Presentation given at the

WCS Workshop on Land Change Modeling for REDD

October 25– 29, 2010

Wildlife Conservation Society - Bronx Zoo
Bronx, New York, USA

Hosted by

Clark Labs and the Wildlife Conservation Society

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POTENTIAL ANIMAL CORRIDORS
Murchison-Semliki landscape

L'hoest's monkey

WCS consultancy for GEF/WWF Albertine Rift Forests Project

- Assess where potential corridors might still be conserved that are important for wildlife

- Undertake biological and socioeconomic surveys of the potential corridors to assess which ones of them are most feasible to conserve
- Assess options for financing the conservation of these corridors

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Location of Uganda

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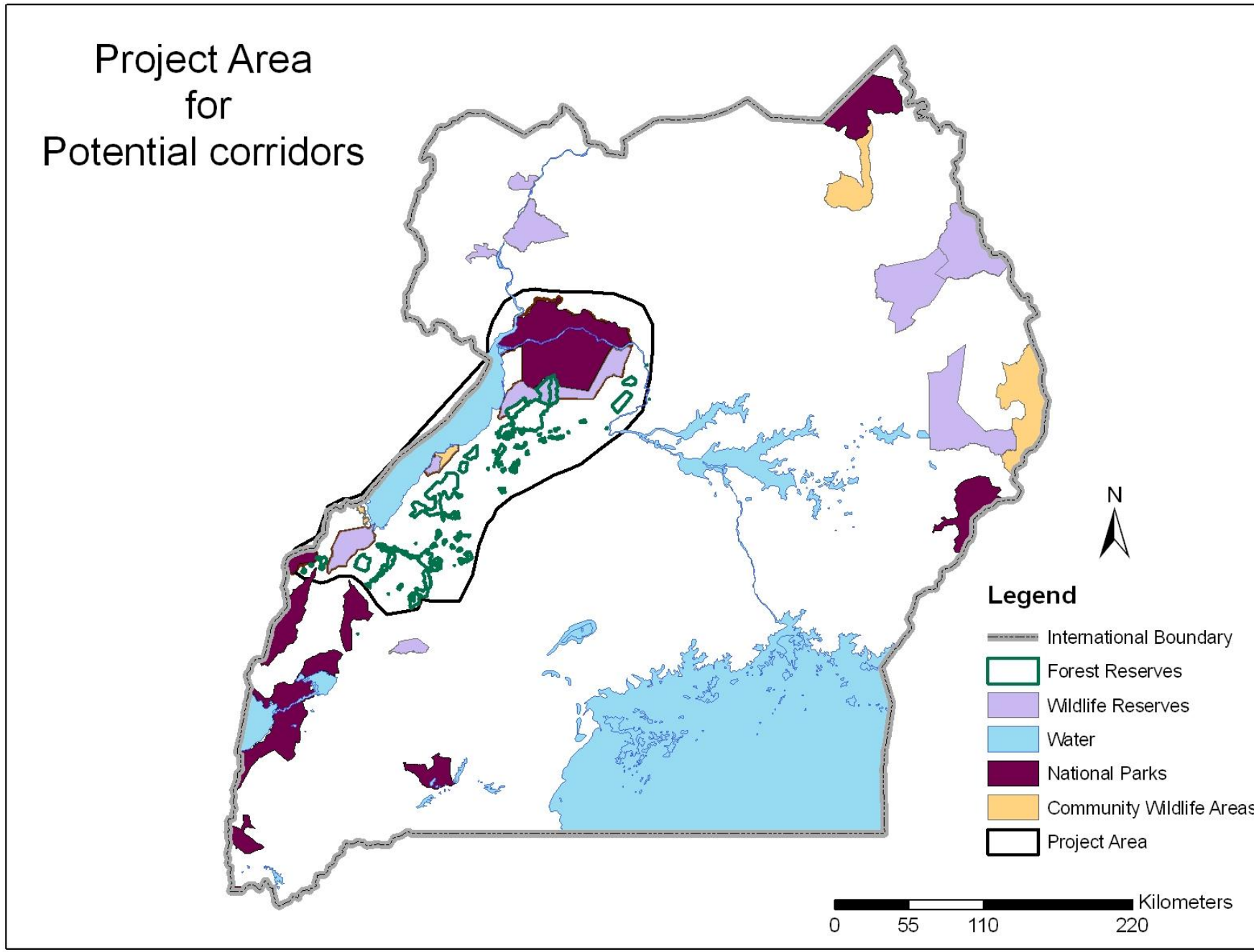
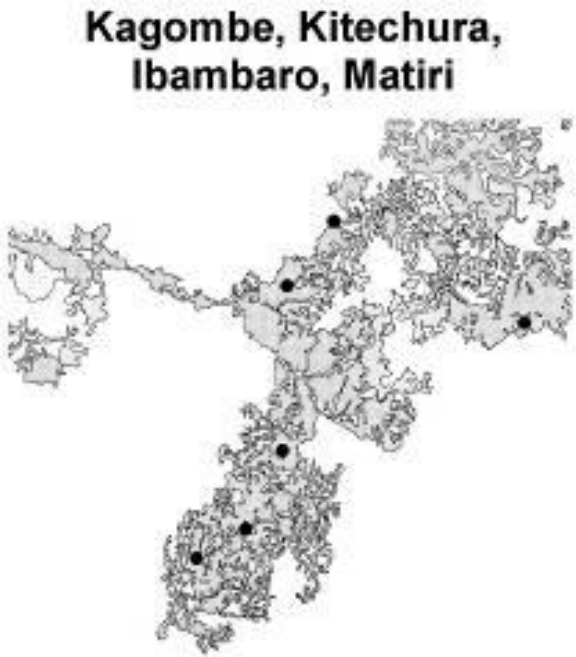
Project Area for Potential corridors

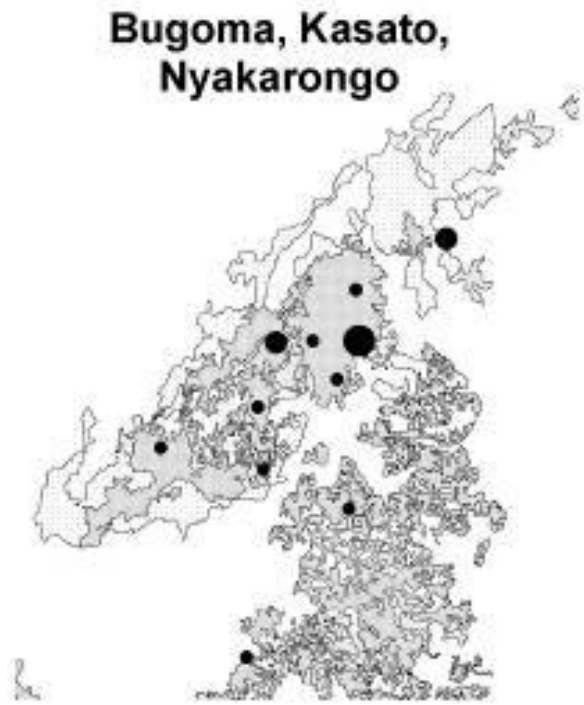


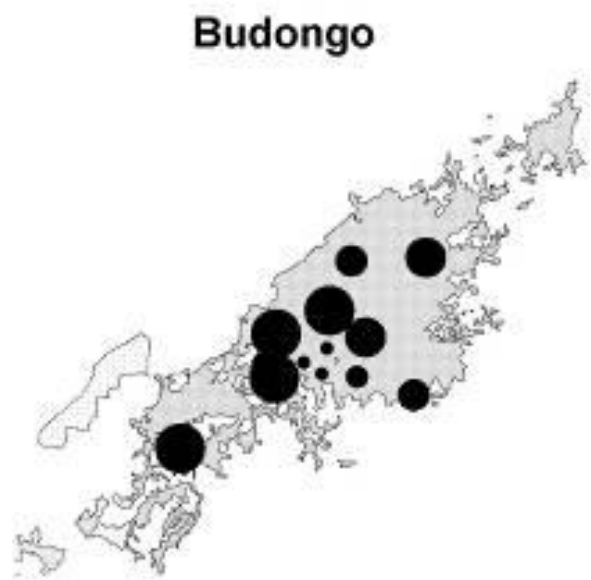
Surveys of Large mammals and threats to the forests made in 1999-2003

