

ESK RIVERS AND FISHERIES TRUST

BIOSECURITY PLAN

JULY 2009



ESK RIVERS AND FISHERIES TRUST

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EXECUTIVE SUMMARY

This plan describes the biosecurity issues of the Esk District area and presents actions that have been agreed with stakeholders for the prevention, early detection, control and mitigation of the introduction and spread of selected invasive non native species (INNS) and fish diseases. This vision of this plan is:

‘To establish a sustainable framework which will prevent, detect, control and eradicate invasive non-native species within the Esk fisheries district through appropriate management, data collection, liaison and education’

This vision will be achieved through the realisation of three objectives with five outputs:

Objective 1: Reduce the risk introduction of new INNS within the Esk District.

Output 1.1: Key stakeholders aware of the impacts and measures required to prevent their introduction and spread

Objective 2: Establish optimum surveillance, detection, monitoring and rapid response systems for the identified INNS which pose significant threats to local biodiversity and economy

Output 2.1 Early warning systems for surveillance, detection and monitoring of new and existing INNS in the district established

Output 2.2 Rapid response mechanism (RRM) established and functioning

Objective 3: Develop effective control and eradication programmes for existing INNS which are operational and sustainable.

Output 3.1 Effective sustainable control/eradication programmes within the Esk District are established and fully functional

Output 3.2 A locally based, fully resourced organisation is established to implement non-government actions specified within the Esk District Biosecurity Plan.

The implementation of this biosecurity plan will bring many socio-economic and environmental benefits:

- 🌿 The maintenance and enhancement of biodiversity – biotic invasion is one of the top five drivers for global biodiversity loss and is increasing with globalisation and tourism
- 🌿 The visual conservation of local landscapes
- 🌿 The prevention of the salmon parasite *Gyrodactylus salaris* from entering the Esk district which would avoid catastrophic economic and environmental loss.
- 🌿 A holistic, cost effective control programme of INN plants e.g. Giant hogweed, Japanese knotweed, and Himalayan balsam the former being a threat to human health will be founded in partnership with key stakeholders.
- 🌿 The conservation of important natural habitats for native species such as Otter, Atlantic salmon, freshwater pearl mussel, European eel,
- 🌿 Control/eradicate signal crayfish.
- 🌿 The protection of the endangered water vole from predation by the American Mink
- 🌿 The prevention of species such as Zebra mussel from entering the district watercourse will help to protect vital local businesses such as whisky distilleries from expensive mitigation measures required if this species was to occur and establish.

- Helping to ensure the outcome of INNS management in the Esk District area is more cost effective, strategic and sustainable.

The actions required to realise the above objectives and outputs along with the lead agency, key partners and timeframe required for their implementation are presented in the table below.

ACTION	LEAD	PARTNERS	TIMEFRAME								
			2009	2009	2010	2010	2011	2012	2013	2014	2015
Objective 1: Reduce the risk of introduction of new INNS within the Esk District.											
Output 1.1: Key stakeholders aware of the impacts and measures required to prevent their introduction and spread											
Launch of ERFT Biosecurity plan through national and local – create press release	ERFT		—								
Produce leaflet on legislation including waste management & planning regulations	Angus and Aberdeenshire councils	SNH, SEPA		—	—						
Produce leaflet on biosecurity risks and the reporting system	ERFT	SNH, SEPA		—							
Produce posters on biosecurity risks and distribute to the general public	ERFT	RAFTS, SNH, SEPA, Plantlife			.....	.....	.....	.....	.....	.....	.....
Continue to promote and install disinfection facilities for anglers at all angling proprietors fishing huts/parking points	EDSB/ERFT		.....	.....	.....	.....	.....	.....	.....	.....	.....
Develop interim code of practice with Montrose Harbour Authority	Montrose Port Authority	ERFT		—	—						
Distribute Codes and posters to relevant retail outlets and clubs at open days and events such as agricultural shows	Angus and Aberdeenshire councils	SNH, SEPA			.....	.....	.....	.....	.....	.....	.....
Engage with Landowners and angling clubs to promote awareness measures to tenants, resource –users, members and visitors	ERFT	SNH, SEPA		—	—						
Work with environmental groups of local schools to enhance awareness of INNS	ERFT	SNH			.....	.....	.....	.....	.....	.....	.....
Objective 2: Establish optimum early surveillance, detection, monitoring and rapid response systems for the identified INNS which pose significant threats to local biodiversity and economy											
Output 2.1 Early warning systems for surveillance, detection and monitoring of new and existing INNS in the district established.											
Train two ERFT personnel in the identification of INNS	ERFT	SNH, RAFTS									
Train ERFT as trainers	ERFT	SNH, RAFTS		—							
Work with user and interest groups to identify “eyes”	ERFT	EBG		—	—						
Training of “eyes”	ERFT	SNH, SEPA		—	—	—	—	—	—	—	—
Produce database to record and manage INNS sightings	ERFT	RAFTS		—							
Establish, test and refine communication mechanisms within surveillance system	ERFT	RAFTS		—	—						
Monitor and periodically evaluate efficacy of surveillance system	ERFT	RAFTS			.....	.....	.....	.....	.....	.....	.....
Output 2.2 Rapid response mechanism (RRM) established and functioning.											
Formulate contingency plans	ERFT	Local Councils, SEPA and SNH		—	—						
Identification of personnel	ERFT	Local Councils, SEPA and SNH		—							

ACTION	LEAD	PARTNERS	TIMEFRAME									
			2009	2009	2010	2010	2011	2012	2013	2014	2015	
Training of personnel	EFRT	Local Councils, SEPA and SNH		—	—							
Identification of funding resources	ERFT	Local Councils, SEPA and SNH		.....	.....	.....	.....	.....	.....	.....	.....	.....
Acquisition of equipment	ERFT	Local Councils	—									
Refresher training	ERFT					—		—	—	—	—	—
Establish local communications systems	EFRT	Local Councils, SEPA and SNH		—	—							
Monitor population	EFRT			.....	.....	.....	.....	.....	.....	.....	.....	.....
Objective 3: Develop effective control and eradication programmes for existing INNS which are operational and sustainable.												
Output 3.1 Effective sustainable control/eradication programmes within the Esk District are established and fully functional												
Initiate and complete catchment wide surveys by trained personnel	EFRT		—	—								
Establish GIS database for recording and mapping INNS within Esk district	ERFT	RAFTS		—								
Continuation of mink eradication programme	Cairngorms National Park Authority		—	—	—	—	—	—	—	—	—	—
Implementation of phase 1 of control/ eradication programme	EFRT	Angling clubs, Landowners, SNH			—	—	—	—	—	—	—	—
Implementation of habitat restoration scheme within successful control areas taking into account all relevant species	EFRT	Angling clubs, Landowners, SNH			—	—	—	—	—	—	—	—
Monitor the effectiveness of control programmes	EFRT			—	—	—	—	—	—	—	—	—
FRS monitoring Red Vent Syndrome	FRS			—	—	—	—	—	—	—	—	—
Output 3.2 A locally based, fully resourced organisation is established to implement non-government actions specified within the Esk District Biosecurity Plan.												
Complete draft biosecurity plan	ERFT		—									
Consult with all stakeholders to agree biosecurity plan	ERFT	All		—								
Consult with representatives from all stakeholder groups to form Esk Biosecurity Group	ERFT	All			—							

SECTION 1 PURPOSE AND SCOPE

This plan describes the biosecurity issues of the Esk District area and presents actions that have been agreed with stakeholders for the prevention, early detection, control and mitigation of the introduction and spread of selected invasive non native species (INNS) and fish diseases. This vision of this plan is:

‘To establish a sustainable framework which will prevent, detect, control and eradicate invasive non-native species within the Esk fisheries district through appropriate management, data collection, liaison and education’




This vision will be achieved through the realisation of three objectives:

Objective 1: Reduce the risk introduction of new INNS within the Esk District.

Objective 2: Establish optimum surveillance, detection, monitoring and rapid response systems for the identified INNS which pose significant threats to local biodiversity and economy

Objective 3: Develop effective control and eradication programmes for existing INNS which are operational and sustainable.





These objectives are in accordance with established protocols for fish diseases and with the three key elements of the [Invasive Non Native Species Framework Strategy for Great Britain](#)¹:

-  Prevention,
-  Early detection, surveillance, monitoring and rapid response,
-  Mitigation, control and eradication

The objectives of this plan will be achieved through a partnership approach to implement the agreed actions.

The ultimate key to the effectiveness of this plan is the building of local awareness, capacity and partnerships to ensure the success and long term sustainability of the presented actions.

The implementation of this biosecurity plan will bring many socio-economic and environmental benefits:

-  The maintenance and enhancement of biodiversity – biotic invasion is one of the top five drivers for global biodiversity loss and is increasing with globalisation and tourism
-  The visual conservation of local landscapes
-  The prevention of the salmon parasite *Gyrodactylus salaris* from entering the Esk district which would avoid catastrophic economic and environmental loss.
-  A holistic, cost effective control programme of INN plants e.g. Giant hogweed, Japanese knotweed, and Himalayan balsam the former being a threat to human health will be founded in partnership with key stakeholders.

