



# **AVIRIS-NG Estimates of Biodiversity from a Biodiversity Hotspot in the Western Ghats Mountains of Southwest India**

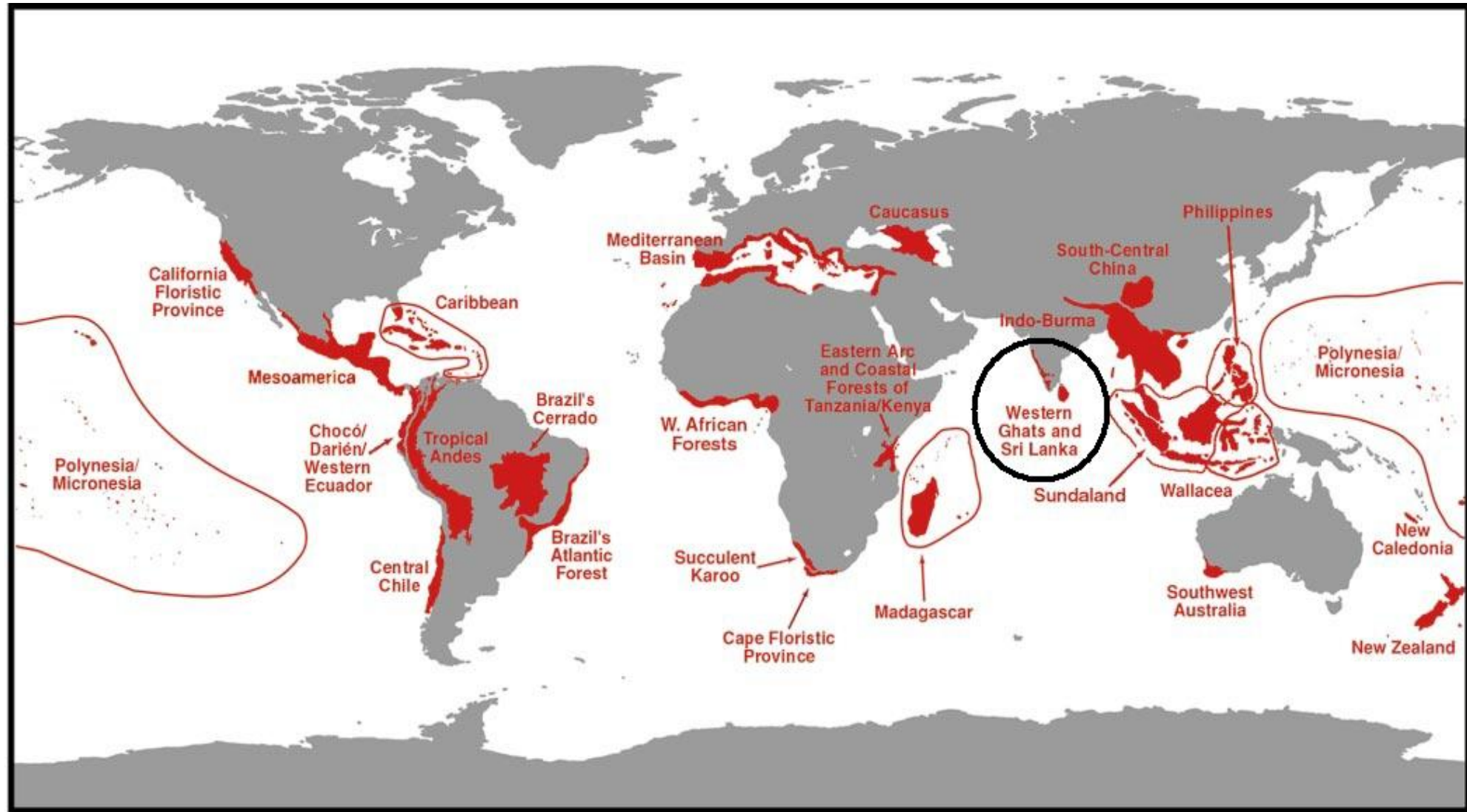
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Centre for Ecological Sciences

