

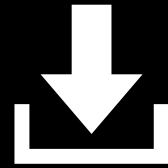


Inspired by satellite data

Baltic GIT 2023

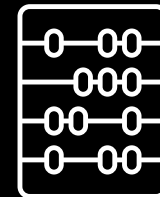
Triin Tajur

ESTHub



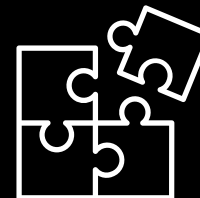
Satellite data portal

<https://ehdatahub.maaamet.ee/>



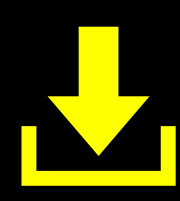
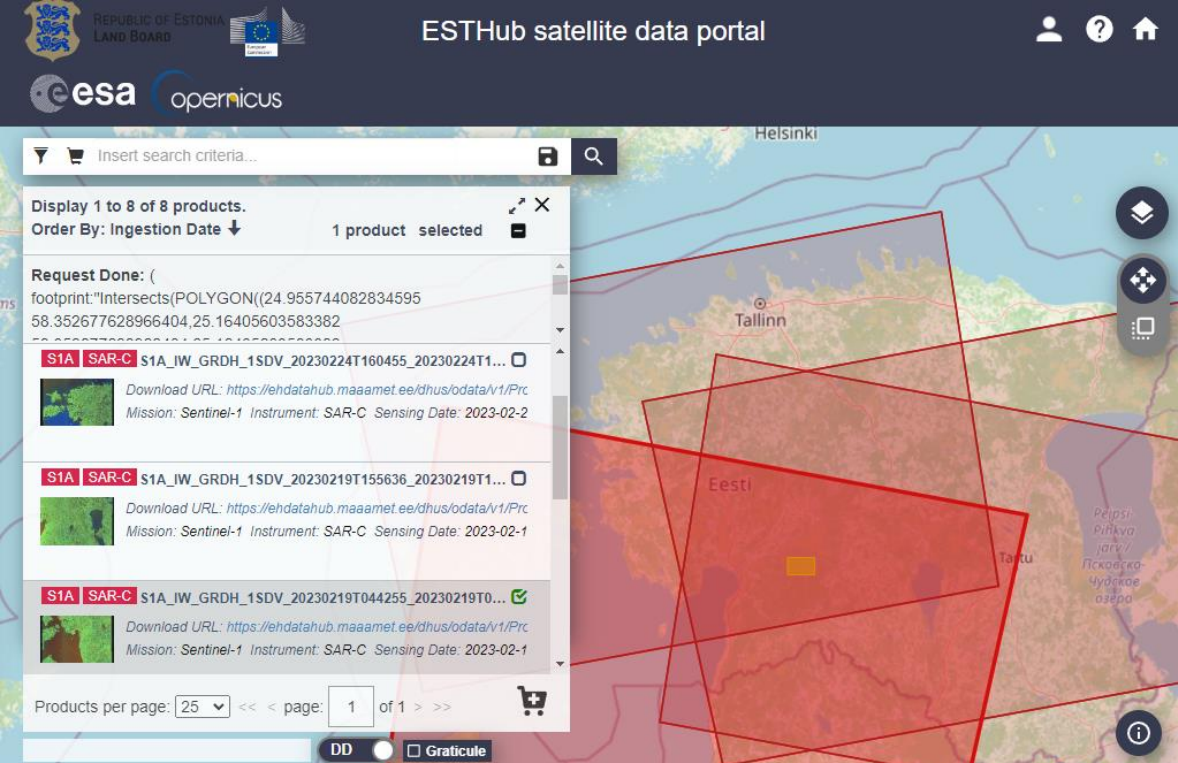
Satellite data processing

<https://ehcalvalus.maaamet.ee/>

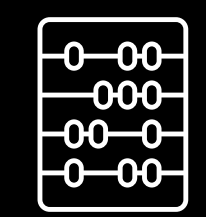


Satiladu

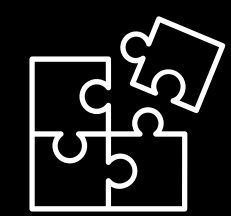
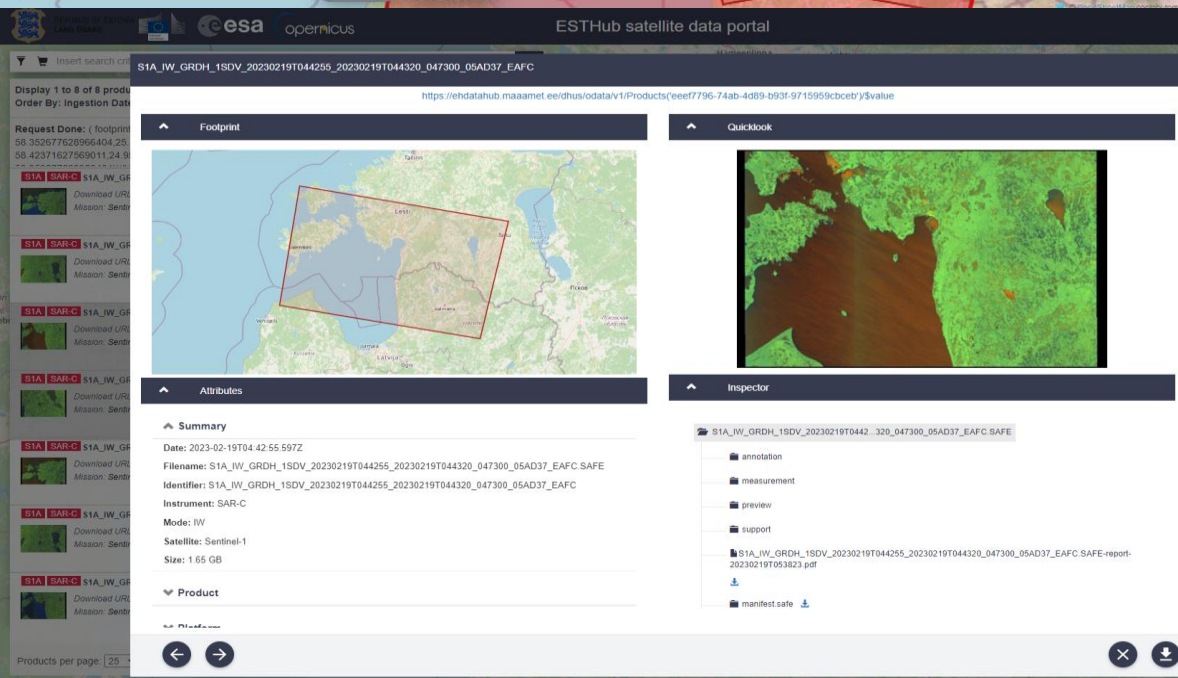
<https://satiladu.maaamet.ee/>



Satellite data portal
<https://ehdatahub.maaamet.ee/>



Satellite data processing
<https://ehcalvalus.maaamet.ee/>



Satiladu
<https://satiladu.maaamet.ee/>

REPUBLIC OF ESTONIA LAND BOARD **Processing Service** triin.tajur [HELP](#) [LOG OUT](#)

Order

- L2 Processing
- Match-up Analysis
- Regional Statistics
- L3 Processing

Management

- Regions
- Requests
- Productions

Links

Input File Set

Show predefined file sets
 Show my outputs and of other users

Sentinel-2 MSI L1C
 Sentinel-2 MSI L2
 Landsat 8 OLI and TIRS L1
 Sentinel-1 SLC
 Sentinel-1 GRD
 Sentinel-1 OCN
 Sentinel 3 OLCI EFR Level 1
 Sentinel 3 OLCI LFR

Name: **Sentinel-2 MSI L1C**
 Type: **S2_MSI_L1C**
 Start Date: **2015-07-01**
 End Date: **2022-12-31**
 Region name: **Estonia**
 Geo Inventory: **Yes**

