UNIVERSITÀ
DEGLI STUDI
FIRENZE

AA 2018-19

INVENTARI FORESTALI

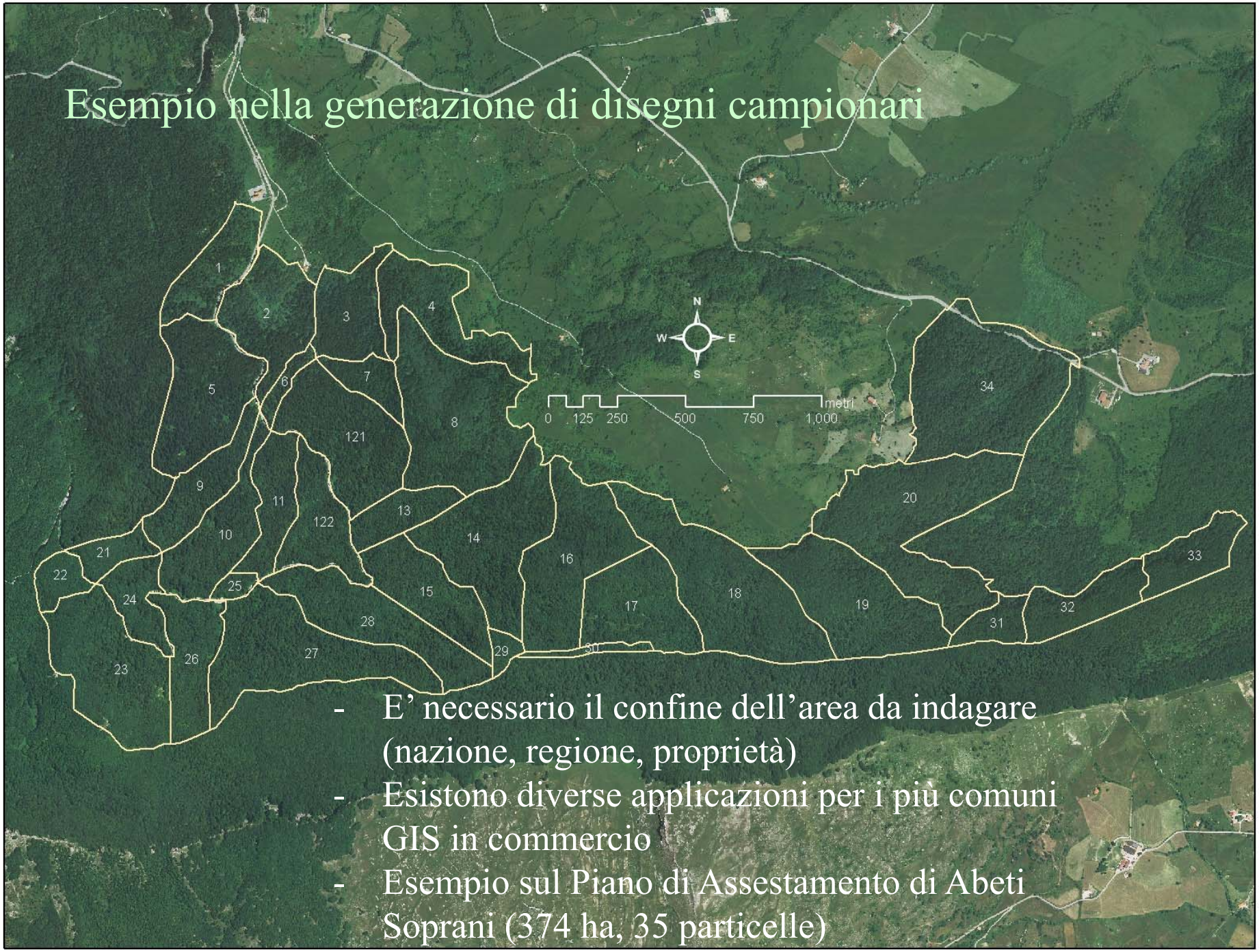
Dispensa 5

Esempi di campionamento

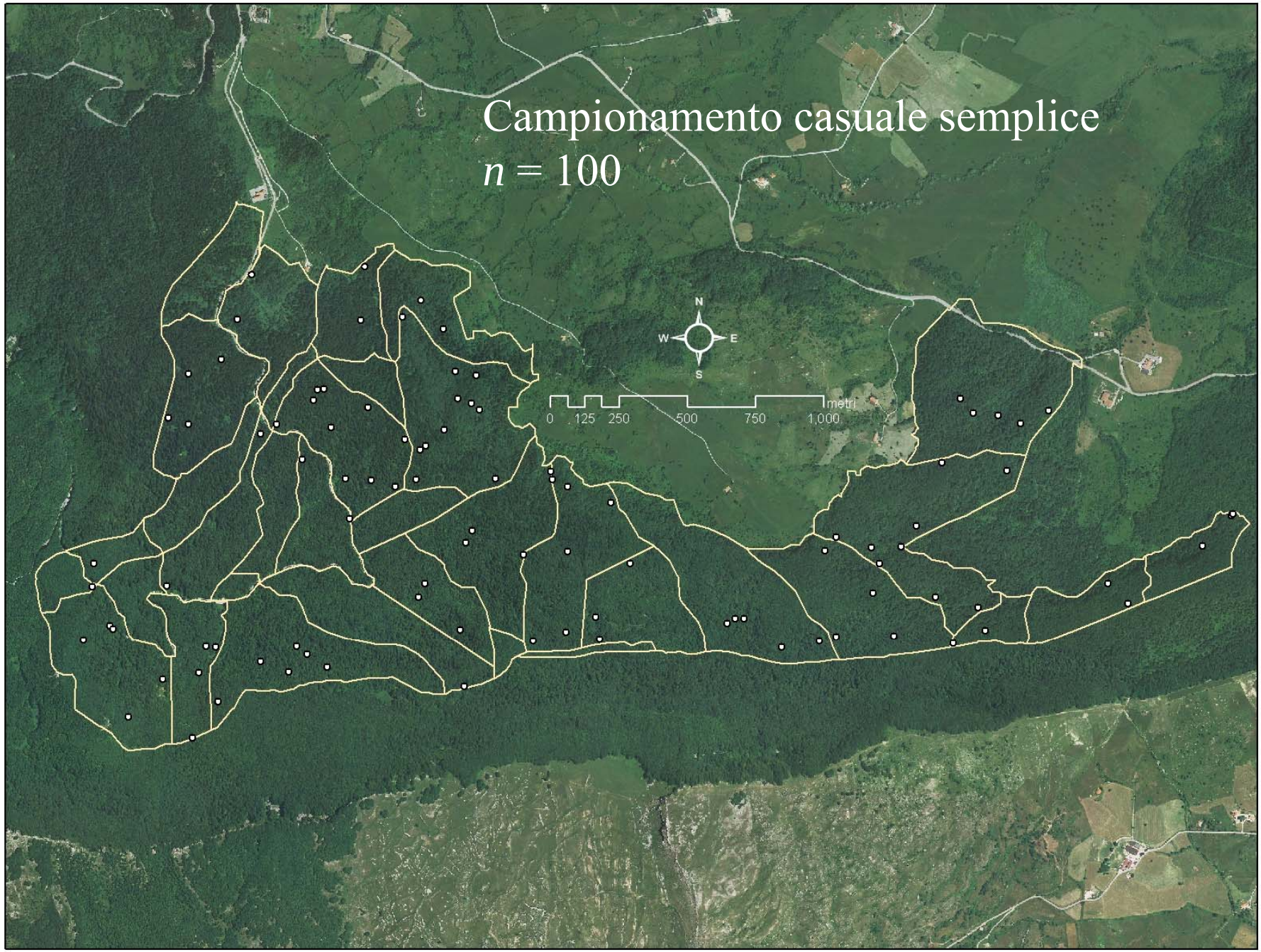
Docente:

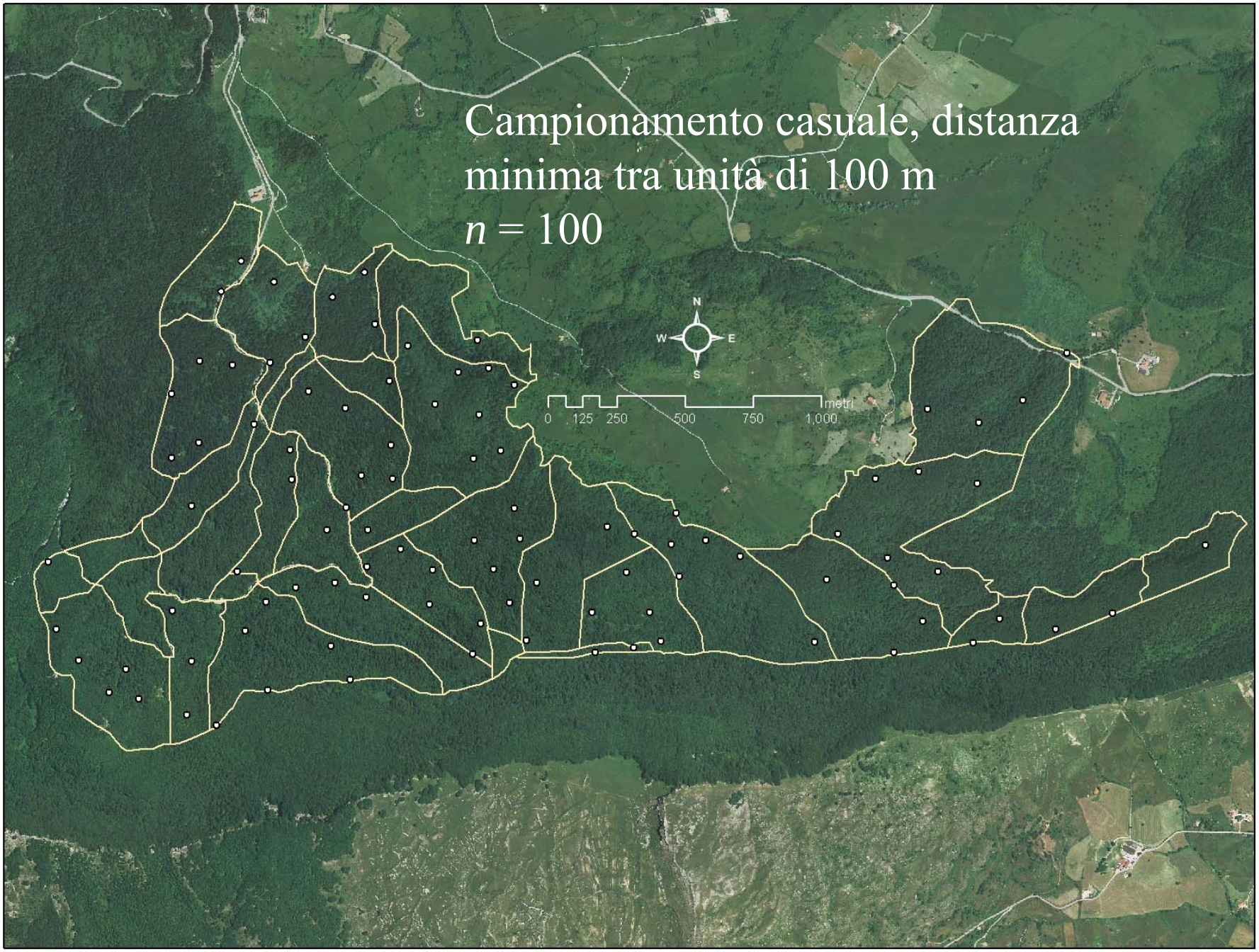
Prof. Gherardo CHIRICI
gherardo.chirici@unifi.it

