

# Frequent Forest Fires Impact Upon Land Use/Cover and Forest Boundaries over the Last Three Decades: Case in Central Kalimantan, Indonesia

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An aerial photograph of a river winding through a dense, green forest. The water is dark and reflects the overcast sky. A small boat with several people is visible on the river, moving away from the viewer. The sky is filled with heavy, grey clouds. In the top left corner, there is a solid orange rectangular bar.

# Outline

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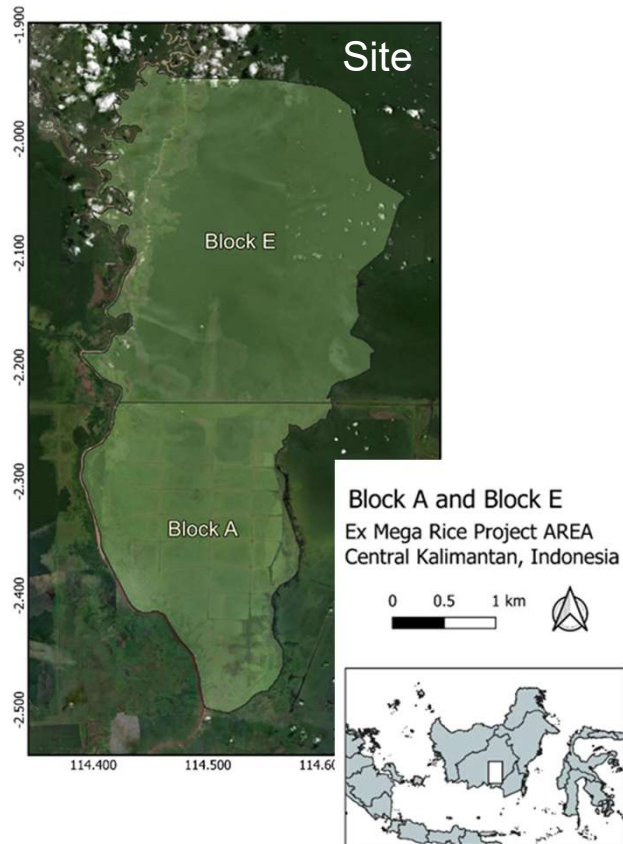
- Background
- Methods
- Forest change and fires impact
- Conclusion

An aerial photograph of a tropical peatland landscape. A dark, winding river flows through a vast expanse of lush green vegetation. The terrain is flat, and the water reflects the surrounding greenery. In the middle of the river, a small boat with several people is visible. The overall scene depicts a healthy, undisturbed ecosystem.

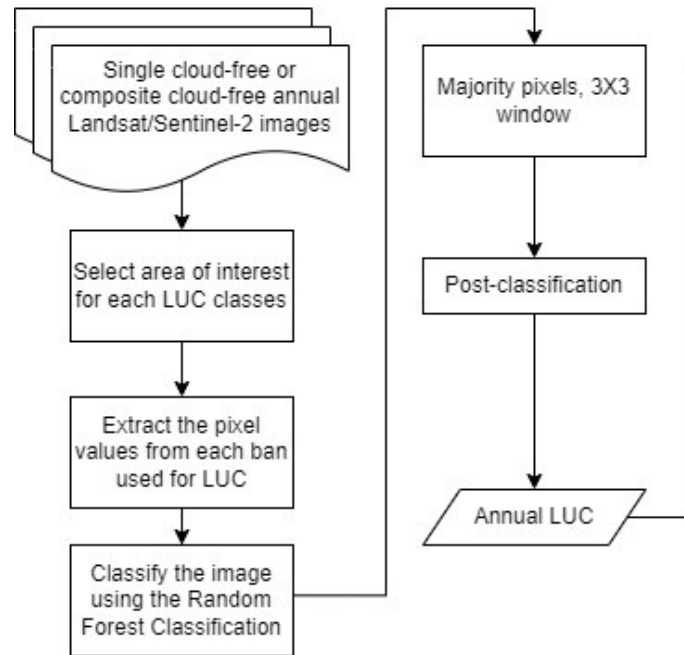
# Background

- Indonesia has some of the world's largest and most diversified tropical peatlands.
- Indonesia actively preserves and restores these unique ecosystems.
- Threats to tropical peatland forests
- Understanding these challenges and forest recovery capability is crucial to sustainable ecosystem management.

