

Kyle of Sutherland District Biosecurity Plan

2010 – 2016

FINAL VERSION 1

Prepared by

The Kyle Fisheries Trust

2009

Scottish Charity (SCO30207)

- **What is Biosecurity?**

Scotland's Environmental and Rural Services in their Biosecurity Guidance state that "Good biosecurity practice refers to a way of working that minimises the risk of contamination and the spread of animals and plant pests and diseases, parasites and non native species".

- **What are Invasive Non Native Species?**

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

Abbreviations

Abbreviation	Organisation
ASSG	Association of Scottish Shellfish Growers
BTA	British Trout Association
DSFBs	District Salmon Fisheries Boards
FCS	Forestry Commission Scotland
KoSFT	Kyle of Sutherland Fisheries Trust
MS	Marine Scotland
NNSS	Non Native Species Secretariat
RAFTS	Rivers and Fisheries Trusts of Scotland
SEPA	Scottish Environment Protection Agency
SFCC	Scottish Fisheries Co-ordination Centre
SG	Scottish Government
SNH	Scottish Natural Heritage
SSPO	Scottish Salmon Producers' Organisation
TWG	Tripartite Working Group

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Executive Summary

This plan describes the biosecurity issues of the Kyle of Sutherland District 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 invasive species (INNS), fish diseases and parasites. The vision of this plan is:

'To eradicate where present and prevent the establishment of specified Invasive Non Native Species within the Kyle of Sutherland Fisheries district through appropriate management, data collection, liaison, and education'

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

Objective 1: Prevent the introduction and spread of INN species within the Kyle of Sutherland fisheries district.

Objective 2: Develop detection and surveillance of, and rapid response to, new incidences of specified INN species

Objective 3: Eradicate existing populations of specified INNS within the Kyle of Sutherland Fisheries District

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 implementation of this biosecurity plan will bring many socio-economic and environmental benefits and a summary of these are described below;

- The prevention of the deadly salmon parasite *Gyrodactylus salaris* from entering the Kyle of Sutherland district which would cause catastrophic economic and environmental loss.
- A holistic and collaborative eradication programme of INN riparian plants such as Japanese Knotweed.
- Increased biodiversity and the conservation of important natural habitats for native species such as Otter, Atlantic salmon, European eel, freshwater pearl mussel and lampreys.
- The visual conservation and maintained amenity value of local landscapes.

¹ www.nonnativespecies.org

- The protection of the endangered water vole and ground nesting birds from American Mink.
- Reduced risk of Zebra mussel from entering the district watercourses helps protect vital local businesses such as hydro electric schemes, whisky distilleries from high mitigations costs.

The table below 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.

Action	Lead	Partners	TIMEFRAME								
			2009	2009	2010	2010	2011	2012	2013	2014	2015
Objective 1: Prevent the introduction and spread of INN species within the Deveron fisheries district.											
Output 1.1 – All key stakeholders aware of the ecological and economic impacts of INNS, means of introduction and spread as well as management best practices.											
Launch of DBIT Biosecurity plan through national and local press release	KoSFT		—								
Produce leaflet on legislation including waste management & planning regulations	Highland Council	AAG		—	—						
Produce leaflet on biosecurity risks and the reporting system	KoSFT/RAFTS			—							
Produce posters on biosecurity risks and distribute to the general public	RAFTS	KoSFT AAG Highland Council		.....	.....	.....	.....	.....	.....	.....	.....
Continue to promote and install disinfection facilities for anglers at all angling proprietors fishing huts/parking points	DSFB		.....	.....	.....	.....	.....	.....	.....	.....	.....
Distribute Codes and posters to relevant retail outlets and clubs at open days and events such as agricultural shows	HISF	KoSFT AAG members		.....	.....	.....	.....	.....	.....	.....	.....
Engage with Landowners and angling clubs to promote awareness measures to tenants, resource –users, members and visitors	KoSFT/DSFB			—	—						
Work with environmental groups of local schools to enhance awareness of INNS	Easter Ross LBAP group	CFFB & T Highland Council Ranger Service		.....	.....	.....	.....	.....	.....	.....	.....
Objective 2: Develop optimum detection and surveillance of, and rapid response to, new INN species											
Output 2.1 - 'Early warning system' established for new INN species in district.											

Action	Lead	Partners	TIMEFRAME								
			2009	2009	2010	2010	2011	2012	2013	2014	2015
Train two KoSFT/DSFB personnel in the identification of INNS	KoSFT/RAFTS			—————	—————						
Train KoSFT as trainers	KoSFT/RAFTS			———							
Work with user and interest groups to identify "eyes"	KoSFT	Highland Council AAG SEPA		—————	—————						
Training of "reporting network"	KoSFT	RAFTS LBAP		—————	—————		———	———	———	———	———
Produce database to record and manage INNS sightings	RAFTS			———							
Establish, test and refine communication mechanisms within 'early warning' system	KoSFT Highland Council			—————	—————						
Monitor and periodically evaluate efficacy of system	CFFT & other partners			.....	.....	.....	.....	.....	.....	.....
Output 2.2 - Rapid response mechanism established for new INN species which pose significant threats to local biodiversity and economy.											
Formulate contingency plans for key species	SEPA and SNH, RAFTS, KoSFT	Highland Council		—————	—————						
Identification of personnel for response teams	KoSFT, SEPA and SNH	Highland Council		———							
Training of personnel to execute contingency plans	KoSFT, SEPA and SNH	Highland Council,		—————	—————						
Identification of funding resources	KoSFT	Local Councils, SEPA and SNH		.....	.....	.....	.....	.....	.....	.....
Acquisition of equipment	KoSFT	Highland Council, SEPA and SNH, RAFTS		———							
Refresher training	KoSFT						———	———	———	———	———
Monitor populations/treated areas	KoSFT	SNH, SEPA		.....	.....	.....	.....	.....	.....	.....
Objective 3: Develop effective control and eradication programmes for INN species.											
Output 3.1 - Control, eradication and habitat restoration programmes established and operational											
Initiate and complete catchment wide surveys by trained personnel	KoSFT	CFFT		—————	—————	—————	—————				
Establish GIS database for recording and mapping INNS within Kyle district	KoSFT	CFFT		———							
Continuation of Mink eradication/monitoring programme	KoSFT	Mink Project Neighbouring Trusts	———	———	———	———	———	———	———	———	———

Action	Lead	Partners	TIMEFRAME									
			2009	2009	2010	2010	2011	2012	2013	2014	2015	
Implementation of eradication of Japanese Knotweed programme	KoSFT			-----	-----	-----	-----	-----	-----	-----	-----	-----
Monitor the effectiveness of control programmes	KoSFT			-----	-----	-----	-----	-----	-----	-----	-----	-----
FRS monitoring Red vent syndrome	Marine Scotland			=====	=====	=====	=====	=====	=====	=====	=====	=====
Identify source of rainbow trout and begin removal	KoSFT/KoSDSFB			=====	=====	=====						

1. Scope and Purpose

This plan describes the biosecurity issues of the Kyle of Sutherland Fisheries District 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 invasive species (INNS), fish diseases and parasites. The vision of this plan is:

‘To eradicate where present and prevent the establishment of specified Invasive Non Native Species within the Kyle of Sutherland Fisheries district through appropriate management, data collection, liaison, and education’

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

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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](#)²:

- 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 its success and long term sustainability.

