



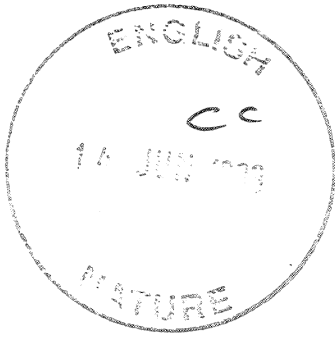
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No. 53

**Preliminary report
on control of
water levels at
Croft Pascoe Pool,
Cornwall**

A G Williams

English Nature Research Reports



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**Preliminary Report on Control of Water Levels
at Croft Pascoe Pool, Cornwall**

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Croft Pascoe Pool, Cornwall, Control of Water Level

Preliminary Report

Introduction

This report is a preliminary investigation of the hydrology of Croft Pascoe Pool, one of the five major pools on the Lizard peninsula (Figure 1). Croft Pascoe, located in the central core of the peninsula, about 7 km south of Helston, is within the Goonhilly Downs SSSI, which is part of the largest remnant of serpentinite heathland. The site is underlain by serpentinite covered in places by loess, which gives rise to a diverse vegetation including 'Cornish Heath' on the serpentinite, 'Short Heath' on the loess and a 'Wet Heath' associated with waterlogged areas, around pockets of loess. Croft Pascoe Pool provides a diversity of aquatic and semi-aquatic vegetation, although the site is still recovering from the removal of the humose layer several years ago. The Pool is situated in a large shallow depression but because of limited storage of groundwater in the shallow regolith, it may be vulnerable to summer drought. Williams (1992) identified the site as being vulnerable to fluctuations in climate due to the limited recharge area and because an annual water budget calculation found the surplus amount of precipitation was very limited (less than 190 mm four years out of 25). There were several other reasons for conducting more detailed monitoring at Croft Pascoe and these were:-

1. a preliminary study of the hydrology suggested that it was typical of sites such as Leech etc.
2. located on the spine of the Lizard which would be important if there was a dominant regional groundwater component.
3. the area is within the largest remnant of serpentinite heathland.
4. relatively easy access.

Furthermore, the site had dried up in recent drought years such as 1976 and 1984. Such was the concern by English Nature that the Pool had been deepened recently by removing the humose in order to increase the water storage. The following research was undertaken in order to elucidate the major pathways supplying Croft Pascoe Pool in order to determine the optimum site management strategy.

Aims

1. Install hydrological monitoring equipment as agreed with English Nature hydrologist to enable

minimal variation can be explained by the stream draining from the Pool in a westward direction towards Goonhilly. The stream outlet effectively controls the level of water in the Pool and to some extent, therefore, the watertable level in the surrounding area as well.

Measurements of watertable depth at sites 1 - 9 indicated only a gradual rise through the autumn (Figure 3). Piezometers 1 and 7, both 1m deep, were at the same elevation as the Pool and of such proximity to it as to monitor the water table gradients right at the pool fringes. Site 3, also 1m depth, showed a similar pattern to sites 1 and 7 except that the elevation was about 32 cm lower: there is thus a drainage gradient from the Pool in a westward direction.

The damped response of the pool suggests that it is being fed by a large storage system which absorbs the incoming rainwater. Whilst the damped response of the water table away from the pool suggests that infiltration of rainwater is slow, with tendency for water to collect at the surface, surface movement of water is minimal because of the shallow gradients, and the surface water infiltrates and percolates down to the water table to act as replenishment for subsurface seepage towards the pool: the entire recharge area is responding to additions of rainwater or drainage losses to the Pool. Croft Pascoe is, therefore, part of a regional watertable system rather than an isolated perched system.

Seismic survey

The surface and primary surface profiles are shown in Figure 4. Depth to bedrock varied between 2 and 3 m. The level ground surface is no indication of the bedrock profile: bedrock profile exhibited rapid change along the transect.

Conclusions

Croft Pascoe Pool owes its existence to the depression it is located within: it sits within a regional watertable system with the Pool acting as a sink. The Pool is vulnerable to summer drought partly because of the negative water balance but also because the depth of regolith is limited and hence the reservoir is also limited for replenishing the Pool. Deepening the Pool further would probably be beneficial, since it would increase slightly the water storage of the system and would maintain the presence of an open water body during dry periods, reducing overall evapotranspirative losses. The drainage ditch is one possible cause of the depression of the water table at sites 3 and 4 relative to the other sites, and its proximity to each site should be investigated further. The ditch is likely to be draining certain parts of the catchment directly, as well as through the pool, and its filling in would probably greatly improve the catchment's summer water levels.