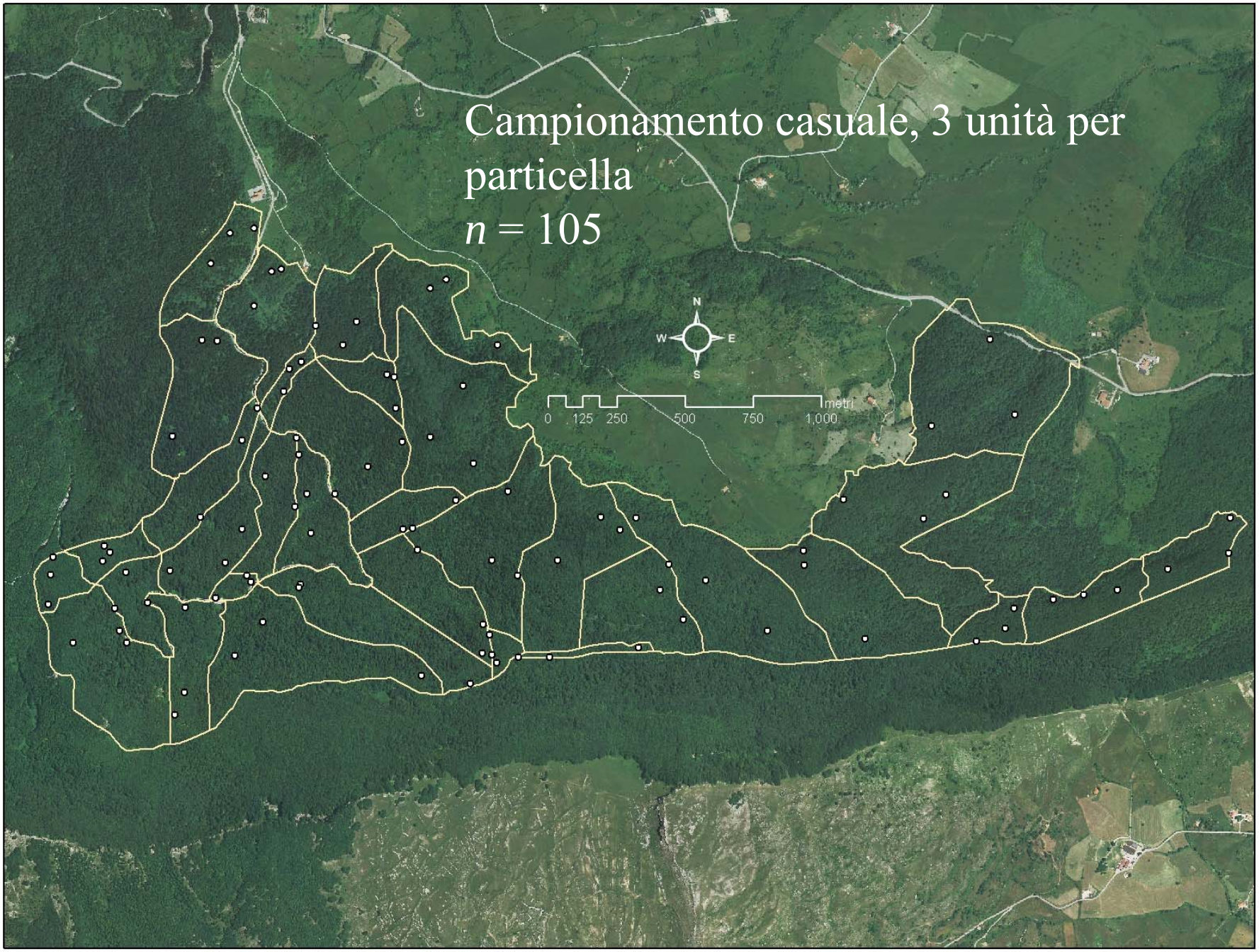
Esempio nella generazione di disegni campionari



- E’ necessario il confine dell’area da indagare (nazione, regione, proprietà)
- Esistono diverse applicazioni per i più comuni GIS in commercio
- Esempio sul Piano di Assestamento di Abeti Soprani (374 ha, 35 particelle)


Campionamento casuale semplice
n = 100
N
W
E
S
0 125 250 500 750 1,000
metri


Campionamento casuale, distanza minima tra unità di 100 m
n = 100
N
W
E
S
0 125 250 500 750 1,000
metri


Campionamento casuale, 3 unità per particella
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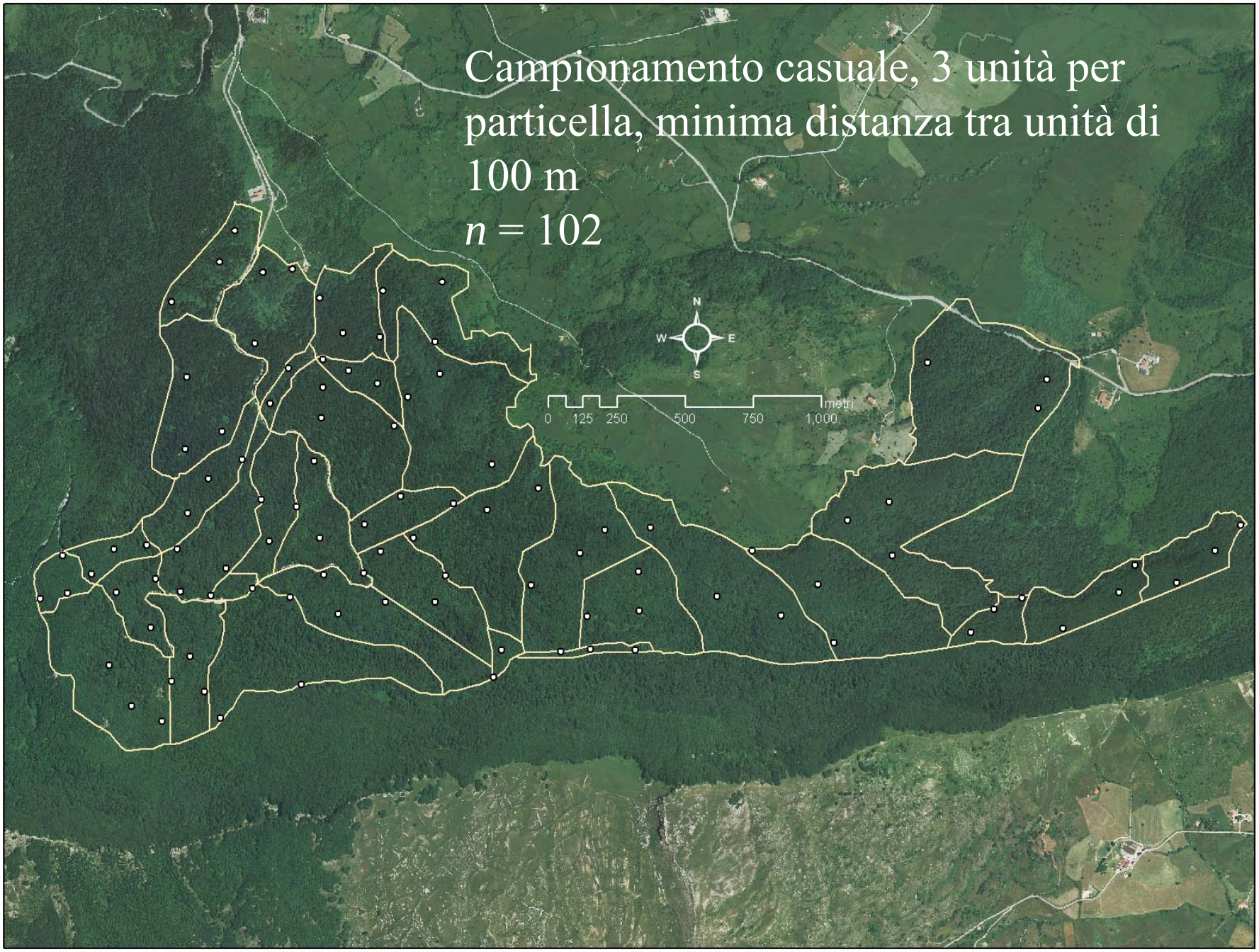
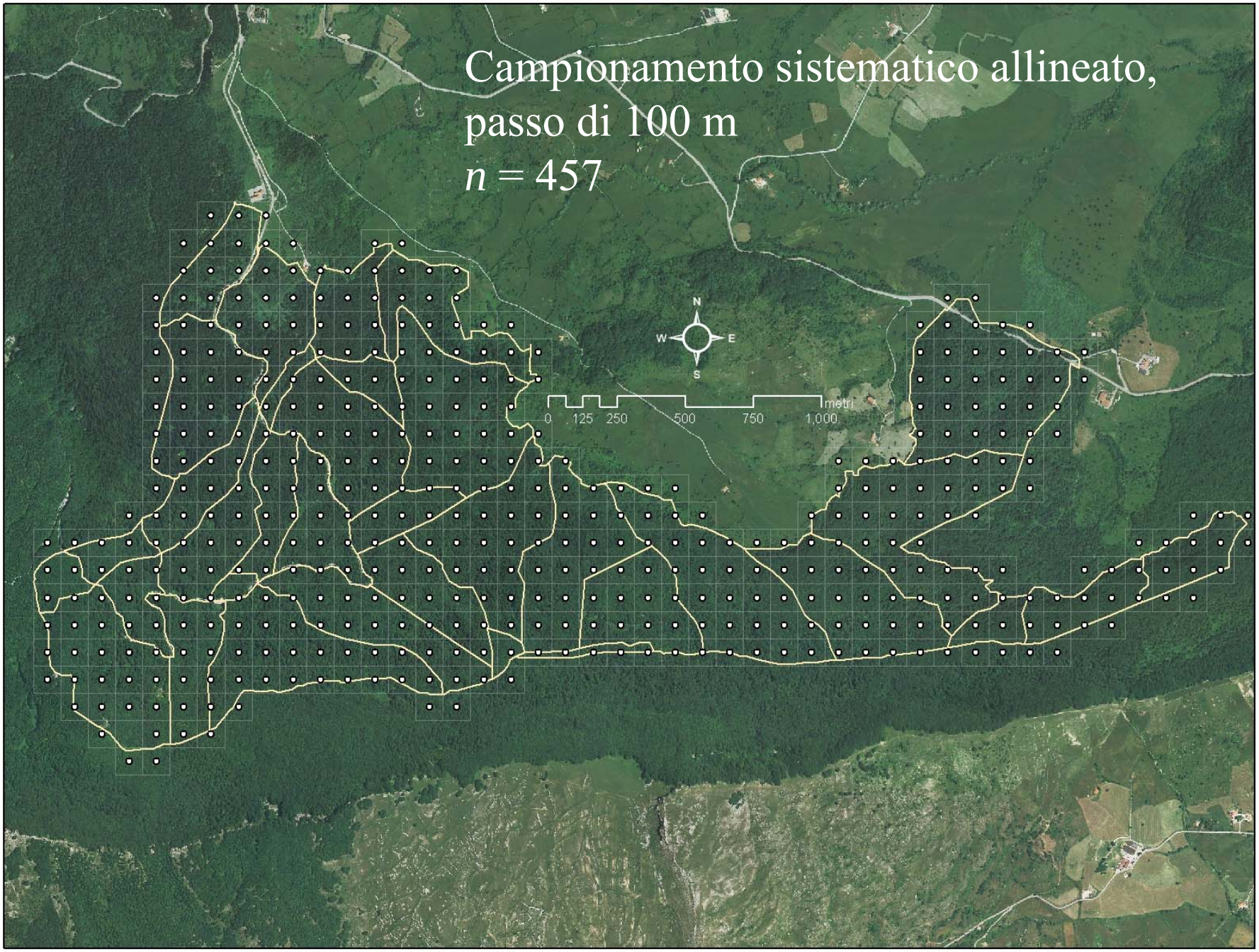
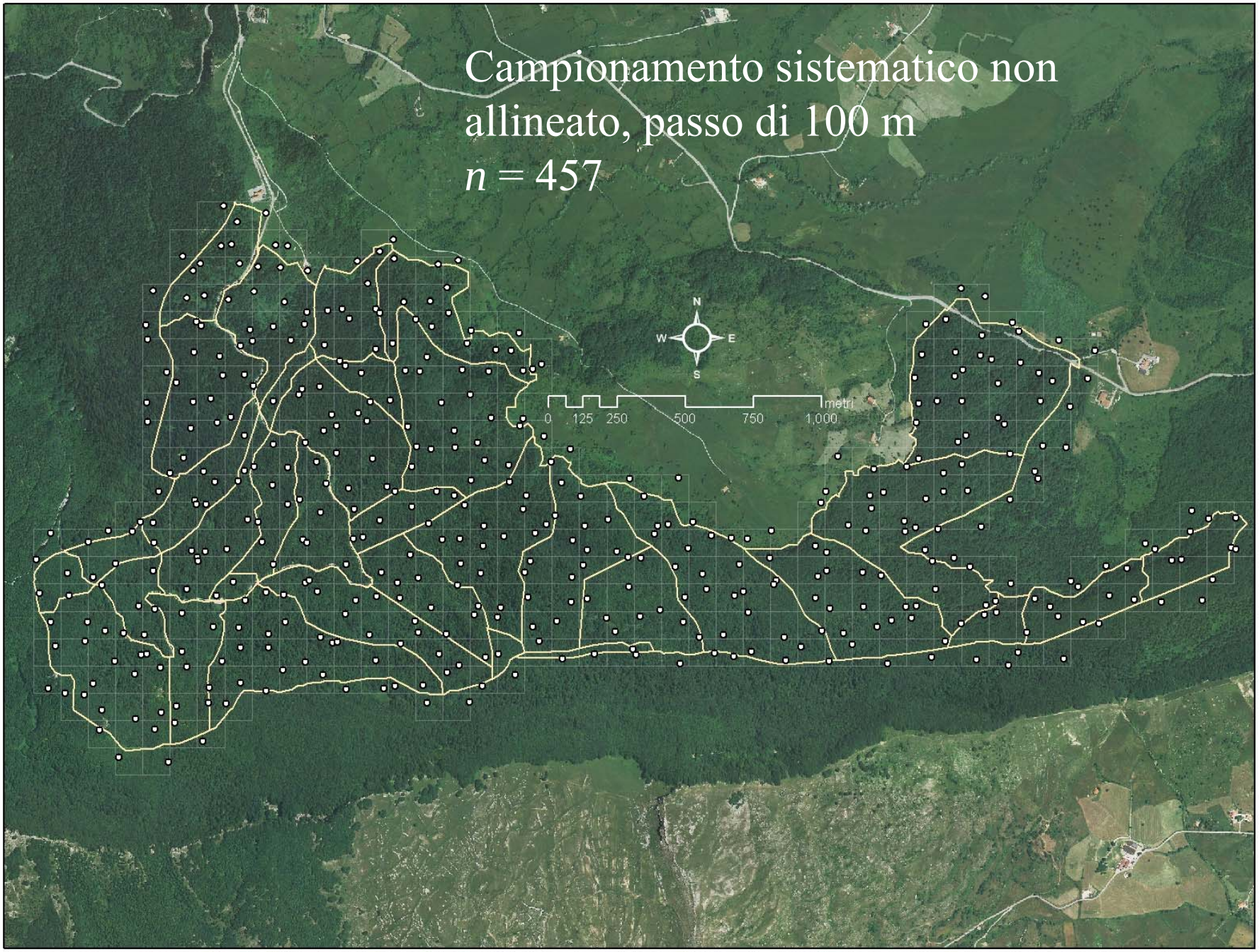
N
W
E
S
0 125 250 500 750 1,000
metri


