SPANISH FOREST MAP AND NATIONAL FOREST INVENTORY

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GOBIERNO DE ESPAÑA
MINISTERIO DE AGRICULTURA, PESCA Y ALIMENTACIÓN

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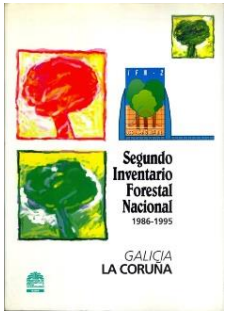
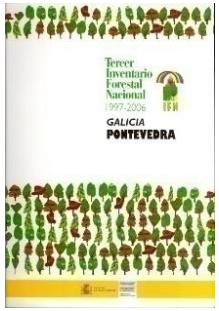
1. GENERAL CHARACTERIZATION OF THE DIFFERENT CYCLES.

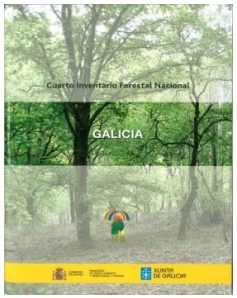
SPANISH NFI SUMMARY

Inventory	Years	Stratification	Sampling method and field plots	Number of plots
NFI 1	1965-1974	Grid over photographs	Optimal allocation of plots, temporary plots	65,000
NFI 2	1986-1995	Grid over maps	Systematic 1 x 1 km grid, permanent plots	84,203
NFI 3	1997-2007	Grid over digital maps	Same systematic grid as NFI2, permanent plots	95,327
NFI 4	2008 - currently	Grid over digital maps	Same systematic grid as NFI3, permanent plots	NA

