

Copernicus HRL-Small Woody Features for monitoring agricultural landscapes and Ecological Focus Areas

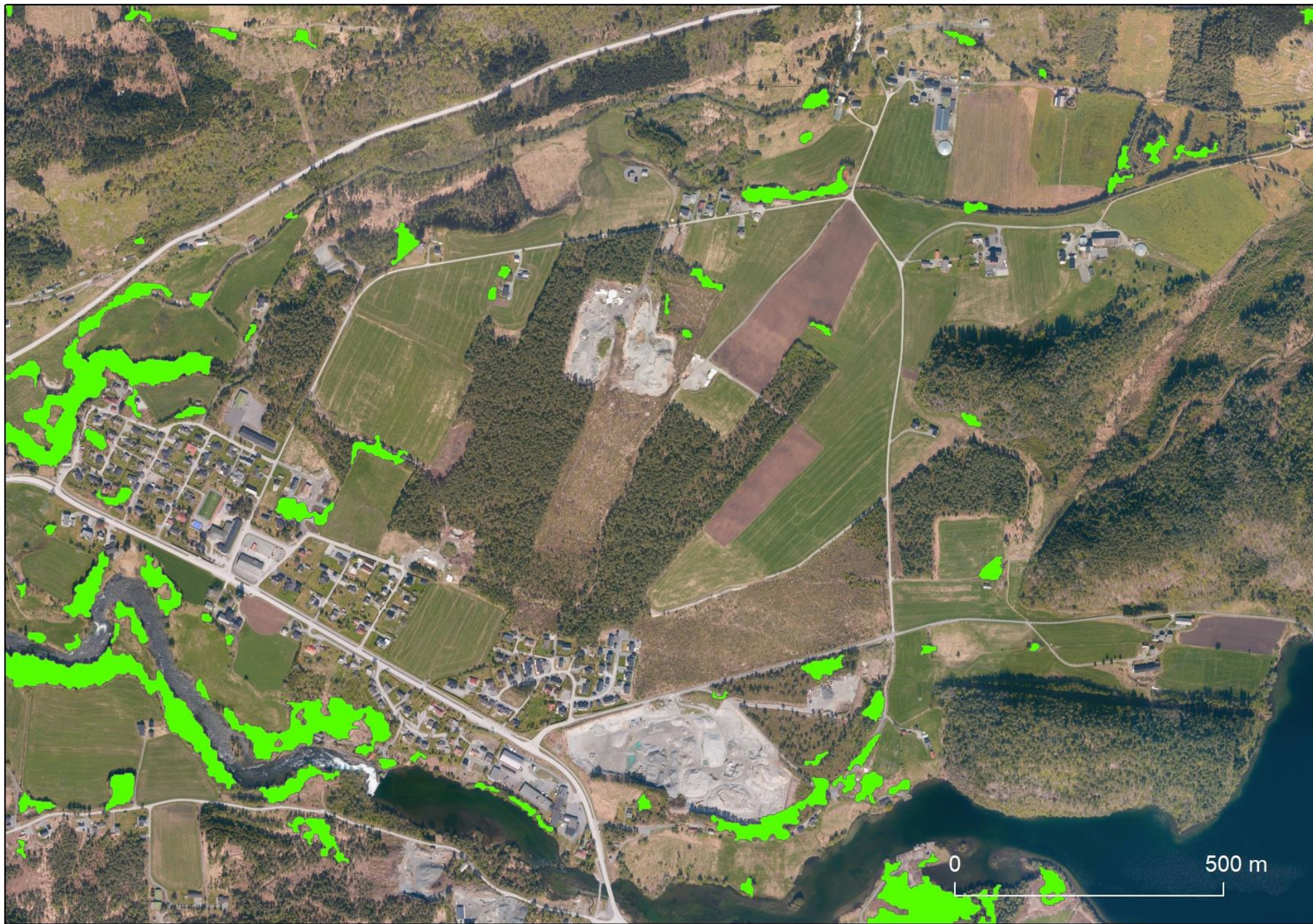
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Small
Woody
Features
(SWF)

Vector/
raster
layer





Forest
Mask (FM)

Woody
Vegetation
Mask
(WVM)

Raster
layers



Small woody features (patches/lines) are important to maintain biodiversity in farmland (e.g. connectivity) and for visual characteristics in (often) homogeneous landscapes
Support a number of ecosystem services



