



RUOKAVIRASTO
Livsmedelsverket • Finnish Food Authority

NoBa Land Cover Retriever helps determining areas to be used for EFSA tools

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EPPO Workshop on Risk Based Sampling

27.4.2023



Introduction

- Statistical assessment and planning of quarantine pest surveys require data on:
 - The target population of the pest
 - The potential entry sites of the pest
- often impossible to get without GIS skills and special programs



Picture: A-M Alanko



What is NoBa Land Cover Retriever (NoBa LCR)?

- NoBa LCR is an easy-to-use web application for retrieving **Corine land cover** data that is needed in planning **statistically sound surveys of quarantine pests**
- NoBa LCR is written with R and its R package 'shiny'
 - **No R or GIS skills required**
- The app was developed in the risk assessment unit of the Finnish Food Authority (Juha Tuomola et al.)*
- The countries currently included in the app are Estonia, Finland, Lithuania, Norway and Sweden

* Tuomola J, Marinova-Todorova M and Hannunen S, 2023. NoBa Land Cover Retriever - A tool for retrieving land cover data needed in statistical assessment and planning of quarantine pest surveys. Finnish Food Authority. The app is available at <http://www.noba-lcr.rahtiapp.fi/>



Agrilus anxius trap close to Vuosaari port
(picture: Finnish Food Authority)



What is Corine Land Cover (CLC)?

- CLC is the European land cover database of the Copernicus Land Monitoring Service (CLMS) that is implemented by the European Environment Agency (EEA) and the European Commission DG Joint Research Centre (JRC)
 - CLC covers whole countries
 - Very high resolution (100 ×100m)
 - Suitable when data is needed on artificial areas or coniferous and broadleaved forests
 - **Not suitable when data is needed on specific plant species**
 - <https://land.copernicus.eu/pan-european/corine-land-cover/clc2018>
- NoBa LCR uses the CLC 2018 in a 100m GeoTIFFformat*



Picture: A-M Alanko



Retrieving data needed for a risk based survey design

- NoBa LCR allows retrieving data needed for two risk-based survey design options
- Both options require data on **entry sites** and **target population**
 - **Entry site:**
 - A site where the probability of pest introduction is elevated (for example harbors, airports)
 - **Target population:**
 - The population to which the results of the survey will be generalized (for example coniferous forests)



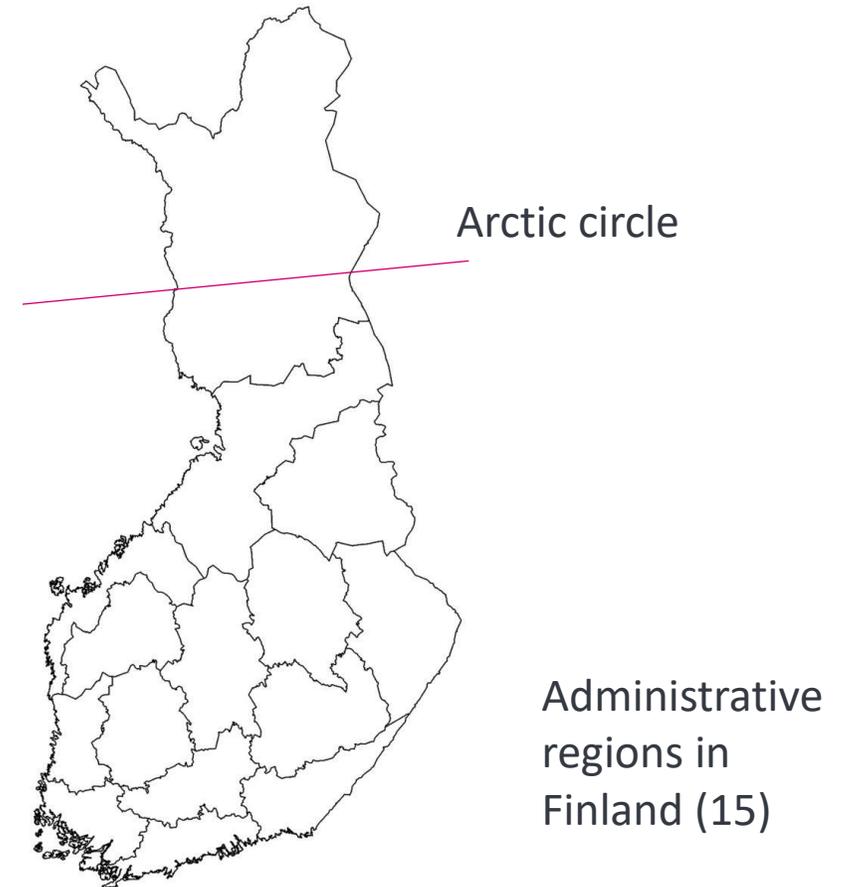
Wood chips at a waste station

(picture: Finnish Food Authority)