Show Help

Temporal Filter

No filter

By date range

Start date:

End date:

By date list

days

Show Help

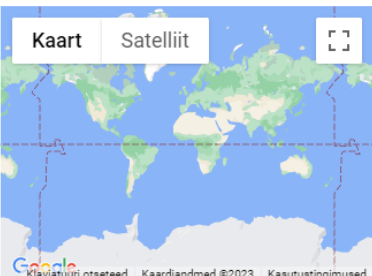
Spatial Filter

No filter (global) By region

EstHUB

training

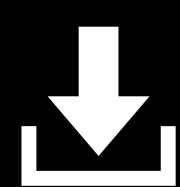
Kaart Satelliid



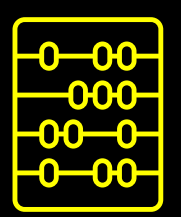
Add and manage user regions

Level-2 Processor

Level-2 Parameters



Satellite data portal
<https://ehdatahub.maaamet.ee/>



Satellite data processing
<https://ehcalvalus.maaamet.ee/>

REPUBLIC OF ESTONIA LAND BOARD **Processing Service** triin.tajur

Order

- L2 Processing
- Match-up Analysis
- Regional Statistics
- L3 Processing

Management

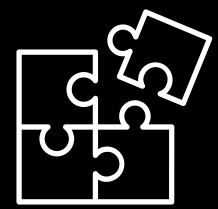
- Regions
- Requests
- Productions

<input type="checkbox"/>	Production	User	Processing Status	Processing Time	Staging Status
<input type="checkbox"/>	20230528082633_L2Plus_80f182dc8a417 Level 2 c2rcc-idepix-msi 2017-06-01 to 2017-06-01 (Paernu-Bay)	triin.tajur	COMPLETED		COMPLETED Edit

1-1 of 1

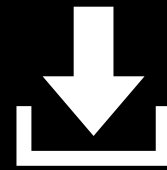
Delete Selected

Note: all generated data products may be viewed and further processed with [ESA SNAP](#)



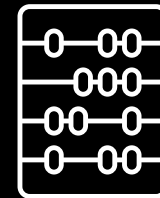
Satiladu
<https://satiladu.maaamet.ee/>

ESTHub



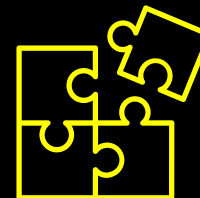
Satellite data portal

<https://ehdatahub.maaamet.ee/>



Satellite data processing

<https://ehcalvalus.maaamet.ee/>



Satiladu

<https://satiladu.maaamet.ee/>



Data

Sentinel-2

Filter

NGR

Start date

2023-05-22

End date

2023-06-05

Search



04.06.2023 Sentinel-2 NGR

Preview

QGIS

WMS

<https://teenus.maaamet.ee/ows/wms-s>



03.06.2023 Sentinel-2 NGR

Preview

QGIS

WMS

<https://teenus.maaamet.ee/ows/wms-s>



zoom in



zoom out



north up / Shift + Alt + left mouseclick



navigate to previous view



navigate to next view

1:1

resolution / 1 screen pixel = 10 meters



PNG

save image in PNG format

GIS

save image with georeference (PNG + PGW)
enable download of multiple files in your browser



Contact: esthub@maaamet.ee



Orto

orthoimagery



Piirid

vector boundaries



Mask

landcover masks



Muu



Hübrid

enable/disable hybrid map

20 km

image compared

add comparison

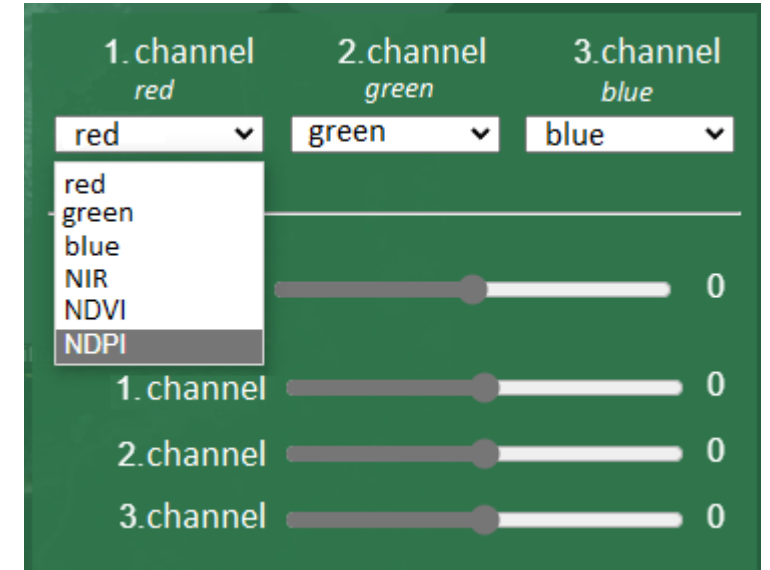
Pick a date



2020-07-18 NGR

Sentinel-2 bands and Satiladu

BAND	SPECTRAL	WAVELEN. [μm]	GEOM. [m]	SENSOR
1	aerosols	0.429 – 0.457	60	MSI
2	blue	0.451 – 0.539	10	MSI
3	green	0.538 – 0.585	10	MSI
4	red	0.641 – 0.689	10	MSI
5	red edge	0.695 – 0.715	20	MSI
6	red edge	0.731 – 0.749	20	MSI
7	red edge	0.769 – 0.797	20	MSI
8	NIR	0.784 – 0.900	10	MSI
8a	narrow NIR	0.855 – 0.875	20	MSI
9	water vapour	0.935 – 0.955	60	MSI
10	SWIR cirrus	1.365 – 1.385	60	MSI
11	SWIR	1.565 – 1.655	20	MSI
12	SWIR	2.100 – 2.280	20	MSI



Spectrum represented on Satiladu:

B4 Red - 665 nm – resolution 10 m

B3 Green - 560 nm – resolution 10 m

B2 Blue - 490 nm – resolution 10 m

B8 NIR - 842 nm – resolution 10 m

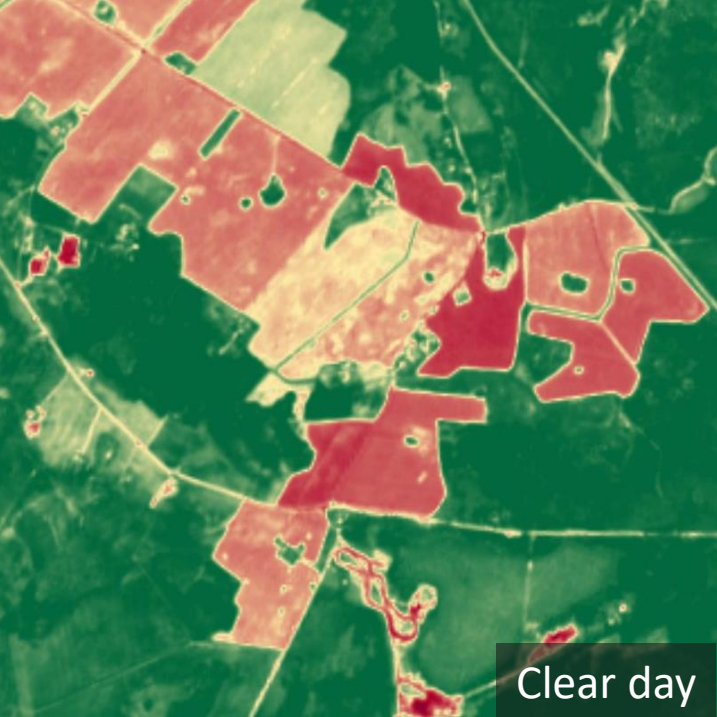
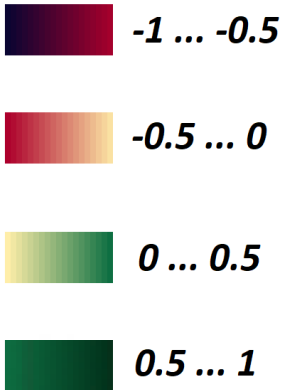
NDVI = $(B8 - B4) / (B8 + B4)$ – resolution 10 m

