CONSULTATIVE DRAFTS

LORNE GILL/SNH

- **Introduction to the Second Consultative Draft**
- **List of the Current HAPs and SAPs**
- **List of Proposed 2nd Tranche HAPs**
- **List of Proposed 2nd Tranche SAPs**
- **Consultation Questionnaire**
- **Selection of Habitat Action Plans**
- **Selection of Species Action Plans**

Tayside Biodiversity Partnership

BIODIVERSITY
THE VARIETY OF LIFE

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CONSULTATIVE ACTION PLAN DRAFTS

SEPTEMBER 2002

This draft has been edited by
Catherine Lloyd
on behalf of the Tayside Biodiversity Partnership

Please send all comments and contributions to the current tranche of consultative drafts to the Biodiversity Co-ordinator by 30 November 2002

Offers of help towards drafting new Habitat and Species Action Plans welcomed

PROPOSALS FOR A 2ND TRANCHE BIODIVERSITY ACTION PLAN

There was an excellent response to the First Consultation Draft in 2001 and all input was considered by the Partnership. All this collaborative work has resulted in the published First Tranche of Habitat Action Plans.

The process, however, is a very dynamic one. As the First Tranche is implemented and monitoring of all the Action starts, there are many more Habitat and Species Action Plans still to prepare. During 2002 a list of the next proposed Tranche of Habitat and Species Action Plans was drawn up by the various Habitat Sub-Groups and Species Sub-Group. Those that are ready for consultation are included in this document. In total, a further 27 HAPs are proposed, together with a further 55 SAPs.

There are many other HAPs and SAPs currently in production. If you would like a list of those that will be available for consultation, please contact the Biodiversity Co-ordinator for an up-to-date list.

Help is urgently needed

There are, however, many Action Plans that still require an author and we would welcome any offer of help. It may be more appropriate to set up a specific "Interest Group" so that a number of specialists can work together to bring an Action Plan to consultation stage; the task does not necessarily have to fall to just one person.

Please contact the Biodiversity Co-ordinator if you can offer to help in any way – your input would be much appreciated to ensure that the proposed Action Plans may one day be published and their actions incorporated into the full Tayside Biodiversity Action Plan.

Response to the Current Consultation Drafts

Whether you are someone who just cares about our local environment, someone already involved in conserving our biodiversity or managing any of the habitats mentioned, your comments on these drafts will be warmly welcomed. A questionnaire is attached to the document, but you are welcome to respond in your own way.

Every one of us can make a difference – please play a part in shaping the Tayside Biodiversity Action Plan and let your voice be heard for Tayside's biodiversity.

THE PUBLICATION OF THE FIRST TRANCHE IS ONLY THE BEGINNING!

The deadline for comments on the current Consultative Drafts is Saturday, 30 November 2002

Please send your contributions and comments to:

Catherine A G Lloyd - Tayside Biodiversity Co-ordinator
Tayside Biodiversity Partnership,
c/o Environment Services, Perth and Kinross Council,
Pullar House, 35 Kinnoull Street, Perth. PH1 5GD

Tel. 01738 476481 Fax: 01738 476410
e-mail: tayside.biodiversity@ukf.net

CONSULTATIVE DRAFTS (SEPTEMBER 2002)

HABITATS

		Ref.
Coasts and Estuaries	Estuarine Reedbeds	CE4
Urban and Built Environment	Hospitals, Sheltered Housing and Residential Complexes	UBE4
Water and Wetlands	Ponds and Pools	WW4
Woodland	Planted Coniferous Woodland	W3

SPECIES

Mammals	Badger	SAP/M1
	Water Vole	SAP/M2
Birds	Grey Partridge	SAP/B1
	Swift	SAP/B2
Fish	Atlantic Salmon	SAP/F1
Invertebrates	Mason Bee	SAP/In1
Plants	Bluebell (or Wild Hyacinth)	SAP/VP1
	Slender Naiad	SAP/VP2
	Whorled Solomon's Seal	SAP/VP3

LIST OF PROPOSED 2ND TRANCHE HABITAT ACTION PLANS

Coasts and Estuaries	▪ Estuarine Reedbeds**
Farmland	▪ Arable and Cereal Field Margins* ▪ Farm Tracks and Verges ▪ Improved Grassland ▪ Cropped Areas ▪ Acid Grassland ▪ In-bye Wetlands ▪ Neutral Grassland
Upland	▪ Lowland Raised Bog* ▪ Blanket Bog
Urban and Built Environment	▪ Hospitals, Sheltered Housing and Residential Complexes** ▪ Urban and Community Woodlands ▪ Roads and Paths ▪ Urban Waters ▪ Burial Grounds (including kirkyards and cemeteries) ▪ Public and Private Buildings ▪ School, College and University Grounds ▪ Private Gardens and Allotments
Water and Wetland	▪ Eutrophic Lochs ▪ Freshwater Reedbeds ▪ Ponds and Pools**
Woodland	▪ Wet Woodland ▪ Upland Birchwood ▪ Planted Coniferous Woodland** ▪ Scrub ▪ Wood Pasture, Parkland and Policy Woods ▪ Upland Mixed Ashwood ▪ Lowland Mixed Broadleaves

** Consultative Draft available September 2002

* Consultative Draft circulated September 2001 (needs completion)

Special thanks are extended to the Habitat Sub-Group members and HAP and SAP authors for their work in bringing together this selection of 2nd Tranche Action Plans for consultation

LIST OF PROPOSED 2ND TRANCHE SPECIES ACTION PLANS

Mammals	▪ Water vole ** ▪ Badger ** ▪ Brown Hare ▪ Red Squirrel ▪ Bat spp.
Birds	▪ Hen Harrier ▪ Barn owl ▪ Osprey ▪ Capercaillie ▪ Black Grouse ▪ Black-necked grebe ▪ Grey partridge ** ▪ Swift ** ▪ Ring ousel ▪ Tern spp. ▪ Lapwing ▪ Water rail ▪ Skylark (or seed-eating passerine spp.)
Amphibians/ Reptiles	▪ Newt spp. ▪ Toads and Frogs ▪ Slow Worm ▪ Common Lizard
Fish	▪ Atlantic salmon ** ▪ Lamprey spp.
Invertebrates	▪ Mason Bee ** ▪ Narrow-headed ant ▪ Pearl-bordered fritillary ▪ Small Blue ▪ Birch moth spp. ▪ Upland Heath moth spp. ▪ Stonefly ▪ Northern-Blue Damselfly ▪ Freshwater Pearl Mussel ▪ Spider spp. ▪ Molluscs ▪ Earthworm ▪ Beetles
Plants	▪ Aspen ▪ Juniper ▪ Woolly willow ▪ Twinflower ▪ Whorled Solomon Seal ** ▪ Pillwort ▪ Slender Naiad ** ▪ Small cow-wheat ▪ Sticky catchfly ▪ Bluebell ** ▪ Sea pea ▪ Arable Plant spp.
Mosses, Liverworts, Lichens and Fungi	▪ Fern spp. ▪ Moss spp. ▪ Upland lichen spp. ▪ Woodland lichens and mosses spp. ▪ Grassland Fungi ▪ Woodland Fungi

** Consultative Draft available September 2002

CONSULTATION QUESTIONNAIRE

The following questions are only a guide.
You are welcome to respond to the consultation document in your own way.

Please list the Action Plans you have read and are commenting on:

1. Are the proposed objectives and targets in the Habitat Action Plans (HAPs) and Species Action Plans (SAPs) meeting the key issues of the habitat or species?

2. Do the actions in the Actions Schedules sufficiently cover the targets?

3. Are there any Actions listed you consider would be impossible to implement or the suggested timing could be altered?

4. What other actions should be added to the HAP and SAPs (please be precise, name the relevant Action Plan and if possible, a proposed Lead Partner to take the action forward)?

5. (*organisations only*) Is there an Action your organisation would be willing to 'Lead' or act as a 'Partner'? (please list)

6. (organisations only) – where your organisation is listed as a proposed Lead Partner or as a proposed Partner, please confirm (or otherwise) your willingness to take on this task.

Any other comments

The deadline for comments on the current Consultative Drafts is Saturday, 30 November 2002

Please return this Questionnaire or other contribution to the Tayside Biodiversity Co-ordinator as soon as possible.

CONSULTATION DRAFT: 2ND TRANCHE
COASTS AND ESTUARIES - CE4

TAYSIDE BIODIVERSITY PARTNERSHIP

ESTUARINE REEDBEDS ACTION PLAN

HABITAT DEFINITION

Reedbeds are fens or swamps dominated by the common reed *Phragmites australis* where the water table is at or above ground level for most of the year. Estuarine reedbeds form a highly productive habitat which develops along sheltered coasts with soft shallow shores, providing protection from strong wave action. Almost all reedbeds are found within estuaries. They represent a transition from sand and mudflat areas on the lower marsh, where vegetation is often flooded by the tide, to upper areas of drier ground where plant communities are less frequently flooded and for a shorter duration.

Sites/ Site Distribution

There are several small areas of estuarine reedbeds in Tayside within river-mouths, but the largest and most significant area is found in the Tay Estuary where there is 410 ha. (360 ha. within Tayside).

CURRENT STATUS AND EXTENT OF HABITAT

It is estimated that there are about 5,000 hectares of reedbeds in the UK, of which around 900 or so sites contribute to this total, and of these sites only about 50 are greater than 20 ha. These sites contribute a large area to the national total, with the rest made up of small isolated fragments of reedbed of varying quality.

The Tay reedbeds extend to some 410 ha, which provides the largest continuous area of reed in Britain. The inner Tay Estuary has a SSSI designation, is Local Nature Reserve and is also listed as a Special Protection Area.

The reedbed area needs to be monitored and quantified to see the rate at which, if any, it has expanded and where - aerial photographs and gauges on the riverside edge will help assess the full extent of reedbed on the Tay.

Key Species		
Mammals	Otter	*Lutra lutra*
	Water vole	*Arvicola terrestris*
Birds	Bittern – UKSAP	*Botaurus stellaris*
	Reed bunting – UKSAP	*Emberiza schoeniclus*
	Bearded tit	*Panurus biarmicus*
	Marsh harrier	*Circus aeruginosus*
	Water rail	*Rallus aquaticus*
	Sedge warbler	*Acrocephalus schoenobaenus*

	Swallow	*Hirundo rustica*
	Sand martin	*Riparia riparia*
	Pied wagtail	*Motacilla alba*
	Starling	*Sturnus vulgaris*
	Redshank	*Tringa totanus*
	Snipe	*Gallinago gallinago*
Amphibians	Common Frog	*Rana temporaria*
Invertebrates Examples of key species are:	The invertebrate communities found within the Tay reedbeds are rich and varied with many notable and Red data species recorded to date.	
Spider	*Porrhoma campbelli*	
Flies	*Platycepphala planifrons*	
	Limonia (Dicranomyia) complicata	
	Platycephala planifrons	
	Platypalpus rapidus	
Hover fly	*Sphaerophoria loewi*	
	Chalco syrphus nemorum	
	Tropidia scita	
Moth	*Chilo phragmitellus*	
Higher plants	Common Reed	*Phragmites australis*
	Marsh Marigold	*Caltha palustris*

NATURE CONSERVATION IMPORTANCE

The Tay Reedbeds comprise mainly of Phragmites, and is the most extensive area of reed in Britain. There is a high commercial interest in the reedbeds with roughly 25% of the 410 ha being harvested. The Tay Reed Company harvest around two thirds of the individual beds annually, and this produces around a fifth of all UK thatching reed. It is recognised that through the active management of the Tay reedbeds and the regular flooding by the tide, this maintains the overall pure stands of Phragmites and the high conservation value of the site. This, in conjunction with areas of poor quality and uncut strips, maintains the mosaic of different stages within the reedbed which gives wide wildlife value.

The reedbeds are naturally managed by the influence of the high tides and commercially managed by the removal of the reed litter. If this were not the case the period of reed dominance would change in some areas and become drier. The reed litter often accumulates and does not get washed out. This does not appear to encourage succession and offers some invertebrate species ideal conditions. This in fresh water reedbeds would allow colonisation for other vegetation types to become established.

Bearded tit *Panurus biarmicus*

The Bearded tit is not actually a true tit, although its behaviour is very similar. Although often very difficult to see, these beautiful birds are very sociable and skilful climbers.

The Bearded tit is exclusively a bird of large reedbeds. They have a fluttery flight which is slow and usually low over the reeds. Their food mainly consists of insects, which they find as they forage among the reed stems during the summer months. In the winter their diet changes to the vast quantities of reed seeds produced from each individual seed head (panicle).

The Bearded tit was first seen in the Tay reedbeds in 1992. Through the monitoring efforts of the Tay Ringing Group, the significance of the Tay reedbed has become apparent as it supports a large percentage of the UK population.

Mammals

The reedbeds provide good grazing for Roe deer after the winter harvest as during the spring the new shoots have a high sugar content that provides good feeding for them. Otters are occasionally sighted in or near the reedbeds and are probably breeding. Small mammals such as Wood mouse, Common shrew and potentially Water shrew also use the reedbeds to forage for food.

Birds

There are four species of birds which are classed as being very dependent on reedbeds for their survival: - Bearded tit, Marsh harrier, Bittern and the Reed warbler. There are many other species that use reedbeds - most notably Reed bunting and Sedge warbler. Reedbeds are important pre-migration roosts, especially for the hirundines and they also act as winter roost sites for birds such as Pied wagtails and Starlings.

There are estimated breeding populations in the Tay Estuary reedbeds of

- 300 - 450 pairs of Reed bunting
- 600 - 700 pairs of Sedge warbler
- 126 pairs of Water rail
- 5 pairs of Marsh harrier
- Reed warbler could be potentially breeding, but not proven as yet.

Marsh Harrier *Circus aeruginosus*

This spectacular bird of prey is associated with open country and is especially attracted to wetlands such as large reedbeds where it breeds among tall reeds. The Marsh harrier hunts over the reedbeds and the surrounding farmland. Their prey includes rats, coot, moorhen and duck. They hunt slowly and with purpose, trying to surprise their potential prey.

During the 1960s it was realised that the use of organochlorine pesticides (DDT aldrin and diealdrin) was having a major impact on bird of prey populations. The effects of these compounds caused thin egg shells and subsequent failed breeding. This caused the UK population of Marsh harrier to decline with devastating effect.

Although Marsh harriers have summered at other sites in Scotland, the Tay breeding population remains the national stronghold.

Amphibians

There is a healthy population of Common frogs which occurs in a variety of habitats associated with the reedbeds. The species is not particularly choosy about spawning sites which can range from small puddles to ditches.

Invertebrates

Reedbeds are known to support specialised and richly varied invertebrate communities, with some species feeding on Phragmites and others are predators or parasites of invertebrate living in the reedbed. There are invertebrates dependent on the reed stems with some preferring old or young stands. Many invertebrates also require the thatch or litter layer in which to survive. Reedbeds overall provide an important type of vegetation structure to which some invertebrates have adapted. The larger areas of unmanaged reedbed act as a reservoir for many of the invertebrates, where they survive and seasonally re-colonise areas which have been harvested. The Invertebrate life within the Tay estuary reedbeds is complex owing to the effects of the sea and its tides. This provides both brackish and freshwater habitat within the reedbeds which can offer a variety of niches for specific adaptable species.

Water Rail *Rallus aquaticus*

The Water rail is a very attractive shy and elusive bird of wetland margins and reedbeds. It is a bird which is more often heard calling than seen. Its call emanating from a dense stand of reed, sounds like a young pig squealing. The call is also known as 'sharming'; both male and female will regularly reply to each other.

The Water rail when seen is easily identified with its long red bill and its slate grey underparts which is barred with black on its flanks. The Water rail also has long legs and toes and a very narrow body which is ideal for its secret life among the stands of reed. The bird feeds among the reed on worms, snails, aquatic insects, tadpoles and sometimes fish, small mammals and young birds.

They nest among the reeds - building a cup of dead vegetation which they conceal by pulling down reed stems to form a canopy. The Tay reedbeds hold what is probably the largest population of Water rail in Britain.

Higher plants

The Tay reedbeds comprise largely of Common reed *Phragmites australis* which occurs in large pure stands and is a perennial flood tolerant grass. As well as providing an invaluable wetland wildlife habitat, it is a profitable commercial resource.

The harvesting of the reed in winter allows a golden carpet of Marsh Marigold to appear in early spring, almost like a crop, in the freshwater areas of the estuarine reedbed.

NATIONAL BIODIVERSITY CONTEXT

There is a UK Habitat Costed Action Plan for Reedbeds and a UK Action Plan for Coastal Saltmarsh. Both have relevance for Estuarine Reedbeds as follows:

Reedbeds

- *Identify and rehabilitate by the year 2000 the priority areas of existing reedbed [targeting those of 2 ha. or more] and maintain this thereafter by active management*

- *Create 1,200 ha. of new reedbed on land of low nature conservation interest by 2010.*

- *Any establishment of new reedbeds should be in blocks of at least 20 ha. where possible near to existing areas of habitat and linking up if possible*

Coastal saltmarsh

- *To offset the current losses due to coastal squeeze and erosion to maintain the existing extent of [the] habitat.*

- *Maintain the quality of the existing resource in terms of community and species diversity and, where necessary, restore the nature conservation interest through appropriate management. It will be desirable for some managed realignment sites to develop the full range of saltmarsh zonation.*

ECOLOGY AND MANAGEMENT

The Tay Reed Company began to harvest and manage the tidally influenced reedbeds of the Tay in 1976. It is thought that prisoners of war established the reedbeds during the Napoleonic campaign to protect the extensive mudflats from erosion. Another opinion suggests that the reed is not native to the Tay and it may have been present in one of the interglacial periods. Reed planting began about 500 years ago, possibly started by monks and has continued to be carried out by landowners since then. It is managed on a single whale cut, meaning the same areas are cut once a year. The reed is cut from December to April, weather and tide dependent, with each season being influenced by these factors. Approximately 40 – 60% of the beds are cut, which equates to about 25% of the whole reedbed area on the Tay. Before cutting commences debris brought in by high tides is cleared from the reedbeds that could potentially damage the Seiga harvesting machine. The commercial harvesting of the reeds has maintained a high quality reed and this has had little detrimental effect on the bird populations. In some cases the harvesting operations have increased the number of breeding birds.

A conservation agreement with SNH is in place under which a 10m wide swathe along the landward edge is left uncut. Strips along drainage channels and poor quality reed are also left uncut, as well as areas where there are potential obstacles or hazards. Research has shown, particularly in relation to Water Rail, the importance of management of the 10m uncut strips, especially along the river as this provide ideal foraging areas for young birds. These uncut areas also provide ideal nest sites for Bearded tit, Sedge warbler and, in smaller numbers, Reed bunting.

SNH encourages the practice of rolling on a rotation of 2 - 3 areas of reed from a total of 15 each year at Cairnie pier which provides suitable habitat for birds and invertebrates. The aim of rolling a swathe through the reed is to create more edge effect and flight ways of approximately 2m. for the benefit of the bird population

At Powgavie the former practice of light grazing a small area of estuarine saltmarsh needs to be re-implemented with a certain amount of urgency as Phragmites is becoming well established at the expense of the saltmarsh habitat which is disappearing altogether. This is important given that there are relatively few examples of saltmarsh on the east coast of Scotland. A notable site where grazing is helping maintain a mosaic of grassland, marsh and saltmarsh within the reedbed system is at Monorgan and Burnside of Monorgan.

CURRENT FACTORS CAUSING LOSS OR DECLINE

Small area

Small total area of the habitat and the critically small population sizes of several key species dependent on the habitat. Where these areas of salt marsh are found within the reedbed system, surveys and a species audit would benefit in deciding future management options.

Sea level rise

Climate change leading to relative sea level rise is predicted to lead to the loss of significant areas of habitat. Erosion of the seaward edge occurs widely in high-energy locations of larger estuaries. There is evidence that this process is exacerbated by sea level rise. Inappropriate flood defence works could potentially be a threat to the Tay reedbed.

Pollution

Pollution of freshwater supplies to the reedbeds: agricultural run off and sewage outflows can increase nutrient levels; siltation may lead to drying; toxic chemicals may lead to loss of fish and amphibian prey for key species; accumulation of poisons in the food chain and eutrophication may cause reed death.

Sediment dynamics

Local sediment budgets may be affected by coastal protection works, or by changes in estuary morphology caused by land claim, dredging of shipping channels and the impacts of flood defence works over the years.

Rubbish

Where it occurs along the entire landward edge of the reedbeds the dumping of rubbish can damage vegetation and visually detracts from the site's beauty. This also continues to encourage further dumping and encroachment on to the reedbed.

