

Deveron District Bio-Security Plan

2021 - 2025



Prepared by

The Deveron, Bogie and Isla Rivers Charitable Trust

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Scottish Charity (SC 032131)



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Executive Summary

This plan describes the biosecurity issues of the Deveron 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 non-native invasive species (INNS), fish diseases and parasites. The vision of this plan is:

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

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.

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

- 🌱 Output 2.1 - ‘Early warning and reporting system’ established for new INN species in district.
- 🌱 Output 2.2 – Monitoring and rapid response mechanism established for new INN species which pose significant threats to local biodiversity and economy.

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

- 🌱 Output 3.1 – Control, eradication and habitat restoration programmes established and operational
- 🌱 Output 3.2 - Coordinate partnerships to source future funding and develop projects

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 Deveron district which would cause catastrophic economic and environmental loss.
- 🌱 A holistic and collaborative control programme of INN plants such as Giant hogweed which is a threat to human health.
- 🌱 Increased biodiversity and the conservation of important natural habitats for native species such as otter, Atlantic salmon, European eel and Freshwater pearl mussel.
- 🌱 The visual conservation and increased amenity value of local landscapes.
- 🌱 The protection of the endangered water vole from American mink and the rare stonefly, *Brachyptera putata* from siltation.
- 🌱 The prevention of species such as Zebra mussel from entering the district watercourse helps protect vital local businesses such as whisky distilleries as this species are extremely costly to mitigate against.

1. Scope and Purpose

This is a continuation of the first Deveron district Biosecurity Plan (2009 – 2015), describing the biosecurity issues of the Deveron Fisheries District and presenting actions that have previously 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 establish a sustainable framework which will prevent, detect, control and eradicate invasive non-native species within the Deveron 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 Deveron fisheries district.

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

Objective 3: Develop effective control and eradication programmes for INN species and habitat restoration programmes



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 and a summary of these are described below;

-  The prevention of the deadly salmon parasite *Gyrodactylus salaris* from entering the Deveron district which would cause catastrophic economic and environmental loss.
-  A holistic and collaborative control programme of INN plants such as Giant hogweed which is a threat to human health.

¹ www.nonnativespecies.org

- 🌿 Increased biodiversity and the conservation of important natural habitats for native species such as otter, Atlantic salmon, European eel and Freshwater pearl mussel.
- 🌿 The visual conservation and increased amenity value of local landscapes.
- 🌿 The protection of the endangered water vole from American mink and the rare stonefly, *Brachyptera putata* from siltation.
- 🌿 The prevention of species such as Zebra mussel from entering the district watercourse helps protect vital local businesses such as whisky distilleries as this species are extremely costly to mitigate against.

2. Background

Although prepared by the Deveron, Bogie and Isla Rivers Trust (DBIT), this plan is one of a set of 10 biosecurity plans being updated throughout the north of Scotland as part of the Scottish Invasive Species Initiative (SISI), a 4-year funded partnership project lead by NatureScot, together with ten Fishery Trusts/Boards and the University of Aberdeen. Volunteers and local groups are key partners, providing a legacy for the project.

The need for continued action on biosecurity issues has been identified in the Trust's updated Fisheries Management Plan ([Deveron Fisheries District Management Plan 2020-2023](#)²) and in the [SEPA River Basin Management Plan](#)³ 2015-2027. This biosecurity plan provides a platform for local action to address those biosecurity issues. This plan has a lifespan of five 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.

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 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.

² <http://deveron.org/site/wp-content/uploads/Deveron-FMP-2020-23-1.pdf>

³ <https://www.sepa.org.uk/environment/water/river-basin-management-planning/the-current-plans/>

A study by Roy *et al.* (2014⁴) showed that in Great Britain more than 2,000 non-native species are recorded currently, with 237 of these species having a negative impact on biodiversity. In Scotland, there are 1,161 non-native species recorded, of which 16% (183) have negative ecological impacts.

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 \(2006\)](#)⁵, **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. Environmental impacts include disrupting habitats and ecosystems, outcompeting native species for space and food, spreading disease and interfering with the genetic integrity of native species. All these impacts lead to a reduction in biodiversity (CBD, 2015⁶).

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.

The total annual cost of INNS to the British economy is estimated at approximately £1.7 billion. This is said to be a conservative figure and does not include indirect costs which could be substantially higher. Estimated total annual costs of invasive non-native species to Scotland is £244,736, 000 (Williams et al, 2010⁷). Japanese knotweed alone is estimated to cost the British economy around £166 million per year (NNS, 2015⁸).

