

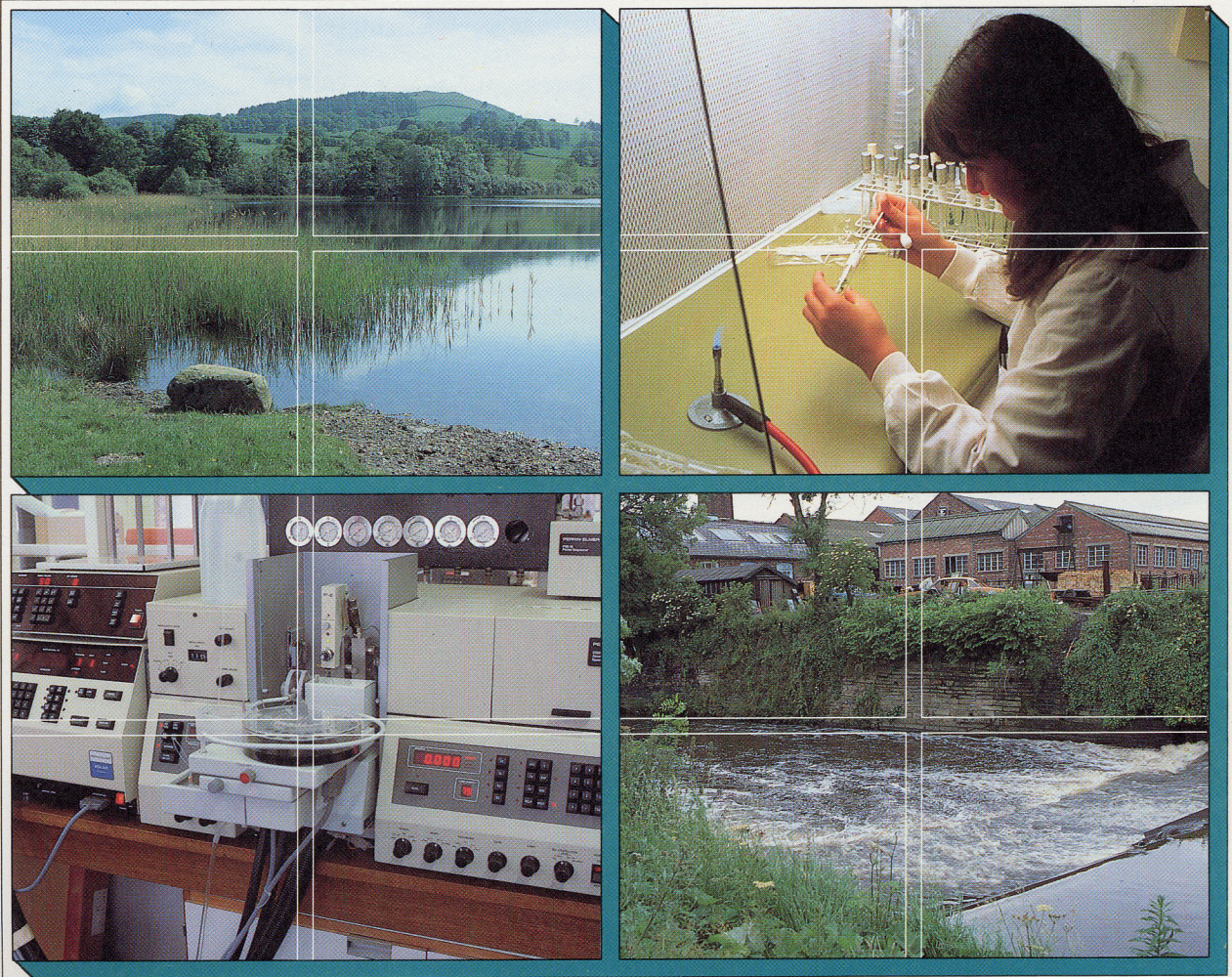
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**Institute of
Freshwater
Ecology**

Species Action Plan - Medicinal Leech
Hirudo medicinalis

**Produced for English Nature
by Mr J.A.B.Bass**



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Species Action Plan - Medicinal Leech *Hirudo medicinalis*

Summary

The medicinal leech has been recorded from only 16 sites post-1970 and 13 sites post-1980 in England, it is noteworthy that 7 of these sites are confined to a small area of Kent and another 4 sites are in Cumbria. The medicinal leech generally lives in ponds and lakes which have areas with elevated summer water temperatures. In addition, the species can only persist at sites which are visited by suitable vertebrate hosts at times when the leeches are actively searching for bloodmeals. The general decline in availability of wetland habitats throughout much of England may have impacted populations of the medicinal leech and its potential hosts.