¹ www.nonnativespecies.org

- 🌿 The conservation of important natural habitats for native species such as Otter, Atlantic salmon, freshwater pearl mussel, European eel,
- 🌿 Control/eradicate signal crayfish.
- 🌿 The protection of the endangered water vole from predation by the American Mink
- 🌿 The prevention of species such as Zebra mussel from entering the district watercourse will help to protect vital local businesses such as whisky distilleries from expensive mitigation measures required if this species was to occur and establish.

SECTION 2 BACKGROUND

Although prepared by the Esk Rivers and Fisheries Trust (ERFT), this plan is one of a set of 20 biosecurity plans being produced throughout Scotland as part of a national programme of action implemented through the Rivers and Fishery Trusts of Scotland (RAFTS) with backing and support from the Scottish Government, Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA) and the Esmeé Fairbairn Foundation.

The Esks Rivers and Fishery Trust (ERFT) is a registered Scottish Charity with the following objectives:

- 🌿 To advance for public benefit environmental protection and improvement by conserving and enhancing all native species of freshwater fish and their environments primarily but not limited to the inland and coastal waters of the rivers and their tributaries (Lunan, South Esk, North Esk and Bervie).
- 🌿 To advance the education of the public and any other association, company, local authority, administration or governmental body or representative body in:
 - The understanding of aquatic ecosystems, including their flora and economic or social activity, and river catchment management.
 - The need for, and the benefits of, protection, conservation, rehabilitation and improvement of the aquatic environment.

In supporting the ERFT in fulfilling its role in the protection, rehabilitation and improvement of, the aquatic environment, the ERFT considers the preparation and implementation of this biosecurity plan as an essential prerequisite and component parts of a programme of survey and control of INNS in the area. The ERFT Fishery Management Plan highlights the importance of biosecurity planning in relation to the Trust's objectives.

The need for action on biosecurity issues has been identified in the Trust's [Fisheries Management Plan](#)² and in the [Draft Tay River Basin Area Management Plan](#)³ being prepared as part of the [River Basin Management Plan](#)³ for the Scotland River Basin District. This biosecurity plan provides a platform for local action to address those biosecurity issues. This plan has a lifespan of six years and as part of an adaptive management cycle its outcomes and impacts will be reviewed and incorporated in the next generation plan. Although this plan is not a legal instrument in itself it utilises existing legal and regulatory instruments to support the implementation of its actions and in pursuance of the realisation

² <http://www.rafts.org.uk/projects/fisheriesmanagementplanning>

³ http://www.sepa.org.uk/water/river_basin_planning

of its objectives. As such the successful implementation of this plan will rely on the formation of strong local partnerships founded on solid legal and policy principles by a range of interested parties.

The plan was produced using a participatory planning process coordinated by the ERFT through which stakeholders identified and agreed the aims, outputs and actions presented in this plan. The plan builds partnerships of differing groups of stakeholders to implement the actions required to address the complex issues associated with biosecurity. This plan therefore represents the agreed approach of the ERFT, stakeholders and appropriate regulatory agencies in the Esk District for the prevention, early detection and control of non native invasive species, fish diseases and parasites.

SECTION 3 THE CONTEXT

3.1 Biosecurity: The Nature of the Problem

Biosecurity issues are of increasing economic and ecological significance. Globalisation has expanded the possibilities, extent and complexity of world trade and the growth of the tourism market has expanded the number of destinations for activity holidays and travellers. These trends have led to the increased probability of the unintentional as well as intentional introduction, establishment and spread of non native invasive species, parasites and diseases in Scotland and the UK. In the context of this first plan, biosecurity issues in the rivers and lochs of Scotland are considered in relation to the potential introduction and spread of a priority list of INNS and fish diseases.

According to a [survey](#)⁴ commissioned by Scottish Natural Heritage in 2001, there are approximately 1000 non-native species present in Scotland, the majority of which exist in small populations with little impact on native flora and fauna. However, a small but significant proportion of these non-native species are invasive.

Invasive non-native species are those that have been transported outside of their natural range and that damage our environment, the economy, our health and the way we live.

Invasive non native species are the second greatest threat to biodiversity being capable of rapidly colonising a wide range of habitats and excluding the native flora and fauna ([CBD, 2006](#)⁵). Furthermore, over the last 400 years INNS have contributed to 40% of the animal extinctions where the cause of extinction is known. As water is an excellent transport medium for the dispersal of many of these species, rivers and lochs and their banks and shorelines are amongst the most vulnerable areas to the introduction, spread and impact of these species. The ecological changes wrought by INNS can further threaten already endangered native species and reduce the natural productivity and amenity value of riverbanks, shorelines and their waterbodies.

⁴ www.snh.org.uk/pdfs/publications/review/139.pdf

⁵ <http://www.cbd.int/gbo2/>

The threat from INNS is growing at an increasing rate assisted by climate change, pollution and habitat disturbance with a correspondingly greater socio-economic, health and ecological cost. Many countries including Scotland are now facing complex and costly problems associated with invasive species for example:

- 🌿 [DEFRA](#) have estimated that INNS cost the UK economy at least £2 billion per year
- 🌿 In the UK Japanese Knotweed is thought to affect an area roughly the size of London and report of the [Review of Non-Native Species Policy \(2003\)](#)⁶ has estimated the total cost of its removal using current techniques at £1.56bn.
- 🌿 A Scottish Government [report](#)⁷ estimated the potential Net Economic Value loss to Scotland of the introduction of *Gyrodactylus salaris* at £633 million with severe consequences for rural communities.
- 🌿 £25 million is the estimated cost of clearing the invasive *Rhododendron ponticum* from the Loch Lomond and Trossachs National Park.
- 🌿 Invasive species have already changed the character of iconic landscapes and waterbodies in Scotland reducing the amenity value of those areas.

There is also a growing recognition of the impacts of **translocated species**. Translocated species are native species that have been transported outside of their natural range and they can also have severe ecological impacts. Examples of translocated species that are impacting the ecology of Scotland's rivers and lochs are the minnow (*Phoxinus phoxinus*) and ruffe (*Gymnocephalus cernuus*). The ruffe in particular has decimated the once significant and diverse population of the rare and protected powan (*Coregonus lavaretus*) in Loch Lomond.

Without some form of coordinated and systematic approach to the prevention of introduction and control of the spread of INNS and fish diseases, it is likely that the ecological, social and economic impacts and the costs for mitigation, control and eradication of these species and diseases will continue to increase. This plan is a first attempt to set out and implement such an approach at a local level for [selected species and diseases](#)⁸ that significantly impact freshwater fisheries and the aquatic environment. This local plan and its implementation is also part of a strategic and coordinated approach to INNS management being undertaken across Scotland by RAFTS members.

3.2 Policy and Legislation

Given the high costs for the mitigation, control and eradication of INNS and fish diseases once they are established this plan emphasises the need for prevention and rapid response to the introduction of INNS **before** they become established. Furthermore, the host of pathways for entry and spread as well as the persistence of many of these species means that a partnership approach to prevent introductions and involving diverse stakeholders is essential. The partnership approach encapsulated in this plan is a key requirement for increased public awareness and engagement, optimisation of the use of resources and

⁶ <http://www.defra.gov.uk/wildlife-countryside/pdf/wildlife-manage/non-native/review-report.pdf>

⁷ www.scotland.gov.uk/resource/doc/1062/0042434.pdf

⁸ www.invasivespeciesscotland.org.uk

the provision of clear guidance for inter-agency working necessary to address the biosecurity issues of the Esk District. These approaches are consistent with the [GB Invasive Non Native Species Framework Strategy](#)⁹ and the [Species Action Framework](#)¹⁰ both of which have been approved by the Scottish Government.

The actions presented in this plan will also conform to, and be supported by, UK and Scottish Government legislation associated with the prevention, management and treatment of INNS, fish diseases and parasites:

- 🌿 Section 14 of [The Wildlife and Countryside Act \(1981\)](#)¹¹ makes it an offence to allow any animal (including hybrids) which is not ordinarily resident in Great Britain, to escape into the wild, or to release it into the wild; or to release or allow to escape from captivity, any animals that is listed on Schedule 9 to the 1981 Act. It is also an offence to plant or otherwise cause to grow in the wild any plant listed on Schedule 9 to the 1981 Act.
- 🌿 Local Authorities have powers to take action against giant hogweed (*Herculeum mantegazzianum*) and japanese knotweed (*Fallopia japonica*) where it is a threat to the local amenity of an area or if it is considered a statutory nuisance.
- 🌿 Section 179 of the [Town and Country Planning \(Scotland\) Act 1997](#)¹² empowers local authorities to serve notice requiring an occupier to deal with any land whose condition is adversely affecting the amenity of the other land in their area.
- 🌿 The [Possession of Pesticides \(Scotland\) Order 2005](#)¹³ regulates the use of pesticides and herbicides for the control and eradication of INNS.
- 🌿 [Environmental Protection Act 1990](#)¹⁴ contains a number of legal provisions concerning “controlled waste”, which are set out in Part II. Any japanese knotweed or giant hogweed contaminated soil or plant material discarded is likely to be classified as controlled waste. This means that offences exist with the deposit, treating, keeping or disposing of controlled waste without a licence.
- 🌿 [The Waste Management Licensing Regulations 1994](#)¹⁵ define the licensing requirements which include “waste relevant objectives”. These require that waste is recovered or disposed of “without endangering human health and without using processes or methods which could harm the environment”.
- 🌿 [Controlled Waste \(Registration of Carriers and Seizure of Vehicles\) Regulations 1991](#)¹⁶ and the [Environmental Protection \(Duty of Care\) Regulations 1991](#)¹⁷ provide guidance for the handling and transfer of controlled waste.