Invasive species have already changed the character of iconic landscapes and waterbodies in Scotland reducing the amenity value of those areas. Some species also have a social impact, whether it is risk to human health (e.g. the harmful sap from Giant hogweed) or those which are considered a nuisance to landowners or recreational users (e.g. Japanese knotweed preventing access to watercourses, or floating pennywort clogging watercourses and preventing angling or boat navigation). The Convention on Biological Diversity (CBD) focusses on protecting biodiversity through a ten-year framework for action by all countries. The plan provides a set of twenty targets, a collectively known as the Aichi Targets (CBD, 2015⁹). Aichi target 9 is focused on Invasive Non-Native Species and this target sets out action to control the most problematic non-native invasive species (NatureScot, 2016¹⁰).

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

⁴ <http://dx.doi.org/10.1007/s10530-0140687-0>

⁵ <http://www.cbd.int/gbo2>

⁶ <https://www.cbd.int/invasive/WhatareIAS.shtml>

⁷ <https://www.cabi.org/VetMedResource/ebook/20123122024>

⁸ <http://www.nonnativespecies.org/index.cfm?sectionid=55>

⁹ <https://www.cbd.int/sp/targets/>

¹⁰ <https://www.nature.scot/sites/default/files/2017-11/Aichi-Targets-Interim-Report-September-2016-A2098126.pdf>

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 a coordinated and systematic approach to the prevention of introduction and control of the spread of INN species 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. Given the high costs for the mitigation, control, and eradication of INNS once they are established this plan emphasises the need for prevention and rapid response to the introduction of INNS before they become established.

The partnership approach encapsulated in the first Deveron district Biosecurity Plan (2009-2015) was 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 Deveron Fisheries District, and has built the foundations for this Biosecurity Plan to continue to implement such an approach at a local level for selected species and diseases 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 the North of Scotland by the Scottish Invasive Species Initiative.

These approaches are consistent with, and support, the [GB Invasive Non Native Species Framework Strategy](#)¹¹ and the [Species Action Framework](#)¹² both of which have been approved by the Scottish Government.

3.2 Policy and Legislation

The actions presented in this plan will 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 \(1981\)](#)¹³ 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.
- 👁️ Section 179 of the [Town and Country Planning \(Scotland\) Act 1997](#)¹⁴ 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.

¹¹ www.nonnativespecies.org

¹² www.sng.org.uk/speciesactionframework

¹³ <https://www.legislation.gov.uk/ukpga/1981/69/contents>

¹⁴ <https://www.legislation.gov.uk/ukpga/1997/8/contents>

- 🌿 The [Possession of Pesticides \(Scotland\) Order 2005](#)¹⁵ regulates the use of pesticides and herbicides for the control and eradication of INNS.
- 🌿 [Environmental Protection Act 1990](#)¹⁶ 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](#)¹⁷ 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](#)¹⁸ and the [Environmental Protection \(Duty of Care\) Regulations 1991](#)¹⁹ provide guidance for the handling and transfer of controlled waste.
- 🌿 [The Aquaculture & Fisheries \(Scotland\) Act 2007](#)²⁰ that regulates against the unauthorised introduction of fish to inland waters.
- 🌿 The [Prohibition of Keeping or Release of Live Fish \(Specified Species\) Order 2003](#)²¹ requires that a licence be obtained for the keeping or release of species listed on Schedules 1 and 2.
- 🌿 [Code of Practice on Non-Native Species](#)²², issued in 2012 by the Scottish Government. Sets out guidance to help stakeholders understand their legal responsibility and provides practical guidance and good practice for management and control of INNS to prevent adverse effects on natural environment.

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.

