

LOCH LEVEN NATIONAL NATURE RESERVE

A framework for provision of local access arrangements for recreation

- 1. Introduction**
- 2. Background**
- 3. Special Wildlife Interest of Loch Leven**
- 4. SNH's Objectives for Loch Leven National Nature Reserve**
- 5. Why is Access a Major Issue?**
- 6. Assessment of the Implications of Changes to Access Arrangements**
- 7. Legislative Context**
 - 7.1 Habitats & Birds Directive
 - 7.2 Land Reform (Scotland) Act 2003
 - 7.3 SNH National Nature Reserve policy statement
- 8. Existing Recreational Use**
 - 8.1 Fishing
 - 8.2 Birdwatching
 - 8.3 Walking
 - 8.4 Wildfowling
 - 8.5 Visits to Castle Island
 - 8.6 General relaxation
- 9. Compatibility of Existing Recreational Use with NNR Objectives and Conditions**
 - 9.1 Fishing
 - 9.2 Birdwatching
 - 9.3 Walking
 - 9.4 Wildfowling
- 10. Potential New Types of Access**
 - 10.1 Water-borne activities
 - 10.2 Cycling and walking
- 11. Compatibility of New Types of Access with NNR Objectives and Conditions**
- 12. Summary**
- 13. Recommendation**
- 14. Framework of Guiding Principles for Loch Leven**

LOCH LEVEN NATIONAL NATURE RESERVE

A framework for provision of local access arrangements for recreation

1. Introduction

This paper outlines Scottish Natural Heritage's (SNH) view on the requirements to safeguard the natural heritage interest of Loch Leven alongside introduction of the Land Reform (Scotland) Act 2004 with its opportunities for responsible access. It sets the framework within which discussions with all interested parties can take place to develop local guidance for 'responsible access' at Loch Leven National Nature Reserve (NNR).

A summary of this framework is available as a leaflet from SNH.

2. Summary

Loch Leven is one of Scotland's 55 National Nature Reserves. It has international accolades as a Special Protection Area¹ for wintering wildfowl and as a Ramsar² wetland site. The site is also designated as a Site of Special Scientific Interest for its wintering and breeding wildfowl, the higher plant species it supports (aquatic and land-based), and its rare beetles and flies.

The Land Reform (Scotland) Act 2004 provides for opportunities for responsible access to most land and inland water, including Loch Leven National Nature Reserve, through adherence to the Scottish Outdoor Access Code (SOAC) and provision of local guidance where suitable. In order to ensure that any new access does not compromise the legal obligations for the NNR, Scottish Natural Heritage (SNH) has taken access as an issue that needs to be examined outside their NNR management plan process.

In order to develop a framework of guiding principles SNH undertook the following steps:

1. Collated information on how, when and where birds use the NNR;
2. Detailed the national and European legislation, and SNH policies;
3. Listed existing and new uses of the loch.

This was then used in producing an ecological assessment for the NNR, which looked at the existing and new uses of the loch and assessed their compatibility with NNR objectives.

An options appraisal of three management scenarios was then undertaken. The options considered were:

- i) Relying on Scottish Outdoor Access Code to protect the NNR interests;
- ii) Restrict access at current level through bye-laws; and
- iii) Pro-active managed access through the development of guidelines for

¹ European wildlife site designated under Council Directive 79/409/EEC

² UK is a contracting party to the Ramsar Convention on Wetlands of International Importance.

responsible access.

Each option was assessed against 5 criteria: legislative framework, SNH NNR policy, impact on natural heritage, impact on user groups, and conclusions of the March 2004 Public meeting.

This concluded that the option of managed access through the development of guidelines for responsible access should be pursued. This led to the development of a series of guiding principles which, if followed, would avoid significant disturbance to wild birds.

3. Special Wildlife Interest of Loch Leven

As the largest naturally eutrophic lowland water body in Britain, Loch Leven's large size, shallow depth and eutrophic status means it is biologically highly productive. As such, the loch supports the largest known concentration of breeding duck in Britain, with around 1,000 pairs nesting on St. Serf's Island, and is why the reserve holds very large migratory and wintering wildfowl populations, with a peak of up to 35,000 in October. In addition, the availability of suitable habitat throughout the loch, with a tradition of being relatively free from human disturbance, has been another important factor in protecting the natural heritage interests. When the loch was first declared a nature reserve in 1964, bye-laws were imposed that restricted land based access around most of the edge of the loch and also restricted the launch or mooring of boats. Although the bye-laws have since lapsed, the basic principles are still adhered to.

4. SNH's Objectives for Loch Leven National Nature Reserve

SNH manages Loch Leven as a National Nature Reserve through agreement with the land-owners, Kinross Estates, and with other managers of the loch. In addition, Vane farm, which is owned by the RSPB, is now within the NNR. We would like Loch Leven NNR to be known as one of the top nature reserves in the country and a place to come and see wildlife.

The Objectives for management of the NNR are:

- To maintain the site for its wildlife, so that people can visit the reserve, understand the loch better and enjoy the natural heritage of the loch to the full;
- To encourage research into the natural heritage and its management;
- To demonstrate specialised management where it is needed to safeguard conservation interests, for example St Serfs Island, where wildlife is especially fragile or vulnerable.

To achieve this we need to meet the following conditions:

- Avoid deterioration to habitats and significant disturbance to habitats and species;
- Give primacy to nature: this does not exclude all other activities, where they are compatible with giving primacy to nature;
- Enable the public to enjoy and appreciate the natural heritage value of the reserve.

These conditions are presented in priority order. SNH recognises the additional challenge at the present time is to both balance our obligations under The Habitats &

Bird Directives³, and our policy to give priority for *primacy of nature* on National Nature Reserves, with our duties under the Land Reform (Scotland) Act 2003, as land managers, and to promote the Scottish Outdoor Access Code. This requires us to take account of potential users wishes to exercise their access rights.

5. Why is Access a Major Issue?

In autumn 2004, the Land Reform Act brings in a right of non-motorised access over land and inland water conditional on responsible behaviour. Such access has not previously taken place over the loch. Given Loch Leven's high natural heritage interest and its management as a National Nature Reserve, any changes in access arising need to be compatible with management of the site as a nature reserve.

Access is also a major issue because there is likely to be an increase in public demand for better access around and onto the loch. This brings potential public safety issues, particularly over the loch itself.

SNH held a public meeting on 22 March 2004 to hear people's views on management of the loch. The published report of this concluded that:

“the qualities people valued about Loch Leven included: the peace & tranquillity, the landscape, the natural wildlife spectacle, the large water body, the fact that it acts as a focus for Kinross, the cultural & historical links, its wildlife / conservation importance, the fishing, walking, the scientific research, its importance to the local economy and tourism, photography, the Vane Farm facility, and its geology.”

As regards aspirations for the future, the report concluded that:

“people wished to see a change in: access on the land and water, water quality, education, interpretation, information, signage, fishing, surrounding development, nature conservation, tourism, development of a visitor centre and other facilities, and community links and involvement. Some wished there to be no change.”

From an evaluation of the views expressed, access around on or over the loch is seen as a major issue. There was not consensus at the meeting on whether access to the loch should increase, but there was agreement that any increase in provision of access needs to be managed. Suggestions included: establishing path networks (including all abilities) and defined access points, setting up water-sports, the use of wardens, setting up voluntary codes of conduct, access via club membership, use of bye-laws, charging users, zoning the loch, licensing, ticketing, hot-lines and monitoring. More generally though, there was a recognition that there is a need for more information and interpretation about the importance of the loch.

6. Assessment of the Implications of Changes to Access Arrangements

This second part of the paper looks at potential impacts of increased access provision in the context of compatibility with the legal and policy framework, the

³ Council Directive 92/43/EEC (1992) on the Conservation of natural habitats and of wild flora and fauna and Council Directive 79/409/EEC (1979) on the Conservation of Wild Birds, jointly known as Natura 2000 Sites

maintenance of the natural heritage interest and compatibility with other recreational users. On the basis of this appraisal it makes recommendations as to how a balance can be achieved.