The procedures for the detection, notification and control of fish diseases procedures are already well defined by fisheries legislation. This stipulates that the Fisheries Research Services (FRS) acts on behalf of

⁹ www.nonnativespecies.org

¹⁰ www.sng.org.uk/speciesactionframework

¹¹ www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1981/cukpga_19810069_en_1

¹² www.opsi.gov.uk/acts/acts1997/ukpga_19970008_en_1

¹³ www.opsi.gov.uk/legislation/scotland/ssi2005/20050066.htm

¹⁴ www.opsi.gov.uk/acts/acts1990/ukpga_19900043_en_1

¹⁵ http://www.opsi.gov.uk/si/si1994/uksi_19941056_en_1.htm

¹⁶ www.opsi.gov.uk/si/si1991/uksi_19911624_en_1.htm

¹⁷ www.opsi.gov.uk/si/si1991/uksi_19912839_en_1.htm

the Government in respect to the suspicion of the presence of notifiable fish diseases and organises and coordinates the response to that outbreak. As such the actions in this plan will raise awareness and provide mechanisms for the realisation of those procedures at the local level.

3.3 Existing Planning Framework

This Biosecurity Plan links Government-led policy, legislation and strategic action with local actions and reflects, implement and/or supports the provisions and requirements of the following existing plans (see also Table 1):

- the ERFT Fisheries Management Plan,
- the Tay Area and River Basin District Management Plan,
- the South Esk Catchment Management Plan (in preparation) and
- the Tayside and North East of Scotland Local Biodiversity Action Plans

Furthermore, this plan supports the conservation objectives of the 22 designated conservation areas listed on the catchment maps.

Table 1 Identified Actions in the ERFT Biosecurity Plan supporting provisions or requirements of other relevant plans

Provision or Requirement of Existing Plan	Action in Biosecurity Plan
The Tay Area Management Plan ¹⁸ Biosecurity planning has been omitted from the draft.	The ERFT Biosecurity Plan will be included in programme of measures
The South Esk Catchment Plan : ¹⁹ (In preparation), will highlight the importance of biosecurity planning and the current situation with invasive species. "Action cards" will hopefully be developed in response to these issues	The South Esk Catchment Plan will recognise and support the ERFT in implementing elements of the Biosecurity Plan
ERFT Fisheries Management Plan ²⁰ Highlighted <ul style="list-style-type: none"> ▪ The need for biosecurity planning ▪ Surveys of invasive non-native plants planned for 2008/9 	This biosecurity plan fulfills the identified need for biosecurity planning and the other identified biosecurity measures in the Fisheries Management Plan
Gyrodactylus salaris (Gs) Contingency Plan : ²¹ A strategy to rapidly contain and eradicate Gs if introduced to Scotland	This plan will establish a local surveillance system that will feed into the national response protocols as well as formulate rapid response protocols for "new" INNS which pose significant threats to local species and biodiversity
North East of Scotland Biodiversity Action Plan ²² Acknowledges the threat from non-native species but only highlights those already present in the area	This plan puts forward a programme for eradication of existing species, preventative measures to curtail new introductions and development of a rapid response aimed at eradication of any new introductions if they do occur

¹⁸ www.sepa.org.uk/water/river_basin_planning.aspx

¹⁹ www.angusahead.com/LiveAngus/RiverSouthEskCatchmentPartnership/Introduction.asp

²⁰ www.rafts.org.uk/projects/fisheriesmanagementplanning.asp

²¹ www.scotland.gov.uk/Topics/Fisheries/Fish-Shellfish/18610/diseases/g-salaris/GsCGrev

²² www.ukbap.org.uk/lbap.aspx?ID=431

Provision or Requirement of Existing Plan	Action in Biosecurity Plan
<p>Tayside Biodiversity Action Plan²³</p> <p>Refers to issues of funding control, verge management involving local groups, the spread of invasive species by rivers and burns and the need for an awareness raising programme</p>	<p>This plan specifically addresses the issues associated with the spread of INNS along rivers and burns as well as identifying targeted awareness activities</p>
<p>Cairngorms National Biodiversity Action Plan:²⁴</p> <p>Promotes the conservation of water voles through mink eradication schemes</p>	<p>Measures for (awareness, monitoring and trapping) the eradication of mink within the Esk District are included in this plan</p>
<p>Plans supporting designated conservation areas (SACs and SSSIs).</p> <p>Scotland's Biodiversity: A strategy for the conservation and enhancement of biodiversity in Scotland.²⁵</p>	<p>Supports the conservation of biodiversity target species through the control and eradication of INNS detrimental to their ecology</p>

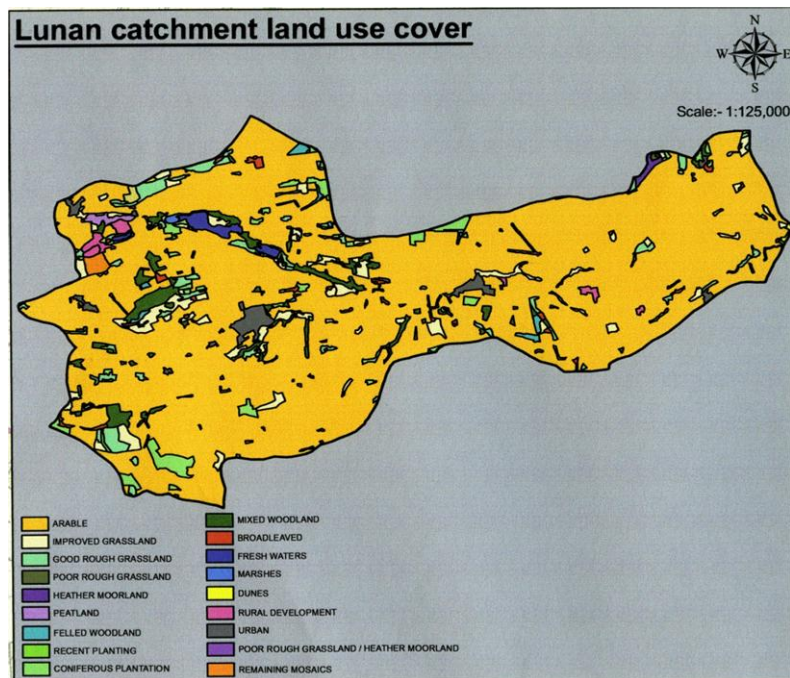
SECTION 4 SCOPE OF THE PLAN

4.1 Description of the ERFT Area

There are 4 catchments within the Esk Salmon Fishery District: River Lunan, River South Esk, River North Esk and River Bervie. The area for which the ERFT has responsibility is the same as that covered by the Esk District Salmon Fishery Board. There are at least 22 protected species as well as 13 focus species for Local Biodiversity Action Plans (Table 2) known to be present in the area.

The Lunan Water is a low energy river with its whole length being in the coastal plain. The Lunan Water has a catchment area of 124km² and a mean annual discharge of 1.67m³s⁻¹. Its major tributary is the Vinny Burn. The main settlements are small towns and villages. The water quality as classified by SEPA is generally "Poor" to "Moderate".

The Lunan Water has no internationally or nationally designated sites in the catchment but has sensitive habitats such as aspen stands, birch woods and lush bank vegetation.

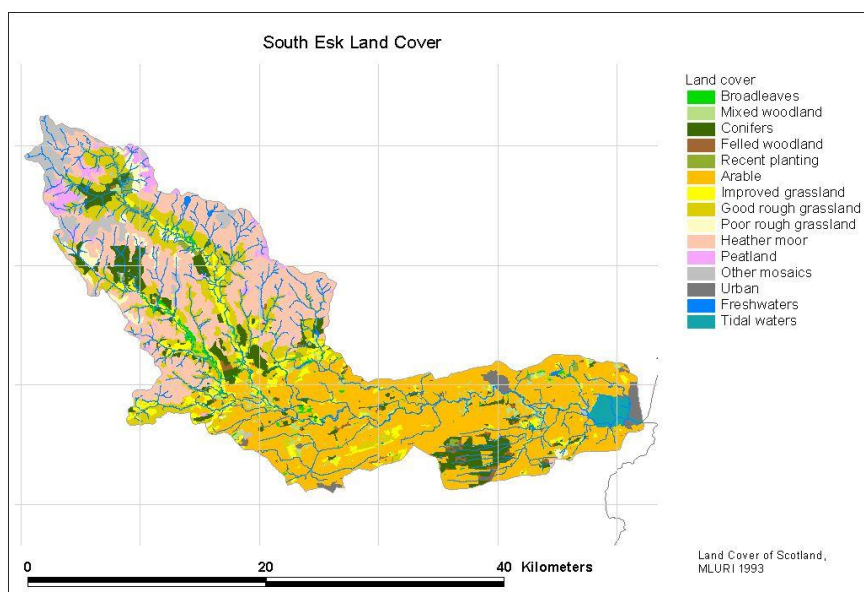


²³ www.ukbap.org.uk/lbap.aspx?ID=486

²⁴ www.ukbap.org.uk/lbap.aspx?ID=360

²⁵ www.scotland.gov.uk/Publications/2004/05/19366/37239

The River South Esk is a high energy river. Its upper reaches are on granite in the Cairngorms massif, its middle reaches are in the foothills of the Cairngorms in glacial valley floors and its lower reaches are in the coastal plain. The catchment is 488 km² and average daily flow of 12.3m³s⁻¹.