NDPI = $(B12 - B3) / (B12 + B3)$ – resolution 20 m

NDVI index on Satiladu

Normalized Difference Vegetation Index

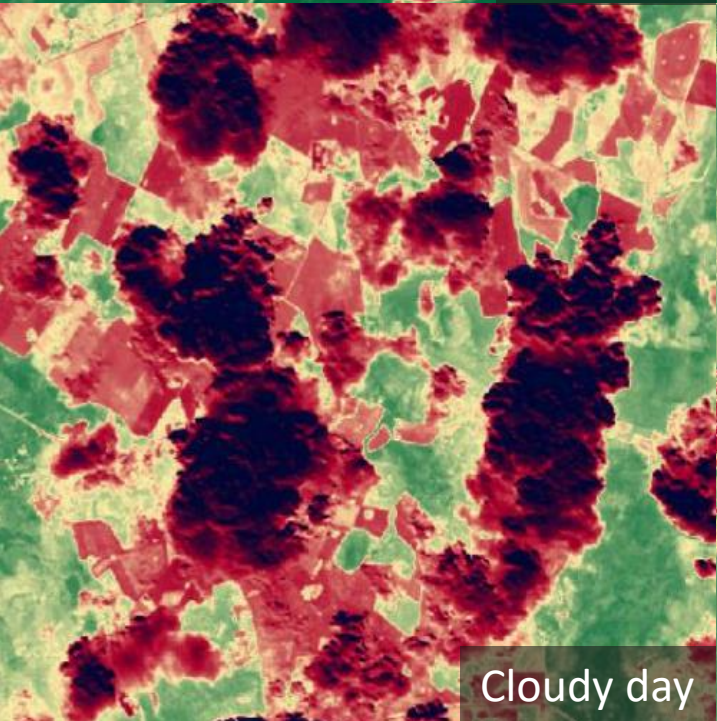
$$NDVI = \frac{(NIR - Red)}{(NIR + Red)}$$



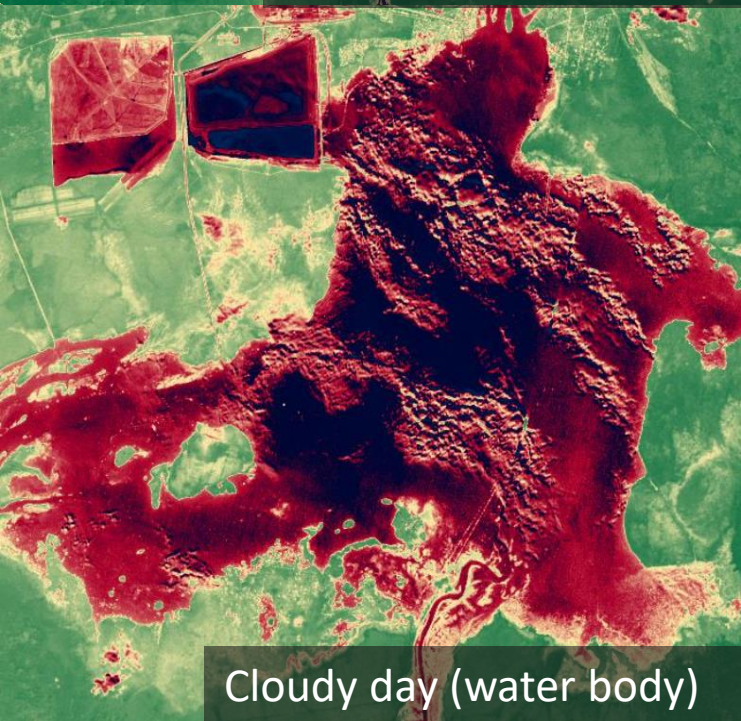
Clear day



Clear day (water body)



Cloudy day



Cloudy day (water body)

HEALTHY
VEGETATION REFLECTANCE

50% NIR 8% RED



NDVI = 0.72

STRESSED
VEGETATION REFLECTANCE

40% NIR 30% RED



NDVI = 0.14

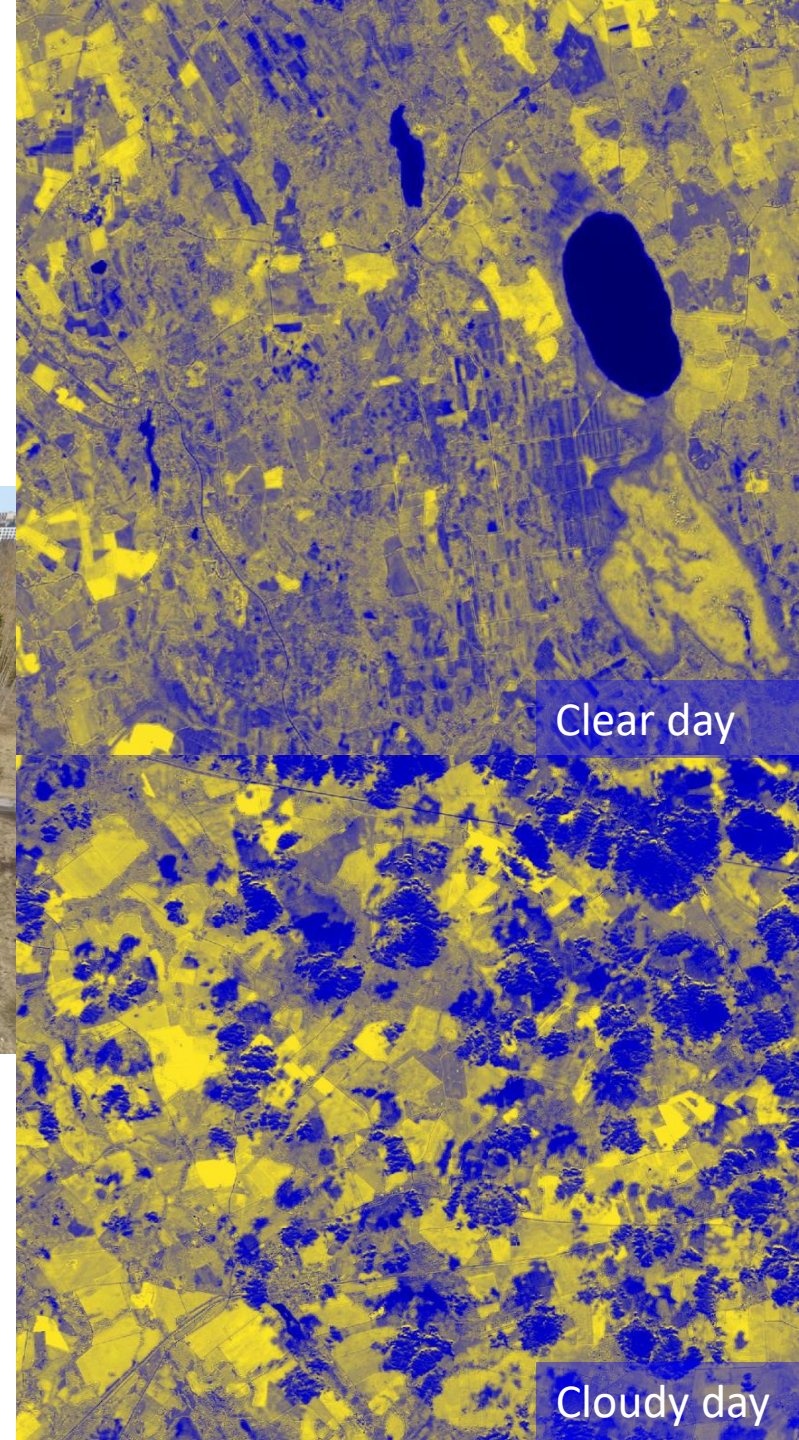
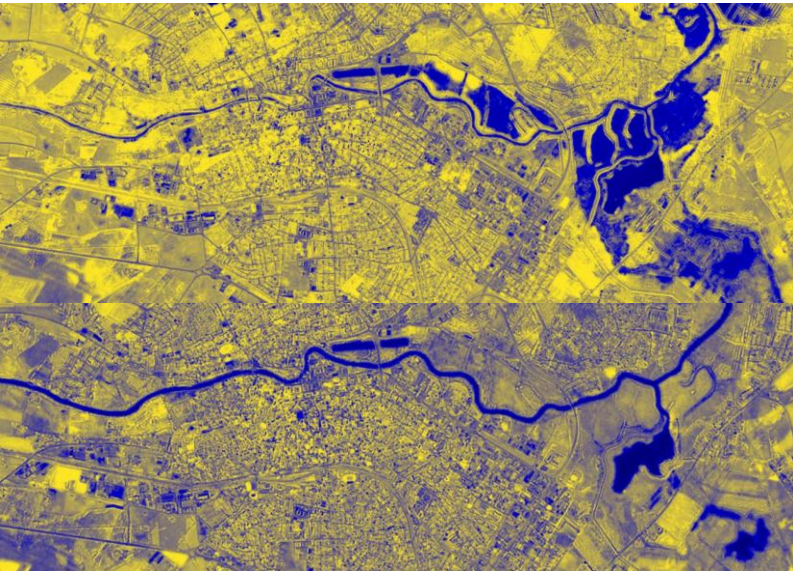
[2]