The main conservation priorities requiring action include:

- 1) Confirming the current distribution of the medicinal leech in England.
- 2) Provision of appropriate advice to maintain the remaining populations.
- 3) Initiating studies to test:
 - a) the desirability of establishing satellite populations close to potentially vulnerable sites where the medicinal leech currently occurs.
 - b) the appropriateness of reintroduction at other suitable localities, to secure the continuing presence of the medicinal leech in England.

1. PRIORITY STATEMENT

Though once common and widespread, since 1980 the medicinal leech *Hirudo medicinalis* has been recorded at only 13 locations in England, 7 of which are in close proximity, and therefore its continued survival in this country is threatened. The status of the medicinal leech is also precarious and declining throughout Europe. Current information suggests that the predominately small waterbodies where the medicinal leech occurs are potentially vulnerable to changing conditions and some local populations may disappear.

The medicinal leech' is protected by inclusion on Schedule 5 of the Wildlife and Countryside Act (1981), appears in the CITES Listing in Appendix II (1987) - Convention on International Trade in Endangered Species of wild Fauna and Flora. It is listed in Appendix III of the Bern Convention and appears in Annex Va of the Directive on Conservation of Natural Habitats and Wild Flora and Fauna [EEC, Council Directive 92/43 (1992)]. The medicinal leech is also listed as a priority species by the UK Biodiversity Steering Group, with the result that a UK Species Action Plan has been drawn up (Biodiversity Steering Group UK (1995)). It was classed as "Rare" in the British Red Data Books (1991). English Nature therefore attach a **high priority** to the conservation of the medicinal leech.

2. ACTION PLAN OBJECTIVES

Objective 1: To confirm the present distribution of the medicinal leech in England by surveying specific known sites and waterbodies adjacent to where the medicinal leech has been recorded since 1970. Additionally, to collate information on site management relevant to the maintenance of the medicinal leech populations at these locations.

Objective 2: In the medium term to monitor annually certain selected populations of the medicinal leech in England, initially estimating the population sizes and, over time, determine whether its continued presence is under threat. Utilise information on site characteristics and management (Objective 1) to determine/confirm the habitat requirements. Provide site managers/owners with the appropriate management advice required to successfully conserve medicinal leech populations.

Objective 3: In the long term, identify key sites which can be suitably managed to ensure that viable populations of the medicinal leech are maintained in England. Assess whether introduction of the medicinal leech to suitable new sites in England, or reintroduction to previously known sites would be appropriate species management measures.

3. LEGAL STATUS

The medicinal leech is a protected species under the following Acts:

Schedule 5 of the UK Wildlife and Countryside Act (1981) - this makes it an offence to kill, injure, take, possess or sell (alive or dead) medicinal leeches from the wild, and to damage, destroy, or obstruct access to their natural habitat. A special licence from the relevant country agency is required for scientific work on this species in the wild.

CITES Listing on Appendix II (1987) - Convention on International Trade in Endangered Species of wild Fauna and Flora.

Permits international trade only where the Scientific Authority of the exporting country is satisfied that the trade will not be detrimental to the survival of the species in the wild - such material to be accompanied by proscribed export permits.

EEC Council Directive 92/43, 1992 (Habitats Directive on Conservation of Natural Habitats and Wild Flora and Fauna) lists the medicinal leech under Annex Va ("Animals and plant species of community interest whose taking in the wild and exploitation may be subject to management measures")

SSSIs. A few sites in England are already designated under the Wildlife and Countryside Act (1981) and the sites are managed to conserve the medicinal leech.

