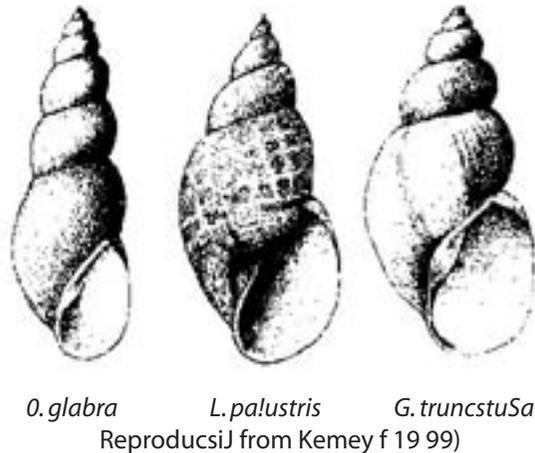


WEST LOTHIAN LOCAL BIODIVERSITY ACTION PLAN
SPECIES ACTION PLAN: MUD SNAIL
2005/06 - 20010/11

An action plan for the Mud Snail - *Omphiscola glabra* (Müller, 1774)

Identification

Adults of *Omphiscola glabra* (Müller, 1774) (formerly *Lymnaea glabra*) are typically 12-20mm in length and can be identified using Macan (1977) or Glöer (2002). Adult snails have distinctive shells, although inexperienced workers may confuse juvenile specimens of *Lymnaea palustris* and *Galba truncatula* with this species.



Status

- UK Red Data Book 2: (Vulnerable - likely to become endangered if current threats continue).
- UK Biodiversity Action Plan (BAP): Species of conservation concern - This species has become extinct over much of lowland England and is continuing to decline. Over the last 25 years the UK population is thought to have declined by 25-49%.
- Local Biodiversity Action Plans: *Omphiscola glabra* has been highlighted in the biodiversity action plans for Falkirk, East Dunbartonshire, Scottish Borders, Clackmannanshire and West Lothian.

Distribution

Scotland

There are Scottish records from 14 ten-kilometre squares, however the majority of these records date from the late 19th/early 20th century. Modern records (>1970) have been reported from East Dunbartonshire (2002 and 2005), North Lanarkshire (1995) and the Scottish Borders (1573 and 1988). Additional sites have recently been reported from Falkirk (1993), West Lothian (2000) and Clackmannanshire (2004). Full details of these records are contained in appendix 1. It should be noted that some of these records appear to be duplicates and others may be erroneous. A thorough review of Scottish records for this species is therefore required.

United Kingdom

Historically, this species was widespread throughout acidic lowland areas of England and Wales. Although possibly under-recorded, it is thought that this species has undergone a marked decline and is now nationally scarce. It remains fairly common on a localised basis in southern Yorkshire and parts of south-western England, with colonies recorded on eight scattered Sites of Special Scientific Interest (SSSI).

Europe

Omphiscola glabra is found south of 61°N in Scandinavia and throughout central parts of Western Europe, including France, Germany, Spain, the Netherlands and Belgium. It is however declining throughout its range, and is now localised wherever it occurs. In Ireland, it has always been rare - the only population found in the last 50 years (Shelmaliere Commons, Co. Wexford) was destroyed by farm drainage in 1980 (Hurley 1981).

Ecology

O. glabra is typically found in soft, nutrient poor waters with few other aquatic animals or plants. These include freshwater marshes, small ditches, temporary pools or seepages that dry up or significantly diminish in summer. These water-bodies are challenging habitats, which in the past were regarded as inferior wildlife habitats and were typically converted into productive agricultural land or improved visually for landscape reasons. Occasionally this species is found in larger water bodies such as swampy drainage dykes and permanent ponds, while in central France this species can also be found in small streams and rivers (Vareille-Morel, Vignoles, Dreyfuss and Rondelaud 2000). It is expected that the number of individuals present at each site will fluctuate from year to year, possibly quite dramatically. This means that any estimate of the population size is likely to be unrealistic.

When pools recede or dry out in summer the snails may be difficult to locate as they burrow into the exposed soft mud and become dormant or aestivate at a depth of 1-6cm (Vareille-Morel, Dreyfuss and Rondelaud 2000), (Rondelaud, Vignoles and Dreyfuss 2003). In marl based mud in France, 51-88% of snails (all ages) survived dormancy, but only 11-24% (all juveniles) survived aestivation in granite based gravelly soils.

Most populations are found on uncultivated land with acidic, sandy or gravelly soils, such as heaths and commons, or other unimproved grasslands. In southern Yorkshire, the habitat tends to be either swampy surface ditches or temporary pools (see Boycott 1936 for detailed habitat requirements).

