

The Eddleston Water

Historical change in context

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A report for the Tweed Forum

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Full scanned images of NAS RHP1437, RHP1438 and RHP140872 are supplied separately – courtesy of Brodies WS and National Archives of Scotland. Every effort has been made to identify copyright owners; errors or omissions, if brought to my attention, will be corrected.

URLs are given for other maps available online such as Roy and Armstrong where they are central to the argument to enable the reader to see the detail in a wider context. It should be remembered that scales are variable, orientation is not always 'north at the top' and the date of publication may differ from the date of survey.

**Riveris ran reid on spate with water broun,
And burnis hurlis all their bankis down. - Gavin Douglas, c.1513 *Eneados*, bk.7.**

Summary

A series of interventions which have influenced the Eddleston Water and other rivers in the area are identified from documentary and cartographic sources. The peak time for the inception of these changes was the later eighteenth and nineteenth centuries. They included field drainage, clearance of bogs and other wetlands and management of small feeder streams as well as work on the Eddleston Water and comparable streams; each of these is discussed in some detail. As with other streams in the area, the major work on the Eddleston Water itself was multi-phase, each section managed by the adjacent landowners between about 1770 and 1815 in a context of agricultural prosperity and near-limitless optimism that ‘improvements’ would continue. The issue of Water Meadows is discussed though with less firm conclusions than for the river.

Introduction

This report surveys the evidence for management of drainage in the Eddleston Valley, the surrounding area of Peeblesshire and more generally within Scotland over the last 400 years or so. It is a contribution to a wider study of the potential restoration of the Eddleston Water to improve habitats and reduce flood risk to local communities. The work is being led by Tweed Forum with Scottish government, SEPA and the University of Dundee. Further information on the restoration project can be found at:

<http://www.tweedforum.org/projects/current-projects/edleston>

The report is the outcome of a desk-based study, conducted over a short time-scale, by a landscape historian – not by a specialist on water management or river systems. Whilst recognising that almost any change in land use (from plough to pasture, from light to heavy grazing etc) would have some impact on the drainage, the report concentrates on more direct interventions though it does note some work on upland peat and the expansion of forestry as potentially significant.

Throughout I have concentrated on presenting such evidence as the archives, maps, plans and published sources (primary and secondary) have to offer. I hope the presentation allows the reader to distinguish between the evidence and my own interpretation. I have tried to be direct whilst providing sufficient context for non-historians to follow the thread of the argument. Sadly, historical sources are better at qualification than quantification. So, the final

analysis of how the historical interventions (field and marsh drainage, canalisation of rivers and so on) have affected the Eddleston Water and other catchments, is a matter for others.

Pre-modern engineering works were often frail; even if they survived for long (and the later history of Eddleston Bridge suggests that most would not) then they would be deemed inadequate by later generations and swept away by human rather than watery agencies. The Eddleston Water already flowed in its modern course by the 1st Edition OS survey. That gives a window of roughly 1750 to 1860 on which the historical research has concentrated, broadly the period of the so-called Agricultural Revolution. The main emphasis is on the Eddleston Water catchment. But the report draws in quite extensive primary material for the upper Tweed and its tributaries and for other catchments across Scotland, at least outside the Highlands.

Agricultural Revolution?

The most obvious manifestations of agricultural change in the eighteenth and nineteenth centuries included the introduction of new crops, of new rotations, of regular enclosures, of new breeds of livestock and the erection of farm buildings on a new model, suited for the new farming. The changes most relevant to this report were improved field drainage, the drainage or clearance of mosses, bogs and lochs, tighter controls of burns and feeder streams and engineering works on medium-sized and even larger rivers – including, latterly, the building of reservoirs to supply the new cities and industries. But those specific changes took place within a wider context.

Historians are now sceptical of the wilder claims of the ‘Improvers’ about the static backwardness of what went before and about the completeness of the transformation which they wrought. Early improvements were frequently swept away as the process of change advanced. For example, new road surfaces and new bridges, created in the Stirling area in the 1670s and 1680s were inadequate to deal with the traffic of a century later so that only one of the new bridges now survives; but the new roads had had a real impact on the local economy in their day (Harrison, 2005, 300-2). The building of new farm buildings is widely documented for much of Scotland from the 1660s onward but very few examples survive from before about 1760 (Glendinning and Wade-Martins, 2008). We should expect that early work on rivers might have been similarly found lacking.

A key foundation to later change was legislation of the later seventeenth century which facilitated estate re-organisation including enclosure (1661, 1669) the division of proprietary run-rig lands (1695), the division of commonlands (1647 and 1695) and the rationalisation of

irregular marches (1669). These measures provided simple, local mechanisms to achieve change, a striking contrast with England, where division of commons often required individual parliamentary legislation. The Scots legislation was little used for some decades but it provided the legal basis for many schemes in the later eighteenth century; in fact, whilst the idea of change and the availability of suitable technologies were both important, neither were sufficient to produce actual change, which required additional factors (Whyte, 1979, p. 98-110; Devine, 2006).

An important stimulus to improvement from about 1760 was the increasing availability of capital – sometimes from more productive land-management, but also from trade (domestic and overseas including India, the slave trade, textiles and tobacco). For well-established landowning families, the new capital might come from marriage or the professions. Landownership was an attractive option for the newly wealthy, too, helping to consolidate their status. The major local landowners fit into this general pattern. James Wolfe Murray, Lord Cringletie (1759-1836) was a Scots law lord with inherited wealth. Patrick Murray, 5th Lord Elibank (1703-1778) qualified as an advocate but became a lieutenant colonel in the marines, retiring to Scotland in 1740 where he wrote on economics. His nephew, who succeeded to the title and estate, was briefly an MP (a very lucrative position) and seems to have married well. James Murray, a younger son of the 4th lord Elibank was a military officer who was (1764-8) governor general of Quebec.

By 1760, the Enlightenment endorsed the idea of Improvement as not merely technically possible but as desirable and even virtuous. Concomitantly, the land-owning class became more willing to invest in public infrastructure, the obvious example in the study area is the creation of the Turnpike Road between Peebles and Edinburgh, mooted in 1770 and, if not operational in that year, with construction well underway in 1772 (Chambers, 1865, p. 265; NAS SC42/5/22, Copy Minutes of the [Turnpike] Trustees, 14th April 1772). By 1776 the tollgates at Broughton, Nether Falla, Eddleston, Horsburgh Castle, Cardrona and Neidpath Castle had probably all been operational for some time with the Eddleston route providing the key link to Edinburgh (NAS SC42/28/13 p. 482-486). An obvious benefit was the facility with which coal could be brought into the area from Midlothian or lime brought from various sites in Peeblesshire.

So, the turnpike was not just a symptom of rising expectations but a cause of further increases in local productivity and can only have contributed to a further rise in land values and growing optimism. Not only were things getting better but, it must have seemed, they would continue to get better. It was a tide of rising optimism which reached a peak with the

high farm prices (and high rents) of the 1790s and early 1800s, the years of the wars with France and which is reflected so often in the Statistical Accounts of the 1790s.