7. Legislative Context

7.1 Habitats & Birds Directive

To comply with the Habitats Directive (Article 6.2), it is an obligation of Member States to ensure that within Natura sites that appropriate steps are taken to avoid deterioration of habitats, and habitats of species, as well as significant disturbance of species. As part of the process for ensuring compliance with Article 6.2, new plans or projects require to be assessed “in view of site’s ‘conservation objectives’” (Article 6.3). The competent authority shall agree to the plan or project only after ascertaining that it will not adversely affect the integrity of the site (Article 6.3).

Should detailed local access guidance for Loch Leven be proposed, this would constitute a “project or plan” as stated in Article 6.3 of the Habitats Directive and it would therefore be subject to an appropriate assessment by SNH, of its implications for the site in view of the site’s conservation objectives.

7.2 Land Reform (Scotland) Act 2003

Everyone, whatever their age or ability, has access rights established by Part 1 of the Land Reform (Scotland) Act 2003. The exercise of access rights is conditional on responsible behaviour and there is a reciprocal obligation on land managers to manage land in a responsible manner. Guidance on responsibilities is provided in the SOAC.

The new statutory rights can be exercised over most land and inland water in Scotland, including mountains, moorland, woods and forests, grassland, field margins, paths and tracks, rivers and lochs, the coast and most parks and open spaces. Access rights are for non-motorised recreational purposes (and some educational and commercialised uses) and guidance on the responsible exercise of access rights includes:

- do not interfere unreasonably with the rights of other people;
- do not intentionally or recklessly disturb or destroy plants, birds and other animals;
- do not linger if it is clear that your presence is causing significant disturbance to a bird or other wild animal;
- follow any agreed local information aimed at preventing significant disturbance to protected plants, birds or other animals, or at preventing the spread of erosion in more sensitive areas;
- take extra care to avoid disturbing more sensitive birds and animals,
- particularly during their breeding season

A land manager must manage land or water responsibly for access:

- Respect access rights in managing their land or water;
- Act reasonably when asking people to avoid land management operations;

- Work with the local authority and other bodies to help integrate access and land management.

Relevant extracts from the Proposed Scottish Outdoor Access Code are attached at Appendix One.

7.3 SNH National Nature Reserve Policy Statement

The primary aim for National Nature Reserves is to safeguard the natural heritage for which the reserves were identified. Whilst nature always comes first on our NNRs, these sites offer special opportunities for people to enjoy and find out about the richness of our natural heritage. The management of Loch Leven is based on 3 purposes: Raising National Awareness, Providing Specialised Management, Encouraging research and demonstration, and 4 attributes: Primacy of nature, National importance, Best practice management and Continuity of management.

8. Existing Recreational Use

Access is currently taken on the NNR for the following:

8.1 Fishing: The loch is an internationally renowned game fishery with native Brown Trout and introduced Rainbow Trout (first stocked in 1993). It provides approximately 30,000 rod visits per annum. The population of Brown Trout is of significant importance to the ecology and economics of the Loch system and is a recognised race of brown trout which has been used for stocking water bodies throughout the world.

8.2 Birdwatching: The main focus for bird watching is at RSPB's Vane Farm which is part of the NNR and provides viewing facilities and interpretation. Between 60,000 – 70,000 visitors a year visit the site (including 7,000 from school visits) with the majority visiting in July and August. The site is of national importance as a bird watching destination and being the top most visited site for the RSPB in Scotland.

8.3 Walking: The three traditional access points at Kirkgate, Burleigh Sands and Findatie provide short walks along the loch-side. No quantitative data exists for numbers of people using the shoreline Public Access Areas (PAAs) but estimates put the total at around 20,000 per year, a large number of whom are dog walkers.

Footpaths from Burleigh Sands link the site to Milnathort in the north and to Kinross. However access to the east along the shoreline is currently prohibited due to the presence of the Tarhill fish-farm although people do climb over the fence to continue walking along the shore. Walking south and west along the Burleigh PAA towards Kinross previously had a restricted feel to it due to the presence of a straight-lined double-fenced path. The reserve side of the double fence was removed two years ago and now people spread out along the shoreline. Some disabled access is available at Burleigh with provision of a swing gate however sometimes the path can be in poor condition, making disabled access problematic. Findatie is the least-used of the three shoreline PAAs. It is currently used primarily by local dog walkers. Disabled access is poor due to the steep slope that leads to the shore and the narrow path. Access beyond Findatie PAA is cut off by the River

Leven to the north and by Vane Farm to the west. Discussions are underway to improve access at this part of the shore (see para 10.2)

8.4 Wildfowling: Wildfowling operates generally as dawn and dusk flying on a week on, week off basis from mid October until the end of January. There is a maximum of four guns at any one time. Some daytime shooting also takes place and there is nearby inland goose shooting on farmland.

8.5 Visits to Castle Island: Historic Scotland operate a summer ferry service from Kinross Pier to Castle Island, where Mary Queen of Scots was temporarily imprisoned. Approx 13,000 people visit the island each year.

8.6 General relaxation: Kirkgate Park, which is managed by Perth & Kinross Council, is a popular area for the public to enjoy general relaxation close the loch. The park is occasionally used as a launch area for rubber dinghies by children during the summer. The park is also frequently used for events.

9. Compatibility of Existing Recreational Use with NNR Objectives and Conditions

9.1 Fishing for brown trout and rainbow trout

Part of the terms of the NNR agreement with Kinross Estate includes controls on fishing activity. This restricts activity to up to 50 small engined boats to operate throughout the loch from April – October inclusive from 10:00 hrs to dusk.

SNH monitors the condition of all SSSI in Scotland through a Site Condition Monitoring programme. For Loch Leven, this shows that wintering bird numbers in general have increased in numbers when comparing five year WeBS and goose count averages from 1985/86 - 1988/89 with the counts from 1996/7 – 2001/02. The total waterfowl assemblage has risen from ~ 20,000 to ~ 24,500 in this 15 – 16 year period. The only species to show a decline are greylag geese and whooper swans. In addition, nest counts of tufted duck (the main species on Loch Leven) show no statistical change in nest numbers over the last 37 years. Between 1967 and 1970 count data for tufted ducks from St Serfs (the revised season total) fluctuated between 300 and 459 pairs. Comparable counts in 1993/94 were 366 and 362 and for 2002/2003 were 320 and 322.

In relation to the SPA and Ramsar interests and the requirements to maintain the natural heritage interests, any disturbance arising through current fishing practices does not appear to be significant or having an *adverse impact on site integrity* and are therefore compatible with the requirements of the Birds Directive and the Ramsar objectives. Whilst fishing may cause some disturbance in certain parts of the loch, which will be affecting overall bird numbers, this activity has been on-going for a long time and was occurring at the time the site was classified as both a SPA and Ramsar site. Therefore, such disturbance is not considered at a level to prejudice SNH's aim of maintaining bird numbers and thereby safeguarding the natural heritage interest of the site.

9.2 Birdwatching

Bird watchers generally restrict their activity to Vane Farm, some distance from the loch side and there is no evidence that disturbance from bird watching is occurring. The facilities at Vane Farm provide an effective means of facilitating enjoyment and understanding of the NNR.

9.3 Walking

Kirkgate is blocked to access at its east end by a fence, though some people do climb or break the fence in order to access the field beyond. This has significant disturbance implications during the autumn and winter for the goose roost at Kirkgate Point. At Burleigh Sands, when people do occasionally continue on along the north shore, they have potential to cause significant amounts of bird disturbance at certain times of the year at the Carsehall shoreline. Outwith this area and more generally there is no evidence from the monitoring of bird numbers that the existing disturbance pressures are having an adverse impact on the numbers of wintering or breeding birds. However, casual observations by Reserve staff are that walkers are going further afield than previously and methodical monitoring of existing recreational use is required. Information collected for the Tetley Trail by the Perth & Kinross Council gave figures of 9 -10,000 walkers per annum. It is thought likely that comparable numbers will access around Loch Leven.

9.4 Wildfowling

SNH commissioned a review of disturbance issues on wild birds arising from access (Riley, 2004 - summary provided at Appendix Two). This concluded that hunting is the most disturbing recreational activity to waterfowl. Large amounts of disturbance can result in changes in distribution of birds and actual desertion from the site as well as the actual killing of individual birds. The level of wildfowling at Loch Leven is low, with few guns and long periods of no shooting. As the numbers of wintering wildfowl have increased in the last ten years and show no adverse impact resulting from the current level of wildfowling, the SPA/Ramsar interests are being maintained. This activity is therefore meeting the requirements of the Birds Directive and Ramsar obligations. Whilst wildfowling is likely to be causing levels of disturbance, which will be depressing overall bird numbers, such disturbance is not considered at a level to prejudice SNH's aim of safeguarding the natural heritage interest of the site.

