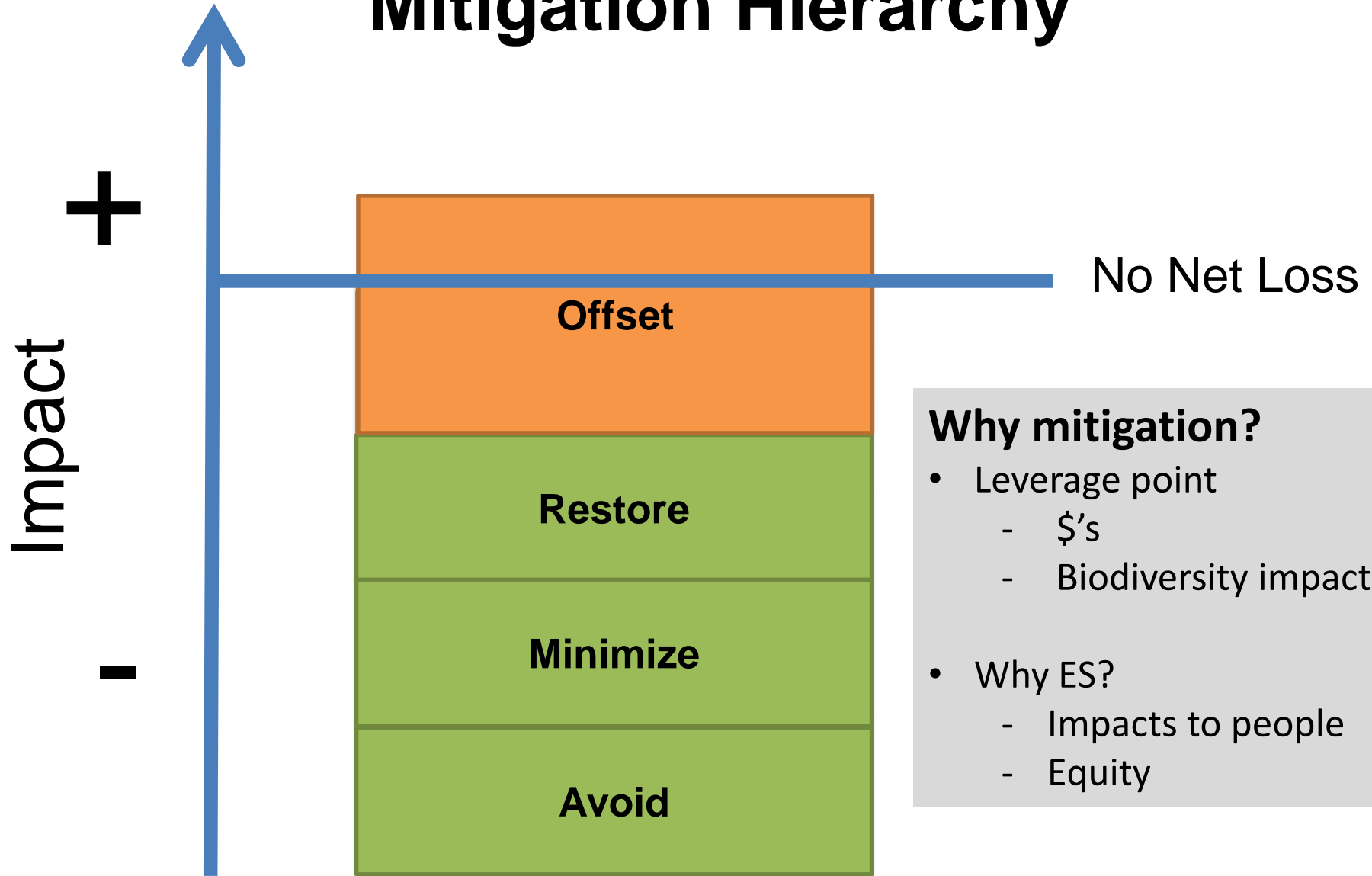




***The pathway to 9 billion people...***



# Mitigation Hierarchy



## Why mitigation?

- Leverage point
  - \$'s
  - Biodiversity impacts
- Why ES?
  - Impacts to people
  - Equity

