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Dykes, Nigel ORCID: https://orcid.org/0000-0002-9159-6692 , Prince, Heather ORCID: https://orcid.org/0000-0002-6199-4892 , Lemmey, Richard and Bunce, R.P. (2007) The Picos de Europa mountains, north-west Spain, an inspiration to non-specialist students to study living cultural landscapes. In: 7th International Association of Landscape Ecologists (IALE) World Congress, 8-12 July 2007, Waganingen, The Netherlands. (Unpublished)

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The Picos de Europa, Northern Spain, an inspiration to non-specialist ecology students to study the Cultural Landscapes of Mountains.

Dykes, N.T, Prince, H.E., Lemmey, R.P., & Bunce, R.G.H.

Every year since 1990 BSc. Outdoor Studies students from St. Martin's College, UK have been surveying components of the landscape in the Picos de Europa, Northern Spain. The aims are to:

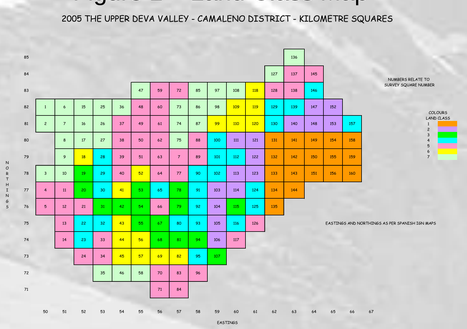
- introduce students to cultural landscapes;
- encourage students to engage with disciplined recording at the landscape level;
- to contribute to the knowledge of the Picos de Europa.

The course has two distinct phases; a **group project**, where a cohort of fifty work on one large scale landscape project, and **individual projects** where students address a specific small scale aspect of the landscape.

Group Project

The group study employs land classification techniques using environmental data. Students are involved in the pro

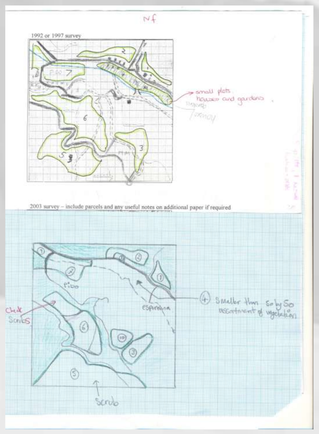
Figure 1 – Land Class Map



Students map parcels (plate 1) according to General Habitat Categories (GHC), BioHab.

Key species are identified and their percentage cover is estimated for each parcel.

Plate 1 – Example of habitat map.



Students are taught ecology and combine this knowledge with their outdoor skills to study the mountain area. They use stratified random sampling to collect the data.

Plate 2 – Mapping Habitats using the GHC.

Plate 3 – Meadow Parcels in the landscape.

Plate 4 – General Habitat Category, LHC/GHC herb rich grassland.

Total hectares of meadow type 3 in each land class

Land Class	No. of squares	Trees in meadows	Scrub encroachment	Grass Meadow	Medium diversity Meadow	Floristic meadow	Grazed	Cut for Hay	Cut for Silage	Dead Grass	Bare soil	Vegetable plot	Ploughed	Sp Man	Building	Total hectares / km	% meadow in square
1	17	54.9	38.45	64.7	71.6	88.85	187	22.25	4.7	0.05	1.95	1.6	1	0	0.95	538	30
2	22	131.6	41.3	110.4	170.5	43.5	349.5	4.9	2	0.5	1.3	2.6	0.1	0	2.5	860.7	39
3	24	74.85	57.5	60.3	137.8	75.2	186.7	1.2	0	4.6	2.7	1.25	0	0	0.95	603	26
4 & 5	4	1.15	25.25	2.9	2.6	1.8	19.4	0	0	0	2.9	0	0	0	0	56	14

Parcel data is then aggregated and expressed per hectare.

Figure 2 - 2003 Meadows Project student data summary

Data Quality

- The combination of data over time and students is a powerful tool.
- Correlation between environmental and habitat data; r=0.91, p=0.01 (Bunce et al, 2005).

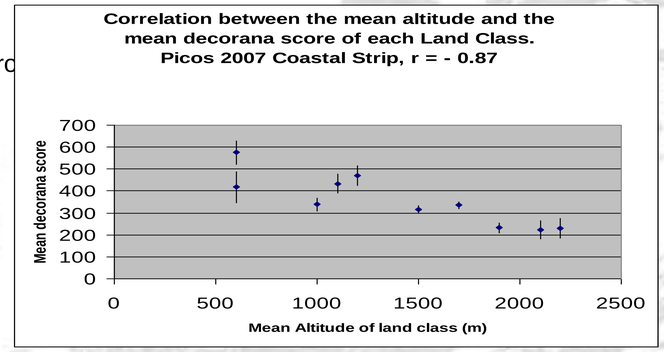


Figure 3 - Example of the correlation between mean altitude and habitat data collected by students in 2007.

Individual Projects

Plate 5 – *Erythronium dens-cani*

- Students choose a diversity of projects according to their personal interests.
- These are often generated by a specific aspect of the group project.
- Individual projects cover a variety of scales:
  - ❖Cultural landscapes e.g. village structures
  - ❖Landscape features e.g. Candelabra trees
  - ❖Habitats e.g. *Quercus ilex* forest
  - ❖Autecology e.g. Butterfly Orchids

Conclusion

- These courses are a peak experience for hundreds of undergraduates from St. Martin's college (Prince, 2005
- Students learn the discipline of group and individual projects.
- Students do collect meaningful data.
- Students will take the inspiration and pass on to the next generation.
- We have contributed to the knowledge of the region.

References
Adolfo, (2003) Abstracts of personal projects from the Picos de Europa, unpublished
Bunce, R.G.H. (2005) BioHab Field Handbook
Prince, H. (2005)