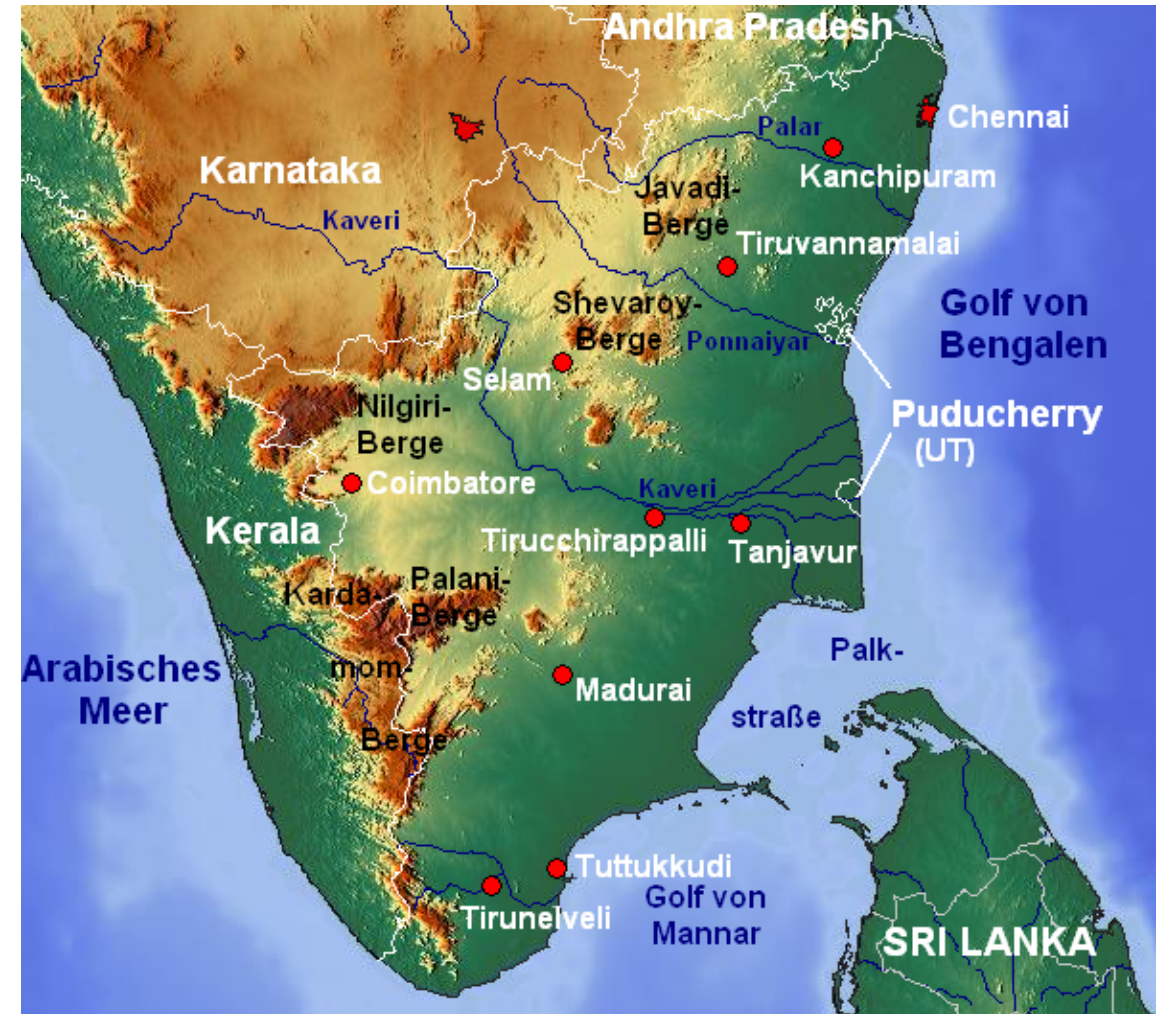
Indian Institute of Science



Biodiversity hotspots (Myers 1988; Myers 1990).



# Geography of India

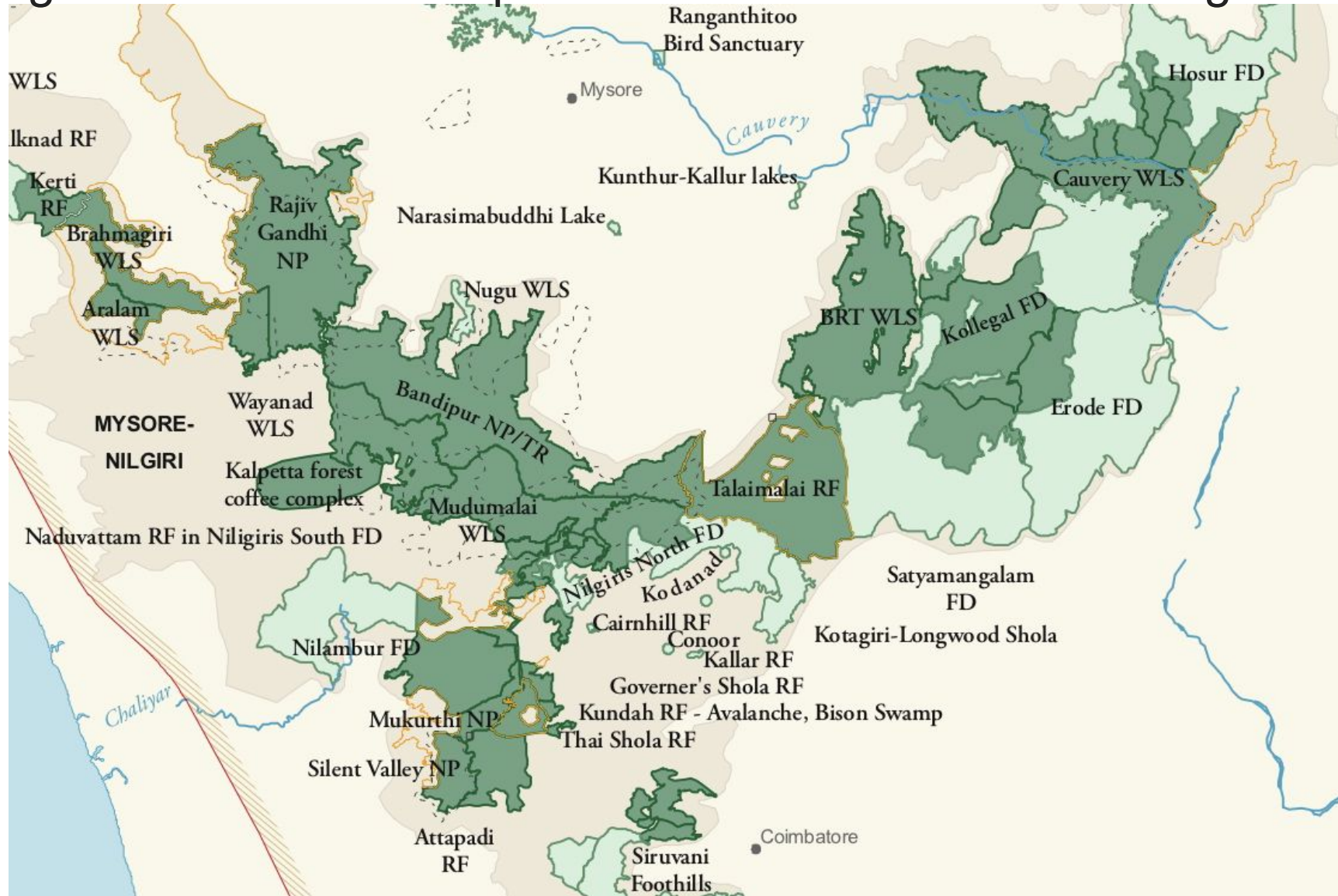




[11°35'N 76°33'E](#)



