

# NORFOLK BIODIVERSITY ACTION PLAN

## PILLWORT (*Pilularia globulifera*)

Pillwort is an easily-overlooked, small, delicate, grass-like fern. It is semi-aquatic, usually growing in the muddy margins of shallow waterbodies and ephemeral pools that experience fluctuating water levels with summer drying. It colonises bare mud exposed by falling water levels and may form extensive mats in shallow water; it flourishes at sites that have a long tradition of grazing. The leaves arise from a creeping root in a characteristic fern-like fiddlehead, and are bright green and thread-like. The plant derives its name from the small blackish 'pills' or nodules at the base of the leaves, which contain the spores.

|                    |                             |                        |
|--------------------|-----------------------------|------------------------|
| Ref 2/S21          | Tranche 2                   | Species Action Plan 21 |
| Plan Author:       | Norfolk Wildlife Trust      |                        |
| Plan Co-ordinator: | Waterbodies BAP Topic Group |                        |
| Plan Leader:       | Norfolk Wildlife Trust      |                        |
| Date: March 2007   | Stage: Final                |                        |
|                    |                             |                        |
|                    |                             |                        |
|                    |                             |                        |

## 1. CURRENT STATUS

### National Status

- The plant is classified as Near Threatened (Cheffings and Farrell, 2005). This means that current trends are likely to cause its status to shift to Vulnerable in the near future. It is also internationally rare and declining within its western European range, to which it is endemic; as such, the UK holds a substantial proportion of the world population. In the UK in the past 100 years it has been recorded in 250 ten km squares, but only in 90 of these since 1970.
- Pillwort receives general protection in England and Wales under the Wildlife and Countryside Act 1981.

### Norfolk Status

- In recent years, pillwort has been present at two sites: on the Norfolk side of the Lound ponds, which straddle the Norfolk/Suffolk county boundary; and at a small pond at Narrowgate Corner, Rollesby.
- Pillwort remains on the Norfolk side of the Lound ponds (found at TG 50434 00557 in autumn 2006, M. Bradbury, pers. obs.), although its status along the Norfolk shoreline requires clarification. It may have been lost from the Rollesby site, following modifications to the pond and changes in site management in *circa* 2003.
- Pillwort was recorded historically at a further 14 sites or localities in Norfolk (four sites during the 20<sup>th</sup> century/ten sites during the 19<sup>th</sup> century).

## 2. CURRENT FACTORS CAUSING LOSS OR DECLINE IN NORFOLK

- Cessation of disturbance to habitat provided by grazing animals allowing competing vegetation to colonise bare ground.

- Colonisation by invasive non-native species which have similar habitat requirements, particularly *Crassula helmsii*; this species is present and increasing at Lound ponds on the Norfolk/Suffolk county boundary.
- Cessation of natural water level fluctuations through water level control.
- Modifications to ponds including over-deepening, creation of steeply sloping banks, permanent flooding and change to fisheries use.
- Site drainage.
- Eutrophication of water bodies causing increases in pH and growth of competitive vegetation.

### **3. CURRENT ACTION IN NORFOLK**

- The Broads Authority and Essex & Suffolk Water are working in a partnership at Lound (on land owned by E&SW), through which a Catchment Officer is employed, to improve water quality and biodiversity. This is being achieved through direct site management and advice to local farmers.
- Routine monitoring of pillwort and *Crassula helmsii* populations is undertaken by the Lound Catchment Officer.
- Options appraisal addressing *Crassula helmsii* is carried out by the Catchment Officer. The extent and distribution of *Crassula helmsii* precludes its complete removal, so focussed removal is being trialled in pillwort 'hotspots'.
- The Norfolk Biodiversity Partnership will work collaboratively with the Suffolk Biodiversity Partnership to achieve pillwort action plan objectives and targets where opportunities arise.

#### **4. ACTION PLAN OBJECTIVES AND TARGETS**

##### **National**

- Maintain current range of the species in the UK in 91 10-km squares.
- Maintain extant viable populations in the seven vulnerable areas.
- Establish two new metapopulations within the species' historic range (excluding the New Forest) by 2010.

##### **Norfolk**

- Restore colonies along Norfolk shoreline at Lound ponds by 2010.
- Re-establish an additional two colonies at suitable former sites and localities with favourable condition by 2012.

