

WASTEWATER PLANT DISCHARGE'S HAZARD POTENTIAL ASSESSMENT A PORTUGUESE CASE STUDY

Albuquerque, MTD^{1,2}, Antunes, IMHR^{1,2}, Silva, ACG¹

1. Polytechnic Institute of Castelo Branco

2. CIGAR, Geo-Environmental and Resources Research Center, FEUP, University of Oporto

Introduction

- Water resources management must contemplate water's quality monitoring according to sources and final uses.
- Essential the study of rivers and stream natural conditions as well as identification of the most important anthropogenic impacts.
- Characterization, monitoring and control of the impacts due to several wastewaters treatment plants discharges on water quality is of crucial importance.
- The presented case study focus on the Alcains wastewater treatment plant which discharges directly into the Lária River, an Ocreza's tributary (Fig. 1).

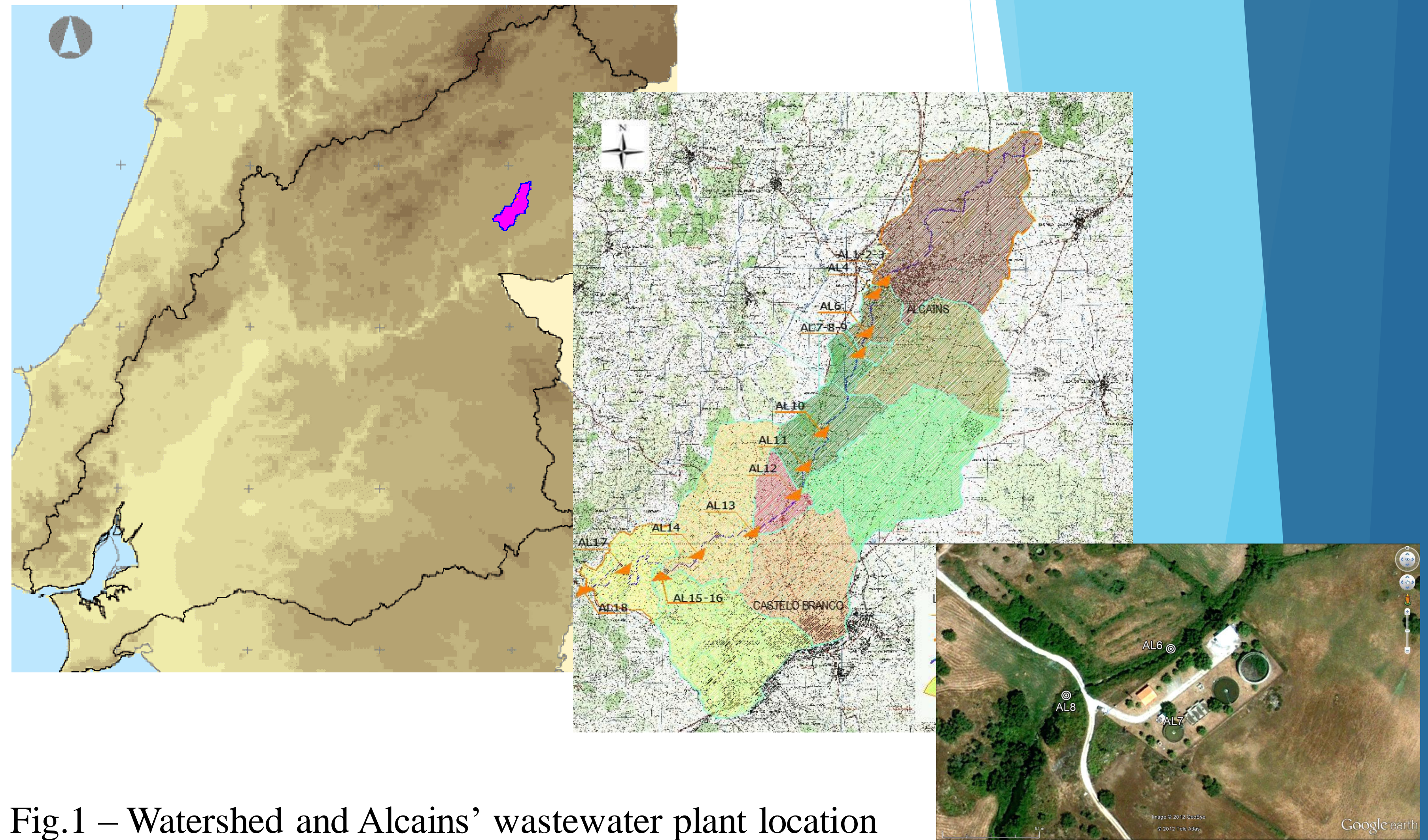


Fig.1 – Watershed and Alcains' wastewater plant location

Material and Methods

- Eighteen georeferenced water samples were collected downstream between the sewage effluent discharge and the Ocreza river confluence.
- The water samples were collected during: rainy conditions (January/2010), intermediate conditions (March/2010dry) and conditions (June/2010).
- Dissolved Oxygen (DO), N and P were used as parameters for evaluating the environmental pollution associated to wastewater plant discharges (Fig. 2).
 - A coupled multivariate statistical approach using the Principal Components Analysis (PCA) and Cluster Analysis (CA) allowed the characterization of the relationships between the measured attributes and water's quality, downstream the impacting discharge.

