

Aquatic Invertebrates Action Plan

Current Status

Deleaster dichrous: This species was recorded from a shingle bank in the Avon Gorge SSSI in 1995. Further details of local and national population status, distribution and trends are currently unknown.

Enicocerus exsculptus: This species has been recorded in the River Carron at Denny in 1994. In the UK this species occurs mainly in central and southern Scotland and northern England. It is listed as nationally scarce on the British Red Data Book list. The UK *Enicocerus exsculptus* population has declined over recent years, becoming scarce throughout most of Wales and England. Its local population size, distribution and trends are unknown.

Neolimnophila carteri: This species has been recorded from Carron Glen SSSI in the Falkirk area. This species occurs mainly in the northern half of the UK, with records widely dispersed in Scotland and northern England. A decline in numbers seems apparent with only six known post 1960 sites in contrast to a relatively large number of older sites. However, this could in part be due to the intense level of recording in northern England in the earlier part of the 20th century.

Parhelophilus consimilis: This species has been recorded at two sites within the Falkirk area: Carron Dams SSSI and Skinflats SSSI. There are few records within the UK and these tend to be widely dispersed in southern England, South Wales and the Galloway Coast. While most records are from coastal areas some inland records do exist. There are post 1960 records of this species from 9 sites (excluding the two in the Falkirk area). However it is possible that other sites exist and the close resemblance to commoner species has resulted in under recording of this hoverfly.

Details of the extent, distribution and population trends of aquatic invertebrates more generally are not known for the Falkirk area.

SPECIES PROFILES



Mayfly

SEPA

Common name: A Beetle
Scientific name: *Deleaster dichrous*

Common name: A Beetle
Scientific name: *Enicocerus exsculptus*

Common name: A Fly
Scientific name: *Neolimnophila carteri*

Common name: A Hoverfly
Scientific name: *Parhelophilus consimilis*

Note: *Lymnaea glabra* and *Ameletus inopinatus* have been dealt with in separate action plans

Status: Locally Priority
Protection: No statutory protection

Associated Habitat and Species Action Plans

Habitats:
Canals
Fen, Marsh & Swamp
Rivers and Streams
Standing Open Water

Species:

A beetle *Brachygluta helferi*
A freshwater snail *Lymnaea glabra*
A ground beetle *Aepus marinus*
A hoverfly *Sphaerophoria loewi*
A mayfly *Ameletus inopinatus*
A soldier-fly *Beris Clavipes*
Atlantic salmon *Salmo salar*
Brook lamprey *Lampeira planeri*
River lamprey *Lampetra fluviatilis*
Sea trout *Salmo trutta*



Damselfly Larvae

SEPA

Ecology

Aquatic invertebrates are at the heart of freshwater ecosystems. From the tiny water flea to large stonefly larvae, these organisms are the very lifeblood of lochs and rivers. They are a vital link in the aquatic food chain. By converting algae and other plants found on the streambed into animal matter they provide food for fish and birds such as the dipper. Without the invertebrates, the fish pursued by anglers would starve, and other animals such as the otter, kingfisher and dipper would have their food supply restricted.

Each of the notable species mentioned above have differing requirements, however the majority of these requirements can be met by avoiding or mitigating the impact of the factors in section 4.

Deleaster dichrous: Recorded from a shingle bank of the River Avon. Other details of this species requirements and habit are currently unknown.

Enicocerus exsculptus: Requires algal films around culverts, boulders, and gravel in clean rivers and streams.

Neolimnophila carteri: Found in areas of damp woodland streams and is likely to require the maintenance of such streams in a reasonably natural state, retaining any

marshy areas and avoiding undue disturbance to banks.

Parhelophilus consimilis: This species favours pools that are transitional between bog and fen, and is often associated with *Typha* species.

Current Factors Affecting the Species

There are many potential threats to aquatic invertebrates. Some of the most commonly encountered are listed below:

- Loss of physical habitat

Loss of habitat is undoubtedly the most immediate threat to aquatic invertebrates. While loss of ponds appears to have been less marked in the Falkirk area recently than elsewhere, there will undoubtedly have been numerous instances of loss of or changes to wetland areas, watercourses and pools, which will have affected invertebrates. Drainage schemes which involve straightening and widening watercourses result in shallower water which becomes warmer more quickly which can prove dangerous to some invertebrates.