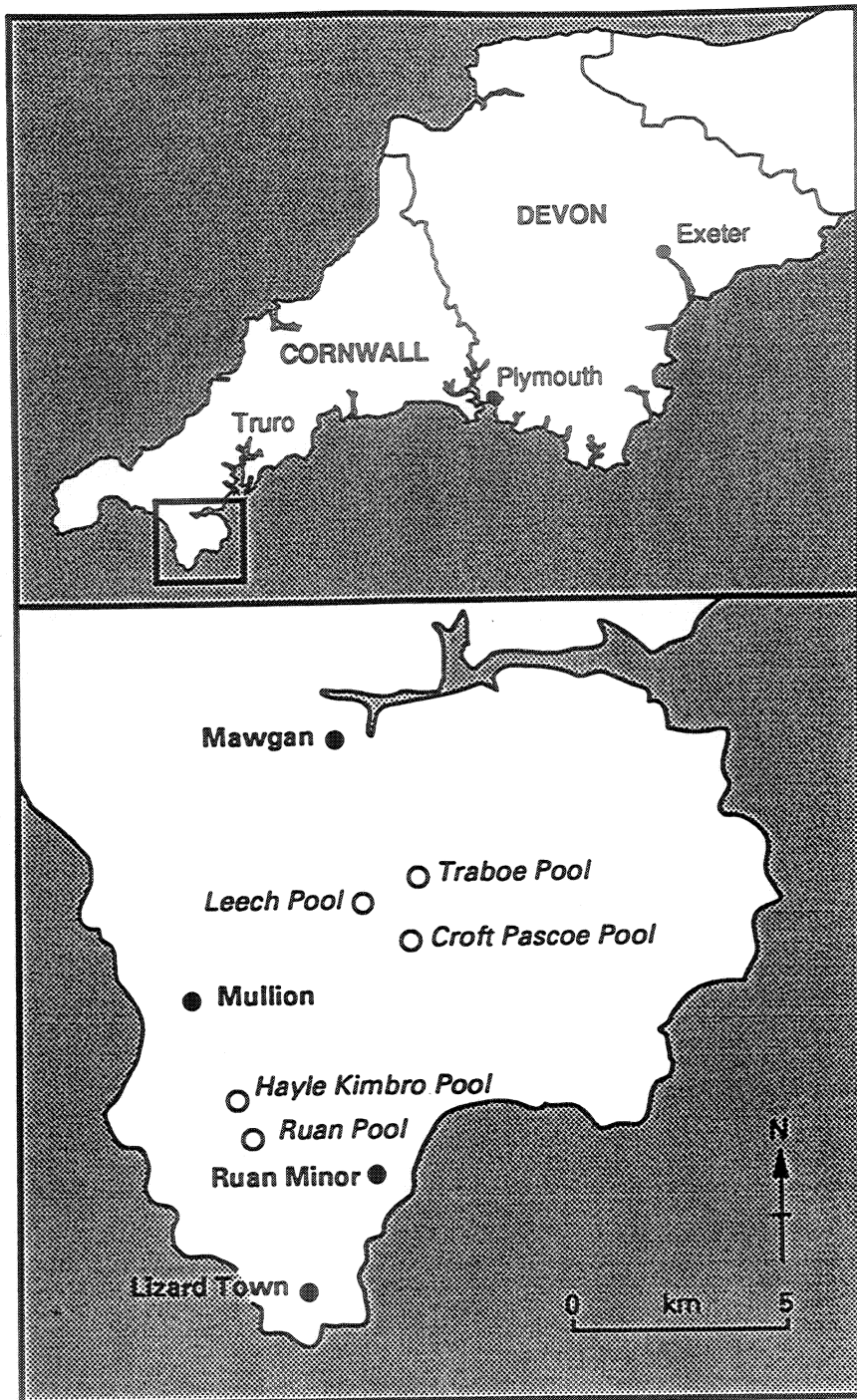


Figure 1 Lizard Peninsula Situation Chart

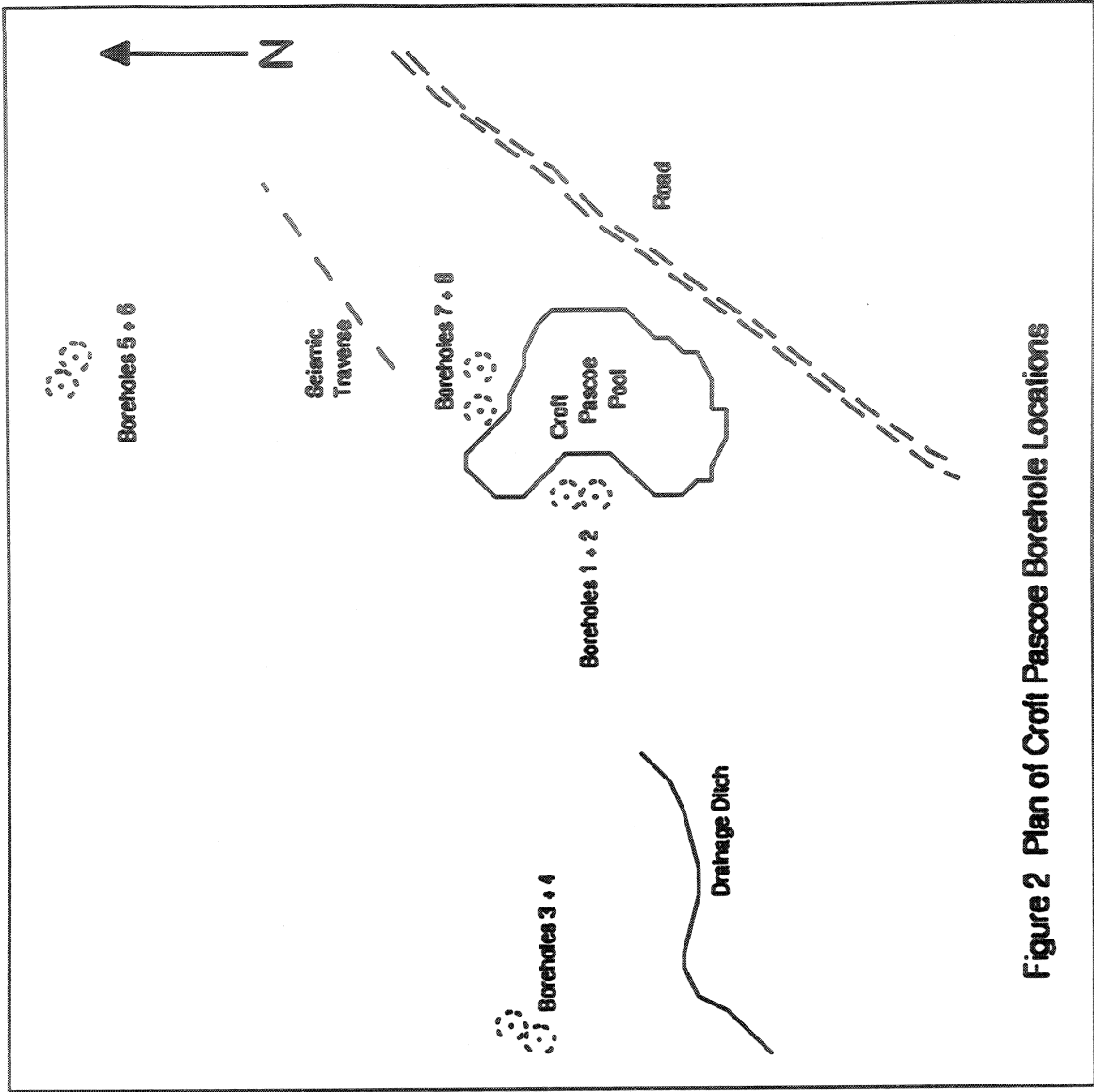


