



**MANAGEMENT PLAN FOR LANDS
OWNED BY GLENBOWER WOOD & LAKE
LTD.: 2006-2010**



GLENBOWER

WOOD & LAKE LTD.

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SUMMARY

Glenbower Wood is located near the village of Killeagh in east Cork. Glenbower Wood & Lake Ltd. own 12.5 ha of land within the wood (the Glenbower Lake site). The objective of Glenbower Wood & Lake Ltd. is to manage this land as a recreational amenity for the people of Killeagh, and for the use and enjoyment of the general public. The coniferous timber within this land is owned by Coillte and is managed for commercial timber production.

The Glenbower Lake site includes the site of the former lake and a section of the Dissour River. The remainder of the site is occupied by broad-leaved and coniferous woodland. A metalled road and car park provide access to the site, and a network of footpaths, footbridges, shelters, etc. provide facilities for passive recreation.

The Glenbower Lake site has a number of important nature conservation features including: eroding/upland river habitat in the Dissour River, oak-birch-holly and wet pedunculate oak-ash woodland habitats, a population of Bird's-nest Orchid (a rare plant), the salmon population in the Dissour River, feeding habitat for Barn Owls, and the Otter population along the Dissour River.

Important amenity and economic features in the Glenbower Lake site include its potential for educational use, its use for passive recreation (walking, picnicking, etc.), its use for community activities and events, the economic value of the commercial timber crops, and the economic value of angling industry supported by the Dissour River.

An important potential feature of the site is the opportunity to restore Glenbower Lake. The lake is regarded as a key feature of the site by the local community and its restoration would significantly increase the amenity value of the site and provide a resource for angling

This management plan contains twelve action plans to maintain and enhance the important features of the site. These include the following actions focused on amenity use:

- Restoration of the lake.
- Improvement of facilities for passive recreation.
- Improvement of interpretation facilities.
- Promotion of the site as a destination for passive recreation.
- Development of a pitch and putt course.

Action plans are also included to manage the important habitats and species in the site, to collect further information about the flora and fauna of the site, and to manage the economic resources (forestry and fisheries) of the site.

PREAMBLE

I was commissioned by Glenbower Wood & Lake Ltd. to prepare a management plan for the land that they own in Glenbower Wood. The brief for this project was to prepare the management plan using the methodology developed by the Countryside Council for Wales (1996: *A Guide to the Production of Management Plans for Nature Reserves and Protected Areas*). Because this methodology was developed for sites where nature conservation is the overriding objective, and this is not the case in Glenbower Wood, I have adapted this methodology slightly.

The area owned by Glenbower Wood & Lake Ltd. is only a section of the overall area of Glenbower Wood. To avoid confusion, in this report I refer to the area owned by Glenbower Wood & Lake Ltd. as the *Glenbower Lake site* and to the overall forested area as *Glenbower Wood*.

This management plan covers a five year period from 2006-2010. This is standard practice for management plans, and allows realistic objectives and targets to be set. A full review of the management plan should be carried out after five years. The purpose of the review should be to determine the extent to which the objectives set in the management plan have been achieved. The outcome of this review should be used to produce a revised management plan for the next five years.

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Much useful information has been derived from the website of Glenbower Wood & Lake Ltd., and I am grateful to the members of their committee for much useful information and comments: Michael Connor, Nuala Connor, Anne Fitzgerald, Michael Lee, David Neal, Kathleen Rohan (Secretary) and Tom Vaughan (Treasurer). I am also grateful to the following for providing information: Alan Cullagh (Southern Regional Fisheries Board), Conor Kelleher (Cork County Bat Group), Christopher Kenyon (Assistant Planner, Cork County Council), Brian Mahoney (Inspector, Forest Service), David Neal (Glenbower Wood & Lake Ltd.), Tony O'Mahony (Botanical Society of the British Isles Vice-County Recorder for East Cork), Pat Roche (Coillte), Pat Smiddy (Conservation Ranger, National Parks and Wildlife Service).

1. POLICY STATEMENT

1.1. LANDOWNERS

1.1.1. Glenbower Wood & Lake Ltd.

The objective of the Glenbower Wood & Lake Co., is to maintain & develop the part of Glenbower Wood that they own, for the betterment and benefit of the shareholders (i.e. the population of Killeagh and the surrounding areas) as an recreational amenity, it is also for the use and enjoyment of the general public.

Two major aspirations are dominant;

1. The restoration of a major water feature, being a lake and the improvement of the Dissour River.
2. The restoration of the native broadleaf stands of trees.

1.1.2. Coillte

Coillte did not provide any specific policy statement for the purposes of this management plan. The main interest of Coillte in the Glenbower Lake site is timber production (see Sections 2.1.3 and 2.4.4). Coillte's overall policy in relation to timber production is set out on their website (http://www.coillte.ie/managing_our_forests/policies_plans/timber.htm):

Timber has always been vital to the life of man as a source of shelter, energy and transportation. Coillte has some of the most productive forests in Europe, which enables us to provide an increasing supply of timber on a sustainable basis.

Coillte's policy is to harvest the optimum, sustainable yield of timber from its forests having regard to the protection of other forest values and to the requirements of its customers. Forest management is a complex business and a wide range of factors must be taken into account in arriving at decisions about which forests should be harvested, when and by what method. Coillte uses sophisticated forest management models to predict growth rates and forecast the volume of timber, which will be contained in the forest in the future. The principal requirement in regard to the sustainability of the timber resource is to ensure that, on average, the volume of timber harvested in any one year does not exceed the amount by which the volume of timber in the forest increases in one year. Having calculated what the total allowable cut should be the further challenge then is to identify those forests which have reached their optimum production potential, assess and mitigate the environmental impact of harvesting them, establish that there is a market for the timber to be harvested and that the price currently available in the market provides a return which will cover the cost of growing and harvesting the timber. Only then can the decision to proceed with harvesting be taken. All forest harvesting requires a felling licence from the Forest Service of the Department of the Marine and Natural Resources.

The focus is on optimising rather than maximising production. A focus on optimisation enables us to ensure that all of the other factors are taken into account when arriving at timber production decisions and that timber production policy takes account not only of economic but also social and environmental considerations.

1.2. OTHER STAKEHOLDERS

1.2.1. Cork County Council

The *Cork County Development Plan 2003* (Cork County Council, 2003) includes the following relevant objectives:

- To identify areas that may be suitable for the NeighborWood Scheme and use this scheme as a means of achieving amenity objectives in association with local community groups and organisations (ECO 5-8).
- To promote the Native Woodland Scheme (ECO 5-8).
- To work with landowners, Dúchas and other stakeholders to contribute to the effective management of sites of natural conservation value (ENV 2-11).
- For passive open spaces, to promote woodland or other open uses appropriate to the setting; and to generally maintain passive open spaces in that use and only allow other development where it is complementary to the open space function and/or any specific zoning objective for those lands.

The Killeagh section of the *Middleton Electoral Area Local Area Plan: Public Consultation Draft* (Cork County Council, 2005) includes the following relevant objectives:

- To protect the special character and amenity value of Glenbower Wood (O-01).
- Maintain amenity walk through Glenbower Wood (U-01).

1.2.2. Forest Service

The Forest Service's main aims in relation to Glenbower Wood are that it is managed in accordance with best forest practice. Due to the high recreational use and potential of the wood it would be an ideal candidate for the NeighbourWood scheme. This would provide funding to develop the signage and paths in the wood and also to carry out forestry works to enhance the recreational potential of the wood. It is important that all felling should have a relevant felling licence. (Brian Mahoney, Forest Service, pers. comm.).

1.2.3. National Parks and Wildlife Service

As Glenbower Wood is not a designated nature conservation site, the National Parks and Wildlife Service does not have specific objectives or policies for the management of the wood. However, NPWS would have a general concern for the way the wood is managed if there was a risk to another more important site or habitat, or to a protected species occurring either within or outside the wood. For example, Otters occur along the Dissour River, which flows through the wood, and NPWS would be concerned about any threat to the species or their habitat. (Pat Smiddy, NPWS, pers. comm.).

1.2.4. Southern Regional Fisheries Board

The Southern Regional Fisheries Board (SRFB) is a statutory body with responsibility for the protection development and promotion of all fisheries within its region. It is the policy of the board to treat all waters and water courses within its region with equal importance. The SRFB considers that the Dissour River, which flows through the wood, can be classed as a significant salmonid nursery and spawning area. The SRFB considers that any development or change of use within the wood may have a detrimental effect on the river and would, therefore, ask to be kept advised of all plans. As regards the management of the wood itself the SRFB would be positive and helpful in any suggestions that would not be detrimental to the ecology of the river. The SRFB acknowledges that some proposals may actually be of benefit to the ecology of the river. In the past a number of proposals were made to the SRFB by various groups for the lake in Glenbower Wood to be re-established. Engineering drawings were commissioned by the SRFB and some drawings were produced, but this proposal was never seriously researched as it was felt the cost may prove inhibitive. However, the SRFB considers that a tourist angling lake with a good stock of trout or coarse fish may be viable and may be open for discussion. (Alan Cullagh, SRFB, pers. comm.).

2. DESCRIPTION

2.1. GENERAL INFORMATION

2.1.1. Location

Glenbower Wood is located in the valley of the Dissour River, adjacent to the village of Killeagh in east Cork.

2.1.2. Conservation status

Parts of Glenbower Wood (including the Glenbower Lake site) were identified as a site of local importance in *Areas of Scientific Interest in Co. Cork* (Goodwillie, 1986). However, Glenbower Wood is not the subject of any formal nature conservation designations.

2.1.3. Land tenure

The section of Glenbower Wood that is the subject of this management plan (the Glenbower Lake site) is owned by Glenbower Wood & Lake Ltd., a voluntary community group. However, within this site, Coillte have various reserved easements (rights) that can be exercised up to 31 December 2030. The reserved easements include the right to extract the coniferous timber (see below). The rest of the wood is owned by Coillte.

The land was granted to Glenbower Wood & Lake Ltd. under an indenture and the provisions of the indenture relevant to this management plan are summarised below. This summary is provided for information but does not constitute a legal interpretation of the indenture. Many of the covenants are qualified by phrases such as “to take all reasonable precautions”.

The indenture includes a number of covenants imposing obligations on Glenbower Wood & Lake Ltd. to Coillte in relation to the management of the land. These include:

- Not to use the land in any way that is inconsistent with Coillte’s rights to the coniferous timber.
- To protect the coniferous timber from fire or other damage.
- To prevent trespass onto the adjoining lands owned by Coillte.
- To maintain access roads.
- To keep gates and barriers on the bounding roadways shut.
- To keep drains, ditches, watercourses, ponds and wells unblocked and unobstructed.
- To maintain ditches and hedges in good condition.
- To prevent the spread of forest pathogens.
- To apply for felling licences on behalf of Coillte.
- Not to bring any animals into the land without permission from Coillte.

The indenture also includes covenants from Coillte:

- To exercise its rights to the coniferous timber in accordance with normal forestry practice and in compliance with the requirements of felling licences and other relevant permissions.
- To give Glenbower Wood & Lake Ltd. first option at mill gate price less harvesting costs on purchasing the coniferous timber.

The indenture includes reserved easements allowing Coillte to:

- Fell the coniferous timber at any time.
- Manage and tend the coniferous timber.
- Use such machinery and equipment as required for forestry purposes.
- Access over the land as required for management of the coniferous timber. Coillte covenants to repair any damaged roadways arising from this use within six months.

2.1.4. Compartments

For the purposes of this management plan, the Glenbower Lake site has been divided into three compartments, as shown in Figure 1. The *Lake Compartment* comprises the northern section of the site,

with its southern boundary formed by the embankment of the former dam. The *Middle Compartment* comprises the mature woodlands in the central part of the site, with its southern boundary formed by an old field boundary, and by the northern edge of the car park. The *Southern Compartment* comprises mainly young woodlands.

2.1.5. Management infrastructure

Physical management infrastructure in the Glenbower Lake site is shown in Figure 2, Figure 3, and Figure 4. Infrastructure associated with former land uses include the old millrace (now a footpath), the embankment of the former dam, the fish pass around the dam, and several old field boundaries. Access routes through the site are integrated with access routes around the adjoining areas of Glenbower Wood, and some important features (such as the Metal Bridge and White Bridge) are just outside the land owned by Glenbower Wood & Lake Ltd. Access facilities within the site comprise:

- A car parking area with space for around 20-30 cars.
- 580 m of metalled road, which provides access to the car park.
- 390 m of forest road, along the southern side of the former lake.
- The old millrace (1.1 km long), which forms a footpath for most of its length.
- Approximately 2.2 km of footpaths, which are formed of compacted earth and stones. These include a few short sections of steps, and four footbridges.

Other recreational facilities include shelters, an information board, benches and picnic tables. The car parking area, metalled road, forest roads and footpaths are all in good condition. The conditions of the other facilities is summarised in Table 1. In addition to these facilities, a number of warning signs (pedestrians only, no horses, etc.) are distributed around the periphery of the Glenbower Lake site.

Table 1. Recreational facilities in the Glenbower Lake site.

Feature	Compartment	Location	Condition ^{1,2}
Footbridge	Middle	fish pass	2
	Middle	river (upper)	2
	Middle	river (lower)	3
	Middle	millrace (lower)	4
Steps	Middle		2
	Southern		2
Fences	Middle	fish pass (west of footbridge)	2
	Middle	fish pass (east of footbridge)	1
	Middle	ford	1
	Middle	between lower and upper river footbridges	4
	Middle	lower river footbridge	4
	Southern	picnic bench below car park	2
	Southern	southern boundary	4
	Southern	eastern boundary	2
Information board	Southern		4
Benches	Middle	upper river footbridge	2
	Middle	lower river footbridge	3
	Southern	northern	2
	Southern	middle	3
	Southern	southern	3
Picnic tables	Southern	northern	2
	Southern	middle	2
	Southern	southern	3
Shelters	Lake		4
	Middle		2

¹ scale of damage/deterioration – 1 = severe, 2 = moderate, 3 = minor, 4 = none.

² based on visual assessment, and should not be relied upon for evaluating the safety of the features concerned.

2.1.6. Map coverage

Glenbower Wood is covered by the various editions of Ordnance Survey Maps. Bishopstown Orienteering Club, Bishopstown Hill Walking Club and Cork Schools Orienteering Association have produced an orienteering map of the wood.

2.1.7. Photographic coverage

A wide range of recent photographs of Glenbower Wood are available on the website of the Glenbower Wood & Lake Ltd. (www.glenbower.com). Photographs of the lake and of the spillway of the dam, prior to the breaching of the dam, are contained in a short unpublished report (Neal, 1997). Photographs of the breach, and of the exposed silt of the lake bed, taken shortly after the breaching of the dam, are contained in M.C. O'Sullivan Consulting Engineers (1988).