# Session Lineup

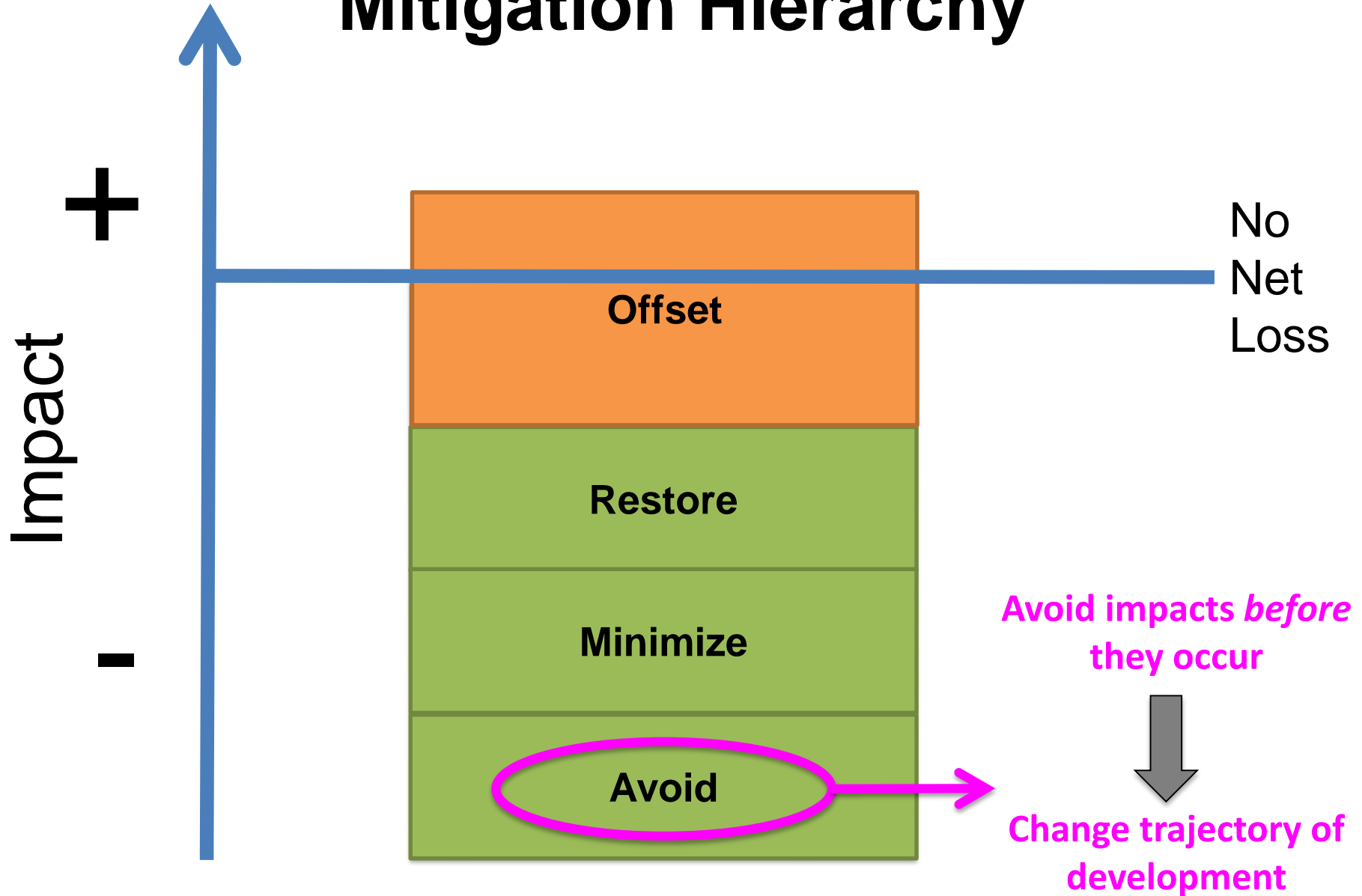




# **Bringing Ecosystem Services into Regional Avoidance Guidance: *National Land-Use Planning in Gabon***

**Josh Goldstein**  
December 10, 2014

# Mitigation Hierarchy



# **Gabon: National Land-Use Planning for Sustainable Development**



# The Future

NEXT EXIT





# Gabon's Economy

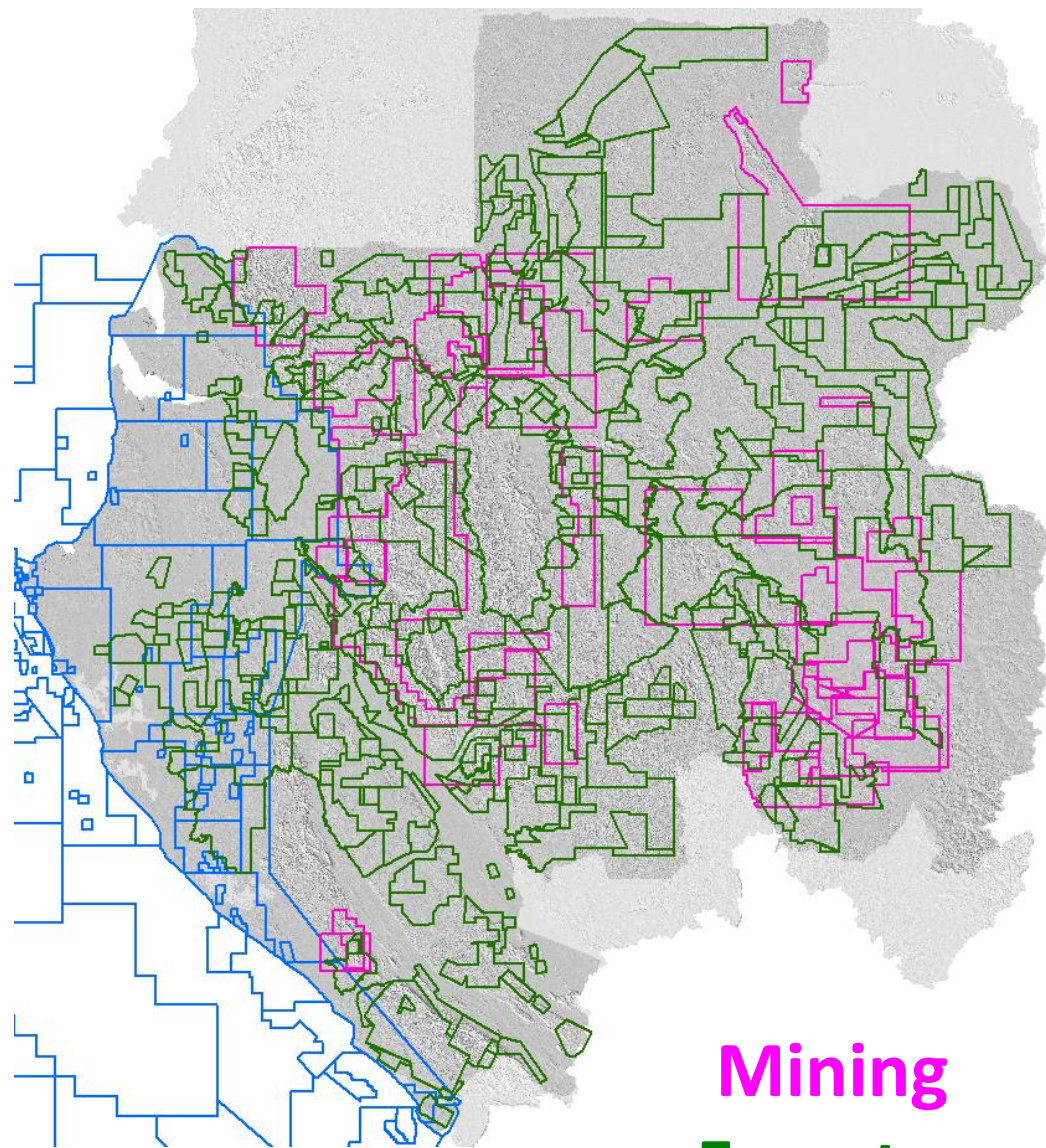
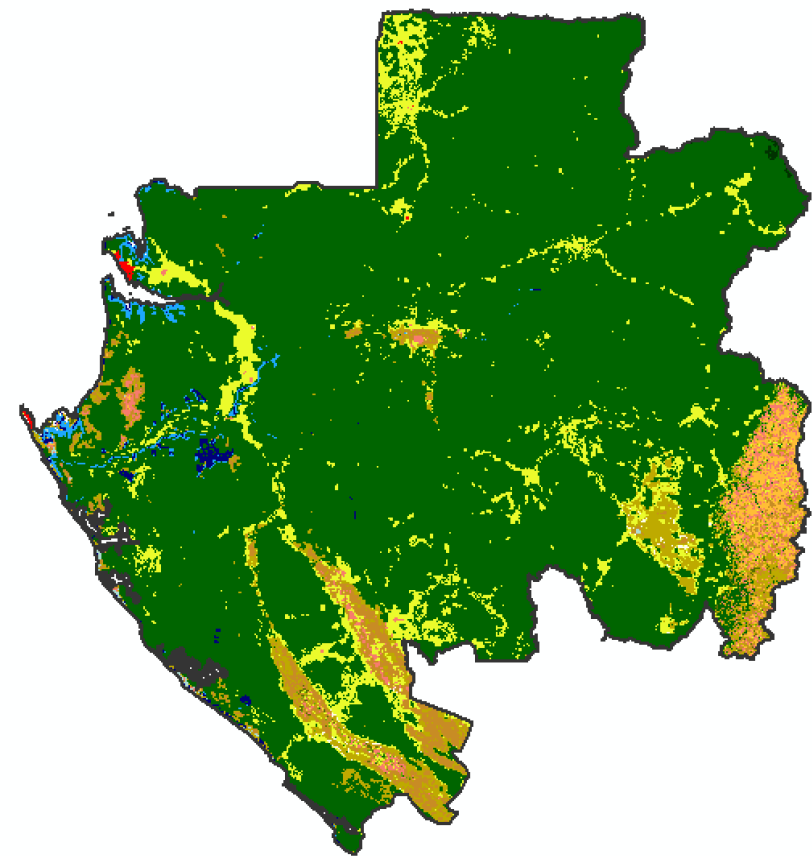
## Past and Present Oil economy