Drainage was a key part of the Improvers' programme, lack of adequate drainage which they most often berated. Their enthusiasm was largely justified in the context of their time since everywhere in Britain precipitation exceeds evapo-transportation and without drains lying water limits productivity. Where irrigation was used in England, from the seventeenth century it was to boost the productivity of grassland, not to supply an absolute shortage of water (Cook and Williamson, 1999, 1). Some Scots water meadows might show a rather different pattern (below).

In what follows the various sorts of water management schemes will be considered under a number of distinct headings;

- Field drainage

- Drainage of mosses, lochs and marshes

- Management of feeder streams and rivers

- Haughs, Riverbanks and River Management

- Management of the Eddleston Water including meadows and water meadows.

In reality, as will be apparent to most readers of this report, all schemes had impacts further downstream; equally, what was happening on the flood-plain of the river might have influenced choices of how to manage the higher slopes. On the other hand, these categories were thought of and dealt with as separate issues, the cascade of consequences of each type of undertaking only slowly becoming apparent.

Field Drainage

Arable fields in wet climates must always have had some drainage. In seventeenth century Scotland most arable was ploughed into a series of ridges, a few metres wide, usually curving sinuously across the fields, a form known in Scotland as rig and furrow (Fig. 1). The top of the rigs, which were near-permanent features and tending to increase in amplitude with time, were fairly dry. But water tended to accumulate in the furrows except where the slope was very steep (which presented its own challenges!). There were also ditches, at least along field edges, perhaps less often within the fields.

Both rigs and ditches might drain to adjacent meadows whilst the rigs in a field might act as property markers or be farmed by different tenants. Hall (1999) thought that ditch maintenance in England was improving by the sixteenth century though there is no clear evidence for Scotland. In the 1750s, James Wright of Loss, managed the rigs on his farm in

Menstrie Glen as separate units, each with its own crop, each ploughed, sown and harvested independently (RCAHMS, 2001).



Figure 9Rig and furrow at Little Jerah in Menstrie Glen, Clacks (photo JGH)

Dr Pennecuik (1715, p. 6) derided Peeblesshire farmers who refused to dig adequate ditches on account of the space they required, though he was convinced the loss of space was more than made up by increased productivity. Ditches continued to be important though they were being systematically removed in parts of East Lothian by the 1720s. In early nineteenth century Aberdeenshire, tenants were ordered to actively plough out the old baulks and to straighten rigs as part of a wider programme of improvement (Williamson, 1999, p. 41; Buchan-Hepburn, 1794, p. 52; Aberdeen Uni Special Collections, Ms2769/I/26/2 General Conditions and Regulations).

By the mid seventeenth century, sub-soil drains known as bush drains were in use in England; a deep trench was dug, lined with branches, broom or other plant material and covered over. These drains carried the water from deep below the plant roots and so right off the field and they had spread north to the Borders by the later eighteenth century (Williamson, 1999, p. 42; Smout, 2000, p. 98). Modern writers agree that bush drains were efficient but they were not durable requiring re-digging every ten of 15 years (Williamson, 1999, p. 44; Wade Martins, 2004, p. 36). In East Lothian subsoil drains are said to have been introduced by Patrick, Lord Elibank (d. 1778) and Sir Hew Dalrymple of North Berwick (Buchan-Hepburn, 1794 p. 51) though the removal of ditches from the 1720s, noted above, suggests that the real date must have been earlier.

Stone drains appear to have been commoner than bush drains in Scotland. One type was known as a rumbling syver and consisted of a deep trench, the bottom lined with stones

formed into a tunnel (DSL, Rummle, v. 2). The earliest record I have come across is again from Menstrie Glen where James Wright had drained a field called The Risk with ‘rumeling sivers’ by 1754, extending drains to other parts of the farm before 1758 (RCAHMS, 2001, 25). Less elaborate stone drains involved cutting a trench and just filling the bottom with stones. Both types are regularly found in the course of archaeological work and in placing new drains; functional stone drains remain widespread. Buchan-Hepburn (1974, p. 132) implies that stone drains were favoured in East Lothian and anywhere else that stones were available. This ready availability of stones and comparative scarcity of woodland surely explains their popularity in Scotland.

Stone drains were increasingly widespread in Peeblesshire in the later eighteenth century with some records in farm leases (NAS SC43/28/12 p. 555-559 SC42/28/14 registered 10 Jan 1781). The OSA (1790s) for Innerleithen hints that the decline in ague in the lower part of the parish might be due to drainage (OSA 1791-9, volume 19, 594). The account for Manor notes that the arable land along the Tweed and Manor Water had been lately improved by drains and ditches (the distinction implying that sub-soil drains were, indeed, employed) (ibid, Manor, p. 384). The type is rarely specified but a claim in 1815 contrasts open drains with under-drains whilst one at Stobo Mill in 1819 was for the costs of cutting drains and filling them with stones (NAS SC42/43/1, p. 181; ibid p. 230). By the 1830s reports and specifications of such drains are widespread across Scotland at least outside the Highlands (NAS SC40/67/6 p. 67-8; Graham, NSA Killearn, p.68; Pollock, NSA Baldernock, p. 173; Niven, NSA Balfour, p. 253). Many of the Peeblesshire Accounts also mention draining and the account for Tweedsmuir (p. 68) is explicit that ‘about fifty years ago draining commenced in this parish on a large scale and at a rough calculation not less than 80,000 roods have undergone that process’. Subsoil drains had significant impacts well before the era of tile drains. The NSA for Broughton (p. 81-3) says that agues as well as wild swans, ducks and gulls were all less common as a result of drainage. In Eddleston, whilst regretting the neglected state of the part of the parish belonging to the Portmore estate, ‘Much has been done with respect to reclaiming waste land, draining, irrigation and embanking upon all the farms that have been let within the last twenty years’. In Linton (p. 165), enclosing, planting and draining appear to have been widespread. In Lyne and Megget (p. 171), draining was practiced where it was thought promising. There had been great advances in draining in Manor (p. 118). In Newlands some draining was still required but evidently a good deal had been done (p. 141). Similar, dynamic advance is apparent elsewhere in the Borders, such as

Liddesdale from about the 1770s, the enthusiasm of both tenants and landlords fluctuating with economic circumstances (Robson, 2004, 206; Harrison, 2000a, 80-2).

The first tile drains for deep drainage were of horseshoe form and invented around 1819 with tubular pipes from 1845. These were no more efficient than bush drains but did not require replacement so often and so, though more expensive to install, were more economical in the long term. But transport was expensive so that use in any district would depend on there being a local works. A tile works appeared in Liddesdale about 1845 when the factor wrote he would endeavour to increase income and keep the costs of tile drainage down; tile drains were installed on many farms in Liddesdale through the 1850s (Harrison, 2000a, 82). Estate records and the advice literature concerned themselves with the best specifications and methods.