¹⁵ <https://www.legislation.gov.uk/ssi/2005/66/contents/made>

¹⁶ <https://www.legislation.gov.uk/ukpga/1990/43/contents>

¹⁷ <https://www.legislation.gov.uk/uksi/1994/1056/contents/made>

¹⁸ <https://www.legislation.gov.uk/uksi/1991/2839/contents/made>

¹⁹ <https://www.legislation.gov.uk/uksi/1991/2839/contents/made>

²⁰ <https://www.legislation.gov.uk/asp/2007/12/contents>

²¹ <https://www.legislation.gov.uk/ssi/2003/560/made>

²² <https://www.gov.scot/publications/non-native-species-code-practice/>

4. Scope of the Plan

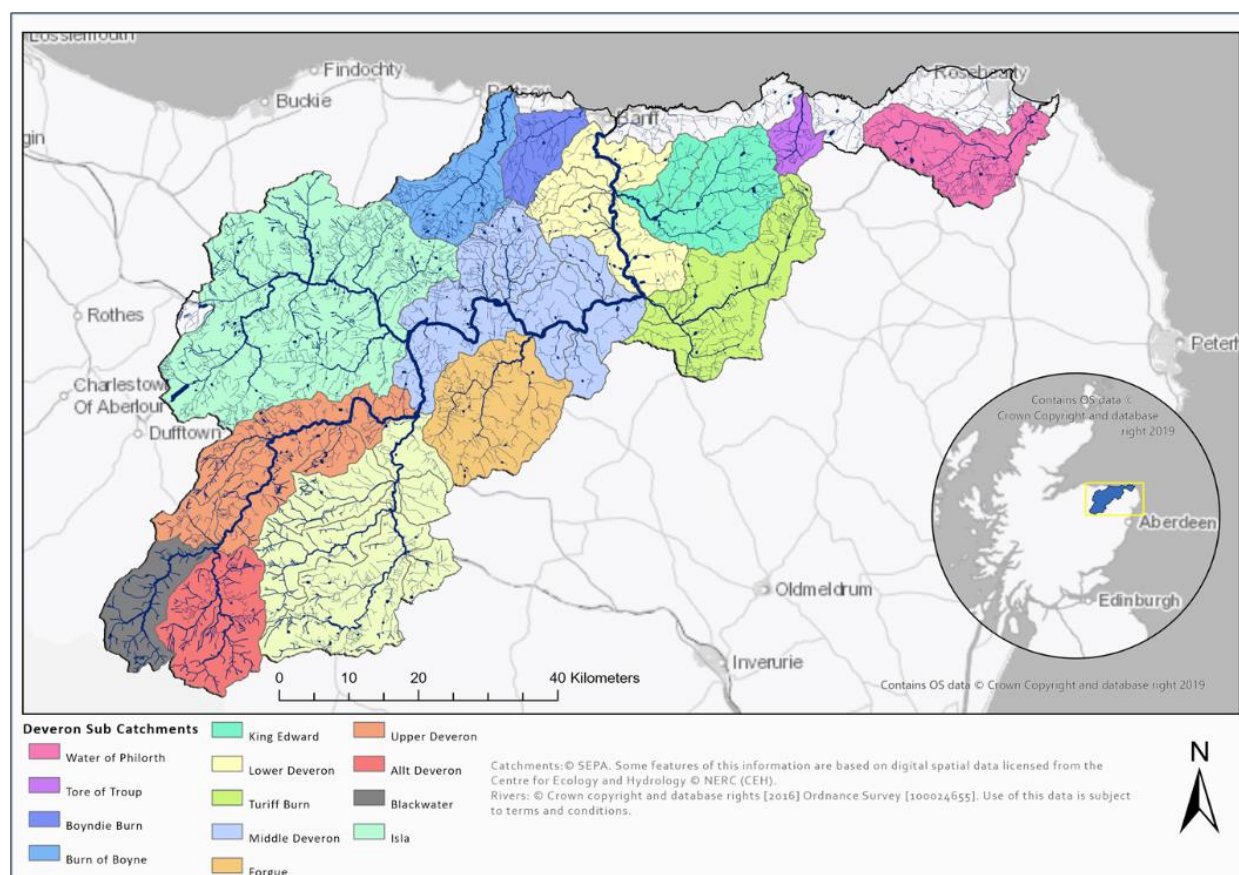
4.1 Deveron fisheries district

The Deveron District Biosecurity Plan (DDBP) covers the management area of the River Deveron District Salmon Fishery Board (RDevDSFB) within the counties of Aberdeenshire and Moray. The district comprises of the river Deveron and its tributaries and all other watercourses that discharge into the Moray Firth on Aberdeenshire's north coast, between Cowhythe Point and the Water of Philorth Point (**Map 1**) namely the Boyndie Burn, Burn of Boyne and the Tore Burn. The Deveron itself is a prolific salmon, sea trout and brown trout fishery and in terms of catches has consistently the fifth highest in Scotland. The Deveron district also contains one commercial land-based rainbow trout farm and numerous small lochs and ponds, five of which are let commercially for angling, these are:

- 🌿 Forge Fishery, Forge Fish Farm, Forge.
- 🌿 Artloch Fishery, Glass.
- 🌿 Delgaty Castle Fishery, Turriff.
- 🌿 Lochpark Fishery, Drummuir
- 🌿 Rathen Reel Fishery, Fraserburgh

The two bordering fisheries districts are that under the management of the Spey and Ugie District Salmon Fisheries Boards.

