

# MAMA-FOREST

## MANAGING MANGROVE FORESTS WITH OPTICAL AND RADAR ENVIRONMENTAL SATELLITES

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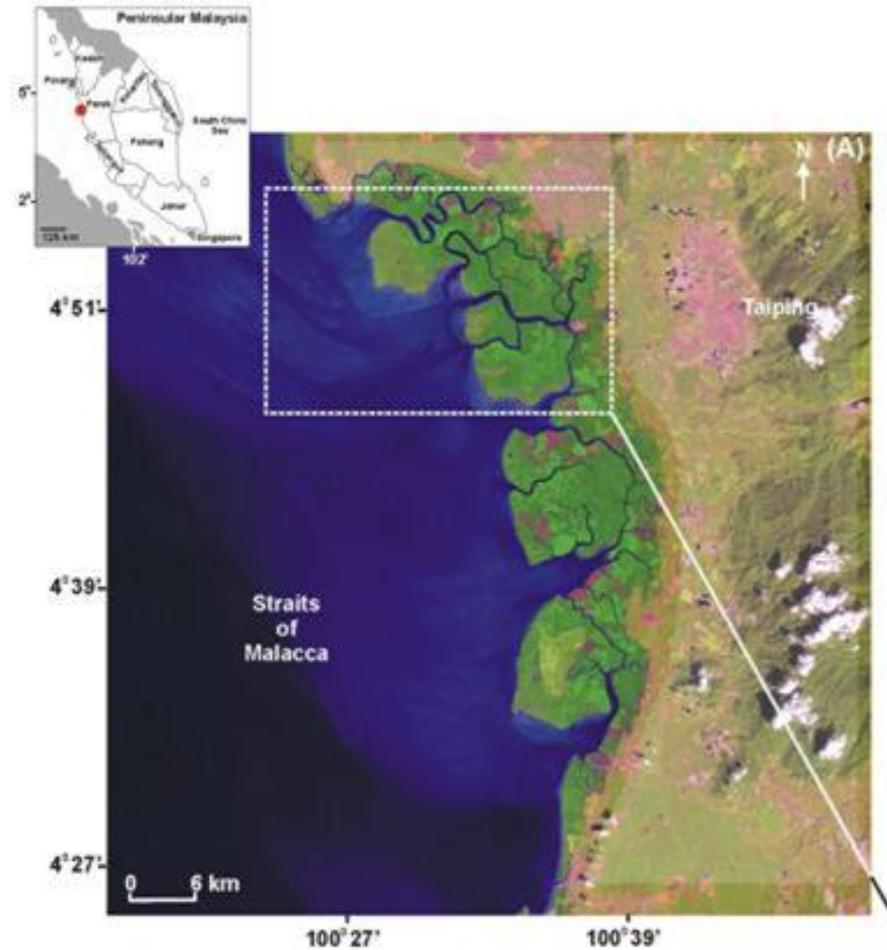
Universiti Malaysia Terengganu

