

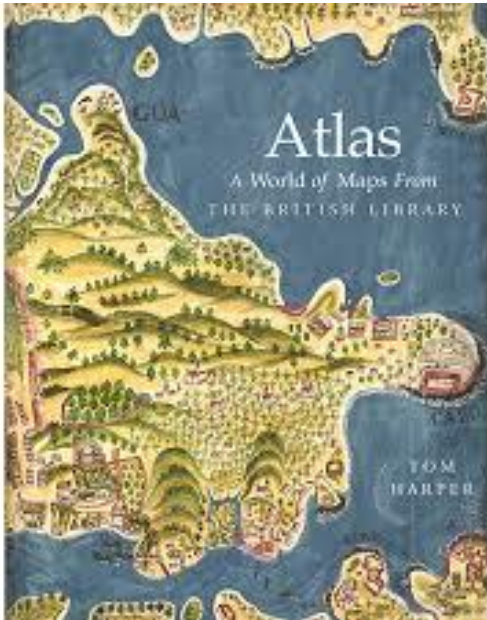
Digital Atlas of Trees and Wildlife in Thailand: Transforming Analog Localities to Web-based GIS Maps

Yongyut Trisurat
Faculty of Forestry, Kasetsart University
Bangkok, Thailand

APBON Web Seminar 2020
29 June 2020

Wave of Atlas

Analog



Digital



Disadvantage

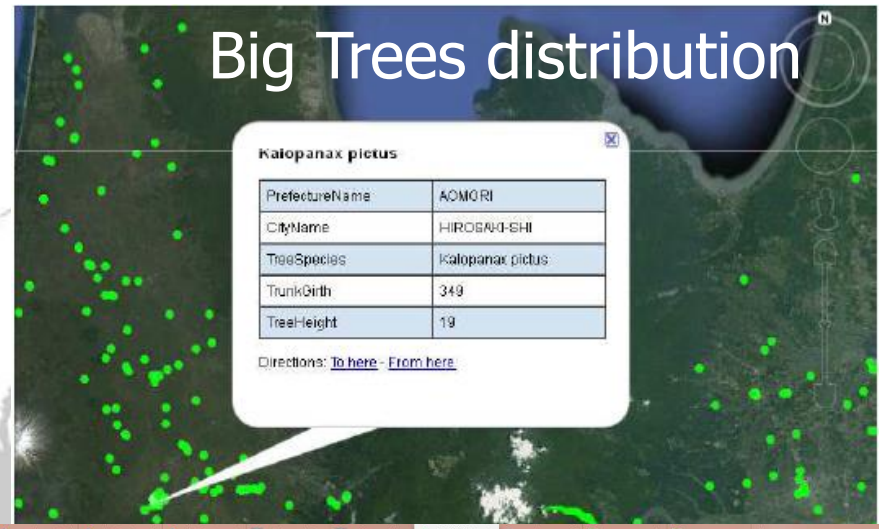
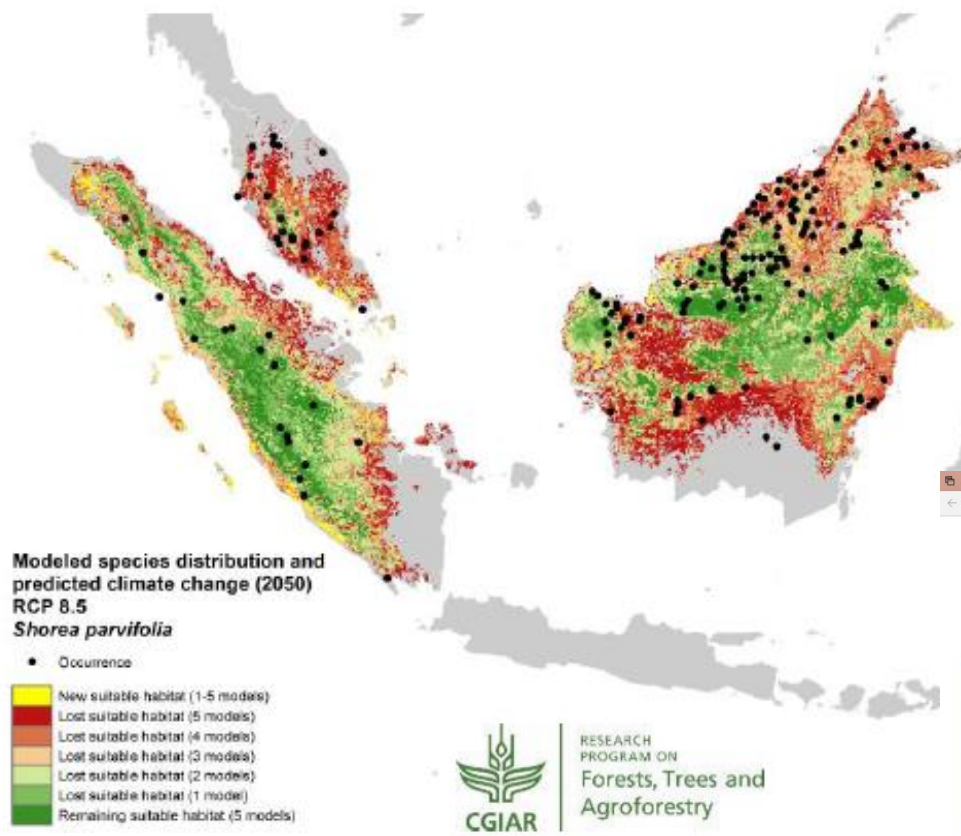
It cannot always give the correct shape and size of features.

Advantage -

It is easy to carry from one place to another. It is cheap as compared to a globe.

