NORFOLK BIODIVERSITY ACTION PLAN

FLOATING WATER-PLANTAIN
(*Luronium natans)*

A slender aquatic perennial, with long-stalked elliptical floating leaves. The flowers are about 15mm across, with three white petals each with a yellow spot. Found in canals and other quiet waters.

Ref 1/S28	Tranche 1	Species Action Plan 28
Plan Author:		Biodiversity Co-ordinator
Plan Co-ordinator:		Waterbodies BAP Topic Group
Plan Leader:		Natural England
Date:		Stage:
31 December 1998		1st Publication
1 July 2009		2nd Publication (Revised)

1. CURRENT STATUS

National Status

- The distribution of this plant is localised in the UK, with records from Wales, the West Midlands, northern England and Scotland. According to data published on the Biodiversity Action Reporting System (BARS) as part of the 2008 Defra reporting round, *Luronium natans* was recorded from 55 sites in the UK (18 in England; 36 in Wales; and one in Scotland).

- *L. natans* continues to be discovered in new, previously overlooked sites. With improved understanding of the species' habitat and ecological requirements, many previously overlooked populations have been found, especially in the upland part of its range. A recent national assessment of the available data by Lockton (2008) has suggested that the total number of extant sites is increasing.

- Floating water-plantain is one of the most highly protected plant species in Britain. It is listed on Annexes II and IV of the Habitats Directive and protected under Schedule 4 of the Conservation (Natural Habitats, etc.) Regulations 1994 and Schedule 8 of the Wildlife and Countryside Act 1981.

Norfolk Status

- *L. natans* has been recorded from the Potter Heigham area since the 1950s, and this is currently the only known site of the species in the county. *L. natans* was also recorded from Calthorpe Broad in the 1970s, but there have been no recent records. Although the occurrence of the species at both sites is often believed to be the result of introductions, there is little direct evidence for this.

- Although the Potter Heigham population was stable for many years, baseline surveys commissioned by Broadland Environmental Services Ltd (BESL) in 2007 as part of the Broadland Flood Alleviation Project (BFAP) failed to find the species at its recorded location. Further BFAP surveys in June 2008 found three populations in two dykes.

2. CURRENT FACTORS CAUSING LOSS OR DECLINE IN NORFOLK

The threats to this species in the Broads include:

- Intensive dyke maintenance;

- Lack of channel management; and

- Poor water quality.

3. CURRENT ACTION IN NORFOLK

- The Broads population has been monitored over the years by a number of organisations, including Natural England, the Natural History Museum in Norwich and Broadland Environmental Services Ltd (BESL).

- A translocation experiment was undertaken in the past but proved to be unsuccessful.

- The Potter Heigham site is being managed under an ESA agreement. Natural England has provided detailed management advice to the landowner.

4. ACTION PLAN OBJECTIVES AND TARGETS

National

- Maintain the current range of this species in the UK.

- By 2010, increase connectivity of sites within two vulnerable lowland populations (Pembrokeshire and Severn Valley), through landscape scale enhancements and local improvements to habitat.

Norfolk

- Maintain the population at Potter Heigham.

- Introduce *L natans* to at least two new sites in the Norfolk Broads by 2012 (if preparatory research shows this to be feasible and desirable).

Floating Water-plantain - Norfolk Action Plan

NATIONAL ACTION		NORFOLK ACTION	ACTION BY:	PARTNERS:
5.1	**Policy and Legislation**			
5.1.1	Ensure the locations and requirements of *Luronium natans* are integrated into the relevant River Basin Management Plans (through the proposed Biodiversity Framework).	No action proposed.		
5.1.2	Ensure the requirements of this species are considered and Habitats Regulations are implemented through the planning process, and where possible, encourage further research and investigation on the species in support of this.	Ensure that the needs of *L. natans* are considered when reviewing planning applications that could potentially impact the species.	BA	
5.2	**Site/ Species Safeguard and Management**			
5.2.1	Ensure the needs of the species are taken into account and incorporated into management plans for all sites where the species is known to occur. Positive management such as dredging and control of problematic competitive vegetation should be included where possible.	Ensure that the needs of the species continue to be met under the terms of the existing ESA agreement for the Potter Heigham site, as well as under any future agri-environment agreements that may be drawn up for this and other sites where the species may be present.	NE	
5.2.2	Seek to develop and implement appropriate management practices when the conservation status of the species is at risk. Consideration should be given to the creation of in-line or off-line 'refuges', and management of other impacts for example those resulting from recreational use or fish stocking.	Assess the need for ditch and margin clearance at the Potter Heigham site and implement works if deemed desirable.	NE, WMA	