The South Esk rises in the Cairngorms National Park, it is a SAC because of its salmon and freshwater pearl mussel populations and flows into the Montrose Basin Special Protected Area (SPA) and Ramsar site. There is also one Site of Special Scientific Interest (SSSI) in the catchment. The catchment supports a variety of important habitats including blanket bog, coastal and floodplain grazing marsh, neutral grassland, rush pastures and wet woodland. Sensitive riparian habitats include aspen stands and birch woods.

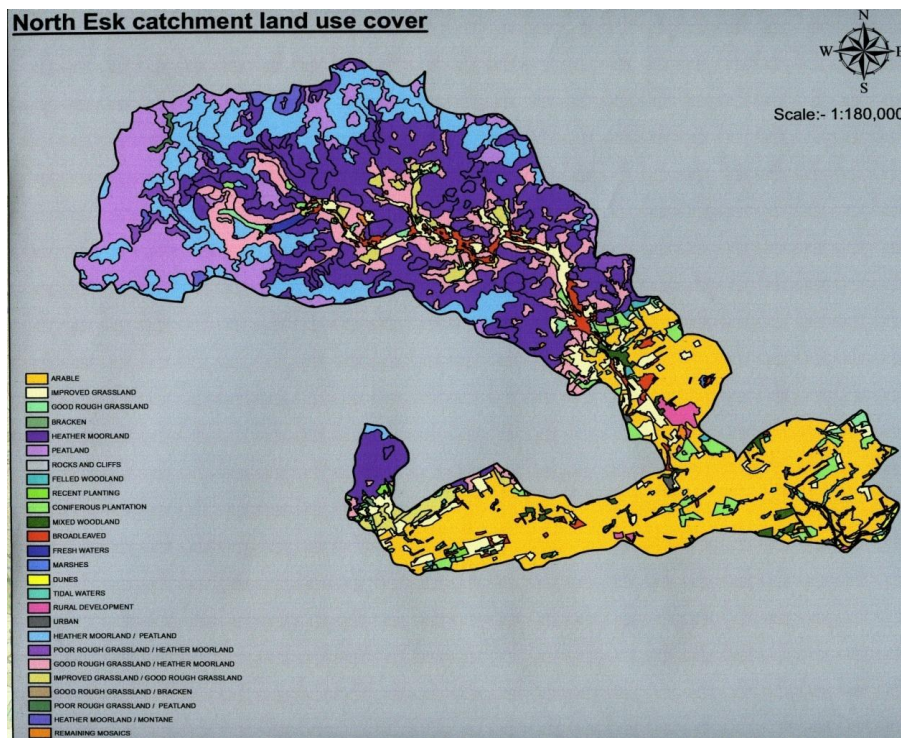
Table 2 Biodiversity Action Plan species in the 4 catchments

SPECIES	CATCHMENT			
	LUNAN	S. ESK	N. ESK	BERVIE
Blue tailed damsel fly <i>Aeschna juncea</i>	+	+	+	
<i>Coenagrion puella</i>	+	+	+	
<i>Cordulegaster boltonii</i>	+	+	+	+
<i>Enallagma cyathigerum</i>	+	+	+	
<i>Exechiopsis pollicata</i>		+		
<i>Ishura elegans</i>	+	+	+	
Emerald damsel fly <i>Lestes sponsa</i>	+	+	+	
<i>Lonchoptera mejerei</i>		+		
<i>Lonchoptera nigrocillata</i>		+		
<i>Megalopelma nigroclavatum</i>		+		
Large red damsel fly <i>Pyrhosoma nymphula</i>	+	+	+	
Black darter <i>Sympetrum danae</i>	+	+	+	
Common darter <i>Sympetrum striblatum</i>	+	+	+	

Water quality in the South Esk is generally “Good” with the Pow Burn being classed as “Poor” and Montrose Basin classed as “Moderate” to “Poor”. There are

two heavily modified water bodies within the catchment – the Noran and Lemno.

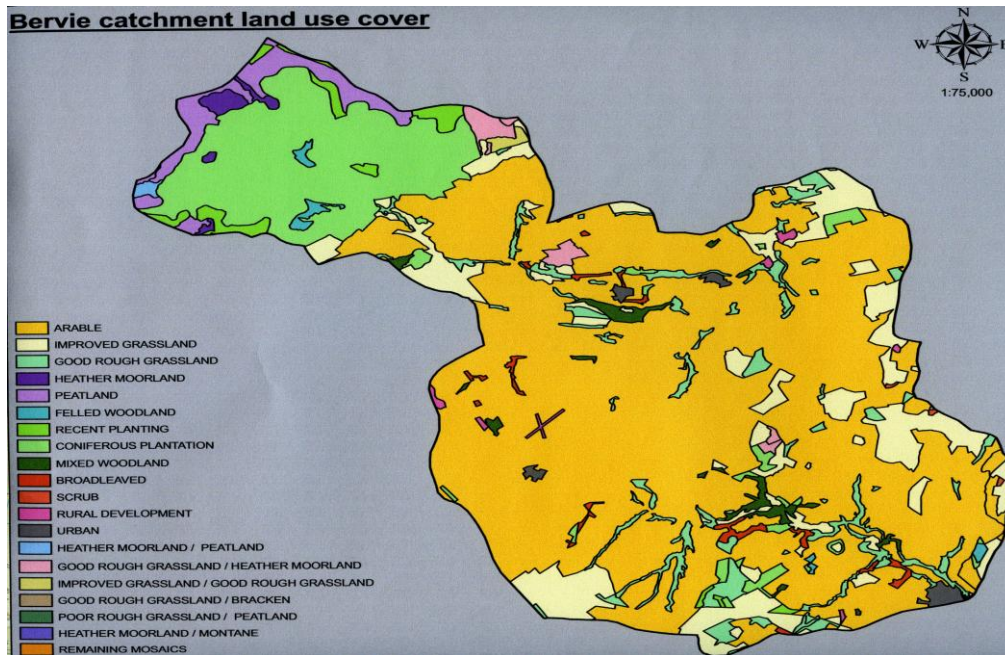
The River North Esk is a medium energy river. Its upper reaches are on granite in the Cairngorms massif, its middle reaches are in the foothills of the Cairngorms in glacial valley floors and its lower reaches are in the coastal plain. The North Esk is 69km long, has a catchment area of 732 km² and a mean annual discharge of 19m³s⁻¹. Its major tributaries are the West Water and the Luther Burn. The main settlements are small towns and villages.



The North Esk starts in the Cairngorms National Park and has three SSSIs in the catchment. It is known to support important habitats such as blanket bog, rush pastures and wet woodland as well as riparian aspen stands, riverside birch woods and lush bank vegetation.

Water quality is generally "High" or "Good" although the Luther is classed as "Moderate".

The River Bervie is a medium energy river. Its upper reaches are in the foothills of the Cairngorms in glacial valley floors and its middle and lower reaches are in the coastal plain. The Bervie is 30km long, has a catchment area of 135 km² and a mean annual discharge of 2.30m³s⁻¹. It has no major tributaries. The main settlement is Inverbervie and it has a catchment population of 3,235. The water quality in the upper reaches is generally "Moderate" and in the lower reaches generally "Good". The Bervie is not at significant risk from pollution under the Water Framework Directive.



The Bervie supports neutral grassland, rush pastures, and wet woodland habitats.

4.2 Use of the Catchment

There are numerous types of land use and businesses spread throughout the district, varying from large scale including agriculture, forestry, tourism, industry (e.g. chemical works, oil supply) and other commercial interests (e.g. quarries, fishing ports and harbours, garden centres, pet shops, sawmills, distilleries, hospitals and drinking water suppliers). Business directly linked with the sport of angling is an important local economic driver and is one of the main but not the only sector this plan seeks to enhance and protect. Other activities including walking, golf, bird watching and canoeing rely in part upon the quality of the aquatic and riparian environments. A recent [survey](#)²⁶ of the economic impact of game and coarse angling in Scotland commissioned by the Scottish Executive revealed that angling is extremely important to Scotland's economy, particularly in rural areas with anglers spending about £113M annually (see Table 3 for North East Scotland Data). When substitution effects are taken into account, this produces an estimated £100M of output in the Scottish economy, and supports around 2,800 full time job equivalents. In addition to fishery proprietors, many businesses, such as hotels, guest houses, restaurants and tackle shops are to a greater or lesser extent dependent upon angling for their continued trade. Angling is mainly focused on salmon and sea trout

Table 3 Angler expenditure table (£ 000s) for North East Scotland (Aberdeenshire, Angus and Tayside)

Fishery	Value (£ 000s)
Salmon & sea trout	£24,344
Brown trout	£1,589
Rainbow trout	£4,910
Coarse fish	£824
Total	£31,667

²⁶ <http://www.scotland.gov.uk/Publications/2004/06/19506/38879>

but there are increasing numbers of put-and-take angling developments based on artificially stocked rainbow trout ponds.

