

QGIS in Remote Sensing Set

coordinated by
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Volume 3

QGIS and Applications in Territorial Planning

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Color section

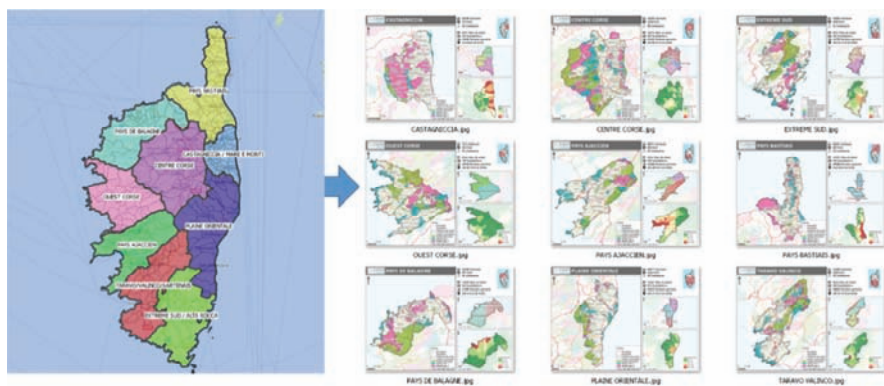


Figure 1.1. *Atlas of Corsica local regions*

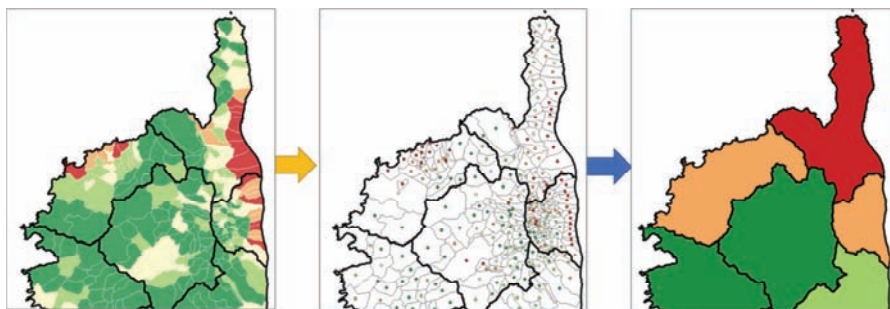


Figure 1.6. *Polygons spatial join based on centroids*

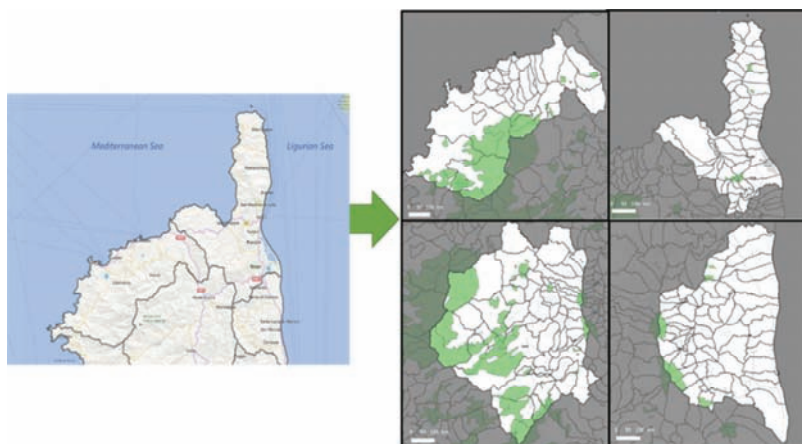


Figure 1.9. *Principle of atlas coverage layer*

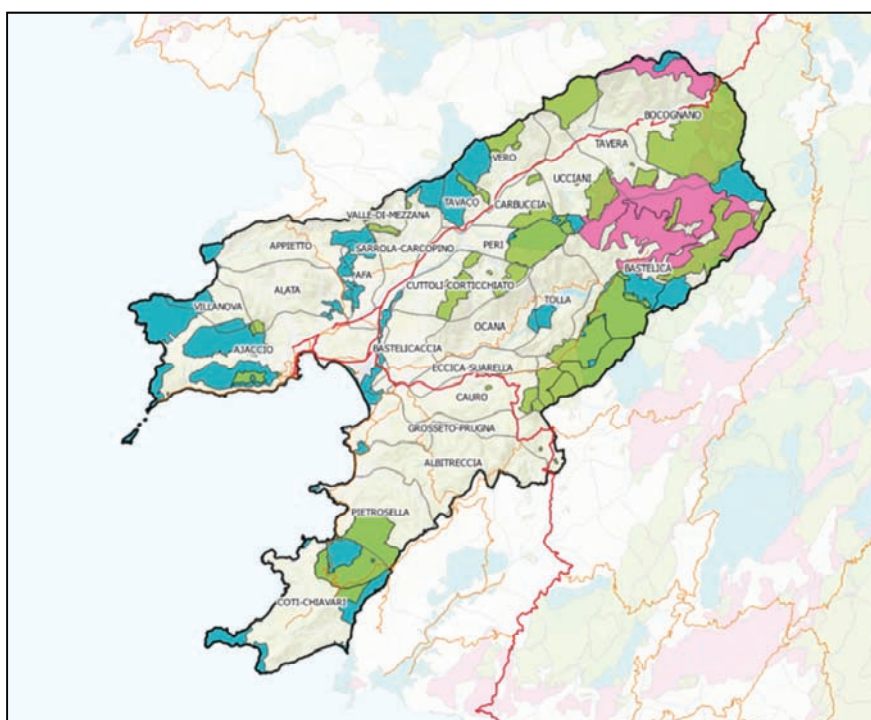
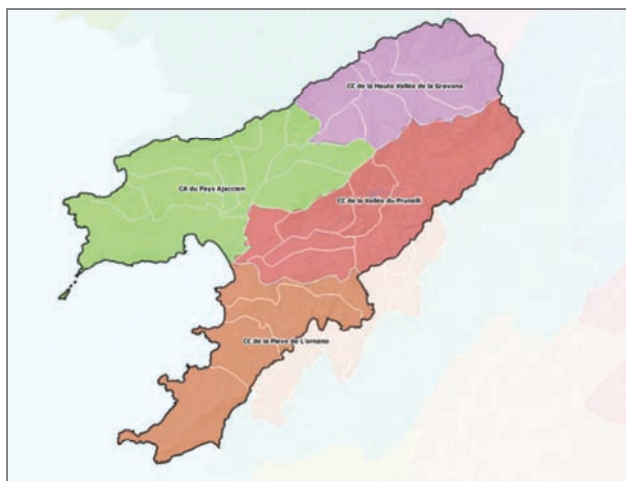
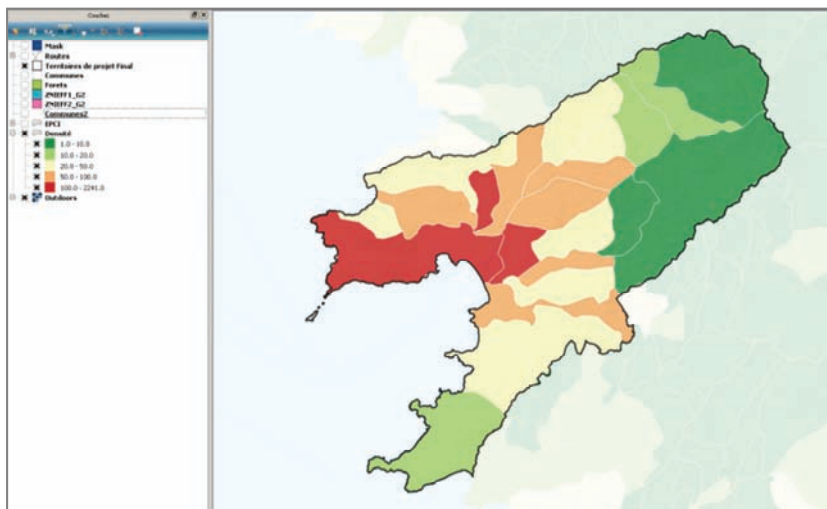