4. BIOLOGICAL ASSESSMENT

4.1 Introduction

The medicinal leech is a comparatively large leech, when fully extended the actively swimming, mature individuals are several centimetres in length. It occurs primarily in ponds and lakes with prolific marginal vegetation and high summer water temperatures. Access to suitable vertebrate hosts for bloodmeals is necessary. Despite being recorded as common in the 19th Century, in 1910 the medicinal leech was declared extinct in the UK. This was somewhat presumptive as it has been recorded at about 16 locations since 1970 in England (Appendix I), 7 of these sites are in very close proximity in Kent (Elliott & Tullett, 1992 and Elliott, JM., pers. com.). The overgrown habitats preferred, cryptic behaviour and comparatively high temperature ranges required to promote conspicuous host searching activity may have led to small populations of the medicinal leech being overlooked. The species has in past centuries been exploited throughout Europe, with an annual trade running into millions of leeches, over this period it enjoyed widespread medical use in blood-letting. Generally they were collected from the wild and importation to England occurred from the continent (Wells, Pyle, & Collins, 1983). More recently, with declining populations, collection from the wild has become greatly restricted and commercial leech fanning is developing (Elliott & Tullett, 1992).

4.2 Ecology

The medicinal leech requires comparatively high water temperatures in summer to initiate breeding and individuals can live for up to four years. It may reach maturity in its second, third or fourth year depending on site conditions. Feeding requires active searching for prey and searching behaviour has been recorded between April to mid-October (Wilkin, 1987). The medicinal leech shows little inclination to move at temperatures below 12°C, whilst 50% become active at 19°C and 90% swim vigorously at about 23°C, particularly in response to water disturbance (Elliott & Tullett, 1986). Records of host selection are based mainly on a few direct observations. However, at two adjacent sites in Kent, blood-meal analysis revealed frogs are important hosts, with smaller contributions from birds and fish. The presence at these same sites of large numbers of smooth newt (*Triturus vulgaris* L.) corpses with bite scars indicated that they are also preyed upon (Wilkin & Scofield, 1990). The introduced marsh frog (*Rana ridibunda* Pall.) is common at the two Kent sites and its more marked aquatic lifestyle could provide extended opportunities for feeding for the medicinal leech in this situation (Wilkin & Scofield, 1990). The medicinal leech displays long periods of inactivity between feeding and searching for hosts, populations at the Kent sites are generally dominated by small, young individuals and these occur in low numbers at most sites where older leeches usually predominate.

Optimum temperature for breeding activity is within the range 25.5-27.5°C, with mating and cocoon production confined to the summer months (Elliott & Tullett, 1992). Sperm can be stored for several months after mating (Wilkin, 1987). Cocoons collected in the wild have contained from 5-15 eggs, whilst in the laboratory up to 30 eggs may be present, the eggs

take 4-10 weeks to hatch depending on temperature (published data reviewed by Elliott & Mann, 1979).

Other features of lakes and ponds regarded as important requirements of the medicinal leech include moderately eutrophic conditions with extensive stands of waterplants in a shallow littoral zone (Whitten, 1990; Bratton & Elliott, 1991) and suitable bankside egg-laying sites (Elliott & Tullett, 1992). The medicinal leech cocoons are attached to the undersurface of stones or other objects just above the water level at the shoreline, where short-term stability of soil moisture conditions are maintained (Wilkin, 1987; Elliott, J.M. pers. com.).

Young medicinal leeches have been reared in captivity from cocoons, using bovine bloodmeals, but establishing continuous laboratory culture can be difficult (Wilkin, 1987) and the optimal field conditions required by young medicinal leeches remain to be established (Elliott & Tullett, 1992). However, commercial fanning has been attempted since the mid-19th Century (Sawyer, 1981) and a leech farm was established in Swansea in 1984 (Elliott & Tullett, 1992).

4.3 Distribution and population

Wells and co-authors (1983) provided an extensive review of information on the medicinal leech, attributing its current reduced occurrence to over-collection from the wild, changes in farming methods and general loss of marsh habitat. Within England, Elliott and Tullett (1992) suggested a reduction in the availability of suitable hosts may exacerbate the problems cited above. The medicinal leech was formerly found widely in Europe, south to

the countries bordering the eastern Mediterranean and east to the Ural Mountains (Elliott and Tullett, 1982; Wells et al, 1983). The northern limits of its range in Scandinavia may have been influenced by repeated introductions, this century the practice has probably ceased with the rapid decline in the widespread use of the medicinal leech in blood-letting therapy.