4.3 Biosecurity – current and potential threats

Thirty two INNS and fish diseases have been included in the ERFT Biosecurity Plan of which 19 high priority species will be the main focus for action. These high priority species were identified as those that:

- 🌿 Already exist within the ERFT area,
- 🌿 If introduced would have severe consequences for local biodiversity and economy; and/or
- 🌿 Have a high risk of introduction due to nature of the pathways for their introduction and their current geographic proximity.

4.3.1 Current biosecurity issues

Current biosecurity issues in the Esk area are associated with eight INNS, two translocated native species and one fish parasite:

- 🌿 American mink (*Mustela vison*) is present mainly in the upper parts of the North and South Esk catchments. Mink spread by migration and kill water fowl, small mammals and juvenile fish. Mink are linked to the decline of water voles in the Cairngorms National Park area with 94% of sites occupied by water voles in the 1950s are now unoccupied.
- 🌿 Canadian pondweed (*Elodea canadensis*) is present in various locations throughout the Esk district. It is spread by disposal of plants or plant fragments near waterways, escapes from garden ponds during flood episodes and possibly by birds and other animals. Canadian pondweed can dominate native macrophyte communities which can lead to their extinction and thereby impacts local invertebrate communities. It can also increase metal loads within waterbodies which compounds its impacts on native flora and fauna.
- 🌿 Nuttall's pondweed (*Elodea nuttallii*) is present in one location within the catchment of the Pow Burn, a tributary of the South Esk. It spreads through escapes from garden ponds, through garden waste and by birds and animals. It dominates native macrophyte communities which can lead to their extinction and removes metals from sediments and releases them into the water.
- 🌿 Rhododendron (*Rhododendron ponticum & hybrids*) is present in many locations throughout the middle and lower Esk and coastal river catchments. It spreads by natural seed and vegetative dispersal after intentional planting in gardens, parks and demesnes. It forms dense thickets and out-competes native plants for space and resources with impacts on fish and invertebrate communities as well as preventing site access.
- 🌿 Japanese knotweed (*Fallopia japonica*) is extensively located throughout the main Esk catchments. It has spread along rivers by movement of plant fragments by water and is found in many other areas

through the movement of plant debris in soil and on vehicles. It forms dense thickets which can exclude native plants and prohibit regeneration. Dense stands can also hinder access, reduce biodiversity and alter the habitat for wildlife.

- 🌿 Himalayan balsam (*Impatiens glandulifera*) is present in scattered populations throughout the Esk catchments and coastal rivers. It spreads through natural dispersion by wind or water from areas in which it has been planted or introduced through the transport of contaminated soil. It forms thick monospecific stands that can shade out low level native plants reducing biodiversity and denuding river banks of understory vegetation. Winter dieback of the plants exposes soil to erosion.
- 🌿 Giant hogweed (*Herculeum mantegazzianum*) is widespread and is present in large areas of the Esk catchments. Spreads through seed dispersal and the movement of soil contaminated by its seeds. It is a public health hazard due to the toxins in the sap reacting with UV light to blister skin. Dense stands can hinder access. Giant hogweed out competes native vegetation for space and resources, and can result in a loss of plant and invertebrate diversity. Winter dieback exposes soil to erosion with loss of river banks and increased sedimentation.
- 🌿 Rainbow trout (*Oncorhynchus mykiss*) is farmed at Kinnaird Fish Farm in the South Esk catchment. Although there are no complete records of distribution, it has been introduced to ponds/fisheries throughout the area for angling. Escapees have been caught by anglers in the vicinity of the farm. In particular significant numbers escaped in the summer of 2008 when the farm was restructured. Escaped farmed fish are a potential source of viral and bacterial diseases affecting wild salmonids and they also compete for resources with native species.
- 🌿 Minnow (*Phoxinus phoxinus*) is a translocated species that has been introduced into the Esk district by anglers. Minnows compete for food and territory with native species but they also provide another food resource for kingfishers, herons, sawbill ducks and other larger fish species. Minnows have been caught in all catchments within the ERFT area during salmonid juvenile surveys.
- 🌿 *Anasakis sp* is a nematode worm that causes the Red Vent Syndrome (RVS). RVS has been found in salmon in over 50 Scottish rivers since June 2007 including the North and South Esks. It can cause varying degrees of bleeding and swelling to salmon vents and may also affect humans who become infected from eating raw meat for example sushi.
- 🌿 American signal crayfish (*Pacifastacus leniusculus*) has been deliberately introduced into ponds which connect into the Luther and there is one record from the Pow Burn on the South Esk. American signal crayfish can feed on aquatic plants, invertebrates, juvenile fish, destabilise river banks by burrowing and exclude salmonids from their preferred habitats.

4.3.2 Potential Biosecurity Issues

The invasive non-native species listed below are not currently present within the Esk district (Tables 4 and 5). They have been classified as High or Medium level threats depending on their likely impact on the local economy and biodiversity in combination with the likelihood of their introduction. The level of

risk of introduction was based on the pathways for the introduction of INNS, their current geographic proximity and the uses within the ERFT area

High Threat: Species with **Severe** consequences for local biodiversity and the economy and a **High to Medium** risk of introduction

Medium Threat: Species with **Moderate** consequences for local biodiversity and the economy with a **Low to High** risk of introduction

There are five High Threat level species that could be introduced into the Esk District that include the fish parasite *Gyrodactylus salaris*, three freshwater invertebrates and two aquatic plant species (Table 4).

Table 4 High Threat level species their impacts and risk of introduction

SPECIES	RISK OF INTRODUCTION	LOCAL IMPACTS
<i>Gyrodactylus salaris</i> (Freshwater external parasite of salmon)	High - Through unintentional introduction from anglers and water sport enthusiasts through: <ul style="list-style-type: none"> contaminated fish clothing/equipment Ballast water 	<ul style="list-style-type: none"> Projected catastrophic impact on salmon (<i>Salmo salar</i>) populations throughout Scotland. (It has largely exterminated <i>S. salar</i> in 41 Norwegian rivers)
Australian swamp stonecrop (<i>Crassula helmsii</i>)	High – Through introduction from two existing populations nearby other pathways include: <ul style="list-style-type: none"> Garden trade²⁷ Disposal of garden waste Spread by animals and human activity 	<ul style="list-style-type: none"> Suited to a wide range of slow moving freshwater systems. Out competes native species. Forms dense carpets choking ponds and ditches. Reduced light levels below dense growths can cause die off of waterweeds and algae and reduce water oxygen levels
Zebra mussel (<i>Dreissena polymorpha</i>) Freshwater Bivalve	Medium -through unintentional introduction from contaminated boat hulls and engines and bilge water.	<ul style="list-style-type: none"> Major economic impact on all subsurface water structures e.g. blocking pipes and impacting upon hydro-electric schemes Varied and unpredictable ecological impacts including changes to freshwater nutrient cycles, extinction of local mussels and changes to stream substrate affecting spawning areas
Chinese mitten crab (<i>Eriocheir sinensis</i>) Resides in freshwater but migrates to the sea for breeding.	Medium -through unintentional introduction from boat hulls and live food trade.	<ul style="list-style-type: none"> Burrowing in high density populations damages river banks Concern over impacts on local species Intermediate host for the mammalian lung fluke known to infect humans
Curly waterweed (<i>Lagarosiphon major</i>)	Medium – found in a small number of locations throughout Scotland especially in the central belt area and spread through: <ul style="list-style-type: none"> Disposal of garden waste Animals and human activity Fragmentation by wind dispersal, boat movement, angling equipment and possibly water fowl 	<ul style="list-style-type: none"> Capable of forming very dense infestations in suitable habitats and occupying the full water column in waters up to 6m deep with significant impacts on native plants, insects and fish. It is a serious threat to tourism, angling, boating and other recreational pursuits as well as conservation goals

²⁷ Note that although the sale of species that are or can become invasive is not illegal, garden centres should be made aware of the impacts of known or potential INNS if they are released into the wild.

There are also 15 Medium Threat level species of which there is a high risk of introduction for two species, a medium risk for eight species and a low risk for five species (see Table 5 below).

Table 5 The risk of introduction of Medium Threat level INNS.

