

Mapping of cultural heritage ahead of forest operations with GIS and lidar data

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SKOGFORSK

Skogforsk in brief

Forestry and the Government in
collaboration

Applied research and development

R&D for sustainable and profitable
forestry

Over 100 employees, in three locations

Communication of knowledge

Research areas:

- Forest Production
- Wood Supply



Background

- **Problem:**
Almost half of all known cultural heritage in the Swedish forests are affected during forest operations.
- On top of that only about 50% of the cultural heritage in the forests are known.
- All cultural heritage (known or un-known) is protected by national laws



Photo: Josefina Sköld

Common cultural heritage in Swedish forests



- ❖ Charcoal pits
- ❖ Tar piles
- ❖ House foundation
- ❖ Old graves
- ❖ Farming cairn
- ❖ Rafting
- ❖ Traces from old abandoned industries

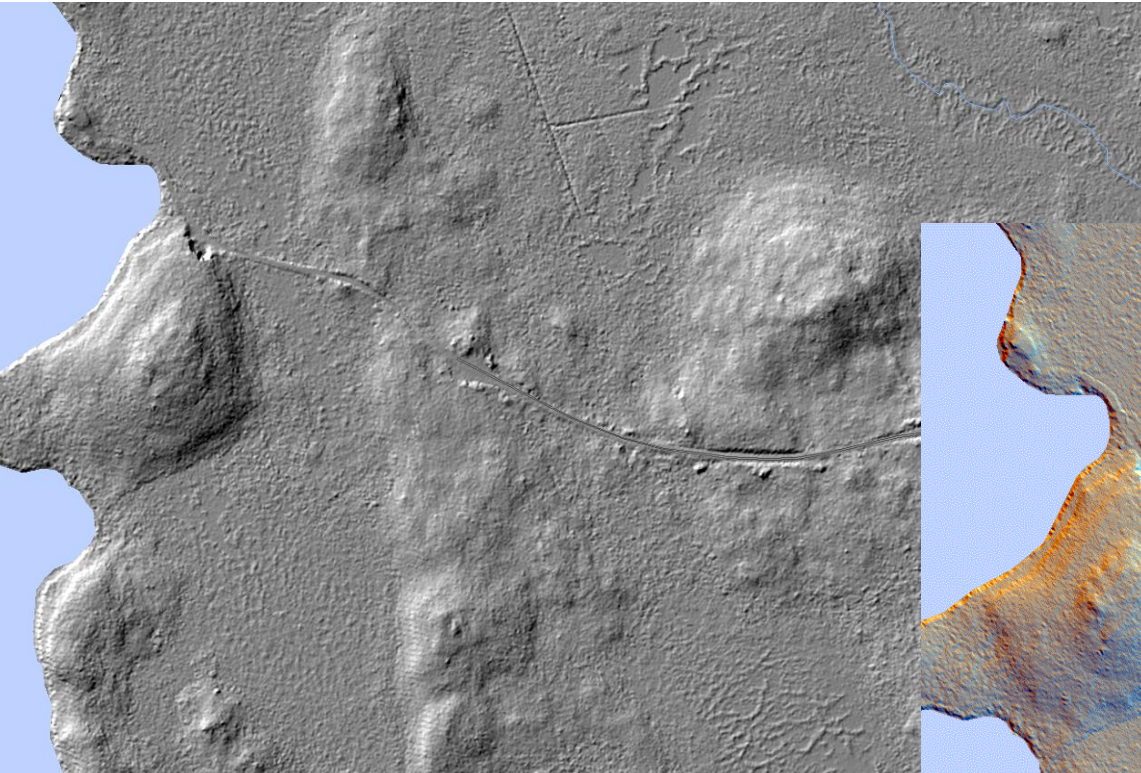
Decision support in forest planning - hypothesis

- Several common cultural heritage may be mapped prior to forest operations
- Nationwide lidar data provide decision support, maps for interpretation
- To be used together with available inventories of cultural heritage