# Nilgiri International Biosphere Reserve and World Heritage Sites



Established by UNESCO in 2012. Includes 39 National Parks, Wildlife Sanctuaries and Reserve Forests covering 5,520 km<sup>2</sup>

20 in Kerala, 10 in Karnataka, 5 in Tamil Nadu and 4 in Maharashtra



The Nilgiri International Biosphere Reserve  
High Species Diversity Endemic to the Western Ghats,


~150 Angiosperms out of 4,000 plant species.

150 endemic vertebrates out of 700 species.

Populations of Asian elephant (*Elephas maximus*) and the Bengal tiger (*Panthera tigris*)  
are among largest in the world







Extreme topographic and climatic diversity creates a wide range of micro-habitats

- 800 – 2000 mm Rainfall
- 14°C to 33°C Temperatures
- 30m – 1200m Elevation
- Frequent disturbance (fires, deforestation)



Mudumalai was identified as a Tiger Reserve in 1940







மதுமலை புலிகள் காப்பகம் உங்களை வரவேற்றது



MUDUMALAI TIGER RESERVE

WEL COMES YOU.



தமிழ்நாடு காவல் துறை  
தமிழ்நாடு எல்லை ஆளும்  
TAMILNADU POLICE  
POLICE CHECK POST  
MUDUMALAI

தமிழ்நாடு காவல் துறை  
தமிழ்நாடு எல்லை ஆளும்  
TAMILNADU STATE LIMIT BUSH

செட்டி கார்

POL













Lion Tailed Macque

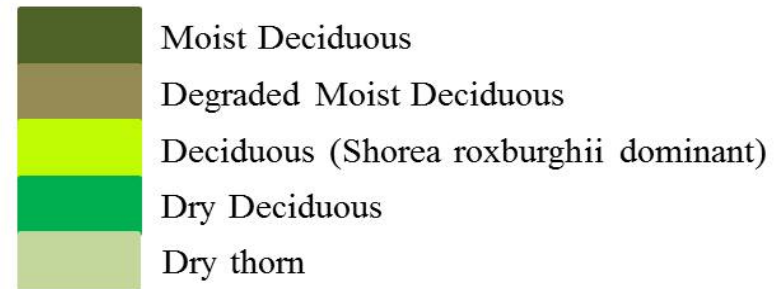
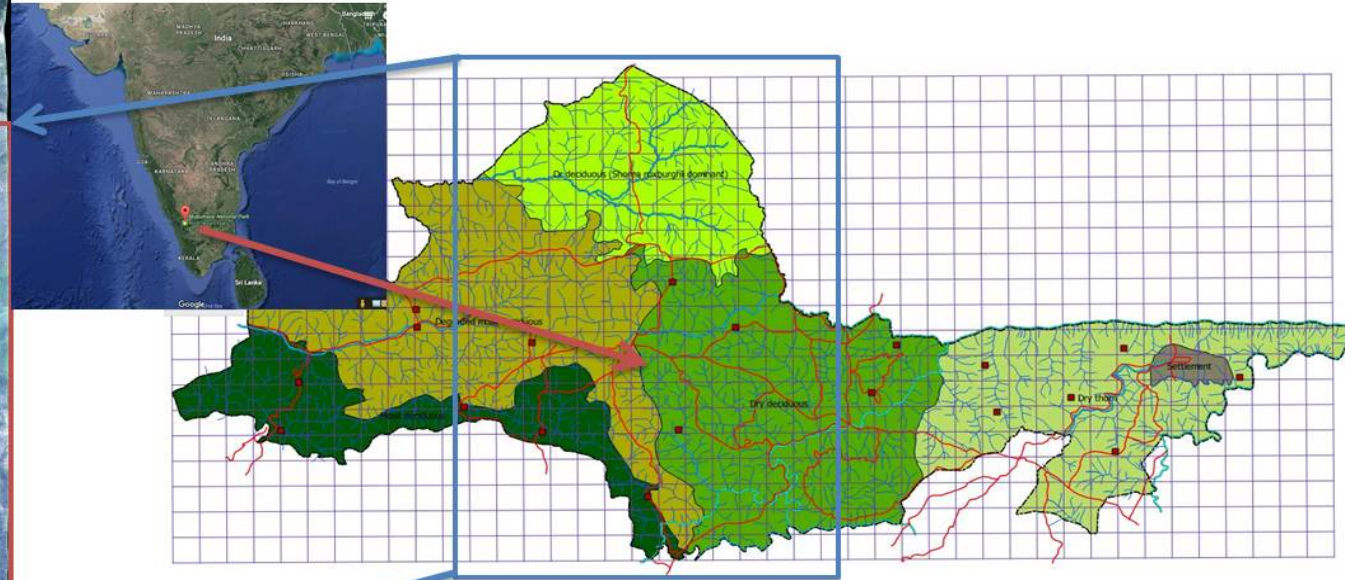