SPECIES		RISK OF INTRODUCTION
Ruddy duck (<i>Oxyura jamaicensis</i>)	High	Could migrate from a number of locations in eastern Scotland
Orfe (<i>Leuciscus idus</i>)	High	Through intentional/unintentional introduction from an existing population nearby.
Water primrose (<i>Ludwigia grandiflora</i>)	Medium	Unintentional introduction from boat hulls and ponds
Water fern (<i>Azolla filiculoides</i>)	Medium	Through intentional/unintentional introduction from numerous locations throughout Scotland, especially central belt
Slipper limpet (<i>Crepidula fornicate</i>)	Medium	Unintentional introduction from boat hulls
Didemnum Tunicates / sea squirts (<i>Didemnum vexillum</i>)	Medium	Unintentional introduction from marine fishing boat hulls
Wireweed (<i>Sargassum muticum</i>)	Medium	Unintentional introduction from marine fishing boat hulls
Ruffe (<i>Gymnocephalus cernuus</i>)	Medium	Currently recorded in central Scotland and could be introduced as live bait or in ballast water
Bullhead (<i>Cotus gobio</i>)	Medium	Translocated species recorded in central Scotland that could be introduced deliberately or as live bait
Common cord grass (<i>Spartina anglica</i>)	Medium	One location near St Andrews
Large flowered waterweed (<i>Egeria densa</i>)	Low	Only found to date in East Lothian. Possible introduction from ponds
Floating pennywort (<i>Hydrocotyle ranunculoides</i>)	Low	Currently only in England up to the midlands. Possible introduction from ponds
Parrot's feather (<i>Myriophyllum aquaticum</i>)	Low	Through intentional/unintentional introduction from two existing populations in the south of Scotland
Fanwort (<i>Cabomba caroliniana</i>)	Low	Only found in one location in southern Scotland possible introduction from ponds
Asian topmouth gudgeon (<i>Pseudorasbora parva</i>)	Low	Currently only recorded from 5 locations in England. Could be introduced as live bait, in ballast water or as releases from aquaria

From Tables 4 & 5, the main pathways or means of introduction of both High and Medium Threat level species into the ERFT catchments are:

- 🌿 Intentional introduction or planting
- 🌿 Fouling and ballast water of marine vessels
- 🌿 Fouling and ballast water of freshwater vessels
- 🌿 Escapes from fish farms, ponds, gardens, demesnes
- 🌿 Contaminated water sports equipment (e.g. from anglers, canoeists)
- 🌿 Movement of contaminated soils or vehicles
- 🌿 Improper control and disposal measures e.g. cutting and dumping without treatment.

To prevent the spread of these INNS and diseases these pathways need to be restricted and where feasible existing populations controlled or eradicated and their impacts mitigated.

4.4 Stakeholders

The engagement of key stakeholders is imperative for the success of this plan. Regulatory agencies and bodies associated with other relevant management plans include the:

- 🌿 Scottish Government, Edinburgh
- 🌿 Angus and Aberdeenshire Local Councils
- 🌿 Forestry Commission, Dunkeld
- 🌿 Angus and Aberdeenshire SNH Office
- 🌿 Angus and North East Scotland SEPA office
 - Tay and North East of Scotland Area Advisory Groups
- 🌿 The Esk District Salmon Fisheries Board
- 🌿 Tayside, Cairngorms National Park and North East Local Biodiversity Action Groups
- 🌿 Scottish Wildlife Trust, Montrose Basin
- 🌿 Royal Society for the Protection of Birds

Other groups that are also important for the prevention of introduction and spread of INNS were identified from an analysis of the pathways presented in Table .

Table 6 Pathways and stakeholders in the Esk District

Pathway	Stakeholders
Intentional introduction or planting	Local Councils and Planning departments
Fouling and ballast water of marine vessels	Montrose Port Authority/SEPA
Fouling and ballast water of freshwater vessels	Montrose Port Authority/SEPA/UK Government; local canoe and water sports organisations
Sale from garden or pond centres	Horticultural Trade Association/Ornamental Fish Producers
Contaminated water (sports equipment e.g. from anglers, canoeists) and as a medium for live fish transport	Esk District Salmon Fisheries Board/FRS
Escapes from fish farms, ponds, gardens, desmesnes.	FRS/SEPA/Planning Authorities/Plantlife/riparian owners/members of the public/angling clubs
Movement of contaminated soils or vehicles	Local Councils/SEPA/quarries/ building contractors
Improper control and disposal measures e.g. cutting and dumping without treatment	Local councils/SEPA/environmental health/ Plantlife/riparian owners/members of the public

This plan identifies key actions required to change the behaviour and practices of the above groups so as to reduce the opportunities for the introduction and spread of INNS and fish diseases.

SECTION 5 BIOSECURITY MANAGEMENT STRATEGY

The objectives of this plan will be achieved through a partnership approach to implement the following strategic elements:

- 🌿 Prevention,
- 🌿 Early detection, surveillance, monitoring and rapid response,
- 🌿 Mitigation, control and eradication

5.1 Objectives and Outputs

This section describes the expected outputs from implementation of the three plan objectives and the actions required for their realisation. Agreed actions for **prevention** are focussed on the disruption of the pathways for the introduction and spread of INNS, translocated species and fish diseases and include a mixture of awareness raising and practical measures. Awareness activities take note of the GB Awareness and Communication Strategy. Increased probability of **early detection** of the introduction or spread of INNS is realised through surveys to establish the location of existing populations, establishment of a coordinated local surveillance and reporting system supported by routine **monitoring** of established populations or sites vulnerable to the introduction and spread of these species.

Objective 1: Reduce the risk of introduction of new INNS within the Esk District.

Output 1.1: Key stakeholders aware of the impacts and measures required to prevent their introduction and spread

Awareness activities will be focussed on addressing the identified local priorities as well as supporting the GB Awareness and Communication strategy and its key messages to the general public:

- 🌿 Invasive non-native species damage our environment, the economy, our health and the way we live
- 🌿 We require the support of stakeholders to increase awareness and better understanding of INNS issues and impacts
- 🌿 Invasive Non Native Species:
 - Threaten our native plants, animals and habitats
 - Cost the British economy between £2 and £6 billion pounds each year
 - Can threaten our health

The local priorities for awareness will focus on disrupting the pathways for the introduction and spread of INNS in the Esk District. The key stakeholders, the identified areas of priority and the proposed mechanisms for delivery are presented in Table 7 below. The roles and actions of key government agencies and non government bodies in promoting awareness of INNS issues is presented in Table 8.

Table 7 Proposed priority areas for awareness and delivery mechanisms according to stakeholder group

Stakeholder Group	Priority Area	Mechanism of Delivery
Local fish farms	<ul style="list-style-type: none"> - Impact of INNS and how they spread -Dangers of importing from contaminated areas - Use of proper screens and other biosecurity measures -Need for controls on movement of stock and water 	<ul style="list-style-type: none"> - ERFT to liaise with local industry and industry and trade associations to advise members regularly of best practice in respect of INNS - Enforcement agencies (SEPA) to undertake site visits to discuss and advise on issues involving INNS -Invasive Species Scotland²⁸ website
Montrose Port Authority	<ul style="list-style-type: none"> - Avoid pumping out of non sterilised ballast water in harbour - Role of hull fouling in the introduction and spread of INNS 	<ul style="list-style-type: none"> -Formulate and implement an interim code of practice requiring non-sterilised ballast water to be discharged on the ebb tide and away from harbour area. -ERFT to assist with the supply of posters and other awareness material for display and signage. -Invasive Species Scotland website
Local Garden Centres	<ul style="list-style-type: none"> -Promotion of existing codes of practice covering the security and disposal of INNS to all garden centres -Target gardeners to dispose plant material and/or soils in a responsible manner. 	ERFT to work with garden centres to encourage distribution of codes and posters (available from Plantlife) and to advise the general public of INNS issues
Local Aquarium and Pond stockists	<ul style="list-style-type: none"> -Promote code of practice to all pet shops and suppliers of ornamental fish -Target aquarists and pond keepers to dispose of unwanted animals or plants in a responsible manner 	-ERFT to work with retailers to encourage distribution of codes and posters (available from Plantlife)
Water User associations (canoeists, sailing clubs)	<ul style="list-style-type: none"> -Promote awareness to clubs and participants of the dangers arising from INNS and Gs -Identification of suitable persons to act as “eyes” 	<ul style="list-style-type: none"> -ERFT to work with associations to promote disinfection of equipment and provide appropriate facilities to eliminate the risk of accidental transfer of INNS - FACT campaign and web site -Invasive Species Scotland website
Landowners	<ul style="list-style-type: none"> - Promote knowledge of biosecurity issues amongst all tenants and resource users - Identification of suitable persons to act as “eyes” for the ERFT 	<ul style="list-style-type: none"> -Work with ERFT to ensure dissemination of best practices and appropriate signage to reduce threats from INNS -ERFT to offer training for “eyes” -Invasive Species Scotland website
Angling clubs	<ul style="list-style-type: none"> - Promote knowledge of biosecurity issues amongst all members and visiting anglers - Ensure the distribution of information and erection of signage in fishing huts and recognised car parks -Recommend suitable members to act as “eyes” 	<ul style="list-style-type: none"> -Work with ERFT to ensure dissemination of best practices and appropriate signage to reduce threats from INNS -ERFT to offer training for “eyes” -Invasive Species Scotland website

²⁸ www.invasivespeciesscotland.org.uk

Stakeholder Group	Priority Area	Mechanism of Delivery
General Public	- General awareness of impacts and measures to prevent/control INNS	-Local Media Campaigns -Use of websites (RAFTS, NNSS) -ERFT to develop a leaflet to promote the Biosecurity plan, the dangers arising from INNS and the reporting system -Promote the Biosecurity Plan to all retail outlets who deal with NNS e.g. pet shops, garden centres -Invasive Species Scotland website
Schools	- General awareness of impacts and measures to prevent/control INNS	-School visits focusing on ecological clubs and encouraging appropriate field trips

Table 8 Roles and/or actions of key government and non government agencies in promoting awareness of INNS issues