Option 1 for a risk-based survey design

- The relative risk of each administrative region is assumed to depend on the area or number of entry sites in the region.
- For this option, data is needed on
 - The area or number of entry sites per region
 - The area of the target population per region





Option 2 for a risk-based survey design

- The target population is divided into **risk areas** that are close to entry sites and **baseline areas** that are further away from entry sites.
- For this option, data is needed on
 - The area or number of entry sites per region
 - The area of the target population separately for risk areas and baseline areas per region



- Entry sites
- Risk areas
- Baseline areas
- Other land areas
- Water bodies

How the NoBa LCR app looks like?



1. Choose a country

Finland

2. Define the data to be retrieved

Data on entry sites

No Yes

The area of entry sites per region
 The number of entry sites per region

Data on target population

No Yes

The area of target population

per region
 separately for risk areas and baseline areas per region

3. Define entry sites

Artificial areas

- Continuous urban fabric
- Discontinuous urban fabric
- Industrial or commercial units
- Road and rail networks and associated land
- Port areas
- Airports
- Mineral extraction sites
- Dump sites
- Construction sites
- Green urban areas
- Sport and leisure facilities

Agricultural areas

- Non-irrigated arable land
- Permanently irrigated land
- Vineyards
- Fruit trees and berry plantations
- Pastures
- Annual crops associated with permanent crops
- Complex cultivation patterns
- Land principally occupied by agriculture with significant areas of natural vegetation
- Agro-forestry areas

Forest and semi-natural areas

- Broad-leaved forest
- Coniferous forest
- Mixed forest
- Natural grasslands
- Moors and heathland
- Sclerophyllous vegetation
- Transitional woodland-shrub
- Sparsely vegetated areas
- Burnt areas

Wetlands

- Inland marshes
- Peat bogs

4. Define target population

Artificial areas

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Link to the app:
<https://noba-lcr.rahtiapp.fi/>



Retrieving data

- Results can be viewed
 - On a map and a table
 - Entry sites + target population
 - Entry sites + target population + risk areas + baseline areas
 - On a table
 - To find out the areas quickly
 - What is the area of coniferous forests?
 - What is the area of industrial/commercial units?
 - To see the number of entry sites per region
 - How many airports or harbors is there?

Do you want to view the results on an interactive map?

No Yes

Please note that retrieving take much longer if the results are presented on a map.

Retrieve data and explore results

RETRIEVE

Please define the data to be retrieved

Please note that retrieving may take several minutes.

DO NOT SWITCH BETWEEN THE TABS WHEN THE APP IS RETRIEVING!



Defining entry sites and target population

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Finland

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4. Define target population

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Forest and semi-natural areas