2.2. PHYSICAL ENVIRONMENTAL DATA

2.2.1. Climate

The mean daily air temperature is 5.5-6°C (January) to 15.5-16°C (July), and the average annual rainfall is 1000-1200 mm (Rohan, 1986).

2.2.2. Hydrology

The Dissour River, which flows through the wood, is a small river of around 13 km in length that flows into the Womanagh River about 3 km downstream of the wood. It has a catchment of around 30 sq. km. upstream of the Glenbower Wood. Within the Glenbower Lake site, the river is around 5 m wide (see Section 2.3.1.2) and three small (< 0.5 m wide) streams flow into the river from the valley sides.

A 2.5 ha lake was formerly present in Glenbower Wood. This lake was formed by damming the Dissour River. However, the dam was breached in 1989 and the lake drained. The breached embankment, which formed the dam, is still present, along with a (now dry) fish pass around the dam. The river has created a new course for a short length downstream of the dam, cutting out the meander which previously connected the river to the fish pass.

A millrace previously ran from the dam, downstream for over 1 km to the corn mills at the southern end of the wood. The mill race remains as a dry ditch.

Water quality data for the Dissour River is shown in Table 2 and Table 3. The river is slightly polluted at Killeagh Bridge, immediately downstream of Glenbower Wood. This is due to discharge of treated sewage at this point (Clabby et al., 2002). The water quality at the sampling station upstream of Glenbower Wood is unpolluted, and it is, therefore, likely that the water quality in the section of the river flowing through Glenbower Wood is satisfactory.

Table 2. Biological water quality data for the Dissour River.

Station	1989	1994	1997	1999	2002
Killeagh Bridge	4-5	4	4-5	3-4	3-4
Br WSW of Ballyre	4-5	3	4	4	4

Source: Clabby et al. (2002).

Table 3. Chemical water quality data for the Dissour River at Killeagh Bridge, 1998-2000.

Parameter	Parameter Units	Minimum	Median	Maximum	No of Samples
Dissolved Oxygen	mg/l O ²	10.5	10.6	11.4	3
Dissolved Oxygen	% Saturation	98	99	103	3
Ortho-Phosphate	mg/l P	0.01	0.04	0.08	9
pH	pH	7.8	7.8	7.8	1
Temperature	°C	8.0	9.3	15.0	8
Total Ammonia	mg/l N	0.02	0.05	0.20	8
Un-Ionised Ammonia	mg/l NH ³	0.002	0.002	0.002	1

Source: <http://www.epa.ie/rivermap/code/results.asp?ID=4698&date=1998&location=Killeagh+Bridge&dateto=2000&station=0400>.

A value displayed in BOLD indicates the value falls outside either an upper or lower threshold, and highlights stations where there may be water quality problems.

2.2.3. Geology, geomorphology and landform

The solid geology of the Glenbower Lake site is shown in the *Geology of South Cork* (Sleeman and Pracht, 1994). Most of the site lies within the Ballytrasna Formation while the southernmost extremity of the site falls within the Gyleen Formation. These formations are Old Red Sandstones, and are mainly composed of mudstones with some fine-medium grained sandstone. The *Feasibility report on the replacement of Glenbower Dam* (M.C. O'Sullivan Consulting Engineers, 1988) includes descriptions of three boreholes sunk in the lake bed. These boreholes indicate that the bedrock under the lake is weathered to varying degrees and is highly permeable.

The Glenbower Lake site occupies the lower slopes and base of the narrow, steep-sided valley of the Dissour River. The land to the east and west rises to altitudes of 150 m and 95 m. The river falls from an altitude of nearly 40 m at the upper end of the site to 20 m at the lower end. The site reaches a maximum altitude of around 50 m at the car park. At the lower end of the site, the valley opens out with an extensive area of low-lying ground to the west of the site.

2.2.4. Soils

The soils in the Glenbower Lake site have been classified as acid mineral shallow well-drained soil in the northern section of the site, and acid mineral deep well-drained soil in the southern section of the site (Irish Forest Soils database). However, this is a soil classification based on remote sensing data and does not show localised variations in soil type. According to the soil classification in the Coillte database (which is based on visual assessment of soils type in the field, the soils in Glenbower Wood (including the Glenbower Lake site) are brown earths, although the soils in one sub-compartment along the river (immediately upstream of the Glenbower Lake site) are classified as alluvial.

2.3. BIOLOGICAL BASELINE DATA

2.3.1. Habitats

2.3.1.1 General

The habitats present within the site are shown in Figure 5. I mapped these habitats in July 2005, using the habitat classifications defined by Fossit (2000) (for terrestrial habitats) and Environment Agency (1997) (for riparian habitats).

2.3.1.2 Habitats within the site

Eroding/upland river (FW1)

A 900 m long section of the Dissour River flows through the Glenbower Lake site. This section is around 5 m wide. It is dominated by shallow riffle and run channel habitats with gravel and cobble substrates. Deeper sections of glide habitat also occur with sand substrate, and a short section of rapids with boulders occurs just downstream of the dam. Vegetated and unvegetated mid-channel and side bars are frequent. The channel is largely shaded in the section downstream of the former dam, while the upstream section contains unshaded sections. Exposed bankside roots are frequent while fallen trees and debris dams also occur.

Three small streams flow down the valley sides to enter the Dissour River within the site. These are all less than 0.5 m wide.

Amenity Grassland (GA2)

A small area of amenity grassland occurs at the southern end of the site.

Dry meadows and grassy verges (GS2)

A narrow strip of this habitat occurs between the access road and the millrace with Broad-leaved Dock, Cock's-foot, Common Nettle, Common Ragwort and Hogweed, etc.

Oak-birch-holly woodland (WN1)

A narrow strip of unmodified native woodland occurs on a steep slope above the southern shore of the former lake. The actual ground surface area occupied by this habitat is greater than the area (0.3 ha) indicated on Figure 5 because of the very steep slope that it occupies. This woodland is dominated by small Sessile Oaks with Hazel. Ash is frequent at the northern end where a small stream may cause less acidic conditions. Holly is frequent with scattered Downy Birch and Rowan. Non-native trees and shrubs are very rare with just one or two Beech, Sycamore and Horse-chestnut trees and a few Rhododendron bushes. The ground flora is dominated by Great Wood-rush with Bilberry, Brambles, Broad Buckler-fern, Hard-fern, Herb-robert, Honeysuckle, Scaly Male-fern, Slender St John's-wort, Wood-sorrel and Wood Avens all reasonably frequent. The canopy is quite open and several regenerating oaks occur.

Wet pedunculate oak-ash woodland (WN4)

This woodland type occurs on areas that are flooded in winter but which dry out in summer and is probably the natural woodland type that would have occupied the valley floor in the Glenbower Wood site. A degraded section of this woodland type occurs downstream of the dam occupying an area of around 1 ha. This woodland is dominated by Alder, Ash and Oak with some Beech and Sycamore, and with Cherry Laurel, Elder and Hazel in the understorey. The southern section of this woodland is quite open and scrubby with mainly small trees, and extensive areas of Cherry Laurel, while the northern section has large mature trees, including some impressive large Alders. The ground layer is dominated by Brambles with typical woodland ground flora, as well as some species indicating wetter conditions such as Hemlock Water-dropwort, Marsh Ragwort, Opposite-leaved Golden-saxifrage, Pendulous Sedge and Remote Sedge. A large fallen tree occurs in the southern section.

Mixed broadleaved woodland (WD1) and mixed broadleaved/conifer woodland (WD2)

These habitats occur extensively throughout the site, occupying area of around 3.5 ha and 1.4 ha, respectively. The main tree species are Ash, Beech, Oak and Sycamore with Spruce in the mixed broadleaved/conifer woodland, and Alder, Willow close to the river. The southern sections include areas of pole stage Ash, Beech, Oak and Sycamore plantations without a differentiated understorey and a poor ground flora.

Most of the remaining areas are mature woodland mainly with tall, but not particularly large (dbh 0.5-0.75 m) trees, and with a well-developed understorey. This understorey is dominated by Holly on the upper slopes and Hazel with some Cherry Laurel and Rhododendron on the lower slopes. The ground flora indicates a transition from more acidic conditions on the upper slopes (e.g., Great Wood-rush, Honeysuckle, Wood-sorrel, etc.) to richer soils lower down (e.g., Enchanter's-nightshade, False Brome, Hart's-tongue, Lords-and-Ladies, Soft Shield-fern, Wood-sedge, Yellow Pimpernel, etc.), as well as generally distributed species (Broad Buckler-fern, Hedge Woundwort, Herb-robert, Scaly Male-fern, Wood Avens, etc.). A few fallen trees and one standing dead tree are present.

The southern section of the access road has single lines of large mature trees along either side, which, because their canopies meet, is classified as mixed broadleaved woodland. This area includes several overmature trees, mainly exotic species, but including two Oaks.

Conifer plantations (WD4)

Around 2.7 ha of conifer plantations occur in several discrete stands throughout the site. These include two mature stands and two thicket stage stands, as well as a small group of mature trees at the northern end of the site. The mature stand in the central part of the site has been thinned and has an open canopy with a sparse Holly understorey. Its ground layer is dominated by Brambles with frequent Broad Buckler-fern, Great Wood-rush, Scaly Male-fern and a little Bilberry. The mature stand in the southern section of the site and the two thicket stage stands have dense canopies with little understorey or ground flora, although Alder and Willows occur along the edge of these stands where they meet the river.

Scrub (WS1)/Recolonising bare ground (ED3)

The 2.5 ha drained bed of Glenbower Lake is occupied by a mixture of these two habitats. The scrub occurs mainly in the southern half and is dominated by Rusty Willow. While many of the willows exceed 4 m in height (the upper height limit for wetland scrub according to Fossit, 2000), the habitat is best described as scrub, rather than wet willow-alder woodland (WN6), because it is of recent origin and has not developed a woodland structure. The recolonising bare ground habitat is dominated by a tall sward of Common Nettle with Hedge Bindweed and some False Oat-grass and Reed Canary-grass. It is also possible that some areas of tall herb swamp habitat (FS2) could occur within this area.

Treelines

Treelines of Ash, Beech, Hawthorn and Oak occur along the upper section of the access road and forming the eastern border of the site.

2.3.1.3 Adjoining habitats

The habitats adjoining the Glenbower Lake site are shown in Figure 6. The northern section is surrounded by woodland. Most of this woodland is highly modified/non-native (WD) and young plantations of broadleaved woodland (WS2), but a small section of oak-birch-holly woodland (WN1) occurs, contiguous with the area of this habitat within the site. The southern section is mainly surrounded by improved agricultural grassland (GA1), with some areas of dry meadows and grassy verges (GS2). Eroding/upland river (FW1) habitat along the Dissour River adjoins the western boundary in the southern section, with a small area of riparian woodland (WN5) on a former island.

2.3.2. Flora

Several notable plant species have been recorded from Glenbower Wood (Table 4.). These include one protected species, two nationally scarce species, one species scarce in Co. Cork, and two introduced species. The protected species has not been recorded since the 19th century. The other species were recorded up to around ten years ago, since which time no botanical surveys have been carried out.

Table 4. Notable plant records from Glenbower Wood.

Species	Typical habitat ¹	Notes
Protected²		
Killarney Fern	Damp, shaded localities, usually on acidic, but often base-flushed rocks	Recorded from the wood in the 19 th century
Nationally scarce		
Bird's-nest Orchid	Densely shaded Beech woodland on base-rich soils	Recorded from the southern end of the wood
Tunbridge Filmy-Fern	Very sheltered, often deeply shaded, humid habitats	
Scarce in Co. Cork		
Great Horsetail	Groundwater seepages on base-rich clay soils	
Introduced		
Slender Rush	Damp open ground by roads and lakes, on paths and in woodland and forest rides	Recorded from the grassland at the entrance to the wood
Sweet Violet	Open woodlands, hedge banks and scrub on base-rich soils	

Source: Tony O'Mahony, Botanical Society of the British Isles Vice-County Recorder for East Cork (pers. comm.).

¹ adapted from Preston et al. (2002).

² Flora Protection Order, 1999 (S.I. No. 94 of 1999).

The Bird's-nest Orchid was described as occurring in the southern end of the wood and, so, almost certainly occurred in the Glenbower Lake site. While it has not been recorded recently, there have been no felling of these stands in the last ten years, and it is, therefore, likely to still occur.

2.3.3. Fauna

2.3.3.1 Invertebrates

There is little available information on the invertebrate fauna of Glenbower Wood. The habitat in the Dissour River is potentially suitable for the Freshwater Pearl Mussel, but none were recorded during a survey in 1998-2000 (Smiddy, 2000).

In August 2004, I recorded several Silver-washed Fritillary butterflies in the wood and the hoverfly *Leucozona glaucia* (L.). These are characteristic species of Irish oak woodland. I also recorded the Beautiful Demoiselle damselfly and the Migrant Hawker dragonfly. The former species is characteristic of woodland rivers, while the latter is a recent colonist to Ireland that breeds in standing water bodies.

2.3.3.2 Fisheries

The Dissour River is a significant salmonid nursery and spawning area. The gradient, water quality and general physical characteristics help in supporting a thriving population of salmonids. In July 2005 a field survey was carried out by SRFB staff. This survey comprised of two 50 metre sites one downstream of the wooden bridge within the wood and one upstream. Both sites were electro fished using a bank side generator. While no population estimate was gained it was clear that both sides contained a good stock of salmon and trout. The downstream site had 16 salmon and 11 trout while the upstream site had 20 salmon and 7 trout. (Alan Cullagh, Southern Regional Fisheries Board, pers. comm.).

Unspecified lampreys have been recorded in the Dissour River (Kurz and Costello, 1999). Eels run up and down the Dissour River (David Neal, pers. comm.).

2.3.3.3 Amphibians and reptiles

The Wildlife of Glenbower Wood (Smiddy, 1990) described the Common Frog as "fairly frequent in damp areas" and the Common Lizard as "fairly frequent in dry areas within the wood".

2.3.3.4 Birds

The Wildlife of Glenbower Wood (Smiddy, 1990), listed 68 species, although ten of these species were associated with the lake habitat and presumably no longer occur. The list includes most of the typical

woodland bird species, a few species associated with the riparian habitat as well as species associated with the adjoining farmland and urban habitats (Table 5).

Table 5. Birds of Glenbower Wood.