NDPI index on Satiladu

Normalized Difference Pond Index

$$\text{NDPI} = \frac{\text{SWIR} - \text{Green}}{\text{SWIR} + \text{Green}}$$

Distinguish between terrestrial and aquatic vegetation



- Detection of flood events
- Estimate vegetation water stress
- Drought monitoring
- Fire risk assessment



Case 1: Lifeguard

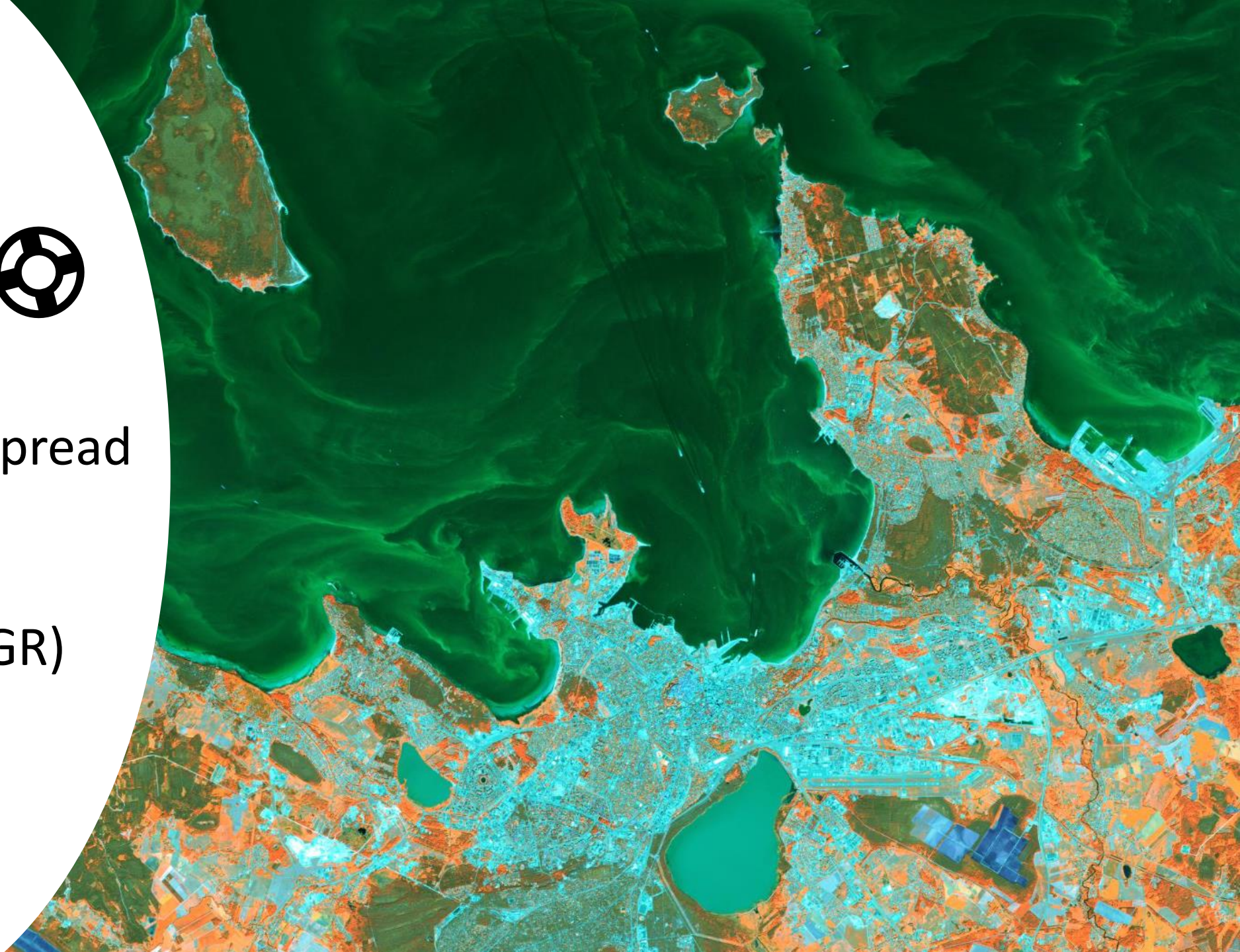


Problem:

blue-green algae spread

Solution: Satiladu

NIR Green Red (NGR)



