



# Minimizing linear infrastructure development impacts on biodiversity: *A case study of the Murchison-Semliki landscape*

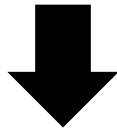
Grace Nangendo, Sam Ayebare & Simon Nampindo



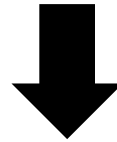
**AFRICA BIODIVERSITY COLLABORATIVE GROUP**

# The mitigation hierarchy

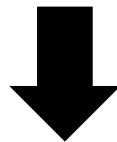
**Avoid**



**Reduce**

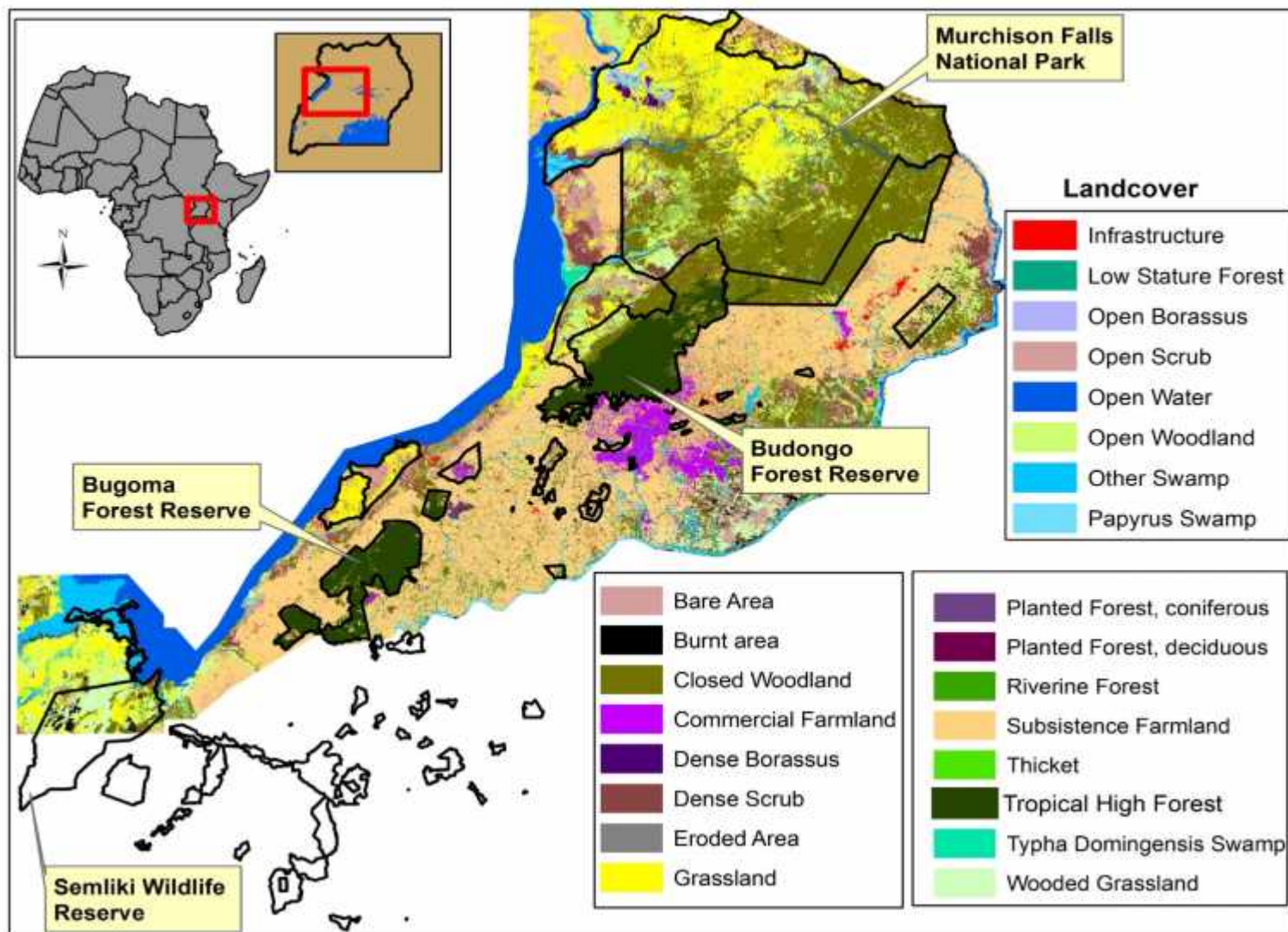


**Restore**

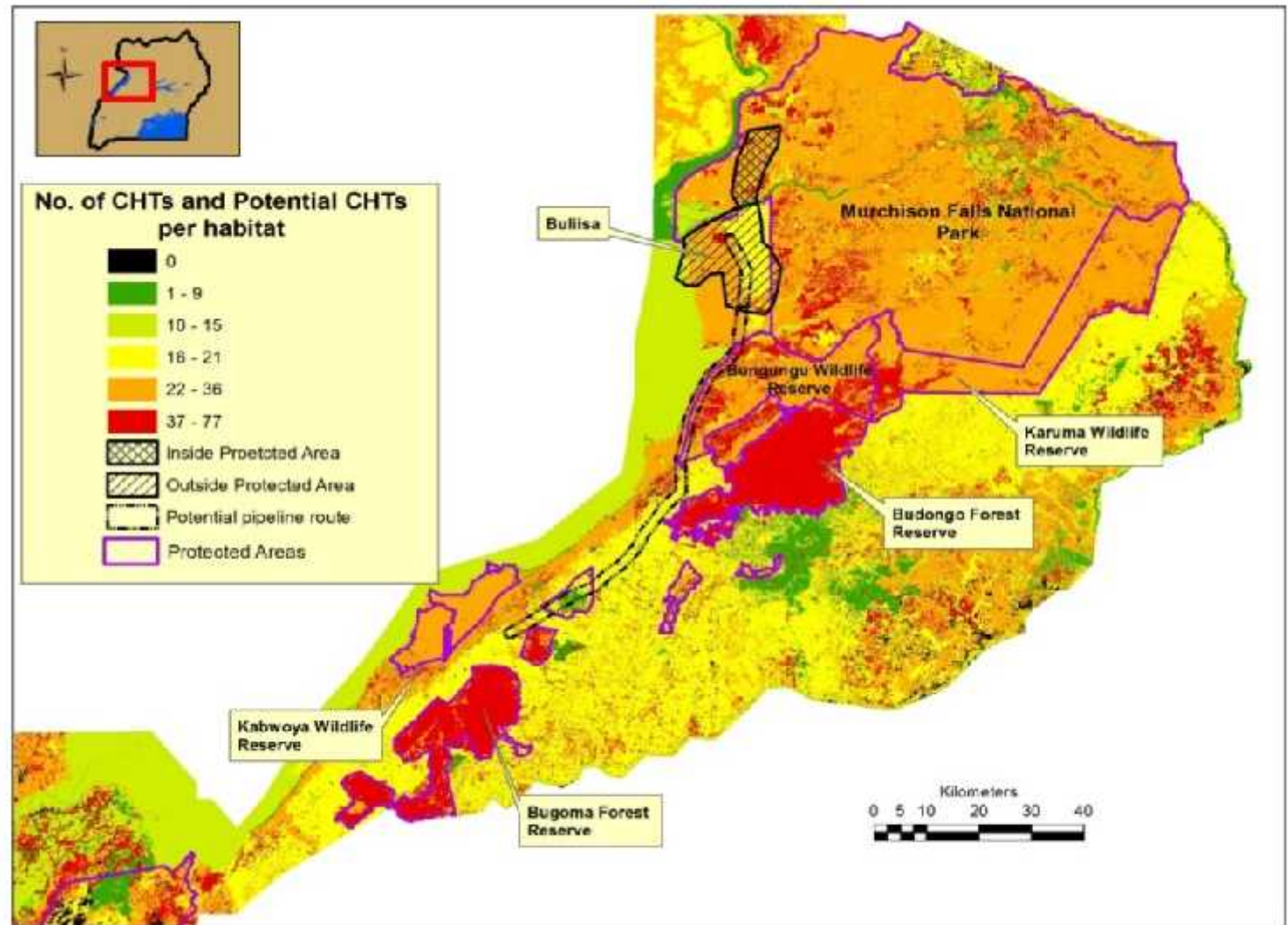


**Residual Impacts**

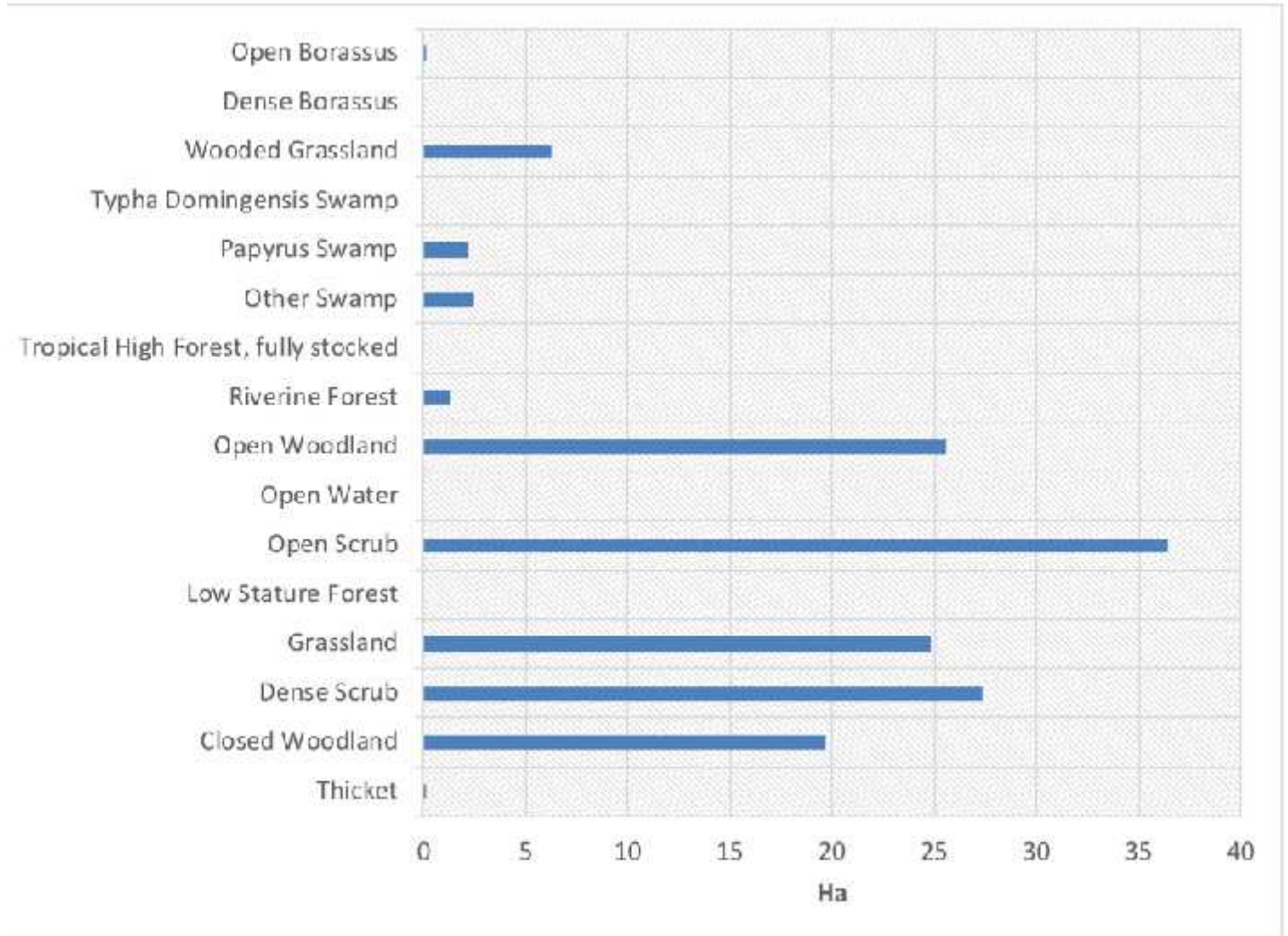




Species richness of Critical Habitat Trigger Species per habitat and an overlay of the potential footprint of oil infrastructure in the northern portion of the Murchison – Semliki Landscape



Potential direct impacts of the pipeline on land cover types in terms of area uptake



