Remote sensing & GIS for biodiversity conservation in Indonesia

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IPB BOGOR AGRICULTURAL UNIVERSITY
Searching and Serving The Best

MEGA DIVERSITY COUNTRY & UNFORTUNATE HABITAT LOSS

Indonesia is home to:
- 11 percent of the world's flowering plants,
- 12 percent of the world's mammals,
- 15 percent of all amphibians and reptiles,
- 17 percent of all birds, and
- 37 percent of the world's fish.

Endangered Species List of Indonesia

Taxonomic Group	Number
Plants	110
Birds	390
Reptiles	48
Fish	8
Mammals	131
Insects	19
Molluscs	12
Crustaceans	9

Noerdjito & Maryanto Nov. 2001

Species receives extra protection from a Presidential Decree (KepPres).

1. Javanese Gibbon (*Hylobates moloch*)
2. Sumatran Tiger (*Phantera tigris sumatrae)*;
3. Orangutan (*Pongo pygmaeus*);
4. Javanese Eagle (*Spizaetus bartelsi*);
5. Anoa *(Anoa depressicornis, Anoa quarlesi)*;
6. Babirusa *(Babyrousa babyrussa)*;
7. Javanese Rhinoceros (*Rhinoceros sondaicus*);
8. Sumatran Rhinoceros (*Dicerorhinus sumatrensis*);
9. Komodo Dragon (*Varanus komodoensis*);
10. Bird of Paradise (all species in the family *Paradiseidae*);
11. Leaf Monkey (*Presbytis potenziani*);



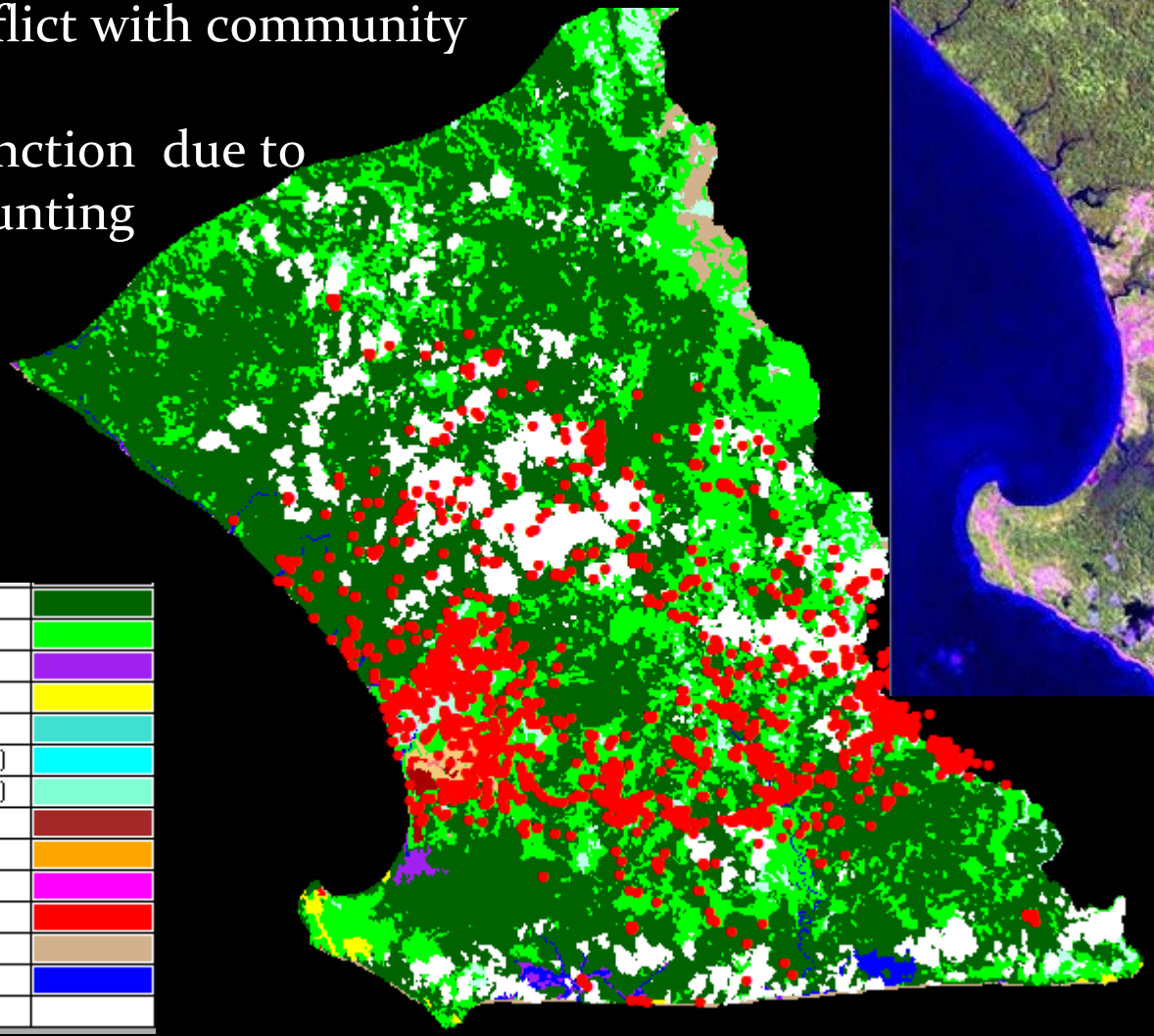




Case 1 :
Sumatran Tiger Conservation
ZSL-Indonesia, PHKA & LIPI

Sumatran Tiger was captured
GPS collar was set up
After several months was released in
To new habitat (second habitat)