Objective

- To examine the potential of SWF products for supporting the Common Agricultural Policy (CAP) in Poland and national agricultural policy in Norway
- Determine the suitability of SWF for monitoring status and change



1998



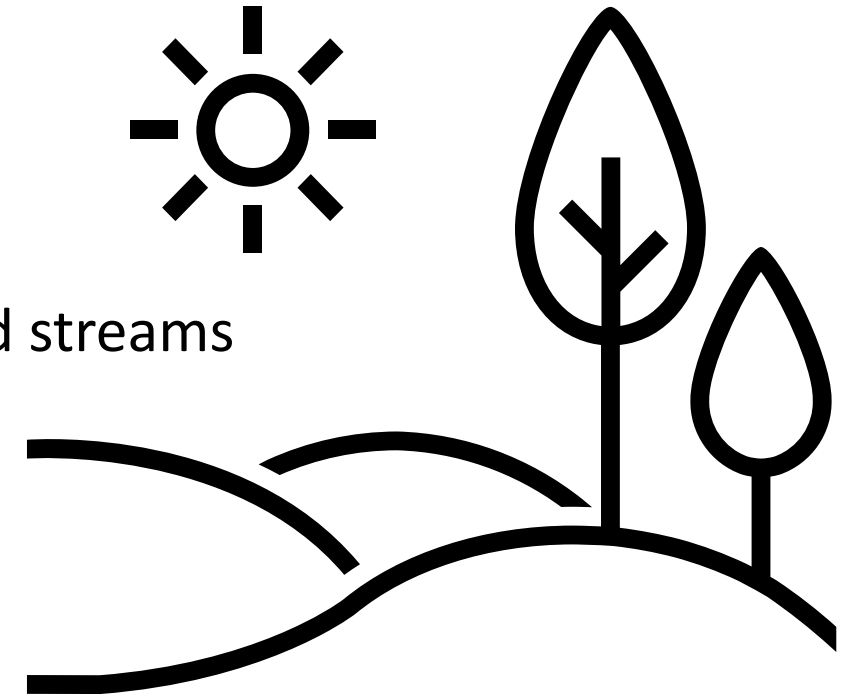
2008

- Small Woody Features (SWF)
 - Linear or patchy structures of woody/scrubby/bushy vegetation
 - High Resolution Layer (HRL)
- Copernicus Land Monitoring Service (CLMS)
 - Jointly implemented by
 - European Environment Agency (EEA)
 - European Commission DG Joint Research Centre (JRC)
 - Copernicus Programme
- Freely and openly accessible
- SWF 2018 released August 2023?