Smith's subsoil plough, first deployed in 1831, cut deeply through the hard pan and greatly reduced costs of laying drains of all kinds; it facilitated the laying of parallel lines of drains at regular intervals. But a crucial accelerator was a system of government loans for laying tile drains from 1845 ('the earliest of all agricultural subsidies apart from the Corn Laws') (Smout, 2000, 98; Wade Martins, 2004, 58-9). In 1847 W.F. McKenzie, proprietor of the Portmore Estate in Eddleston applied for £1938 12s 6d under the scheme (*Daily News*, Wednesday 28 April 1847). There are several records of tile drains laid about Carlops from 1849 and later on South and West Mains farms, near Linton, though so late as 1853 these were horseshoe drains laid with soles (NAS SC42/43/2 claims registered 10 Jan 1849, 31 Jan 1850, 11 Jan 1851, 10 Feb 1852, 17 Jan 1853, 1 Feb 1854).

This expansion of tile drainage was part of a wider pattern with tile works springing up in many areas. Millions of pounds were claimed under the government scheme and millions of acres drained in consequence. In 1909 Drysdale (1909, 74; *ibid* 87) thought that on the carse of Stirling (an area devoid of stones) subsoil tile drains had brought the harvest forward by several weeks, allowing it to take place earlier in the season when the weather was better. In Selkirkshire total arable increased from 14,441 acres in 1857 to 23,302 in 1885 and those sorts of figures were replicated or exceeded elsewhere in Scotland (Wade Martins, 64).

But even at this stage, open drains continued to be cut on pasture land, particularly in the hills. Often known in Scotland as sheep drains, they might be cut with a spade or by a plough and then smoothed out. There are records from almost all upland districts of Scotland. In 1816 a prize was offered for the Dumfriesshire farmer who made the most sheep drains at his own expense (Anon, 1816). But most records of cutting sheep drains are from the 1840s and

1850s (Fraser, nd. Fraser, 2001; Stephens, 1844, 497; *John O'Groats Journal*, 22 Sept 1848; NAS GD112/12/2/3 Improvements 1840-1 Item 6; GD224/493.3 report on sheep drains in Liddesdale, 1836;

<http://her.highland.gov.uk/hbsmrgatewayhighland/DataFiles/LibraryLinkFiles/86027.pdf>).

The NSA for Chirnside parish (p. 124) blames the numerous sheep drains lately cut on the Lammermuir hills for floods on the river becoming higher than formerly, albeit they also fell more rapidly. In Buchan's *John Burnet of Barnes*, the 'maze of little streams and sheep drains' made traversing the Kilbucho Glen a tiring exercise. No reports of sheep drains in Eddleston parish have been located though, assuming they have been extensive, it is likely that they could be identified on the ground.

Springs and wet flushes within the fields also required special approaches. Buchan-Hepburn (1794, 131-2) describes a method applied in East Lothian, where a deep trench was cut above the spring and then a channel down from it to the nearest ditch. Similar methods were used elsewhere.

What should now be clear is that, throughout the Tweed area, the Borders and indeed, throughout Scotland, the period from about the 1770s to the 1850s and beyond saw intense efforts at field drainage, with a diversity of technologies.

One observer, echoing the report from Chirnside, noted in 1864;

Until comparatively recent times, occasional heavy falls of rain kept the river [Tweed] flooded for days, when it formed a broad sheet of turbid water, often destructive to the crops on its more level banks; but now, from the general practice of draining, falls of rain are carried rapidly off, and if the river suddenly rises, it as suddenly subsides, rarely causing any serious injury during these paroxysms (Chambers, 1864, p. 12).

That was general across Scotland and a later commentator at Bridge of Allan notes houses built in the eighteenth century in an area more recently subject to flooding;

Two hundred years ago the land in the upper reaches of the Allan was not drained, as it is today. The great spates we now have were consequently unknown then. The river did not rise so rapidly as it does today, and it never fell so low... (Morrison, 192, 38-9).

Drainage of muir, mosses and lochs

Drainage of the higher uplands is less well understood than that of the lower grounds. So far as they were grassy pasture, it could be achieved by open drains, like the sheep drains just considered. Deep peat was more difficult to deal with – and its drainage was recognised to have significant consequences lower down the catchments. Main reasons for draining the higher areas in the Borders were probably improving pasture, management for grouse and forestry. In some areas of Scotland, at the peaks of optimism, quite high land was converted to arable or was limed to become 'improved' pasture and new settlements established,

sometimes well above the upper limits of previous centuries. Almost inevitably, as happened on North Lochtayside, when prices fell back, the settlements foundered. But, of course, the drains remained and the land did not return to its former state (Harrison, 2005, 108).

All the medieval and post-medieval properties in Eddleston had rights to cut peat somewhere, though, as in the case of Courope in 1481, the location is not specified (NAS GD32/6/1). In 1759 John Brown said that, for as long as he could remember, the people of Skiprig and Borland had cut peat and turves on part of the Commonty of Nortshschiels between the Chester Dykes [Northshield Rings] and the White Ground on the west side of the loch (NAS CS21/ 9/2/1760, item 8). In the thirteenth century, the rights to the peat-moss of Kingside were retained by Newbattle Abbey, clearly as they were too important to be assigned to any single tenant or landowner (*Origines*, 214).

By the late eighteenth century the inhabitants of Eddleston village, of Darnhall mansion and the associated farms to Skiprig and beyond, all cut their peats in the extensive mosses around Whitelaw Burn, (NAS SC42/28/15 P. 310-303). In the late 1760s the tenant of Darnhallmains claimed that the deep pools in the cuttings around the Shiplaw march and Whitelaw Burn were dangerous to stock and so had channels cut to drain parts of the moss. But the few cart-loads involved can have had little overall impact (NAS SC42/9/5 Registered 17 April 1770 Murray v. Pringle). Armstrong (1775 shows several other areas which appear to be moss within the parish including on in the area of these cuttings (<http://maps.nls.uk/counties/view/?id=1020>) (Figure 2).



Figure 10 Moss areas in northern Eddleston parish on Armstrong's map where peat cutting is documented c. 1760-1800 (NLS).

By the time of the First Edition OS, the mossy area west of Kilburn had been drained by a straight ditch, leading into a still-sinuuous Kil Burn; the Craig Burn had been similarly straightened as had other, un-named streams in this northern part of the parish (OS Peeblesshire, Sheet 13, surveyed 1856). By that time, too, the Scarcerig area, though shown as unimproved or marshy ground, is traversed by a road (inevitably with ditches) and sections of the adjacent burn have been straightened. The area between Northshield Rings and Portmore Loch (where the tenants of Northshield had formerly had their peat cuttings) was woodland. The moss south west of Upper Falla has clearly been encroached on by improved fields whilst one west of Darnhallmains has been lost to policy plantations.

