

localhost:8501 Step 1: The Architecture.

An overview of the end-to-end Python pipeline:
From Sentinel-2 Tasking to Automated Risk Auditing.

EcoSentinel

Keyword Search for any Region

Select Region & Date

Targeting Mode

- Use Presets
- Search Anywhere
- Draw Area

Enter Location
Kainuu, Finland

System will analyze a 10km radius.

Coordinates Found

Search Window
2024/06/01 – 2024/08/31

EUDR Multi-Spectral Deforestation Engine

About the Platform & Methodology

Objective: This platform provides real-time, satellite-based auditing for the EU Deforestation Regulation (EUDR). It enables supply chain managers and financial auditors to verify if a sourcing region complies with environmental standards.

How it works:

- Ingestion:** Tasks the **Sentinel-2 constellation** (via Microsoft Planetary Computer) to retrieve multi-spectral imagery.
- Processing:** Applies a parallelized Python pipeline to calculate **NDVI** (Vegetation Health) and **NDWI** (Water Content).
- Smart Masking:** Uses a Multi-Index Decision Tree to filter out urban noise and water bodies.
- Audit:** Generates a precise "Risk Score" based on vegetation stress levels.

Target: Kainuu, Manner-Suomi, Suomi / Finland

Location & Targeting Multi-Spectral Detection

Luvanjärvi Kokkojärvi



Visualizing the raw NDVI/NDWI layers to establish a baseline for agricultural health before applying compliance thresholds.

EcoSentinel  Select Region & Date

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2024/06/01 – 2024/08/31

 Run Analysis

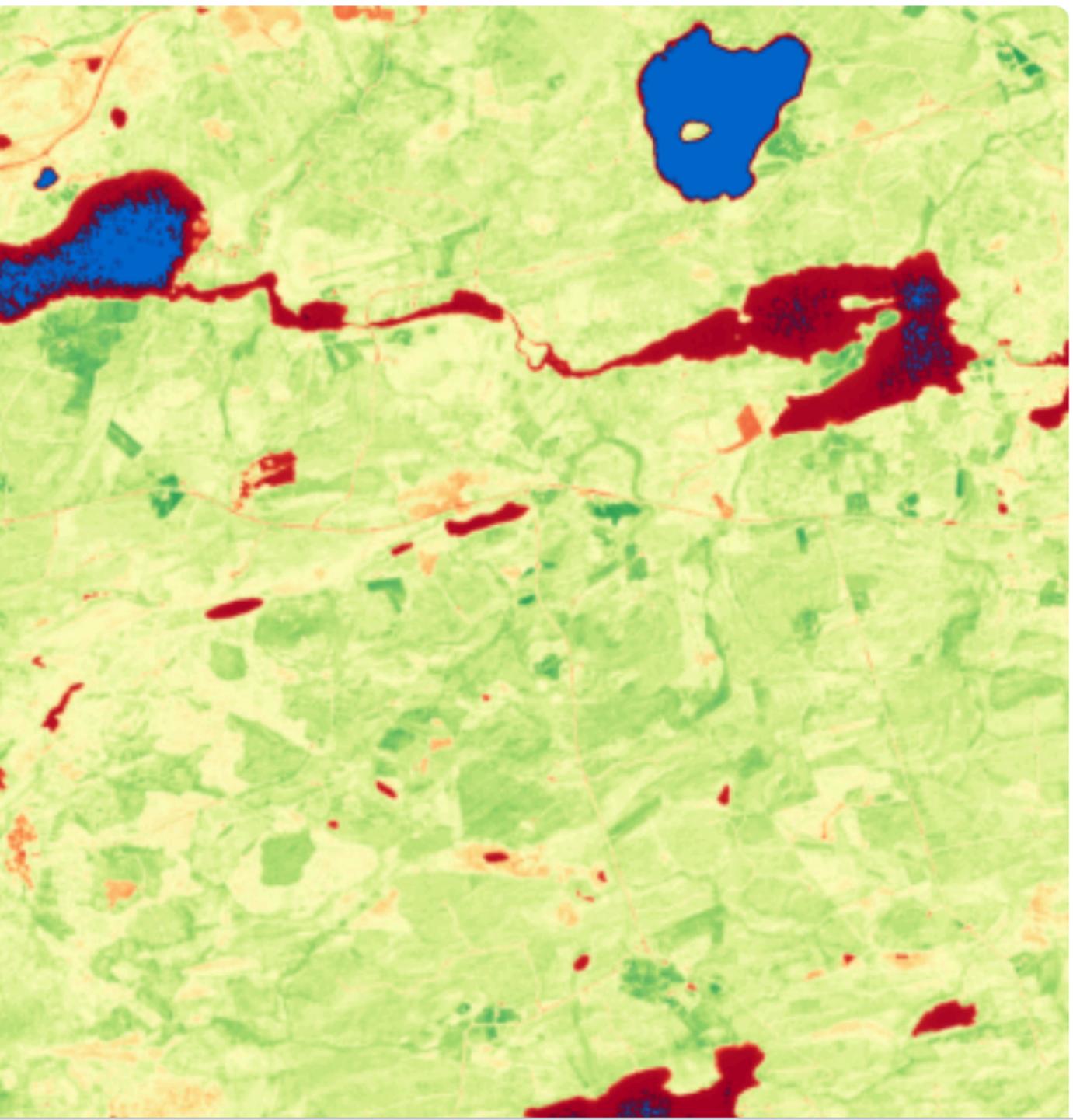
Target: Kainuu, Manner-Suomi, Suomi / Finland

