

2016-
2021

Harperrig Reservoir
2nd Management Plan



West Lothian
Council



pentland hills
regional park

	CONTENTS	PAGE
1.	Summary	3
2.	Introduction	4
3.	Site Description	4
	3.1 Facts and Figures	6
4.	Statement of Significance	6
	4.1 Key Features	7
	4.1.1 Natural Heritage	7
	4.1.2 Landscape	8
	4.2.3 Social and Economic Context	9
	4.1.4 Recreation and Access	9
	4.1.5 Cultural Heritage	10
5.	Vision Statement	11
6.	Statement of Intent	11
7.	Review of 2009-14 Aims and Objectives	12
8.	2016-2021 Management Plan Aims	19
9.	Work Plan	19
10.	Contacts	23
Map 1	Harperrig Reservoir Location	5
Map 2	Local Nature Reserve Boundary	5
Map 3	SNH 2009 Phase 1 Habitat Map	8
Appendix 1	SNH 2009 Phase 1 Habitat Survey and Target Notes	24



1. Summary

This management plan for Harperrig Reservoir brings together various aspects of the area and it is proposed to promote it as a Local Nature Reserve. This process encourages involvement with land managers, the local community, Pentland Hills Regional Park, associated councils and agencies to determine the future of such sites, their management needs and the resolution of conflict and the creation of a working relationship.

This plan continues to set out the significance of the area for flora and fauna and highlights the key features related to natural heritage, landscape, social and economic factors and cultural heritage, as well as recreation and access. A vision statement is proposed, along with aims and objectives for the reservoir and the surrounding area. A work programme for the period 2016 - 2021 is also included.

2. Introduction

The original management plan dated 2009-2014 was produced in the context of the *Pentland Hills Regional Park Plan (2007-2017)*, *West Lothian Local Plan (2009)* and the *West Lothian Local Biodiversity Action Plan (LBAP) 2005-2009*.

On agreeing this second draft plan, in conjunction with Harperrig Management Group and City of Edinburgh Council, it is proposed that West Lothian Council will proceed to finally designate Harperrig Reservoir as a Local Nature Reserve (LNR).

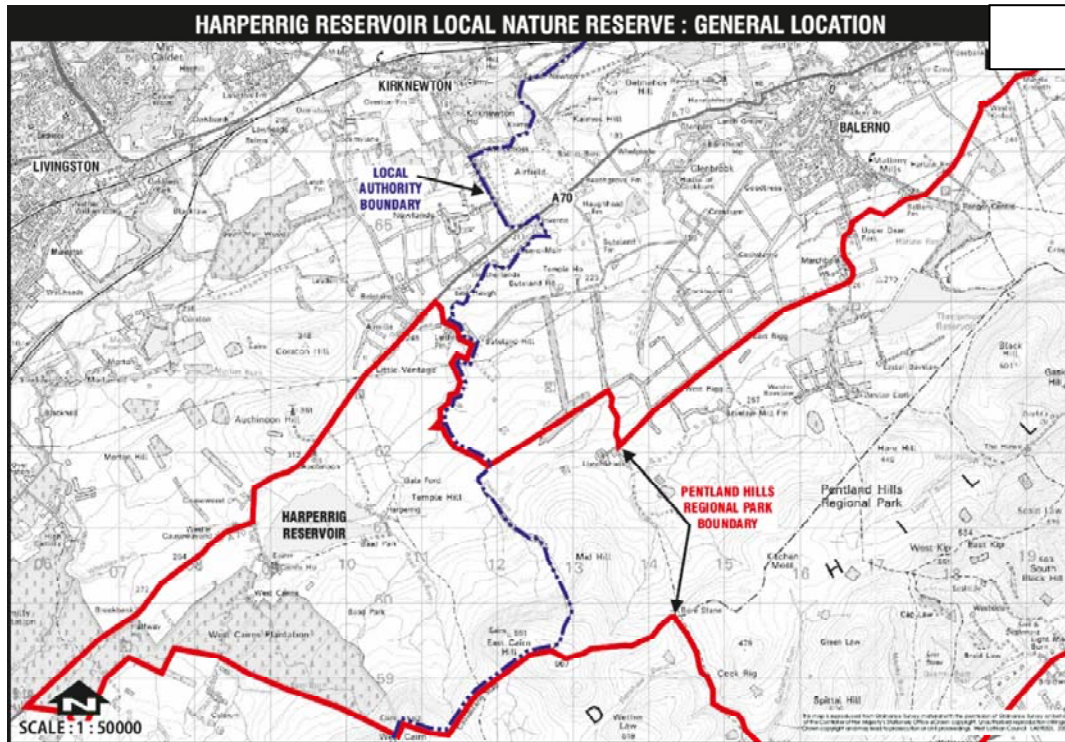
Harperrig Reservoir LNR sits within the boundary of the Pentland Hills Regional Park the aims of which, as set out in its designation order, are:

- To retain the essential character of the hills as a place for the peaceful enjoyment of the countryside;
- Caring for the hills so that the landscape and the habitat is protected and enhanced;
- Within this caring framework to encourage responsible public enjoyment of the hills; and,
- Co-ordination of these aims so that they can co-exist with farming and other land uses within the park.

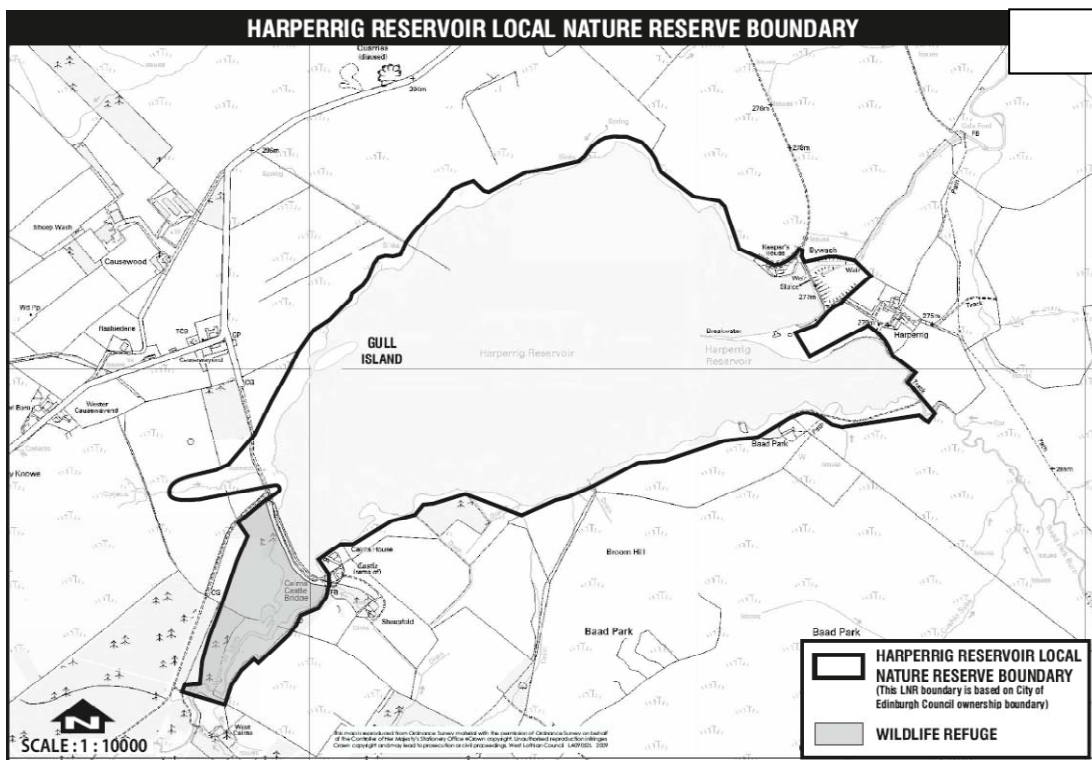


3. Site description

Harperrig Reservoir lies in the centre of a shallow basin on the northwest side of the Pentland Hills approximately 5 miles from Kirknewton and 12 miles from Edinburgh. It is surrounded by the hill farms of Dalmahoy, Baad Park, Cairns and Colzium and West Cairns plantation owned by Forestry Commission Scotland.