The implementation of this biosecurity plan will bring many socio-economic and environmental benefits and a summary of these are described below;

- The prevention of the deadly salmon parasite *Gyrodactylus salaris* from entering the Kyle of Sutherland district which would cause catastrophic economic and environmental loss.

² www.nonnativespecies.org

- A holistic and collaborative eradication programme of INN riparian plants such as Japanese Knotweed.
- Increased biodiversity and the conservation of important natural habitats for native species such as Otter, Atlantic salmon, European eel, freshwater pearl mussel and lampreys.
- The visual conservation and maintained amenity value of local landscapes.
- The protection of the endangered water vole and ground nesting birds from American Mink.
- The prevention of species such as Zebra mussel from entering the district watercourse helps protect vital local businesses such as hydro electric schemes, whisky distilleries as this species is extremely costly to mitigate against.

2. Background

Although prepared by the Kyle of Sutherland Fisheries Trust (KSFT), 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 Fisheries Trusts of Scotland (RAFTS) with backing and support from the Scottish Government (SG), Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA) and the Esmeé Fairbairn Foundation (EFF).

The need for action on biosecurity issues has been identified in the Trust's new Fisheries Management Plan ([Kyle Fisheries District Management Plan 2008-2012](#)³) and in the Draft [North Highland Area Management Plan](#)⁴ 2009-2015. 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 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 KSFT 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 KSFT, stakeholders and appropriate local regulatory for the prevention, early detection and control of non native invasive species, fish diseases and parasites. As the spread of INNS is not isolated to Ayrshire this plan will also facilitate coordination and communication

³ <http://www.rafts.org.uk/projects/fisheriesmanagementplanning>

⁴ http://www.sepa.org.uk/water/river_basin_planning

with the neighbouring fisheries Trusts, Boards, local authorities and other stakeholders of neighbouring areas e.g. West Sutherland and Cromarty Firth.

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 INNS, 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.

A [survey](#)⁵ commissioned by Scottish Natural Heritage in 2000, shows 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 (INNS) 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.

According to [CBD \(2006\)](#)⁶, **invasive non native species** (INNS) are the second greatest threat to biodiversity being capable of rapidly colonising a wide range of habitats and excluding the native flora and fauna. 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.

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](#)⁷ have estimated that INNS cost the UK economy £2 billion per year

⁵ www.snh.org.uk/pdfs/publications/review/139.pdf

⁶ <http://www.cbd.int/gbo2>

⁷ <http://www.defra.gov.uk/wildlife-countryside/wildlife-manage/non-native/index.htm>

- In the UK Japanese Knotweed is thought to affect an area roughly the size of London and the [Review of Non-Native Species Policy \(2003\)](#)⁸ has estimated the total cost of its removal using current techniques at £1.56bn.
- A Scottish Government [report](#)⁹ estimated the potential Net Economic Value loss to Scotland of the introduction of *Gyrodactylus salaris* at £633 million with severe consequences for rural communities.
- A Forestry Research [Report](#)¹⁰ estimates the current cost of clearing the invasive *Rhododendron ponticum* from Argyll and Bute as £9.3m that could rise to £64m in the next 50 years.
- 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](#)¹¹ 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

⁸ <http://www.defra.gov.uk/wildlife-countryside/pdf/wildlife-manage/non-native/review-report.pdf>

⁹ www.scotland.gov.uk/resource/doc/1062/0042434.pdf

¹⁰ [http://www.forestresearch.gov.uk/pdf/Argyll_Bute_rhododendron_2008_costs.pdf/\\$FILE/Argyll_Bute_rhododendron_2008_costs.pdf](http://www.forestresearch.gov.uk/pdf/Argyll_Bute_rhododendron_2008_costs.pdf/$FILE/Argyll_Bute_rhododendron_2008_costs.pdf)

¹¹ www.invasivespeciesscotland.org.uk

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 the provision of clear guidance for inter-agency working necessary to address the biosecurity issues of the Kyle Fisheries District. These approaches are consistent with the [GB Invasive Non Native Species Framework Strategy](#)¹² and the [Species Action Framework](#)¹³ 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 invasive non native species, fish diseases and parasites:

- Section 14 of [The Wildlife and Countryside Act \(1981\)](#)¹⁴ makes it an offence to allow any animal (including hybrids) which is not ordinarily resident in Great Britain, to escape into the wild; or release it into the wild; or to release or to allow to escape from captivity, any animals that is listed on Schedule 9 of the 1981 Act. It is also an offence to plant or otherwise cause to grow in the wild any plant listed on schedule 9 of the 1981 Act.
- Local Authorities have powers to take action against giant hogweed (*Heracleum mantegazzianum*) where it is considered a statutory nuisance.
- Section 179 of the [Town and Country Planning \(Scotland\) Act 1997](#)¹⁵ 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](#)¹⁶ regulates the use of pesticides and herbicides for the control and eradication of INNS.
- [Environmental Protection Act 1990](#)¹⁷ 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](#)¹⁸ 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".

¹² www.nonnativespecies.org

¹³ www.sng.org.uk/speciesactionframework

¹⁴ www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1981/cukpga_19810069_en_1

¹⁵ www.opsi.gov.uk/acts/acts1997/ukpga_19970008_en_1

¹⁶ www.opsi.gov.uk/legislation/scotland/ssi2005/20050066.htm

¹⁷ www.opsi.gov.uk/acts/acts1990/ukpga_19900043_en_1

¹⁸ http://www.opsi.gov.uk/si/si1994/uksi_19941056_en_1.htm

- [Controlled Waste \(Registration of Carriers and Seizure of Vehicles\) Regulations 1991](#)¹⁹ and the [Environmental Protection \(Duty of Care\) Regulations 1991](#)²⁰ provide guidance for the handling and transfer of controlled waste.
- [The Aquaculture & Fisheries \(Scotland\) Act 2007](#)²¹ that regulates against the unauthorised introduction of fish to inland waters.
- The [Prohibition of Keeping or Release of Live Fish \(Specified Species\) Order 2003](#)²² requires that a licence be obtained for the keeping or release of species listed on Schedules 1 and 2.
- The [NetRegs](#)²³ website contains useful guidance on INNS and their control

The procedures for the detection, notification and control of fish diseases procedures are already well defined by fisheries legislation. This stipulates that Marine Scotland acts on behalf of 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 policy, legislation and strategic action with local actions, and reflects the provisions and requirements of the following existing plans (see also Table 1):

- The Kyle Fisheries District Management Plan 2008-2012,
- The North Highland Area and River Basin District Management Plans,
- Highland Local Biodiversity Action Plan.