Lack of management

Overall the reedbeds appear to have been increasing and have expanded, but the quality of the habitat in some areas has deteriorated through lack of management. For example, lack of grazing at Powgavie, where Snipe benefited and also on Mugdrum Island, where the highest number of breeding Redshank recorded in Tayside has decreased significantly since grazing ceased in the past two years.

Areas harvested in the past could, if possible, be brought back into the cutting regime to improve the habitat. This will provide further suitable reed especially for Bearded tit and other reedbed wildlife.

Inappropriate management such as burning cut or standing reed, if carried out insensitively, can be detrimental to the site's overall ecology, especially the invertebrate communities. This management practice, if necessary, should be done in a controlled way on a reasonable scale creating the desired effect with minimal damage to reedbed wildlife.

Pests and invasive species

Rats are thriving where farmers leave or burn waste grain and potato supplies above and adjacent to the reedbed bank. This was revealed in certain areas when numerous rats were caught in Water Rail traps during the Water Rail survey.

Other mammalian predators, which forage in or near the reedbeds include Mink and Fox.

Starlings, although considered not to be a major problem, can have a localised effect on the reedbed when they roost. No areas have been identified in particular - they roost throughout reedbed.

Giant hogweed, Reed sweet grass and Japanese knotweed occur in places throughout the reedbeds with the potential to spread. It is important that this should be monitored and controlled where necessary.

MAIN THREATS TO KEY SPECIES'

Water Vole
There are no recent records of this species in the reedbeds, but future tributary management and habitat enhancement schemes could potentially benefit Water Vole.
UK importance of Tayside population: **moderate**
This is a UKBAP priority species

Bittern
Threats affecting species may include the potential effects of pesticides and heavy metals. Other threats include habitat management such as ditch management, due to lack of reed cutting and succession.
UK Importance of Tayside population: **low**
- the species has been an occasional winter visitor.
- there may be potential for habitat creation projects which may consider the Bittern's requirements in the future.

Reed bunting
Threats include changes in farming practices such as switching from spring to autumn sown crops. In wetlands a deterioration of habitat is also thought to have contributed to the decline.
UK Importance of Tayside population: **high**
– the national population has been in serious decline by 40% in 25years

Marsh harrier
Threats include the deliberate disturbance of nest sites, egg collection and predation from foxes. Accidental disturbance could affect breeding success.
UK Importance of Tayside population: **high**
- the Tay reedbeds are the stronghold of the breeding population in Scotland.

Bearded tit
The Tay reedbeds support a significant large percentage of the UK population.
UK Importance of Tayside population: **high**
- National population 350-450 pairs, Tayside population 95 pairs in 2000.

Water rail
The population within the Tay reedbeds is probably the largest in the UK
UK importance of Tayside population: **high**
-the Tay reedbeds holds nationally important numbers (estimated at 126 pairs minimum).

Sedge warbler
There appears to be a healthy population in the Tay reedbeds, although this species has undergone a recent decline
UK importance of Tayside population: **moderate**

Swallow
Large numbers of hirundines roost in reedbed with post breeding birds travelling north to the Tay estuary before their main migration south.
UK importance of Tayside population: **high**

Sand martin
Large numbers use the reedbed to roost on migration.
UK importance of Tayside population: **high**

Pied wagtail
This species has shown a decline in recent years. The cause may be habitat related. The species is vulnerable to cold winters but can recover if the following years are mild.
UK importance of Tayside population: **unknown**

Starling
Although this bird is considered by some to be universally common, over the last few decades there has been a notable decline throughout Europe
UK importance of Tayside population: **unknown**

Redshank
Changes or lack of management have affected the breeding population within the salt marsh areas due to reed colonisation.
.UK importance of Tayside population: **high**

Snipe
This species has undergone a national decline and has suffered a similar trend to the Redshank within the reedbeds owing to lack of habitat management
UK importance of Tayside population: **unknown**

Invertebrate spp.
An overall assessment of the reedbeds and their management should be carried out with the habitat requirements of invertebrate communities and priority species identified. A survey carried out in 1994 indicated the range of species present within the Tay reedbeds. A further detailed survey could determine species numbers and raise the profile of this ecologically important but often overlooked group.

OPPORTUNITIES AND CURRENT ACTION

- Management plan for designated site to be kept current.
- Site Condition Monitoring programme being carried out by SNH monitors all SSSI notified interests on a six-yearly basis. This could be supplemented in between by other work (potentially by others).
- Tay Estuary Forum and overall plan for Integrated Coastal Zone Management.

ACTION PLAN OBJECTIVES

1 It is intended to maintain and encourage good conservation management practice of the Tay reedbeds through the commercial interests of the Tay Reed Company and all private landowners the company liases with during the annual harvest.

2 It is essential to establish links with landowners who influence the larger areas of the reedbeds which are not commercially managed.

Target: All relevant landowners to be included in the LBAP process by 2002

3. The importance of the Tay reedbeds is significant both nationally and UK wide because of its wildlife value. This significance needs to be more widely recognised and supported.

Target: All parties involved with Tay reedbeds to raise the profile of thisnationally important site.

4. Where possible, when land is purchased for nature conservation consideration should be given to any future projects with the potential for habitat creation on land adjacent to or within the reedbeds. This could possibly focus on UKBAP priority species such as Bittern and Water vole, for example.

Target: Link with the Lead Partners of the appropriate UK Species Action Plans.
Establish priority species status in reedbeds and other wetland sites in Tayside

5. Determine in detail the area, extent and condition of estuarine reedbed habitat and associated saltmarsh in Tayside

   Target: Complete survey of all estuarine reedbed habitat by 2003.

6. Maintain and protect the quality and integrity of designated sites. Ensure that the current set of management plans is completed and that monitoring of sites goes ahead.

   Target: Keep up-to-date management plans for all designated areas.

7. Set up a five-year programme to raise awareness of biodiversity and its importance, the fragility of the coast and the need for its conservation in Tayside. Include Tay reedbeds in this programme.

   Targets: Set up a public awareness programme by 2002. Run public awareness programme until 2006.

Stakeholders

Landowners, land managers, statutory bodies, advisors, businesses, species interest and species research groups, local users, general public.

REFERENCES:

- CJ Hawke & PV Jose *Reedbed Management for Wildlife & Commercial Interests*. RSPB
- Batten, Bibby, Clement, Elliot & Porter Red Data Birds in Britain NCC RSPB
- Dr WJ Peach. *Minimum breeding population of Bearded Tits on the Tay reedbeds* 2000 TRG
- Paul Whalley *Insects A comprehensive illustrated guide to insects of Britain & Europe.* Hamlyn
- Kenneth R Watt. *The Invertebrates of the Phragmites Reed Beds of the River Tay Estuary* 1994
- Perth & Kinross Council *Inner Tay Estuary Local Nature Reserve Draft Management Plan* 1999-2003

PROPOSED ACTION FOR BIODIVERSITY

Proposal for Action – Tay Estuarine Reedbeds	Potential deliverers		To take place by						Meets obj. no.
	Lead	Partners	02	03	04	05	06	07	
A. Policy and legislation									
1. Complete designations under SPA and SAC process under European Directives	SE EU	SNH	X	X					3,6
2. Tay Estuary SSSI and LNR: continue its role within local planning system. Ensure local planning documents take full account of UK priority status of reedbeds	PKC	SNH	X	X	X	X	X	X	3,6,7
B. Site safeguard and management									
1. Review and update the 20 year old SNH conservation agreement.	SNH Tay Reed Co.		X	X	X	X	X	X	1,2,3
2. Encourage Tay Reed Company to manage sensitively and leave strips and islands of reed to an agreed size to encourage and maintain overall wildlife value. Act on any other management practices agreed in the review.	SNH	Tay Reed Company		X					1
3. All landowners who own part of the reedbeds to be involved in the biodiversity process and be invited to comment on this HAP.	SNH TBP	Landowners	X						
4. Establish good partnership with all relevant landowners in order to implement this plan.	SNH TBP		X						1,2,4
5. Consider implementing grazing projects where appropriate to encourage a mosaic of habitats within the reedbed/ saltmarsh.	SNH TBP	Landowners		X					2,5
6. Oppose any developments which threaten loss or damage of Tay reedbeds	SNH PKC DCC SEPA		X	X	X	X	X	X	3,6
7. Liase with Scottish Water and SEPA on any works involving waste water if it has a potential damaging effect to the reedbed habitat.	SNH SEPA Scottish Water		X	X	X	X	X	X	6
C. Species management and protection									
1. Implement and prepare an up to date invertebrate survey, identifying priority and key species within invertebrate communities and their habitat requirements.	SNH	Local Biological Records Centre	X						5,6
2. Monitor and control where necessary identified pest or invasive species.	SEPA SNH	Landowners	X	X	X	X	X	X	6

3. Consider habitat enhancement schemes that include tributary management, local ditch creation and pond creation within the reedbeds.	SNH SEPA (HEI)	Tay Reed Company Landowners	X	X	X	X	X	X	4
D. Advisory									
1. Continue to encourage the Tay Reed Co. in best practice management of reedbeds with regular guidance from ongoing research.	SNH	Tay Reed Company	X	X	X	X	X	X	5,6
2. (i) Ensure all relevant bodies are aware of this type of habitat, its importance and management for its conservation value. (ii) Consider setting up a demonstration site for occasional training of site management and best practice.	TBP SNH	SEPA		X					1,2,3,4
E. Research and monitoring									
1. Ensure suitable monitoring of reedbed condition continues annually.	SNH		X	X	X	X	X	X	6
2. The Tay Ringing Group to continue to research and report on important bird populations within the Tay reedbeds, especially highlighting the Bearded tit population.	Tay Ringing Group	Local Biological Records Centre	2						3,6
3. Tay Estuarine Reedbed Habitat Action Plan review process - ensure this Plan is being delivered annually and review fully after 5 years	TBP		X					X	All
F. Promotion and awareness-raising									
1. Put a programme in place to raise public awareness of reedbeds, promoting their wildlife and commercial interests e.g. Open Day/ guided walks, etc.	SNH TBP	Tay Reed Company	X	X	X	X	X	X	3,7
2. Produce a leaflet on the Tay reedbeds highlighting their unique biodiversity, their management and commercial interests	SNH TBP	Tay Reed Company		X					3,7
3. Where there is public access, provide suitable on-site interpretation to highlight the inter-relation between wildlife management and commercial interests.	SNH	TBP		X					3,7

CONSULTATION DRAFT: 2ND TRANCHE
URBAN AND BUILT ENVIRONMENT – UBE4

TAYSIDE BIODIVERSITY PARTNERSHIP

HOSPITALS, SHELTERED HOUSING AND RESIDENTIAL COMPLEXES ACTION PLAN

INTRODUCTION/ DEFINITION

Biodiversity and health care go hand in hand. It has been found that a view of nature from a hospital bed speeds up recovery from operations. It also improves the surroundings for anxious visitors and enhances the workplace for staff, clients and suppliers alike.

Modern Heath Care and Plant Use

Out of the150 commonest prescription drugs used in the USA, 80% are based on compounds derived from natural resources. Foxgloves and hawthorn, for instance, are widely used in heart medicines and many wild plants are currently being screened in the search of cures for cancer, AIDS and other diseases. Chemicals from jellyfish are now being used in the study of cancer. The medicinal leech – long used in historical times - is a UK BAP priority species and still used in modern healthcare. There is, however, a fine line between utilising the natural resources around us to exploiting them and in recent years concerns have been raised that some species, especially wild plants, are not being harvested sustainably.

Throughout Tayside hospitals, sheltered housing and residential complexes cover many hundreds of hectares (insert statistics). Most of these have a wide variety of landscaped or maintained grounds; some encourage visitors and residents to use them. Such surroundings are not only visually important, they add to the economic value of the properties. If managed to benefit the diversity of wildlife already using the area, it will also be possible to encourage active participation of many of the staff, residents, their families and the surrounding community.

Phased improvement in the management of these important green spaces usually results in a reduction of maintenance costs; for example, the introduction of a grass management regime invariably results in less cutting required.

MAP
Location map showing hospitals, sheltered housing and nursing homes. Possibly include unused hospitals or those whose use is being changed.

CURRENT STATUS AND EXTENT OF URBAN HABITATS

Throughout Tayside there are (insert statistics) hospitals/residential/nursing homes and sheltered housing complexes, with (insert statistics) patients, residents or clients.

Areas Within Tayside	Hospitals	Residential / Nursing Homes	Sheltered Housing Complexes
Angus	7	36	47
Dundee	5	?	?
Perth & Kinross	1?	?	?
Total		?	?

NATURE CONSERVATION IMPORTANCE

(to add)

KEY SPECIES

Mammals	Bats / Squirrels / Hedgehogs
Birds	Tawny owl / Goldfinch / Greenfinch / Dunnock / Blue Tit / Chaffinch / Song Thrush / Starling / Blackbird / Wren / Robin / Swift / Swallow / House Martin
Amphibians	Common Frog / Common Toad / Slow-worm
Invertebrates	Butterflies and moths; bumble bees; damselflies, grasshoppers and beetles
Plants	Native Trees (inc. ash, oak, elder, hazel, willow, hawthorn, bird cherry, holly, rowan) / Ox-eye daisy / cowslip / wall rue
Lichens and fungi spp.	

NATIONAL BIODIVERSITY CONTEXT

There is a UK broad habitat statement for urban areas, which has the following objective:

- *Maintain the existing diversity and extent of wildlife in all urban areas, expanding the range and distribution of rare and common species and enabling the resource to be utilised as an educational tool.*

National measures relevant to this Action Plan:

- Incorporate the conservation and enhancement of wildlife into the design and management of urban greenspace.
- Encourage community and individual action to survey, plan for and manage wildlife habitats.
- Promote wild space in urban areas as an educational resource to inform communities about local wildlife in the context of the wider environment.

ECOLOGY AND MANAGEMENT

Better management of the green spaces around hospitals, nursing homes, sheltered housing complexes and medical centres will improve the biodiversity of these areas. Each site will have different opportunities but the current overall landscape should be taken into consideration before improvement or enhancement works are proposed.

Hospital grounds, such as Ashludie, which has large green spaces within its grounds, provide more opportunities to increase the habitat value.

CURRENT FACTORS CAUSING LOSS OR DECLINE

The increasing expansion of residential and commercial buildings is resulting in the loss of many green spaces. Where older buildings are utilised for health-care use, the need to keep maintenance costs as low as possible invariably means the destruction of the original surroundings, especially walled orchards, old hedgerows, mature trees and traditional herbaceous borders. New buildings and extensions to existing properties are invariably designed so that their surroundings are as maintenance-free as possible. With staff costs at a maximum, designed gardens and green spaces are perceived as optional extras in many cases.

OPPORTUNITIES AND CURRENT ACTION

Dedicated areas around regularly used places such as hospitals, sheltered housing, nursing homes and medical centres can be specifically managed with local wildlife needs in mind with the benefit that they greatly enhance the surroundings for residents and staff alike.

- Encourage the use of raised beds close to building entrances so that they can act as sensory or low allergen gardens. People of all ages, but particularly the elderly or disabled, can easily see the plants at close range to appreciate their colour and scent. In many instances residents, staff or the local community can be encouraged to maintain the raised beds themselves.
- Such areas can be utilised as summer waiting areas or rest areas for the residents or patients.
- Areas of planting can draw the eye away from less attractive buildings or industrial areas nearby and create a local haven for wildlife; they can even be sited to improve a stark thoroughfare between buildings.
- Many of these areas encourage wider community use which better integrate the residents or patients. Local schools and colleges can take part in new plantings or making bird tables and nestboxes. The area can be enhanced by locally made sculpture and used for serving refreshments regularly or on Open Days. Local craftspeople can purchase specially grown bamboo sticks or willow withies; they can even offer their teaching skills for winter events.
- Local children – within scouts or brownie clubs, natural history groups or from schools, can be encouraged to undertake simple surveys of the wildlife visiting the gardens. This can be followed by the making of nestboxes and bird tables to help wildlife cope with the loss of habitat or having difficulty accessing food. There are opportunities for year-long involvement with the residents or patients in learning together and projects introduced to encourage people of all ages to identify and care for the wildlife seen from the window.
- In Angus there are 90 establishments which could get involved in different biodiversity projects.
- Ensure information is available so that advice on what to include in the garden is readily available, i.e. native flowers good for nectar; berry- or fruit-bearing trees and shrubs to provide winter food for birds; bird and bat boxes, including hedgehog, toad or ladybird hibernation boxes; bird table and bird bath. This can be arranged via the Tayside Local Patch Project and the SNH Gardening for Life scheme.
- To appropriately site bird tables/feeders through the difficult winter months.
- To appropriately site bird/bat boxes in the spring.
- To enhance the residents/clients appreciation of the environment.

ANGUS CASE STUDY
and proposals to take project Tayside-wide

Bird tables/feeding stations are being sited in a number of Angus sheltered housing complexes during the winter/spring period. This will potentially give the common garden bird population much needed sustenance and shelter during the winter but it is hoped that suitable nest sites can be made available during the breeding season. The increased use of the surrounding garden areas by a wide variety of birds should give great pleasure to the residents/clients of housing complexes.

It is intended to:

- Involve the managers and residents/clients of the housing complexes at as early a stage as possible.
- Access funding not only for construction materials for the bird tables (and nestboxes), but also bird food, binoculars and identification books.
- Funding will also be considered for environmental enhancement to the existing grounds where appropriate, i.e. tree planting or provision of berry-bearing shrubs
- Identify potential labour sources to include a wide range of age groups, e.g. Ranger Services, Scout/Guide Groups, Princes Trust, Scottish Wildlife Trust, Royal Society for the Protection of Birds.
- Take cognisance of future maintenance requirements.

OBJECTIVES AND TARGETS

Aims:

- Encourage management to introduce/implement grassland management schemes that will improve the surrounding biodiversity.
- Encourage management to consider tree-planting schemes that will benefit the natural environment and increase biodiversity.
- Utilise sites where no or little environmental/conservation action is taking place to the benefit of the more common species of garden bird, mammals and invertebrates such as butterflies and moths.
- Raise people's awareness of biodiversity (in particular, the older age group) and engender an appreciation and concern for the environment.
- Enable older citizens, who perhaps are now less mobile, the opportunity to enjoy both the common and possibly rarer wildlife that may frequent such green space.
- Encourage simple data recording and ownership of each project.

Main Objectives:

- To demonstrate to both management and residents within hospitals (both Health Board and private), residential/nursing homes, sheltered housing complexes and medical centres that they can have a positive influence on the environment around them.
- Liase with the relevant local authority Property Services, Social Work and Housing Departments, planners, private owners, architects and developers on a landscape level regarding maintenance, new build/renovation, and community projects
- To establish contacts and implement a variety of projects throughout Tayside.
- To encourage ownership of the individual projects to give sustainability a chance.
- To provide meaningful survey data as a result of implementing the projects.

Main Targets

- In Angus implement a Sheltered Housing/Nursing Home Bird Feeding Biodiversity Project in 5 Angus Burghs by end 2002
- In Dundee City, implement a similar Sheltered Housing/ Nursing Home project in x no. of establishments by end 2004
- In Perth and Kinross, implement a similar Sheltered Housing / Nursing Home project in x no. of burghs by end 2004
- In Angus implement a Hospital Biodiversity Project in 1 hospital by end of 2003.
- In Angus 2004-2006 advance the project to other similar establishments.
- In Perth & Kinross implement the project in x no. of establishments by 2005.
- In Dundee City Council implement the project in x no. of establishments by 2005.
- Encourage local youth and community groups to become involved during the first phase and thereafter.
- In 2003 – 2004, produce a newsletter for circulation for those involved in the project and to be used as a stimulus for others to become involved.
- In Angus implement wider biodiversity-based projects in Sheltered Housing complexes or Nursing Homes where appropriate (to include, for example, window box or pot plantings, native tree and shrub planting, wildflower meadows, hedges, etc.) in x no. of Angus Burghs by 2005
- In Dundee City, implement similar Sheltered Housing/ Nursing Home projects in x no. of establishments by end 2005
- In Perth and Kinross, implement similar Sheltered Housing / Nursing Home projects in x no. of burghs by end 2005.

Work Objectives

- Set up area co-leaders and teams to commence achieving main targets listed above.
- Ensure that appropriate design/construction materials are readily available.
- Ensure appropriate tools required for construction are readily available.
- Health and Safety issues to be acknowledged.
- In Angus rangers to be allocated responsibility for initial project.
- In Angus establish project in each of the burghs in first year.

- In Angus extend project to hospital grounds in year 2003.
- In Angus extend project to more than 1 project per burgh in years 2 and 3.
- In Angus rangers to progress and establish project.
- In Angus X to encourage wider environmental projects in the health sector
- In Perth & Kinross?
- In Dundee City Council?