9.5 Visits to Castle Island

The boat taking visitors to Castle Island has operated for a number of years and once visitors arrive on the island, their access is restricted to the castle grounds. Whilst this may cause some disturbance to birds along the route taken out to the island, which will be affecting overall bird numbers, this activity has been on-going for a long time and was occurring at the time the site was classified as both a SPA and Ramsar site. Therefore, such disturbance is not considered at a level to prejudice SNH's aim of maintaining bird numbers and thereby safeguarding the natural heritage interest of the site..

9.6 General relaxation

Some of the visitors to the park will enter the shallow margins of the loch at Kirkgate and occasionally launch rubber dinghies. This all takes place within a restricted area not generally well used by birds and is not likely to be having a significant impact.

10. Potential New Types of Access

The right of access to be available under the Land Reform (Scotland) Act 2003 will allow additional access, providing it is exercised responsibly. It is difficult to predict the nature or amount of access that may be taken.

In addition, when considering the potential impacts of additional access, it must be the cumulative effects which are relevant, taking account of the existing impacts of angling, walking and wildfowling.

Examples of additional access are as follows:

10.1 Water-borne activities

Local users have suggested local canoe and sailing clubs (for small dinghies and sailboards) are keen to gain access to the loch, perhaps throughout the year. The Royal Yachting Association has not, to date, received many registers of interest from sail-craft users to be able to access the loch and it has not been possible to quantify the demand from wind-surfers. Potentially, there is a large demand, as Loch Leven is within easy travelling distance of large centres of population.

Loch Leven's large size in comparison with all other shallow lowland lochs is unmatched and therefore offers a unique experience for water-borne users. It could offer an opportunity for the natural heritage to be appreciated in a different way to that which is currently available and from a different perspective than the land based experience.

In terms of the lochs attractiveness for sailing, its open aspect provides good wind conditions for sailing. However, its shallowness over large parts of the loch with over half being less than 2m depth poses practical constraints on sail-craft on Loch Leven. In addition there is very little existing infrastructure for launching craft with only two piers, both at Kirkgate and there are health and safety issues.

Other nearby existing facilities for water-borne recreation are available at Loch Ore,

and Loch Gelly, which are 3-5 km distance from Loch Leven and at Town Loch in Dunfermline approximately 10 km away.

10.2 Cycling and walking

The Loch Leven Heritage Trust project aims to create access to 40 diverse natural, cultural and built heritage sites around Loch Leven. One of the main features of the project is the proposal for a path that links the Vane Farm wetland trail in the south to Findatie PAA, then bridging the cut and into the Levenmouth Pools area. From here the proposal is to create a path through Levenmouth Woods north to the Blackwood and then on to link to the communities at the north of Loch Leven. The proposal aims to create a major new access provision for the NNR and the wider area.

Kirkgate Park is currently being examined both by the Kinross-Shire Partnership and by the Friends of Kirkgate Park for its potential for tourist development.

11. Compatibility of New Types of Access with NNR Objectives and Conditions

Introduction

SNH have used an options appraisal to provide structure to the analysis of the management issues. This identifies the various possible scenarios which may arise following implementation of the Access legislation and then assesses each of these options against relevant criteria.

Options Appraisal

Three options (scenarios) were identified:

- i) Rely on the general provisions of the Scottish Outdoor Access Code and other legislation to protect the NNR;
- ii) Keep access at existing levels; and
- iii) Managed access through local access arrangements.

Each was assessed against 5 criteria: legislative framework, SNH policy on NNRs, impact on natural heritage, impact on other user groups, and conclusions of the 22 March 2004 public meeting.

Key findings from ecological assessment

The options appraisal was based on an ecological assessment (Appendix 3), examples of case-studies around GB, and the SNH commissioned Disturbance Report (2004) (Appendix 2). Their key findings were:

- The breeding, moulting, migrating and wintering wildfowl are the bird interests most sensitive to disturbance arising from increased access provision. All of these annual stages of a birds life cycle are represented at Loch Leven.
- All of these interests are of international importance, either directly or indirectly as part of the SPA interest, or as a component part of the Ramsar “eutrophic loch” interest. An assumption is made that there is a connectivity between the breeding and moulting bird interests and the wintering waterfowl

assemblage. Any adverse impacts on breeding or moulting birds will therefore have an adverse impact on the wintering wildfowl assemblage.

- Unrestricted access, both waterborne and on land, can cause significant disturbance to waterfowl. This can result in actual displacement of birds, reduced breeding productivity or loss of condition during the migrating and wintering periods.
- Wintering and migrating waterfowl are under greatest stress due to food shortages and cold conditions and are especially vulnerable to disturbance. Wintering wildfowl feed on the whole loch throughout the day and therefore there is a likelihood of adverse effect on the integrity of the SPA and the associated internationally important wintering waterfowl interest occurring if water-borne activities were to take place during the winter months or terrestrial access around the loch is too close to the shore line.
- During the moulting period, many birds will be flightless and gather for protection in large flocks in the fringing vegetation. These birds are particularly vulnerable to disturbance and may desert a site where they are regularly disturbed. There is a likelihood of adverse effect on the integrity of the internationally important moulting waterfowl populations occurring if water-borne activities take place during the moulting period within the moulting areas, or if terrestrial access around the loch is too close to the shore line. Shallow margins of the loch should be avoided during mid-July – mid August.
- The use of a water-based recreation zone operating in the summer months would likely result in a total loss of brood rearing in the zone. These displaced birds would not be likely to be absorbed within other parts of the Loch as all suitable parts of the loch already hold territorial broods, but would be displaced from the site. This would result in a net reduction in overall numbers and density of breeding birds on Loch Leven. The bay at Kirkgate is sometimes cited as providing opportunities for a water-based recreational zone due to the proximity to facilities. However, between 20-25% of the total brood population of the loch is found in this area. Loch Leven is one of only four known sites in Scotland notified for its high concentrations of breeding birds and it is one of the components of the Ramsar and SPA site interests. The use of a recreational zone would result in a significant percentage reduction in the numbers of breeding birds and geographic distribution within the site and thus would be incompatible with the NNR objectives and obligations of Natura.
- Nests on the islands are well camouflaged and are closely spaced. Apart from the likelihood of actual physical damage to nests, disturbance causing breeding birds to keep off the nest can result in failed nests or desertion. There is a likelihood of adverse effect on the integrity of the internationally important nesting areas of breeding duck if disturbance occurs on the islands.
- In addition to the nesting areas on the islands, the shallow margins around the loch-edge and islands of Loch Leven are used during the breeding season for brood rearing. This is a crucial stage of the breeding cycle and therefore there is a likelihood of adverse effect on the integrity of the internationally important brood rearing areas if significant disturbance occurs within shallow margins of the loch used by broods. These areas should be avoided during April – August.
- During the breeding season, the deeper open water areas are less sensitive for birds as these areas are less used by broods.

- Canoeing and sail-craft have different needs, use the site in different ways and therefore can have different resultant impacts. Canoes move through an area, often close in to the shore and depart, whereas sail craft will often move at speed repeatedly across an area and are highly visible. The disturbance can arise when canoes operate close in to fringing vegetation and overhanging vegetation within brood rearing areas. Sail-craft cause disturbance by displacing birds for the extended period of time when boats are using an area.
- The first craft entering the water causes the greatest level of disturbance.
- Dogs not under control are one of the greatest forms of disturbance to waterfowl.
- Little information exists regarding the presence and use of the loch by otters, a European protected species. Surveys need to be undertaken prior to the further planning and design of footpath/cycle access around the loch.