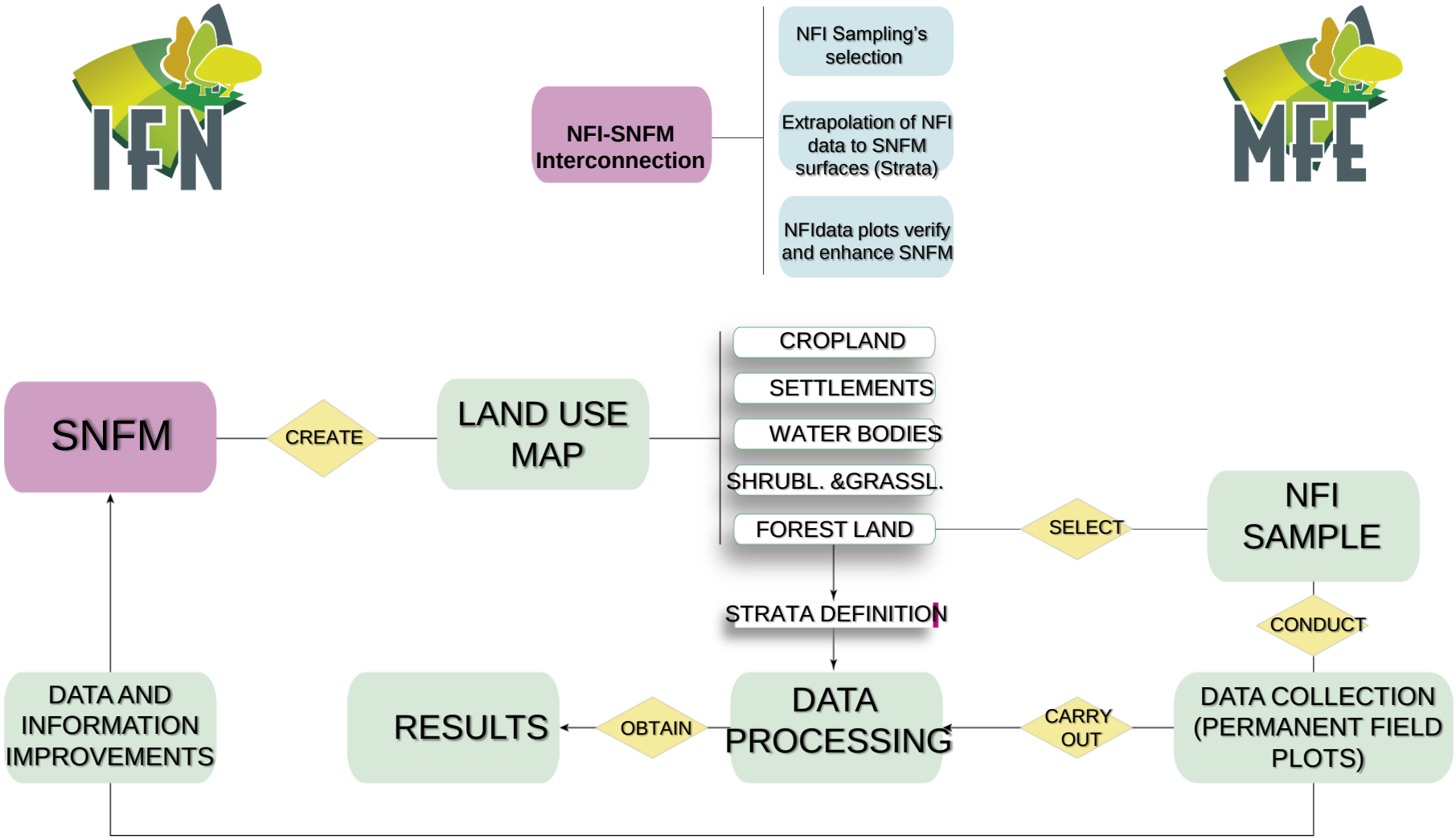
Repeated plots







2. GENERAL SCHEME. SPANISH NATIONAL FOREST MAP (SNFM) AND NATIONAL FOREST INVENTORY (NFI) RELATIONSHIP



3. NFI CARTOGRAFY: SPANISH NATIONAL FOREST MAP (SNFM)

MAIN CHARACTERISTICS:

✓Photo-interpretation of all the national territory (1ha resolution).
✓Tessera delimitation based on the different land use and input data.