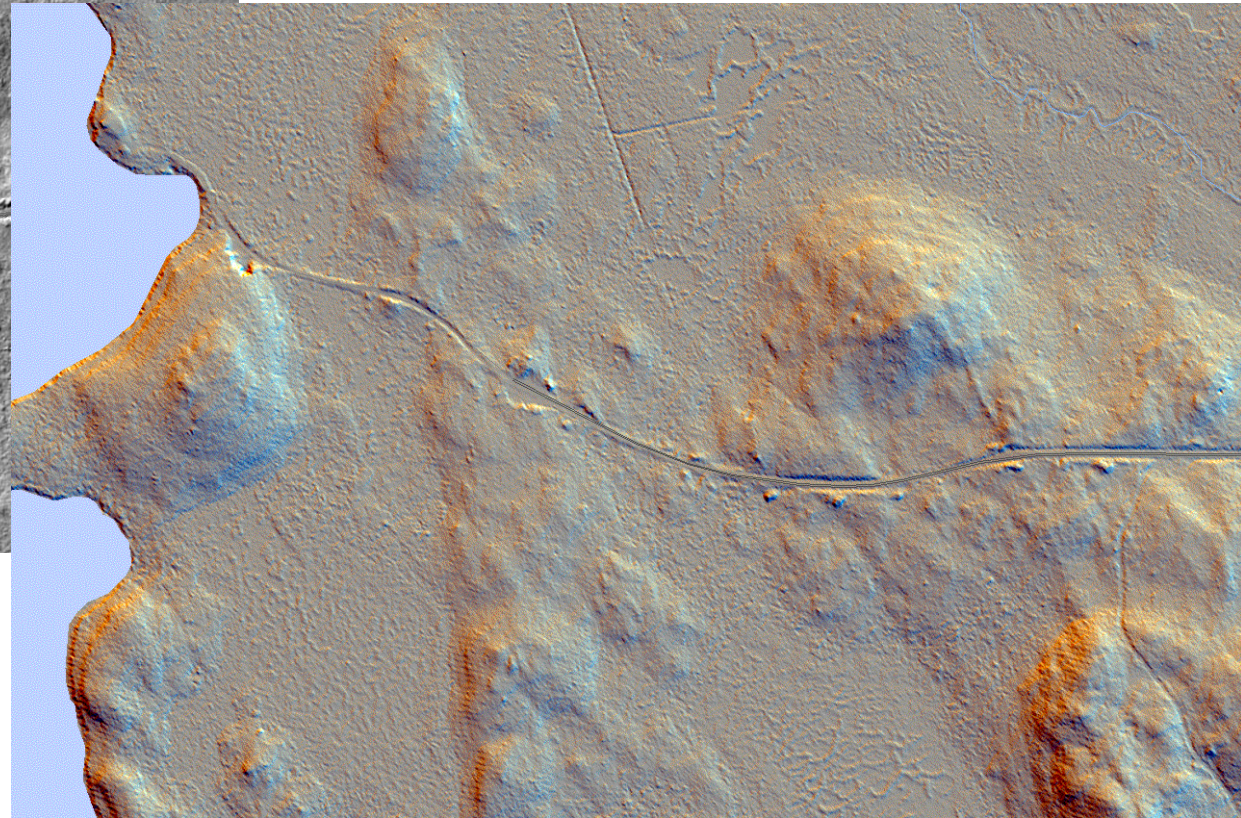
Digital elevation models

(0,5-1 hits/m²)



- **HS:** Hillshade (1m)

