Universiteit Utrecht

Sustainable Rural & Regional Development Forum Indonesia

Connecting the fragmented habitat of endangered mammals in the landscape of Riau–Jambi–Sumatera Barat (RIMBA), Central Sumatra, Indonesia

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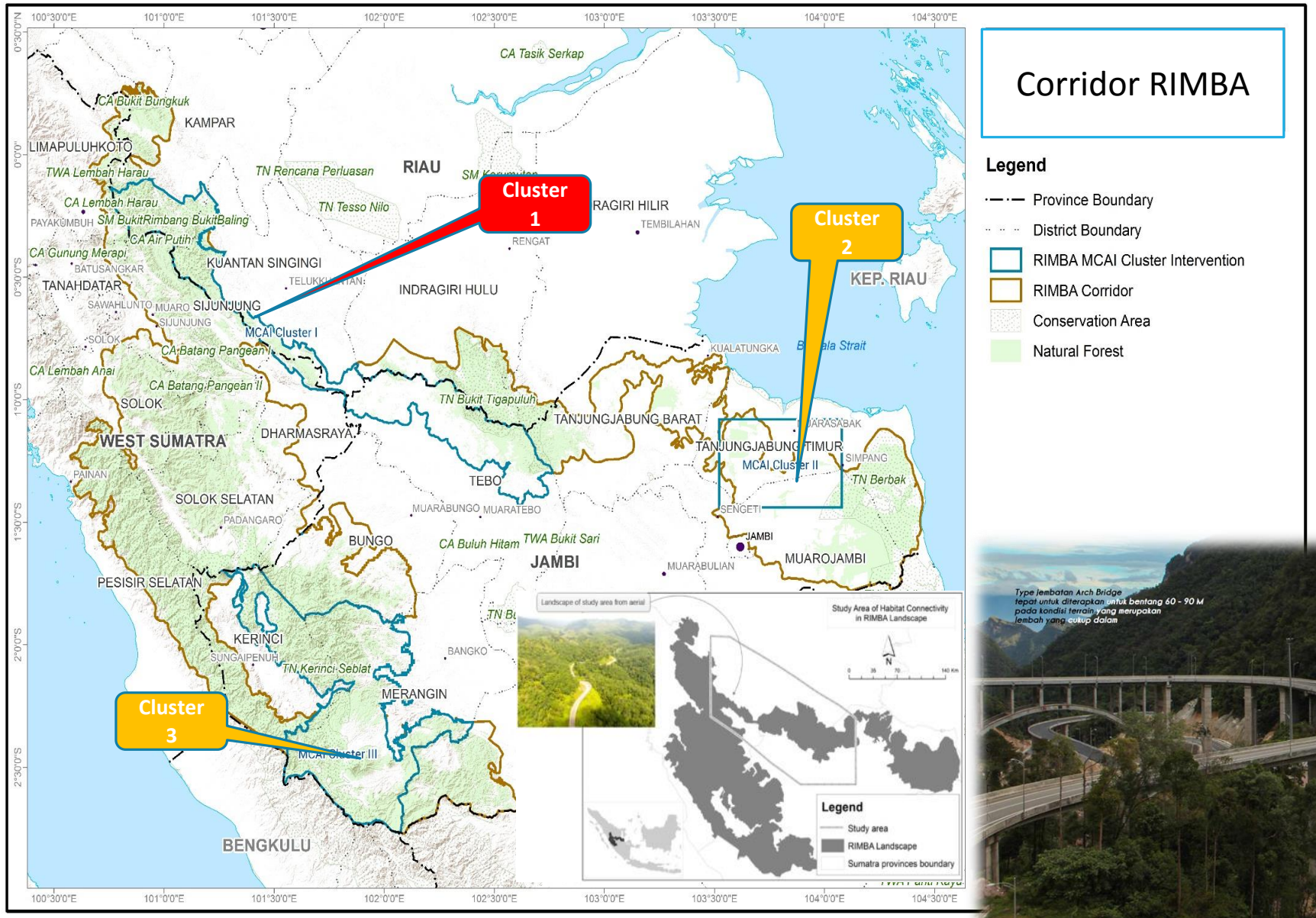
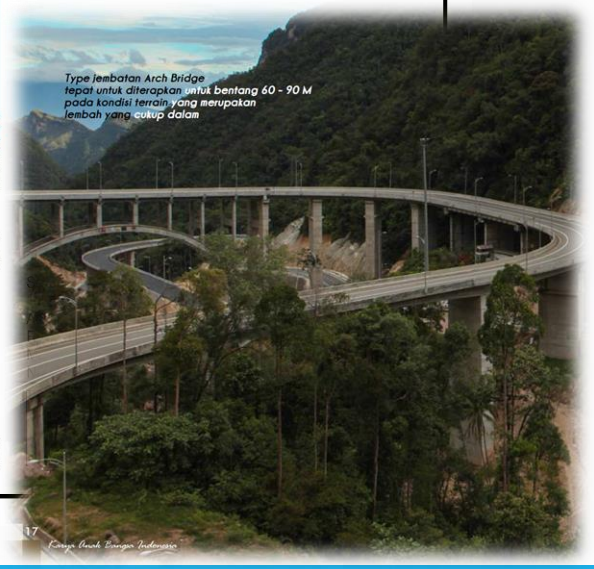