✓Field visits: 10% tessera (MFE 25) at least

FOREST LAND- INPUT DATA:

Tree species composition
Canopy cover
Artificial age classes
(young growth; thicket; polewood; high forest)
Forest fire combustible models

OWL – INPUT DATA :

National shrub formation
Shrub cover and estimated average height

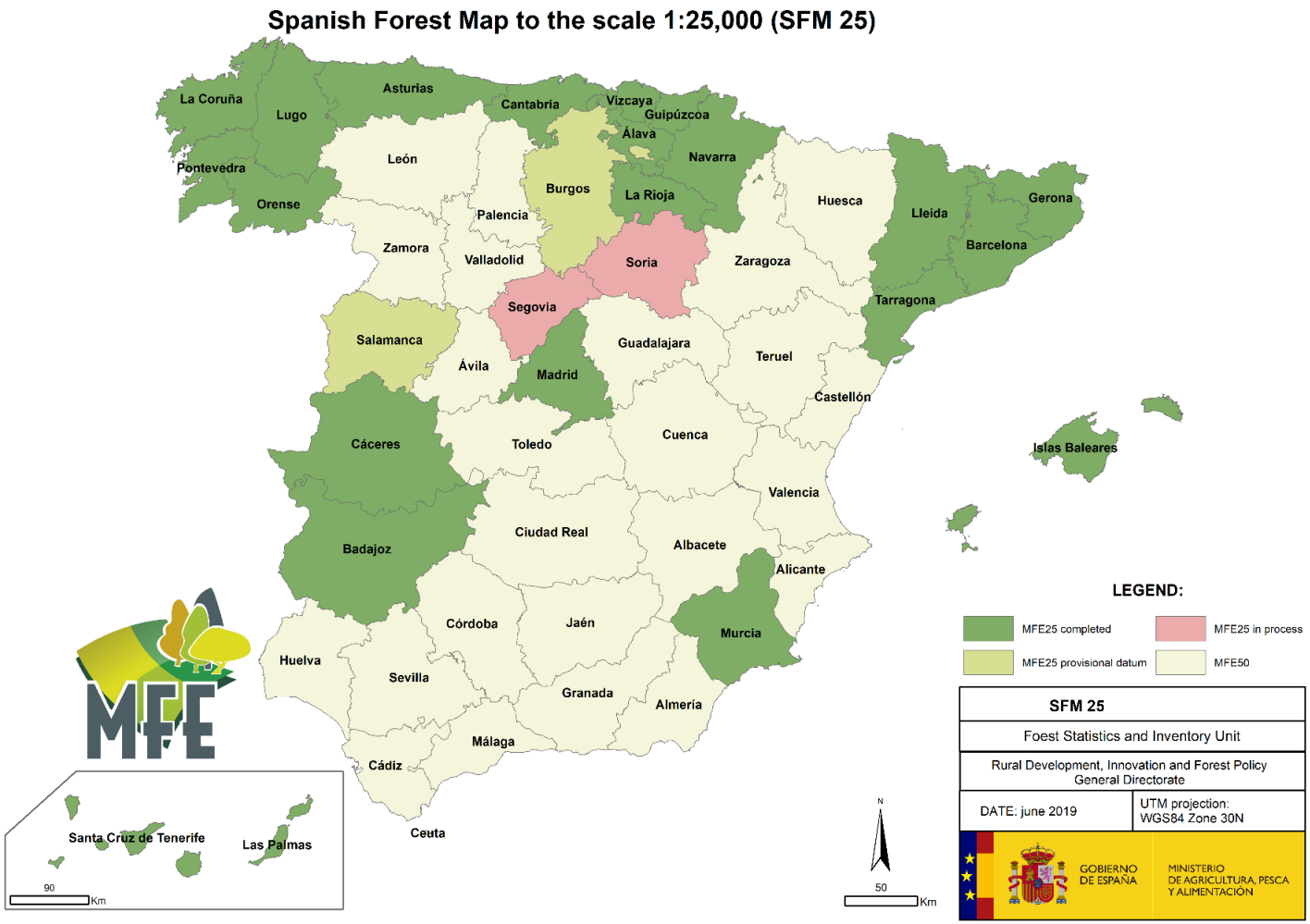
3. NFI CARTOGRAFY: SPANISH NATIONAL FOREST MAP (SNFM)