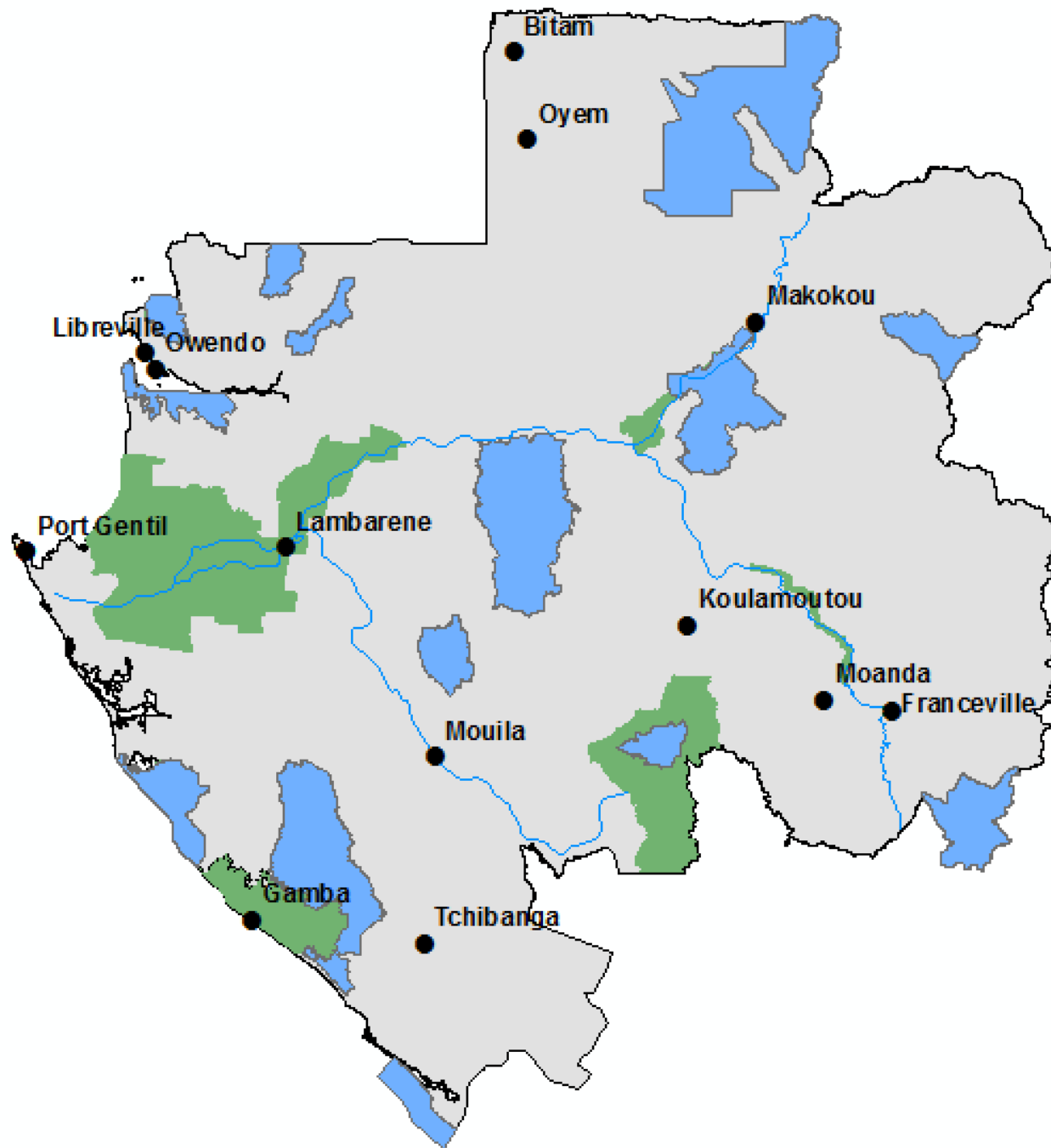
## Future: “Emerging Gabon”



- Mining
- Agriculture
- Stabilize rural populations
- Electricity (hydropower)
- Tourism
- Fisheries
- Transportation infrastructure