Status	Species
Resident, probably breeding within the wood	Sparrowhawk, Pheasant, Stock Dove, Woodpigeon, Long-eared Owl, Grey Wagtail, Dipper, Wren, Dunnock, Robin, Blackbird, Song Thrush, Mistle Thrush, Goldcrest, Long-tailed Tit, Coal Tit, Blue Tit, Great Tit, Treecreeper, Jay, Magpie, Hooded Crow, Chaffinch, Greenfinch, Goldfinch, Siskin, Linnet, Bullfinch
Resident, but probably does not breed within the wood	Collared Dove, Barn Owl, Skylark, Meadow Pipit, Pied Wagtail, Jackdaw, Rook, Starling, House Sparrow, Yellowhammer
Summer visitor, probably breeding within the wood	Whitethroat, Blackcap, Chiffchaff, Willow Warbler, Spotted Flycatcher
Summer visitor, but probably does not breed within the wood	Cuckoo, Swift, Sand Martin, Swallow, House Martin
Winter visitor	Kestrel, Woodcock, Fieldfare, Redwing, Redpoll ¹ , Reed Bunting
Occasional visitor	Kingfisher, Raven ²
Associated with the lake	Little Grebe, Cormorant, Grey Heron, Mute Swan, Teal, Mallard, Tufted Duck, Moorhen, Coot, Snipe, Green Sandpiper, Common Sandpiper

Source: Smiddy (1990).

¹ may now breed in the bed of the former lake (P. Smiddy, pers. comm.).

² now breeds in Glenbower Wood, outside the Glenbower Lake site (P. Smiddy, pers. comm.).

Species of conservation concern (Newton et al., 1999) included in this list are two red-listed species Barn Owl and Yellowhammer and eleven amber-listed species. The red-listed Barn Owl occupies a nearby ruined building, and hunts in the wood. The amber-listed Stock Dove, Spotted Flycatcher and Redpoll breed in the wood, while the amber-listed Cuckoo, Woodcock, Kingfisher, Sand Martin, and Swallow are non-breeding visitors. The red-listed Yellowhammer and the amber-listed Skylark were described as breeding in fields around the wood in 1990 although the latter no longer breeds. The amber-listed Coot and Snipe occurred in the lake and, therefore, probably no longer occur regularly although the latter may still visit occasionally.

Several other species of local significance occur. A small breeding colony of Grey Herons was present near the lake. The Dipper breeds on the White Bridge. Long-eared Owl and Jay, species associated with mature woodland, both breed. The Whitethroat, a species that has a rather localised distribution in south Cork, also breeds.

2.3.3.5 Mammals

The Wildlife of Glenbower Wood (Smiddy, 1990) listed thirteen species: Hedgehog, Pygmy Shrew, Rabbit, Irish Hare, Red Squirrel, Wood Mouse, House Mouse, Common Rat, Fox, Stoat, American Mink, Badger and Otter. Since then the introduced Bank Vole has also colonised the wood (P. Smiddy, pers. comm.). The Pine Marten is also considered likely to have colonised: one was found dead in Killeagh in April 1997 (Smiddy and Berridge, 2002). Most of these species are likely to occur regularly within the wood and either breed within it, or use it as part of their breeding territory. However, the Irish Hare is associated with the adjoining fields, while the House Mouse is associated with houses in Killeagh village.

No information on bat populations in the area is available.

2.4. CULTURAL

2.4.1. Archaeology

One archaeological site, listed in the Records of Monuments and Places (Dúchas, 1998), occurs on the edge of the Glenbower Lake site. This is the Metal Bridge (C-066-048). Other archaeological sites in the vicinity of the site are Killeagh Mills (C-066-05201), a Bullaun Stone (C-066-037) and Aghadoe House (Castle, C-066-03801; Sheela-na-Gig, C-066-03802; Country House, C-066-03803).

2.4.2. Past land use

Glenbower Wood was part of the Aghadoe Estate and is described by Lewis (1837) as “one of the few remnants of the ancient forests”. The various editions of the Ordnance Survey maps show that most of the current extent of Glenbower Wood has been continuously wooded since at least the 1840s. However, much of the woodland in the southern compartment of the Glenbower Lake site is of more recent origin (post-1930s). The Metal Bridge was constructed in the 1830s when the landowner built a road through the wood. Glenbower Lake was constructed in 1860 to provide a head of water for the mills in Killeagh. Glenbower Wood and Lake was acquired by the Forest and Wildlife Service in 1933, and the wood was subsequently managed as a commercial forest, with some informal recreational use. The dam maintaining Glenbower Lake was breached in 1989, due to safety concerns, and the lake bed has subsequently been colonised by ruderal vegetation and willows (see Section 2.4.2). The Glenbower Lake site was acquired by Glenbower Wood & Lake Ltd. in 1994.

2.4.3. Present land use

The Glenbower Lake site is managed by Glenbower Wood & Lake Ltd. as a public amenity site. The coniferous stands within the site are managed by Coillte for commercial timber extraction.

2.4.4. Forestry management

The forest inventory data recorded by Coillte for the Glenbower Lake site, and adjoining areas, is summarised in Figure 7 and Table 7. The stands of Norway Spruce and Western Hemlock-spruce in the middle compartment were planted in 1944 and 1953, respectively. The southern compartment contains younger stands of Douglas Fir and Sitka Spruce planted in 1968 and 1979. The lake is fringed by young (planted 1988 and 1993) stands of Douglas Fir and Sitka Spruce on its southern side and mature (planted 1944) stands of Norway Spruce on its northern side. The mature broad-leaved woodland in the middle compartment, and along the access road, is shown as planted in 1830, but this will be an estimate based on assessment of tree growth rather than an historical record. Many of the stands are now in their second rotation, following felling and restocking in the 1980s and 1990s.

Table 6. Summary of Coillte inventory data for stands in, and adjoining, the Glenbower Lake site.

Sub-compartment ¹	Composition ²	Mixture type	Constraints	First thinning	Scheduled felling year	Area/ha
Completely or substantially within the Glenbower Lake site						
31783N 1	70% Oak and 5% Beech (1830), and 25% Alder (1928)	Non-intimate	Amenity			3.38
31783N 8	100% Norway Spruce (1944)			1981	2008	1.79
31783N10	40% Oak, 40% Ash, 10% Other broadleaves and 10% Beech (1830)	Intimate	Amenity			0.83
31783N11	60% Douglas Fir, 30% Ash, 5% Alder and 5% Oak (1979)	Non-intimate	Amenity	1997	2032	1.97
31783N12	100% Sitka Spruce (1968)			1981	2008	0.96
31783N13	85% Sitka Spruce and 10% Ash (1979), and 5% Sycamore (1970)		Amenity	1997	2017	0.58
31783N14	60% Poplar 20% Beech, and 10% Sycamore (1941), and 10% Sitka Spruce (1944)	Non-intimate	Amenity			0.86
Small part within the Glenbower Lake site						
31781A 4	85% Western Hemlock-spruce, 5% Norway Spruce, 5% Oak and 5% Scots Pine (1953)			1975	2016	1.68
31781A 7	90% Douglas Fir and 5% Birch (1988), and 5% Oak (1989)			2014	2045	1.14
31781A 8	100% Sitka Spruce (1993)		Amenity	2014	2034	0.80
31781A 9	100% Other broadleaves (1993)		Amenity			0.68
31783N 4	100% Norway Spruce (1944)			1981	2005	0.47
31783N 5	70% Norway Spruce and 30% Scots Pine (1944)	Intimate		1981	2019	0.93
31783N 6	100% Norway Spruce (1944)			1981	2005	0.95
Adjoining the Glenbower Lake site						
31779M 1	70% Ash (1994), 25% Beech (1997) and 5% Oak (1880)	Intimate				1.84
31780F13	70% Oak (1990), 10% Beech (1940), 10% Norway Spruce (1940), and 5% Douglas Fir (1940)	Non-intimate				1.48
31781A 2	90% Oak (1989) and 10% Douglas Fir (1988)		Amenity			0.68
31781A 3	100% Douglas Fir (1923)			1951	2016	0.42
31782S 1	60% Other broadleaves (1993), 15% Beech (1942), 15% Sycamore (1942) and 10% Western Red-cedar (1992)	Intimate				2.09
31783N 7	100% Scots Pine (1944)			1981	2015	0.28
31783N 9	45% Scots Pine, 20% Sycamore and 5% Douglas Fir (1980), and 30% Beech (1979)	Intimate	Amenity	2007	2052	1.30

¹ see Figure 7 for sub-compartment locations.² planting year in parentheses.

2.4.5. Nature conservation

There has not been any management for nature conservation purposes.

2.4.6. Educational use/facilities

Educational and care institutions visit the wood (see Section 2.4.9), but they do so informally without any arrangement with the Glenbower Wood & Lake Ltd.

2.4.7. Research use/facilities

Glenbower Wood was included in a study of vegetation diversity and stand structure in streamside forests in the south of Ireland (Coroi et al., 2004). However, the area surveyed was outside the Glenbower Lake site.

2.4.8. Interpretation use/facilities

The Forest and Wildlife Service established a nature trail in Glenbower Wood in the 1970s. This followed the mill race as far as the metal bridge, returning along the forest road to the car park. Numbered stops were established and a leaflet describing features of interest at each stop was produced.

A booklet about Glenbower Wood was produced in 1990. This contained a short summary of *The Wildlife of Glenbower Wood* (Smiddy, 1990), as well as other material.

Another nature trail was established by Glenbower Wood & Lake Ltd. in the early 1990s. A few of the numbered posts for this nature trail are still visible. A guide to the nature trail, with descriptions of each of the numbered stops, is available on the website of Glenbower Wood & Lake Ltd. (www.glenbower.com), but no map of the trail route is available.

A nature walk, guided by Pat Smiddy (Conservation Ranger, NPWS), was held on 29 December 2002.

2.4.9. Recreational use/facilities

Glenbower Wood is used for passive recreation, such as walking, picnicking, etc., and there are a variety of recreational facilities (see Section 2.1.5). There is a tarmac road leading to a car park. An information board about the wood is located in the car park. There is a network of footpaths and forest roads providing a variety of walking routes through the wood. Within the Glenbower Lake site, there are approximately 2.6 km of footpaths and forest roads. There are two wooden footbridges over the Dissour River, and one over the fish pass within the site. There are also two wooden shelters and several benches and picnic tables. Three waymarked circular walking routes have recently been established: the Red, Blue and Yellow routes. These are approximately 0.9, 2.3 and 2.2 km in length, respectively (see Figure 8).

Glenbower Wood is also used for more formal recreation activities. An annual May Day Pattern (festival) has been held in the wood since the 1830s. This originated as the landlord, De Cappell Brooke, entertaining the people of the district as a sign of his gratitude for the work that had been carried out on his estate. In the 1920s, various bands entertained thousands in Glenbower Wood.

In recent years, Glenbower Wood & Lake Ltd. has organised an annual “Music in the Wood” event on the August bank holiday. Orienteering events have been held in the wood by the Bishopstown Orienteering Club (who have produced an orienteering map of the wood), and the wood is also used for training by the Glenbower Athletic Club and the Youghal Athletic Club. Educational and care institutions (including the Spanish College and Rayfields Mental Hospital) also regularly visit Glenbower Wood, as it provides a safe place for walking.

No angling takes place within the Glenbower Lake site.

3. CONFIRMATION OF IMPORTANT FEATURES

3.1. THE SITE IN WIDER PERSPECTIVE AND IMPLICATIONS FOR MANAGEMENT

The Glenbower Lake site is part of the wider area of Glenbower Wood. Forestry management elsewhere in the wood will have implications for the Glenbower Lake site (see Section 4.3.2). The Dissour River, which flows through the wood, has a catchment of around 30 sq. km. upstream of the site. Land use in this catchment may have effects on water quality in the section of the river that flows through the site (see Section 4.3.1).

3.2. EVALUATION

3.2.1. Evaluation for nature conservation

3.2.1.1 Habitats

The Glenbower Lake site contains five semi-natural habitats: eroding/upland river (FW1), dry meadows and grassy verges (GS2), oak-birch-holly woodland (WN1), wet pedunculate oak-ash woodland (WN4), and scrub (WS1).

The eroding/upland river habitat represented by the section of the Dissour River that flows through the site, is high quality unmodified riparian habitat. However, such habitat is quite widespread in Co. Cork. Therefore, this habitat is of high local importance but probably not of county importance.

The oak-birch-holly woodland habitat is of high quality due to the absence of non-native species. However, due to its limited extent it is probably of not more than high local importance. This habitat type is listed (as *old sessile oak woods with Ilex and Blechnum in the British Isles*) on Annex 1 of the Habitats Directive (92/43/EEC).

The wet pedunculate oak-ash woodland habitat has been degraded by invasion by non-native species in both the canopy and the understorey. However, it is notable for the occurrence of a number of large Alder trees; most Alder woodlands have relatively small Alder trees due to coppicing. This is a scarce habitat in Co. Cork, but due to the level of habitat degradation, the example present in the Glenbower Lake site is probably of not more than high local importance. This habitat type is listed (as *Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Pandion, Alnion incarnae, Salicion albae)*) on Annex 1 of the Habitats Directive (92/43/EEC).

The dry meadows and grassy verges and scrub habitats are not of significant nature conservation importance in terms of their intrinsic habitat quality.

The highly modified/non-native woodland (WD) habitat is not a semi-natural habitat and is, therefore, not significant nature conservation importance in terms of its intrinsic habitat quality, but parts of these habitats may be of nature conservation importance for plants and/or invertebrates.

3.2.1.2 Plants

Glenbower Wood is of county importance for its populations of Bird's-nest Orchid and Tunbridge Filmy-Fern. The Bird's-nest Orchid population probably occurred within the Glenbower Lake site and may well still be extant.

A scarce species in Co. Cork, Great Horsetail, also occurs in Glenbower Wood. However, this species appears to be quite widespread in east Cork (Preston et al., 2002).

It is quite possible that other notable plant species could occur in Glenbower Wood.

3.2.1.3 Invertebrates

Very little information on the invertebrates of Glenbower Wood is available. As an old woodland site, Glenbower Wood has the potential to support an interesting invertebrate fauna. However, it has little habitat for saproxylic invertebrates (species whose larvae feed on micro-organisms dependent on dead or dying wood, or on the activities of other saproxylics), one of the important components of such faunas.

3.2.1.4 Vertebrates

The Dissour River supports good populations of Salmon, a species listed on Annex 2 of the Habitats Directive (92/43/EEC). Unspecified lampreys have also been recorded from the Dissour River; all three Irish species of lampreys are listed on Annex 2 of the Habitats Directive.