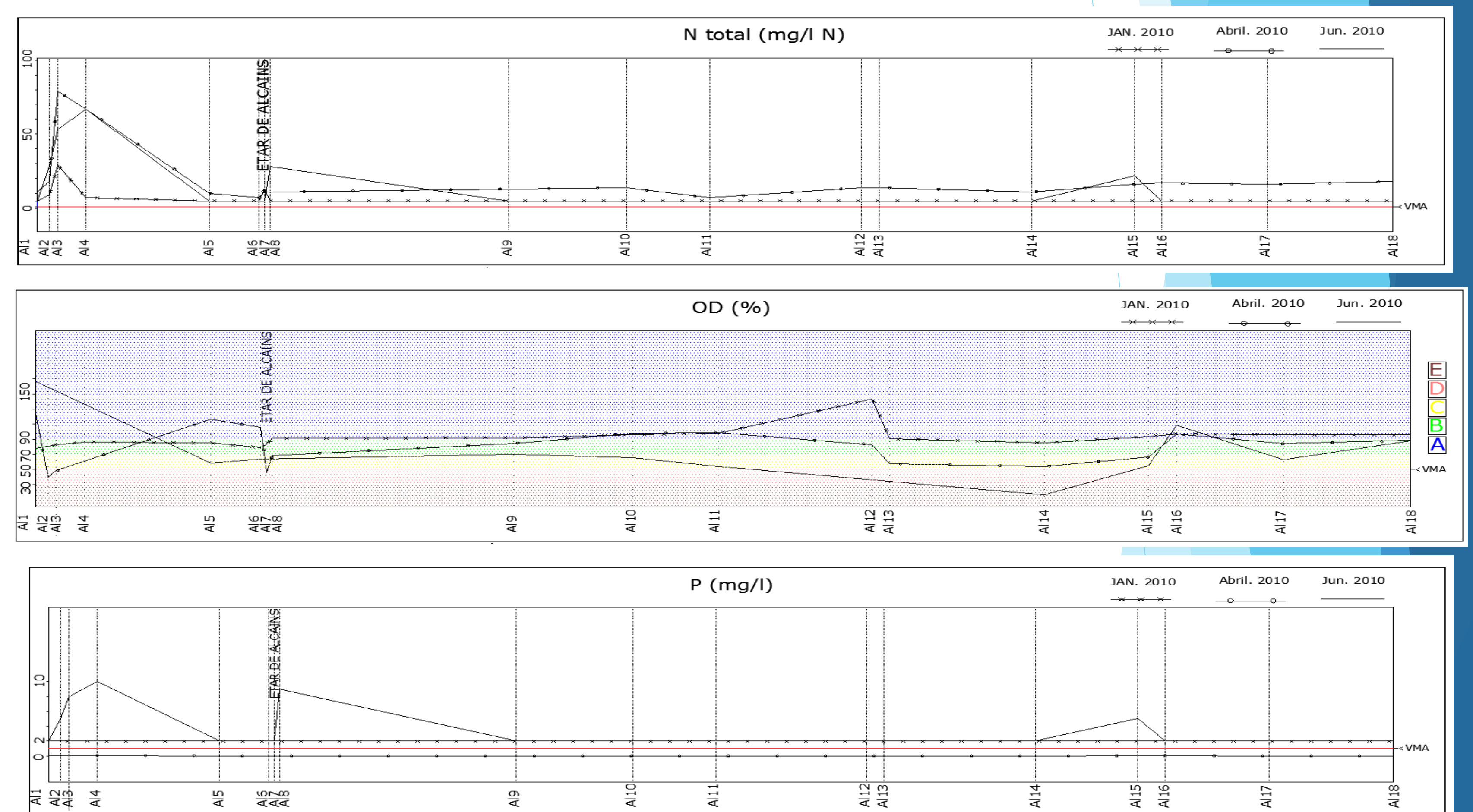


Fig.2 – Longitudinal level distribution – Ntotal; DO; P

Results and Conclusions

- The results demonstrate a suitable approach for evaluating the environmental impact due to sewage discharges and showed generally a low impact downstream the river (Fig. 3).
- Dry residue, BOD, Ntotal, Ptotal and microbiological parameters showed some outliers above the legal Portuguese parametric values for water quality. Feasibility studies of