Furthermore, it supports the conservation objectives of designated conservation areas (SAC, SSSI) in the Kyle of Sutherland area.

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

Provision or Requirement of Existing Plan	Action in DFD Biosecurity Plan
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¹⁹ www.opsi.gov.uk/si/si1991/Uksi_19911624_en_1.htm

²⁰ www.opsi.gov.uk/si/si1991/uksi_19912839_en_1.htm

²¹ http://www.opsi.gov.uk/legislation/scotland/acts2007/asp_20070012_en_1

²² <http://www.scotland.gov.uk/resource/doc/47133/0009766.pdf>

²³ <http://www.netregs.gov.uk/netregs/default.aspx>

Provision or Requirement of Existing Plan	Action in DFD Biosecurity Plan
<p>Plan: The Kyle Fisheries District Management Plan²⁴ 2008-2012.</p> <p>Provision/s: Identify affected areas and create a management programme</p>	<p>This plan fulfils the requirement of the Kyle Fisheries District MP to identify affected areas and create a management programme. This plan's key elements are to prevent introduction of high impact INNS and to eradicate existing populations outside of private gardens.</p>
<p>Plan: Gyrodactylus salaris (Gs) Contingency Plan²⁵:</p> <p>Provision/s: A strategy to rapidly contain and eradicate Gs if introduced to Scotland.</p>	<p>Formulate rapid response protocols for new INN species which pose significant threats to local biodiversity and economy</p>
<p>Plan: Highland Biodiversity Action Plan²⁶</p> <p>Provision/s: Raise awareness and promote good practice; identify gaps and prioritise future work, control of INNS in the Highland region.</p>	<p>This plan identifies key awareness needs and delivery mechanisms, promotes good practice, presents key actions for the eradication, surveillance and monitoring of INNS.</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 Scotland²⁷.</p>	<p>Supports the conservation of biodiversity target species through the control and eradication of INNS detrimental to their ecology</p>
<p>The North Highland Area Management Plan and the RBMP for the Scotland River Basin District. The RBMP for the Scotland River Basin District contain the following measures relating to biosecurity:</p> <ul style="list-style-type: none"> • identification of appropriate actions to manage species that threaten high and good status sites, together with identification of potential sources of re-infestation in the surrounding area • establishment of detection/surveillance/control strategies for problem species • risk assessment of pathways for problem species into the Scotland River Basin District • development of biosecurity plans to prevent movement of species between catchments and respond quickly to new infestations 	<p>RBMPs are likely to provide a framework and cross-sector approach to biosecurity planning through Area Advisory Groups (AAGs). This will assist and facilitate a coordinated and widespread response to biosecurity issues:</p> <ul style="list-style-type: none"> • Raising awareness of biosecurity issues • Act as a conduit for national initiatives into the local management sphere • Develop catchment-based approach to control and eradication • Ensure control methods do not impact on the water environment
<p>Highland Invasives Species Forum INNS Strategy</p>	<p>This plan supports and will implement actions with regard to the five priority species of the Highland INNS strategy.</p>

4. Biosecurity Issues in the Kyle of Sutherland District

4.1 Description of the Kyle of Sutherland district

²⁴ www.rafts.org.uk/projects/fisheriesmanagementplanning.asp

²⁵ www.scotland.gov.uk/Topics/Fisheries/Fish-Shellfish/18610/diseases/g-salaris/GsCGrev

²⁶ <http://www.highlandbiodiversity.com/>

²⁷ www.scotland.gov.uk/Publications/2004/05/19366/37239

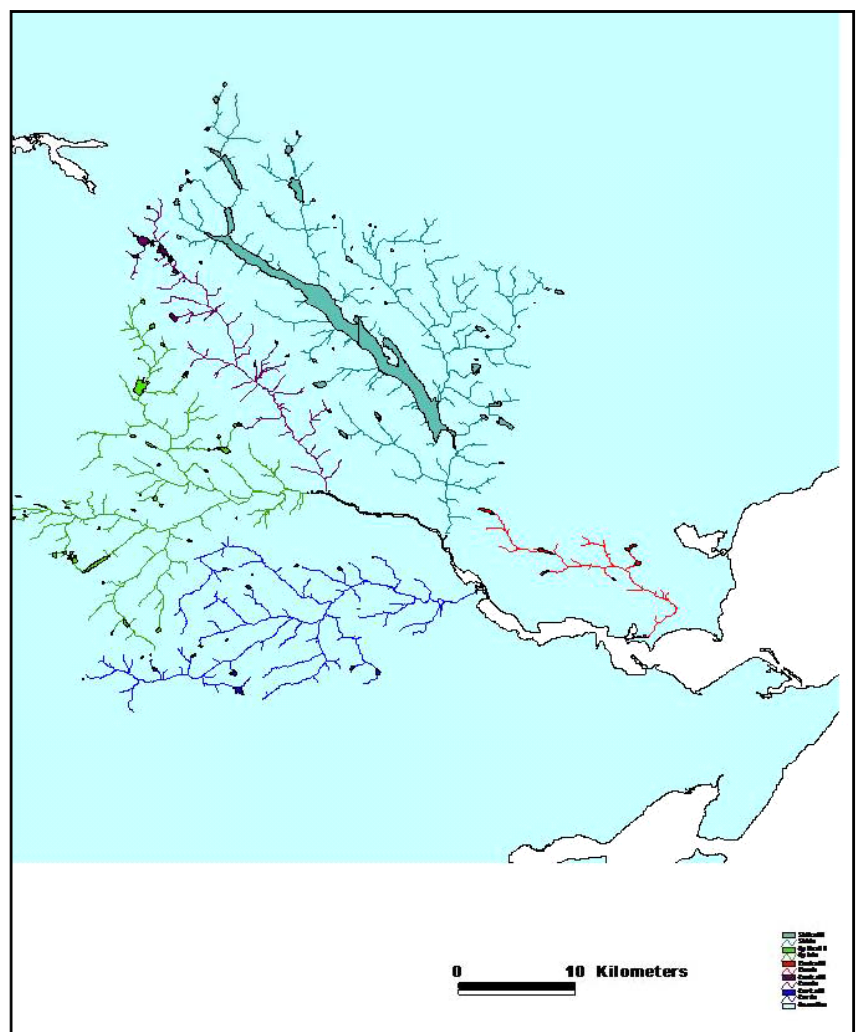
The Kyle Fisheries District Biosecurity Plan (KFDBP) covers the management area of the Kyle of Sutherland Fisheries District Salmon Fishery Board (KoSSFB) within the counties of Sutherland and Ross-Shire. The district comprises all freshwater courses running into the Dornoch Firth including the Rivers Oykel, Carron, Shin, Cassley and Evelix and their tributaries (Map 1). The Dornoch Firth is a Special Area for Conservation for common seals. To the west the District almost approaches the coast line in places; being not far from the road linking Ullapool to Leadmore Junction. The northern end of the district lies at the northern extremity of Loch Merkland and the south slopes of Ben Klibreck. To the East a line from the Cathedral in Dornoch to Tarbat Ness marks the boundary of the district.