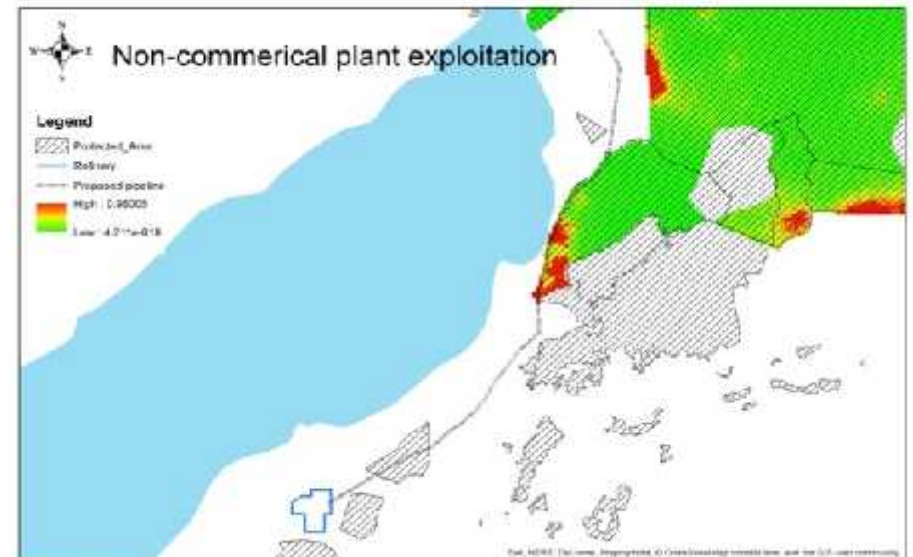
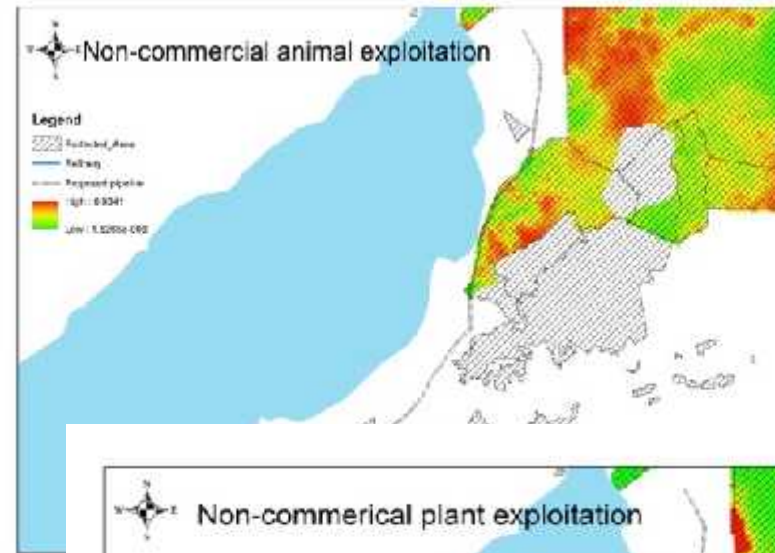
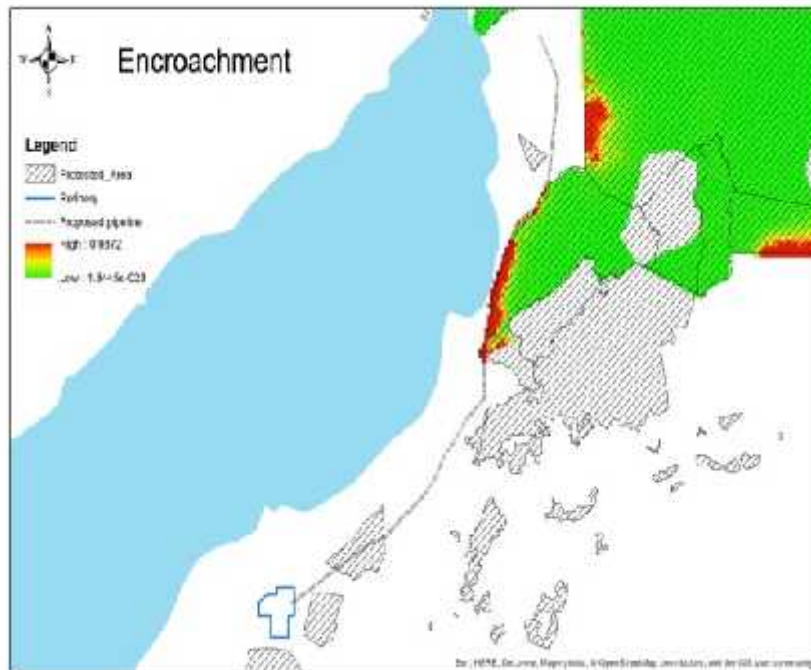
## Impacts on species (WCS studies: WILD Program)

- ❖ Displacement of species at both temporal and spatial scales
- ❖ Direct habitat loss

WCS has done avoidance studies that will minimize impacts on species displacement



# Existing impacts



## Opportunity for offsets and restoration

- WCS surveys showed that the riverine forests between Budongo and Bugoma provide connectivity for chimpanzee and other primates
- Tullow Phase II biodiversity study showed that there are mammals in the savannah area between Bugungu Wildlife Reserve and Kaiso Tonya Community wildlife area
- This Savannah could act as a potential corridor if it can be maintained as a savannah habitat
- Planned pipeline will border or lie within some conservation areas, it could increase access to relatively intact areas and also increase wildlife poaching as well as potential fire outbreaks that could destroy the critical habitat for some species
- Minimizing the existing risks within PAs