Figure 1.10. *Example of layout of main map*



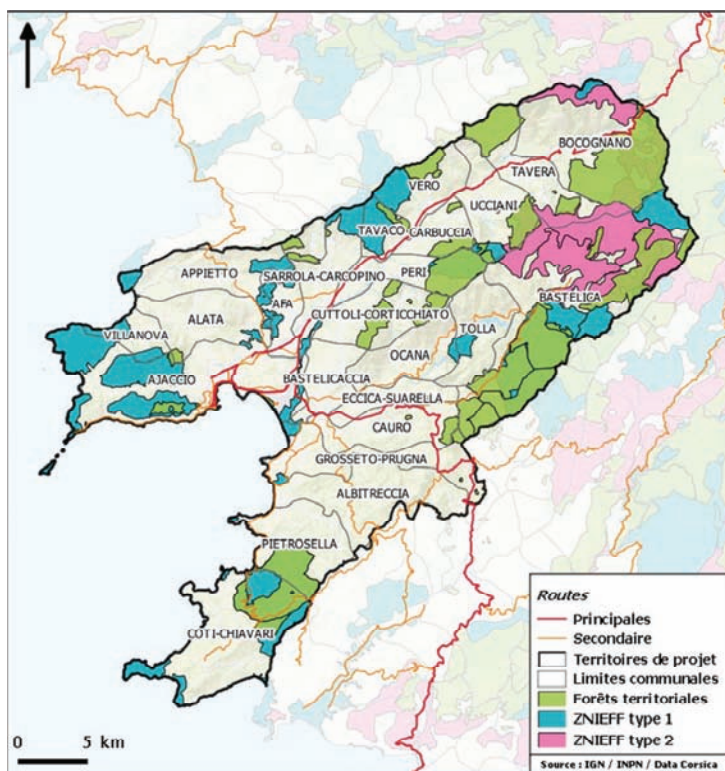


Figure 1.13. Add main map to the atlas template

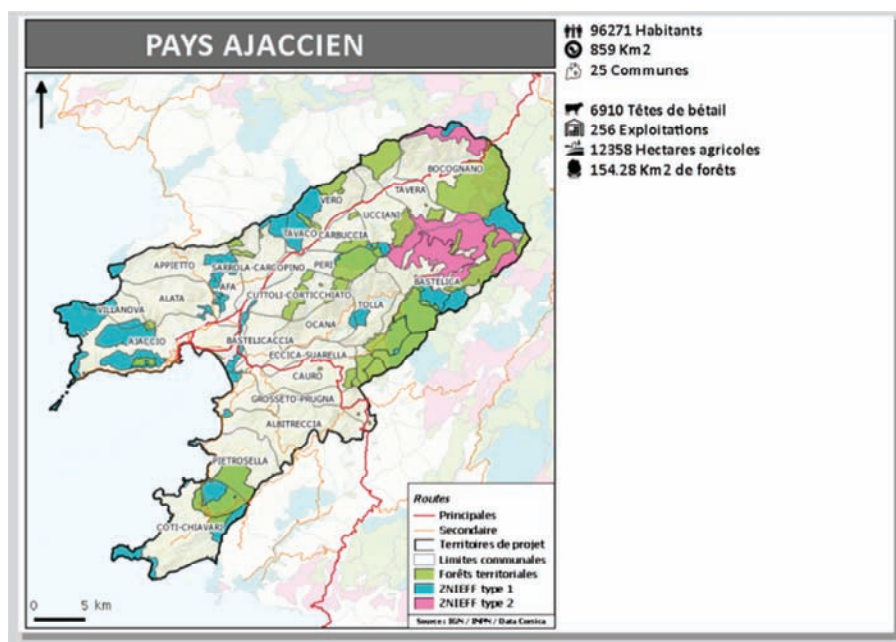


Figure 1.14. Add title and indicators to the atlas template

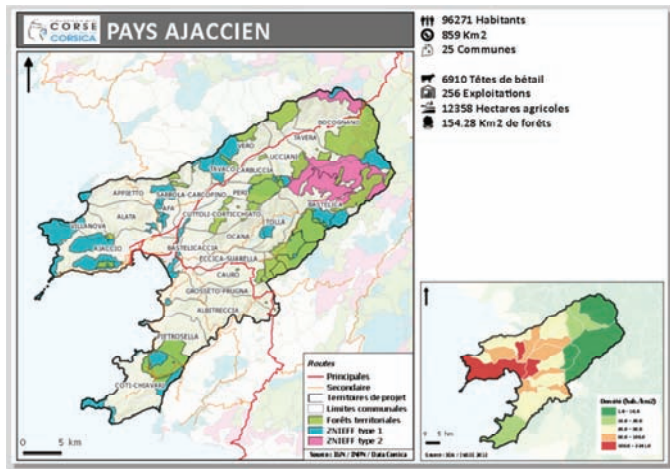


Figure 1.15. Add municipal population density map to the atlas template

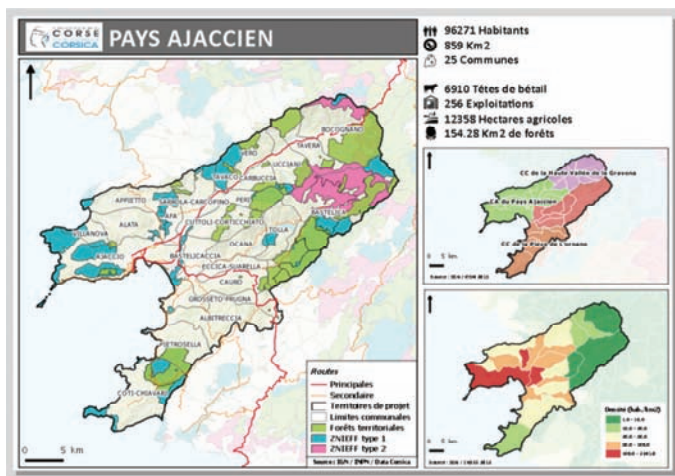


Figure 1.16. Add Intermunicipal cooperation map to the atlas template

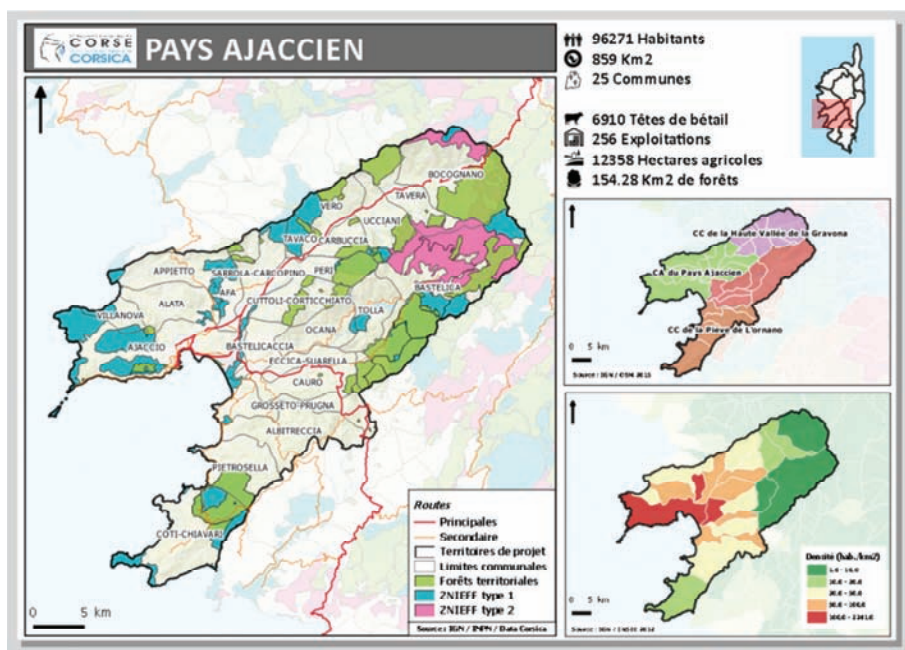


Figure 1.17. Example of completed atlas template

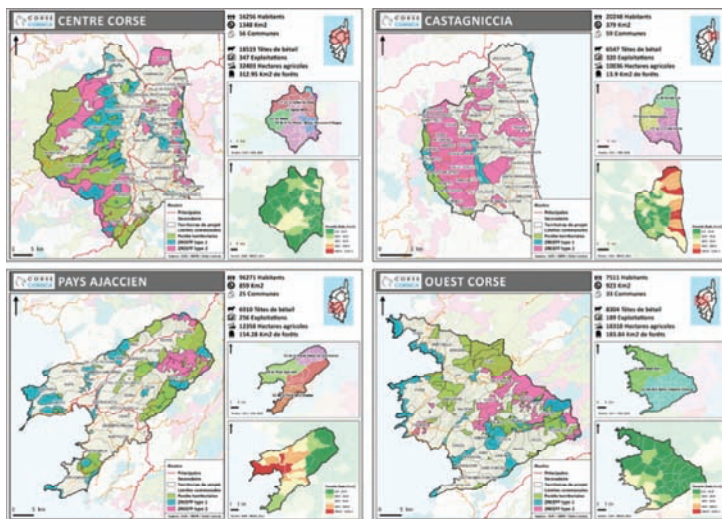


Figure 1.18. Overview of the pages of the atlas

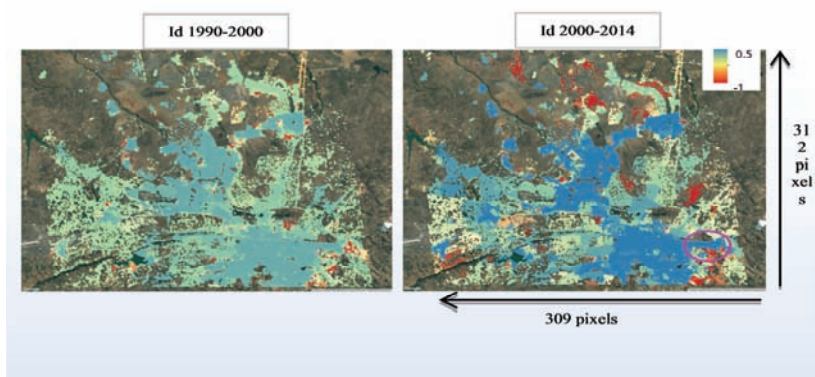


Figure 2.11. Results of the calculation of the LUE indicator for two intervals: Id_{1990-}