Campionamento casuale, 3 unità per particella, minima distanza tra unità di 100 m
n = 102
N
W
E
S
0 125 250 500 750 1,000
metri

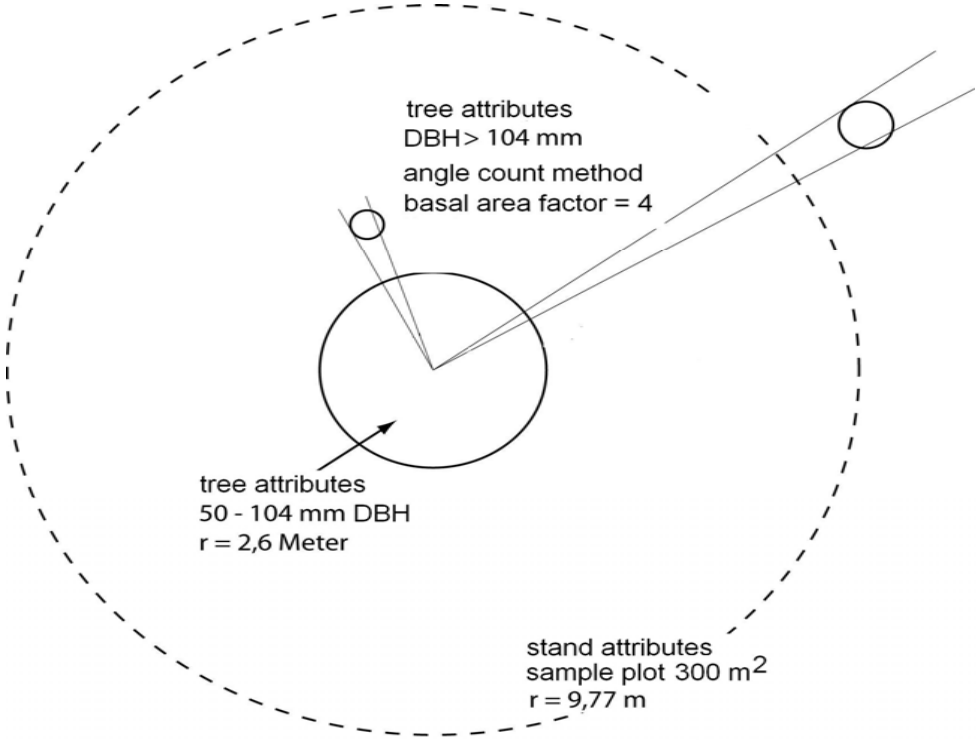

Campionamento sistematico allineato,
passo di 100 m
n = 457
N
W
E
S
0 125 250 500 750 1,000
metri

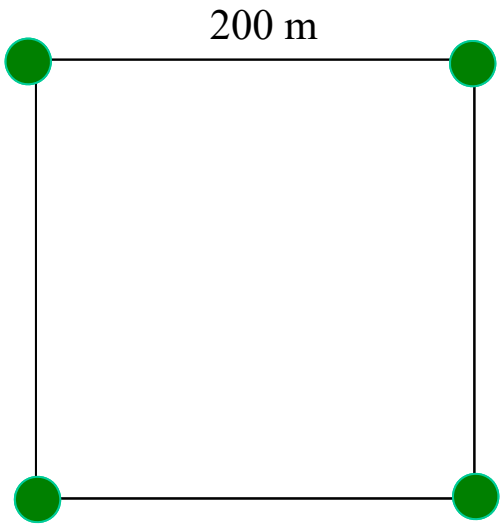

Campionamento sistematico non allineato, passo di 100 m
n = 457
N
W
E
S
0 125 250 500 750 1,000
metri

Il disegno delle unità di campionameno

Le variabili di cui deve essere ottenuta la stima devono essere definite prima dell'avvio dei lavori
Ogni variabile può avere il suo disegno campionario
Ogni variabile può avere un diverso disegno delle unità di campionamento
In genere le diverse unità di campionamento sono "ancorate" allo stesso punto inventariale
Possibile utilizzo delle tecniche di *clustering*: unità di campionamento a grappolo. Un gruppo (grappolo, cluster) di unità di campionamento sono posizionate ravvicinate per ridurre I tempi di accesso