Can we maintain the habitat connectivity from anthropogenic disturbance?



Especially linear Infrastructure such as road development

Spatial planning vs Conservation planning

Strategic Environmental Assessment

Spatial planning:
Development policies
Land use allocation/ zoning
Infrastructure planning
Reduce human disturbance impact

Environmental Impact Assessment to obtain Permit (administration)

Environmental and Social Management Framework to acquire financing

Conservation systematic planning:
Maxent
Marxan

Data constraint

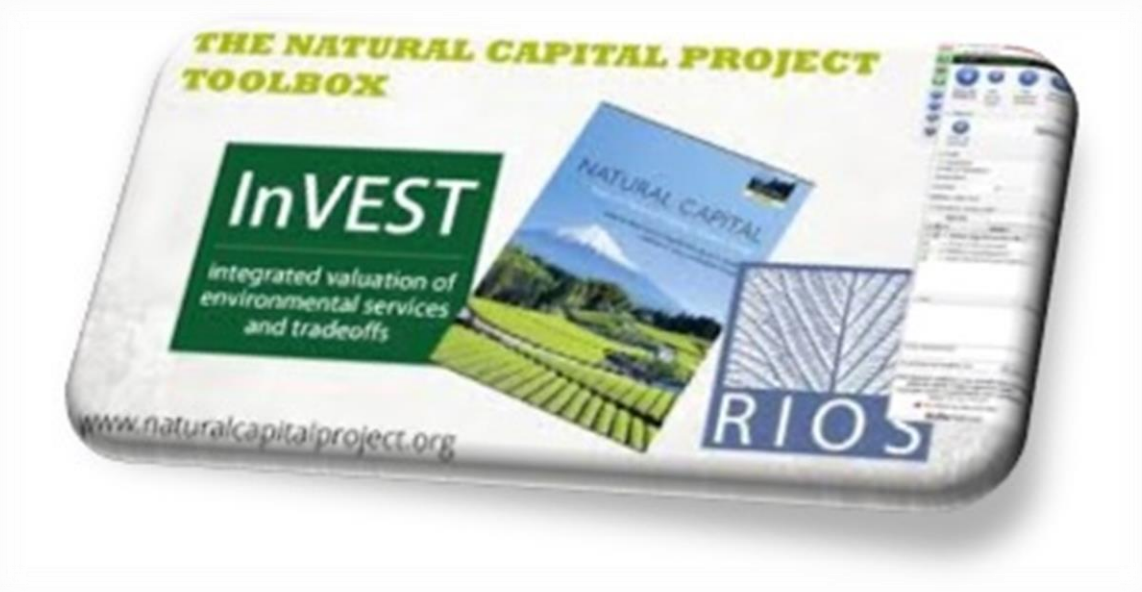
Conservation planning:
Species occurrence
Habitat types & environmental conditions
Matrix landscape habitat and human land use

