Scottish Environment LINK response to:

Pressures and Impacts
on
Scotland's Water Environment

A consultation by the Scottish Environment Protection Agency

The National Trust
for Scotland

September 2004

The following LINK members support this response:

RSPB Scotland
WWF Scotland
Plantlife Scotland
The National Trust for Scotland

TABLE OF CONTENTS

1. Executive summary

Scottish Environment LINK has a wide range of knowledge and experience of freshwater policy issues. LINK has actively participated in the transposition of the Water Framework Directive in Scotland, and significantly contributed to the success of the Directive' implementation.

The Freshwater Taskforce of Scottish Environment LINK warmly welcomes SEPA's initiative to consult the public on the results of the Pressures and Impacts analysis. As mentioned in our previous responses, we are disappointed by the lack of non-governmental organisation (NGO) involvement in the UK Technical Advisory Group (TAG) on the WFD process. We would welcome SEPA and the Scottish Executive taking a similar approach to partnership working as was taken by the European Commission in the Common Implementation Strategy process.
Our main concerns over the characterisation process are summarised below.

- **Understanding the risk assessment and the decision making processes**

We are disappointed with SEPA's limited attempts to describe the **relationship between the environmental objectives and the risk assessment**. The report does not provide information needed to understand the principles of the risk assessment, and the processes involved in the decision-making. We believe this has formed a barrier to stakeholders' understanding of good ecological status, and reference condition, and subsequently affected the ability of stakeholders to comments on the results of SEPA's risk assessment.

- **Provision of detailed results of the risk assessment**

We believe that the consultation on risk assessment could have been made more effective by SEPA providing detailed results of the risk assessment, and methodology used (*e.g.* pollution loads, pollution thresholds between various risk classes). We would strongly recommend that SEPA takes this approach to similar consultations in future.

- **'No deterioration' duty**

The 'no deterioration' duty will become operational in Scotland in March 2006, and will have a significant impact on the risk-assessment process and the future assessment of potentially damaging developments. We would like SEPA to clarify its approach to the 'no deterioration' obligation and its impact on the risk assessment of future activities.

- **Assessing impacts on hydro morphology**

We are concerned over SEPA's approach to addressing the following aspects of the Water Framework Directive requirements:

- Assessment of impact of hydro morphological changes in the riparian, lake, and intertidal zones on the biological elements of surface water bodies
- The assessment of impacts of activities on the hydro morphology of seabed and intertidal zones
- The consideration of hydro morphological elements on the definition of 'reference condition', and derivation of ecological status in the risk assessment

We express these concerns mainly due to the lack of explanation of these processes in the report, and we would therefore like to seek clarification in relation to all of the above.

- **Characterisation of wetlands**

We welcome the inclusion of a paragraph about wetlands. However, this initiative does not go far enough to explain what work SEPA will be undertaking in relation to wetland obligations, nor does it gives the time-scale for this work. We are very disappointed by the lack of initiative from SEPA to meet the legal requirements of the WEWS (Scotland) Act 2003 by the required deadline of December 2004.
We therefore urge SEPA to **clarify its approach to wetland characterisation**, and finalise the time-scale for this work in the final report. As discussed before, LINK's Freshwater Taskforce, including the RSPB Scotland are looking forward to partnership working with SEPA on this issue, and its active input into the wetland process in the forthcoming months.

- **The assessment of non-native species**

Scottish Environment LINK welcomes the inclusion of non-native species assessment in the characterisation report. However, we are disappointed with SEPA's approach to its non-native species assessment. We believe that the list of species chosen for the assessment excludes some potentially very damaging species. We recommend that **the list of alien species be expanded** to include all potentially damaging aquatic species (as listed in Annex 1), and that SEPA design **a monitoring programme,** which takes **full account of non-native species**, and which is able to detect the presence of new non-native species at early stages of their occupancy.

