

Harvesting A Major Vegetation Map



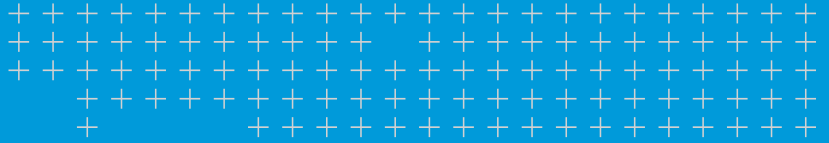
The medieval Fort la Latte on Cap Fréhel, seen from the top of the castle tower. Photo credit: Eddy Blondey, Pixabay.

How eCognition is helping put nature at the root of urban and environmental planning

A French organization leverages Trimble software to produce Brittany's first-ever regional vegetation map

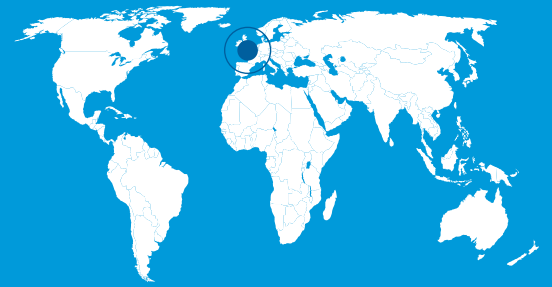
Solution

Trimble® eCognition®



overview

In France's Brittany region, stakeholders have been pressured to balance urban development demands with environmental protection policies, but insufficient vegetation maps have made that difficult. A botanical organization used Trimble's eCognition software to develop a semi-automated mapping system and produce Brittany's first-ever regional vegetation map. The goldmine of classified flora is giving stakeholders a holistic view of Brittany's biodiversity and the knowledge to protect, develop and manage it.



Location
FRANCE

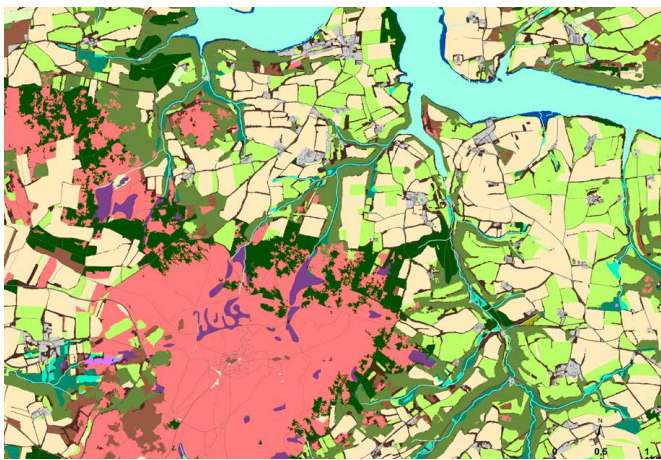
Vegetation maps are an essential tool for stakeholders in biodiversity conservation and land use planning. Traditionally, however, these maps have been produced for singular needs. The localized focus has made it difficult for regional development managers to understand the vegetation landscape as a whole.

As specialists in studying, inventorying and preserving vegetation, the National Botanical Conservatory of Brest (CBN) offered to fill in that mapping gap and provide a common vegetation repository.

Vanessa Sellin, a biologist and geology scientist with a Master's degree in GIS, joined the CBN in 2011 to develop a more efficient vegetation mapping methodology. After researching and testing options, she chose eCognition object-based image analysis (OBIA) technology to help her develop a semi-automated approach to vegetation mapping at a 1:25,000 scale.

After a few years of experimenting and refining the methodology, in 2016 she put the technique through its most significant trial: mapping the main vegetation of the Armorique Regional Natural Park (PNRA), a 125,000-hectare protected territory in Finistère, a department in Brittany.

To map the vegetation, she used eCognition with orthoimage mosaics and integrated ancillary data. Using predominantly texture images, brightness and a normalized difference vegetation index, eCognition analyzed each orthomosaic to first distinguish non-vegetated areas like roads, buildings and artificial areas like gardens. Based on tiered workflows, the software then used a series of multispectral segmentation algorithms to separate objects into different classes of vegetation, non-vegetation and artificial vegetation. After sorting these, eCognition began the process of identifying specific vegetation types, distinguishing the easiest class of vegetation (forest, dunes) to the most difficult (shrubs, heathland).



Left: Near-infrared orthophotos used to map the Menez-Hom region in southern Finistère. Below it is the eCognition classified map of the major vegetation types of the Menez-Hom region.



CBN's Agnes Lieurade records findings during a vegetation survey.

In total, eCognition delineated 27 classes. Exporting the classifications as shapefiles, the 1:25,000 map of the PNRA was finalized in ArcGIS.