Filling the gap: Using InVEST & Corridor Design for assessing the habitat quality for connecting the fragmented habitat based on available data, threat and habitat sensitivity toward the land cover and land use

Habitat quality Model of InVEST

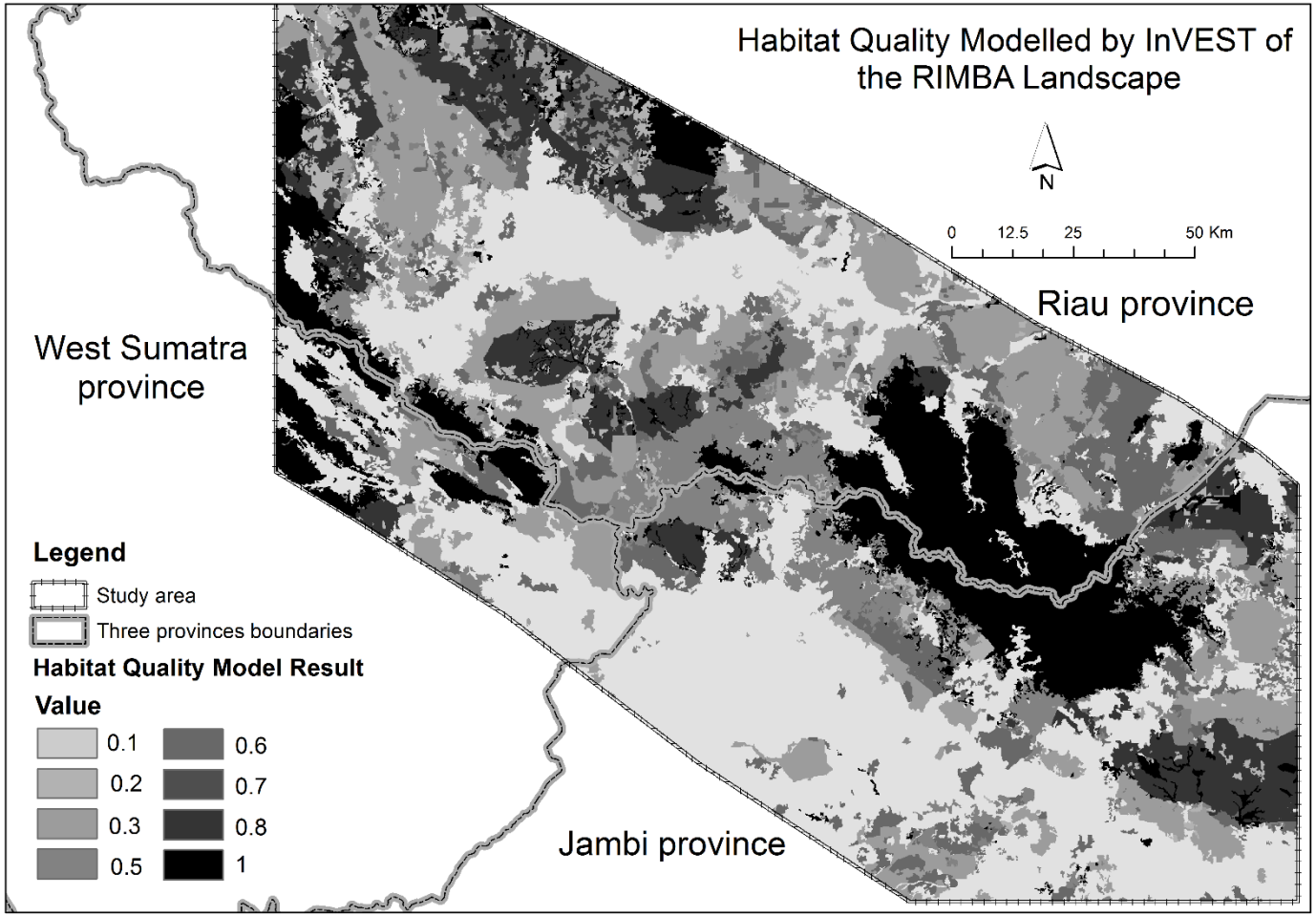
Habitat quality model of InVEST as proxies for biodiversity, ultimately estimating the extent of habitat and vegetation types across a landscape, and their state of degradation.