Map 1 Deveron Fisheries District



4.2 Summary of district land use

There are numerous types of land use and businesses spread throughout the district, varying from large scale arable crops to hoteliers. 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, canoeing and other riverside activities rely in part upon the quality of the aquatic and riparian environments to enhance the visitor experience. A 2004 [survey](#)²³ of the economic impact of game and coarse angling in Scotland commissioned by the Scottish Government revealed that angling is extremely important to Scotland's economy, particularly in rural areas with anglers spending about £113M annually (see **Table 2** for North East Scotland information). 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.

Table 2 Angler expenditure table (£ 000s) for North East Scotland (Aberdeenshire, Angus and Tayside)

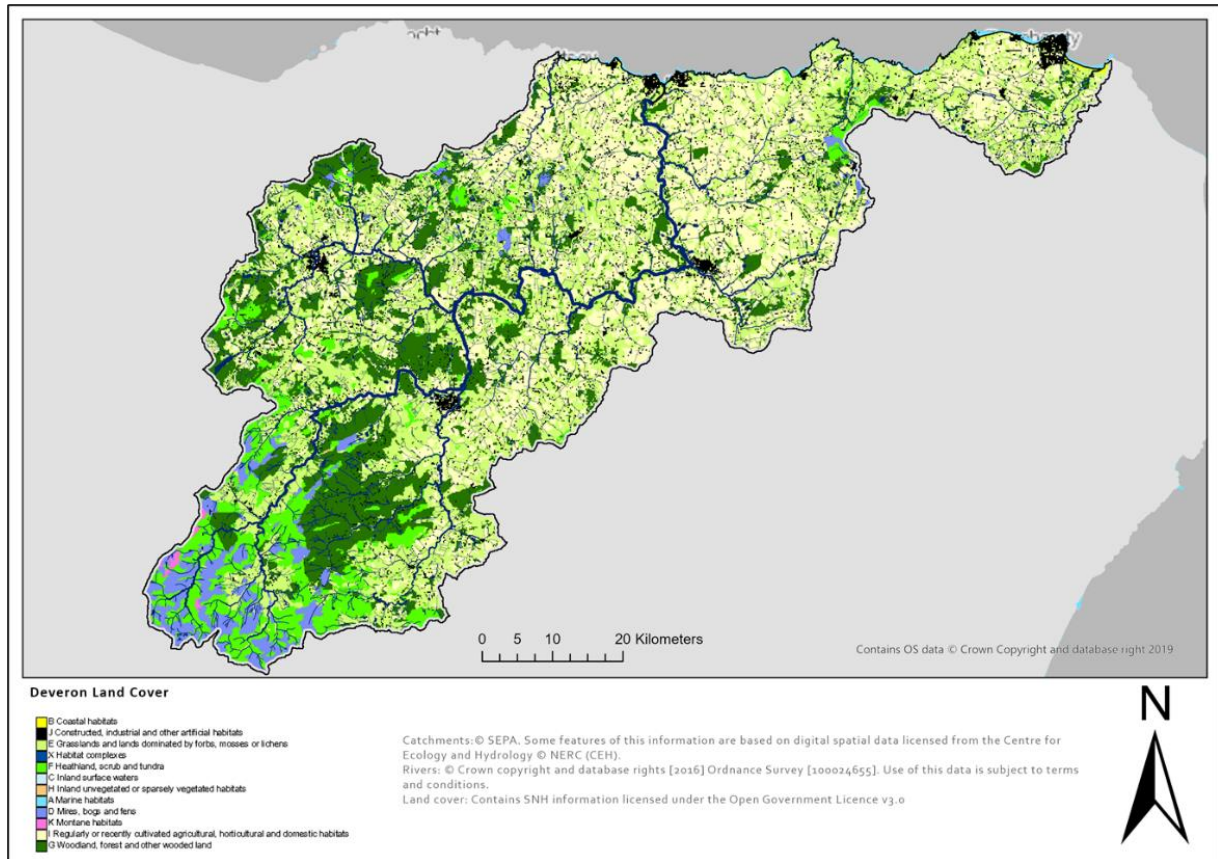
Fishery	Value (£ 000s)
Salmon & sea trout	£24,344
Brown trout	£1,589
Rainbow trout	£4,910
Coarse fish	£824
Total	£31,667

The River Deveron has a catchment area of 1266 km² and a length of 96kms. It rises on the edge of the Grampian Mountains (600+m above sea level) in the heather moorland of the Cabrach. The upper Deveron is classified as from its source to its confluence with the River Isla and is characterised as a narrow, fast flowing river through a steep sided valley with only one large tributary entering, named Blackwater. The surrounding land use here is mainly crofting and countryside sports (e.g. deer stalking), until the river passes its first main settlement, the town Huntly.