Map 1- Location



Map 2 LNR Boundary

Harperrig Reservoir was completed in 1860 as a compensation reservoir to guarantee water to the mills on the Water of Leith. Later it became part of a scheme to supply public drinking water to Edinburgh and served to transfer water from an extensive catchment area on the northern slopes of the Pentland Hills, south west of the city.

The 96 hectare reservoir changed ownership in March 2007 from Scottish Water to City of Edinburgh Council and is managed by their Flood Prevention team, as part of the Water of Leith Flood Prevention Scheme. This change of ownership means that the Harperrig Management Group now has more influence and active involvement in the future management of the area.

Intensively-grazed neutral grassland dominates the vegetation structure around the reservoir, with large areas of marshy grassland. However, immediately to the west of the reservoir is a five hectare wildlife refuge which is roughly triangular in shape and has a south-west to north-east orientation and is largely separated from the main body of Harperrig Reservoir by a stone-built causeway. The refuge is mostly flat with steep banking to the south-east of the Water of Leith and has a range of habitats including marsh and swamp. A Forestry Commission plantation is situated to the area south-west of the river.

When water levels are low, inundation vegetation communities quickly establish within the refuge. A shelterbelt of mature Scots Pine can be found at the northern corner of the refuge, bordered by a recent plantation of mixed mature woodland.

Central Scotland Green Network Trust (CSGNT – previously Central Scotland Forest Trust) has also undertaken 5 phases of amenity woodland planting around the reservoir since 2011. A small timber bird hide was established on the southern shore by Oatridge College students in 2011 with improvements also carried out to the south shore path.

3.1 Fact & Figures:

Harperigg Reservoir is 1mile long and almost ½ a mile wide. It covers an area of 94.4 ha (233 acres) and contains 4091 million litres (900 million gallons) of water while the maximum water depth is 13.3m (43.6 feet). The earth embankment dam at the east end is 150m (492 feet) long and 15.4m (50.5 feet) high, having been raised in height in 1890. The outflow of the reservoir was modified in 2007-8 to as part of the Water of Leith flood prevention scheme.

4. Statement of significance

One of the most significant aspects of this part of the Pentland Hills is its proximity to the urban settlements of West Lothian and particularly Kirknewton and Livingston. Harperrig Reservoir and surrounding area provide a wild, remote and relatively undeveloped area that can be accessed by a variety of user groups.

In particular, Harperrig Reservoir is an important habitat as it supports a variety of plants, such as floating sweet grass (*Glyceria fluitans*) and bog pondweed (*Potamogeton polygonifolius*) with rushes and sedges in the drier areas and animals, such as otters, badgers and wetland birds. With the ownership of the reservoir with City of Edinburgh Council, this area is able to be sympathetically managed to provide the best habitats to a diverse group of species. This management will need to recognise that within this area are also a working

farm and a managed fishery. The recreational and educational usage of this area will also have to be taken into account when planning the management of the site.

4.1 Key features

4.1.1 Natural heritage

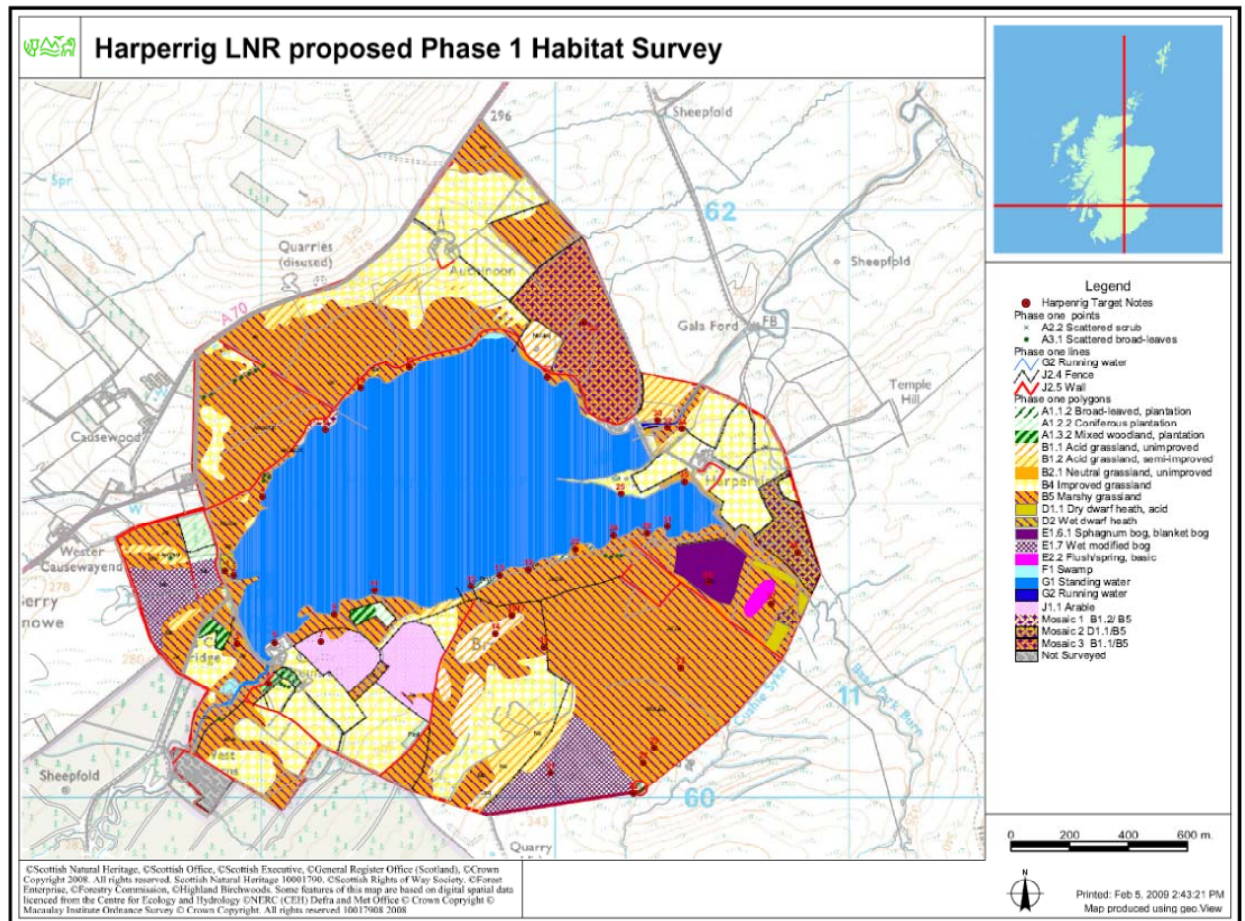
The main areas covered by this Management Plan (see Map 2) are Harperrig Reservoir with its surrounding margins and also the wildlife refuge.

Reservoir The significance of this area is the use of the reservoir margins for over-wintering wildfowl and wading birds. Gull Island (annotated on Map 2) has been re-instated and it provides a predator-free nesting area for gulls and ducks. This freshwater habitat is important as there are few suitable wetland habitats of this type in the Lothians, with this being one of only 4 sites to record the stonefly species *Leuctra nigra*. Other species to note, which have been recorded on site are pink-footed goose, osprey, crossbill, little ringed plover and merlin.



