Please refer to the accompanying guidance for information about how to complete this form and an explanation of terms used

Field 1: Action Plan details

Species/Habitat Action Plan	*Linnaea borealis*
Lead Partner/Agency	PLANTLIFE
Steering Group/Other organisations	Yes
Work programme in existence?	Yes

Field 2: Objectives and targets overview

Number and text	UK	E	NI	S	W	Comments
4.1 Prevent the further decline of twinflower by retaining populations of twinflower as components of functioning pine wood ecosystems wherever possible.				✓		
4.2 Ensure that all populations are capable of sexual regeneration by 2008.				✓		
4.3 Restore, by 2003, the species to five historic sites.				✓		
4.4 Ensure that action to encourage the regeneration and restoration of native pine woods is managed in such a way to provide habitats suitable for the restoration of twinflower and other pine wood species.				✓		

Field 3: Proposed action overview

Number and text	UK	E	NI	S	W	Action significant?	Action complete or ongoing?
5.1.1 Identify potential incompatabilities and integrate the actions in this plan with those actions in the pinewood action plan designed to protect, restore and expand the pinewood habitat on which this species depends. (ACTION: FA, SNH)				✓			
5.1.2 Consider, and develop prescriptions for, the introduction of twinflower into new woodland sites created by the Native Pinewood Grant Scheme. (ACTION: FA, SNH)				✓			
5.2.1 Consider the representation of twinflower within the SSSI series and ensure that management prescriptions take its requirements fully into account. (ACTION: SNH)				✓			Yes
5.2.2 Ensure that Caledonian Forest reserves and other Forest Enterprise sites where twinflower is present, are managed with consideration for its ecological requirements. (ACTION: FE)				✓			Yes
5.2.3 Ensure that management plans for Forest Reserves, NNRs, SSSIs and SACs where twinflower is present take account of the need to maintain viable populations of the species. (ACTION: SNH)				✓			Yes
5.2.4 Ensure that where twinflower is located in plantation forests, consideration is given to modifying the management of the surrounding area to ensure the survival of the				✓			Yes

population. (ACTION: FC, SNH)							
5.3.1 Instigate measures to remedy chronic failure of fruit production in populations. (ACTION: SNH)				✓		✓	Yes
5.3.2 Reintroduce the species to five historic sites which now appear suitable to maintain a viable population. (ACTION: FE, SNH)				✓			
5.4.1 Inform landowners, land managers and foresters of the presence and significance of twinflower and advise them of suitable management for its survival. (ACTION: FA, SNH)				✓			Yes
5.5.1 Establish the current and past distribution of twinflower, and assess population size and sexual regeneration by encouraging and sponsoring appropriate botanical survey. (ACTION: SNH)				✓		✓	Yes
5.5.2 Assess the effect of current management practices on survival and seed-set of the species by examining existing populations. (ACTION: FR, SNH)				✓		✓	Yes
5.5.3 For a sample of populations use genetic markers to establish the distribution of clones. (ACTION: SNH)				✓		✓	Yes
5.5.4 Examine experimentally the efficacy of translocation between existing populations to overcome negative results of clonal isolation on fruit production. (ACTION: SNH)				✓		✓	Yes
5.5.5 Monitor the survival and performance of twinflower at a				✓		✓	Yes

representative range of known sites including populations under a range of management conditions. (ACTION: FR, SNH)							
5.5.6 Report on the value for a relatively wide-ranging species and difficulties of trying to maintain live clones or seed *ex-situ*, primarily as material for research and as a means to encourage public awareness and to maintain the genetic diversity. (ACTION: RBG Edinburgh, SNH)				✓			
5.5.7 Exchange information on the ecology and habitat requirements of twinflower with European counterparts and in particular on fruit production. (ACTION: RBG Edinburgh, SNH)				✓			
5.6.1 Ensure that the rarity of the species and threats to its survival are widely understood by woodland managers and the general public. (ACTION: FA, SNH)				✓			
5.6.2 Create or manage at least one accessible population in natural habitat to increase appreciation and understanding of this attractive and threatened species and encourage the display of the species in *ex-situ* collections to assist this process. This will act as a 'flagship' for its habitat and will reduce botanical pressure on other populations. (ACTION: FE, RBGE, SNH)				✓			

Field 4: Assessment of status

Please tick the appropriate category to indicate the assessment of status of the species or habitat, for each country/region where appropriate, and provide a statement supporting the category selected.

	Not appropriate	Recovered	Signs of recovery	No change	Declining	Lost	Insufficient information
UK							
England						✓	
Northern Ireland							
Scotland					✓		
Wales							
Scotland: the size of the known population has increased but it is not thought that these are new populations and the species is extinct at a number of locations. England: the populations thought to be introduced with pines from Scotland, are believed to be extinct.							

Field 5: Summary statement

Please provide an overview of plan implementation, including new factors affecting the species or habitat, which will accelerate or constrain progress towards meeting of the targets. Where a factor results in new action(s) please cross-reference back to the relevant numbers under Field 3 and Table B.

Although the loss of populations is well recorded, it is not clear what aspects of woodland management or population factors may be the cause of this. Therefore initially research funded by SNH at Edinburgh University is examining the performance of populations in relation to woodland structure and management to attempt to determine appropiate management. Investigations of genetic variation within populations to indicate past regeneration success and have already indicated that selfing by clones is possible and therefore cannot explain limited fruiting success. The process of examining populations has also revealed previously unrecorded population. A baseline has been laid down in one area where recent and proposed woodland management may be beneficial to the species.