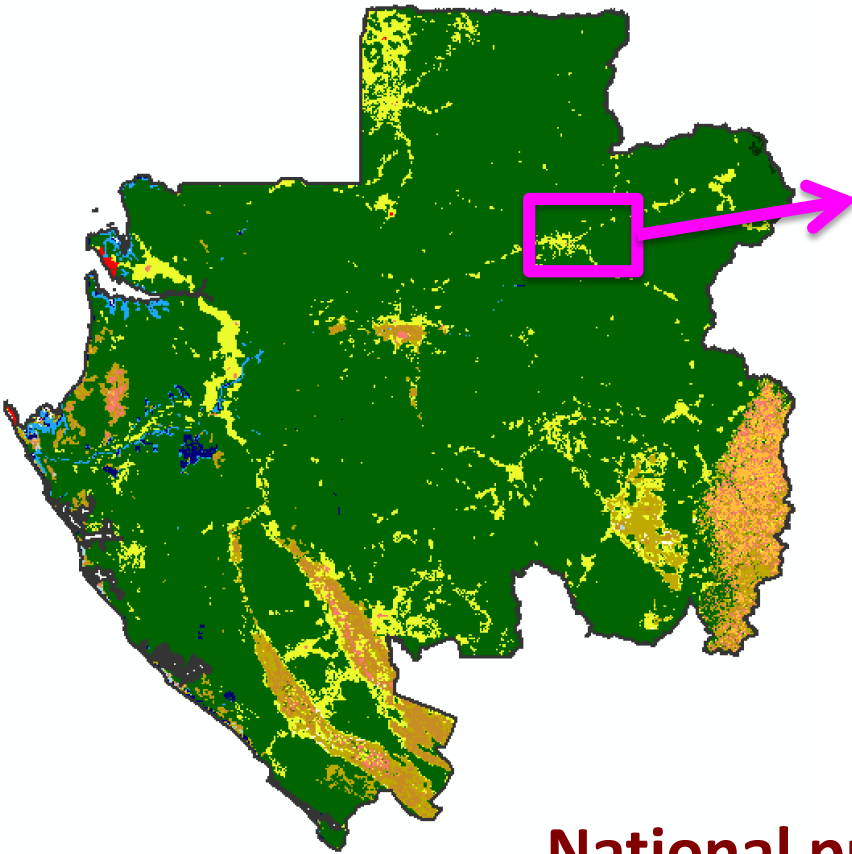


**Mining**  
**Forestry**  
**Oil and gas**



**National Parks  
and  
Ramsar Sites**





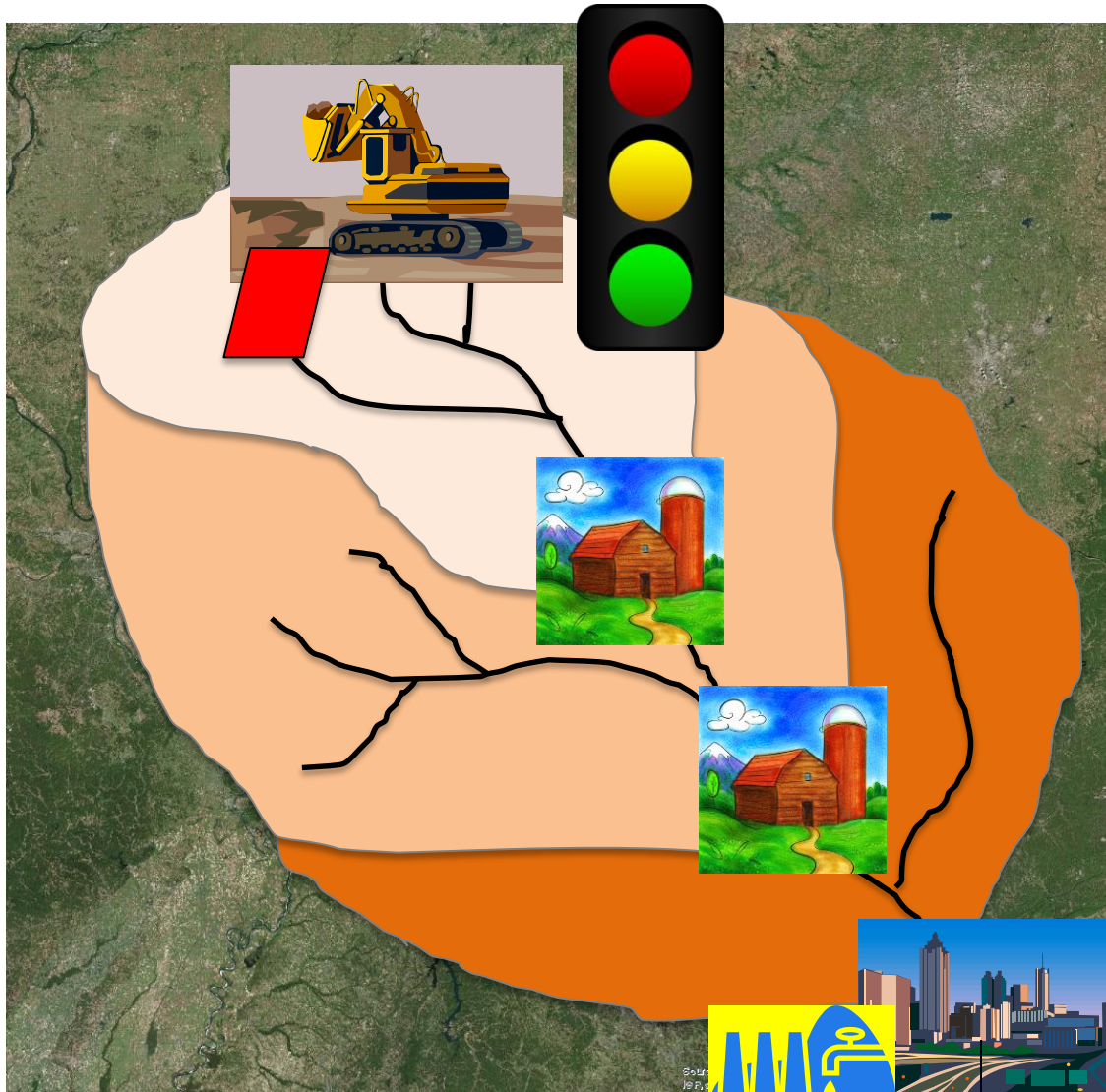
- + Mining, economy
- biodiversity, ecosystem services

**National priority areas for ecosystem services**

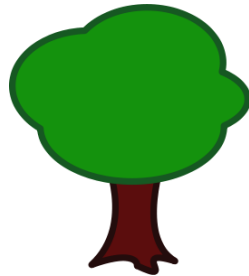
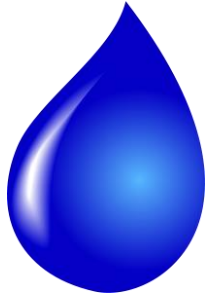
**=**

**“Avoid”**

# Cumulative Impacts



# Multiple Services



# PRIORITIZE areas where...



***Affected people in cities and villages*** (e.g., total #, vulnerable groups) would be impacted by...



***Severe losses in ecosystem services supply*** across multiple services if the areas are not sustainably managed or protected.



