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The distribution of recorded landslides in south-west England

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December 1984, Geomorphological Services Ltd (GSL), in association with Rendel, Palmer & Tritton (RPT), were awarded a research contract by the Department of the Environment (DOE) to undertake a "Review of Research into Landslipping in Great Britain" as an initial stage of a strategy for landslide research in the United Kingdom. The broad aim of the project was to collate and assess the available published work on landslides in Britain, and to focus attention on any major gaps in knowledge. It was also intended to identify priority areas where further work may be needed in order to properly evaluate the risk to communities and important structures.

The review has six main objectives, the first of which was to identify the distribution of recorded landslides, with the specific aim of assessing the current level of knowledge concerning landslides and not to undertake research with a view to defining the actual distribution of landslides on the ground. The survey, therefore, was directed towards the collection, collation and synthesis of all information on the occurrence of landsliding contained in extant published sources within the public domain, up to the end of 1985.

For the South-west Region the search revealed 1638 reported landslides including 224 coastal and 1414 inland failures (Fig. 1). On a county basis the distribution of landslides is as follows:

Avon:	288 (all inland);
Cornwall:	46 (all coastal);
Devon:	437 (63 coastal);
Dorset:	233 (94 coastal);
Gloucestershire:	453 (3 coastal);
Somerset:	98 (18 coastal)
Wiltshire:	83 (all inland)

The distribution map (Fig. 1) reveals a variable pattern of reported inland landslides, but with marked concentrations associated with the following 5 areas:

(i) central Devon; numerous active landslides have been recorded by Grainger (1983) on the variable lithologies of the Crackington Formation, in a study area west of Exeter. Most of these failures are shallow translation (planar) in form and involve movement of periglacially remoulded clay soils in response to groundwater conditions;

(ii) the dissected uplands of the east Devon plateau and adjacent areas of west Dorset and south Somerset, developed in Upper