Figure 2.11. Results of the calculation of the LUE indicator for two intervals: $Id_{1990-2000}$ and $Id_{2000-2014}$ (cells of 250 m x 250 m)



Figure 2.12. Example of backyard shacks that are formal government-built housing, but where over-occupation corresponds to an average of 15 people living in a four-room dwelling [GER 13]. This explains the increase in the value of the LUE indicator in these areas



Figure 3.2. Buildings' heights rasterization process from BD TOPO®



Figure 3.4. *Geometric overlaps between roads and railways*

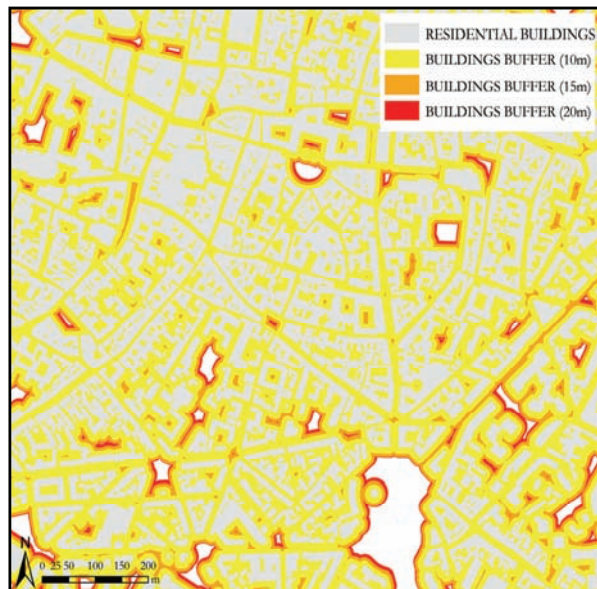


Figure 3.6. *Various buffer radius tests (10, 15 and 20 m) in dense building area: City center of Dijon*

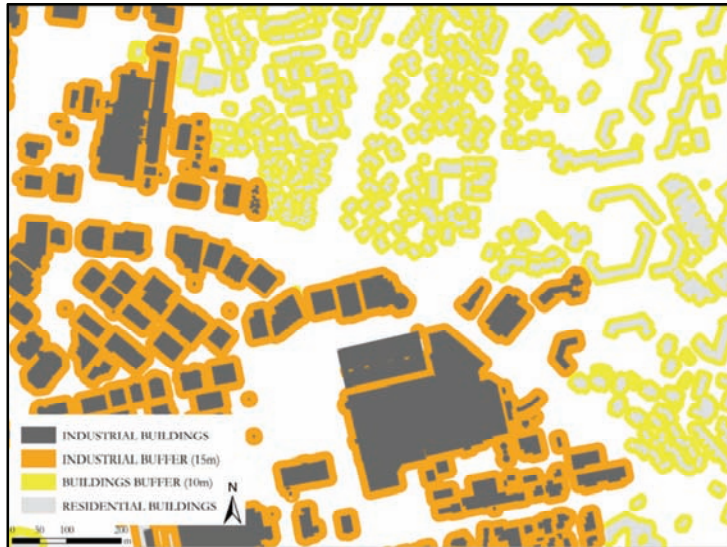


Figure 3.7. Buffer allocation in mixed areas including a residential zone in the northeast, and an industrial zone in the southwest: the tertiary activity zone of Quetigny (Lat: 6692129.501971; Long: 858612.392790) located in the suburbs of Dijon



Figure 3.8. Complementarity between vegetation from OpenStreetMap and BD TOPO® in open landscape: the University campus in Dijon



Figure 3.9. Anthropization map at the end of step 2



Figure 3.10. Illustration of intersection GIS processing in accordance with a regular grid (QGIS functionality: Intersection)

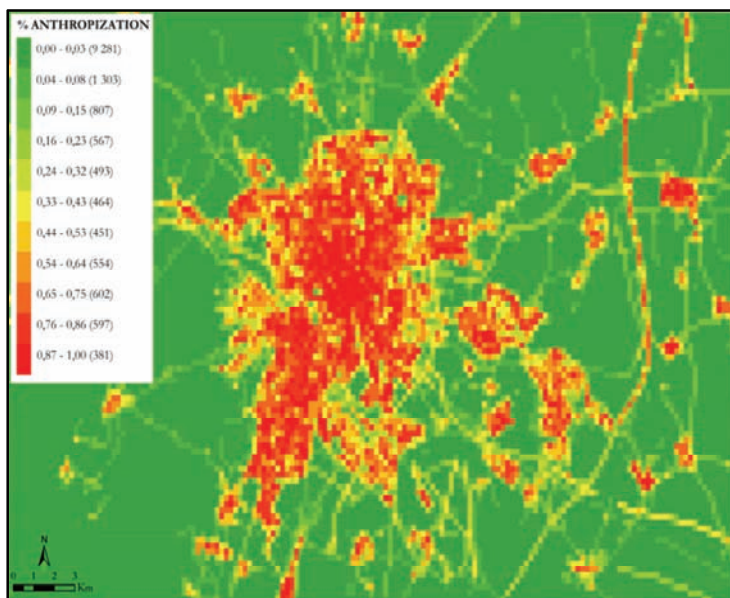


Figure 3.11. *Anthropization index at a resolution of 150 m in the study area (in brackets: the number of features associated at each % class)*

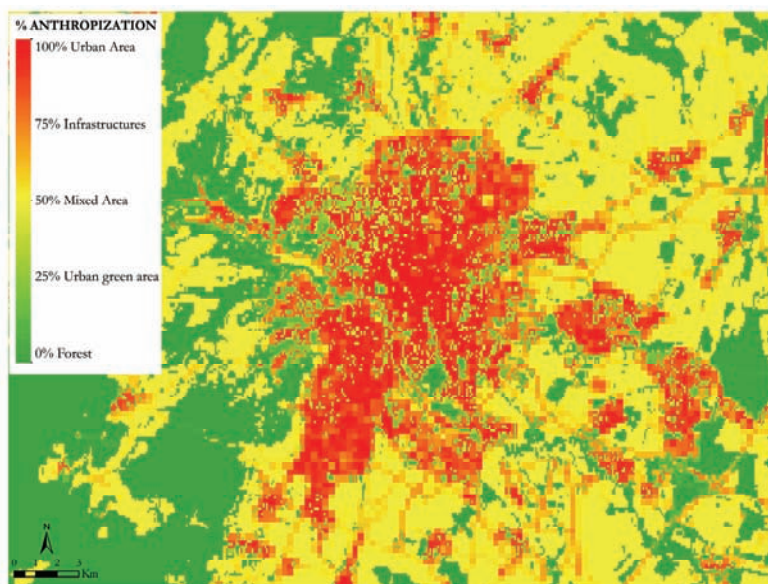
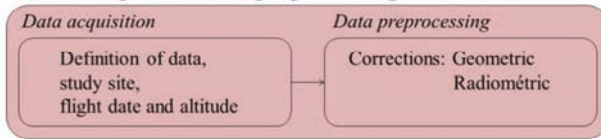
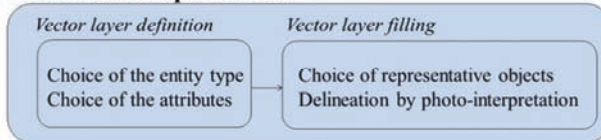


Figure 3.12. *Anthropization index of the territory at 30 m of spatial resolution*