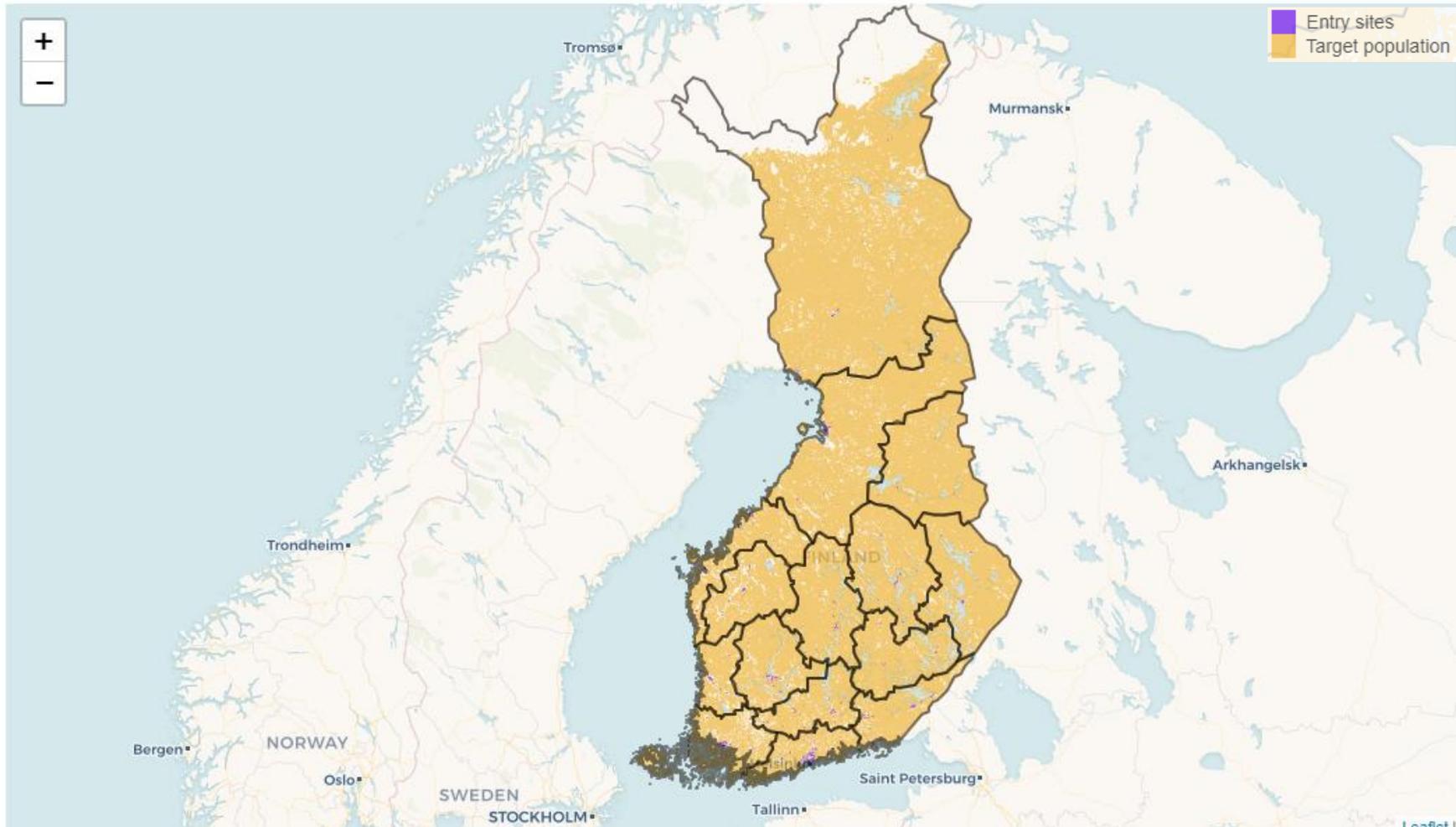
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Wetlands