EXAMPLES

AFORGIS Regional Workshop, China 2019



Mapping Asia Plants (MAP), ABCDNet, CAS

Plant Collection: in Thailand



Prof. Kai Larsen & Prof. Tem Smitinand

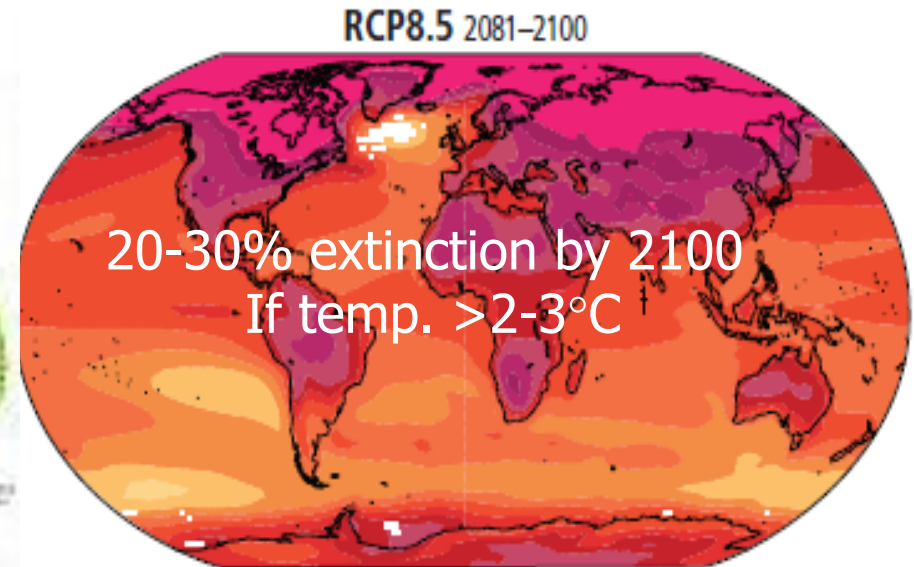


- Initiated in 1963 under Thai-Danish collaboration
- 280,000 preserved specimens
- 290 Families
- 14,00 spp. (trees and ferns)

Major Threats

Deforestation

IPCC AR5 Report (2014)



Rainfall in the dry months – 80 mm
Mean temp. in the driest quarter 2.4 °C

Mean temp. in the driest quarter changes
between 2000 and 2050

Raw data



Observations

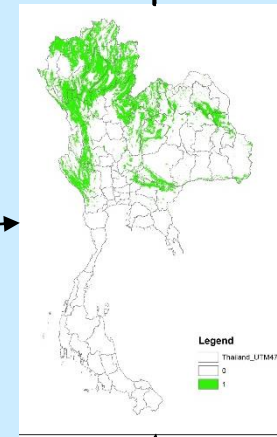
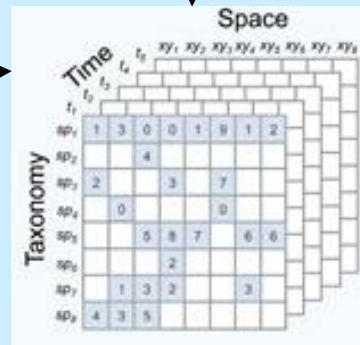


BEN

Train data (75%)

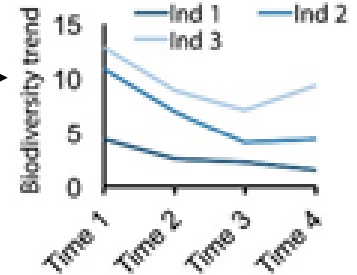
Modeling

Environ. variables



Test data (25%)

Reporting



PAs & CC scenarios

Plant community

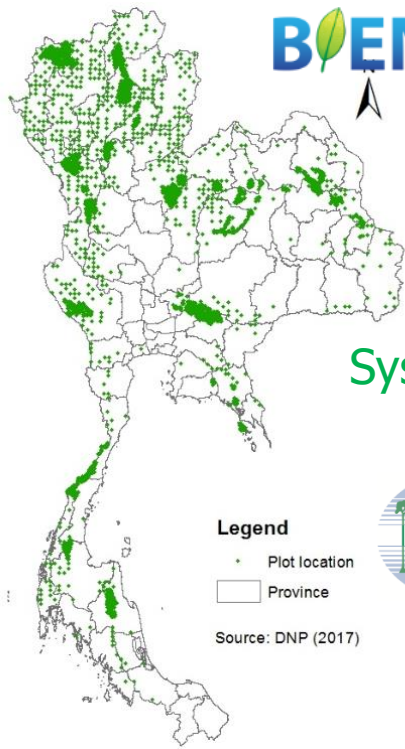
Conservation status

Raw data from field survey & digitized database

Harmonized **dataset**, quality Checked & **SDM**

Accuracy assessment

Change detection (gain & loss)



Systematic Forest Inventory

Legend
 * Plot location
 □ Province
 Source: DNP (2017)



RFD/DNP

Raw data

- **BIEN:** Thailand 659 spp.; 1,471 records
- **ITTO/RFDS/DNP:** 24,605 records
376 species
- **Selected spp.:** 201 with >20 occurrences

Received: 28 September 2019 | Revised: 24 November 2019 | Accepted: 28 November 2019
 DOI: 10.1111/1440-1703.12105



SPECIAL FEATURE

Data rescue—collection of precious and laborious in situ observed data



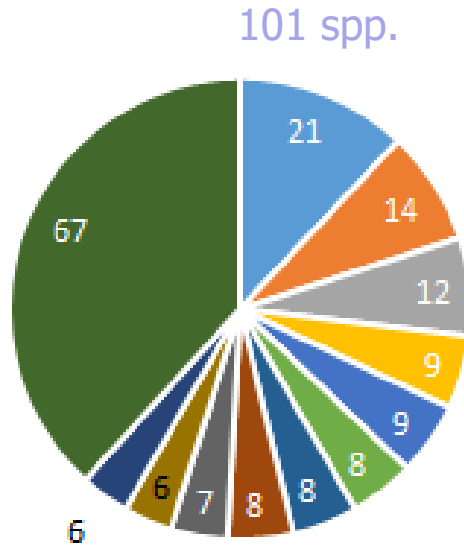
Systematic forest inventory plots and their contribution to plant distribution and climate change impact studies in Thailand

Yongyut Trisurat¹ | Wichan Eiadthong¹ | Weeraphart Khunrattanasiri¹ | Somyot Saengnin² | Auschada Chitechote² | Sompoch Maneerat²