- **Defining characterisation and future needs**

There are substantial gaps in the monitoring/risk assessment of certain elements required by the WFD. It is very important to identify these 'gaps' in the monitoring network. A characterisation report that is mainly based on existing data will be insufficient, and will undermine the surveillance monitoring, leading to an uncertainty about the programme of measures. Between now and 2007 SEPA needs to collect all the information necessary to address the full impact of significant activities on the water environment. This period will also be important for establishing a monitoring programme, which will allow the validation of the characterisation results, and the reduction of uncertainties surrounding the 2004 characterisation. **We recommend**

that SEPA re-visits the high uncertainty results (category '1b' 'probably at risk, and '2a' probably not at risk') during the 2007 review.

2. Introduction

The Freshwater Taskforce of Scottish Environment LINK welcomes SEPA's consultation on the Pressures and Impacts on Scotland's water environment. While we are generally pleased with the format of the report, and the presentation of complex and technical results, we are concerned by the **lack of explanation of the underlying processes** used to derive the good ecological status, and methods used to classify water bodies into risk categories. We are especially concerned by the **exclusion of the NGO sector from the discussions** about the 'reference condition', what is meant by 'undisturbed' conditions, and the meaning of 'good ecological status'. The pressures and impacts report provides little explanation about how the reference condition was used to derive good ecological status, and how water bodies failed to meet good ecological status.

What is Scottish Environment LINK?

Scottish Environment LINK is a coalition of Scotland's major environmental non-governmental organisations, united by their common interest in the natural environment. LINK acts as a forum for its members to develop their view on national and international issues affecting wildlife and the countryside and to work together to influence Scottish policy and contribute to a more environmentally sustainable society. The following LINK members participated in this consultation:

RSPB Scotland

RSPB Scotland is a part of the RSPB, a charity with over a million members, working throughout the UK and abroad, researching environmental problems, campaigning for sustainable solutions, managing land for biodiversity and people.

RSPB Scotland has a long history of involvement with the conservation of the aquatic environment, as well as those uses, which have significant impact on water quality and quantity. RSPB Scotland provides educational resources and advice to government, farmers, landowners, and others involved in the countryside.

RSPB Scotland aims to promote the conservation of birds and their habitats. It is supported by over 73,500 members in Scotland, with a strong membership based in rural areas as well as town and cities. We believe that sustainable management of water is essential for wildlife and people.

WWF Scotland

WWF is a part of the global environmental network WWF, which works with people to build long-term solutions to environmental problems for the benefit of people and nature. WWF has, in Scotland and globally, a long record of accomplishment in working on freshwater issues. WWF established demonstration projects with farmers and were instrumental in creating a new advisory service in association with the Executive and Scottish Agricultural College. In partnership with local authorities and

businesses, WWF established flood appraisal groups and illustrated the benefits of 'soft engineering' through practical projects.

Plantlife Scotland

Plantlife Scotland is part of Plantlife International, a UK membership charity, dedicated exclusively to conserving all forms of native plant life and its habitats. We act directly to stop common wild plants becoming rare in the wild, to rescue wild plants on the brink of extinction and to protect sites of exceptional botanical importance. The charity carries out practical conservation work, works to influence relevant policy and legislation, involves its members in many aspects of its work and collaborates widely to promote the cause of wild plant conservation.

Plantlife is lead partner in the UK BAP process for 77 species of plants, fungi, bryophytes, lichens and algae, 55 of which occur in Scotland and 7 of these exclusively so. 16 of these species are affected directly by the status of our freshwater and marine habitats and by threats including diffuse pollution, water body management, coastal management and invasive non-native species. The impact of diffuse pollution in Scotland on our rarest stoneworts for example, was highlighted in Plantlife's 2004 report "Important Stonewort Areas". Invasive non-native plants are another threat and Plantlife works hard to increase awareness of the impact of these plants on our native plants and habitats. Having drawn up the UK's response to the Global Strategy for Plant Conservation, "Plant Diversity Challenge", alongside JNCC and the Royal Botanic Garden, Kew, Plantlife is now working towards ensuring that target 10, to *have in place management plans for at least 100 major alien species specie that threaten plants, plant communities and associated habitats and ecosystems*, is achieved by 2010.

National Trust for Scotland

The National Trust for Scotland is Scotland's largest voluntary conservation organisation, with some 266,000 members. It owns or manages 128 properties, including almost 76,000 hectares of countryside. The Trust cares on behalf of the nation for a great diversity of properties, including mountains, coastlines, islands, woodlands, battlefields and historic sites, gardens, castles, mansions and cottages. Those properties where numbers are recorded welcome around 1.5 million visitors each year, and hundreds of thousands more visit its countryside properties unrecorded.