- WCS/JGI field teams recorded signs of human activity in 2x2km blocks of the forest
  - Timber harvesting
  - Encroachment
  - Charcoal burning
  - Bushmeat Hunting

Timber harvesting







Detailed Land cover map

- Developed a detailed landcover map with Prime West Support
  - Used 2006 ASTER imagery
  - Ground truthed in 2008

- In collaboration with Woods Hole Research Center, we undertook an assessment of forest loss. GEF/WWF support enabled us finalize this assessment.
- Socio economic survey to assess drivers of forest loss

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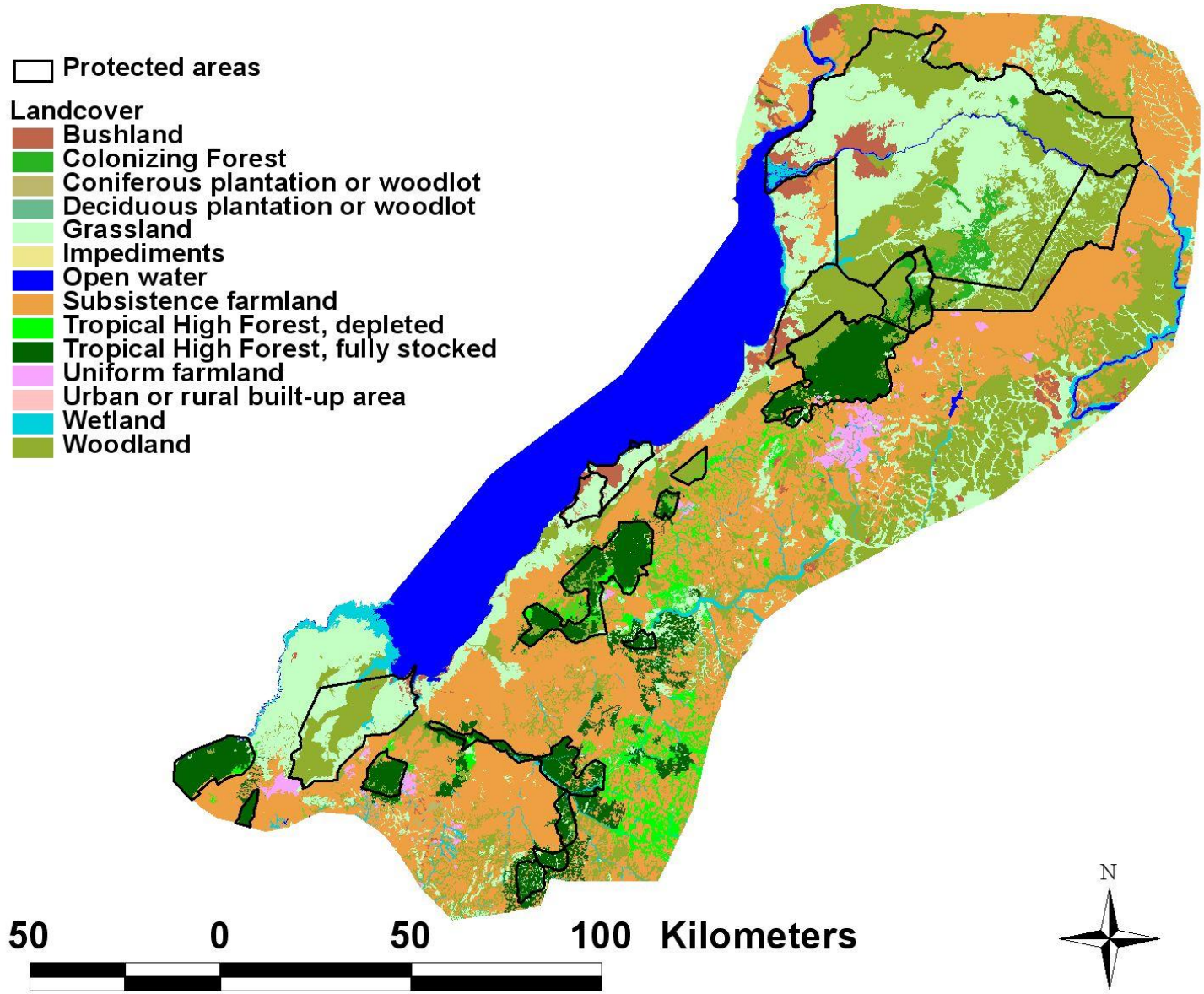
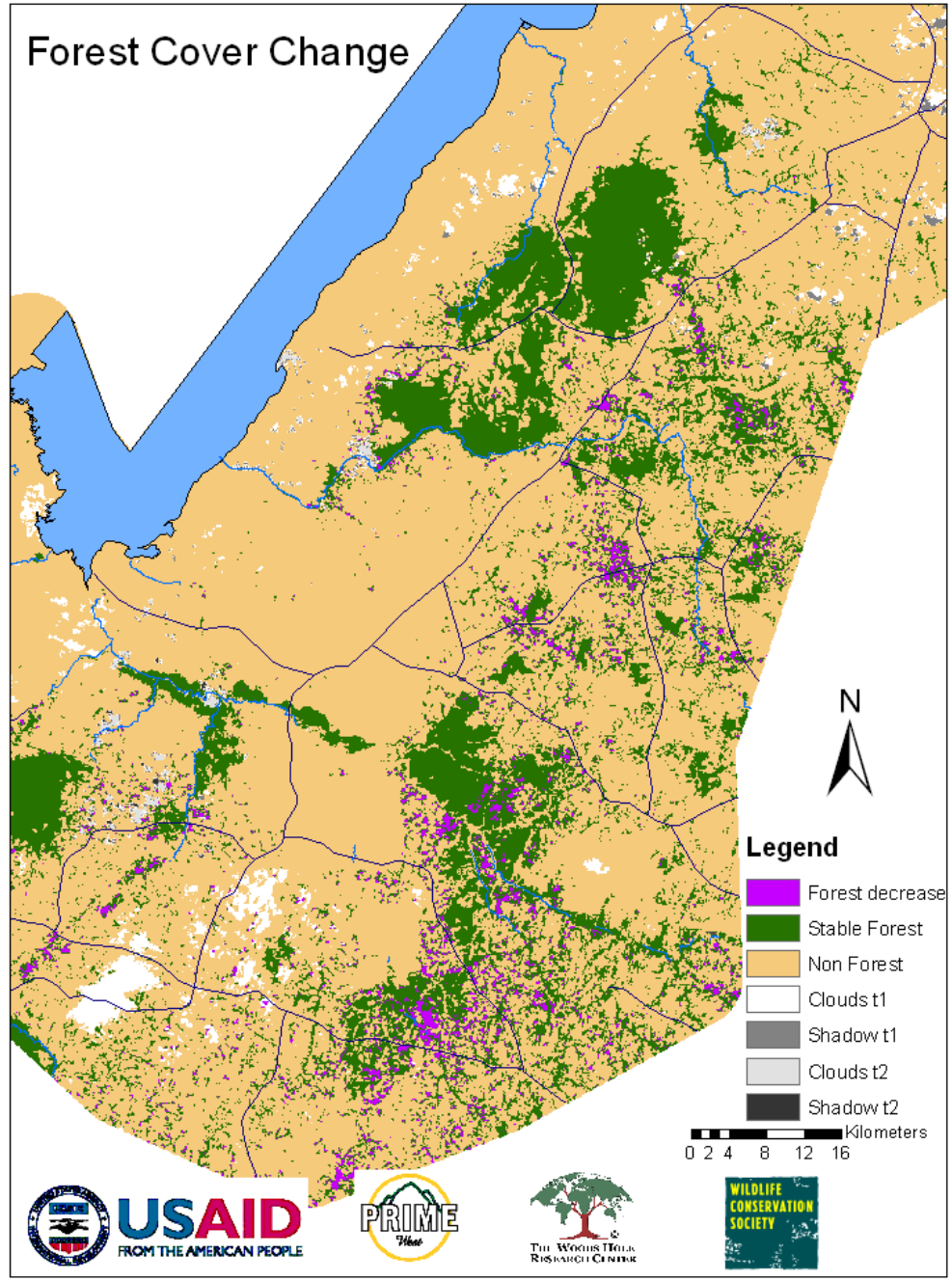
THE WOODS HOLE RESEARCH CENTER