Inland marshes
 Peat bogs

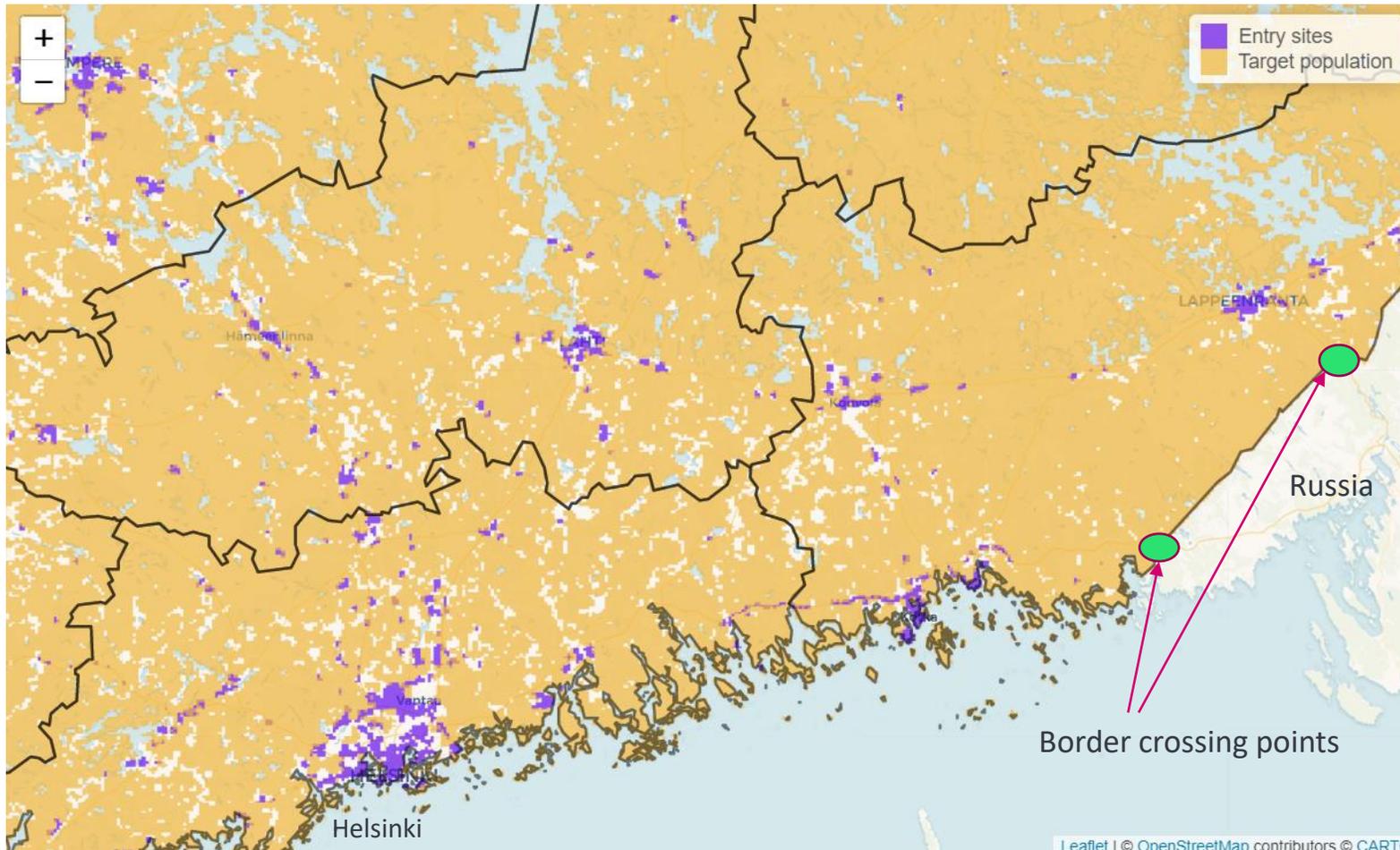
Example: How the coniferous or mixed forests are situated around industrial areas, road and rail networks, port areas and airports?

Entry sites and target population (coniferous/mixed forests) on a map





Entry sites (purple) and coniferous forests (yellow)



The areas of entry sites and target population per region:

Regions	Entry sites, km2	Target population, km2	Entry sites, number
Uusimaa	164	5167	16361
Varsinais-Suomi	66	5685	6554
Satakunta	52	4993	5160
Hame	60	7066	5979
Pirkanmaa	70	9491	6970
Kaakkois-Suomi	79	6807	7937
Etela-Savo	25	10392	2463
Pohjois-Savo	42	13184	4182
Pohjois-Karjala	27	15007	2663
Keski-Suomi	41	12856	4148
Etela-Pohjanmaa	38	8471	3787
Pohjanmaa	49	8176	4872
Pohjois-Pohjanmaa	64	24952	6394
Kainuu	13	15543	1287
Lappi	46	54729	4587
Ahvenanmaa	4	799	378
Whole_country	837	203319	83722



Risk areas and baseline areas on a map

1. Choose a country

Finland

2. Define the data to be retrieved

Data on entry sites
 No Yes

The area of entry sites per region
 The number of entry sites per region

Data on target population
 No Yes

The area of target population
 per region
 separately for risk areas and baseline areas per region

Define the radius of risk areas (km)

5

3. Define entry sites

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Forest and semi-natural areas