Austria



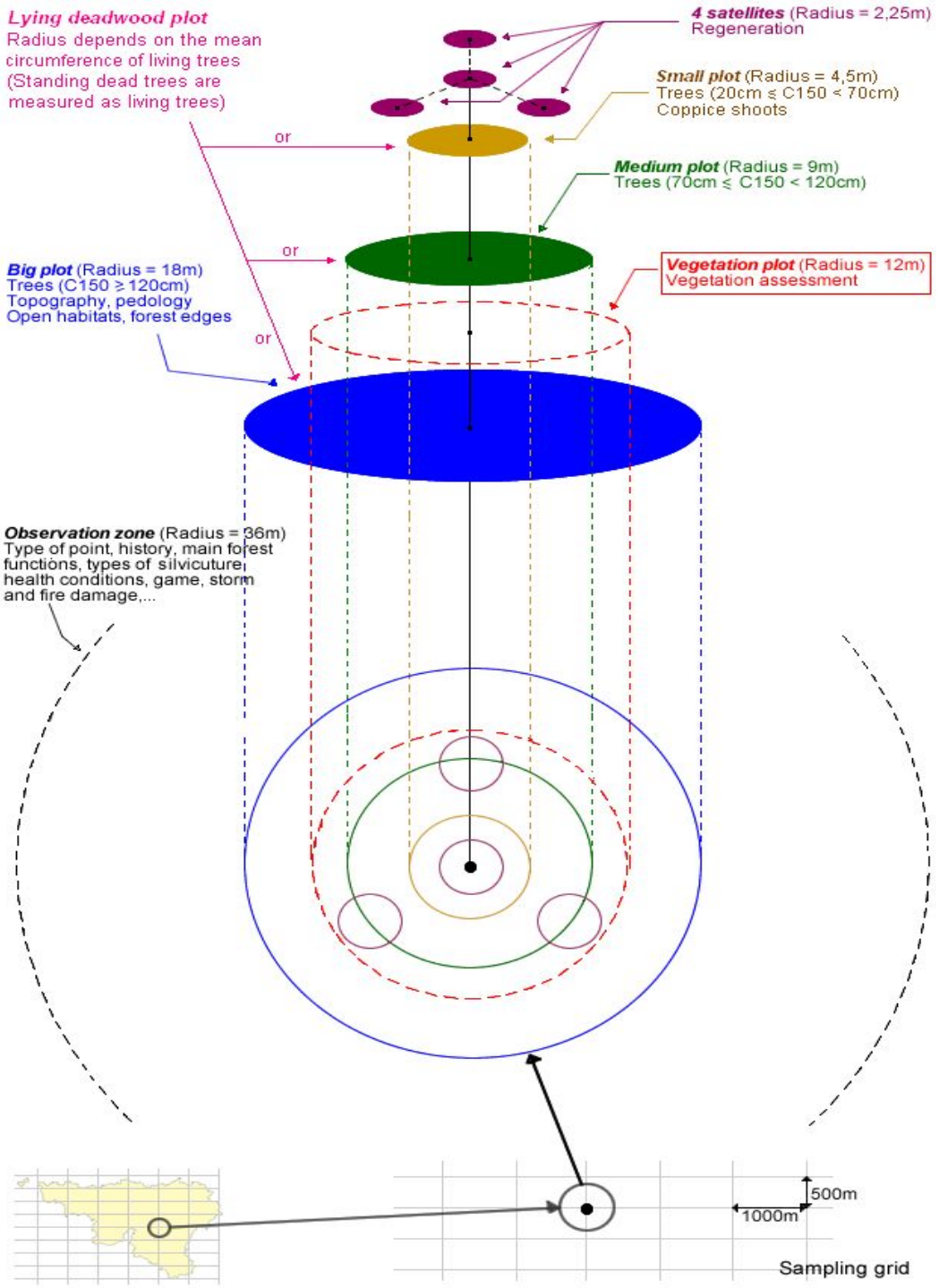


Each plot consist of 4 clustered sample plots at the corners of a square with l=200 m. Each cluster consist of two concentric circles with radii of 9.77 and 2.60 meters. The great circle with an area of 300 square meters is used for assessing variables connected with the forest area. The second smaller circle is used to sample trees with an DBH between 5 and 10.4 centimeters. Trees with an DBH greater than 10.4 centimeters are sampled “plotless” with the relascope using a BAF of 4.

Belgio

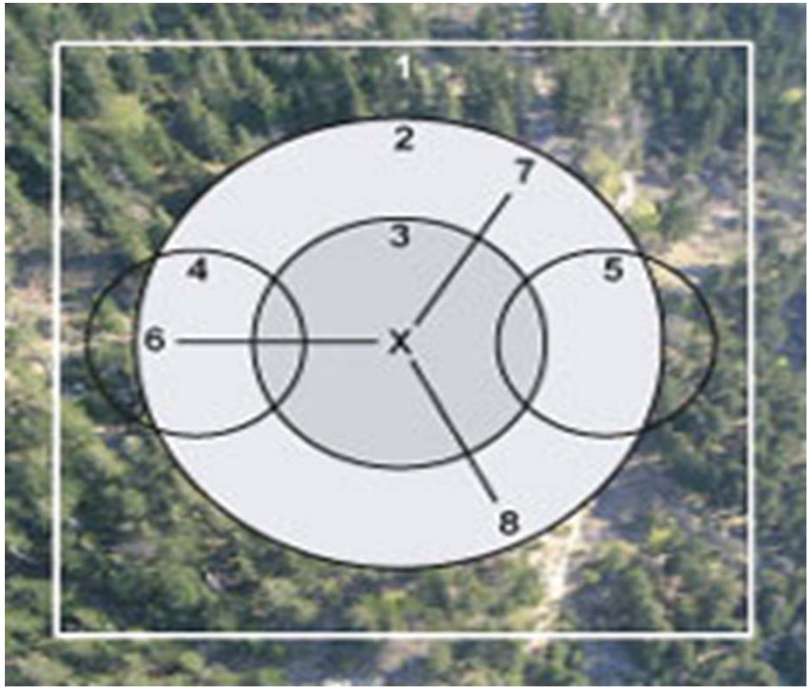
Each sampling unit is composed of 3 main circular concentric plots (with radii of 18, 9 and
4.5 m). The 3 corresponding plots take into account trees belonging to 3 predetermined circumference (C) categories = plot with a radius of 18 m : C ≥ 120 cm ; plot with a radius of 9 m : 70 cm ≤ C < 120 cm and plot with a radius of 4.5 m : 20 cm ≤ C < 70 cm ;

- 1 cluster of 4 circular sub-units especially set apart for regeneration measurements (radius of 2.25 m each) ;
- 1 circular plot with a radius of 12 m only used to describe the lesser vegetation (abundance, frequency…) ;
- 1 circular area with a radius of 36 m for a visual diagnosis of health conditions, game, storm and fire damage, the general quality appraisal of trees, the main forest functions, the types of silviculture, etc.



Svizzera

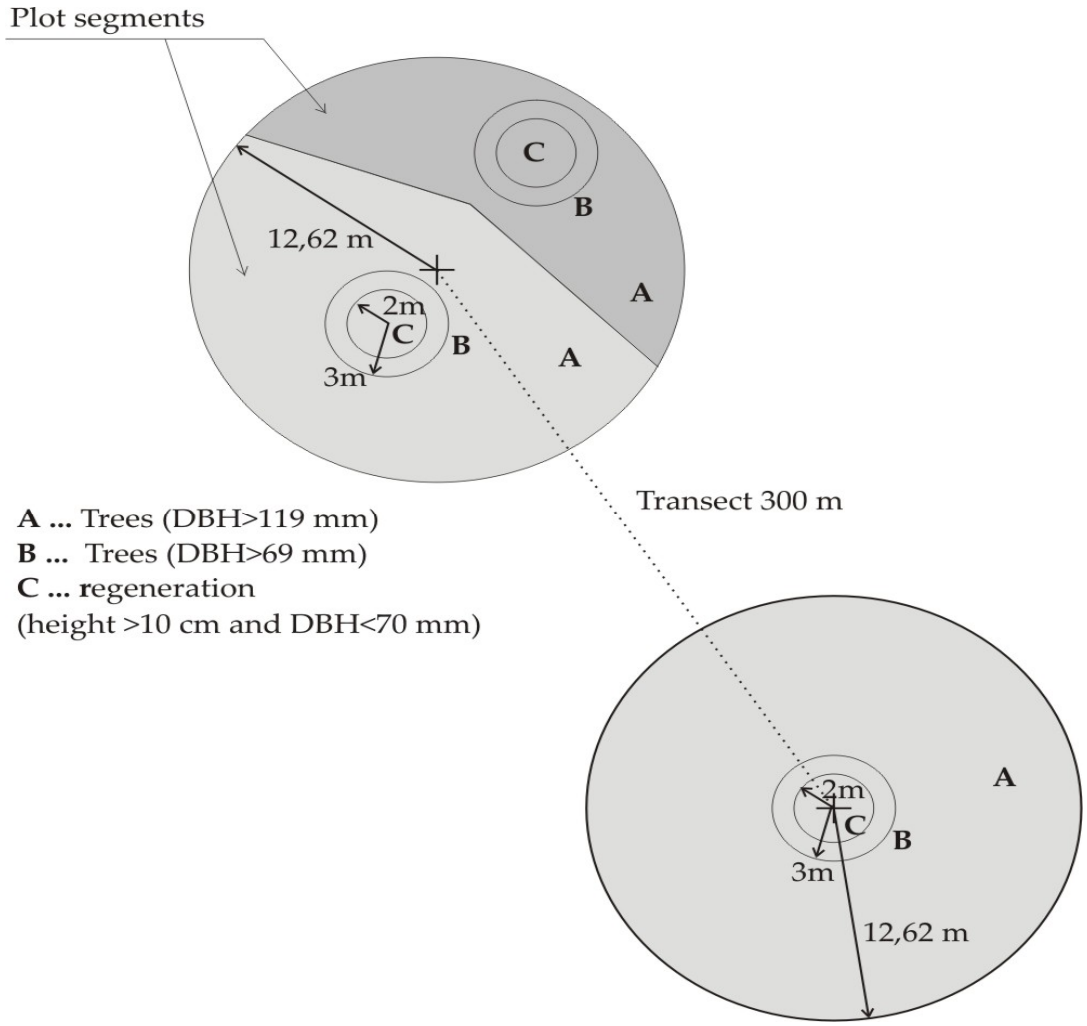
Terrestrial plots site and stand data are assessed on quadratic area of 50 m x 50 m.
Tree data are recorded on two concentric circular areas of 500 m^2 and 200 m^2.
Small trees from 0.1 m hight up to 11.9 cm DBH are assessed on two circular areas with radii depending on plant density (max. 6.0 m).
Lying dead wood is survey on three transects of 10 m lenght each.
Camping methods and data catalogue are the same on each terrestrial plot.



1 NFI3 sample plot
2 circle for survey of trees with a DBH of ≥ 36 cm
3 circle for survey of trees with a DBH of ≥ 12 cm
4, 5 circle for survey of young forest
5, 6, 7 transect for survey of lying deadwood
X sample plot center