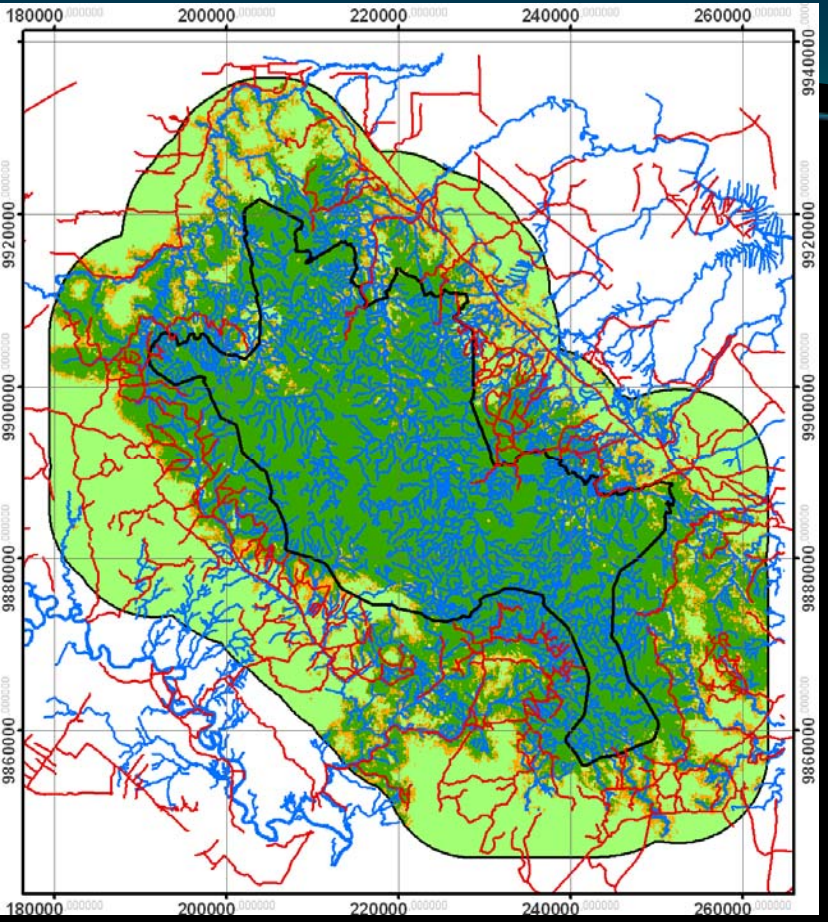
- ✓ Sumatran Tiger were spending more time in the forest edge (border between forest non forest, disturb forest)
- ✓ Lead to conflict with community
- ✓ Lead to extinction due to poaching/hunting

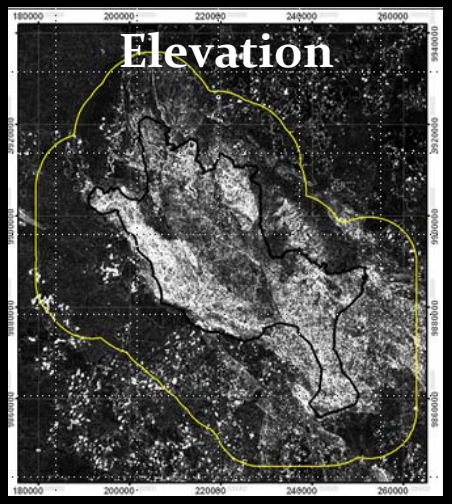


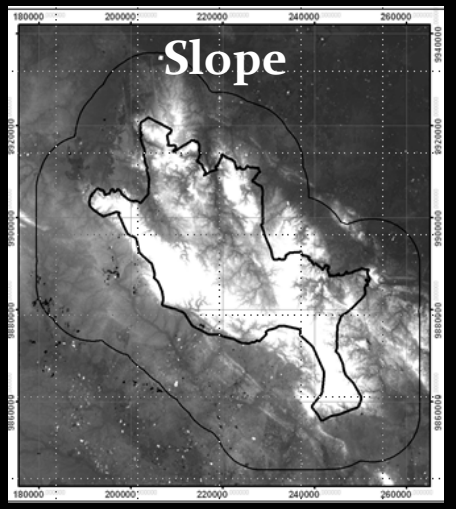
1	Primary forest
2	Secondary forest
3	Mangrove
4	Shrub
5	Agroforestry
6	Agroforestry (coffee 10 years)
7	Agroforestry (cocoa 10 years)
8	Imperata land
9	Grassland
10	Cropland
11	Settlement
12	Bareland
13	Water body
14	No data