Linear or patchy structures of woody/scrubby/bushy vegetation

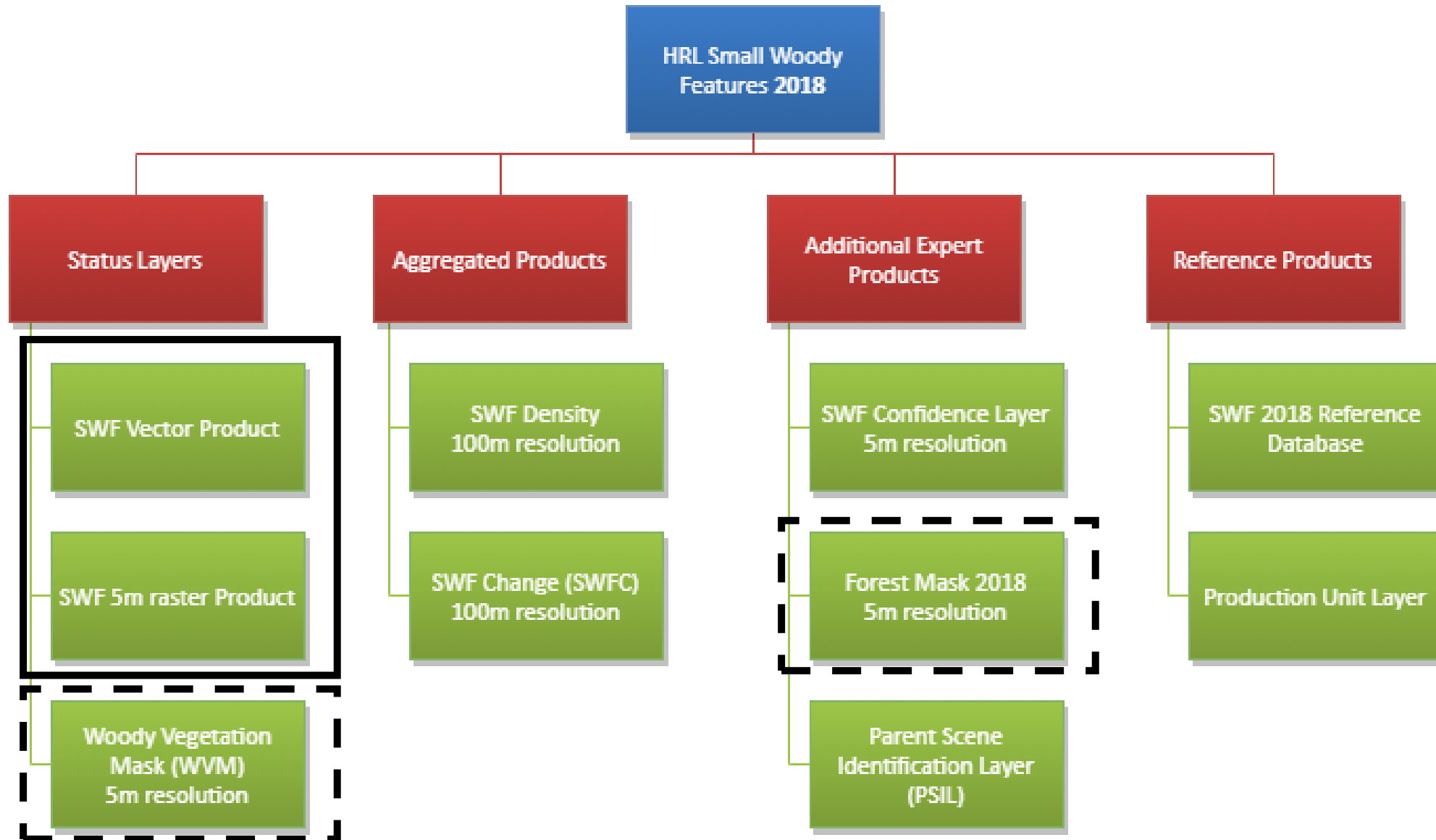
- Linear structures include
 - Hedgerows
 - Tree alignments or scrubs along field margins
 - Tree alignments or scrubs along roads
 - Riparian woody vegetation along waterways and streams
- Patchy structures include
 - Scattered group of trees/scrubs
 - Isolated trees/scrubs



- Main data source: Very High Resolution (VHR) satellite imagery
- 2–4 m spatial resolution, 4 spectral bands
- Semi-automated production workflow
- Geometric rules