 Location & Targeting Multi-Spectral Detection Compliance Audit

Optical Reality



Multi-Spectral Deforestation Detection



Applying the Decision Tree: Blue (Water), Grey (Urban), Red (Risk), and White (Safe) for pixel-perfect accuracy.

All Bookmarks

Deploy

:

Multi-Class Masking & Compliance Map

EcoSentinel

Select Region & Date

Targeting Mode

 Use Presets Search Anywhere Draw Area

Enter Location

Kainuu, Finland

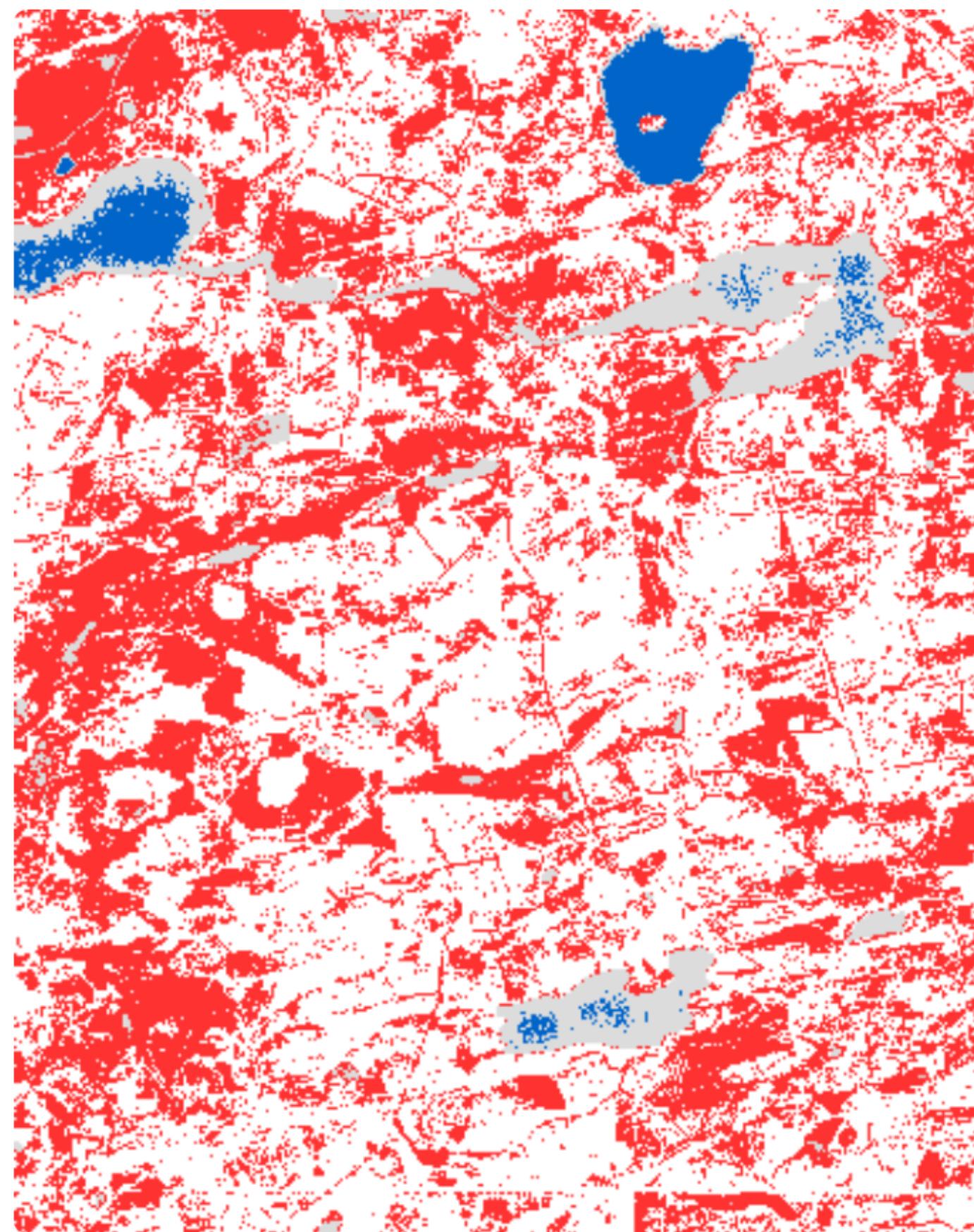
System will analyze a 10km radius.