STAKEHOLDERS

- Health Board / NHS
- Privately-owned hospitals/clinics
- Local authority services, including Property section, Planning, Social Work and Housing Departments
- Ranger Services
- Statutory bodies
- Private sheltered housing architects and developers
- Housing Associations and local site managers
- Local residents/clients.
- Local scout/youth/school groups
- Local conservation volunteers (of all ages)
- Local environment groups (such as RSPB, SWT, NTS)

PROPOSED ACTION FOR BIODIVERSITY

	Proposal for Action – Hospitals, Sheltered Housing and Residential Complexes	Potential deliverers		To take place by								Meets Objective No.
		Lead Partner(s)	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	Policy and legislation											
	1. Discuss project with relevant council departments.	TBP SNH	AC PKC DCC									
	Site and species safeguard/ management											
	Set up Bird Feeding Biodiversity Project: i) Implement Project at 5 Sites in AC by 2002 ii) Implement Project at x no. of sites in PKC and DCC by 2003 iii) Advance Project to other AC sites by 2004 iv) Advance Project to other sites (PKC and DCC) by 2005	AC PKC DCC Site managers	Target Selected Sites									
	i) Implement Project in Hospital Grounds, AC by 2003 ii) Implement Project in Hospital Grounds PKC by 2004 iii) Implement Project in Hospital Grounds DCC by 2005	TPB NHS										

	i) Implement wider biodiversity-based projects in Sheltered Housing complexes or Nursing Homes where appropriate in x no. of Angus Burghs by 2005 ii) In Dundee City implement similar Sheltered Housing/ Nursing Home projects in x no. of establishments by end 2005 iii) In Perth and Kinross, implement similar Sheltered Housing / Nursing Home projects in x no. of burghs by end 2005.											
	Advisory											
	1. Collate examples of best practice and design.	TBP RSPB SWT	AC PKC DCC NHS									
	Research and monitoring											
	1. Introduce simple monitoring (inc. Local Patch Project) that can be carried out by the residents/clients.	TBP AC PKC DCC	Residents RSPB SWT									
	Promotion and awareness-raising											
	1. Raise public awareness of project through the local press and the LBAP 2. Produce a regular biodiversity newsletter to circulate to hospitals, sheltered housing complexes and nursing homes	AC PKC DCC TBP										
	Plan Monitoring											
	1. Monitor and review this plan on an annual basis and in detail every 5 years	TBP										

CONSULTATION DRAFT: 2ND TRANCHE
WATER AND WETLANDS – WW4

TAYSIDE BIODIVERSITY PARTNERSHIP

PONDS AND POOLS ACTION PLAN

DEFINITION

For the purpose of this Action Plan ponds and pools are "man-made or natural bodies of freshwater between 1m^2 and 2 hectares in area which hold water for all or part of the year". Pond ecology also includes the vegetation and wildlife that depends on the pond such as the associated terrestrial or marginal habitat and dependent visiting mammals, birds, amphibians and invertebrates.

MAP - Sites/Site Distribution	
Trottick Mill Ponds LNR, Dundee.	Barry Mill Ponds
Lochindores SSSI	Barrie Buddon Ponds
Kingoodie Quarry ponds	Ardler SUDS ponds
Vane Farm Ponds	Pitmedden
Bloody Inches/ Meikleour SSSI	

CURRENT STATUS AND EXTENT OF HABITAT

Scotland has many small waterbodies – estimated at 150,000. This represents about half the ponds in Britain. While some are created by natural processes, considerable numbers of ponds in Tayside were created during the 18th and 19th centuries. Their water was used to power waterwheels, process textile fibres and for steam power. Other ponds were created for landscape and agricultural reasons, or by hard rock excavation.

The loss of ponds is common across Europe. In Britain, since their peak in the nineteenth century, the numbers of ponds has been falling and only about one third remain. Ponds have been:

- Lost to silting and succession
- Removed by development
- In filled in landfill
- Drained for agriculture

It is believed that pond loss has been the major specific factor in the decline of amphibian populations.

Habitat Quality

The man-made ponds that have survived into the 21st century are of significant value as a wildlife resource:

- The water feeding ponds is often less polluted as mills have closed and legislation has been introduced
- The habitats in and around ponds have been allowed to develop
- The loss of many ponds add rarity value to those remaining

From studying Ordnance Survey (1:25,000) maps, Dundee has 15 ponds greater than 150m^2. Dundee City Council's Frog Spawn Survey 2000 identified a further 37 smaller ponds, mainly in gardens. There are many other ponds in private gardens, school nature areas and farmland. (Tayside-wide data to be inserted)

Water Quality
(Tayside data to be inserted)

NATURE CONSERVATION IMPORTANCE

Ponds are very rich habitats as compared to lochs and rivers, supporting a wider variety of species. The importance of ponds, pools and surrounding habitat in supporting rare species is underlined by the number of freshwater UK Biodiversity Action Plan (BAP) Species.

Key Species	P = UK Priority species CC = UK species of conservation concern
Mammals	Water vole *Arvicola terrestris* (P) Otter *Lutra lutra* (P) Pipistrelle bat *Pipestrellus pipistrellus* (P) Daubenton's bat *Myotis daubentonii* (CC)
Birds	Goosander *Mergus merganser* (CC) Kingfisher *Alcedo atthis* (CC) Red necked phalarope *Phalaropus lobatus* (CC) Black necked grebe *Podiceps nigricollis* (CC) Red-breasted merganser - *Mergus serrator* (CC) Goosander *Mergus merganser* (CC) Gadwall *Anas strepera* (CC) Pochard *Aythya ferina* (CC) Reed bunting *Emberiza schoeniclus* (CC)
Amphibians and Reptiles	Great crested newt *Triturus cristatus* (P) Natterjack toad (P)
Invertebrates	a diving beetle *Hydroporus rufifrons* (P) a reed beetle *Donacia aquatica* (P) Medicinal Leech (P)
Plants	Pillwort (P) Slender Naiad (P) Marsh Clubmoss (P) Shetland Pondweed (P) Slender stonewort (P) Baltic club-moss (P) Sea bryum (P) Violet crystalwort (P)

NATIONAL BIODIVERSITY CONTEXT

There is a UK Broad Habitat Statement for Standing Open Water which includes Ponds and Pools. This gives the following conservation direction:

- *Maintain and improve the conservation interest of standing open waters through the use of integrated management plans, and the sensitive management of adjacent land. Create new standing open waters, of maximum wildlife benefit, where possible.*

UK priority species and others of conservation concern are detailed under Key Species.

ECOLOGY AND MANAGEMENT

The ecology and management of Ponds and Pools can vary significantly depending on water supply, water nutrients, acidity and seasonal water variation.

Pond Description	Typical Ecological Issues
Lowland man-made ponds e.g. farm or mill ponds	Often polluted, they only support wildlife able to survive high nitrate levels and algal blooms
Flood plain ponds	Ecology relies on river water quality. Naturally supports fish.
Man-made or natural peat pools, dubh-lochans, upland pools or lochans	Often highly acidic and not supporting large variety of wildlife until plant life well established
Temporary ponds	Often shallow with important plant populations
Dune slack pools	May be slightly alkaline
Ponds in semi natural woodland	Often shaded, high in nitrates from decayed leaves and low in oxygen.
New forestry plantation ponds	As for semi natural woodland but at greater risk from soil additives
Sustainable Urban Drainage System (SUDS) ponds	Maybe polluted with contaminated surface run off. May suffer from invasive alien plants.

CURRENT FACTORS CAUSING LOSS OR DECLINE

There is renewed interest in ponds. In urban Tayside an increasing proportion of householders have garden ground in which to own a pond. Garden ponds have been made more popular through gardening television programmes. Materials to create and maintain garden ponds are more readily available at DIY stores and garden centres.

In flood prevention Sustainable Urban Drainage Systems, including designed flood plains and ponds, are becoming more common. These can become valuable wildlife habitats if managed appropriately.

Ponds have long been of interest to farmers for flight ponds, water storage and wildlife interest. Grants are available for new ponds and the restoration of existing ponds. However information from BASC and FWAG indicate grants funds such as the Rural Stewardship Scheme are underfunded compared to grants previously available from the Nature Conservancy Council.

Factors Affecting Water Quality - Pollution

Pollution is a significant threat to the biodiversity of Ponds and Pools. SEPA detailed in its 1999 State of the Environment Report the seven most important causes of polluted water in Scotland. These were:

- Sewage effluent
- Agriculture - diffuse sources
- Acidification
- Urban drainage
- Mine drainage
- Agriculture - point sources
- Industrial effluent

Mine drainage is not a significant factor in Tayside. However each of the other causes of pollution are known to affect ponds and pools.

A significant threat to the water quality of ponds and pools is eutrophication – an increase in nutrient levels. This increase is from a variety of sources: mainly sewage treatment and run off from agricultural land. Eutrophication may occur by natural processes. However, when as a direct result of human activity (cultural eutrophication) it leads to a significant loss of species dependent on reduced nutrient status. There often follows problematic algal growth (generally blue/green algae or green filamentous algae). These algal blooms cause:

- Rapid and extreme diurnal variations in oxygen which kills wildlife
- Death of submerged plants by blocking sunlight affecting organisms higher up food chain
- Release of toxins from blue/green algae blooms
- Unsightly appearance which is invariably foul-smelling

Locally ponds may also suffer eutrophication from significant roosting bird populations or where fish or bird food is added excessively. **(Tayside data to be inserted)**

Factors Affecting Water Quantity

Changes in hydrology, for example abstraction of surface or ground water, or drainage, can seriously affect the habitat and reduce biodiversity.

Groundwater abstraction via boreholes has increased dramatically in Scotland in the last two decades. Groundwater abstractions in Tayside predominantly take place for agricultural purposes in the lowland areas. In the absence of a comprehensive scheme for controlling abstractions from groundwater there are no means of ensuring that aquifer fed rivers are guaranteed protection.

Physical habitat destruction and simplification

Complete habitat loss is a major threat to ponds and pools. The loss may be due to natural processes of siltation, which may be more pronounced in shallow ponds. Waterbodies may also be lost due to in-filling for industrial and urban development, neglect or deliberate draining. Temporary ponds are at particular risk from draining while flood plain ponds will suffer from inappropriate river flood prevention.

Pressures from agriculture can lead to bank trampling and erosion and the loss of riparian zones due to cultivation right up to the pond edges. Similarly, urbanisation, road development, etc. can have similar effects.

Inappropriate management including unnecessary excavation, emptying and vegetation clearance etc. will reduce habitat variety and quality. Many species rely on shallow water and the different types of associated vegetation. A water only pond (such as a boating pond for example at Stobswell, Dundee) has little conservation value.

Biological Pressures

Non-native plant species such as Canadian pondweed are already firmly established in Tayside but other less well-known invasive plants including Australian Swamp Stonecrop, Water Pennywort and Water Fern have the potential to cause serious habitat loss and damage to native species. (**add Tayside figures/examples**). Even fish already common in Tayside, such as pike and perch, can be spread inappropriately to ponds with subsequent harmful effects. Stocking with trout for fishing can alter the ecology of a loch or pond, with possible detrimental affects. American Mink are firmly established in Tayside and represent a serious threat to many bird species and to water voles. Artificially high numbers of mallard, released for shooting, can cause serious degradation of standing waters.

Invasion by alien species may represent one of the most significant long term threats to ponds because, once established, elimination of such species may prove impossible. In many cases, the spread of alien species requires human intervention. This may involve:

- the selling of invasive plants through garden centres
- the deliberate introduction of fish species.

Increasing awareness is a key issue in prevention of alien introduction.

Recreational Pressures

This is a broad category that can act in a number of different ways. Increasing recreational pressures, such as walking and dog walking, angling and boating are likely to cause erosion to the banks of popularly visited ponds, as well as disturbance to particular species such as breeding wildfowl. Vehicle access to the water's edge may cause particular damage. Ponds used for fishing and shooting may not support high biodiversity if insensitively managed, but this need not necessarily be the case. Feeding of duck in shooting ponds and fish in fishing ponds also attracts rats and mink, predators of birds and Water Vole.

Climate Change

A potential and significant threat is climate change. Changing temperatures and rainfall will alter the character of rivers. For example a reduction in rainfall would lead to ponds drying up. Or an increase in temperature may lead to accelerated plant growth and colonisation by non-native species. Changes in flooding patterns may lead to pressures for increased flood defences and loss of seasonal inundation of riparian habitats.

MAIN THREATS TO KEY SPECIES

Otter
Pollution of watercourses, especially by PCBs. - identified on the UK SAP for this species as a significant factor nationally, but probably not significant in Tayside.
Insufficient prey associated with poor water quality - identified on the UK SAP for this species as a significant factor nationally, but probably not significant in Tayside.
Impoverished bankside habitat features needed for breeding and resting - may be locally important in Tayside.
Incidental mortality, primarily by road deaths and drowning in eel traps.
UK importance of Tayside population: Moderate
National Lead Partner: SNH, British Mammal Society

Water vole
Loss and fragmentation of habitats.
Disturbance of riparian habitats.
Predation by mink.
Pollution of watercourses and poisoning by rodenticides.
UK importance of Tayside population: Moderate
National Lead Partner: SNH, British Mammal Society

Pipistrelle Bat
Reduction in insect prey abundance owing to high intensity farming practice and inappropriate riparian management.
Loss of insect-rich feeding habitats and flyways owing to loss of wetlands, hedgerows and other suitable prey habitats.
Loss of winter roosting sites in buildings and trees.
Disturbance and destruction of roosts, including the loss of maternity roosts owing to the use of toxic timber treatment chemicals.
UK importance of Tayside population: Moderate
National lead partner: Bat Conservation Trust

Great Crested Newt
Loss of suitable breeding ponds.
Loss and fragmentation of terrestrial habitat.
Pollution and toxic effects of agrochemicals.
UK importance of Tayside population: Moderate
National lead partner: Herpetofauna Groups of Britain and Ireland, SNH

A water beetle - Hydroporus rufifrons
Loss of unimproved pasture
Damage to waterside marginal pool complexes
Inundation through impoundment for reservoirs
UK importance of Tayside population: uncertain
National lead partner: SNH?

A stonefly - Brachyptera putata
Acidification in headwaters and upland lochs
Agricultural pollution from modern insecticides used in sheep and cattle farming.
Decline in water quality due to eutrophication from sewage and agricultural run-off.
UK **importance of Tayside population**: uncertain, historic records for Rannoch area
National lead partner: SNH?

Pillwort
Nitrate/phosphate pollution and the associated increase in the growth of competitive species.
Abandonment of its main habitats, especially changes in grazing which lead to less disturbance.
Modification of water level regimes
Introduction of non-native competitive plants.
UK **importance of Tayside population**: High
National lead partner: SNH or Plantlife ?

Opportunities and Current Action

Current Action

- New water quality legislation is ensuring that rivers and burns are being improved by way of sewage treatment and monitoring.

- Ponds are included within protected areas such as Nature Reserves. One example, Trottick Mill Ponds, was declared a Local Nature Reserve in 2001.

- There is a renewed interest in garden ponds and the necessary products are readily available. Presumably more garden ponds are being created (statistics required).

- Better information and research provides greater opportunities for getting appropriate protection, development and management for natural, old and new ponds.

- With grant initiatives such as the Rural Stewardship Scheme, farmers are encouraged to develop integrated farm plans which may include ponds.

Policy and Legal Status

Various statutory bodies have a role in the current actions to maintain and improve the status of Ponds and Pools in Tayside. These include the Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH) Scottish Executive Environment and Rural Affairs Department (SEERAD), Tay, Esk and Forth District Salmon Fisheries Boards (TDSFB, EDSFB, FDSFB), Local Authority Planning Units, Scottish Water and the Forestry Commission (FC).

- Natural heritage conservation legislation including the designation of Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs), Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)
- UK Biodiversity Action Plan
- Planning legislation and policies.
- Pollution control legislation
- Agri-environment schemes such as the Rural Stewardship Scheme.

Some of the Acts which provide the framework for these functions are given below.
- Control of Pollution Act 1974
- Control of Pollution (Amendment) Act 1989
- EC Directive on the Conservation of Wild Birds (Directive 79/409/EEC)
- Wildlife and Countryside Act 1981
- Water Act 1989
- The Town and Country Planning (Scotland) Act 1997
- Environmental Protection Act 1990
- The Flood Prevention and Land Drainage Act 1997
- Natural Heritage (Scotland) Act 1991

- Wildlife and Countryside (Amendment) Act 1991
- EC Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (Directive 92/43/EEC)
- Conservation (Natural Habitats) Regulations 1994
- Environment Act 1995
- Scottish Office Circular 6/1995, Habitats and Birds Directives
- Urban Wastewater Treatment Directive

Management, Research and Guidance

Most of the regulatory bodies, in addition to their core regulatory duties, are actively involved in management, research and guidance activities. Many other organisations such as the Farming and Wildlife Advisory Group (FWAG), Scottish Agricultural College (SAC), Scottish Wildlife Trust (SWT), WWF in Scotland, and the Royal Society for the Protection of Birds (RSPB) not only conduct research and provide advice and guidance but some also manage Ponds and Pools for conservation purposes.

Many landowners and estates manage the resources under their control to enhance biodiversity.

Many individuals put in considerable amounts of time in voluntary work helping to manage or create important areas for conservation, recording wildlife or becoming acknowledged experts for various species.

Typical examples of actions currently undertaken by various organisations include:
- Environmental grants for farmers, such as those available under the Rural Stewardship Scheme have encouraged and funded the modification of farming activities, including creation and restoration of ponds.
- SNH produce site management statements for SSSIs.
- Some wildlife reserves include ponds.
- FWAG and SAC have undertaken 20 Farming and Water Management Plans in Tayside.
- Flood Appraisal Groups promote environmentally sensitive flood alleviation schemes.

Case Study - Trottick Ponds Local Nature Reserve, Dundee

Trottick Ponds in Dundee were built with water channels and weirs to provide water to the Claverhouse Bleach Works in the 18th and 19th centuries. Long after the linen and jute industries departed, the ponds and surroundings are now a recognised wildlife area with active community involvement. They are fed by the Dighty Water which suffers high nitrate levels from agricultural run off. The ponds and surrounding woodland and meadow were declared a Local Nature Reserve in 2001 and benefit from a management plan and considerable local community support. Dundee City Council Countryside Ranger Service organise educational and community events throughout the year. Plans have been prepared for sensitive excavation of areas of silt and a grant application submitted to Scottish Natural Heritage. The Countryside Ranger Service is experimenting with different methods to try to reduce filamentous algal bloom.

A considerable amount of accessible literature exists, including guidance leaflets and more detailed documents from all the organisations listed. Selected documents and guidance notes are listed under references. These only represent a small amount of the available literature. Further information is frequently available direct from organisations, or via their web sites, some of which are listed below.

Scottish Natural Heritage	www.snh.gov.uk
Scottish Environment Protection Agency	www.sepa.org.uk
SEERAD	www.scotland.gov.uk
SEERAD Freshwater Fisheries Laboratory	www.marlab.ac.uk
Farming and Wildlife Advisory Group	www.fwag.org.uk

Scottish Agricultural Colleges	www.sac.ac.uk
Forestry Commission Scotland	www.forestry.gov.uk
WWF in Scotland	www.wwf-uk.org
Froglife	www.froglife.org.uk
Herpetological Conservation Trust	www.hcontrst.f9.co.uk

Opportunities

In the UK habitat statement for Standing Open Water, measures to consider further include:

- Development and implementation of integrated catchment management plans.
- Use existing measures such as the previous Countryside Premium Scheme and the current Rural Stewardship Scheme Water Margin option to support appropriate management
- Review the powers and duties of water management institutions to manage water for nature conservation objectives.

Together with other existing initiatives, the implementation of the Local Biodiversity Action Plan, the designation of Special Areas of Conservation, implementation of options under the Rural Stewardship Scheme and the introduction of the Water Framework Directive will provide a stronger mechanism for the protection and enhancement of rivers and streams than has ever previously existed.

ACTION PLAN OBJECTIVES AND TARGETS

Objectives

1. Maintain and protect pond and pool habitats supporting semi-natural assemblages of animals and plants in both the 'open water' and surrounding habitat.

2. Maintain and improve water quality standards according to Scottish Environment Protection Agency Classification System and implement Sustainable Urban Drainage systems in new and re-developments to protect natural and semi-natural pond and pool habitats and at risk species.

3. Identify and improve, on a site by site basis, the factors impairing appropriate biodiversity, including the quality of the habitat, water quality, and the impact of non-native species.

4. Increase public awareness of biodiversity, the wildlife value of Ponds and Pools and their importance as an asset to the community.