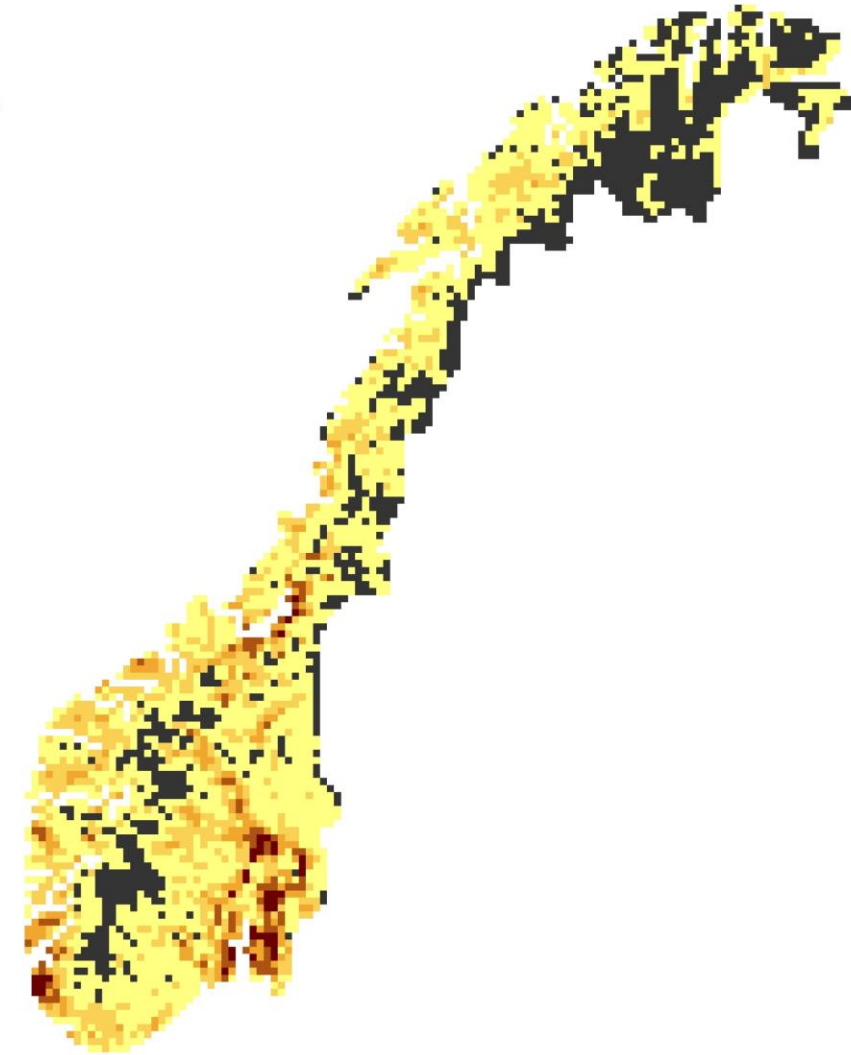
	Linear Structures	Patchy Structures
Width	≤ 30 m	n/a
Length	≥ 30 m (was 50m for 2015)	n/a
Area	n/a	$200 \text{ m}^2 \leq \text{area} \leq 5000 \text{ m}^2$
Compactness	≤ 0.785 (was 0.75 for 2015)	> 0.785 (was 0.75 for 2015)

+ ensure connectivity



Agriculture in Norway and Poland

- Agricultural land accounts for around 40 % of the EU land area
- Norway
 - 3.5 % agricultural land
 - 1 million hectare
- Poland
 - 57 % agricultural land
 - 18.7 million hectare?