Habitat quality and rarity are a function of four factors: each threat's relative impact, the relative sensitivity of each habitat type to each threat, the distance between habitats and sources of threats, and the degree to which the land is legally protected.



Source: http://data.naturalcapitalproject.org/invest-releases/documentation/current_release/habitat_quality.html?highlight=habitat%20quality

Steps of InVEST Analysis



Spatial data gathering and preparation

Classification of the land cover type as a proxy habitat.

Habitat Impact factors (secondary data and expert judgment)

Habitat threats

- Fire
- Road network
- Land use for non-forestry (Conversion)
- Oil palm plantation
- Mining
- Snares (insufficient data)

Validation of model habitat quality (comparing the habitat model within and outside Tigers and Elephants habitat)

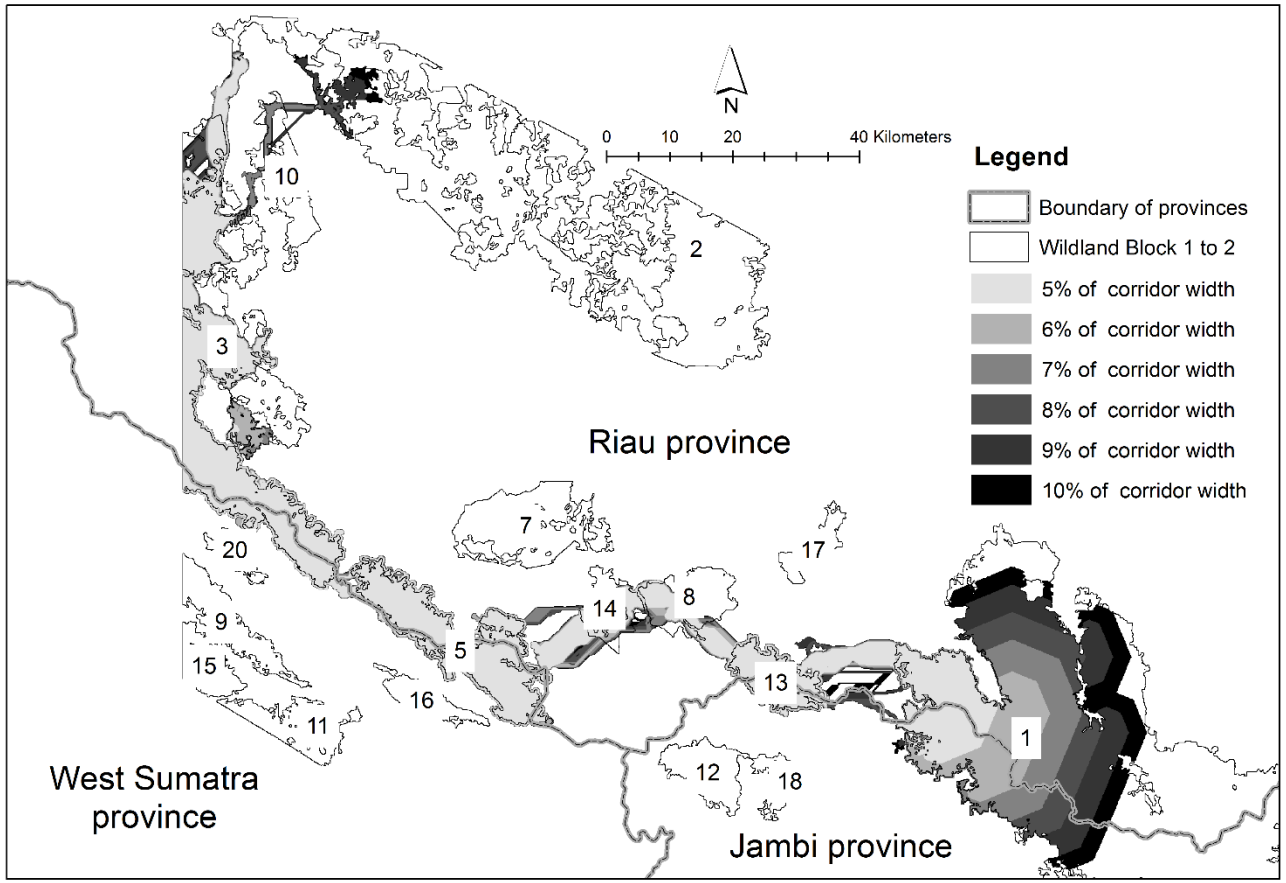
Corridor Design Model

Wildlife habitat connectivity can mitigate the fragmentation impact to wildlife population and biodiversity

Corridor design model is defining specific land that it can accommodate wildlife species movement from one wild land block to another wild land blocks within the landscape

Source: http://corridordesign.org/designing_corridors/

Corridor Design



The result of InVEST "habitat quality" as an input for Corridor Design model

Re-classification of raster values (0-1) to (0-100)