Spacing	Year	Number of plots	Extent	Responsible agency	Remarks
1.5 km × 1.5 km	2001–2003	903	Country	RFD/ITTO	Designed and pilot project
20 km × 20 km	2004–2007	1,285	Country	RFD/ITTO	Entire country but 158 plots un-established
10 km × 10 km	2004–2005	10,372	Country	RFD/DNP	Only inside remaining forest cover
5 km × 5 km	2006–2010	14,152	Protected area	DNP	Using a 0.1 ha plot center
10 km × 10 km	2011	859	Country	DNP	Using a 0.1 ha plot center
2.5 km × 2.5 km ^a	2012–present	4,500	Protected area	DNP	Using a 0.1 ha plot center



Family = 56
 Genera = 134
 Species = 201



- Dipterocarpaceae ■ Lamiaceae ■ Rubiaceae ■ Annonaceae
- Malvaceae ■ Anacardiaceae ■ Euphorbiaceae ■ Sapindaceae
- Meliaceae ■ Ebenaceae ■ Phyllanthaceae ■ Others

Spp.	No. of records
<i>Pterocarpus macrocarpus</i>	777
<i>Canarium subulatum</i>	700
<i>Xylia xylocarpa</i> var. <i>kerrii</i>	600
<i>Shorea siamensis</i>	527
<i>Shorea obtusa</i>	484
<i>Nephelium hypoleucum</i>	388
<i>Syzygium cumini</i>	387
<i>Aporosa villosa</i>	382
<i>Spondias pinnata</i>	374
<i>Vitex pinnata</i>	367

Hopea pierrei 21
Barringtonia macrostachya 21
Alstonia rostrata 21



Wildlife survey in protected areas

Total records
>34,000

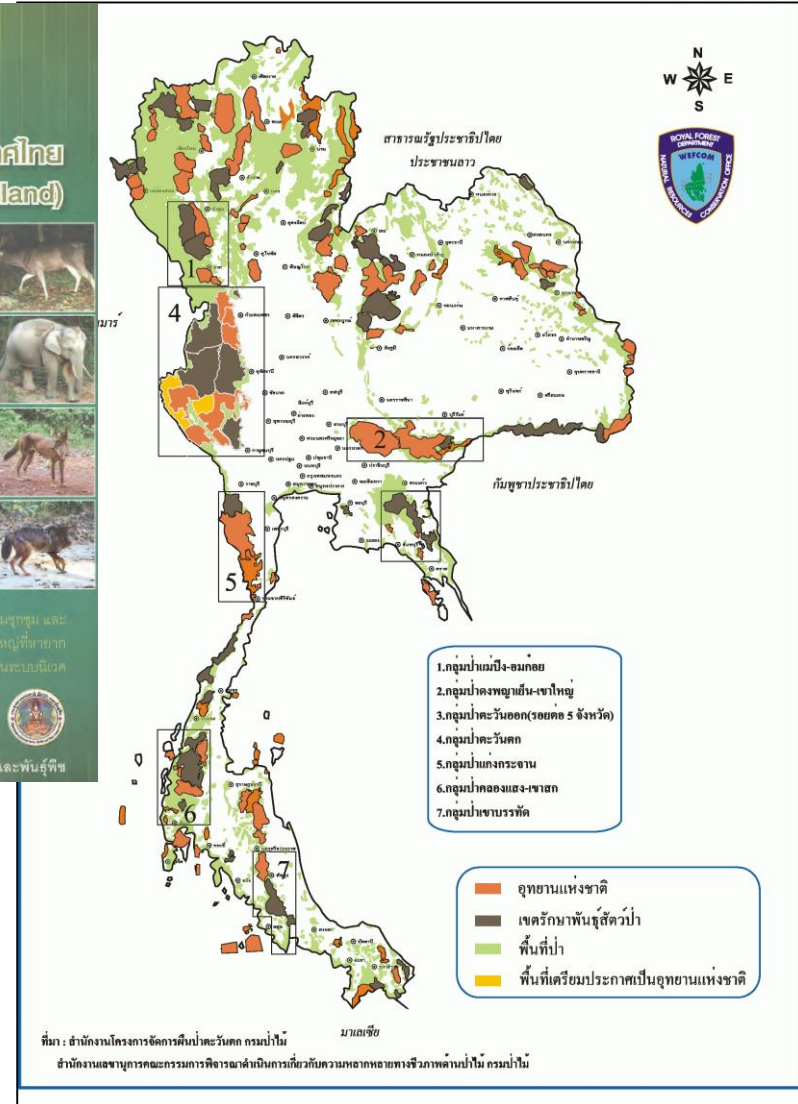
สถานภาพของสัตว์เลี้ยงลูกด้วยนมขนาดใหญ่ในประเทศไทย
(Status of Large Mammals in Thailand)

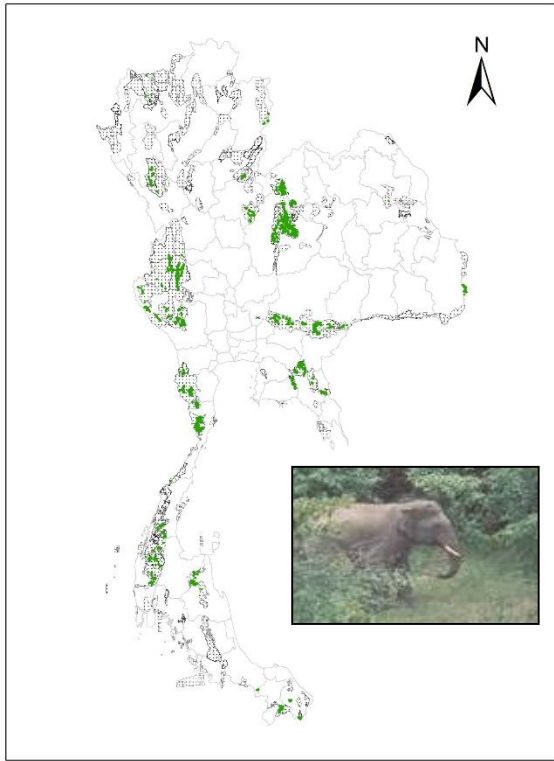
โครงการศึกษา การแพร่กระจาย ความชุกชุม และประชากรสัตว์เลี้ยงลูกด้วยนมขนาดใหญ่ที่หายากใกล้สูญพันธุ์ และความสำคัญในระบบนิเวศ