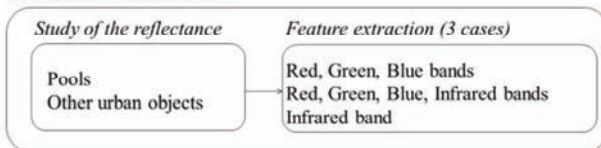
1. Data acquisition and preprocessing



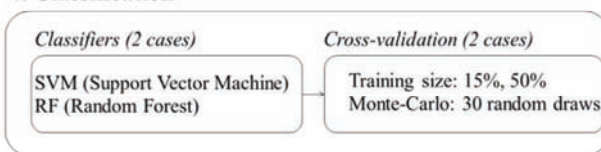
2. Reference map definition



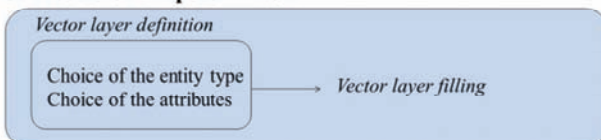
3. Feature extraction



4. Classification



5. Prediction map definition



6. Performance assessment

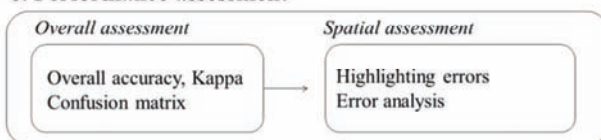


Figure 4.1. Method for studying the potential of airborne optical remote sensing for pool mapping in an urban environment

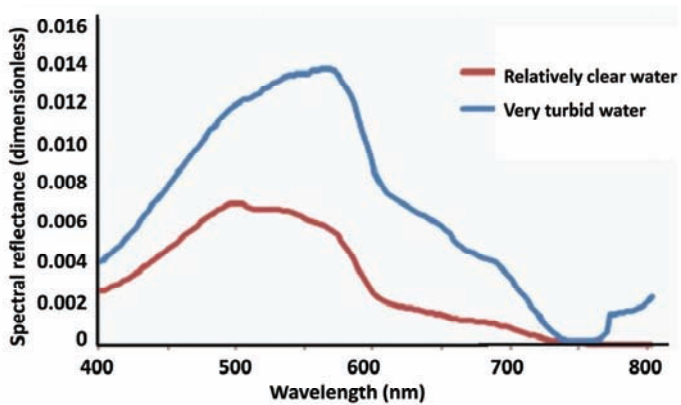


Figure 4.2. Spectral reflectance of relatively clear and very turbid water [LOI 13]

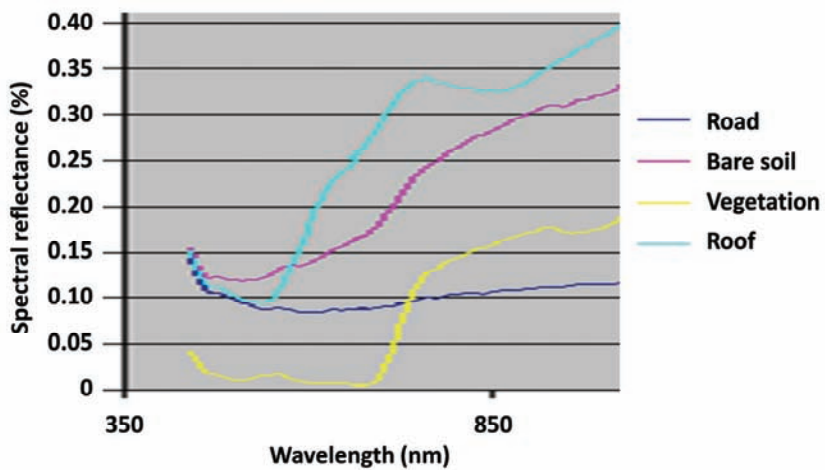


Figure 4.3. Spectral reflectance of road, bare soil, vegetation and roof [NCR 13]

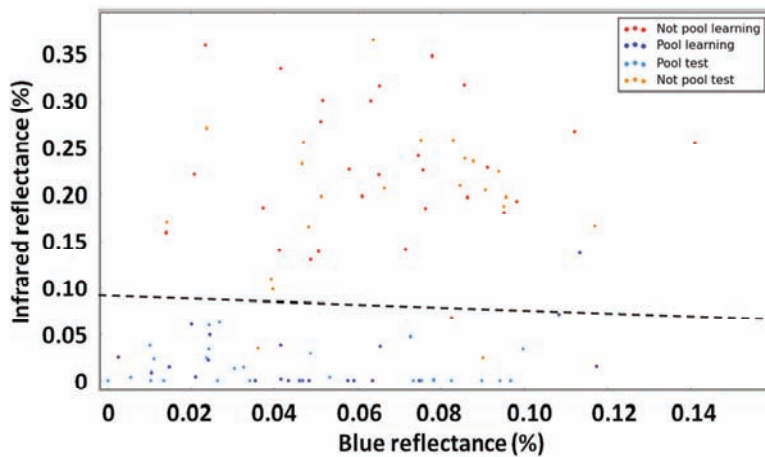


Figure 4.4. Simulated data that illustrate how SVM works. The dashed line represents the decision boundary of a linear SVM between the data of the two classes. Below, this is the pool class; above, this is the not-pool class

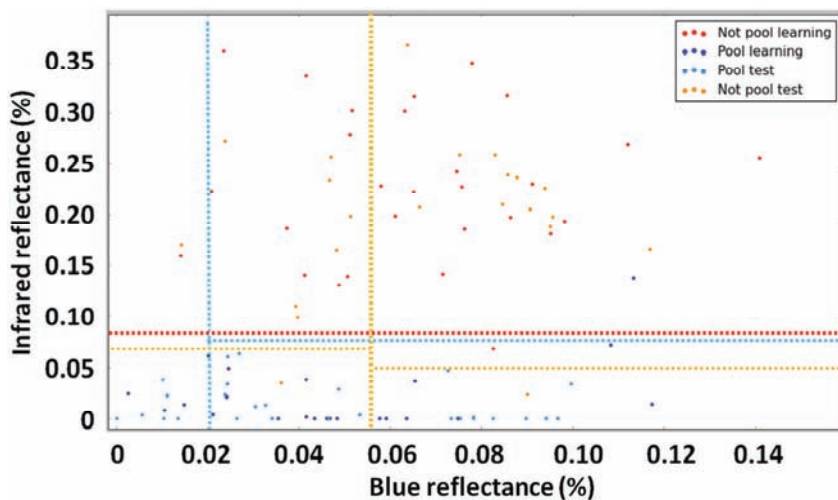


Figure 4.5. Simulated data that illustrate how RF works. The dashed lines represent the decision boundaries of RF with at most two nodes (see decision trees in Figure 4.6). Each line represents a branch of a tree. For example, the red line should be related to the red tree (Figure 4.6). Indeed, considering this tree and in a similar way to the SVM, below it is the pool class while above it is the not-pool class

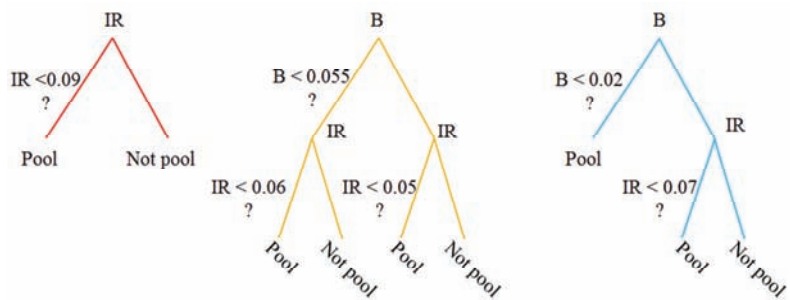


Figure 4.6. Example of three decision trees in connection with Figure 4.5

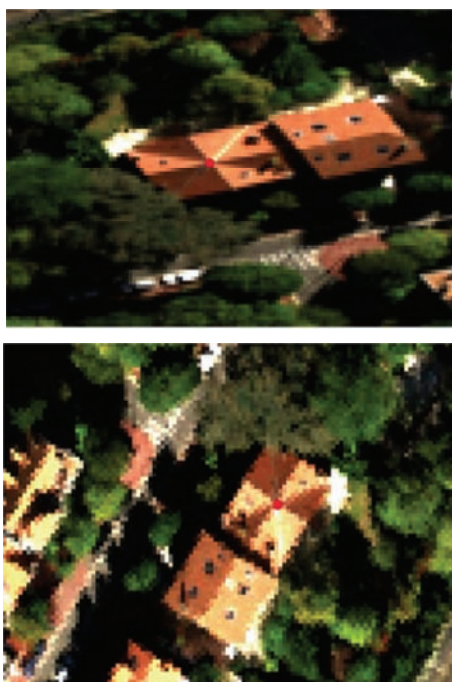


Table 4.2. *Creation of a georeferenced image (step 1)*

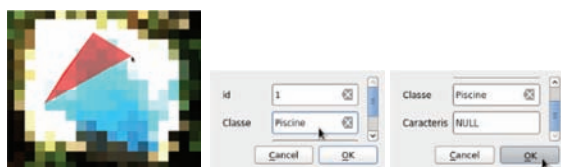


Table 4.3. *Building of reference map (step 2)*



Figure 4.10. *Overlapping of the reference map and the georeferenced hyperspectral image: the swimming pools are blue and the non-pools are red*