Repubblica Ceca

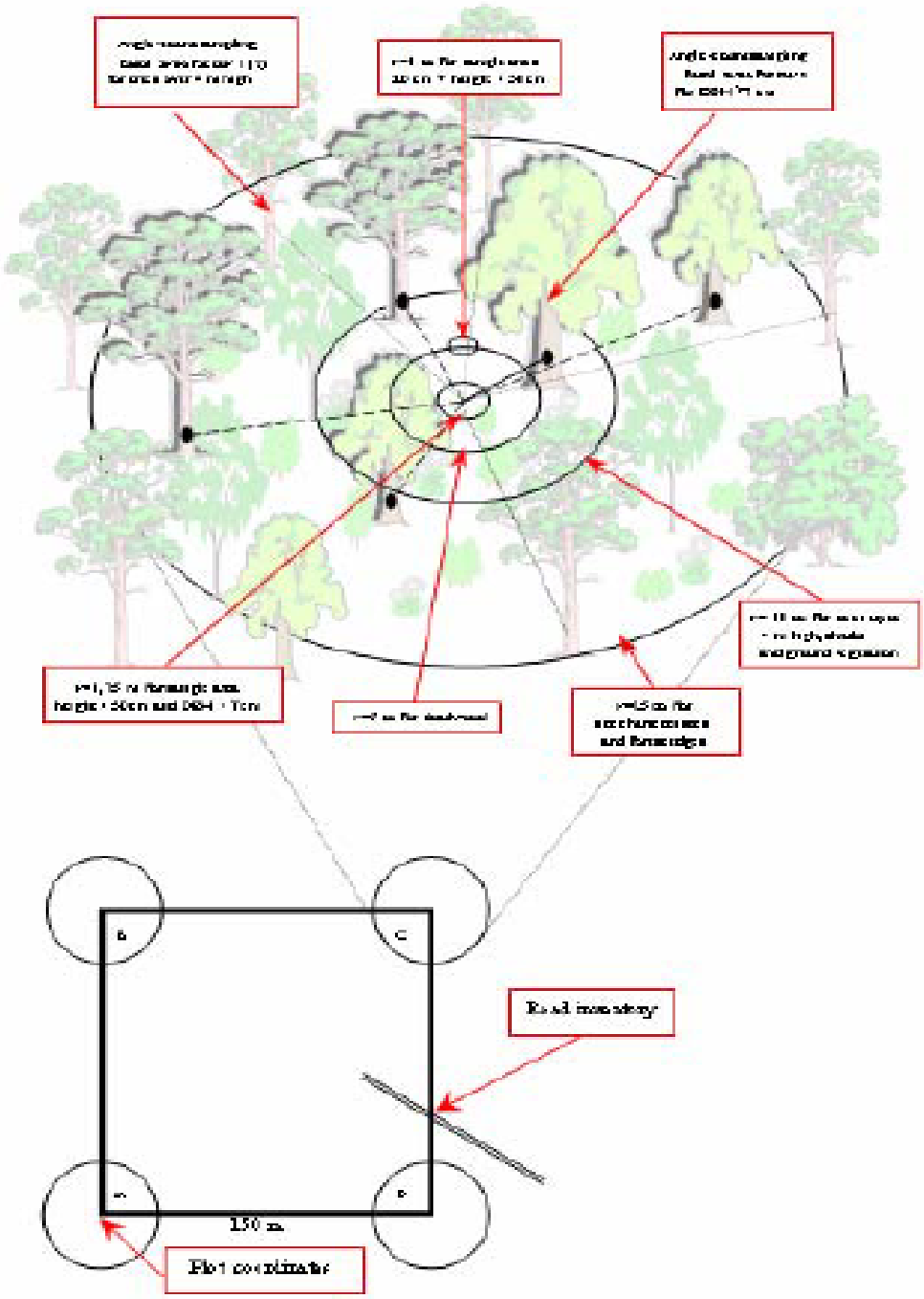
Fixed size circle 500 m^2 for trees with DBH 12 cm and more;
additional two
concentric circles are established in the center of gravity of each polygonal segment of the
Plot;
circle with the radius 3 m for the trees between 7-11.9 cm,
circle with the radius 2 m for the regeneration with the height of 10 cm and higher



Germania

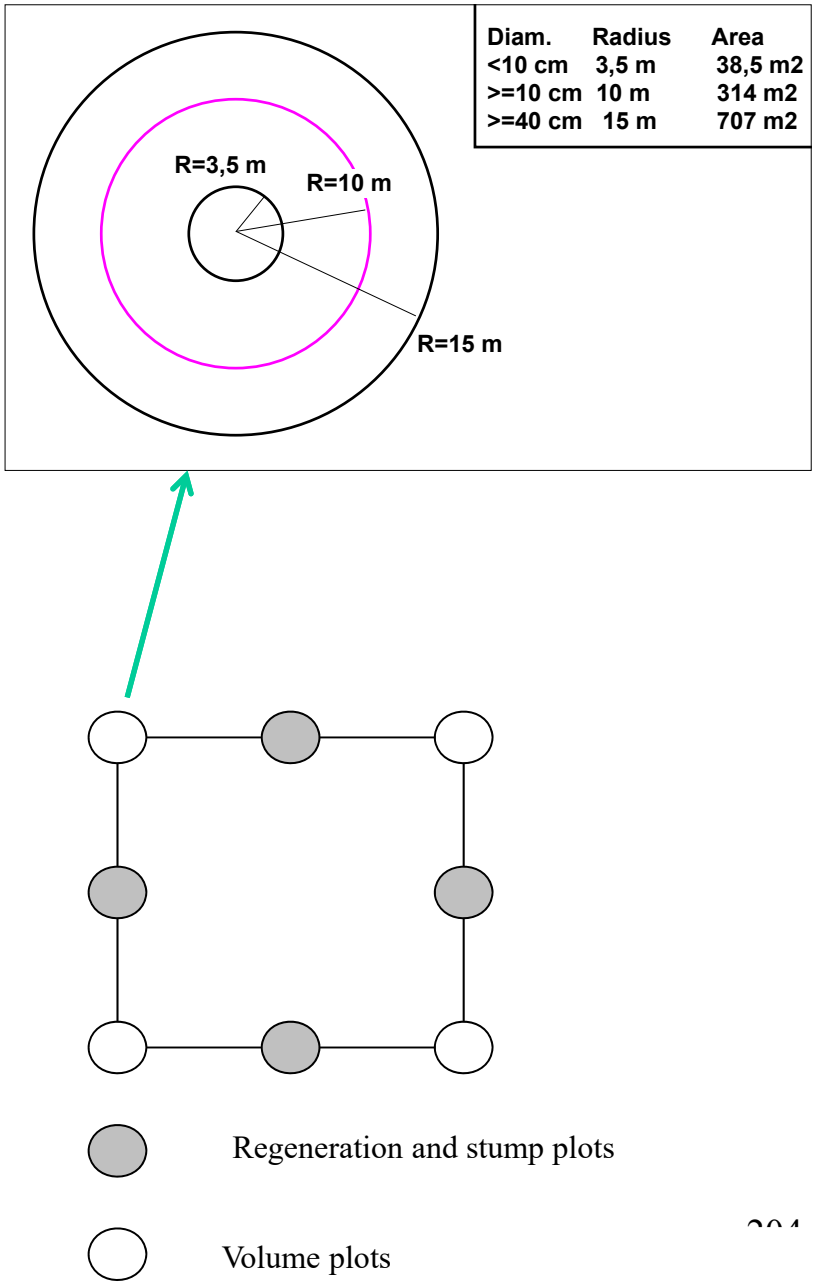
The inventory plot covers a quadrangle with side length of 150 m. The data collection is carried out at the corners of the plot. The road inventory is conducted along the circumferential line of the plot. Each corner of a plot inside the forest is centre of an angle-count sampling with basal area factor BAF=4. In addition an angle-count sampling with basal area factor 1 or 2 is carried out as a basis for the description of the forest structure by species and storey.

- Each plot corner located inside the forest is the centre of a sample circle with a radius of 1,75 m. In this area, all trees over 50 cm high and under 7 cm breast-height diameter are surveyed.
- A sample circle with a 1,00 m radius is located 5 m away from the plot corner, generally to the north. In this area, the trees of 20 cm to 50 cm in height are recorded.
- In a sample circle with a 5 m radius around the plot corner the occurrence of deadwood is determined.
- In a sample circle with a 10 m radius around the plot corner trees up to 4 m in height, shrub layer and ground vegetation are surveyed.
- In a circle of 25 m around plot corners located in the forest site characteristics and forest edges are recorded.



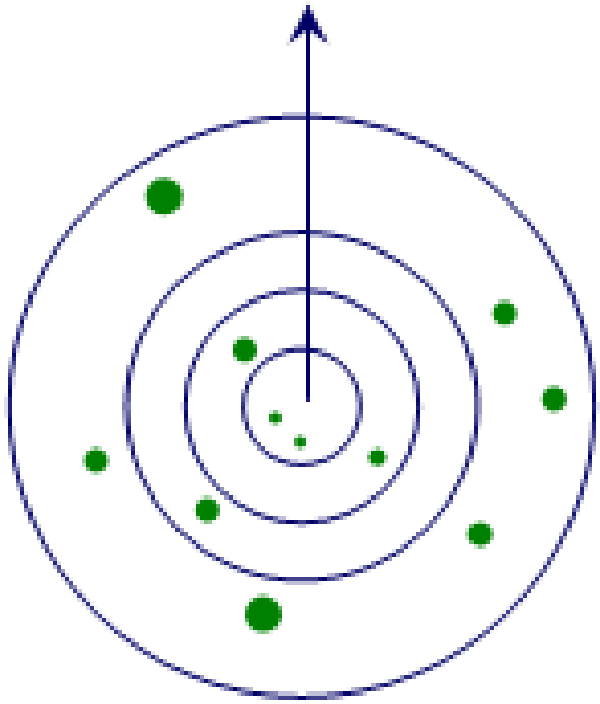
Danimarca

Each plot has a unique number and can be temporary or permanent and include different types of plots: volume plots, regeneration plots and stump plots. The volume plots are always inventoried, while the regeneration plots are only measured when the mean height is less than 1.3 m. Stumps plots are measured when the plot has been cut within the past year. The sampling is more comprehensive on the permanent plots.
The volume plots are 3 concentric circles with radii of 3.5, 5.0, and 15 meters. Different breast height diameters are assessed in different circles. The other collected information refers to the 15 m radius plot (Figure 2). The stump inventory is done on a plot with a radius of 10 m. A special circular plot design is used for the regeneration plot. 3 concentric circles



Spagna

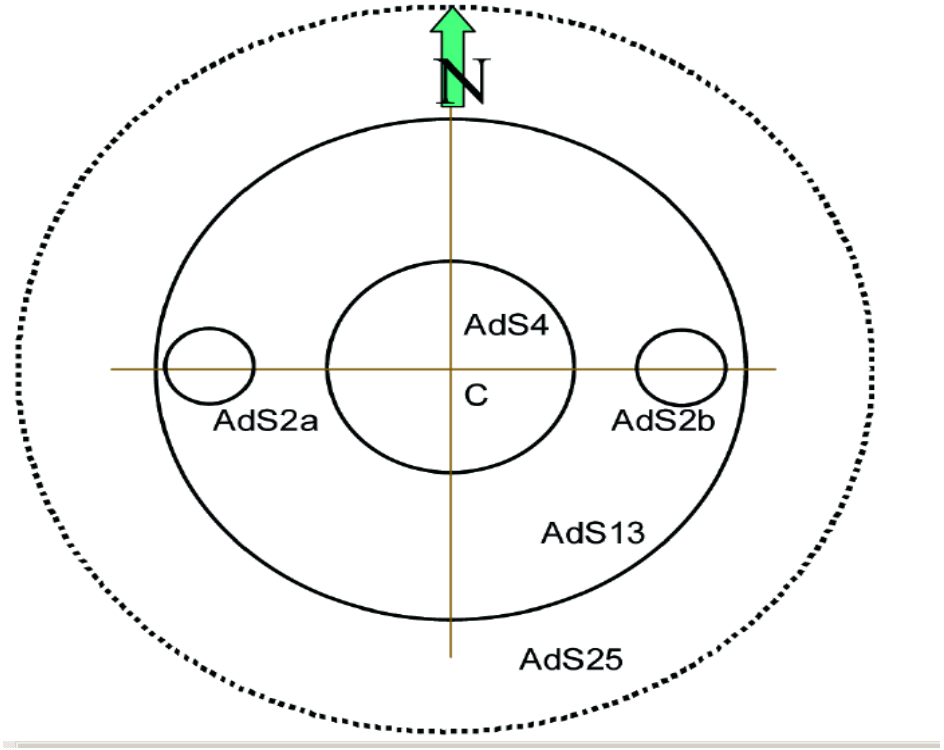
1963 m^2 (for trees with DBH>42.5)
707 m^2 (for trees with DBH within 42.5 and 22.5 cm)
314 m^2 (for trees with DBH within 22.5 and 12.5 cm)
78.5 (for trees with DBH within 12.5 and 7.5 cm)
707 m^2 deadwood
78,5 m^2 regeneration
314 m^2 shrub



