

2021-2025

Spey District

Biosecurity Plan



Spey Fishery Board

SCOTTISH INVASIVE SPECIES INITIATIVE

Acknowledgements

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Abbreviations

Abbreviation	Organisation
CBD	The Convention on Biological Diversity
CNPA	Cairngorms National Park Authority
INNPS	Invasive Non-Native Plant Species
INNS	Invasive Non-Native Species
RSAA	River Spey Anglers Association
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SBP	Spey Biosecurity Plan
SEPA	Scottish Environment Protection Agency
SFB	Spey Fishery Board
SFCC	Scottish Fisheries Co-ordination Centre
SLE	Scottish Land & Estates
SMI	Scottish Mink Initiative
NS	NatureScot
SSSI	Site of Special Scientific Interest

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1. Introduction

The Spey catchment already has its share of invasive species, many of which have spread extensively, often using the river, and tributaries, as a transport mechanism. Some of these species are highly invasive with detrimental effects on the natural environment, including economic and societal impacts. Management and control of these species is already resource-demanding. Novel invasive, or other biosecurity risks, will only add to the present problems.

A general definition of a non-native species is any species of plant or animal that survives outside of its historical or natural range as a result of human activity. Non-native species are also often referred to as 'alien', 'exotic' or 'non-indigenous' species¹.

An invasive non-native species (INNS) is regarded as one which has the ability to spread rapidly and become dominant in an area or ecosystem, and which causes unwanted ecological (e.g. loss of biodiversity) or societal effects (e.g. effects on human health or activities).

The Scottish Government defines INNS as animals and plants which, if not under control of any person, would be likely to have a significant adverse impact on:

- Biodiversity
- Other environmental interests
- Social or economic interests².

There are many species in the UK which have been introduced by humans over the past few thousands of years; most do not cause problems. Many have been important economically, for example the many forestry and crop species introduced for cultivation.

Once INNS are established, for many species there are no effective techniques available to eradicate them, so preventing introduction and spread is the most effective way to protect the environment. Prevention minimises the impacts and costs of tackling established populations.

Biosecurity is about reducing the risk of introducing or spreading invasive non-native species (and other harmful organisms such as diseases) in the wild³. Disease risks can be brought in through poor biosecurity but there could be outbreaks of naturally occurring diseases, amongst wild fish populations, for example. Examining, and assessing preparedness, and readiness to react, if such an outbreak occurs, will be considered in this plan.

Existing biosecurity plans (SFB, 2010) and the extensive invasive species management undertaken locally through the Scottish Invasive Species Initiative provide an excellent foundation of knowledge and understanding upon which to develop this next biosecurity plan.

This plan contains:

- An overview of the catchment and a summary of INNS already present.
- An overview of current INNS management priorities and actions.

¹ <https://www.parliament.scot/Research%20briefings%20and%20fact%20sheets/SB10-33.pdf>

² <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2012/08/non-native-species-code-practice/documents/00398608-pdf/00398608-pdf/govscot%3Adocument/00398608.pdf>

³ <http://www.nonnativespecies.org/index.cfm?sectionid=58>

- Assessment of potential pathways for INNS to enter and spread within the Catchment.
- A five-year biosecurity management plan (2021 to 2025).

2. Scope and Purpose

This plan describes the biosecurity issues of the Spey Fishery District (see Figure 4.1.1) and presents actions for the prevention, early detection, control and mitigation of the introduction and spread of INNS, fish diseases and parasites. The vision of this plan is:

‘To establish a sustainable framework that will prevent, detect, control and eradicate invasive non-native species within the Spey district through the coordination of data collection, appropriate management, liaison, and education.’

The 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 actions presented throughout this plan.

This plan focusses on five key species already present in the Spey District, but will also consider how new invasive species can be prevented from becoming established in the area, as well as other biosecurity risks. The five key species, all of which are already present, are American mink, Giant hogweed, Japanese knotweed, Himalayan balsam and White butterbur.

The implementation of this biosecurity plan will bring socio-economic and environmental benefits such as those described below:

- Protection of native ecology from American mink.
- Maintenance of access to riverbanks for recreation and angling through the removal and control of invasive plant species such as Japanese knotweed, Giant hogweed & Himalayan balsam.
- Restoration and protection of native riparian habitat, including tree regeneration through the management of invasive riparian plants.
- Prevention of economic losses that INNS could cause.
- Conservation and increased amenity value of local landscapes.