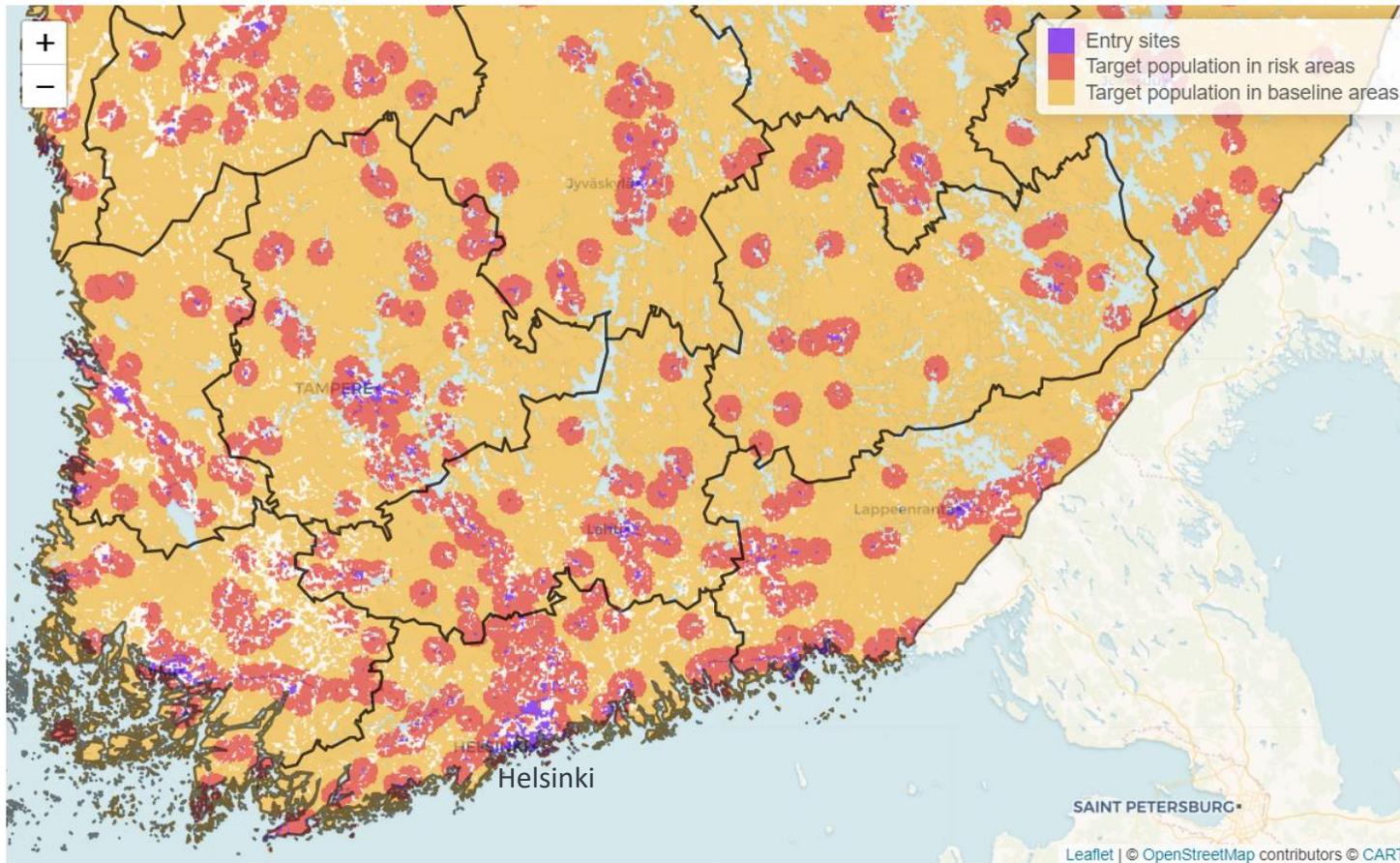
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- Natural grasslands
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- Transitional woodland-shrub
- Sparsely vegetated areas
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Wetlands

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Risk areas 5km around entry sites and baseline areas



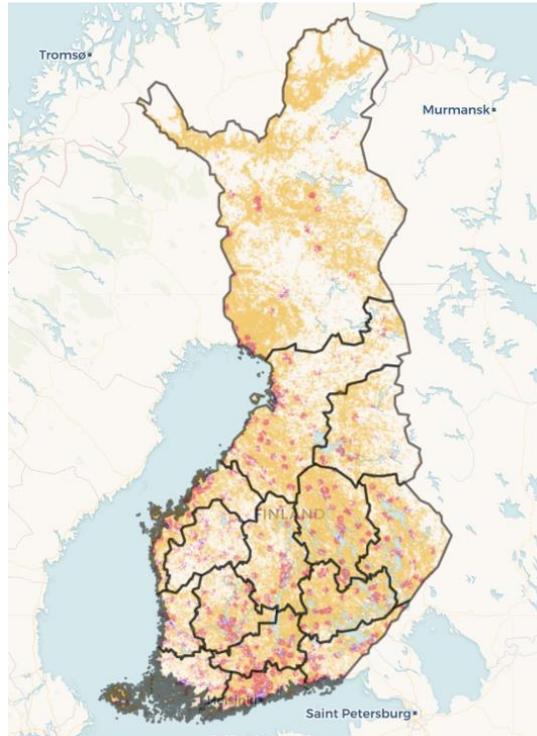
Regions	Entry sites, km2	Target population in risk areas, km2	Target population in baseline areas, km2
Uusimaa	30	664	4503
Varsinais-Suomi	12	515	5170
Satakunta	9	164	4829
Hame	2	183	6883
Pirkanmaa	4	226	9265
Kaakkois-Suomi	25	660	6147
Etela-Savo	4	246	10146
Pohjois-Savo	6	224	12960
Pohjois-Karjala	3	205	14802
Keski-Suomi	8	170	12686
Etela-Pohjanmaa	4	245	8226
Pohjanmaa	10	299	7877
Pohjois-Pohjanmaa	12	345	24607
Kainuu	2	53	15490
Lappi	15	505	54224
Ahvenanmaa	2	72	727
Whole_country	148	4776	198543