Wildlife Refuge Where the Water of Leith enters the reservoir is an area of marshy grassland vegetation. Within this area otters (*Lutra lutra*) have been recorded, albeit some time ago, and in 1997 an artificial otter holt was built. Otters are classified as a European protected species and given full protection under the Conservation (Natural Habitats etc.) Regulations 1994 and the Conservation (Natural Habitats etc.) Amendment (Scotland) Regulations 2007. In addition, it is a *UK Biodiversity Action Plan Priority Species*, Edinburgh Council LBAP and a *Red Data Listed* protected species, it is important to maintain a suitable habitat for otters. An appropriate management regime, beneficial to supporting otters, will need to be considered and agreed.

General A Phase 1 Habitat Survey was undertaken by Scottish Wildlife Trust (SWT) in September 1991 and a species survey was undertaken in 2006 by JDC Ecology to inform the Flood Prevention Works Programme. A further *Phase 1 Habitat Survey* and species survey was undertaken in 2009, funded by Scottish Natural Heritage (SNH). This provided up to date information about what species are present and what management regimes may need to be adopted.



Map 3- Phase 1 Habitat Map for target notes see appendix 1

4.1.2 Landscape

The reservoir lies within an area that is designated as an “*Area of Great Landscape Value*” in the Calders Area Local Plan (adopted 1994), the West Lothian Local Plan (adopted 2009) and will be replaced by a “*Special Landscape Area*” (SLA) in the new Local Development plan due for adoption in 2017. It is overlooked by the public road from Edinburgh to Lanark (A70). Although outwith the boundaries of this management plan, the vista to the south of the reservoir across the moorland to the steep slopes of East and West Cairn Hills (which form the administrative boundary with Borders Council area) and the Cauldstane Slap, provide a very dramatic open backdrop and character setting for Harperrig Reservoir LNR. This landscape encapsulates the essence of the Pentland Hills landscape of which the aims of the Regional Park seek to maintain.

4.2.3 Social and economic context

Agricultural The area of the wildlife refuge and the fields bounding the reservoir are primarily used for sheep and cattle grazing. The owners of Cairns Farm are part of the Pentland Produce scheme, although the farm shop is in abeyance. The close working relationship with local farmers is crucial in planning and managing not only this area, but the Regional Park as a whole.



Community use The Harperrig Reservoir Management Group has been set up for a number of years and is made up of representatives from the Pentland Hills Regional Park, West Lothian Council, City of Edinburgh Council, local landowners, farmers, anglers and members of the local community. It is vital that the local community continue with their interest in this area and take ownership of this management plan to ensure its successful implementation and to maintain LNR status in the future.

The closest communities to this site are Kirknewton, East Calder, South Livingston and Balerno, the latter within City of Edinburgh Council area.

Fishing There is a fishery on the reservoir managed by Harperrig Fisheries. As the Flood Prevention Scheme has been in place for some time, it is hoped that a more stable water level management regime will be maintained. This will allow a sustainable fishery to continue to re-establish alongside the other aims of this plan.

Shooting The shooting rights to the reservoir are owned by the City of Edinburgh Council and private landowners.

4.1.4 Recreation and access

The *Pentland Hills Visitor Survey 2005-2006*, indicated that the estimated number of visitors to the wider area surrounding Harperrig Reservoir was 23,200. Along the Cairns Castle path there were 6,000 out of a total of 580,000 visitors to the regional park as a whole. Although this is a small percentage (just over 1%), it is also one of the main attractions of this area, making it one of the quieter and wilder areas of the Pentland Hills Regional Park. A recent

visitor survey by Potsdam & Edinburgh Universities in 2014 confirms the same general visitor trends.

To the east the old drove road, 'Cauldstane Slap', is a right of way between West and East Cairn Hills that connects West Lothian south through to West Linton in Scottish Borders. The recent study PHRP Upland Path Audit 2016 carried out by Cairngorms Outdoor Access Trust on behalf of Edinburgh and Lothians Greenspace Trust (ELGT) looked at the issues involved in upgrading a number of key access routes in and around the Pentland Hills Regional Park including the Cauldstane Slap. The report also highlighted priorities and gives indicative costings.

With the guidelines laid out in the *Scottish Outdoor Access Code (2004)* it is important to promote responsible access to this area without detracting from the elements that give it its individual character. No paths in this area were included in the *West Lothian Core Path Plan (adopted 2013)*.

The reservoir has historically been used for sailing and identified as having potential for water-based recreation. Also, access rights for water based activities such as sailing, canoeing and windsurfing apply.

4.1.5 Cultural heritage

Within the local surrounding area there are a number of significant features. There are Scheduled Ancient Monuments on East Cairn and West Cairn Hills which are Bronze Age. The Old School House at Causewayend is a B Listed Building and there are a number of sites listed in the *Royal Commission Inventory*, such as old quarries, sheepfolds and farm buildings.

Cairns Castle stands on an area of raised ground projecting into the reservoir. It is thought to have been built around 1440 by George Crichton, who was later created the Earl of Caithness by James II. It consists of a main almost square tower rising to a height of three storeys, attached to which was a secondary tower to the south-east. The main tower is still a substantial ruin, but most of the smaller tower has gone.

While the reservoir is relatively modern being constructed in the late 19th century, the castle would have originally been afforded protection by the Water of Leith to the west / north and a burn to the south. The Ordnance Survey map of 1854 shows the original meandering course of the Water of Leith through what is now the reservoir.

There are no formal public footpaths around the reservoir, although the old drove road comes close to the east side before continuing between East Cairn and West Cairn Hills towards West Linton in the Scottish Borders. The 52 mile Cross Borders Drove Road has now been recognised as one of Scotland's Great Trails - an elite group of long distance routes in Scotland.

As its name implies the route follows sections of the former drove road between Harperrig, on the A70 (Lang Whang) south-west of Edinburgh, over the Cauldstane Slap, through West Linton to



Peebles and Traquair, and onward via the Yarrow Valley to Hawick. Each drove consisting of anything between 100 and 1,000 head of hardy black cattle and sheep from the Highlands & Islands were driven along this route between the trysts (markets) in Falkirk and Crieff and markets south of the border and London. Development of railways, land enclosure and movement of cattle by steamship meant by 1900, the droving trade had all but disappeared.

5. Vision statement

Our vision is of West Lothian Council and the Pentland Hills Regional Park working closely with landowners and the local community to manage Harperrig Reservoir Local Nature Reserve for the benefit of the local community and visitors, in order to see a greater diversity of plants and animals within this wild and quiet landscape, and to support responsible public enjoyment of the site.

6. Statement of intent

It is proposed to continue to work with local landowners and local residents to ensure that they benefit from local natural resources; to maintain and enhance the landscapes, habitats and species within and surrounding Harperrig Reservoir Local Nature Reserve with a mixture of habitat and species enhancement measures; including allowing natural regeneration of trees and shrubs and also some planting of native species. In addition, public access will be improved with paths and interpretation around the area, as well as encouraging the LNR to be used as an educational resource for schools. Water-based recreation will not be actively promoted, but people exercising their right of responsible access under Part I Land Reform (Scotland) Act 2003, will be encouraged to do so as long as their activities do not disturb wildlife or unreasonably interfere with fishing and other local land management operations.

7. Review of 2009 -14 Management Plan Aims & Objectives

The following highlights the aims and objections of the 2009-2014 Harperrigg Management Plan and provides an update on progress.

Aim 1: To improve the amount of woodland cover around the reservoir on land owned by City of Edinburgh Council.