The **Carron**²⁸ drains some 150 square miles, and is the third largest of the Kyle rivers. Its source is only five miles from Loch Broom on the west coast. It then flows 14 miles to the Kyle at Bonar Bridge via the Falls at Glencalvie and absorbing the Alladale River, the Diebidale River/Water of Glencalvie and its major tributary, the Blackwater.

The **Oykel**, drains 137 square miles and emanates from the south-facing slopes of the Ben More Assynt massif. It flows for over 20 miles via the Oykel Falls and receives several tributaries including the Einig before reaching the head of the Kyle by Rosehall. The Oykel is the only Kyle river which has not been harnessed for commercial hydro-electric purposes. The Oykel is now a Special Area of Conservation for salmon and freshwater pearl mussels under the European Habitats Directive.

The **Cassley** drains some 75 square miles of mountainous terrain (notably the north and east slopes of Ben More Assynt),

and is by far the smallest of the four Kyle of Sutherland rivers. From Gorm Loch Mor, which is just three miles from saltwater on the west coast at Loch Glencoul, it hardly



Map 1 Kyle Fisheries District

²⁸ Chapters from Andrew Graham-Stewarts "The Salmon Rivers of the North Highlands and the Outer Hebrides." Used with permission.

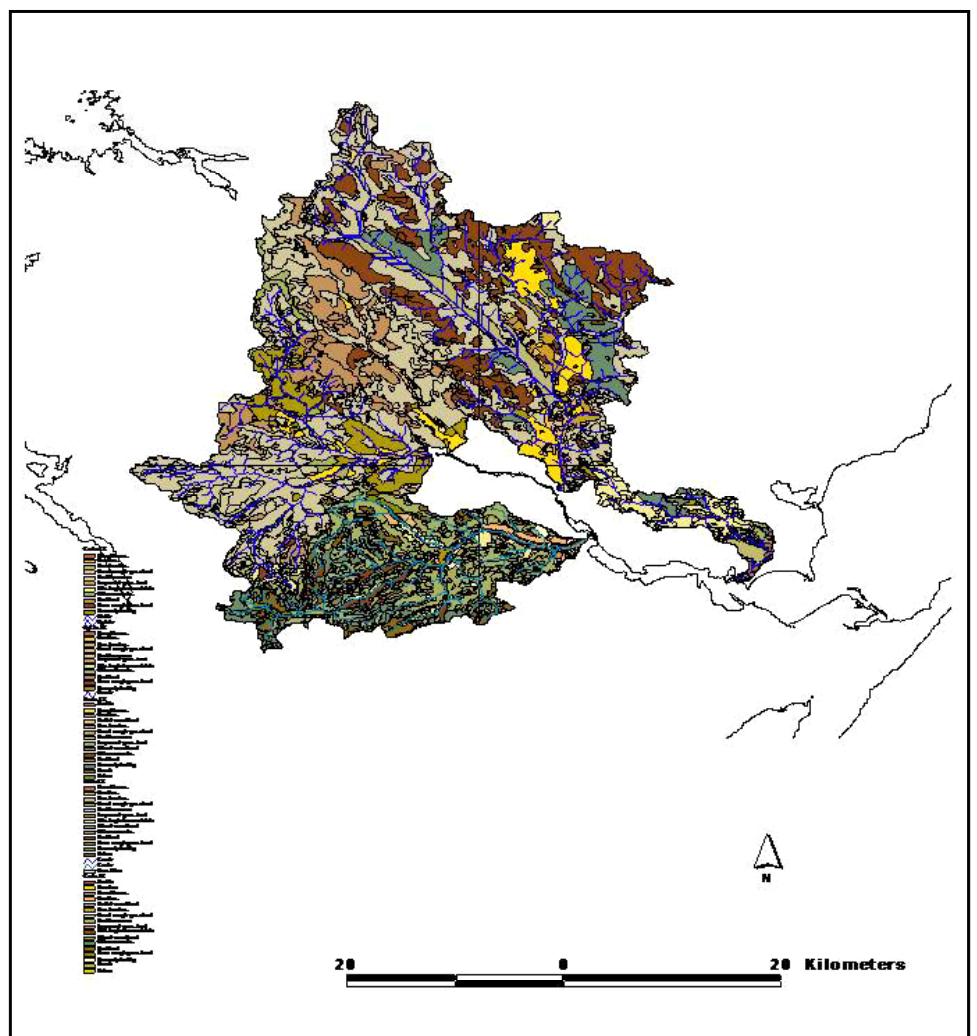
deviates over 18 miles from its south-easterly course to its mouth and junction with the Kyle near Rosehall. Waters from the head of the Cassley are diverted to Loch Shin as part of the Shin hydro-electric scheme. The Cassley is counted as part of the Oykel system in the European Habitats Directive and is therefore a Special Area of Conservation for Atlantic salmon and freshwater pearl mussels.

Draining some 220 square miles the **Shin** has three main tributaries flowing into the loch. The furthest west rises in the high terrain of Reay Forest between the upper catchments of the Laxford and Hope systems; various headwaters combine to form the Allt nan Albannach. These waters enter Loch Merkland and thence via the Merkland River and Loch a Griama they discharge into Loch Shin. The other two significant tributaries, the Fiag and the Tirry, drain less dramatic landscape to the north of the loch. The latter is 16 miles long; from its outlet the River Shin drops 270 feet in its short seven mile course and most of this descent is in the last mile or so.