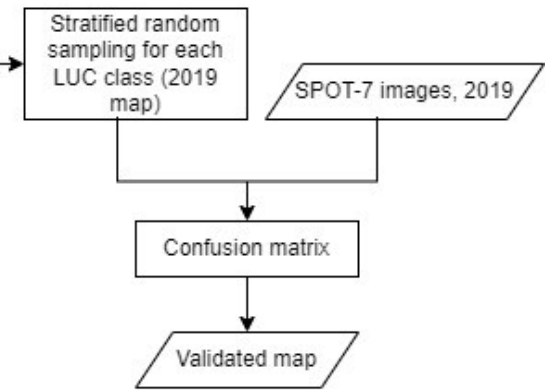
# Methods



## Derive the Land Use/Cover (LUC) maps



## Accuracy assessment



## Approach

Vetrita, Y. et al (manuscript prepared)  
See also: Vetrita, Y., and M.A. Cochrane (2021), <https://doi.org/10.3334/ORNLDAAC/1838>

# Results

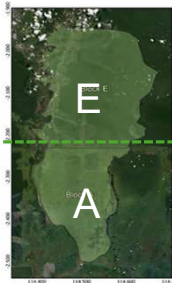
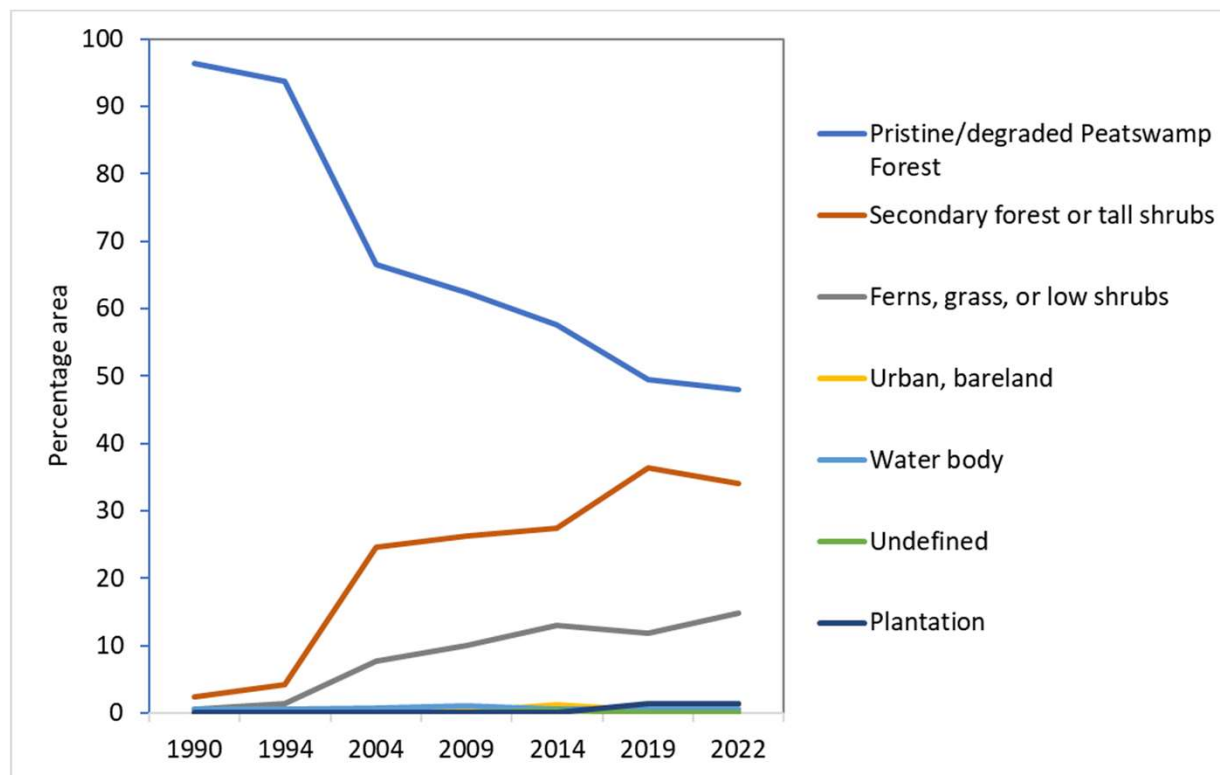
# Accuracy assessment