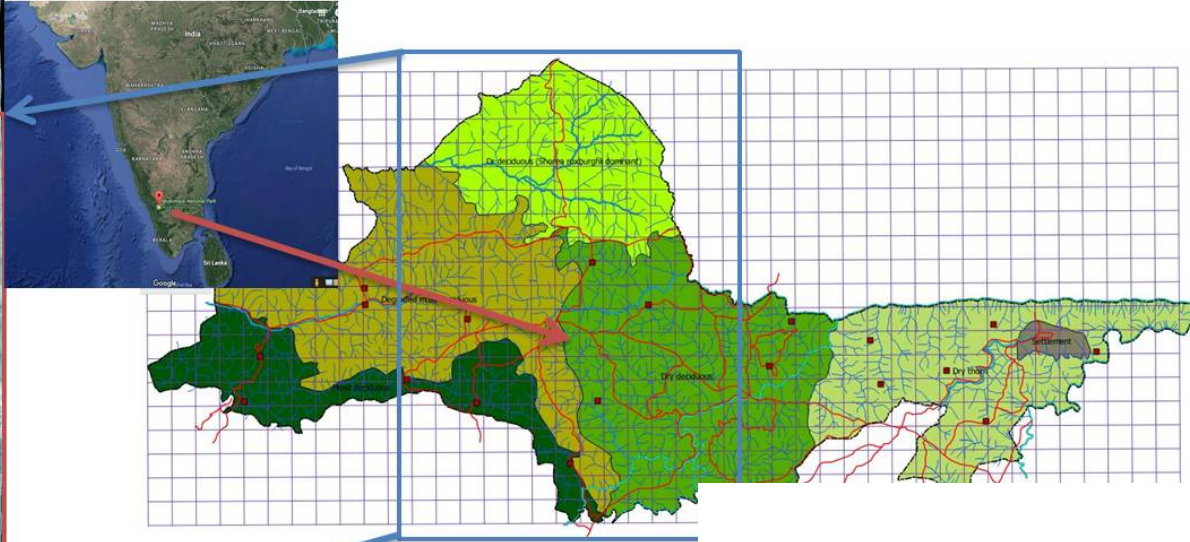
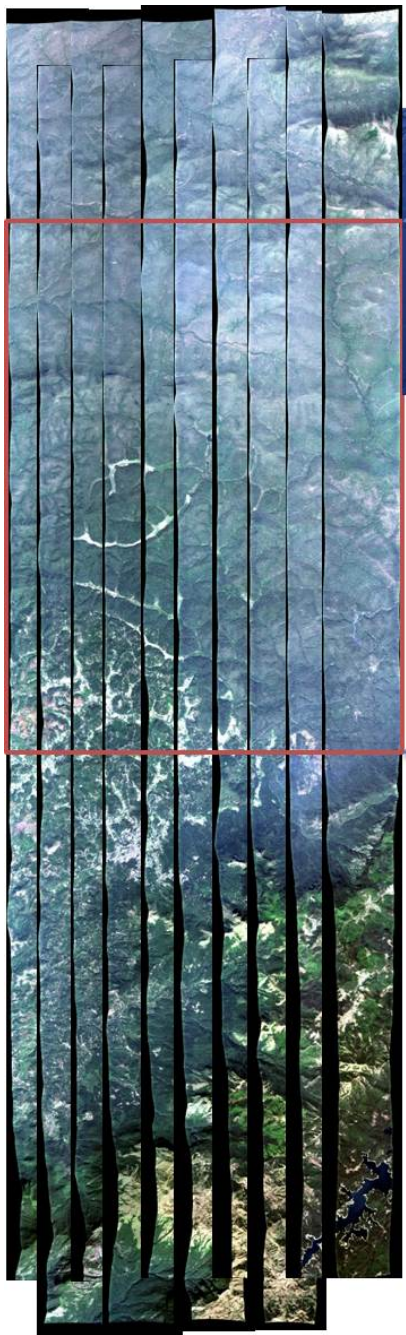
# Mundamali National Park