Rising east of the lower Shin, the **Evelix** drains a narrow strip of land to the north of the Kyle of Sutherland and the Dornoch Firth. The headwaters pass through two small lochs (Laro and an Lagain), following which the river tumbles down through rough moorland and then flows in meandering fashion through farmland to Loch Evelix and thence to the firth three miles inland from Dornoch. The Evelix is a Special Area of Conservation for freshwater pearl mussels under the European Habitats Directive.

4.2 Summary of district land use

Land use in the District is primarily agriculture and forestry with extensive hill farming, commercial forestry and deer forests in the upper catchment; livestock farming and crofting, commercial forestry and native woodlands in mid catchments and mixed farming and crofting in the lower catchments. Renewable energy, both wind and hydro is an important activity with implications for biosecurity as are commercial quarries; garden centres, pet shops, saw mills,



Map2 Kyle of Sutherland District Land Use

drinking water suppliers, distilleries, aquaculture and angling.

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.

A 2007 [survey](#)²⁹ of the economic importance of angling to the KSFT area revealed that anglers spend about £3.7M annually supporting an annual income flow of £1.68M and 80 full time jobs. 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.

Other activities including walking, golf, bird watching, and other riverside activities rely in part upon the quality of the aquatic and riparian environments to enhance the visitor experience.

4.3 Biosecurity: Current and potential threats

The Kyle of Sutherland is strategically important as it has a few satellite populations of INNS that can be easily eradicated if dealt with in a timely manner and there is considerable water transfer within the District (e.g Cassley-Shin) and to and from neighbouring Districts e.g the Naver and Conon. These water transfers provide interlinkages between catchments that will facilitate the spread of water borne INNS and fish diseases.

The water transfers for hydro-electric generation between the river catchments within the District and with the neighbouring Brora, Conon and Naver Districts significantly increases the risk of spread of any introduced INNS and fish diseases.

This section identifies **27** INNS and fish diseases for inclusion in the Kyle of Sutherland Biosecurity Plan of which **12** high priority species will be the main focus for action. The priority species were identified as those that:

- Already exist within the Kyle of Sutherland 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 are associated with seven INNS, one translocated native species and one fish parasite that are currently found in the Kyle of Sutherland District:

²⁹ <http://www.ksft.org/news.asp>

- Rhododendron (*Rhododendron ponticum & hybrids*) is present in many locations throughout the District but is mainly confined to private gardens and is not a significant threat at present. 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 located in small satellite populations within the Carron catchment. It spreads along rivers by movement of plant fragments by water and forms dense thickets which can exclude native plants and prohibits regeneration. Dense growth of Japanese knotweed can also hinder access, reduce biodiversity and alter the habitat for wildlife.
- Giant hogweed (*Herculeum mantegazzianum*) was reported by NBN in one area over twenty years ago but there have been no recent reports. It 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.
- Himalayan balsam (*Impatiens glandulifera*) is reported present in four locations by NBN but has not been reported for over 10 years. 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 and shades out low level native plants reducing biodiversity and denuding river banks of understory vegetation. Winter dieback of the plants exposes soil to erosion and so promotes spread.
- Canadian pondweed (*Elodea canadensis*) is reported in six locations between 1985 and 1994 by NBN. 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. These pondweeds dominate native macrophyte communities which can lead to their extinction and thereby impacts local invertebrate communities. Canadian pondweed can also increase metal loads within waterbodies that compounds its impacts on native flora and fauna.
- Rainbow trout (*Oncorhynchus mykiss*) have been introduced into lochs in some areas for angling. Farmed fish are a potential source of viral and bacterial diseases affecting wild salmonids and they also compete for resources with native species if allowed to escape. Fish stocking can also be a pathway for the introduction of non native crayfish. Stocking is also an issue with imported Brown Trout (*Salmo trutta*)

- Minnow (*Phoxinus phoxinus*) is a translocated species that has been introduced into the KSFB district by anglers and is now known to be resident in the Shin system. 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.
- Stone Loach (*Barbatula barbatula*) are found at the bottom of the Tirry system (a tributary of Loch Shin). They compete for resources with salmonids and are present in very high densities that could have negative impacts for salmonids.
- *Anasakis sp* is a nematode worm that causes Red Vent Syndrome (RVS). RVS has been found in salmon in over 50 Scottish rivers since June 2007. 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.

4.3.2 Potential biosecurity issues

The invasive non native species listed below are not currently present within the Kyle Fisheries district. 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 Kyle district.

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

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

There are five High Threat level species that could be introduced into the Kyle district and they include one fish parasite, one vertebrate and three freshwater invertebrates (Table 3).

Table 3 High threat level species their impacts and risk of introduction

SPECIES	RISK OF INTRODUCTION	LOCAL IMPACTS
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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 which has been in contact with infected water including canoes 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)
North American signal crayfish (<i>Pacifasticus leniusculus</i>)	High- Through intentional/unintentional introduction from an existing population nearby (Nairn) and as hitchhikers in fish transfers.	<ul style="list-style-type: none"> Burrows into river banks causing destabilisation Diet include small fish, fish ova and invertebrates
Mink (<i>Mustela vison</i>)	High – Through migration from existing nearby populations in the Conon catchment.	<ul style="list-style-type: none"> Kills water fowl, small mammals and juvenile salmon and trout. 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 now being unoccupied.
Zebra mussel (<i>Dreissena polymorpha</i>) Freshwater Bivalve	Medium- through unintentional introduction from contaminated boat/canoe 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 <i>Paragonimus ringer</i>, known to infect humans

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 4 below).

Table 4 The risk of introduction of Medium Threat level INNS.

SPECIES		RISK OF INTRODUCTION
Ruddy duck (<i>Oxyura jamaicensis</i>)	High	Reported from Loch Eye.
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	Through unintentional introduction
Didemnum Tunicates / sea squirts	Medium	Unintentional introduction from marine fishing

SPECIES		RISK OF INTRODUCTION
<i>(Didemnum vexillum)</i>		boat hulls
Wireweed (<i>Sargassum muticum</i>)	Medium	Through unintentional introduction
Ruffe (<i>Gymnocephalus cernuus</i>)	Medium	Currently recorded in central Scotland and could be introduced as live bait or in ballast water
Bullhead (<i>Cottus 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 3 and 4, the main pathways or means of introduction of both High and Medium Threat level species into the Kyle district are:

- Intentional introduction or planting
- Fouling and ballast water of marine vessels
- Fouling and ballast water of freshwater vessels
- Escapes from garden ponds
- 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

4.3.3 Fish Health and Genetic Issues

There are a number of diseases and parasites that have potential to cause catastrophic or significant impacts on fish health and affect the fishery resource. Similarly, the introduction of non-native genotypes of species already present may undermine productivity of native species and act as a vector for the spread of fish diseases. The influence of fishery management and aquaculture activities on the productivity of native fish communities and fisheries is of growing concern as the potential biological and ecological impacts are becoming better understood.

