



Global Observation of Forest and Land Cover Dynamics



# Monitoring forest degradation

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GOFC-GOLD side event at CIFOR forest day: 8.Dec.2007, 12 pm

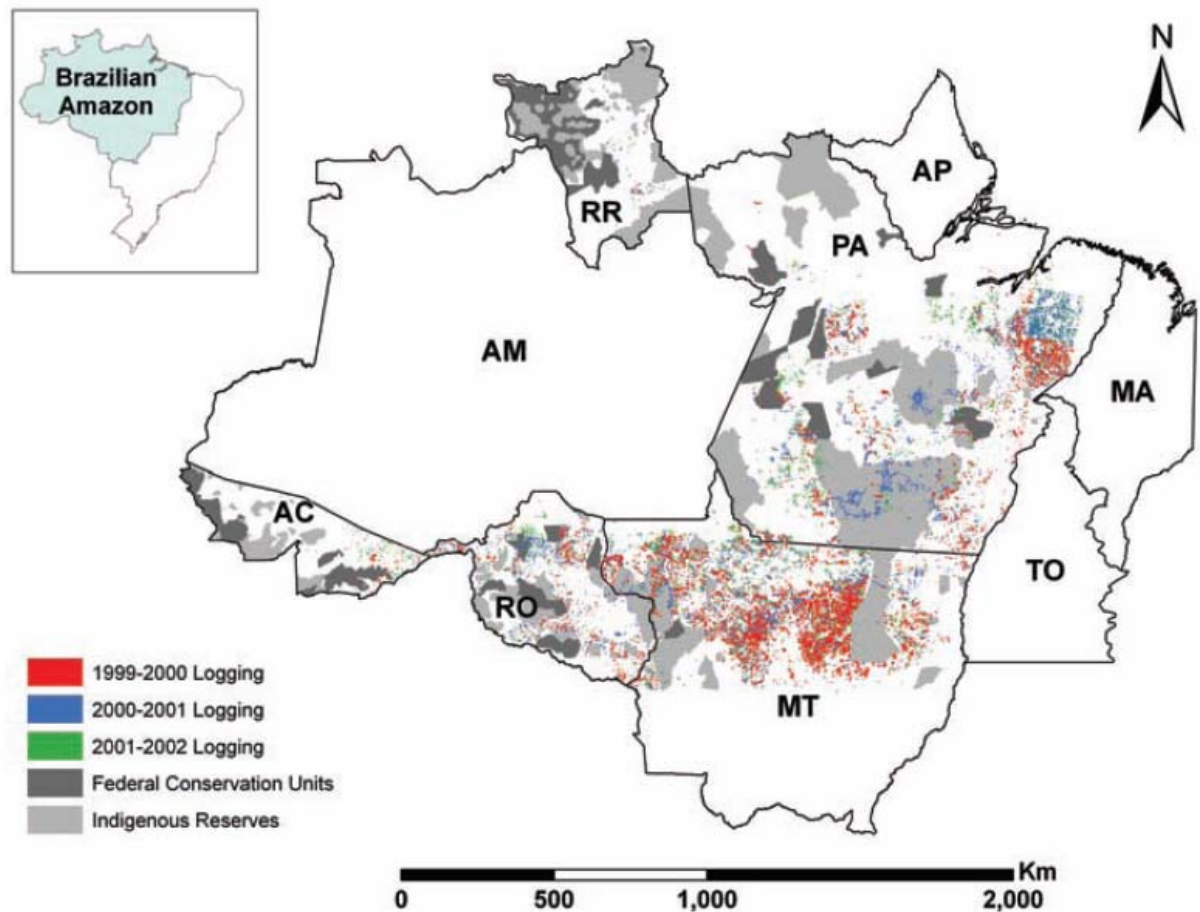
# Background

Monitoring forest degradation has never been the target of one operational forest area monitoring system, but recently this issue has been investigated in several research activities and some of them have obtained significant results:

## Selective Logging in the Brazilian Amazon

Gregory P. Asner,<sup>1\*</sup> David E. Knapp,<sup>1</sup> Eben N. Broadbent,<sup>1</sup>  
Paulo J. C. Oliveira,<sup>1</sup> Michael Keller,<sup>2,3</sup> Jose N. Silva<sup>4</sup>