***Limited alternatives or capacity to buffer*** against these losses (e.g., human-derived alternatives), and...



***Low potential to offset impacts*** within the serviceshed if development is allowed.



# Freshwater Ecosystem Services



## **Water quality for human uses** (e.g., drinking water, hydropower)

- Erosion control
- Nitrogen retention
- Phosphorous retention



## **Groundwater recharge**

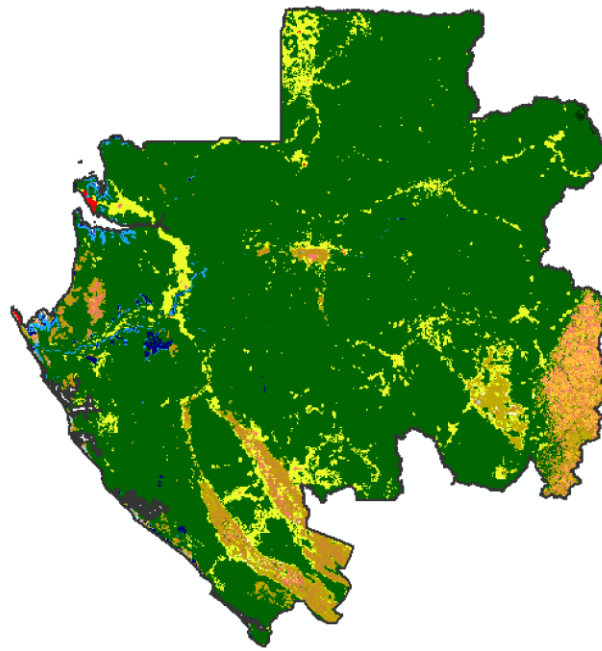


## **Flood risk mitigation**

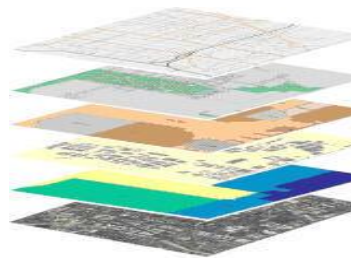


# RIOS

resource investment  
optimization system



Current  
Landscape



Watersheds  
DEM  
LULC  
Climate  
Etc.



- **Systematic spatial analysis** to score the importance of maintaining current condition of each pixel for providing ES benefits
- Present results aggregated to sub-watershed units
  - “Weight of evidence”

# Priority Areas to Protect Freshwater Ecosystem Services



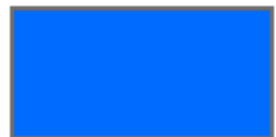
Higher priority area for ecosystem services; most sensitive to development