The middle Deveron runs from the confluence with the River Isla to the confluence of the Turriff Water (Turriff). The surrounding land use changes here to mixed farming with arable and stock, with the largest local town being Turriff. The Lower Deveron flows from Turriff to the estuary at Banff, the last of the three main Deveronside towns where the Deveron discharges into the Moray Firth. The land use within this area is predominately arable. The two main Deveron tributaries are the River Bogie which joins at Huntly and the River Isla which flows through Keith and joins the Deveron just prior to Milltown of Rothiemay.

²³ <http://www.scotland.gov.uk/Publications/2004/06/19506/38879>

Map 2 Deveron Catchment Land Cover



There are many other important economic and public service activities within the district. These include commercial quarries; fishing ports/harbours, garden centres, pet shops, sawmills, drinking water suppliers, distilleries and many more.

4.3 Biosecurity: Current and potential threats

This section identifies 32 INNS and fish diseases for inclusion in the DBIT Biosecurity Plan of which 19 high priority species will be the focus for action. The priority species were identified as those that:

- 🌿 Already exist within the DBIT 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 eight INNS, one translocated native species and one fish parasite that are currently found in the Deveron catchment:

- 🌿 **American mink (*Mustela vison*)** is present throughout the Deveron catchment and is likely to be also present on coastal rivers. Mink (pictured below) spread by migration and kill waterfowl, 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 unoccupied.





- 🌿 **Canadian pondweed (*Elodea Canadensis*)** is present in various locations throughout the Deveron 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 dominates native macrophyte communities which can lead to their extinction and thereby impacts local invertebrate communities. It can also increase metal loads within waterbodies that compounds its impacts on native flora and fauna.
- 🌿 **Rhododendron (*Rhododendron ponticum & hybrids*)** is present in many locations throughout the middle and lower Deveron and coastal river catchments but is not a significant threat. 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 Deveron catchment including the two main tributaries the Bogie and Isla. 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 prohibits regeneration. Dense growth of Japanese knotweed can also hinder access, reduce biodiversity and alter the habitat for wildlife.


🌿 **Himalayan balsam (*Impatiens glandulifera*)** is present in scattered populations throughout the Deveron catchments and coastal rivers. It spreads through natural dispersion by wind or water from areas where 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 Deveron 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 (pictured below) 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.



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Rainbow trout (*Oncorhynchus mykiss*) are farmed at Forgue Fish Farm in the middle Deveron catchment. Although there are no complete records of distribution, rainbow trout have been introduced to ponds/fisheries throughout the district area 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.

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Minnow (*Phoxinus phoxinus*) is a translocated species that has been introduced into the Deveron district and is now known to be resident in 5 tributaries of the Deveron. 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.

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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 in sushi.

- 
Grey Squirrel (*Sciurus carolinensis*) has just encroached into the Deveron catchment via the upper Bogie. Decimates native red squirrel (*Sciurus vulgaris*) populations through carrying the squirrel pox virus and direct competition. Also known to impact other native flora and fauna reducing biodiversity.

4.3.2 Potential biosecurity issues

The invasive non-native species listed below are not currently present within the Deveron 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 Deveron 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 six High Threat level species that could be introduced into the Deveron district and they include one fish parasite, three freshwater invertebrates and two aquatic plant species (**Table 3**).

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

SPECIES	RISK OF INTRODUCTION	LOCAL IMPACTS
<i>Pink salmon (Oncorhynchus gorbuscha)</i>	High - Pink salmon (<i>Oncorhynchus gorbuscha</i>) are not native to Scotland and are likely to have 'strayed' from some of the rivers in northern Norway or Russia. In 2017 & 2019, unprecedented numbers of Pink salmon were captured across the UK. Captures were also reported in Norway, Finland, Iceland, Denmark and Germany. Due to their two-year life-cycle, juvenile fish will be derived from distinct 'odd' or 'even' years, with the Russian/Norwegian fish being odd-year stocks. It is therefore possible that they will occur again in Scottish rivers in 2021.	<ul style="list-style-type: none"> ▪ Potential negative consequences for native aquatic biodiversity and the productivity of local Atlantic salmon populations.
<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.	<ul style="list-style-type: none"> ▪ Burrows into river banks causing destabilisation ▪ Diet include small fish, fish ova and invertebrates
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 trade ▪ 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/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




SPECIES	RISK OF INTRODUCTION	LOCAL IMPACTS
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

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	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	Through unintentional introduction
Didemnum Tunicates / sea squirts (<i>Didemnum vexillum</i>)	Medium	Unintentional introduction from marine fishing 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 Deveron 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 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
- 🌿 NatureScot, Aberdeen
- 🌿 Scottish Environment Protection Agency, Elgin
- 🌿 Forestry and Land, Huntly
- 🌿 Aberdeenshire and Moray Local Council(s)
- 🌿 The River Deveron District Salmon Fishery Board, Huntly
- 🌿 Marine Scotland, Pitlochry (Scottish Government Agency)
- 🌿 Wildlife Crime Officers

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 5**.

