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Background

I am currently in my third and final year of a Biology degree at Cardiff University. My pre-university education was spent at The Chantry School and Worcester Sixth Form College. At the latter I gained three A Levels in Biology, Chemistry and French. During this time I also spent two weeks doing work experience in a laboratory in Ireland.

Current Research

The subject of my final year project is change in land cover and its effect on water quality. Using data from the Land Cover Map of Great Britain (LCM) project, I have examined the changes in land cover classes in 128 DURESS catchments across Wales. This data will be plotted against changes in water quality from those same catchments, in order to identify if there is a correlation between the two factors.

For this analysis, I have used 10 different land cover classes, as determined by DURESS. These can be seen in Figure 1. The land cover classes used by the LCM project were reclassified into the DURESS classes, as the LCM project spanned over seventeen years (with samples taken in 1990, 2000 and 2007) and the land cover classes varied over the three sampling years. This meant that the land cover classes had to be standardised in order for a comparison between the years to be made. The area of each reclassified class for each catchment was extracted using Geographical Information Services (GIS) software.

The water quality data has been taken from many of the 128 DURESS catchments and many different parameters have been measured, but this project will concentrate on nitrogen content. The nitrogen content data will also enable me to answer the hypothesis of my project, namely whether if the area of agricultural land in a catchment increases, there will be a corresponding decrease in water quality (see Figure 2) and increase in nitrate content. This project corresponds to Theme 4 of the DURESS themes by relating water quality to land use.

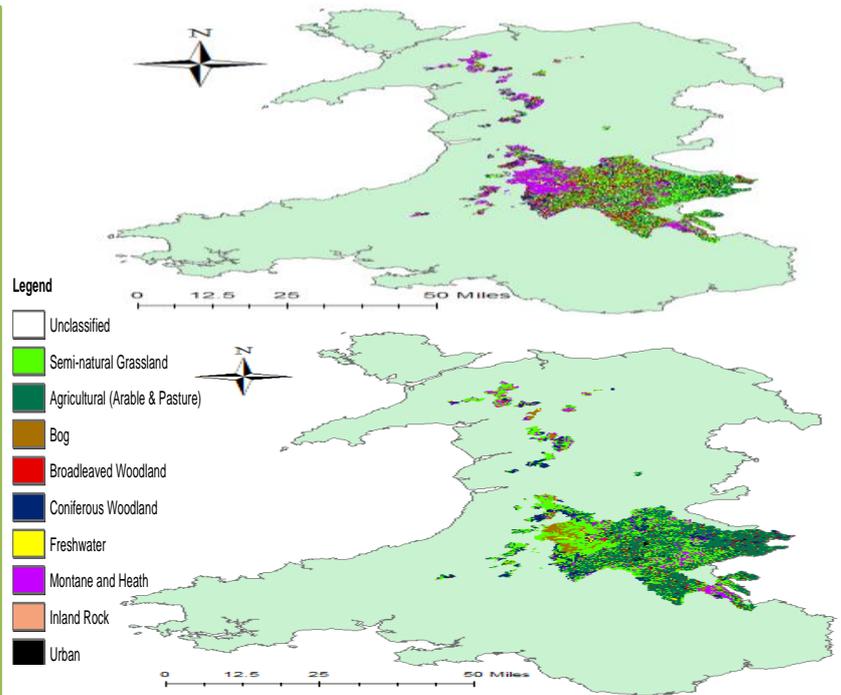


Figure 1: Land Cover Maps for a) 1990 and b) 2007. All three maps are shown clipped to the 128 DURESS catchments and reclassified into the 10 DURESS habitat classes, with a boundary of Wales and part of England to indicate the spatial location. Based upon LCM2007 © NERC (CEH) 2011. Contains Ordnance Survey data © Crown Copyright 2007. © third party licensors. LCM2007 © and database right NERC (CEH) 2011. All rights reserved. Contains Ordnance Survey data © Crown copyright and database right 2007. © third party licensors. © NERC (CEH). (Fuller *et al.*,1994; Morton *et al.*, 2011). © Crown Copyright and Database Right [27/02/2015]. Ordnance Survey (Digimap Licence). © 2015 - NERC Duress

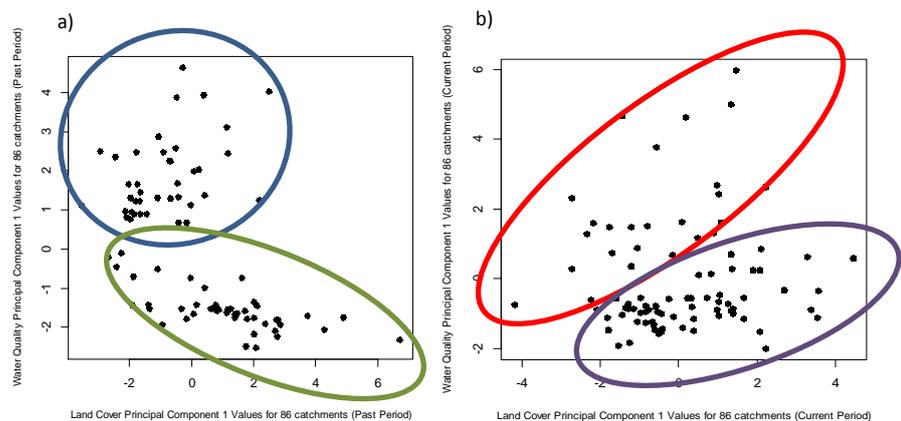


Figure 2: Scatterplot showing the Principal Component 1 values for land cover plotted against those for water quality for each catchment for a) the past period, and b) the current period. For the past period there are two clear groupings of catchments: those which decreased in levels of pollution as agricultural land cover increased (green circle), and those which increased in pollution level (blue circle). There are also two clear groupings in the current period: those catchments whose eutrophication level stayed constant as agricultural land cover increased (purple circle) and those who have increased in eutrophication levels (red circle). © 2015 - NERC Duress. Based upon LCM2007 © NERC (CEH) 2011. Contains Ordnance Survey data © Crown Copyright 2007. © third party licensors. LCM2007 © and database right NERC (CEH) 2011. All rights reserved. Contains Ordnance Survey data © Crown copyright and database right 2007. © third party licensors. © NERC (CEH). (Fuller *et al.*,1994; Morton *et al.*, 2011).

References:

1. Fuller, R.M., Groom, G.B. and Jones, A.R. 1994a. The Land Cover Map of Great Britain: an automated classification of Landsat Thematic Mapper data. *Photogrammetric Engineering & Remote Sensing*, 60, 553-562.
2. Morton, D. et al., 2011. *Final Report for LCM2007 - the new Land Cover Map.*, (CEH project number: CO3529): CS Technical Report No 11/07: NERC/Centre for Ecology and Hydrology 108pp.