Figure 2 Plan of Croft Pascoe Borehole Locations

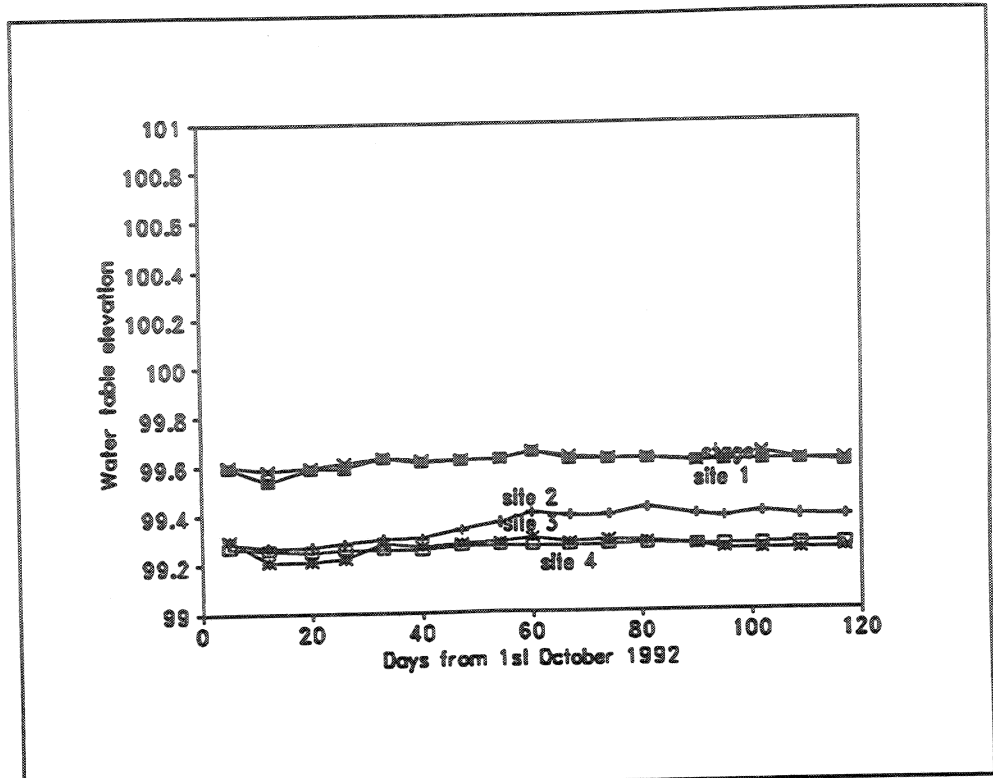