Stakeholder Group	Priority Action	Mechanism of Delivery
ERFT	- Promote awareness to general water users promoting the Biosecurity Plan and highlighting the dangers from INNS	- Promote and launch of Biosecurity Plan to coincide with National Biosecurity Action -Develop a leaflet to promote the Biosecurity plan, the dangers arising from INNS and the reporting system and ensure appropriate distribution to stakeholders -See actions for ERFT above
EDSFB	-Continue to promote awareness to anglers and angling clubs of the dangers arising from INNS through open days, field visits and demonstrations	Continue to promote disinfection of equipment and provide appropriate facilities
Local Councils: Aberdeenshire Council – Bervie catchment Angus Council – Lunan, South Esk and North Esk catchments	- Promote use of codes of best practice for construction, haulage, horticulture, aquaculture amongst local business and relevant departments particularly construction, garden and pet trade - Promote awareness of planning, waste disposal and transport regulations amongst local business - Promote awareness of the GB communications strategy to the general public	- Councils to promote codes of best practice at every opportunity e.g. including them with planning applications and building warrants - Production (by Council’s legal department) and distribution of information leaflets on all relevant legislation relevant to INNS -Holding of awareness event/open days to promote biosecurity issues -Distribute leaflets with council tax bills - Display posters (produced by RAFTS) in council offices, libraries and other public places
SEPA	- Clarify SEPA responsibilities for INNS to both staff and customers - Incorporate INNS issues into relevant guidance documents (as they are developed or updated)	- Page on website with links to relevant SEPA information and other sites e.g. Non-Native Species Secretariat, RAFTS, Scottish Canoe Association. - Digital documents available for download on SEPA Website
SNH	-Promotion of good practice in the prevention, control and eradication of INNS. -Provision of funding for local INNS initiatives	- Holding of SNH Sharing Good Practice events. - SNH part funded the South Esk Catchment Management Plan ²⁹ & the Esk District Salmon Fisheries Board Invasive Weeds survey of the North and South Esk. This survey will inform any catchment/tributary scale operations in relation to INNS issues.

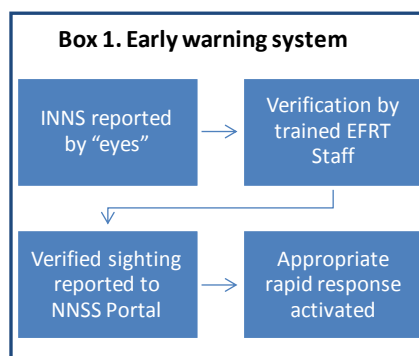
²⁹ <http://www.angusahead.com/LiveAngus/RiverSouthEskCatchmentPartnership/Introduction.asp>

The delivery mechanisms form the basis for the actions required to promote awareness amongst the key stakeholders of the Esk District. The actions are presented in Section 5.2 along with the responsible agency and a timeframe for their implementation.

Objective 2: Establish optimum early surveillance, detection, monitoring and rapid response systems for the identified INNS which pose significant threats to local biodiversity and economy

Output 2.1 Early warning systems for surveillance, detection and monitoring of new and existing INNS in the district established.

The “eyes” of the early warning system (Box 1) will be trained members of the public, bailiffs, ghillies, canoeists and walkers with reported sightings verified by trained ERFT personnel. A sighting of a GB or local high priority species (Table 10) will be verified within 48 hours. If confirmed, it will initiate the appropriate GB or local high priority response (see Output 2.2 below). Reports of priority species will be verified as time permits. All verified sightings will also be entered onto the ERFT Geographic Information System to monitor INNS distributions within the Esk District. Actions to establish the reporting system are presented in Section 5.2.



Output 2.2: Rapid response mechanism (RRM) established and functioning.

The type of rapid response will depend on the species detected (Table 10) and proportionate to the threat posed. There are three levels of response:

- 👁️ a GB level response that will be lead by national governmental institutions as part of the GB INNS strategy
- 👁️ a high priority local rapid response
- 👁️ a priority local rapid response

Table 10 Response level for the 39 invasive non-native species

GB Response	High Priority Local Response	Priority Local Response
Gyrodactylus salaris	Water fern	American mink
Asian topmouth gudgeon	Ruffe	Canadian pond weed
Ruddy duck	Bullhead	Nuttal’s pond weed
Didemnum spp	Parrot’s feather	Japanese knotweed
Water primrose	Curly waterweed	Himalayan balsam
	Australian swamp stonecrop	Giant hogweed
	Orfe	Rhododendron
	American signal crayfish	Rainbow trout
	Mitten crab	Minnow
	Slipper limpet	Anasakis sp.
	Zebra mussel	
	Common cord grass	
	Wireweed	
	Fanwort	
	Large flowered waterweed	
	Floating pennywort	

There are likely to be some species which will not qualify for a GB rapid response which are considered priorities at a Scottish level and action may therefore be instigated by Scottish agencies or the Scottish Government. There is no agreed species list at present; this work is being taken forward by the Scottish Working Group on Invasive Non-Native Species and once agreed, will be circulated to all interests.

A confirmed sighting of a GB priority species will trigger the GB contingency plan for that species for example *Gyrodactylus salaris*. However, there is still a need for local level protocols to link with and assist the GB response, as well as for local level contingency plans for local priority species. The elements to be included in the response to detection of a GB priority species or the contingency plans for local priority species are outlined in Table 11. Actions to establish the RRM are presented in Section 5.2.

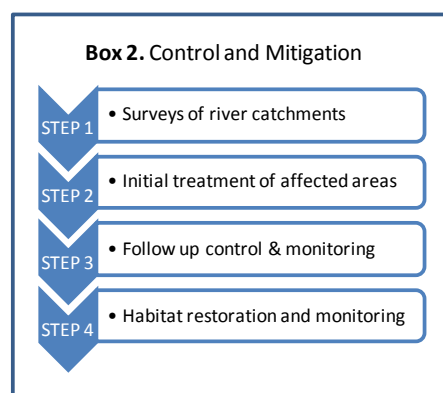
Table 11 Elements of contingency plans or protocols for response to GB priority, local high priority and priority species

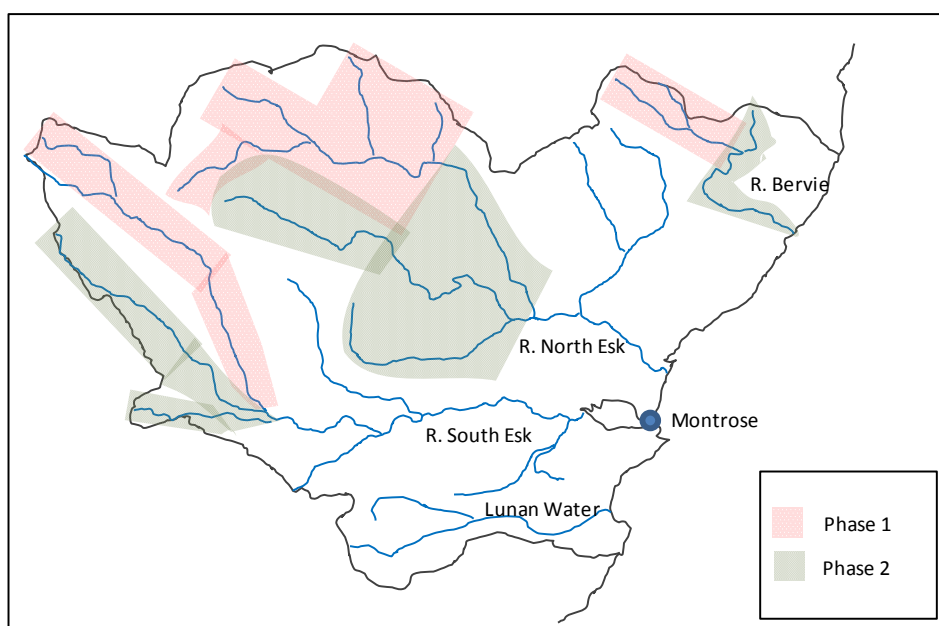
GB Response	Local High Priority Response	Local Priority Response
<ul style="list-style-type: none"> -Report to local and GB institutions -Determine the extent of infestation -Isolate area where practicable 	<ul style="list-style-type: none"> -Report to local and GB institutions -Determine the extent of infestation - Isolate area where practicable Establish source and check related sites - Closure of all pathways -Decide on appropriate action eradication/containment. - Approve eradication methodology -Monitor 	<ul style="list-style-type: none"> -Report to local and GB institutions -Determine the extent of infestation -Survey in course of normal work to establish and map distribution -Include new areas in existing eradication/control programmes - Identify and close all pathways - Monitor as part of planned catchment monitoring programme

Objective 3: Develop effective control and eradication programmes for existing INNS which are operational and sustainable.

Output 3.1 Effective sustainable control/eradication programmes within the Esk District are established and fully functional

Surveys will identify INNS distributions within the Esk district. Survey information will be entered onto GIS and analysed to target nascent and “upstream or source” populations of INNS that are potential sources of spread and re-infestation. Control and eradication programmes will be phased with treatment commencing at the upstream point of distribution and then systematically progressing downstream (see Map below). A combination of specialist contractors, volunteers and ERFT/EDFB staff will be used depending on the management requirements of the area involved. Envisaged mitigation, eradication and control measures for the 11 INNS present in the Esk catchment are presented in Table 13.