# THE MATANG MANGROVE FOREST RESERVE, MALAYSIA

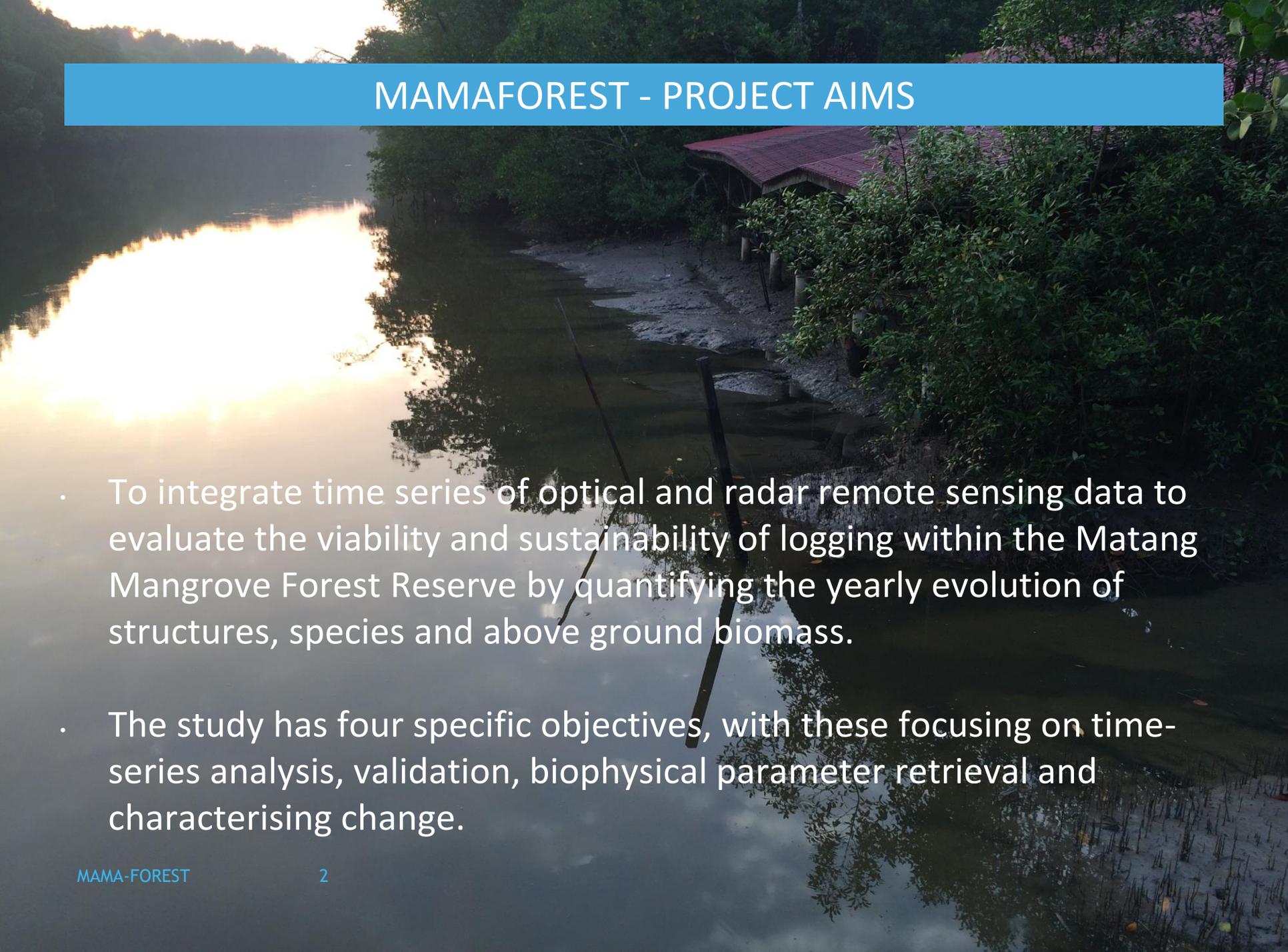
Silviculturally managed for charcoal and pole production with a 30 year rotation cycle

One of the oldest managed mangrove forests in the world where logging is regarded as sustainable

Increasing requirements for charcoal and timber, which might have an impact on productivity



Goessens et al. (2014) *PLoS ONE*



## MAMAFORREST - PROJECT AIMS

- To integrate time series of optical and radar remote sensing data to evaluate the viability and sustainability of logging within the Matang Mangrove Forest Reserve by quantifying the yearly evolution of structures, species and above ground biomass.
- The study has four specific objectives, with these focusing on time-series analysis, validation, biophysical parameter retrieval and characterising change.