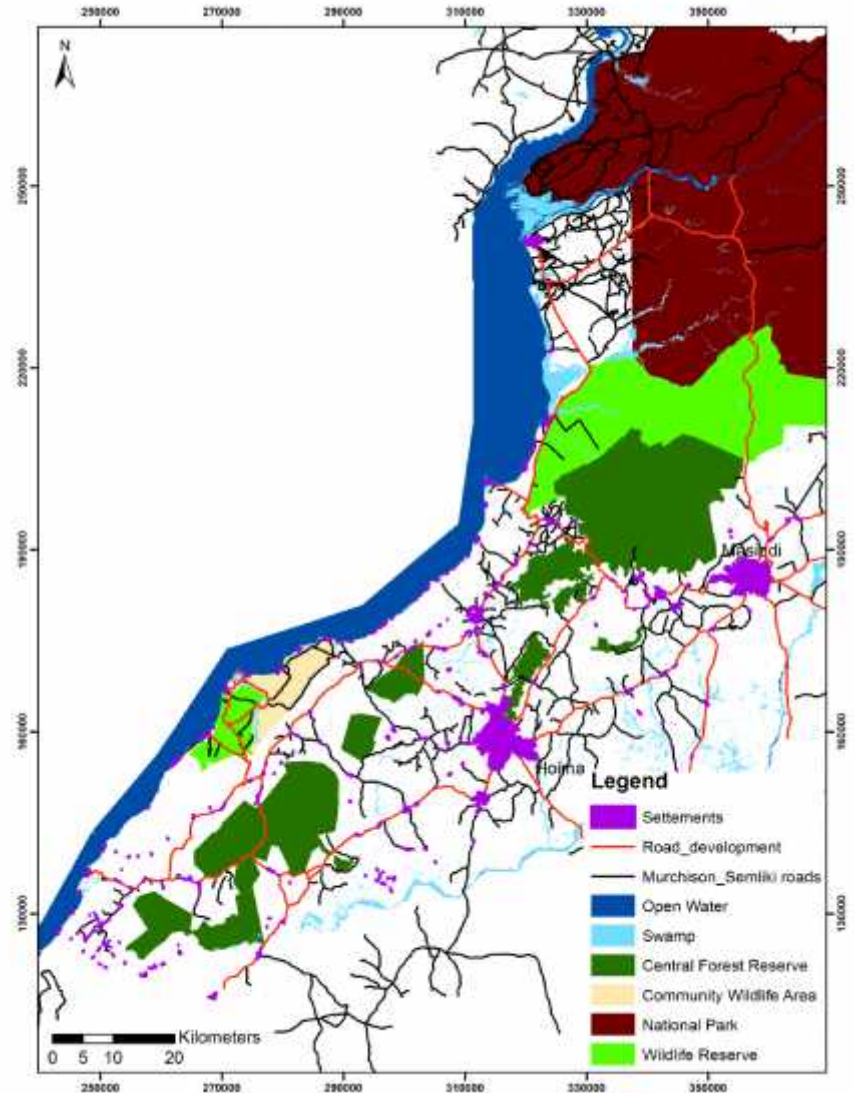
## Relationship between roads and settlement locations

The settlements closer to the roads are likely to benefit most from the improved road infrastructure

But benefit will be for all settlements:

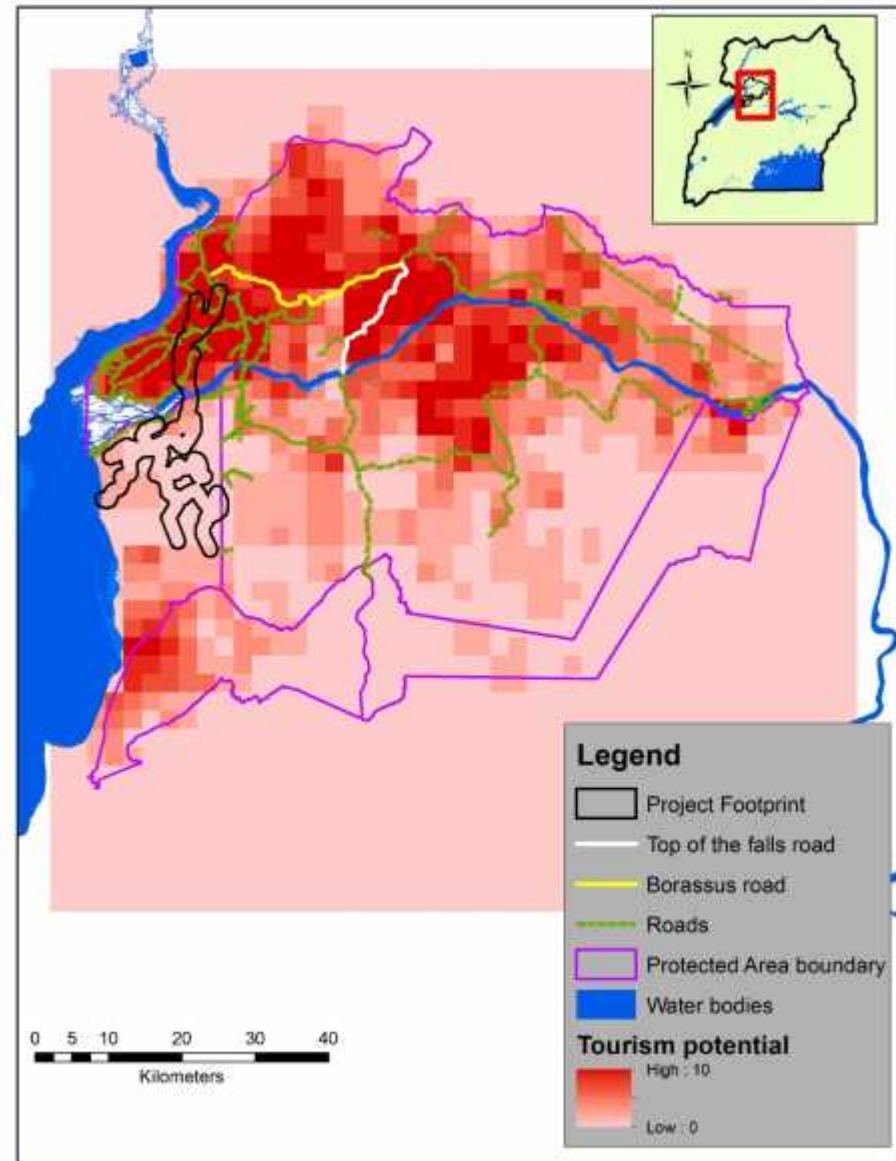
- Direct - homes along the improved roads
- Indirect - the distance to the improved roads will be reduced