Figure 3a Croft Pascoe Water Table Levels

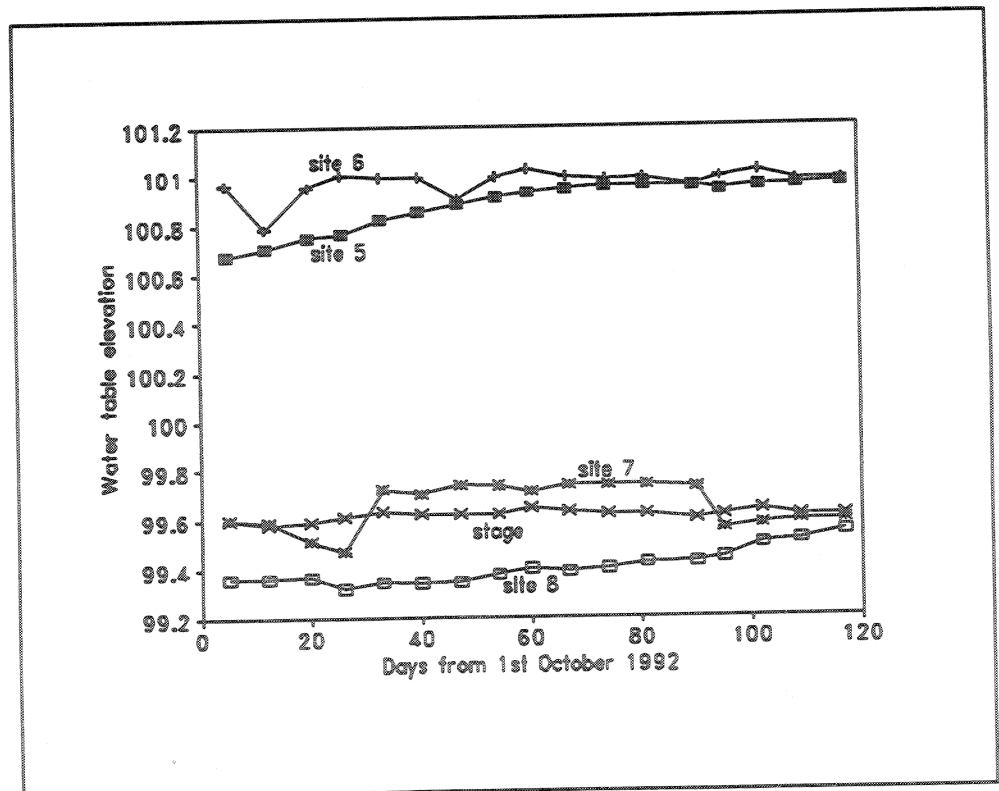


Figure 3b Croft