Land Cover Map



Forest Change Map



- Between 2000 and 2006, greatest forest decrease was in the southern part of the landscape

At district level:

- Kyenjojo – 7.2%(170km2)
- Kibale – 4.2% (102 km2)
- Hoima – 1.0% (36 km2)

Total: 308 km2

Drivers of land cover/use change

- Population increase - migration in search for agriculture land
- Commercial agriculture
  - Sugarcane, tobacco
- Demand for timber
- Clearing of forest to eliminate vermin animals
- Oil exploration
  - land uptake and associated developments
  - Migration in search for work in the oil industry
- Infrastructure development
  - Roads
  - Housing

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Corridors Assessment

Identification of species that need the corridors

- Species selected on certain criteria:
  - Probably at a population smaller than 500 individuals in any one of the major reserves in landscape – i.e. need corridor for viable population
  - Likely to be using existing corridors and can survive in them
  - Threatened at a national or global level or relatively rarely encountered
  - Can be possibly flagship species for corridor

Corridordesigner an ArcGIS add-in tool - http://www.corridordesign.org/

Species groups selected

- Forest species
  - Chimpanzee
  - Golden cat
  - Large Forest Raptors
  - Small Forest Raptors
  - Understorey migrators – e.g. Green Pitta
- Savanna species
  - Lion
  - Martial eagle
  - Buffalo

Corridor layers

- Assessed what geographical data layers we have that could affect species movement in the landscape
  - Land cover – map from 2006 imagery
  - Presence of a protected area
  - Distance from roads
  - Population (Households per settlement)
  - Distance from rivers
  - Patch size that is adequate
    - to maintain a population for at least 10 years
    - For breeding

Weighting factors for resistance to movement

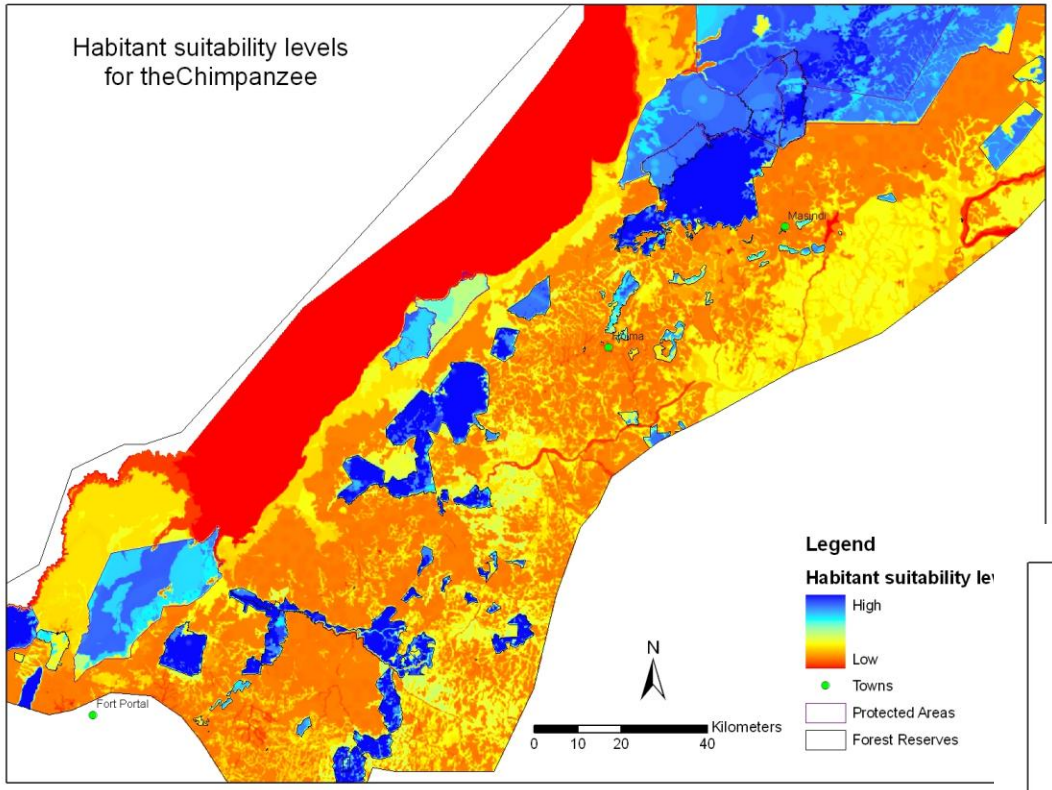
Layers	Classes	Chimp	Golden cat	Large forest raptors	Small forest raptors	Understorey movers	Lion	Martial eagle	Buffalo
Land cover	Forest	100	100	100	100	100	25	5	5
	Degraded forest	75	85	100	95	80	10	5	5
	Colonising forest	70	85	100	80	70	25	5	5
	Woodland	60	50	80	50	20	100	100	90
	Bushland	60	70	90	30	10	80	70	50
	Grassland	40	30	50	20	5	100	100	100
	Rocks and bog	0	5	50	5	0	5	5	0
	Wetland	1	5	50	5	0	0	5	50
	Plantations	50	60	90	70	50	10	40	5
	Small scale Agriculture	10	10	25	20	8	5	25	2
	Large scale agriculture	20	20	30	10	1	10	30	4
	Urban areas	0	0	5	1	0	0	5	0
Protected areas	NP	100	100	100	100	100	100	100	100
	WR	90	90	90	90	90	90	90	90
	Community CAS	25	25	25	25	25	25	25	25
	CFR	85	85	85	85	85	85	85	85
	LFR	35	35	35	35	35	35	35	35
Distance from Roads	0-50	15	10	80	50	5	20	50	10
	50-100	25	20	85	65	15	35	60	25
	100-500	40	35	95	80	30	60	85	50
	500-1000	75	70	98	90	70	80	90	80
	>1000	100	100	100	100	100	100	100	100
Distance from large village or towns	0-500	20	5	10	5	0	0	20	0
	500-1000	30	10	25	10	5	5	40	10
	1000-5000	60	45	50	40	35	25	65	30
	5000-10000	90	80	90	80	75	75	90	75
	>10000	100	100	100	100	100	100	100	100
Distance from rivers	0-50	100	100	100	100	100	100	100	100
	50-100	100	100	100	100	100	100	100	100
	100-500	100	100	100	100	100	100	100	100