O. glabra is usually the only species of snail present, but sometimes it is found where a few other species that can cope with occasional drying out of the habitat also occur, typically the Moss Bladder Snail (*Aplexa hypnorum*) and occasionally the Button Ramshorn Snail (*Anisus leucostoma*). Other molluscs that have been found in habitat suitable for *O. glabra* include the Red-cruled Pea Mussel (*Pisidium personatum*), *Pisidium casertanum* and the Dwarf Pond Snail (*Galba truncatula*). *Omphiscola glabra* is never found where there is a high diversity of snails.

In common with other Lymnaeidae, *O. glabra* is one of the intermediate hosts of a range of endoparasites. The most economically important of these is *Fasciola hepatica* (or liver fluke) - a digenean trematode (parasitic fluke), which can be found in a number of Lymnaeid snails, and causes Fasciolosis in domestic livestock such as cattle and sheep. Due to the heavy parasite burden of these snails it is essential that any snails selected for translocation be subjected to a period of quarantine to allow the release of any parasites present. In practice, this is best achieved through a programme of captive propagation prior to translocation. The local Scottish Natural Heritage office should be involved in the planning stage of any translocation project, and it is imperative that the policies and procedures detailed in McLean (2003) are adopted and followed.

Historic and known threats

Incomplete knowledge of the distribution of the species: the preference of this species for under-recorded habitats such as ditches, wetlands, marshes and temporary pools may account in part for its apparent rarity.

Failure of conservation organisations to inform landowners of the presence of the snail and develop management agreements

Improvements in field drainage destroying boggy areas: Current advice from DEFRA and NADIS (National Animal Disease Information Service) on the control of liver fluke in livestock induces draining wet areas of fields to limit the habitat available for the snail intermediate host. It is suggested that such drainage schemes are responsible for the decline of Fasciolosis cases since the 1970s.

Loss of small ponds and wetlands through development or neglect is likely to have had a significant impact on this species.

Habitat fragmentation will limit or prevent the colonisation or recolonisation of this species.

Ploughing and other agricultural activities leading to enrichment and run-off into areas containing *O. glabra*, may cause eutrophication or siltation of these habitats, which in turn may jeopardise the survival of the snail population.

Chemical run-off: the use of crop pesticides and livestock treatments in the catchment of their habitat could have an adverse effect on this species.

Lack of grazing resulting in the succession of vegetation on the site and the loss of wet areas.

Poaching by livestock in ponds and marshes, leading to habitat fragmentation and the isolation of individuals from the main population.

Inappropriate management such as deepening of seasonal pools to create permanent ponds to benefit other conservation species such as frogs, toads, newts and dragonflies. Any management that is required at *O. glabra* sites should be undertaken on a rotational basis, with dredging limited to less than 50% in any period of two years to maintain the population at the site.

Current conservation action

A captive-breeding programme has been running since 2002 at Mugdock Country Park, East Dunbartonshire (see appendix 2). There are plans to roll out this programme to schools in the East Dunbartonshire area during 2005. Every effort should be made to use stock bred from local sites in future breeding programmes to maintain the local gene pool and to guard against the transfer of parasites.

Wetlands have been created at the Milngavie Water Treatment complex to accept the first of the 'safeguard' populations from the East Dunbartonshire captive-breeding programme.

Opportunities to raise awareness

The development of captive-breeding programmes will help raise the profile of this species. In particular, the involvement of schools in this process represents an excellent opportunity to raise awareness of this species.

There is scope to use *O. glabra* as a 'flagship' species for temporary aquatic habitats in Scotland.

Where appropriate, introductions to new sites and the creation of new habitats should involve local interest groups and should be publicised in local/national media.

OBJECTIVE AND TARGETS

National Objective

Maintain and where possible, extend the current population size and the distribution of *O. glabra* in Scotland.

Target 1.1

Determine the current distribution of *O. glabra* in Scotland through surveys by 2010.

Target 1.2

Ensure that existing populations and habitats are protected from adverse developments/changes in practice by 2007 to ensure the species is not lost from these sites. Ensure that newly discovered sites are protected appropriately by 2011.

Target 1.3

Ensure appropriate management for the species and the habitats used by them. Negotiate with and provide advice to landowners/land managers of relevant sites by 2008.

Target 1.4

Establish two new safeguard populations in each area by 2010.