The Barn Owl is a nationally scarce breeding species (estimated population of 170 pairs in 2002; Hillis, 2004) that is red-listed because of severe declines in its breeding population and range (Newton et al., 2002). Therefore, Glenbower Wood is of County importance as a feeding habitat for this species.

Most of the bird species recorded from Glenbower Wood are protected under the Wildlife Acts 1976 and 2000. The Kingfisher, which occurs as an occasional visitor, is also listed on Annex 1 of the Birds Directive (79/4/09/EEC). Several bird species recorded from Glenbower Wood are listed as of conservation concern (Newton et al., 1999) or are of local significance (see Section 2.3.3.4).

The Common Frog, Common Lizard, Hedgehog, Pygmy Shrew, Irish Hare, Red Squirrel, Stoat, Badger, Otter and Pine Marten are protected under the Wildlife Acts 1976 and 2000. The Otter is also listed on Annex 2 of the Habitats Directive (92/43/EEC). All the above species, except the Pine Marten, are widespread and common in southern Ireland, although the Red Squirrel is listed as near-threatened at a global scale (IUCN, 2004). The Pine Marten was formerly very rare and localised but has been rapidly expanding its range in recent years.

Overall, while many of the vertebrate species recorded from Glenbower Wood have some form of conservation designation, most are relatively common and widespread species. The Barn Owl, because of its rarity, and the Salmon, because of the importance of the Dissour River population, can be confirmed as important features of Glenbower Wood. Some other species (e.g., some bird species) are of some local significance.

3.2.2. Evaluation for public use, educational use and interpretation

3.2.2.1 Educational use

While Glenbower Wood is not currently used for educational purposes, it has significant potential for this kind of use. It is easily accessible with a good network of walks. It has features of cultural interest, and the history of the wood is well known. Some aspects of its ecology are also well known, but more information, in particular a list of characteristic woodland plant species, would be useful.

3.2.2.2 Amenity use

Glenbower Wood has high value for amenity use. It is easily accessible with a good network of walks, and has other features such as shelters and information boards. It has a varied range of woodland landscapes and has a number of features of cultural interest. It also has an established role in the local community and is an important venue for community activities and events. However, some of the recreational facilities are in poor condition and require repair work. The wood is also not very clearly signposted, and the access road passes through an unsightly and poorly surfaced pub car parking area before it enters the wood.

3.2.3. Evaluation for scientific research/study

Apart from one study, Glenbower Wood has had no history of scientific research or study. As it does not contain a large area of native woodland habitat, and as public access could cause interference with survey work, it does not have an obvious high potential for intensive scientific research or study.

3.2.4. Economic value

3.2.4.1 Forestry

The majority of Glenbower Wood has been managed for commercial forestry. Within the Glenbower Lake site, most of the southern section and the eastern side of the central section contain commercial timber crops. These will have a potential economic value when they are harvested, which will depend upon the quality of the timber in relation to the ease of harvesting. Within the lifetime of this management plan, approximately 2 ha of Norway Spruce and Sitka Spruce are scheduled for harvesting.

3.2.4.2 Fisheries

The Dissour River supports good populations of Salmon and Trout. This is a resource which has an economic value through direct income from angling licences and indirect income to local businesses from angling tourism. However, at present, there is no direct economic benefit to the Glenbower Wood & Lake Ltd. because the section of the Dissour River within the Glenbower Lake site is not suitable for angling.

3.2.5. Potential for restoration/improvement

Restoration of Glenbower Lake would significantly increase the amenity value of the site and provide a resource for angling (see Section 4.2.4).

3.3. CONFIRMED LIST OF IMPORTANT FEATURES

3.3.1. Nature conservation features

- Eroding/upland river habitat in the Dissour River.
- Oak-birch-holly woodland habitat.
- Wet pedunculate oak-ash woodland habitat.
- Population of Bird's-nest Orchid.
- Salmon population in the Dissour River.
- Feeding habitat for Barn Owls.
- Otter population along the Dissour River.

3.3.2. Amenity and economic features

- Potential for educational use.
- Use for passive recreation (walking, picnicking, etc.).
- Use for community activities and events.
- Economic value of commercial timber crops.
- Economic value of angling industry supported by Dissour River.

3.3.3. Potential features

- Restoration of Glenbower Lake.

4. FACTORS WHICH INFLUENCE OR MAY INFLUENCE THE FEATURES

4.1. OWNER/OCCUPIER'S OBJECTIVES

4.1.1. Glenbower Wood & Lake Ltd.

The management objectives of Glenbower Wood & Lake Ltd. are:

- To restore the lake and improve the Dissour River.
- To restore stands of native broadleaf trees.
- To maintain and enhance facilities for passive recreation.

4.1.2. Coillte

Coillte did not provide any specific management objectives for the purposes of this management plan. Their main interest in the Glenbower Lake site is timber production. Their management objectives for this site are, therefore, presumably to maximise the economic return from the timber that they own within the site.

4.2. INTERNAL FACTORS

4.2.1. Introduced species

The wet pedunculate oak-ash woodland habitat is threatened by spread of non-native trees and shrubs, particularly Cherry Laurel and Sycamore, and this habitat has already been degraded by this process. The oak-birch-holly woodland could also, potentially, be threatened by this process, although there is no evidence of this happening at present.

4.2.2. Forestry management

Clear-felling of commercial timber crops may negatively affect the visual amenity of the site, and also could have negative ecological effects if any scarce woodland plants or invertebrates occur in these areas. In particular, the Bird's-nest Orchid occurs in the southern section of the site, which is entirely occupied by commercial timber crops. If not properly managed, timber harvesting has the potential to have negative effects on water quality in the Dissour River. However, adherence to the statutory guidelines (Forest Service, 2000a, 2000b) should prevent this from happening.

Harvesting of commercial timber crops, however, will provide opportunities for forest restructuring. This can be used to create forest habitats of higher potential nature conservation interest, and/or to provide more varied recreational experiences.

4.2.3. Visitors

Visitors are unlikely to have adverse impacts on the nature conservation interest of the site, unless the location of a scarce plant or invertebrate population happens to coincide with an area of high visitor pressure. This is unlikely to be a risk at present, as visitor pressure occurs in areas with established history of visitor use.

Visitor pressure can have negative impacts on the amenity value of the site, through both deliberate vandalism and general wear and tear.

Glenbower Wood & Lake Ltd. is concerned about the impact of unauthorised visits by organised groups in relation to:

- Numbers of coaches using the car park (often four at a time), which is not designed for use by large vehicles.
- Littering by these visitors.

4.2.4. Restoration of the lake

Proposals to restore the lake have been developed by Glenbower Wood & Lake Ltd., in conjunction with the Department of the Marine and Natural Resources. Restoration of the lake would significantly increase the amenity value of the site. It would increase the variety of the recreational experience for the passive

visitor, both in terms of visual amenity, and by providing habitat for easily observed wildlife such as various species of waterbirds. It would provide a focus for attracting non-local visitors to the site, and would also benefit the use of the site for community activities and events, given the strong local identification with the lake. The lake would also provide opportunities for developing more active recreational uses, such as angling and boating, and this may have economic benefits to the local area.

In terms of the identified features of nature conservation importance, restoration of the lake might have some benefits for the Otter population, and should not affect the Salmon population (if appropriate measures to maintain access for fish movement are included in the works). Additional species would be attracted by the lake. These are likely to be mainly relatively common species, although standing water is a rare habitat in east Cork so any new standing water habitat would be of at least high local importance.

4.3. EXTERNAL FACTORS

4.3.1. Water quality

The landscape outside Glenbower Wood is dominated by intensive agriculture. Therefore, run-off from fields poses a potential threat of eutrophication to the Dissour River. The section of the river flowing through the site, and for 3 km upstream of the site, is surrounded by forest habitat, providing a buffer against such effects. However, the section of the river adjoining the southern section of the site has intensive grassland on its western bank, with livestock access to the river in places.

4.3.2. Forestry management

Forestry management of sections of Glenbower Wood adjoining the Glenbower Lake site may have similar potential effects to those discussed in Section 4.2.2 above.

4.4. FACTORS ARISING FROM LEGISLATION OR TRADITION

4.4.1. Legislation

4.4.1.1 Forestry Act 1946

Under the Forestry Act, 1946, a felling licence is required to fell any tree over ten years old, with certain exceptions. In general, a felling licence will have a condition attached requiring the licensee to reforest the land to the satisfaction of the Minister with responsibility for forestry. However, limited felling licences can be granted in which this requirement can be modified.

4.4.1.2 Occupiers Liability Act 1995

The Occupiers' Liability Act, 1995 (Act No. 10 of 1995) defines the legal obligations of landowners towards visitors. This act states that the occupier owes a duty of care towards a visitor. This duty includes "not to act with reckless disregard". However, the occupier may restrict, modify or exclude the duty of care, providing that the restriction, modification or exclusion "is reasonable in all the circumstances", and that the occupier "has taken reasonable steps to bring the notice to the attention of the visitor". The occupier shall be presumed to have "taken reasonable steps" if a notice "is prominently displayed at the normal means of access to the premises".

4.4.1.3 Safety, Health and Welfare at Work Act, 1989

Section 6 of the Safety, Health and Welfare at Work Act, 1989 requires all employers to ensure the safety health and welfare of their employees at work in so far as is reasonably possible. Employers and self-employed persons must prepare a safety statement, specifying the manner in which the safety, health and welfare of their employees shall be secured while at work. All employers must bring the safety statement to the attention of their employees and other persons at the place of work. Employers and self-employed persons are also required to work in a manner that does not put the health and safety of the public (persons other than their employees) at risk, and to provide the public with information with information about activities that could affect health and safety.

4.4.1.4 Wildlife Acts 1976 and 2000

Many vertebrate species occurring in Glenbower Wood are protected by schedule and statutory instrument under the Wildlife Acts, 1976 and 2000 (see Section 3.2.1.4). Under Section 22 and 23 of the Wildlife Acts, 1976 and 2000 it is an offence to kill, or injure a protected animal or interfere with their breeding or resting places. However, “unintentional” killing or injury or interference with breeding or resting places resulting from various activities including forestry and fisheries works is exempted from this provision.

Under Section 40 of the Wildlife Acts, 1976 and 2000 it is an offence to cut, grub, burn, or destroy any vegetation on uncultivated land from 1 March-31 August, to protect nesting birds. However, various activities including forestry and fisheries works are exempted from this provision.

4.4.2. Traditional practices

Community festivals have been traditionally held in Glenbower Wood on the May and August bank holidays (see Section 2.4.9).

4.5. PHYSICAL CONSIDERATIONS/CONSTRAINTS

There are no obvious physical considerations or constraints which might influence the features identified in Section 3.3.

4.6. AVAILABILITY OF RESOURCES

Glenbower Wood & Lake Ltd. is a voluntary community organisation with limited financial resources. However, management of the commercial timber crops will be carried out by Coillte.

4.7. SUMMARY OF FACTORS WHICH INFLUENCE OR MAY INFLUENCE THE FEATURES

Table 7 summarises the factors which influence or may influence the important features of Glenbower Wood.

Table 7. Summary of factors which influence or may influence the important features of Glenbower Wood.

Factor	Positive effects	Negative effects
Introduced species		Degradation of native woodland habitat.
Forestry management	Create habitats of higher nature conservation interest Provide more varied recreational experiences	Visual amenity Scarce plants and invertebrates
Visitors		Vandalism Wear and tear of facilities Unauthorised visits by organised groups
Agricultural run-off		Water quality in Dissour River
Restoration of the lake	Provide more varied recreational experiences Increase value of site for community activities Opportunities for active recreation Economic benefits from angling Creation of a locally scarce habitat (standing water)	

5. ACTION PLANS

5.1. INTRODUCTION

This section presents a series of Action Plans. Each Action Plan is targeted at features identified in the *Confirmed List of Important Features* in Section 3.3. Objectives are identified for each Action Plan. A rationale is described for each Action Plan. The rationale explains how the action plan is intended to meet the objectives, taking into account the factors which are thought to influence the features (as discussed in Section 4). Indicative locations for some of the major management proposals are shown in Figure 9.

5.2. PUBLIC USE, EDUCATION AND AMENITY

5.2.1. Restoration of the lake

5.2.1.1 Objectives

To restore the lake for use as a key amenity feature and as an angling resource.

5.2.1.2 Rationale

Restoration of the lake is a key objective of Glenbower Wood & Lake Ltd. It would significantly increase the amenity value of the site and provide a resource for angling (see Section 4.2.4). Initial survey and design proposals have been prepared by the Southern Regional Fisheries Board and the Department of the Marine and Natural Resources. An outline action plan is presented below, but the detail of the action plan will need to await a detailed specification and grant application.

5.2.1.3 Action Plan 1

- | | |
|----------|--|
| Task 1.1 | Removal of scrub, detailed survey and feasibility study, including initial correction of the river course. |
| Task 1.2 | Location of spoil dumps, access points and the planning permission requirements. |
| Task 1.3 | Commencement of excavation of the lower section of the lake area. |
| Task 1.4 | Commencement of excavation of the middle section of the lake area. |
| Task 1.5 | Commencement of excavation of the upper section of the lake area. |
| Task 1.6 | Provision of the water supply. |
| Task 1.7 | Introduction of stock and plant life. |
| Task 1.8 | Completion of river realignment. |
| Task 1.9 | Provision visitor facilities & landscaping where required. |

5.2.2. Passive recreation

5.2.2.1 Objectives

Maintain and enhance the facilities of the site for passive recreational uses.

5.2.2.2 Rationale

The site has an established use for passive recreation. This use depends upon a basic infrastructure providing car parking, pedestrian access, shelter, etc. This infrastructure is already in place but some parts require repair or replacement. There are opportunities to extend the footpath network to enhance the recreational amenity by creating additional routes and providing access to features of interest. There are also opportunities for enhancing the recreational experience by forest restructuring following the felling of mature conifer stands. The access to the site is not clearly signposted from the main road, and passes through an unattractive car park. The number and variety of signs around the car park, while important in providing information for visitors, present a rather cluttered appearance and a rationalisation of the signage would be useful.

The work described in this action plan (with the exceptions of Tasks 7.5 and 7.6) should qualify for funding under the NeighborWood Scheme.