Map of EFRT District with indicative phasing of control activities within the river catchments. Note that these may change depending on the results of the planned surveys

Table 13 Invasive Non Native Species Control and Eradication in the Esk District








SPECIES	ACTION	TREATMENT/POST TREATMENT ACTIONS
Japanese knotweed	Control/Eradiation Identify and close pathways.	Leaf spraying with Glyphosate by contractors for large populations with follow up of stem injection treatment to maintain control. Stem injection for smaller populations and individual plants Requirements for riparian zone habitat restoration assessed and implemented
Himalayan balsam	Control/Eradiation Identify and close pathways	Hand pull Monitor catchment for activation of dormant sources of infestation Habitat restoration if required
Giant hogweed	Control/Eradiation Identify and close pathways	Spray large areas with aquatic roundup 3x in year 1; repeat as required. Stem injection is also an option. Monitor catchment for activation of dormant sources of infestation Habitat restoration if required
Rhododendron	Monitor distribution	
Canadian pond weed	Monitor distribution	
Nuttall's pond weed	Monitor distribution	
American mink	Control/Eradiation	Continue trapping programme
American signal crayfish	Control/Eradiation	Monitor population post treatment
Rainbow trout	Monitor distribution	
Minnow	Restrict to present distribution	
Red vent syndrome	Monitor	FRS sample net & coble catch on the North Esk

The actions required to establish the proposed control/eradication programme are presented in Section 5.2.

Output 3.2 A locally based, fully resourced organisation is established to implement non-government actions specified within the Esk District Biosecurity Plan.

The sustainable and effective implementation of biosecurity measures at the local level would be facilitated by the establishment of a multi-stakeholder group or forum, for example **The Esk Biosecurity Group** (EBG) ([ADAS, 2008](#)³⁰). This group would plan and coordinate activities on behalf of all stakeholders within the Esk District. The consultation procedure to finalise of the Esk Biosecurity Plan would assist in the development of such a group from the principal stakeholders.

The remit of the EBG would effectively be the implementation of this Biosecurity Plan for the Esk District. This would also require support from the partners and a focal point to facilitate delivery of the following issues:

-  Promoting awareness of the impacts of INNS to all stakeholders
-  Development of the early surveillance, detection, monitoring and rapid response mechanisms
-  Maintaining a database of all INNS sightings
-  Maintaining INNS on a GIS system
-  Instigating and coordinating appropriate control measures (eradication/containment) for identified INNS
-  Monitoring the effectiveness of all measures implemented to reduce/eliminate the impact of INNS
-  Liaising with government bodies with regard to use of best practices, legislative and policy issues.

The actions required to develop a stakeholder group or forum are presented in Section 5.2.

³⁰ http://www.snh.org.uk/pdfs/publications/commissioned_reports/Report%20No299.pdf

5.2 Actions and Timeframes

The section presents the actions required to realise the objectives and outputs described in Section 5.1 along with the lead agency, key partners and timeframe required for their implementation.

Table 8 Required actions, lead agency, key partners and timeframe according to objective and output.

ACTION	LEAD	PARTNERS	TIMEFRAME								
			2009	2009	2010	2010	2011	2012	2013	2014	2015
Objective 1: Reduce the risk of introduction of new INNS within the Esk District.											
Output 1.1: Key stakeholders aware of the impacts and measures required to prevent their introduction and spread											
Launch of ERFT Biosecurity plan through national and local – create press release	ERFT		—								
Produce leaflet on legislation including waste management & planning regulations	Angus and Aberdeenshire councils	SNH, SEPA		—	—						
Produce leaflet on biosecurity risks and the reporting system	ERFT	SNH, SEPA		—							
Produce posters on biosecurity risks and distribute to the general public	ERFT	RAFTS, SNH, SEPA, Plantlife		.....	.....	.....	.....	.....	.....	.....	.....
Continue to promote and install disinfection facilities for anglers at all angling proprietors fishing huts/parking points	EDSB/ERFT		.....	.....	.....	.....	.....	.....	.....	.....	.....
Develop interim code of practice with Montrose Harbour Authority	Montrose Port Authority	ERFT		—	—						
Distribute Codes and posters to relevant retail outlets and clubs at open days and events such as agricultural shows	Angus and Aberdeenshire councils	SNH, SEPA			.....	.....	.....	.....	.....	.....	.....
Engage with Landowners and angling clubs to promote awareness measures to tenants, resource –users, members and visitors	ERFT	SNH, SEPA		—	—						
Work with environmental groups of local schools to enhance awareness of INNS	ERFT	SNH			.....	.....	.....	.....	.....	.....	.....
Objective 2: Establish optimum early surveillance, detection, monitoring and rapid response systems for the identified INNS which pose significant threats to local biodiversity and economy											
Output 2.1 Early warning systems for surveillance, detection and monitoring of new and existing INNS in the district established.											
Train two ERFT personnel in the identification of INNS	ERFT	SNH, RAFTS									
Train ERFT as trainers	ERFT	SNH, RAFTS		—							
Work with user and interest groups to identify “eyes”	ERFT	EBG		—	—						
Training of “eyes”	ERFT	SNH, SEPA		—	—		—	—	—	—	—
Produce database to record and manage INNS sightings	ERFT	RAFTS		—							
Establish, test and refine communication mechanisms within surveillance system	ERFT	RAFTS		—	—						
Monitor and periodically evaluate efficacy of surveillance system	ERFT	RAFTS		.....	.....	.....	.....	.....	.....	.....	.....

ACTION	LEAD	PARTNERS	TIMEFRAME									
			2009	2009	2010	2010	2011	2012	2013	2014	2015	
Output 2.2: Rapid response mechanism (RRM) established and functioning.												
Formulate contingency plans	EFRT	Local Councils, SEPA and SNH		—	—							
Identification of personnel	ERFT	Local Councils, SEPA and SNH		—								
Training of personnel	EFRT	Local Councils, SEPA and SNH		—	—							
Identification of funding resources	ERFT	Local Councils, SEPA and SNH		.....	.....	.....	.....	.....	.....	.....	.....	.....
Acquisition of equipment	ERFT	Local Councils	—									
Refresher training	ERFT					—		—	—	—	—	—
Establish local communications systems	EFRT	Local Councils, SEPA and SNH		—	—							
Monitor population	EFRT			.....	.....	.....	.....	.....	.....	.....	.....	.....
Objective 3: Develop effective control and eradication programmes for existing INNS which are operational and sustainable.												
Output 3.1 Effective sustainable control/eradication programmes within the Esk District are established and fully functional												
Initiate and complete catchment wide surveys by trained personnel	EFRT		—	—								
Establish GIS database for recording and mapping INNS within Esk district	ERFT	RAFTS	—									
Continuation of mink eradication programme	Cairngorms National Park Authority		—	—	—	—	—	—	—	—	—	—
Implementation of phase 1 of control/ eradication programme	EFRT	Angling clubs, Landowners, SNH			—	—	—	—	—	—	—	—
Implementation of habitat restoration scheme within successful control areas taking into account all relevant species	EFRT	Angling clubs, Landowners, SNH			—	—	—	—	—	—	—	—
Monitor the effectiveness of control programmes	EFRT			—	—	—	—	—	—	—	—	—
FRS monitoring Red Vent Syndrome	FRS			—	—	—	—	—	—	—	—	—
Output 3.2 A locally based, fully resourced organisation is established to implement non-government actions specified within the Esk District Biosecurity Plan.												
Complete draft biosecurity plan	ERFT		—									
Consult with all stakeholders to agree biosecurity plan	ERFT	All	—									
Consult with representatives from all stakeholder groups to form Esk Biosecurity Group	ERFT	All		—	—							

SECTION 6 MONITORING

Biosecurity planning has been initiated within the Esk Area by the ERFT through the preparation of this plan. Progress in implementing the plan will be determined by the level of engagement, support and commitment of the stakeholders and partners to deliver action against shared priorities. That is now the challenge for all parties as we seek to deliver the objectives of this plan.

To ensure the effective implementation of this plan, it is vital that the outcomes and impacts of the actions are monitored and reviewed to ensure that the objectives are being met. Thus a coordinated monitoring programme must be established to ensure efficacy and sustainable treatment initiatives. This programme should include:

- 👁️ Assessment of efficacy of surveillance and rapid response systems
- 👁️ Occurrence and distribution of the selected INNS within the Esk area
- 👁️ Effectiveness of control/eradication programme including:
 - Application/delivery of effective concentrations of biocides
 - Checking that treatments have been effective
 - Re-treating immediately where treatment has been ineffective
 - Monitoring and investigation of any apparent resistance to treatments
 - Surveillance of the area for signs of dormant plants becoming activated
- 👁️ Assessment of the ability to close established pathways of transmission
- 👁️ Monitoring the effectiveness of all legislation and codes of practice especially those which are aimed at restricting/closing pathways
- 👁️ Monitoring general activities within the district and assessing them in terms of risk for the introduction of INNS.

Monitoring activities will be undertaken by EFRT staff in conjunction with stakeholder representatives who will be aware of local initiatives and priorities for action.