



EXPANSION PATTERNS OF ALIEN INVASIVE PLANTS ALONG ROADS: A REMOTE SENSING APPROACH

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ESTRUTURA DA APRESENTAÇÃO

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INTRODUCTION



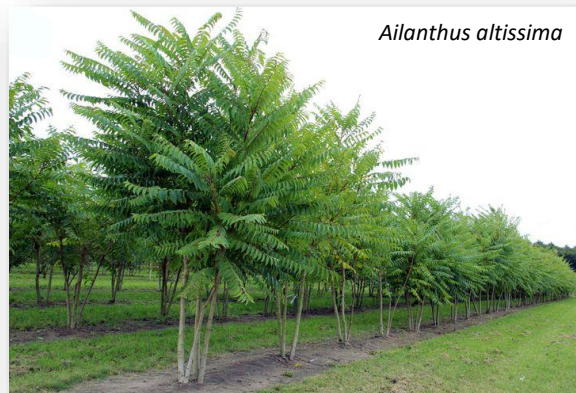
INVASIVE PLANTS

What are invasive plant?

- **Harmful exotic species that cause negative environmental and economic impacts**
- **Introduced with the purpose of ornamental, shade, soil stabilization, etc.**



Ornamental



Shade



Soil stabilization

INTRODUCTION



INVASIVE PLANTS

What characterizes an invasive plant?

- **They have rapid growth and/or high dispersibility**
- **They compete more effectively for available resources than native species**
- **They produce many seeds, which may be viable for long periods of time and can be stimulated by fire**
- **They reproduce vegetatively without need for production of seeds to disperse**

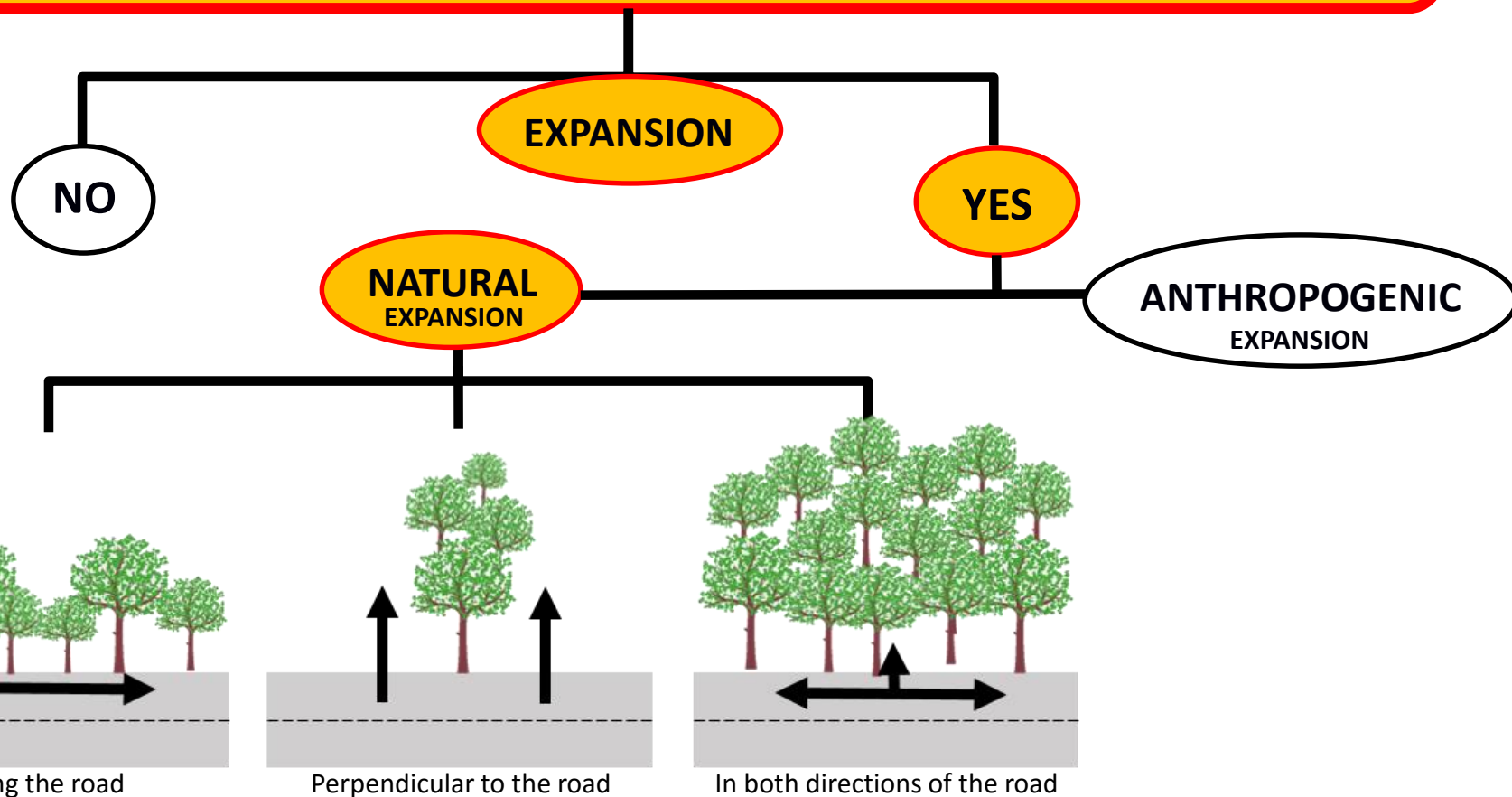
INVASION BY EXOTIC SPECIES ARE AMONG THE MOST IMPORTANT THREATS TO ECOSYSTEMS AND HUMAN WELL-BEING