Produces cost layers

Create habitat suitability

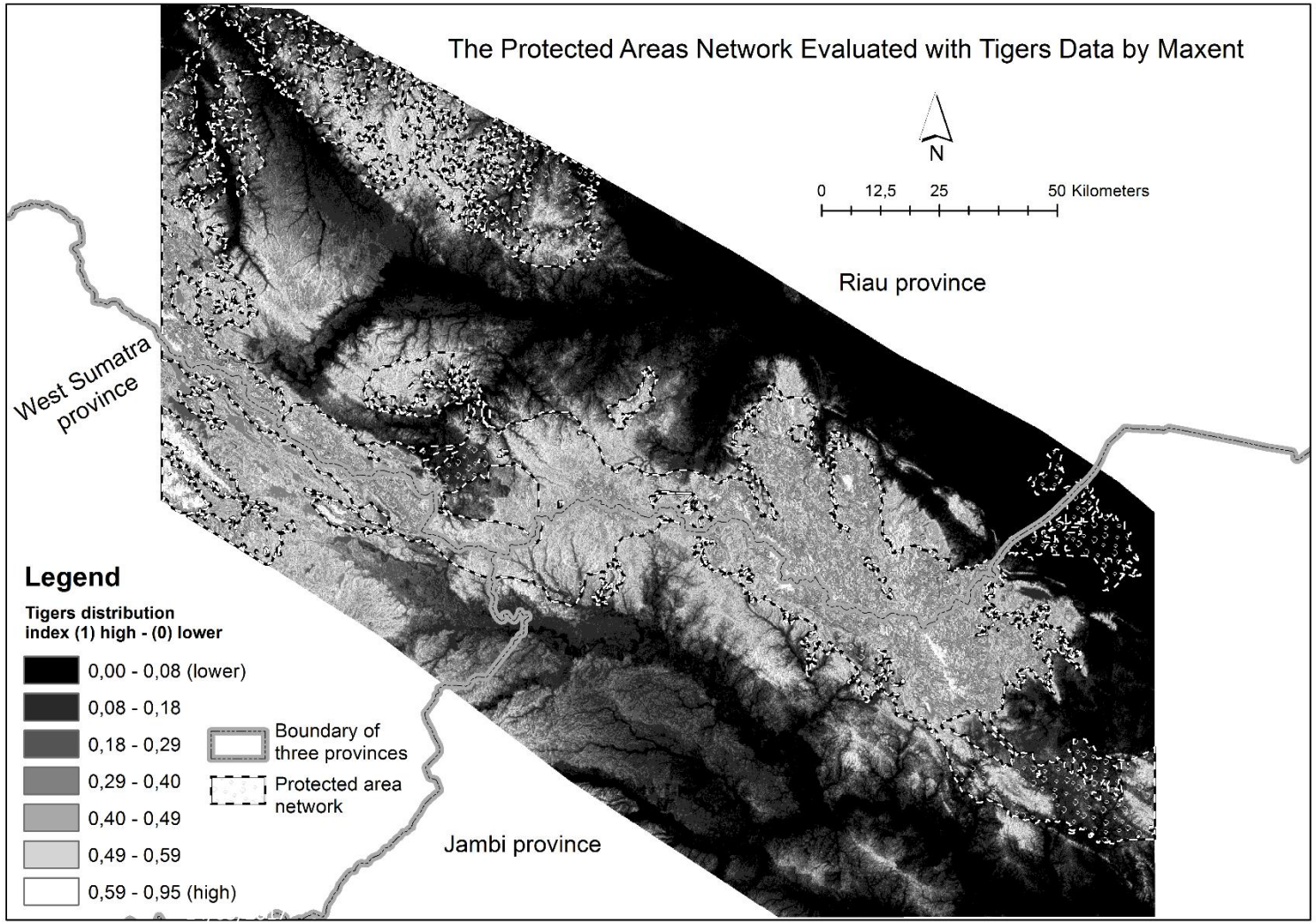
Create block habitat

Decide the wildland block connectivity

Filled the holes within the corridor

Overlaid the CD result "called PA network" with road class to identify road segments