The Trust supports increased protection and planning for the water environment in order to integrate water policies into the planning system and to enhance biodiversity across the water cycle.

3. Characterisation of the water environment

The consultation document deals with the very important issue of characterisation of water environment, and the assessment of anthropogenic pressures and impacts. The results of the characterisation process will inform the regulatory process, the river basin management planning process (including the setting of environmental objectives, designing a programme of measures, and informing the monitoring programme). **It is therefore very important that SEPA carry out the characterisation process based on best available practice.**

The Freshwater Taskforce of Scottish Environment LINK would like to take this opportunity and raise a number of concerns regarding the underlying principles of the risk assessment.

3.1 Understanding the risk assessment and decision making processes

While we are very pleased with SEPA's report and the presentation of complex results, we are disappointed with SEPA's attempts to describe **the relationship between the environmental objectives and the risk assessment**. While SEPA's report provides a useful analysis and summary of the main findings, it fails to describe the processes involved in the decisions about the ecological status and risk categorisation.

We believe that the consultation on the risk assessment results could have been made more effective by SEPA **providing details of the results.** This would include listing of pollution loads, pollution thresholds, and a non-technical summary of the methodology used to derive the results.

We are also disappointed by the **exclusion of non-governmental sector** from the discussions about technical developments, including the setting of reference conditions for type-specific water bodies, and the general guidance processes informing the Water Framework Directive implementation (UK Technical Advisory Group on the Water Framework Directive). We feel that since the NGO sector and other stakeholders were excluded from these processes, SEPA should have provided a **non-technical summary** of the guidance and methodology. This would have provided a useful tool for all consultees to further their understanding and improve their ability to comment on the results of the risk assessment.

3.2 Linking 'no deterioration' duty and future activities

The 'no deterioration' duty will become operational in Scotland in March 2006, and will have a significant impact on the risk-assessment of future, and potentially damaging operations/development**.** It is of concern to us that the report does not **fully address future activities and their potential impact on the water environment** in great detail. While we welcome the acknowledgment that such developments will impact on the water quality and water quantity, this assessment could have been taken further to address developments, such as: hydroelectric schemes, fish farms, flood defence schemes, and offshore wind farms. These developments can have detrimental

effects on the water environment, and therefore must be fully assessed in terms of the Water Framework Directive requirements.

3.3 Assessing hydro morphology of water bodies

In relation to hydro morphology, LINK is concerned over SEPA's approach to the following:

- Assessment of impacts of hydro morphological changes in the riparian, lake, and intertidal zones on the biological elements of surface water bodies
- The assessment of impacts of activities on seabed
- The consideration of hydro morphological elements on the definition of 'reference condition', and derivation of ecological status in the risk assessment

3.3.1 Assessing the riparian, lakeshore, and intertidal zones

The Water Framework Directive requires the assessment of hydro morphological elements, including the structure and condition of the riparian zone, lakeshore, and intertidal zones. Drainage of floodplains, canalisation and embankment of rivers affect the interaction of the river with associated habitat. This affects flow rates, depths, and sedimentation patterns. Floodplains provide important aquatic habitats and are important in determining the abundance and composition of plants and fish communities that make up a river at high ecological status. Disconnecting the surrounding floodplain from the river can result in significant changes in ecological functioning. The same principle applies to lakeshore morphology, where hydro morphological changes can affect the macrophyte community within the water body and influence the total condition of the lake eco-system.

Since it is very unclear how these key quality elements were assessed during pressures and impacts, we would like to seek clarification from SEPA on its approach to the assessment of hydro-morphology, in relation to establishing type-specific reference conditions, and risk assessment.

3.3.2 Assessing impacts on the seabed

The Water Framework Directive requires the assessment of hydro-morphological impacts on the seabed, where these could compromise the WFD environmental objectives. The types of activities that need to be covered include land claim, dredging, mineral extraction, oil and gas exploration and extraction, coastal flood defence, and fisheries and aquaculture impacts on the seabed. We are concerned that this analysis has not been carried out comprehensively to include all the activities mentioned above.