PROVIDED INFORMATION:

- **Tree and shrub crown cover**
- **Land use:** Forest, Plantation, Dehesa, Temporarily unstocked forest land (Fires, Tree felling area, Natural felling area), Small forest stands, Linear stands, Riparian forest, Mosaics. In relationship to land cover. Describes the vegetation structure in forest and other wooded land.
    - Main cover/use (structural type)
    - Cover of rest of uses (≥10%)
- **Stand structure** (uniform, patches, strip, irregular…)
- **Species:** Up to 3 main species : **Sp1; Sp 2; Sp3**
- **Relative crown cover:** From1-10. It is possible to deserve 2 for the rest of species (Sp4..): **O1, O2, O3**
- **Stand stage/Artificial stage age** (regeneration, thicket, pole wood and high forest)
- **Forest type**
    - Conifers, Broadleaves, mixed forest
    - National Forest classification. Different kinds of forest using a classification developed to describe Spanish forests.
- **Land cover class**
- **Shrub types (new)**
- **Fuel model (new)**

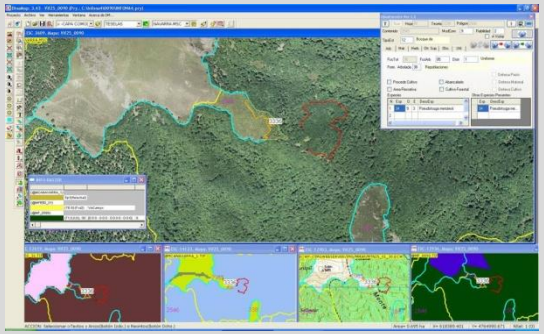
3. NFI CARTOGRAFY: SPANISH NATIONAL FOREST MAP (SNFM)

CURRENT STATUS: MOST UPDATED SNFM (for each province)



4. SAMPLING DESIGN. STRATIFICATION

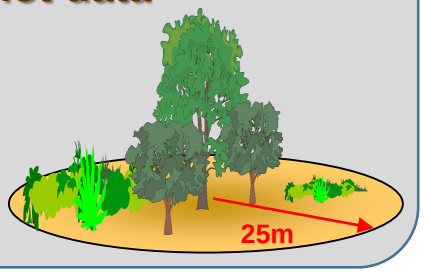
National Forest Map

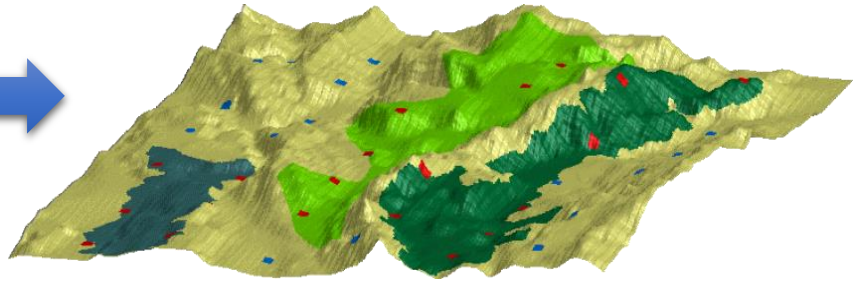


Additional cartography:

- Nature 2000
- Forest tenure
- Administrative regions

NFI plot data





Sampling unit: province

4. SAMPLING DESIGN. STRATIFICATION

STRATIFICATION "A POSTERIORI"
PLOT LEVEL INPUT DATA :

- **National forest types**:
  - Ecological forest types (floodplain forest)
  - Man-made open forest stands (dehesas, resin tapping stands)
  - Productive plantation
  - Alien/native species