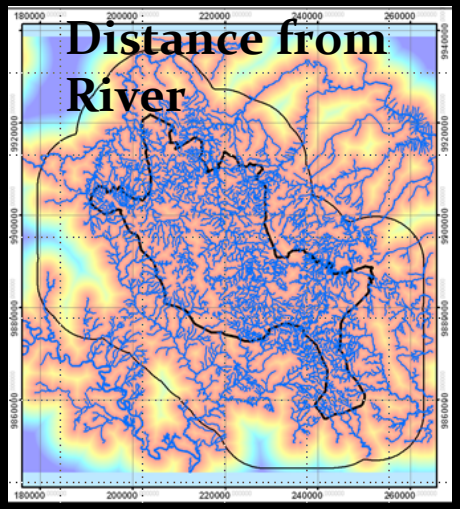
Every one hour the GPS information was received

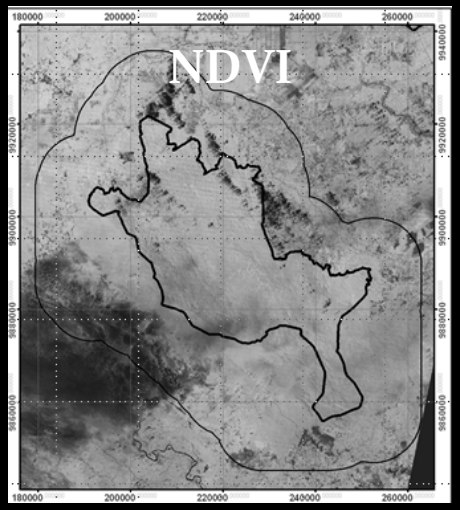
Case 2 :Habitat Suitability, Sumatran Tiger Bukit Tiga puluh National Park