Increased settlements along roads has potential for increased impact on high biodiversity areas

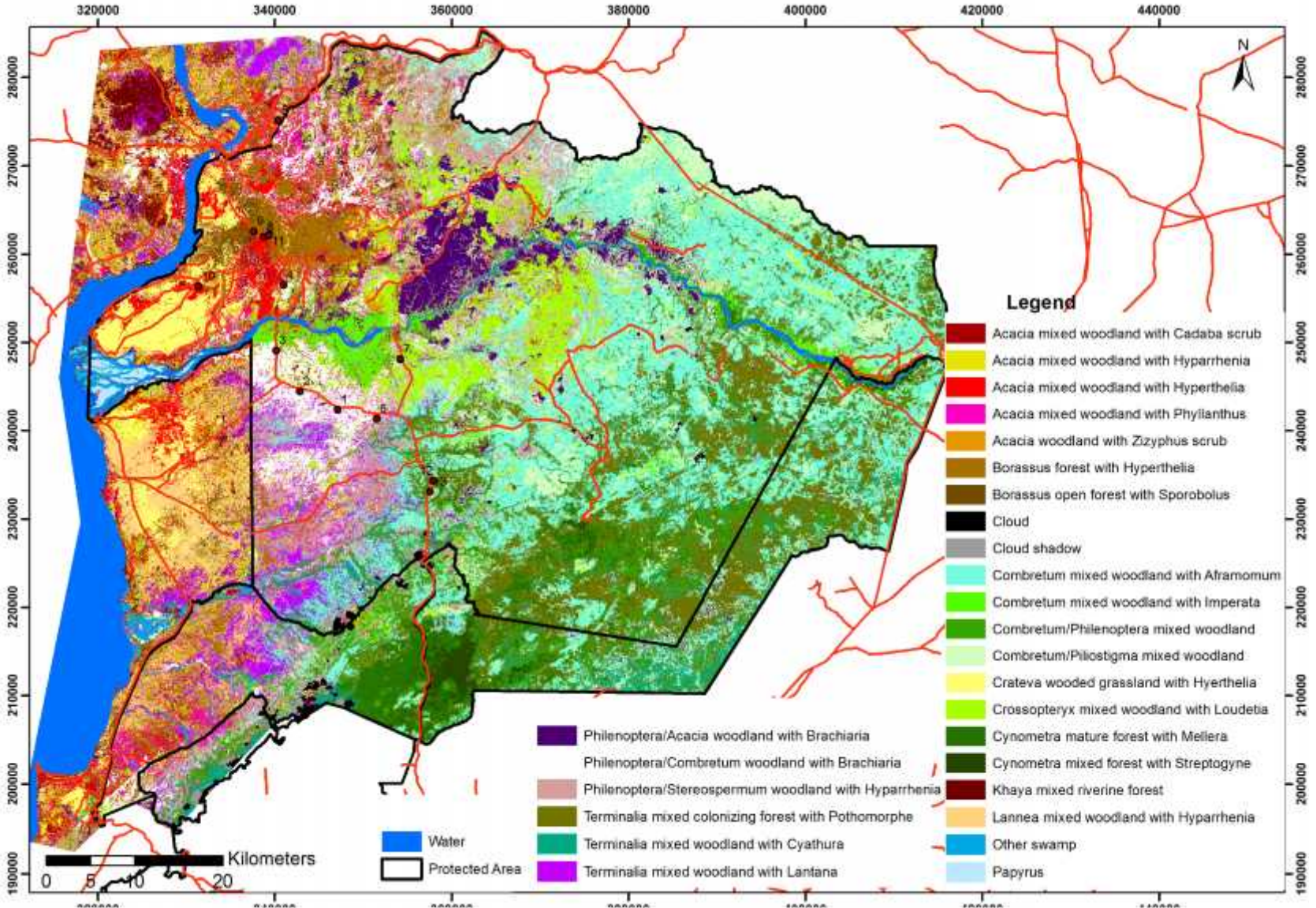