Objective	Prescription	Lead role	Funding Required	09/10	10/11	11/12	12/13	13/14	Resources	REVIEW COMPLETE
1.1 As part of the Flood Prevention Works it has been agreed that a stock proof fence will be installed encompassing the whole reservoir though not including the wildlife refuge.	1.1.1 Work ongoing on ensuring dykes/fences are stock proof.	CEC	No	*					CEC	YES
	1.1.2 Arrangements to be made for drinking water for stock.	CEC/GH	Possible	*					CEC/SW	Completed by landowner
1.2 It is anticipated that following the installation of the stock proof fencing that some natural regeneration will occur. However CEC will intervene if this regeneration has not happened by 2013.	1.2.1 Baseline survey to be undertaken.	PHRP	Yes – part £2500 (SNH)		*				SNH/PHRP/LWIC/SWT	YES
	1.2.2 Annual walk round survey to be undertaken.	PHRP	No		*	*	*	*	PHRP	Completed
	1.2.3 Fixed point photos to be taken annually.	PHRP	No	*	*	*	*	*	PHRP	Not undertaken decide to monitor tree grow
1.3 To supplement the natural regeneration a programme of planting will be undertaken of trees and shrub.	1.3.1 Areas for planting to be identified.	Mgt Grp	No	*	*				n/a	YES
	1.3.2 Applications for funding to be submitted.	Mgt Grp	No	*					n/a	YES
	1.3.3 Planting to be carried out.	CSFT	Yes		*	*	*	*	Grants - CSFT/ WT/ FCS/SRDP/ LEADER	YES
1.4 To ensure that additional woodland cover fits well with the local landscape character.	1.4.1 Areas of planting to be sensitive to the landscape bearing in mind the need for stock shelter.	SNH/Mgt Grp	No		*				n/a	YES

Aim 2: To improve the amount of woodland cover on areas outwith the reservoir on privately owned land.

Objective	Prescription	Lead role	Funding required	09/10	10/11	11/12	12/13	13/14	Resources	REVIEW - COMPLETE
2.1 It is proposed to consult with local land owners to decide who would be willing to have extra tree cover on their land.	2.1.1 Discuss with local land owners and mark suitable areas on map.	Mgt Grp	No	*					n/a	YES
	2.1.2 Include areas in baseline survey (see 1.2.1 above).	PHRP	Yes – part £2500 (SNH)		*				SNH/PHRP	YES
2.2 Once identified the areas would need to be fenced with stock proof fencing.	2.2.1 Arrange for fencing.	CSFT	Yes		*				Grants - CSFT/ WT/ FES/SRDP/ LEADER	YES
	2.2.2 Supervise fencing contractors.	CSFT /PHRP	No		*				n/a	YES
2.3 A programme of planting will be undertaken of trees and shrubs.	2.3.1 Identify suitable tree species.	SNH / PHRP /CSFT	No	*					n/a	YES
	2.3.2 Planting to be carried out.	CSFT	Yes		*	*	*	*	Grants - CSFT/ WT/ FCS/SRDP/ LEADER	YES
2.4 To ensure that additional woodland cover fits well with the local landscape character.	2.4.1 Areas of planting to be sensitive to the landscape bearing in mind the need for stock shelter.	SNH/ Mgt Grp	No		*				n/a	YES

Aim 3: To protect and enhance habitats and species within the LNR.

Objective	Prescription	Lead role	Funding required	09/10	10/11	11/12	12/13	13/14	Resources	REVIEW - COMPLETE
3.1 To carry out an assessment to identify and locate important and sensitive habitats and species and make recommendations for their protection and enhancement, as well as the potential for habitat creation e.g. a new pond, particularly within the wildlife refuge and with regard to otters, bearing in mind the interests of all user groups.	3.1.1 Consultant to carry out assessment.	PHRP/SNH/Consultant	Yes part £2500 (SNH)		*				SNH/PHRP	YES
3.2 To implement habitat and species protection, enhancement and creation measures agreed by the Harperrig Management Group.	3.2.1 Agree and implement measures.	Mgt Grp/PHRP/SNH/Contractor	Yes/SRDP/LEADER		*	*	*	*	Grants	YES

Aim 4: To improve public access and interpretation around the reservoir and encourage its use as an educational resource.

Objective	Prescription	Lead role	Funding required	09/10	10/11	11/12	12/13	13/14	Resources	REVIEW - COMPLETE
4.1 To carry out an assessment to identify suitable routes for new paths, bearing in mind the interests of all user groups.	4.1.1 Carry out the assessment.	SNH/ Consultants	Yes – part £2500 (SNH)		*				SNH	YES
	4.1.2 Management Group to agree assessment recommendations.	Mgt Grp	No		*				n/a	YES
4.2 To construct the new paths agreed by the Harperrig Management Group.	4.2.1 Construct new paths.	PHRP/ Land owners	Yes - SRDP		*	*	*		Grants - SRDP / SNH / LEADER	YES
	4.2.2 Maintain new paths.	WLC/ PHRP/ Land owners	Yes - SRDP			*	*	*	PHRP	Some maintenance carried out by PHRP
4.3 To carry out an assessment to identify suitable signage and interpretation for the LNR.	4.3.1 Carry out assessment.	SNH/ PHRP/ CEC	Yes part £2500 (SNH)		*				SNH	YES
	4.3.2 Management Group to agree assessment recommendations.	Mgt Grp	No		*				n/a	YES
4.4 To install signage and interpretation agreed by the Harperrig Management Group.	4.4.1 Carry out installation.	Contractor/Land owners	Yes - SRDP / CEC		*				Grants - SRDP / SNH / LEADER	YES – PARTLY Main signage has been installed and interpretation panels at car park and woodpecker Walk. Other suggestions are for Cairns Castle and in bird hide
	4.4.2 Check condition of signage and interpretation.	PHRP	No			*	*	*	n/a	YES
4.5 The local Ranger Service to arrange school visits to the LNR to support the Curriculum for Excellence.	4.5.1 Ranger Service to carry out school visits.	PHRP	No		*	*	*	*	n/a	NO

Objective	Prescription	Lead role	Funding required	09/10	10/11	11/12	12/13	13/14	Resources	REVIEW - COMPLETE
4.6 To assess and construct extra car parking at the West side of the reservoir.	4.6.1 Assess extra car parking space.	Mgt Grp/WLC	No	*					n/a	YES
	4.6.2 Construct car park.	Contractor/Land owner	Yes - SRDP		*				Grants	YES
4.7 To encourage visitors to do so responsibly under Scottish Outdoor Access Code.	4.7.1 Ranger Service to patrol and monitor / advise visitors	PHRP	No	*	*	*	*	*	n/a	YES
	4.7.2 Incorporate SOAC info on site signage	PHRP	No	*	*	*	*	*	n/a	Interpretation panel by car park has information on responsible access, as does signal post in woodpecker walk. Seasonal sign put up at lambing time to encourage dogs to be kept under control.
	4.7.3 Monitor use for water-based recreation and review visitor management arrangement as required	PHRP	No	*	*	*	*	*	n/a	No use of reservoir other than fishing observed by PHRP

Aim 5: To provide suitable habitats for breeding birds and to allow increased usage by over-wintering birds

Objective	Prescription	Lead role	Funding required	09/10	10/11	11/12	12/13	13/14	Resources	REVIEW - COMPLETED
5.1 As part of the current Flood Prevention Works, the area surrounding Gull Island was dredged resulting in the re-creation of this habitat.	5.1.1 Investigate volunteer bird monitoring programmes.	PHRP	No	*					Local residents / volunteers / BTO	YES
	5.1.2 Update signage around Gull Island.	PHRP	Yes - SRDP		*				CEC	Seasonal signage put around the reservoir including close to Gull island at nesting time
	5.1.3 Mgt Grp will keep under review the interaction between water users and Gull Island and conservation interests in relation to shooting rights and consider if there is any impact on breeding birds.		No	*	*	*	*	*	PHRP /SNH / Local residents/ BTO	Bird population monitored by local resident. PHRP monitoring for Avian Flu aspects
5.2 The City of Edinburgh, City Development Department will control the reservoir water level and attempt to maintain a stable level. This will be done within the restrictions of the Flood Prevention Programme, the need to maintain compensation flow in the Water of Leith as well as the need to maintain the reservoir dam and draw-off facilities.	5.2.1 CEC to report back to Man Grp on water levels.	CEC	No	*	*	*	*	*	n/a	YES
	5.2.2 CEC to seek advice of Man Grp with regard to any significant planned change to water levels (within operational limits).	CEC	No	*	*	*	*	*	n/a	Flood team attend meeting and liaise with Mgt Grp

Aim 6: To review and measure the success of the Harperrig Reservoir LNR Management Plan in consultation with the local community.