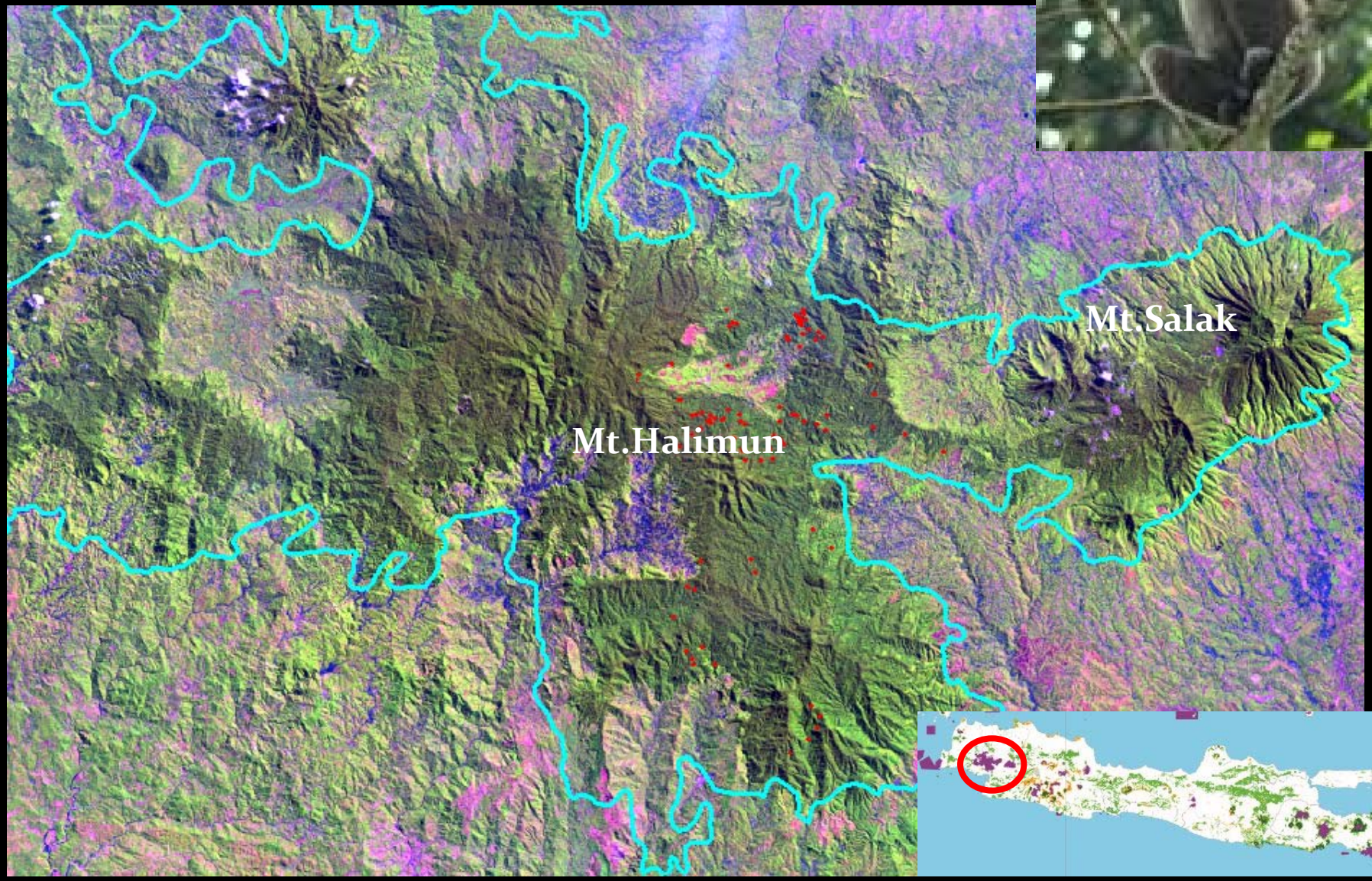




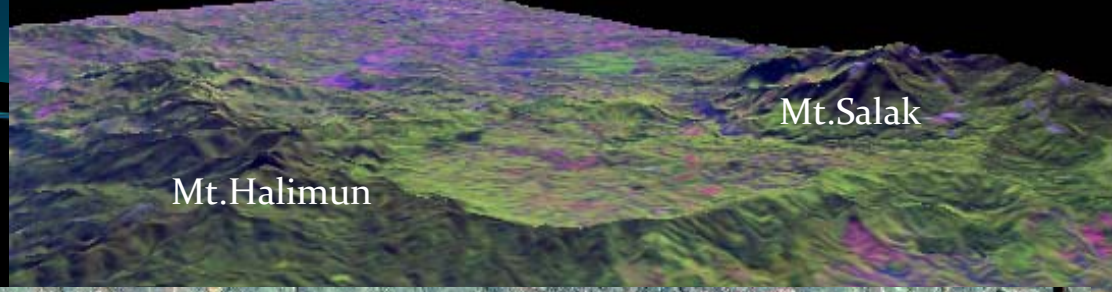
Low Suitable
Moderate Suitable
High Suitable

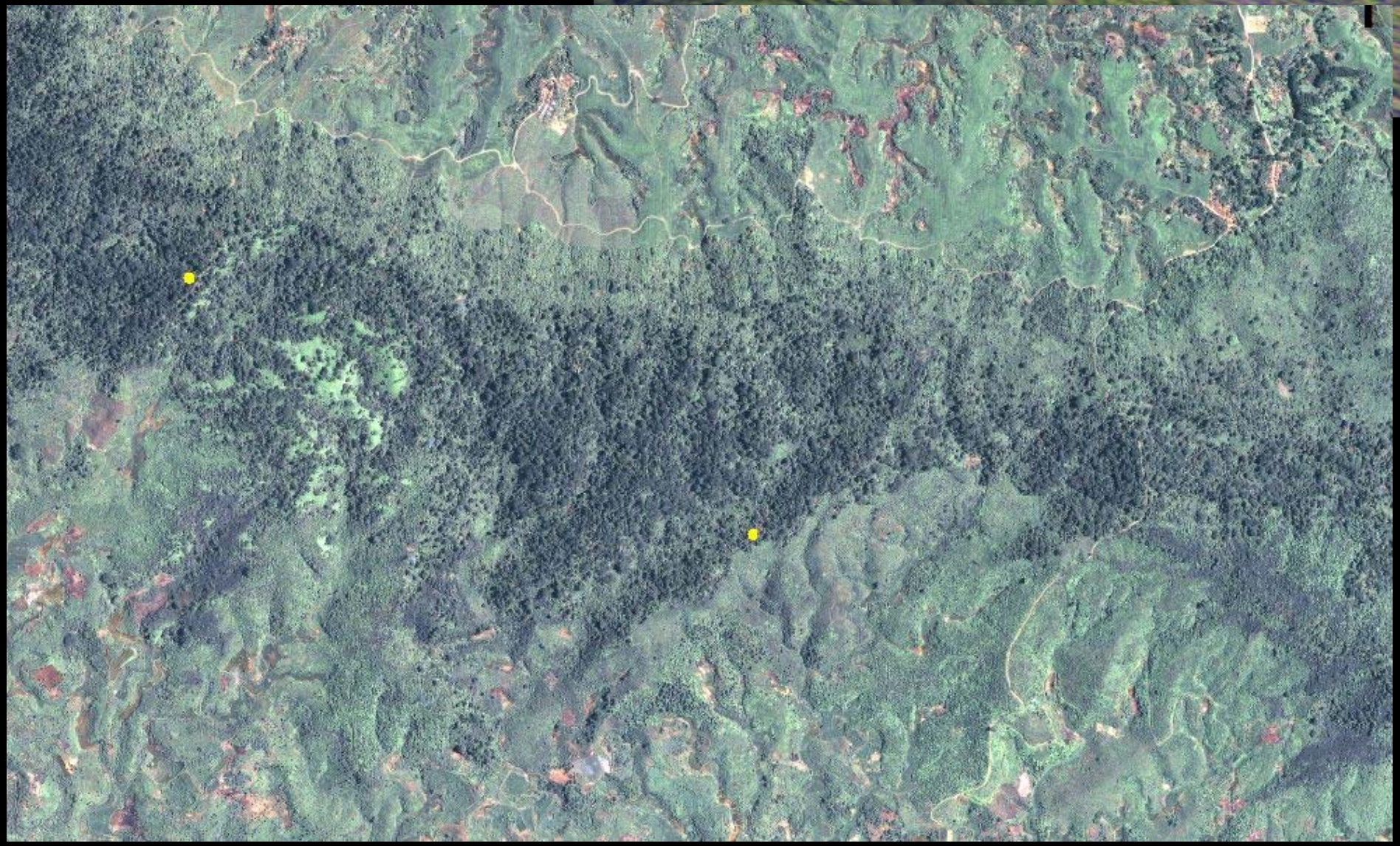
$$P = \frac{1}{1 + e^{-(-9{,}198 + (0{,}052 * elv) - (0{,}284)\,slp) - (0{,}003 * driv) + (14{,}655 * ndvi))}}$$