Floating Water-plantain - Norfolk Action Plan

NATIONAL ACTION		NORFOLK ACTION	ACTION BY:	PARTNERS:
5.2.3	Where sites containing this plant are subject to unavoidable disturbance through use or development, mitigation must be implemented to maintain favourable conservation status of the species, for example through creation and management of reserve areas.	Ensure appropriate mitigation measures are put into place during the implementation of flood defence works being carried out by BFAP.	BESL	
5.2.4	Ensure adjacent forests are subject to the Forestry Commission's "Forests and Water Guidelines", and new forestry plans are subject to assessment under the Habitat Regs.	No action proposed.		
5.2.5	Identify and review list of current sites where species is known to occur, and implement population monitoring, disseminate information to UK Steering Group.	Monitor all known populations on an annual basis.	BESL	BA, NE
5.2.6	Seek to develop and experiment with management techniques to encourage re-colonisation of sites where populations of the species have recently become absent.	Assess the feasibility/desirability of introducing *L natans* to Ludham, Strumpshaw, Calthorpe and the BESL wetland creation site in Potter Heigham. Begin introduction measures by 2011 if deemed appropriate.	NE, RSPB, BESL	
5.3	**Advisory**			
5.3.1	Investigate the opportunity to develop an inter-agency Conservation Handbook for Priority Aquatic Macrophyte species, and ensure the species is considered during revision of "Nature Conservation and the Management of Drainage Channels".	Help to disseminate both publications, once available.	NE	EA, Waterbodies BAP Topic Group

NATIONAL ACTION		NORFOLK ACTION	ACTION BY:	PARTNERS:
5.3.2	Ensure all environmental stewardship officers, local SNCO officers, Local Authority Officers, members of appropriate liaison groups, and partner organisations are advised of locations of this species, its importance and appropriate management for its conservation.	Continue to ensure that NE, BA and BESL staff remain aware of the locations of this species, its importance and appropriate management.	NE, BA, BESL	
5.3.3	Advise landowners and site managers of waters containing this species of its presence, importance and appropriate management for its conservation. Ensure any future guidance is publicly available.	Continue to advise landowners of appropriate management practices for this species.	NE	
5.4	**Future Research and Monitoring**			
5.4.1	In England and Wales, review known sites for floating water plantain, identify sites to be considered for increasing connectivity, taking into account genetic information. Monitor following an appropriate protocol, and undertake specific ecological studies.	Carry out a comprehensive survey of the Potter Heigham site and adjacent areas to ascertain the current status of the species. Carry out a survey at Damgate Marshes SSSI, where there was an unconfirmed report of *L natans* in 2007.	BESL NE	BA, NE, Plantlife BA, Plantlife
5.4.2	Encourage ecological studies into the influence of combined stress factors upon this species to support site management plans, planning applications and translocation programmes.	Maintain regular contact with the UK Lead Partner for this species, in order to stay abreast of the latest research findings.	Biodiversity Co-ordinator	

NATIONAL ACTION		NORFOLK ACTION	ACTION BY:	PARTNERS:
5.4.3	Encourage further research and a review of the ecology and distribution of this species at a European level and use the information and expertise gained towards its conservation in the UK.	Maintain regular contact with the UK Steering Group for this species, in order to stay abreast of the latest research findings; adjust management practices accordingly.	Biodiversity Co-ordinator	
5.4.4	Encourage research on the ecology and distribution of this species on a European level and use the information and expertise gained towards its conservation in the UK.	Maintain regular contact with the UK Lead Partner for this species, in order to stay abreast of the latest research findings; adjust management practices accordingly.	Biodiversity Co-ordinator	
5.4.5	Pass information gathered during survey and monitoring of this species to JNCC, NBN, BRC and LRCs for incorporation into national databases, (including licence return data).	Pass information gathered during survey and monitoring of this species to the Norfolk Biodiversity Information Service and the UK Steering Group for this species, so that it can be incorporated into local and national databases.	NE, BA, BESL	
5.4.6	Provide information annually to the World Conservation Monitoring Centre on the UK status of the species to contribute to maintenance of an up-to-date global Red Data List.	No action proposed.		
5.5	**Communications and Publicity**			
5.5.1	Raise awareness amongst the wider public and ecological community of the presence and importance of floating water plantain. Investigate the possibility of creating and/or linking species information into stakeholders' websites.	Publish at least one article about this species every three years in the Broads Ranger or similar publication.	BA	
5.5.2	Update and review UK BAP and BARS websites.	Update BARS on an annual basis.	Biodiversity Co-ordinator	

NATIONAL ACTION		NORFOLK ACTION	ACTION BY:	PARTNERS:
5.5.3	Investigate opportunities to raise awareness of the species through media and interpretation at various sites.	No action proposed.		
5.6	**Links with Other Plans** *Potamogeton compressus*, eutrophic standing waters, mesotrophic lakes and future relevant habitat plans.	This plan should be considered in conjunction with the Norfolk action plan for *Potamogeton compressus* as well as future action plans for eutrophic standing waters, mesotrophic lakes and rivers.	Waterbodies BAP Topic Group	

Abbreviations

BA	Broads Authority
BESL	Broadland Environmental Services Ltd
EA	Environment Agency
NE	Natural England
RSPB	Royal Society for the Protection of Birds
WMA	Water Management Alliance

MANAGEMENT GUIDANCE

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

This plant is an opportunist, growing best in open water conditions. It has been described as “a prolific opportunist” in the wake of a severe disturbance by dredging or other clearing operations. However, it is unable to compete once the ditch becomes overgrown.