Coordinates Found

Search Window

2024/06/01 – 2024/08/31

Run Analysis



Step 4: Due Diligence Summary.

A generated risk assessment explaining the why and how of the result, ready for banking or supply chain audits.

coSentinel

Select Region & Date

Targeting Mode

Use Presets

Search Anywhere

Draw Area

Center Location

Kainuu, Finland

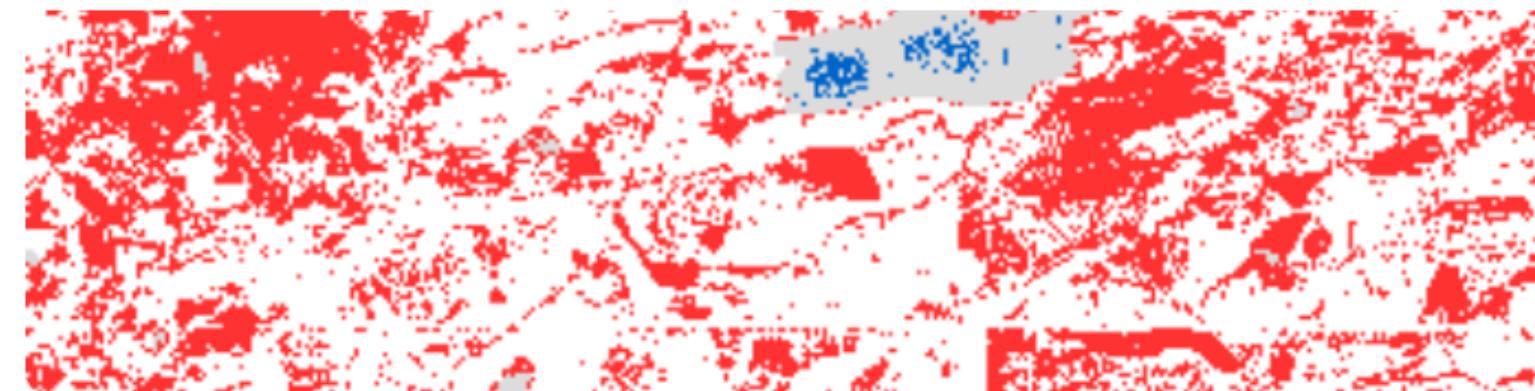
System will analyze a 10km radius.

Coordinates Found

Search Window

2024/06/01 – 2024/08/31

Run Analysis



EUDR Classification Layer

Executive Summary: 39.02% Risk (Compliant)

Risk Assessment:

The algorithm has identified that 39.02% of the agricultural vegetation in this sector is exhibiting **moderate spectral variation** (typical for this biome). Vegetation gaps are within standard agricultural or forestry tolerance (thinning/spacing).

Algorithmic Methodology (Multi-Index Decision Tree):

- **BLUE (Water):** Masked via NDWI > 0 (Surface water bodies).
- **GREY (Urban/Barren):** Excluded where NDVI < 0.25 (Non-organic surfaces).
- **RED (Risk):** Vegetation with NDVI 0.25–0.45 (Sparse/Stressed signal).
- **WHITE (Safe):** Vegetation with NDVI > 0.45 (Dense chlorophyll signal).

Data Validity Check: This analysis detected active vegetation cover of 92.72%. (Areas with < 10% cover may indicate invalid seasonal windows or desert terrain).

Ensuring data integrity by exposing the exact Sentinel-2 scene ID,
cloud cover percentage, and acquisition timestamp.

All Bookmarks

Deploy

⋮

EcoSentinel

Select Region & Date

Targeting Mode

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Kainuu, Finland

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Search Window

2024/06/01 – 2024/08/31

Run Analysis



EUDR Multi-Spectral Deforestation Engine

About the Platform & Methodology

Target: Kainuu, Manner-Suomi, Suomi / Finland

Location & Targeting

Multi-Spectral Detection

Compliance Audit

Stress Area

39.02%

Compliance

COMPLIANT

Cloud Cover

0.0%



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{  
    "region_name" : "Kainuu, Manner-Suomi, Suomi / Finland"  
    "scene_id" : "Mosaic_Composite"  
    "acquisition_date" : "2024-08-07T09:55:49.024000+00:00"  
    "cloud_cover_avg" : 0  
    "platform" : "Sentinel-2B"  
    "bbox" : [  
        0 : 28.631052399999998  
        1 : 64.5446354  
        2 : 28.7310524  
        3 : 64.6446354  
    ]  
}
```