Table 5 Pathways and stakeholder groups in the Deveron District

Pathway	Stakeholders
Intentional introduction or planting	Plantlife, riparian landowners, members of the public, Marine Scotland, local councils
Fouling and ballast water of marine vessels	Local harbour authorities/SEPA
Fouling and ballast water of freshwater vessels	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)	RDevDSFB, local canoe/water sports organisations, anglers, angling associations, fishing agents and tackle shops.
Escapes from fish farms, ponds, gardens, and desmesnes	Marine Scotland/ SEPA/ Planning Authorities/ Plantlife/ riparian owners/ members of the public
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.

4.5 Existing and past INNS control activities

Control of INNS has been ongoing in the catchment since 2001 and has focused on Giant hogweed and American mink. The DBIT has controlled the hogweed infestation on the River Isla catchment (a major seed source) and Huntly Fishings has completed similar control of the River Bogie. The DBIT has also encouraged riparian land owners to commit to controlling any infestations under their ownership. During 2007, The Esmeé Fairbairn Foundation committed funds to help continue control of hogweed, on the rivers Isla and Bogie, for another three years.

During 2007 as part of a national campaign, the River Deveron District Salmon Fisheries Board and DBIT instigated a publicity campaign to prevent the introduction and spread of the parasite *Gyrodactylus salaris*. Interviews were given to local press and leaflets and posters distributed to angling and canoeing outlets. Information and warning signs were also installed at access points to rivers. 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.

The control of American mink has been mainly undertaken by a selection of ghillies/keepers and supported by the DBIT. The DBIT operated mink rafts in a selection of tributaries during 2006/07 where the presence of mink had been reported or where water voles were known to exist. The rafts provided many positive indications of mink presence. As a result of these findings the DBIT increased the level of mink control and increased effort again in 2008 through collaboration with the North East Water Vole Conservation Project.

The inaugural Deveron Bio-security Plan was completed in 2008. Since then, there has been six main projects which have implemented the Objectives and Actions of the plan and they are outlined below.

- Deveron District Biosecurity and Fisheries Development Project 2009-2012
- Deveron District Biosecurity Project-Phase II 2012 to 2013
- Deveron District Biosecurity Project-Phase II Extension 2014 to 2015
- Deveron District Biosecurity 2015-2016
- Hogweed Control-Tesco Bags of Help 2017




The projects outlined above have facilitated and funded many key and successful actions including the plan launch, public and landowner engagement, surveys of existing INNS, recruitment of dedicated officers, giant hogweed (Sheep) grazing trial, links with local environmental groups and volunteers, monitoring and trapping of American mink and the systematic control of priority Invasive non-native plants.

Since 2018, INNS control for Giant hogweed, Himalayan balsam, Japanese knotweed and American mink has been carried out as part of the [Scottish Invasive Species Initiative](#) which runs from 2017-20210 (but with a possibility of extension to 2022).

This plan will include and support ongoing existing INNS control programmes.

5. Biosecurity management strategy

The objectives of this plan will be achieved through a partnership approach, based on the following crucial elements:

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

Stakeholder engagement and participation will be essential to achieve the biosecurity objectives.




5.1 Objectives and outputs of Deveron district biosecurity plan


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. Control activities will be undertaken in a systematic and cohesive manner on a catchment-wide scale to eradicate identified INNS where feasible.

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.

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
-  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

-  We require the support of stakeholders to increase awareness and better understanding of INNS issues and impacts