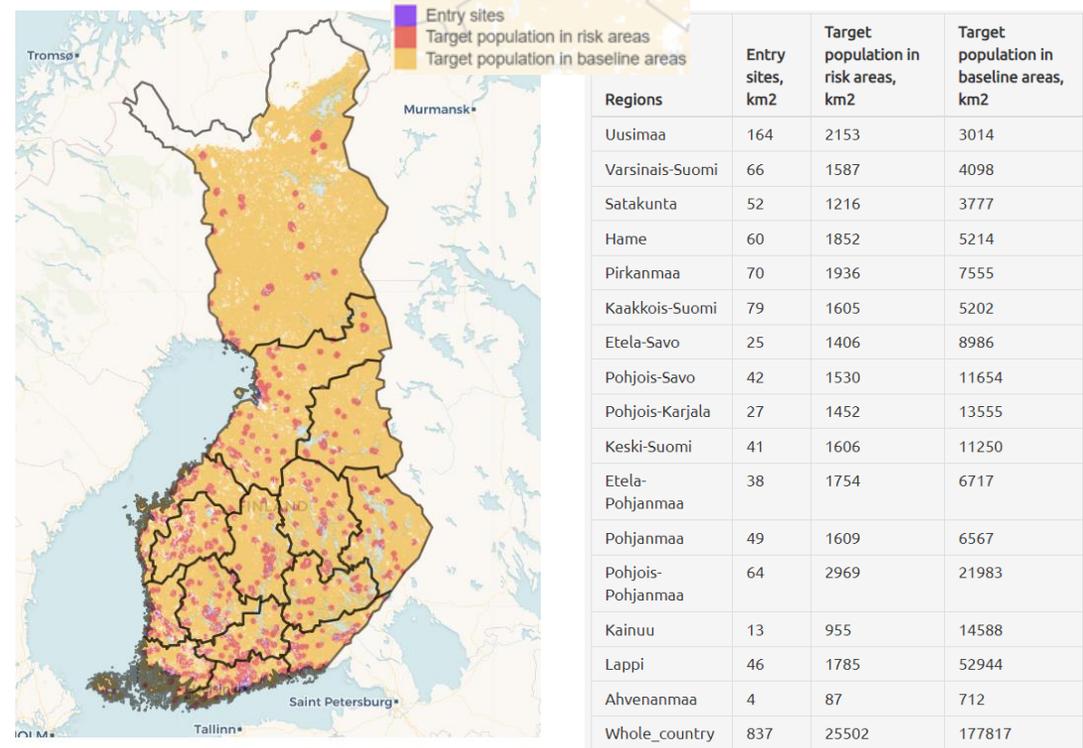
The area of broad leaf forests and coniferous forests

Broad leaf forests:

Regions	Entry sites, km2	Target population in risk areas, km2	Target population in baseline areas, km2
Uusimaa	164	1361	1487
Varsinais-Suomi	66	353	830
Satakunta	52	315	873
Hame	60	1119	2861
Pirkanmaa	70	867	2436
Kaakkois-Suomi	79	719	1619
Etela-Savo	25	768	4505
Pohjois-Savo	42	1031	6547
Pohjois-Karjala	27	709	5022
Keski-Suomi	41	639	3458
Etela-Pohjanmaa	38	357	1196
Pohjanmaa	49	808	2729
Pohjois-Pohjanmaa	64	1157	6460
Kainuu	13	269	2919
Lappi	46	679	16786
Ahvenanmaa	4	69	629
Whole_country	837	11220	60357