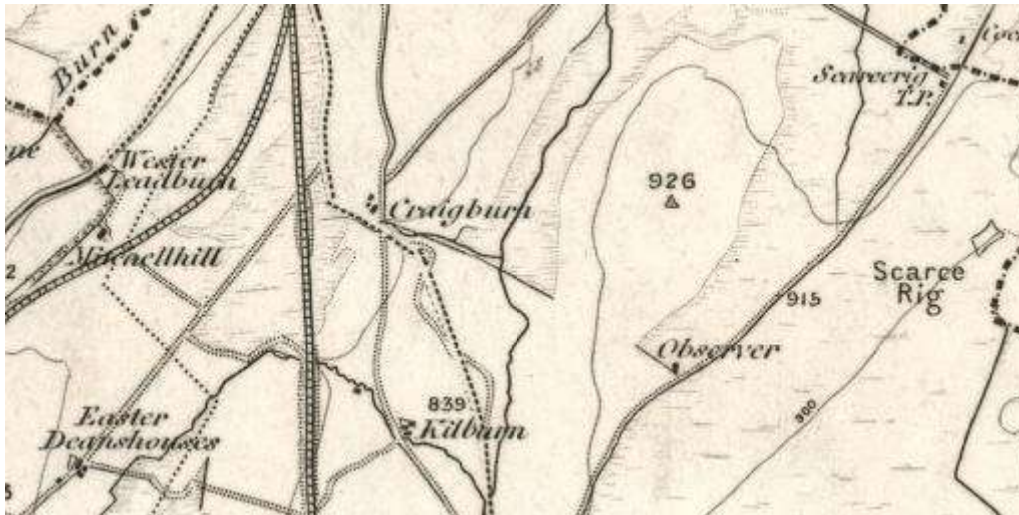


Figure 11 The upper Eddleston Valley on 1st Edition OS (NLS)

In pre-improvement Scotland marshes and wet flushes were not always regarded as problematic. A grant of land near Stirlingshire's Torwood in 1588 consisted of marshes, a pool and bogs with some (evidently very wet) meadows, though already it was bounded on one side by a ditch which separated it from the King's Bog. Where such sites were large enough they might be managed for wildfowl and that was perhaps the case here as the Torwood was a hunting area. Part was known as the Blakarnybog – black bog with alder trees and this is not untypical, the land was used for what it was good for, rather than radically changed for some other use (RMS V, 1533). Pennecuik, writing in early eighteenth century Peeblesshire said that the house of Halmyre was on a hill but surrounded by 'bogs and meadows excellently watered' (p. 13). There may have been some clearance by paring and burning and peat cutting but it was piecemeal and slow, work for slack times not a project with a long-term objective of final clearance (Harrison, 2008/9, 8).

Chambers (1864) described a significant attempt at clearance at Blairbog, later called Whim in Newlands parish, begun about 1730. The moss was about 100 acres and between 12 and 20 feet deep. Attempts at drainage were impeded as the soft moss collapsed into the drains, so that the work had to be done over again whilst plantations on the drained peat, failed (p. 508-9). As the 'improvement' period advanced many small marshes across Scotland were drained – whether in whole or on part and, as land values rose, efforts became more systematic and ever larger areas were tackled with the aim of the obliteration of wetlands, as happened on the Carse of Stirling (NAS SC67/49/19 p. 211- 216; Harrison, 2008/9 16).

Systematic drainage of upland peat bogs in the region (and elsewhere across Scotland) was also happening by the early nineteenth century. The ‘advice’ literature even describes specially-developed processes and equipment and there are spasmodic records in estate papers (Stephens, 1852, vol. 1 p. 377; NAS SC40/67/4, p. 283). There is less information about the purposes, either in general or in specific cases. By a curious contrast with most of the Improving projects, it is the doubters who are heard most clearly on this form of upland drainage. The NSA for Innerleithen deprecates the draining of peat bogs which used to hold the rainwater in the uplands ‘which gradually flowed into burns and rivulets... the draining of these bogs has neither benefitted the sheep nor the salmon fishery’. Armstrong (1775) shows extensive moss on the northern marches of Innerleithen parish, spilling over into Eddleston and over the Midlothian march; there is no indication on the 1st Edition OS of drainage in this area. Elsewhere Gibson (1883, p 159) notes that the drainage of the mosses of the Ochils during the preceding 30 years had had a deleterious effect on the water supply of the Hillfoots mills. He noted drainage of Helen’s Muir by deep, wide channels as a characteristic example. It is now suggested that drainage dissection is key to understanding peat loss in the uplands, (<http://www.scotland.gov.uk/Publications/2007/03/16170508/7> para. 5.3.2) emphasising the importance of these early attacks as instigators of long-term change. Threats to the habitat have continued throughout Scotland (and elsewhere) with the loss of some 21% of the former coverage in Scotland between the 1940s and 1980s and losses continuing from a diversity of causes.

Records of loch drainage are sparse in the Tweed area but in 1661 the town of Berwick complained that drainage of a loch draining into the Ettrick by the laird of Haining polluted the water and affected their fisheries. The laird argued that any detriment was slight and temporary. His objective was to reclaim the land for farming. The court seemingly supported the laird’s argument that ‘it was the proper use of rivers to carry away the corruption and filth of the earth’ and that the laird’s rights had priority over those of the fisheries owners (SCA, Fisheries Boxes 1 of 6, Berwick v. Haining). In 1699 Graham of Slipperfield employed a mason to ‘drain and evacuat the water from and out of the great Loch called the Mickle Loch of the Loch third of Slipperfield and to make the same dry’ (NAS SC42/28/7, 25th Sept 1699). Evidently this scheme did not succeed for the NSA for Linton notes that 2000 acres around Slipperfield were ‘in a state of nature’ and there was a substantial loch though improvements were then current. The loch was still present on Thomson’s 1821 map but the transformation of the landscape was described in glowing terms in an 1843 letter (NRAS

771/167 Grant to Grant, 5 May 1843). The loch had vanished by 1st Edition OS – though significantly there were still marshy areas and a pump.



Figure 12; Thomson's 1821 map and 1st Edition OS for Slipperfield (NLS)

Woods and plantations

The early maps and documents give few hints of the presence of woods in Eddleston. Even in the sixteenth or seventeenth century, there must have been birch, rowan and other species on the less accessible slopes and gullies and some minimal managed woodland to supply timber suitable for traditional buildings. In the seventeenth century, too, it was usual to have some woodland around the mansion houses and the larger farms – with an eye to ornament and shelter as well as to use for building. By the time of Roy's map (1752-5) there were enclosures and planting close to Darnhall and Cringletie but woodland seldom extended far from the policies of the big houses (<http://geo.nls.uk/search/mosaic/>).

Change tended to radiate out from the parks round the mansions or (more extensively) onto land otherwise of low value. Kailzie, near Peebles, had extensive planting by 1757 (NAS SC42/28/12 p. 27ff, registered 6 Dec 1757). Tenants were enjoined to plant by a series of leases around Drochil registered in 1783 (though some dated earlier) (NAS SC42/28/12 registered 14 Aug 1783). In Eddleston parish planting on the muir of Hattonknow is recorded in a tack registered in 1787 (SC42/28/14/ registered 20 April 1787) strips and plantations at Hattonknow, Wormiston and Hattonknow Muir are mentioned in a lease of 1802 when planting was actively continuing (SC42/28/15 p. 323-328; SC42/28/15 p. 340-344 registered 4 June 1802). By the time of the 1st Edition OS woodland was extensive across the parish and all of it would have involved some degree of drainage.

Management of feeder streams and minor rivers

The tributaries of the Tweed have their own small feeder streams, their modest size making them easily managed. The advice literature puts some emphasis on small streams as it was often into these that the field drains fed. Looking at specific Peeblesshire examples, tributaries of the Biggar Water include the Kilbucho Burn, the Clashford Burn and Holms Water. On Roy's map (1752-5) these streams are sinuous and sometimes braided but an estate plan of 1768 shows parts of the Kilbucho Burn to have been canalised as well as indicating substantial work on the Biggar Water (NAS RHP1437). Similarly with the Back Burn at Magbiehill in 1835.