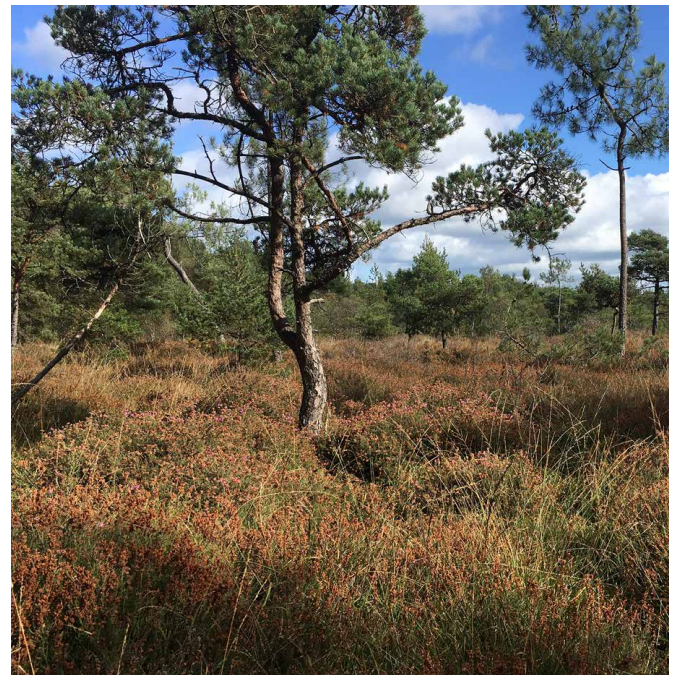
Based on that mapping success, CBN received regional buy-in to scale the mapping system for the whole of Brittany.

BRITTANY, BY NATURE

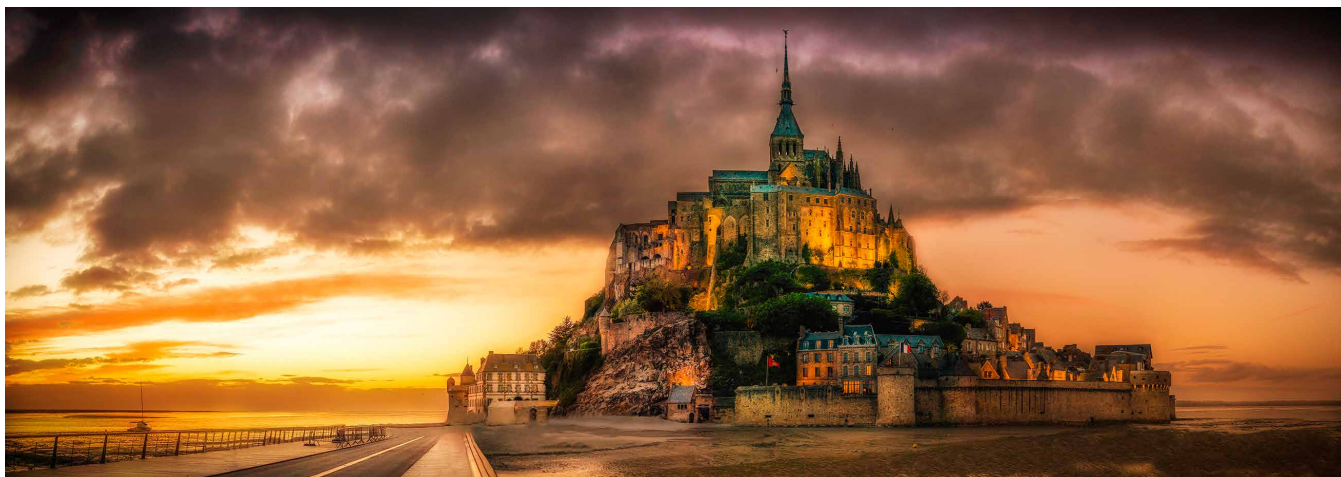
Similar to the PNRA project, the landscapes of each of Brittany's four departments — Finistère, Ille-et-Vilaine, Côtes-d'Armor and Morbihan — would be categorized into 27 major classes and mapped at a 1:25,000 scale.

In March 2018, the team began with Finistère in the extreme west of Brittany.

Following the same previous approach, they acquired and created color orthomosaics and integrated ancillary data. Using customized rule sets, eCognition sorted all of the



Wet heathlands, one of the most difficult vegetation types to automatically classify. Photo credit: Oriana Garcia.



The majestic Mont St Michel at sunset. The tidal island is about 1 kilometer off the coast of Normandy, France.

objects into 27 different major classes — 16 vegetation, six artificial vegetation and five non-vegetation.

They exported the classification into ArcGIS and again validated the results with existing data and ground truthing. They finalized the map in October and published it online in December 2018.

The map for Ille-et-Vilaine was released online in September 2019. Côtes-d'Armor's map was published in January 2020 and the map for Morbihan is scheduled for release in June 2020. All the maps are freely available on the CBN's website (cbnbrest.fr/cgtv-bzh), and once all maps are complete, Sellin's team will combine them to create one seamless vegetation map of the whole region — all 680,656 ha of it.

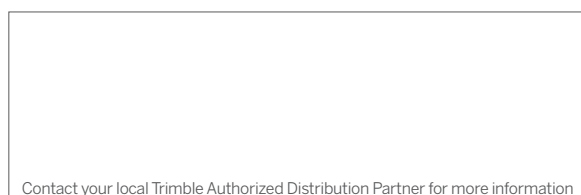
"With these maps, people can now easily see the different types of vegetation and its distribution," said Sellin. "It's a holistic view planners and managers have never had before and they have been rushing to see and use the data."



The colorful swaths of flowers along Brittany's coast.

"There was no way we could have produced this regional map with our traditional methods. By allowing us to integrate more data layers, eCognition is smarter, more efficient and definitely more accurate than pixel-based image processing software."

— Vanessa Sellin, project manager, National Botanical Conservatory of Brest



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