3.3.3 Hydro-morphological elements in relation to the 'reference condition'

The Water Framework Directive requires proper weight to be given to the interactions between the condition of the riparian zone, lakeshore and intertidal zones and their associated surface water bodies, when setting objectives for water bodies and reference conditions. Hydro-morphological quality elements of the water body are

ecologically inseparable from the water body itself, and in many cases will be directly relevant to achieving the WFD objectives. Significant water body modifications, including changes to floodplain condition and connectivity alter the composition and abundance of macrophytes, invertebrates and fish (as mentioned in previous section). Sites chosen to represent reference conditions should have hydromorphic condition and taxonomic composition/abundance that corresponds totally or nearly totally to undisturbed condition. If no river/water body can be found that meets these criteria, water bodies from other member states should be used instead of UK water bodies. An example of such a reference site for a floodplain eco-system is the River Biebrza in Poland.

Again, the processes used to derive reference conditions do not form a part of the Pressures and Impacts report. **We would therefore like to seek clarification from SEPA on the above.**

3.4 Defining coastal water bodies in relation to hydro-morphology

While we are content with the principle of SEPA's division of rivers, loch and transitional waters into water bodies, we are **slightly concerned over SEPA's division of coastal water bodies.** Coastal water bodies should be further subdivided into smaller units on the basis of their hydro-morphology, using 'sediment transport cells'. Sediment substrate type has a major influence over the biota present and the pressures likely to affect the water body, for example dredging, fishing, or hand-gathering. **We believe this should be a criterion to further define water bodies**. This division should be flexible enough to enable changes in the division due to natural processes, and developing pressures.

4. Characterisation of wetlands

While the Freshwater Taskforce of Scottish Environmental LINK welcomes the inclusion of an explanatory paragraph about wetlands, we are concerned that SEPA has not done enough to protect this important resource.

4.1 Water Environment and Water Services (Scotland) Act 2003

We are disappointed by the lack of initiative from SEPA to meet the legal requirements of the WEWS (Scotland) Act 2003 by the required deadline of December 2004. The progress on wetland inventory / characterisation, has been very slow. While the explanatory paragraph about wetlands, the 'wetland statement' is much welcomed, it does not go on to explain the exact time-scale for this important work, nor does it clarify SEPA's intentions towards 'wetland identification'.

We would therefore welcome clarification of a) SEPA's approach to wetland characterisation, and b) time-scale for this work in the final report. LINK Freshwater Taskforce is looking forward to a partnership working with SEPA on this issue, and its active input into the wetland process.

4.2 Water Framework Directive requirements

Article 1 of the Directive provides for the protection, enhancement and prevention of deterioration for **'wetlands and terrestrial eco-systems directly depending upon aquatic eco-systems'**. It is our understanding that SEPA's characterisation process only includes the provision for wetlands directly dependent upon groundwater water bodies, which have been designated as Protected areas under Habitats and Birds Directives. **The European requirements for wetlands are fully explained in the Common Implementation Strategy for Wetlands and Water Framework Directive[1].**

We believe that in order to meet National and European requirements, characterisation must:

- Identify all groundwater **and surface water dependent eco-systems** as part of the characterisation process, including pressures and impacts analysis and economic analysis of water use
- **The contiguity of rivers with floodplains** must be used to determine the ecological status, and the reference condition for type-specific water bodies

We recommend that SEPA take the above approach to characterisation of wetlands in future assessments.

[1] The text of the Common Implementation Strategy for the Water Framework directive Horizontal Guidance on the Role of Wetlands in the WFD can be found on the European Commission website: http://forum.europa.eu.int/

5. The assessment of non-native species

We welcome the inclusion of invasive non-native species assessment in the characterisation report. The introduction of non-native species into the water environment can have significant impacts on native fauna, flora, and biodiversity, and sometimes result in marked economic losses. There are numerous examples of non-native species of plants and animals successfully establishing, spreading and becoming invasive in Scotland (see Figure 1 – Non native fish in Scottish waters). The spread of such species can cause significant changes in the ecology and the composition of biota, and therefore has a direct relationship with the Water Framework Directive's objectives of good ecological status.