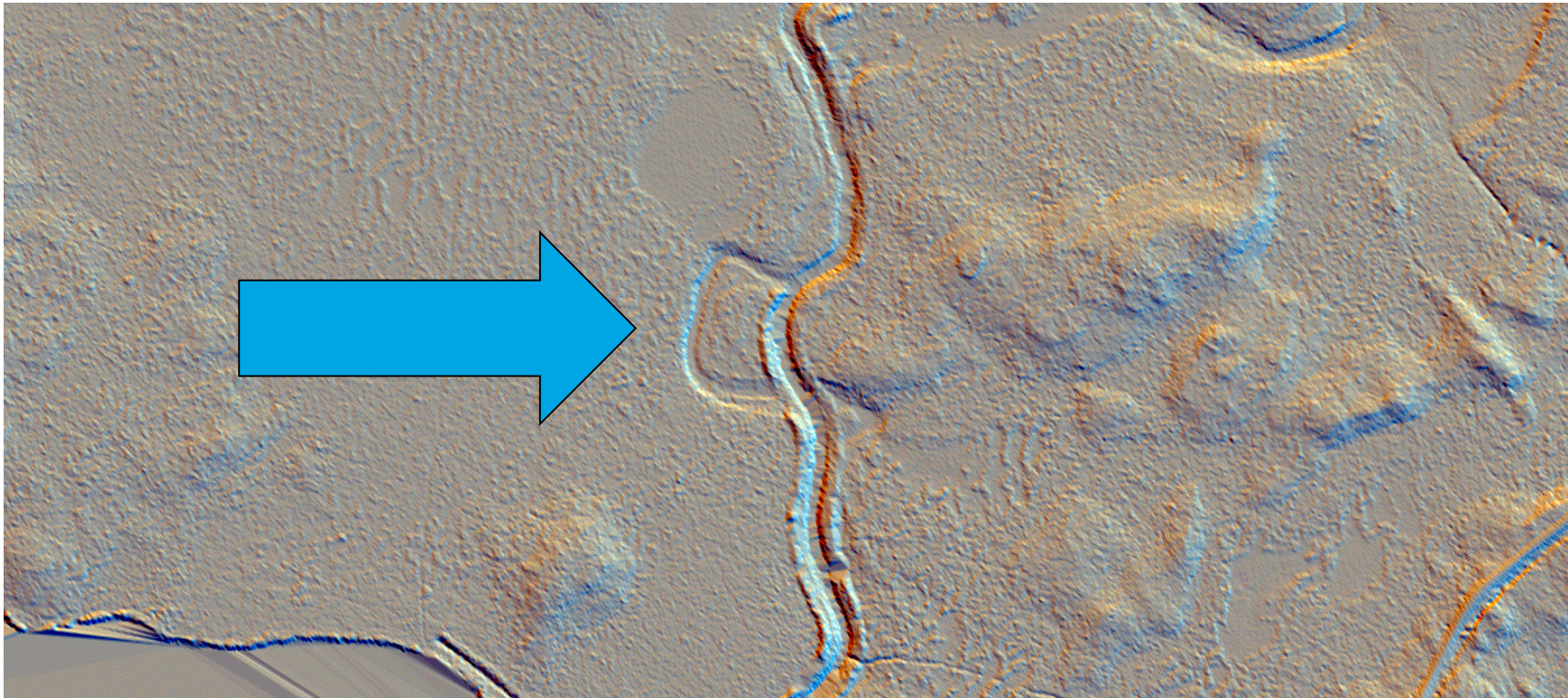
- **MHS:** Multipel hillshade (1 m)