5.2.2.3 Action Plan 2

- Task 2.1 Repairs will be carried out to the items of existing recreational infrastructure in poor condition (see Table 1).
- Task 2.2 A new section of footpath will be created along the western section of the old millrace (see Figure 9).
- Task 2.3 If resources are available, a new footpath and footbridge will be created across the embankment of the dam millrace (see Figure 9).
- Task 2.4 A new footpath will be created along the river from the southern boundary, linking up with the existing millrace footpath in the vicinity of the car park (see Figure 9).
- Task 2.5 The Norway Spruce stand on the eastern side of the central part of the site will be felled in 2008. The replanting of this area will be designed to enhance the recreational experience by following the recommendations on species selection in the NeighborWood Scheme guidelines (Forest Service, 2001, pp. 10-11). An option that could also be considered is to leave some open unplanted areas to provide views across the site from the forest road.
- Task 2.6 A signpost to Glenbower Wood will be installed on the N25 in Killeagh.
- Task 2.7 The possibility of “tidying-up” the car park area, which the access road passes through before it enters the wood, will be discussed with the landowner.
- Task 2.8 The signage around the car park will be rationalised, reducing the number of separate signs by combining various information on the same sign. For example, one sign could show a list of regulations and another sign provide information about the recreational facilities. Standard international symbols can be used, instead of text, to reduce the amount of space required and make the information accessible to foreign visitors.

5.2.3. Community activities and events

5.2.3.1 Objectives

To maintain the use of the site for community activities and events.

5.2.3.2 Rationale

The existing facilities in the Glenbower Lake site are considered to be adequate for the annual “Music in the Wood” event, and, therefore, no specific management action is proposed.

5.2.4. Interpretation

5.2.4.1 Objectives

To improve interpretative facilities for visitors.

5.2.4.2 Rationale

Interpretative facilities can be an important part of the visitor experience, can make a site a destination for visitors from outside the local area, and can encourage use of the site for educational purposes. Interpretative facilities at Glenbower Wood include a nature trail (website description only) and an information board at the car park. The nature trail will be re-established on the ground, and other facilities have been identified to enhance the visitor experience.

5.2.4.3 Action Plan 3

- Task 4.1 The nature trail will be re-established by installing numbered posts. Additional features can be included in the nature trail, such as information about the two native woodland habitats that occur in the site.

- Task 4.2 Additional information boards will be installed. These could include one showing the route of the nature trail, one at the entrance to the site with information about the millrace and one at White Bridge with information about the lake.
- Task 4.3 An information leaflet about the site will be produced. This could include general information about the site, as well as a guide to the nature trail. This could be available as a downloadable pdf file on the Glenbower Wood & Lake Ltd. website for easy availability to people intending to visit the site.
- Task 4.4 Nameplates will be attached to examples of the main tree species that occur in the site. This could be combined with the nature trail (Task 4.1).

5.2.5. Promotion

5.2.5.1 Objectives

To promote the Glenbower Lake site as a passive recreation destination for visitors from outside the local area.

5.2.5.2 Rationale

Glenbower Wood is a well known amenity site in the east Cork area. However, knowledge of the site is disseminated largely by “word of mouth”. Therefore, many people, for whom the site would be an attractive destination, are not aware of its existence. Promoting the site, through local tourist information, would be in accordance with the policy of Glenbower Wood & Lake Ltd. to manage the site for the use and enjoyment of the general public. Increasing awareness of the site would also help in generating resources for projects such as the restoration of the lake.

5.2.5.3 Action Plan 4

- Task 4.1 The information leaflet (see Task 4.3 in Section 5.2.4.3) will be distributed to local tourist offices and other venues where tourist information is available.

5.2.6. Pitch and putt course

5.2.6.1 Objectives

To submit a planning application for a pitch and putt course in the Glenbower Lake site.

5.2.6.2 Rationale

Glenbower Wood & Lake Ltd. considers that there is a demand for a pitch and putt course in Killeagh, and that this is a facility that would be of benefit for the local community. Therefore, development of a pitch and putt course in the Glenbower Lake site would be in accordance with the policy of Glenbower Wood & Lake Ltd. to develop the site for the benefit of the population of Killeagh and the surrounding areas. The pitch and putt course would be developed in the area of young forestry in the southern part of the site millrace (see Figure 9). It will be necessary to leave a buffer zone between the course and Dissour River to prevent any water quality impacts from run-off from the course. The buffer zone specified by the National Parks and Wildlife Service for rivers in Special Areas of Conservation is 30 m, so this is recommended as an appropriate standard to follow. As Coillte own the coniferous timber in this area, it will be necessary to purchase the rights to this timber from Coillte. A botanical survey would also be required because of the possible presence of a nationally scarce plant (Bird's-nest Orchid) in this area.

5.2.6.3 Action Plan 5

- Task 5.1 Consultations will be carried out with Coillte, Cork County Council, the Forest Service, the local community, and any other relevant interest groups to determine the feasibility of this proposal and to identify any considerations or constraints that will be taken into account in the development of proposals for a pitch and putt course.
- Task 5.2 A botanical survey of the area proposed for the pitch and putt course will be carried out during June-August, to determine whether Bird's-nest Orchid, or any other rare plants, occur in this area.

- Task 5.3 Detailed proposals will be prepared for the design of the pitch and putt course. These should include a buffer zone of at least 30 m between the course and the Dissour River, and should also avoid any areas of botanical importance identified by the botanical survey.
- Task 5.4 Consultations will be carried out with Coillte, Cork County Council, the Forest Service, the local community, and any other relevant interest groups to identify any concerns about the detailed proposals.
- Task 5.5 Following any necessary modifications to the proposals arising from the consultation in Task 5.4, a planning application will be submitted.

5.3. NATURE CONSERVATION MANAGEMENT

5.3.1. Eroding/upland river habitat in the Dissour River

5.3.1.1 Objectives

To maintain the existing high level of integrity of this habitat.

5.3.1.2 Rationale

This habitat has a high level of integrity due to the lack of physical modification of the river channel, and the apparently satisfactory water quality. There is little need for active management to maintain the quality of this habitat. However, there is some potential for impacts to water quality from the intensive farmland that adjoins the western side of the channel adjoining the southern section of the site, and creation of a 10 m wide uncultivated buffer strip would be desirable if this could be agreed with the landowner.

5.3.1.3 Action Plan 6

- Task 6.1 The feasibility of creating a 10 m wide buffer strip along the western bank of the Dissour River adjacent to the southern section of the site will be discussed with the landowner.

5.3.2. Oak-birch-holly woodland habitat

5.3.2.1 Objectives

To maintain integrity of existing area of this habitat by preventing spread of *Rhododendron* and preventing regeneration of non-native trees.

To liaise with Coillte to expand the area of this habitat.

5.3.2.2 Rationale

The existing habitat has a high level of integrity due to the almost complete absence of non-native trees and shrubs. However, a small amount of the invasive non-native *Rhododendron* is present and should be eliminated before it spreads any further. Regeneration of non-native tree species does not seem to be an issue at present, but needs to be monitored on an ongoing basis in case it becomes a problem. The total extent of this habitat (including the adjoining area within the Coillte property) is very small and expanding the area of this habitat would create a more viable area of habitat.

5.3.2.3 Action Plan 7

- Task 7.1 The *Rhododendron* bushes present within this habitat will be removed.
- Task 7.2 A survey for evidence of regeneration by non-native tree species (principally Beech and Sycamore) will be carried out every few years and any found will be uprooted and disposed of away from this area.
- Task 7.3 The feasibility of expanding the area of this habitat will be discussed with Coillte.

5.3.3. Wet pedunculate oak-ash woodland habitat

5.3.3.1 Objectives

To restore the existing area of this habitat (depending on funding).

To extend the area of this habitat.

5.3.3.2 Rationale

The existing habitat has been heavily degraded by invasion of non-native trees and shrubs. However, attempting to restore this habitat would require intensive work and significant resources. Therefore, it is probably not feasible for a voluntary group to undertake this work without some form of assistance, but such assistance might be obtained through the Native Woodland Scheme (Forest Service, 2001a). An opportunity to expand the area of this habitat will occur in 2008 when a stand of Sitka Spruce on the river floodplain at the southern end of the site will be felled.

5.3.3.3 Action Plan 8

- Task 8.1 The possibility of obtaining funding through the Native Woodland Scheme to restore the existing habitat will be explored.
- Task 8.2 When the Sitka Spruce stand (sub-compartment 31783N 12) on the river floodplain at the southern end of the site is felled, this area will be used to create additional wet pedunculate oak-ash woodland habitat, either by planting or by allowing natural regeneration.

5.3.4. Population of Bird's-nest Orchid

5.3.4.1 Objectives

To maintain this population.

5.3.4.2 Rationale

The precise location of this population is not known and it would be useful to carry out a survey to find this out. However, in the absence of such a survey it is reasonable to assume that the population will persist if the forest habitat at the southern end of the site is not interfered with. Therefore, before any forestry operations are carried out in this area, a survey will need to be carried out so that the area where the population occurs can be avoided during any forestry operations.

5.3.4.3 Action Plan 9

- Task 9.1 A survey to determine the location of this population will be carried out if resources allow. It may be possible to achieve this by volunteer effort (see also Task 6.1). If the action plan for development of a pitch and putt course is carried out (see Section 5.2.6) is carried out, then this survey will be carried out as part of that action plan.
- Task 9.2 Before any forestry operations are carried out in the southern section of the site, the location of this population must be established, and measures must be agreed to protect the population during the operations.

5.3.5. Salmon population in the Dissour River

5.3.5.1 Objectives

To maintain the role of the Glenbower Lake site in supporting the Salmon population in the Dissour River.

5.3.5.2 Rationale

The Southern Regional Fisheries Board (SRFB) has recently carried out an assessment of the fish stocks in the Dissour River and is preparing a report on the results of this assessment. This report may contain recommendations for measures to improve the salmonid habitat in the Glenbower Lake site.

5.3.5.3 Action Plan 10

- Task 10.1 Subject to the availability of resources, any recommendation in the SRFB report relating to the Glenbower Lake site will be carried out.

5.3.6. Feeding habitat for Barn Owls

5.3.6.1 Objectives

To maintain the role of the Glenbower Lake site in providing feeding habitat for the local Barn Owl population.

5.3.6.2 Rationale

There is no reason to suppose that the role of the Glenbower Lake site in providing feeding habitat for the local Barn Owl population is likely to change in the foreseeable future, and, therefore, no management action is proposed.

5.3.7. Otter population along the Dissour River

5.3.7.1 Objectives

To maintain the role of the Glenbower Lake site in supporting the local Otter population.

5.3.7.2 Rationale

There is no reason to suppose that the role of the Glenbower Lake site in supporting the local Otter population is likely to change in the foreseeable future, and, therefore, no management action is proposed.

5.4. RESEARCH

5.4.1.1 Objectives

To acquire information for evaluating the significance of the site, and to provide information for educational/interpretation purposes.

5.4.1.2 Rationale

Glenbower Wood is an old, probably ancient, woodland. In such cases, even when the habitats have been highly modified, there is a strong likelihood of rare woodland plants and invertebrates occurring. At Glenbower Wood, this has already been demonstrated by the occurrence of Bird's-nest Orchid and Tunbridge Filmy-Fern. Further survey work would be useful to determine the status of these species in the Glenbower Lake site, and to find out if any other notable plant or invertebrate species occur. Bat surveys would also be useful. However, this information is not essential to the core management objectives for the site, and the opportunity for such survey work will, therefore, probably depend upon the availability of voluntary expertise.

5.4.1.3 Action Plan 11

Task 11.1 Surveys of plants, invertebrates and bats will be carried out on an opportunistic basis if resources or volunteer effort is available.

Task 11.2 Casual records of flora and fauna from the site will be collated, by soliciting records from visitors to the site (e.g., through a recording form on the website).

5.5. ECONOMIC USES

5.5.1. Forestry

5.5.1.1 Objectives

The objective of Coillte, in relation to the Glenbower Lake site, is assumed to be to maximise the economic return from the timber that they own within the site (see Section 4.1.2).

5.5.1.2 Rationale

During the period covered by this management plan, Coillte intend, in 2008, to harvest coniferous timber from sub-compartments 31783N 8 and 12. Under the terms of the agreement between Glenbower Wood & Lake Ltd. and Coillte, Glenbower Wood & Lake Ltd. will be required to apply for a felling licence on Coillte's behalf, for this operation. Due to the requirements of the relevant legislation (see Section 4.4.1.1), it may be necessary to apply for a limited felling licence so that the proposals for the future uses of these

areas in Tasks 2.5 and 8.2 (see Sections 5.2.2.3 and 5.3.3.3) can be carried out. Therefore, it will be necessary to develop the necessary detail of these proposals before the scheduled felling date (2008) so that these proposals can be agreed with the Forest Service if a limited felling licence is necessary. The felling operations will be carried out by Coillte and, therefore, does not require action by the Glenbower Wood & Lake Ltd.

5.5.1.3 Action Plan 12

- Task 12.1 Glenbower Wood & Lake Ltd. will prepare proposals (see Tasks 2.5 and 8.2 in Sections 5.2.2.3 and 5.3.3.3) for the future uses of sub-compartments 31783N 8 and 12 before the end of 2007.
- Task 12.2 Coillte will inform Glenbower Wood & Lake Ltd. in good time when it is necessary to apply for a felling licence.
- Task 12.3 Before applying for the felling licence, Glenbower Wood & Lake Ltd. will consult with the Forest Service to determine any specific requirements for their application, in order to obtain a felling licence that will allow the implementation of the proposals for the future uses of the felled areas.
- Task 12.4 Before applying for the felling licence, the botanical survey specified in Task 9.2 will be carried out
- Task 12.5 Glenbower Wood & Lake Ltd. will apply for a felling licence in accordance with the advice received from the Forest Service, and taking account of any recommendations arising from the botanical survey.
- Task 12.6 Subject to the granting of the felling licence, Coillte will fell the coniferous timber in sub-compartments 31783N 8 and 12 in accordance with any relevant guidelines and standards, and any specific conditions of the felling licence.
- Task 12.7 Following completion of the felling operations, Glenbower Wood & Lake Ltd. will implement the proposals (see Tasks 2.5 and 8.2 in Sections 5.2.2.3 and 5.3.3.3) for the future uses of sub-compartments 31783N 8 and 12.

5.5.2. Fisheries

5.5.2.1 Objectives

To maintain the value of the section of the Dissour River within the Glenbower Lake site as nursery and spawning habitat for salmonid fisheries lower down the Dissour River.

To develop an angling resource within the Glenbower Lake site.

5.5.2.2 Rationale

Proposals to maintain the value of the section of the Dissour River within the Glenbower Lake site as site as nursery and spawning habitat for salmonids are contained in Action Plan 10 (see Section 5.3.5.3). Proposals to develop an angling resource, by restoration of the lake are contained in Action Plan 1 (see Section 5.2.1.3).