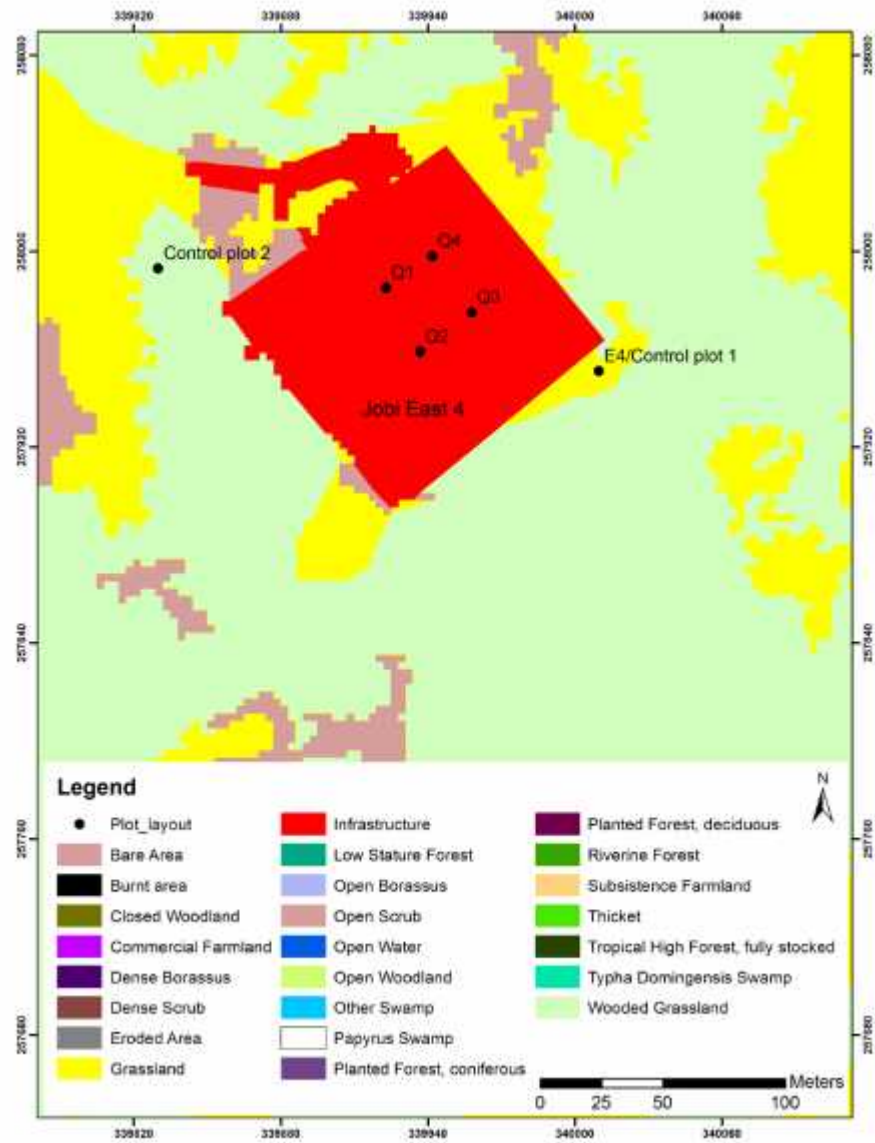
Species richness of large mammals for (2005, 2010, 2012, 2014 and 2016) as proxy for tourism potential.