Targets

1. Improve or maintain the water quality classification of all ponds and pools in the region.

2. Ensure no net loss in area or reduction in quality of natural pond or pool habitats.

3. Establish and maintain an inventory of Ponds and Pools which provides information on environmental quality, biodiversity quality, impacts on biodiversity, etc.

4. Prepare Catchments Management Plans involving both statutory and non-statutory organisations. Seek to have these plans adopted by the local authorities to inform planning decisions and provide a framework for integrated management.

5. Set up public awareness programme. Set up a Tayside Frog Spawn Survey to develop comparable data to that collected by Dundee City Council in 2000, and encourage participation in pond projects.

REFERENCES

- *The Natural Heritage Handbook and Information Annex.* SEPA .
- *Ponds, Pools and Lochans: Guidance on good practice in the management and creation of small waterbodies in Scotland.* SEPA, 2000. Habitat Enhancement Initiative. ISBN 1-901322-16-5
- *Improving Scotland's Water Environment. State of the Environment Report* - SEPA 1999 ISBN 1-901322-11-3
- *1998 Environmental Strategy* - SEPA 1998
- *Policy no. 4 the Consent Conditions Manual* - SEPA
- *Policy No. 15 Regulation on urban drainage* - SEPA
- *leaflets and documents covering most aspects of aquatic pollution* - SEPA
- *Sustainable Urban Drainage Systems: design manual for Scotland and Northern Ireland.* - CIRIA, SUDS, Scottish Working Party (2000). CIRIA, London. ISBN 0 86017 5219
- *Forest and Water Guidelines* - Forestry Commission 1993
- *Safety at Inland Water Sites* - RoSPA
- *BTCV Waterways and Wetlands – a practical handbook.* - ISBN 0-9501643-8-0
- *The Green Code - code of good practice for the safe use of pesticides on farms and holdings* - MAFF 1998 PB3528
- *Frog Spawn Survey, 2000* - Dundee City Council, 2000
- *The Pond Book: A Guide to the Management and Creation of Ponds,* 1999 – The Ponds Conservation Trust

Abbreviation List

RSPB	Royal Society for the Protection of Birds
SEPA	Scottish Environmental Protection Agency
SNH	Scottish Natural Heritage
SAC	Scottish Agricultural College
SWT	Scottish Wildlife Trust
NTS	National Trust for Scotland
FRS	Fisheries Research Services, Freshwater Laboratory
FWAG	Farming and Wildlife Advisory Group
LBAP	Local Biodiversity Action Plan
DSFB	District Salmon Fisheries Board
SUDS	Sustainable Urban Drainage Systems
SEERAD	Scottish Executive Environment and Rural affairs
CMP	Catchment Management Plan

PROPOSED ACTION FOR BIODIVERSITY

	Proposal for Action – Ponds & Pools HAP	Potential deliverers		To take place by								Meets Objective No.
		Lead Partner(s)	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	**Policy and legislation**											
	1. Ensure that all statutory water quality and discharge standards are maintained and where necessary improved.	SEPA Scottish Water		☐	☐	☐	☐	☐	☐	☐	☐	
	2. Develop policies to control alien species and favour establishment of appropriate native species.	SEPA SNH	PKC DCC AC Garden Centres	☐	☐	☐	☐	☐	☐	☐	☐	
	3. Develop and implement Catchment Management Plans as directed in the Water Framework Directive, which take into account and restore the natural nutrient status of the waterbody.	SEPA	SNH, PKC DCC AC	☐	☐	☐	☐		☐	☐	☐	
	4. Promote the adoption of SUDS (sustainable urban drainage schemes) where possible.	PKC AC DCC SEPA	TBP	☐	☐	☐	☐	☐	☐	☐	☐	
	5. Establish site-specific plans to achieve appropriate water quality, water resource use, fishery management for all important waterbodies, for example waterbodies which are under threat, vulnerable, have potential for nature conservation and/or restoration.	PKC AC DCC SEPA SNH	Angling bodies, Landowners	☐	☐	☐	☐	☐	☐	☐	☐	
	6. Ensure that pressure is brought to bear on relevant organisations conducting activities within and outwith the region but which impact on standing open water (e.g. industrial emissions, acidification).	SEPA	SNH	☐	☐	☐	☐	☐	☐	☐	☐	
	7. Ensure that development plans do not adversely affect ponds and pools and associated wildlife in the region, and promote no net loss of this habitat.	PKC DCC AC		☐	☐	☐	☐	☐	☐	☐	☐	
	Site safeguard and management											
	1. Oppose development or other proposed activities which threaten loss or damage to this habitat or associated species.	PKC DCC AC SNH		☐	☐	☐	☐	☐	☐	☐	☐	
	2. Ensure that existing nature reserves and SSSIs which include ponds are managed appropriately.	SNH	RSPB SWT PKC DCC AC	☐	☐	☐	☐	☐	☐	☐	☐	
	3. Maintain or introduce appropriate fishery management. Encourage fisheries interests to establish management schemes which enhance populations of important local fish species but not to the detriment of biodiversity.	FRS DSFB	Angling Groups	☐	☐	☐	☐	☐	☐	☐	☐	
	4. Ensure that all local planning mechanisms, such as Local Plans, take into account the wildlife interest of pond and pools.	PKC DCC AC SNH SEPA		☐	☐	☐	☐	☐	☐	☐	☐	

	5. Encourage appropriate management of ponds and surrounding habitats in existing developments in urban areas.	PKC DCC AC Scottish Executive		☐	☐	☐	☐	☐	☐	☐	☐	
	6. Promote adoption of SUDS (Sustainable Urban Drainage Systems) principles, such as swales, infiltration basins, detention/retention ponds, wetlands, reedbeds) in new developments.	SEPA PKC DCC AC	Developers architects	☐	☐	☐	☐	☐	☐	☐	☐	
	7. Encourage habitat restoration, identify list of demonstration sites with management plans.	SEPA SNH TBP	FWAG SAC SWT RSPB NTS	☐	☐	☐	☐	☐	☐	☐	☐	
	8. Encourage better management and protection of ponds on farmland and forestry.	FWAG SAC Forestry Commission	SLF NFUS	☐	☐	☐	☐	☐	☐	☐	☐	
	9. Encourage the full implementation of the Forestry Commission Water Guidelines i.e. buffer strips and the strategic planting of broadleaves.	Forestry Commission	FWAG SAC Scottish Native Woods	☐	☐	☐	☐	☐	☐	☐	☐	
	Species management and protection											
	1. Complete Species Action Plans (SAPs) for all Priority Species	TBP		☐	☐	☐	☐	☐	☐	☐	☐	
	2. Implement SAPs	TBP	Special interest groups	☐	☐	☐	☐	☐	☐	☐	☐	
	3. Use national campaign to highlight species importance at local levels	TBP	PKC DCC AC	☐	☐	☐	☐	☐	☐	☐	☐	
	Advisory											
	1. Provide advice for managers and users of ponds, to promote the conservation of biodiversity of this habitat.	SNH	PKC DCC AC RSPB SEPA	☐	☐	☐	☐	☐	☐	☐	☐	
	2. Promote best practice in farming and encourage landowners and farmers to prepare and implement Farm Waste Management Plans and Nutrient Budget Plans	SEPA SEERAD	FWAG SAC	☐	☐	☐	☐	☐	☐	☐	☐	
	3. Develop guidelines for best practice in fishery management	SEPA Scottish Executive	SNH FRS DSFB	☐	☐	☐	☐	☐	☐	☐	☐	
	4. Promote practices that encourage improvement of the biodiversity value of ponds and surrounding habitat as part of all environmental improvement programmes (e.g. farm plans, forestry & planting schemes etc.).	SNH	FWAG SAC PKC DCC AC SEERAD	☐	☐	☐	☐	☐	☐	☐	☐	

	Research and monitoring											
	1. Survey of waterbodies in area: Collection of accredited data such as Riparian biodiversity data (mammals, birds, invertebrates, plants), Alien plant data	SWT	Local Biological Recording Centre BASC, RSPB, SEPA	☐	☐	☐	☐	☐	☐	☐	☐	
	2. Review current water quality to identify causes of down grading, particularly where biodiversity priorities may be important.	SEPA		☐	☐	☐	☐	☐	☐	☐	☐	
	3. Continue to monitor the impact and extent of acidification in the region.	SEPA		☐	☐	☐	☐	☐	☐	☐	☐	
	4. Monitor impact of diffuse pollution, such as phosphates, nitrates etc.	SEPA		☐	☐	☐	☐	☐	☐	☐	☐	
	5. Survey ponds and pools in the region and designate, where possible, important sites as 'Local Wildlife Sites' and incorporate them into the planning system.	SWT	Local Biological Record Centre	☐	☐	☐	☐	☐	☐	☐	☐	
	6. Establish a regular programme of standing open water surveys which will include ponds and pools.	SEPA SNH		☐	☐	☐	☐	☐	☐	☐	☐	
	7. Review data on standing open waters as a precursor to the preparation of Catchment Management Plans and updating of existing CMPs.	SEPA	Local Biological Records Centre	☐	☐	☐	☐	☐	☐	☐	☐	
	8. Monitor the delivery of the action plan yearly and in detail every five years, starting in 2003.	TBP		☐	☐	☐	☐	☐	☐	☐	☐	
	9. Support the setting up of a Tayside Biological Record Centre to ensure all data collected for this Action Plan is collated.	SNH SEPA PKC DCC AC	Local Biological Records Centre	☐	☐	☐	☐	☐	☐	☐	☐	
	Promotion and awareness-raising											
	1. Provide a newsletter, progress report or leaflet to raise awareness and report good practice management for biodiversity in pond and pool habitats.	TBP		☐	☐	☐	☐	☐	☐	☐	☐	
	2. Compile a directory of private landowners and local interest groups, who would be receptive to participation in discussions about local ponds and pools, organise initial meetings and community talks.	TBP	PKC AC DCC SNH SEPA BASC	☐	☐	☐	☐	☐	☐	☐	☐	
	3. Compile an information resource of key legislative, policy, management, guidance and research documents to be available for public consultation at key locations e.g. libraries, museums, council offices.	TBP	PKC DCC AC SNH SWT SEPA	☐	☐	☐	☐	☐	☐	☐	☐	
	4. Set up public participation activity - Tayside Frog Spawn Survey based on Dundee 2000 survey	TBP PKC DCC AC	SWT RHS	☐	☐	☐	☐	☐	☐	☐	☐	

CONSULTATION DRAFT: 2ND TRANCHE
WOODLAND – W3

TAYSIDE BIODIVERSITY PARTNERSHIP

PLANTED CONIFEROUS WOODLAND ACTION PLAN

INTRODUCTION

The management of all woodland in the UK, including coniferous woodlands, is regulated by the government through the Forestry Commission (FC). The Commission also encourages forestry expansion and management of existing woodland through the payment of grants where it is in accordance with forestry and conservation policies. Policies are informed by both national and international priorities and these are set out in a series of publications that provide the framework for environmental regulations and incentives.

The UK Forestry Standard defines and applies government commitments to sustainability and biodiversity and this is augmented by a series of environmental guidelines on conservation, landscape, water, etc. In Tayside these policies will help ensure that new and existing conifer forests are diverse and that biodiversity aspects are properly addressed. This will take place throughout the UK. Therefore, this Action Plan will concentrate on proposed actions on important local issues and opportunities that arise from the distinctive character of the region's extensive forest resource. An important feature of this resource is that some 35% of the woodland area is state owned and managed by Forest Enterprise. The large contiguous holdings, which include additional extensive open ground, offer particular scope for exemplary management with respect to government biodiversity aims.

HABITAT DEFINITION AND BACKGROUND

This Action Plan will concentrate on woods composed wholly or mainly of conifer species, both native and introduced.

Tayside - particularly Highland Perthshire - has a unique place in British forest history and development as the site of many of the original introductions of trees from overseas. Additionally there has been a strong tradition of active forest management and tree planting amongst the traditional estates of which Atholl, Breadalbane, and Scone are perhaps the outstanding examples.

Original specimen introductions of larch, Douglas fir and other conifers can still be found illustrating the biological potential of these trees in this country as well as their biodiversity potential which inevitably becomes enhanced with age.

Early forestry management in the 18th, 19th and early 20th centuries could best be summed up in the following words: 'In my opinion Planting ought to be carried on for Beauty, Effect and Profit' wrote 'Planter John', the Fourth Duke of Atholl (1755 –1830) writing in his Forestry Journal and putting profit third. Accordingly long-established conifer woodlands tend to be more diverse and of significant biodiversity interest, which perhaps helps explain the success of the early 19th century re-introductions after their local extinction and disappearance, of capercaillie and red squirrel to the woodlands on Drummond Hill.

Forestry practices after WWII were arguably less enlightened and focussed heavily on timber production and economic returns. Consequently many of the new conifer woodlands established in the 1950's,'60's, '70's, and early '80's tended to be heavily weighted in favour of single species, predominantly Sitka spruce, and single age monocultures. Whilst there were a number of notable exceptions to this approach, especially amongst the traditional estates, such an approach to afforestation and management of existing semi-natural woodlands brought forestry into conflict with conservation interests and a perception that productive forestry for timber production was inimical to conservation and habitat interests.

The challenge to forest managers in Tayside is to demonstrate that this need not be the case. There are many outstanding examples already where modern multi-purpose forest management in predominantly coniferous woodlands can co-exist with conservation interests and may even enhance those interests as current initiatives with red squirrels and capercaillie and other species seek to demonstrate. Conifer forests are home to a variety of habitats and are themselves potentially important habitats when sympathetically managed.

Recent developments in forest management, the requirements of the UK Forestry Standard, and the financial incentives available through the FC's woodland grant incentives all serve as huge opportunities to enhance the status of conifer woodland as a major contributor to Tayside's biodiversity wealth.

KEY SITES/SITE DISTRIBUTION

There are extensive areas of planted coniferous woodland in the region. There are no SSSIs designated for the habitat but small areas planted over or adjacent to other habitats are included in SSSIs.

CURRENT STATUS

There are approximately 75,000 hectares of planted coniferous woodland in Tayside which is approximately 5 % of the UK total for all conifer woodland. One-third of Tayside's conifer woodland is publicly owned and managed by the Forest Enterprise.

NATURE CONSERVATION IMPORTANCE

The potential importance of large UK plantations is often underestimated and should not be over-looked. This recognition has prompted many second rotation forests to be planned to take account of nature conservation needs through creating internal forest diversity in tree and stand age. Much of this is now enshrined in the UK Forestry Standard which requires forest managers to comply with its various standards when undertaking forest operations when seeking FC approval or financial aid.

Woodland rides and glades can be important for vascular plants and invertebrates. Old stands with dead and dying trees, understorey vegetation and open canopies are also important for a variety of species. There are stands of conifer in Tayside which have the only known records of invertebrate species either regionally or nationally (add data). In some instances, it may be possible to recreate former habitats to some extent, although this is heavily dependent on productive ground being available elsewhere. There is also increasing evidence of the adaptation of important species to new forest habitats, for example barn owl, short-eared owl, goshawk and merlin using forest edge nest sites. Conifer forest also provides some unique habitats for important and threatened species such as red squirrel, nightjar and a range of woodland birds. In addition, conifer forest provides special habitats for lichens, mosses, ferns and fungi.

Many planted forests have displaced other habitats which had significant biodiversity value as open ground such as raised bogs or native woodland habitats. There is potential for restoration of these habitats in some cases. In addition, many of the region 's forests were planted over a relatively short period and lack age and species diversity, which, if in place, would encourage biodiversity associated with old trees. This post WWII planting was dominated by Sitka spruce because the climate and soils of Tayside provide excellent growing conditions for this tree, giving optimum timber production.

Current practice as outlined in the Standard requires a more rigorous approach to biodiversity, species variety and forest management.

KEY SPECIES

Mammals

Badger	Meles meles (CC)
Roe deer	Capreolus capreolus (CC)
Red deer	Cervus elaphus (CC)
Fallow deer	Dama dama (CC)
Pine marten	Martes martes (CC)
Red squirrel	Sciurus vulgaris (P)
Brown long-eared bat	Plecotus auritis (CC)

Birds

Goshawk	Accipiter gentilis (CC)
Sparrow hawk	Accipter nisus (CC)
Buzzard	Falco columbarius (CC)
Woodcock	Scolopax ruticola (CC)
Green woodpecker	Picus viridis (CC)
Black grouse	Tetrao tetrix (P)
Barn owl	Tyto alba (CC)
Long-eared owl	Asio otus (CC)
Short-eared owl	Asio flammeus (CC)
Nightjar	Caprimulgus europaeus (P)
Tawny owl	Strix aluco (CC)
Tree pipit	Anthus trivialis (CC)
Redstart	Phoenicurus phoenicurus (CC)
Goldcrest	Regulus regulus (CC)
Grasshopper warbler	Locustella naevia (CC)
Common crossbill	Loxia curvirostra (CC)
Siskin	Carduelis spinus (CC)

Add – invertebrate spp.; higher plants; lower plants.

Key Species Management

Conifer woodlands support species which are of importance both nationally and locally. The development of Local Species Action Plans is required to focus attention on these. Species to consider for action include:

Red deer The encroachment of sika deer threatens the genetic integrity of the Tayside herd of red deer through hybridisation.

Red squirrel Tayside has a high proportion of coniferous woodland which offer significant opportunity in terms of the conservation of this species. The possibility of a 'core reserve ' could be further considered.

Bat species All species of bat in Tayside use coniferous woodland. Provision of additional roost sites (boxes) and feeding habitats could greatly increase populations.

Barn owl Practical conservation measures within conifer forests have resulted in dramatic improvements in the number and prospects of barn owl.

Capercaillie Although under threat across its Scottish habitat the Tayside outliers of the remaining capercaillie make extensive use of conifer woodlands.

Black grouse. Tayside has many woodland and woodland edge habitats which can offer potential for the foraging of this species.

Nightjar *Tayside holds the majority of the Scottish population of this species in forest clearings.*

NATIONAL BIODIVERSITY CONTEXT

There is a UK Broad Habitat Statement for planted coniferous woodland, which gives the following conservation direction:

- *Maintain and enhance the wildlife potential of the existing conifer resource through continued restructuring and diversification.*

Measures to be considered further include:

- Implementation of the UK Forestry Standard which embraces the Resolution for the Conservation of Biodiversity of European Forests as agreed in Helsinki (1993).
- Continue to direct the expansion of conifer woodland of introduced species to land of low conservation value (e.g. derelict industrial, low grade arable, improved pasture and other such habitats) ensuring habitats of high nature conservation value are not displaced using Indicative Forest Strategies (FC Woodland Grant Scheme consultation procedures).
- Promote forestry management which enhances conservation value through restructuring and diversification.
- Develop systems of monitoring the biodiversity conservation value of planted coniferous woodlands, for example by assessing critical habitat features and selecting key or indicator species.

CURRENT FACTORS AFFECTING THE HABITAT

There is no particular threat to the conifer resource as a whole although some factors could either reduce the existing wildlife interest of plantations or mean that potential improvements are not realised.

These include:

- Catastrophic wind damage and fires (particularly started through vandalism).
- Insect damage from imported pests can devastate the forests.
- Prospect of shorter rotations as timber processing becomes more efficient and timber markets change.
- Perpetuating uniform age and species composition of forests

TAYSIDE FOREST BIRDS INITIATIVE

The Tayside Forest Birds Initiative was established in 1991 as a forum where foresters, conservation organisations and local ornithologists could work together for birds in the Tay Forest Park. Central to the project has been the gathering of good quality survey data and using it to inform the planning of future forests.

MAIN THREATS TO KEY SPECIES

Add section

OPPORTUNITIES AND CURRENT ACTION

The existing or potential importance for biodiversity of large UK plantations should not be overlooked, especially since the rotation of forest felling can be planned to take account of nature conservation needs and thus help create forest diversity in tree and stand age.

Age Class Diversity
The UK Forestry Standard gives guidance on increasing age class diversity by restructuring age classes, retaining forest cover in some areas (continuous cover silvicultural systems) and the identification of long term retentions to encourage old trees to flourish with all their associated biodiversity benefits.

Tree Species Diversity
UK policy now addresses the question of single species monoculture as perhaps best exemplified by the large plantations of post-WWII Sitka spruce (though SS itself is a useful tree with important biodiversity potential in its own right when managed appropriately). Now a minimum proportion of minor conifer species is included together with open space and broadleaves. These elements are likely to comprise 20 - 30% of new and second rotation forests which gives good potential to achieve biodiversity aims and to improve environmental aspects of conifer forests in general. Important local species should be considered and plans developed for them to inform forest management.