Recorded national declines of the medicinal leech are universal throughout its known range, it has been not been recorded from Ireland for over 100 years and was temporarily considered extinct in Britain, Holland and Norway, where a few isolated populations now persist (Wells et al, 1983). Most records of occurrence in England result from repeat visits to known sites and chance encounters. The overgrown habitats preferred, cryptic behaviour and comparatively high temperature ranges required to promote conspicuous host searching activity may have led to small populations of the medicinal leech being overlooked.

The medicinal leech was recorded from 7 sites within England by Elliott & Tullett (1982). More recently a sizable but localised population in Kent has been found and studied intensively (Wilkin, 1987). At most other new English locations, only single individuals, or low densities have been recorded (Wilkin, 1987; Guthrie, 1993; Elliott, J.M. pers corn; Appendix I). The continued presence of the medicinal leech at many of these sites remains to be established. Within England, nearly half the currently known sites where the medicinal leech occurs are protected, in some way, and therefore the possibility of successfully conserving this species in England must be high (Elliott & Tullett, 1992). Notwithstanding this, particularly small and locally isolated populations are at risk of becoming extinct, leading to a contraction in the present scattered geographic distribution of the medicinal leech in England. Only one site in England (and the UK) is known to support substantial numbers of medicinal leeches (6000-12000; Wilkin.1987).

4.4 Limiting factors

4.4.1 Habitat

Importance: high

In England the medicinal leech requires comparatively high water temperatures to breed successfully. Above average temperatures are associated with shallow water in sheltered localities of ponds and lakes. Such conditions are provided by a well developed marginal zone of aquatic vegetation. The presence of suitable hosts, at appropriate times, within this marginal zone is necessary for successful blood-feeding to occur, therefore appropriate management of the surrounding land use is also necessary. Shelter from potential predatory fish and birds may be critical. Factors such as the in-filling of small ponds and changes in pond use (eg development of fisheries and irrigation supply, their reduced level of use by farm stock), may result in the habitats becoming unsuitable for the medicinal leech. The general loss, fragmentation and isolation of suitable wetland habitats throughout much of England will also have been detrimental in the past to the species.

4.4.2 Egg laying substrata and the microhabitats of newly-hatched leeches

Importance: to be established

Egg cocoons are deposited in damp locations under stones or other objects above the water level at the pond or lake margin. The cocoons may be susceptible to either drying out, if the water level falls, or the development of anoxic conditions if the water level rises markedly during the incubation period. The availability of suitable stones for sheltering

cocoons, at the waters edge, may be important (Elliott, pers corn).

More information on breeding requirements and the ecology of newly-hatched medicinal leeches is required. Most autecological studies show that the mortality rate during this early phase of an animal's life cycle can be very high and varies between years and between different habitats. The optimum conditions for young medicinal leeches to grow and survive are not known but studies indicate some young are capable of surviving their first winter without feeding (Wilkin, 1987).

4.4.3 *Food availability*

Importance: high

The medicinal leech requires blood-meals from vertebrates. It depends on the presence of suitable hosts when water temperatures are sufficiently high to trigger an active response to the hosts' movements in the water. The recorded declines in amphibians in England may have impacted the medicinal leech populations and their scope for recovery. The relative importance of waterbirds and fish as hosts remain to be established on a wider scale (Wilkin, 1987). Recent work has indicated that mammalian blood may not be required in order for the medicinal leech to attain maturity (Wilkin, 1987). Survival of the medicinal leech at each site depends on its access to suitable hosts, many of which are impacted directly or indirectly by mans activities.

4.4.4 *Water quality* ***medium***

Importance:

There are few data on the water quality requirements of the medicinal leech (apart from

temperature requirements) but water quality will indirectly impact the medicinal leech through habitat availability, influencing the growth of algae and larger waterplants and also the availability of suitable vertebrate hosts. Direct impacts of water quality on egg survival in cocoons may be important.