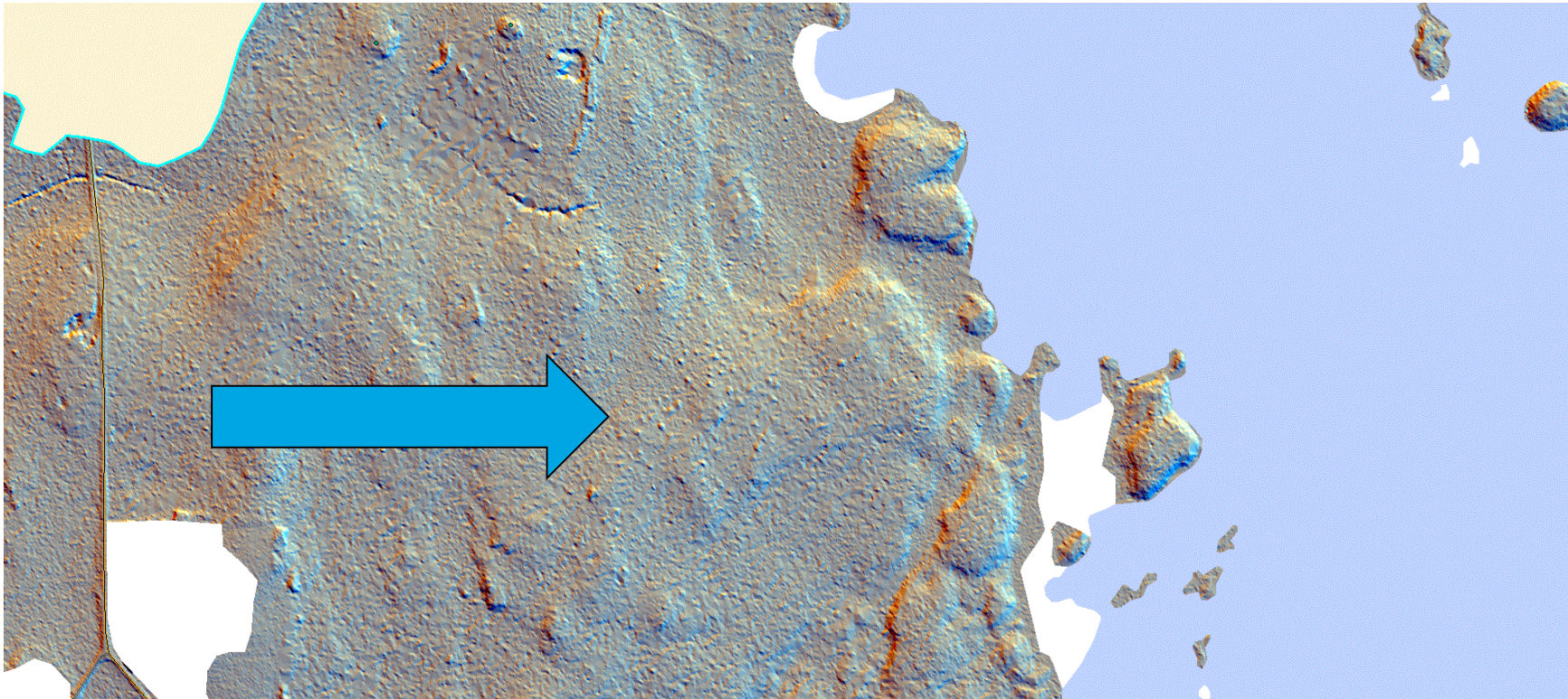
Charcoal pits



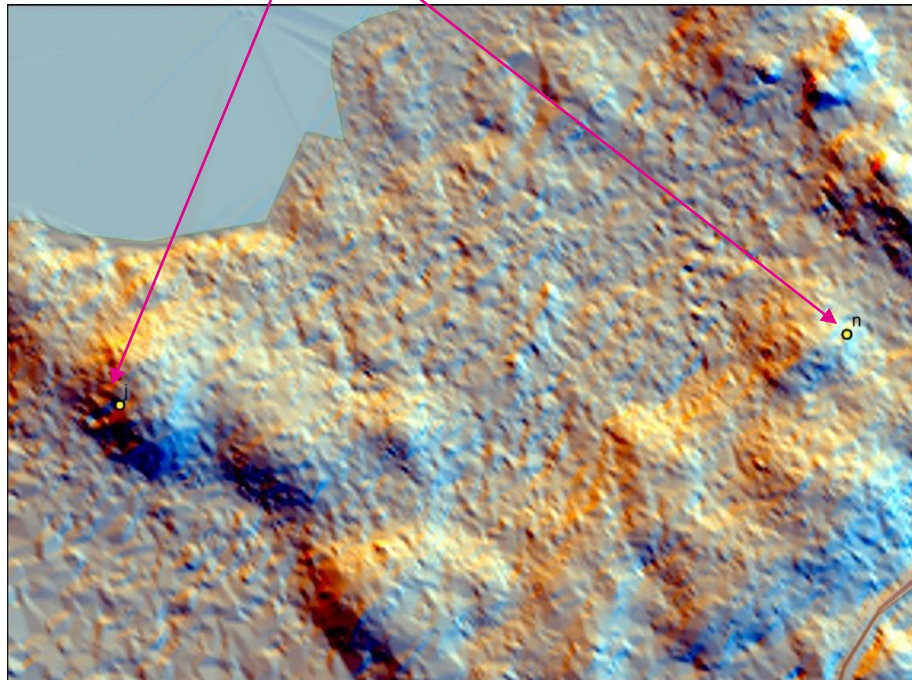