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# Degradation definition

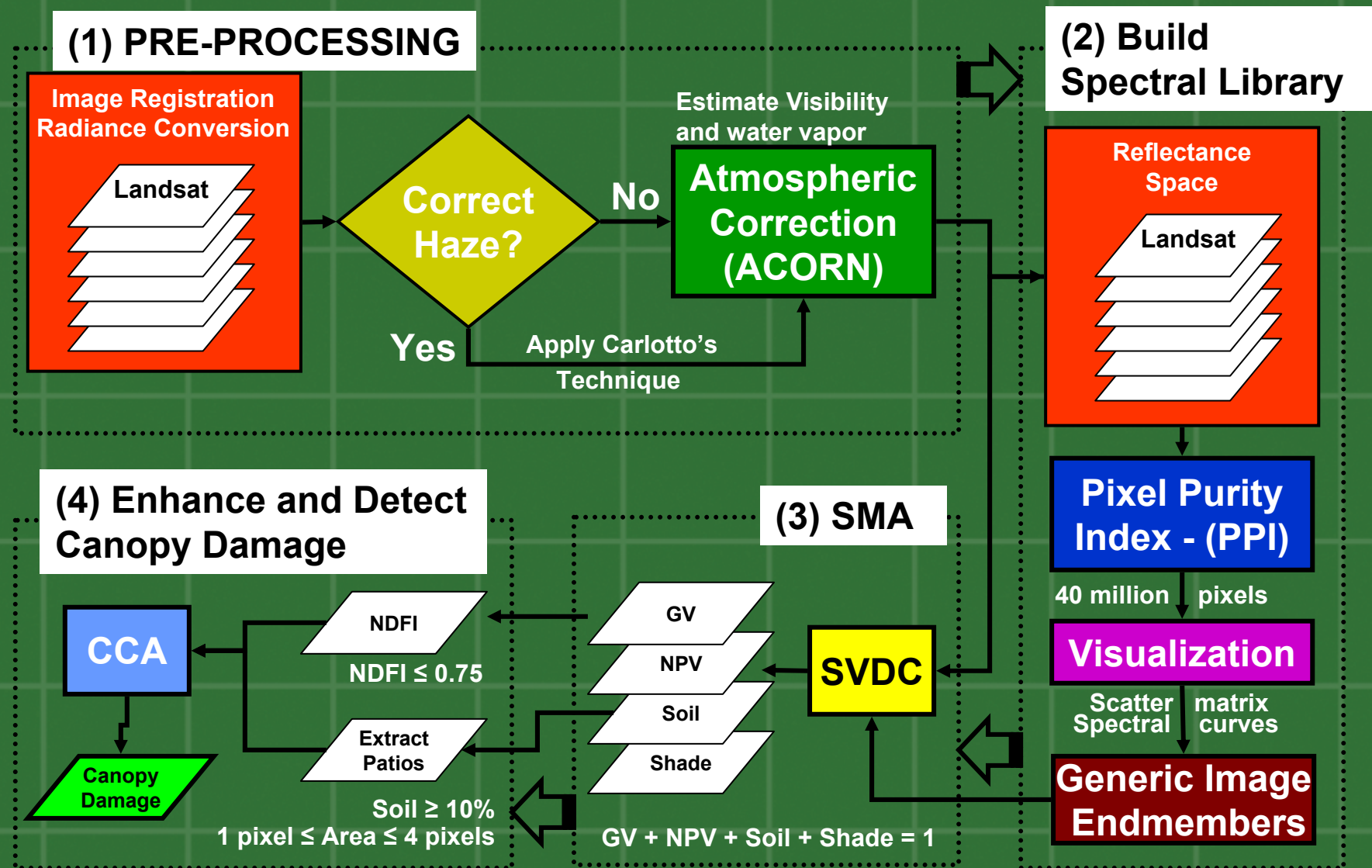
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**“A direct, human-induced, long-term loss (persisting for X years or more) or at least Y% of forest carbon stocks [and forest values] since time T and not qualifying as deforestation”.**

To assess and report carbon emission from forest degradation it is necessary to know the degraded forest area extension and the carbon stocks changes per unit area. While current remote sensing capability could not allow estimation of carbon stock changes, here we present two approach to assess degraded forest area:

- the direct approach
- the indirect approach

# Direct approach: Image Processing Steps



# Mapping Selective Logging with Landsat Image (Souza Jr. et al., 2005)

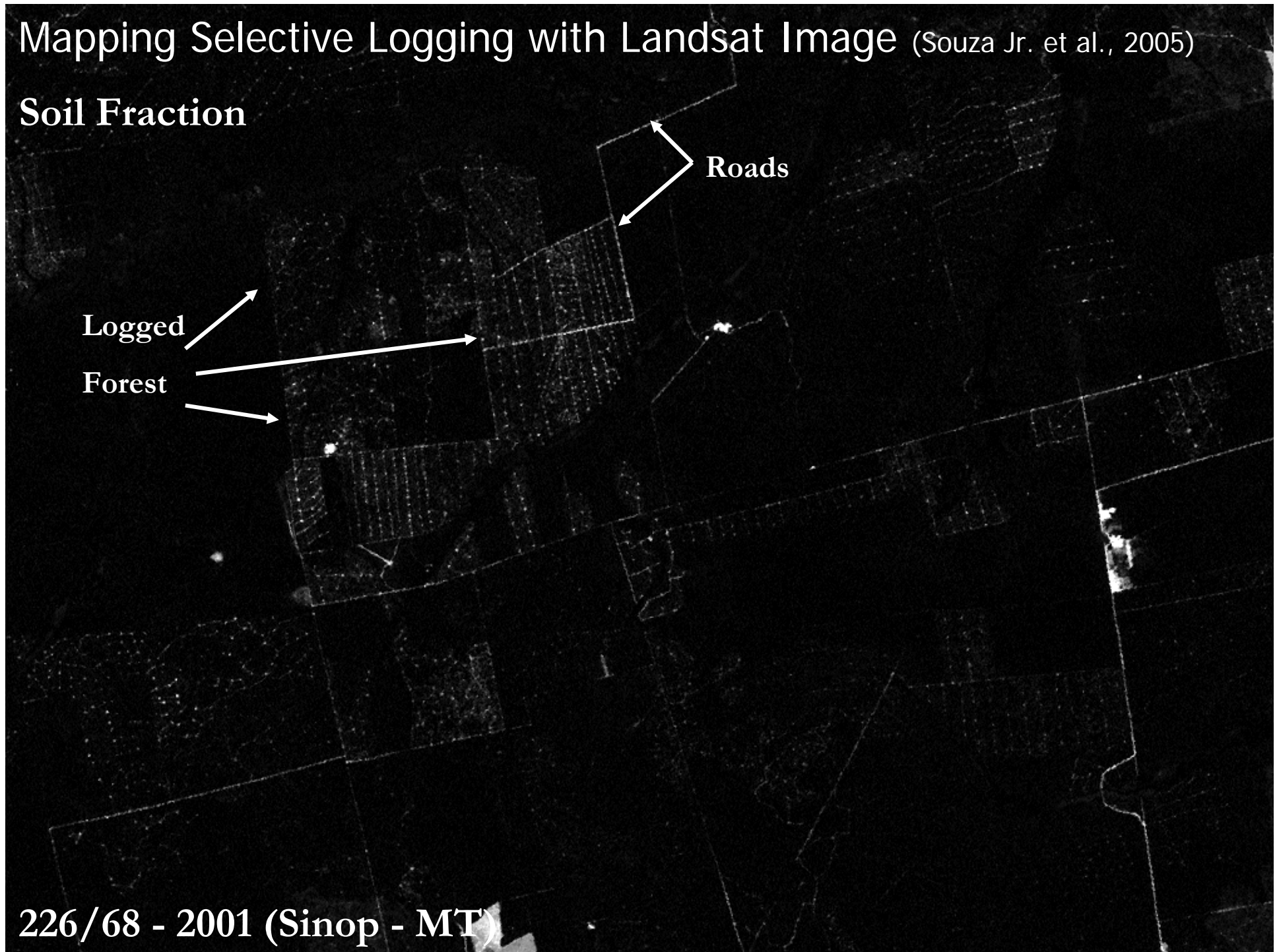
Soil Fraction

Logged

Forest

Roads

226/68 - 2001 (Sinop - MT)