Case 1: Lifeguard

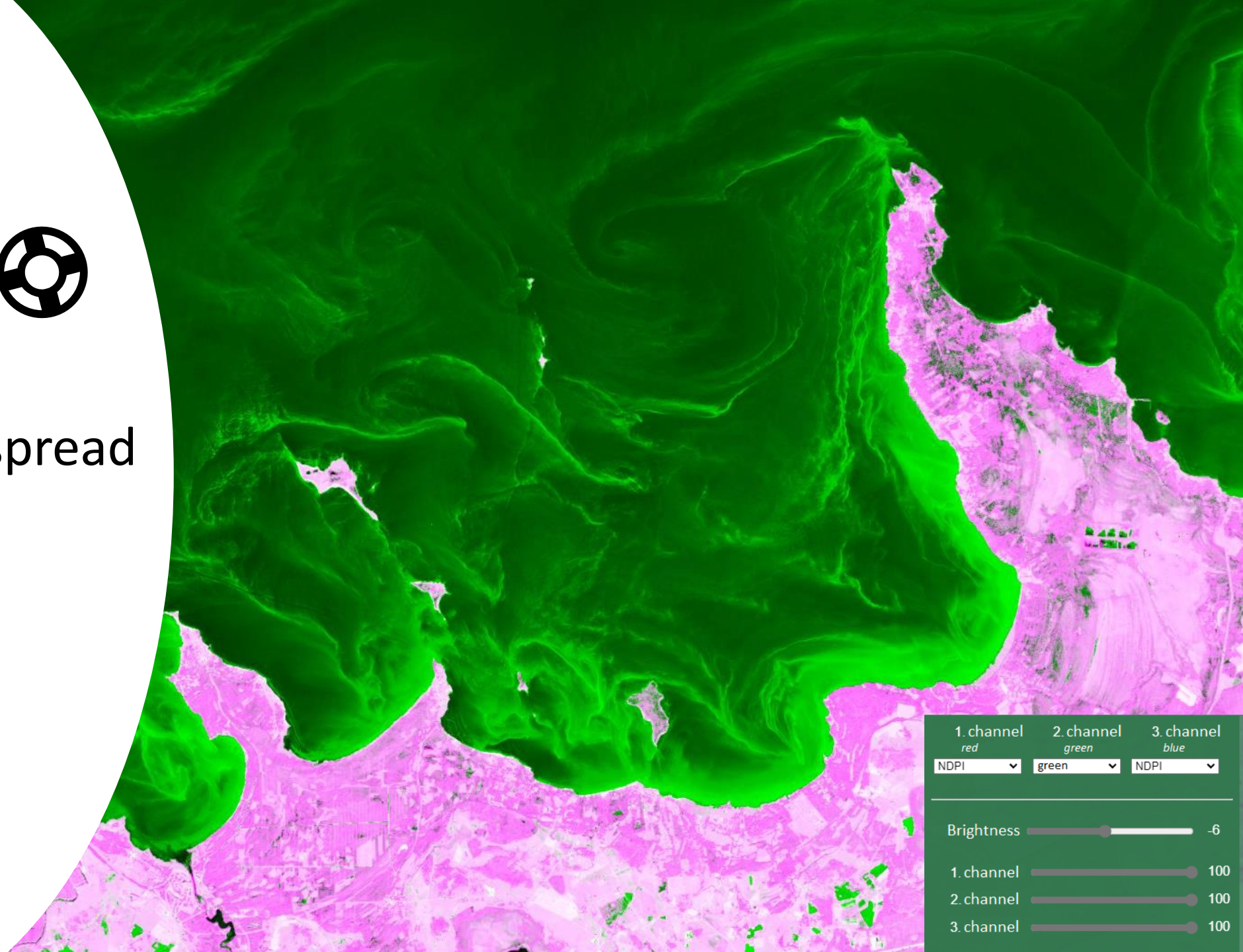


Problem:

blue-green algae spread

Solution: Satiladu

NDPI Green NDPI

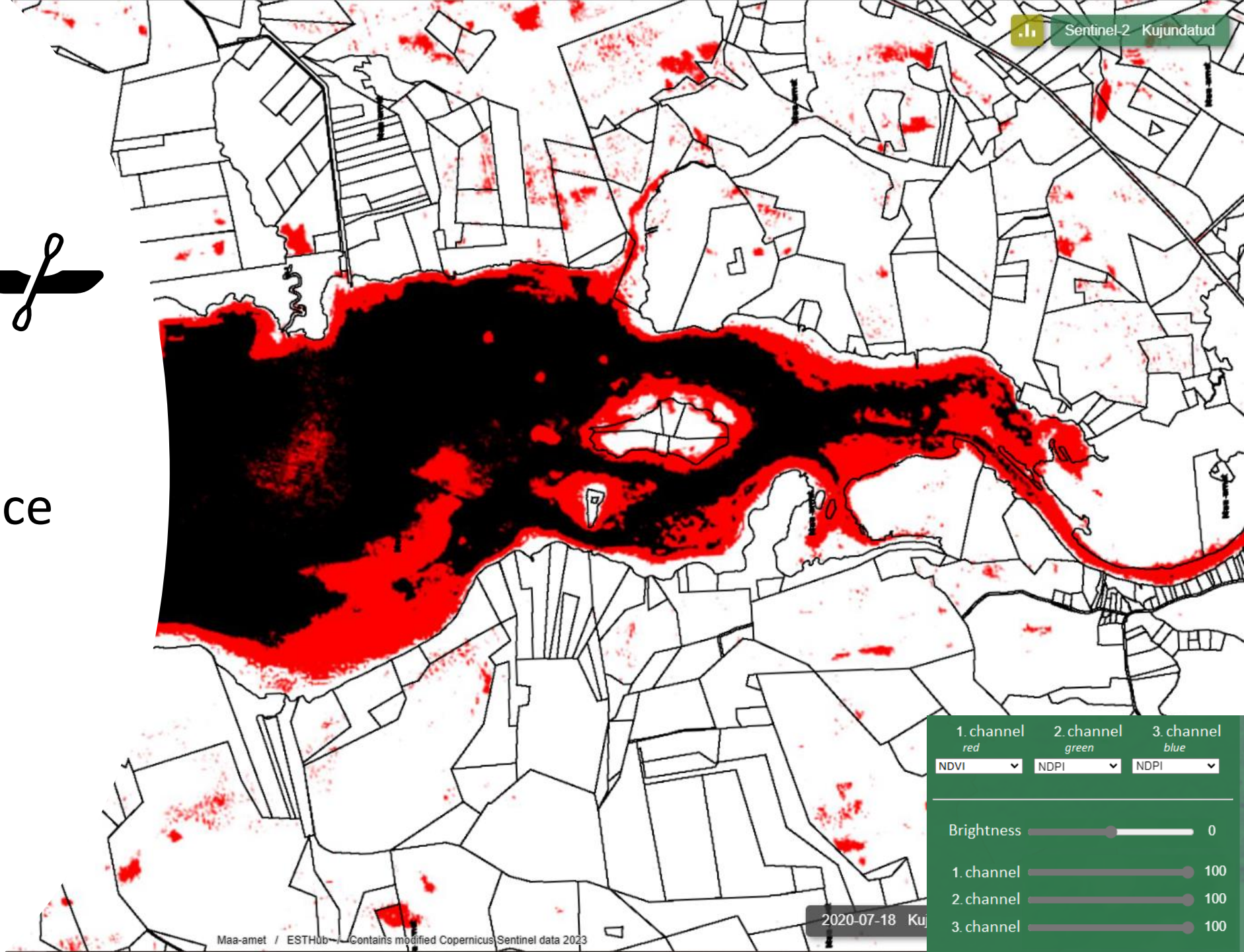


Case 2: Kayaker



Problem:
reeds and shore
vegetation influence
accessibility to
land/water

Solution: Satiladu
NDVI NDPI NDPI
cadastre units vector



Case 2: Kayaker



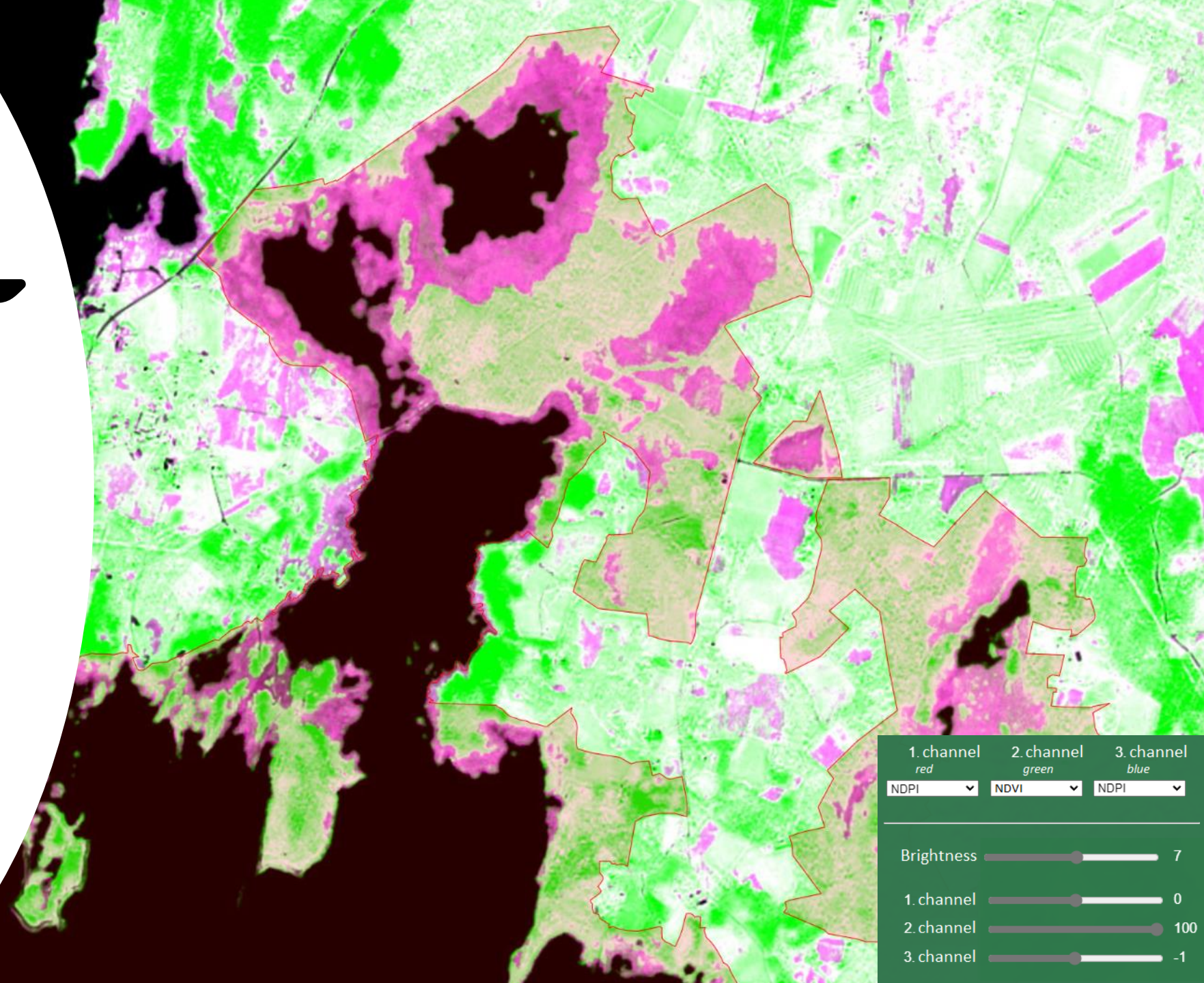
Problem:

reeds and shore
vegetation influence
accessibility to
land/water

Solution: Satiladu

NDPI NDVI NDPI

protected areas vector



1. channel red	2. channel green	3. channel blue
NDPI	NDVI	NDPI
Brightness <input type="range"/> 7		
1. channel <input type="range"/> 0	2. channel <input type="range"/> 100	3. channel <input type="range"/> -1

Case 3: Inspector



Problem:
supervision of
logging activities

Solution: Satiladu
NIR NDVI Red (NDR)
forest notifications vector



Case 4: Farmer

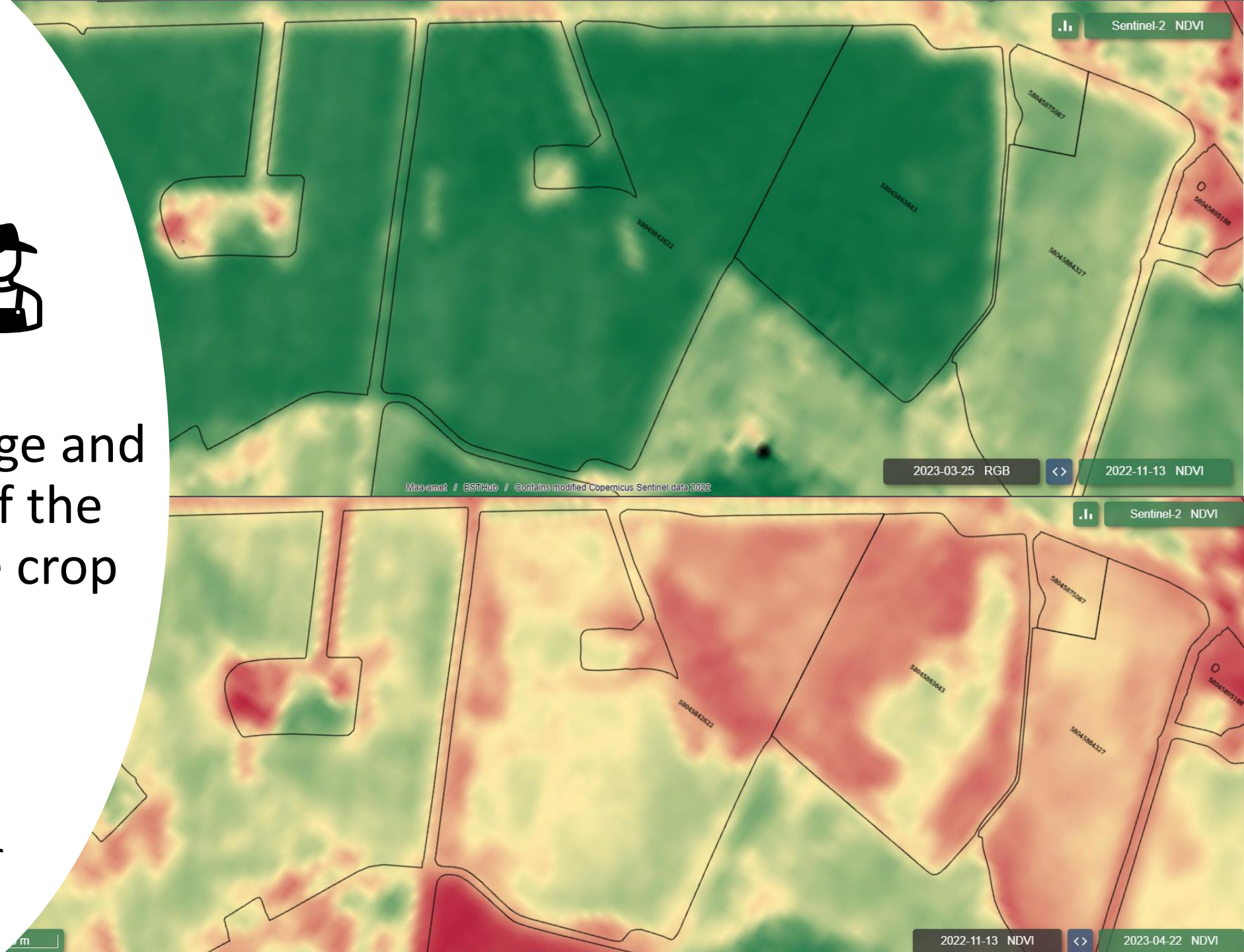


Problem:

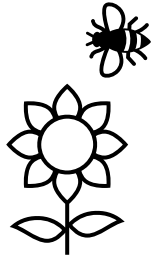
assess frost damage and get an overview of the consistency of the crop