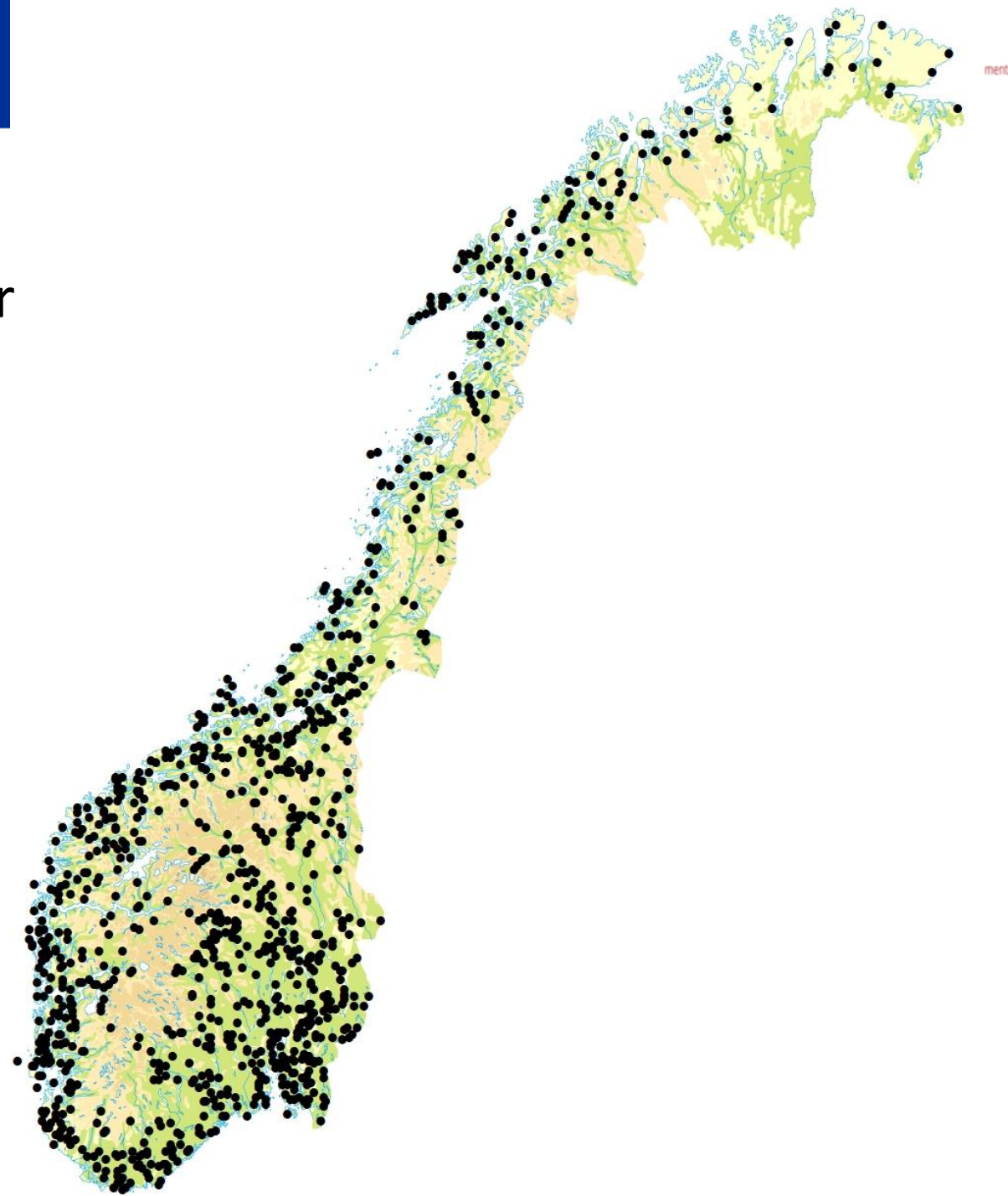


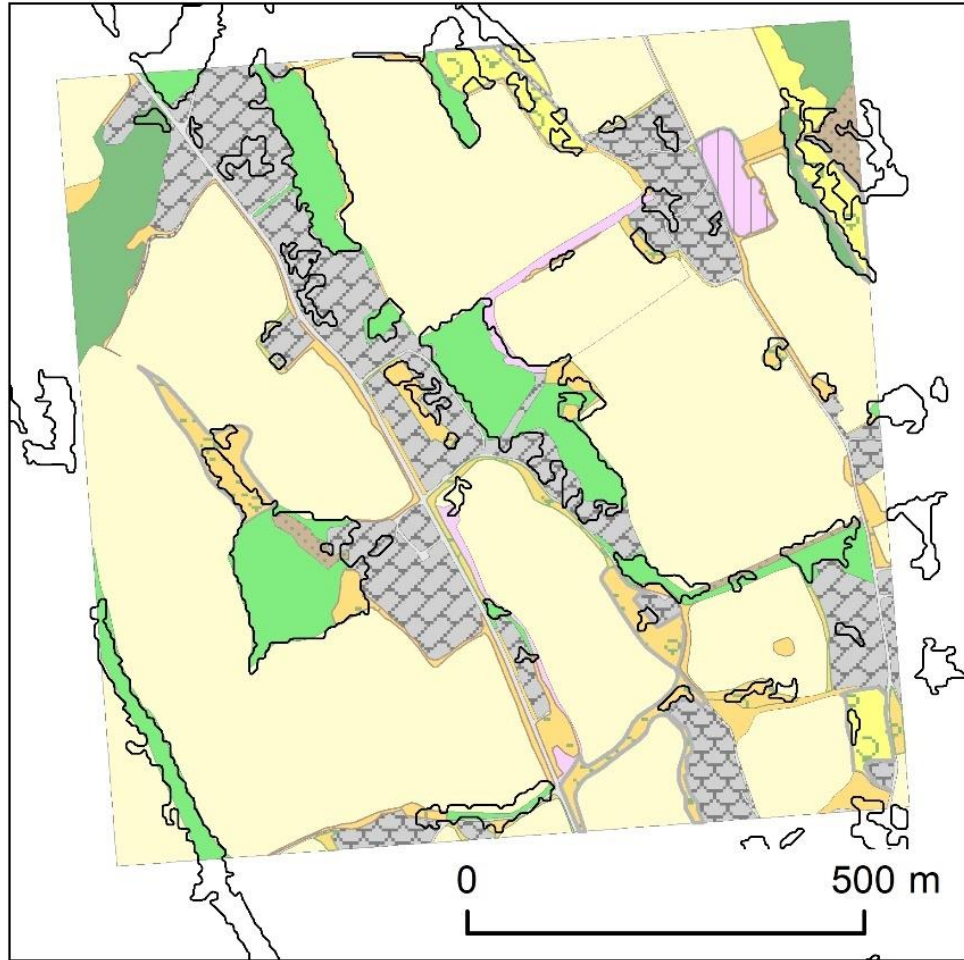
Compare SWF with national agriculture relevant map data