# FIELD WORK 2016

## Field-work summer 2016

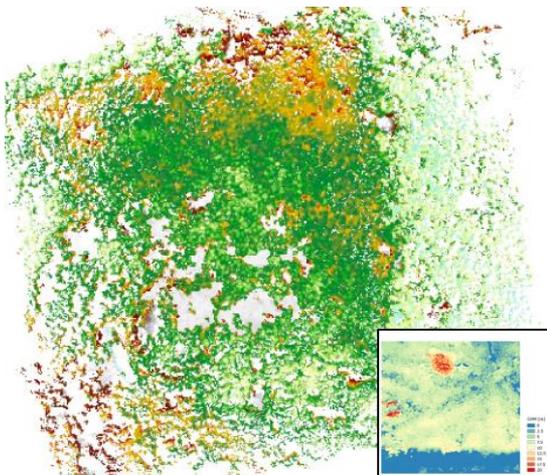


# FIELD, AIRBORNE AND SPACEBORNE DATASETS

Phantom-3 Go Pro Orthomosaic



Canopy Height Model



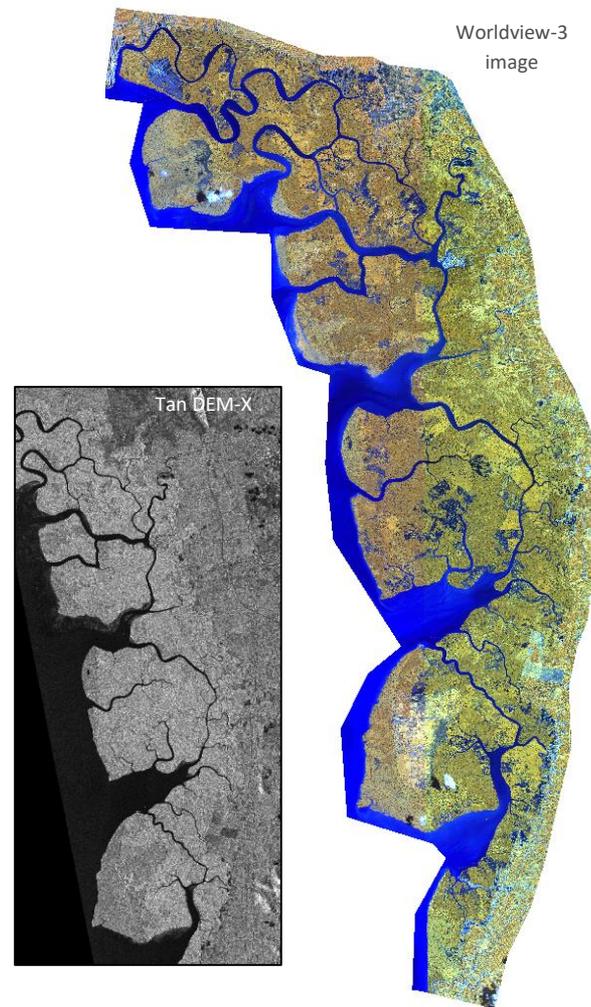
TanDEM-X SAR Image



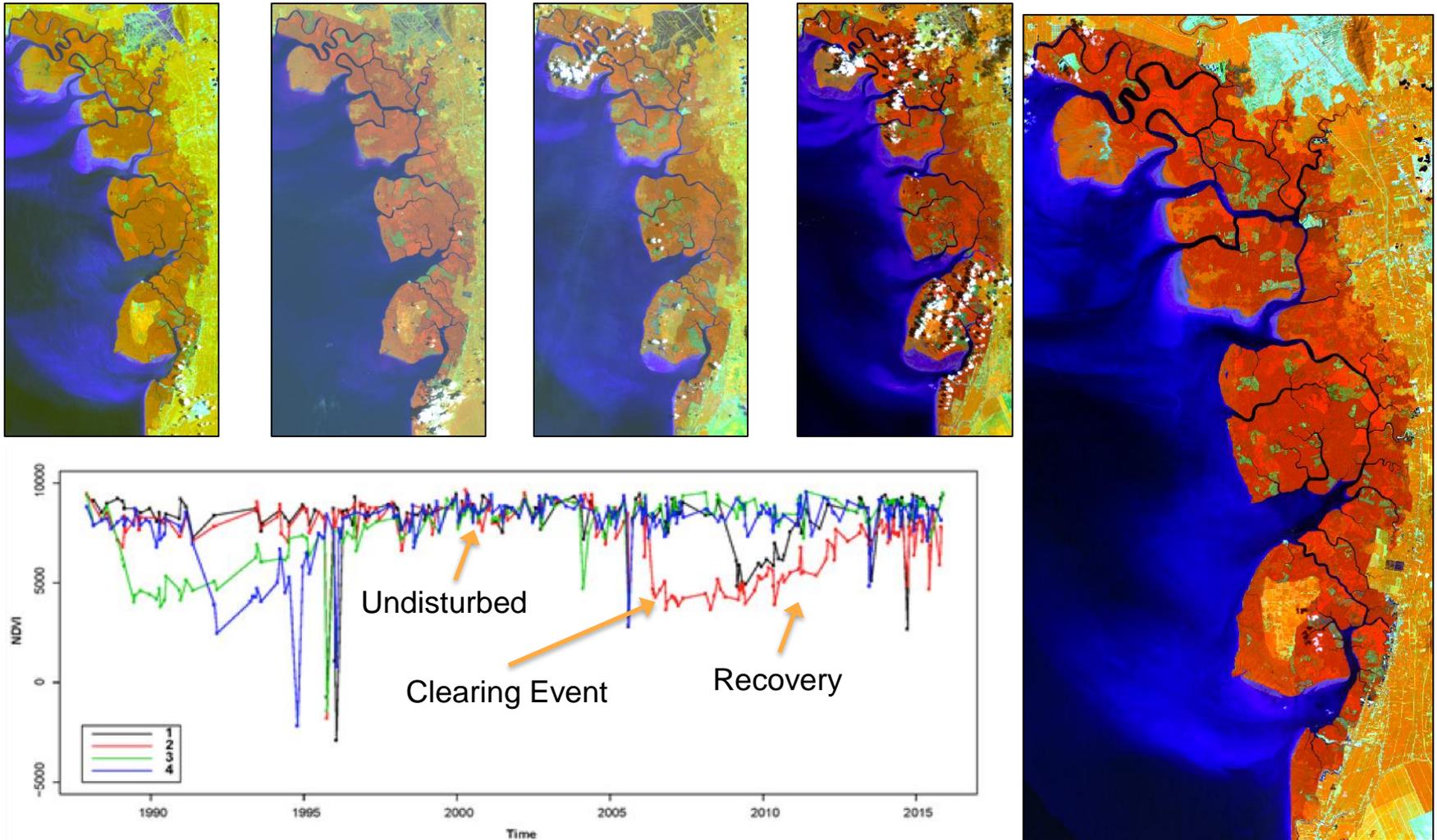
Worldview-3 image



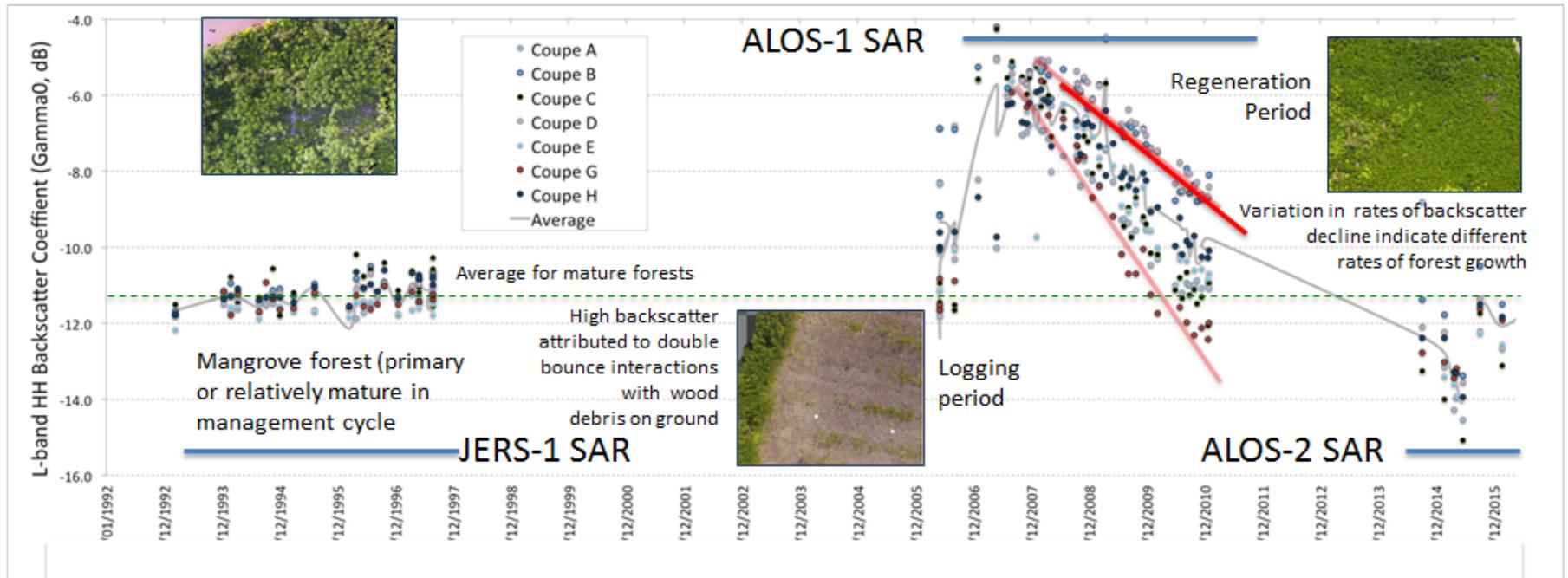
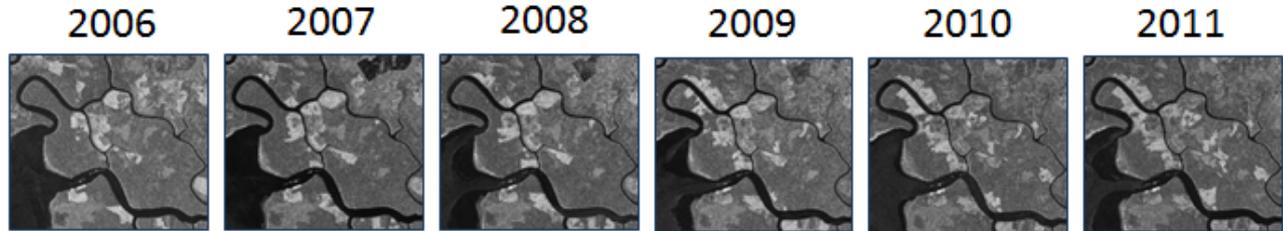