Moderate priority area

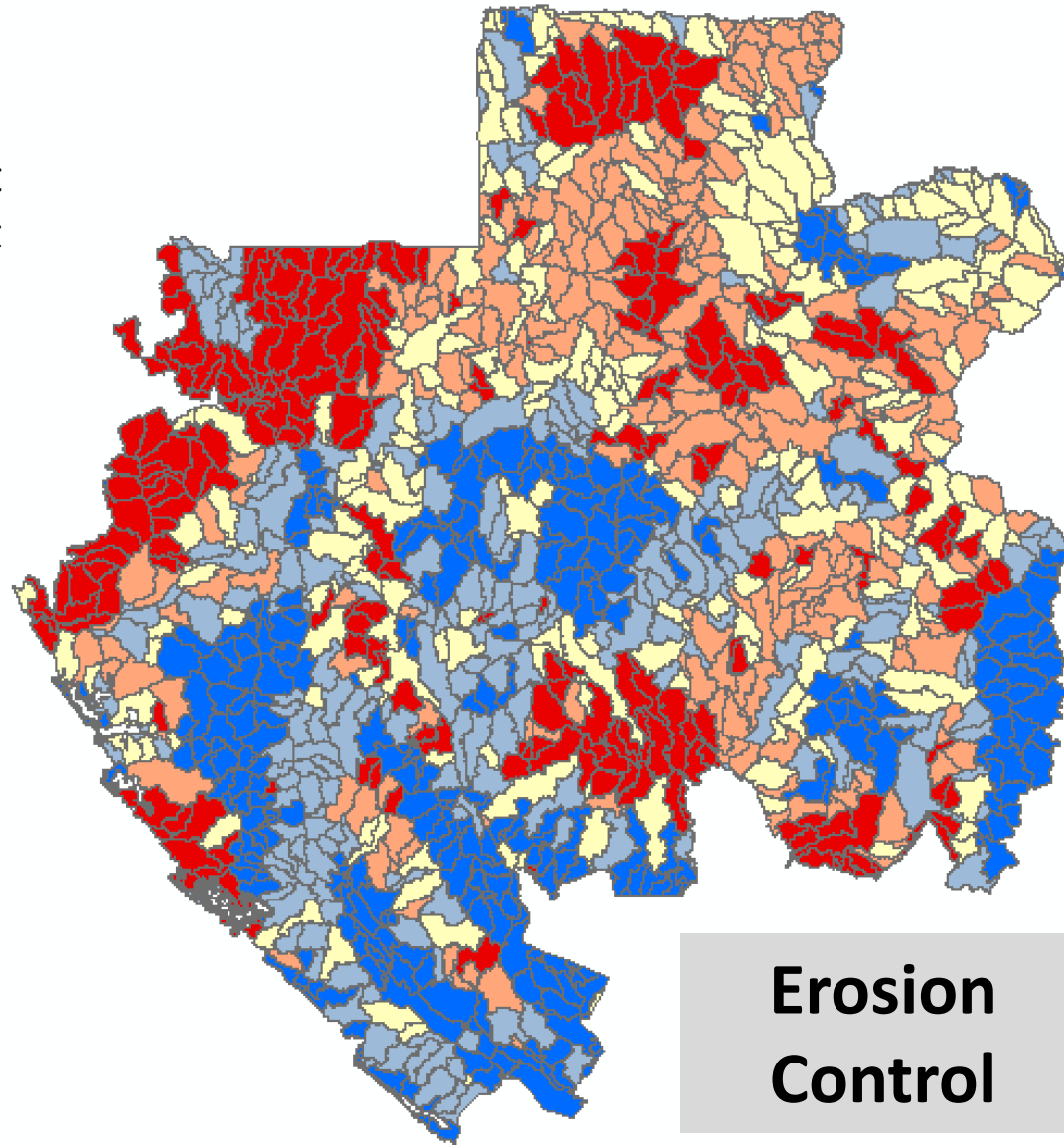
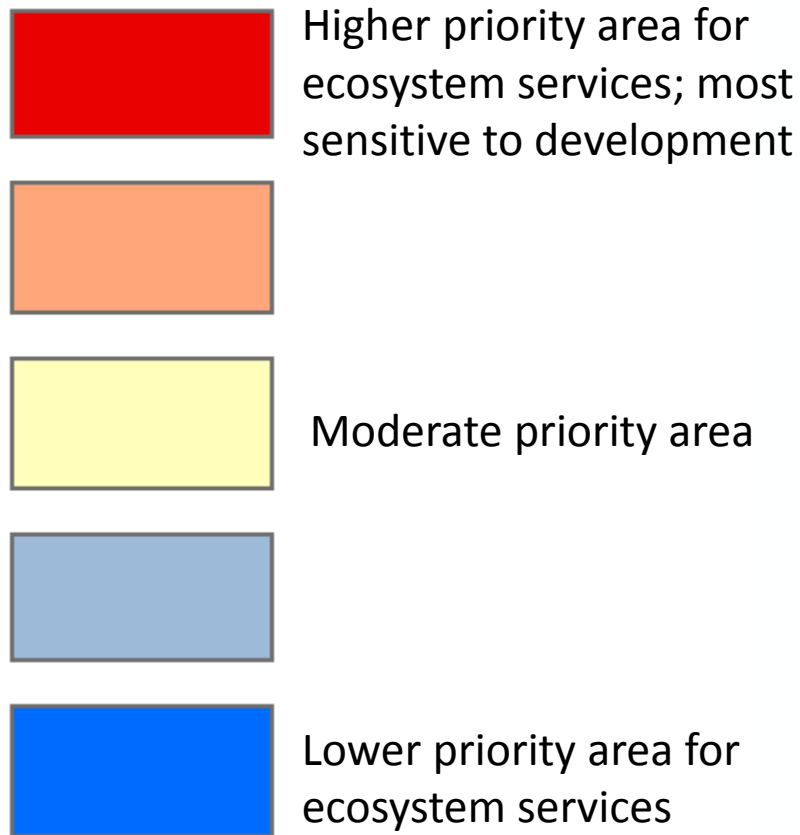