Option i) Rely on the general provisions of the Scottish Outdoor Access Code and other legislation to protect the NNR

The Scottish Outdoor Access Code provides generic guidance on how to take the natural heritage into account so that access rights can be exercised responsibly. Other legislation also provides protection from disturbance to particularly rare species. These are obviously not site specific and Loch Leven has a set of special circumstances: it is a large water body, with high concentrations of birds throughout the site and throughout the year and lies within the Central belt of Scotland, with its large centres of population. Dependent on the level of use, even abiding by the Outdoor Access Code, will result in increased levels of access to and on Loch Leven. It would be likely that significant disturbance would result, either intentionally or unintentionally, as users will not be aware of the particular ecological requirements of the site and therefore how to take special care to avoid disturbing wildlife. This is both in relation to where they should take access and the numbers of users taking access at the same time. This would likely result in deterioration/disturbance to the SPA qualifying interests and would not maintain the Ramsar qualifying interests and would result in the UK government being in breach of their international (Natura) obligations. It would also be incompatible with the primary aim of safeguarding the natural heritage interest of NNRs and would compromise the special interest of the site. The resultant significant levels of disturbance to wildlife would also be against the principles of the access code.

Measured against the criteria of impact on other users and the conclusions of the public meeting of 22 March 2004, recognition has to be given of the strong “*sense of place*” of Loch Leven and quiet enjoyment valued by existing users; walkers, anglers, visitors to the Castle and bird watchers. This was one of the key messages coming from the public meeting and having numbers and variety of water-borne craft or walkers on the loch-side will change the peace and tranquillity which was valued by many. In addition Loch Leven is an internationally important brown trout fishery and is also of national importance as a bird watching site. High levels of recreational activity could detract from the enjoyment by these other users and would be against one of the key principles of the access code which is to respect the needs of others enjoying the outdoors.

Increased access would meet with SNH's aim to "facilitate public enjoyment of the natural heritage" and would fulfil one of the NNR purposes i.e. to enable the public to appreciate the natural heritage value of the reserve. However, this would only be in the short term as the natural heritage interest of the reserve would be likely to decline depending on the level of access, and likewise, so would the public appreciation.

Option (i) Conclusion

SNH's view is that there will be increased levels of new forms of access (especially water-borne) and these are likely to lead to a decline in the natural heritage interest if we only rely on the SOAC.

Option ii) Keep access at existing levels (maintain status quo)

The basic principles of the previous bye-laws are still generally adhered to by both users of the loch and the loch managers. These bye-laws restricted access both to, and around the loch. If this option was taken forward it would require new bye-laws which need to be consulted on and approved by the Scottish Executive. This would mean this option could not be delivered within a minimum of 12 months and is therefore not a solution in the short term.

Maintaining the status quo would fulfil the Natura obligations and the primary aim of the NNR to safeguard the natural heritage interest. The terms of the NNR agreement under which angling takes place, have generally been adhered to and it is felt that users of the fishery do not cause adverse impact on the Natura interest.

It does not, however, fit well with the need to enable the public to appreciate the natural heritage value of the reserve. Neither does it fit with SNH's duties under the access code as land managers to "respect access rights in managing land or water and working with the local authority and other bodies to help integrate access and land management." At present, the existing access facilities are limited and generally provide for awareness raising and appreciation at a distance (apart from the visitor centre and observation hides at Vane Farm) and do not go far enough towards facilitating more the experiential quality of the loch and its bird life. At the Public Meeting, there was a general aspiration for the future to see improved access and interpretation at Loch Leven; although some did not want any change. This option goes against the general views expressed at the Public Meeting.

There is already a expectation by canoeists and sail-craft users that they will have increased access to Loch Leven when the SOAC is introduced: there could be significant backlash if they are unreasonably prevented from accessing the loch in a responsible way.

Option (ii) Conclusion

Whilst maintaining the status quo would fit well with fulfilling Natura obligations and safeguarding the NNR Primacy of Nature objective, it is unnecessarily restrictive for protecting the natural heritage interest of the site.

It would also not allow for improving facilities to enhance the public's enjoyment and awareness of the natural heritage interest.

Option iii) Managed Access

This option was founded on the ecological assessment which demonstrated that there are areas of the loch which were less sensitive to disturbance at certain times of the year. On the basis of this, the option suggests provision of site specific access arrangements: managed access tailored towards a limited increase in access on and around Loch Leven. It is clear from the ecological assessment that opportunities for responsible access are limited however, particularly in relation to water-borne access on the loch.

Under the Habitats Directive and the Natura designation, this option will need to be the subject of an appropriate assessment by SNH once more detailed access arrangements have been agreed to check whether or not there will be “an adverse impact on site integrity”.

Taking account of the findings of the ecological assessment should ensure that the NNR objectives for Primacy of Nature and the Natura obligations are properly met under this option. It is likely that the scope for improving access around the loch will allow opportunities to incorporate interpretation into the plans thus enhancing provision for the public to appreciate the natural heritage value of the Reserve. In having some access on the loch, it will also enable the natural heritage to be enjoyed and understood from a different perspective and by a different user group.

It should be acknowledged that under this option there will be only limited opportunity for sail-craft to take responsible access on the loch. To ensure this, sail-craft would have to operate in the less ecologically sensitive areas e.g. the North Deeps. There are practical constraints associated with launching craft to access this area; e.g. no slipway, limited parking and SNH has no plans to change these constraints. This lack of facilities on Loch Leven is particularly relevant when considering possible use of the loch for training and given the existing provision at Loch Ore and Loch Gelly, use of Loch Leven for training is not considered a major issue.

Option (iii) Conclusion

The ecological assessment demonstrates that there is potential for limited access to some parts of the loch shore and possibly to restricted areas of the loch at certain times of the year provided satisfactory management measures and responsible behaviour by users can be implemented. Any such access should be carried out in a manner which should ensure that the primary objective of *Primacy of Nature* is maintained and there is no adverse impact on the integrity of the Natura interest. This could also meet the potential for increasing the experiential quality of the loch and its wildlife, particularly from other locations on or near the loch shore.

12. Summary

The ecological assessment and options appraisal have demonstrated that there is potential for limited increased access provision at Loch Leven appropriate with maintaining the natural heritage interest. This would need to be facilitated by managed access through local access arrangements.

13. Recommendation

Loch Leven does not provide an access framework which readily translates to other water bodies. By virtue of it being one of Scotland's most important wildlife lochs and having special features which are particularly vulnerable to disturbance, it requires site specific guidance which is tighter than would be anticipated for the majority of lochs in Scotland.

There is therefore a need to supplement the Scottish Outdoor Access Code with site specific local access arrangements for Loch Leven. A local group, with a fixed lifespan, involving managers, users and public agencies could develop this. To guide development of the detailed local access arrangements, SNH recommends using the following *Framework of guiding principles*:

14. Framework of Guiding Principles for Loch Leven

- 1) The international obligations of "avoiding deterioration of the habitats and significant disturbance of bird species" need to be met.
- 2) Loch Leven National Nature Reserve is of the highest nature conservation interest: the priority objective is therefore to maintain this natural heritage interest.
- 3) Opportunities to have access and enjoy the National Nature Reserve should be improved, so far as this is compatible with the natural heritage interest.
- 4) The bird life on Loch Leven is sensitive to disturbance and significantly increased access is likely to lead to a reduction of use of the site by birds.
- 5) The precautionary approach should be followed. This means that, with a site of this sensitivity, any increased access arrangement would be better to be small-scale initially and should be considered as part of a staged process. Arrangements should be trialled, monitored and reviewed if necessary. It is more straightforward to have strict guidelines initially and relax these than have to increase restrictions.
- 6) In considering the management of access, Loch Leven should be seen in the wider regional context of Fife and Perth & Kinross.
- 7) Access at Loch Leven should be managed on the basis of where, in time and place, access can be accommodated without detrimentally affecting the natural heritage interest. Use of fixed "water based recreational zones" are not appropriate.
- 8) The potential conflict between existing and new user groups must be recognised and each will need to show mutual respect for each others activities.

- 9) Account needs to be taken of the difference in operation and different impacts of different craft when devising local guidance.
- 10) To avoid disturbance from dogs entering the water, dogs should be kept on a lead when close to the loch shore.
- 11) Access around the shore-line should be carefully designed and managed so as to avoid disturbance to wildfowl, otters and nesting osprey.
- 12) Voluntary control of access is the preferred means of ensuring that access is compatible with the natural heritage interest. This will need the managers of the loch to win the hearts and minds of users. The vulnerable nature of the site and the international obligations to ensure its protection require that other means of control (e.g. management rules or bye-laws) should be available if voluntary methods are insufficient.
- 13) Where recreational activity is deemed broadly compatible with the natural heritage interest, management measures would need to consider the following:

Timings

- I. The most sensitive times for bird disturbance are wintering and moulting periods followed by breeding periods.
- II. The loch is used all year round by wintering, migrating, moulting and breeding waterfowl.
- III. Wintering birds are particularly sensitive and it is probable that there will be an adverse impact on site integrity from water based recreational use throughout the Loch in the months Sept – March and therefore access should be discouraged to the whole loch in winter.