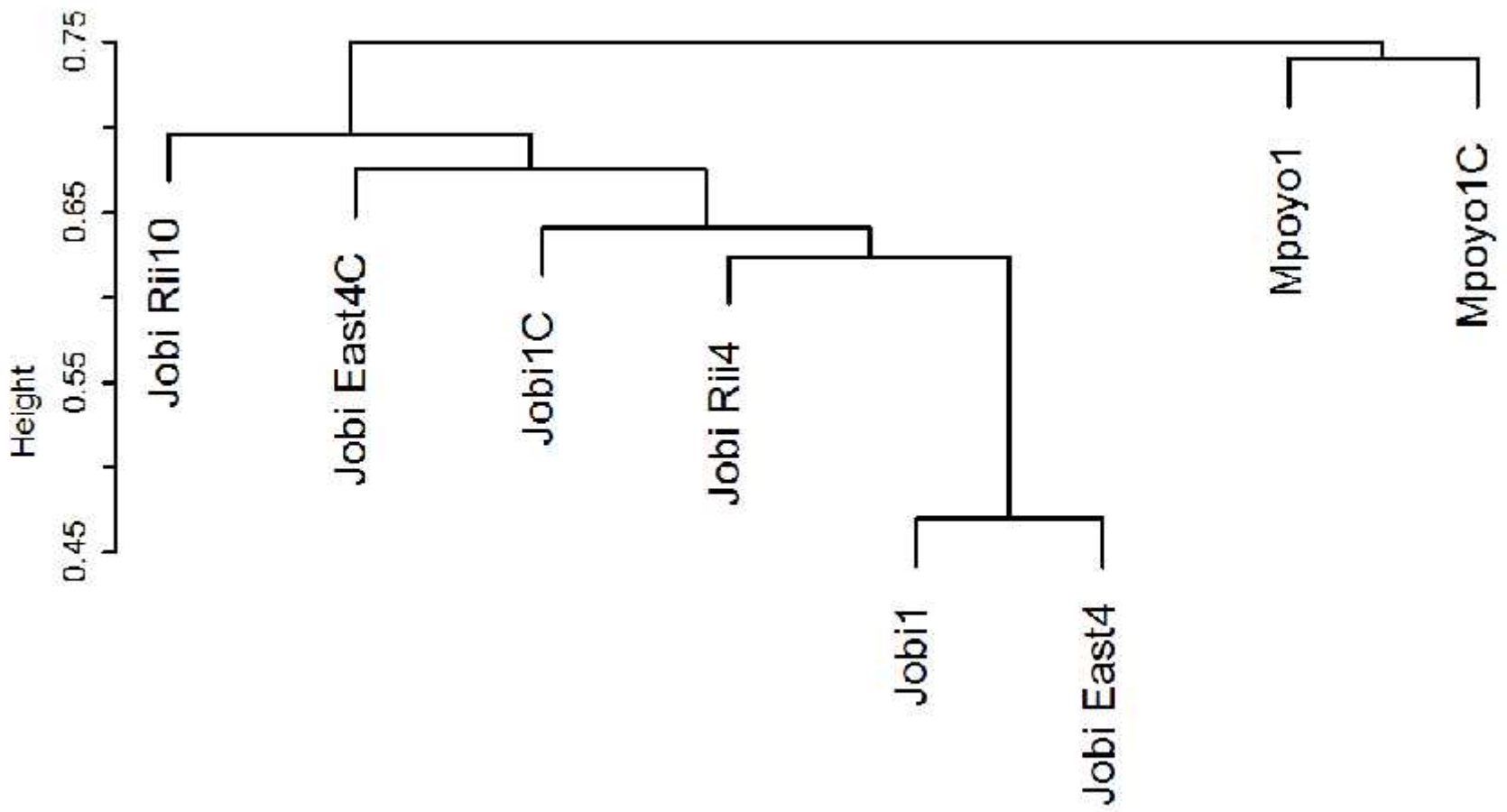
Animals considered:  
Uganda Kob, Jackson's hartebeest, Rothschild giraffe, Elephant, Warthog, buffalo, oribi, reedbuck, waterbuck, baboon, bushbuck, duiker and hippo



# Restoration efforts assessment







hclust ("ss", "single")

## Comparison of restored site plots and control site plots

Well Pad	Count of Species
Jobi 1	41
<b>Jobi 1 C</b>	<b>18</b>
Jobi East 4	42
<b>Jobi East 4 C</b>	<b>19</b>
Jobi Rii 10 (proposed site)	98
Jobi Rii 4	60
Mpoyo 1	32
<b>Mpoyo 1 C</b>	<b>45</b>

Even opportunistic species show up during the recovery

# Conclusions

- Majority of the pipeline routing does a good job at avoiding important biodiversity areas except for a small area where small adjustments in the design of the pipeline to follow the nearby road could reduce potential impacts
- Indirect impacts e.g. increased poaching, and wood fuel and timber demand due to increased population are likely to occur
- To achieve no net loss of biodiversity, investment in restoration and increased protection of biodiversity will be needed
- The Budongo-Bugoma riverine forests and the savannah areas between Bugungu WR and Kaiso-tonya CWA offer potential sites for offset
- There is a need to do monitoring after restoration to ensure recovery of species composition

# Thank you