Weighting GIS layers

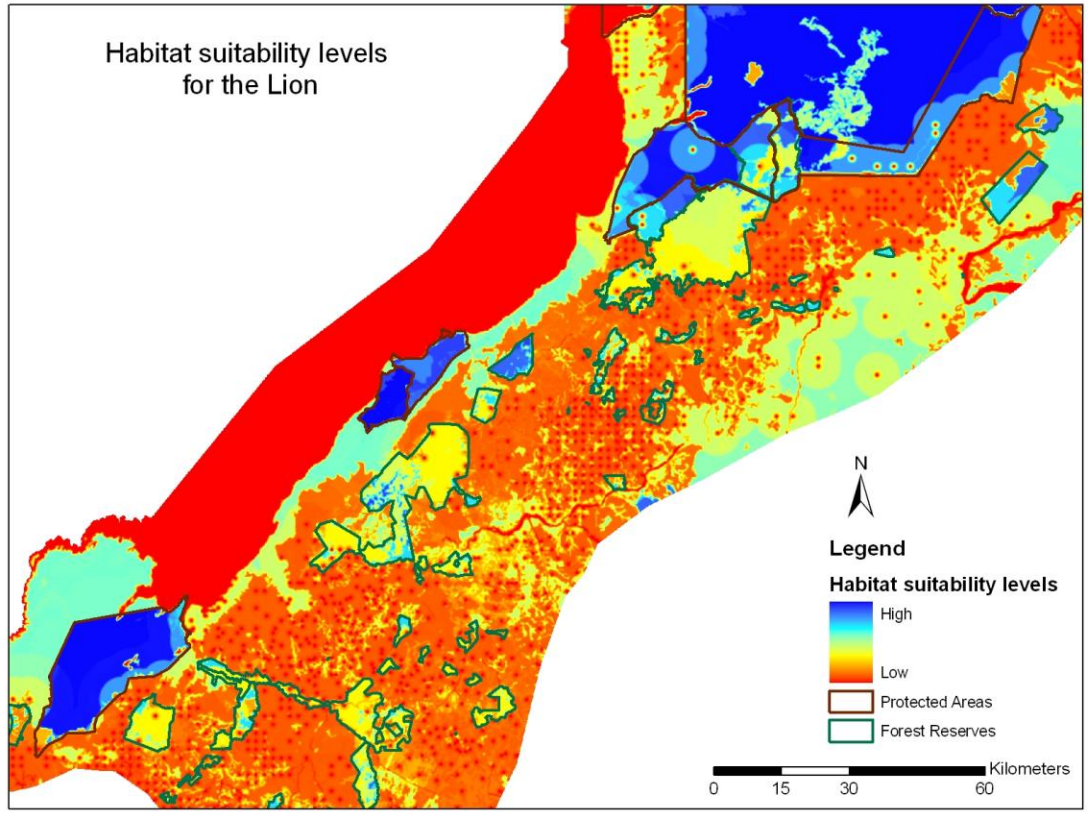
- Each layer needed weighting in terms of its importance in determining movements of the animal species/species group
- 0-100 scale used where weighting sums to 100

Layers	Chimp	Golden cat	Large forest raptors	Small forest raptors	Understorey movers	Lion	Martial eagle	Buffalo
Land cover	50	40	80	85	85	30	30	40
Protected areas	30	30	8	5	5	50	30	30
Distance from Roads	3	6	2	2	2	3	6	6
Distance from large village or towns	10	15	5	3	3	10	20	10
Distance from rivers	2	3	1	2	2	2	4	8
Population density	5	6	4	3	3	5	10	6
	100	**100**	**100**	**100**	**100**	**100**	**100**	**100**