This vision will be achieved through the delivery of the following main objectives:

Objective 1: Reduce the risk of the introduction and spread of identified INNS within the Spey district.

Output 1.1: Raising awareness of:

- The ecological and economic impacts of INNS.
- The potential pathways for introduction and spread of INNS.
- Management best practice to prevent the introduction and spread of INNS.

Objective 2: Maintain a framework for the detection and surveillance of INNS, linked to a protocol to ensure a rapid management response.

Output 2.1: Identify mechanisms and resources for maintaining long-term reporting system for INNS within the Spey district.

Output 2.2: Maintain and develop strategic monitoring of INNS in Spey district.

Output 2.3: Develop rapid response protocol for significant new biodiversity threats.

Objective 3: Coordinated management, control, eradication & habitat restoration programmes for INNS.

Output 3.1: Develop shared mechanisms for the sustained control of INNS with the objective of eradication where possible.

Output 3.2: Identify and implement habitat restoration for sites where INNS have been removed.

Objective 4: Develop community capacity to detect, monitor and respond rapidly to new INNS.

Output 4.1: Resilient communities with the knowledge and understanding of INNS and the threats they pose to the local environment.

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 community awareness, capacity and partnerships to ensure the success and long-term sustainability of the presented actions.

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

- Rivers and land, where access is not limited by the presence of invasive and potentially harmful species such as Giant hogweed.
- Natural habitats where native biodiversity is able to flourish free from competition and displacement by INNS.
- The conservation and restoration of valued local landscapes.
- The prevention of harmful diseases, or parasites, such as *Gyrodactylus salaris*, which is catastrophic for wild salmon, from entering the Spey district.
- The protection of ground nesting birds, and endangered species, such as water vole from American Mink.

3. Context

3.1 Biosecurity & INNS: The nature of the problem

INNS issues are of increasing economic and ecological significance. Globalisation has expanded the 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 this plan, biosecurity issues in the rivers, lochs and stillwaters of the Spey District are considered in relation to the potential introduction and spread of a prioritised list of INNS, disease and pathogens.

According to CBD (2006)⁴, 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 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 waterbodies⁵. More recently the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment Report identified INNS as one of the top five culprits driving negative change in nature around the world – with numbers having risen by 70% since 1970 across 21 countries⁶.

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:

- more than 2,000 non-native species are recorded in Great Britain; of which 237 established species have a negative impact on biodiversity (Roy. et al (2014)⁷).
- Among the 1,161 non-native species established in Scotland, 183 (16%) have negative ecological impacts. (CBD, 2015a).
- Estimated total annual costs of invasive non-native species to Scotland is £244,736, 000 (Williams et al, 2010)⁸.
- The potential Net Economic Value loss to Scotland of the introduction of *Gyrodactylus salaris* has been estimated at £633 million⁹ 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.

⁴ <https://www.cbd.int/doc/gbo/gbo2/cbd-gbo2-en.pdf>

⁵ <https://www.cbd.int/invasive/WhatareIAS.shtml>

⁶ <https://www.ipbes.net/news/Media-Release-Global-Assessment>

⁷ <http://plymsea.ac.uk/id/eprint/6634/>

⁸ <https://www.cabi.org/VetMedResource/ebook/20123122024>

⁹ <https://nasco.int/wp-content/uploads/2020/02/NEA083.pdf>

¹⁰ <https://www.forestresearch.gov.uk/research/management-of-upland-native-woodlands/rhododendron-control/>

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, collectively known as the Aichi Targets (CBD, 2015b). 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 (SNH, 2016).

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. More recently a number of translocated fish species were introduced into lochs in the upper Spey catchment, including perch (*Perca fluviatilis*). New species such as this could affect existing biodiversity e.g., Arctic charr in Loch Insh.