Declining Moisture Gradient

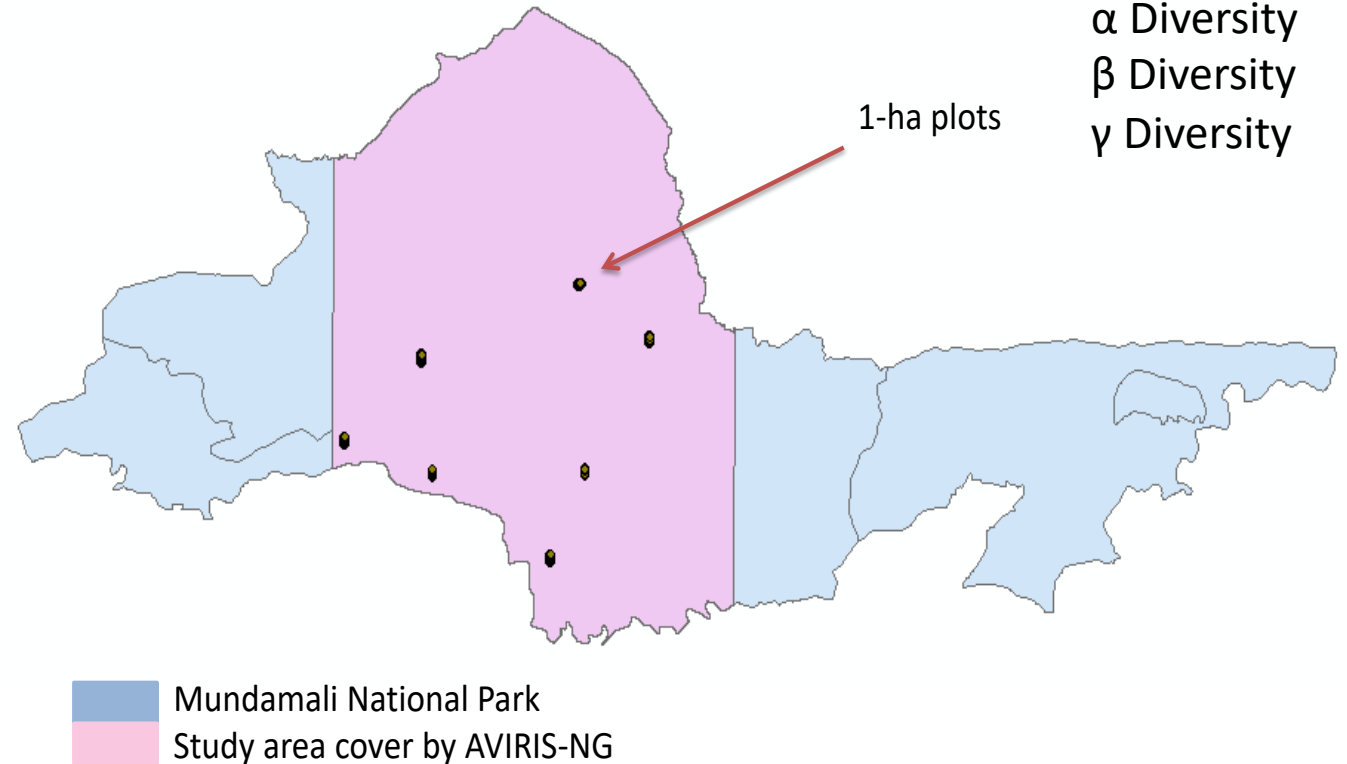


# Mundamali National Park



## Ecosystem Biodiversity

$\alpha$  Diversity  
 $\beta$  Diversity  
 $\gamma$  Diversity





# Comparing k-means Classifier and Random Forests Classifier

Forested 50 ha censused plot:

72 species greater than 1 cm DBH

63 species greater than 10 cm DBH

(Sci. (2000) 288: 1414-1417)

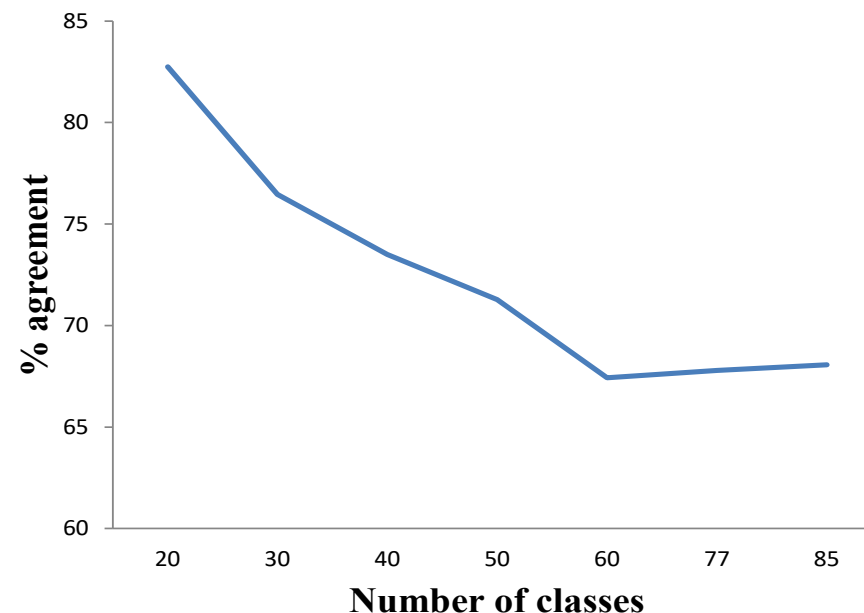
17,432 individuals

68 species

(PNAS (2000) 97: 10850-10854)