| Class                              | Producer's accuracy | User's accuracy |
|------------------------------------|---------------------|-----------------|
| Pristine/degraded Peatswamp Forest | 0.98                | 0.95            |
| Secondary forest or tall shrubs    | 0.73                | 0.76            |
| Ferns, grass, or low shrubs        | 0.76                | 0.81            |
| Urban, bareland                    | 0.88                | 0.78            |
| Water body                         | 0.99                | 0.99            |
| Plantation                         | 0.99                | 0.99            |
| Overall accuracy                   |                     | 0.88            |

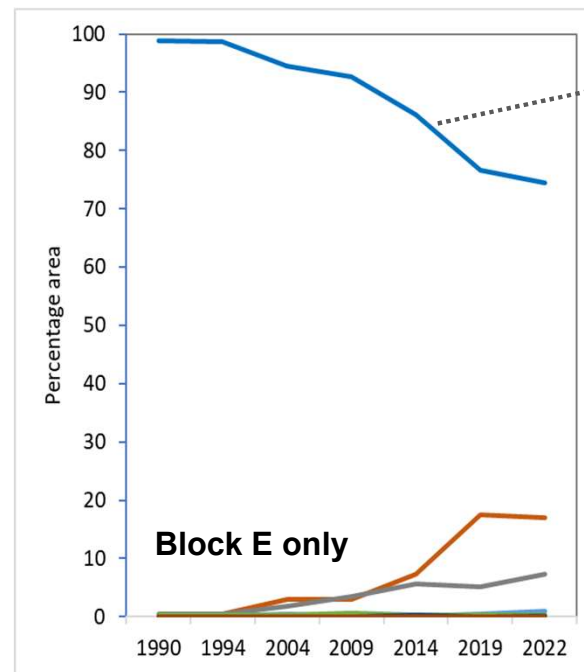
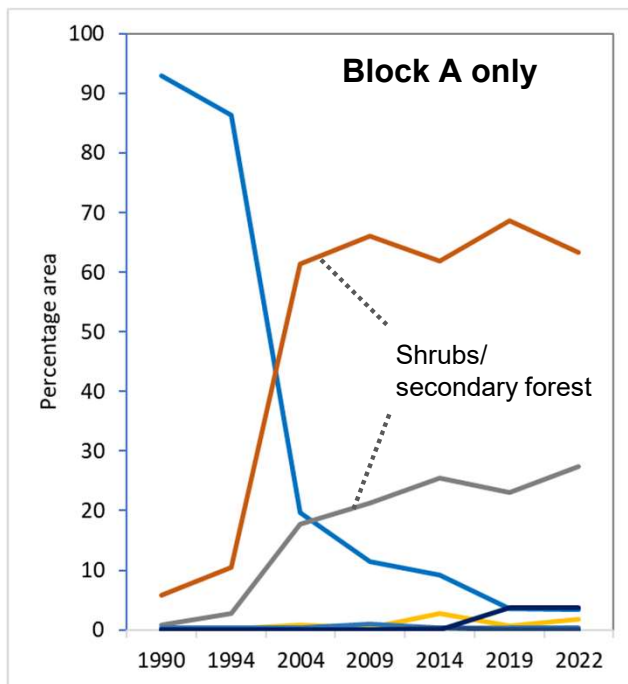
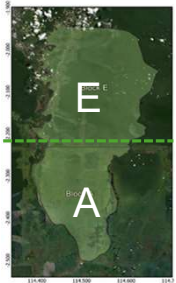
## Limitation