Without a coordinated and systematic approach to the prevention of introduction and control of the spread of INNS, 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 mitigation, control and eradication of INNS, this plan emphasises the need for prevention and rapid response to the introduction of INNS before they become established. Furthermore, the host of pathways for entry and spread as well as the persistence of many of these species means that a partnership approach to prevent introductions and involving diverse stakeholders is essential. The partnership approach encapsulated in this plan is a key requirement for increased community awareness and engagement, optimisation of the use of resources and the provision of clear guidance for agencies, NGOs, and the community to work together to address the biosecurity issues in the Spey district.

“Addressing the direct and underlying drivers of biodiversity loss will ultimately require behavioural change by individuals, organisations and governments. Understanding, awareness and appreciation of the diverse values of biodiversity, underpin the willingness of individuals to make the necessary changes and actions and to create the “political will” for governments to act” (CBD, 2013).

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:

- Section 14 of The Wildlife and Countryside Act (1981)¹¹ (as amended in Scotland by the Wildlife and Natural Environment (Scotland) 2011)¹² makes it an offence to release an animal, allow an animal to escape from captivity or otherwise cause an animal not in the control of any person to be at a location outside its native range, or to plant or otherwise cause to grow a plant in the wild at a location outside its native range.
- [Code of Practice on Non-Native Species](#)¹³ was issued in 2012 by the Scottish Government. The Code sets out guidance on how you should act responsibly within the law to ensure that non-native species under your ownership, care and management do not cause harm to our environment.
- Section 179 of the Town and Country Planning (Scotland) Act 1997¹⁴ 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 2005¹⁵ regulates the use of pesticides and herbicides for the control and eradication of INNS.
- Environmental Protection Act 1990¹⁶ 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 1994¹⁷ 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 1991¹⁸ and the Environmental Protection (Duty of Care) Regulations 1991¹⁹ provide guidance for the handling and transfer of controlled waste.
- The [Aquaculture & Fisheries \(Scotland\) Act 2007](#) regulates against the unauthorised introduction of fish to inland waters.
- The [Prohibition of Keeping or Release of Live Fish \(Specified Species\) Order 2003](#) requires that a licence be obtained for the keeping or release of species listed on Schedules 1 and 2.
- The [NetRegs](#) website contains useful guidance on INNS and their control

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 3.2.1).

¹¹ <https://www.legislation.gov.uk/ukpga/1981/69/contents>

¹² <https://www.legislation.gov.uk/asp/2011/6/part/2/crossheading/nonnative-species-etc/enacted>

¹³ <https://www.gov.scot/publications/non-native-species-code-practice/>

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

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/1991/1624/contents/made>

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

Furthermore, it supports the conservation objectives of designated conservation areas (SAC, SSSI) in the Spey district.

Table 3.2.1 Identified Actions in the Spey Fishery Board Biosecurity Plan supporting provisions or requirements of other relevant plans

Provision or Requirement of Existing Plan	Action in SFB Biosecurity Plan
<p>Plan: Gyrodactylus salaris (Gs) Contingency Plan²⁰:</p> <p>Provision/s: A strategy to rapidly contain and eradicate Gs if introduced to Scotland.</p>	<p>Formulate rapid response protocols for new INNS which pose significant threats to local biodiversity and economy.</p>
<p>Plan: North East of Scotland Biodiversity Partnership²¹</p> <p>Provision/s: Collaborative working, operates the North East Scotland Biological Records Centre (NESBReC)²²</p>	<p>Continue collaborations across the North East of Scotland to control invasive species and protect native biodiversity.</p>
<p>Plan: River Spey Catchment Management Plan²³.</p> <p>Provision: Further the knowledge and understanding of the impact of rainbow trout on native fish species and co-ordinate fish farming with other fishery activities.</p>	<p>Continue and increase awareness of the impacts of INNS species.</p> <p>Ensure all riverine & coastal water users comply with codes of best practice to minimise risk of INNS species introduction, spread and cross catchment contamination.</p> <p>Continue annual inspection of commercial fishery 'screens'.</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 Scotland²⁴.</p>	<p>Supports the conservation of biodiversity target species through the control and eradication of INNS detrimental to their ecology.</p>

²⁰ <https://www.gov.scot/publications/diseases-of-wild-and-farmed-fish/pages/gyrodactylus-salaris/>

²¹ <https://www.nesbiodiversity.org.uk/our-biodiversity-in-the-north-east-of-scotland/invasive-non-native-species/>