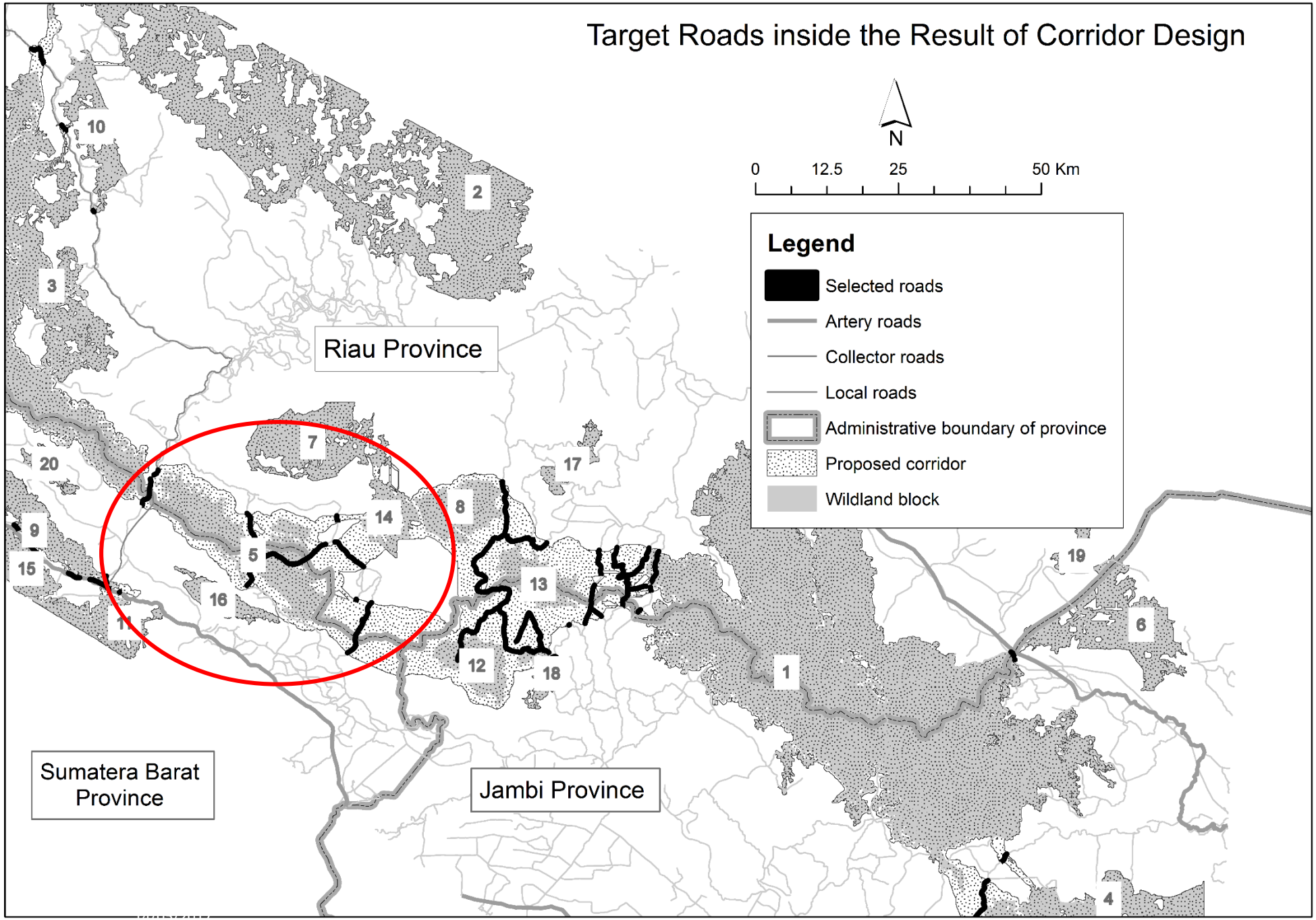
Evaluate the corridor Model result



MAXENT

entropy

Method



Existing roads crossing the corridor RIMBA

Result

Least Concern
LC

Near Threatened
NT

Vulnerable
VU

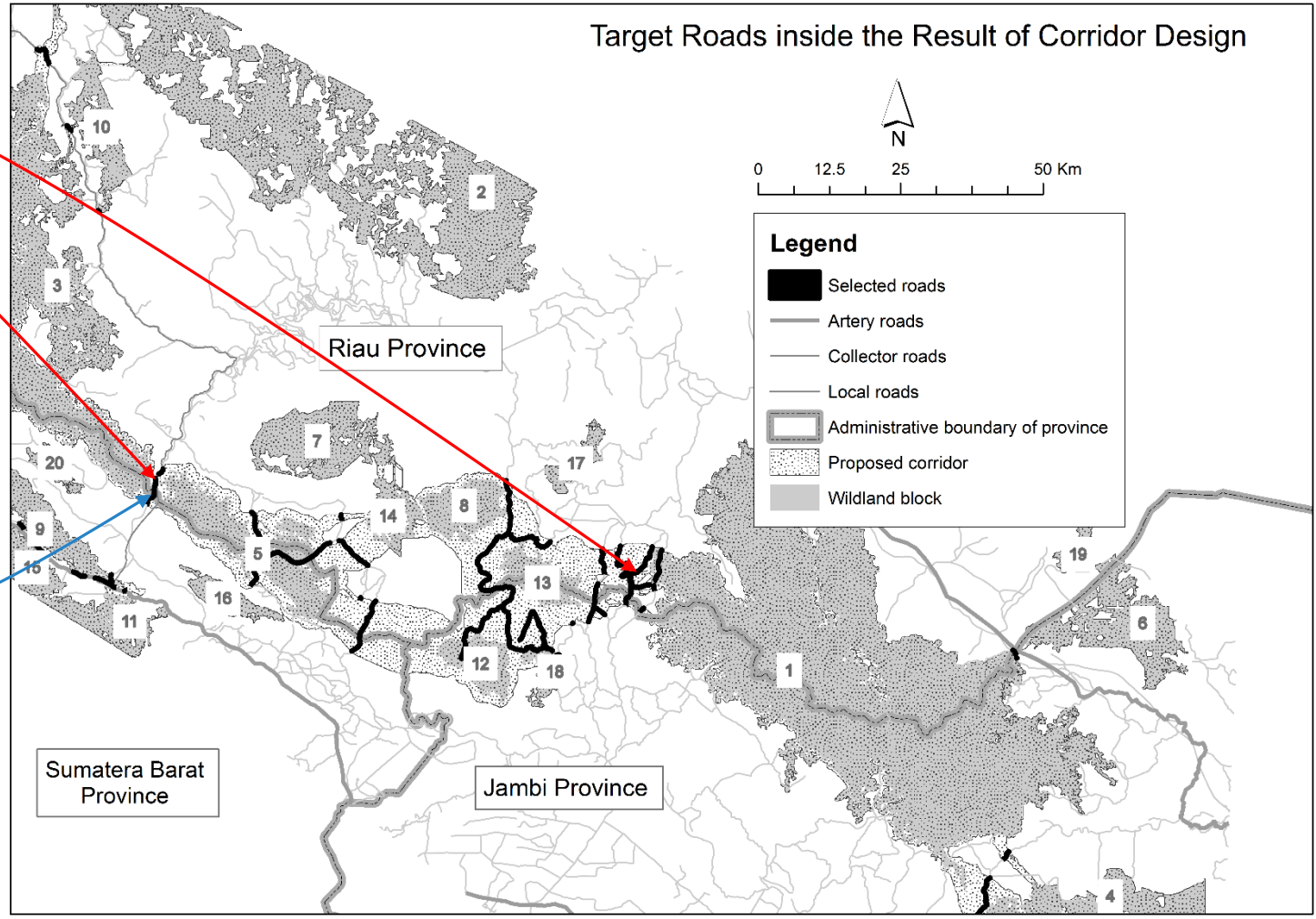
Endangered
EN

Critically Endangered
CR

Helarctos malayanus
(Beruang Madu)
Status IUCN Redlist : VU

Tapirus indicus (Tapir)
Status IUCN Redlist : EN

The latest update up to 50 species on May 2017