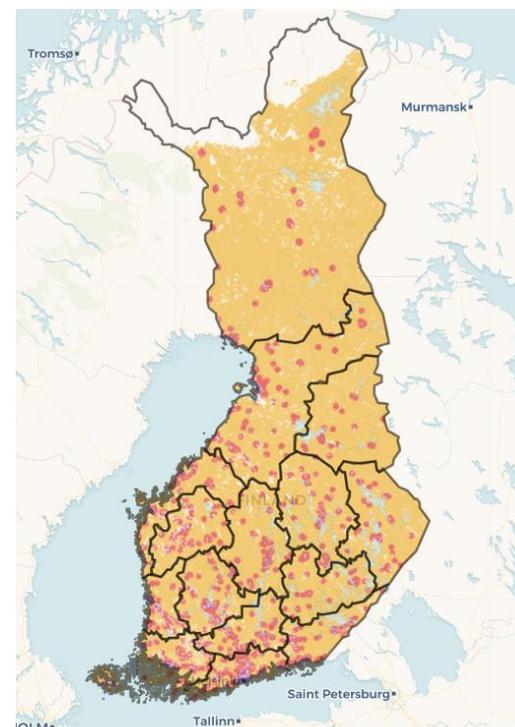
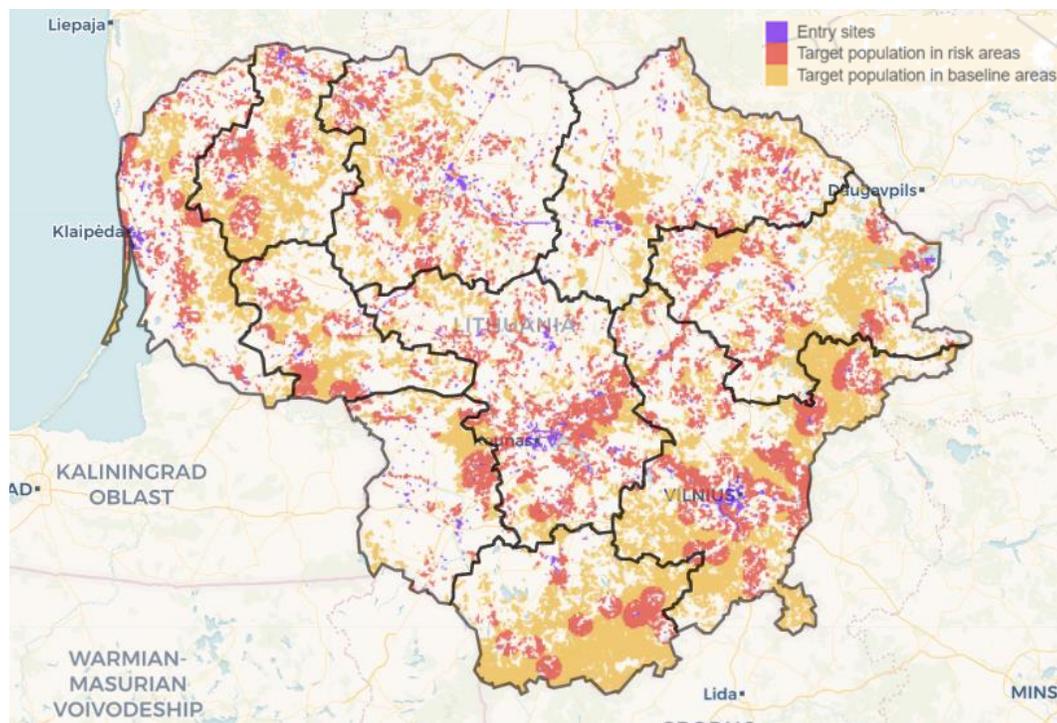


Coniferous forests:





Coniferous forests in Lithuania and Finland





Using own data for entry sites

CSV table including coordinates

1. Choose a country

Finland

2. Define the data to be retrieved

Data on entry sites

No Yes

The area of entry sites per region

The number of entry sites per region

Data on target population

No Yes

The area of target population

per region

separately for risk areas and baseline areas per region

3. Define entry sites

Do you want to use your own data for entry sites?