²² <https://www.nesbiodiversity.org.uk/get-involved-in-biodiversity/north-east-scotland-biological-records-centre-nesbrec/>

²³ <https://www.speycatchment.org/wp-content/uploads/2019/11/SCI-2016-Catchment-Management-Plan.pdf>

²⁴ <https://www.gov.scot/publications/2020-challenge-scotlands-biodiversity-strategy-conservation-enhancement-biodiversity-scotland/pages/7/>

Provision or Requirement of Existing Plan	Action in SFB Biosecurity Plan
<p>The RBMP for Scotland</p> <p>In 2015, 150 water bodies are at risk of deterioration because of the potential for such species to spread to them from nearby water bodies.</p>	<p>The river basin management plans for Scotland set out a range of actions to address these impacts.</p> <p>Actions to prevent the spread of invasive non-native species and diseases of wildlife listed.</p> <p>For the period 2015 to 2027 a list of actions are defined.</p>

4. Catchment overview

4.1 Spey Fishery District

The Spey Biosecurity Plan (SBP) covers the management area of the Spey Fishery Board (SFB) within the Highland Council and Moray Council regions (Fig: 4.1.1). The district comprises the River Spey and its tributaries and all other watercourses that discharge into the Moray Firth, between Cowhythe Head to the east and Lossiemouth to the west, including the Cullen Burn, Buckie Burn and Tynet Burns. The Spey itself supports an internationally renowned salmon and sea trout fishery with fishing for brown trout, charr and pike also available. The Spey also contains several commercial rainbow trout, and other species, stocked fisheries.