กรมงานวิจัยสัตว์ป่า สำนักอนุรักษ์สัตว์ป่า กรมอุทยานแห่งชาติ สัตว์ป่า และพันธุ์พืช

16 wildlife species:

- Carnivores: tiger, leopard, dhole
- Herbivores: golden jackal, Chinese goral, banteng, water buffalo, tapir, elephant, Asiatic black bear, sun bear, gaur, seow, barking deer, sambar, wild boar

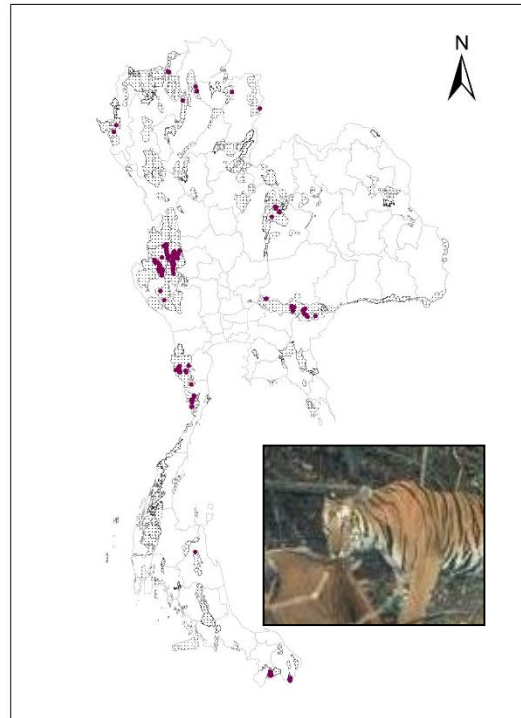




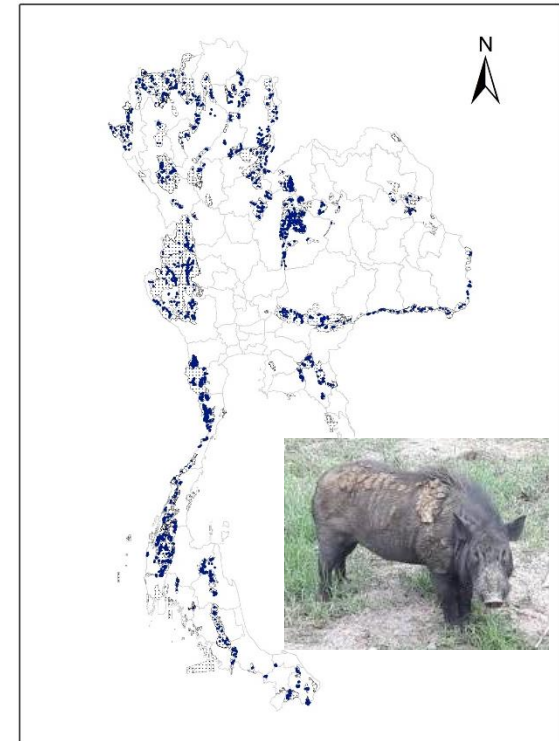
Elephant
(7,129)



Wild water buffalo (93)



Tiger (496)



Wild boar
(9,721)

Species Distribution Model (MaxEnt)

Environmental Factors

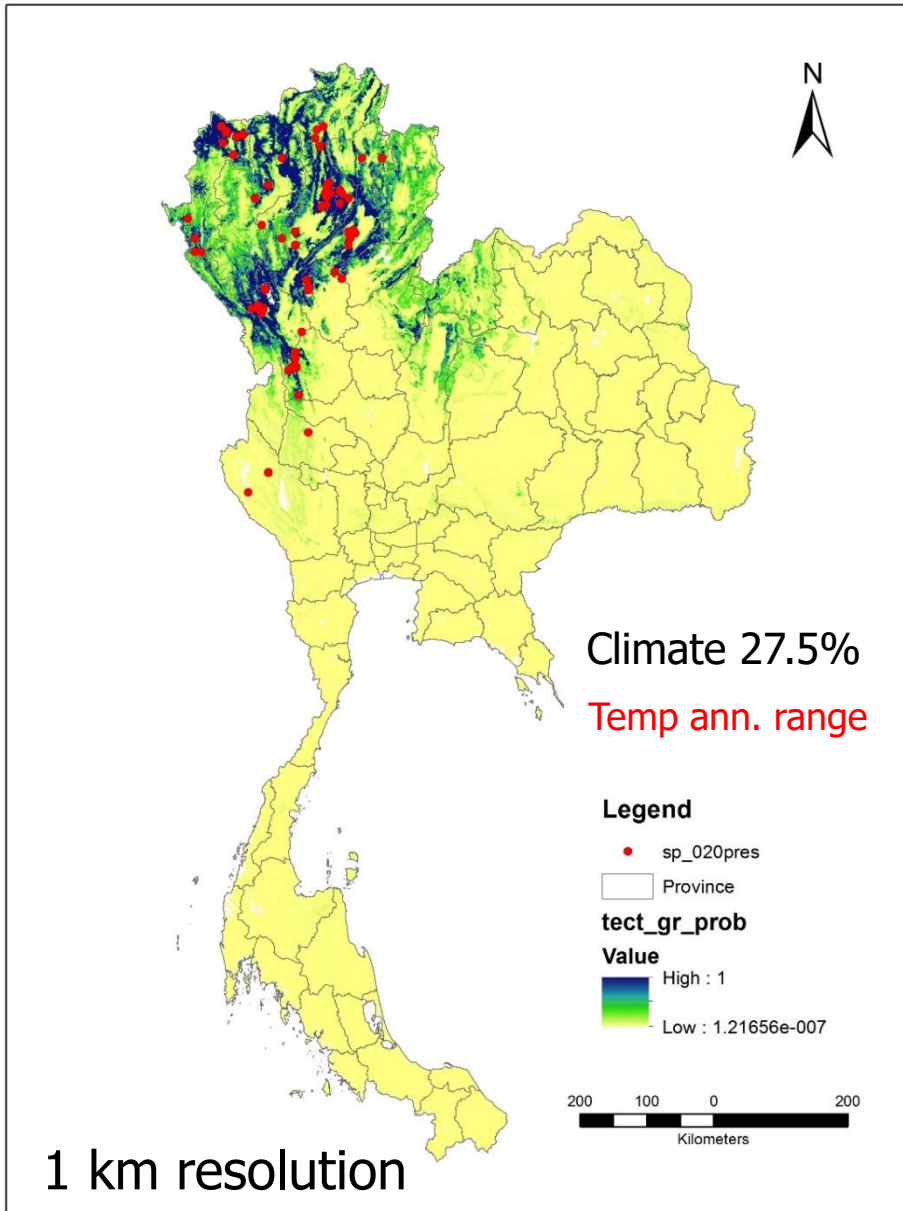
- Topography (DEM & slope)
- 12 bioclimatic variables (*non-correlated*)
- Soil charac.: phys & chem.)
- Geology