The local priorities for awareness will focus on disrupting the pathways for the introduction and spread of INNS in the Deveron 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"> - DBIT to work with local industry and trade associations to advise members regularly of best practice in respect of INNS - Enforcement agencies (SEPA & RDevDSFB) to undertake site visits to discuss and advise on issues involving INNS e.g. rainbow trout - Scottish Invasive Species Initiative and GBNNS websites
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"> - 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. - DBIT to assist with the supply of posters and other awareness material for display and signage. - Scottish Invasive Species Initiative and GBNNS websites
Local Garden Centres	<ul style="list-style-type: none"> - Promote 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. 	<ul style="list-style-type: none"> - DBIT to work with garden centres to encourage distribution of codes of practice and posters (available from Plantlife). - Scottish Invasive Species Initiative and GBNNS websites
Local Aquarium and Pond stockists	<ul style="list-style-type: none"> - Promote code of practice to all pet shops and suppliers of ornamental fish 	<ul style="list-style-type: none"> - DBIT 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 	<ul style="list-style-type: none"> - DBIT to work with associations to promote disinfection of equipment and provide appropriate facilities to eliminate the risk of accidental transfer of INNS - Scottish Invasive Species Initiative and GBNNS websites
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 DBIT to ensure dissemination of best practices and appropriate signage to reduce threats from INNS - DBIT to offer training for “eyes” - Scottish Invasive Species Initiative and GBNNS websites
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 DBIT to ensure dissemination of best practices and appropriate signage to reduce threats from INNS - DBIT to offer training for “eyes” - Scottish Invasive Species Initiative and GBNNS websites
General Public	<ul style="list-style-type: none"> - General awareness of impacts and measures to prevent/control INNS - Promote the Biosecurity Plan to all retail outlets who deal with NNS e.g. pet shops, garden shops 	<ul style="list-style-type: none"> - Local Media Campaigns - Use of websites (, NNS) - DBIT to develop a leaflet to promote the Biosecurity plan, the dangers arising from INNS and the reporting system - Scottish Invasive Species Initiative and GBNNS websites

Schools	- General awareness of impacts and measures to prevent/control INNS	-School visits -Field trips - Scottish Invasive Species Initiative and GBNNS websites
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Table 7 Roles and/or actions of key government and non-government agencies in promoting awareness of INNS issues

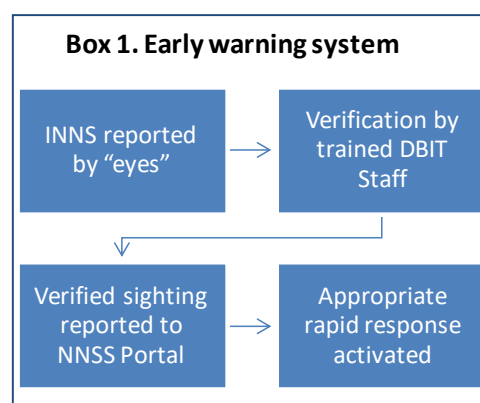
Organisation	Role and/or action	Delivery Mechanisms
DBIT	- Promote awareness to general water users promoting the Biosecurity Plan and highlighting the dangers from INNS	- Promote Biosecurity Plan - - provide Biosecurity kits for fishing beats as part of SISI
RDevDSFB	- Continue to promote awareness 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
Local Councils: Aberdeenshire / Moray	- 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. GB Non-Native Species Secretariat , Scottish Invasive Species Initiative , Scottish Canoe Association - Digital documents available for download on SEPA Website
NatureScot	- National: Promotion of good practice in the prevention, control and eradication of INNS - Local: NatureScot support and advise the DBIT.	- Holding of Sharing Good Practice events. - Grant funding may be available for some projects.

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 new 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 DBIT 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 DBIT Geographic Information System to monitor INNS distributions within the Deveron District and reported to the GBNNS and North East Scotland Biological Recording Centre (NESBReC). 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:

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

Table 8 Response level for the 31 invasive non-native species

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

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

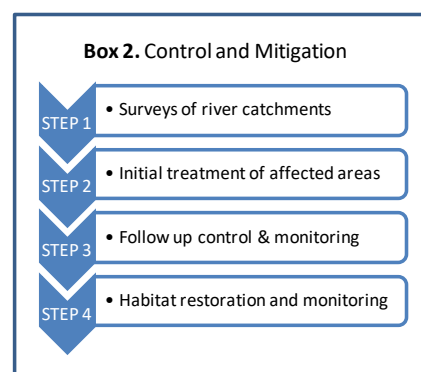
Table 9 Elements of contingency plans or protocols for response to GB priority, local high priority and priority species

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

Activities for the control of mink undertaken as part of the current Scottish Invasive Species Initiative will continue. For other priority species surveys identify their distributions within the Deveron area. Control and eradication programmes will be phased with treatment commencing at the upstream point of distribution and then systematically progressing downstream. The first phase of control will focus on the upper Deveron, Rivers Bogie & Isla with subsequent phases tackling INNS on the lower Deveron and the coastal rivers. A combination of SISI project officers, specialist contractors, volunteers, land managers, ghillies (river managers), local estate staff and DBIT staff will be used depending on the management requirements of the area involved. The DBIT will seek



to form and coordinate partnerships with organisations with an interest in long-term commitments to invasive species control and neighbouring fisheries trusts to identify funding sources and potential projects that ensure sustainable control of INNS in the Deveron district. Such partnership working will be essential to bring about long-term, large-scale resource-intensive projects. Envisaged mitigation, eradication and

control measures for the 9 INNS present in the Deveron catchment 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	Control/Eradication Identify and close pathways.	- Leaf spraying with Glyphosate by SISI/DBIT staff, trained volunteers, land managers for existing populations with follow up to maintain control if required. - Stem injection for smaller populations and individual plants. - Requirements for riparian zone habitat restoration assessed and implemented
Himalayan balsam	Control/Eradication Identify pathways and close	- Hand pull or cut - Monitor catchment for activation of dormant sources of infestation - Habitat restoration if required
Giant hogweed	Control/Eradication Identify pathways and close	- Continue to spray with glyphosate ; 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
Rhododendron	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	- DBIT collect records from proprietors and pass on to Marine Scotland