L. natans requires clean water and high levels of light. Management should therefore aim to retain ditches in a fairly open condition, without removing the plant altogether during works. Dykes should be cleared three-quarters of the way across, every two to three years. Work should be carried out from different sides each time. An NE (Defra development) licence is required.

CONTACT

Rick Southwood
Natural England
Dragonfly House
2 Gilders Way
Norwich
NR3 1UB

REFERENCES

Barrat-Segretain, M.H., Bornette, G., & Hering-Vilas-Boas, A. (1998). Comparative abilities of vegetative regeneration among aquatic plants growing in disturbed habitats. *Aquatic Botany* 60: 201-211.

Bazydlo, E. (2004). Effect of environmental conditions on the populations of *Luronium natans* (L.) Raf. *Polish Journal of Ecology* 52 (2): 181-189.

Bazydlo, E. and Szmeja, J. (2004). Effect of pH, dissolved organic carbon and total phosphorus concentrations on selected life history traits of *Luronium natans* (L.) Raf. *Polish Journal of Ecology* 52 (2) :191-200.

Beckett, G., Bull, A. and Stevenson, R. (1999). *A Flora of Norfolk*. Norwich: Jarrold Book Printing.

Charlton, W.A. (1999). Studies in the Alismataceae. X. Floral organogenesis in *Luronium natans* (L.) Raf. *Can.J.Bot.* 77:1560-1568.

Greulich, S., and Bornette, G. (1999). Competitive abilities and related strategies in four aquatic plant species from an intermediately disturbed habitat. *Freshwater Biology* 41: 493-506.

Greulich, S., Bornette, G. and Amoros, C. (2000). Persistence of a rare aquatic species along gradients of disturbance and sediment richness. *Journal of Vegetation Science* 11: 415-424.

Greulich, S., Bornette, G., Amoros, C. and Roelofs, J.G.M. (2000). Investigation on the fundamental niche of a rare species: an experiment on establishment of *Luronium natans. Aquatic Botany* 66: 209-224.

Kay, Q.O.N., John, R.F. and Jones, R.A. (1999). Biology, genetic variation and conservation of *Luronium natans* (L.) Raf. in Britain and Ireland. *Watsonia* 22: 301-315.

Lansdown, R.V. and Wade, P.M. (2003). *Ecology of the Floating Water-plantain, Luronium natans*. Conserving Natura 2000 Rivers Ecology Series No.9. Peterborough: English Nature.

Lockton, A. (2008). *Luronium natans* update. Unpublished report to the National *L. natans* Steering Group.

Maessen, M., Roelofs,J.G.M., Bellemakers, M.J.S. and Verheggen, G.M. (1992). The effects of aluminium, aluminium/calcium ratios and pH on aquatic plants from poorly buffered environments. *Aquatic Botany* 43:115-127.

Nielsen, U.N., Riis, T., and Brix, H. (2006). The importance of vegetative and sexual dispersal of *Luronium natans. Aquatic Botany* 84: 165-170.

Nielsen, U.N., Riis, T. and Brix, H. (2006).The effect of weed cutting on *Luronium natans*, *Aquatic Conservation: Marine and Freshwater Ecosystems* 16: 409-417.

Rich, T.C.G., Kay, G.M., & Kirschner, J. (1995). "Floating-water plantain *Luronium natans* (L.) Raf. (Alismataceae) present in Ireland", *Ir.Nat.J.* 25, 4: 140-145.

Smits, A.J.M., Kleukers, R.M.J.C., Kok, C.J. and van der Velde, G. (1990). Alcohol dehydrogenase isozymes in the roots of some nymphaeid and isoetid macrophytes. Adaptations to hypoxic sediment conditions? *Aquatic Botany* 38:19-27.

Smits, A.J.M., Laan, P., Thier, R.H. and van der Velde, G. (1990). Root aerenchyma,oxygen leakage patterns and alcoholic fermentation ability of the roots of some nymphaeid and isoetid macrophytes in relation to the sediment type of their habitat. *Aquatic Botany* 38: 3-17.

Willby, N., Eaton, J., and Clarke, S. (2003). *Monitoring the Floating Water-plantain.* Conserving Natura 2000 Rivers Monitoring Series No.11*.* Peterborough: English Nature.

Willby, N. and Eaton, J.W. (1993). The Distribution, Ecology, and Conservation of *Luronium natans* (L.) Raf. in Britain. *J. Aquat. Plant Manage* 31: 70-76.

Websites

Botanical Society of the British Isles: www.bsbi.org