HYPOTHESIS



INVASIVE PLANTS

Is there natural expansion of invasive plants species in one of the main transport / energy corridors linking Portugal to Spain?

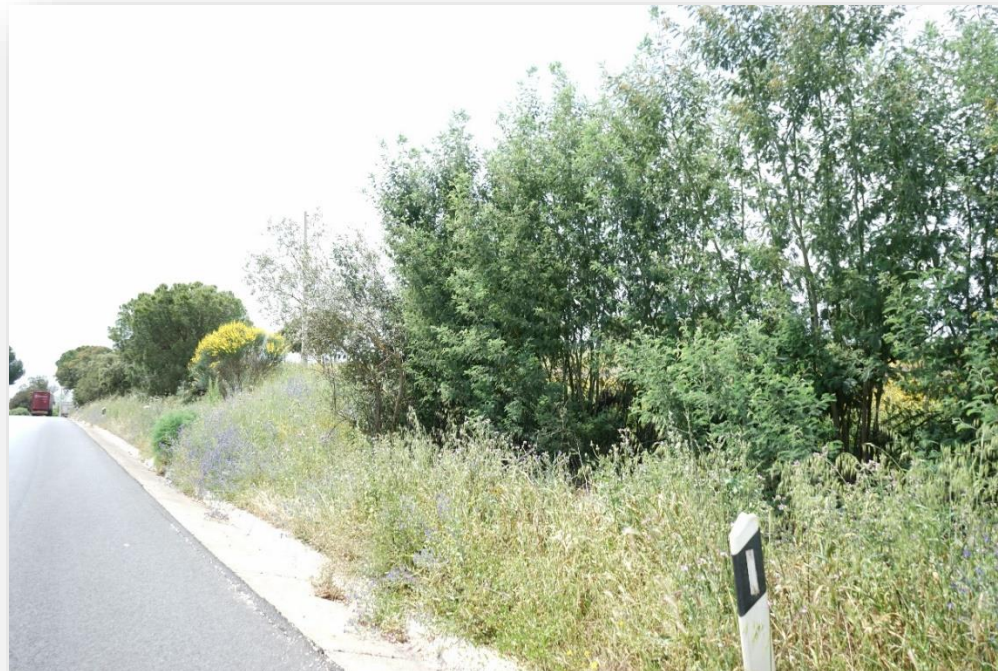


OBJECTIVE



INVASIVE PLANTS

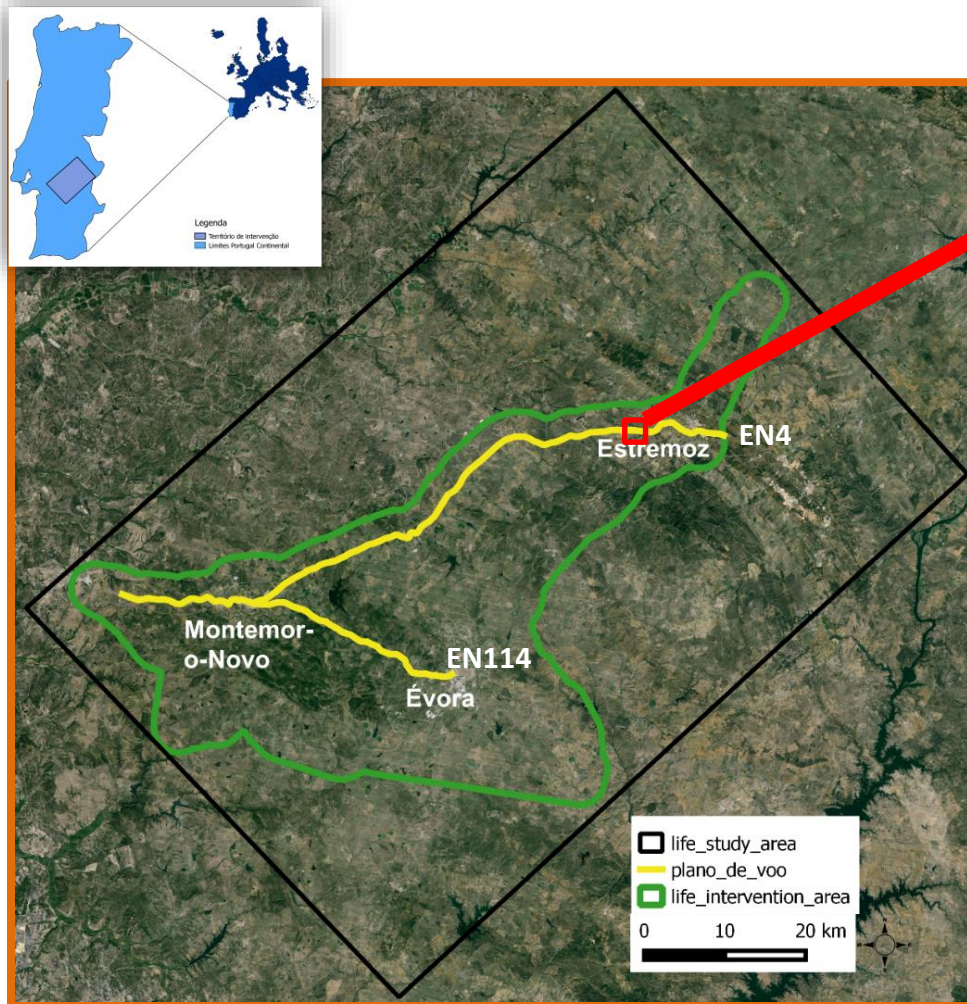