Annex II of the Water Framework Directive provides for the assessment of invasive non-native species by listing ***'other significant anthropogenic impacts on the status of surface water bodies'*** as pressures that require to be assessed that impact upon the biological quality. This approach is consistent with the UK Technical Advisory Group process, and the Guidance on the assessment of Alien Species Pressures produced by the UK TAG working group.

While we welcome **the inclusion of non-native species assessment, we are very concerned with SEPA's approach to the assessment. In addition,** the list of species chosen for the assessment **excludes some potentially very damaging species.**

The Freshwater Taskforce recommends:

- The list of non-native species be expanded to include other invasive aquatic plants, and fish species, as listed **in Annex 1** of this document.
- SEPA must design a monitoring programme that it is capable of detecting the presence of invasive non-native species at early stages of colonisation. This will be an effective tool to deal with new non-native, and potentially damaging species effectively at early stages

5.1 Designing a monitoring programme for early detection of invasive non-native species

The WFD states that: '*the monitoring network shall be designed so as to provide a coherent and comprehensive overview of ecological and chemical status within each river basin and shall permit classification of water bodies into five classes consistent with the normative definitions in section 1.2'.*

Based on the above, we recommend that SEPA design and implement a monitoring programme, which takes full account of priority invasive non-native species, and which is able to detect the presence of these species at early stages of their occupancy. SEPA may want to do this in partnership with other organisations who already collect some data on these species, although to different specifications that do not necessarily support the implementation of WFD.

Figure 1

Non-native fish in Scottish waters

1. Impact of ruffe in Loch Lomond

This is perhaps the most commonly used example of non-native fish introduction into a fragile eco-system. Introduction of ruffe has caused some fundamental changes in the functioning and the ecology of the loch, altering the trophic relationships, and food web dynamics, endangering the native stock, and affecting the top predators, such as birds.

2. Impact of Barbel in the Clyde

Barbel fish have bred successfully in the Clyde for the first time. The presence of barbel is thought to cause a significant threat to the river's fragile eco-system, and damage native stocks. Barbel fish are native to England, but until recently have been absent from Scottish waters. Their discovery came after decades of deliberate introduction, possibly by coarse anglers. The fish have now spread upstream and downstream of the place of formal introduction, causing some major concerns about the future of the Clyde's ecosystem. Such introductions do not only threaten the fish community, but can also introduce diseases and other environmental risks.

3. Introduction of pike to lochs in the Scottish Highlands

The introduction of pike has had some significant effects on the populations of trout in a number of Highland lochs. The pike is a large predatory fish, which causes decline in trout populations, sometimes even eliminating trout from its native range. This has resulted in a number of lochs being unsuitable for predatory bird species such as divers.

In cases such as those outlined above, the ecological status of the affected water body has been altered so much that it can not be considered as being at good ecological status due to changes in the fish communities. Such cases must be fully considered in SEPA's risk assessment, so that the water body has appropriate environmental objectives, and a programme of measures.

6. Defining characterisation and future needs

There are substantial gaps in the monitoring/risk assessment of certain elements required by the WFD. SEPA, in its risk assessment, relied heavily on existing data and methods, **which are not fully compliant with the Water Framework Directive** requirements. It is very **important to identify these 'gaps'** in the monitoring network, because a characterisation report that is mainly **based on existing data will be insufficient**, and will undermine the surveillance monitoring, leading to an uncertainty about the programme of measures. SEPA therefore needs to develop the appropriate tools, and design and implement an effective monitoring programme that will enable SEPA to address any uncertainties identified in the first characterisation process. Between 2006 and 2007, SEPA will need to accumulate relevant data about significant and building pressures. **We strongly advise SEPA to seek notification over all activities impacting on the water environment (even if not significant) to get an overall picture of all activities.** This will enable SEPA to build up a cumulative picture of many small pressures impacting the water environment. In Scotland, this will be especially important for septic tank discharges in rural areas, and low volume abstractions. **We also advise SEPA to use the time between now and 2007 to validate the results of the first characterisation** in time for the first river basin management process.