- Water resource management

Water resource management, especially abstraction, can have several potentially damaging effects for aquatic invertebrates. Invertebrate eggs and young can be stranded as water levels drop. Receding water levels expose soils, which may dry out and erode, and emergent and submerged vegetation, which will quickly wither. Loss of marginal vegetation is likely to lessen the chances of successful breeding. Some aquatic invertebrates cling to the surface of submerged vegetation, which can be damaged or lost due to unsympathetic maintenance work.

- Waterway maintenance and engineering

Dredging, bank protection and weed control can lead to bed disturbance, temporarily increasing the level of silt in the water. Silt can clog the gills of invertebrates or bury them.

- Bankside grazing

Livestock grazing can damage land adjacent to water bodies, leading to erosion and the silting up of gravel on the streambed, which is a preferred habitat of species such as stoneflies and mayflies.

- Acidification

Acidification caused by coniferous forestry operations, acidic rain or discharges from mines and augmented by nitrogen compounds from agricultural sources, can seriously affect aquatic invertebrates. In fresh waters, acidification results in the loss of plant and animal species sensitive to or intolerant of the change in pH.

- Nutrient enrichment

Sewage discharges, agricultural fertilisers, fish farms or even livestock defecating in the water cause nutrient enrichment, which can result in extensive mats of filamentous algae occurring. This can alter the composition of the invertebrate population.

- Chemical pollution

Chemical pollutants such as household and agricultural pesticides or even bleach can cause serious damage to invertebrate populations. As little as a cupful of some garden pesticides can devastate the freshwater invertebrate population of a waterbody.

- Climate change

Climate change leads to variations in the life cycles of freshwater invertebrates. Milder winters will result in an increase in the populations of some invertebrates. Other invertebrates, such as the stoneflies, mayflies and caddisflies will hatch and emerge as adults earlier. As a result, the availability of these invertebrates as food for fish and birds will be affected. Species that rely on colder water will be forced to retreat upstream, leading to a decline in their range.

Current Action and Opportunities

SEPA carry out routine sampling of aquatic invertebrates at various sites on the Rivers Carron and Avon and their tributaries. Regular surveying of invertebrates is also undertaken along the canals in the Falkirk area. Relatively little other surveying or monitoring is currently undertaken.

The action plans for rivers & streams, standing open water and fen, marsh & swamp will include habitat protection and enhancement measures, which should help to conserve associated aquatic invertebrates.

Objectives and Targets

Objective 1

Maintain the existing populations of notable species of aquatic invertebrates that have been recorded from Falkirk.

Target 1.1

- Conduct surveys of aquatic habitats, in particular identifying any notable aquatic invertebrate species present.

Target 2.1

- Determine the distribution and current status of recorded notable species by end 2005.

Target 1.3

- Monitor key populations of notable aquatic invertebrate species. (Annually from 2006).

Target 1.4

- Increase the local knowledge of experts, key site owners and managers, and key wetland user groups in the ecology and requirements of these notable species. (Ongoing).

Target 1.5

- Encourage the management of waters and wetlands in a fashion sympathetic to the needs of aquatic invertebrates, particularly those identified as key sites for notable/priority species.

Target 1.6

- Wherever possible incorporate invertebrates into general educational programmes for biodiversity and aquatic habitat promotions.