To characterize the spatial distribution of invasive plant species identified along the roads to better equate the conservation measures to be adopted in those infrastructures



STUDY AREA



INVASIVE PLANTS IN ESTREMOZ REGION



Acacia dealbata (mimosa)

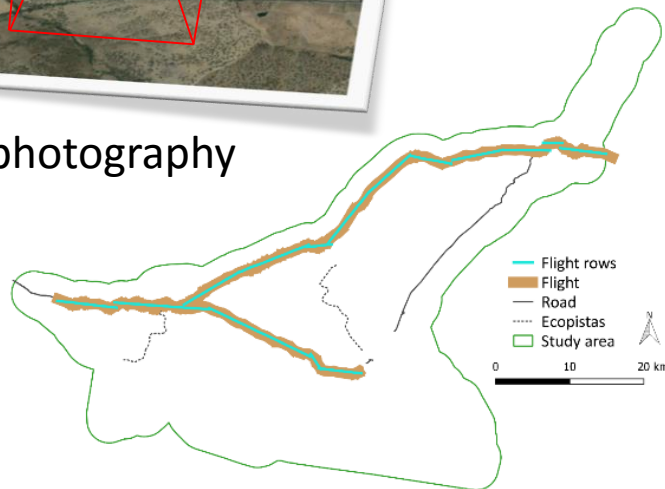
METHODS



AERIAL FLIGHT AND REAL-TIME KINEMATIC (RTK)



