



To tree or not to tree?

...that is the question for the oil-shale bings of West Lothian. With apologies to William Shakespeare, Barbra Harvie gives a tongue-in-cheek account of the unique qualities of some of Scotland's most distinctive post-industrial sites.

The Prologue

Anyone travelling through or over central Scotland by rail, road, canal or air will be familiar with some of the oil-shale bings of West Lothian. These are the conspicuous red hills of spent shale, the waste from Scotland's first oil industry, and can be clearly seen towering over the surrounding landscape.

The largest bing is Greendykes, affectionately known as the Uluru of the North. There are, however, another 18 bing sites still remaining in the county and these vary in shape, size and management – from the Five Sisters, so distinctive that it is part of the West Lothian Council logo, and Addiewell North, an SWT nature reserve, to Albyn, almost completely removed for hardcore.

Much Ado About Nothing

To many the bings are just piles of post-industrial waste and ideal sites for restoration to woodland as part of the vision for the Central Scotland Forest (see page 16). They are considered by some to be no different from the hectares of reclaimed coal spoil or ironstone waste that also abound in the central Scotland valley and have been successfully restored and regenerated. Several of the oil-shale bing sites have been restored, some more successfully than others, and are already important amenity sites for walkers, botanists, 'bing baggers' and the many others who visit the sites regularly. Some even have trees growing on them!

Measure for Measure

The sites are unique in Britain and Western Europe because of their geological and industrial origins. Oil-bearing shale was formed in the Carboniferous era, in the centre of Lake Cadell, a tropical lagoon, when layers of fine silt and plant debris were deposited by the tides to form a sedimentary rock containing varying amounts of solid organic material (kerogen). The shale fields never contain any liquid oil but the parent rock, when heated to 500°C, yields hydrocarbons in the form of paraffin and crude oil. Bings are the piles of waste from the industrial process to extract mineral oil from deep-mined rock.

Oil-shale spoil is free draining, neutral to basic and does not contain toxic concentrations of metals like coal spoil and other industrial waste. High levels of soluble salts in the material when it is first dumped are rapidly leached by rain, resulting in a medium that becomes conducive to plant establishment within a few years.

A Midsummer Night's Dream

Lying under clear blue skies in a sward of mixed grasses and wildflowers, looking up at clouds of butterflies and listening to skylarks; rising to your feet to absorb a breathtaking view across central Scotland to Fife, Arthur's Seat, the Pentlands, the River Forth and both bridges; looking down onto Niddry Castle (where Mary Queen of Scots spent her first night of freedom after escaping from Loch Leven Castle)... yes, it is definitely worth the climb to

the plateaued summit of Greendykes on a clear summer's day. Admittedly, on some days you have to ignore the buzz of off-road bikes, but there are not many places where you can find naturally occurring calcareous grassland in central Scotland, albeit species poor and on a far-from-natural site.

The West Lothian oil-shale bings are important havens of biodiversity at both a local and a national (UK) level. They are examples of true primary succession, of the kind seen when plantlife colonises a stretch of barren land after a volcanic eruption. They provide a refuge for many locally rare species, both plant and animal, in an urban-industrial-agricultural landscape, making them important to conservation and increased local biodiversity.

The diversity of life on the bings includes rarities like alpine and stag's horn clubmoss, orchids of many species, common wintergreen, twayblade, red data book mosses and lichens, brown hare, yellowhammer, ringlet butterfly and the first recording of ten-spot ladybird in the county. The destruction and landscaping of shale bings is a severe threat to some of the rarer plant species, both locally and nationally.

As You Like It

Most of the tree species that arrive naturally on the bings are scrubby pioneers that are associated with derelict land. Willows, birch, hawthorn and elder are commonplace, particularly in

crevasses, and near the bases of the bing sites. On the larger bings, a few hardy individuals also establish on the exposed summits and even manage to cling to shale on the steeper slopes, whilst on the smallest sites you can't see the bing for the trees!

Mature elder trees provide a habitat for many epiphytic lichens and are a clear indicator that the pH of the bing substrate is considerably higher than coal spoil or many other types of industrial waste in Scotland. Canopy tree species, however, rarely establish naturally, despite the many farm shelter belts and small areas of woodland in the surrounding landscape. Even the ubiquitous sycamore is noticeable by its absence and there are sites where no trees have established naturally, even 100 years after abandonment, despite mature woodland growing at the perimeter of the bing.

There is, however, an excellent example of considerate, well-planned planting using a range of (mainly) native tree species over a considerable period of time. On Oakbank Bing, West Lothian Council have carried out an extensive restoration project that incorporates the site into Almondell and Calderwood Country Park. Addiewell North also has a good cover of trees resulting mainly from planting.

Opposite page: The Five Sisters bings. Photo by Flickr user DNQA, used under a Creative Commons Attribution License. Below: Extensive woodland at Addiewell where planting has been combined with natural regeneration. Note the bare scree slope in the top right of the photo. Photo: Barbra Harvie.



The Comedy of Errors

Sadly there is a danger that planners of new woodland become blinkered in their quest to restore Central Scotland to the glorious forest of ash, elm and oak that may or may not have been the predominant vegetation immediately after the last Ice Age, and that ideology takes over from common sense.

Well-meaning but misguided examples of reforestation on bing sites include the removal of established, naturally regenerated birch woodland (with a luxuriant and diverse bryophyte undergrowth) from the base of Mid Breich to make room for plastic tubes that briefly contained oak, ash and other saplings.

At Addiewell North, original 'stabilisation' planting with lodgepole pine is now being removed by SWT at great expense and birch is already colonising beautifully. There are also a few Italian alders that may need to be removed before they start to regenerate or hybridise with the natives. And at Oakbank, the 'native' planting unfortunately includes beech, which could cause shading problems for ground vegetation and future tree regeneration.

To be fair to those responsible for planting the non-native tree species, there is also a plethora of exotic plant species that have arrived on the bings of their own accord (or with a little help from fly-tipping of garden refuse). These range from biting stoncrop on Greendykes to opium poppies and cannabis (on more than one site).

All's Well That Ends Well

Scottish Natural Heritage Information and Advisory Note Number 50 emphasises 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."

Greendykes and Five Sisters are now protected as designated Scottish Industrial Heritage Sites. Other bing sites are protected for more remarkable reasons. As already mentioned Addiewell North is an SWT Reserve, Oakbank is part of Almondell Country Park and all of the bings together make up a major habitat in West Lothian's biodiversity plan.

Trees, both naturally regenerated and carefully planted, are an integral part of the vegetation on many of the sites and long may they continue to flourish, but not to the exclusion of the bings' own distinctive, developing vegetation.

Exit, pursued by a forester.

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More information

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 Harvie, B.A. (2010) *The shale-oil industry in West Lothian, Scotland 1858-1962*. I: Geology and History. Oil shale, 27(4), 354-358
 The first two are available electronically at www.geos.ed.ac.uk/homes/harvie/