- **Forest stand categories:**
regeneration, thicket, pole wood and high forest

- **Tree species composition**

- **Crown cover**

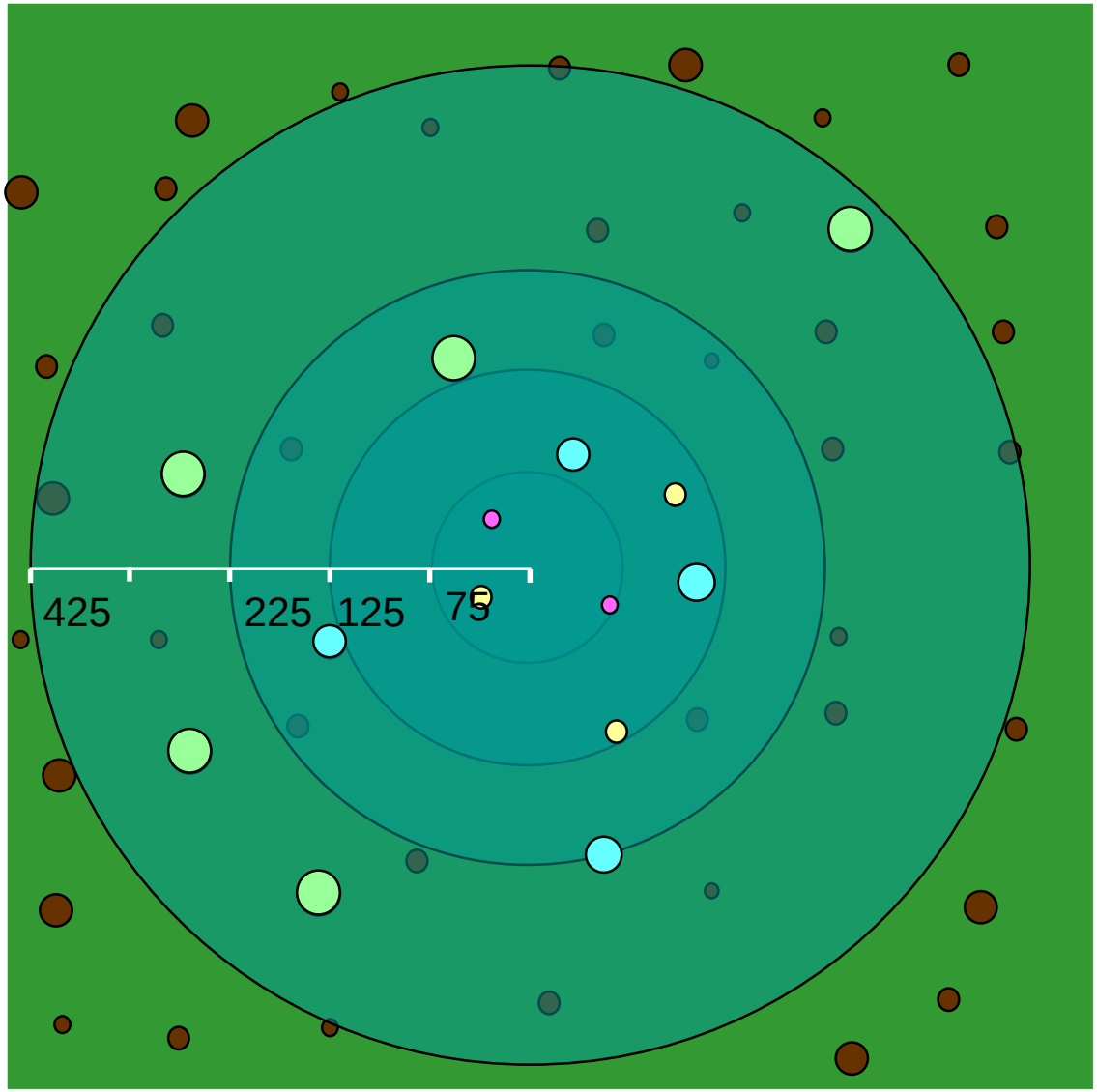
- **Management regime** (dehesas, reforestations, forestation…)

5. SAMPLE PLOTS

- **Permanent plots** (permanently marked by metallic tube)

-**Concentric sampling plots**: four circular concentric fixed areas with radius 5 (DBH ≥ 7.5 cm), 10 (DBH ≥ 12.5 cm), 15 (DBH ≥ 22 5 cm) and 25 m (DBH ≥ 42 5). 5 m radius; trees with DBH between 2.5 and 7.4 cm are counted.

-**Field data**: including plot identification, forest type, trees mensuration, sample tree data, shrub, erosion factors and tree damages.



6. BIODIVERSITY SURVEY

INIA
Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria

More than 45.000 plots by now (aprox. 75% of the total)