Actions

NB. The following abbreviations are used in this section:

CRS	Countryside Ranger Service
LA	Local Authorities
LBAP	LBAP Partnerships
MSSG	Mud Snail Study Group

1. Policy and legislation

- a. Ensure that this species is afforded adequate consideration and, where possible, it and its associated habitats are protected from damaging development 'through the Environmental Assessment process by:
 - i) developing appropriate policies within local and structure plans and other strategies as they are written or reviewed.
 - ii) producing supplementary local planning guidance (2006 - 2007).
[LA]

2. Site safeguard and management

- a. Review all historical records of this species (2006) [MSSG]
- b. Undertake risk assessments for each of the known populations of *O. glabra* (2006). [MSSG]
- c. Establish at least two new 'safeguard' populations in each area at suitable sites with positive conservation management through a programme of captive breeding/translocation (2006-10). [CRS/MSSG]

3. Species management and protection

- a. Negotiate with landowners/managers to secure the future of the species and its habitats on their land (2006-08). Long-term management agreements may be appropriate. [LBAP]
- b. Establish captive-breeding programmes in each area following proven methods developed by Wisniewski (1999) and Baker (appendix 2). (2007 - 2008). [CRS/MSSG]
- c. Develop a site register for this species containing details of populations and sites, including translocated populations and captive breeding programmes (2006 - 2011). [MSSG]
- d. Establish a 'Mud Snail Study Group' to champion the conservation of this species in Scotland and maintain the site register (2005).

4. Advisory

- a. Ensure all relevant landowners/land managers are aware of the existence of the species on their land (2006-2011). [LBAP]

- b. Produce basic free advisory material for landowners/land managers on the habitat requirements and need for conservation of this species (2007). [LBAP]/[MSSG]

5. Future research and monitoring

- a. Determine if the species is still present at known sites: undertake surveys for the species during spring at known sites and suitable habitat in surrounding 1km area (2006). [LBAP]/[MSSG]
- b. Expand survey area to include suitable habitat, radiating out from the known localities. Should further sites be identified, the survey should be adapted to also radiate out from them (2006-08). [LBAP]/[MSSG]
- c. Develop a standardised monitoring protocol to allow workers to assess whether populations of this species are in 'favourable conservation status'. [MSSG]
- d. Monitor all populations (including translocated populations) on a biennial basis. Known sites should be visited in the spring to check that the species is still present and managed as required. (Biennially). [LBAP]/[MSSG]
- e. Visit sites where this species is now extinct and try to identify the factors leading to the extinction. Determine whether the factors still exist or whether it would be possible to reintroduce this species to the site (2006-2008). [MSSG]
- f. Survey areas throughout southern Scotland in an attempt to find previously unknown populations of this species (2006-2008). [MSSG]

6. Communications and publicity

- a. All affected landowners/land managers should be made aware of the species and its habitat requirements (2006). [LBAP]
- b. Publicise *O. glabra* as a 'flagship' species for temporary aquatic habitats in Scotland (2006 -). [LBAP]
- c. Involve local interest groups in the creation of new habitats and the introduction of this species to new sites. [LBAP]
- d. Publicise the creation of new habitats in the local/national media. [LBAP]

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Appendix 1

Scottish records of *Omphiscola glabra*.

NB. Some of these records appear to be duplicates and other may be erroneous. A thorough review of Scottish records for this species is required.

Date	Locality	Grid Ref	Recorder	Comments
1881		NO12		
1950		NS65		
1950		NS66		
1995	Barrhill Farm, Torrance (confirmed as Kinkell Farm) (East Dunbartonshire)	NS629760	D. Bentley	Presence confirmed by C. Macadam, P. Baker and N. Scobie in September 2002.
1965		NS67		
1995	Kilsyth, nr Banton Loch (North Lanarkshire)	NS740788	D. Bentley	
Aug 1993	River Carron at Carron Bridge (Falkirk)	NS741835	SEPA	Requires confirmation
Oct 1917	Falkirk, roadside pool, Drum Road (Falkirk)	NS87	G.Nelson, ver. J.W.Taylor	
1950		NS87		
2000	Lohcote Marshes (West Lothian)	NS97	A.T.Summer	
June 1936	Pool at Sheardale, S. of Dollar (Clackmannanshire) NS99	NS99	ARW &DKK ver. ASK	Presence confirmed by C. Macadam in July 2004
1950		NS99		
1955	Bavelaw Moss, Midlothian (City of Edinburgh)	NT16	Non-marine Mollusc recording scheme	Requires confirmation
1950		NT16		
		NT26		
1950		NT26		
1836	Braid Marshes (City of Edinburgh)	NT27	R.	
03/06/73	Gordon Moss SSSI (Scottish Borders)	NT635425	M. Sinclair	Found in several pools on the moss
1965		NT64		
Aug 1988	Gordon Moss (Scottish Borders)	NT634625	B.,D.	Grid reference incorrect
June 2003	Gordon Moss (Scottish Borders)	NT635425	A. Somerville	Peaty polls north of disused railway. Requires confirmation