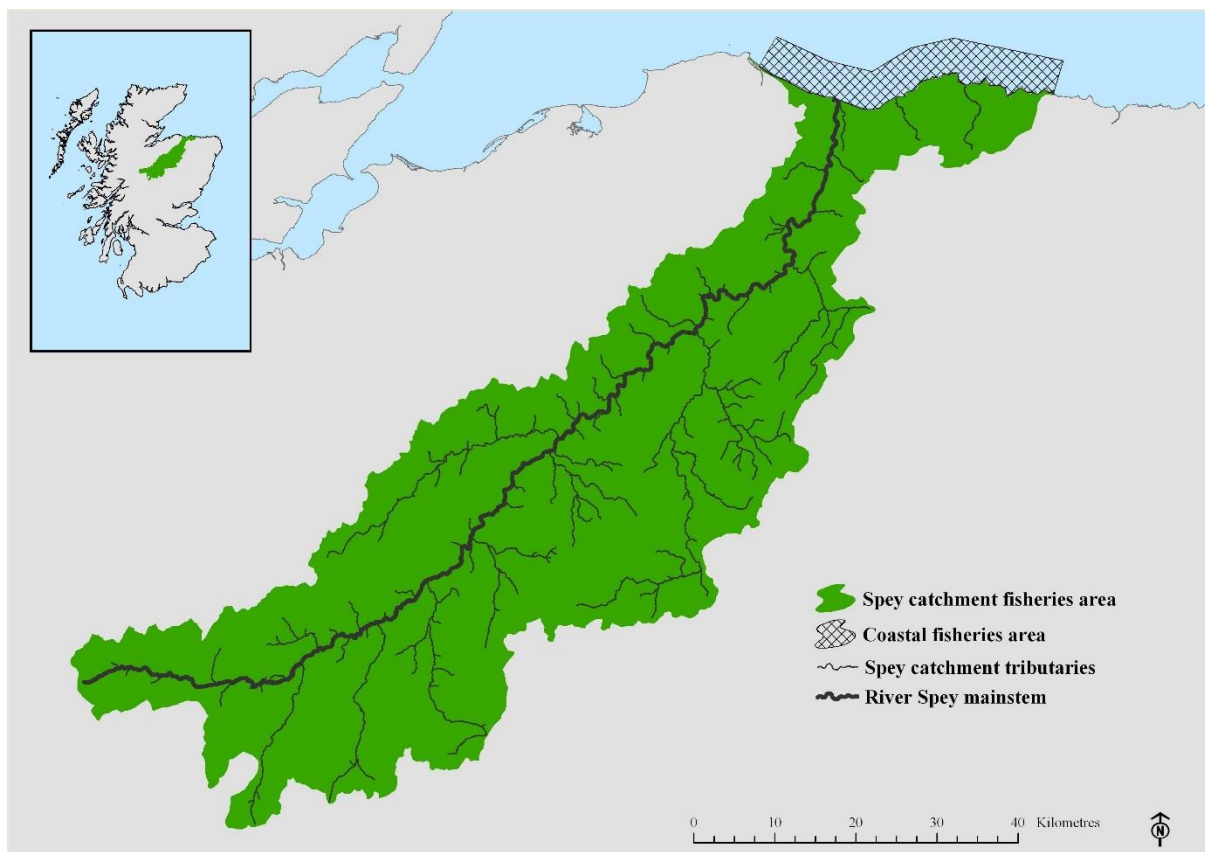


Figure 4.1.1: Spey Fishery District including coastal burns

4.2 Summary of district land use

The catchment is split between two Local Authority administrations, the Highland and Moray Councils, and 63% of the catchment is within the Cairngorms National Park (Figure 4.2.1).

Badenoch, Strathspey and Speyside can be classed as a low population density area. The settlement pattern is one of small planned towns housing less than 3,000 residents, e.g., Kingussie, Grantown, Aberlour and Fochabers, and, small villages of less than 500 residents, e.g. Nethybridge, Carrbridge, Craigellachie and Garmouth. However, recent years have seen a substantial growth in housing within the Aviemore area increasing demands for water supply in particular.

Hill farming, forestry and sporting estates dominate the land-use pattern in the upper catchment, where the high ground of the Cairngorms represents the most extensive range of high mountains in the UK. On the opposite side of the broad Strathspey, the Monadhliaths form another extensive area of high ground which is virtually uninhabited. Cattle rearing, extensive commercial forestry and arable farming become more prevalent in the lower catchment. Along the Moray coast there is high quality agricultural land with intensive arable farming. The main industry in the area is whisky distilling with almost half of Scotland's malt distilleries to be found in the Speyside.

The flow of water through the catchment is monitored by SEPA, using a network of gauging stations. The lowest station at Boat o'Brig²⁵ shows an average daily flow of about $65\text{m}^3\text{s}^{-1}$ with a dry weather flow of about $19\text{m}^3\text{s}^{-1}$. There are two major sources of potable water abstraction in the River Spey catchment, a groundwater abstraction at Aviemore and a groundwater abstraction from the river terrace gravels at Fochabers (the Dipple Wellfield). There also remain a few local village supplies as well as numerous private sources.

There are two main hydro schemes in operation in the upper catchment. Firstly, Scottish & Southern Energy plc diverts water from the catchments of the rivers Tromie and Truim to Loch Ericht (Tummel/Tay catchment). As part of this scheme some water is transferred from the upper Edendon Water (Tay catchment) to the headwaters of the River Tromie. Secondly, SIMEC diverts water from the upper Spey at Spey Dam to Loch Laggan for hydro-power generation at Fort William.