1963 m^2 for the Presence of threatened species and Number of threatened species: 25x6 m;
314 m^2 for shrubs (species, height and cover);
1963 m^2 for GV life-forms cover

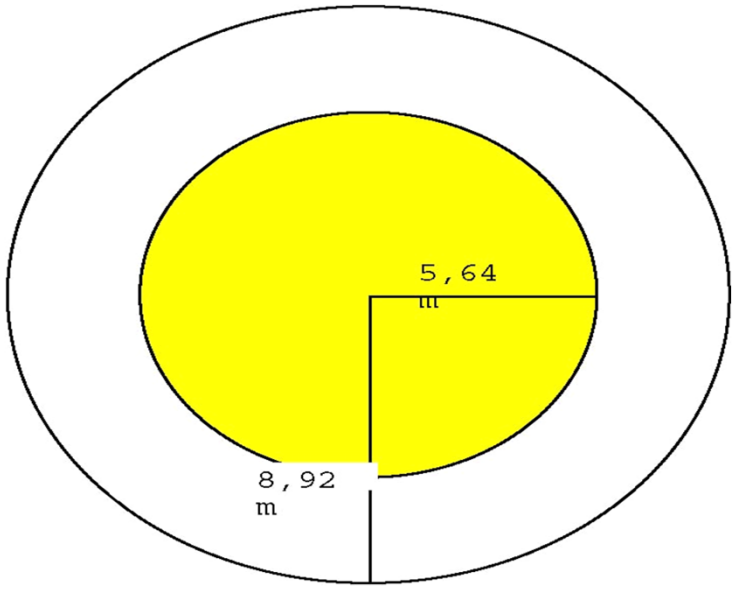
Italia

Each plot consist of a total of 5 circles: 3 concentric circles with different radius (25 m, 13 m, 4 m) and two small circles (2 m radius) with the centre located at 10 m to the centre of the others threr circles, severally in the East and the in the West direction.
530 m^2 (for trees with DBH>=9.5 cm)
50 m^2 (for trees with DBH>4.5 cm)
Deadwood 530 m^2
Regeneration, shrub 25 m^2



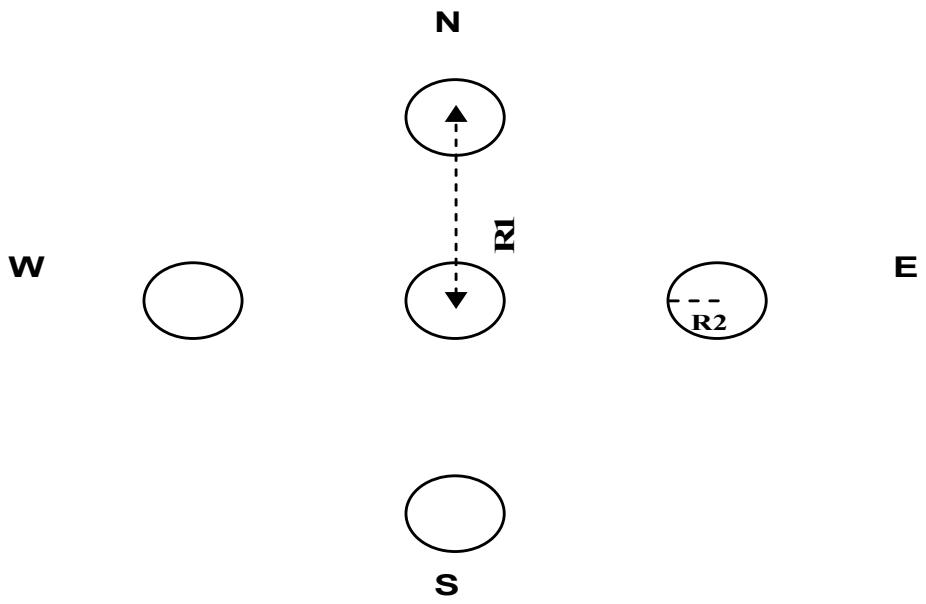
Norvegia

The tally tree sample plot, measured on forest and other wooded land, is a fixed radius sample plot.
The radius is 8.92 m (area 250 m^2).
This type of plot has been applied for all permanent plots ever since 1994, for the measurement of trees with dbh>=50 mm.
Sample trees are now being selected in such a way that there should be approximately 10 trees on each sample plot on forest and other wooded land, when possible.
The method is based on the application of an adjustable basal area factor for the selection of sample trees.



Portogallo

Two circular areas: 500 m^2 and 2000 m^2 (for Quercus suber and Quercus rotundifolia inventory). Small trees/regeneration sampling plots: five circular satellite subplots of 1,78 m of radius distant 10m from the centre of the plot (total area: 50 m^2); and, for Quercus suber and Quercus rotundifolia, five circular satellite subplots of 3,57 m of radius distant 15 m from the centre of the plot (total area: 200 m^2).



500m^2 Inventory Plot:

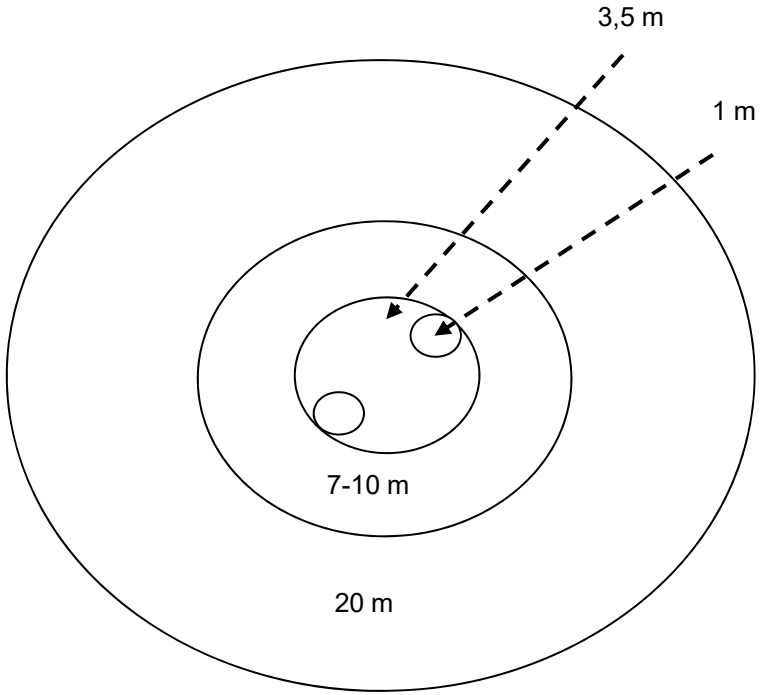
- 5 satellite plots area = 10m^2;
- R1= 10 m;
- R2 = 1.78 m

2000m^2 Inventory Plot:

- 5 satellite plots area = 40m^2;
- R1= 15 m;
- R2 = 3.57 m

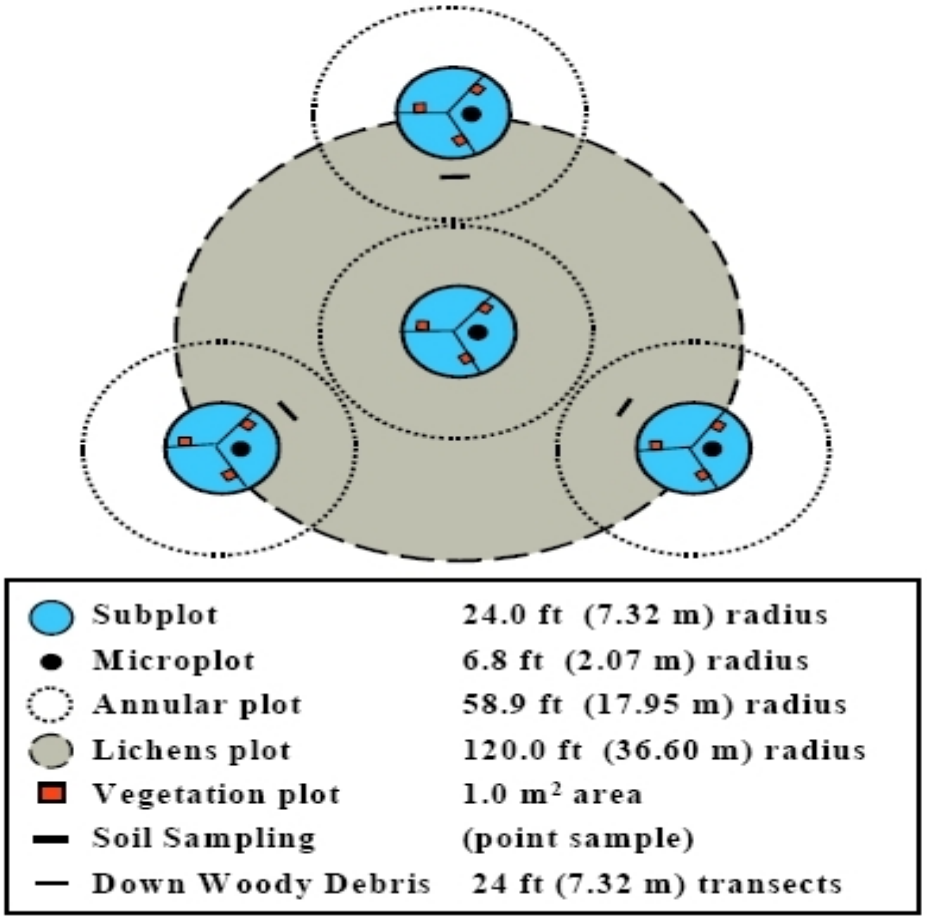
Svezia

Sample plot with radii for different measurement- and data-capture methods. The 7 m radius is for temporary plots, while permanent plots have the 10 m radius.
1 m radi: Measurement/counting of trees/seedlings higher than > 0.5 m
3.5 m radi: Measurement of trees >= 40 mm dbh
7/10 m radi: Measurement of trees >= 100 mm dbh, site index measurements
20 m radi: Mean height, Basal area, crown cover, Species composition, Stand age, silvicultural measures, forest historyStand: Maturity class



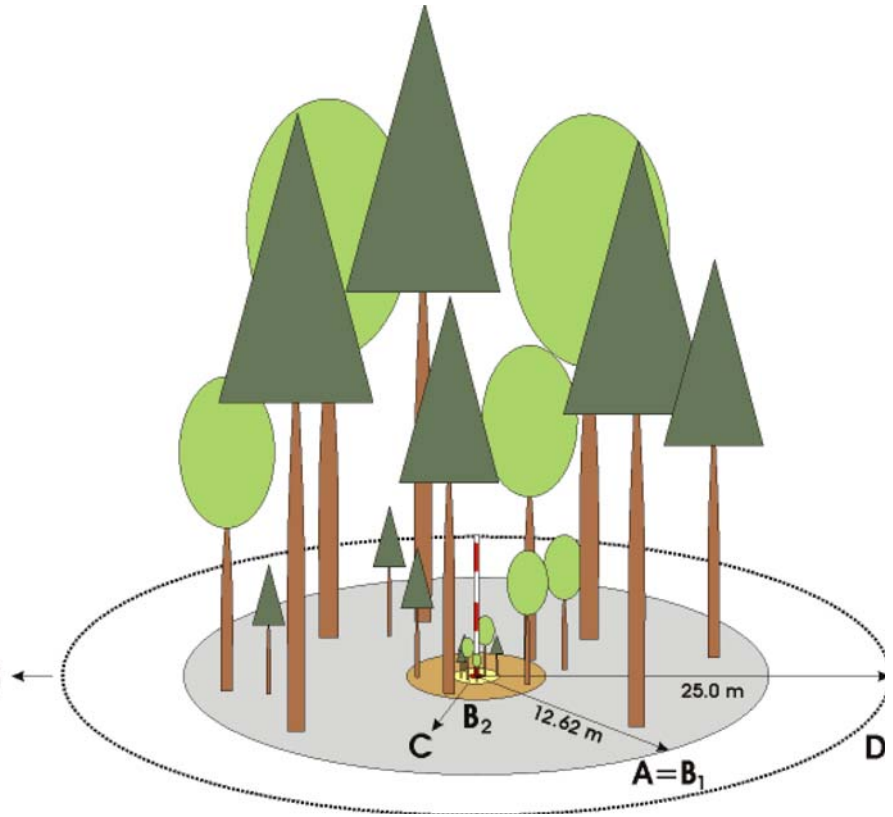
USA

Each plot consists of four 7.31-m (24-ft) radius circular subplots for a total area of 672 m^2. The subplots are configured as a central subplot and three peripheral subplots with centres located at 36.58 m (120 ft) and azimuths of 0o, 120o, and 240o from the centre of the central subplot.