Case 3 :
Javan Gibbon Distribution at Mt. Halimun Salak National Park

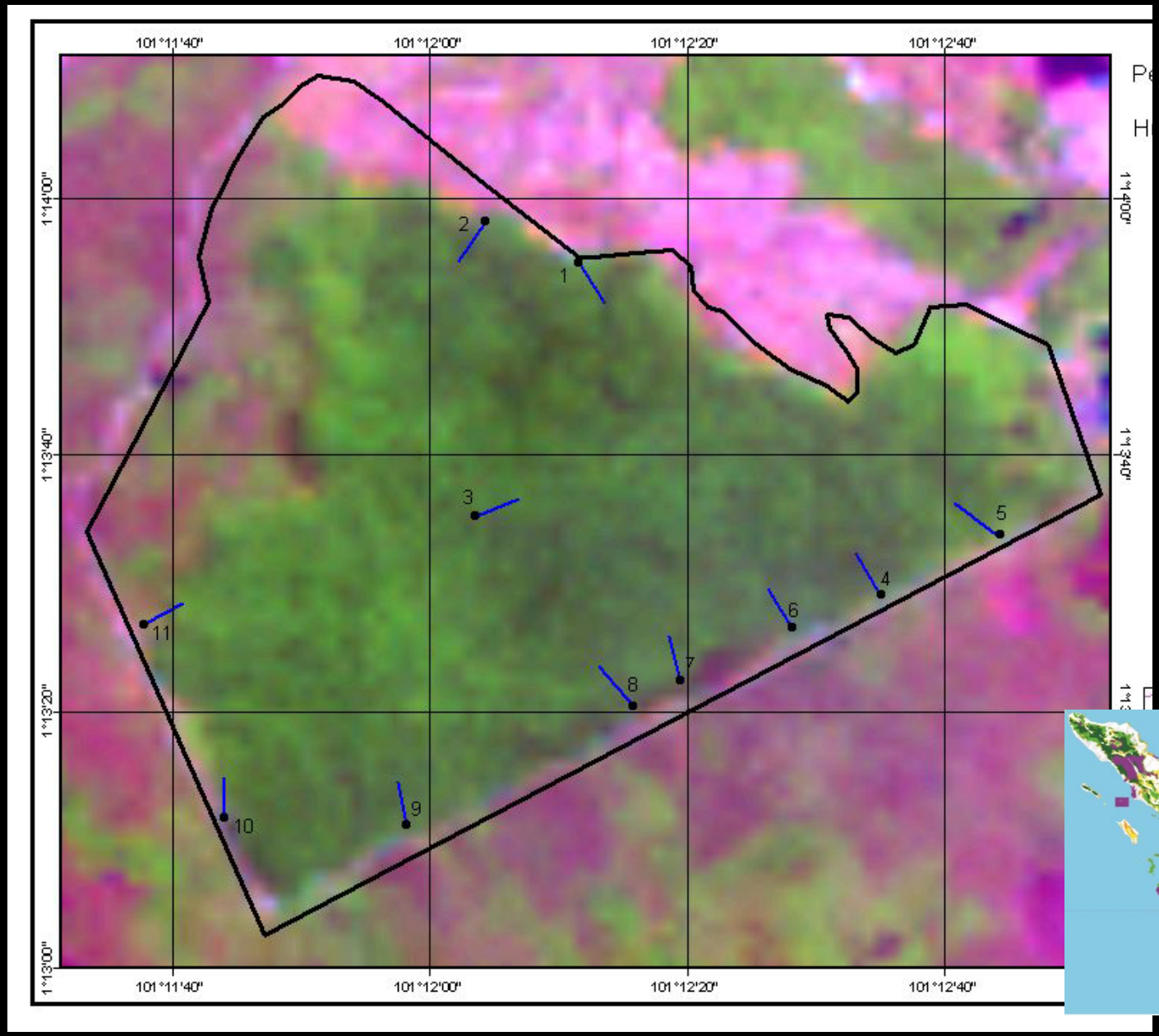


Corridor Fragmentation

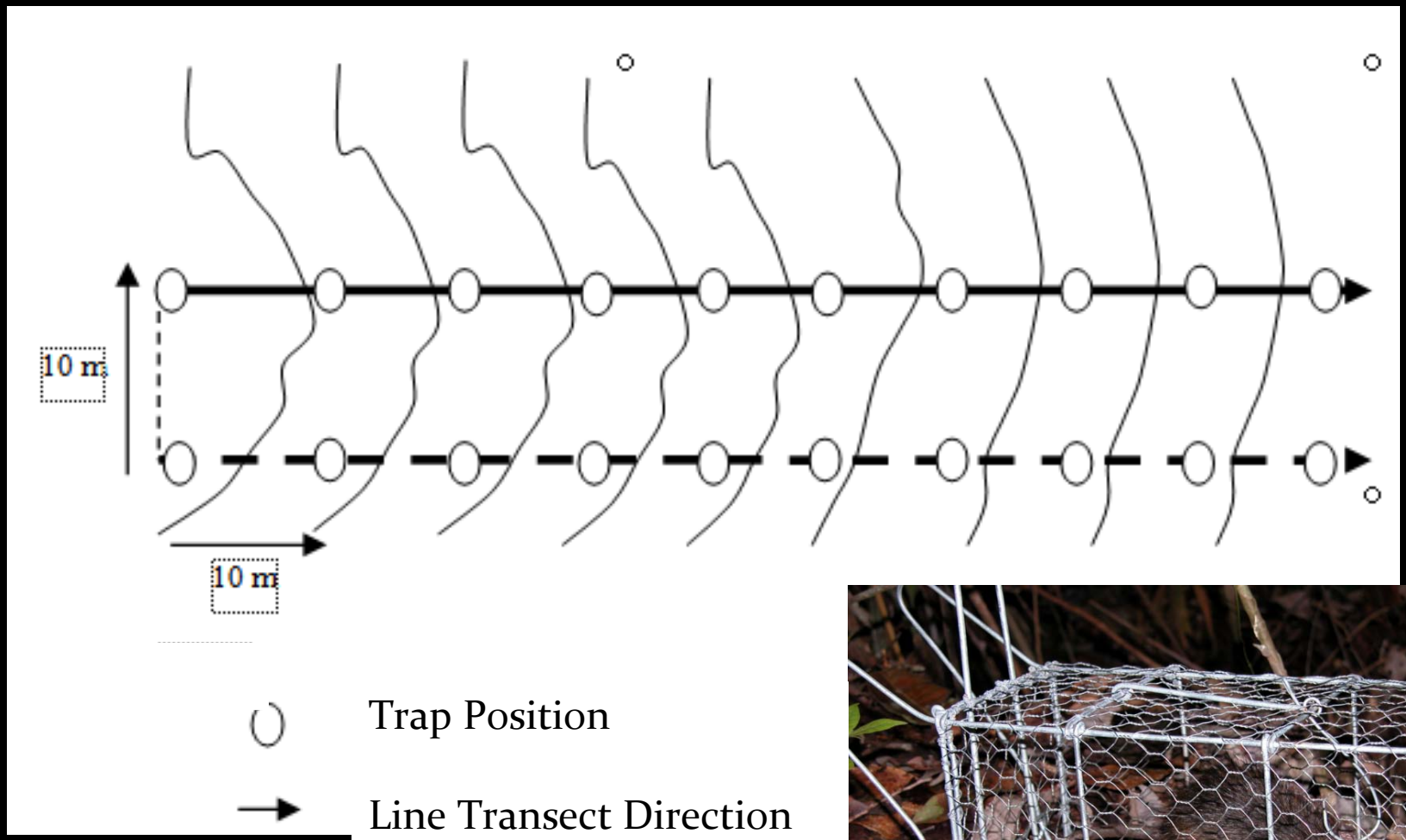




Case 4 : Small mammal distribution in Remnant Forest Balairaja Nature reserve