- Cloud cover
- Seasonal flooded areas (pixel selected during wet season, can be classified as peatswamp forest)
  - using temporal data and visual inspection
- Mining (sand/bareland) classified as cloud: visually corrected

# Forest change into shrubs within the last three decades



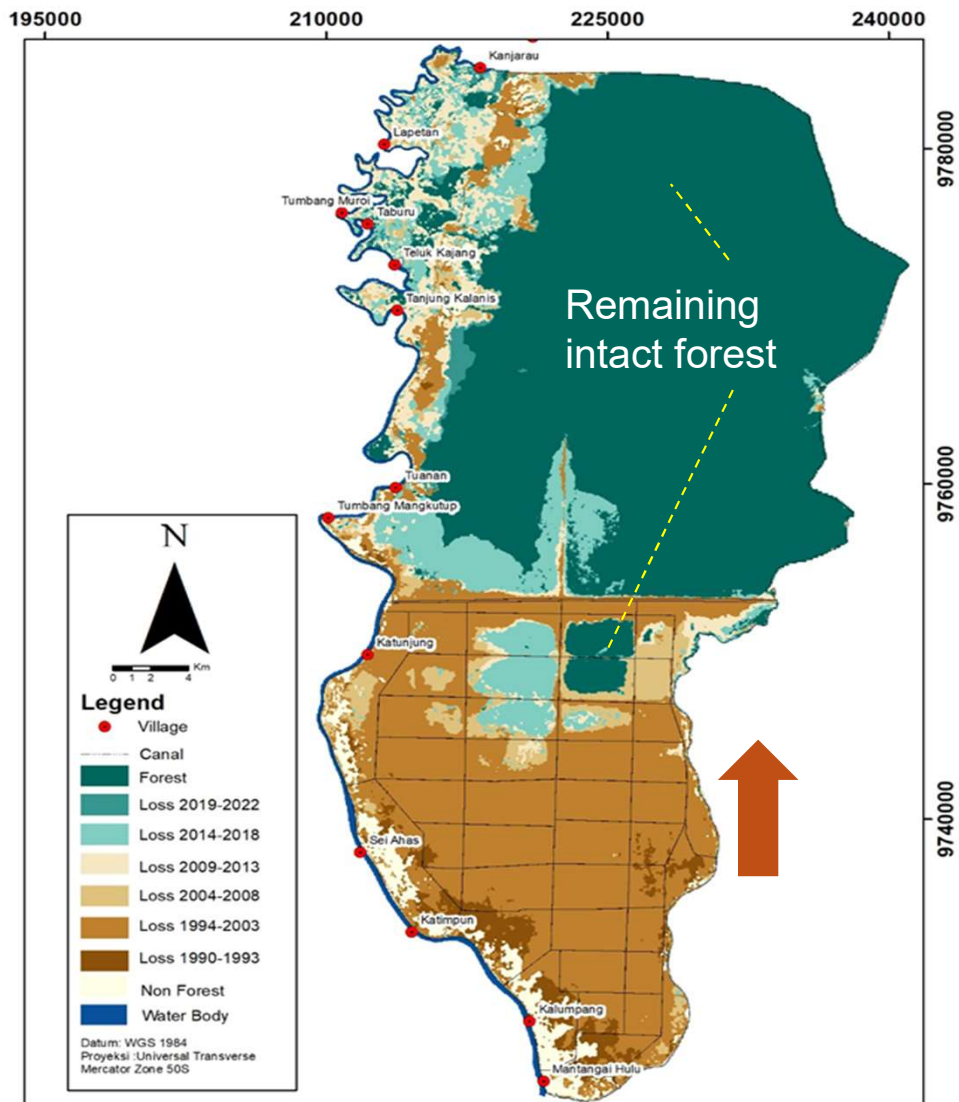
# Forest change into shrubs within the last three decades