# Mapping Selective Logging with Landsat Image (Souza Jr. et al., 2005)

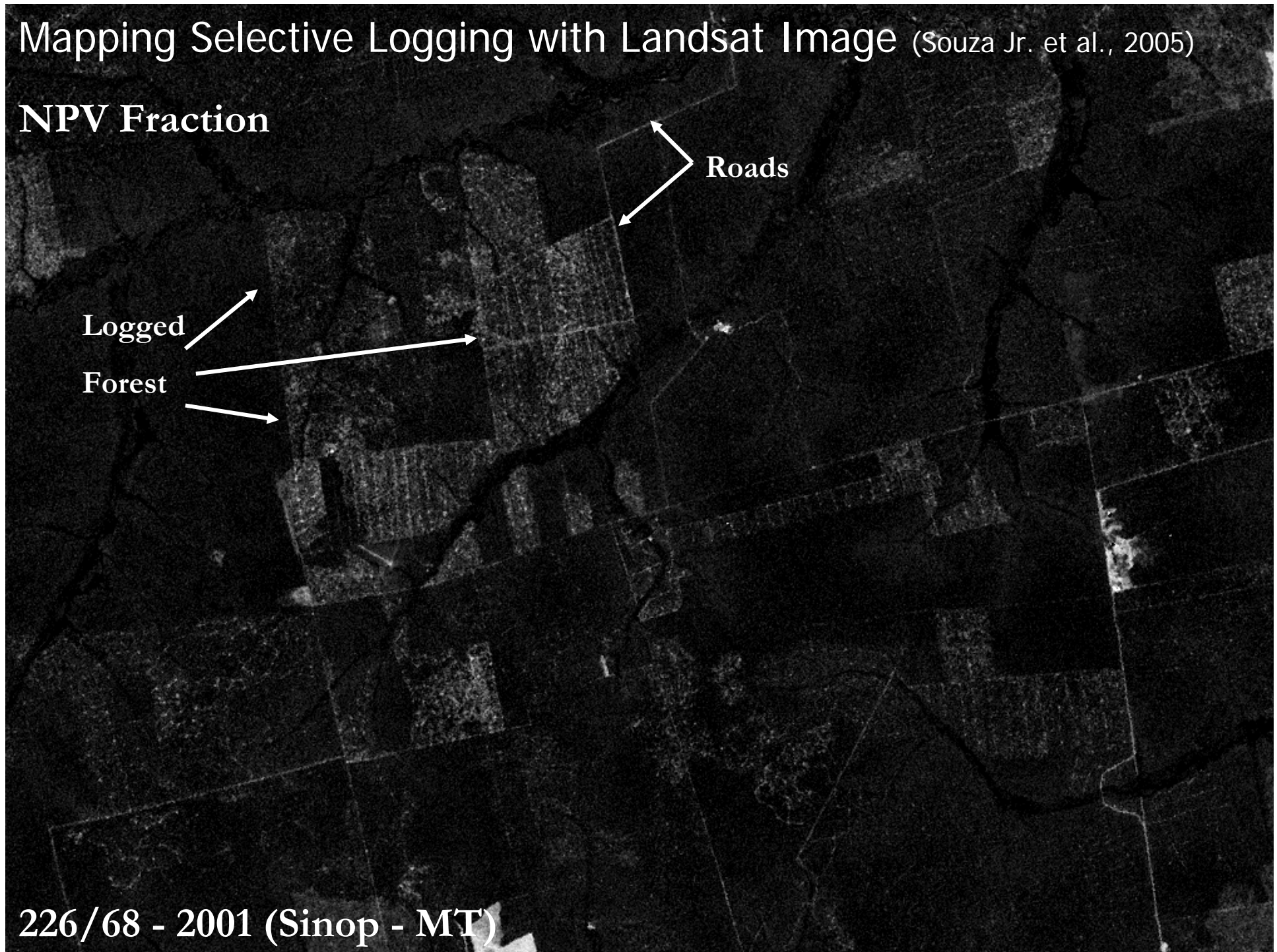
NPV Fraction

Logged

Forest

Roads

226/68 - 2001 (Sinop - MT)



# Mapping Selective Logging with Landsat Image (Souza Jr. et al., 2005)

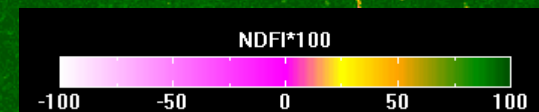
**NDFI (Normalized Difference Fraction Index)**

Logged

Forest

Roads

226/68 - 2001 (Sinop - MT)

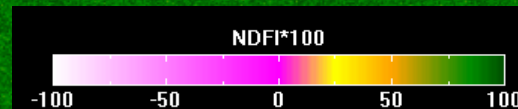




# Mapping Burned Forests with Landsat Image (Souza Jr. et al., 2005)

NDFI

226/68 - 2000 (Sinop - MT)