Aerial photography



METHODS

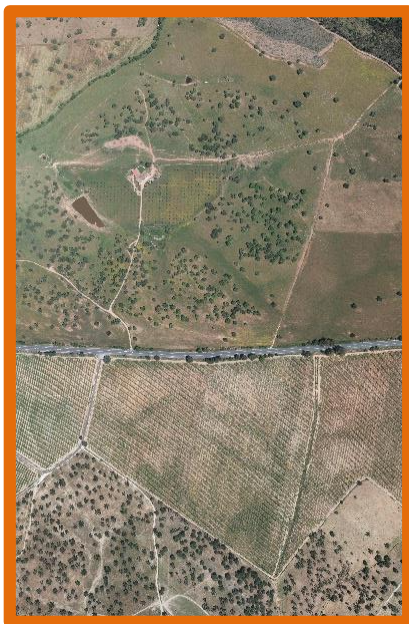


MULTI-TEMPORAL AERIAL IMAGES BETWEEN 1995 AND 2016

- Identification of expansion patterns of the invasive plant species along the roads
 - Classification and photointerpretation of multi-temporal images

2016

- Resolution 10 cm
- RGB and IR bands



2010

- Resolution 50 cm
- RGB band



1995

- Resolution 1 m
- RGB band



RESULTS

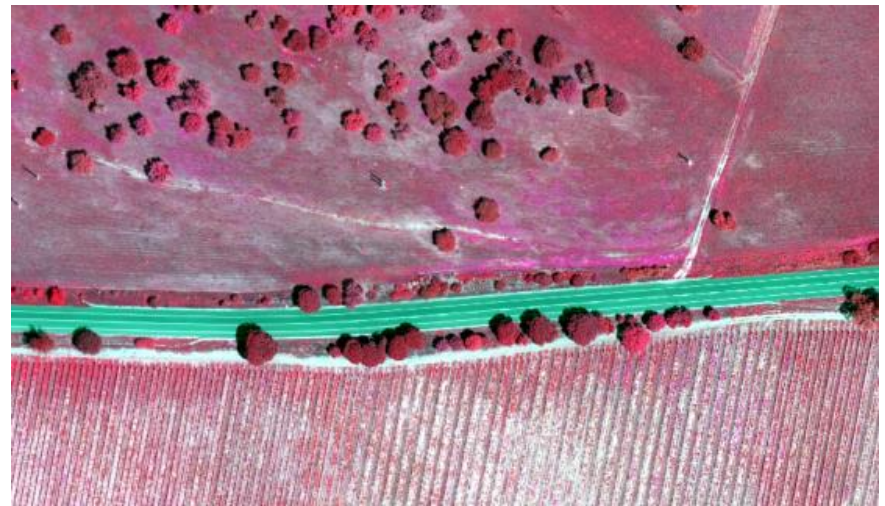


AERIAL IMAGE 2016

RGB= 3-2-1



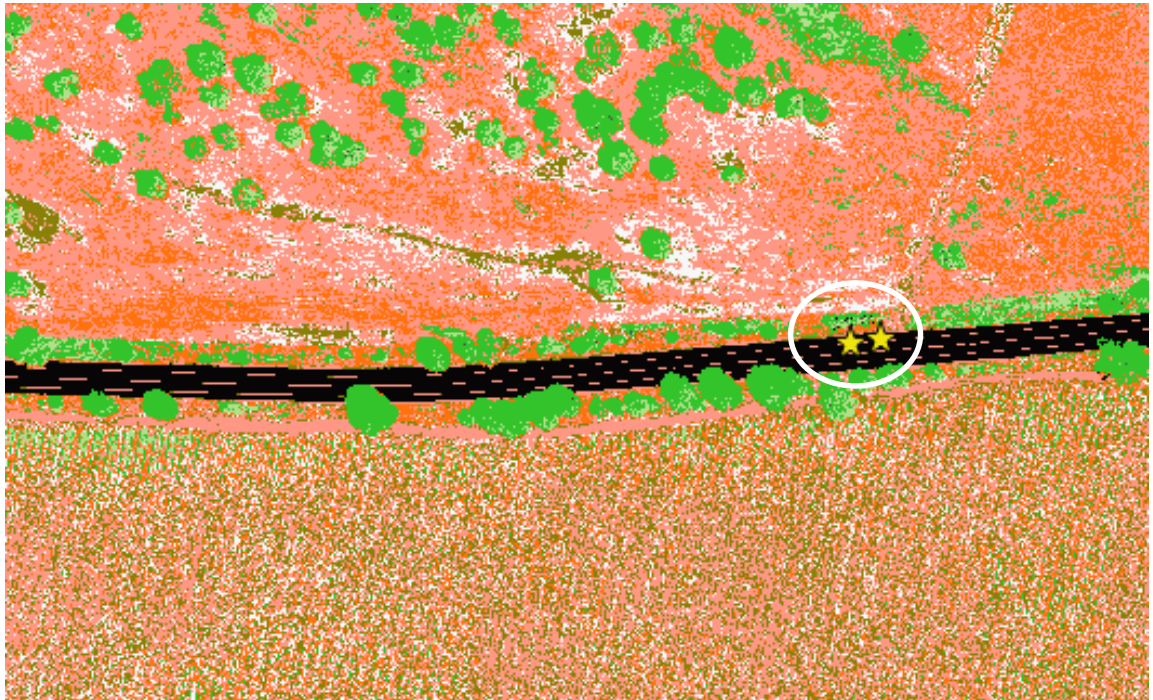
RGB= 4-3-2



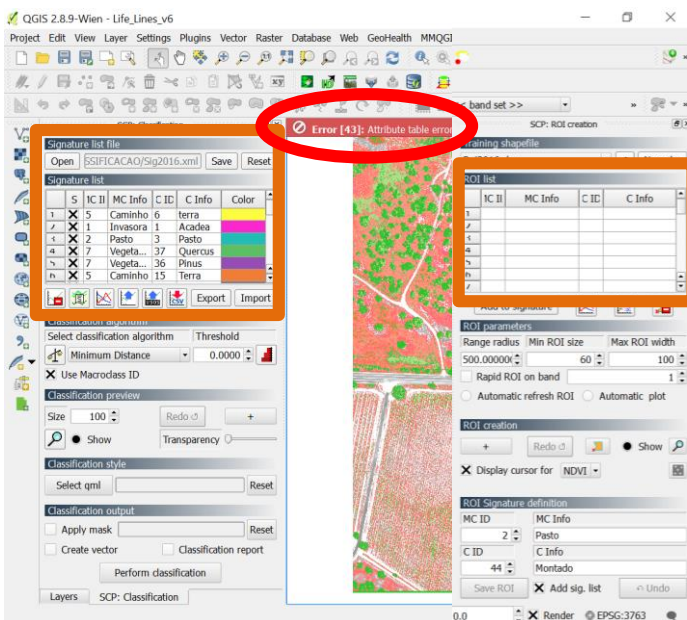
RESULTS



SEMI-AUTOMATIC CLASSIFICATION PLUGIN



- Vine
- EN4
- Bare soil
- Grass
- Trees
- Scrub
- Invasive plant