Figure 4.11. *Illustration of selected pixels within polygons*

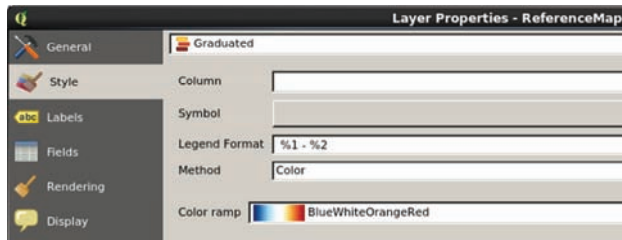


Table 4.4. *Classification and prediction map (step 3)*



Figure 4.12. *Not-pools are red. Top left: SVM RGB; top right: RF RGB; middle left: SVM RGB-IR; middle-right: RF RGB-IR; bottom left: SVM IR; bottom right: RF IR*

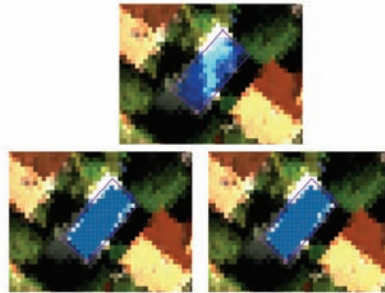


Figure 4.13. Pools are blue. Top: reflectance image;
bottom left: SVM IR; bottom right: RF IR