Figure 13 NAS RHP1437 (detail) Estate of Kilbucho in 1768 showing partly canalised Kilbucho Burn; north is towards the bottom left! (Brodie W.S. and NAS).



Figure 14 NAS RHP 1438 (detail) Back Burn at Magbiehill in 1835 (Brodie W.S. and NAS).

Doubtless this was a widespread pattern, though evidence is again sparse. The streams were too small to show on the small-scale early maps and often confined to a single property so that they could be changed at will. There are, for example, no detailed early plans for the Manor Valley but the numerous small streams which transect the haughlands are all very

straight on the modern Landranger map. Extensive canalisation south west of Haystoun on the Crookston and Haystoun Burns is first shown on 1st Edition OS.

Spasmodic records from East Lothian suggest that the work was largely late eighteenth and early nineteenth century, that drainage and sometimes road construction were major stimulants whilst, as will be seen from the figures above, these small streams could often serve as field boundaries and sometimes as marches (NAS SC40/67/4 1811-1816 p. 365; SC40/67/5 1816-1818 p. 149; NAS SC40/67/6 p. 69-70). There are regional variations, of course, and for example on the deep carselands around Stirling deep ditches must long have existed but many were cut into new channels and straightened to become both drains and boundaries. The Forglen and Rough Burns, on carseland at Bridge of Allan were dramatically realigned in this way about 1808 (JM Allan, pers.com).

Haughs, Riverbanks and River Management

Doubtless the uses of riverbanks varied with time and place. Arable and grassland on the Tweed haughs were protected by dykes of earth and stone at least by the early eighteenth century. Along other rivers much depended on soil, water table and frequency of flooding but, where the land was wet, it was certainly often used for meadow for the production of hay both in the Borders and elsewhere (Ross, 2008, *passim*; Harrison, 2000a 12; Harrison, 2003 67). Evidence is often indirect such as the names 'Leahaugh Meadows' and 'meadow of Dastonburn' in Liddesdale in the early seventeenth century. Much of the haughland along the un-canalised Biggar Water was meadow and small meadows are shown in the loops of the burn at Magbiehill, near West Linton in 1805 against the setting of a fashionable, improved landscape (NAS RHP14381). Documented meadows in pre-improvement Eddleston were in wet places. In the twelfth century, Harcarflat (probably the haugh at Marcus) had 'an acre of ground ... between it and the highway, with the meadow lying next to it' (*Origines Parochiales Scotiae*, 213). In the thirteenth century, Spurlands was bounded by a meadow seemingly beside a stream and with arable above (*ibid.* 214). In the early seventeenth century, a lease of Skiprig included the Skiprig haugh with half the meadow beside the Skiprig Burn (NLS Ch 12022). But all sorts of small wet flushes on the higher slopes were also used as meadowland for hay (NAS SC42/5/23 *Dickson v Laidlaw*, case current 1773). Other meadow types are discussed by Ross (2008).

Medieval mills, fish traps and bridges all imply some degree of management of the water course. On the Eddleston Water and its tributaries mills are reported at Auchincloich in c. 1412 (NAS GD32/3/1) at Culrope in 1481 (NAS GD32/6/1) at Kidston and at Eddleston itself

in 1507 (NAS GD436/1/13; GD32/11/3). Later there were mills on the outflow of Portmore Loch, at Nether Falla and perhaps at Borland. There was a mill on the Eddleston Water at Peebles as well as one on the Tweed (Renwick, 1910, 76). Roy's Map shows that the lade for Kidston Mill, which supplied a significant part of its produce to the town of Peebles, was a substantial structure (1752-5 <http://geo.nls.uk/search/mosaic/>). In the early eighteenth century, a dam diverted 'half' of the water of the Garvald Burn via Dolphinton Mill and into the Tath whilst the balance continued to its natural destination, the Clyde (Mitchell, 1908, 150). Eddleston and Kidston Mills survived at least till the mid nineteenth century when many smaller mills in Scotland were going out of business (Gauldie, 1981, 229-233).

Mills and the associated engineering were major capital assets. Nonetheless, they were often comparatively flimsy and readily damaged by floods – or even by people. So, in 1709 Peebles burgh council noted the 'great breach' in the cauld on the Eddleston Water. It could not be repaired that year so temporary measures were to be taken to ensure an adequate water supply to keep the mills going (Renwick, 1910, 177). In 1773 the Earl of Traquair complained of poachers breaking weirs on the Tweed (NAS SC42/9/6 Registered 4 April 1773). Eddleston Bridge was demolished or seriously damaged by floods in about 1757 and again in 1832, this time with fatal results (*Caledonian Mercury*, 11 Oct 1832; *ibid* 9 Jan 1836). The same must be true of attempts at embankment (indeed, embanking the Tweed was a constant effort) and of early attempts to constrain river channels.

Flimsy controls meant that rivers regularly overflowed and sometimes changed their channels. An agreement between the lairds of Chapelhill and Winkiston in 1729 aimed to make the Eddleston Water 'as it now runs' the fixed march between them; if future floods cast up sand beds and so turned the water, each would have the right to straighten the course again (NAS GD297/94). At Broughton in 1768 steps were taken to repair the breaches the river had made in its banks on the Bridge Farm (NAS SC42/28/12 p. 555-559). A section of the Tath was straightened and deepened about 1775 but several years later the tenant of Upper Drochil complained that it did not really stay in the new channel, indeed, sometimes flowed in the old one as he had feared it would do when the work was projected (NAS SC42/9/6, Registered 25th July 1775, petition for Hyndford; NAS SC42/9/8 Registered 13 Jan 1784, Queensberry against Symington). In, 1787 the Leithen in the vicinity of modern Innerleithen still frequently changed its course in spates and some witnesses appear to have been sceptical that things would change any time soon (NAS SC42/9/9 Horsburgh against Hyndford).

Attempts to constrain streams are recorded from other parts of the Borders and more widely across Scotland. Proposals to engineer the Pow of Inchaffray, a tributary of the Perthshire Almond were made as early as 1641 and continued until at least 1696 with specifications for proposed depth and width etc. The intention to improve drainage and use the burn as a march clearly preceded the completion of a practical scheme (RPS 1641/8430 accessed 16 Jan 2012; RPS 1696/9/157 accessed 16 Jan 2012).

Legislation of the Scots parliament in 1669 provided local mechanisms for the adjustment of irregular marches and was used very creatively over the following 150 years or so, to allow for straightening of streams and burns which were then adopted as the new march (RPS 1669/10/54 accessed 16 Jan 2012). It cannot be coincidence that the English parliament was also legislating on drainage matters at this time, most dramatically to override local interests to achieve the drainage of the East Anglian fenlands (Cook and Williamson, 1999, 10; Taylor, 1999, 141-156). But the Scots legislation was largely permissive, using the sheriff courts as facilitators. Many landowners in Scotland, indeed, entered into private agreements and 'got on with it' without any legal process.