Lower priority area for ecosystem services



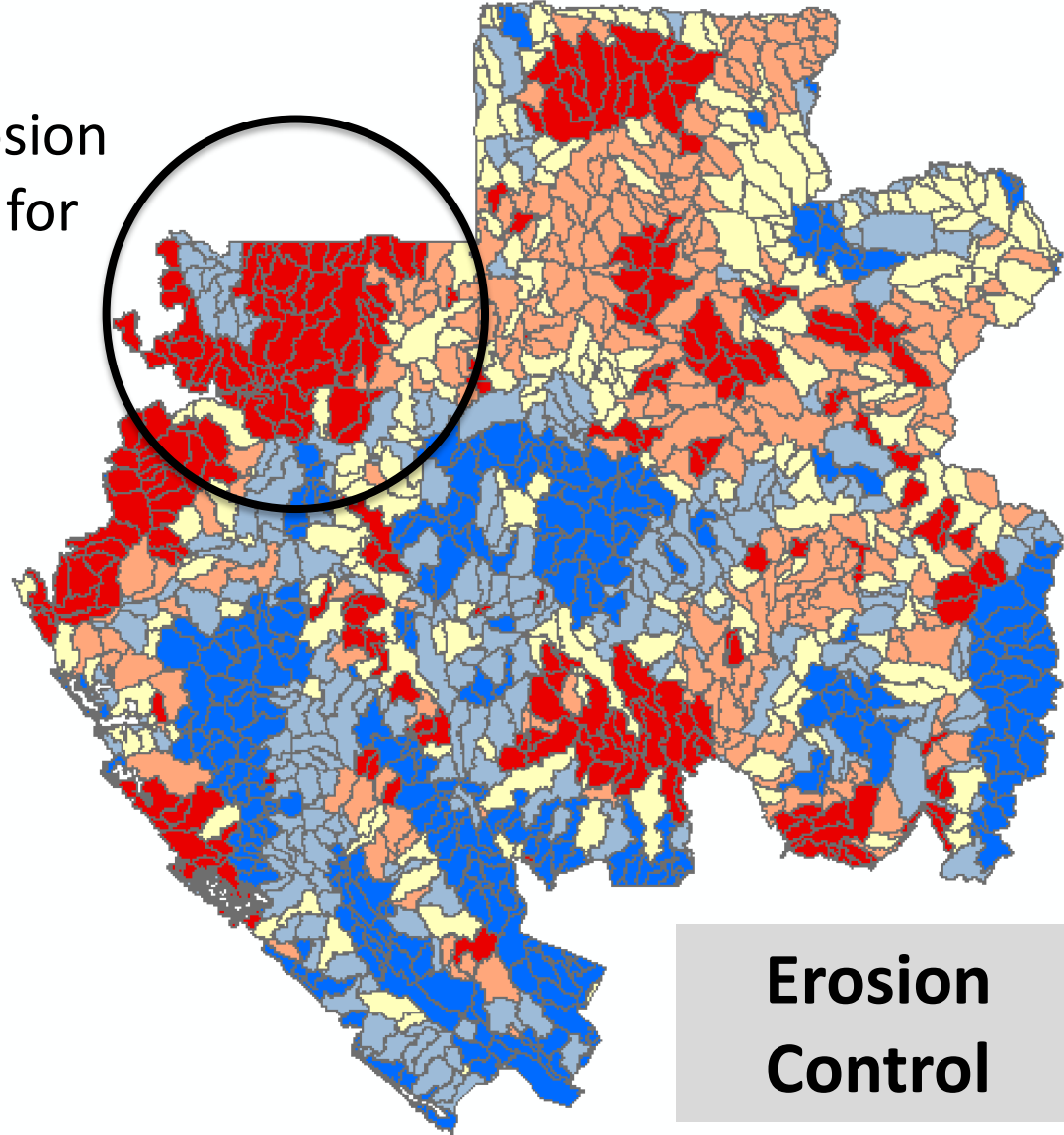


# Priority Areas to Protect Freshwater Ecosystem Services

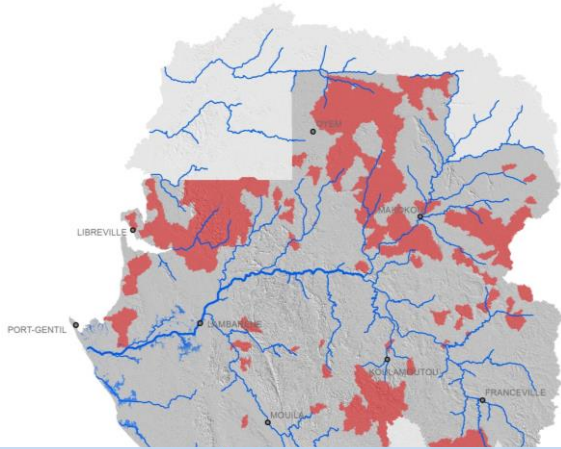


# Priority Areas to Protect Freshwater Ecosystem Services

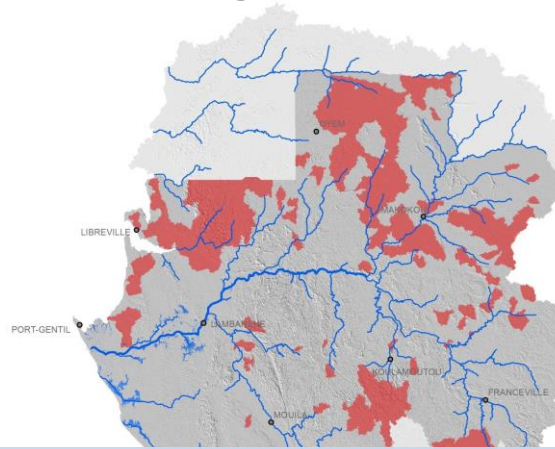
Forest cover is preventing erosion that would affect watersheds for major population centers



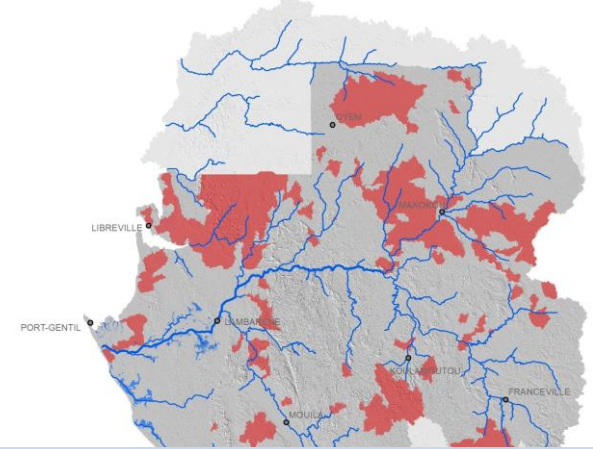
## Erosion Control



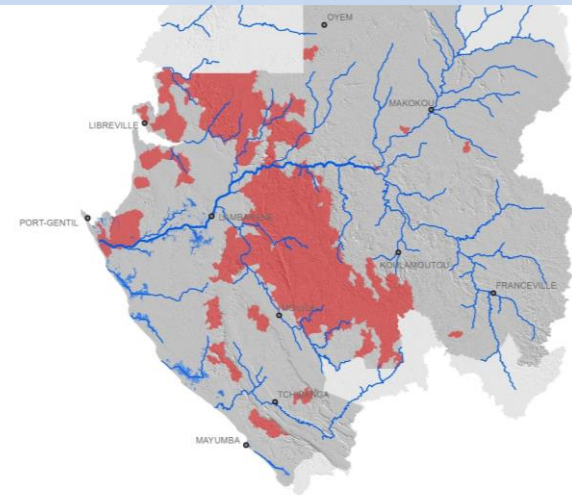
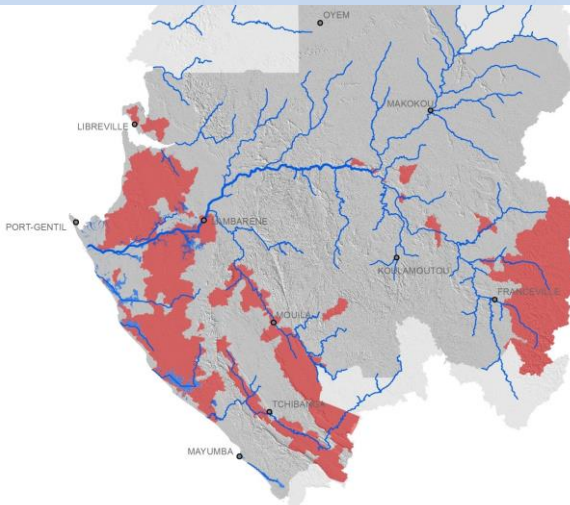
## Nitrogen Retention