5 replicate runs

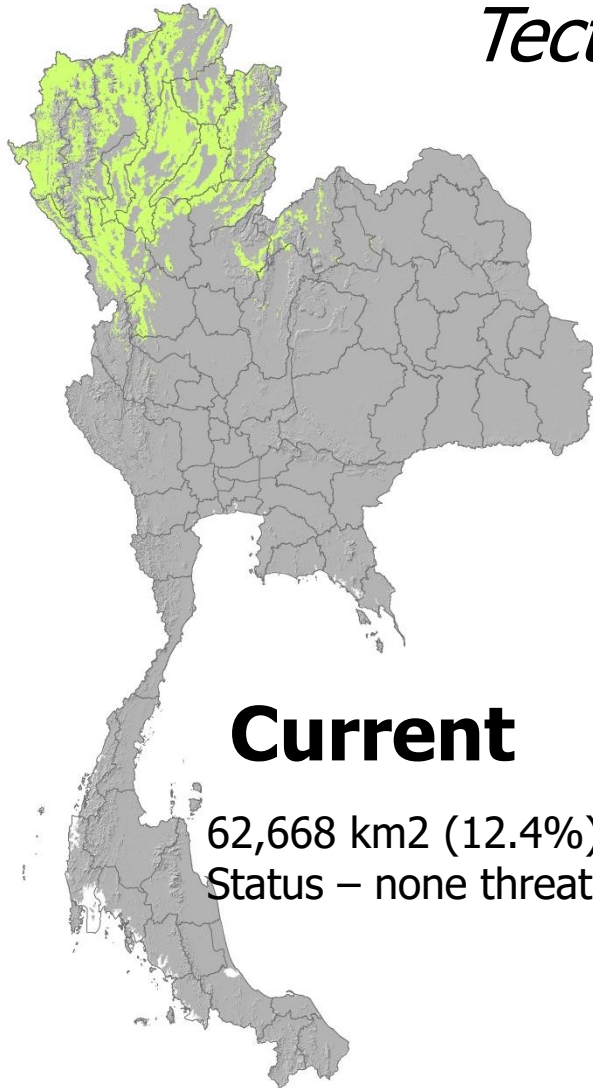
Accuracy assessment of 5 log. thresholds

- 1) 10percentile
- 2) Equal train sens & spec.
- 3) Max train sens plus spec.
- 4) Equal test sens and spec.
- 5) Max test sens plus spec.

Liu et al. (2005)