- Pasture

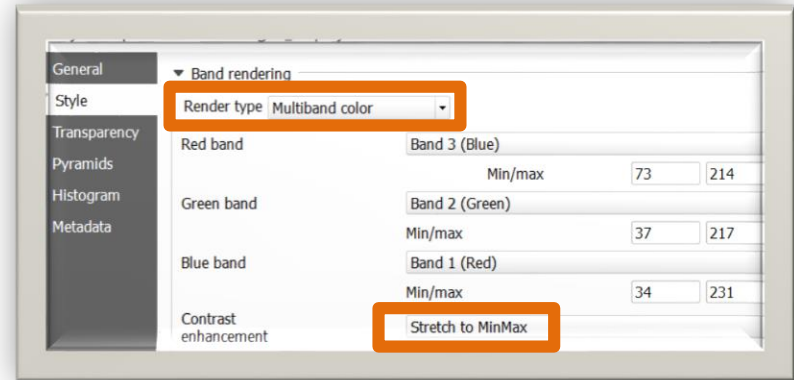


RESULTS



AERIAL IMAGE 2010

Original image



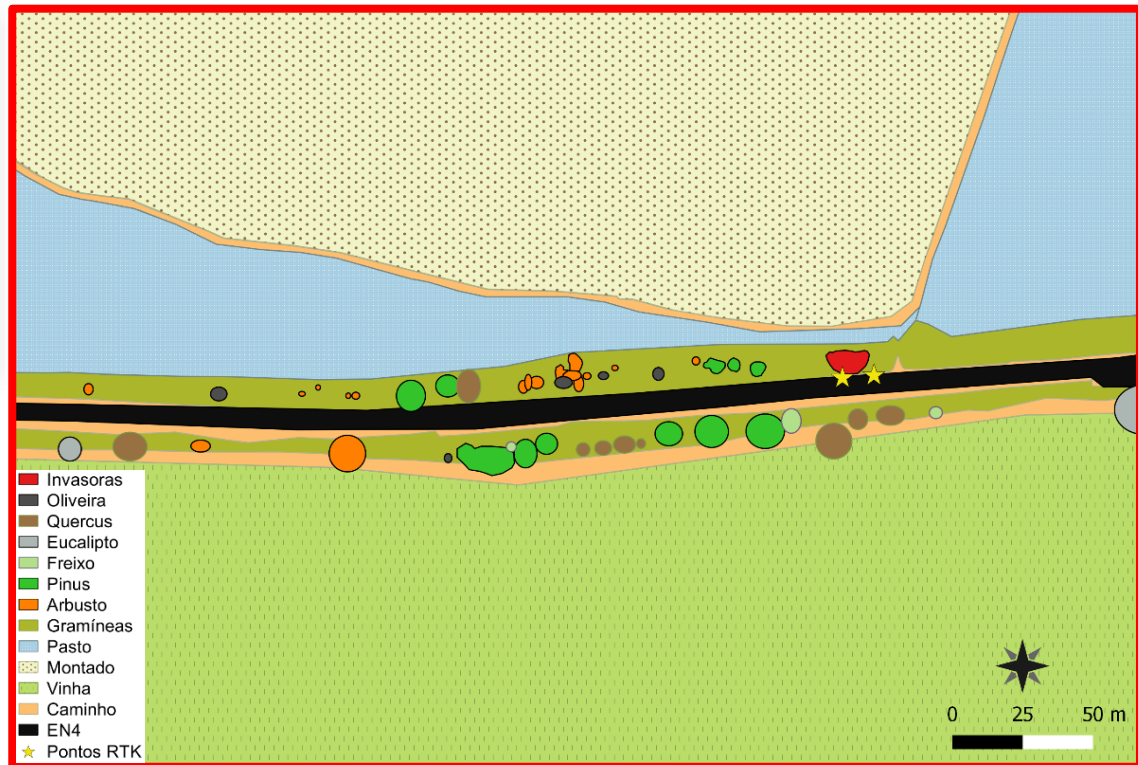
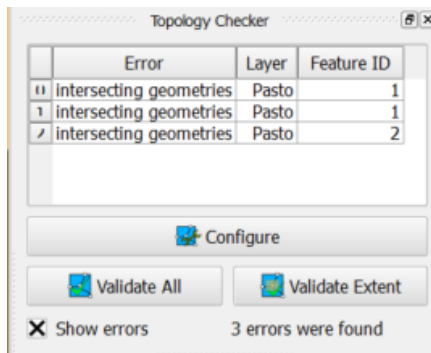
Stretched image



RESULTS



AERIAL IMAGE 2010 – DIGITIZING TOOLS & TOPOLOGY CHECKER

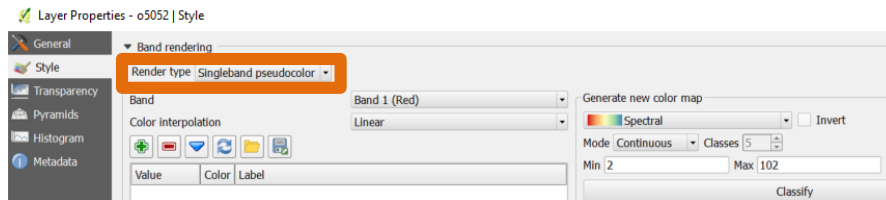
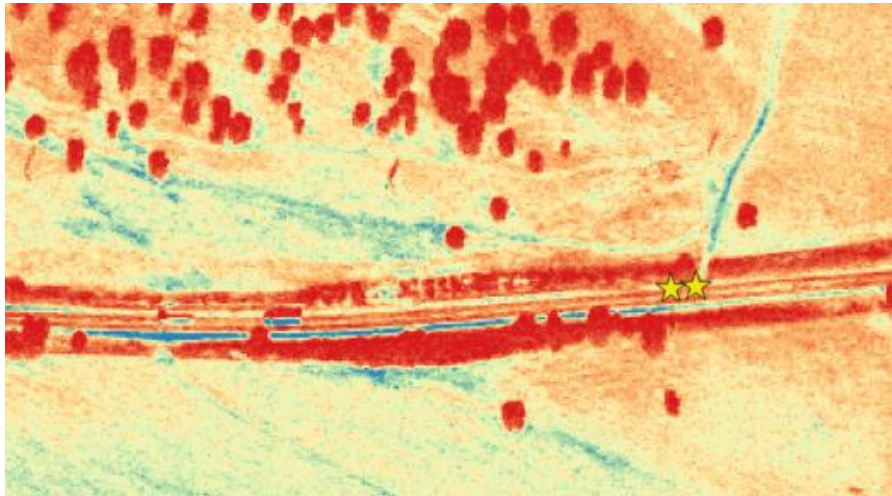