Spatial

- I. Birds use the deeper areas of the loch less than the shallower areas in the breeding season.
- II. The islands and their immediate environs are particularly important bird habitats throughout the year and therefore access should be discouraged from these areas.
- III. Nesting, brood rearing and moulting areas for waterfowl extend round all of the islands and most of the loch shoreline during the summer and these, plus a buffer zone, need to be undisturbed as regards both waterborne and terrestrial access.

Levels

- I. Effective mechanisms may be required for controlling the numbers of people taking access. In considering water-borne access the existing level of boat use by anglers is relevant since impacts will be cumulative.

Appendix One - Relevant extracts from the Proposed Scottish Outdoor Access Code section 5. - A practical guide to access rights and responsibilities

<p>Canoeing, rafting, rowing and sailing</p>	<p>Access rights extend to non-motorised water-based activities, such as canoeing, rafting, rowing and sailing. Make sure that the river, loch or reservoir is appropriate for your activity and the numbers involved and take care not to interfere unreasonably with other interests. On some water bodies that are intensively used for a wide range of activities, various management measures, such as zoning and byelaws, may be needed for safety or water quality reasons and to protect the environment. Follow any agreed guidance provided.</p> <p>Respect the needs of anglers by avoiding nets or other fishing tackle. When close to anglers keep noise and other disturbance to a minimum. On lochs, keep a safe distance from anglers. On rivers or other confined waters, await a signal from the angler or ghillie to proceed if they have a line in the water and follow any suggested route they indicate if safe and practicable to do so. Take extra care when entering and leaving water to avoid damaging the banks or disturbing wildlife, and use a public slipway if one is close by. Do not pollute the water.</p> <p>If you wish to canoe or sail on a loch or reservoir used intensively by a commercial fishery, be aware that this can be very disruptive, may raise safety issues because of the high number of anglers in a relatively small area and may impact on the operation of these businesses. Always talk to the land manager before going onto the water.</p>	<p>Where appropriate, work with your local authority and/or recreation groups to identify suitable parking and launching sites. Where intensive recreational use causes safety, operational or environmental concerns you could work with your local authority and/or recreation groups to determine what management measures might be needed. Wherever possible, if a club or group of users wishes to have a motorised rescue boat present for safety reasons give permission for this.</p>
<p>Rivers and lochs</p>	<p>Access rights extend to rivers, lochs and reservoirs (but never go close to spillways or water intakes). Care for the interests of other users and for the natural heritage of rivers and lochs by: not intentionally or recklessly disturbing birds and other animals; not polluting the water as it may be used for public water supply; making sure that the river, loch or reservoir is appropriate for your activity and the numbers involved; following the guidance in the Code, and any local byelaws, to ensure that your activity will not interfere unreasonably with the interests of other users, such as anglers, or the environment.</p>	<p>Where appropriate, work with your local authority and other bodies to help identify areas for parking vehicles at popular sites and places where people can best take access to the river or loch without causing problems. Avoid putting fences from one side of a river to the other side without reasonable cause or without putting in gates at the sides or leaving a gap in rivers used by canoeists. Public bodies could take steps to promote the use of reservoirs where access would not conflict with water</p>
<p>Nature reserves and other conservation areas</p>	<p>Access rights extend to these places but remember that they are carefully managed for nature conservation and to safeguard rare animals and plants. Take care to avoid damaging the site or disturbing its wildlife, or interfering with its management or enjoyment by others.</p> <p>Depending on your activity, you might be requested to follow a specific route or to avoid exercising access rights in a specific area: following such local guidance can help to safeguard the natural heritage of these areas.</p>	<p>Providing information on the importance of the site and on the best routes for people to follow, and providing good paths, can help to minimise damage and disturbance, and increase public awareness of wildlife.</p>

Appendix Three - Ecological Assessment

1. Description on interest

The ecological interests of Loch Leven are summarised in the table below. The priorities are derived as follows: International represents Natura/Ramsar qualifying interest, National represents SSSI qualifying interest that is not part of the Natura/Ramsar interest, Regional represents features of regional interest.

FEATURE	PRIORITY		
	International	National	Regional
Habitats	Eutrophic loch – Ramsar (Criterion 1) (this includes the component habitats and species)		
Communities & Populations			
Birds	<p>Wintering waterfowl – SPA (Article 4.1) & Ramsar (Criterion 3a)</p> <p>SPA Article 4.2 - Qualifying species which are components of the wintering waterfowl assemblage are: Whooper swan, Pink-footed goose, Teal, Pochard, Tufted duck, Goldeneye, Cormorant, Gadwall, Shoveler</p> <p>Breeding bird assemblage - Tufted duck, Shoveler and Gadwall – SPA (JNCC Review 2001)</p>	<p>Breeding ducks, high concentrations – SSSI (14.3.8)</p> <p>Wintering waterfowl - SSSI</p>	
Species			
Higher Plant		<p>Rare Plants:</p> <p>Creeping Spearwort <i>Ranunculus reptans</i></p> <p>Holy-grass <i>Heiurochloe odorata</i> (RDB)</p> <p>Thread rush <i>Juncus filiformis</i> (RDB)</p>	
Invertebrates		<p>Rare beetles:</p> <p><i>Thanatophilus dispar</i></p> <p><i>Macrolea appendiculata</i></p>	
Birds	Wintering populations:	Breeding waterfowl – SSSI	Osprey – Schedule 1

FEATURE	PRIORITY		
	International	National	Regional
	SPA & Ramsar (Criterion 3c) Whooper swan (Article 4.1) Pink-footed goose (Article 4.2) Shoveler (Article 4.2)	(14.3.1) Gadwall, Wigeon, tufted ducks, Shoveler, Mallard <i>black-headed gulls breed in internationally important numbers on Loch Leven but are not a notified interest.</i>	species
Mammals	Otters, Bats - EPS		

At approximately 1300 ha with a mean depth of 4m and half the loch only 2m depth, Loch Leven is the largest naturally eutrophic water body in the British Isles, the largest lowland loch in Scotland and is the 13th largest loch in Scotland. Of the approximately 27,000 lochs in Scotland (Scottish Lochs, survey team data, OS maps), only 253 are larger than 50ha. Of these large lochs, most are oligotrophic in nature. Data from the JNCC standing water database, which holds information on 3000 sampled lochs, shows that Loch Leven was one of only 17 eutrophic lochs sampled which was larger than 50ha and one of only two eutrophic lochs larger than 200ha – the other being Loch Glashan at 205ha. Many of the naturally eutrophic lochs are on the islands of Scotland or their interest has been compromised by pollution or high levels of disturbance. This special character as a naturally shallow, exceptionally large clear water loch, with a naturally high nutrient status means that Loch Leven is highly productive, in biological terms.

This is partly why Loch Leven can support the largest known concentration of freshwater breeding duck in Britain, with around 1,000 pairs nesting on St. Serf's Island and why the reserve holds very large migratory and wintering wildfowl populations, with a peak of up to 35,000 in October. In addition, the availability of suitable key habitats throughout the loch, with a tradition of being relatively free from human disturbance, has been another important factor in protecting the natural heritage interests.

The nearest loch of similar trophic status is Kilconquhar (55 ha), and further north, the lochs of Rescobie and Balgavies (215 ha). Neither of these lochs compare with the size of Loch Leven.

Loch Leven's size, character and ecological carrying capacity makes it one of only a handful of freshwater sites in Scotland which are of such importance for wintering, migratory and breeding wildfowl.