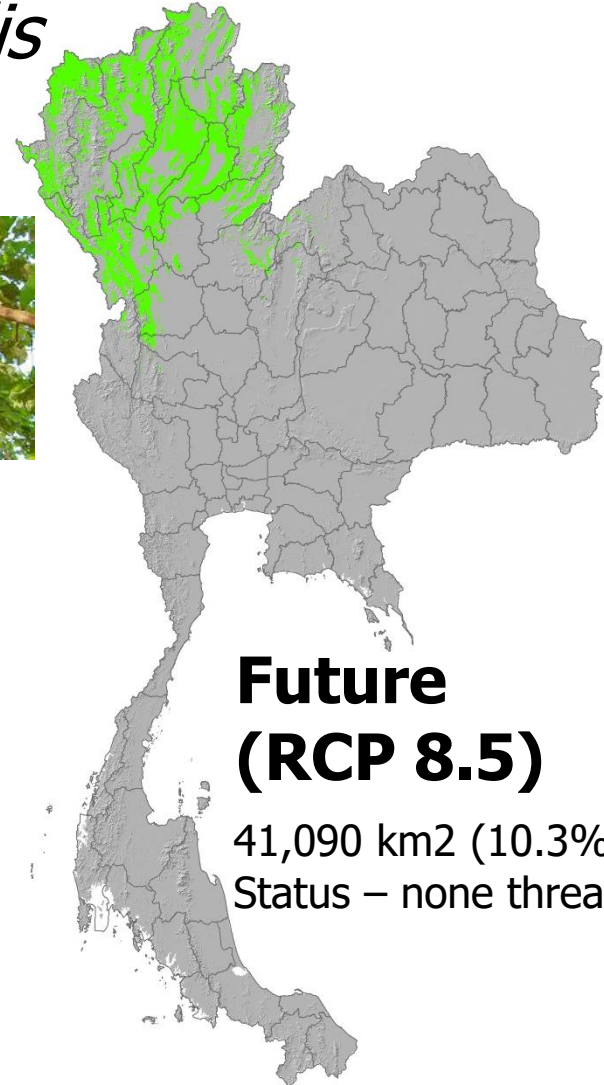


Tectona grandis



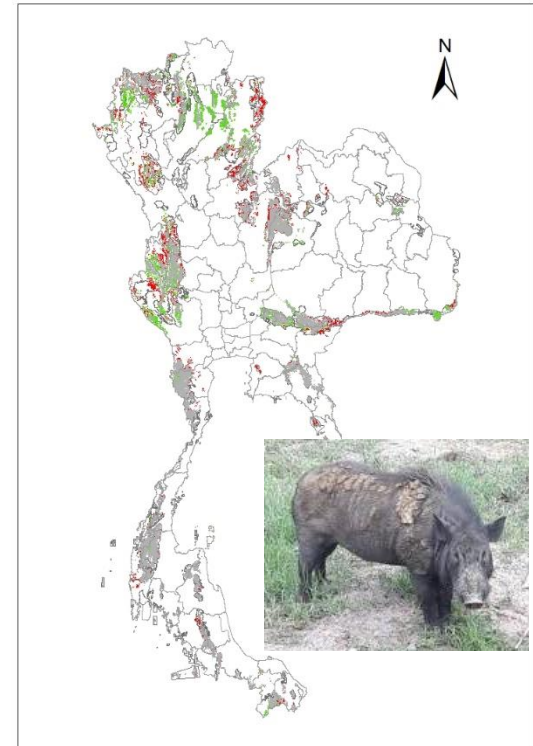
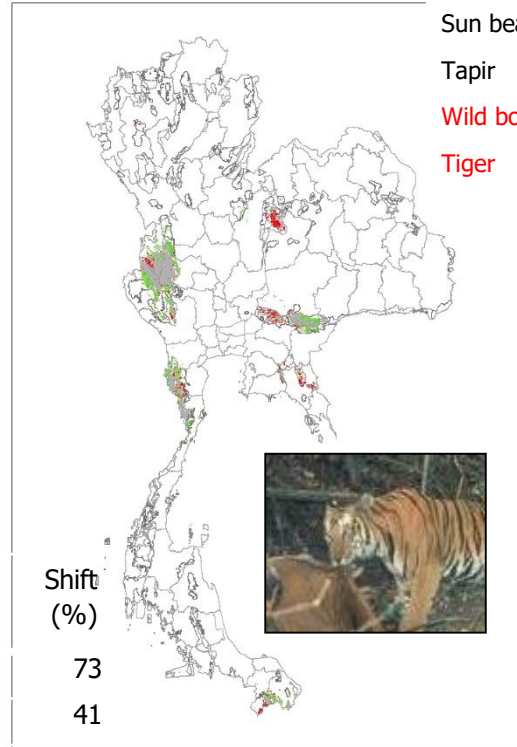
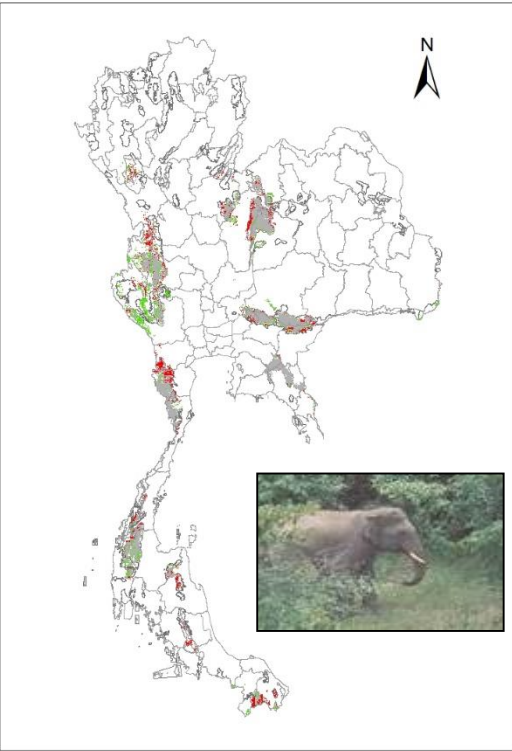
Current

62,668 km² (12.4%)
 Status – none threatened



**Future
 (RCP 8.5)**

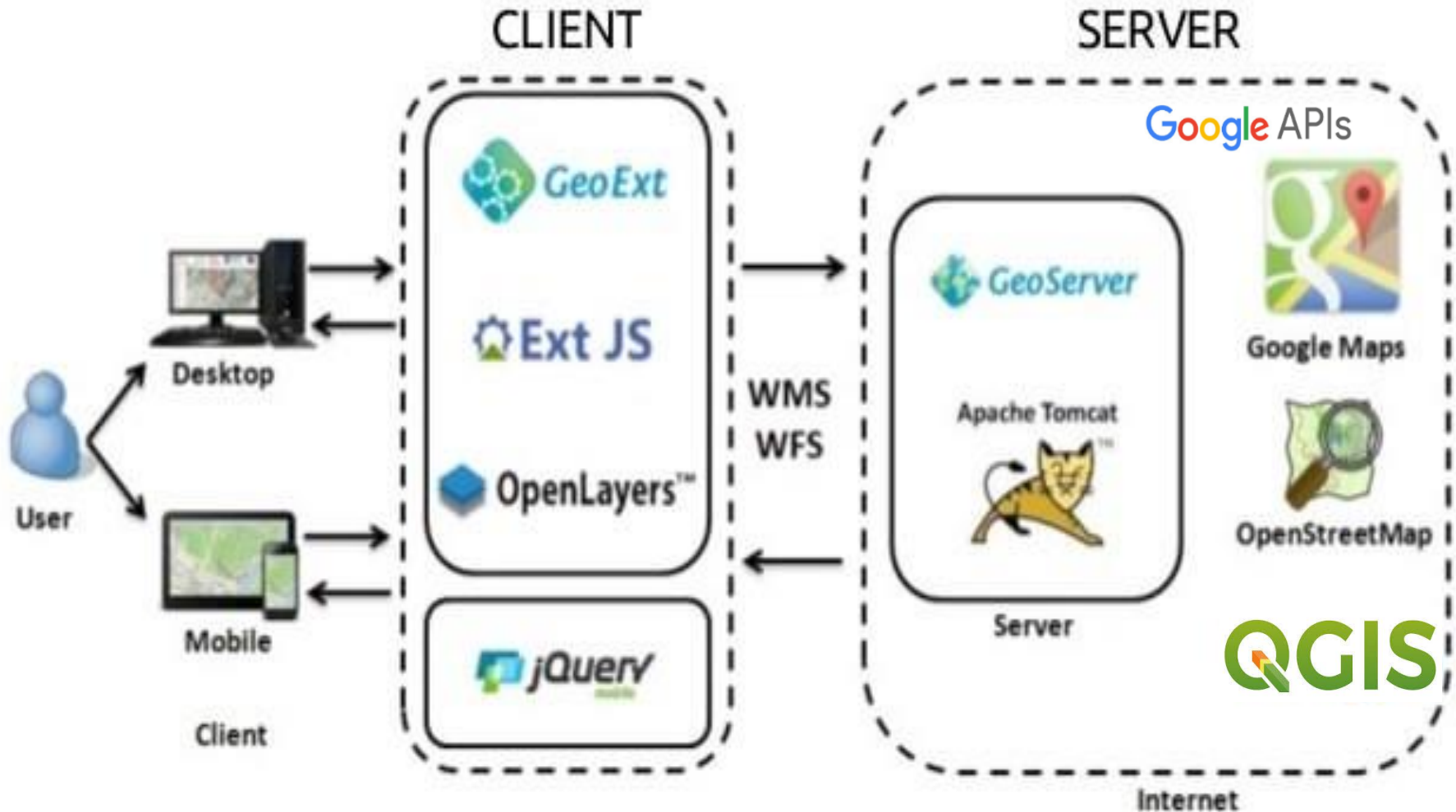
41,090 km² (10.3%)
 Status – none threatened