Objective	Prescription	Lead role	Funding required	09/10	10/11	11/12	12/13	13/14	Resources	REVIEW - COMPLETED
6.1 To consult with the local community (i.e. the Harperrig Management Group and the Community Council) to evaluate the achievement of the aims and objectives of the Harperrig Reservoir LNR Management Plan.	6.1.1 Consult the local community.	WLC / SNH	No			*	*	*	n/a	UNDERWAY
6.2 To review the Harperrig Reservoir LNR Management Plan in year 5 and revisit its aims and objectives.	6.2.1 Review aims and objectives.	Mgt Grp	No					*	n/a	LATE BUT UNDERWAY

8. 2016 – 2021 Management Plan Aims

Following on from the review, management aims for the next five years (2016/21) have been developed;

Aim 1: To improve the amount of woodland cover around the reservoir;

Aim 2: To protect and enhance habitats and species within the LNR;

Aim 3: To provide and enhance habitats for breeding birds and to allow increased usage by over-wintering birds;

Aim 4: To improve interpretation around the site and encourage its use as an educational resource;

Aim 5: To improve public access around the reservoir and deter misuse of the site; and,

Aim 6: To encourage community involvement and participation in the management of the site.

9. Work Plan

The following highlights the aims and objections of the 2016-2021 Harperrigg Management Plan and provides a suggested timetable for works and projects to be undertaken.

Aim 1: To improve the amount of woodland cover around the reservoir

Objective	Prescription	Lead role	Funding required	16/17	17/18	18/19	19/20	20/21	Resources
1. Continue to seek opportunities for native woodland planting on non-CEC owned land	Consult the local landowners	CSGNT/ WLC	Yes	*	*	*	*	*	Grant- Wind Farm Community Development Fund
2. Continue to seek opportunities for native woodland planting on CEC owned land	2.1 Monitor current woodland stock and re-plant failed trees where appropriate and funding availability	PHRP	Yes		*	*	*	*	PHRP
3. Ensure site is protected from stock grazing	3.1 Monitor the boundaries and carry out repairs as required to exclude stock grazing on site	PHRP/ landowners	TBC	*	*	*	*	*	PHRP/ landowners

Aim 2: To protect and enhance habitats and species within the LNR.

Objective	Prescription	Lead role	Funding required	16/17	17/18	18/19	19/20	20/21	Resources
1. Identify species and habitats for protection	1.1 Analyse available data and produce species and habitats list	PHRP	No		*				Students

Objective	Prescription	Lead role	Funding required	16/17	17/18	18/19	19/20	20/21	Resources
	1.2 Encourage species recording through iRecord	PHRP	No	*	*	*	*	*	FoP/TWIC
2. Enhance habitats and species	2.1 Consider species such as sand martin, water vole, otter and kingfisher and habitats such as reed-beds or wet woodland for enhancement	PHRP	Yes	*	*	*	*	*	Grant- Wind Farm Community Development Fund
3. Monitor the water levels for benefit of both fishery and waterfowl	3.1 Liaise with CEC Flood Prevention to monitor the water levels for benefit of both fishery and waterfowl where possible within the restrictions of the Flood Prevention Programme	PHRP / Flood	No	*	*	*	*	*	N/A
4. Prevent disturbance to species and habitats	4.1 Install seasonal signage to ensure responsible use of site by visitors	PHRP	No	*	*	*	*	*	N/A
	4.2 Install interpretation within bird hide to inform public of sensitivities of the site	PHRP	Yes		*				Grant- Wind Farm Community Development Fund
	4.3 Ensure that contractors/ groups working on the site are informed of sensitivities of the site prior to any works	PHRP	No	*	*	*	*	*	N/A
5. Monitor badger population	5.1 Undertake regular checks of known badger setts, liaise with local badger group and report findings	PHRP	No	*	*	*	*	*	N/A

Aim 3: To provide and enhance habitats for breeding birds and to allow increased usage by over-wintering birds

Objective	Prescription	Lead role	Funding required	16/17	17/18	18/19	19/20	20/21	Resources
1. Improve Gull Island for breeding and over-wintering birds	1.1 Survey island and analyse data	PHRP	Yes	*					SNH, TWIC, FoP
	1.2 Seek expert advice for most up to date methods of improving the area	PHRP	No		*				N/A

Objective	Prescription	Lead role	Funding required	16/17	17/18	18/19	19/20	20/21	Resources
	1.3 Consult with fishery / local landowners and implement agreed improvements	PHRP	Yes		*				Grant- Wind Farm Community Development Fund
2. Improve the area for raptors	2.1 Liaise with local raptor group over the installation of habitat boxes	PHRP/ Raptor Group	Yes		*	*			Grant- Wind Farm Community Development Fund
	2.2 Liaise with raptor group over production contingency plan in the event of increased nesting taking place.	PHRP	No		*				N/A
3. Investigate habitat improvements for birds on Red List	3.1 Identify Red List species which are present on site.	PHRP	No	*					N/A
	3.2 Prioritise species for habitat improvement and promote projects to students	PHRP	No		*	*	*	*	N/A

Aim 4: To improve interpretation around the site and encourage its use as an educational resource.

Objective	Prescription	Lead role	Funding required	16/17	17/18	18/19	19/20	20/21	Resources
1. Review Woodpecker walk	1.1 Arrange for area to have trees made safe	Landowner	Yes	*	*				Landowner
2. Improve interpretation at bird hide	1.1 Assess and make improvements on gaining information on visitor numbers	PHRP	Yes	*					Grant- Wind Farm Community Development Fund
	3.3 Consider locating second bird hide near western car park	PHRP/WLC	Yes			*			Grant- Wind Farm Community Development Fund
3. Assess signage	3.1 Produce a list of signs requiring upgrading or replacement	PHRP	No	*					N/A
	3.2 Apply for funding through Wind Farm Development Fund for new signs	WLC	Yes		*	*			Grant- Wind Farm Community Development Fund

Aim 5: To improve public access around the reservoir and deter misuse of the site

Objective	Prescription	Lead role	Funding required	16/17	17/18	18/19	19/20	20/21	Resources
1. Identify usage of the area	1.1 Monitor usage of west car park	PHRP	No	*	*	*	*	*	N/A
	1.2 Consider installing height restriction barrier	PHRP	Yes		*				Grant- Wind Farm Community Development Fund
	1.3 Monitor usage of bird hide	PHRP	No	*	*	*	*	*	N/A
2. Improve access routes	2.1 Consult local landowners on improvement works to drainage and surface of south reservoir path	WLC / PHRP	Yes		*	*	*	*	Grant- Wind Farm Community Development Fund
	2.2 Create a list of priority works, consult local residents and landowners, and apply for funds to the Wind Farm WL Development Trust Fund. Works to include: dyke reinstatement; hedge planting, new path to bird hide, path along north shore, signage, interpretation panels etc	WLC / PHRP	Yes		*	*	*	*	Grant- Wind Farm Community Development Fund

Aim 6: To encourage community involvement and participation in the management of the site

Objective	Prescription	Lead role	Funding required	16/17	17/18	18/19	19/20	20/21	Resources
1. Encourage participation in the management of the site	1.1 Review membership of Mgt Group and contact surrounding landowners/ tenants and groups with an interest in the site	PHRP	No	*					
	1.2 Promote the site as a location for corporate volunteering for practical tasks	PHRP	No	*	*	*	*	*	
	1.3 Liaise with local wildlife group on recording of species and sharing of records	PHRP	No	*	*	*	*	*	TWIC