- ***The 2007 review of significant uncertainty***

We understand that SEPA is proposing to review only the category 'probably at risk' as part of the 2007 review. We believe that all water bodies, categorised in the high uncertainty group (category '1b' 'probably at risk' and '2a' 'probably not at risk') should be the focus of the 2007 review**. Both high 'uncertainty' categories contain the same amount of error. We therefore recommend that in order to improve the confidence in the assessment, both categories should be reviewed during the 2007 review.**

7. Summary of recommendations

In summary, the Freshwater Taskforce of the Scottish Environment LINK recommends:

- Future consultations on pressures and impacts must provide more detailed information about the processes involved in the decision-making, in order to improve stakeholders understanding of the processes involved, and improve the ability to comment on the results of the risk assessment.

- SEPA should clarify its approach towards the risk assessment of future activities in relation to the 'no deterioration' duty.

- SEPA should clarify its approach to assessing hydro morphological quality elements when defining a) impacts on water bodies, b) setting reference conditions, and c) assessment of impacts on seabed and intertidal zone.

- SEPA should clarify (in the final report) details of work on wetlands characterisation.

- SEPA should expand its assessment of non-native species to include other potentially invasive species.

- SEPA should revisit the 'high uncertainty' results of the pressures and impacts assessment in time for the first river basin planning cycle (during 2006/07).

ANNEX 1 – LIST OF SPECIES FOR RISK ASSESSMENT

A) FISH

This table was produced using SNH Review No 139: An audit of alien species in Scotland[2]

Table 1 - Fish species

Fish species that	require impact	assessment in	time for the first	river basin	management cycle	
Common Name	**Latin Name**	**Place of Origin**	**Place of Introduction**	**Manner of Introduction**	**Current Impact**	**Predicted Future impact**
Rainbow trout	Oncorhynchus mykiss	America	Multiple	Sporting quarry	Competition with native fish	Breeding could increase with temperature raise
Grayling	Thymallus thymallus	England	Clyde and Tay	Sporting quarry	Competition with native fish	Increased competition
Ruffe	Gymnocephalus cernua	England	Lochs Lomond/Ken	Unused fish bait	Competition/predation of native fish	Changes of food web structure
Barbel	Barbus barbus	England	River Clyde	Sporting quarry	Competition/predation of native fish	Unknown - now breeding in the Clyde

Fish species whose	impact is not known,	and requires	further	investigation		
Chub	Leuciscus caphalus	England	SW/Clyde	Sporting quarry	Unknown	Unknown, but spreading
Tench	Tinca tinca	England	S/Central/ NE	Sporting quarry	Unknown	Unknown, could spread
Gudgeon	Gobio gobio	England	Rivers Don/Enrick	Unused fish bait	Unknown	Unknown, could spread
Bullhead	Cottus gobio	England	Forth/Clyde	Unknown	Unknown	Unknown, could spread
Common carp	Cyprinus carpio	Europe	Central/NE	Sporting quarry	Unknown	Breeding could increase with temperature raise
Dace	Leuciscus leuciscus	England	Central/South	Sporting quarry	Unknown	Spreading into central areas

[2] D Welch, D N Carrs, J Gornall, S J Manchester, M Marquiss, C D Preston, M G Telfer, H Arnold, J Holbrook, 2001: An audit of alien species in Scotland, A report to SNH

B) AQUATIC PLANTS

LINK proposes that the following non-native species of plants are added on the list of species requiring risk assessment and monitoring programme. Species listed in **bold** have been assessed as part of 2004 characterisation exercise.

