

Presented at the FIG Working Week 2017,  
May 29 - June 2, 2017 in Helsinki, Finland

## Use of laser data as a tool when calculating the volume of standing forest in property tax assessment of agricultural properties (8794)

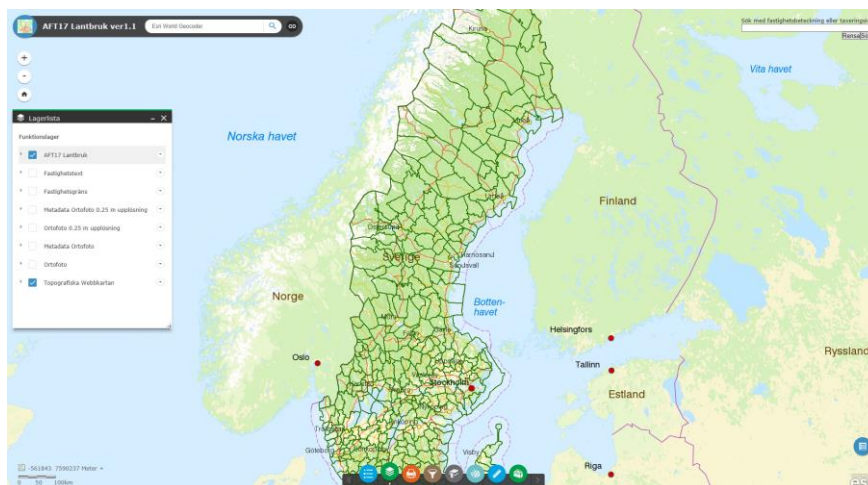
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Lantmäteriet - The Swedish mapping, cadastral and land registration authority

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## GIS application in ESRI Web App Builder for ArcGIS Portal



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## Forest properties in Sweden

- 55 % of the land area is covered by productive forest land
- 50 % of the forest area is owned by 328,000 non-industrial (individual) owners, divided in 238,000 management units

## Tax assessment of forest properties

- Assessed value is based on market value
- Swedish Tax Agency is responsible for the assessment
- The assessment is carried out every third year
- Lantmäteriet provides important assistance and is responsible for the preparatory work
- The preparatory work comprises analyses of sales during the reference year and two years before

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## Tax assessment of forest properties

Two different models are used

1. Units < 30 hectares – value factors:
  - size of the forest area
  - standing volume – of both conifers and broadleaves together
2. Units => 30 hectares – value factors:
  - size of the forest area
  - site quality
  - standing volume of conifers and broadleaves separately

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## Tax assessment of forest properties

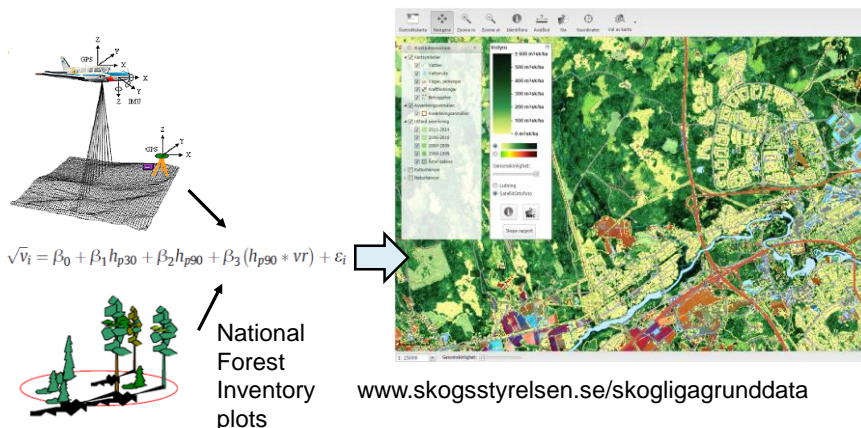
The standing volume:

- Is a very important value factor
- Can never be determined exactly, is only an estimate
- Is always changing over time due to growing, harvesting, storm damages, etc.
- Is difficult to estimate for the forest owner – he/she needs a recently made standwise forest management plan (which is relatively expensive) or a similar skilled estimation of the growing forest - otherwise a high risk of incorrect values of the volume

**This means that modern methods that allow gathering information without asking the forest owner would mean a big improvement for both Lantmäteriet and the Swedish Tax Agency!**