Most of the riverside schemes which invoked the Scots legislation had drainage and flood prevention as their primary aims; livestock losses in floods were a particular concern in the Borders, though arable was also liable to suffer. A well-documented agreement involved the Goodie Water, a tributary of the Forth arising from the Lake of Menteith. Roy shows the Goodie as sinuous and bordered by wetlands. In 1760 a mediator was appointed by the riparian owners, who all accepted that the new line would be the march between those to north and south. Engineers now projected the new line and the mediator proposed compensatory adjustments between owners to allow for losses and gains of land. Quotes were obtained and agreed to and all accepted their share of costs and to a post-works maintenance scheme. Work then went ahead and was delivered on time and under-budget; Stobie's map of 1783 shows the new straight course. The maintenance scheme operated to within living memory, though the prime objective, to prevent flooding and improve the productivity of the land, was only partially achieved (Harrison, 2008/9). Large estates had no need for any agreement for work within their own bounds and in Liddesdale many attempts to constrain the river and its tributaries are recorded in the Buccleuch estate accounts from about the 1690s (NAS GD224/239/3; GD224/349/3 Copshawholm Account 1797).

But, by the 1790s and early 1800s, with more money and more knowledge available, the attempts became more determined and more strongly engineered – and so, one assumes, more permanent and more effective. An article of 1803 described the construction of embankments

of gravel and stones on a small, formerly serpentine river in Cumberland where previous schemes had failed, as had a similar attempt at Lauriston in Liddesdale and another on the River Irthin (also in Cumberland) (Anon, 1803, 312-314; Stephens, 1829). Such articles and books, comparing failed and successful schemes, were important in diffusing technical expertise and so ensuring that, in the longer term, embankments would become more durable. But all the projects remained piecemeal, undertaken by individuals or small groups of proprietors attempting to solve their own problem, only to push it on downstream, often to urban areas (Smout, 2000, 91). As will be seen in the next section, the same approach was used on the Eddleston Water.

By far the most dramatic work within the study area has been on the Biggar Water. Roy's map (Figure 6) shows it as largely sinuous, with marshy areas but, already, with some enclosure and what must be reclaimed land (<http://geo.nls.uk/search/mosaic/>):



Figure 15 Roy's Map shows work has already started to claim land along the Biggar Water.

By 1768 the newly straightened sections north of Broughton Bridge were still marked by fields with names like North and South Bog Meadow (Fig. 7). The work is seen to be much more extensive than this on Armstrong's map of 1775 and the work on its tributaries is also seen (Fig. 4) (<http://maps.nls.uk/counties/view/?id=1020>). Surprisingly, this major work was ignored by the writers of the Old Statistical Accounts and no detailed documentation has been found for this early phase. However, work was continuing and in 1811 Carmichael of Skirling gave notice of his intention to drain the meadows at Skirling along the Biggar Water, with part of the work to be done that summer, the work claimed for including embanking of parts of the river, which here formed his march with two other proprietors who also met parts of the cost (NAS SC42/43/1 p. 87-8)



Figure 16 detail of NAS RHP1437 showing the straightened Biggar Water in 1768; north is towards the bottom left on this plan.

The New Statistical Account, after commenting on the fertility of the haugh lands in Broughton parish regretted that

But for the liability to be overflowed by the swellings of Biggar Water, the fields would make an ample return of green crops. The potatoes have sometimes suffered materially from the inundations...

The drainage of bogs and cultivation of mosses are also noted as significant changes, leading to the abolition of agues amongst the people and a loss of wetland birds (NSA Broughton etc, p. 81-3). The NSA for Skirling expands on this saying that up to 100 acres of good ground had been gained from 'boggy ground' which had formerly yielded only 'a little coarse dry hay'. This 'could be further improved and several hundred acres more recovered if the Biggar Water adjacent were deepened 18 inches or two feet' (NSA Skirling, p. 109). The

writer of the NSA for Biggar also recommended the deepening of the Biggar Water, a measure which could reclaim 500 acres of good ground (NSA Biggar p. 372).

Around 1810 the proprietor of Heaviside, in Biggar parish north of the Biggar Water, used a mechanical pump to drain parts of his land with no natural fall, reclaiming 200 acres previously ‘totally unfit for cultivation’ and greatly increasing its value (Irving and Murray, 1864, p. 347). This inspired new proprietors along the Biggar Water to set to work, seemingly to follow up the NSA advice and deepen the river channel, the work being completed by 1858 and ‘some hundreds of acres’ becoming productive (ibid p. 349).

Management of the Crookston and Haystoun burns is much less well covered by plans or by documents. Roy shows the Haystoun Burn formed by the junction of several streams, all more or less sinuous and including the Waddenshope Burn, the Crookston Burn and the Black Burn. Even the reaches which march with the enclosed lands of Haystoun show little or no sign of canalisation. It is only with the 1st Edition OS (Peebles-shire Sheet XIII surveyed 1856, published 1859) that ‘The Cut’ is clearly seen. Its creation might have followed the sale of the commonry of Cademuir in 1845 (Adams, 1971, 176). But in this case, as the Landranger series shows, there has been very extensive drainage around the Caidmuir Hill in an area which must once have been very marshy.

The Lyne Water and its tributary the Tarth show a similar pattern of incremental change as work was undertaken for different proprietors; again, drainage and the firmer definition of marches were important aims.



Figure 17 Roy's map shows extensive marsh south east of Linton, later drained as the Cairn Burn was straightened.

The Tarth, though sinuous on Roy, does have some enclosed land along its banks and clearly the situation was very variable, with stream banks often the best land. That was said to

be the case at Over Drochil where two proprietors used the Act of 1669 to straighten the ‘very crooked’ river in 1775, calling on the sheriff court to underwrite their agreement, against the complaints of the tenant of Over Drochil. The tenant was overruled and the straightening went ahead but in 1784 the former tenant’s son was still demanding compensation as he had lost his best land, the river continued sometimes to flow in the old channel and sometimes overflowed from the new one (NAS SC42/9/6 Registered 25th July 1775; SC42/9/8 Registered 13 Jan 1784).

The Leithen was particularly torrential and noted as often changing its course and it was recognised that, even if markers were placed well back from the present channel, they might be swept away in future floods. But, it was hoped that if it was ‘caulded’ (in this case the word means ‘embanked’) then it might stay within its channel or, the court agreed, either party might make a new cut on their own land, in an effort to contain it (NAS SC42/9/9 Horsburgh v. Hyndford, registered 9 Aug 1787).

Management of the Eddleston Water including Meadows and Water Meadows

Such evidence as has been found suggests that, like other rivers, efforts to constrain the Eddleston Water were flimsy prior to the later eighteenth century and that lands liable to regular flooding, along its banks, would be managed as meadows with arable on less vulnerable areas. Also, as noted elsewhere, the work was undertaken in several stages, over several decades. Roy’s map shows the Cringletie section as sinuous (<http://geo.nls.uk/search/mosaic/>) but Armstrong’s map of 1775 shows this section to be much straighter (<http://maps.nls.uk/counties/view/?id=1020>). However, Taylor and Skinner’s road map of 1776 shows the Cringletie section as very sinuous still (<http://maps.nls.uk/atlas/taylor-skinner/index.html>).