OPPORTUNITIES ARISING FROM FOREST PRODUCTION

- Appropriately placed profitable forestry may generate income to support important conservation projects, for example, the Barn Owl Project under taken by Forest Enterprise in Tayside

- Felling of woodland areas (often helped by wind and fire damage) can open up clearings in forests and encourage biodiversity associated with the catastrophic events that occur in natural ecosystems.

OBJECTIVES AND TARGETS

Objective 1
- Increase the habitat diversity of coniferous woodlands in Tayside.

Targets:
Incorporate objectives for increasing habitat diversity in all new forest design plans and all those under review with immediate effect.

Objective 2
- Increase the tree species diversity of coniferous woodlands.

Targets:
Incorporate objectives and prescriptions for increasing tree species variation in all new forest design plans and all those under review with immediate effect.

Objective 3
- Increase the diversity of the forest structure by retaining stands to biological maturity, introducing age class diversity, and establishing areas of long-term forest structure managed by continuous cover systems where possible.

Target:
Include biodiversity objectives into forest design plans for at least 30% of the afforested area of the region by 2005

Objective 4

- Identify habitats and species which are of importance within and around coniferous woodlands, develop Action Plans for these and ensure these actions are taken into account in forest planning at all levels.

Targets:
Compile and complete an audit of the biodiversity of at least 50% of the coniferous woodlands in Tayside by 2005. Incorporate prescriptions for important habitats and species identified by this audit in all forest design plans by 2010.

Objective 5

- Restore, where possible, habitats of biodiversity importance within the forest holding.

Target:
Include targets for restoration in all forest design plans with reference to the following local Biodiversity Action Plans by 2005:

- Native Woodlands
- Wood and Scrub Pasture
- Lowland Raised Bogs
- Blanket Bogs
- Rivers and Burns
- Upland Heath
- Wet Grassland
- Acid Grasslands
- Sand Dunes

Objective 6

- Target new woodlands towards areas which will result in a net gain for biodiversity such as the expansion out from existing native woodlands and avoid open habitats of a recognised and agreed high conservation importance.

Target:
Ensure that the Indicative Forestry Strategies consult the local Biodiversity Action Plan to ensure biodiversity is used as criteria for directing new woodland establishment 2002. (NB IFS's in Angus and Perth & Kinross need to be revised to take account of the new circumstances and developments in forestry.)

STAKEHOLDERS – to add

REFERENCES – to add

PROPOSED ACTION FOR BIODIVERSITY

Proposal for Action – Planted Coniferous Woodland	Potential deliverers		To take place by						Meets obj. no.
	Lead	Partners	02	03	04	05	06	07	
A. Policy and legislation									
1. Ensure that restructuring policies applied increase habitat diversity, landscape character, tree species diversity and age class diversity of coniferous woodlands in the region (e.g.UK Forest Standards).	FC PKC DCC AC								
2. Ensure that biodiversity objectives from this and other relevant plans (Native Woodlands, Wood and Scrub Pasture, Raised Bogs, Rivers and Burns, Upland Heath, Wet Grassland, important acid grasslands, and Sand Dunes) are fully incorporated in the design, of new and second rotation forests.	SNH FC SEPA	PKC, DCC, AC NGOs							
3. Include objectives and actions for priority forest species and habitats in all forest design plans, owners, and FE conservation plans. Encourage this approach in private forest areas.	FC FE SNH	NGOs							
4. Review the IFS's for Angus and P&K local authority areas which incorporate objectives for biodiversity and help define the criteria to be used in deciding on the location for new conifer woodlands.	FC PKC AC								
B. Site safeguard and management									
1. Ensure site safeguard and management takes account of the recommendations of the agreed Forestry Subject Plan.	FC TBP								
2. Retain old conifer stands to biological maturity on sites where opportunities exist.	FC FE Private Foresters								
3. Develop Action Plans for key species associated with coniferous woodlands in the region.	FE, SNH, FC, RSPB, SWT	TBP							
C. Advisory									
1. Ensure that all forest managers receive advice about biodiversity within their holdings and the potential for enhancing this.	FC	TBP							
D. Research and monitoring									
1. Carry out necessary audits of priority habitats forest and species for incorporation into Plans. (see Policy and Legislation above).	FC, FE SNH	Wood-land owners NGOs							
2. Set up research projects to investigate the potential and the methods for restoring areas of important open ground habitats and native woodland, which have formerly been planted	FC FE SNH	TBP							

with conifers. Using information collected in the auditing process as a baseline (see Research and Monitoring above), monitor the effects of restructuring and species management on species and habitats of coniferous woodlands.									
3. Set up a Biological Record Centre for Woodlands in Tayside and ensure that all working data collected for this plan is held there.	SNH TBP								
4. Habitat Action Plan review process - ensure this Plan is being delivered annually and review fully after 5 years	TBP								
E. Promotion and awareness-raising									

CONSULTATION DRAFT: 2ND TRANCHE – SAP/M1

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TAYSIDE BIODIVERSITY PARTNERSHIP

BADGER ACTION PLAN

Common Name Eurasian Badger

Scientific Name *Meles meles*

SPECIES PROFILE

UK Biodiversity Status	Not listed
Tayside Status	Species of Conservation Concern
Statutory Protection	Badgers are fully protected by law - The Protection of Badgers Act 1992 and The Wildlife and Countryside Act 1981
Scottish Lead Partner	Scottish Badgers

Relevant Habitat Actions Plans The badger is a "mosaic" species and occurs in varying habitat throughout Tayside. Although the majority of known sites are in woodland, there are records of setts in montane habitat and at least one open-aspect sett in a pasture. It should be noted that many setts are in semi-natural woodland, but others occur in non-native pinewoods.

DESCRIPTION AND HABITAT

- The badger is our largest surviving carnivore although it is omnivorous in habit.
- The species is largely nocturnal
- Life expectancy is 10 years
- Badgers weigh about 10kgs and are about 1 metre in length. They have a distinctive black and white face.
- Badgers live in a tunnel and chamber system called a sett
- A badger family is called a "Clan"
- Badgers require a suitable strata in which to dig their sett and a reliable food source
- Badgers are very territorial and defend areas rigorously from other clans
- Territories within Tayside are very varied ranging between Montaine and lowland woods and grasslands
- Mating takes place in late summer/early autumn
- Cubs are born the following February/March
- The staples of the badger diet are earthworms but they also eat insects, cereals, mammals, fruit, eggs and birds, green plants as well as a few other foods.
- Badgers are contractionist by nature and do not readily expand their territory.

CURRENT STATUS AND EXTENT

There are some 20 - 25, 000 badgers in Scotland, ranging in various density from the north coast to the border with England. Only the island of Arran has been identified as having badgers, which were introduced in Victorian times for sporting purposes. There is some evidence that badgers are on Skye, although this has yet to be confirmed.

In the past, badgers were found throughout Tayside in much higher numbers, but past persecutions and changes in farming methods have caused numbers to dramatically drop. Too little is known of the local population to confirm the extent of badger population.

CURRENT FACTORS CAUSING LOSS OR DECLINE

The single most important factor causing loss or decline are road traffic accidents. Too little is known about distribution to come to any realistic conclusion about other threats at this time, although it is believed that criminal persecution is low.

Badgers are particularly at risk through development, forestry and agricultural operations.

OPPORTUNITIES AND CURRENT ACTION

- There is a national impetus headed by the National Federation of Badger Groups to enhance our knowledge of the badger and to identify its distribution.
- In Tayside the North Tayside Badger Group is surveying the area and recording information on distribution. Some 26 people are carrying out local surveys.

MAIN OBJECTIVES / TARGETS

Conserve the existing population

- Measurable against existing records
- Achieve, through arrangements already in place, regular visits to known sites.
- Ongoing with at least two visits per year to each known sett
- Lead partner - North Tayside Badger Group

Survey and identify new sites

- Measurable against existing records
- Survey x ten kilometre squares per annum
- Lead partner North Tayside Badger Group.
- A figure of ??? squares per annum surveyed would be realistic.

Identify and form closer links with statutory/non statutory bodies

- Improve communication between the active Badger Group and link partners.
- Link partners would include Scottish Natural Heritage, Regional and local planning departments, Forest Enterprise, Local Biological recording centres, Tayside Biodiversity Partnership, Landowners and managers.
- Lead partner North Tayside Badger Group
- Ongoing but should be in place after one year

Promotion and Awareness-raising

- Raise awareness of the species to the public, planners and developers
- Increase the North Tayside Badger Group's membership, particularly in Perthshire

REFERENCES - add

PROPOSED ACTION FOR BIODIVERSITY

	Proposal for Action – Badger	Potential deliverers		To take place by								Meets Objective No.
		Lead Partner(s)	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	A. Policy and legislation											
	B. Site and species safeguard/ management											
	1. Conserve the existing population with continuation of making regular visits to known sites	North Tayside Badger Group (NTBG)										
	C. Advisory											
	D. Research and monitoring											
	1. Survey and identify new sites on a regular basis (x ten kilometre squares per annum)	NTBG										
	2. Identify and form closer links with statutory/non statutory bodies	NTBG	SNH FE FC TBP Local Biological Recording Centre Landowners									
	E. Promotion and Awareness-raising											
	1. Raise awareness of the species to the public, planners and developers	NTBG										
	2. Increase the North Tayside Badger Group's membership, particularly in Perthshire	NTBG										
	F. Plan Monitoring											
	1. Monitor and regularly review this plan on an annual basis and in detail every five years	TBP										

CONSULTATION DRAFT: 2ND TRANCHE – SAP/M2

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TAYSIDE BIODIVERSITY PARTNERSHIP

WATER VOLE ACTION PLAN

Common Name WATER VOLE

Scientific Name *Arvicola terrestris*

SPECIES PROFILE

UK Biodiversity Status:	Priority Species
Tayside Status:	Priority Species
Statutory Protection:	Special protection under schedule 5 of the Wildlife and Countryside Act 1981 making it an offence to intentionally:

- damage or destroy any place which water voles use for shelter or protection;
- disturb water voles while they are using such a place.

UK Lead Partner:	Environment Agency on behalf of the UK Water Vole Steering Group
Relevant Habitat Action Plans	Lowland Raised Bogs; Standing Open Water; Rivers and Burns; Mesotrophic Lochs; Upland Heath; together with general riparian woodland and farmland habitats

Map – *if relevant*

DESCRIPTION AND HABITAT

The water vole is the largest of the British voles, weighing between 200g-350g, with a body length of 120mm-235mm and a tail length of 40mm-145mm. The males are larger and heavier than the females.

Water voles inhabit most types of freshwater systems, including slow-flowing rivers, lochs, ponds, raised bogs, marshes and wetlands, lowland drainage ditches and headstreams up to 600m. Being predominantly herbivorous, they require an abundant source of waterside vegetation such as rushes, sedges and in particular, grasses. Food is gathered in late Autumn, stored in underground chambers and eaten during winter months when frost and snow cover the ground for long periods. During this time there is also a greater reliance on roots, rhizomes, bulbs, tree bark and invertebrates.

With a few rare exceptions, water voles are generally found within three metres of a water course, preferring areas with steep bankings where they can excavate extensive burrow systems. In large, long established populations, these systems consist of interconnecting tunnels with many entrances and bolt holes, some of which may be under water. In smaller populations, however, and where no steep banks exist, burrow entrances are kept to a minimum and are usually well concealed at water level under thick vegetation. Entrance holes are typically wider than they are high, measuring from 4cm-8cm across and often having grazed "lawns" around them.

Breeding lasts from late March to late September with females producing from two to five litters in a season, each of four to eight young. Nests consist of shredded grass and are usually situated underground, although occasionally they are woven into the base of sedges and reeds where no suitable banks exist. Young born early in the season may breed later in the year, but most reach sexual maturity the following spring. Few voles survive more than one winter. Both males and females will aggressively defend their respective breeding territories, with males holding up to 200m of bank and females up to 100m at low densities and less than half this distance at high densities. During the breeding season territories are marked by latrines. The droppings, measuring 8-12mm long, cylindrical with blunt ends, are deposited in small piles, usually on a mud bank close to the water's edge.

Water voles are active day and night, being generally diurnal where habitat permits. Where disturbance is high, or bankside vegetation is heavily grazed by livestock, the voles will be predominantly nocturnal. In these circumstances, food is gathered and taken underground to be eaten. The water vole has evolved a defence strategy of either bolting underground or diving under water, often kicking up a concealing cloud of mud to evade native predators which at one time included stoat, weasel, heron, marsh harrier, wildcat and polecat, none of which are adapted to make any serious impact upon the species. The non-native brown rat, however, is a serious predator on water voles, as is the feral American mink which is ideally suited to pursuing water voles both under water and underground.

MANAGEMENT

The following management recommendations should aim to maintain or establish optimal habitat requirements which will maintain breeding sites (core areas), afford safe areas from flooding and maintain a corridor with sufficient vegetation to maintain connectivity between any adjacent core areas, unless isolation is considered essential to protect from mink predation.

- Retain waterside vegetation to a minimum width of 3 metres from the water's edge.
- Leave a buffer zone where fertilisers, herbicides, and rodenticides are not to be used.
- Periodic long-term mink control.
- Avoid dredging and bank alterations which are considered detrimental to water vole habitat. Where such dredging is unavoidable, ensure work does not affect both banksides simultaneously. Seek to establish steep banks of around 35 degrees. Where long stretches of low banks exist, consider using spoil to heighten banks at 30m intervals to enhance breeding habitat and reduce vulnerability of voles to flooding.
- Consider dredging or periodic grazing where habitat has decreased in quality due to siltation and scrub encroachment.
- Avoid tree planting schemes which would cause over shading to core breeding sites and fragment populations.

CURRENT STATUS AND EXTENT

Local

Although water voles are under recorded in Tayside, a few records exist to show a past widespread distribution ranging from Lowland Perthshire and Angus to high altitude catchment areas, such as Ben Lawers and Glen Lyon. Recent surveys on some of these sites, together with others resulting from local questionnaires, have concluded that water voles are now locally extinct throughout most of their former range. Such extinction of water vole populations throughout many lowland areas is now well documented. However, it is unclear just what change there has been in populations in upland areas as these have been largely neglected by researchers with just a handful of records for the whole of upland Tayside over the past twenty years.

Nationally

Although once common along water courses, ponds and wetlands throughout Britain, the water vole has suffered one of the most catastrophic declines of any British mammal this century. National surveys were carried out in 1989-1990 and again in 1996-97. The first survey found water voles present in 15-74% of the sites surveyed, while the second found only 2-30% of sites occupied with a staggering loss of an estimated 88% of the population over seven years and a loss of 94% predicted by 2002. Further accelerated declines were predicted as populations continue to fragment and constrict.

CURRENT FACTORS CAUSING LOSS OR DECLINE

- Watercourse dredging and canalisation, especially where both banksides are affected simultaneously, leading to loss of burrow systems, habitat loss and fragmentation of breeding populations.

- Overgrazing, resulting in poaching of watercourse banks, loss of waterside vegetation.

- Mink predation may now be the critical factor determining the future survival of water voles in Britain. Numerous studies have shown a direct correlation between the extinctions of water vole colonies and presence of mink. Extensive studies in England have found that even thriving water vole colonies became extinct within twelve months of mink colonising their stretch of watercourse. Studies of water vole colonies in lowland Perthshire and Angus found each became extinct within six months of mink colonising their stretch of watercourse, with one colony lasting less than one month. The relative isolation of these colonies limited their potential for recruitment from other breeding colonies and contributed to their vulnerability to extinction.

  Questionnaire results from upland gamekeepers, stalkers and water bailiffs on mink distribution found a perception that mink are expanding their range in upland areas. Suggested reasons for this include diminishing riparian prey species in lowland areas such as water vole and moorhen, together with a general warming of climate allowing rabbits to colonise higher altitudes, thus facilitating mink colonisation of upland areas, as well as elevating stoat numbers.

  However localised or widespread this may be, it nevertheless has potentially serious consequences for those small isolated water vole colonies which may still exist in upland areas.

- Pollution of watercourses from rodenticides and herbicides, sewage and nutrient run off.

- Loss of habitat due to development, inappropriate riparian management schemes such as bank improvements or tree planting resulting in overshading of core breeding sites.

- Climate change, resulting in increased flooding of water courses.

OPPORTUNITIES AND CURRENT ACTION

Although much has been done to arrest the decline of water voles in England and Wales, little has been done in Scotland outside a few key sites in Aberdeenshire, Central and Lowland Scotland. Tayside in particular has seen very little direct action on water vole conservation.

Tayside holds a wide range of conservation based organisations which collectively have the potential to utilise a large volunteer input in surveys and other conservation measures. There is also the potential to incorporate water vole conservation measures in conjunction with other Habitat Action Plans and Species Action Plans, as well as projects such as the Forest of Clunie Moorland Management Scheme and catchment projects. A handbook on 'Water Vole Habitat Management in Conservation' is available, together with a guidance booklet for planners and developers by English Nature and the Environment Agency.

MAIN OBJECTIVES / TARGETS

1. **Main Objectives**
   - Restore water voles to their former widespread distribution throughout Tayside.

2. **Main Targets**
   - Ensure no net loss of the species during the lifetime of this plan.

3. **Work Objectives**
   - Promote appropriate management of water courses and wetland habitats where water voles either currently exist or may do so in the future.
   - Carry out systematic surveys to determine the current status of water voles in Tayside. Based on the results of the survey, produce a definitive map of distribution.

4. **Work Targets**
   - Complete mapping and survey work by end of 2003 – *effective immediately.*
   - Promote management for water vole in all relevant Habitat Action Plans and catchment projects by 2003.
   - Ensure all known water vole populations are under appropriate management by 2004.

REFERENCES

- Strachan, R., and Jefferies, D.J. 1993. *The Water Vole (Arvicola terrestris) in Britain 1989-1990 : Its' distribution and changing status.* Vincent Wildlife Trust, London.
- English Nature. 1999. *Water Vole Guidance for Planners and Developers.* English Nature.
- UK Biodiversity Steering Group. 1995. *Water Vole in Biodiversity: The UK Steering Group Report.* Volume 2: Action Plans. HMSO, London.

PROPOSED ACTION FOR BIODIVERSITY

		Proposal for Action – Water Vole	Potential deliverers		To take place by								Meets Obj. No.
			Lead Partner(s)	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	A	**Policy and legislation**											
	1	Promote relative options for water voles for all relevant HAPs and agri-environment schemes.	SNH	SAC FWAG TBP	#	#	#	#	#	#	#	#	1, 3
	2	Enforce Schedule 5 (Sect 9) of the Wildlife and Countryside Act 1981 to protect the water vole's places of shelter or protection.	SNH Police Wildlife Liaison Officers			#	#	#	#	#	#	#	2,3
	B	**Site and species safeguard and management**											
	1	Advise relevant landowners of all known water vole sites with view to securing management agreements. Ensure water voles are included in management plans for relevant nature reserves and SSSI.	SEPA SNH	SWT Scottish Nature SAC FWAG	#	#	#						3

	2	Carry out mink control at regular intervals at all confirmed water vole sites and examine the possibility of larger eradication projects in key areas which could combine with other conservation interests such as fisheries, otters, black grouse and wildfowl.	SNH	NFUS SLF Landowners/ farmers	#	#	#	#	#	#	#	#	2,3
	3	Avoid the use of herbicides and rodenticides near potential water vole habitats.	SEPA	FWAG SAC Landowners/ farmers		#	#	#	#	#	#	#	3
	4	Identify any island or large viable populations where resources can be focused to ensure long-term survival.	SNH	Scottish Nature SWT	#	#							2,3
	5	Identify remnant populations considered too vulnerable for effective protection and consider translocations to suitable sites or for use in captive breeding programmes.	SNH	Scottish Nature SWT			#	#	#				1
	6	Identify sites suitable for re-introductions in conjunction with appropriate site management, with due consideration given to the biological differences of high altitude and lowland populations.	SNH SWT Scottish Nature	SAC FWAG				#					1
	C	Advisory											
	1	Provide advice to riparian landowners and other relevant parties on water vole habitat management and the reasons for and methods of mink control.	SAC FWAG SNH	SEERAD NFUS SLF			#						4
	2	Consider production of a management booklet for distribution.	SNH SWT	FWAG SAC		#	#	#	#	#	#	#	1
	D	Research and monitoring											
	1	Carry out systematic survey to produce a definitive map of water vole distribution in Tayside and make available to relevant bodies.	SNH	SWT Scottish Nature RSPB	#	#	#						3,4
	2	Identify key upland areas where a population metadynamic study may increase understanding of upland water vole ecology.	SNH				#						3
	E	Promotion and awareness-raising											
	1	Organise occasional seminars for interest groups and landowners on the plight of water voles and their needs, possibly widening the theme to riparian management to include otters	SNH SWT FWAG SAC SEPA			#			#				1
	2	Plan a publicity programme for schools and colleges to raise awareness and encourage more distribution records.	SNH SWT	PKC DCC AC TBP		#	#	#	#	#	#	#	1
	F	Plan Monitoring											
	1	Monitor and regularly review this plan on an annual basis and in detail every five years	TBP					#					All

TAYSIDE BIODIVERSITY PARTNERSHIP

GREY PARTRIDGE ACTION PLAN

Common Name *Grey partridge*

Scientific Name *Perdix perdix*

SPECIES PROFILE

- **UK Biodiversity Status** — Priority Species
- **Tayside Status** — Priority species
- **Statutory Protection** — Gamebirds - protected by close seasons – 1 February to 31 August.
  The Grey partridge is also listed on Annex III/1 of the EC Birds Directive and Appendix III of the Bern Convention.
- **UK Lead Partner** — The Game Conservancy Trust
- **Relevant Habitat Actions Plans** — *Cereal Field Margins; Hedgerows and Treelines*

Key sites -

DESCRIPTION AND HABITAT

A medium sized bird up to 31cm long, grey/brown with a distinctive orange face, speckled upperparts and less bold flank stripes.