Objective	Prescription	Lead role	Funding required	16/17	17/18	18/19	19/20	20/21	Resources
	1.4 Direct Volunteer Rangers to patrol the area on a regular basis	PHRP	No	*	*	*	*	*	

10. Contacts

Victor Partridge
 Natural Heritage Officer
 Pentland Hills Regional Park HQ
 Hermitage of Braid House
 Edinburgh
 EH10 6JF

Tel: 0131 529 2403

Email: Victor.partridge@edinburgh.gov.uk

Chris Alcorn
 Planning, Economic Development & Regeneration
 Services
 West Lothian Council
 Civic Centre
 Howden South

Livingston

EH54 6FF

Tel: 01506 282428

Email: chris.alcorn@westlothian.gov.uk

HARPERRIG RESERVOIR

PHASE 1 VEGETATION SURVEY

Melanie Findlay

Border Ecology

September 2009

1. Introduction	26
2. Survey Methodology.....	26
<i>2.1 Survey limitations</i>	<i>26</i>
3. Site overview.....	26
4. Bryophytes of drawdown zone.....	27
5. Factors influencing tree planting proposal.....	27
6. Vegetation descriptions.....	28
7. Target Notes.....	30

1. Introduction

The following Phase 1 survey was undertaken to contribute to the process of Local Nature Reserve designation at Harperrig Reservoir and to inform a developing tree planting proposal.

2. Survey Methodology

The vegetation was surveyed following standard protocol¹.

The habitats within the site and surrounds were mapped according to Phase 1 method and small areas of interest and general descriptions of features were made using target notes. The survey was undertaken on the 6th, 21st and 24th August 2009. Higher plant nomenclature follows that of Stace (1991) *New Flora of the British Isles*. Cambridge University Press Bryophyte nomenclature follows that of the British Bryological Society, National Census 1998.

2.1 Survey limitations

The time of year the survey was undertaken was within the optimum season for unenclosed, upland fringe habitats. Survey conditions were variable, with spells of rain, but all terrestrial areas were accessible giving good coverage. The loch margins could not be seen to any great degree as at each visit; the water level was high covering most of the regularly inundated areas. The grounds of West cairns Farm were not surveyed due to earthworks present.

3. Site overview

The survey area includes Harperrig Reservoir and its surrounds which comprises enclosed farmland and unenclosed land to the south. The reservoir margins are sparsely vegetated without substantial emergent vegetation; the shore line is mostly silt and stones with rock reinforcement in the east. The shoreline supports communities of low growing annuals with occasional stands of sparse bottle sedge (*Carex rostrata*) and common spike rush (*Eleocharis palustris*). The shoreline is of most interest where it receives water seepage from adjacent marshy grassland. The shoreline is virtually all backed by marshy grassland in various guises, but which is usually dominated by the bulky soft rush (*Juncus effusus*) or sharp flowered rush (*Juncus acutiflorus*). These areas did not appear to be particularly rich. Occasionally acid or neutral flushing can be found and even more rarely a hint of base enrichment with species such as yellow sedge (*Carex flava* spp. *brachyrrhyncha*) or marsh arrow grass (*Triglochin palustris*). The enclosed fields are either improved, or a rough semi improved acid grassland with large stands of marshy grassland. Blanket bog is present in small areas, to the east of Baad Park, the stand is in reasonable condition despite its small size, but the stands to the south of the reservoir and to the west of the fisherman's parking area are quite modified. No semi natural woodland exists within the study area, but small plantations are dotted about. Equally, scattered trees are rare, with some self set ash and sycamore growing in the rocky bank armour in the east, and a couple of areas of planted willows which would appear to be osier (*Salix viminalis*). Tree seedlings such as pine and larch are occasionally present on the shore, but are likely not to survive.

¹ JNCC, (2007), Handbook for Phase 1 habitat survey - a technique for environmental audit, Revised reprint 2003, reprinted 2007

Signs of historical agriculture are common over the site, from old earth banks (possibly old enclosure boundaries) to ridge and furrow. The latter can readily be picked out in the fields to the south of Auchinoon, where the rushes grow in the lines along the furrows and also on Broom Hill. The changing land use and its impact on the landscape could be an interesting theme in any interpretation material produced.

Fauna recorded includes snipe, oystercatcher and lapwing and also several spraint sites which indicate sporadic otter activity as there was variation in the ages of spraint found.

4. Bryophytes of drawdown zone

It was not possible to locate the two rare mosses *Aphanorhegma patens* and *Physcomitrium sphaericum* as water levels were too high. It was noted however, that the site where they have been recorded before (in front of the castle) was the only place on the shoreline likely to receive some shade from trees and this may be a contributing factor to its distribution as well as water levels and substrate.

5. Factors influencing tree planting proposal

Map 2 illustrates the most sensitive areas found. These are listed here:

Given that no areas were particularly botanically outstanding around the shoreline itself, the general principle should be to avoid excessive shading of areas with shallow shelves and a potentially wide draw down zone. The botany of these draw down areas will develop according to how the water levels are managed. A more stable water level over shallow margins will facilitate beds of emergent vegetation, but there will be a loss of the annual and bryophyte communities that rely on a fluctuating water level and reduced competition. The low nutrient status of the reservoir and the general lack of organic matter around the water's edge will not lead to luscious margins of reeds and reed mace, but over time species such as bottle sedge (*Carex rostrata*) and water horsetail (*Equisetum fluviatile*) would gain more coverage.

Assessing the quality of the water margins in the field was rather difficult due to high water levels at the time of survey. Some areas which were considered suitable for planting have been highlighted. It would be beneficial to create some reasonable pockets of broad leaf woodland, but to maximise their biodiversity gain these should be planted with species which would naturally be found in such situations such as *Salix cinerea*, *Salix pentandra*, *Salix caprea*, *Betula pendula*, *Betula pubescens* and *Sorbus aucuparia* with the intention of planting low growing thickets to complement the local ecology as opposed to high canopy shelterbelts. Areas suitable for such woodlands have been

identified separately on Map 2 from areas that are slightly drier and could be planted with a more general riparian mix based on alder (*Alnus glutinosus*).

It is not recommended that planting occurs in the nature area to the west. The hydrology of this area has changed dramatically, with a general drying out as a result of the channel being modified and any planting would exacerbate this.

Out with the immediate reservoir shore area, there is plenty of scope for tree planting. The marshy grassland offers good potential for creating riparian woodland of willows, alder and birch. Even the wettest of these areas should not be discounted for planting a suitable mix to create wet and flushed willow woodland. Groups of small ponds could also be considered within these areas, or in the open, where emergent vegetation would grow in the comparatively sheltered and stable conditions. Wader scrapes are another habitat which could be created to compliment the reservoir.

It should be noted that Map 2 is not an exhaustive inventory of areas that could be planted as there are many considerations on land use at this site which will influence any forestry plan.

6. Vegetation descriptions

Descriptions follow for the most significant habitats and communities in terms of their biodiversity interest, or their coverage of the site.

Grassland

Unimproved acid grassland

Small stands of unimproved acid grassland are scattered over the site which vary in their character. Flatter, and more poorly drained stands are dominated by hard grass (*Nardus stricta*), often accompanied by heath rush (*Juncus squarrosus*). The better areas are on the more freely draining soils such as on Broom Hill and the embankment to the east of the reservoir and the north of the river. This latter stand is particularly species rich, facing directly south. In all these drier stands species such as Ladies bedstraw (*Galium verum*), wild thyme (*Thymus polytrichus*), bird's foot trefoil (*Lotus corniculatus*) and bitter vetchling (*Lathyrus montanus*) crop up regularly.