5. RESUME OF CONSERVATION ACTION TO DATE

Internationally the threats to survival of the medicinal leech were highlighted by Sawyer (1981), who recognised the growing industrial demand for hirudin and other useful biochemical extracts. Sawyer called for urgent protection for the species, referring to data compiled for the IUCN Invertebrate Red Data Book (Wells et al, 1983). Subsequently, a range of publications and reports have echoed this concern (eg, Elliott & Tullett, 1984, 1992; Wells & Coombes, 1987; Wilkin, 1987; Whitten, 1990; Bratton & Elliott. 1991). The medicinal leech is fully protected in the UK by listing under Schedule 5 of the Wildlife and Countryside Act 1981. However, in a wider context, it is noteworthy that the EEC Council Directive 92/43, 1992 (Directive on Conservation of Natural Habitats and Wild Flora and Fauna, which identifies priority species within Europe) lists the medicinal leech under Annex V ("Animals and plant species of community interest whose taking in the wild and exploitation may be subject to management measures") rather than Annex IV ("...in need of strict protection") (adopted October 1994). In addition, continuing attempts to control the international trade in medicinal leeches collected from the wild [eg, Turkey (Kasperek, 1995)] highlight the persisting danger from over-exploitation of wild stocks.

Within the UK several sites where it has been recorded in the past have been designated as SSSIs or have local Nature Reserve status (Ball, 1994). Active management, at sites

known to be frequented by the medicinal leech in England, is thought to be confined to the sites in Kent.

The NGO publication "Biodiversity Challenge" (2nd Edition)(1995) provides a UK-wide summary species action plan for the medicinal leech, which includes proposals to extend reserve status to all known sites in which it occurs, re-establish populations at new sites and undertake future research and monitoring.

The UK Biodiversity Action Plan Steering Group (1995) has broadly similar proposals and highlights current action including: the designation of 12 sites as SSSIs, the creation of a new pond in Wales to increase the availability of medicinal leech breeding habitat and the current development of appropriate species management guidelines for the medicinal leech funded by Scottish Natural Heritage.

6. PROPOSED ACTION BY ENGLISH NATURE

6.1 Policy and legislation

Action 1: No action required at this time, the medicinal leech is given complete protection under current legislation.

Priority: low

6.2 Site safeguard, land acquisition and management

Action 2: Review the options for effective future conservation of the medicinal leech in England after a survey to establish more precisely the distribution of the species in England.

Priority: high

Such options might include further SSSI designations, the establishment of new reserves and site management agreements.

6.3 Species management, protection and licensing

Action 3: Notify the appropriate site owners and local wildlife trusts of the presence of the medicinal leech, in order that critical habitats are protected from disturbances caused by inappropriate management procedures or the collection of leeches. The vulnerability of particular populations to collectors should be considered before the locations of specific sites are publicised.

Priority: medium

The maintenance of viable medicinal leech populations may require active management with regards to the availability of vertebrate hosts, bearing in mind the recorded declines in amphibians in England and changing practices in relation to provision of piped water for farm animals. Where geographically isolated and potentially vulnerable populations are present, the possibility of translocation and establishment of satellite populations in suitable locations nearby should be investigated. Similarly, at previously known sites, where the medicinal leech no longer occurs, reintroductions should be considered where appropriate conditions and site management can be maintained.

6.4 Advisory

Action 4: Information should be provided to landowners that have the medicinal leech in their waters. This should emphasise the potential vulnerability of the medicinal leech to habitat degradation and the species reliance on continued access to suitable hosts for

blood-feeding.

Priority: high

Many people with access to ponds and lakes are unaware of the whereabouts and ecological requirements of the medicinal leech.

6.5 International

Action 5: Any measures taken to conserve the medicinal leech, particularly those within the UK, would benefit from a coordinated approach which utilises new information on effective species management as it becomes available.

Priority: high

The medicinal leech was formally widely distributed in Europe, although there have been relatively few studies confirming its status. In the north temperate regions it is recorded as being scarce (Wells et al, 1983). A recent survey of medicinal leech distribution in Scotland, with advice on appropriate conservation action, is nearing completion (Maitland, 1996). Any future study of the English populations of the medicinal leech should include contact with other UK and overseas scientists involved in investigations of the Hirudinea (leech family) and particularly the medicinal leech. The sites in Kent supporting large populations of the medicinal leech are of international importance.