RESULTS

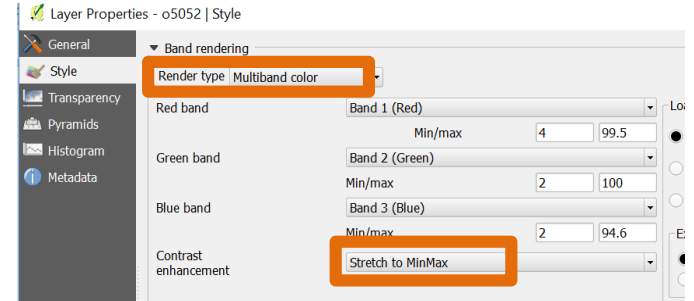


AERIAL IMAGE 1995

Pseudocolor image



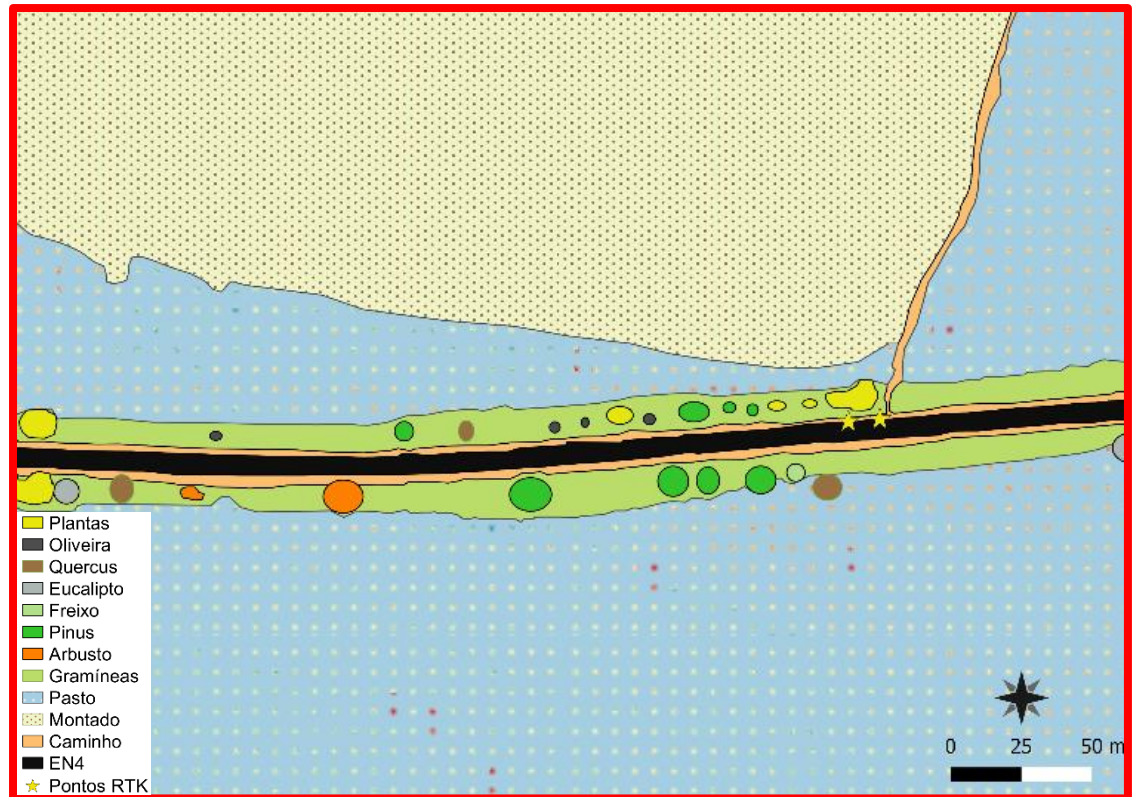
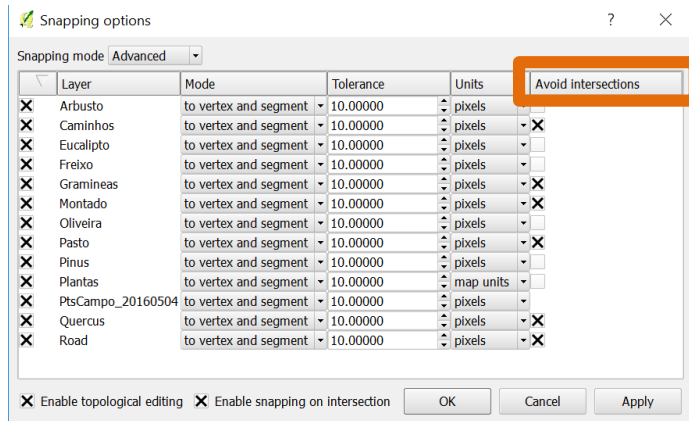
Stretched image