Unimproved Neutral Grassland

These stands are situated on the margins of the loch in the east, where they are dominated by tufted hair grass (*Deschampsia cespitosa*) due to the proximity of the reservoir.

Marshy Grassland

Marshy grassland is by far the commonest habitat in the survey area. Generally it is dominated by soft rush (*Juncus effusus*) with patches of sharp flowered rush (*Juncus acutiflorus*) in the wetter

areas, occasionally with a localised carpet of Sphagnum where it is an acid flush. Neutral flushing occurs regularly within the marshy grassland with the inclusion of small sedges, particularly yellow sedge (*Carex flava ssp. oedocarpa*) and common sedge (*Carex nigra*) and occasionally *Philonotis fontana*. The poorest stands can be picked out by the accompanying tufted hair grass (*Deschampsia cespitosa*), and these are quite rank and coarse. On peatier soils, purple moor grass (*Molinia caerulea*) is frequent, especially where the marshy grassland is neighbour to heath or bog vegetation.

Dry dwarf shrub heath

The heathland in the east of the survey area is a peculiar mix of species and doesn't fit well with a standard dry heath given the large amount of sedges (*Carex nigra* and *Carex pulicaris*) growing with the heather. However, the frequency of cross leaved heath is low and these areas are dominated by heather (*Calluna vulgaris*). Ultimately, the dry heath here could feasibly also be mapped as wet heath!

Blanket bog

One small stand exists in the survey area of blanket bog, see TN 36.

Base rich flush

Base rich flushing is generally quite rare on the site. Some sizable stands exist in the east (TN37) within the marshy grassland, and the odd calcicole such as yellow sedge (*Carex flava ssp. brachyrrhyncha*) and marsh arrow grass (*Triglochin palustris*) crops up in the stony flushes around the loch margin.

Inundation Vegetation

A narrow strip of stony, silty or occasionally peaty substrate lies at the water's edge and is seasonally inundated, virtually surrounds the reservoir. This thin strip supports a community of annual and small perennial species such as corn spurrey (*Spergula arvensis*), autumnal hawkbit (*Leontodon autumnalis*), bulbous rush (*Juncus bulbosus*), procumbent pearlwort (*Sagina procumbens*) and lesser spearwort (*Ranunculus flammula*). The species composition is generally quite uniform, with occasional additions such as water purslane (*Peplis portula*), shoreweed (*Littorella uniflora*) marsh arrow grass (*Triglochin palustris*) and bristle club rush (*Isolepis setacea*). Bottle sedge (*Carex rostrata*) and common spike rush (*Eleocharis palustris*) also grow here, but are quite patchy.

7. Target Notes

Map Ref	OS Grid Ref (NT)	Target Note
1	08878 60771	Small area of purple moor grass struggling to be wet heath with deer sedge (<i>Trichopherum cespitosum</i>) and occasional cross leaved heath (<i>Erica tetralix</i>) as well as a few sprigs of bilberry (<i>Vaccinium myrtillus</i>) and heather (<i>Calluna vulgaris</i>). Peaty. Downslope from an area of modified bog.
2	08908 60756	Small area of marsh arrow grass (<i>Triglochin palustre</i>) by water's edge
3	08920 60524	Nature area, marshy grassland by the plantation that sits to the north. Low sward of velvet bent (<i>Agrostis canina</i>), common sedge (<i>Carex nigra</i>) with silver weed (<i>Potentilla anserina</i>), lesser spearwort (<i>Ranunculus flammula</i>), marsh violet (<i>Viola palustris</i>), cuckoo flower (<i>Cardamine pratensis</i>), white clover (<i>Trifolium repens</i>), Yorkshire fog (<i>Holcus lanatus</i>), marsh bedstraw (<i>Galium palustre</i>), jointed rush (<i>Juncus articulatus</i>), oval sedge (<i>Carex ovalis</i>) and Calliergonella cuspidatum. The margins along the water include bottle sedge (<i>Carex rostrata</i>), common spike rush (<i>Eleocharis palustris</i>), marsh marigold (<i>Caltha palustris</i>), creeping forget me knot (<i>Myosotis secunda</i>), water horsetail (<i>Equisetum fluviatile</i>), water mint (<i>Mentha aquatica</i>), flote grass (<i>Glyceria fluitans</i>) and areas of rushes.
4	09008 61023	Small inundated peaty margin with procumbent pearlwort (<i>Sagina procumbens</i>), bulbous rush (<i>Juncus bulbosus</i>), water purslane (<i>Peplis portula</i>) and water pepper (<i>Polygonum hydropiper</i>). This is bordered by a stand of bottle sedge (<i>Carex rostrata</i>) with yellow sedge (<i>Carex viridula ssp. oedocarpa</i>), water horsetail (<i>Equisetum fluviatile</i>) and common spike rush (<i>Eleocharis palustris</i>)
5	09027 60388	Mixed plantation with about 70% sycamore to 30% Scot's pine.
6	09049 60529	Otter spraint
7	09207 60530	Shallow, bare and stony shore. Shoreweed (<i>Littorella uniflora</i>) growing submerged with a few bits of creeping bent (<i>Agrostis stolonifera</i>) along the water's edge.

Map Ref	OS Grid Ref (NT)	Target Note
8	09220 61253	Approx. 40 lapwing feeding along loch margin.
9	09251 60626	Flushed shoreline on stones and silt. Stands of bottle sedge (<i>Carex rostrata</i>), and common spike rush (<i>Eleocharis palustris</i>) dominate in patches with lesser water spearwort (<i>Ranunculus flammula</i>), marsh willow herb (<i>Epilobium palustre</i>), marsh bedstraw (<i>Galium palustre</i>), jointed rush (<i>Juncus articulatus</i>), cuckooflower (<i>Cardamine pratensis</i>), water horsetail (<i>Equisetum fluviatile</i>), yellow sedge (<i>Carex viridula ssp. oedocarpa</i>), water mint (<i>Mentha aquatica</i>) and creeping forget me knot (<i>Myosotis secunda</i>).
10	09339 61396	3 oystercatchers
11	09387 60705	Otter spraint and run
12	09505 61465	The marshy grassland drains down over the shore line which is flushed and stony. Yellow sedge (<i>Carex viridula ssp. oedocarpa</i>), common sedge (<i>Carex nigra</i>), jointed rush (<i>Juncus articulatus</i>), autumn hawkbit (<i>Leontodon autumnalis</i>), bristle club rush (<i>Isolepis setacea</i>) and the bryophytes Bryum pseudotriquetrum Philonotis fontana and Calliergonella cuspidata.
13	09716 60717	Otter spraint
14	09798 60558	Warm, south facing slope with grassland. Sweet vernal grass (<i>Anthoxanthum odoratum</i>), sheep's fescue (<i>Festuca ovalis</i>), red fescue (<i>Festuca rubra</i>), tufts of hard grass (<i>Nardus stricta</i>) and common bent (<i>Agrostis capillaris</i>). Also tormentil (<i>Potentilla erecta</i>), eyebright (<i>Euphrasia agg.</i>) and occasional patches of wild thyme (<i>Thymus polytrichus</i>), Ladies bedstraw (<i>Galium verum</i>), bird's foot trefoil (<i>Lotus uliginosus</i>), harebell (<i>Campanula rotundifolia</i>) and wild pansy (<i>Viola tricolor</i>).
15	09812 60756	Water purslane (<i>Peplis portula</i>) on shoreline
16	09854	Acid flush, soft rush (<i>Juncus effusus</i>) and Sphagnum