2. Significance of features

Natura interest

Loch Leven has been classified as a Special Protection Area on the following grounds:

- an assemblage of over 20,000 wintering waterfowl; which includes nationally important numbers of whooper swan, pink-footed goose, greylag goose, tufted duck, teal, pochard, gadwall, goldeneye, shoveler and cormorant.
- a nationally important wintering population of the Annex 1 species whooper swan;
- internationally important wintering populations of the migratory species pink-footed goose and shoveler.
- In line with the JNCC Review (JNCC 2001 – The UK SPA network: its scope and content, Vol III) sites selected for water bird species on the basis of their occurrence in the breeding, passage or winter periods also provide legal protection for these species when they occur at other times of the year. On Loch Leven this gives European protection to the component species: tufted duck, gadwall and shoveler.

Ramsar interest

Loch Leven has been designated as a Ramsar site on the following grounds:

- a particularly good example of a naturally eutrophic loch;
- an assemblage of over 20,000 wintering waterfowl ;
- internationally important wintering populations of pink-footed geese and shoveler.

Site of Special Scientific Interest

Loch Leven is notified as a Site of Special Scientific Interest on the following grounds:

As well as being of interest for wintering waterfowl as already described, Loch Leven is notified as a Site of Special Scientific Interest on the following additional grounds:

Internationally important wintering populations of greylag and pink-footed goose and nationally important wintering populations of several other waterfowl species;

- Exceptionally high numbers of breeding ducks;
- An outstanding number of higher plant species, including nationally rare species;
- Wet unimproved pasture containing nationally and locally rare plants including *Juncus filiformis*, *Hierochloe odorata* and *Ranunculus reptans*.
- Rare beetles and flies.

European protected species

- Bats and otters are both present on the site

3. Conservation Objectives for Natura sites – Bird species

Introduction

To comply with the Habitats Directive (Article 6.2), it is the obligation of Member states to ensure that the qualifying habitat features of a site should not deteriorate nor the qualifying species suffer significant disturbance. As part of the process for ensuring compliance with Article 6.2, new plans or projects must be assessed in view of the site's "conservation objectives" (Article 6.3 of the Habitats Directive). As the obligations of these Articles also applies to the Birds Directive, conservation objectives are also required for SPA features.

Conservation objectives

To avoid deterioration of the habitats of the qualifying species: whooper swan, pink-footed goose, greylag goose, teal, pochard, tufted duck, goldeneye, cormorant, gadwall, shoveler - or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained.

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site;
- Distribution of the species within the site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

In line with the JNCC review, (*JNCC UK 2001 – The UK SPA network: its scope and content, Vol. III*) "sites selected for water bird species on the basis of their occurrence in the breeding, passage or winter periods also provide legal protection for these species when they occur at other times of the year." Therefore the component breeding waterfowl assemblage needs to be taken into account when setting conservation objectives for the wintering waterfowl assemblage.

4. Ramsar objectives/obligations

The Ramsar Convention on Wetlands of International Importance requires contracting parties to designate suitable wetlands for inclusion in a list of wetlands of international importance and to formulate and implement their planning so as to promote the conservation of the wetlands and, as far as possible, the wise use of wetlands.

No formal advice is given on the setting of conservation objectives for Ramsar sites to fulfil the above requirements. However, the SNH approach is for the maintenance

of the “Eutrophic Loch interest and its component habitat and species”. The Ramsar convention especially highlights the importance of wetlands as waterfowl habitat.

5. SSSI objectives

To ensure compliance with legal and other obligations arising out of the sites designations;

To maintain and, where appropriate, enhance the ecological features of the loch system, which underpin the breeding and wintering bird populations, and other key features.

6. Features likely to be affected

As the first part of the ecological assessment, the potential impact of increased access on each of the notified/designated, and other, interests was scoped. From this it was concluded that:

- I. It is not considered likely that there would be significant damage to the eutrophic status of the loch and the associated rare plant, beetles and flies. This assumes that levels of water-borne access are not so large as to result in large amounts of disruption to the sediment and damage to the aquatic plant communities. Therefore, these interests are not considered further .
- II. Daubenton’s bats roost in the castle and feed over the loch during the evening and night. It is considered that bats will not be significantly affected by increased access on and around the loch.
- III. Cormorants, which form part of the overall wintering waterfowl assemblage, use the loch for roosting, loafing and feeding and their wintering numbers form part of the total waterfowl assemblage. Night-time roosting takes place exclusively on Reed Bower. Day-roosts (loafing sites) are scattered around the loch shore though there are some key sections that are more important than others. Loafing and feeding cormorants are not considered to be as sensitive to disturbance as other species of waterfowl on Loch Leven, partly due to the fact that there is a high turn-over of birds using the site and also as cormorants are seen to be more tolerant of activity in the vicinity of their loafing sites. Safeguards for other wintering waterfowl will safeguard the cormorant interest. This species is not therefore considered further.
- IV. Black-headed gulls, which number approximately 4000 breeding pairs, nest on St Serfs Island and are protected from disturbance during the nesting period under the Wildlife & Countryside Act. They are not considered further as safeguards to protecting nesting waterfowl will safeguard the black-headed gull interest.

Summary of scoping exercise: The wintering/breeding waterfowl assemblages, breeding osprey and otters are considered further.

7. Current condition of designated/notified interests

Results of Site Condition Monitoring

Site Condition Monitoring (SCM) is part of SNH's six yearly programme of monitoring of the condition of all notified/designated features on SSSIs, Natura sites and Ramsar wetlands.

SCM has been undertaken for all SPA and Ramsar qualifying interests and for the SSSI notified interests on Loch Leven. Results comparing Wetland Bird Survey (WeBS) count data for two periods 1980/81 – 1984/5 data with the period 1997/98 – 2001/02 show the following:

- Peak wintering pink-footed goose numbers have increased from approx 11,000 birds to 13,500 birds.
- Greylag geese have declined in the same period from 2,590 to 726, reflecting a re-distribution of this species nationally.
- Whooper swan numbers have started to recover following a local population crash in 1990. Peak birds numbers for the recent 5 year period were 122, compared with 200 in the previous count period.
- Wintering Waterfowl species which have increased in numbers include tufted duck, gadwall, teal and pochard, whilst goldeneye and shoveler numbers have remained stable. 10,000 wintering waterfowl winter on the loch. Counts from 85/86 – 89/90 gave an estimate of 6,300 wintering waterfowl.
- In October there are peak numbers of up to 35,000 wildfowl on the loch as migratory birds use the site as a staging site before a number move further south during November or December.
- Breeding duck numbers are estimated at about 1,000 pairs and counts of tufted duck gadwall and mallard from the 1998 count of St Serfs gave a mean of 337 pairs of tufted duck (3% of GB population), 58 pairs of gadwall (7% of the GB population), and 612 pairs of mallard. This compares with counts ranging from 250 – 485, 25 – 30 and 272 - 557 respectively for the five years 1966 – 1970. This suggests tufted duck and mallard numbers are relatively stable within natural fluctuations whilst gadwall numbers have doubled. This is generally in line with national trends (Wingfield Gibbons 1993).

Otters have not been systematically surveyed for on Loch Leven and so there is little information about the health of the population although it is likely that there is an increase in the local population in line with national trends and in response to improved water quality. The national otter surveys conducted in 1977, 1985 and 1992/3 found signs of otters at sampled locations on the mouth of the River Leven and at North Queich, near Kinross.

One pair of osprey nest on the loch-side and other nearby nesting pairs also hunt over the loch. This pair have been nesting at Loch Leven for 6 years but nesting success is still low.

8. Potential impacts on Waterfowl

Wintering, migratory and breeding birds require relatively undisturbed conditions in which to nest, rear young, feed, moult and roost.

- I. **Wintering ducks**, which number approximately 10,000 birds, feed throughout the whole loch with the dabbling ducks concentrating their feeding in the shallow margins of the loch, whilst the diving ducks feed more in the middle of the loch at varying depths, generally between 2 – 10m. Numbers of duck have increased significantly over the last 10 years. In addition to the large over-wintering populations, Loch Leven is used as an important staging post in migration with peak numbers of birds of 35,000 wildfowl occurring in September and October.

Although there is morning and evening lighting for geese, and some duck shooting on the loch, there is only small-scale levels of shore based disturbance from walkers during daylight hours. The fishing stops at the end of October through until March.