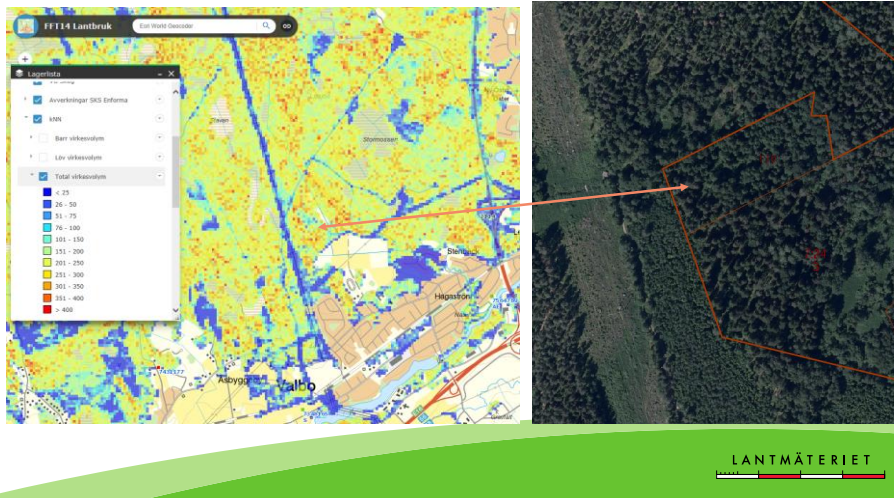
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## Free nationwide "Forest Map" was available in 2015 at the Swedish Forest Agency

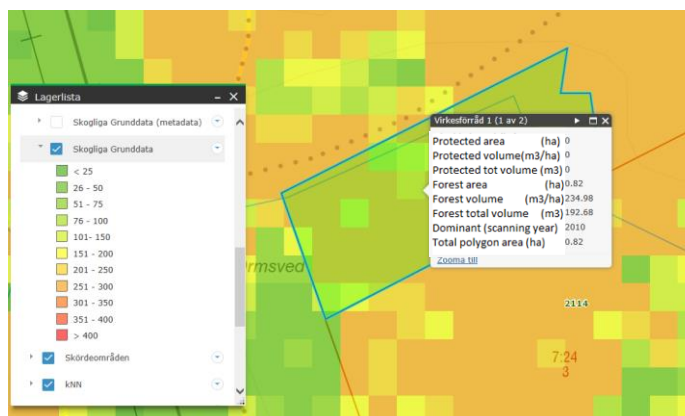


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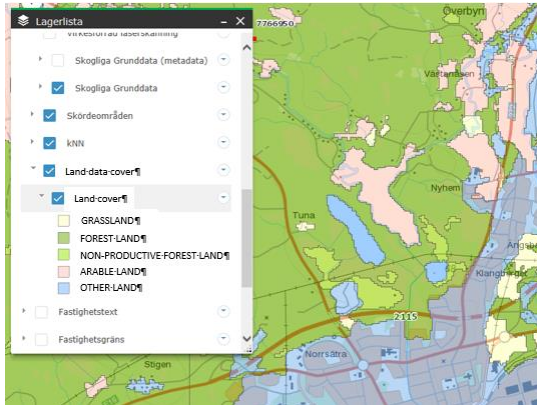
## kNN-data (derived from satellite photo and NFI-plots) and orthophoto was in use at the assessment 2014



## Forest data (derived from laser scanning and NFI-plots) in use at the assessment 2017



## Layer of land data cover, CORINE

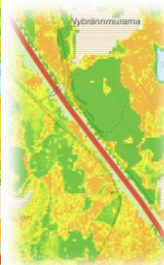
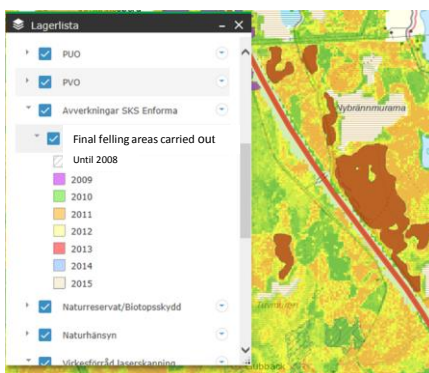