Former rafting



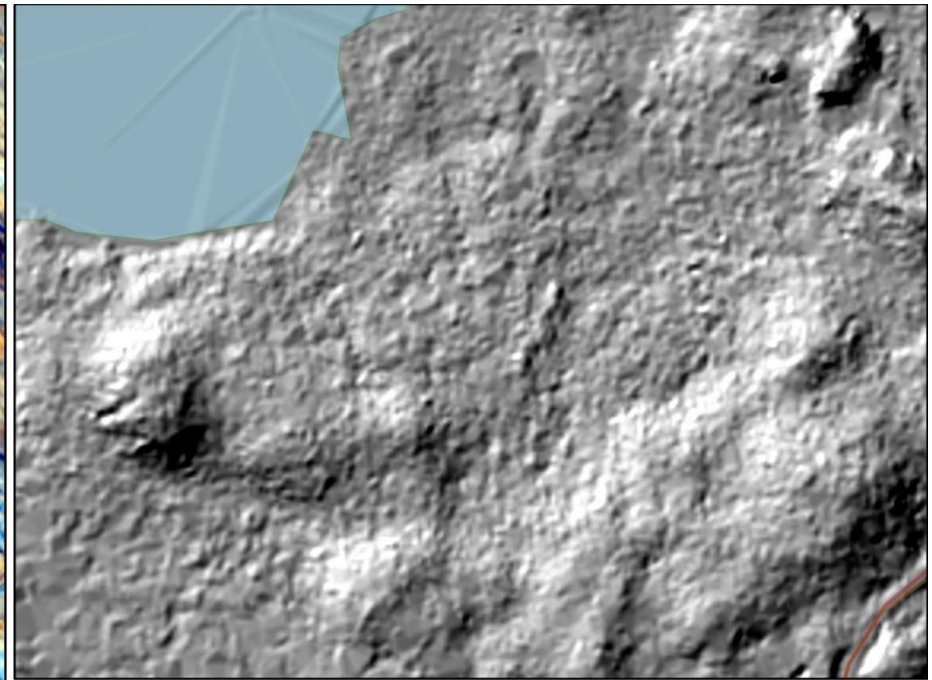
Farming cairns in forest