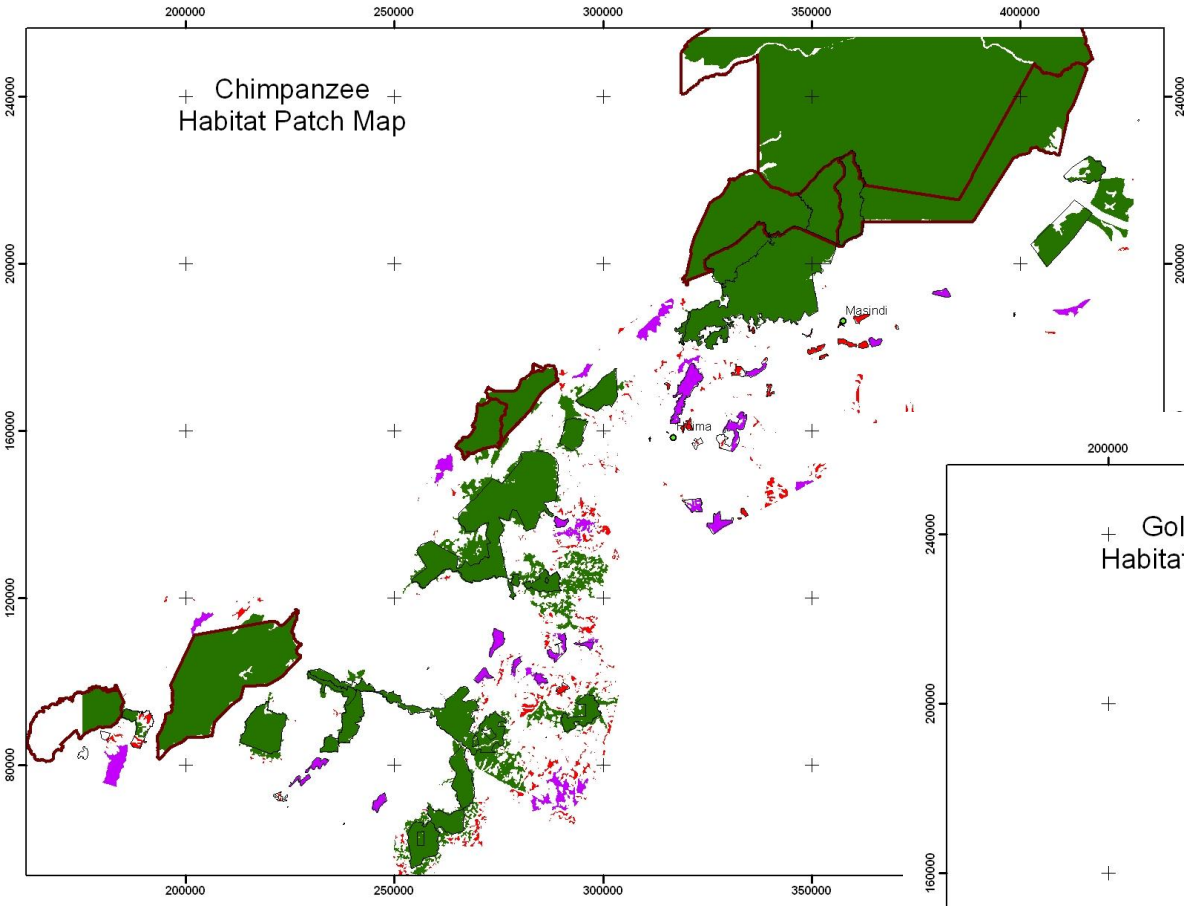
Habitat suitability gradient

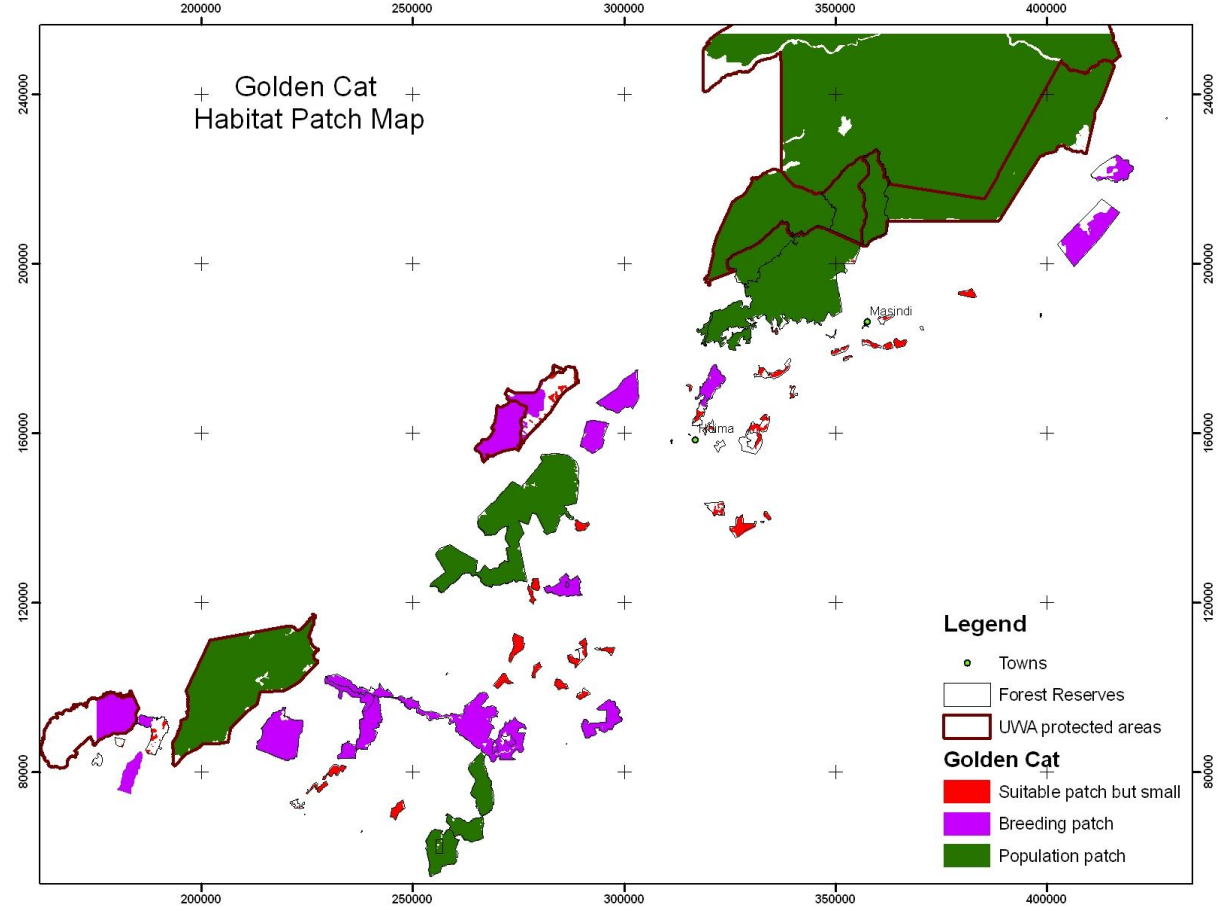


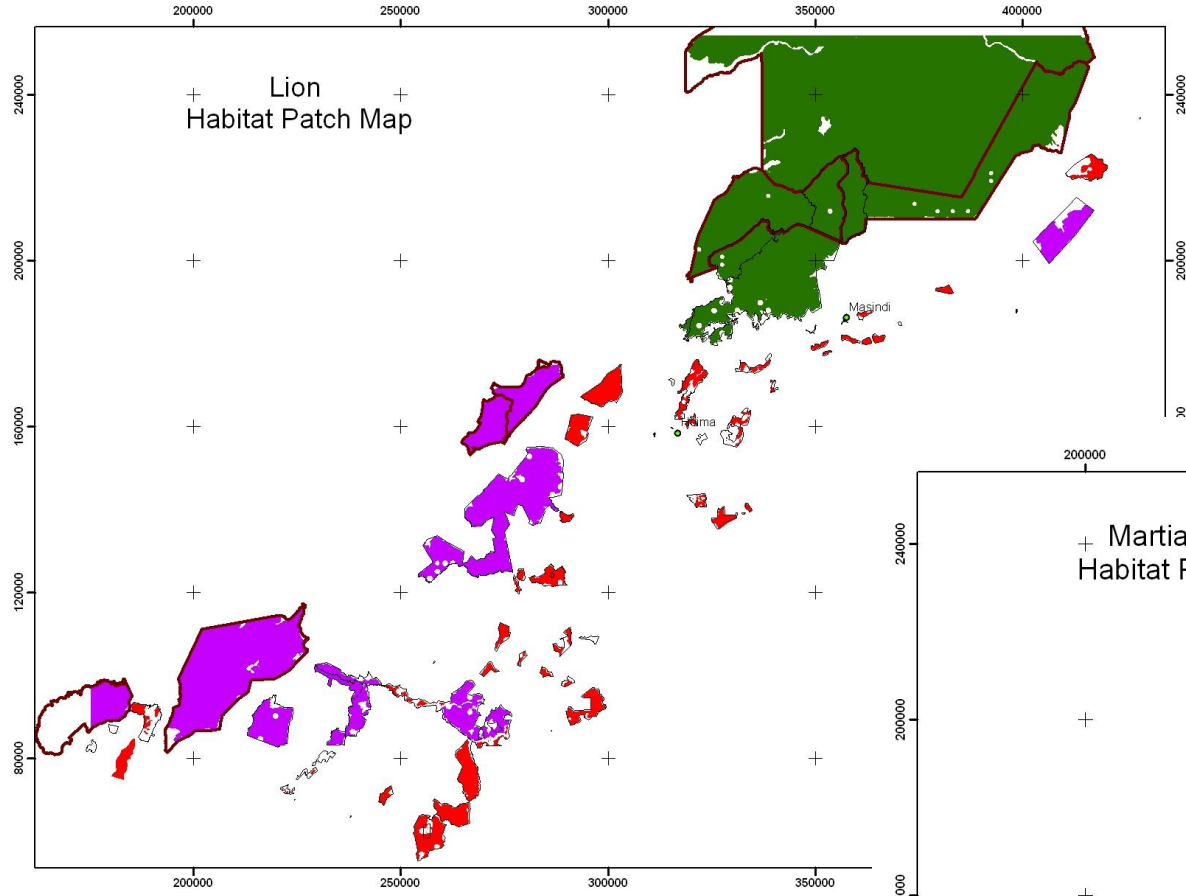
Chimpanzee

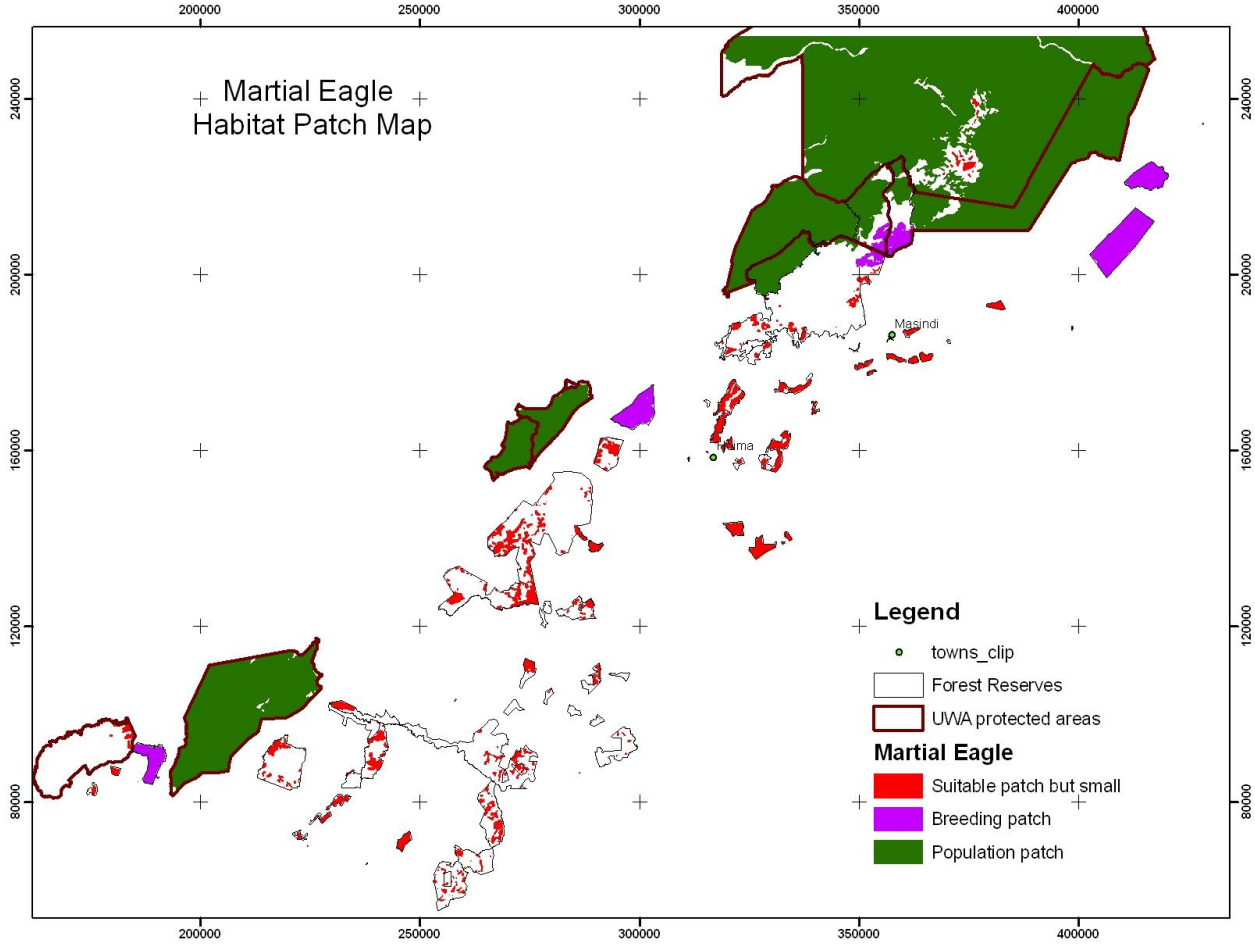


Lion


Chimpanzee
Habitat Patch Map
200000
250000
300000
350000
400000
240000
200000
160000
120000
80000
Masindi
Hoima


Golden Cat
Habitat Patch Map
200000
250000
300000
350000
400000
240000
200000
160000
120000
80000
Masindi
Hoima
Legend
Towns
Forest Reserves
UWA protected areas
Golden Cat