6.6 Future research and monitoring

Action 6: EN should commission work or otherwise support work to confirm the distribution of the medicinal leech in England and its habitat requirements during the

different stages of its life cycle.

Priority: 'high' immediate

This work should commence with a survey and classification of the 16 sites in England at which the medicinal leech has been recorded since 1970 (Appendix I). Records should be collated and incorporated in national and UK databases (eg Biological Records Centre, Monks Wood). Such a survey could be extended to adjacent, potentially suitable, sites. This work would need to be undertaken by suitably trained persons capable of identifying the medicinal leech in the field. This data would provide additional information on the habitats utilised by the medicinal leech in different localities.

Action 7: A suitable monitoring programme needs to be designed and implemented.

Priority: High

Such a monitoring programme would need to be undertaken by suitably trained persons capable of identifying the medicinal leech in the field.

6.7 Communications and publicity

Action 9: Promote the publication and dissemination of information on the medicinal leech particularly to owners and managers of sites where it occurs and the local wildlife trusts and Environment Agency staff.

Priority: High

Information on the ecology of the medicinal leech would best be presented in accessible publications, taking account of the vulnerability of specific sites to unauthorized collection.

Action 10: Promote the development of alternative sources for important biochemical derivative, 'currently extracted from medicinal leeches obtained from the -wild.

Priority:High

Current international trade in medicinal leeches from the wild poses a continuing threat to the remaining European populations.

7. ACTION PLAN REVIEW

A revision of the Action Plan will be needed after the survey of the medicinal leech distribution in England is completed, in order that priority areas containing the most important populations can be identified and, if necessary, given some protection. The vulnerability of these and other medicinal leech habitats to damage will also need to be assessed. Surveys at approximately five year intervals will enable English Nature to monitor any change in the distribution and status of the medicinal leech

Consultees: Dr J.M.Elliott (IFE Windermere), Dr P.S.Maitland (Fish Conservation Centre, Stirling), Alison Rosser (IUCN), John.H.Bratton (JNCC).

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Appendix I

Post-1970 records of occurrence for the medicinal leech, *Hirudo medicinalis* L., in England, were kindly provided by Dr J.M.Elliott. [Note: More recent records for the Kent sites may be available from P.J. Wilkin or the RSPB - owners of Burrowes Pit. An unconfirmed report of occurrence in Devon (Lucy Cordrey, RSPB, Exeter) should be investigated].

National Grid / or site References in parentheses are approximate locations only.

Site	Recorder	Map Ref.	Date of last record
R.Frome, East Stoke	T.Gledhill	30/868868	1970
Ponteland, Northumberland	G.White	45/148732	1970
Eyeworth, New Forest	J.M.Breeds	41/228147	1978
Stalham, Norfolk	P.R. Hale	(63/37-26-)	1981
Romney Marsh, Kent	A.M. Scofield	61/077217	1982
Creech, Dorset	J.A.B. Bass	30/918832	1984
Brockenhurst, New Forest	P.J. Wilkin	(41/30-03-)	1985
Lydd Airport, Kent	P.J. Wilkin	61/068216	1990?
Lydd Airport, Kent	P.J. Wilkin	61/068213	1990?
Lydd Airport, Kent	P.J. Wilkin	61/065210	1990?
Burrowes Pit, Kent	P.J. Wilkin	61/069185	1990?
Hamilton Farm Pit, Kent	P.J. Wilkin	61/058190	1990?

Site	Recorder	Map Ref.	Date of last record
Mockmill Sewer, Kent	P.J. Wilkin	61/073214	1990?
Stonehills Tarn, Cumbria	J.M. Elliott	34/418943	1990?
Jenny Dam, Cumbria	J.M. Elliott	34/462955	1990?
Minnow Tarn, Cumbria	M. Guthrie	(Ulverston)	1992
Leech Tam, Cumbria	M. Guthrie	(Ulverston)	1992

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