No Yes

Upload the data as a csv file

Browse... No file selected

Artificial areas

Continuous urban fabric

Discontinuous urban fabric

Industrial or commercial units

Road and rail networks and associated land

Port areas

Airports

Mineral extraction sites

Dump sites

Construction sites

Green urban areas

Sport and leisure facilities

Agricultural areas

Non-irrigated arable land

Permanently irrigated land

Vineyards

Fruit trees and berry plantations

Pastures

Annual crops associated with permanent crops

Complex cultivation patterns

Land principally occupied by agriculture with significant areas of natural vegetation

4. Define target population

Artificial areas

Continuous urban fabric

Discontinuous urban fabric

Industrial or commercial units

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Land principally occupied by agriculture with significant areas of natural vegetation

Agro-forestry areas

Forest and semi-natural areas

Broad-leaved forest

Coniferous forest

Mixed forest

Natural grasslands

Moors and heathland

Sclerophyllous vegetation



Example: adding own entry sites for surveys on nurseries

Surveys of pests that might spread with coniferous plants for planting

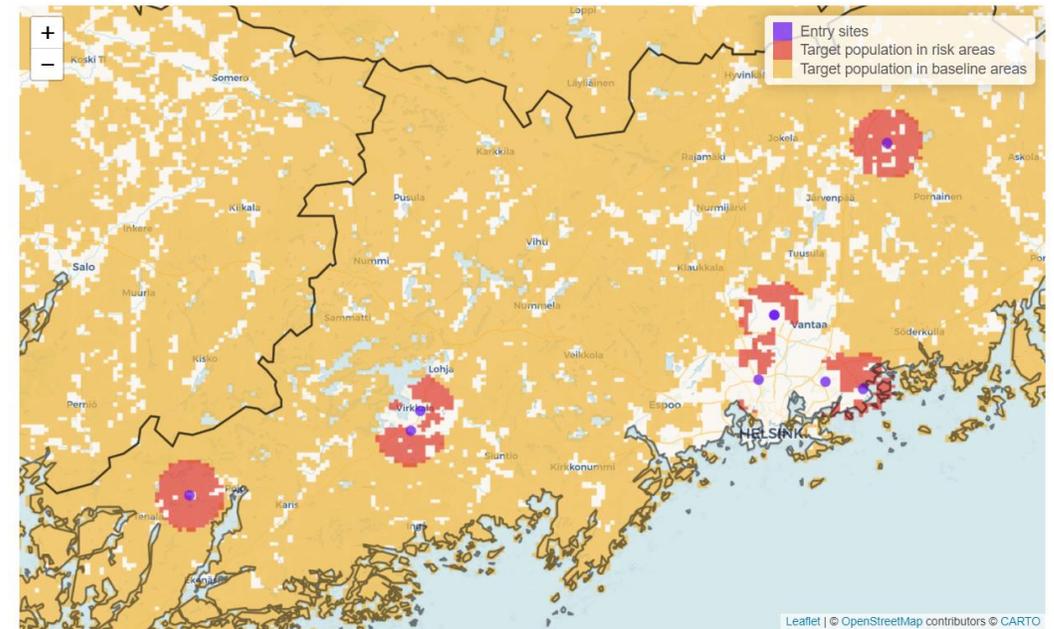
- *Cronartium* spp.,
- *Choristoneura fumiferana* etc.)

Entry sites:

- Six nurseries
- Helsinki-Vantaa airport
- Vuosaari harbor in Helsinki

Target population:

- Coniferous forests
- Mixed forests



Regions	Entry sites, number	Target population in risk areas, km2	Target population in baseline areas, km2
Uusimaa	9	155	5012



Downloading the results

- The results can be downloaded in the following formats:
 - A summary table of the retrieved data
 - The retrieved data in GIS formats
 - The parameter values used for retrieving the data



Picture: A-M Alanko



Conclusions

- The NoBa LCR app helps to assess the areas to be used in EFSA tools
 - The numbers of areas on a table
 - Visual map
 - Especially suitable for forest pest surveys
- Results can be transferred to GIS-programs to build permanent map of entry sites, target population and risk areas



Picture: Finnish Food Authority

NoBa Land Cover Retriever was developed as part of a project '*Assessing the confidence in pest freedom gained in the past pine wood nematode surveys*'.

The project is a co-operation between

- Finnish Food Authority
- Estonian Agriculture and Food Board (EAFB)
- State Plant Service under the Ministry of Agriculture of the Republic of Lithuania (SPSMoA)
- Norwegian Scientific Committee for Food and Environment (VKM)
- Swedish University of Agricultural Sciences (SLU)

The project is funded by the European Food Safety Authority (EFSA) Partnering grant (GP/EFSA/ENCO/2020/03), yet EFSA is not responsible for any use that may be made of the information contained in the app.



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AGRICULTURE AND FOOD BOARD





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Thank you!

Technical questions about the app:

Juha Tuomola

juha.tuomola(a)ruokavirasto.fi

Questions regarding this presentation:

aino-maija.alanko(a)ruokavirasto.fi