Suitable patch but small
Breeding patch
Population patch


Lion
Habitat Patch Map
200000
250000
300000
350000
400000
240000
200000
160000
120000
80000
Masindi
Nama


Martial Eagle
Habitat Patch Map
200000
250000
300000
350000
400000
240000
200000
160000
120000
80000
Masindi
Nama
Legend
towns_clip
Forest Reserves
UWA protected areas
Martial Eagle
Suitable patch but small
Breeding patch
Population patch

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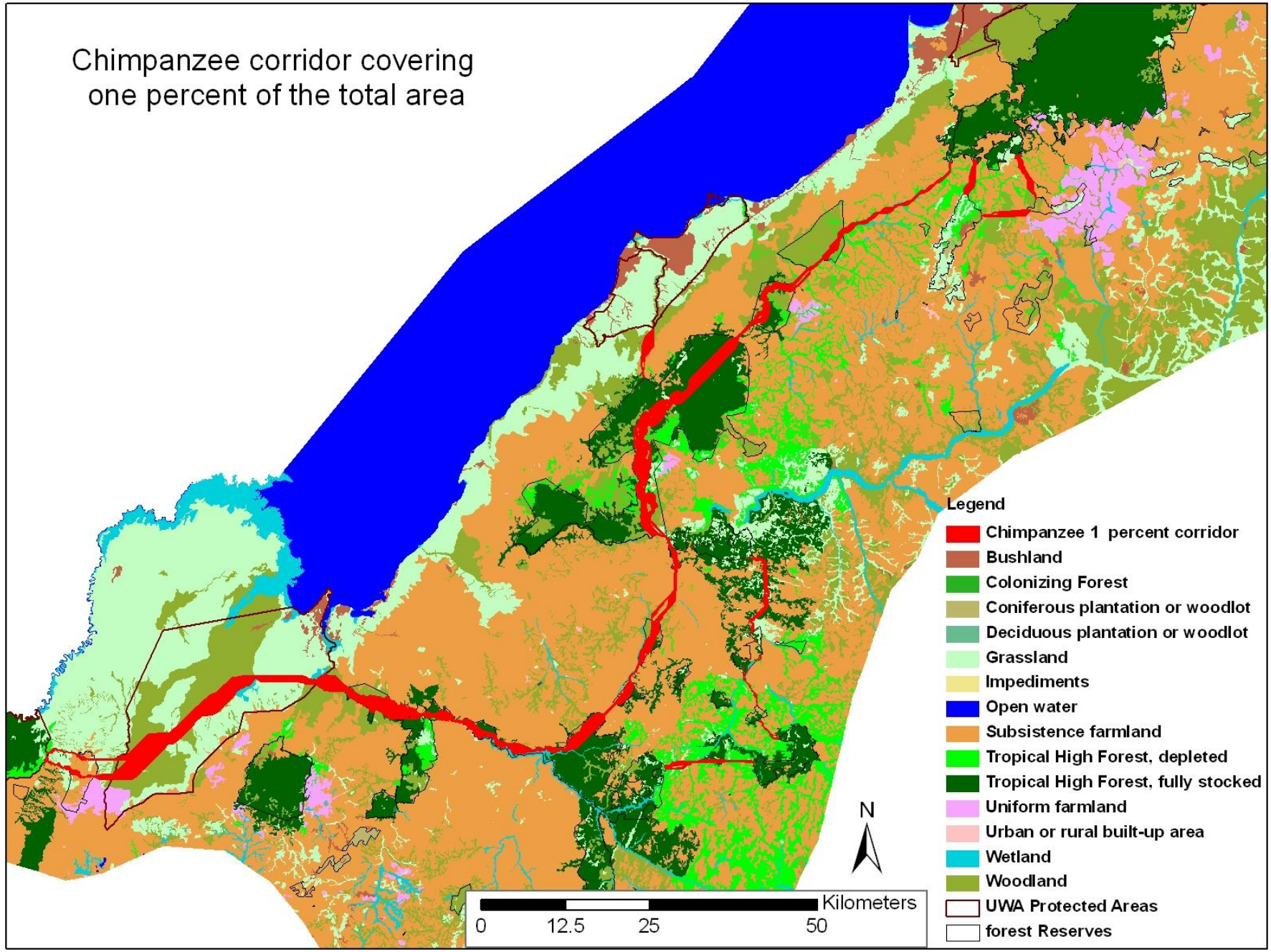