Appendix 2

Captive Breeding: the Martin Mere experience

A successful breeding programme has been running at the Endangered Species Breeding Unit at Martin Mere since 1997. Initially six snails were housed in a plastic aquarium (size: 22 x 33 x 20cm deep) with a substrate of local garden soil (a slightly acidic mixture of sand and peat). The tank was filled with soft tap-water to a depth of 3 centimetres and a small piece of cuttle-bone was added to the water as a source of calcium, although there was little evidence that the snails grazed upon this. The tank was stored in a cool and shady environment and lettuce leaves and TetraMin tropical fish flakes were introduced to the tank immediately and replenished when eaten.

The first egg mass was found four weeks after the introduction of the snails, with many egg masses being present two weeks later, mostly at the air/water interface. The young snails fed upon the lettuce and grew to adult size within three months, whereupon a second colony was established. A boom and bust pattern then occurred, with each culture producing a maximum of two batches of eggs before dying out. In order to ensure continuity of the captive stock three separate colonies were maintained at any one time with young being removed and re-housed on a rolling programme.

The exact reason for the loss of viability of each colony after approximately 4-5 months is unknown but may be related to depletion of some nutrient in the substrate, the accumulation of toxins or the presence of a predator. Snails were observed to climb

out of the water especially when food was not replenished. However, it was found unnecessary to allow colonies to dry out in order to encourage breeding, (see Wisniewski, 1999 for further details).

Captive breeding - the East Dunbartonshire experience.

30 immature snails were introduced to a standard 1-metre long glass aquarium in 2002. A substrate of mud from the original collection site was added and the tank was filled to a depth of 8 cm with filtered pond-water, also taken from the original site. Plants were introduced from a pond at Mugdock Country Park. The tank was housed indoors (no heating) at Mugdock Country Park, and artificial light provided between 9am and 5pm daily. Within three months the snails had bred with approximately 30-50 snails less than 2mm long seen. The colony continued to prosper with no food until additional water was added from a pond at the Country Park, after which time the colony slowly declined, to just a few individuals, with no apparent breeding by January 2005. The decline was slow, and the colony did not experience the rapid boom and bust of that described by Wisniewski, (1999).

A second colony was established in a tank 30cm long x 20cm wide and 16cm deep with a founder stock of 28 mixed immature and adult snails from the wild in September 2003. This tank had a small amount of mud, water weed and duckweed added and was filled with mineral water. It was kept indoors until December 2003, when the tank was transferred to a north-facing ledge in the kitchen of volunteers for the winter. The tank was topped up with rainwater as necessary, then placed outside in the spring. It was taken inside

again in September 2004, and then returned to East Dunbartonshire Council in February 2005, at which time a cursory examination showed 80+ individuals present. This colony did not receive any additional feeding and only received rainwater to top up the water level. Over a period of 17 months there was no sign of a boom/bust pattern in the population. It is suggested that if an additional food source had been added there might have been a much faster proliferation of snails, however it is unclear whether the culture would have then experienced the boom/bust pattern.

A third culture of 22 snails from the wild was established in one of 40 tanks funded by the East Dunbartonshire Environmental Grant Scheme in October 2004. The tank was filled with mineral water, and a few pieces of Water Forget-me-not (*Myosotis scorpioides*), grown from cuttings, were added. This tank was placed outside in a sheltered position and naturally topped up with rainwater. By February 2005, this culture had declined to 10 fully mature individuals over 1cm in length, with no immature specimens present. On transferring this culture inside, these snails immediately began laying egg masses on the Water Forget-me-not.

Appendix 3

Mud Snail Study Group - Terms of Reference.

The Mud Snail Study Group will be established to support the conservation work of Local Biodiversity Partnerships and other conservation organisations by:

1. Undertaking and promoting study and research on mud snails
2. Promoting the sound management of land and water to maintain and enhance the distribution of mud snails in Scotland
3. Promoting education and publicising mud snails and their conservation.

The aim of the Mud Snail Study Group is to maintain sustainable populations of mud snails in Scotland. This will be achieved by:

1. Reviewing all records of the mud snail from Scotland
2. Preparing risk assessments for all extant populations
3. Investigating the cause of extinction at historical sites.
4. Establishing and maintaining a site register of all mud snail populations, including extinct, translocated and captive breeding populations.
5. Providing advice and guidance on the conservation of the mud snail in Scotland.

Membership of the Mud Snail Study Group will be informal and open to all interested parties, particularly mollusc enthusiasts and LBAP officers.