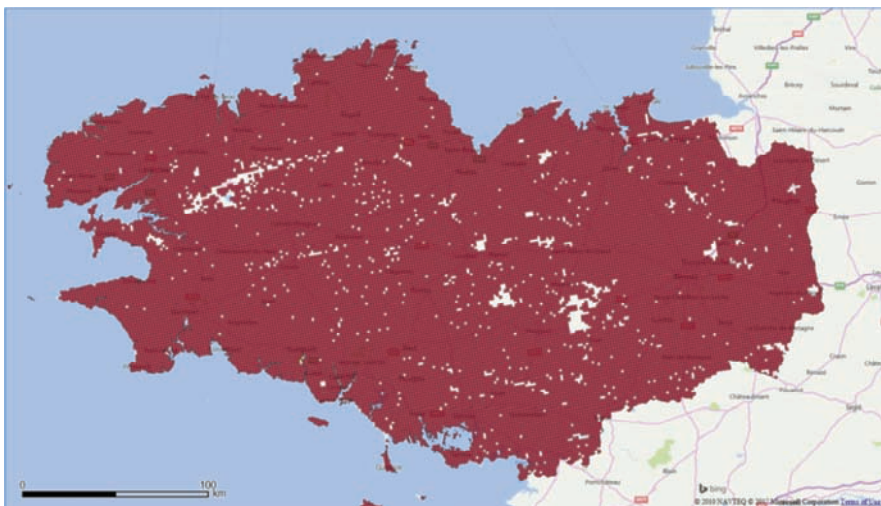


Figure 5.5. Brittany population grid

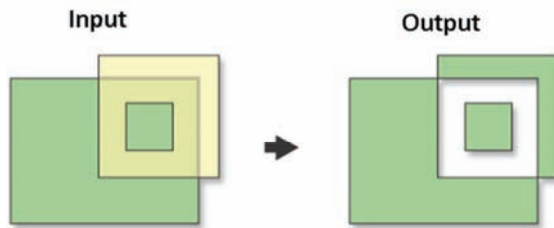


Figure 5.6. *Principle of symmetrical difference*

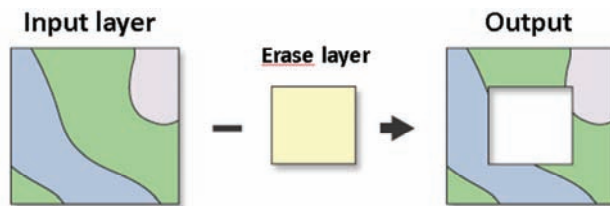


Figure 5.7. *Principle of difference*

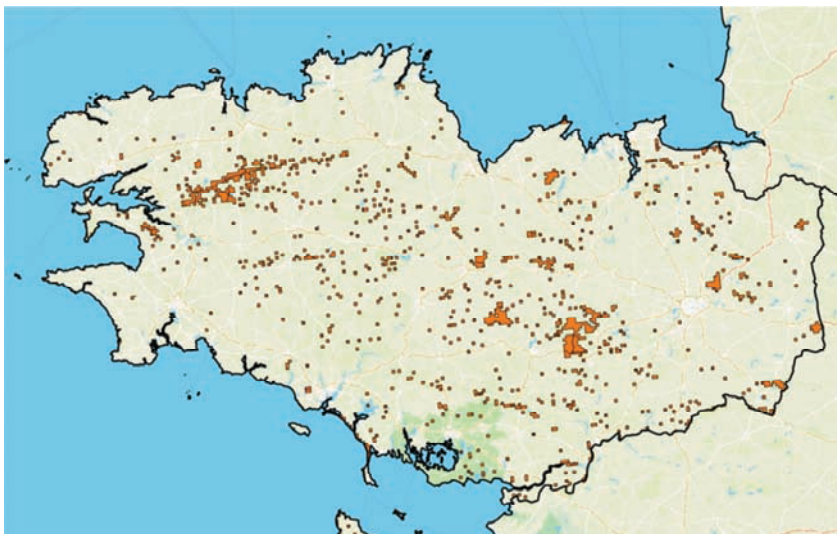


Figure 5.9. *Mapping result of uninhabited areas*

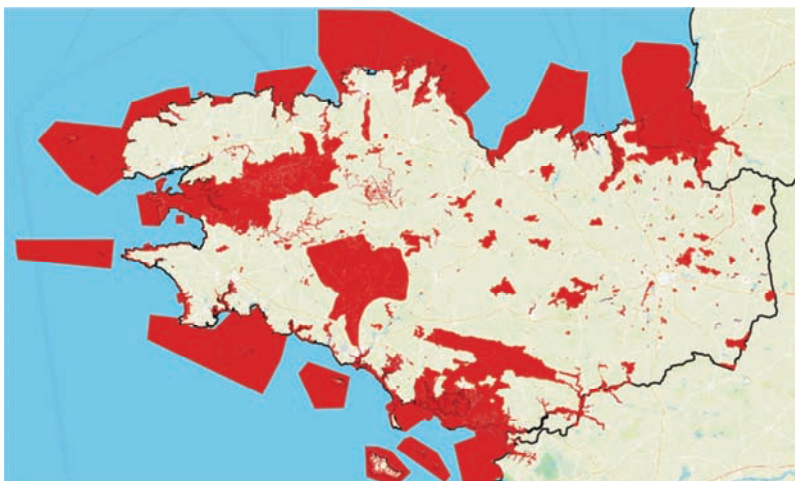


Figure 5.11. *Mapping result of different protected areas union*

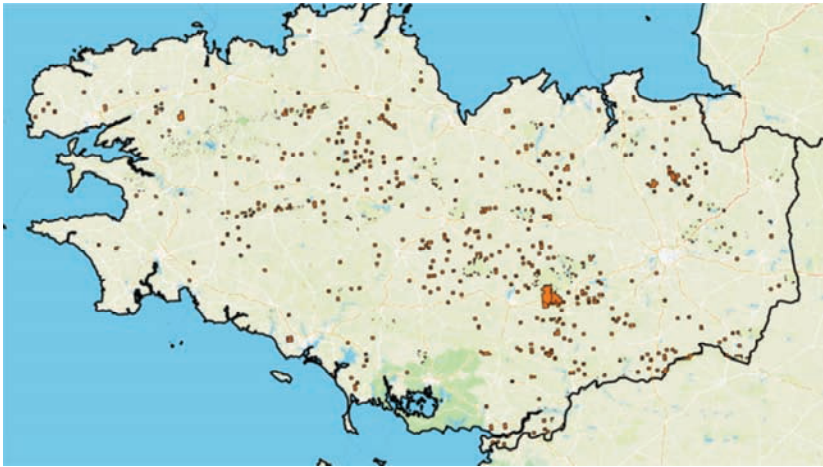


Figure 5.13. *Mapping result of the difference of protected areas*

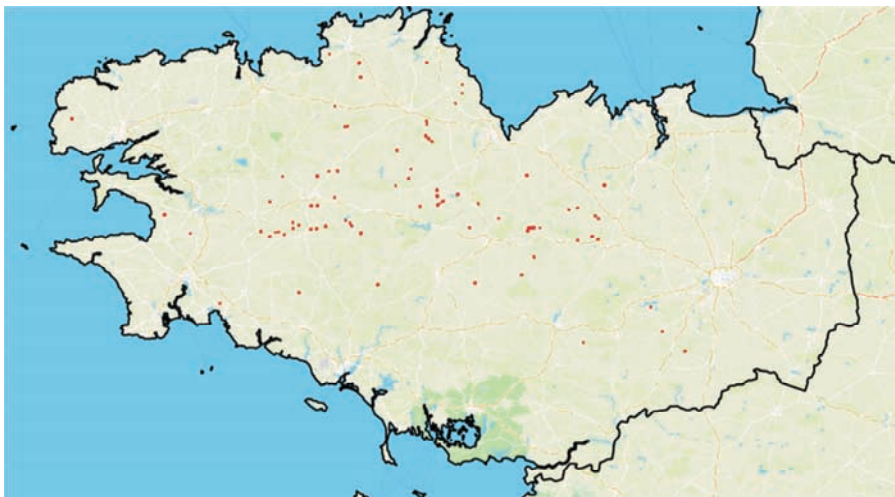


Figure 5.15. *Mapping result of the workflow*

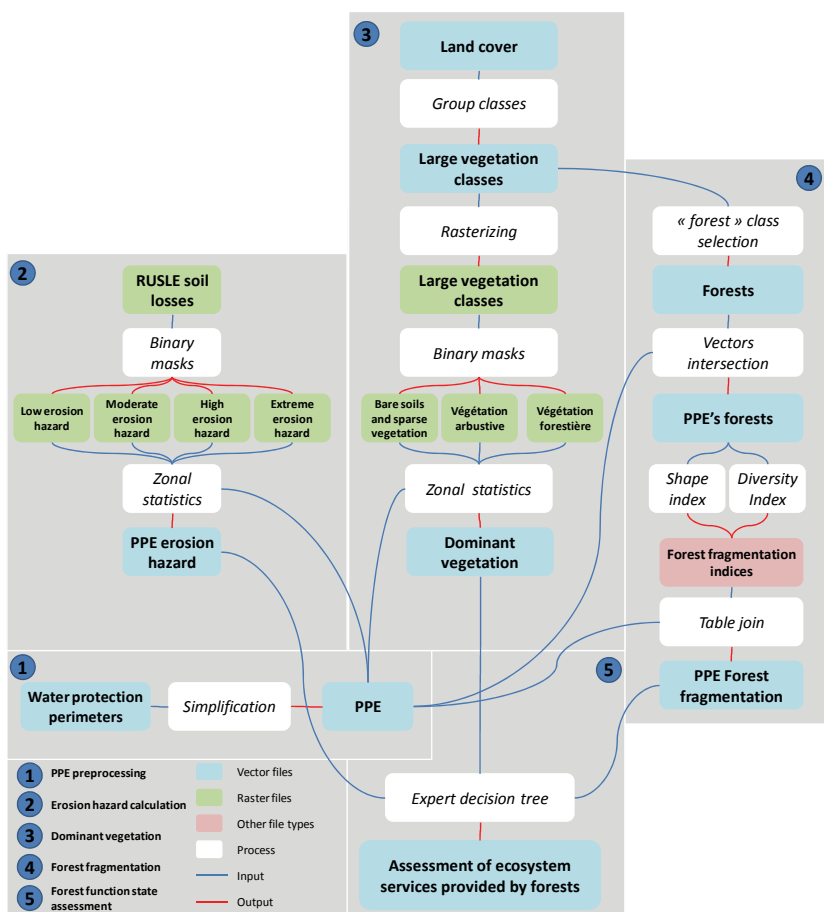


Figure 6.1. Forest function assessment for water protection within water catchment perimeter algorithm

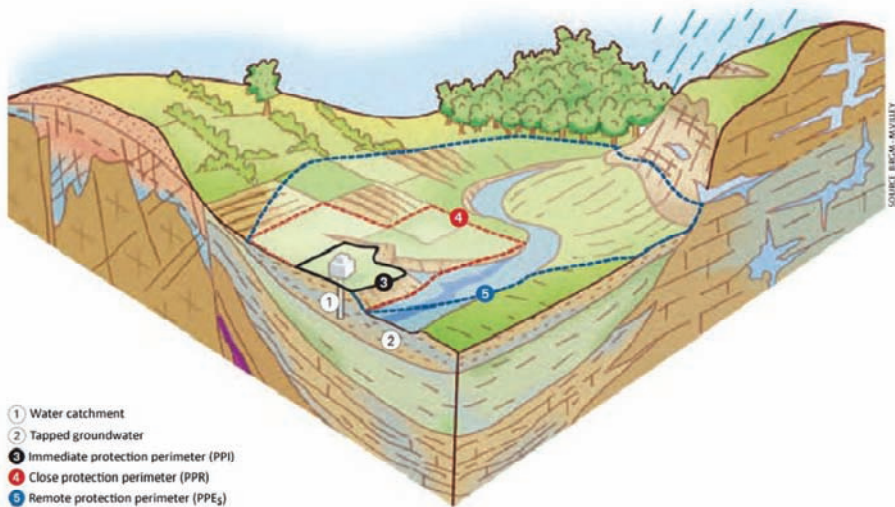


Figure 6.2. *Water catchment protection perimeters*

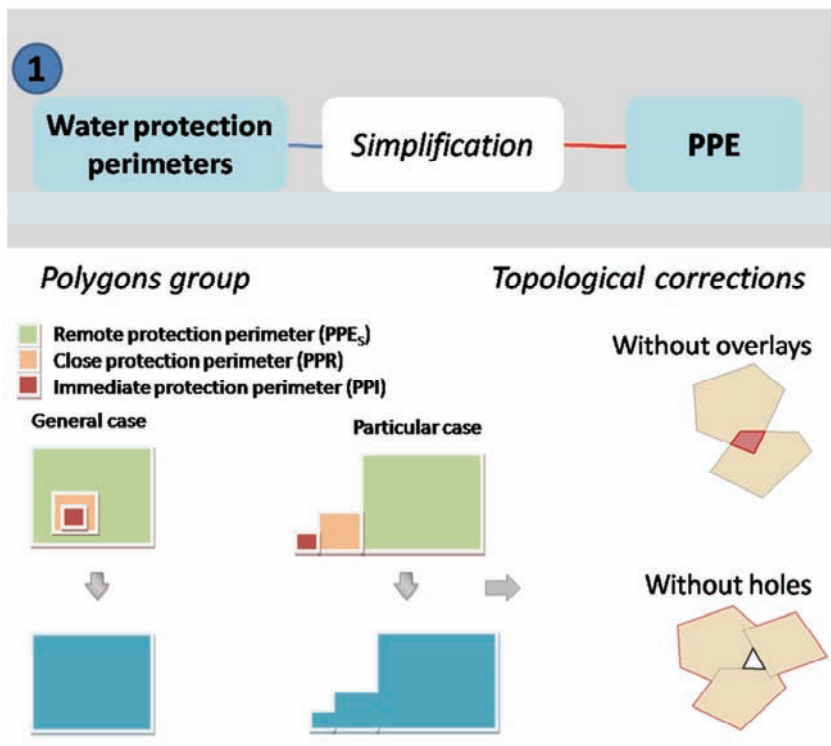


Figure 6.3. PPE database preparation

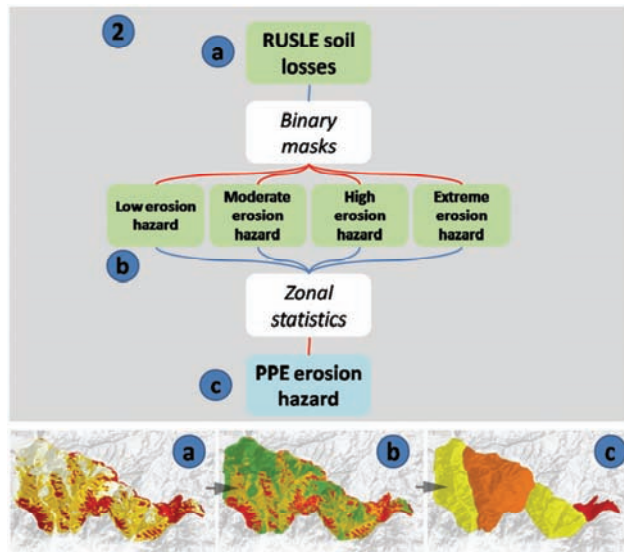


Figure 6.4. Erosion hazard assessment for each PPE: a) soil loss estimates from RUSLE equation in t/ha/year (from white, values near 0 to red, high soil loss estimates); b) erosion hazard map per pixel according to soil loss estimates: low (green), moderate (yellow), high (orange), extreme (red); c) PPE erosion hazard classification (yellow, low to moderate; orange, moderate to high; red, high to extreme)