The review of disturbance (J.Riley, 2004) showed that wintering ducks are very susceptible to disturbance from water-borne activity, both at the site specific level and population level. Desertion of the site has been known to occur, and particularly in winter when there is less available food and the birds are under greater stress. Disturbance at low levels has also been shown to cause birds to move off the site in winter and the studies showed the first craft entering the water caused the most disturbance and in one example caused pochard to move off the site. Empirical studies show movement of birds from disturbed to undisturbed areas or decreased use of a site associated with increased levels of recreational activity.

- II. **Moulting birds** - During the main moulting period (mid-July to mid-August) large concentrations of flightless waterfowl gather at Loch Leven. Moulting wildfowl occur all over the site at this time. Dabblers may concentrate in the shallower areas but at that time of the year this can mean almost half the loch, as the water level is down. Diving ducks will occur over wide areas of the loch as will moulting Mute Swans. Wildfowl are particularly vulnerable to disturbance at this stage due to their inability to fly.

The review of disturbance cites a study which recorded sailboard disturbance at a site with moulting tufted ducks where all the birds capable of flight left the site but those remaining underwent obvious stress. Such disturbance had the effect of depressing the numbers of moulting tufted duck at the site for several years.

- III. **Breeding waterfowl** - Loch Leven holds the highest known concentrations of breeding freshwater waterfowl in Britain due to its eutrophic status, large size, availability of nesting habitat, low levels of disturbance and availability of food. Nearly all the breeding duck nest on the islands, with St Serfs supporting the largest proportion of the overall breeding population. About 1,000 pairs nest on St Serfs in dense clumps of tufted hair grass, *Deschampsia caespitosa* at spacings of approximately 10 m. Sample nest

counts are taken annually. In addition, a loch-wide mapping of territorial pairs and broods is also carried out one to three times each year.

Early breeders such as mallard may commence nesting in late February with late breeders such as tufted duck continuing to use the site until late July. Nesting birds can be very vulnerable to disturbance and such events can lead to nest desertion resulting in the loss of eggs due to cooling or predation.

Once hatched; there is insufficient food supply, shelter or territory space in the immediate vicinity of the islands for broods so females move off the islands with their brood and move up to 4km across the loch to the shoreline "brood rearing" territories which have been held by the males since February for the early breeders such as mallard. . These are found around the shallow margins of the loch and the islands, in depths between 0 – 2m. Such areas can support high densities of fledgling ducks due to better cover from predators and an abundant food supply. The deeper, open water areas of the loch are not significantly used during the nesting and brood rearing periods.

The review of disturbance cited examples where great crested grebes breeding productivity declined from 100% of pairs to between 53 – 71% of pairs following the introduction of sailing while common terns ceased nesting altogether. In addition, the review highlighted the impact of increased predation of chicks on the Ythan Estuary resulting from increased recreational activity, mainly walkers. Three empirical studies are cited in the Disturbance Report (2004). Two of these demonstrate a reduction in clutch size in great-crested grebes resulting from the introduction of water-borne activities and one showed increased predation by gulls on velvet scoter.

9. Significance of impacts on waterfowl

The Review of Disturbance was only able to cite the findings of a few empirical studies and there are dangers in transferring the findings of the more descriptive studies to different sites. It is argued here however that there were sufficient similarities in the types of impacts occurring on a wide range of sites cited in the review or from other case-studies around Britain from the introduction of recreation activity, including water-borne activity. Generally birds moved to undisturbed areas, often not their preferred feeding area, or left a site completely when some form of recreational disturbance occurred.

Shore based recreational activity

- I. Disturbance by dogs entering the water could have a significant effect on wintering, moulting and breeding birds. If high levels of regular disturbance occurred this would likely lead to birds deserting the area, reduced productivity or loss of condition.

Moulting birds hide in the vegetated margins of the loch, gather in large flocks in the deeper areas or where extensive beds of aquatic plants provide an easily accessible food supply during the period of late summer when they are

flightless. Disturbance, even intermittent or at very low levels, could result in moulting birds suffering severe stress.

Regular disturbance from walkers around extensive stretches of the loch and in close proximity to the lochside, which have previously not been open to walkers, could keep birds away from the shallow margins of the lochs. Shallow margins are the preferred feeding areas for dabbling duck during the autumn and winter months and a reduction in their use of these shallows could result in loss of condition and actual displacement of wintering birds.

There are few nesting birds around the loch-side so desertion of nests is probably not an issue. However, the margins of the lochs are used heavily by territorial pairs and for brood rearing. Disturbance at close proximity would likely result in these brood rearing areas being deserted with a resultant reduction in the total number of breeding waterfowl.

Water based recreational activity

- II. **Wintering duck** –The high numbers of wintering ducks (over 10,000) are dependent on the relative lack of disturbance traditionally on Loch Leven, which has allowed them to feed throughout the entire site. Any increase in water-borne activity, even at low levels, is likely to shift birds away from those parts of the site being accessed, some of which could be favoured waterfowl feeding areas, for an indeterminate period. Given the birds vulnerability during the winter, the huge numbers of birds involved, and the high level of uncertainty of impacts, this could be considered significant and a precautionary approach should be taken otherwise this could result in failure to meet NNR management purposes and/or satisfy the requirements of the EC Birds Directive.

Studies have shown that there are higher numbers of birds in refuges than non-refuges, therefore the potential creation of water-borne recreational zones operating in the winter months would most likely result in reduced numbers of birds using these areas, and possibly the loch as a whole. Again this would mean that the obligations of the Birds Directive are not being met.

- III. **Moulting waterfowl** – Loch Leven is notified as an SSSI for its nationally important breeding populations of 4 duck species. Of these, 3% of the GB tufted duck population and 7% of the GB gadwall population breed on Loch Leven. This represents a significant proportion of the GB population. These birds will remain on the loch to moult and are particularly vulnerable to disturbance from water-borne activity during mid-July – end of August due to their temporary flightless ness. The moulting flocks reach nationally important numbers and make a possible contribution to the wintering bird population. Increased disturbance from water-borne activities during this period within the main areas used by moulting birds could also result in failure to meet the NNR management purposes and/or the requirements of the EC Birds Directive .
- IV. **Breeding ducks** - The breeding duck population is of international importance as a component part of the Ramsar “Eutrophic Loch” interest and

is of national importance as a notified interest for the SSSI. Only 10 sites in Scotland are notified for their concentrations of breeding waterfowl. Most of these have been notified because they hold regionally important concentrations of breeding duck species. Apart from Loch Leven, only the River Wick Marshes, Loch Skene, River Spey Marshes and River Dee (Parton to Crossmichael) hold nationally high concentrations of waterfowl. The breeding waterfowl connectivity to the wintering wildfowl assemblage is still to be clarified and in the meantime a precautionary approach has been taken and connectivity has been reasonably assumed. This would be in accordance with the JNCC Review (JNCC 2001) which provides legal protection for water bird species when they occur at other times of year other than winter periods (namely tufted duck, gadwall and shoveler for Loch Leven).

The high density of breeding ducks on Loch Leven is partly attributable to the relative lack of disturbance on Loch Leven traditionally, both on the islands where nesting occurs and in the shallows of the loch itself where broods are reared. The high density and camouflage of the nests make them liable to damage from people walking on the islands. The nests are protected from disturbance by the Wildlife and Countryside Act. As well as the high risk of damage to unseen nests, disturbance from craft landing on the island is likely to cause birds to be kept off nests resulting in increased egg predation or mortality due to cooling. All access to the islands, except the Castle Island, should be avoided.

Once hatched, the broods disperse to the “brood rearing” areas which have been held by the males since as early as February. These are around the shallows of the islands and around the loch-side where the broods can remain through until July/August . Apart from along short stretches where existing disturbance keeps birds away from the area (e.g. Kirkgate park) or where the habitat is unsuitable and there is no fringing vegetation, most of the loch side contains territorial broods. Disturbance in these areas during the brood rearing period could result in increased predation or displacement. Given the territorial behaviour of the birds and the high level of usage made of the whole loch, displaced birds may not be absorbed into the surrounding population. The impact of low levels of disturbance are less clear. Some studies have shown that the birds can be disturbed as soon as the first boat enters the water, whilst other studies have shown that small numbers of craft, (albeit displacing birds for a short period), do not cause any long term displacement or reduction in breeding success. As birds can show different tolerance distances to disturbance, any such activity within the brood areas are best avoided as the consequences are not clear and as the numbers of birds involved are so high.