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APPENDIX 1 SCIENTIFIC NAMES OF PLANTS AND ANIMALS MENTIONED IN THE TEXT

Plants

Alder	<i>Alnus glutinosa</i>
Ash	<i>Fraxinus excelsior</i>
Beech	<i>Fagus sylvatica</i>
Bilberry	<i>Vaccinium myrtillus</i>
Bird's-nest Orchid	<i>Neottia nidus-avis</i>
Brambles	<i>Rubus fruticosus</i> AGG.
Broad-leaved Dock	<i>Rumex obtusifolius</i>
Broad Buckler-fern	<i>Dryopteris dilatata</i>
Cherry Laurel	<i>Prunus laurocerasus</i>
Cock's-foot	<i>Dactylis glomerata</i>
Common Nettle	<i>Urtica dioica</i>
Common Ragwort	<i>Senecio jacobaea</i>
Douglas Fir	<i>Pseudotsuga menziesii</i>
Downy Birch	<i>Betula pubescens</i>
Elder	<i>Sambucus nigra</i>
Enchanter's-nightshade	<i>Circaea lutetiana</i>
False Brome	<i>Brachypodium sylvaticum</i>
False Oat-grass	<i>Arrhenatherum elatius</i>
Great Horsetail	<i>Equisetum telmateia</i>
Great Wood-rush	<i>Luzula sylvatica</i>
Hard-fern	<i>Blechnum spicant</i>
Hart's-tongue	<i>Phyllitis scolopendrium</i>
Hawthorn	<i>Crataegus monogyna</i>
Hazel	<i>Corylus avellana</i>
Hedge Bindweed	<i>Calystegia sepium</i>
Hedge Woundwort	<i>Stachys sylvatica</i>
Hemlock Water-dropwort	<i>Oenanthe crocata</i>
Herb-robert	<i>Geranium robertianum</i>
Hogweed	<i>Heracleum sphondylium</i>
Holly	<i>Ilex aquifolium</i>
Honeysuckle	<i>Lonicera periclymenum</i>
Horse-chestnut	<i>Aesculus hippocastanum</i>
Killarney Fern	<i>Trichomanes speciosum</i>
Lords-and-Ladies	<i>Arum maculatum</i>
Marsh Ragwort	<i>Senecio aquaticus</i>
Norway Spruce	<i>Picea abies</i>
Oak	<i>Quercus</i> sp.
Opposite-leaved Golden-saxifrage	<i>Chrysosplenium oppositifolium</i>
Pendulous Sedge	<i>Carex pendula</i>
Reed Canary-grass	<i>Phalaris arundinacea</i>
Remote Sedge	<i>Carex remota</i>
Rhododendron	<i>Rhododendron ponticum</i>
Rowan	<i>Sorbus aucuparia</i>
Rusty Willow	<i>Salix cinerea</i> subsp. <i>oleifolia</i>
Scaly Male-fern	<i>Dryopteris affinis</i>
Scots Pine	<i>Pinus sylvestris</i>
Sessile Oak	<i>Quercus petraea</i>
Sitka Spruce	<i>Picea sitchensis</i>
Slender Rush	<i>Juncus tenuis</i>
Slender St John's-wort	<i>Hypericum pulchrum</i>

Soft Shield-fern	<i>Polystichum setiferum</i>
Spruce	<i>Picea</i> sp.
Sweet Violet	<i>Viola odorata</i>
Sycamore	<i>Acer pseudoplatanus</i>
Tunbridge Filmy-Fern	<i>Hymenophyllum tunbrigense</i>
Western Hemlock-spruce	<i>Tsuga heterophylla</i>
Western Red-cedar	<i>Thuja plicata</i>
Willow	<i>Salix</i> sp.
Wood-sedge	<i>Carex sylvatica</i>
Wood-sorrel	<i>Oxalis acetosella</i>
Wood Avens	<i>Geum urbanum</i>
Yellow Pimpernel	<i>Lysimachia nemorum</i>

Invertebrates

Beautiful Demoiselle	<i>Calopteryx virgo</i> (L.)
Freshwater Pearl Mussel	<i>Margaritifera margaritifera</i> (L.)
Migrant Hawker	<i>Aeshna mixta</i> Latreille
Silver-washed Fritillary	<i>Argynnis paphia</i> (L.)

Fish

Brown/Sea Trout	<i>Salmo trutta</i>
Salmon	<i>Salmo salar</i>

Amphibians and reptiles

Common Frog	<i>Rana temporaria</i>
Common Lizard	<i>Lacerta vivipara</i>

Birds

Barn Owl	<i>Tyto alba</i>
Blackbird	<i>Turdus merula</i>
Blackcap	<i>Sylvia atricapilla</i>
Blue Tit	<i>Parus caeruleus</i>
Bullfinch	<i>Pyrrhula pyrrhula</i>
Chaffinch	<i>Fringilla coelebs</i>
Chiffchaff	<i>Phylloscopus collybita</i>
Coal Tit	<i>Parus ater</i>
Collared Dove	<i>Streptopelia decaocto</i>
Common Sandpiper	<i>Actitis hypoleucos</i>
Coot	<i>Fulica atra</i>
Cormorant	<i>Phacrocorax carbo</i>
Cuckoo	<i>Cuculus canorus</i>
Dipper	<i>Cinclus cinclus</i>
Dunnock	<i>Prunella modularis</i>
Fieldfare	<i>Turdus pilaris</i>
Goldcrest	<i>Regulus regulus</i>
Goldfinch	<i>Carduelis carduelis</i>
Great Tit	<i>Parus major</i>
Green Sandpiper	<i>Tringa ochropus</i>
Greenfinch	<i>Carduelis chloris</i>
Grey Heron	<i>Ardea cinerea</i>
Grey Wagtail	<i>Motacilla cinerea</i>
Hooded Crow	<i>Corvus corone cornix</i>

House Martin	<i>Delichon urbica</i>	Wood Mouse	<i>Apodemus sylvaticus</i>
House Sparrow	<i>Passer domesticus</i>		
Jackdaw	<i>Corvus monedula</i>		
Jay	<i>Garrulus glandarius</i>		
Kestrel	<i>Falco tinnunculus</i>		
Kingfisher	<i>Alcedo atthis</i>		
Linnet	<i>Carduelis cannabina</i>		
Little Grebe	<i>Tachybaptus ruficollis</i>		
Long-eared Owl	<i>Asio otus</i>		
Long-tailed Tit	<i>Aegithalos caudatus</i>		
Magpie	<i>Pica pica</i>		
Mallard	<i>Anas platyrhynchos</i>		
Meadow Pipit	<i>Anthus pratensis</i>		
Mistle Thrush	<i>Turdus viscivorus</i>		
Moorhen	<i>Gallinula chloropus</i>		
Mute Swan	<i>Cygnus olor</i>		
Pheasant	<i>Phasianus colchicus</i>		
Pied Wagtail	<i>Motacilla alba</i>		
Raven	<i>Corvus corax</i>		
Redpoll	<i>Carduelis flammea</i>		
Redwing	<i>Turdus iliacus</i>		
Reed Bunting	<i>Emberiza schoeniclus</i>		
Robin	<i>Erithacus rubecula</i>		
Rook	<i>Corvus frugilegus</i>		
Sand Martin	<i>Riparia riparia</i>		
Siskin	<i>Carduelis spinus</i>		
Skylark	<i>Alauda arvensis</i>		
Snipe	<i>Gallinago gallinago</i>		
Song Thrush	<i>Turdus philomelos</i>		
Sparrowhawk	<i>Accipiter nisus</i>		
Spotted Flycatcher	<i>Muscicapa striata</i>		
Starling	<i>Sturnus vulgaris</i>		
Stock Dove	<i>Columba oenas</i>		
Swallow	<i>Hirundo rustica</i>		
Swift	<i>Apus apus</i>		
Teal	<i>Anas crecca</i>		
Treecreeper	<i>Certhia familiaris</i>		
Tufted Duck	<i>Aythya fuligula</i>		
Whitethroat	<i>Sylvia collybita</i>		
Willow Warbler	<i>Phylloscopus trochilus</i>		
Woodcock	<i>Scolopax rusticola</i>		
Woodpigeon	<i>Columba palumbus</i>		
Wren	<i>Troglodytes troglodytes</i>		
Yellowhammer	<i>Emberiza citrinella</i>		
Mammals			
American Mink	<i>Mustela vison</i>		
Bank Vole	<i>Clethrionomys glareolus</i>		
Common Rat	<i>Rattus norvegicus</i>		
Fox	<i>Vulpes vulpes</i>		
Hedgehog	<i>Erinaceus europaeus</i>		
House Mouse	<i>Mus musculus</i>		
Irish Hare	<i>Lepus timidus</i>		
Otter	<i>Lutra lutra</i>		
Pine Marten	<i>Martes martes</i>		
Pygmy Shrew	<i>Sorex minutus</i>		
Rabbit	<i>Oryctolagus cuniculus</i>		
Red Squirrel	<i>Sciurus vulgaris</i>		
Stoat	<i>Mustela erminea</i>		

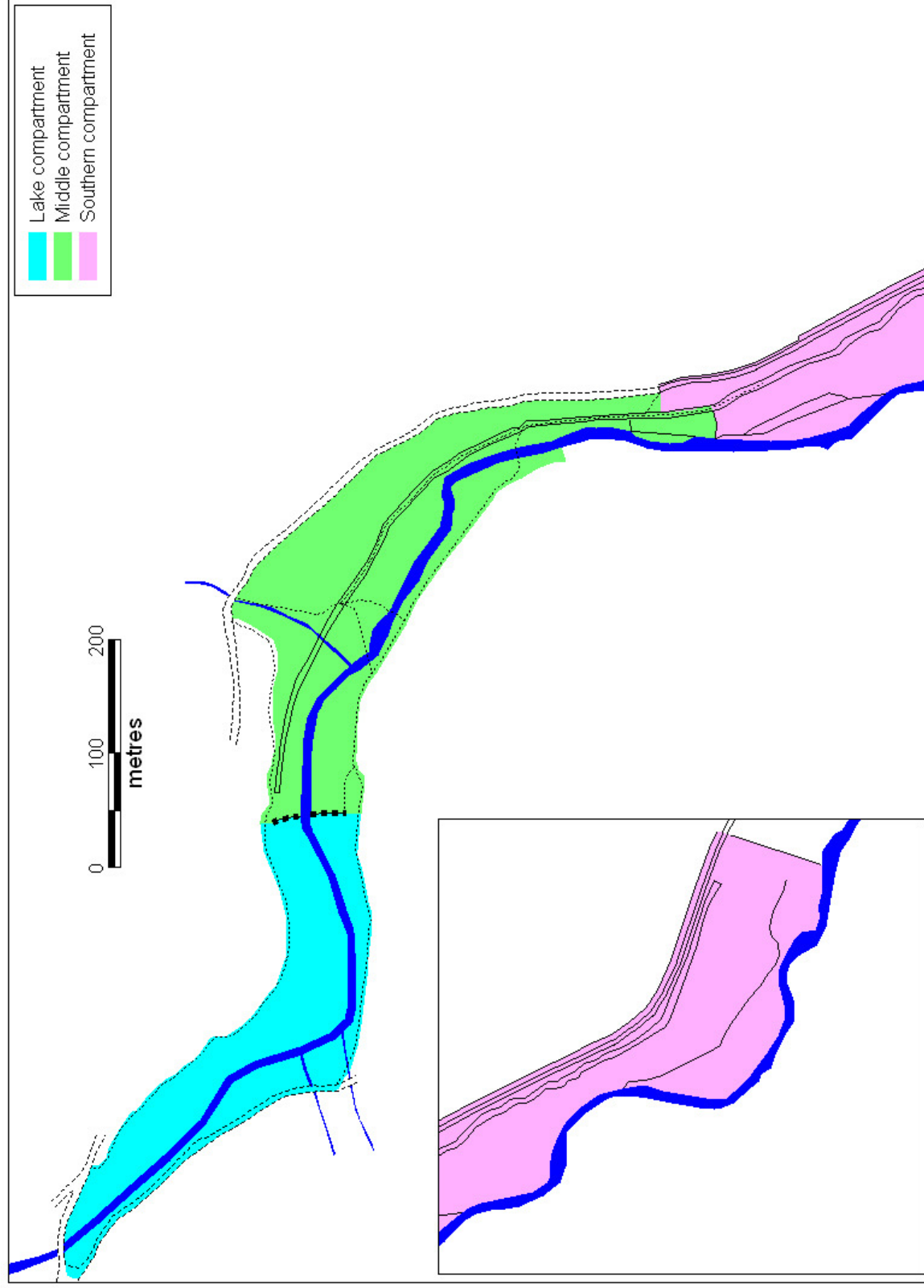


Figure 1. Compartments of the Glenbow Lake site.

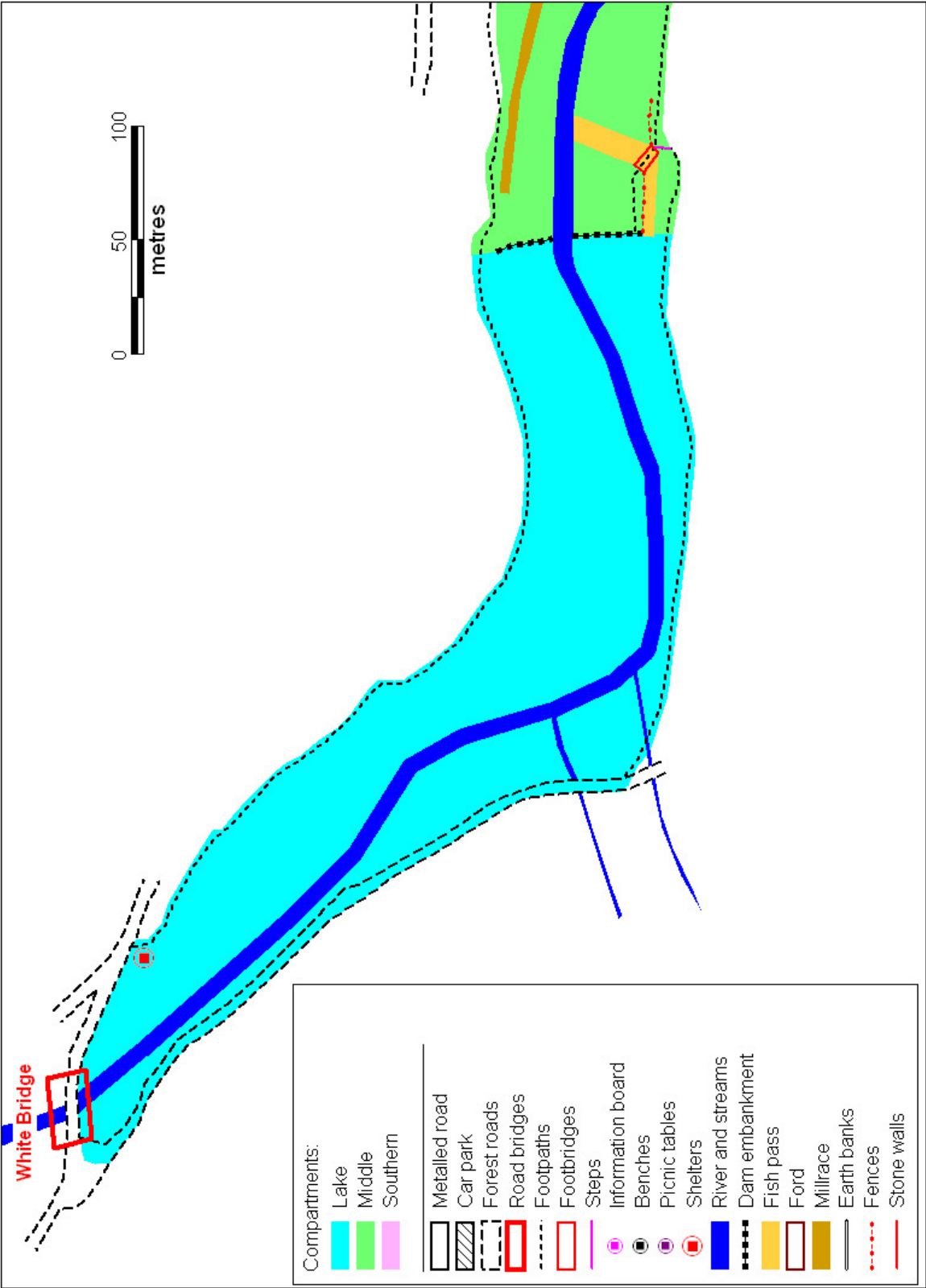


Figure 2. Physical features and management infrastructure of the Glenbow Lake site: Lake compartment.