Solution: Satiladu NDVI

agricultural fields vector



Case 5: Ecologist



Problem:
early planning of hive
positioning to optimise
the forage area

Solution: Satiladu
Blue NDVI NDPI
agricultural fields vector



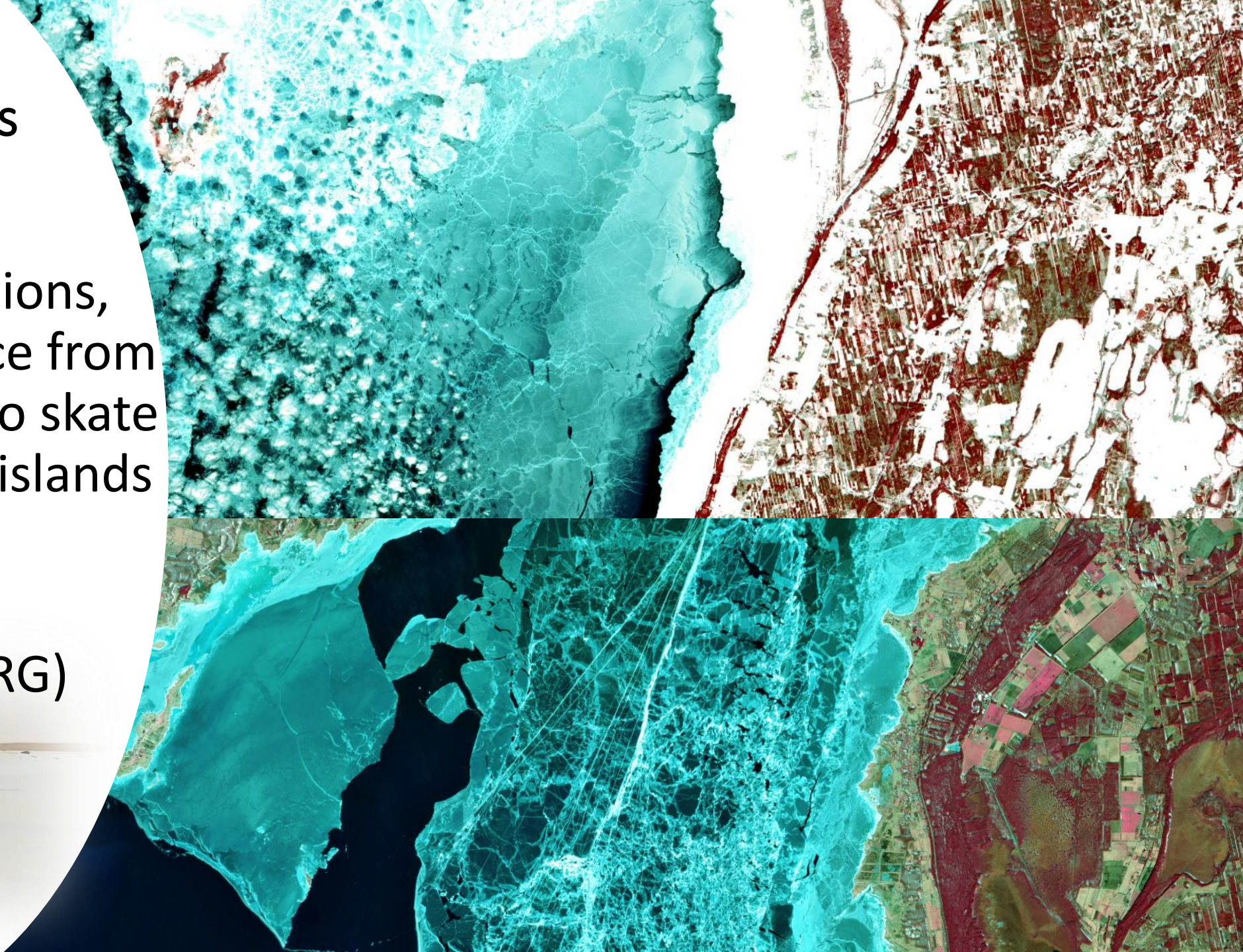
Case 6: Enthusiasts

Problem:

observe ice conditions,
distinguish clear ice from
snowcovered ice to skate
from mainland to islands

Solution: Satiladu

NIR Red Green (NRG)



Case 7: Grinch

Problem:

detect all coniferous trees to steal Christmas

Solution: Satiladu

NIR Red Green (NRG)