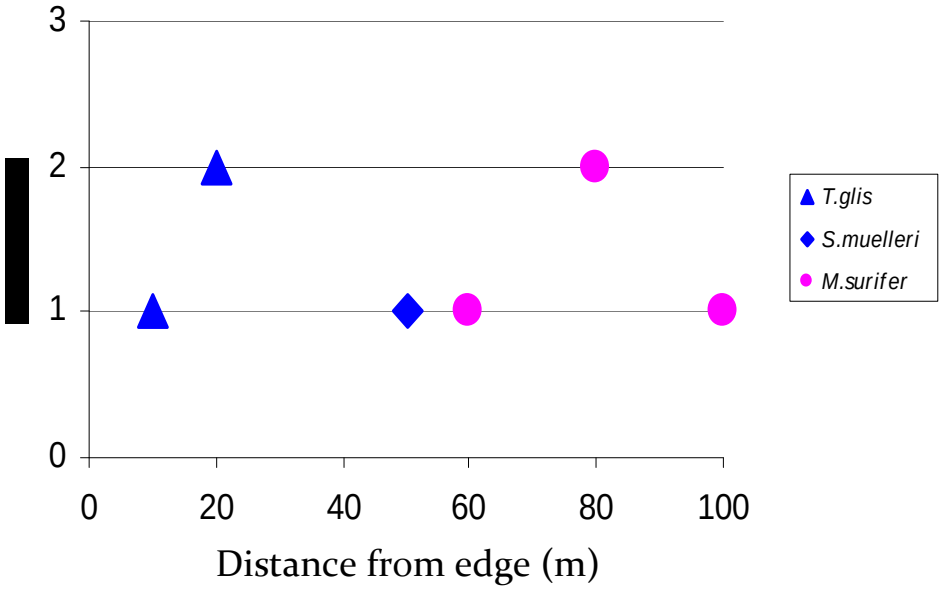
LINE TRANSECT & TRAP POSITION

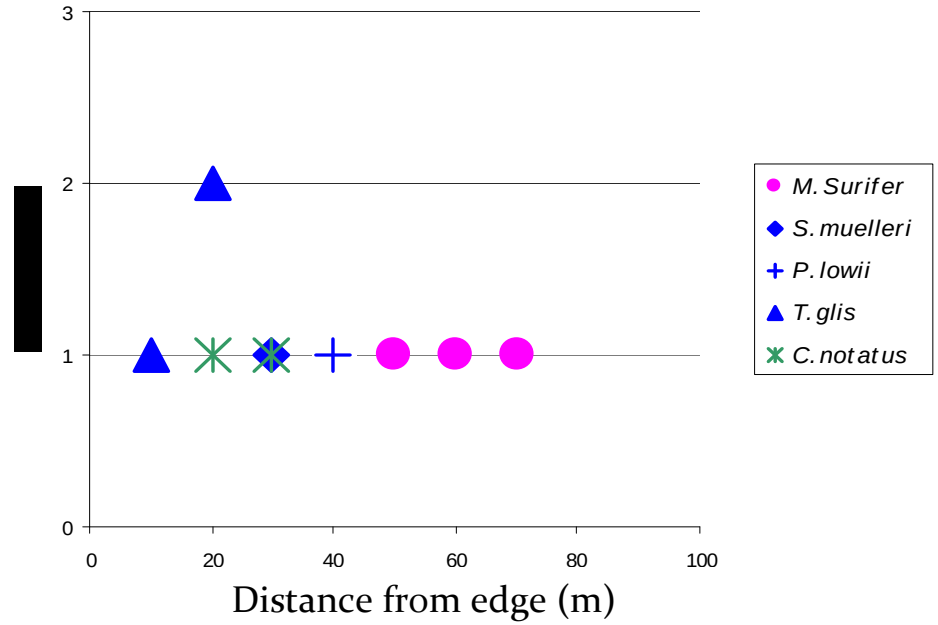


Captured Species List

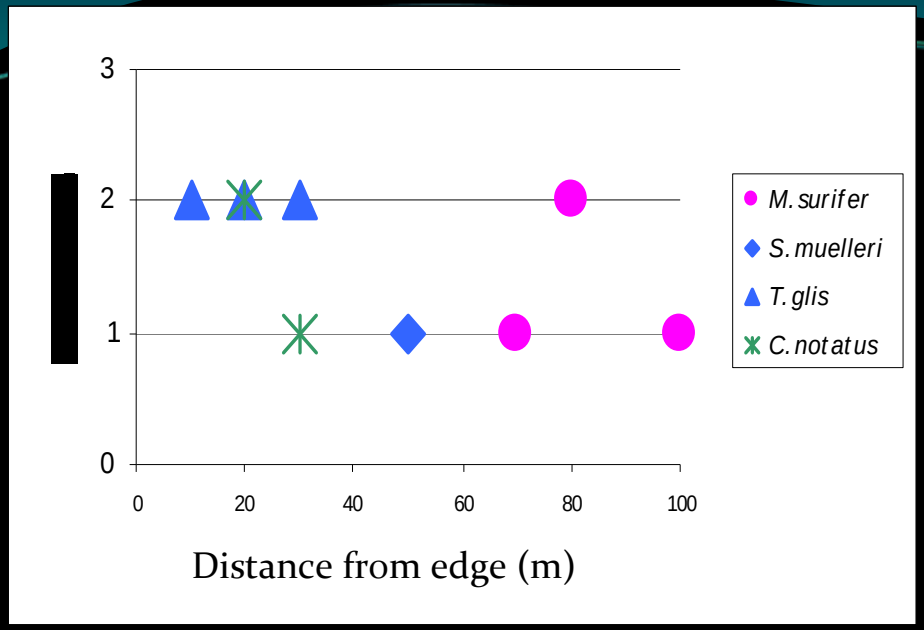
No	Species	Transect											Σ
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	
1	*S.muelleri*	4	3	6	1	-	-	1	1	1	1	2	20
2	*R.tiomanicus*	2	1	-	3	2	2	-	-	-	2	3	15
3	*T.glis*	1	1	-	-	3	2	6	3	3	1	1	21
4	*M.surifer*	-	-	2	4	4	4	4	3	4	-	-	25
5	*C.notatus*	-	-	-	-	1	2	3	2	-	-	-	8
6	*P.lowii*	-	-		-		-	-	1	-	-	-	1
Total		7	5	8	8	10	10	14	10	8	4	6	90