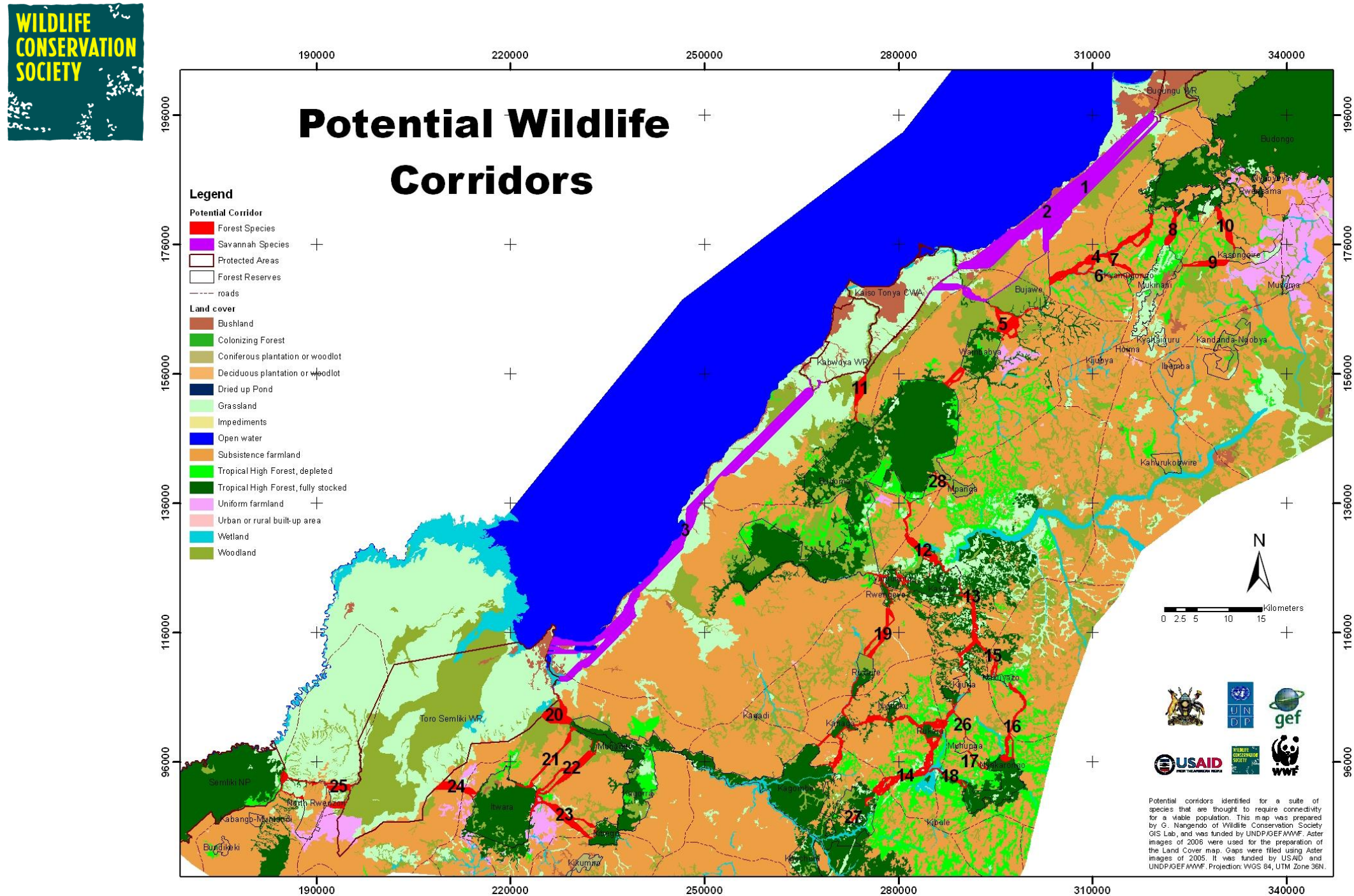
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Potential Wildlife Corridors
Legend
Potential Corridor
Forest Species
Savannah Species
Protected Areas
Forest Reserves
roads
Land cover
Bushland
Colonizing Forest
Coniferous plantation or woodlot
Deciduous plantation or woodlot
Dried up Pond
Grassland
Impediments
Open water
Subsistence farmland
Tropical High Forest, depleted
Tropical High Forest, fully stocked
Uniform farmland
Urban or rural built-up area
Wetland
Woodland
190000
220000
250000
280000
310000
340000
196000
176000
156000
136000
116000
96000
Budongo WR
Budongo
Kaiso Tonya CWA
Bujawe
Kabwoya WR
Kahurukobwire
Toro Semliki WR
Semliki NP
North Rwenzori
Kabango-Muhindi
Burdikeki
Itwara
Kikumuro
Kagadi
Kibale
Kasingoire
Mukihani
Kyakaiguru
Kandanda-Nyobya
Homa
Kijubya
Iramba
Rwengeye
Kijuna
Nyabiku
Mukunya
Nyakarongo
Kyabigambire
Nyabyeya
Kwebisama
Musoma
N
Kilometers
0 2.5 5 10 15
USAID
UNDP
gef
WWF
Potential corridors identified for a suite of species that are thought to require connectivity for a viable population. This map was prepared by G. Nangendo of Wildlife Conservation Society GIS Lab, and was funded by UNDP/GEF/WWF. Aster images of 2006 were used for the preparation of the Land Cover map. Gaps were filled using Aster images of 2005. It was funded by USAID and UNDP/GEF/WWF. Projection: WGS 84, UTM Zone 36N.