Result

Goal

Connecting the habitat through eco-road constructions

Outcomes

Outputs

Planning and design eco-road construction

- Innovation of ecological road
  - Design eco-road
  - Guidance to design eco-road
- Analysis instrument (InVEST)
  - Guidance for planning

Financing sources

- Financing for ecological road
  - Financing for eco-road design
  - Financing for establishing eco-road
- Funding sources

Implementation of eco-road

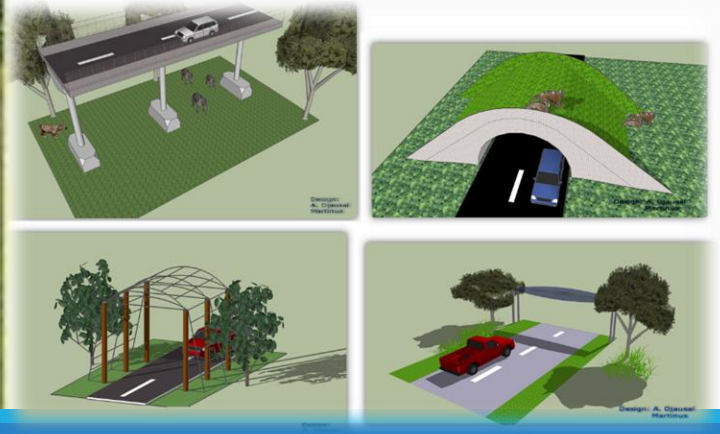
- Briefing to contractor
- Supervision and control
  - Check the development status

Eco-road governance

- Coordination and institutionalise the eco-road
- Monev and financing for maintenance

Further steps

the article can be downloaded at http://www.sciencedirect.com/science/article/pii/S235198941630110X



Terima Kasih – Thank You

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