Field 6: Signing off

Contact details	Lead Partner	Contact Point
Name	M Scott	J. Humphrey
Organisation	Plantlife	Forestry Commission
Assessment date	30/9/99	15/11/99

Completed forms should be submitted to JNCC

Biodiversity Information Service
Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough PE1 1JY
Tel: 01733 562626
Fax: 01733 555948
E-mail: lpr99@jncc.gov.uk

Table A: Action Plan objectives and targets (Copiable table)

Objective/target	4.1 Prevent the further decline of twinflower by retaining populations of twinflower as components of functioning pine wood ecosystems wherever possible.				
Country		**Target achieved**	**Some progress**	**No progress**	**Insufficient information**
UK					
England					
Northern Ireland					
Scotland			✓		
Wales					
Scotland: research into methods for achieving this.					

Objective/target	4.2 Ensure that all populations are capable of sexual regeneration by 2008.				
Country	**Not appropriate**	**Target achieved**	**Some progress**	**No progress**	**Insufficient information**
UK					
England					
Northern Ireland					
Scotland			✓		
Wales					
Scotland: research into methods for achieving this.					

Objective/target	4.3 Restore, by 2003, the species to five historic sites.				
Country	**Not appropriate**	**Target achieved**	**Some progress**	**No progress**	**Insufficient information**
UK					
England					
Northern Ireland					
Scotland				✓	
Wales					

Objective/target	4.4 Ensure that action to encourage the regeneration and restoration of native pine woods is managed in such a way to provide habitats suitable for the restoration of twinflower and other pine wood species.				
Country	**Not appropriate**	**Target achieved**	**Some progress**	**No progress**	**Insufficient information**
UK					

England					
Northern Ireland					
Scotland			✓		
Wales					
Scotland: research into methods for achieving this.					

Table B: Proposed actions (Copiable table)

For each significant action please copy and complete the table below.

Published action/organisation(s) responsible	**5.5.1** Establish the current and past distribution of twinflower, and assess population size and sexual regeneration by encouraging and sponsoring appropriate botanical survey.	
Work plan/organisation(s) responsible	SNH	
Action/workplan undertaken?	YES	
Description of work taken and organisation responsible	Populations being assessed as above.	
Output and time scale	Report on populations assessed in 2000.	*Action by* SNH
Constraints to action		
Action complete or ongoing?	Ongoing	
Next steps	*Please outline future action/work including an indication of expected output, time scale and organisation responsible.*	
Output and time scale	Will depend on outcome of research.	*Action by*

Published action/organisation(s) responsible	**5.5.2** Assess the effect of current management practices on survival and seed-set of the species by examining existing populations. (ACTION: FR, SNH)	
Work plan/organisation(s) responsible	SNH	
Action/workplan undertaken?	Yes	
Description of work taken and organisation responsible	Populations being assessed 1998-1999.	
Output and time scale	Report in 2000	*Action by* SNH
Constraints to action		
Action complete or ongoing?	Ongoing	
Next steps	*Please outline future action/work including an indication of expected output, time scale and organisation responsible.*	
Output and time scale	Will depend on outcome of research.	*Action by* -

Published action/organisation(s) responsible	5.5.3 For a sample of populations use genetic markers to establish the distribution of clones.	
Work plan/organisation(s) responsible	SNH	
Action/workplan undertaken?	Yes	
Description of work taken and organisation responsible	For a sample of populations genetic markers have been used to establish the distribution of clones.	
Output and time scale	Report by 2000	*Action* by SNH
Constraints to action		
Action complete or ongoing?	Yes	
Next steps	*Please outline future action/work including an indication of expected output, time scale and organisation responsible.*	
Output and time scale	Will depend on outcome of research.	Action by -

Published action/organisation(s) responsible	5.5.4 Examine experimentally the efficacy of translocation between existing populations to overcome negative results of clonal isolation on fruit production.	
Work plan/organisation(s) responsible		
Action/workplan undertaken?		
Description of work taken and organisation responsible	*Please provide details of progress to date, including information about outputs, deadlines, which organisations and where action is being undertaken.*	
Output and time scale		*Action by*
Constraints to action	Research carried out under 5.5.3 indicates that clones are not self infertile and therefore that this action is not required.	
Action complete or ongoing?	Yes	
Next steps	*Please outline future action/work including an indication of expected output, time scale and organisation responsible.*	
Output and time scale		Action by

Published action/organisation(s) responsible *(For new or revised actions please provide the new paragraph number and action text.)*	**5.5.5** Monitor the survival and performance of twinflower at a representative range of known sites including populations under a range of management conditions. (ACTION: FR, SNH)	
Work plan/organisation(s) responsible *(Summary of work plan agreed by the steering group, broken down by year if possible.)*	The performance of twinflower at a number of populations has been examined.	
Action/workplan undertaken? *(Please state yes or no.)*	Yes	

Description of work taken and organisation responsible	*Please provide details of progress to date, including information about outputs, deadlines, which organisations and where action is being undertaken.*	
Output and time scale	Report in 2000	*Action by* SNH
Constraints to action		
Action complete or ongoing?	Yes	
Next steps	*Please outline future action/work including an indication of expected output, time scale and organisation responsible.*	
Output and time scale	Depends on outcome of research	*Action by* SNH