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| <b>NATIONAL ACTION</b> |   | <b>NORFOLK ACTION</b>  | <b>ACTION BY:</b> | <b>PARTNERS:</b>                            |
|------------------------|---|--|-------------------|---|
| <b>5.1</b>             | <b>Policy and Legislation</b>   |  |                   |   |
| <b>5.1.1</b>           | Consider proposing that this species is added to Appendix I of Bern Convention and Annex IIb of the EU Habitats & Species Directive.  | No action proposed.  |                   |   |
| <b>5.1.2</b>           | As far as possible, ensure that the needs of pillwort are considered when reviewing structure and scope of relevant agri-environment schemes.   | No action proposed.  |                   |   |
| <b>5.1.3</b>           | Support a review of common land legislation to take into account the requirements of pillwort and other wet heath species.  | No action proposed.  |                   |   |
| <b>5.2</b>             | <b>Site Safeguard and Management</b>  |  |                   |   |
| <b>5.2.1</b>           | Where appropriate, promote entry of pillwort sites and adjacent land into relevant agri-environment schemes to encourage sympathetic land management practices to reduce impacts of enriched run-off. | At recently extant and historical sites suitable for re-establishment, provide advice to owners and facilitate entry into Environmental Stewardship scheme if appropriate. | NWT, NE, BA, E&SW | Landowners/ managers, SWT                   |
| <b>5.2.2</b>           | Encourage beneficial site management where a long-term commitment is possible.  | Have regard to pillwort in the management of Lound ponds.  | E&SW              | Waterbodies BAP Topic Group                 |
| <b>5.2.3</b>           | Encourage the creation of suitable habitats where opportunities arise in the vicinity of extant sites.  | Investigate and assess appropriate historical sites and localities for possible habitat creation projects.   | NWT, BA, E&SW     | Landowners/ managers, Waterbodies BAP Topic |

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|-----------------|--|---|------------|-----------------------------|
|                 | Heritage and cultural organisations could consider restoring mill ponds and curling ponds. Any such schemes should consider the possibility of restoring cattle/pony grazing or (re)introducing pillwort if natural colonisation fails to occur. |   |            | Group                       |
| 5.2.4           | Ensure that Water Level Management Plans (WLMPs) take full account of the requirements of pillwort.  | Ensure that any appropriate Water Level Management Plans (WLMPs) take full account of the requirements of pillwort. | EA         |                             |
| 5.2.5           | Seek to maintain appropriate water level regimes when undertaking or authorising activities at sites where pillwort is extant.   | At Lound ponds, try to maintain fluctuating water levels within the operational constraints of the site.            | E&SW       | Waterbodies BAP Topic Group |
| 5.2.6           | Where this species falls within candidate SACs, ensure that management plans take pillwort into account.   | Where appropriate, ensure SAC management plans take pillwort into account.  | NE         | Landowners/managers         |
| 5.2.7           | Consider notifying as SSSIs a representative number of sites with viable populations across the range of this species where this is necessary to ensure their long-term protection.  | No action proposed.   |            |                             |
| 5.3             | <b>Species Management and Protection</b>   |   |            |                             |
| 5.3.1           | Assess the feasibility and desirability of establishing an <i>ex-situ</i> conservation   | No action proposed.   |            |                             |

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|                 | programme and implement promptly if appropriate.   |   |   |  |
| <b>5.3.2</b>    | Assess the feasibility and desirability of (re) introducing pillwort to suitable new and former sites.                                       | Survey and assess the suitability for re-establishment of pillwort at 14 historical sites and localities by 2009.<br><br>If natural regeneration at former sites does not occur, translocate <i>ex situ</i> pillwort material from the nearest appropriate sites. Extend area of habitat suitable for pillwort once established.  | NWT<br><br>NWT  | Landowners/ managers, Waterbodies BAP Topic Group, SWT<br><br>Landowners/ managers, Waterbodies BAP Topic Group, SWT   |
| <b>5.3.3</b>    | Where sites exist with recent records and suitable habitat and management can be restored, attempt to regenerate plants from the spore bank. | Re-establish pillwort at Rollesby pond site by end-2010.<br><br>Clarify status of pillwort along the Norfolk shoreline at Lound ponds, focussing on former known locations.<br><br>Create trial habitat plots at all suitable historical sites where conditions and management for pillwort are appropriate and monitor for regeneration. Extend area of habitat suitable for pillwort on sites where regeneration is successful. | NWT, E&SW, BA<br><br>NWT, E&SW, BA<br><br>NWT, E&SW, BA | Landowners/ managers, Waterbodies BAP Topic Group, SWT<br><br>Landowners/ managers, Waterbodies BAP Topic Group, SWT<br><br>Landowners/ managers, Waterbodies BAP Topic Group, SWT |
| <b>5.4</b>      | <b>Advisory</b>  |   |   |  |
| <b>5.4.1</b>    | Ensure that landowners and managers are aware of presence of pillwort and are advised on appropriate   | Ensure landowners and managers are aware of presence of Pillwort and are advised on appropriate   | NWT, ESW, BA  | Landowners/ managers   |