Forest

- Pristine/degraded Peatswamp Forest
- Secondary forest or tall shrubs
- Ferns, grass, or low shrubs
- Urban, bareland
- Water body
- Undefined
- Plantation



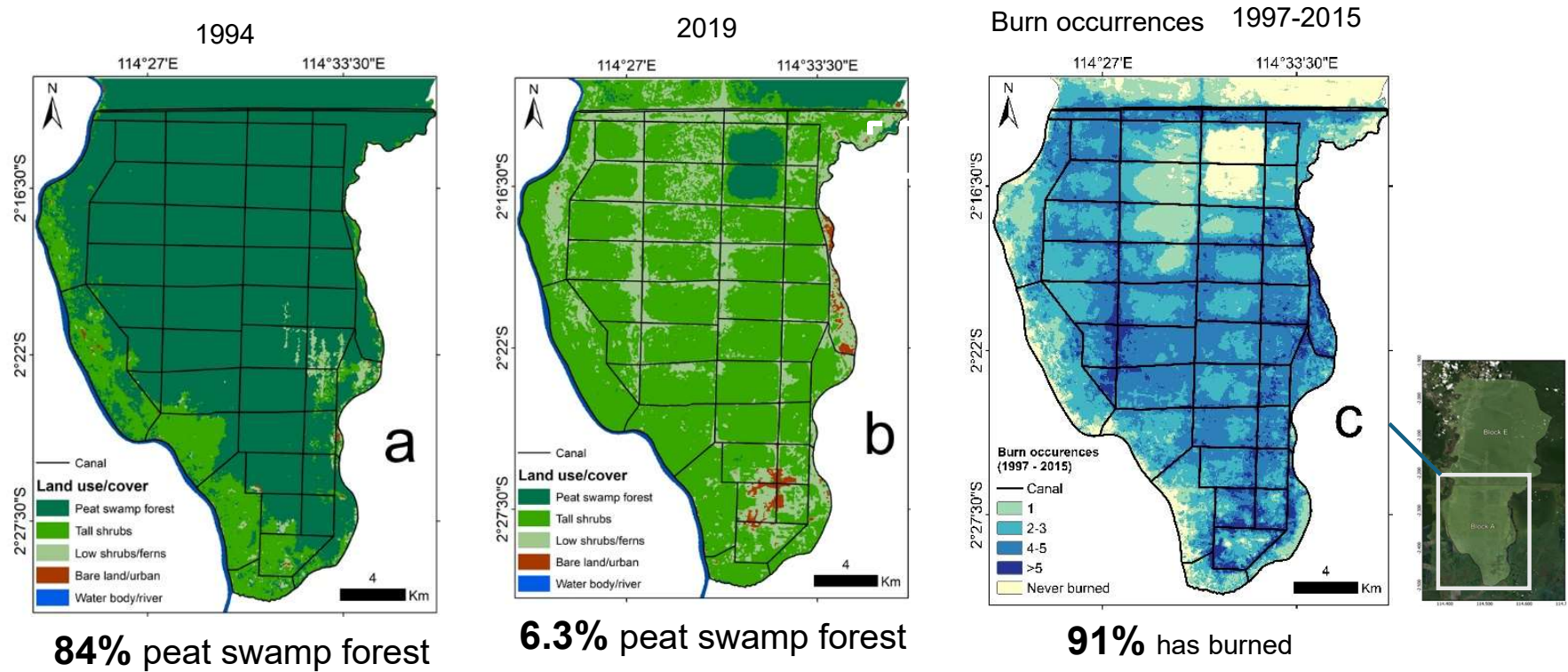


## Forest loss over time

- Forest loss gradually since 1990
- Starting from the southern part of site
- Now threatening the remaining intact forest