Figure 10 Taylor and Skinner Cringletie section; north to the bottom

A Plan of Windylaws drawn in 1811 shows the old and new courses of the Eddleston Water in the Cringletie section; less usefully, the plan of Wormiston in 1813 shows just the new course (NAS RHP23153; RHP140861, the two plans redrawn as Fig.2.7 in Werrity et al. 2010, figure 2.7). In 1812 the Cringletie estate claimed that £776 had been spent on ‘cutting’ 337 roods of the Eddleston Water between Cringletie and Whitebarony (on the eastern bank of the river) (SC42/43/1 p. 109). The cost indicates very substantial work even though this sum was to be divided between the two estates and the work had probably extended over several years. Unfortunately, the Scots ‘rood’ is more usually a measure of area and what is probably meant is something close to the English ‘rod, pole or perch’ = 5.03m, making around 1.7km of the river. This must be the work indicated on the Windylaws plan though even that may only have been a refinement of work undertaken between the surveys by Roy and Armstrong.

The Darnhall section is also sinuous on Roy, though less so than Cringletie (<http://geo.nls.uk/search/mosaic/> ; on Armstrong, both sections appear rather similar, wavy rather than the obvious sinuousness of Roy (<http://maps.nls.uk/counties/view/?id=1020>) . Taylor and Skinner, admittedly at a rather small scale, is similar. A splendid plan of proposed alterations to the turnpike is, unfortunately, undated and shows not only a still-sinuous Eddleston Water in the Darnhall section but also the ‘proposed new cut’. This plan must post-date the early 1770s when the Turnpike Trust was formed and predate 1801 when a farm lease refers to the ‘old course of the Eddleston Water’ as one of the boundaries of Darnhallmains (NAS SC42/28/15 P. 310-303). It is curious that the proposed cut left the section just above Eddleston Bridge untouched. The bridge was rebuilt or improved between 1780 and 1783 and an offer made

for cutting the water of Edlestoun from the Bridg upward as far as is found necessary the Breith of the Cut to be 27 feet cleare the Deept 3 feet at soome plases and less at others as is found necessary for the rune of the water

The work was to involve some embankment and the cost for the work on the river was estimated at £9 13s 6d (NAS CO8/5/4). It is possible that the plan predates this work or, clearly, the bid was rejected. The section had been 'straightened' by the 1st Edition OS. Work on the upper parts of the catchment has already been discussed.

It is not clear when the turnpike north of Eddlestoun was switched from the west to the east bank, though it was before 1821 when the new route appears on Thomson's map of Peeblesshire. The change might have followed a petition to parliament in 1808 for improvements to the route (*Caledonian Mercury*, September 22, 1808; Issue 13534).

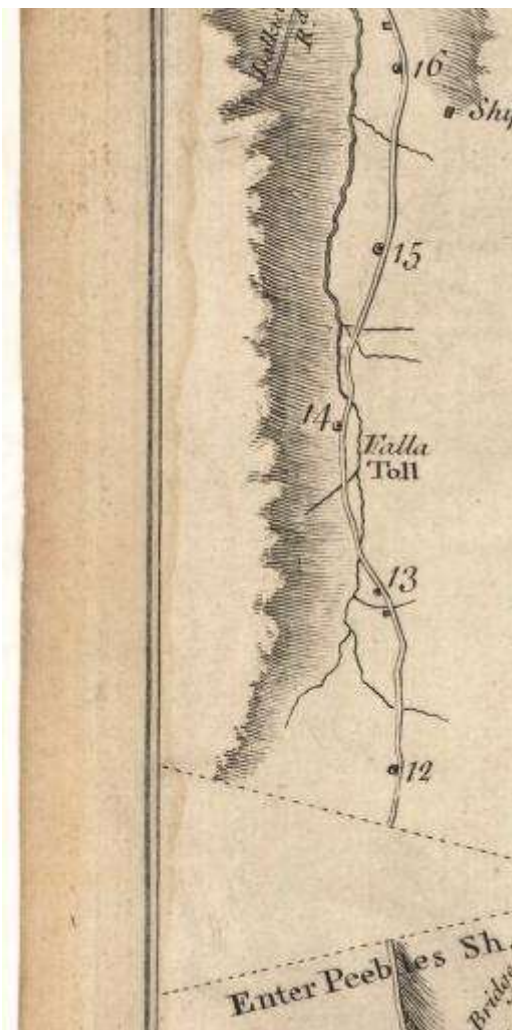


Figure 18 Taylor and Skinner; north is to bottom (NLS)

Another key aspect of the valley floor is the existence of remains of water meadows in the Cringletie section (Fraser, nd.). It has also been suggested to me by Chris Spray that the fields shown east of the river, above Eddlestoun Bridge, on the undated plan NAS RHP140872 might

also be water meadows, supplied by water from the slopes above or that they would be flanked by ditches to channel water from the slopes above, directly into the main stream. Fraser's study of Scots water meadows remains incomplete. Ross produced a summary overview http://www.snh.org.uk/pdfs/publications/commissioned_reports/313.pdf. John Mitchell has published important papers, particularly on the huge water meadow on the Carron Valley, near Fintry, Stirlingshire (Mitchell 1984, 1997, 2002), though knowledge of Scots meadows is sketchy compared with England.

In very general terms, there appear to be three phases, inevitably with regional and local variations. 'Catch-meadows' in which water was encouraged to flow down slopes which were perceived to be too dry with a view to encouraging grass growth and hay production were found in Scotland and elsewhere from medieval times. There is some discussion about when exactly the English 'float meadows' or bed-work was first developed but most writers agree that they were introduced into Scotland in the 1790s and early 1800s, perhaps by the Stephens family. But the system was not seen as widely successful and some of these meadows were abandoned or reverted to other uses. Then, in the 1820s, a new generation of water meadows was created in Scotland, presumably benefitting from the earlier failures. Finally, and not to be further considered here, in the vicinity of Edinburgh and on the Earn below Crieff, meadows benefitted from urban effluents; the Edinburgh meadows originated at least in the early eighteenth century (Smith, 1975; Fraser, 2001).

The real situation was certainly more complex. For example, the Carron Valley meadows, which were established by the 1780s, were clearly float meadows, described as such in the 1790s; the characteristic beds were visible when they were exposed in the 1980s and can be seen on Mitchell's photographs. Ross (2008 8) suggests persuasively that this huge meadow, estimated at over 500 acres, must have been created to cater for the cattle trade. It is, of course, possible that a long-established system was modified at some stage during its history. Fraser gives other pre-1790s examples, some clearly 'catch-work' others uncertain.

Sir Alexander Murray's scheme of 'canals' at Stobo, dating from the 1720s, looks like a variant of such a system, with contouring channels leading to areas which, the projector thought, sometimes suffered from lack of water (NAS RHP1902; Murray, 1740). Fraser notes developments and refinements of the 'indigenous' system in Perthshire with a particular flourish in the 1770s.