## Phosphorous Retention



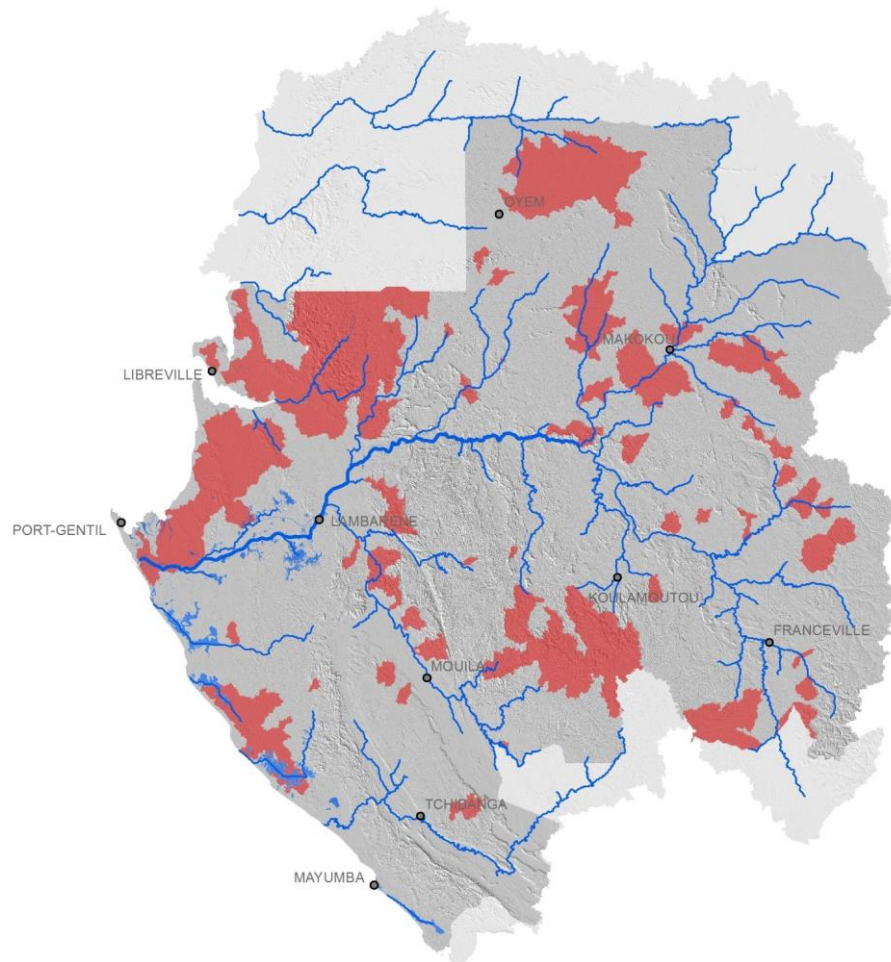
- High overlap for erosion, nitrogen, and phosphorous
- Largely different areas for groundwater and flood mitigation
- Balancing ecosystem services for urban *and* rural communities



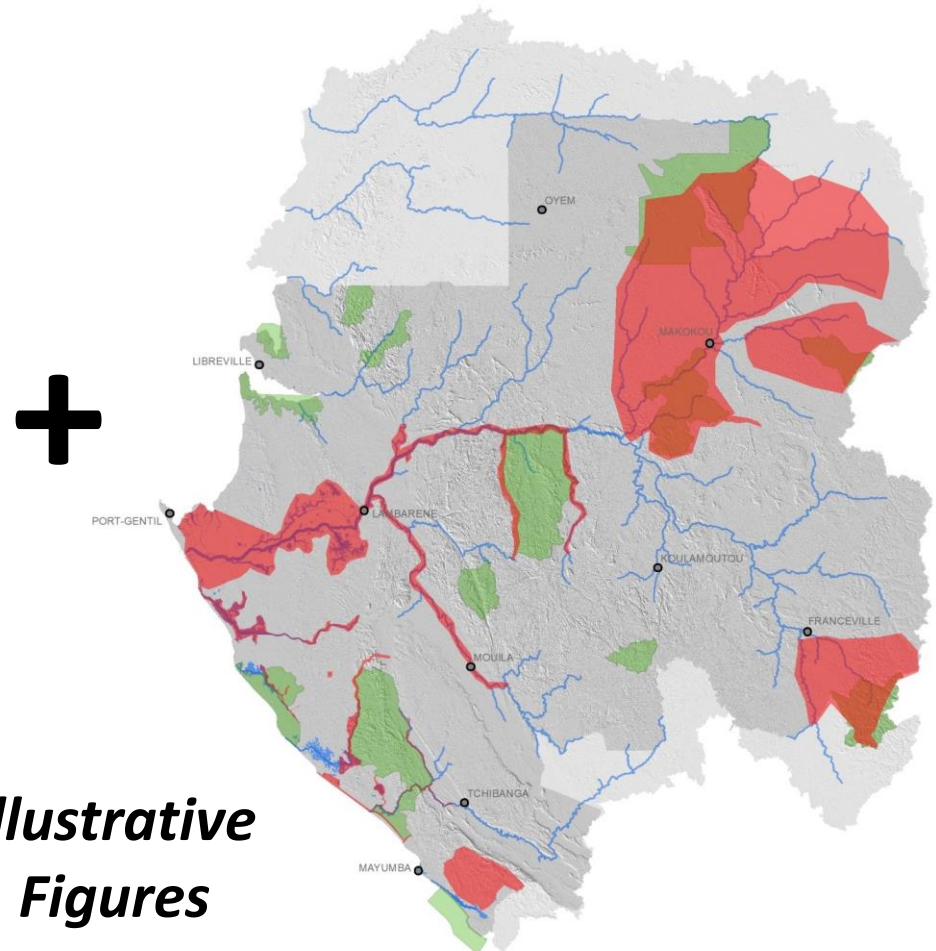


# Integrated Conservation Portfolio to Support National Land-Use Plan

## Freshwater Ecosystem Services



## Freshwater Biodiversity



+

*Illustrative  
Figures*

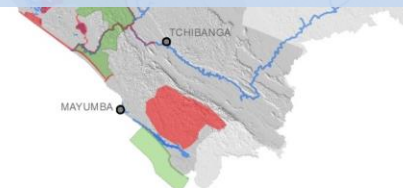
# Integrated Conservation Portfolio to Support National Land-Use Plan

## Freshwater Ecosystem Services

## Freshwater Biodiversity

- Conservation “blueprint” to inform options and tradeoffs in multi-sector planning effort
- Making impacts to people explicit has strengthened the case for why protecting nature is key to economic development strategies
- Suite of tools working at multiple scales will be needed to balance conservation and development goals

*Illustrative  
Figures*



# *Avoiding* avoidance?





# **Ecosystem Services Avoidance**



**Securing natural capital for  
human wellbeing**