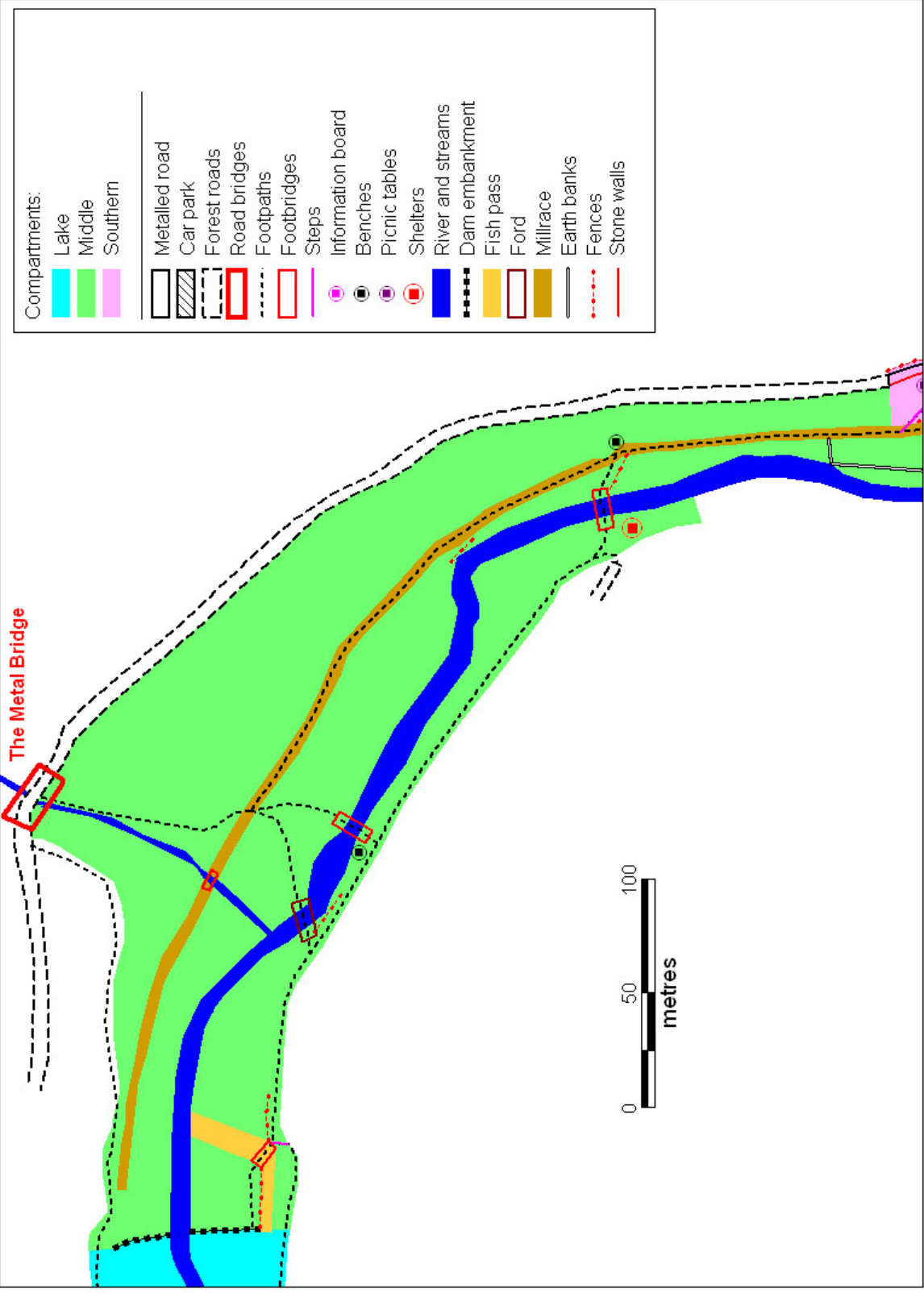


Figure 3. Physical features and management infrastructure of the Glenbow Lake site: Middle compartment.

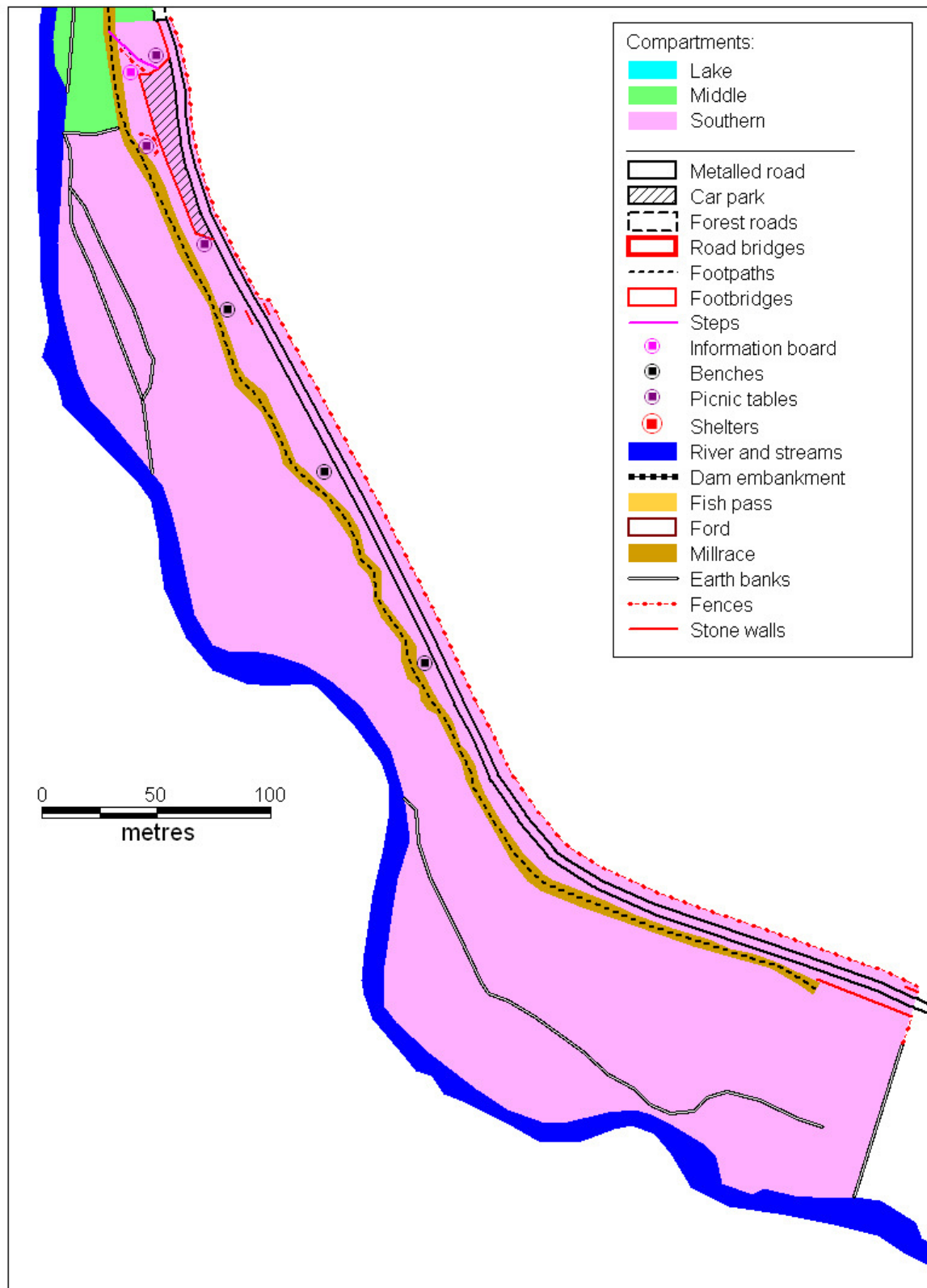


Figure 4. Physical features and management infrastructure of the Glenbower Lake site: Southern compartment.

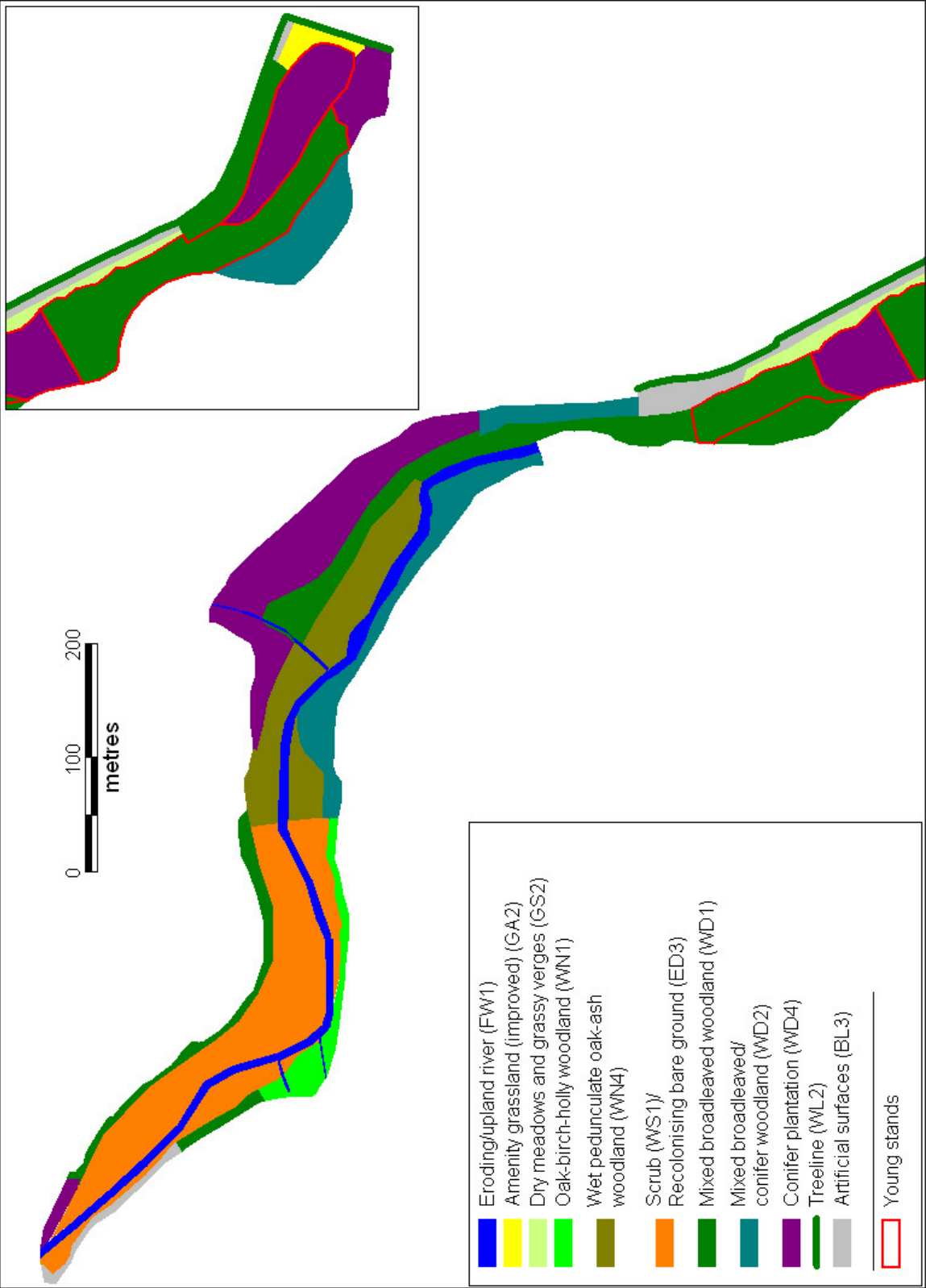


Figure 5. Habitat map of the Glenbow Lake site.