- Norway
 - Monitoring Programme for Agricultural Landscapes (3Q)
 - Land Resource Map (AR5)
- Poland
 - Land Parcel Identification System (LPIS)
 - Ecological Focus Area (EFA) elements
 - «Management fields» layer
 - Topographic Objects database (BDOT10K)

Data from the Monitoring Programme for Agricultural Landscapes (3Q)

- Statistical sampling (1 x 1 km²)
- Polygons
- Linear elements
- Points elements

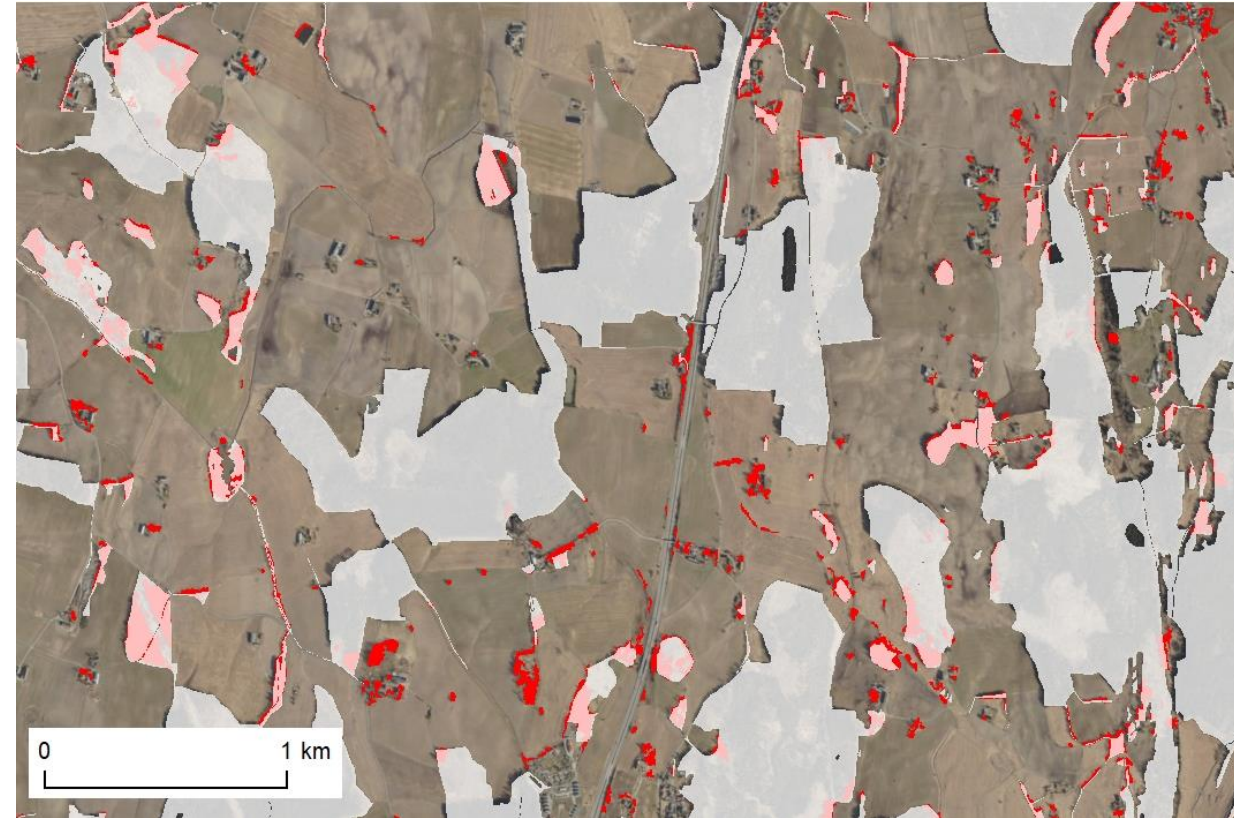
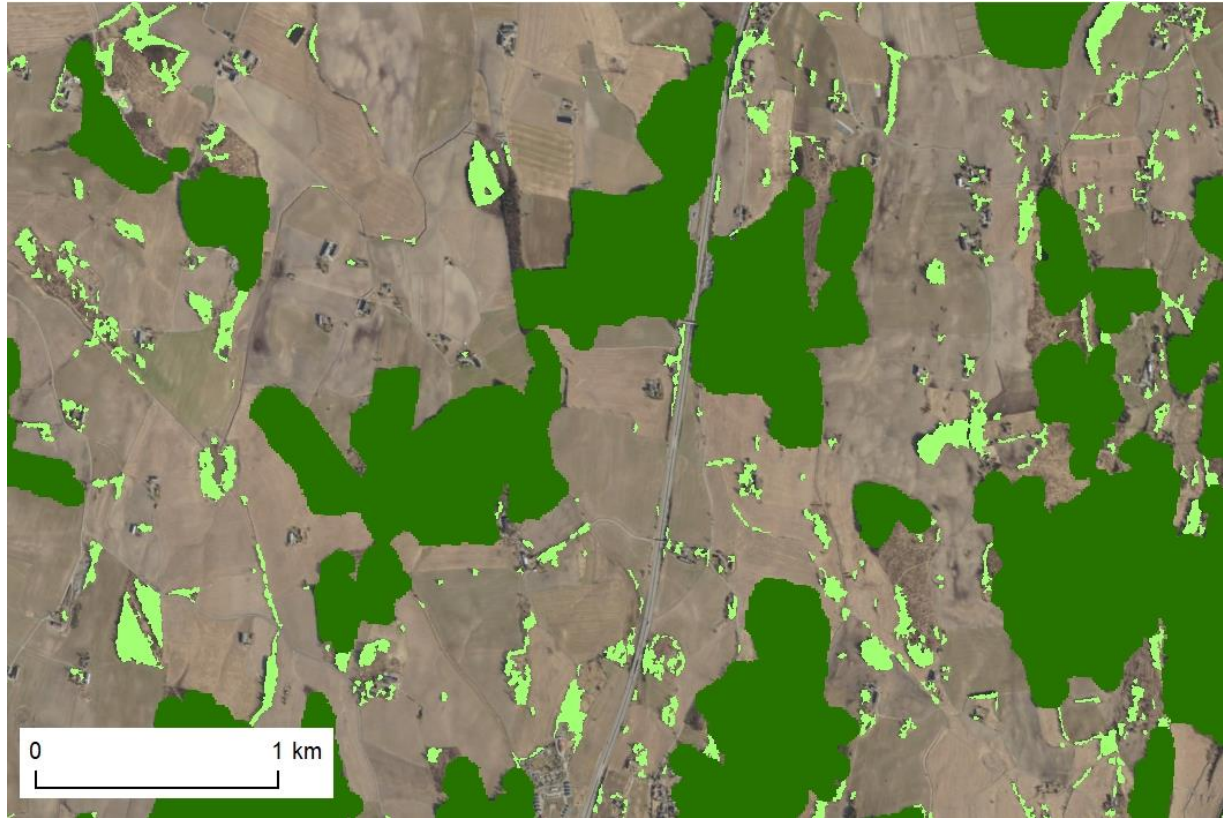