Tar piles



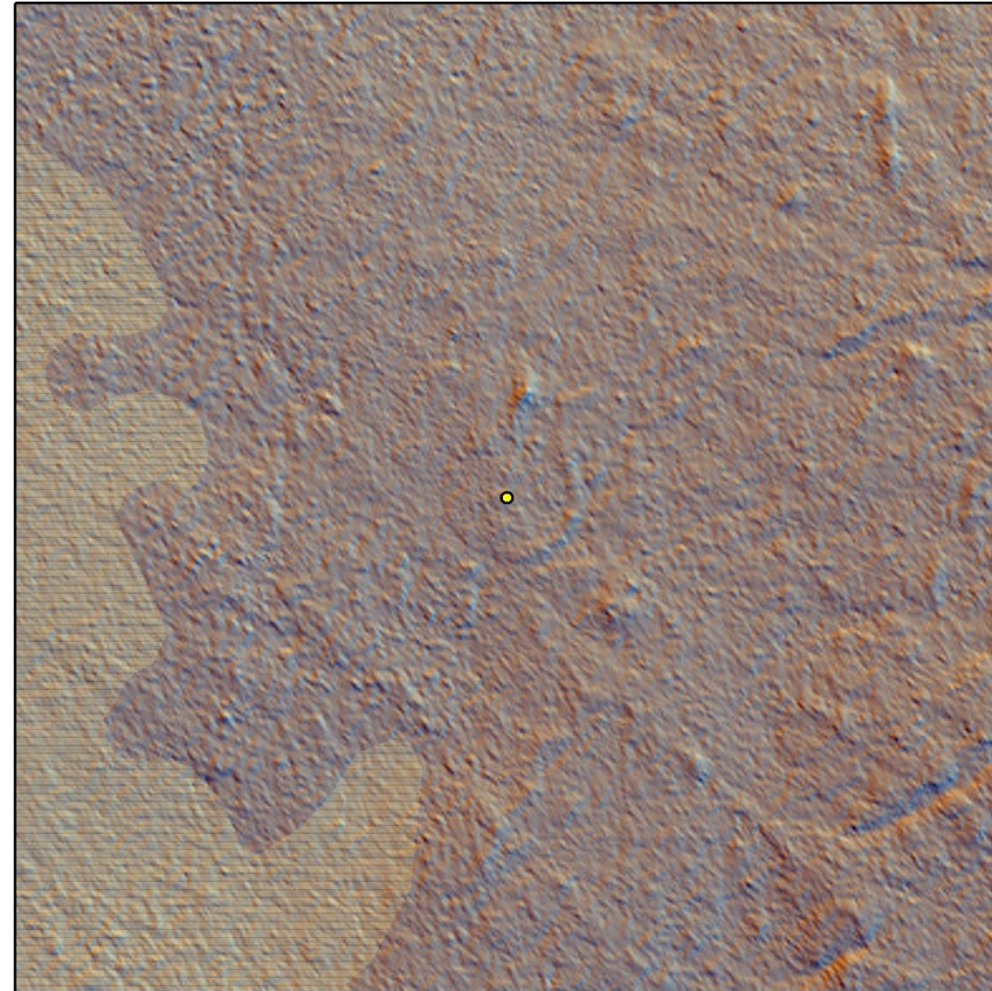
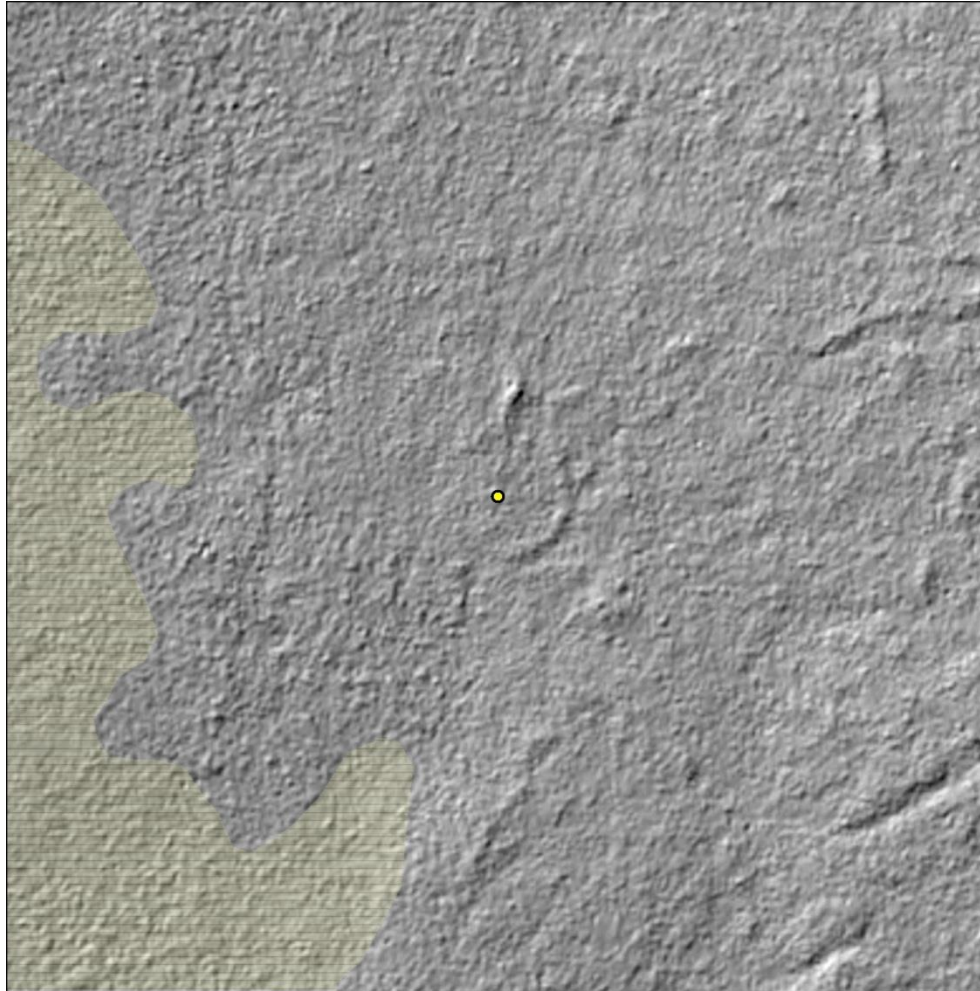
MHS



