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# Afon Glaslyn at Aberglaslyn, Caernarfonshire and Merionethshire

[SH 595 458]–[SH 592 472]

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## Highlights

This is a gorge section with steep-gradient rapids on a relatively large Welsh river, which has a suite of representative river features. It is transitional between reaches of more gentle gradient with floodplains. The bedrock channel contains some large, locally derived slope materials.

## Introduction

The Afon Glaslyn at Aberglaslyn is an example of a laterally stable channel confined by a 200 m deep gorge, where the size of the sediment currently occupying the channel is out of all proportion to anything transported by the present-day river (Figure 3.8). The reach consists of a boulder-bed channel, with such boulders ranging up to a maximum of 5 m in diameter. The characteristics of this 600 m reach — in terms of bedload, bank types, mobility and long profile — contrast with sections both upstream and downstream of the gorge of Pont Aber Glaslyn [SH 593 462] where the river is less confined, more laterally unstable and has a range of depositional features not observed in the gorge section. There is limited active input from the slopes of this gorge, so that the present-day river must be reworking deposits left by previous glaciations. Sediment transport is dominantly by bedload, although there is evidence of the overbank sedimentation of fines, especially in the wake of vegetated islands after high-magnitude events. The composite profiles of the Glaslyn valley may represent successive stages in episodic rejuvenation of the river to former base levels.

## Description

For the majority of its course, the Afon Glaslyn flows in a glacially overdeepened valley where it is largely unconfined such that traces of old channels and/or terraces are seen locally (e.g. between Beddgelert [SH 592 481] and the footbridge at 592 474), indicating a degree of lateral mobility. Upstream of Beddgelert the river passes through Llyn Dinas and Llyn Gwynant. At Beddgelert it is joined by the Afon Colwyn. The river at this point is typical of many lowland rivers of Wales, with composite banks comprising up to 30 cm of fine to medium gravel, overtopped by a finer 70 cm unit of sediment that contains cobble-sized material. The river is of a shallow gradient, typically has riffle-pool sequences and has depositional features such as point bars, counterpoint bars and mid-channel islands. The channel is migrating across a 500 m wide floodplain and there is evidence of meander scrolls and sections of abandoned channels. In the case of the meander immediately upstream of the footbridge [SH 592 474], abandonment has been carried out artificially by the construction of a wall at the neck of the channel, so that an area of slack-water remains.

Between the footbridge and Pont Aber' Glaslyn [SH 595 462] the characteristics of the river change in that it becomes steeper in gradient and is confined in a 200 m deep gorge. The channel here is lined by bedrock, in some places up to 4 m in height, especially on the right bank. The left bank is characteristically dominated by bouldery deposits, with some boulders up to 5 m in diameter, which were derived from a previous period of glacial erosion and subsequent periglacial activity on the slopes of the gorge. The river cuts obliquely across a series of rock bars, creating a sequence of rapids in the section (e.g. at [SH 596 464]), some of which fall over 2–3 m of bedrock. Much of the material present is angular, suggesting that it has not been fluvially transported but is derived from the adjacent slopes. Immediately downstream of the largest sequence of rapids is a deep pool where there are deposits of boulders up to 1 m in size, orientated in a downstream direction. In the lee of such deposits, finer gravels accumulate at low flows. There are also deposits of boulders in mid-channel which are not being moved under present river conditions, even during extreme events.

Downstream of the gorge section the river is characteristically of lower gradient, with deposits of finer gravels and riffle-pool sequences. The river has a meandering thalweg and there are depositional features such as mid-channel bars (e.g. opposite Aberglaslyn Hall [SH 595 462], where a bar up to 40 m in length has been formed). In addition, there are point and counterpoint bars 50 m downstream of Pont Aber Glaslyn. Much of this material is transported through Aberglaslyn Pass during extreme flooding events. There are also floodplain features such as palaeochannels and terraces.