Fish diseases and parasites have potential to impact on the productivity of fish populations by reducing growth and survival of infected fish to the point where fishery performance is affected. The introduction and spread of **non-native genotypes, diseases and parasites** from aquaculture and fishery

Parasites & diseases

Restrictions on the import into the UK of live fish have played a major part in preventing the introduction and spread of serious fish diseases. Health conditions of aquaculture animals are today governed by the Fish Health Regulations 1997 legislation that have three categories of [Notifiable Diseases in Fish](#) depending on their potential impact on the Scottish aquaculture industry and wild fish stocks.

List I diseases are those which have a serious economic impact and are exotic to the EU, including:

Infectious Salmon Anaemia (ISA)

List II diseases are those which are present in the EU, but approved zones and approved farms in non-approved zones can be distinguished. These include:

Viral Haemorrhagic Septicaemia (VHS)

Infectious Haematopoietic Necrosis (IHN)

List III diseases are those for which individual Member States can decide whether to put control measures in place or not, including:

Infectious Pancreatic Necrosis (IPN)

Bacterial Kidney Disease (BKD)

Furunculosis

Spring Viraemia of Carp (SVC)

Gyrodactylus salaris (Gs)

Enteric Redmouth Disease (ERM)

The biggest current threat to Atlantic salmon populations and the fisheries they support is the parasite ***Gyrodactylus salaris* (Gs)**. The potentially catastrophic consequences of its introduction mean that it is a priority for fisheries and aquaculture industries to identify and mitigate potential vectors.

Non-native genotypes

Fishery and aquaculture activities utilise non-native genotypes of Atlantic salmon, brown trout and the non-native species rainbow trout for angling amenity and production of fish for the table market. It is now well understood that as well as being a potential vector for disease, stocking of fish from non-native sources can undermine the short and long-term productivity of fisheries. Breeding and competitive interaction between native and introduced fish is likely to produce offspring that have reduced survival and lower reproductive

success³¹. Preventing release of non-native genotypes likely to interact with wild populations is essential to avoid biosecurity issues and short and long term biological (genetic) and ecological (competition) impacts on wild fish populations. Currently, there is no provision for AFT to be notified of the release of non-native genotypes into stocked fisheries.

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:

Policy and Legislation	Land Resources	Water Resources
Scottish Government Edinburgh Scottish Natural Heritage Scottish Environment Protection Agency Marine Scotland Association of Salmon Fishery Boards Rivers and Fisheries Trusts Scotland	Forestry Commission Highland Council National Farmers Union Highland Invasive Species Forum Landowners Association	North Highland Area Advisory Group Scottish Water Scottish and Southern Energy
Fisheries Management	Recreation	Conservation and Biodiversity
Cromarty Firth District Salmon Fishery Board Cromarty Firth Fisheries Trust Association of Still Water Fisheries	Inverness Canoe Club Ramblers Association Local Angling Associations RYA	Scottish Wildlife Trust Royal Society for the Protection of Birds Scottish Native Woods Ross and Cromarty East Local Biodiversity Action Group Plant Life Highland Biological Recording Group Dingwall Environment Group British Trust for Conservation Volunteers Dingwall Field Club Tain Field Club

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 6.

³¹ McGinnity et al. 2003. Fitness reduction and potential extinction of wild populations of Atlantic salmon, *Salmo salar*, as a result of interactions with escaped farm salmon. Proc Biol Sci. 270 (1532)

Table 6 Pathways and stakeholders in the Kyle of Sutherland District

Pathway	Stakeholders
Intentional introduction or planting	Local Councils and Planning departments
Fouling and ballast water of freshwater vessels	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

4.5 Existing INNS control activities

The LBAP for Highland states that projects for the control of INNS will be developed and implemented but none are operational in the Kyle Fisheries District at present. The North West Highlands Highlands Mink Project is currently monitoring the status of mink in the area with the goal of establishing a cordon sanitaire. This project involves the deployment of mink rafts in a number of strategic locations by a wide range of stakeholders including the Kyle of Sutherland Fisheries Trust. To date no evidence of mink has been reported in the District.

This plan will include and support ongoing existing INNS control

Gyrodactylus salaris

During 2007 as part of a national campaign , the Kyle of Sutherland Trust and District Salmon Fisheries Board instigated a publicity campaign to prevent the introduction and spread of the parasite *Gyrodactylus salaris*. Warning signs were also installed at access points to rivers and information leaflets distributed to proprietors. In addition to the publicity campaign, anglers fishing in the district now sign a declaration form before fishing to ensure that their equipment is free from possible infection.

Highland Invasive Species Forum

Formed in June 2008 its aims are to:

- bring together the key players and take stock of the situation regarding invasive non-native species in Highland;
- raise awareness and spread good practice;
- identify any major gaps and prioritise key areas for future work; and
- work together to secure new resources and funding.

The forum has identified five key INNS, *Rhododendron ponticum*, Japanese knotweed, Himalayan balsam, giant hogweed and mink as high priority species and recently completed mapping their distributions in the area. A strategy has been produced and a Highland Rhododendron Officer appointed. The forum collaborates with the RAFTS Biosecurity and Invasive Species Programme and also supports control work of riparian INNS being undertaken by four fisheries trusts in the Highlands including Kyle of Sutherland.

5. Biosecurity management strategy

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

- 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: Prevent the introduction and spread of INN species within the Kyle of Sutherland district.

- *Output 1.1 – All key stakeholders aware of the ecological and economic impacts of INNS, means of introduction and spread as well as management best practices.*

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:

- INNS are any non-native animal or plant that has the ability to spread causing damage to the environment, the economy, or health and the way we live
- 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 Kyle of Sutherland District. The key stakeholders, the identified areas of priority and the proposed mechanisms for delivery are presented in Table 6 below. The roles and actions of key government agencies and non government bodies in promoting awareness of INNS issues is presented in Table 7.