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| NATIONAL ACTION |  | NORFOLK ACTION   | ACTION BY:                  | PARTNERS: |
|-----------------|--|--|-----------------------------|-----------|
|                 | management. Particular attention should be given to owners of land with stronghold populations.  | management at Rollesby and Lound ponds sites.  |                             |           |
| <b>5.4.2</b>    | Advise relevant agri-environment project officers of locations of this species, its importance and management needed for its conservation.   | Produce information/ briefing for landowners, managers and all appropriate conservation organisations by end 2007. | Waterbodies BAP Topic Group |           |
| <b>5.5</b>      | <b>Future Research and Monitoring</b>  |  |                             |           |
| <b>5.5.1</b>    | Collate all known information on extant and lost UK sites.   | Collate all known information on recently extant and historical Norfolk sites and localities.                      | NWT, BA                     | SWT       |
| <b>5.5.2</b>    | Re-survey all known sites to assess the changes that have occurred since the early 1980s and to identify potential threats. Priority should be given to isolated sites in the lowlands.  | No action proposed.  |                             |           |
| <b>5.5.3</b>    | Continue with research into techniques for ex-situ conservation.   | No action proposed.  |                             |           |
| <b>5.5.4</b>    | Investigate effects of competitive non-native marginal plants, eg Australian swamp stonecrop, on pillwort populations.   | Continue monitoring of species interactions at Lound ponds.  | E&SW, BA                    | SWT       |
| <b>5.5.5</b>    | Consider other research elements which may be necessary to inform conservation management for pillwort, and which could become part of a wider study into the ecology of species of ephemeral water bodies on lowland heathland. | No action proposed.  |                             |           |

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|-----------------|--|---|--|--|
| 5.5.6           | Undertake investigation into levels of genetic variation within pillwort in Britain and on the continent.  | No action proposed.   |  |  |
| 5.5.7           | Support collation of information on habitat of this species as part of an investigation into the ecology of a number of species of similar habitat to be undertaken in France and Spain in spring 1999.                          | No action proposed.   |  |  |
| 5.5.8           | Develop protocols for monitoring and surveillance of this species and implement where appropriate.   | Keep abreast of national developments in monitoring and surveillance of pillwort.   | NWT, E&SW, BA                              | Waterbodies BAP Topic Group                                    |
| 5.6             | <b>Communications and Publicity</b>  |   |  |  |
| 5.6.1           | Promote importance of habitats with fluctuating water levels and high levels of disturbance. Articles could be written for appropriate county wildlife trust magazines and other relevant farming and conservation publications. | Include this information on interpretation at Lound ponds where appropriate.<br><br>Write articles for local Wildlife Trust/landowner publications. | E&SW, BA, NWT, NE<br><br>E&SW, BA, NWT, NE | Waterbodies BAP Topic Group<br><br>Waterbodies BAP Topic Group |
| 5.7             | <b>Linkages</b>  |   |  |  |
| 5.7.1           | It is likely that implementation of this action plan will benefit <i>Juncus pygmaeus</i> , <i>Lycopodiella inundata</i> , <i>Mentha pulegium</i> and <i>Ranunculus tripartitus</i> .   | Not applicable to Norfolk.  |  |  |
| 5.7.2           | The plan should be considered in conjunction   | This plan should be considered in conjunction   | Heathland BAP Topic                        |  |



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|-----------------|--|--|------------------------------------|-----------|
|                 | with those for lowland heathland and aquifer-fed fluctuating water bodies. | with those for lowland heathland and aquifer-fed fluctuating water bodies. | Group, Waterbodies BAP Topic Group |           |

**Abbreviations**

|      |                         |
|------|-------------------------|
| BA   | Broads Authority        |
| EA   | Environment Agency      |
| E&SW | Essex and Suffolk Water |
| NE   | Natural England         |
| NWT  | Norfolk Wildlife Trust  |
| SWT  | Suffolk Wildlife Trust  |

## NORFOLK DISTRIBUTION

### MANAGEMENT GUIDANCE

*(This guidance is a general summary; for more detailed information or advice, please consult the references or contacts below.)*

Pillwort requires open conditions, so scrub and trees should not be allowed to develop within the vicinity of the colony. It grows on bare mud, often a clay or clay-sand substrate, subject to fluctuating water levels and disturbance. Grazing by cattle or ponies provides the disturbed open ground at the water's edge required by pillwort, preventing the dominance of larger, more vigorous marginal aquatic and terrestrial plants that would otherwise out-compete pillwort, as well as preventing the establishment of woody vegetation.

A protective buffer zone should be established around the waterbody or area that supports pillwort in order to prevent excessive nutrients entering the water.

Monitor sites supporting pillwort for the presence of invasive non-native species and remove these during the autumn or winter period, at the earliest possible stage.

Suitable habitat for pillwort can be re-created at former, historical sites by dredging pools to their original profile and removing overhanging woody vegetation, followed by deployment of an appropriate grazing regime.

### KEY REFERENCES

Plantlife International. (2006). Back from the Brink Species Briefing Sheet: Pillwort (*Pilularia globulifera*). Salisbury: Plantlife International.

Stewart, N.F., Fitzgerald, R., Lansdown, R.V. and Jermy, A.C. (2000). The conservation of pillwort (*Pilularia globulifera*) in England. Interim report no. 2. Plantlife International Back from the Brink report no.151.

Stewart, N.F., Lansdown, R.V., Fitzgerald, R. and Jermy, A.C. (1999). The conservation status of pillwort *Pilularia globulifera* in England. Interim report no. 1. Plantlife International Back from the Brink report no.130.

UK Biodiversity Action Plan: Pillwort National Species Action Plan. [www.ukbap.org.uk](http://www.ukbap.org.uk)

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