## **Interpretation**

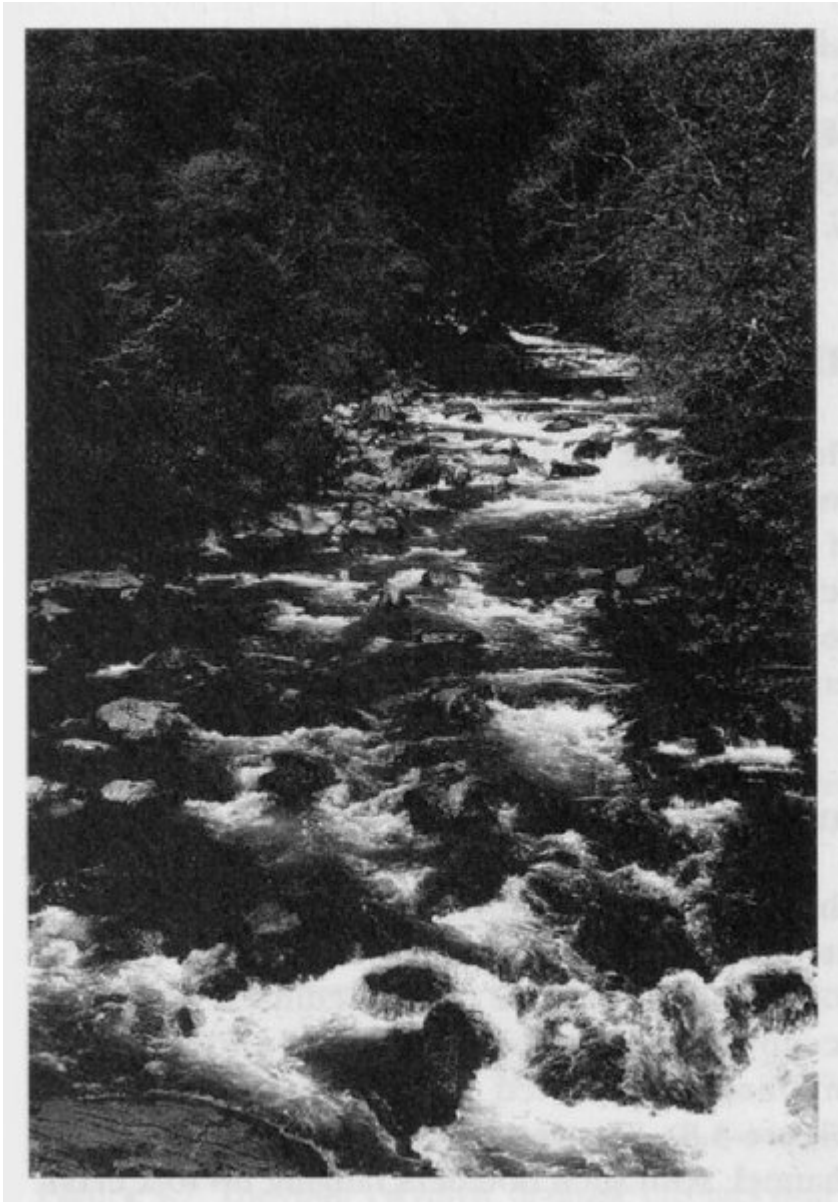
The channel changes from a 'typical' mountain torrent with a bed of coarse boulders and a confined planform to a wandering gravel river more typical of lowland Welsh rivers, with gradual lowering of channel slope and widening of the floodplain. There is an area of extensive deposition immediately downstream of the gorge section where older, more stable depositional features are intermixed with recent active point bars. The reach, therefore, appears to be one in which transport processes during extreme events are dominated by bedload mobilization. Fluvial deposition within the confined reach is restricted to an area just upstream of the A4085 road bridge on the outside of the bend. The deposited material tends to be of a more coarse nature than that further downstream in the unconfined reach. Some coarse, angular material within the gorge shows no evidence of fluvial transport and has been derived from the slopes under glacial and periglacial conditions.

The section of the Glaslyn in Aberglaslyn Pass provides an excellent example of a steep-gradient, bedrock-confined reach in the lower reaches of a Welsh river. The river is notable for a major transition in character in the space of less than a kilometre from a low-gradient, laterally active stream to a 'typical' mountain torrent (with characteristic boulder deposits and resistant bedrock benches leading to rapids) and back to a lowland-type stream where depositional features such as mid-channel bars and point and counterpoint deposits are prominent. The river then enters a wide floodplain area, some of which is of marine origin, where transport of dominantly finer sediments occurs.

## **Conclusion**

An excellent range of contrasting river features is represented within a short distance on the Afon Glaslyn, with a transition from a low-gradient, mobile and unconfined stream to a gorge containing large boulders, and then back to a lowland meandering stream with typical depositional features.

## **[References](#)**



*(Figure 3.8) Steep-gradient rapids on the Afon Glaslyn. (Photo: S. Campbell.)*