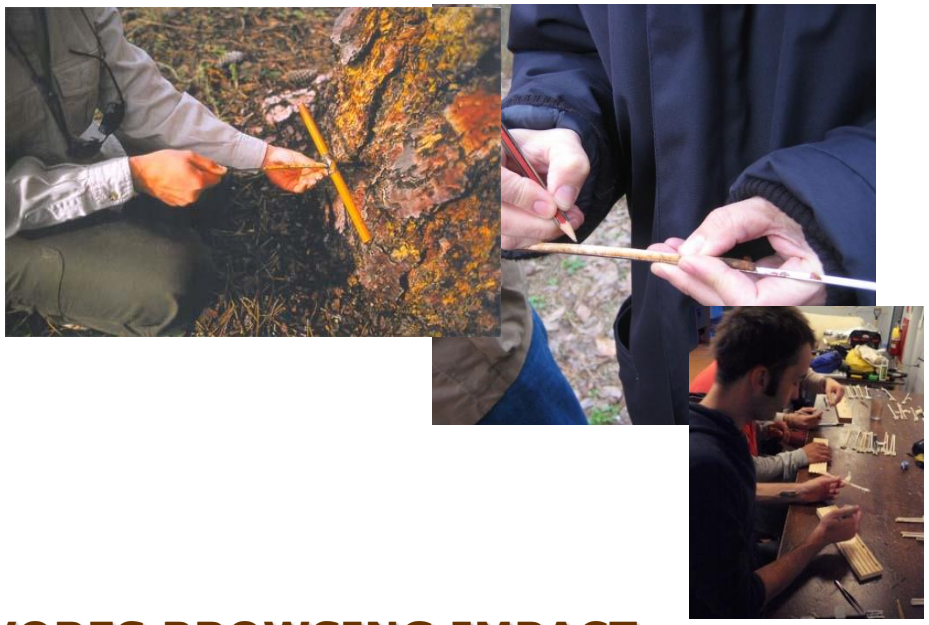
FOREST STRUCTURE

VEGETATION SPECIES

Invasive exotic species survey

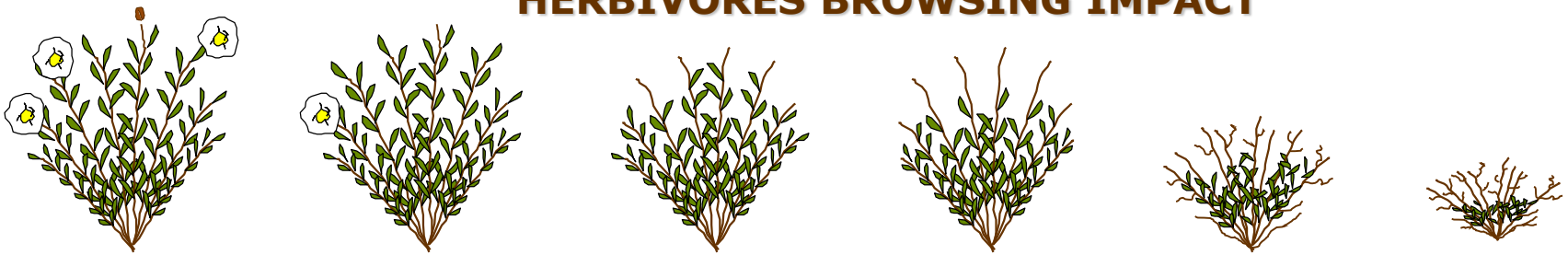
6. BIODIVERSITY SURVEY

DENDROLOGY



DEAD WOOD

HERBIVORES BROWSING IMPACT

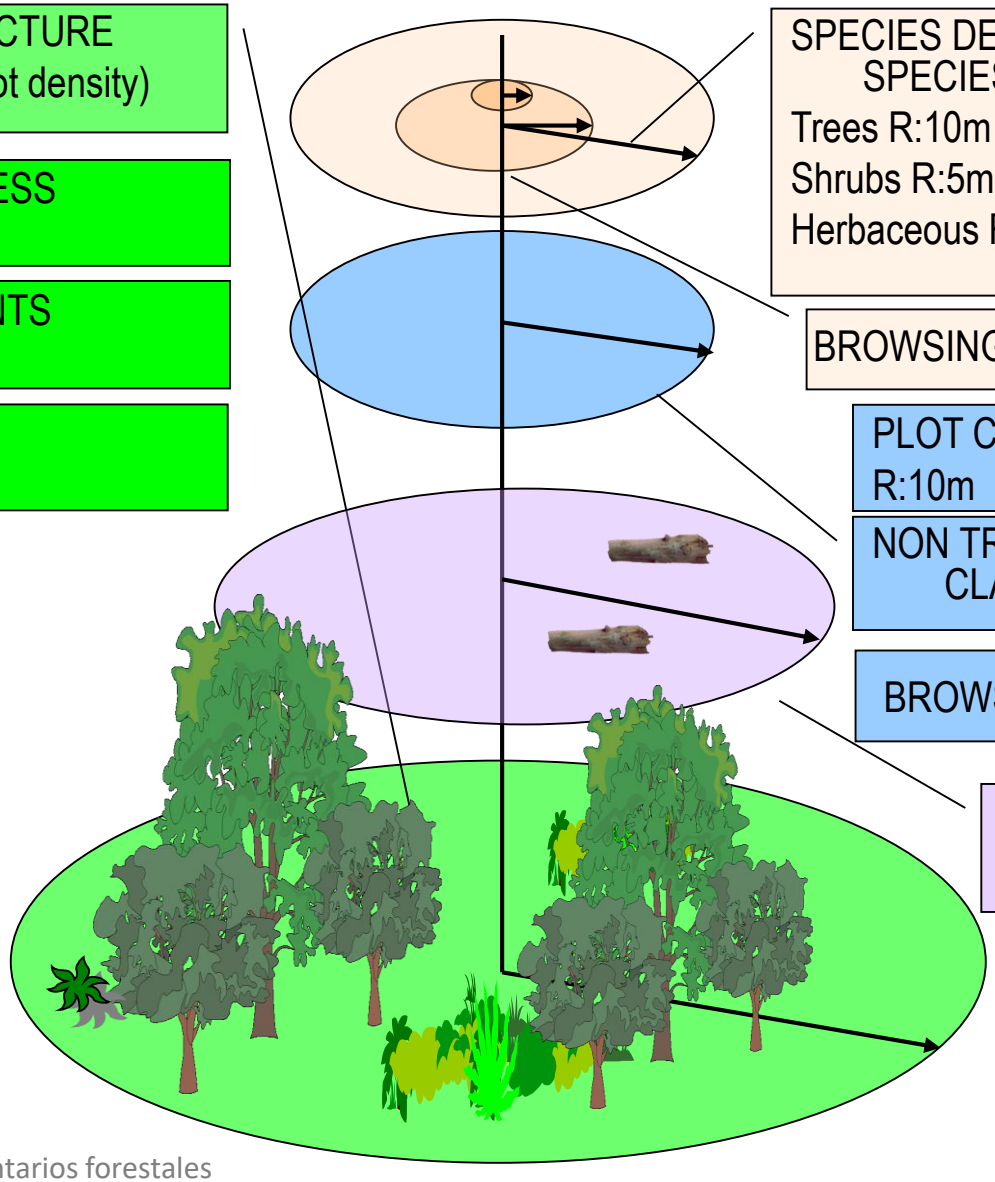


PLOT STAND STRUCTURE
(depending on the plot density)

STAND NATURALNESS
R:25m (Tessera)

SINGULAR ELEMENTS
R:25m

PLOT AGE
R:25m



SPECIES DENSITY: INVASIVE EXOTIC SPECIES; PROTECTED SPECIES
Trees R:10m
Shrubs R:5m
Herbaceous R:1m

BROWSING IMPACT .Regeneration(R=5)