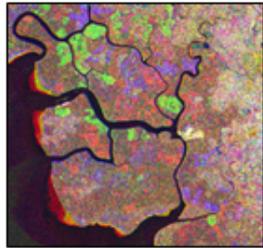
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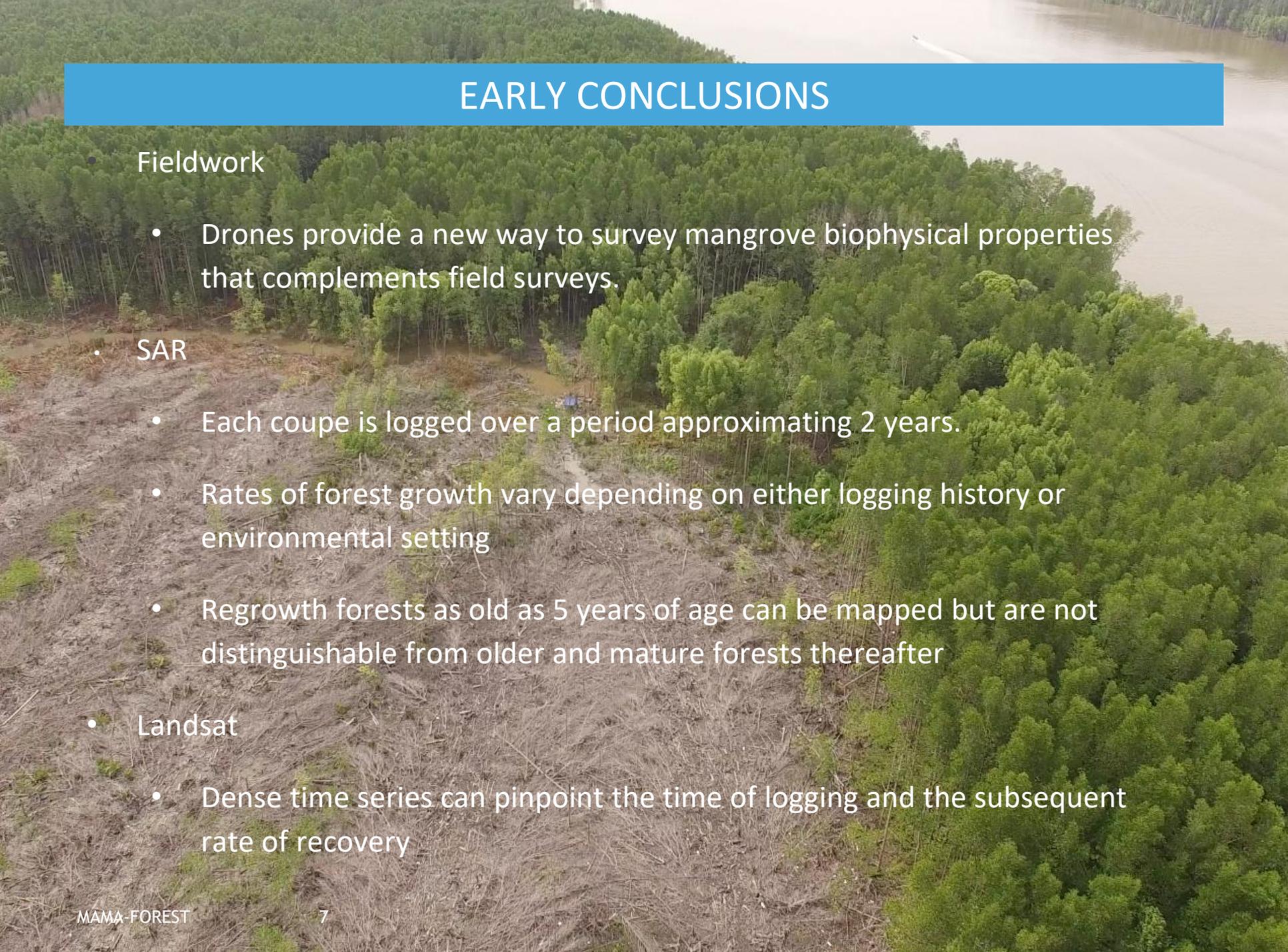


# TIME-SERIES ANALYSIS OF LANDSAT SENSOR DATA (1985-2016)



# TEMPORAL TRAJECTORIES OF L-BAND RADAR (HH)





# EARLY CONCLUSIONS

- Fieldwork
  - Drones provide a new way to survey mangrove biophysical properties that complements field surveys.
- SAR
  - Each coupe is logged over a period approximating 2 years.
  - Rates of forest growth vary depending on either logging history or environmental setting
  - Regrowth forests as old as 5 years of age can be mapped but are not distinguishable from older and mature forests thereafter
- Landsat
  - Dense time series can pinpoint the time of logging and the subsequent rate of recovery

## FUTURE WORK

- Acquire more drone imagery and field work data
  - December 2016/January 2017
- Generation of logging sequences and forest age class maps and assess sustainability of carbon stocks, production and structure integrity.
- Comparison of Shuttle Radar Topographic Mission (SRTM) and Tandem-X to determine variability in recovery of height as a function of logging history and site.
- Wide dissemination
  - Workshops with local stakeholders