

# CASE STUDY: SHALE BINGS IN CENTRAL SCOTLAND: FROM UGLY BLOTS ON THE LANDSCAPE TO CULTURAL AND BIOLOGICAL HERITAGE

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Mining for mineral or energy resources occurs worldwide and many mining enterprises result in the production of waste or residues that require storage and/or treatment. In central Scotland, mining for coal and oil shale was widespread. The extraction of oil from shales began in the 1850s and developed into an important industry, supplying 25% of the city of London's lamp oil. The arrival of the internal combustion engine and the motor car led to the production of motor spirit (petrol) from shale oil that was sold throughout the UK, and the development of the diesel engine in 1938 led to further refinement processes. The maximum output from the industry in Scotland

was in 1913 when 27.5 million barrels of crude oil were produced. However, production declined due to competition from oil produced elsewhere and ceased altogether in 1962.

The process of retorting crude oil from deep-mined oil-bearing shale resulted in 7 tonnes of burnt shale waste for every 10 barrels of oil produced. The waste was left lying around West Lothian (west of Edinburgh) in large heaps, creating the area's unique red shale bings or spoil heaps. These tower above the naturally low-lying landscape of West Lothian. For some, they represented a major blot on the landscape, a reminder of the large-scale exploitation of resources and result-



**Figure 35.1** Naturally occurring species-poor calcareous grassland community on the plateau of Greendykes. Photographs: B.A. Harvie.

ant waste products and an intrusion on the natural geomorphology of the area. However, the burnt shale (blaes) was also recognized as a useful resource: a source of landfill for roads and other construction. Changes to UK legislation after the Aberfan mining disaster in Wales in 1966 resulted in many small bings being reclaimed as green space from the late 1960s onwards. The remaining sites, mostly privately owned, were retained for their commercial value.

However, those bings that remained in the landscape soon came to the attention of botanists and other naturalists as they were gradually colonized by plants and animals. The physical and chemical structure of burnt shale is unlike coal spoil or any other type of industrial waste. The substrate varies in physical and chemical characteristics and thus provides a variety of different, locally distinct habitats. As a consequence of their additional industrial heritage they are a unique habitat, not found anywhere else in Britain or Western Europe. The bings are now home to several nationally (UK) rare and protected plant and animal species from

*Stereocaulon saxatile* (an inconspicuous lichen) to badgers (*Meles meles*). The sites form refugia for many other locally rare fauna and flora, and more than 350 plant species have been recorded on them. Some of the bings have remained unmanaged since shale extraction ceased (Fig. 35.1), while others have been reshaped, seeded and planted in various ways during the 1970s and 1980s when land reclamation was a national political priority. The resulting vegetation, in all instances, is so unusual within the region that the oil-shale bings constitute one of the eight main habitats in West Lothian's Biodiversity Action Plan. At the base of one bing, a genetically distinct birch woodland has established naturally and contains many of the associated ground flora and bryophyte species of long-established native woodlands. Another bing is designated as a Scottish Wildlife Trust nature reserve because of its diversity of habitats and species.

Several garden escapes have been recorded on the bings and are well established on many sites. These now pose an interesting dilemma: should they be

encouraged as an integral part of a novel vegetation type or should they be removed for fear that they spread uncontrollably throughout the surrounding landscape? Species like these may become a permanent component of plant assemblages on the bings and form part of established novel community types. Many environmentalists and ecological managers may consider that they are not natural and should therefore be discouraged, but what is natural on an entirely human-created habitat?

The bings are now also of considerable social and historical importance; two are scheduled as historical industrial monuments. They are a focus of community identity in a population whose common culture of mining is slowly being eradicated by families of non-West Lothian origin taking up residence in the many new housing developments in the county. As a consequence, the bings have potential as an education resource at all levels because of the historical importance of the shale-oil industry that created them (global engineering expertise and products ranging from paraffin to detergent), the ecological importance of their extensive flora and fauna (nature reserves and primary succession) and the geological importance of the sedimentary rocks that they were mined from (Carboniferous limestone series). Socially, they provide much used public open space. Several bings, such as the Five Sisters (Fig. 35.2), are seen as important land-

marks with social, cultural and historical significance in addition to their biological values.

Restoration and management of spoil waste is common in many parts of the world, but it has been argued that it is unnecessary on the shale bings. Restoration has largely followed 50-year-old policies with a standard recipe of: reducing the height and gradient of the heap; rounding peaks and ridges; covering with topsoil; applying fertilizers (liberally); and sowing with commercial grass mix. On low-lying heaps, trees (usually birch and alder) were planted directly into the spoil at the bottom of the heap without any amelioration. Often the only purpose was to obtain a satisfactory visual effect. Management decisions on the restoration of the bings and similar sites are affected by an unrealistic public perception of what post industrial and other waste sites should be restored to, and how quickly they should be restored. Scottish Natural Heritage Information and Advisory Note Number 50 (<http://www.snh.org.uk/publications/on-line/advisorynotes/50/50.htm>) emphasizes the “need for careful consideration to be given to any bing reclamation proposals to ensure that the distinctive and potentially unique natural heritage interest is adequately considered”. Recent changes to local conservation policy have now ensured that many of the remaining bings are safe from demolition, reshaping, reclamation and restoration.



**Figure 35.2** Five Sisters, near West Calder, West Lothian, Scotland. Photograph: R.J. Hobbs.

The shale bings of central Scotland represent an interesting case of novel ecosystems: their novelty arises because of the deposition on the landscape of new structures comprising physically and chemically distinct substrates that are subsequently colonized in an idiosyncratic way by both native and non-native species. They have also gone from being perceived as undesirable features to valuable social and cultural components of the local landscape. Is this the future for other types of novel ecosystem too?

The material in this chapter is based on Harvie (2005, 2007, 2011) and Harvie and Russell (2007), which provide more detailed information on the subject.

## REFERENCES

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