Figure 19; detail of lades at Posso, from Murray, 1740 (NLS
<http://brighid.lib.ed.ac.uk:8081/BrowserInsight/BrowserInsight?cmd=start&cid=17&ig=1&ir=20529&id=1543&iwc=1&iwas=2&iwo=true&d=0&ia=1&gw=1&gws=1&ss=0>

Findlater's comments (1802, 170) that watering '*seems to have been pretty much in practice, in the parish of Dolphington*' but had fallen into disuse '*probably from never having been scientifically conducted*' suggests that it had not become widespread in the Tweed area. However, he continues that '*an intelligent farmer in Dunsyre parish*' [Lanarks.] was then in process of forming one whilst Stephens said that Kirkhouse meadow, of nine Scots acres (one Scots acre equalled 1.26 English acres) in the parish of Traquair was the first scientifically formed irrigated water meadow in Scotland (quoted Ross, 2008, 7).

From then on, the new-style 'scientific', 'bed-work' meadows spread rapidly, both nationally and in the Tweed area. Singer in 1807 records 20 examples along the Esk, Ewes, Teviot, Ettrick, and Yarrow rivers plus 37 meadows, totalling 362 acres, laid out by Stevens on the Buccleuch estates more generally between 1797 and 1804, with more being created (quoted Ross, 2008, p. 8).

However, a contributor to the Farmers' Magazine in 1815 claimed that the meadows on the Buccleuch estates had failed by 1805 and been abandoned or converted to arable land. His explanation was that the shortage of fodder they were intended to solve was simultaneously remedied by other means such as sown grass and turnips, so that there was an excess of fodder for which there was no market. The meadows were expensive to create and to manage

and required attention at the wrong time of year; they froze in winter, before the land was properly watered. He thought that English water-meadows used more nutritive water and pointed out that 'catch work' systems were much cheaper and better adapted to the conditions on spate-prone streams in Scotland. As grain prices were high, it was natural for farmers to turn the ground over to arable. Some support for this view is given by a Member of the Eddlestone Farmers' Club who said (in 1804) that in the last year or so, the market was overstocked with hay and farmers needed to consume the excess pasture by bullocks or sheep, rather than to make hay; he also emphasised the increased importance of sown grasses and turnips for fodder in the parish. But he makes no mention of water meadows, either successful or failed, a particularly striking fact as he is likely to have been Gideon Needham, tenant of Darnhallmains (Anon, 1804, p. 13-16).

Local information is sparse through the 1810s and 1820s but there does seem to have been a phase of new meadows created in many parts of Scotland towards the 1830s. As Ross points out, that is too late to attribute to the direct or indirect effects of the French Wars (ended in 1815) and is against a background of declining investment in Scots agriculture from the 1820s onward and to ploughing up former meadows as a response to high grain prices, even in the 1820s (2009,10). One possible and partial explanation, which I have discussed with Iain Fraser, is that in this final phase, the schemes combined features of 'catch meadows' and of 'bed-work'. He certainly sees some physical evidence for that in some cases, though his work is incomplete and it is striking that Findlater (1802, 171) says that in 1797 a float meadow and a catch meadow had been formed on ground at Traquair, seemingly adjacent to each other. Establishing how far the meadows on the Eddleston Water involve elements of both systems would depend on detailed archaeological survey and study of the relationships of the surviving features of the meadows with the river banks and other physical and perhaps scientific evidence.

Discussion, Summary and Conclusions

I have tried to identify major human impacts on the drainage and river systems in the last 400 years but it must be borne in mind that climate change and other natural factors may have impacted on precipitation and temperature and so have influenced human activity. Tipping (2010) aware of the potential for such feedbacks and using scientific methods to examine an entire catchment within the Borders area over a period of 12,000 years, cautions against assuming that human activity was always and necessarily responsible for environmental change, including changes in fluvial activity or expansion of peat cover. But he found that, in

the last c. 200 years, human impacts were, indeed, very significant. At the same time, human activities do not always have the effects desired, sometimes quite the contrary.

It should also be kept in mind that the historical sources available, whilst sufficient to define broad similarities between the various catchments of upper Tweeddale, are not sufficient to distinguish the effects of the varying geography, geology and hydrology of each valley. Some of the factors identified in this report were clearly nationwide but significant variations of timing and intensity are to be expected.

Historians associate work on drainage, river straightening and embankment with a tide of optimism in the later eighteenth and early nineteenth century, stopping when prices were static or fell back in the 1840s (eg Taylor, 1999, 151-4; Wade Martins, 2004, 12). It may be that these schemes were also, in part, a response to a period of increased fluvial activity associated with colder, wetter climate, widely detected across the region in the period c.1660-1770 (Tipping, 2010, 198). The documentary evidence (particularly for earlier periods) cannot resolve such puzzles as whether the flooding and ‘spontaneous’ changes to river channels which the Improvers sought to remedy were of fairly recent origin – or even of ‘natural’ origin. Similarly, records of medieval floods, for example, are records of exceptional events, even those records survive only spasmodically and the gaps and uncertainties mean that little can be said about frequency. We might be on safer ground if there were good records of flood levels but, in most early cases, there are none.

The withdrawal of arable farming from the higher parts of the hills between the seventeenth and early nineteenth century was often quite an extended process, so that even nineteenth century ‘sheep farms’ would have a significant arable component (Dodgshon, 1983, 52). But it is not unreasonable to associate that withdrawal with greater productivity on the lower ground, due to drainage and greater availability of manures. But the withdrawal itself would have impacts, reducing soil movements and soil permeability, whilst the digging of ‘sheep drains’ on the former arable would have further impacts. These were not a series of independent changes.

Whyte (1981) has provided some data on precipitation levels for the Southern Uplands from archival evidence and this might be expanded. Chris Spray has suggested that records of the local presbytery might provide evidence of floods, when ministers were unable to attend meetings. That would be a considerable task and would also be bedevilled by a problem shown by a search of the (now digitised) *Scotsman* newspaper from 1817 to 1900. It revealed flood events on the Eddleston or Tweed in 1839, 1875, 1876, 1881 whilst heavy snow disrupted travel in 1882 and the Tweed and Eddleston water froze in 1895 (*Scotsman*, 21

Sept 1839, p. 4; *ibid*, 9 Oct 1839, p. 3; *ibid*, 3 July 1875, p. 4; *ibid*, 12 Oct 1876, p. 4; *ibid*, 22 Jan 1881, p. 9; *ibid* 11 March 1881, p. 3; *ibid* 9 Dec 1882, p. 7; *ibid*, 18 March 1886, p. 7; *ibid*, 14 Jan 1895, p. 8). But that search did not find the flood of 1832 which brought down Eddleston Bridge with fatal results (*Caledonian Mercury*, 11 Oct 1832; *ibid* 9 Jan 1836). Almost any search for documentary evidence of such spasmodic events is likely to be bedevilled by similar problems, increasing in degree as we go back in time.

It is very unlikely that major new documents for the Eddleston Water will emerge though some might for other rivers in the catchment. This means that comparison across the region is one of the most promising avenues for future research, though perhaps the immediate priority should be to re-examine the Eddleston Water and its associated structures, haughs, meadows etc in light of the new information now provided about chronology. Scientific methods, such as sediment and pollen studies are now able, as Tipping shows, to reveal long-term patterns of change into the remote past.

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[NLS] National Library of Scotland [NLS]

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