The Grey partridge originated as a grassland bird on the open, largely treeless, Steppe; this has allowed it to adapt easily to cereal farmland.

- Nests on the ground, hidden in rough grass or similar vegetation. After the eggs hatch the cock and hen take their brood to forage among tall grasses or cereals for caterpillars, beetles, plant bugs and aphids.
- As they mature, chicks begin to feed, like their parents, on young shoots and seeds.
- Tall tussocky vegetation at the base of a hedgerow makes an ideal nest site. Cereal crops provide good cover from predators while the young brood is searching for insects.

MANAGEMENT

The ideal habitat of the Grey partridge is open arable farmland, especially on lighter soils and ideally with no more than 10 trees per km. in hedgerows. Undisturbed dry nest sites in hedge bottoms and banks with tussocky grass are usually utilised. The chicks need a variety of insects in their first weeks and a Wild Headland with its zero use of herbicides and fertilisers is ideal. Weedy stubbles, field margins and banks provide shelter and food over the winter.

Small populations of 'hill grey partridges' are found on many moorland fringes. These benefit from the control of predators as their nesting habitat tends to be linear and easy for predators to work. Grey partridge chicks are often supported by sawfly larvae found on dwarf rushes associated with the upland edge.

CURRENT STATUS AND EXTENT

- The UK population of Grey partridge declined by 82% between 1969-1990 to a current estimated 150,000 pairs. Populations in some mixed farming areas seem quite stable, especially in the north, but in areas of historical low abundance such as intensive grasslands in the west, declines have sometimes exceeded 95%.
- The Grey partridge has a wide distribution across much of Tayside, especially in mixed arable areas. It favours farms still growing forage root crops and raspberries.
- Many 'hill partridge' populations have not shown the same declines demonstrated by the lowland/arable populations.

CURRENT FACTORS CAUSING LOSS OR DECLINE

- Loss of nest sites (such as hedge bottoms and other field margins) due to farm intensification. The ITE has estimated a 20% loss of hedgerows between 1984 and 1990.
- Reduced food supplies and sources for chick food through the use of insecticides and herbicides.
- Loss of winter stubble and forage crops such as turnips for over-wintering birds may have an effect.
- Vulnerability of nests to predators in farmland accompanied by a decline in professional keepers devoting time to predation control.
- Nest destruction caused by early mowing of silage as opposed to hay and other farm operations.

OPPORTUNITIES AND CURRENT ACTION

- The agri-environment Rural Stewardship Scheme (and agreements made on the previous Countryside Premium Scheme) provides grant aid for farmers. A range of options under the schemes (i.e. unharvested crops, grass margins, hedge planting, conservation headlands) has the potential to benefit Grey partridge.
- The GCT, SAC and FWAG actively promote RSS throughout Tayside.
- In conjunction with Advisory Client and LEAF farmer Edward Baxter in Fife, a working demonstration farm has been set-up where monitoring and experiments have been conducted by the GCT Lowland Research Teams.
- An SBAP Species Recording Chart has been produced and circulated for the Grey partridge by The Game Conservancy Trust.
- GCL run courses in game conservation, several of which focus heavily/exclusively on Grey partridge management.
- Game Conservancy Limited Advisory Services provide specialist professional advice on habitat enhancement, help from grant aid, predation control requirements, counting in spring and autumn, and optimum harvesting strategies for Grey partridge.
- The Rural Stewardship Scheme has potential to benefit the species and provide the best publicly-funded mechanism currently available to help reach the targets set. There are also opportunities to enhance Grey partridge habitat through the set-aside Wild Bird Cover Option, Grass Option and Natural Regeneration Options.
- Grant aiding the employment of professional gamekeepers/countryside wardens could reverse the difficulties caused by declining predation control at key nesting and chick raising periods.
- Set-aside land currently offers important habitat creation opportunities for this species. Partridge-friendly prescriptions should be rewarded at higher levels to reflect their increased management costs.

The UK Lead Partner's Role (Game Conservancy Trust)

- The Grey partridge has been listed as a costed, key species in the UK Steering Group Report.
- The Game Conservancy Trust is the lead organisation for this species in the UK.
- The Game Conservancy Trust encourages land managers to create suitable conditions for this species. Conservation Headlands, unharvested crops, beetle bank, well distributed forage crops and winter stubbles are key to this advice, along with predation control and sustainable shooting controls.

MAIN OBJECTIVES / TARGETS

1. Despite still being numerous and widespread, the Grey partridge has declined dramatically on farmland in the UK in the past hundred years. Without action this species could repeat the trends demonstrated by the corncrake, declining throughout its range and becoming threatened due to agricultural intensification. Many of the reasons for decline are well known and have been the subject of intensive study by the GCT. The Grey partridge will respond quickly to favourable management and the Action Plan aims to restore a proportion of the population to its previous level.
2. Halt the decline by 2005.
3. Contribute towards improving the UK population to above 150,000 pairs by 2010.
4. Maintain, and where possible enhance the current range of this species.
5. Tayside is a region where the Grey partridge was particularly abundant, so there is great scope to re-build populations by sympathetic land management and effective predation control in the most vulnerable spring/early summer breeding season.

GLOSSARY OF TERMS/ ABBREVIATIONS:

GCT	The Game Conservancy Trust
GCL	Game Conservancy Limited Advisory Services
SEERAD	Scottish Executive Environment & Rural Affairs Department
SAC	Scottish Agricultural Colleges
FWAG	Farming & Wildlife Advisory Group
LEAF	Link Environment & Farming

REFERENCES:

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PROPOSED ACTION FOR BIODIVERSITY

	Proposal for Action – Grey Partridge	Potential deliverers		To take place by								Meets Objective No.
		Lead Partner(s)	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	**A. Policy and legislation**											
	1. The species is protected by close seasons – 1 February to 31 August	GCT										
	2. The species is listed on Annex III/I of the EC Birds Directive and Appendix III of the Bern Convention.											
	B. Site and species safeguard/ management											
	1. Encourage landowners and managers to create suitable conditions for the species, including conservation headlands, unharvested crops, beetle banks, well distributed forage crops and winter stubbles.	GCT	SAC FWAG NFUS SLF									
	C. Advisory											
	1. Promote the RSS to landowners and managers.	GCT SAC FWAG										
	2. Provide specialist professional advice on habitat enhancement.	GCT	SAC FWAG									
	3. Promote the LEAF demonstration farm in Fife and consider any opportunities to set up a similar demonstration site in Tayside.	CGT LEAF	SAC FWAG									
	D. Research and monitoring											
	1. Continue circulating SBAP Species Recording Charts to assess distribution of the species throughout Tayside	GCT										
	E. Promotion and awareness-raising											
	1. Run a series of courses in game conservation, focussing extensively on grey partridge management.	GCT										
	F. Plan Monitoring											
	1. Review plan on an annual basis and in detail every five years	TBP										

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TAYSIDE BIODIVERSITY PARTNERSHIP

SWIFT
ACTION PLAN

Common Name *Swift*

Scientific Name *Apus apus*

SPECIES PROFILE

- UK Biodiversity Status
- Tayside Status
- Statutory Protection — Wildlife & Countryside Act 1981. It is illegal to *intentionally* destroy or disturb the nest site during the nesting season.
- UK Lead Partner (if any) — Concern for Swifts and Concern for Swifts (Scotland)

Relevant Habitat Actions Plans — Urban and Built Environment, Businesses with Land,

Map

Distribution – Widely distributed throughtout Tayside.

Loch of Kinnordy (RSPB Reserve) – noted feeding area;
Caltto Reservoir attracts swifts during migration.

DESCRIPTION AND HABITAT

Swifts are sometimes confused with the other hirundines: house martins and swallows. Distinguishing characteristics are: lack of white on the body; the fact that they do not land anywhere; invisibility of the nest (as it is within the fabric of a building).

- Swifts are small (wing-span of approx. 16") boomerang-shaped birds which look all black against the sky (the small white area on the throat is not often visible)
- They are summer migrants to Britain, arriving in Scotland from Africa at the beginning of May and leaving in early August.
- They have become finely adapted to live entirely on the wing and only set foot to ground at the nest site. The nest is minimal – small air-borne particles glued together with saliva to form a small saucer.
- They feed on large quantities of insects and aerial plankton. When feeding young these are collected in a gape below the beak and fed to the nestlings in a ball.
- Because they feed only on the wing they are very dependant on weather conditions and because of this, they are unique in the ability of the young to go into a state of torpor and survive for several days without food.
- On fine summer evenings local swifts will gather together in wild "screaming parties", chasing around the buildings where they nest. It has been claimed that they reach speeds of up to 200km/hr.

HABITAT

Swifts feed anywhere where there may be aggregations of air-borne insects. The significant habitat as far as swift conservation in Britain is concerned is the nest site habitat. Swifts have adapted to nesting almost exclusively in buildings. They have been recorded nesting in church towers; under roof tiles; on the wall head of buildings (gaining access via gaps and cracks in the wall or soffit); and in holes in the walls of buildings. Although usually associated with older buildings, they will also be found nesting in recent buildings so long as there are suitable gaps and spaces. They need a clear flight path to and from the nest, which is usually over 4m above ground.

Young pairs seek out new or unoccupied nest sites during their first summer as adults and return to breed there in the following year. Pairs are loyal to their nest sites and if disturbed or excluded from a nest site may find it difficult to relocate to a new nest site at least for that season. This why the conservation of existing sites is important.

Nesting does no damage to buildings nor do swifts leave mess around the nest site. They are able to gain access through holes which are too small for starlings or pigeons.

CURRENT STATUS AND EXTENT

The most recent BTO estimate for the total swift population in Britain is about 80,000 pairs. The common swift nests in most areas of Britain except the windswept western islands, but an increasing number of people both in Britain and abroad are becoming concerned about a decline in numbers generally associated with renovation or demolition of buildings. There are many places where swifts used to breed but are now absent.

The focus on swift nest site conservation is international and accelerating. Such a focus is also reflected in concerns and projects across Europe and the Middle East. Although some people are pressing for the swift to be included on the RSPB's "orange" list, lack of repeat survey data makes it impossible to ascertain the exact status of the decline.

Tayside status

At present Tayside appears to hold a healthy population of swifts. However, there are increasing reports of loss or diminution of colonies. Main feeding areas and gathering areas are noted at (insert information when available).

In Tayside, nesting swifts are reported to be mainly in older buildings, often at eaves level. Important feeding areas are (insert information).

There has been no integrated survey in Tayside, although some figures have been collected by SOC, Concern for Swifts (Scotland) and more recently by voluntary groups such as the Broughty Ferry Environment Project and Dundee Ranger Service.

CURRENT FACTORS CAUSING LOSS OR DECLINE

The impact of various changes to the insect population on swifts is unknown (drought in their winter home grounds, insecticide use in agriculture etc.). There is, however, a connection between loss of nest sites and loss of breeding colonies and an important focus of concern for our swift populations is loss of nest sites due to modern building practices.

Increasingly swifts are excluded from their traditional sites by construction details, materials and repairs which seal all gaps and cover ventilation spaces. Wire mesh plates or grids are now used to cover ventilation gaps and new building materials and techniques do not offer alternative possibilities.

OPPORTUNITIES AND CURRENT ACTION

- Swift nest site conservation is taken very seriously in Amsterdam where thousands of nest sites have been built into renovated or new buildings. There are also examples of work from Berlin.
- There are several projects in England involving protection and creation of nest sites.
- In Scotland both Glasgow and North Lanarkshire Housing Departments have agreed to make provision for swifts in their repair and renovation programmes.
- Several Housing Associations and Co-ops have agreed to make swift nest site provision in new housing schemes.
- Both Historic Scotland and the National Trust for Scotland support the airms and objectives of this Action Plan. In Tayside, for example, gaps in stonework at eaves level were retained for swift access and a case study involving the renovation of Stanley Mills, Perthshire, was featured in the Built and Developed Environment HAP.
- Information is becoming increasingly available about conserving existing swift nestsites and creating new ones.

OBJECTIVES

The objective of the Action Plan is to ensure provision is made for swifts in new buildings and during renovation to older buildings in and adjacent to areas where there are known or suspected to be swifts colonies. Thus it will be possible to ensure an increase in suitable nesting habitat for swifts in those areas.

In principle this is not a dificult task because permitting swifts access to potential nest sites has been found to be acceptable, cheap and technically easy. Swifts seem to prefer a small entrance giving access to a larger internal space for nesting. The small entrance generally excludes sparrows, starlings and pigeons. However, achieving action requires continued vigilance and liason with house owners, local authority personnel, NGOs, builders and developers.

Insert local case studies

REFERENCES

- Lack.D. Swifts in a tower. 1979
- Scottish Executive Development Department, 2000. *Planning for Natural Heritage PAN 60.*
- Scottish Office Development Department, 1999. *NPPG 14 Natural Heritage.*
- SOC

PROPOSED ACTION FOR BIODIVERSITY

	Proposal for Action – Swift	Potential deliverers		To take place by								Meets Obj. No.
		Lead Partner(s)	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	**A. Policy and legislation**											
	1. Enforce Wildlife and Countryside Act 1981.											
	2. Liaise with council departments to ensure that local authorities take the lead in swift nest site conservation in their own properties by retaining existing nest sites or making new provision.	Concern for Swifts (Scotland) PKC AC DCC										
	3. Have swift conservation measures included in planning conditions for new build or change of use proposals in relevant areas.	CfSS PKC AC DCC	SNH									
	4. Promote the practice that building repair work or demolition should not begin between mid-May and the end of July where swift nest sites are believed to exist.	TBP CfSS SNH	Architects Developers PKC AC DCC									
	5. Liase with local authority historic building conservation sections to require conservation of swift nest sites when considering grant aid for the repair or renovation of historic buildings. Involve Historic Scotland, National Trust or the Scottish Executive as appropriate.	CfSS SNH	PKC AC DCC HS NTS SE									
	B. Site and species safeguard/ management											
	1. Achieve 6 pilot projects in both renovated buildings and new buildingsacross Tayside	TBP BFEP DCC	PKC AC NTS HS									
	2. Inform owners/ occupiers of properties with breeding swifts of the birds' presence, of their legal obligations and of the positive conservation action they can undertake.	CfSS TBP										
	3. Incorporate the results of the Swift Survey into local authority planning GIS systems so that up to date information on swift nesting areas and significant buildings is readily available.	PKC AC DCC TBP	Local Biological Records Centre									
	C. Advisory											
	1. Offer advice on suitable design details for swift nest sites.	TBP CfSS										
	2. (i)Promote the use of externally-fitted nest boxes only where it is not possible to use existing internal spaces. (ii) Circulate the "Swifts in Historic Buildings" Advice Note where	TBP CfSS	NTS HS									

	appropriate to local authorities, NGOs, architects and developers.											
	3. Promote the use of external nest boxes as a tool for education and awareness e.g. on schools and in Country Parks.	TBP CfSS	PKC DCC AC									
	D. Research and monitoring											
	1. Co-ordinate records of swift nest areas or sites in order to update and maintain the GIS map	SOC	Local Biological Records Centre									
	2. Publicise swift survey requirements and enlist the help of interested individuals and organisations.	TBP CfSS	PKC, DCC, AC, NTS, HS, SOC, BTO, RSPB									
	3. Co-ordinate a comprehensive survey of swift colonies in Tayside as an indication of where nest conservation is needed and as a base line for future surveys	SOC TBP	CfSS									
	4. Continue to monitor numbers of feeding swifts over key sites	SOC										
	5. Keep records of the buildings swifts nest in and where in the buildings they nest in order to structure swift nest site conservation to various situations	PKC DCC AC	NTS HS TBP									
	6. Monitor and analyse population fluctuations across Tayside	SOC										
	E. Promotion and awareness-raising											
	1. Distribute appropriate leaflets to architects, developers, planners and the public in general to raise awareness of the species (e.g. Concern for Swifts (Scotland) and Swifts in Historic Buildings.)	CfSS TBP										
	2. Encourage involvement of schools and community groups in areas where there are swift colonies.	PKC, DCC, AC, BFEP, TBP										
	3. Input relevant information to web-site so that information can be shared.	CfSS TBP										
	4. Ensure that the media is aware of swift conservation issues and swift nestsite requirements, highlighting at the same time suitable 'best practice' case studies from both the public and private sector	CfSS TBP	HS NTS RSPB PKC DCC AC									
	F. Plan Monitoring											
	1. Monitor and review this plan on an annual basis and in detail every five years	TBP										

CONSULTATION DRAFT: 2ND TRANCHE – SAP/F1

full colour transparency available √

TAYSIDE BIODIVERSITY PARTNERSHIP

ATLANTIC SALMON ACTION PLAN

Common Name Atlantic Salmon

Scientific Name *Salmo salar*

SPECIES PROFILE

UK Biodiversity Status:	Species of Conservation Concern
Tayside Status:	Species of Conservation Concern
Statutory Protection:	The Salmon and Freshwater Fisheries Protection (Scotland) Act 1951; Salmon Fisheries (Scotland) Act 1868; Freshwater Salmon Fisheries (Scotland) Act 1976; The Salmon (Scotland) Act 1986; Salmon (Fish Passed and Screens) (Scotland) Regulations 1994.
UK Lead Partner:	
Relevant Habitat Action Plans	Rivers and Burns; Standing Open Waters; Mesotrophic Lochs; Estuaries

Map

DESCRIPTION AND HABITAT

Salmon spawn in the late autumn / winter in clean gravelly rivers and streams. The female salmon digs a hole in gravel with her tail and deposits her eggs which are then fertilised by the male. The female fish covers the fertilised eggs with more gravel. The numbers of eggs produced vary according to the size of the fish and other factors, but average approximately 1500 per kg of fish weight.. The eggs incubate over a period of months depending on water temperature. Water currents percolating through the gravel bring dissolved oxygen to the eggs and carry away ammonia and other metabolic products.

In the late spring having absorbed their yolk reserves the fry wriggle out of the gravel and commence feeding. The little fish occupy a position on or near the river bed by swimming into the current; they intercept invertebrates which drift or swim past them in the current. From the start, the fry are fiercely competitive and establish territories. As they grow they become known as parr. They seem to prefer fairly fast cobbly, even bouldery, streams 10cm to 40cm deep where they use the stones along the river margins as shelter from the current and from seeing each other. This habitat segregation results from competition with the older parr. With the onset of winter and the cooling of the water, their metabolism slows down and they then spend extended periods hiding in the substrate.

After a period of some years in the Spring a parr will develop a silver coat and now known as a smolt migrates to the sea. The age at smolting depends on the fish's growth rate which can be influenced by stream fertility, level of competition and temperatures. In this part of the world most smolts are two years old, but in low fertility headwaters the majority may not smolt until three years. In some low lying rich burns such as the Cruick Water on the North Esk or the Dean Water in Strathmore some smolts might actually only be one year old.

Once in the sea our understanding of their life history is patchy. The smolts seem to migrate quickly out of the coastal zone and head north towards the Norwegian Sea or the Faroe Islands. Some migrate westwards rounding Cape Farewell to the west coast of Greenland. At sea the fish grow rapidly as salmon seem to be voracious and generalist feeders, eating crustaceans and small fish such as sandeels, capelin, blue whiting, herring, etc. After a year at sea they may weigh 1.5k, increasing to 3k or 4k by eighteen months. Sexual maturation starts after a period of this rich feeding and the fish make their way homewards again.