Slovacchia

A, basic circle with the radius r=12.62 m for detecting terrain, site, stand and ecological characteristics, sources of food for animals and for the inventory deadwood and stumps on the ground;
B, two concentric circles (r=3 m and 12.62 m) for detecting tree characteristics of DBH diameter $d_{1,3}$=7-12 cm and $d_{1,3}\geq$12 cm;
C, variable circle for thin trees with diameter $d_{1,3}$<7 cm. The radius r=1.0 m, 1.41 m or 2.0 m is chosen according to the concrete tree density;
D, enlarged constant circle with the radius 25 m established for the inventory of forest edges, forest roads and water resources.



ICP forests
International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests

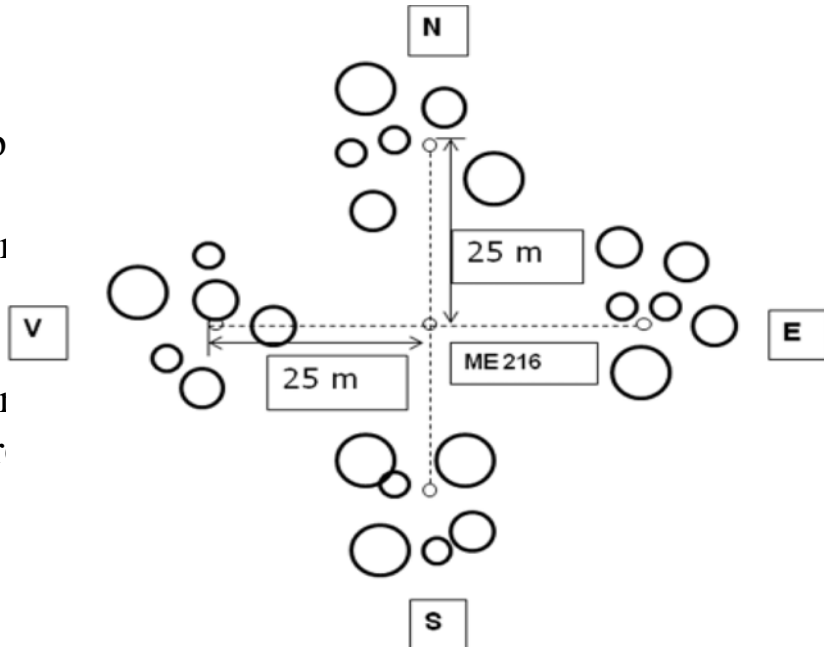
The monitoring of forest condition (FCM) has started in the 1980s in response to the concern about the alleged progressive deterioration of forests in Europe and elsewhere (Innes et al., 1993).

Between 1991 and 2003, the ICP-forests program was develop close co-operation between the EU and the United Nations Economic Commission for Europe (UNECE), and a joint repo system was adopted.

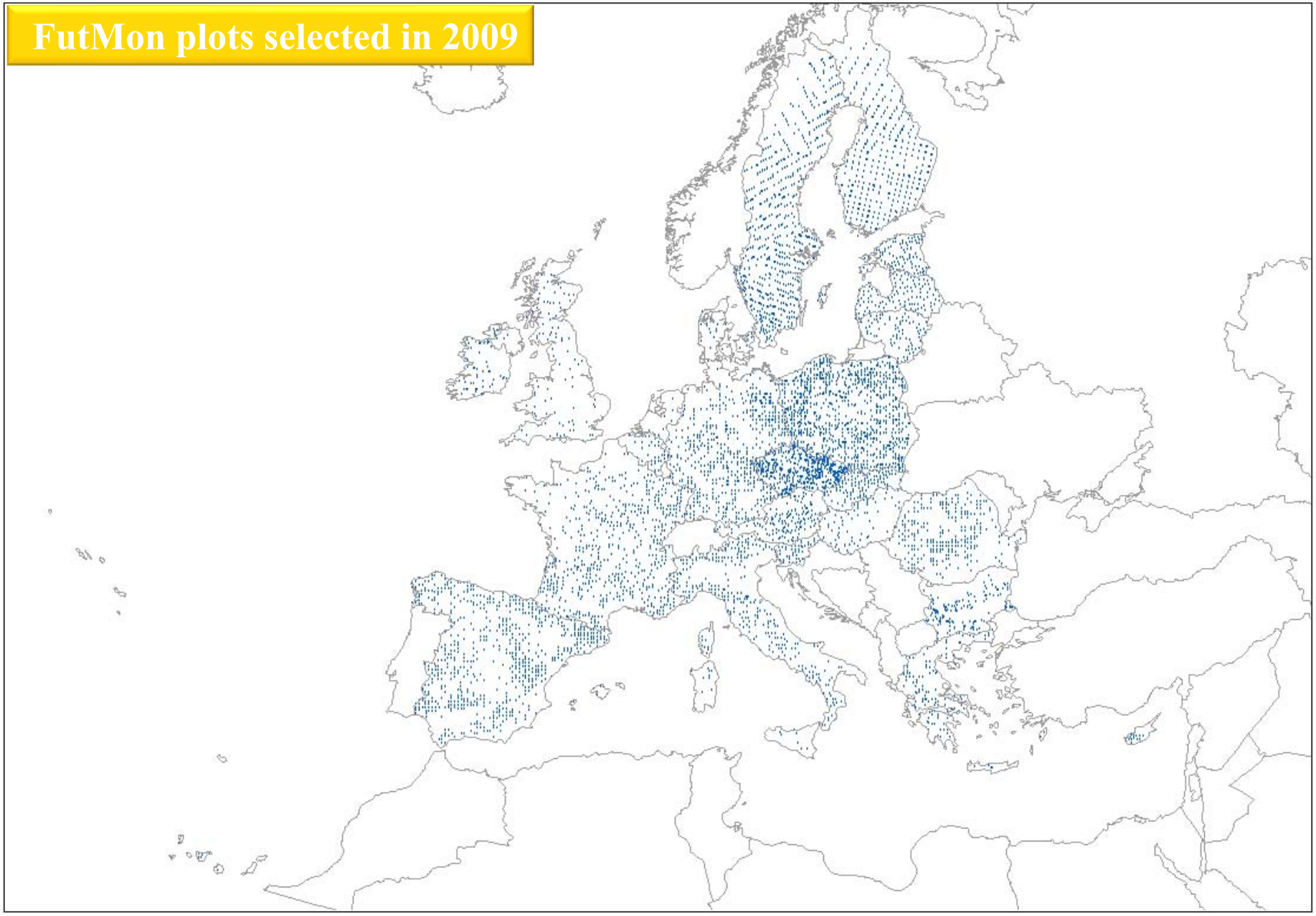
The UNECE forest condition monitoring is organized in two monitoring intensity levels (Level I and Level II), correspondi different networks, different aims and features (Percy and Ferr 2004):

Level I is based on about 6000 plots located on a nominal systematic large-scale grid with a size of 16 x 16 km and aims producing information on status and trends of forest condition across Europe. Despite several criticisms, the most important attribute recorded is defoliation, also termed crown transparency (Ferretti, 1997, 1998);

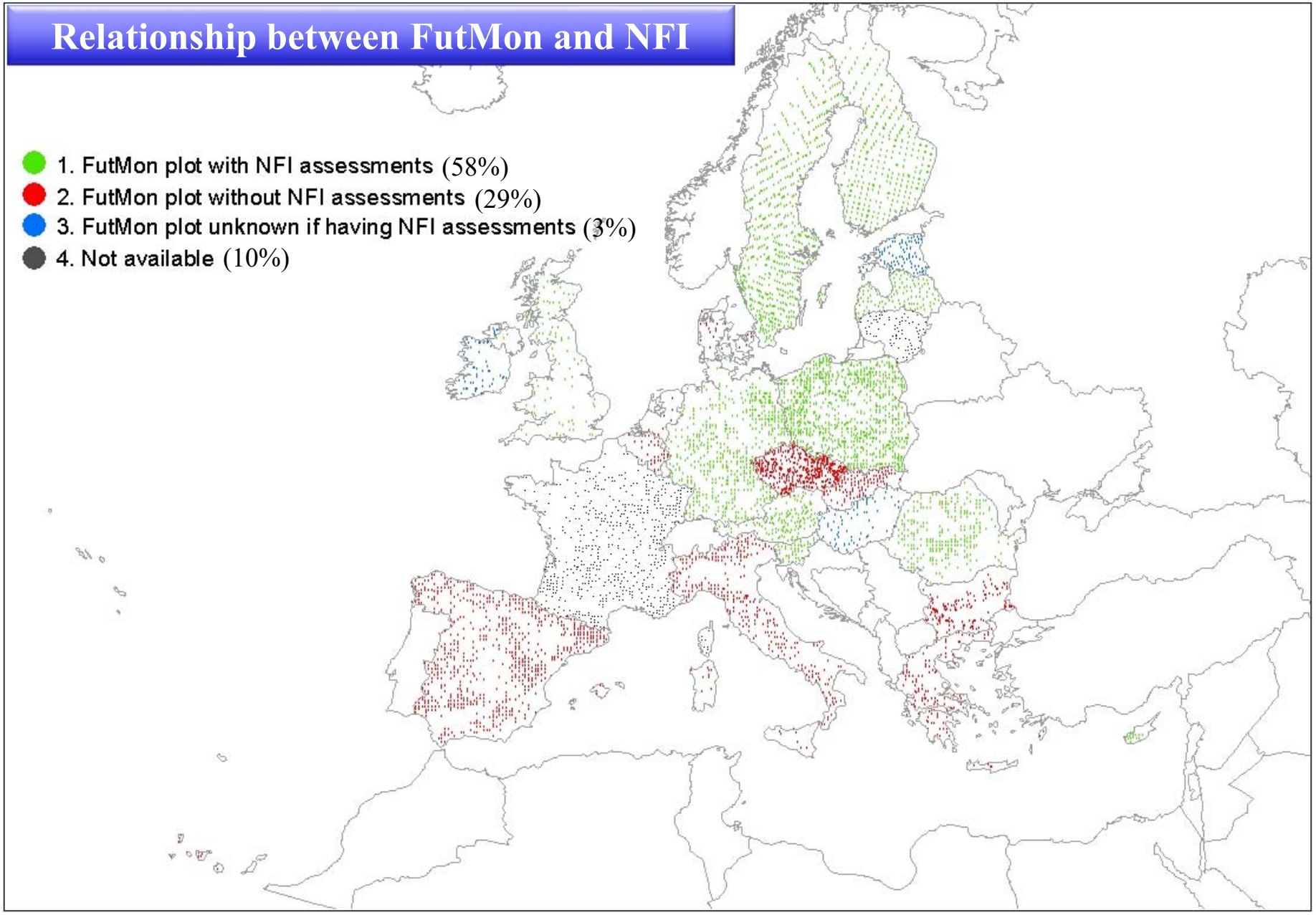
Level II consists of more intensive investigations on a reduced, preferentially selected number of sites (about 800 plots). Level II features monitoring of both stressor and response indicators and aims at indentifying relationship among the two.