# Fire has become the biggest threat to keep the forest



**84%** peat swamp forest

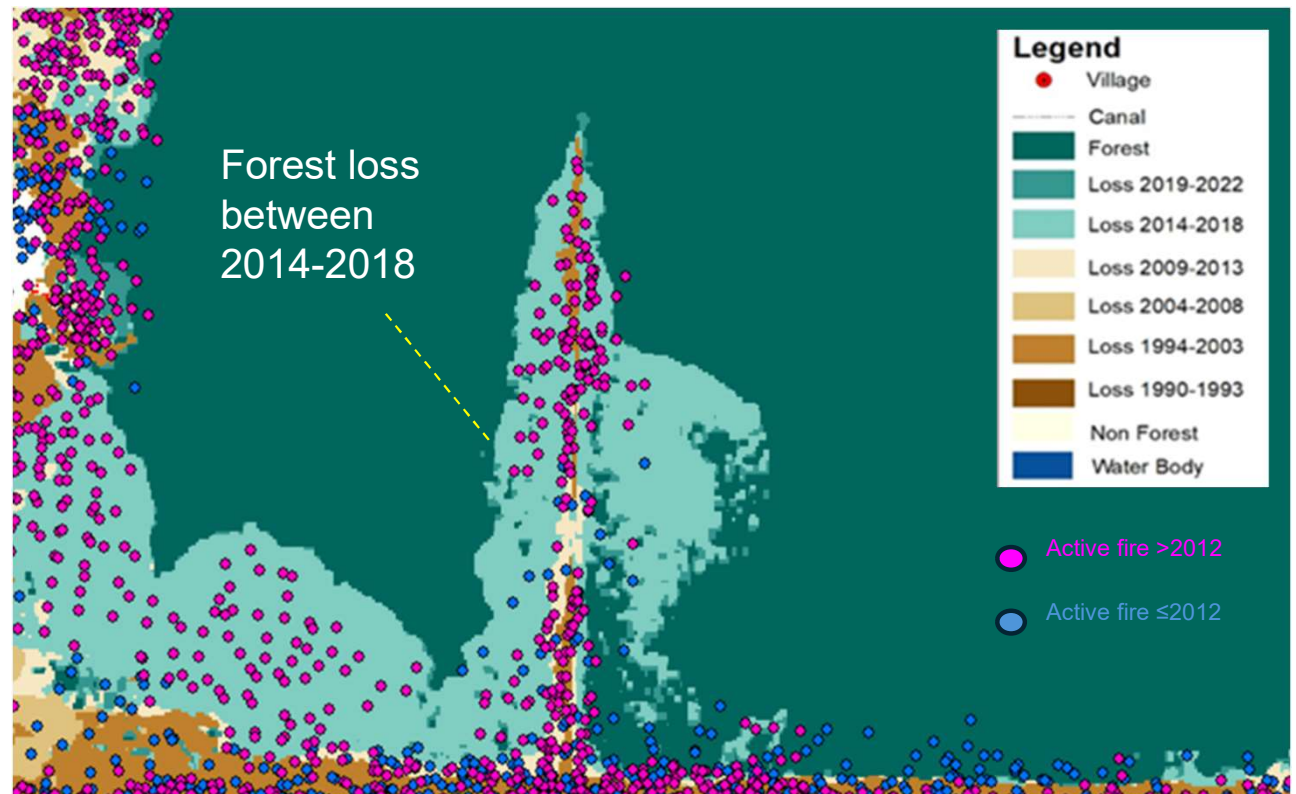
**6.3%** peat swamp forest

**91%** has burned

Sources: Vetrina, Y., and M.A. Cochrane (2019), <https://doi.org/10.3334/ORNLDAAAC/1708>  
 Vetrina and MA Cochrane (2020), <https://doi.org/10.3334/ORNLDAAAC/1838>

# Fires affect the edge of forest

Opening the forest with fires causes the forest's loss further away from the forest edge.





## Conclusion

- Fire has become the biggest threat to keep the peatland forest
- Forest change into shrubs within the last three decades
- Opening the forest with fires causes the forest's loss further away from the forest edge.
- Understanding these threats and the capacity for forest recovery will be key to ensuring the successful sustainable management of these ecosystems

# Acknowledgment

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