Action	Potential Deliverers		Year to be completed or in place						Meets objective
	Lead	Partners	2003	2004	2005	2006	2007	2012	
A. Policy and Legislation									
1. Support the implementation of the relevant water and wetlands action plans, which will help to protect and enhance aquatic invertebrate habitats.	WWAG		✓	✓	✓	✓	✓	✓	1
2. Ensure that as far as possible aquatic invertebrates are fully considered in any management plans produced for water and wetland habitats.	WWAG	BW, SWT, SW, SNH	✓	✓	✓	✓	✓	✓	1
3. Ensure that where appropriate, aquatic invertebrates are fully considered in any environmental assessments undertaken.	Falk C (DS)	WWAG	✓	✓	✓	✓	✓	✓	1
4. Ensure that this species is afforded adequate consideration and, where possible, it and its associated habitats are protected from damaging development through the planning process by: a) Developing appropriate policies within local and structure plans and other strategies as they are written or reviewed. (Ongoing).	Falk C (DS)	WWAG	✓	✓	✓	✓	✓	✓	1
5. Ensure that this species is afforded adequate consideration and, where possible, it and its associated habitats are protected from damaging development through the planning process by: b) Production of supplementary planning guidance. (By 2003).	Falk C (DS)	WWAG	✓						1
B. Site Safeguard and Management									
1. Through contact with landowners/farmers, encourage the positive management of water levels and habitat condition to prevent the loss or degradation of aquatic habitats.	FWAG SAC	WWAG	✓	✓	✓	✓	✓	✓	1
2. Through contact with landowners/farmers, encourage the establishment, retention and appropriate management of riparian and wetland buffer strips suitable for adult aquatic invertebrates.	FWAG SAC	WWAG SWT	✓	✓	✓	✓	✓	✓	1
3. As far as possible ensure that all site management activities on or near waterbodies or wetlands take full account of the requirements of aquatic invertebrate species.	WWAG	SW, SEPA, Falk C, FWAG, SAC	✓	✓	✓	✓	✓	✓	1
4. Using earlier survey data and other local information identify key sites for aquatic invertebrates and contact the landowners to promote appropriate management/protection of the site. Ongoing from 2005.	WWAG	SEPA			✓				1
C. Species Management and Protection									

Action	Potential Deliverers		Year to be completed or in place						Meets objective	
	Lead	Partners	2003	2004	2005	2006	2007	2012		
D. Advisory										
1. Provide information about aquatic invertebrate requirements and appropriate site management to owners and managers of sites with populations of notable aquatic invertebrate species and agencies involved in their management. (By 2005 and then as required).	WWAG				✓					1
2. Organise aquatic invertebrate identification workshop sessions for anglers and other key user groups/site managers. (at least 1 by 2004).	WWAG	AES		✓						1
3. Following identification workshops encourage the submission of invertebrate records by key water/wetland user groups and site owners.	WWAG	AES		✓	✓					1
E. Research and Monitoring										
1. Continue to survey watercourses in the Falkirk area, making aquatic invertebrate data available to those implementing this action plan.	SEPA		✓	✓	✓	✓	✓	✓	✓	1
2. Survey all potential sites for notable aquatic invertebrates recorded in the Falkirk area, by the end of 2004.	AES	WWAG		✓						1
3. Establish a monitoring programme for each of the notable aquatic invertebrate species recorded from the Falkirk area. (Using volunteers wherever possible).	AES	WWAG		✓						1
4. Collate and review aquatic invertebrate records annually (from SEPA, BW, AES, etc...), from 2004.	CARSE	WWAG		✓	✓	✓	✓	✓	✓	2
F. Communication and Publicity										
1. Where appropriate incorporate aquatic invertebrates into awareness raising and education activities relating to the aquatic environment.	EARAG	WWAG	✓	✓	✓	✓	✓	✓	✓	1
2. Promote good management of garden ponds for aquatic invertebrates via the '10 steps for garden biodiversity' and the garden action plan.	UAG	EARAG	✓	✓	✓	✓	✓	✓	✓	1
3. Generate articles about aquatic invertebrates and their conservation locally in publications targeted at key audiences including anglers, wetland/watercourse managers etc (at least one article annually).	WWAG	EARAG	✓	✓	✓	✓	✓	✓	✓	1
G. Plan Monitoring and Review										
1. Monitor the implementation of actions in this plan annually.	WWAG	All partners	✓	✓	✓	✓	✓	✓	✓	1
2. Monitor the completion and effectiveness of the actions in detail and review this plan every 5 years to ensure continued effectiveness, starting in 2007.	WWAG	All partners					✓	✓		1

Abbreviations

AES	- Amateur Entomologists' Society	SAC	- Scottish Agricultural College
BW	- British Waterways	SEPA	- Scottish Environment Protection Agency
CARSE	- CARSE Wildlife Records Centre	SNH	- Scottish Natural Heritage
EARAG	- Education and Awareness Raising Action Group	SW	- Scottish Water
Falk C	- Falkirk Council	SWT	- Scottish Wildlife Trust
Falk C (DS)	- Falkirk Council Development Services	UAG	- Urban Action Group
FWAG	- Farming and Wildlife Advisory Group	WWAG	- Inland Water and Wetlands Action Group

Key contacts

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Bibliography

Macadam, C., 1998, Aquatic Invertebrates - their future in our hands. Bull. Am. Ent. Soc. August. pp.171-178.