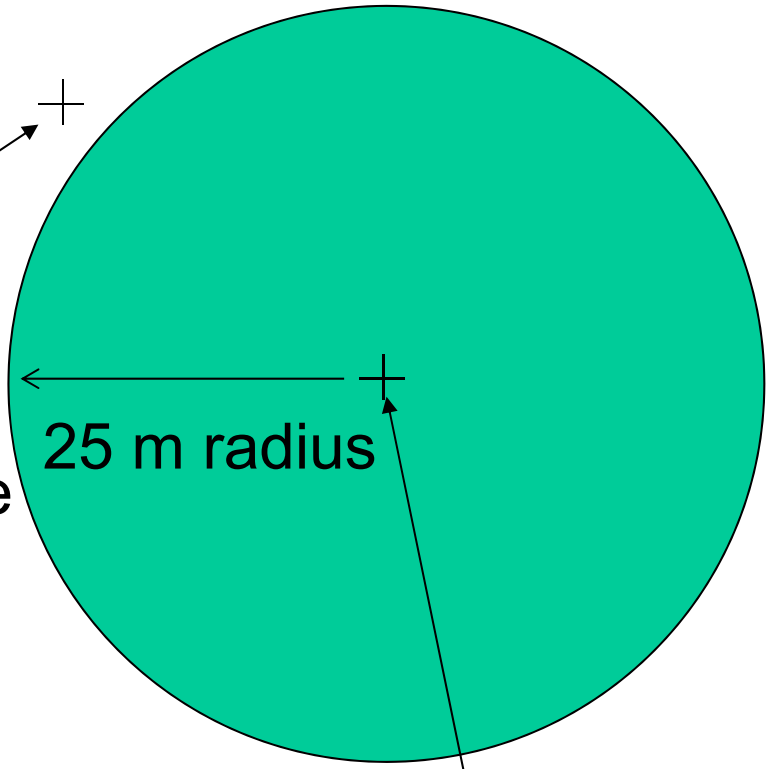
FutMon plots selected in 2009



Relationship between FutMon and NFI



Plot size and positioning



accurate geolocation of soil profile sampling point by GPS (recommended RMSE<10 m)

Recommendations:

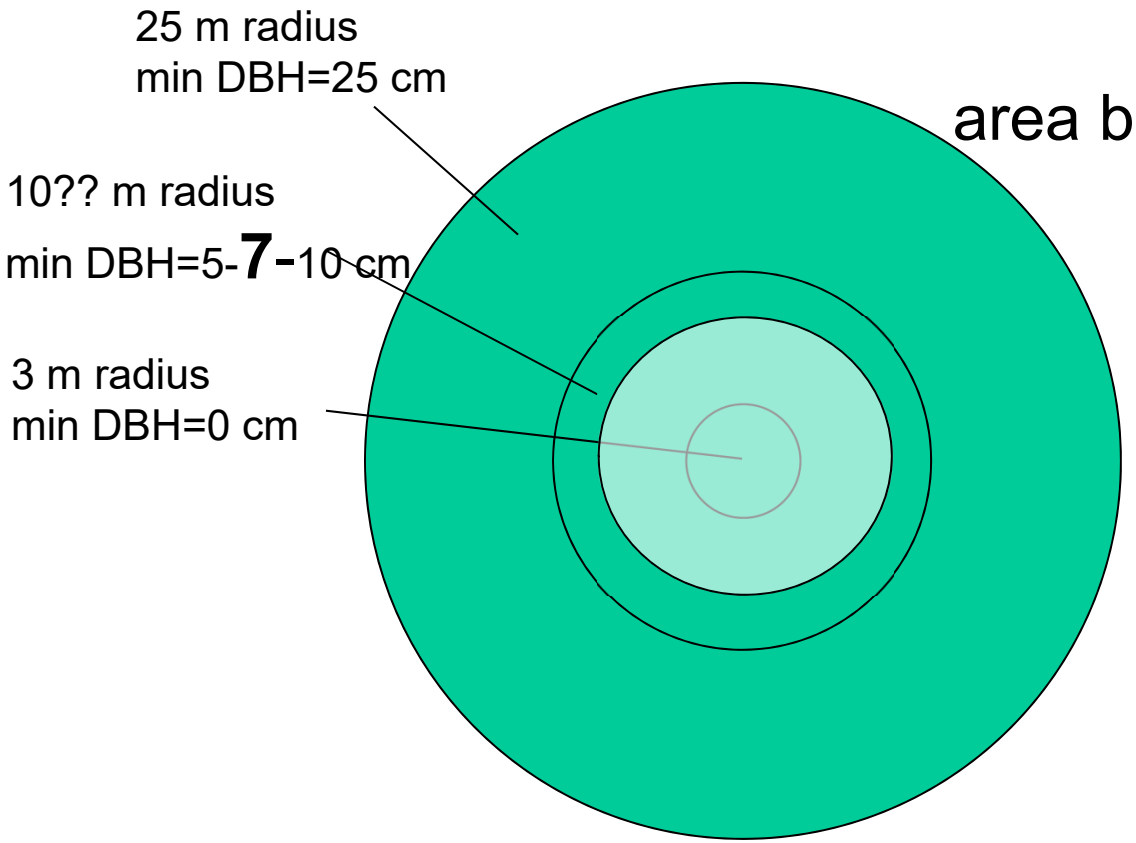
- outside BIOSOIL ICP level 1 plot

- as close as possible to BIOSOIL ICP level 1 plot

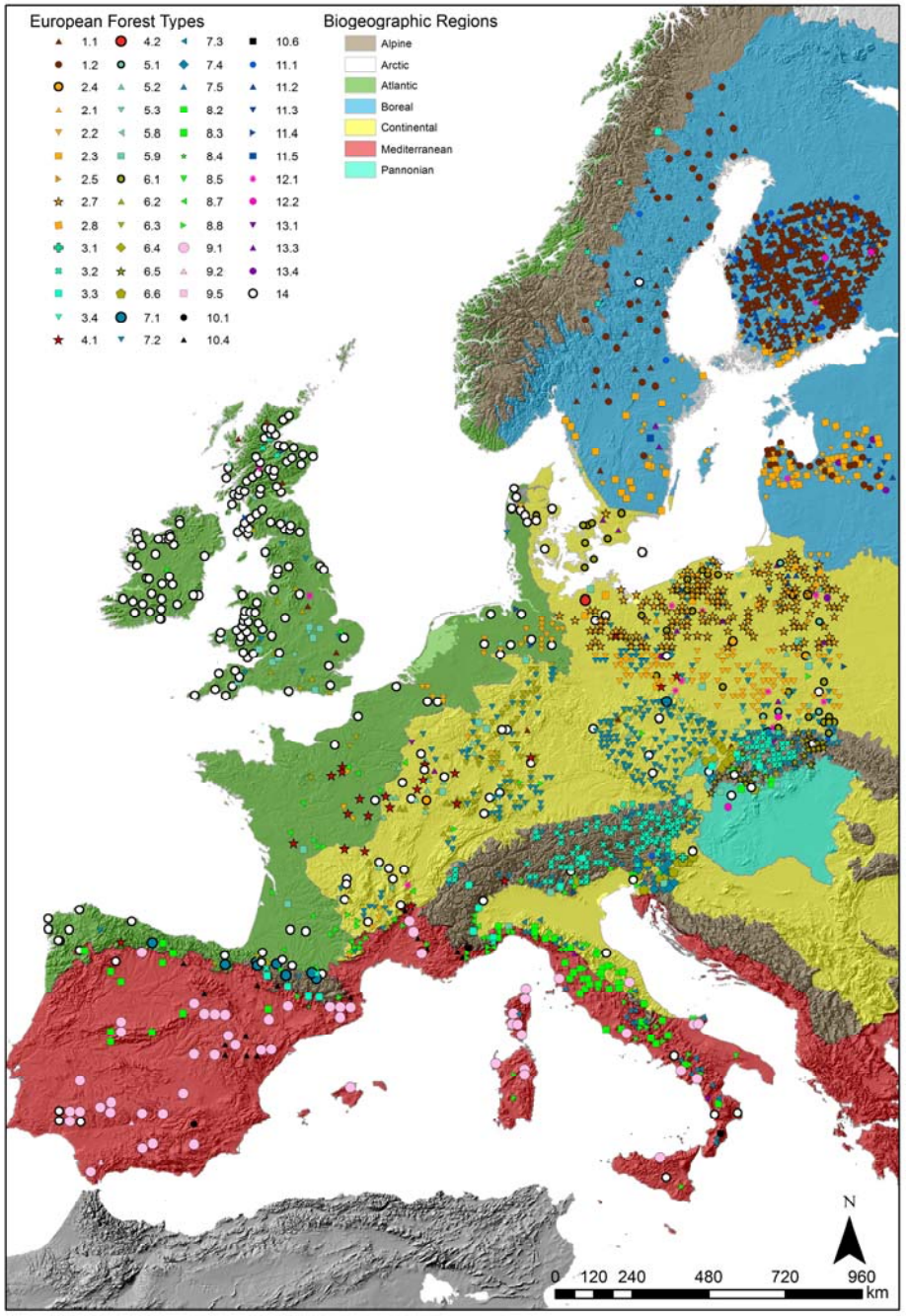
accurate geolocation of centre by GPS (recommended RMS

Callipering

radius based on area
or
area based on radius



Target: all woody plants measurable at 1.3 m height
Record all woody species in all the 25m radius plot
Number of small trees (under 1.3 m height in inner subplot)


European Forest Types
1.1
1.2
2.4
2.1
2.2
2.3
2.5
2.7
2.8
3.1
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10.6
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11.4
11.5
12.1
12.2
13.1
13.3
13.4
14
Biogeographic Regions
Alpine
Arctic
Atlantic
Boreal
Continental
Mediterranean
Pannonian
N
0 120 240 480 720 960
km