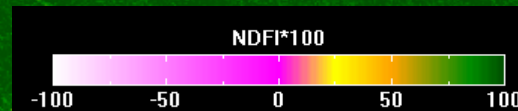




# Mapping Burned Forests with Landsat Image (Souza Jr. et al., 2005)

NDFI

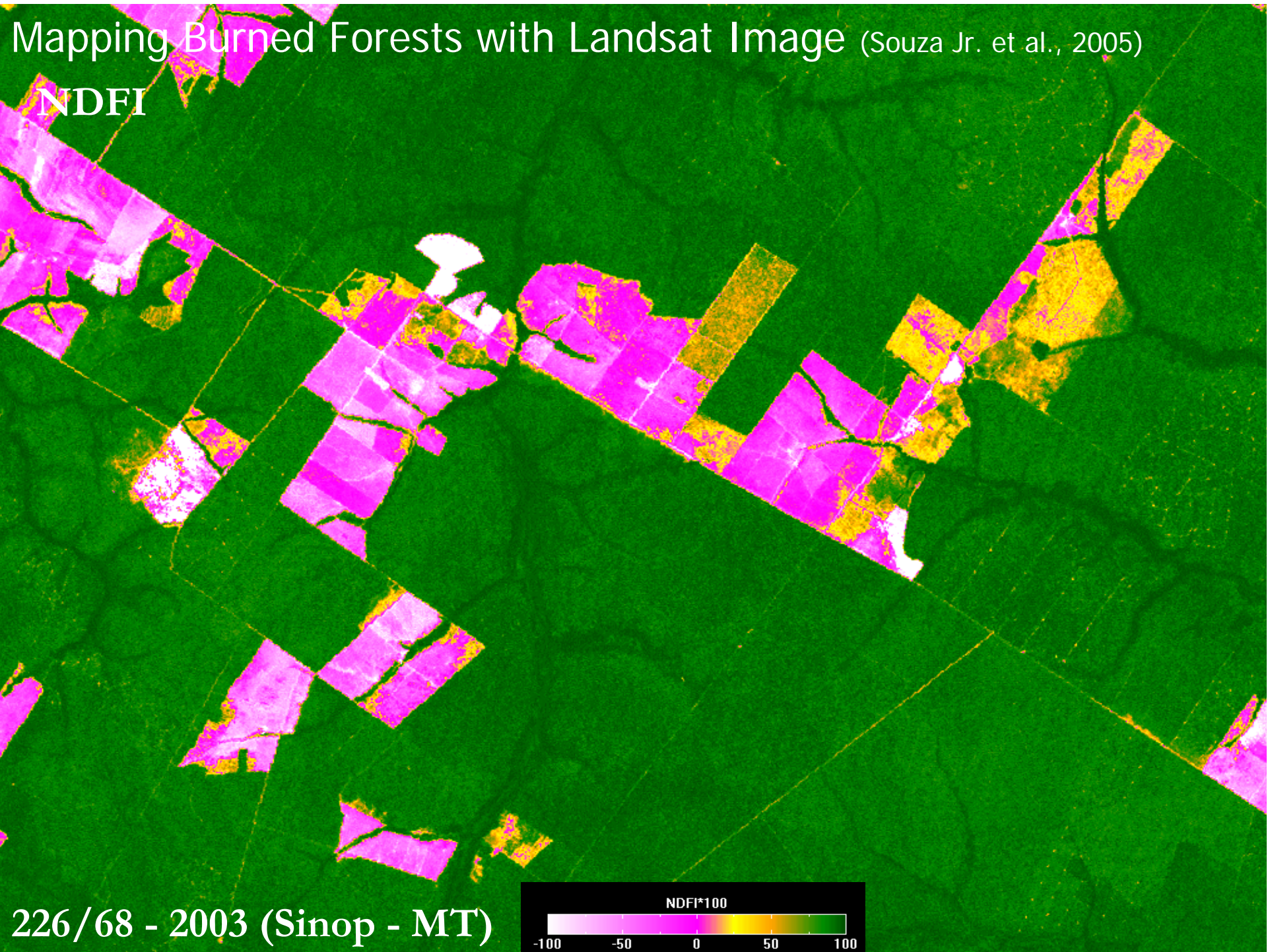
226/68 - 2001 (Sinop - MT)



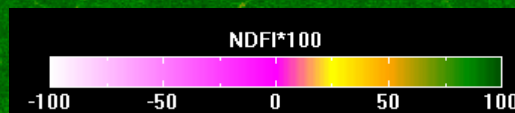


# Mapping Burned Forests with Landsat Image (Souza Jr. et al., 2005)

NDFI



226/68 - 2003 (Sinop - MT)