Common name	**Latin name**	**Habitat**	**Listings (if any)**	**Manner of introduction**	**Status in Scotland**	**Current impact**	**Future impact**
Fallopia japonica	Japanese knotweed	River banks	Schedule 9	Gardens in 1825	Throughout Scotland except Cairngorms & north	Well established on waste ground & along river, loch & canal banks. Spread by root fragments	Likely to continue increasing
Heracleum mantegazzianum	Giant hogweed	"	"	Gardens in 1820	Along east coast & across central belt	Spreading along rivers & streams by seeds, which are prolifically produced.	Likely to continue increasing.
Codium fragile	green seafingers	marine	Proposed Sch 9 species (1996)	Introduced with shellfish and spread throughout Britain since 1840	Occurs along Scottish coasts, including Shatland	This species should replace *Codium fragile* ssp. *tomentosoides*, already on sch 9, because several invasive sub-species of *C. fragile* occur in Britain and Europe	Likely to spread but may be currently limited by cool summer temperatures
Grateloupia filicina var. *luxurians*		marine	Proposed Sch 9 species (1996)	Probably with shellfish	Not yet recorded in Scotladn	Spreading slowly through southern England and Channel Islands	Currently limited by low temperatures
Sagittaria latifolia	duck-potato	Freshwater		Introduces in cultivation in Britain in 1818	Not yet recorded in Scotland	Range increasing in northern England	Reproduced by seed and vegetatively
Cabomba caroliniana	Fanwort***	Freshwater	Proposed Sch 9 in 2004 consultation	From aquariums	Not thought to be present in Scotland but has been found in Forth & Clyde canal although is not winter hardy	Can establish if allowed to escape into wild.	Should be banned from sale to prevent introductions. Success more likely with climate change.
Eichhornia crassipes	Water	Freshwater	Proposed Sch 9 in	Gardens	Recorded in	Not yet hardy in UK but	Should be banned

	hyacinth		2004 consultation		Scotland but unable to survive winters to date	cold water varieties known and being developed in Holland.	from sale to prevent introductions. Success more likely with climate change.
Pistia stratiotes	Water lettuce	Freshwater	Proposed Sch 9 in 2004 consultation		Unknown		Should be banned from sale to prevent introductions. Success more likely with climate change.
Salvinia molesta	Giant salvinia***	Freshwater	Proposed Sch 9 in 2004 consultation	Gardens	Unknown but recorded in England	Currently limited by low temperatures but is invasive elsewhere in range	Should be banned from sale to prevent introductions. Success more likely with climate change.
Azolla filiculoides	**Water fern**	freshwater	Proposed Sch 9 in 2004 consultation	Gardens	Limited to Central belt but potential to spread	Will increase because survives harsh winters	Can invade rapidly & exclude all competitors.
Hydrocotyle ranunculoides	Floating pennywort	freshwater	Proposed Sch 9 in 2004 consultation	Gardens: first recorded in wild in 1990	Not yet recorded in Scotland	Spreading in England & deoxygenating water bodies, killing fish 7 invertebrates, drowning cattle, choking drainage systems, causing extensive localised flooding & crowding out native plants English Nature 1999). In 2000, estimated for control in infested area by herbicides is 4250,000 -	Will spread across Scotland. Remove plant from sale (it is sold under a variety of names) & eradicate from newly infested sites.

						£300,000 per year.	
Myriophyllum aquaticum	**Parrot's feather**	Freshwater	Proposed Sch 9 in 2004 consultation	Gardens since 1878	Not yet recorded in Scotland	Will spread across Scotland. It spreads as vegetative fragments, particularly from dumped garden waste	Extend of spread to new sites is unknown, but spread is likely to increase with climate change
Crassula helmsii	**Australian swamp stonecrop**	Freshwater	Proposed Sch 9 in 2004 consultation	Gardens since 1911	Established in Scotland & spreading from gardens.	Spreading quickly across UK. Cost of adequate control in 1999 was estimated to be about £3,000,000. Sold in UK under variety of names	Remove plant from sale & create Crassula free zones.
Lagarosiphon major	Curly waterweed	Freshwater	Proposed Sch 9 in 2004 consultation	Gardens	Present in central belt	Will spread across Scotland	Remove from sale. Already banned in New Zealand & Australia
Spartina alterniflora x S. maritime	Townsend's cord grass	Marine		S. alterniflora probably originally introduced in ballast water. Later planted as mud binder throughout Britain	Present on Solway & Loch Linnhe		
Spartina angelica	Common cord garss	Marine		Planted as mud binder throughout Britain	Single record in St Andrews Bay	Expanding on west coast of GB. However, on south coast, having initially spread quickly, it now appears to have declined because of die-back.	Low temperatures may currently be limiting ability to set viable seed. Once established, however, spread vegetatively.
Other *Spartina sp.*		Marine					