HS

1:2 000

Unknown artificial structures



0 25 50 100
m

1:3 000

Results from test mapping

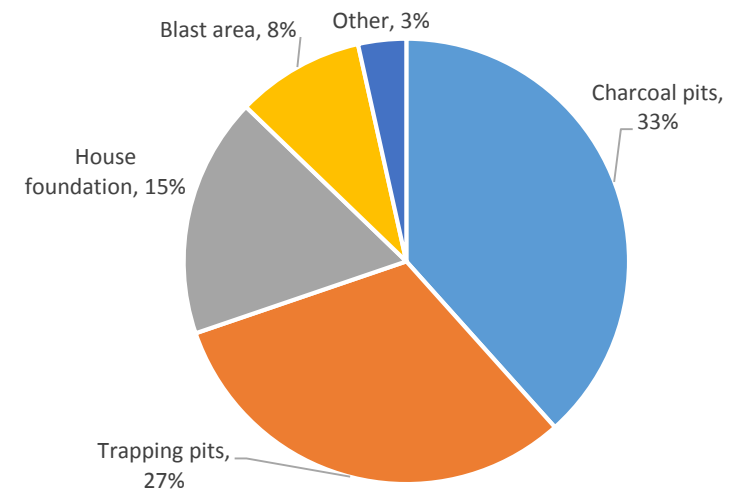
- 10 000 hectares (about 20 000 acres) in central Sweden
- Forested areas with main impact from forestry, hunting and reindeer herding
- Use of HS/MHS + orthophotos + maps by 3 different interpreters
- Newly inventoried areas as reference - 48 cultural heritages in previous inventory - mainly charcoal pits and trapping pits



Results

Interpretation	Number of findings
Definitive finding	172
Possible finding	203
Total	<u>375</u>
New inventory (by Agency)	248
Definitive findings	108
In inventory – not found	140
Found – not in inventory	64

- What did we miss?



- What did we find (not in new inventory)?
 - 90 % Trapping and charcoal pits

75 % of those not possible to find in HS/MHS

Preliminary findings

- Interpretation in HS/MHS intuitive
- Unknown cultural heritages is found to large extent
- Very useful in pre-planning of forest operations - field validation necessary
- Image quality important
- Some heritages impossible to map with available remote sensing (rock carvings, house foundations, ...)



Pile of stones in former agricultural land

Currently in operational demonstration at two Swedish forest companies