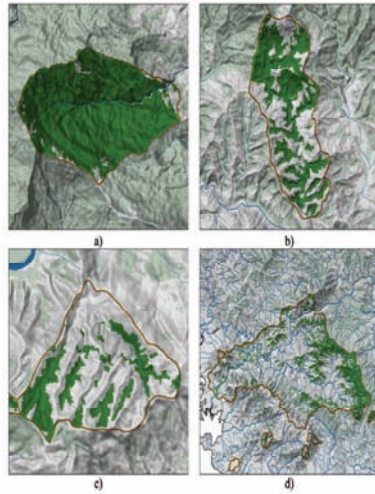


Figure 6.7. *Examples of forest diversity indices in New Caledonia.*
a) Diversity index = 0.02. b) Diversity index = 0.90. c) Diversity index = 1.95. d) Diversity index = 3.56

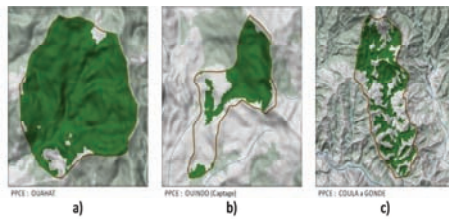


Figure 6.8. *Examples of forest shape indices in New Caledonia.* a) Shape index = 39. b) Shape index = 95. c) Shape index = 965

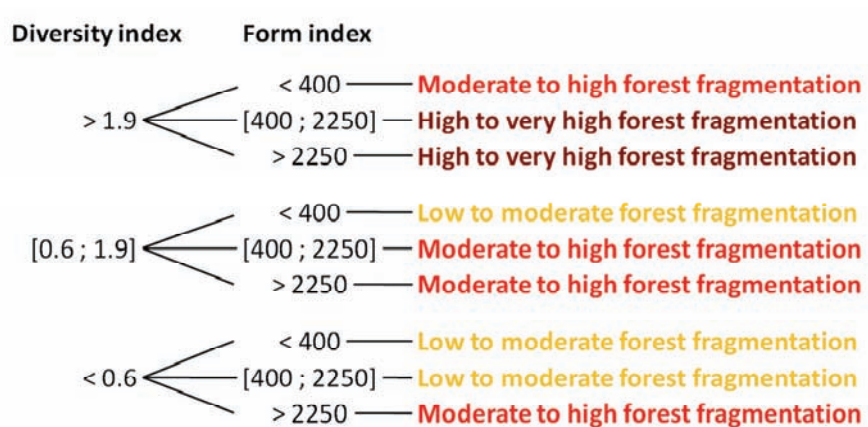


Figure 6.9. PPE's forest fragmentation decision tree

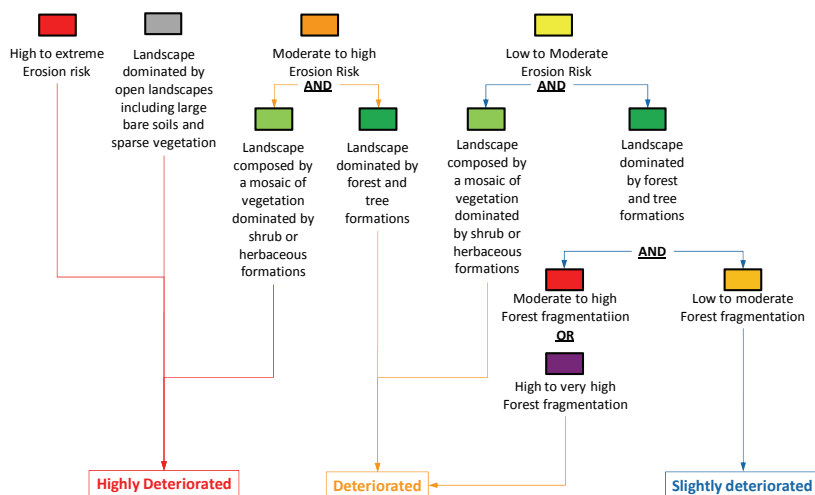


Figure 6.10. The decision tree used to assess forest function state of the PPE (dominant vegetation 1: landscape dominated by tree and shrub formations; Dominant vegetation 2: mosaic of tree, shrub and herbaceous formations with the presence of bare soils and predominance of shrub and herbaceous formations; Dominant vegetation 3: landscape with the large presence of bare soil where the vegetation is sparse and consists of herbaceous formations, with some shrub and tree formations from degraded forests)

