

ENVIRONMENTAL AND VEGETATIONAL RELATIONSHIPS OF LAKES, FENS AND TURLOUGHS IN THE BURREN

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ABSTRACT

The limestone country of the eastern Burren includes permanent lakes, extensive fens, and turloughs—depressions characterised by large fluctuations in water levels that become dry in summer and have distinctive vegetation. Most of the larger lakes lie on an almost level surface, draining southwards via the River Fergus into the Shannon estuary; Lough Bunny drains through the limestone north towards Galway Bay. Field evidence indicates that the lakes and fens, whether they flood in winter or not, have a relatively constant summer water level, probably because the underlying limestone is sealed by glacial drift. Their vegetation follows a normal hydrosere succession from open-water deposits (mostly calcareous marl) to reed swamp and *Schoenus* fen, culminating locally in raised bog. Present-day exposed expanses of marl are products of erosion of a former peat cover. Turloughs are characterised by unconstrained fluctuations of the water level through most or all of its vertical range. They occur where there is no barrier at the surface to drainage into the limestone, but there is sufficient hydraulic resistance to underground flow to allow water levels to rise during winter and after heavy rain. The vegetation of typical turloughs has more in common with dune slack or flood meadow communities than with true fens.

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INTRODUCTION

The Burren—the limestone area south of Galway Bay in western Ireland—is celebrated for its geomorphological, phytogeographical and ecological interest (Praeger 1934; Braun-Blanquet and Tuxen 1952; Webb 1962; Ivimey-Cook and Proctor 1966; D'Arcy 1997; Nelson 2008). Characteristic of the low-lying eastern part of the Burren between Kinvarra, Gort and Corrofin are the *turloughs*, depressions in the limestone that are flooded more or less deeply in winter (or following heavy rain) but that dry out completely or nearly so in summer. They are then seen to be occupied by essentially terrestrial vegetation, often heavily grazed. Praeger (1932) emphasised the great fluctuations of water level in the turloughs. There is striking evidence of these fluctuations from winter strand lines of water-borne debris high above summer water level, and it is also clear that the amplitude of the annual fluctuation of water level varies greatly from one turlough to another.

In the same general area as the turloughs there are also permanent lakes, some with marginal expanses of calcareous marl that now show little evidence of progressive hydrosere development. There are also numerous fens, and substantial

depths of peat have accumulated in some of these. Some of the fens are associated with extant lakes; others lie in (mostly small) basins that have become completely filled in with peat. The turlough, fen and lake-shore communities all show zonation evidently related to water level. The character of the sites and their vegetation is likely to be determined at least in part by the amplitude or nature of the fluctuations of the water table. What evidence have we of these? The coexistence of the different site and vegetation types raises two questions. First, what factors operating in the present day determine the occurrence of the different types? Second, are the different types related developmentally, and if so, in what sequence may they occur?

Several authors have addressed these questions over the last few decades (MacGowran 1985; Coxon 1986; 1987a; 1987b; Goodwillie 2003; Goodwillie and Reynolds 2003; Sheehy Skeffington *et al.* 2006), and much has been written about the karstic geomorphology and hydrology of the Burren and of turloughs in general (Sweeting 1955; Coxon and Drew 1986; Drew 1990; 2001; Drew and Daly 1993; Mullan 2003), but we are still some way from a fully satisfactory picture of the nature and relationships of these lake, fen and turlough sites.