Species	2000 %	2050 %	+/- km2	Shift (%)
Gaur	5.32	5.50	890	22
Chinese goral	1.50	0.21	-6,458	81
Jackal	11.55	11.33	-1,088	39
Leopard	3.13	3.40	1,348	39
Sambar	5.44	5.22	-1,136	33
Serow	8.30	8.18	-604	37
Sun bear	5.23	5.39	805	32
Tapir	3.20	2.93	-1,349	26
Wild boar	10.86	10.78	-441	30
Tiger	3.96	2.86	-5,538	41

Species	2000 %	2050 %	+/- extent km2	Shift (%)
Wild buffalo	0.03	0.08	291	73
Banteng	1.95	1.64	-1,554	41
Barking deer	11.08	10.73	-1,759	30
A.black bear	5.30	5.91	3,037	30
Dhole	4.74	4.77	185	46
Elephant	5.40	5.15	-1,261	34

GIS geo-species mapserver



Digital Atlas of Trees and Wildlife in Thailand

Geo-species and GIS data

- Unnamed Layer
- Extent (Print)
- Tree Species [T2000] : [T2050]
- Wildlife Species [W2000] : [W2050]
- Climate
- Plant Community [P2000] : [P2050]
- Thailand Boundary
- Protected area in Thailand
- BaseMap

OverviewMap

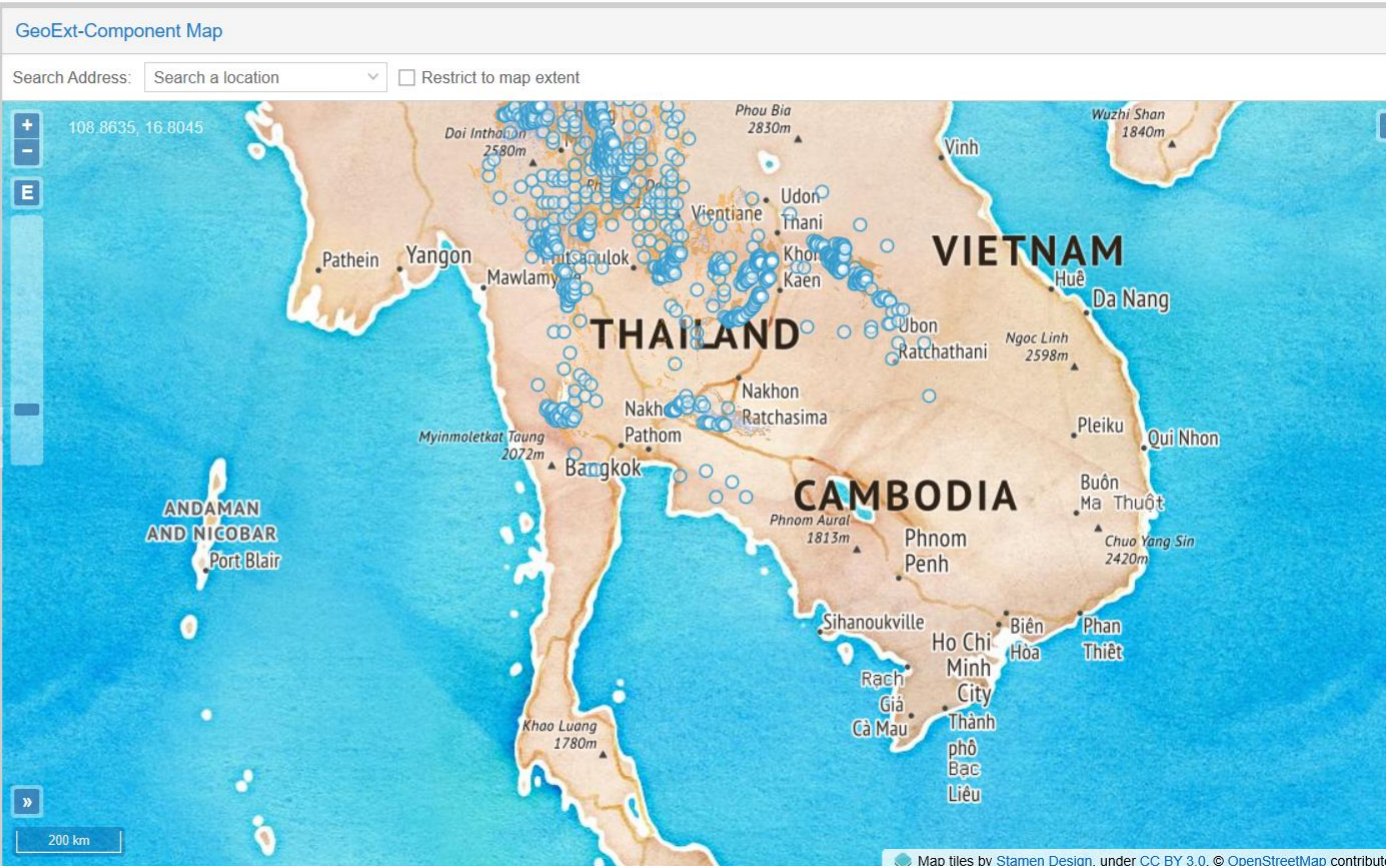
Description

[Print](#)