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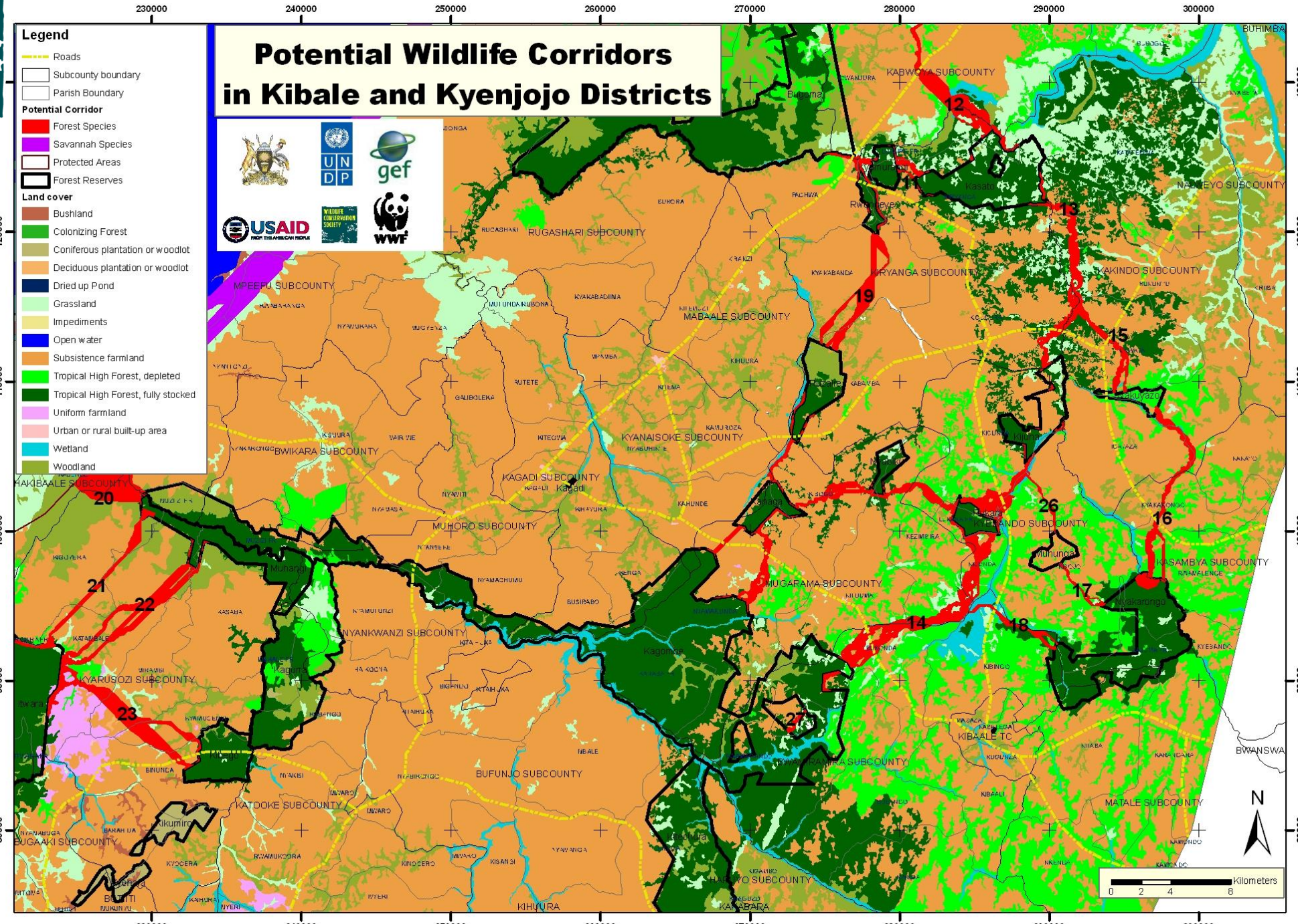
Potential Wildlife Corridors in Kibale and Kyenjojo Districts



Main observations

- Forest outside protected areas is being depleted fast
- Most of the corridors, wherever possible, passed through undisturbed vegetation and away from human disturbance
- Suitable patches identified varied between species therefore there is need to conserve all existing protected areas

Next steps

Biological surveys: Ongoing

1.To identify what animals are using the potential corridors and where?

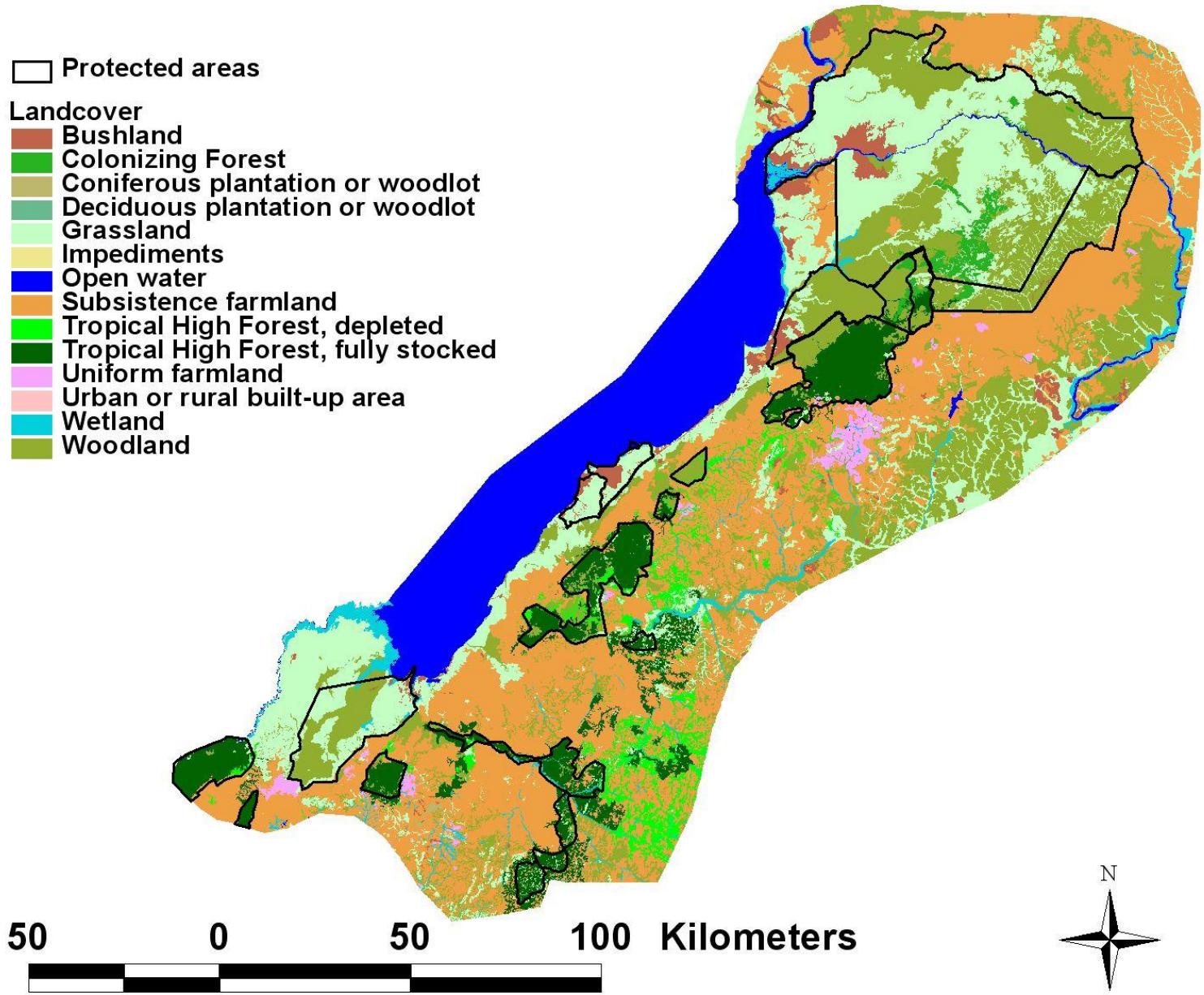
2. To obtain tree biomass data of existing forest

- Ground surveys
- Camera trapping

Socioeconomic surveys: Ongoing to know what people get from the forests and how important is it to their annual income and get a feel of their willingness to participate in carbon projects.

Financing: what are the options for funding the conservation of these corridors – carbon, biodiversity offsets, payment for ecosystem services. Is it enough to offset what people get from the forest? = Feasibility study

Survey coverage



Actors in the landscape

- JGI, WWF, Chimpanzee sanctuary trust, Harness Initiatives, Bunyoro Kingdom, Independent forest owners, Local government, National Forest Authority, UWA, ECOTRUST,
- Strategy to avoid implementation overlap
  - Develop a joint strategic plan
  - Define areas of operation – spatial or functional


THANK
YOU