RESULTS



AERIAL IMAGE 1995 – DIGITIZING TOOLS & TOPOLOGY CHECKER



RESULTS

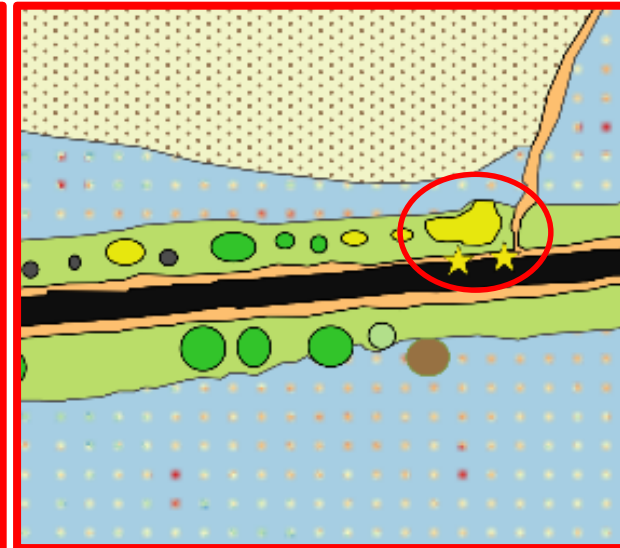
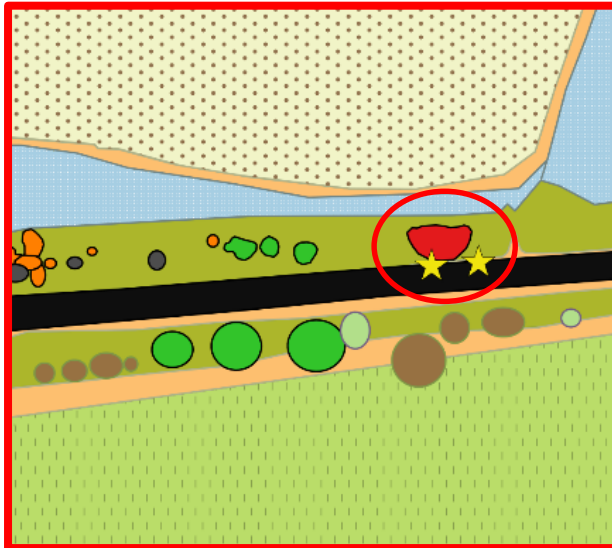


CLASSIFICATION ANALYSE

2016

2010

1995



ON GOING WORK...



EXPANSION OF INVASIVE PLANTS

- **Identification of expansion patterns of the invasive plant species along the roads**
 - Multi-temporal aerial images between 1995 and 2016
 - Classification of multi-temporal images (QGIS)
- **Analyse of expansion patterns of the invasive plant species**
 - MAXENT
- **Future prediction of plants' invasion in our study area based on current relationships between the invasive plant species occurrence and spatially explicit variables**
 - Risk map

Obrigada pela vossa assistência!