As the main feature of the SSSI notified interest is for its having the highest known concentration of breeding freshwater ducks in Britain, any resultant fall in numbers due to disturbance during the brood rearing period would mean the NNR management purposes and SSSI objectives not being met. In addition, the breeding waterfowl interest forms a component of the Ramsar “Eutrophic Loch” interest and part (tufted duck, gadwall and shoveler), is a component of the SPA interest.

Outwith the main brood rearing and nesting areas, i.e. the deeper, more open areas of the loch, there may be opportunities for increased use by water-borne users during the summer months.

Providing a *sacrificial* water-based recreational zone has been suggested as a compromise to allow some part of the loch to be used by water craft. This would likely result in a significant reduction in brood numbers in the zoned area and possible total desertion depending on the recreational levels. This would reduce the numbers of breeding pairs on the loch as a whole. For example the South west corner of the loch, Kirkgate bay is cited as a good place to mark off and allow as a recreational zone. Figures from brood counts in 1999 and 2002 showed 47 broods out of a loch total of 247 used this bay in 2002 and 117 out of a loch total of 428 used this bay in 1999. This is 20 and 27% respectively. This equates to an unacceptable loss of broods, especially as it is likely that these birds will not be absorbed into the rest of the population.

Conclusion

There is a likelihood of adverse effect on the integrity of the internationally important wintering duck interest if water-borne activities were to take place during the winter months and if there is regular use of paths close to the loch side on extensive stretches of the loch which have previously not been accessed.

There is a likelihood of adverse effect on the integrity of the internationally important migratory duck interest if water-borne activities were to take place during September and October and if there is regular use of paths close to the loch side on extensive stretches of the loch which have previously not been accessed.

There is a likelihood of adverse effect on the integrity of the internationally important moulting waterfowl populations occurring if water-borne activities take place during the moulting period within the moulting areas. Shallow margins of the loch should be avoided during Mid-July – mid August

There is a likelihood of adverse effect on the integrity of the internationally important nesting areas of breeding duck if disturbance occurs on the islands. Access to the islands should be discouraged.

There is also a likelihood of adverse effect on the integrity of the internationally and nationally important brood rearing areas if disturbance occurs within these areas, both during the early period of the year when the males set up territories and later in spring when the broods are moved from the islands to feed. Shallow margins of the loch should be avoided by water-borne access during February – August and paths should generally be routed a safe distance back from the water's edge.

There is a likelihood of significant disturbance and adverse effect of the wintering, breeding and moulting birds if dogs can gain access along extensive stretches of the

loch. Dogs should be kept on leads throughout the year when walking close to the loch shore except in existing designated areas.

10. Potential Impacts - Wintering geese - Pink-footed geese and greylag geese are present throughout the winter with five year average peaks for 1997/8 – 2001/02 of 13,502 and 726 numbers of respectively. Both species feed on adjacent farmland during the day and fly into the loch during the afternoon and evening to roost. The three main roost locations are: the north-east shore of St Serfs Island, to the east of Kinross House in the bay in front of Alice's Bower and the along the Carsehall shoreline at the mouth of the Pow Burn. The use of individual roosts is dependent on weather conditions, the phase of the moon and wildfowling activity. Greylag geese numbers have declined over the last 20 years reflecting a re-distribution of this species nationally. Numbers of pink-footed geese have risen significantly during the same period at Loch Leven, following the national trend.

Studies and experience from other sites has shown that roosting geese are vulnerable to disturbance. After feeding all day, they require quiet roosts sites where they can gather in large numbers safe from predators. Excess disturbance at these sites can have serious consequences on the energy budgets of the geese especially during prolonged periods of cold weather or can result in desertion as the birds no longer feel safe. If the birds are regularly disturbed during such periods their likelihood of overwinter survival can be seriously reduced.

Many management schemes are already in existence which have shown the importance of protecting goose roosts from disturbance. Such schemes have often related to the wildfowling situation where there is no shooting over the roosts and where shooting stops an hour before dusk and an hour after dusk to protect geese flying in and out of their roost sites. Disturbance at feeding sites is a different issue; geese are accustomed to moving around an area several times throughout the day to feed and can cope with amounts of disturbance unless this too becomes prolonged and there are no nearby alternative feeding areas.

11. Significance of impacts

Protection of goose roosts from disturbance is a broadly accepted management principle as geese are very vulnerable at this time. There are many examples where provision of safe refuges have resulted in increased wildfowl numbers using a site. At Loch Leven, the traditionally undisturbed conditions during the winter months have created suitable conditions for roosting geese, upon which they are dependent. These roost sites are very traditionally used and disturbance leading to desertion of the site or increased mortality would almost certainly result in the failure to meet NNR management purposes, as well as the requirements of the EC Birds Directive.

Conclusion

There is a likelihood of adverse effect on the integrity of the internationally important wintering geese interest occurring if access were to take place during late afternoon and early morning within proximity of the goose roosts, both around and on the loch.

12. Potential impacts - Otters

Otters are a European Protected Species and as such their breeding and resting holts are protected from damage and disturbance. Little quantitative data or systematic survey information exists for the use or numbers of otters on Loch Leven. Casual observations show most signs of otters are on the north shore, near to the rainbow trout release area but otters have been seen throughout the loch and on burns running into/out of the site. There may be two families using the loch (pers. comm. P.Brooks). Otters are particularly secretive animals and require quiet places in which to rest up and as breeding holts but are less sensitive to disturbance when feeding. There is a large amount of suitable habitat for otters around the loch and alternative, less disturbed locations are in good supply.

13. Significance of impacts

As no quantitative data are available, it is difficult to assess the likely significance of the impact of increased access provision. However, if terrestrial access around large stretches of the loch is created and no controls placed on dogs, then there could be a significant reduction in the use of the loch by otters. Breeding and resting sites have legal protection from disturbance. Disturbance, particularly by dogs which are allowed free access to the water's edge, could be particularly damaging and lead to desertion of a breeding or resting holt. The likely impact on otters from water-borne craft is less obvious. As long as access is managed and there is plenty of relatively undisturbed areas for otters to feed, they are likely to continue to use Loch Leven at current levels. However, there could be desertion of breeding holts if access does not take account of preferred or known breeding areas.

Conclusion

As most disturbance to this species is likely to occur from dog walkers and dogs off leads, it is important to undertake surveys prior to the provision of additional terrestrial access around the loch and to design access accordingly.

14. Potential impacts on osprey

At Loch Leven the one nesting pair established this nest site in 1998. They have been productive during 2000 and 2003.

Ospreys vary in their sensitivity to disturbance during the nesting periods. Those birds which initially establish nest sites in locations with existing activity are more habituated to disturbance than those nesting in quiet undisturbed locations. Feeding birds over the loch are not likely to be detrimentally impacted by recreational activity on the loch. There are several other pairs of osprey around Scotland which feed over fishing lochs.

15. Significance of impacts

The pair of nesting osprey at Loch Leven are in a relatively undisturbed part of the loch-side and not therefore habituated to human activity close to the nest site. Any increased access along the loch side could result in a reduction in productivity or desertion of the nest site.

Conclusion

Interpretation and planned access at this location should be developed to prevent access close to the nest site occurring at sensitive periods.

Bibliography

A.Allison, I Newton & C.Campbell – (1974) Loch Leven National Nature Reserve – A Study of waterfowl biology by the The Nature Conservancy Council, The Institute of Terrestrial Ecology and The Wildfowl Trust.

J.Riley (2004) - A review of Recreational Disturbance research on selected wildlife in Scotland, SNH series

JNCC UK (2001) – The UK SPA network: its scope and content, Volt III

Loch Leven SSSI – Management Plan 2000/01 – 2005/6, SNH Tayside & Clackmannanshire Area

Nature Conservancy Council (1989) – Guidelines for selection of biological SSSIs

Scottish Executive Circular June 2000 - Habitats and Birds Directive – Nature Conservation: Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds (‘The Habitats and Birds Directives’)

D. Wingfield Gibbons et al - The New Atlas of Breeding Birds in Britain and Ireland (1988 –1991) BTO 1993

SNH – Site condition monitoring of Loch Leven SPA/Ramsar and SSSI features (2003) (unpublished)

SNH breeding bird counts of St Serfs and mapping of brood rearing areas (unpublished)