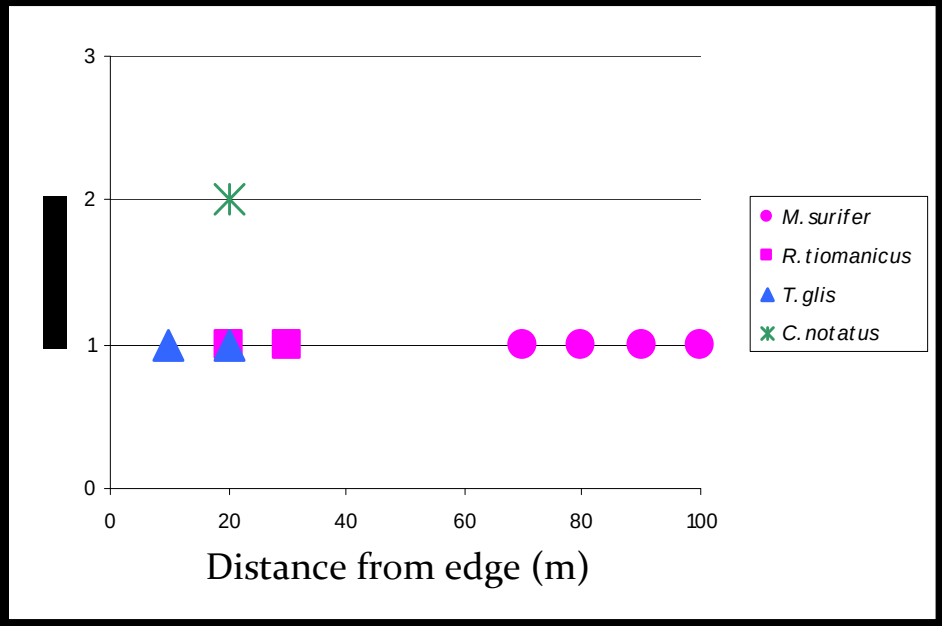
DISTRIBUTION PATTERN :





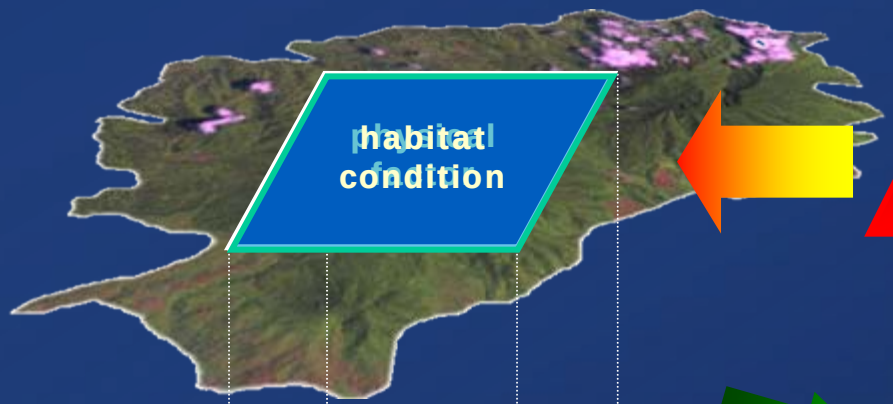
Interior species





EDGE SPECIES

Summary : Remote Sensing & GIS Contribution for Biodiversity Conservation



habitat condition

Species Sustainability

spatial analysis, decision rules

KNOWLEDGE BASE

Habitat Suitability

Species Home Range

Impact of habitat Loss & fragmentation

Impact of climate change

Impact of anthropogenic disturbance

Species Distribution Model

SUMMARY

- RS provide data & information of biological component of habitat -> habitat monitoring
- RS & GIS contribute to the development of knowledge based, relation between habitat components & species / bio-ecological needs of the species.
- Since response of species on habitat/climate changes may difference among species -> Modeling of species distribution/habitat suitability need understanding on the bio-ecological aspects of the species

Thank you very much !