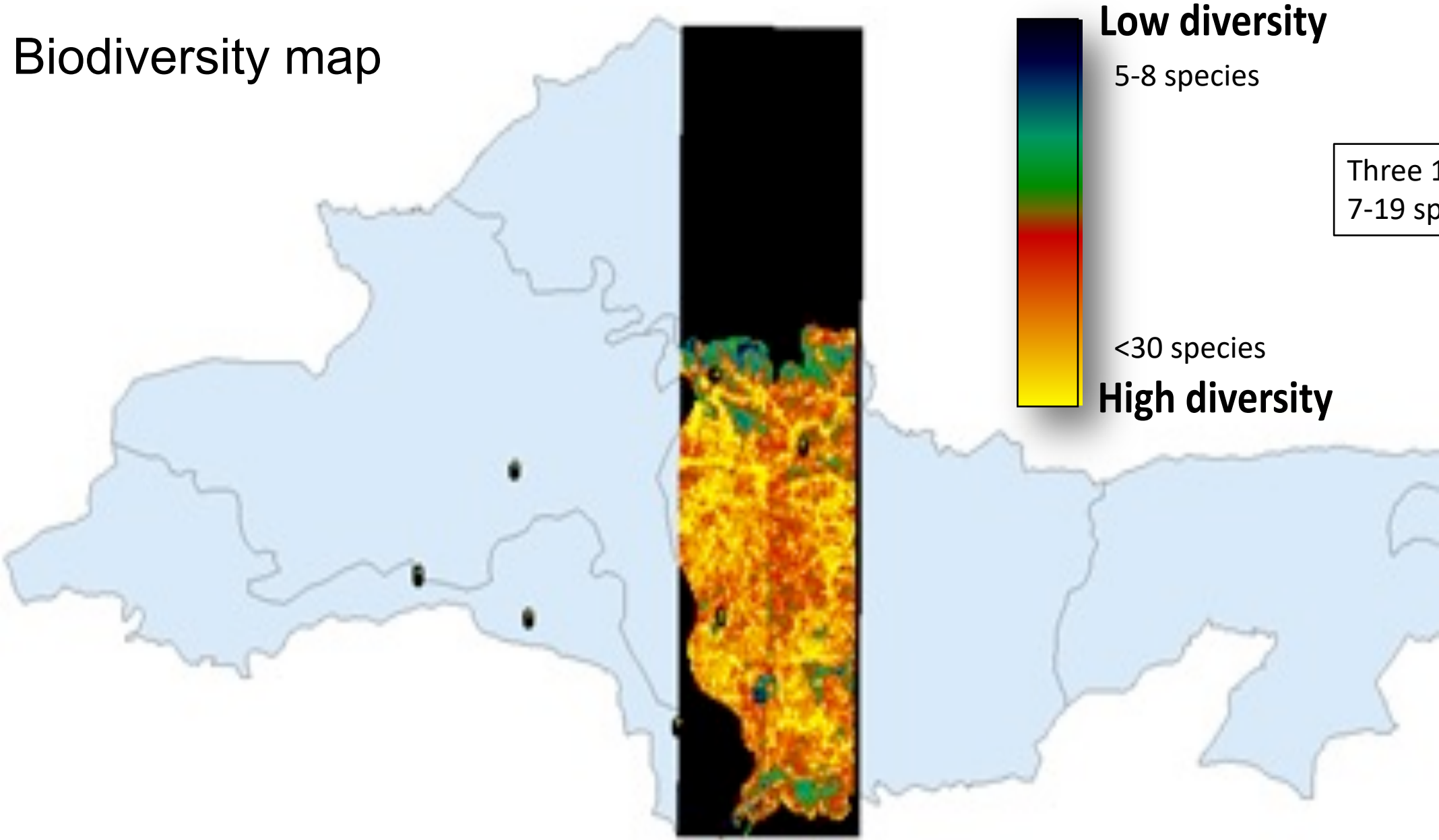
Absolute prediction for 3 sites ranged from 1-40 species

Each mapping unit is 0.78 ha



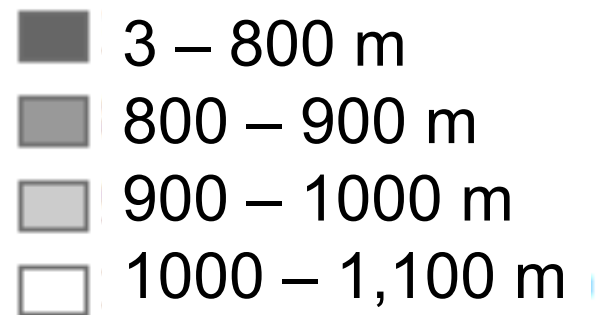
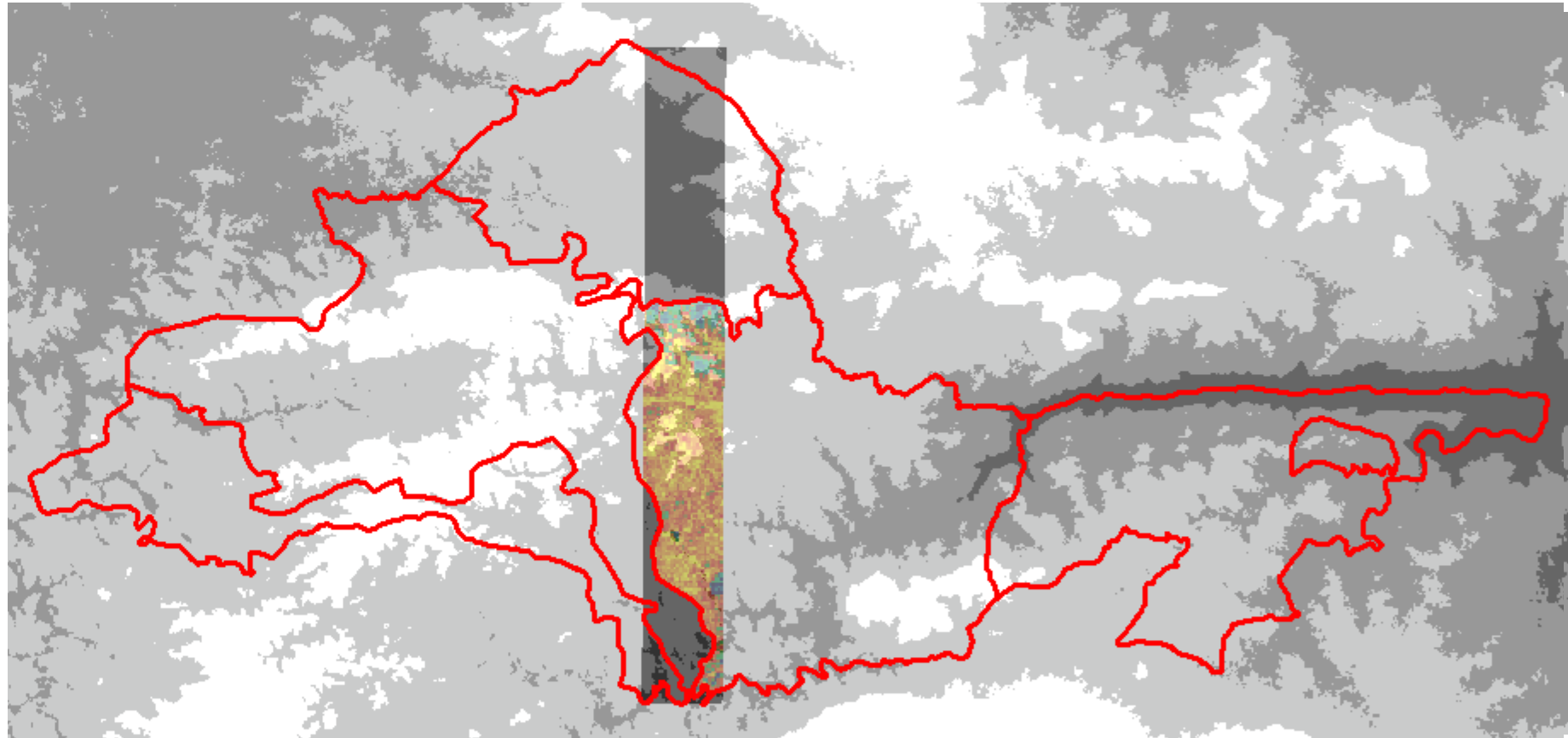