The timing of the onset of maturation again varies. Some fish mature in their second summer at sea and return to spawn in their second winter after smolting. By convention these fish are known as "one sea-winter fish" or commonly as "grilse". Some fish will not mature for a further year, "two sea-winter" fish, with some even staying out for one or two further years. In addition to a varied age at maturation, the actual calendar date of return into freshwater is also variable. Some grilse start to appear in freshwater as early as May and will not spawn until November while other grilse return as late as December and spawn within days. These differences in maturation rates and time of return may be influenced by environmental conditions, but it is also accepted that there is a strong genetic component to it.

It is well known that Salmon have the ability to return to their native rivers. In fact they will even return to their natal stream or even part of the stream. Within a river system this homing allows sub-populations of salmon to exist giving rise to a diversity of traits, arising in part to adaptation to local conditions. Thus the fish which tend to spawn in the upper reaches of rivers (e.g. the upper main stem of the North Esk, the Blackwater / Shee, the Tilt, the Lyon or the Dochart on the Tay) tend to enter freshwater early in the calendar year while fish which spawn in the lowland reaches tend not to enter until the autumn.

Thus a main issue in salmon conservation is maintaining the diversity of types and the integrity of individual sub-populations.

CURRENT STATUS AND EXTENT

Tayside is one of the most important regions for Atlantic salmon in the UK. The main populations in rank of relative importance are in the River Tay system, North Esk, South Esk and the Earn. Smaller, but none the less important populations occur in the Lunan Water and the Dighty Burn.

Current Status of Stocks

Assessment of the size of salmon populations is usually inferred from fishing catches, which although a useful guide do not necessarily reflect true changes in population size. The trends in catches in net fisheries and many rod fisheries has been downwards since the 1960s. Most noticeable has been the decline in numbers of two and three sea-winter salmon entering early in the year. In the 1950s perhaps 1000 fish might be caught on the Tay between the opening of the angling season on 15 January and 1 March, whereas it is now a small fraction of this. Over the longer term however, fish entering the Tay and the Esks in the late autumn have actually increased.

To improve the accuracy of salmon numbers in Tayside electronic counts have been undertaken on the North Esk (since 1981) and on the Tay tributaries Tummel (since 1953) and Ericht (since 1990). The numbers ascending the North Esk show a slight increasing trend since the 1980s as does the Ericht since 1990. The longer series for the Tummel at Pitlochry has been fairly stable over the long term except for a period of greater abundance in the 1970s. Another counter at Clunie Dam on the Tummel system actually shows a threefold increase in the 1990s.

The stability or slight increases in counter figures probably reflects the reduced netting effort in recent years and that fish which formerly would have been caught succeed in entering

freshwater. The numbers returning to the coast have decreased. This effect has probably been quite marked in Tayside owing to the historic intensity of net fishing locally. In the early 1980s the then Department of Agriculture and Fisheries for Scotland estimated fixed sea nets in general on the east coast of Scotland took around 50% of fish on the coast in summer. However, on the North Esk, the various nets combined might take up to 80% of incoming fish, probably the highest level of exploitation of any river in Scotland.

The decline in returns to the coast seem largely to be caused by an increase in mortality at sea. Since the mid-1960s smolt tagging investigations on the North Esk indicate output from that river has shown no trend over this period but survival rates back to the coast seem to have fallen from perhaps 40 - 50% to nearer 10%. Census of juvenile salmon by electrofishing in parts of the Tay system still indicate good numbers of juveniles. In the upper reaches of the Tummel system juvenile numbers have increased in the last decade. This followed what were thought to be improvements in fish access at a hydro electric facility lower downstream. Thus this salmon population has expanded as it has recolonised some of it's former range.

CURRENT FACTORS CAUSING LOSS OR DECLINE

Fisheries

Salmon have long been exploited, first as a food resource and now to an ever greater extent by recreational fishing. From Medieval times netting for salmon was important on the Tay and the Esks and until recently there still existed a considerable commercial fishery in Tayside. Only ten years ago on the Tay estuary, for example, netting was conducted from the mouth of the River Earn to the mouth of the River Almond. On the North Esk, in addition to the estuary, the lowest mile of the river was netted as was also the estuary of the South Esk. In addition a myriad of fixed nets were set in Montrose Bay, Lunan Bay and the headlands south of Montrose.

For a number of reasons including conservation buy-out schemes and commercial failure through reducing catches and reduced prices owing to salmon farming, the number of net fisheries has declined greatly during the 1990s. Since 1997, when the netting rights were leased by the Tay Foundation, there has been no appreciable netting in the Firth of Tay. Netting effort has also reduced in the Montrose area with none taking place in the Montrose Basin or within the North Esk above the head of tide; netting does still take place in the estuary and in Montrose Bay.

The angling fisheries on the Tay and the two Esks are of considerable importance, the Tay alone thought to bring in £10 to £15 million per year. Angling is regulated to prevent any possibility of over-cropping. Fishing rights are private property and so the numbers of anglers is firstly controlled. In addition statutory laws prohibit certain methods being used (e.g. use of prawns and shrimps as bait), specify fishing seasons and owners themselves often request that only certain methods are used on their waters.

Marine Mortality

The causes of the increased marine mortality in recent years are not exactly known. It is now accepted that marine climatic influences may play a large part. In recent decades there have been concurrent changes in sea temperatures, currents, plankton abundance and other fish species. There is little doubt that such events have occurred but the mechanisms are not clear. Over the long term major fluctuations in the abundance of different sea ages of salmon or calendar run timing have occurred in the past. However, it is feared that climate change may be a driver of the current decline and we may be entering a new phase.

OPPORTUNITIES AND CURRENT ACTION

- Rural Stewardship Scheme increases the awareness of the importance of riparian zones for the conservation of aquatic systems.
- Forestry restructuring and the Forest Water Guidelines.

[add others]

MAIN OBJECTIVES / TARGETS

- Maintain salmon populations above biologically safe levels.
  [add targets]
- Increase awareness and education opportunities regarding wild salmon resources and the aquatic ecosystem.
  [add targets]

GLOSSARY OF TERMS / ABBREVIATIONS: add

REFERENCES: add

PROPOSED ACTION FOR BIODIVERSITY

		Proposal for Action – Atlantic Salmon	Potential deliverers		To take place by								Meets Objective No.
			Lead Partner(s)	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	A	Policy and legislation											
	1												
	2												
	B	Site and species safeguard and management											
	1	Encourage good riparian management where appropriate											
	2	Promote appropriate habitat protection schemes											
	3	Promote appropriate habitat enhancement and restoration schemes											
	4												
	C	Advisory											
	1	Provide advice to riparian landowners, fisheries managers and other relevant parties on riparian habitat management											
	2	Incorporate appropriate biodiversity information into relevant newsletters and publications.											
	3												
	D	Research and monitoring											
	1	Encourage stakeholders to assist in data collection. 1. Undertake a juvenile survey and monitoring programme. 2. monitor annual salmon smolt production in designated Tayside rivers.											
	2	Consider a fisheries habitat survey											
	3	Monitor the implementation of this Action Plan on an annual basis and review in full every five years	TBP										
	4												
	E	Promotion and awareness-raising											
	1	Liase with stakeholders to arrange demonstration or training events to raise local awareness.											
	2												

CONSULTATION DRAFT: 2ND TRANCHE

TAYSIDE BIODIVERSITY PARTNERSHIP
(in association with the Cairngorms LBAP)

MASON BEE ACTION PLAN

Common Name *MASON BEE*

Scientific Name *Osmia inermis*, Hymenoptera: Apidae

SPECIES PROFILE

UK Biodiversity Status	UK BAP Priority Species
Tayside and Cairngorms Status	Priority species - restricted to one known modern Tayside area (Blair Atholl), although other historic ones are known and one newly discovered site in Deeside.
Statutory Protection	None. The species is listed as **Red Data Book 2**, *Vulnerable,* in Shirt, 1987 and Falk 1991.
UK Lead Partner	UK Lead Partners SNH, Aculeate Conservation Group
Relevant Habitat Actions Plans	Upland; Calcareous Grassland (including Limestone Pavements)

MAP –

List of Key Sites and Site Distribution

DESCRIPTION AND HABITAT

This bee is one of a small group of boreal/alpine species of aculeate Hymenoptera found in the United Kingdom.

All nesting sites found in Scotland have been in the altitude range 300 to 600m, although there are some earlier records from lower areas. Nests, which may be the work of several bees and exist for several generations, are built in crevices in rock, or under thin stones lying on the surface of the ground or short vegetation . All nest sites are in warm, sunny positions.

Nests are made in areas which have sufficient calcareous influence to support good numbers of its sole known UK pollen-forage plant, Common Bird's-foot Trefoil, *Lotus corniculatus.* The flight period of the bee, in Scotland, is from late April to early July. The chrysidid wasp *Chrysura hirsuta* (also a UK BAP species) known to be parasitic upon this bee and is present in the Blair Atholl area.

MANAGEMENT

Appropriate management of the calcareous grassland habitat is provided by Autumn-Winter-grazing, which subsequently encourages the growth and flowering of its pollen-forage plant, Common Bird's-foot Trefoil and a short, mixed-heather, vegetation structure. Summer grazing, especially by sheep, removes the flowering heads of the Bird's-foot Trefoil. It is essential that the habitat includes thin, loose stones lying on the surface of the vegetation or suitable cracks in rocks.

CURRENT STATUS AND EXTENT

This species is circumpolar in distribution, being found at low altitudes north of the Arctic circle and in montane locations further south. The site in Blair Atholl is the only known extant site for the species in Tayside. One other site in Braemar makes up the total, known, population in the UK.

CURRENT FACTORS CAUSING LOSS OR DECLINE

Loss of herb-rich upland grasslands or moorlands with short swards through loss of, or decline in, sheep grazing. Overgrazing by sheep and deer in the summer may, also, reduce the availability of it's forage plant, Bird's Foot Trefoil. Direct afforestation of the remaining sites is also considered a potential threat.

The species has a highly fragmented and very localised distribution in the Cairngorms, making it very vulnerable to unforeseen detrimental events and susceptible to changes in land management. By being restricted to two isolated sites, this species has little opportunity to (re)colonise new areas away from Blair Atholl and Braemar.

OPPORTUNITIES AND CURRENT ACTION

Sympathetic management of a much larger area of potentially suitable habitat in adjacent areas.

Targeted awareness raising of the species and its habitat requirements to local naturalists, landowners, farmers, crofters and conservation advisors may well reveal further locations within Tayside and the Cairngorms. The nests are very distinctive and easily identified by non-specialists.

Inclusion of the requirements of Osmia Inermis in agri-environment and forestry schemes. Farmers and crofters can score high biodiversity ranking points under the Rural Stewardship Scheme for activities benefiting this UK priority species.

Ensure the species is included in management prescriptions for all relevant SSSIs.

Consider notifying as SSSIs sites supporting viable populations of Osmia Inermis.

Information gathering for a Tayside/Cairngorms dataset

MAIN OBJECTIVES / TARGETS

National Action Plan objectives and Targets and comment on Progress

- Survey to determine the status of the bee in Tayside and the wider Cairngorm area by 2005. (Considerable survey effort on the part of ACG, but great opportunity for locally resourced survey)
- Seek to identify its precise habitat requirements by 2005. (Completed, 2001)
- Seek to identify and maintain all strong populations.
- Seek to ensure the long-term survival of the bee in Tayside and the wider Cairngorms, using habitat restoration and translocations as necessary. (Not started)

GLOSSARY OF TERMS/ ABBREVIATIONS: still to complete

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- Westrich, P. , 1989. *Die Wildbienen Baden Wurttembergs,* 819. Ulmer, Stuttgart

PROPOSED ACTION FOR BIODIVERSITY

LBAP Ref.	Proposal for Action – OSMIA INERMIS	Potential deliverers		To take place by								Meets Obj. No.
		Lead Partner(s)	Partners	02	03	04	05	06	07	11	16	
	A. Policy and legislation											
	B. Site and species safeguard/ management											
	1. Seek to identify its precise habitat requirements by 2005. (Completed, 2001)	SNH										
	2. Seek to maintain the two Tayside and Cairngorms sites by bringing them under a long-term favourable management agreement.	SNH										
	3. Seek to ensure the long-term survival of the bee in Tayside and the wider Cairngorms area, using habitat restoration and translocations as necessary	SNH										
	4. Seek to identify further sites in the Tayside/Cairngorms area	TBP CBP	SNH ACG									
	C. Advisory											
	1. Promote responsible habitat management through targeted suitable advice.	SNH FWAG SAC										
	D. Research and monitoring											
	1. Survey to determine the status of the bee by 2005.	ACG										
	E. Promotion and awareness-raising											
	1. Increase awareness of the species and its habitat by providing suitable identification materials and promoting these widely amongst interested local people.	TBP CBP	SNH ACG									
	2. Feature the species in the Perth Museum exhibition on Tayside Biodiversity Action Plan in the museum 2004	PKC	TBP									
	F. Plan Monitoring											
	1. Monitor and review this plan on an annual basis and in detail every 5 years	TBP CBP										

TAYSIDE BIODIVERSITY PARTNERSHIP

BLUEBELL (or Wild Hyacinth) ACTION PLAN

Common Name *BLUEBELL*

Scientific Name Hyacinthoides non-scripta
(Previously Endymion non-scripta, Scilla non scripta)

SPECIES PROFILE

- **UK Biodiversity Status** — UK priority species, Long list
- **Tayside Status** — Species of Conservation Concern
- **Statutory Protection** — Bluebells have legal protection under the Wildlife and Countryside Act 1981, Schedule 13 (Section 8)
- **UK Lead Partner** — None
- **Relevant Habitat Actions Plans** — Lowland Mixed Broadleaves; Upland Oakwoods; Upland Mixed Ashwoods; Upland Birchwood; Scrub; Hedgerows and Treelines

MAP – *to show Tayside distribution*
List of Key Sites (to add)
Site Distribution – Found throughout Tayside, but usually associated with ancient or long-standing semi-natural woodlands, where they may form dense 'carpets'. They are also found in hedge bottoms, along the tops of sea-cliffs and occasionally in unproductive pastures and under bracken, which can act as a substitute woodland canopy for the plant.

DESCRIPTION AND HABITAT

Short hairless perennial with heavily scented, violet-blue drooping bell-shaped flowers. Flowers can also be pink or white.

The sap was widely used to starch cotton neck ruffs in Elizabethan times; it was also used as a glue in book-binding

- Native to North -Western Europe
- Reproduction is by vegetative means; the underground stem thickens to form a bulb, with new bulbs formed in the axils of the leaves
- Prefers slightly acidic soil
- Prefers partial shade where the light intensity does not fall below 10% of daylight between April and mid June
- Has a fairly narrow tolerance of light levels
- In favourable conditions, particularly in Beech woods, dense 'carpets' can form
- Valuable source of nectar for bees, hoverflies and butterflies

The timing of leaf production and flowering between April and June is such that both pollination (mainly by Hymnoptera spp) and the build up of food stores within the bulb take place before the woodland canopy fully closes; thereafter the leaves die back, leaving the seed head.

The plant's contractile roots often result in the mature bulb being buried to a depth of 250mm or more. The bulbs can therefore be vulnerable to waterlogging and the more superficial bulbs of ramsons can dominate on alluvial terraces.

MANAGEMENT

Large numbers may appear directly after tree felling has taken place, with the increase in light subsequently favouring more aggressive species, such as bracken. A decline in bluebell numbers then tends to follow owing to the previous year's litter shading out the plants. With the return of the shrub and canopy species light conditions can favour bluebell growth and the population can increase again.

The replanting of woodlands with exotic species, particularly conifers, can result in the presence of continuous shade, causing a decline in the population.

Bluebells have an epicormic growth form, with a central bud producing a predetermined number of leaves and a single flower spike. Damaged leaves cannot be replaced so the species is very susceptible to grazing, cutting or trampling. Careful management of any public access and exclusion of livestock will therefore be required. Routes through woods should be limited to designated footpaths, tracks and rides, rather than open access. Where bluebells occur in grassland, early cutting and grazing should be avoided.

CURRENT STATUS AND EXTENT

Internationally the species is considered to have favourable conservation status within Europe. The UK currently holds 25-49% of the world population with records from 101+ 10km squares. The British populations are unique in producing 'carpets,' whilst European populations are usually intermixed with other woodland ground flora species.

Still to add: range of Tayside distribution (historical and recent)

CURRENT FACTORS CAUSING LOSS OR DECLINE

There is little data to ascertain population trends within Tayside but it is assumed a general decline in bluebell cover has occurred, particularly where there has been unsympathetic management of woodland habitats.

Light penetration to the woodland floor is of prime importance, so conifer plantings, which have too dense a canopy, are severely detrimental. In addition, many agricultural woodlands have been used to provide sheltered grazing for stock. This has had the effect of obliterating the ground flora, including the bluebells.

The stripping of woodlands to provide bulbs for the horticultural market appears to be, so far at least, a potential rather than current threat within Tayside.

Trampling causes localised losses and the advent of mountain biking has introduced pressure to areas previously left undisturbed.

The species is also threatened by cross-pollination with the Spanish bluebell, *Hyacinthoides hispanica,* which is widely planted in gardens and once present in the wild, gives rise to a hybrid *Hyacinthoides variablis*. Cross-pollination with the local population causes the hybrid to dominate with subsequent impacts on other dependant species.

OPPORTUNITIES AND CURRENT ACTION

The 'Bluebell Recovery Project', currently being undertaken by Landlife and the Mersey Forest Team, aims to produce a sustainable source of native bluebell bulbs to help halt the illegal trade in bulbs looted from the wild.

MAIN OBJECTIVES / TARGETS

1) Main Objectives

i) Maintain, and where possible, enhance the current populations and distribution of bluebells within Tayside

ii) Ensure the appropriate management of both existing and new woodland habitats within Tayside to facilitate the above

2) Main Targets

i) Prevent any further decline in suitable habitat and bluebell populations

ii) Promote sensitive management of habitat for bluebells, where this will not unduly compromise other biodiversity goals

3) Work Objectives

i) Carry out systemic survey and mapping of Tayside to establish current populations, status and distribution

ii) Promote appropriate methods of management of habitats where bluebells either currently, or may in the future, exist

iii) Reduce the possibility of threats to the wild population of bluebell via illegal picking, uprooting or introduction of 'garden escapes' which would result in hybridisation

4) Work Targets

i) Collate existing data regarding distribution and population of bluebell

ii) With this data as a baseline, survey and map the distribution of the species within Tayside

iii) Promote responsible habitat management to protect existing populations and where feasible, to create new populations in 'native' plantations

iv) Ensure the enforcement of schedule 13, section 8 of the Wildlife and Countryside Act, 1981

v) Use the bluebell as a 'flagship' species for awareness-raising of woodland habitats and management issues

vi) Set up management projects for the bluebell, which will complement and coincide with the projects for other woodland species and appropriate Woodland HAPs

vii) Prepare educational and interpretative materials for woodlands, which will include information on bluebells to promote the conservation of the species within Tayside

GLOSSARY OF TERMS/ ABBREVIATIONS: still to complete

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PROPOSED ACTION FOR BIODIVERSITY

	Proposal for Action – Bluebell	Potential deliverers		To take place by								Meets Obj. No.
		Lead Partner(s)	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	A. Policy and legislation											
	1. Enforce Wildlife and Countryside Act 1981 Schedule 13, Section 8.	SNH WLO'S		*	*	*	*	*	*	*	*	

	B. Site and species safeguard/ management											
	1. Obtain details of the Landlife/ Mersey Forest Team Bluebell Recovery Project (and any other Scottish Bluebell Projects) and implement similar project in Tayside	Landlife FC SNH	SNW?									
	2. Identify best practice sites and use these as examples of positive management for the species	SNH SNW										
	3. Ensure that Woodland management/ development schemes do not adversely affect bluebell populations	FC SNH P&KC AC DCC	SNW FWAG SAC									
	4. Identify any recent woodland plantings which are at a suitable stage of development for having species introduced	SNW	SNH FWAG SAC									
	C. Advisory											
	1. Promote responsible habitat management.	FC	SNW FWAG SAC									
	D. Research and monitoring											
	1. Collate existing data re. distribution & population of bluebell.	SNH SNW										
	2. Survey & map distribution of species within Tayside	FC	SNH SNW									
	3. Monitor population on a 10(?) year cycle	FC										
	E. Promotion and awareness-raising											
	1. Promote bluebell as 'flagship' species for awareness raising to the general public	LBAP P&KC AC DCC	SNH SNW Garden Centres									
	2. Prepare educational & interpretative material	Ranger Services	SNH									
	3. Promote bluebell as a 'flagship' species for positive woodland management	SNH FC	SNW SAC FWAG									
	F. Plan Monitoring											
	1. Monitor and review this plan on an annual basis and in detail every five years	TBP										

TAYSIDE BIODIVERSITY PARTNERSHIP

SLENDER NAIAD ACTION PLAN

Common Name *Slender Naiad*

Scientific Name *Najas flexilis*

SPECIES PROFILE

- **UK Biodiversity Status** — UK priority species
- **Tayside Status** — Priority species
- **Statutory Protection** — EC Habitats Directive, Annexes II and IV.
  Wildlife and Countryside Act, Schedule 8.
  Conservation (Natural Habitats, etc.) Regulations, 1994, Schedule 4.
  Bern Convention, Appendix 1.
- **UK Lead Partner (if any)** — None
- **Relevant Habitat Actions Plans** — Standing Open Waters, Mesotrophic Lochs

MAP - *assistance required from other Partners as to Tayside distribution*	
List of Key Sites	Loch of Craiglush, Loch of Lowes, Butterstone Loch, Clunie Loch, Marlee Loch?
Site Distribution	Lunan chain of lochs in the Dunkeld-Blairgowrie area of Tayside

DESCRIPTION AND HABITAT

The Slender Naiad Najas flexilis is an inconspicuous, elongated aquatic plant with simple slender leaves that clasp the stem. It is an annual plant that reproduces by seed or by fragmentation. Typically it germinates in early summer, flowers from July to September and breaks up in the autumn when fragments can be found blown onto the shoreline.