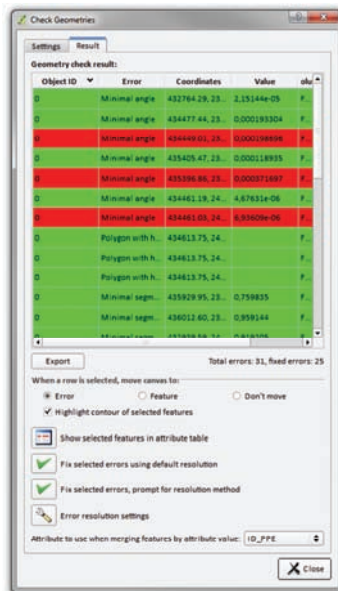


Table 6.8. *Geometry check*



Table 6.9. *Remove small polygons using GRASS*

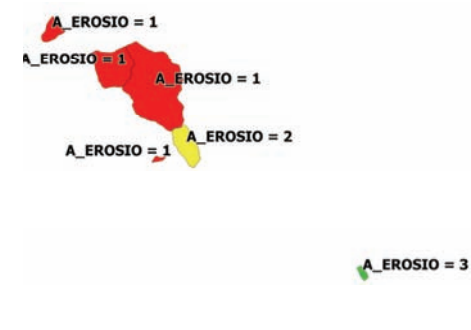


Table 6.12. *Estimation of the erosion hazard for each PPE*

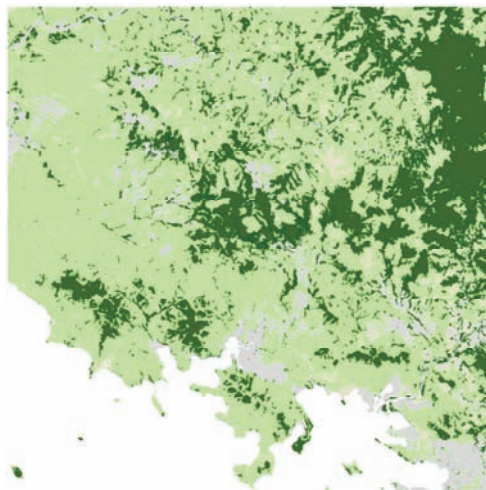


Table 6.15. *Update the attribute table of the land cover map*



Table 6.19. *Determination of the dominant vegetation in each PPE*

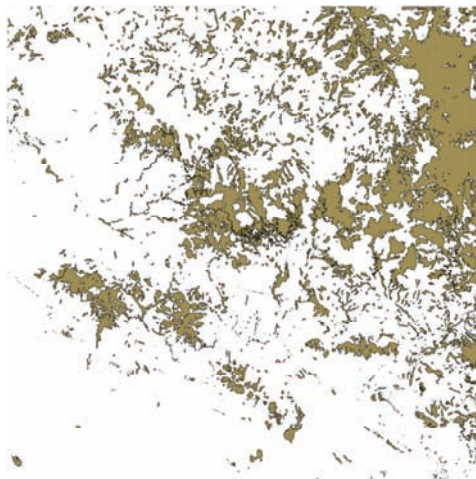




Table 6.20. *Clipping forests in the PPE*

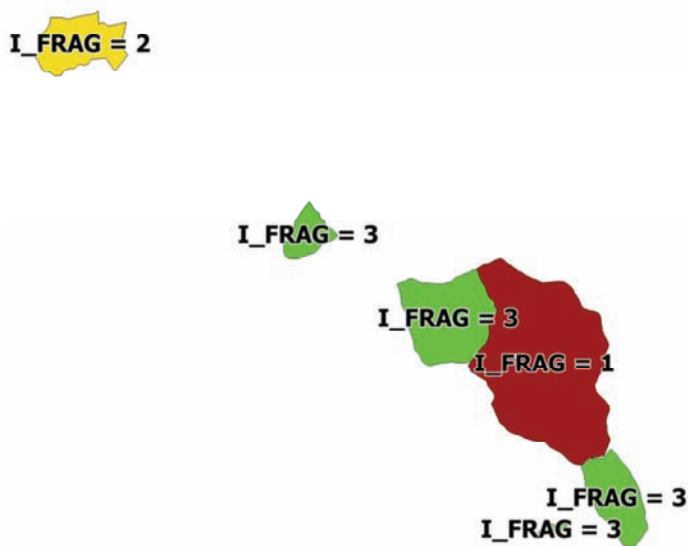


Table 6.27. *Forest fragmentation estimate for each PPE*

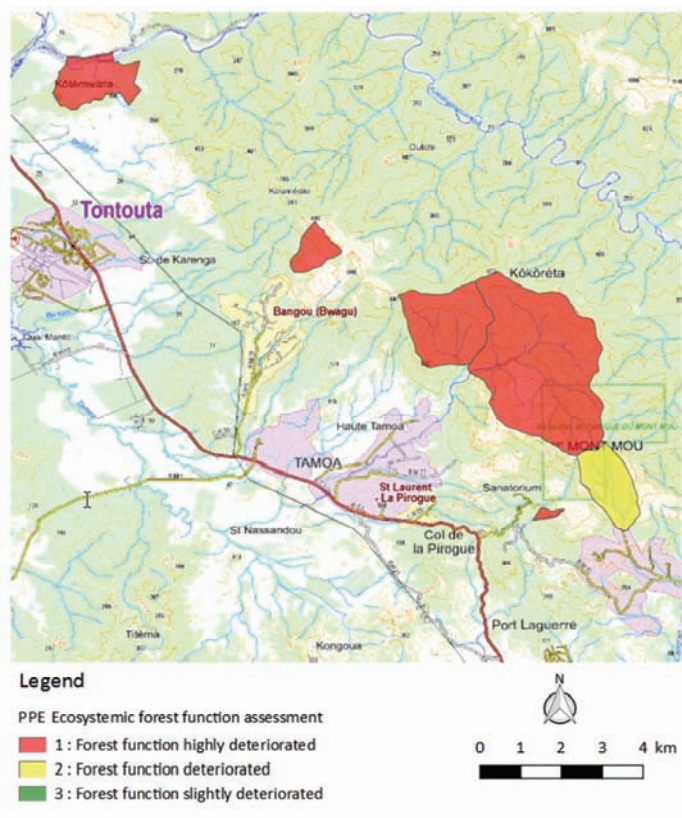


Table 6.28. *Forest function state assessment*

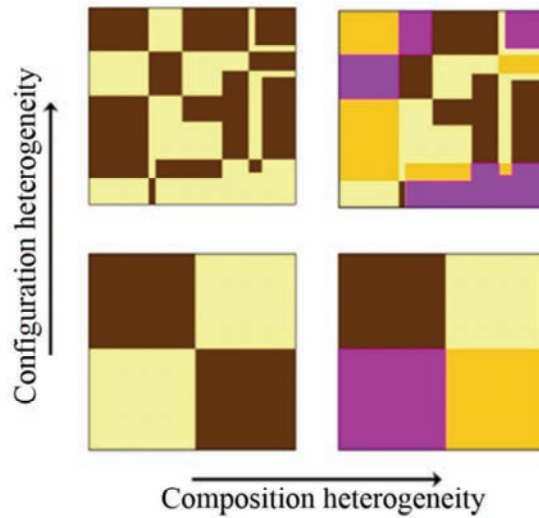


Figure 7.1. The two components of spatial heterogeneity: composition and configuration. The heterogeneity of composition increases with the number of patches of various types (from left to right). The heterogeneity of configuration increases with the complexity of the organization of the patches (from bottom to top) (source: adapted from [FAH 11])

- Summer crop (11)	- Industrial and commercial areas (43)
- Winter crop (12)	- Road (44)
- Deciduous forest (31)	- Mineral surfaces (45)
- Coniferous forest (32)	- Beaches and dunes (46)
- Grassland (34)	- Water (51)
- Mountain pastures (35)	- Glaciers or snow (53)
- Wood moor (36)	- Meadows (211)
- Urban (40, 41)	- Orchard (221)
- Diffuse urban (42)	- Vine (222)

Table 7.3. *Nomenclature of the classes of the OSO 2016 map with associated codes*

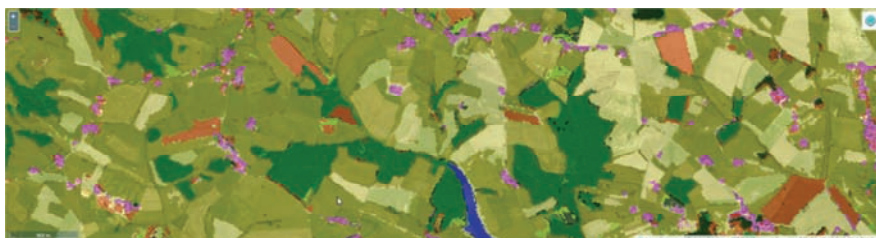
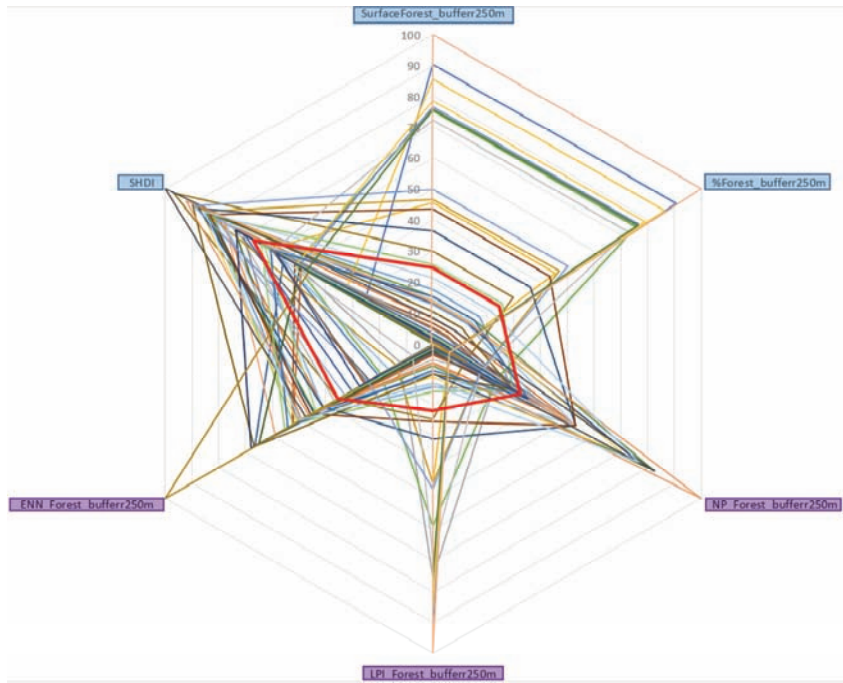
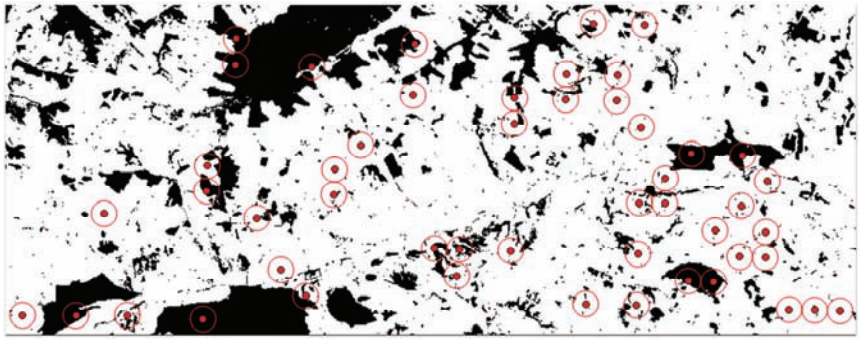


Figure 7.3. *The land cover French map OSO 2016 (43°16'23.24" N; 0°48'05.75" E) with an area of 17 km². For the associated nomenclature, see Table 7.3 and http://osr-cesbio.upstlse.fr/~oso/ui-ol/S2_2016/layer.html*



Section 7.4.3