Table 6 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 - Use of sufficient screens and other biosecurity measures - Dangers of importing stock from contaminated areas - Controls on movement of stock and water 	<ul style="list-style-type: none"> - KoSFT to work with local industry and trade associations to advise members regularly of best practice in respect of INNS - Enforcement agencies (FHI & DSFB) to undertake site visits to discuss and advise on issues involving INNS e.g. rainbow trout - Invasive Species Scotland³² website
Port Authorities	<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"> - Promote implementation of code of practice requiring non-sterilised ballast water to be discharged away from harbour - KoSFT to assist with the supply of posters and other awareness material for display and signage. - Invasive Species Scotland website
Water User associations (canoeists, sailing clubs)	<ul style="list-style-type: none"> - Promote awareness to clubs and participants of the dangers arising from INNS 	<ul style="list-style-type: none"> - KoSFT 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 DBIT 	<ul style="list-style-type: none"> - Work with KoSFT to ensure dissemination of best practices and appropriate signage to reduce threats from INNS - KoSFT 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 - Promote 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 KoSFT to ensure dissemination of best practices and appropriate signage to reduce threats from INNS - KoSFT to offer training for "eyes" - Invasive Species Scotland website
Contractors / Ground Maintenance Workers	<ul style="list-style-type: none"> - General awareness of impacts and measures to prevent/control INNS 	<ul style="list-style-type: none"> - Work with KoSFT to ensure dissemination of best practices - KoSFT to offer training for "eyes" - Invasive Species Scotland website
Schools	<ul style="list-style-type: none"> - General awareness of impacts and measures to prevent/control INNS 	<ul style="list-style-type: none"> - School visits - Field trips - Invasive Species Scotland website

³² www.invasivespeciesscotland.org.uk

Table 7 Roles and/or actions of key government and non government agencies in promoting awareness of INNS issues

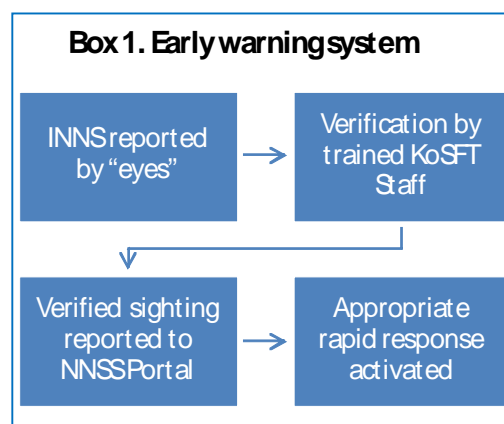
Organisation	Role and/or action	Delivery Mechanisms
KoSFT	- Promote awareness to general water users promoting the Biosecurity Plan and highlighting the dangers from INNS	- Promote and launch of Biosecurity Plan -Develop a leaflet to promote the Biosecurity plan, the dangers arising from INNS and the reporting system and ensure appropriate distribution to stakeholders -See actions for KoSFT above
KDSFB	-Continue to promote awareness to anglers and angling clubs of the dangers arising from INNS.	-Continue to promote disinfection of equipment and provide appropriate facilities - Holding of open days, field visits and demonstrations
Highland Council	- 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	- Council 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	-National: Promotion of good practice in the prevention, control and eradication of INNS -Local: SNH will continue to support and advise the Kyle of Sutherland Fisheries Trust.	- Holding of SNH Sharing Good Practice events. - Grant funding may be available for some projects.
Marine Scotland	-Fish Health Inspectorate part of Marine Scotland is lead body with respect of fish diseases and escapes	- Undertake site visits to discuss and advise on issues involving INNS - Promote disinfection of equipment and provide appropriate facilities to eliminate the risk of accidental transfer of INNS

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

Objective 2: Ensure optimum detection/surveillance of, and rapid response to, new INN species

Output 2.1 - 'Early warning system' established for identified INN species in district

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 KoSFT personnel. A sighting of a GB or local high priority species (Table 9) 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 KoSFT Geographic Information System to monitor INNS distributions within the Kyle of Sutherland District. Actions to establish the early warning system are described in Section 5.2.



Output 2.2 – Rapid response mechanism (RRM) established for new INN species which pose significant threat to local biodiversity and economy

The type of response will depend on the severity of the species detected (Table 8) and is proportionate to the threat posed. There are three levels of response:

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

Table 8 Response level for the 31 invasive non native species

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

		waterweed Floating pennywort
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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 e.g. *Gyrodactylus salaris*. However, there is still a need for local level protocols to link with 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 9. The actions required to establish and maintain the RRM are presented in Section 5.2

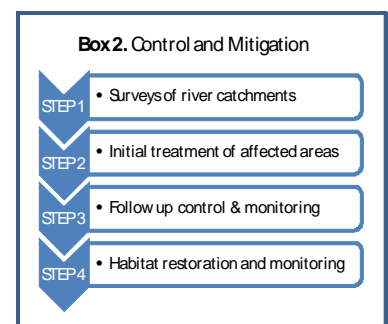
Table 9 Elements of contingency plans or protocols for response to GB priority, local high priority and priority species

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 -Isolation of area where practicable 	<ul style="list-style-type: none"> -Report to local and GB institutions -Determine the extent of infestation - Isolation of area where practicable Establish source and check related sites - Closure of all pathways -Decision on appropriate action eradication/containment. - Approved eradication methodology -Monitor 	<ul style="list-style-type: none"> -Report to local and GB institutions -Determination of the extent of infestation -Surveys in course of normal work to establish and map distribution -Inclusion of new areas in existing eradication/control programmes - Identification and closure all pathways - Monitor as part of planned catchment monitoring programme

Objective 3: Ensure effective control and eradication programmes for INN species.

Output 3.1 – Control, eradication and habitat restoration programmes established and operational

Eradication and control activities will follow recognised good practice e.g. target nascent and “upstream or source” populations of INNS that are potential sources of spread and re-infestation. A combination of specialist contractors, volunteers and KoSFT staff will be used depending on the management requirements of the



species and area. Envisaged mitigation, eradication and control measures for the INNS that are reported as being present in the District are presented in Table 10. The actions required to establish the proposed control/eradication programme are presented in Section 5.2.

Table 10 Invasive Non Native Species Control and Eradication in the Deveron District

SPECIES	ACTION	TREATMENT/POST TREATMENT ACTIONS
Japanese knotweed (JK)	Control/Eradication Identify and close pathways.	-Leaf spraying with Glyphosate staff for existing populations with follow up of stem injection treatment to maintain control if required. -Stem injection for smaller populations and individual plants. -Requirements for riparian zone habitat restoration assessed and implemented
Himalayan balsam (HB)	Control/Eradication Identify pathways and close	-Hand pull -Monitor catchment for activation of dormant sources of infestation -Habitat restoration if required
Giant hogweed (GH)	Control/Eradication Identify pathways and close	-Continue to spray large areas with roundup 2x in year 1; repeat as required -Monitor catchment for activation of dormant sources of infestation -Habitat restoration if required
American mink	Control/Eradication	-Co-ordinated monitoring and trapping
Rhododenron (R)	Monitor distribution	
Canadian pond weed	Monitor distribution	
Rainbow trout	Monitor distribution	-Identify source and engage fish removal by electro-fishing.
Minnow	Restrict to present distribution	
Red vent syndrome	Monitor	-Marine Scotland to monitor

5.2 Actions and Timeframes

The table below 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.