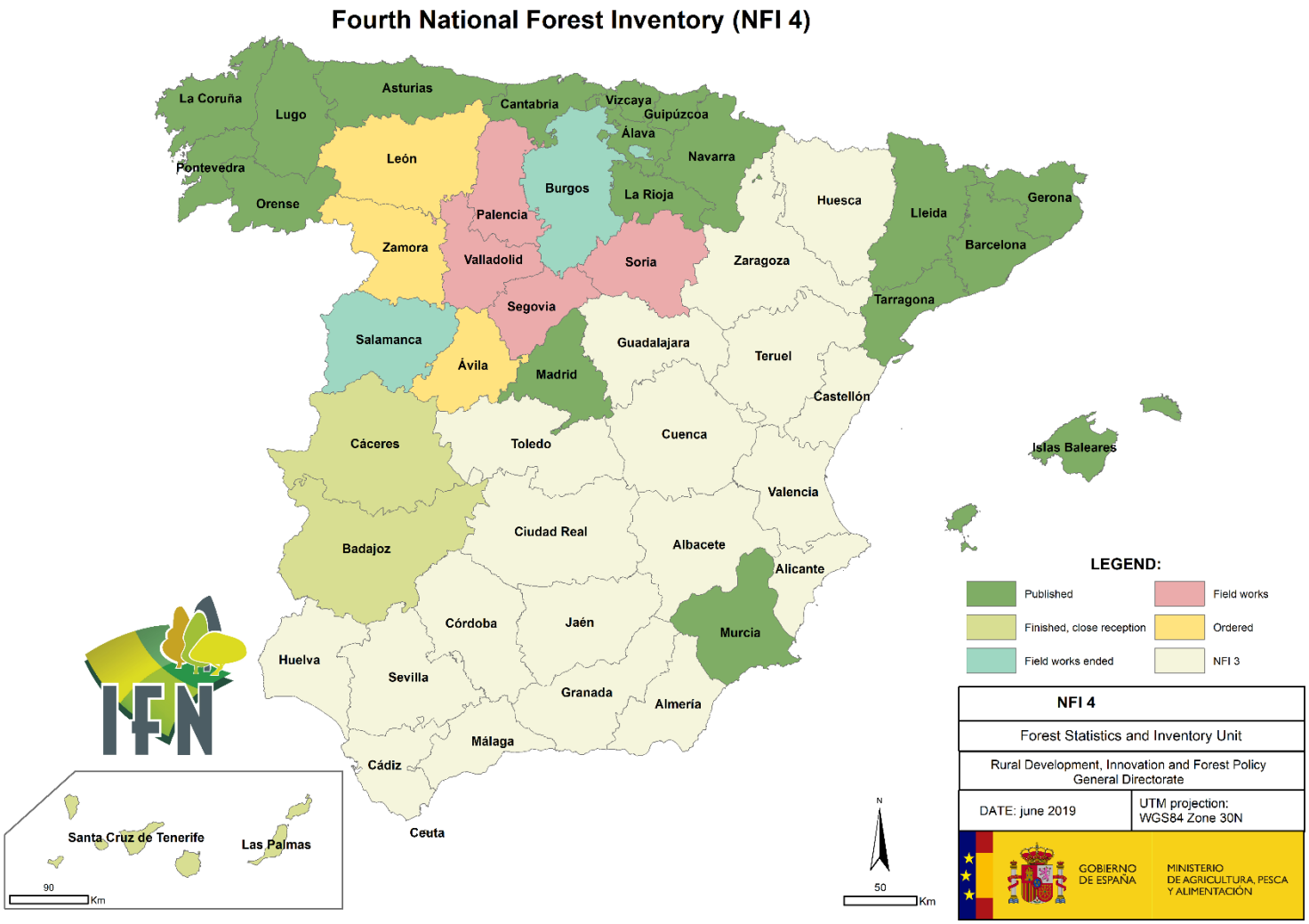
PLOT COVERAGES (bare soil…)
R:10m

NON TREES SPECIES COVER BY CLASSES. R: 10m

BROWSING IMPACT (R=10)

DEAD WOOD
R: 15 m

NFI4 CURRENT STATUS



7. NEW IMPROVEMENTS NFI4

WHAT IS NEW IN THE NFI4/SFM25?

1. CARTOGRAPHY

- Quick review (Foto Fija), updated each 3 years (2009, 2012 and 2015 available, next 2018)
- New strata definition: which will homogeneity provincial and national strata
- Since 2017, starting integrated process with LPIS

2. IMPROVEMENTS IN NFI SURVEY

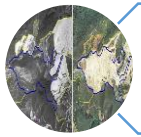
- NFI. Minimize to a half the cycle in the atlantics provinces (North of Spain). New measurements in order to estimate wood quality
- Improvement of the biodiversity survey
- Improvement of other special parameters: resin, pine cones, cork

7. NEW IMPROVEMENTS NFI4

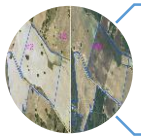
CARTOGRAPHY: Quick review SNFM (Foto Fija)

International and national information requirements: time referred (1 year).
Need to have a yearly map. Drastic anthropic changes are analyzed by photo interpretation:

CHANGES ANALYZED

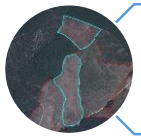


Deforestation: analysis of the intersect MFE-SIGPAC



Forestation/afforestation: analysis of information provided by autonomous regions

Wild forest fires: analysis of the information provided by the Ministry and autonomous regions

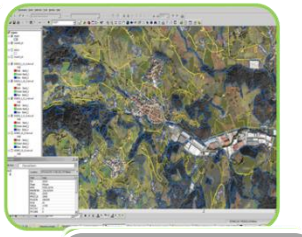


Tree-fellings (partial information)

The natural dynamic of forest-land has not be studied in this project by the moment.

MOST UPDATED SNFM (for each province)

CHANGE SHAPE



QUICK REVIEW (FOTO FIJA)

PRODUCTS
• Yearly Forest Map, each 3-5 years (three versions available: 2009, 2012 and 2015. Next: 2018) • Change shape

7. NEW IMPROVEMENTS NFI4

FOREST INVENTORY FOR NORTH ATLANTIC PRODUCTIVE SPECIES

5 year cycle.
Started in 2017,
definitive results
are expected soon

2500 plots

More than 1
Millon
hectareas

- Scope:
  - 4 atlantic autonomus regions: Galicia, Asturias, Cantabria, Basque country
  - Species: ***Eucalyptus* sp, *Pinus radiata*, *Pinus pinaster*** and **their mixtures**
- Cartography and field information
- Parameters:
  - Only **dasometric** measurements (no biodiversity)
  - New parameters in order to estimate **Wood quality**
  - **Genetic studie**s about provenance of *Pinus pinaster* and *Pinus radiata* (100 plots)

7. NEW IMPROVEMENTS NFI4

IMPROVEMENT OF OTHER SPECIAL PARAMETERS

RESIN (*PINUS PINASTER*)

- AIM: Estimate resin potential and real productivity
- New methodology of field survey, measuring new parameters

PINE CONES (*PINUS PINEA*)

- AIM: Estimate potential and real productivity
- How many *Pinus pinea* forests are exploitated
- New methodology of field measuring new parameters
- Prediction models of pine cones production

CORK (*QUERCUS SUBER*)