Map Ref	OS Grid Ref (NT)	Target Note
	60621	
17	09854 60621	Ringlet butterfly
18	09911 60776	Some flushing from marshy grassland draining over shore line. Neutral.
19	09964 60513	Acid flush by fence. Sharp flowered rush (<i>Juncus acutiflorus</i>) dominates over a high cover of <i>Sphagnum palustre</i> with a scattering of marsh violet (<i>Viola palustris</i>), marsh willow herb (<i>Epilobium palustre</i>), Yorkshire fog (<i>Holcus lanatus</i>), tormentil (<i>Potentilla erecta</i>), sorrel (<i>Rumex acetosa</i>), common sedge (<i>Carex nigra</i>) and <i>Polytrichum commune</i> .
20	09975 61433	This shore is down wind and downstream and so has high energy in water and therefore no aquatics seen. Shore is reinforced with boulders, so no shoreline vegetation.
21	09987 60086	Flat area of modified bog which has been heavily grazed so that there is a proliferation of heath rush (<i>Juncus squarrosus</i>) and the hare's foot cotton grass (<i>Eriophorum vaginatum</i>) has very few flower heads. Purple moor grass (<i>Molinia caerulea</i>) is frequent also sweet vernal grass (<i>Anthoxanthum odoratum</i>) F, bilberry (<i>Vaccinium myrtillus</i>) F, tormentil (<i>Potentilla erecta</i>) O, heather (<i>Calluna vulgaris</i>) R, wavy hair grass (<i>Deschampsia flexuosa</i>) F and cover of bryophytes from <i>Polytrichum commune</i> A, <i>Sphagnum capillifolium</i> O, <i>S. recurvum</i> F. Moor drains are frequent but not particularly active.
22	10070 60846	Dry mound of grassland. Sward of common bent (<i>Agrostis capillaris</i>), sweet vernal grass (<i>Anthoxanthum odoratum</i>), red fescue (<i>Festuca rubra</i>) with harebell (<i>Campanula rotundifolia</i>) F, pignut (<i>Conopodium majus</i>) O, Eyebright (<i>Euphrasia agg.</i>) O, white clover (<i>Trifolium repens</i>) O, yarrow (<i>Achillea millefolium</i>) O, tormentil (<i>Potentilla erecta</i>) O, sorrel (<i>Rumex acetosa</i>) O, <i>Rhytidadelphus squarrosus</i> A, bird's foot trefoil (<i>Lotus corniculatus</i>) O, wild pansy (<i>Viola tricolor</i>) R.
23	10100 61620	Cattle grazed and poached field. Areas of hard grass (<i>Nardus stricta</i>) and heath rush (<i>Juncus squarrosus</i>) with drier areas losing the latter species. Areas of rush dominated marshy grassland with acid flush within this. Improvement in this field is in patches where there has been preferential grazing which has lead to a brighter sward. Mosaic being approximately half

Map Ref	OS Grid Ref (NT)	Target Note
		marshy grassland to half semi improved grassland.
24	10201 60890	Otter spraint
25	10224 61034	Occasional self set sycamore and ash in rocky bank reinforcement
26	10266 60015	Sheep enclosure. Wall is defunct and the ground has been grazed by sheep to a species poor sward. Scot's pine and a couple of whitebeam (planted origin).
27	10302 60117	Faint outline just discernible of old peat cutting
28	10314 60898	Spraint on boulder
29	10337 60170	Large scoured out section of drain illustrating a peat depth of just under 0.5m.
30	10350 61285	Steep species-rich south facing bank with acid grassland. <i>Pimpinella saxifraga</i> , red fescue (<i>Festuca rubra</i>), tormentil (<i>Potentilla erecta</i>), zig zag clover (<i>Trifolium medium</i>), bitter vetch (<i>Lathyrus montanus</i>), ribwort plantain (<i>Plantago lanceolata</i>), birds foot trefoil (<i>Lotus corniculatus</i>), Ladies bedstraw (<i>Galium verum</i>), heath bedstraw (<i>Galium saxatile</i>) and harebell (<i>Campanula rotundifolia</i>).
31	10382 60922	Quite a nice section of shoreline with common spike rush (<i>Eleocharis palustris</i>) and bottle sedge (<i>Carex rostrata</i>) forming a grassy sward above the drawdown zone. Also: selfheal (<i>Prunella vulgaris</i>), silverweed (<i>Potentilla anserina</i>), yarrow (<i>Achillea millefolium</i>), greater bird's foot trefoil (<i>Lotus uliginosus</i>), bristle club rush (<i>Isolepis setacea</i>), bulbous rush (<i>Juncus bulbosus</i>), marsh arrow grass (<i>Triglochin palustris</i>), lesser spearwort (<i>Ranunculus flammula</i>).
32	10383 61258	Two otter sign heaps (scraped up vegetation topped with spraint) on concrete arm in river. Several other spraint.

Map Ref	OS Grid Ref (NT)	Target Note
33	10427 60441	Large expanse of marshy grassland, not particularly interesting. Dominated by patches of soft rush (<i>Juncus effusus</i>) and sharp flowered rush (<i>J. articulatus</i>) with Yorkshire fog (<i>Holcus lanatus</i>) and purple moor grass (<i>Molinia caerulea</i>) running through. Also marsh thistle (<i>Cirsium palustre</i>), meadow buttercup (<i>Ranunculus acris</i>) F, white clover (<i>Trifolium repens</i>) O, sweet vernal grass (<i>Anthoxanthum odoratum</i>) O, carnation sedge (<i>Carex panicea</i>) R, oval sedge (<i>Carex ovalis</i>) R, hard grass (<i>Nardus stricta</i>) R, tufted hair grass (<i>Deschampsia cespitosa</i>) R <i>Rhytidiadelphus squarrosus</i> A and <i>Sphagnum palustre</i> R. There are some poached ditches with bits of brooklime (<i>Veronica beccabunga</i>) coming in but are generally quite dry.
34	10432 61254	Small stand large sedge, gone over. Possibly lesser pond sedge (<i>Carex acutiformes</i>)
35	10441 61074	Three snipe at water's edge
36	10521 60733	Blanket bog. Cover of heather and cross leaved heath (<i>Erica tetralix</i>) with tussocks of hare's tail cotton grass (<i>Eriophorum vaginatum</i>) and purple moor grass (<i>Molinia caerulea</i>) in patches. Also deer sedge (<i>Trichopherum cespitosum</i>), <i>Empetrum nigrum</i> , heath rush (<i>Juncus squarrosus</i>), <i>Sphagnum papillosum</i> , <i>S. capillifolium</i> , <i>S. subnitens</i> , <i>Pleurozium schreberi</i> . The mire is modified to a degree as the Sphagnum layer is not constant throughout.
37	10737 60660	Quite a sizeable area of base-rich flush here and smaller areas elsewhere within this area of marshy grassland. The rushes are replaced in these stands with a grassy-looking sward of flea sedge (<i>Carex pulicaris</i>), star sedge (<i>Carex echinata</i>) and common sedge (<i>Carex nigra</i>). Also found: quaking grass (<i>Briza media</i>), crested dog's tail (<i>Cynosurus cristatus</i>), sneezewort (<i>Achillea ptarmica</i>), and devil's bit scabious (<i>Succisa pratensis</i>), yellow sedge (<i>Carex flava</i> ssp. <i>brachyrrhyncha</i>), patches of <i>Palustriella commutatum</i> and <i>Climacium dendroides</i> .
38	10826 60835	Mosaic of soft rush (<i>Juncus effusus</i>) dominated marshy grassland and dry heath with an occasional acid flush especially in ditches. The dry heath is a mix of heather (<i>Calluna vulgaris</i>) and hard grass (<i>Nardus stricta</i>) with some purple moor grass (<i>Molinia caerulea</i>) coming in near burns and ditches. In wetter areas, the heath comes close to wet heath with sprigs of cross leaved heath (<i>Erica tetralix</i>) and stands of heath rush (<i>Juncus squarrosus</i>) and common sedge (<i>Carex nigra</i>).