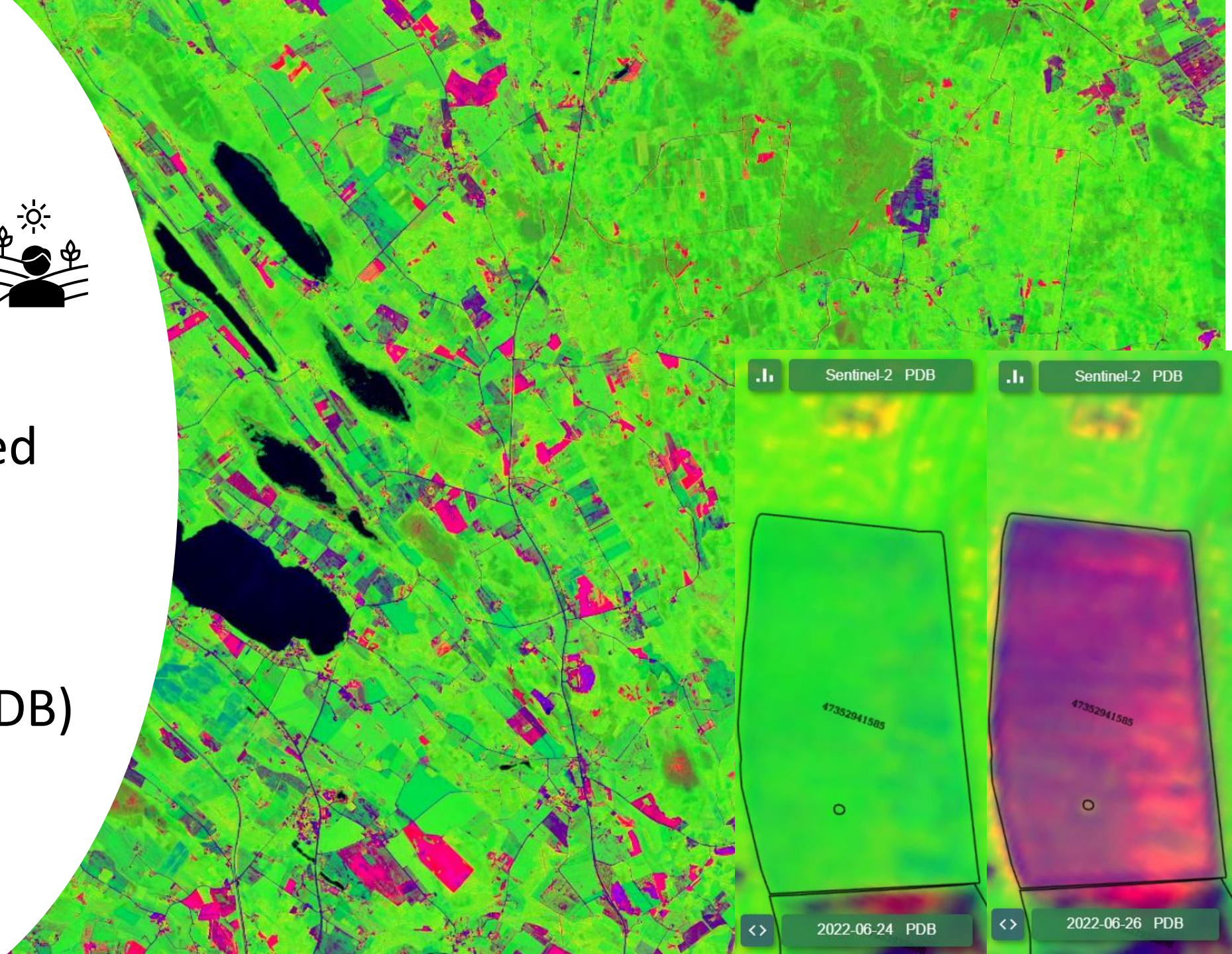


Case 8: Specialist



Problem:
detection of mowed
grassland

Solution: Satiladu
NDPI NDVI Blue (PDB)
agricultural fields vector



Case 9: Citizen

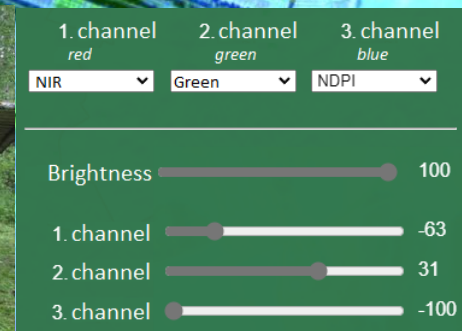
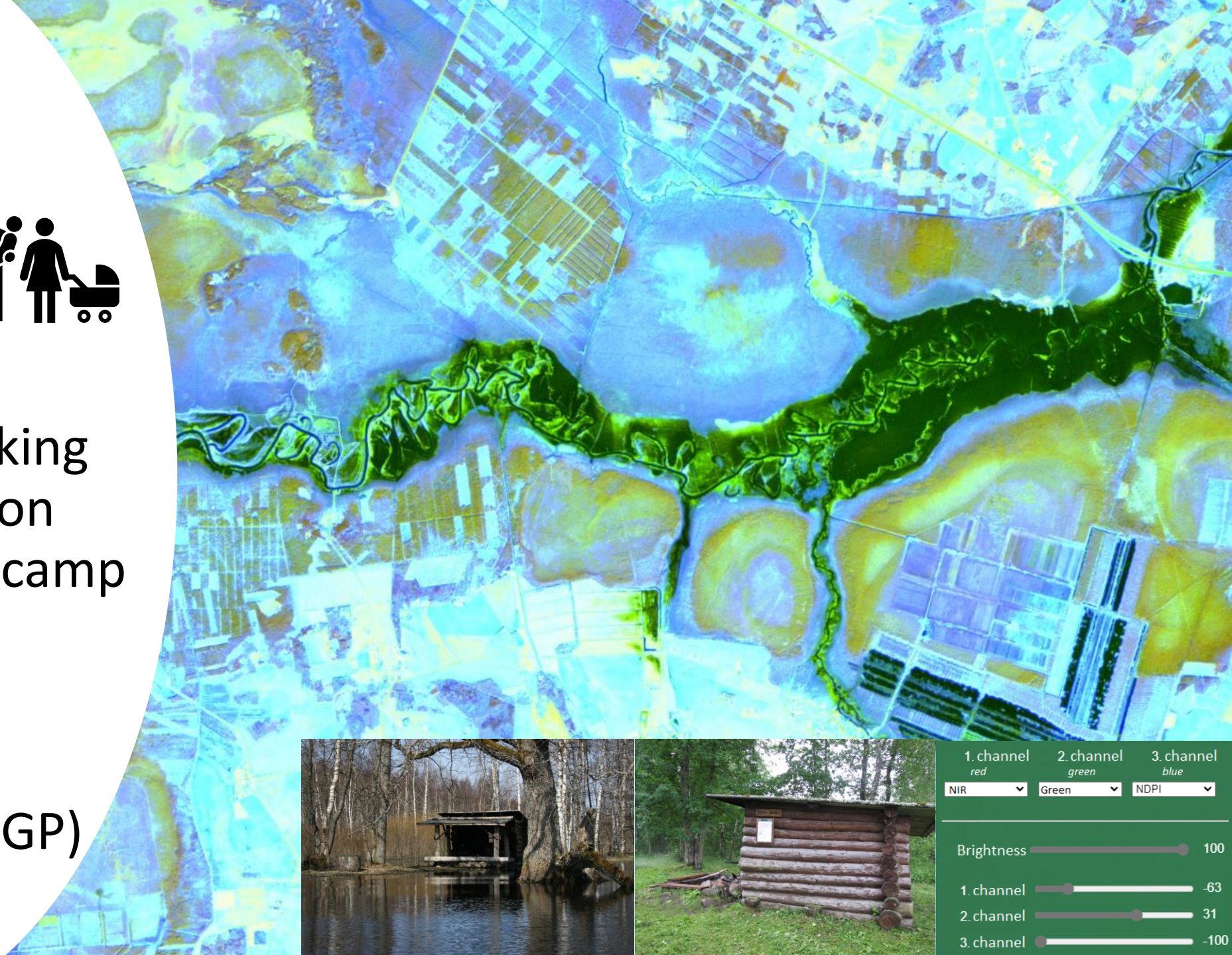


Problem:

spring floods – making an informed decision when to visit RMK camp site near the river

Solution: Satiladu

NIR Green NDPI (NGP)



Case 10: Forest owner

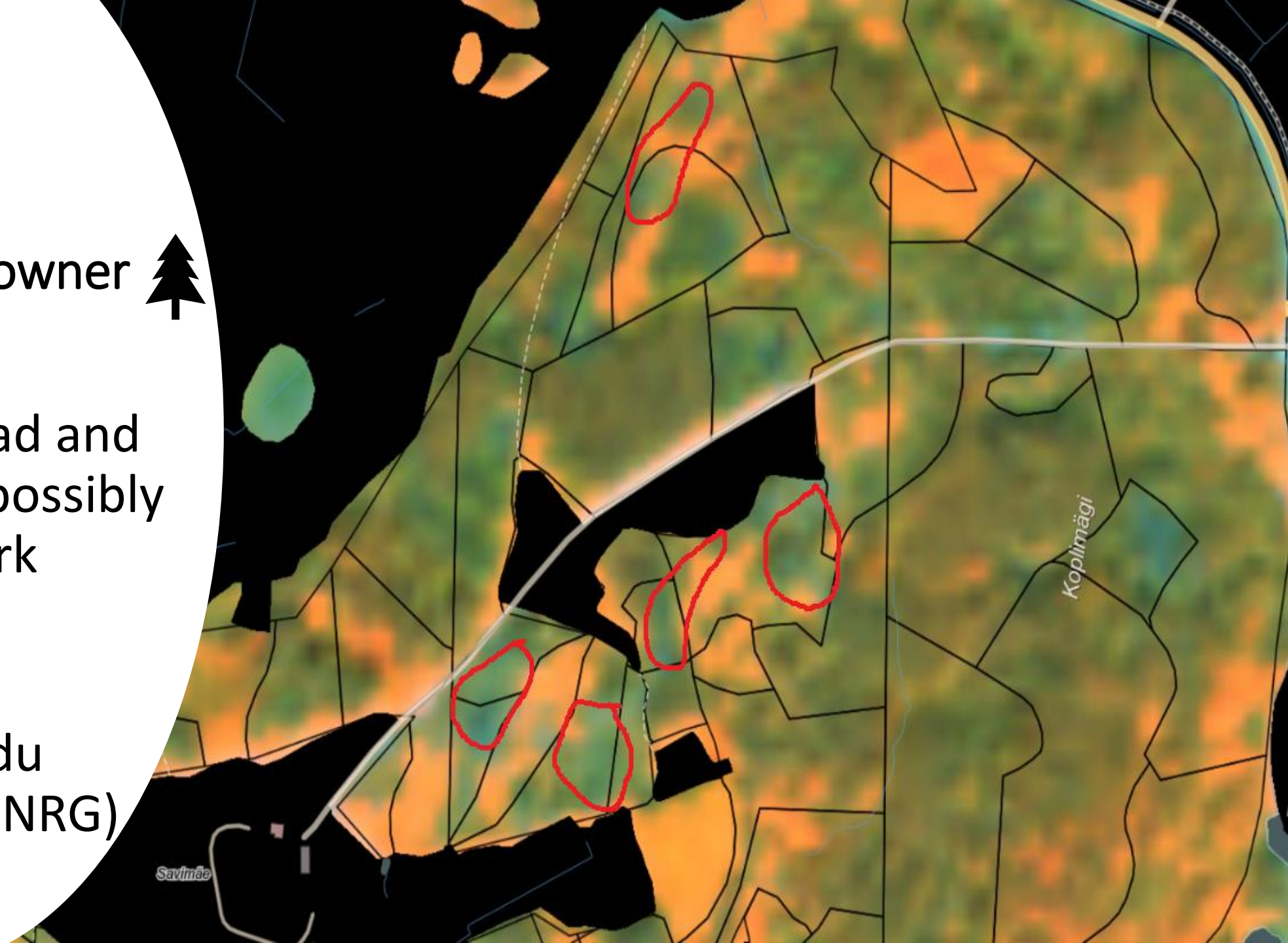


Problem:

detection of dead and stressed trees, possibly inhabited by bark beetles

Solution: Satiladu
NIR Red Green (NRG)

state forests vector



A satellite-style map of the Baltic Sea region, showing land in shades of green and brown and water in dark blue. A large, dark, semi-transparent overlay covers the central part of the map, highlighting the Baltic Sea basin. The text is overlaid on this dark area.

Inspired by satellite data

Baltic GIT 2023

Triin Tajur