Left: SWF (black outline) and 3Q (agricultural fields yellow, forest green, built-up areas grey, semi-natural grassland orange)
Right: SWF (black outline) and aerial orthophoto

Land Resource Map (AR5)

- Scale of 1:5 000
- Full coverage below tree line (all agricultural land)
- Part of data for applications for agricultural production subsidies
- Aerial photograph interpretation, parts updated every fifth year
- Land type 'Forest'






Left: SWF (light green) and FM (dark green)
Right: AR5 forest transparent white, SWF red

Data from the Land Parcel Identification System (LPIS) database

- Ecological Focus Areas (EFA) elements
 - Group of trees up to 0.3 ha
- The land cover layer «management fields» (PZ)
 - Woodland and shrubs
 - Forest




SWF 2018 and FM 2018 vs EFA: group of trees up to 0.3 ha






-  EFA_powierzchniowe_2018_ZG
-  Small Woody Features 2018
-  Forest Mask 2018

SWF 2018 and FM 2018 vs PZ: woodland or shrubs



-  PZ Z – teren zadrzewiony lub zakrzewiony
-  Small Woody Features 2018
-  Forest Mask 2018



-  PZ L – las
-  Small Woody Features 2018
-  Forest Mask 2018

Data from Topographic Objects database (BDOT10K)

- Forest and wooded area

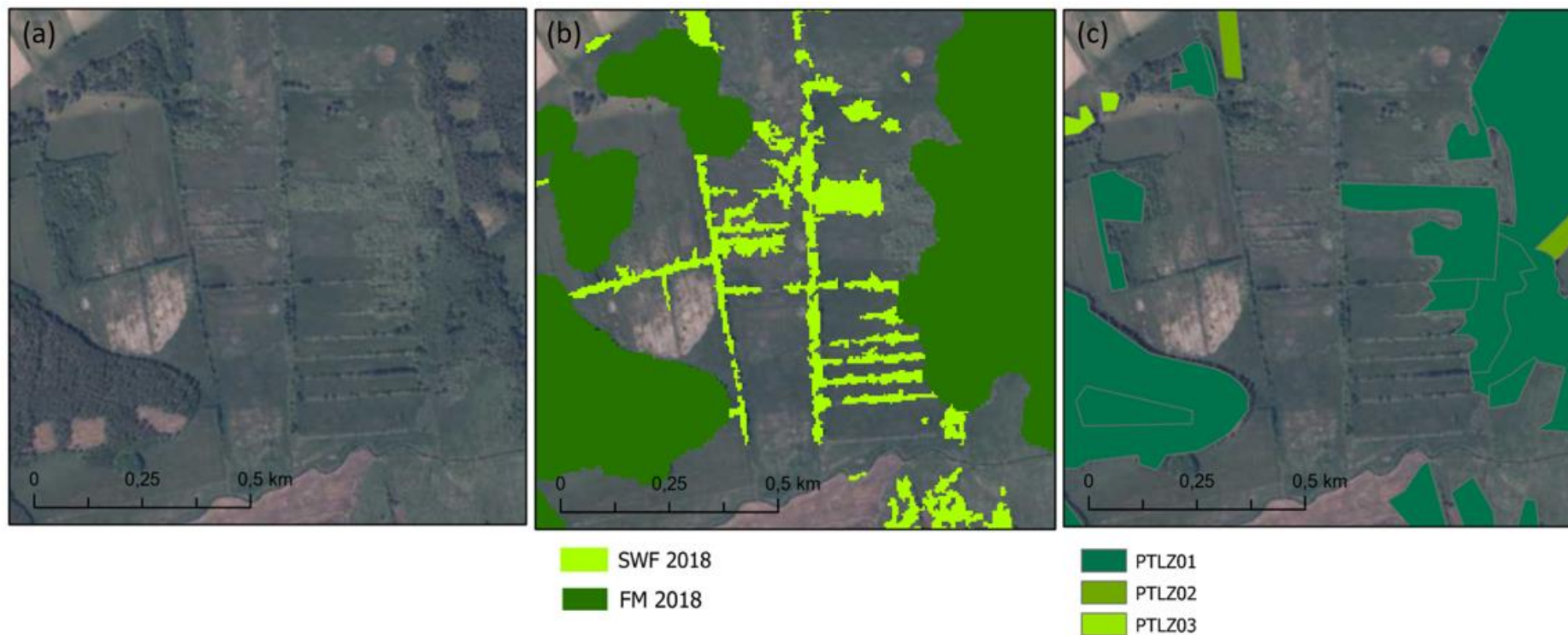


Figure 5: The example of wooded areas along agricultural fields (a) on the orthophotomap, (b) with SWF – Small Woody Feature and FM – Forest Mask layers and (c) with BDOT10K data: PTLZ01 – forest, PTLZ02 – woodland area and PTLZ03 – mountain pine.

Key findings and recommendations

- In general, relatively poor correspondence with national datasets, but can generally be explained by different mapping rules
- Product provider report high accuracy values (LUCAS points)
- Recommend national quality assessment with aerial photographs
 - No national datasets exactly correspond for proper verification
- Lack of up-to-date data a possible drawback (SWF2018 released 2023)
- Expert products exists, but user friendly (e.g. Forest Mask)?
- Promising
 - Fill a gap, used in conjunction with other data, flag areas for updating, full coverage, standardised product for international comparison, ...

Thank you!