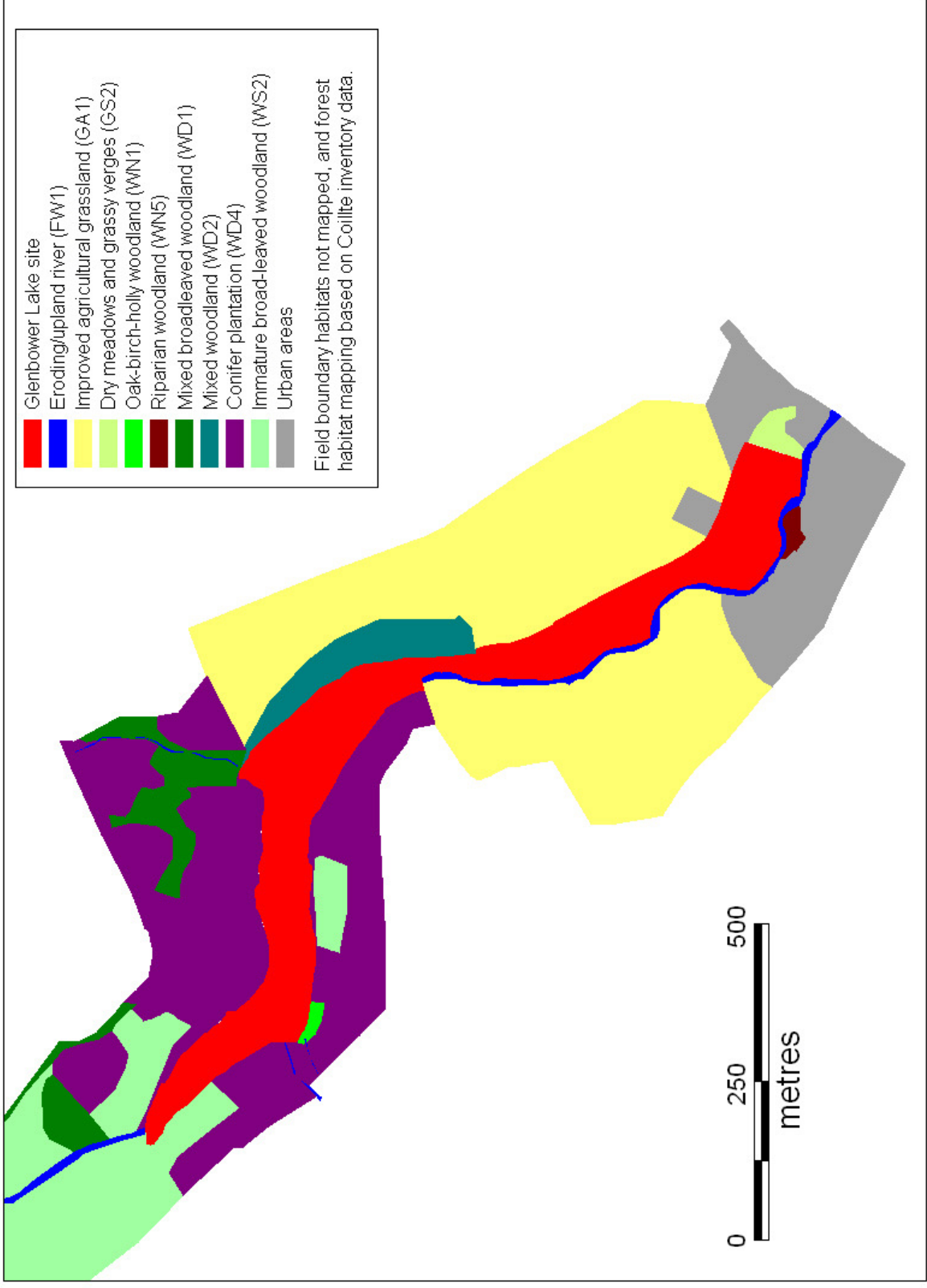


Figure 6. Habitats adjoining the Glenbower Lake site.

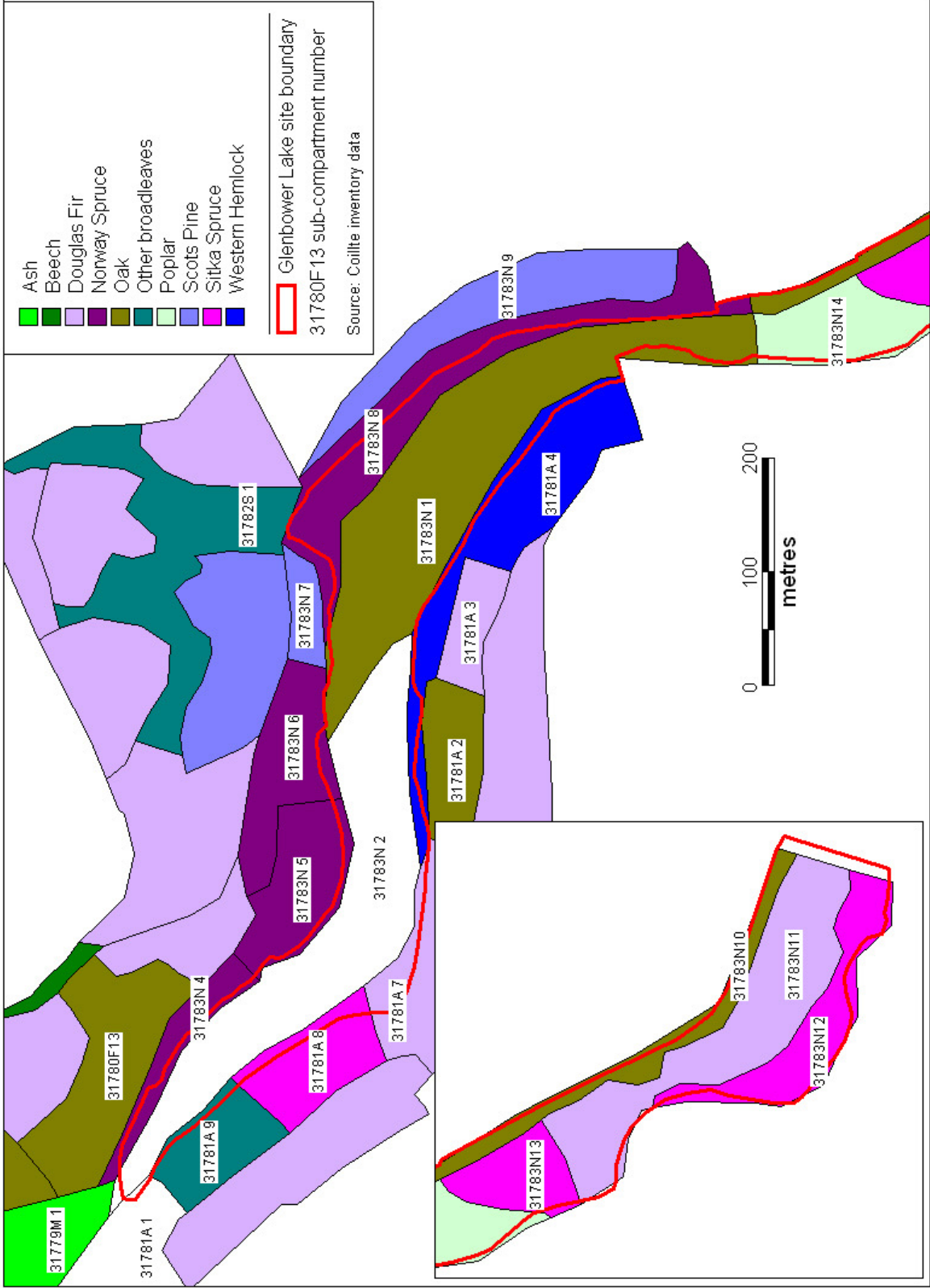


Figure 7. Forest inventory map of the Glenbow Lake site and adjoining areas.

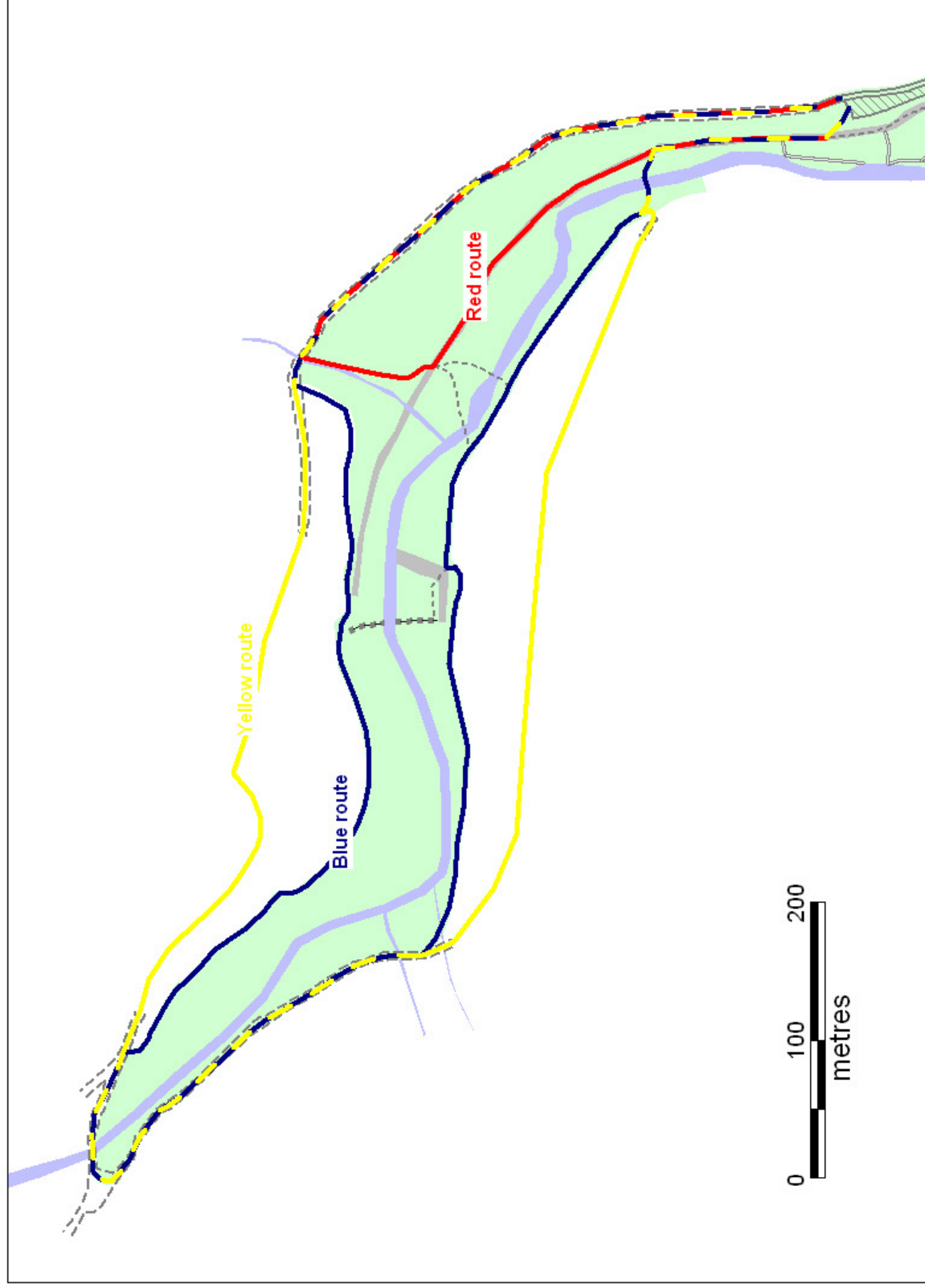


Figure 8. Waymarked circular walking routes

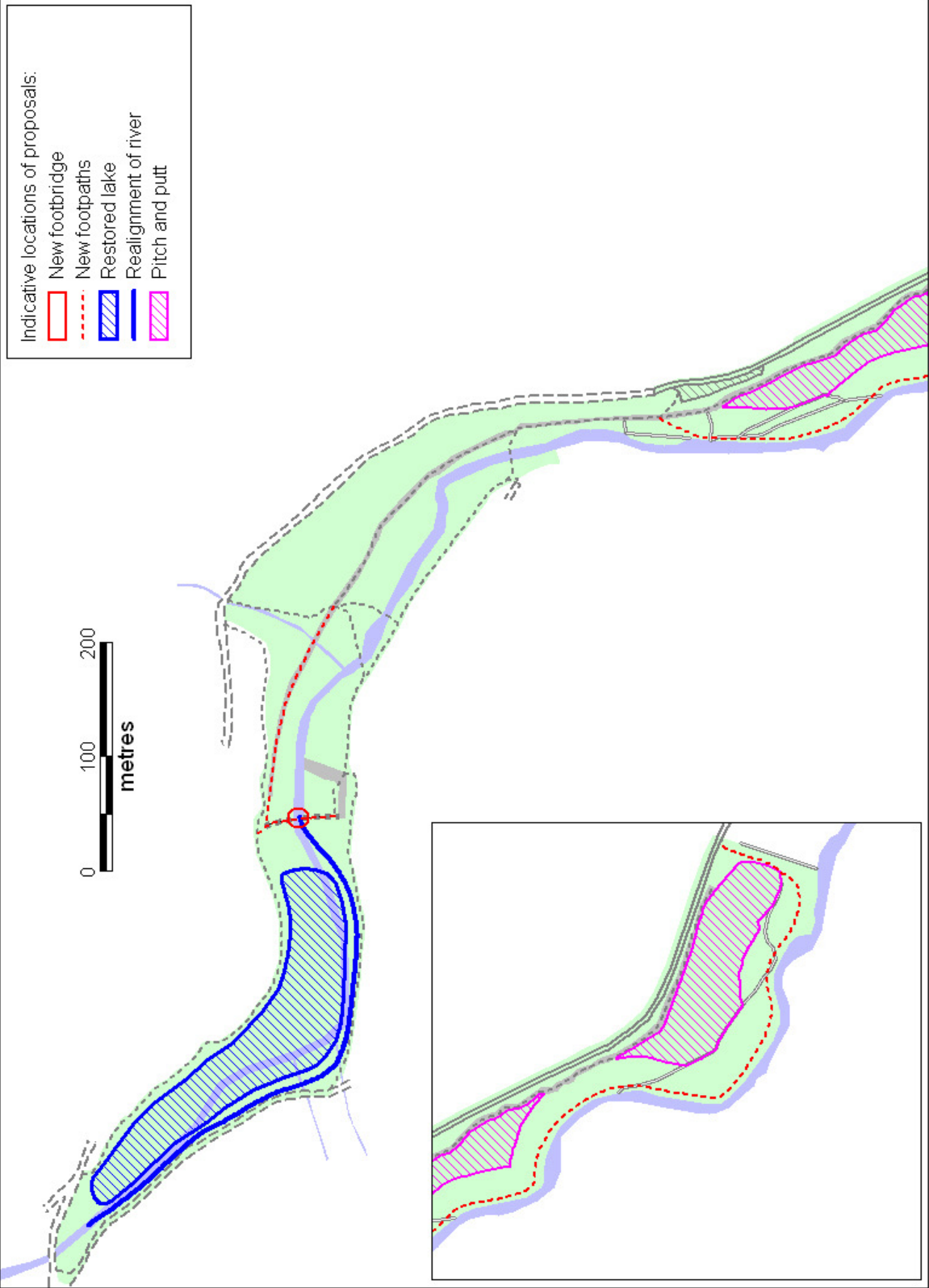


Figure 9. Major recreation/amenity management proposals.