Pascoe Water Table Levels

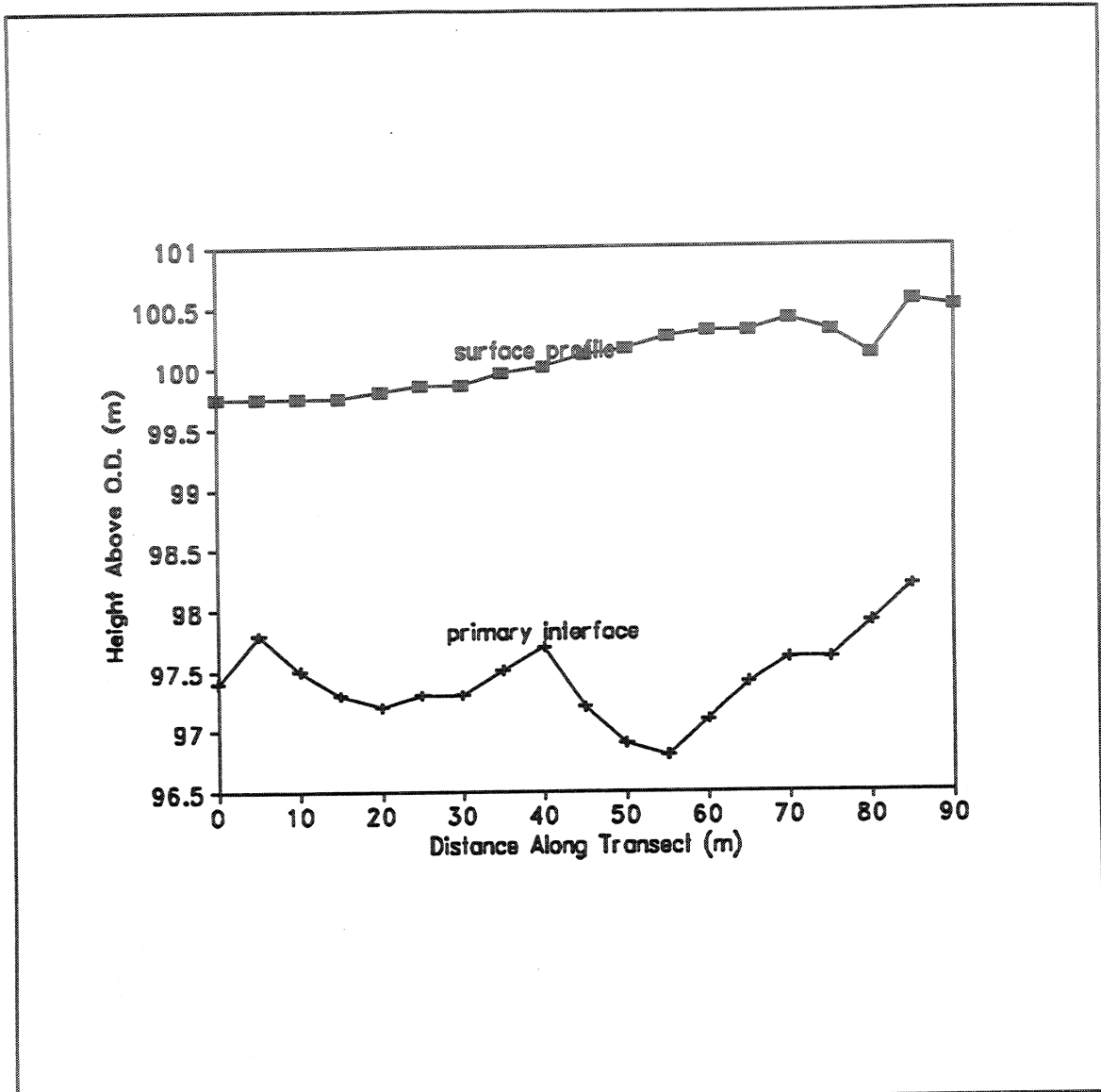


Figure 4 Seismic Transect at Croft Pascoe