In property tax assessment we must separate the ground into land use classes

We have used an existing layer from CORINE land data cover to detect forest land

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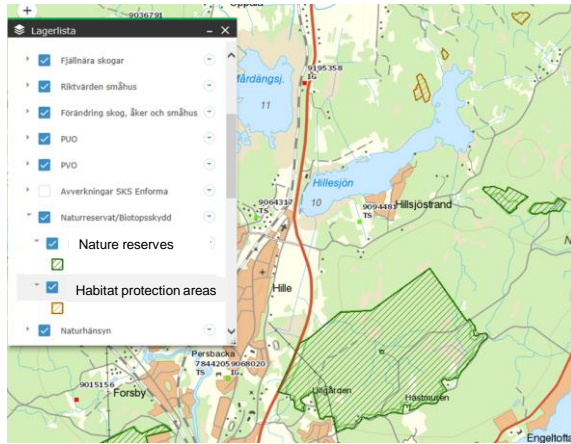
## Layer of recently made final fellings



If final felling is made after laser scanning the volume is reduced to zero

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## Layer of protected forest land

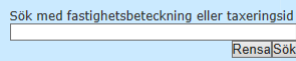


Protected forest land was separated from production forest with a layer from the National Forest Agency

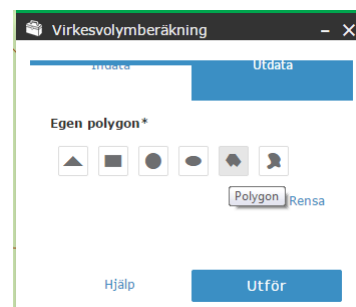
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## Different ways to search for properties

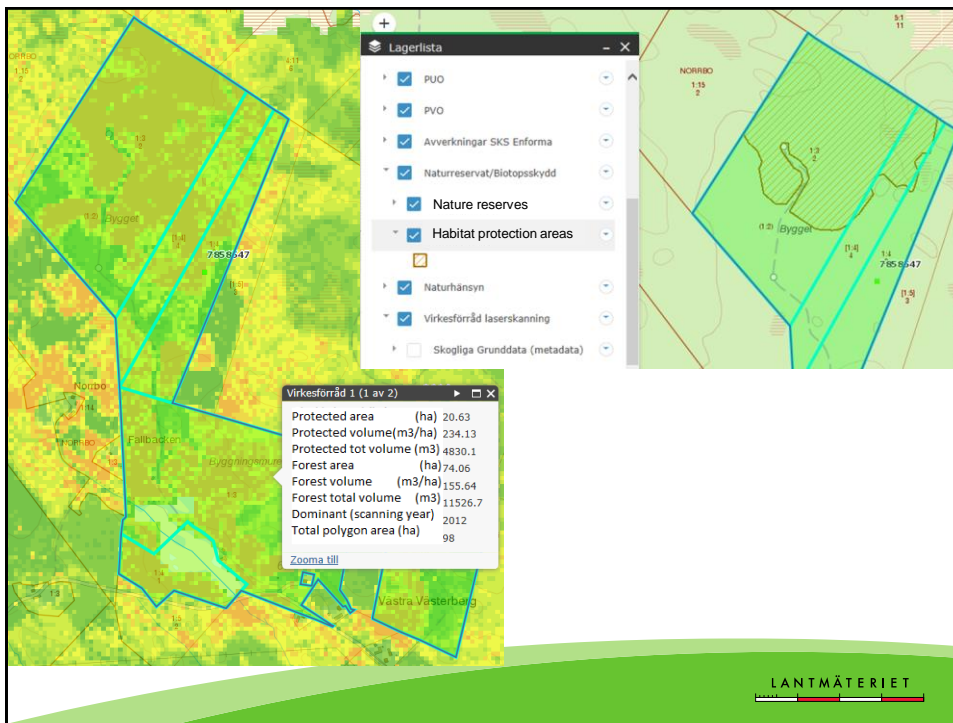
- It is possible to search for an individual property or assessed unit (consisting of one or more properties)



- It is also possible to do forest volume calculations from your own drawn figure/polygon



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## Conclusions

- Better prediction of the tax value when using this tool as an aid in the assessment in those cases when the growing forest volume is uncertain or missing
- Both the forest industry as well as other societal and environmental interests benefit greatly from the information the maps provide
- Probably a new laser nationwide scanning, starting in 2018, which can lead to continued development – maybe calculation of site quality index