Geo-Species and GIS data web mapservers...

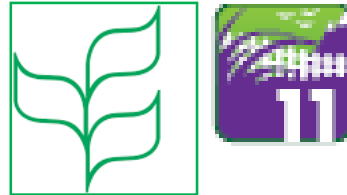
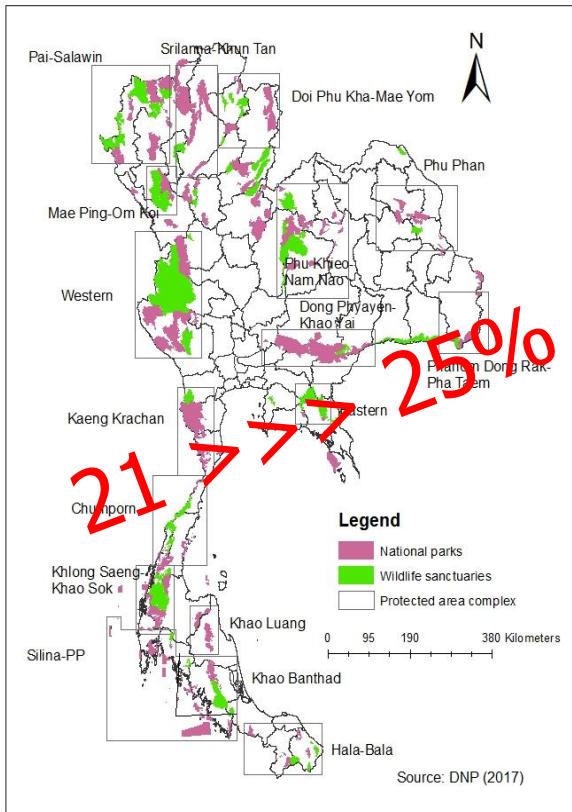
Download name of Geo-Species Tree: [\[Tree species name\]](#)

The dataset is available on request.
Please contact Prof. Yongyut Trisurat at Email: fforyyt@ku.ac.th

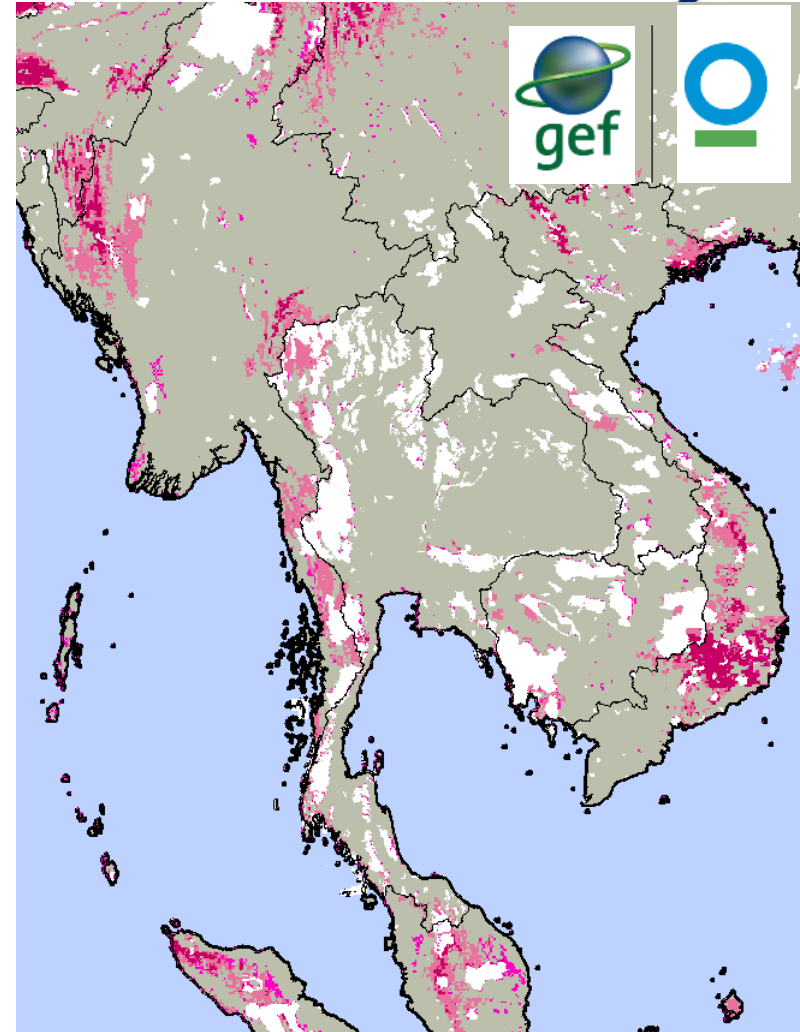


National Master Plan of Thailand's Protected Areas

(Wild Animal Preservation Act, 2019)



17% by 2020
30% Post Aichi target



Climate Change Priority Areas

In-situ taxonomic survey and description was initiated over 60 years with limited use in planning and not user friendly accessibility.

CC – Cause irreversible changes of some species & ecosystems leading to extinction.

Digital atlas enhances conservation planning and facilitate citizen science & accessibility.

THANK YOU FOR YOUR ATTENTION