Output 3.2 Output 3.2 Coordinate partnerships to source future funding and develop projects

The sustainable and effective implementation of the required biosecurity actions at the local level post SISI project will require coordination of partnerships with other organisations with an interest in INNS control. Funding sources and future projects to ensure on-going sustainable INNS control will need to be sought out and implemented catchment-wide.

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					
			2020	2021	2022	2023	2024	2025
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	DBIT			—				
Produce leaflet on legislation including waste management & planning regulations	Moray and Aberdeenshire councils	SEPA NatureScot		—				
Produce leaflet on biosecurity risks and the reporting system	DBIT	NatureScot	—	—				
Produce posters on biosecurity risks and distribute to the general public	DBIT	NatureScot		.....	.....	.....	.....	.....
Continue to promote and install disinfection facilities for anglers at all angling proprietors fishing huts/parking points and provide biosecurity kits	RDevDSFB/ DBIT	NatureScot	.....	.....	.....	.....	.....	.....
Develop good practice protocol with Harbour Authority	Port Authorities	DBIT		—	—			
Distribute Codes and posters to relevant retail outlets and clubs at open days and events such as agricultural shows	DBIT	NatureScot		.....	.....	.....	.....	.....
Engage with Landowners and angling clubs to promote awareness measures to tenants, resource –users, members and visitors	DBIT	NatureScot		—	—	—	—	—
Work with environmental groups of local schools to enhance awareness of INNS	DBIT	NatureScot	.....	.....	.....	.....	.....	.....
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 DBIT personnel in the identification of INNS	DBIT	NatureScot	—	—				
Work with user and interest groups to identify “eyes”	DBIT		—	—	—	—	—	—
Training of “eyes”	DBIT	NatureScot	—	—	—	—	—	—

Action	Lead	Partners	TIMEFRAME					
			2020	2021	2022	2023	2024	2025
Produce database to record and manage INNS sightings	DBIT		—————	—————	—————			
Establish, test and refine communication mechanisms within 'early warning' system	DBIT	NatureScot	—————	—————	—————			
Monitor and periodically evaluate efficacy of system	DBIT		.....	.....	.....	.....	.....	.....
Output 2.2 – Rapid response mechanism established for new INN species which pose significant threats to local biodiversity and economy.								
Formulate contingency plans	DBIT	Local Councils, SEPA and NatureScot		—————	—————			
Identification of personnel	DBIT			—————	—————	—————		
Training of personnel	DBIT			—————	—————	—————		
Identification of funding resources	DBIT	Local Councils, SEPA and NatureScot		.....	.....	.....	.....	.....
Acquisition of equipment	DBIT	Local Councils	—————	—————	—————			
Refresher training	DBIT			—	—	—	—	—
Monitor populations/treatment areas	DBIT		.....	.....	.....	.....	.....	.....
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	DBIT		—————	—————	—————			
Implementation of mink trapping program and continuation of SISI	DBIT	Aberdeen University	—	—	—	—	—	—
Implement habitat restoration scheme within successful control areas taking into account all relevant species	DBIT		—	—	—	—	—	—
Monitor the effectiveness of control programmes	DBIT		—	—	—	—	—	—
Monitoring Pink salmon	DBIT	Marine Scotland Fisheries Management Scotland	—————	—————	—————	—————	—————	—————
Identify sources of rainbow trout and continue removal	DBIT/RDevDSFB		—————	—————	—————	—————	—————	—————
Continue to identify and develop opportunities for future funding of eradication projects	DBIT and all stakeholders					—————	—————	—————

6 Monitoring

Biosecurity is being initiated within the Deveron district by the DBIT. It must be recognised that if current resources are not continued that progress will be limited past 2022 and the end of the SISI project (if the scheme is extended by 1 year as planned). However, despite limitations, any work completed by the DBIT will be monitored and the results evaluated particularly in the light of changing circumstances e.g. climate change. In this respect, the DBIT 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 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. Monitoring activities will be undertaken by DBIT 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.