different treatment schemes and the development of specific monitoring activities are required.

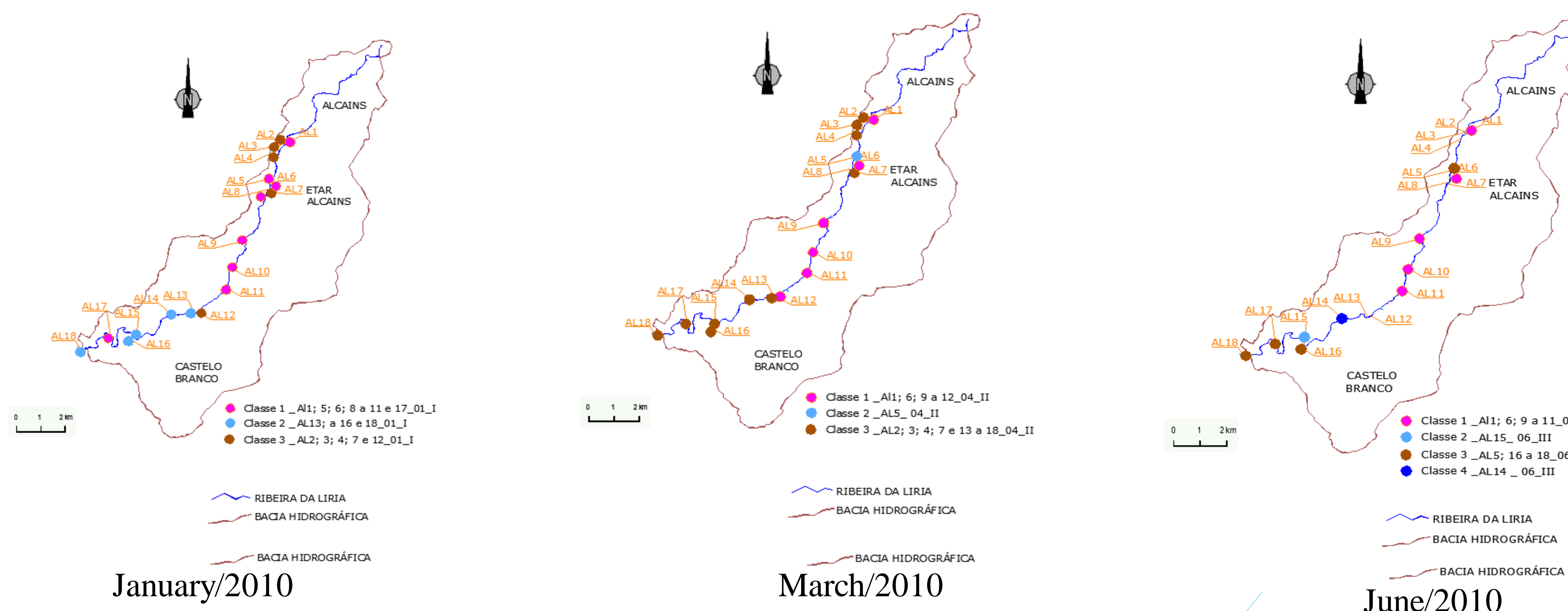


Fig.3 – Water's quality classification – INAG scale



References

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Pelletier G.J., Chapra, C.S. (2006). QUAL2K: a Modeling Framework for simulating river and stream water quality: documentation and user manual, Civil and Environmental Engineering Dept., Tufts University, Medford,