# Indirect approach: the origin



## The world's last intact forest landscapes

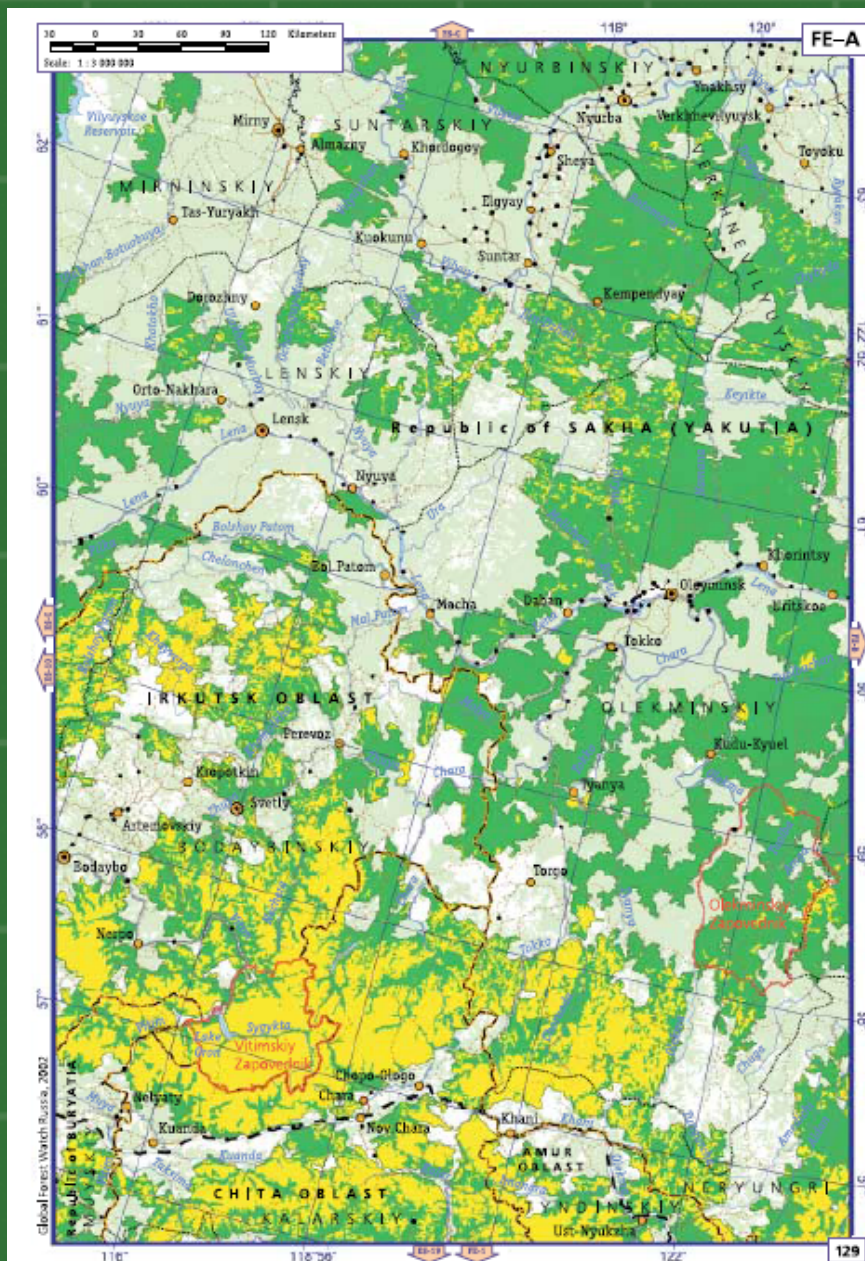
GREENPEACE



GOFC-GOLD

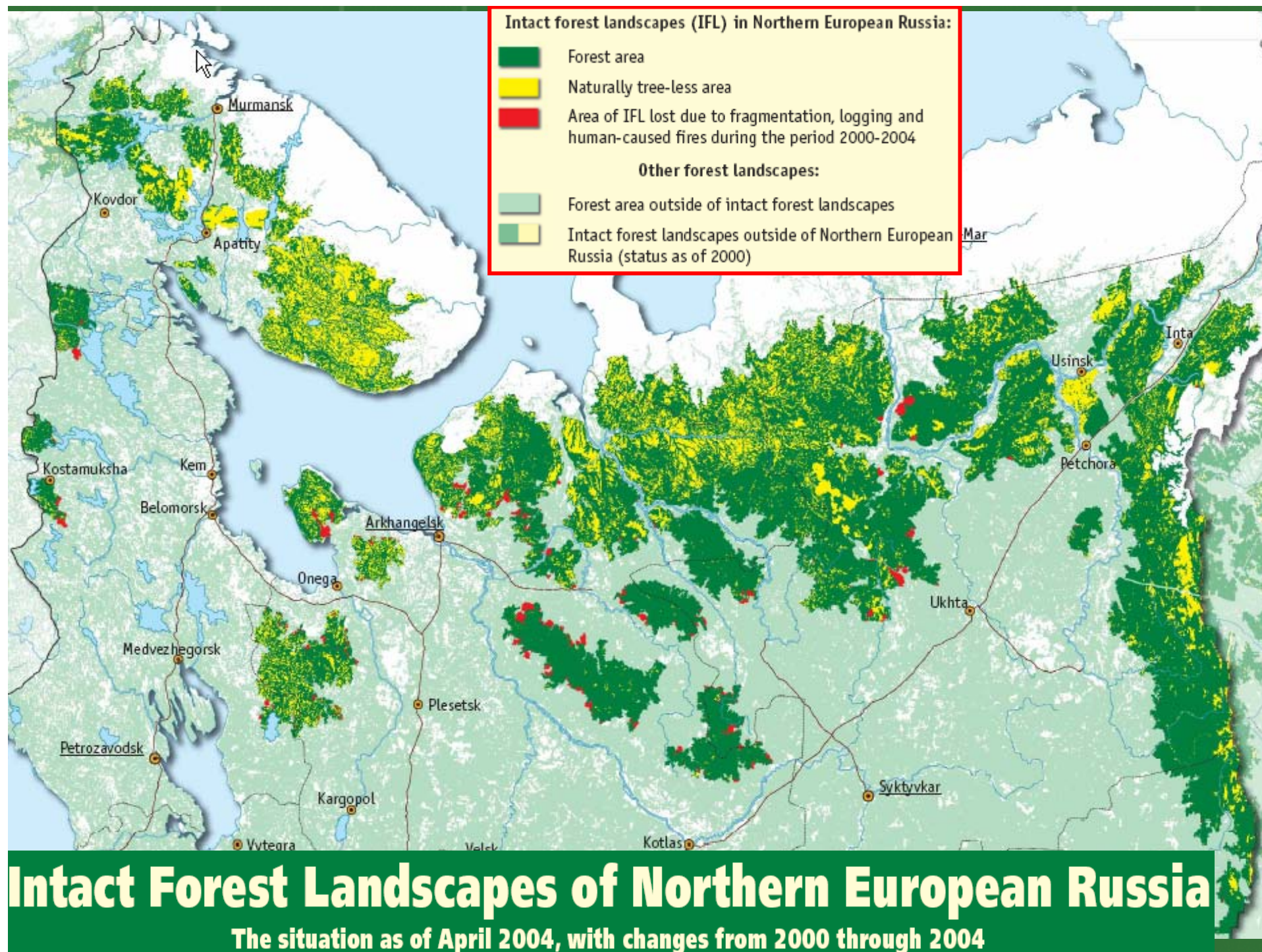


# Indirect approach: the origin



Detailed map have been delivered for all Russia

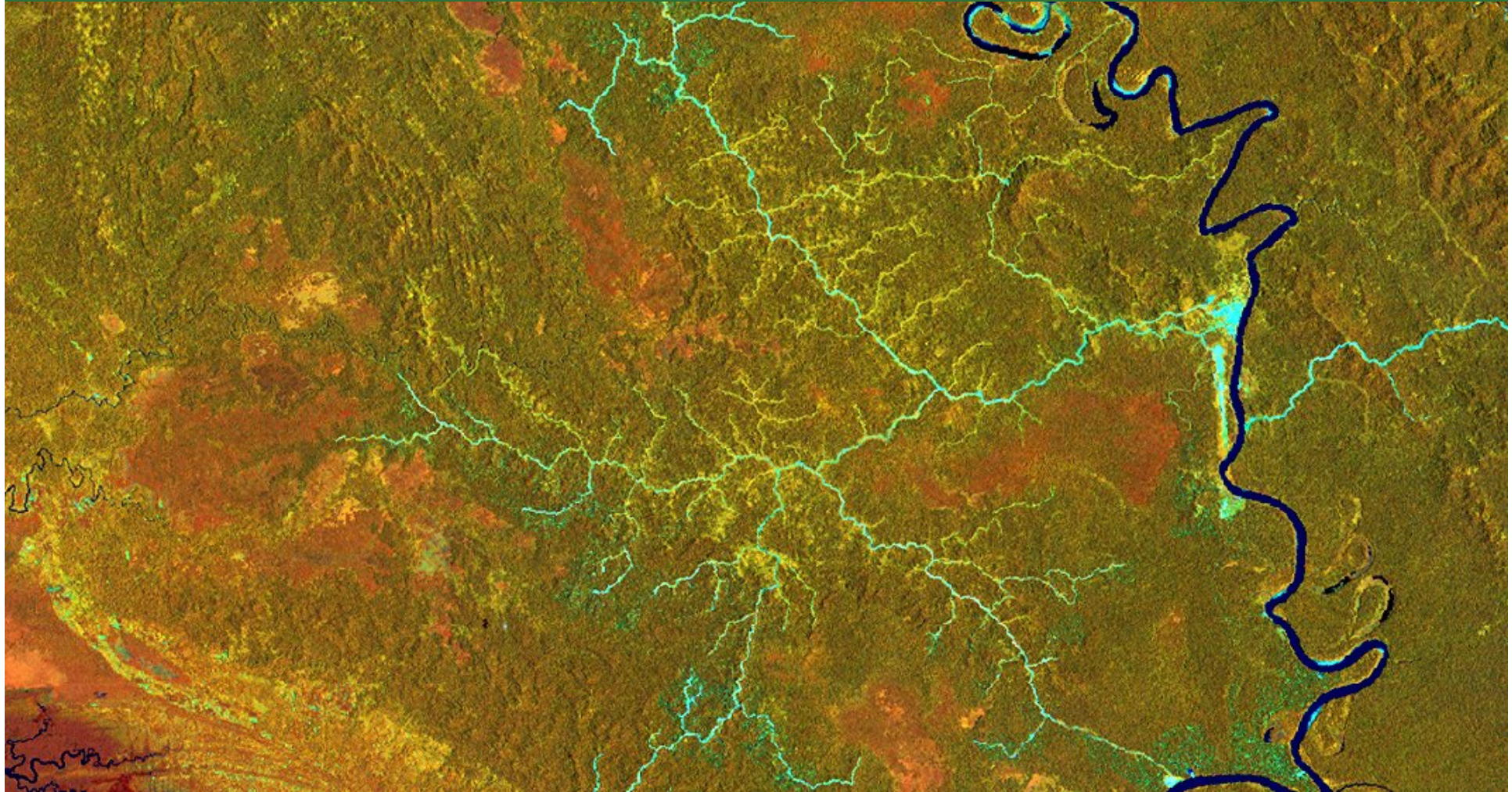






# Monitoring degradation in PNG – Indirect approach

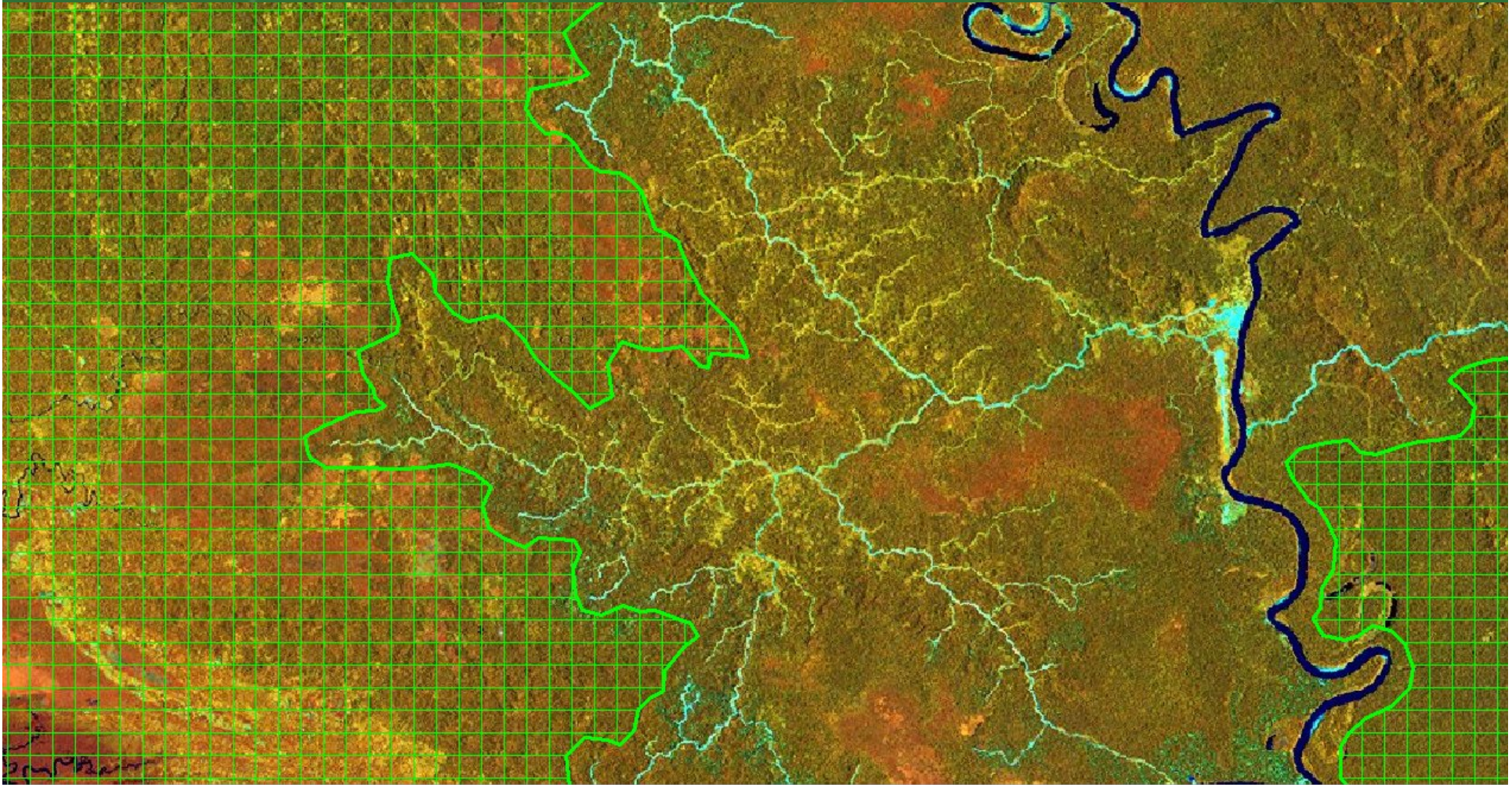
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# Monitoring degradation in PNG – Indirect approach

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## Indirect approach: intact forest definition

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The *intact* forest areas are defined according to parameters based on spatial criteria that could be applied objectively and systematically over all the Country territory. Each Country according to its specific national circumstance (e.g. forest practices) may develop its *intact forest* definition. Here we suggest an *intact forest* area definition based on the following six criteria:

- \* *situated within the forest land according to current UNFCCC definitions and with a 1 km buffer zone inside the forest area;*
- \* *larger than 1,000 hectares and with a smallest width of 1 kilometers;*
- \* *containing a contiguous mosaic of natural ecosystems;*
- \* *not fragmented by infrastructure (road, navigable river, pipeline, etc.);*
- \* *without signs of significant human transformation;*
- \* *without burnt lands and young tree sites adjacent to infrastructure objects.*