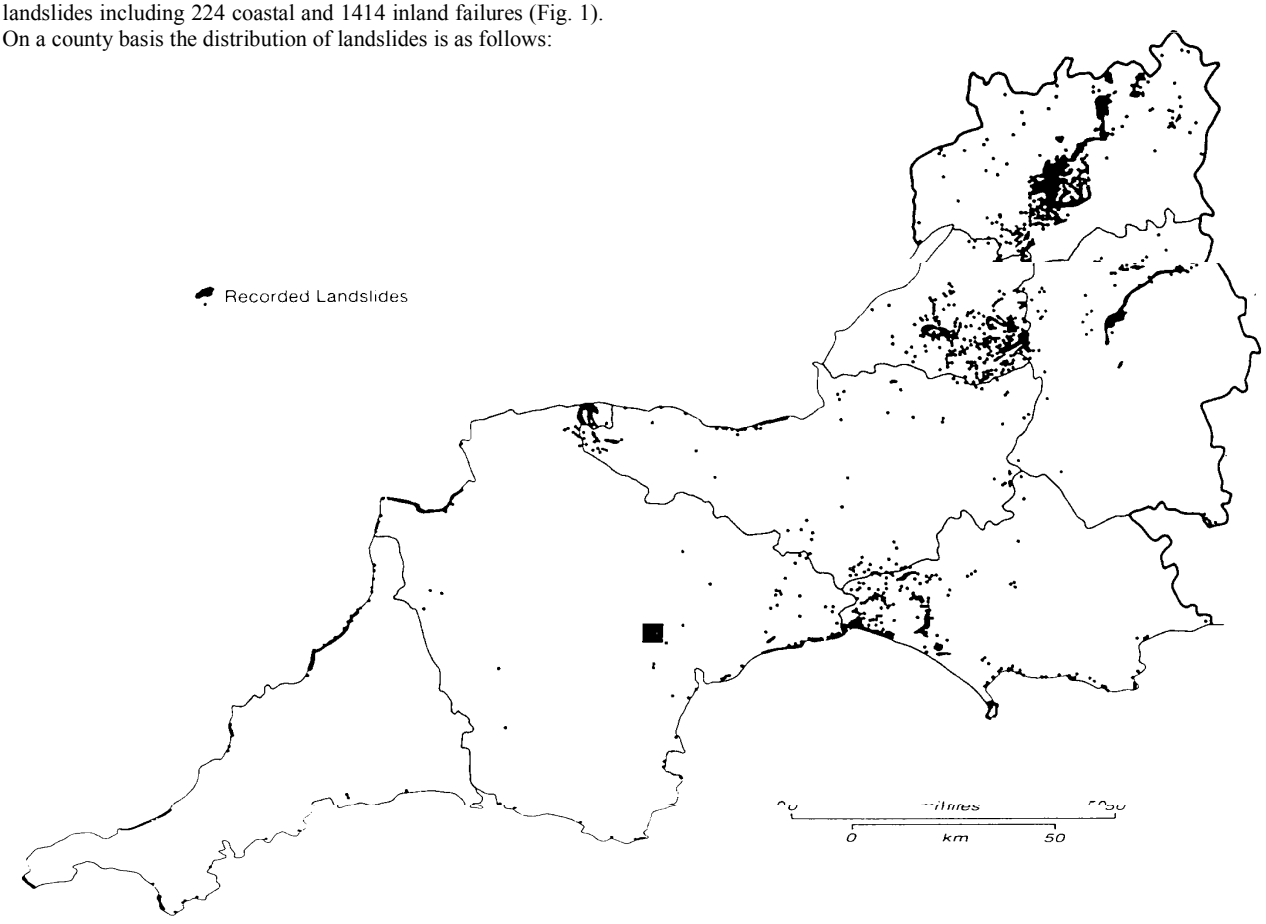

Figure 1. The distribution of recorded landsliding in south-west England

Greensand and occasionally Chalk, overlying clays and marls of Triassic and Liassic age. In this area large numbers of landslides have been identified by Wilson et al. (1958), Brown (1966) and Fakhraee (1979). It is likely that many of the valley slopes in this area are mantled by degraded landslides which can cause problems especially during building development (e.g. Conway and Denness 1972) and highway construction (e.g. Griffiths and Marsh 1986);
(iii) parts of the Wessex scarplands, most notably the Avon valley and its tributaries, between Bath and Bristol. These valleys experienced considerable downcutting by streams throughout the Pleistocene, stimulating the development of cambered Great and Inferior Oolite strata and valley bulging involving deformation of the incompetent Lower Lias clays and Fuller's Earth (e.g. in the Swainswick valley; Chandler et al. 1976). Further incision during the Devensian period resulted in the initiation of large, deep-seated rotational landslides such as those at North Stoke and Bailbrook, in the Bath area (Hawkins and Privett 1979). In addition, there are numerous recorded examples of smaller, shallower, translational (planar) slides concentrated on the outcrop of the Lower Lias clays and Fuller's Earth (e.g. Forster et al. 1985);
(iv) various forms of landsliding, including both rotational and translational failures, have been reported along the Upper Greensand escarpment of north Wiltshire (White 1925);
(v) the Cotswolds; cambering, large scale rotational landsliding and shallow translational failures are common along the Cotswolds escarpment, particularly north of Stroud. Similar forms of mass movement also occur in the deeply incised valleys which dissect the dipslope, such as the Frome valley. The distribution of landslides in this area appears to be largely controlled by the presence of either Upper Lias clays or Fuller's Earth clays. Landslides in the Cotswolds have been studies by a number of workers, including Ackerman and Cave (1967), Briggs and Courtney (1972) and Butler (1983).
In addition, there is a major concentration of landslides in north Devon associated with the Exmoor storm and Lynmouth floods of 15th August 1952. The majority of these landslides involved the failure of saturated soil layers and took the form of debris avalanches (Kidson 1953; Gifford 1953).

The following coastal sections stand out in the published records as being particularly prone to landsliding;
(i) the Isle of Portland and coast of Weymouth Bay, involving the Purbeck and Portland Beds and the underlying Kimmeridge Clay;
(ii) Lyme Bay from Sidmouth to Bridport, where massive complex landslides have developed in Lias clays and the Upper Greensand e.g. the Bindon landslide (Brunsden and Pitts 1987), Black Ven (e.g. Conway 1974) and Fairy Dell (Brunsden and Jones 1976);
(iii) the cliffs west of Budleigh Salterton, involving the Budleigh Salterton Pebble Beds Formation (e.g. Kalaugher and Grainger 1981);
(iv) parts of the hard rock coast of the south-west peninsula from Boscastle to the Taw estuary in Devon (e.g. Royal Commission on Coast Erosion 1907);
(v) the Lower Lias cliffs of the Somerset coast around Watchet (e.g. Whittaker and Green 1983).

It is important to recognise that there are a number of significant limitations of the data which should be borne in mind when trying to explain the pattern of landsliding shown on Fig. 1, or when considering the needs for future investigatory work. These limitations include:
(i) that the nature of the data sources has resulted in marked spatial variations in the density of recorded landslides in the region. These distributions may reflect more the pattern of past investigations than the actual distribution of landslides;
(ii) it follows that a relatively accurate appreciation of landsliding may only be available for a limited number of areas for which detailed investigations have been specifically directed to the identification and delimitation of landslides (e.g. Brunsden and Jones 1972; Grainger 1983). Elsewhere information has been the by-product of broader based research programmes with other specific objectives, and therefore there is considerable variation in the attention given to recording details of slope failures;
(iii) the reporting of coastal landslides tends to be limited to those locations where slope failure is either conspicuous and dramatic (e.g. Bindon and Black Ven) or has implications for coastal defence works (e.g. the Isle of Portland);
(iv) it must be stressed that individual landslides recorded in this survey vary markedly in extent and significance depending on the level of detail employed in their investigation and reporting. As a consequence the term "landslide" has no significance in terms of scale or status, with examples varying from the massive landslide complex at Black Ven to small failures involving the Crackington Formation in central Devon.

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