# Biodiversity map



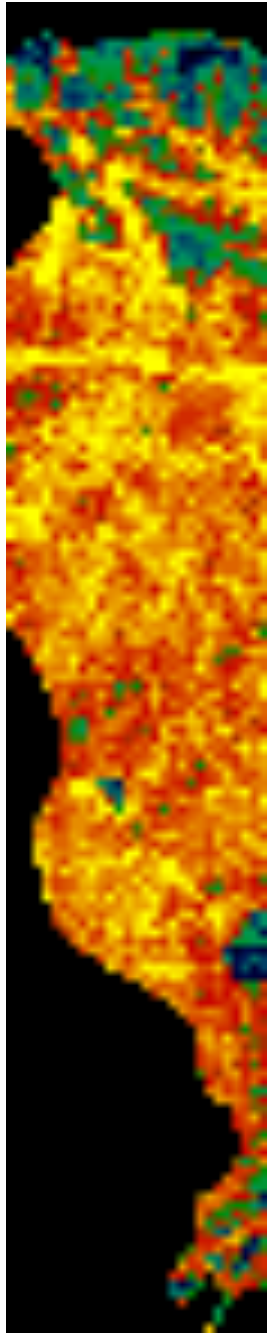


# Relationship of Topography to Biodiversity





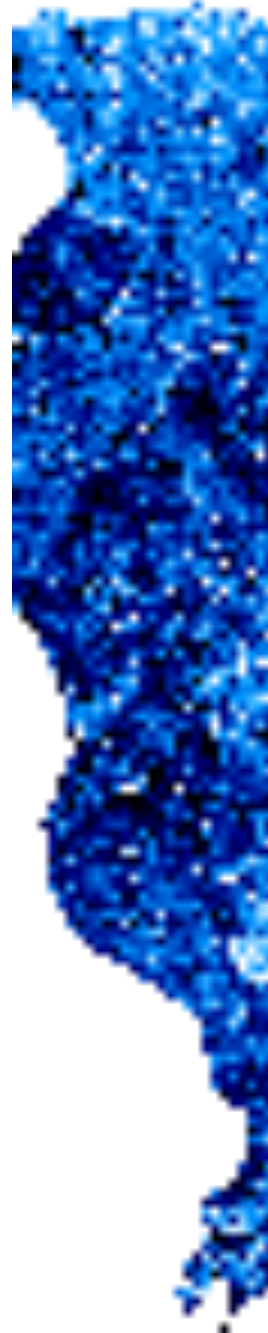
**Biodiversity**



**Pigments**



**Water**



**Dry matter**

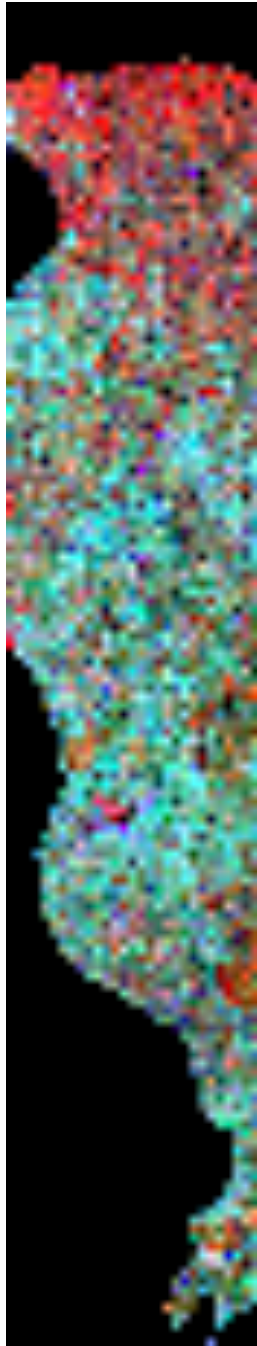
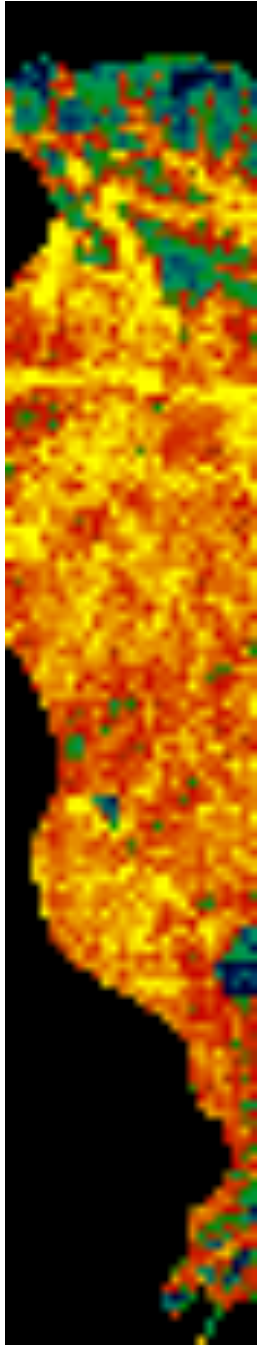