Action	Lead	Partners	TIMEFRAME							
			2009	2009	2010	2010	2011	2012	2013	2014	2015
Objective 1: Prevent the introduction and spread of INN species within the Deveron fisheries district.										
<i>Output 1.1 – All key stakeholders aware of the ecological and economic impacts of INNS, means of introduction and spread as well as management best practices.</i>										
Launch of DBIT Biosecurity plan through national and local press release	KoSFT	SEPA	—							
Produce leaflet on legislation including waste management & planning regulations	Highland Council	AAG		—	—					
Produce leaflet on biosecurity risks and the reporting system	KoSFT/RAFTS	AAG, SNH		—						

Action	Lead	Partners	TIMEFRAME								
			2009	2009	2010	2010	2011	2012	2013	2014	2015
Produce posters on biosecurity risks and distribute to the general public	RAFTS	KoSFT AAG Highland Council		.....	.....	.....	.....	.....	.....	.....
Continue to promote and install disinfection facilities for anglers at all angling proprietors fishing huts/parking points	DSFB		.....	.....	.....	.....	.....	.....	.....	.....
Distribute Codes and posters to relevant retail outlets and clubs at open days and events such as agricultural shows	HISF	KoSFT AAG members			.....	.....	.....	.....	.....	.....
Engage with Landowners and angling clubs to promote awareness measures to tenants, resource –users, members and visitors	KoSFT/DSFB	SEPA,SNH		———							
Work with environmental groups of local schools to enhance awareness of INNS	Easter Ross LBAP group	CFFB & T Highland Council Ranger Service			.....	.....	.....	.....	.....	.....
Objective 2: Develop optimum detection and surveillance of, and rapid response to, new INN species											
Output 2.1 - 'Early warning system' established for new INN species in district.											
Train two KoSFT/DSFB personnel in the identification of INNS	KoSFT/RAFTS			———	———						
Train KoSFT as trainers	KoSFT/RAFTS			———							
Work with user and interest groups to identify "eyes"	KoSFT	Highland Council AAG SEPA		———	———						
Training of "reporting network"	KoSFT	RAFTS LBAP, SEPA		———	———		———	———	———	———	———
Produce database to record and manage INNS sightings	RAFTS			———							
Establish, test and refine communication mechanisms within 'early warning' system	KoSFT Highland Council	RAFTS, SEPA (National)		———	———						
Monitor and periodically evaluate efficacy of system	CFFT & other partners			.....	.....	.....	.....	.....	.....	.....
Output 2.2 - Rapid response mechanism established for new INN species which pose significant threats to local biodiversity and economy.											
Formulate contingency plans for key species	RAFTS, KoSFT	Highland Council, SEPA and SNH,		———	———						

Action	Lead	Partners	TIMEFRAME									
			2009	2009	2010	2010	2011	2012	2013	2014	2015	
Identification of personnel for response teams	KoSFT,	Highland Council, SEPA and SNH		—								
Training of personnel to execute contingency plans	KoSFT, SEPA and SNH	Highland Council,		—								
Identification of funding resources	KoSFT	LHISF, AAG and SNH		.....	.....	.....	.....	.....	.....	.....	.....	.....
Refresher training	KoSFT	RAFTS, SNH					—	—	—	—	—	—
Monitor populations/treated areas	KoSFT	SNH, SEPA		.....	.....	.....	.....	.....	.....	.....	.....	.....
Objective 3: Develop effective control and eradication programmes for INN species.												
Output 3.1 – Control, eradication and habitat restoration programmes established and operational												
Initiate and complete catchment wide surveys by trained personnel	KoSFT	CFFT		—	—	—	—	—	—			
Establish GIS database for recording and mapping INNS within Kyle district	KoSFT	CFFT, RAFTS, SFCC, SEPA		—								
Continuation of Mink eradication/monitoring programme	KoSFT	Mink Project Neighbouring Trusts	—	—	—	—	—	—	—	—	—	—
Implementation of eradication of Japanese Knotweed programme	KoSFT	SEPA ³³		—	—	—	—	—	—	—	—	—
Monitor the effectiveness of control programmes	KoSFT	SEPA		—	—	—	—	—	—	—	—	—
FRS monitoring Red vent syndrome	Marine Scotland			—	—	—	—	—	—	—	—	—
Identify source of rainbow trout and begin removal	KoSFT/KoSDSFB			—	—	—						
Identify and develop opportunities for future funding of eradication projects	LFT	Highland Invasive Species Forum SEPA AAG FC SNH	—	—	—	—	—	—	—	—	—	—

6 Monitoring

Biosecurity is being initiated within the Kyle of Sutherland district by the KoSFT. It must be recognised that if current resources are not increased that progress will be limited. However, despite limitations, any work completed by the KoSFT will be monitored and

³³ May be eligible for funding from the Restoration Fund

the results evaluated particularly in the light of changing circumstances e.g. climate change. In this respect, the KoSFT will endeavor to evaluate its work and strategy on a 5-year basis.

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 fully coordinated monitoring programme must be established to ensure efficacy and sustainable treatment initiatives and include:

- Assessment of efficacy of surveillance and rapid response systems
- Occurrence and distribution of the selected INNS within the district
- Effectiveness of control/eradication programme including:
 - Application/delivery of effective concentrations of biocides
 - Checking that treatments have been effective
 - Re-treating immediately where there is doubt
 - Monitoring any apparent resistance to treatments and investigate
 - Surveying 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.

A monitoring programme will be developed based on the agreed objectives and outputs of this plan. The Trust will work with the Scottish Fisheries Coordination Centre (SFCC), SEPA and SNH to develop and agree national protocols for INNS surveying and monitoring. This will ensure compatibility with existing SFCC habitat survey methodology, the more recent SEPA point survey protocols and to ensure that high quality data is collected, stored and shared between agencies.

Monitoring activities will be undertaken by KoSFT staff in conjunction with stakeholder representatives who by virtue of their work are out in the catchment on a regular basis e.g roads department and access officers employed by local councils.