- AIM: Estimate potential and real productivity
- New methodology of field measuring new parameters

7. HARMONIZATION NEEDS

Several initiatives (ENFIN)

COST ACTIONS: E43 /USEWOOD

Specific Contracts (JRC)

DIABOLO (H2020)

http://diabolo-project.eu/

Main results achieved in WP3

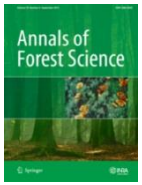
Methods, indicators and/or protocols using NFIs as data source to improve the forest information:

1. Recommendations for harmonized forest biodiversity and conservation assessment in Europe
2. Improvement of the availability and quality forest information of specific non-wood forest products production
3. Recommendations of the priorities for the future refinement and inclusion of social and recreational variables in European NFIs
4. Identification of relevant indicators for the protective function of forests against wind storms based on the information provided by NFIs
5. Improvement of the characterization of canopy fuel loads for fire risk assessment

DIABOLO
Distributed, Integrated and Harmonised Forest Information for Bioeconomy Outlooks

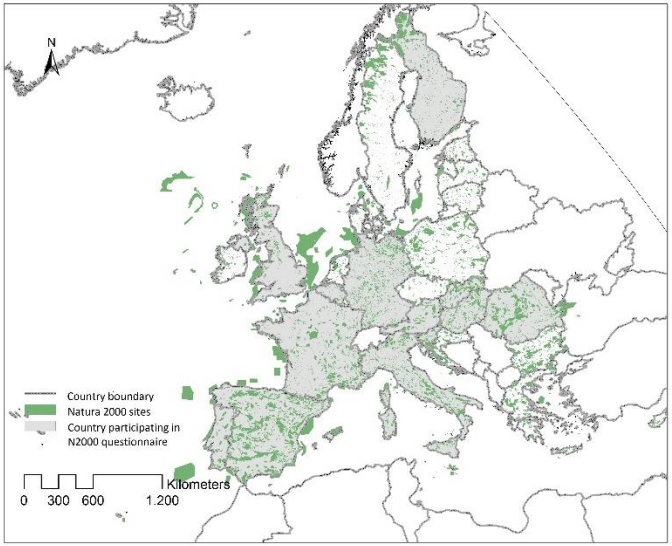
The use of National Forest Inventory data for the conservation status assessment of Natura 2000 forest habitats in Europe

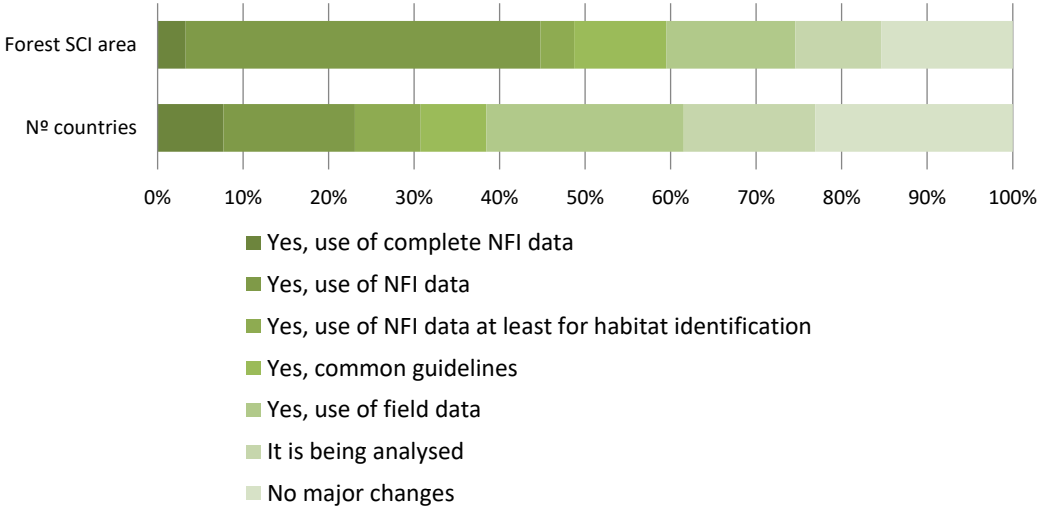
Alberdi et al AFS



Survey (use of NFI data, Habitat Directive) covered thirteen European countries, accounting for 62% of FHT area.

Previous RP(2007-2012) >70% ACS expert knowledge





DISSEMINATION AND USER INFORMATION CONTRIBUTION

- ✓ Wide dissemination (different levels of information)
  - ➢ Requirements (N/I)
  - ➢ decision-makers
  - ➢ forest managers
  - ➢ researchers
  - ➢ to any user
- ✓ Paper and digital format
  - ➢ Paper format: key indicators
  - ➢ Digital format: full information
- ✓ NFI's own Website. Alphanumeric and cartographic information download

THANK YOU FOR YOUR ATTENTION

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