It grows well in clear lowland mesotrophic lochs (with low to medium nutrient concentrations). It can also grow in base-rich waters on limestone outcrops or in machair lochs adjoining calcareous sand dunes.

The Slender Naiad occurs in standing water from 20cm to 14m, but is most commonly found at a depth of 60cm to 2m. It is usually found in sheltered bays; it prefers fine silty substrata and the fragile plant is easily broken by strong waves, making its location within a water body dependent on the level of exposure. The depth at which it colonises is affected by the water clarity but can also be dependent on exposure; in sheltered waterbodies it may be found in the shallower water of the littoral zone.

CURRENT STATUS AND EXTENT

In the UK the Slender Naiad is found exclusively in Scotland where it has been recorded from 34 lochs within 18 ten km squares since 1980. The majority of the sites are on the Inner Hebrides, the Outer Hebrides and in the Dunkeld-Blairgowrie area of Tayside. The Lunan chain of lochs supports the only known population of Slender Naiad within Tayside. However the distribution of the plant is thought to be decreasing in this area.

Slender Naiad is listed under Annexes II and IV of the EC Habitats Directive and Appendix 1 of the Bern Convention. It is protected under Schedule 4 of the Conservation (Natural Habitats, etc.) Regulations 1994 and Schedule 8 of the WCA 1981. It appears on the UK BAP short list of priority species; there is a UK Species Action Plan for the Slender Naiad.

CURRENT FACTORS CAUSING LOSS OR DECLINE

Nutrient enrichment can affect the Slender Naiad. Nutrients enter waterbodies from a variety of sources such as sewage or agricultural effluents, fertiliser run-off from land, or the nutrient- rich wastes from fish farms. The resulting increase in photosynthesis by algae and macrophytes can lead to carbon dioxide levels in the water becoming limited. Slender Naiad cannot utilise bicarbonate in such situations as some plants can and therefore ceases to photosynthesise. As it is an annual plant such conditions may not need to be prolonged for Slender Naiad to be affected.

Excessive growth of weed can restrict light penetration through the water column, affecting the ability of Slender Naiad to photosynthesise.

Acidification may be a threat to Slender Naiad in Scotland, although this appears to be a greater problem in Ireland. Where acidification occurs Slender Naiad can fail to produce seeds which, as an annual plant, it is reliant on for regeneration.

OPPORTUNITIES AND CURRENT ACTION

The Slender Naiad was one of the original designated interests for the SSSIs on Loch Butterstone, Loch of Craiglush, Loch of Lowes, Clunie Loch and Marlee Loch, and in addition the combined designation of these as the Dunkeld-Blairgowrie Lochs cSAC includes Slender Naiad as a European interest.

SNH and SEPA have statutory responsibilities under the Conservation (Natural Habitats, etc.) Regulations 1994 to protect the designated interests of SSSI's, SAC's and SPA's. SEPA has a duty to consult SNH before authorising any activities or emissions which may affect this species or the ability of the SSSI to support it.

Research of Slender Naiad in the lochs has included a PhD on 'The Functional Ecology of *Najas flexilis*' submitted by Ruth Wingfield in March 2002. SNH contracted diving surveys that were carried out by Northern Ecological Surveys in 1997 on Loch Butterstone and Loch of Craiglush, and in 1998 Valerie James and Alan Barclay of SWT surveyed Slender Naiad distributions in Loch of the Lowes and Loch of Craiglush.

Other work includes a palaeolimnological investigation by ENSIS (University College London) in 2001 and a phosphorus budget study of Loch of Craiglush, Loch of the Lowes and Butterstone Loch in 1997. The Lochs Survey Team carried out a freshwater survey of Loch of Craiglush, Clunie Loch and Marlee Loch in 1997. SEPA prepared a review of data and proposals for action on the Lunan chain of Lochs in April 2002.

MAIN OBJECTIVES / TARGETS

Main Objectives

1. Maintain and, where possible, enhance the current populations and distribution of Slender Naiad within Tayside

2. Introduce an appropriate management programme for the Lunan chain of lochs.

3. Consider appropriate sites for the reintroduction of the Slender Naiad.

Main Targets

1. Limit the impact of development or land-use changes that could lead to increased nutrient inputs to the lochs.

2. Liaise with appropriate bodies to establish a monitoring programme to assess any changes to the loch habitat that may require management.

3. Research the possibility of establishing a new population in an appropriate site based on genetic stock from the Loch of Lowes, or strengthening the current population by replanting along shores where the species is absent

Work Objectives

1. Review the water quality data of the Lunan chain of lochs.

Work Targets

1. Promote responsible site management to protect existing populations.

GLOSSARY OF TERMS/ ABBREVIATIONS: add

REFERENCES:

- James, V.A. (1997) *The Occurrence and distribution of Najas flexilis in Loch of Craiglush,*
- *Loch of Lowes and Loch of Butterstone*. Report to Scottish Wildlife Trust, 1997.
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- SEPA (1999) Information Annex (A-2-1-6). Natural Heritage Handbook, Issue 1. SEPA.

PROPOSED ACTION FOR BIODIVERSITY

	Proposal for Action – Slender Naiad	Potential deliverers		To take place by								Meets Obj. No.
		Lead Partner(s)	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	**A. Policy and legislation**											
	1. Ensure that all of the Lunan chain of lochs meet EU Directives in terms of designations for wildlife, importance and/or quality.	SEPA SNH						*				
	2. Contribute to the development of policies within land use development plans to safeguard the Slender Naiad within the Lunan chain of lochs.	PKC DCC AC	SNH SEPA TBP		*	*	*	*	*	*	*	
	B. Site and species safeguard/ management											
	1. Ensure that proposed developments or activities have no adverse affects on known populations of Slender Naiad.	SNH	SEPA FWAG									
	2. Ensure that the Lunan chain of lochs has a management plan implemented by 2005.	SNH					*					
	C. Advisory											
	1. Provide advice for managers and users of the Lunan chain of lochs to promote the biodiversity conservation of this habitat.	TBP	SNH SEPA	*	*	*	*	*	*	*	*	
	2. Review current water quality data to determine current status of the Lunan chain of lochs.	SEPA					*					
	3. Continue Site Condition Monitoring for SACs and SSSIs	SNH			*					*		
	4. Monitor the delivery of the action plan yearly and in detail every 5 years, starting in 2003.	TBP			*							
	D. Promotion and Awareness-Raising											
	1. Ensure widespread awareness of the biodiversity significance of the Slender Naiad, and promote the links between habitat health and distribution of the species	TBP	SEPA SNH SWT FWAG				*					

CONSULTATION DRAFT: 2ND TRANCHE – SAP/VP3

full colour transparency available √

TAYSIDE BIODIVERSITY PARTNERSHIP

WHORLED SOLOMON'S SEAL ACTION PLAN

Common Name ***Whorled Solomon's seal***

Scientific Name *Polygonatum verticillatum* (L.) All (Family: Liliaceae)

SPECIES PROFILE

- **UK Biodiversity Status** Species of Conservation Concern
- **Tayside Status** Species of Conservation concern
- **Statutory Protection** Schedule 8 of the Wildlife & Countryside Act 1981
- **UK Lead Partner (if any)** None
- **Relevant Habitat Actions Plans** Upland Oakwoods; Upland Mixed Ashwoods; Wet Woodlands

MAP – *a 10km map to be provided*

List of Key Sites/ Site Distribution
Glen Tilt Woods SSSI
Den of Airlie NNR/SSSI
Den of Reichip SSSI
Milton Wood NNR/SSSI
Craighall Gorge SSSI/cSAC
Romadie Wood SSSI
River Lyon Bank SSSI
Keltneyburn SSSI/cSAC
Wood near Pitlochry

Eight sites mostly in gorge woodlands but also one in riverine woodland; central and eastern Perth & Kinross along or north of the Highland Boundary Fault. Now not found as a native species anywhere else in the UK.

DESCRIPTION AND HABITAT

Medium sized perennial with whorls of narrow pointed leaves. Single stems produced on short rhizomes. Flowers drooping in leaf axils. Fruit red berries

- Reproduction by rhizomes and by berries; berry production inhibited by heavy shade and definite evidence of seedling production only from 1 site.
- Thought to be mainly pollinated by bumblebees.
- Prefers moist moderately base-rich soils (pH neutral, rarely above) in broadleaved gorge or riverine woodland.

- In Scandinavia it is a sub-alpine species associated with species such as Alpine sow-thistle *Cicerbita alpina* and wood crane's-bill *Geranium sylvaticum*. May have been lost from this habitat in the UK through grazing pressure.
- Usually found in National Vegetation Classification communities W9 and W11; one site in W7 [may actually be found in W10 rather than W11].
- In Scandinavia also characteristic of wood meadows. Management such as brash pile creation, and burning of brash has been found to reduce competition with other species.

MANAGEMENT

Requires moist moderately base rich soil in shade light enough to allow berry production but reduce competition from other more vigorous woodland plants.

CURRENT STATUS AND EXTENT

- Eurasian, mountain ranges from North Spain to the Himalaya, and north to Scandinavia
- Formerly found in Angus and north-east England. 12 sites known in Perth & Kinross, but of these 4 are now extinct, including one since late 1990's.
- A difficult species to find, but no new sites have been recorded since 1913.
- In cultivation in UK since at least 1597, and occasionally naturalised in Scotland.

Monitoring and research work in the 1990s particularly by SNH (2000 and 2001), Wright (1998) and Wright et al (1993), have produced the following population estimates:

Site	Site status	Number of populations	Date of most recent count	Total Population size	Number of populations > 25 stems	Site condition*
Craighall Gorge	SSSI/cSAC	5	2000/1	169 *	4	Favourable; one population has declined significantly
Den of Airlie	NNR/SSSI	1	2000	101 - 1000	1	Favourable
Den of Reichip	SSSI	3	1993	140	3	Favourable
Glen Tilt	SSSI	1	2001	Extinct	0	Un-favourable: lost from site Plants last seen in late 1990s
Keltneyburn	SWT reserve; SSSI/cSAC	1	2000	85	1	Un-favourable
Wood near Pitlochry	-	7	1996	283	4	Favourable
Milton Wood	NNR/SSSI	2/3	2000	22	0	Un-favourable
River Lyon Bank	SSSI	1	2000	34	1	Un-favourable
Romadie Wood	SSSI	1	2000	9	0	Un-favourable

* based on the SNH Site Condition Monitoring assessments; Glen Tilt and Milton Wood will be excluded from future SCM assessments

** excludes population known as E4 for which no locational information exists.

CURRENT FACTORS CAUSING LOSS OR DECLINE

A variety of factors can adversely affect this species, but only one or two may operate in each population or site.

Small population effects: 4 sites are currently unfavourable because of small population sizes. Most populations are isolated, even within sites. Most populations probably consist of clones of only one or two genotypes. Cross-pollination between sites is probably very rare.

Dutch elm disease: Although excessive shade inhibits flowering and berry production, too little can result in the growth of other competitive plants species and drier soils in the summer.Tree loss might also allow greater water run off causing erosion after heavy rain

Wayleave management: One population lies under an electric power line. Scrub and tree clearance have recently threatened this population, although in Scandinavia in traditional management of wood meadows, brash piles have been shown to reduce competition.

Excessive shade: Shade from non-native trees (especially beech and conifers) and competitive ground vegetation such as ferns, appears to be inhibit seed production.

Lack of woodland: The historic loss of woodlands, particularly in the uplands and along rivers may have significantly reduced available habitat. Indeed, its sub-alpine habitats may have completely disappeared largely through grazing.

Podsolisation: conifers and other species such as beech can increase soil acidification and nutrient loss, thereby reducing areas of suitable habitat.

Woodland management: Most sites are SSSIs and SNH should be able to comment on most proposals to change management. One site is undesignated, and statutory consultation is not required. Changes to woodland management such as felling or the introduction of grazing could have adverse effects.

Solomon's seal sawfly; a sawfly *Phymatocera aterrima* has recently been introduced in the UK. In some years this species can cause leaf/seedling damage.

Lack of seed production: Evidence of seed production is very limited, and relates to reports of single leaf plants at some of the larger populations. Seedling production only definitely recorded from one site.

The following table gives those factors which are currently operating at each site:

Site	Long term trend	Adverse factors affecting, or potentially affecting, populations
Den of Reichip	Healthy population	Wayleave management
Romadie Wood	Relict of larger population; previously two populations, now one; threatened	Small size of woodland; no seed set
Milton Wood	Previously one of strongest populations; threatened	Beech/rhododendron invasion restricting suitable habitat; grass understorey; limited seed production; difficult site to survey
Den of Airlie	Historically more than one population, now only one; current population apparently grown from relatively small one. Only site known to have reproduced sexually.	None known
River Lyon Bank	Relatively stable population;	Seed viability is low. Limited size of woodland
Keltneyburn	Relatively stable; one population apparently lost since 1930's/60's.	Competition from ground flora inhibiting seed set

Site	Long term trend	Adverse factors affecting, or potentially affecting, populations
Wood near Pitlochry	Population since end of 1800's. Trends unknown; current population healthy	None known but seed set inhibited possibly by competition from ground vegetation. Non-SSSI site
Glen Tilt	Sharp fall in population size from mid 1980's; now extinct	Erosion of wet bank possibly exacerbated by tree loss leading to greater water run off; climatic change with wetter winters?
Craighall Gorge	One population has declined markedly; trends in others unknown	Loss of elm trees at declining population may have led to greater competition from other species and/or drought in summer; at all populations seed production either absent or limited. No locational data on one population found in 1990's

OPPORTUNITIES AND CURRENT ACTION

Current actions

Small numbers of seed have been collected from Den of Airlie (113 seeds in 1992), Den of Riechip (1996) and Craighall Gorge in the 1990's as part of the Millennium Seed Bank Project overseen by the Royal Botanic Gardens at Kew.

Two pieces of rhizomes were collected from Glen Tilt in the mid 1990s and cultivated at the Royal Botanic Gardens Edinburgh. One piece has been successfully propagated. The objective was to safeguard material from this site with a view to possible re-introduction.

All populations in SSSIs have been monitored by SNH as part of its Site Condition Monitoring programme. Sites were last monitored in 2000 and 2001, and except for Glen Tilt and Milton Wood, will be monitored in future on a six year cycle. All SSSIs are the subject of Site Management Statements, and the NNRs of management plans.

SWT have at least occasionally (eg 1999) managed ground vegetation to reduce shading of the population in Keltneyburn.

This species is the subject of an entry in the Threatened Plants in Scotland CD produced by SNH. Conservation priorities are considered to be:

- Increase size of two declining populations by suitable management [not specified but probably Milton Wood and Glen Tilt]
- Consider the need to replace the population threatened by erosion [namely the Glen Tilt site where now extinct]

Craighall Gorge and Keltneyburn cSACs are both the subject of a LIFE III Woodland project coordinated by Highland Birchwoods which aims to develop conservation management to the benefit of the Tilio-Acerion gorge woodland communities.

Opportunities

The following possible actions could be undertaken:

Den of Reichip:	Investigate potential of using brash piles to safeguard population under wayleave
Romadie Wood:	Search for missing population; bring material into cultivation; augment population by translocation; investigate potential to increase woodland size
Milton Wood	Bring material into cultivation; remove beech and Rhododendron from site; augment population by translocation
Den of Airlie	Search for new populations
River Lyon Bank	Bring material into cultivation; augment population by translocation

Keltneyburn	Search for more colonies; reduce competition from ground vegetation to promote seed set; augment population by translocation
Wood near Pitlochry	Reduce competition from ground vegetation to promote seed set
Glen Tilt	Re-introduce plants from RBGE cultivated material; search for new populations
Craighall Gorge	Reduce competition from ground vegetation to promote seed set; relocate 'lost' population; consider removal of conifers and beech from around populations.

MAIN OBJECTIVES / TARGETS

Aim: to maintain a viable population of Polygonatum verticillatum in Tayside by ensuring that all sites are in favourable condition according to the SNH SCM criteria.

Objectives:

1. To reduce the potential loss of genetic variation by bringing into secure cultivation rhizomes from threatened populations at Milton Wood, Craighall Gorge and Romadie Wood.

2. To seek to encourage greater seed production by habitat management at sites where seed production is currently inhibited (Keltneyburn, Craighall, Gorge, wood near Pitlochry)

3. To carry out Site Condition Monitoring at each population every 6 years

4. To translocate cultivated material to most threatened sites to augment existing populations or create new populations (Glen Tilt and Romadie Wood).

5. To seek to remove or control regeneration of conifers and beech from around existing populations or in potential new locations for populations (Glen Tilt, Milton Wood, Craighall Gorge)

6. To seek to expand smaller woodland sites to create suitable woodland habitat (Romadie Wood, River Lyon Bank)

7. To collect seed from populations at Den of Airlie, Den of Reichip and Craighall Gorge to create a sufficiently large seed collection in the Millennium Seed Bank.

8. To search for additional or 'lost' populations at Glen Tilt, Den of Airlie, Keltneyburn, and Craighall Gorge.

GLOSSARY OF TERMS

to include - **Site Condition Monitoring**: monitoring carried out by SNH on a six yearly cycle of the notified (=designated) interests of all Sites of Special Scientific Interest. The criteria for vascular plants include: a minimum of two populations per site with each population containing at least 25 individuals.

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- Wright, Jenny 1998 *An ecological basis for the conservation of* Polygonatum verticillatum *(L.) All., Whorled Solomon's seal in Scotland*, A thesis presented for the degree of Doctor of Philosophy, University of Aberdeen.
- Scottish Natural Heritage 2002 *Threatened plants in Scotland*, Scottish Natural Heritage, Compact Disk

PROPOSED ACTION FOR BIODIVERSITY

	Proposal for Action – Whorled Solomon's Seal	Potential deliverers		To take place by								Meets Objective No.
		Lead Partner(s)	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	A. Policy and legislation											
	B. Site and species safeguard/ management											
	1. Bring into secure cultivation rhizomes from threatened populations at Milton Wood, Craighall Gorge and Romadie Wood.	SNH	RBGE Landowner			*						1
	2. Undertake habitat management at sites where seed production is currently inhibited (Keltneyburn, wood near Pitlochry)	SWT	Landowner			*						2
	3. Translocate cultivated material to most threatened sites at Glen Tilt and Romadie Wood.	SNH	Landowner							*		4
	4. To seek to remove or control regeneration of conifers and beech in Glen Tilt, Milton Wood, Craighall Gorge	SNH	Landowner			*						5
	5. To seek to create suitable woodland habitat at Romadie Wood, River Lyon Bank	SNH	Landowner			*						6
	6. To collect seed from populations at Den of Airlie, Den of Reichip and Craighall Gorge for the Millennium Seed Bank	BSBI	SNH Landowner						*			7
	C. Advisory											
	D. Research and monitoring											
	1. Carry out Site Condition Monitoring at each population every 6 years	SNH	BSBI		*				*			3
	2. To search for additional or 'lost' populations at Glen Tilt, Den of Airlie, Keltneyburn, and Craighall Gorge	BSBI	SNH SWT				*					8

	E. **Promotion and awareness-raising**											
	1. Species is highlighted on the Perthshire Herbarium website and will be featured in the Biodiversity Exhibition 2004 (Perth Museums)	PKC TBP										
	2. Include species in the proposed "Theatened Plants of Tayside" publication that could follow on from the Biodiversity Exhibition	TBP	PKC BSBI PSNS Dundee Naturalists SWT SNH									
	F. **Plan Monitoring**											
	1. Review plan on an annual basis and in detail every five years	TBP										