**Low**

**High**



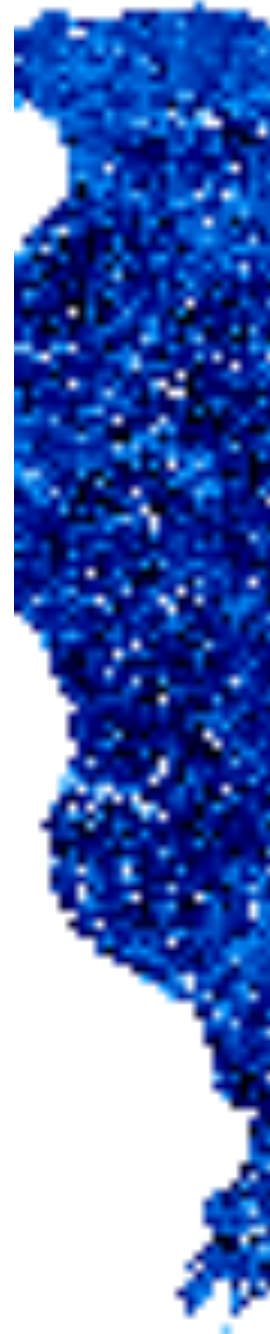
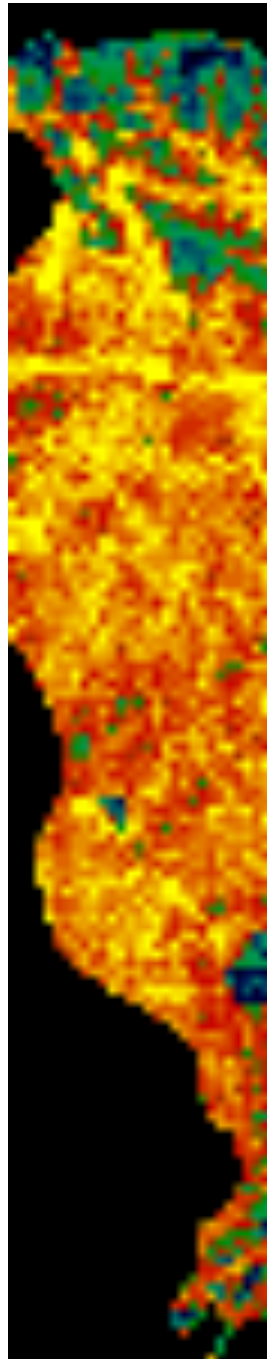
Biodiversity  
map



R Dry matter  
G Chlorophyll  
B Water Content



Chlorophyll Carotenoids Anthocyanins

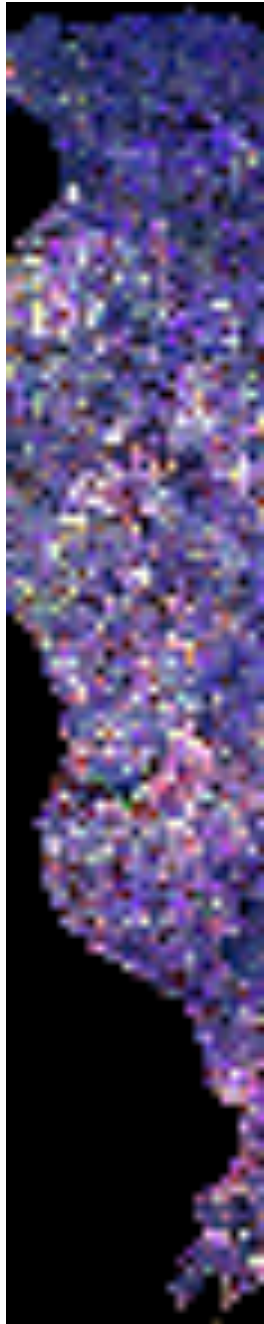
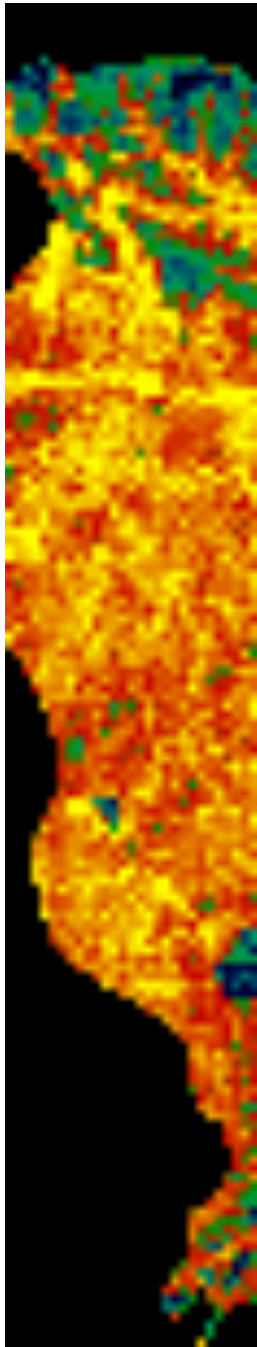


Low

High



Biodiversity  
map



R Chlorophyll  
G Carotenoids  
B Anthocyanins



Thanks for Your Attention!

Questions?