²⁵ <https://nrfa.ceh.ac.uk/data/station/meanflow/8006>

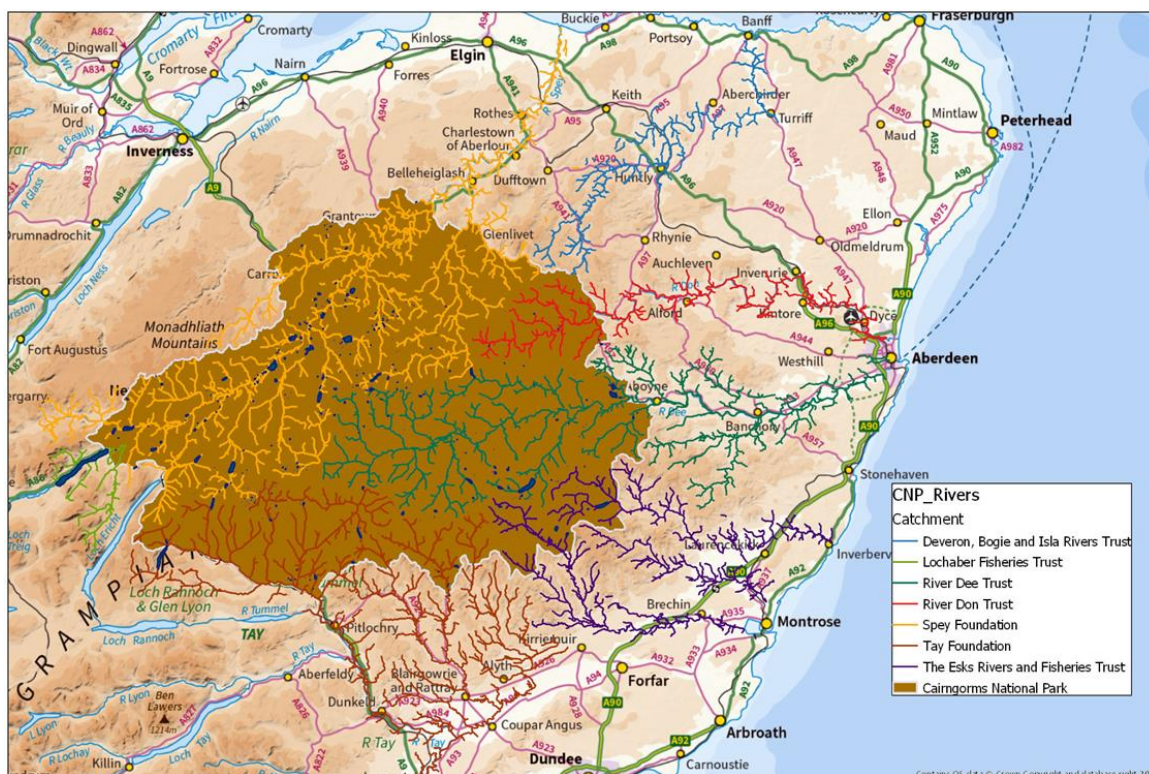


Figure 4.2.1: Cairngorms National Park showing major rivers and fishery trust areas

4.3 Recreation

The outstanding scenery of the Cairngorms area has been a draw to visitors since Victorian times. The diverse landscapes lend themselves to a wide range of pursuits and it is one of the premier regions for outdoor recreation in Scotland²⁶. This extends beyond the Cairngorms into the greater Spey hinterland. In Moray the Whisky Trail, and its numerous festivals, attract a wide international clientele.

The Strathspey and Speyside are famous for the country sports available and the River Spey is a global salmon fishing destination attracting anglers from around the world. Angling trips are usually of short duration; weekly, or more frequent, turnover of guests is the norm.

As a consequence of the innate attractiveness of the area there is a highly developed tourism industry with a range of accommodation providers. The Cairngorms national park also has a much higher proportion of second homes. In the National Park around 12% of all houses within the Park are second homes; significantly higher than the Scottish average of around 1%²⁷. This popularity as a destination may bring heightened biosecurity risks.

5. Biosecurity: current and potential threats

There are a number of invasive non-native species already present within the Spey district. The Spey Foundation carried out a survey of INNS in the lower Spey catchment, including some tributaries, in 2012 (Spey Foundation, 2012). This greatly informed knowledge of the distribution of a wide range of INNS including identification of potential infection sources. Coastal burns were not surveyed but some






²⁶ <https://cairngorms.co.uk/caring-future/cairngorms-landscapes/special-landscape-qualities-recreation/>

²⁷ <https://cairngorms.co.uk/working-together/national-park-partnership-plan/visitor-experience/priority-7-housing/>




infestations have been reported to, and recorded by, SISI and partners. Their known distribution, impacts and pathways for spread are discussed below.

In addition, potential biosecurity risks will be assessed according to their likely impact on the local biodiversity and community, along with their likelihood of introduction.

5.1 INNS already present within the area

-  American mink (*Mustela vison*) is present throughout the Spey catchment and along the Moray coast. Mink spread by migration and predate on birds, small mammals and fish, including 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. SISI has maintained and extend the mink control programme. Mink numbers in the Cairngorms area of the catchment have been greatly reduced and it is only along the Moray coast that they are still present in any numbers.
-  Giant hogweed (*Herculeum mantegazzianum*) is widespread in the lower catchment particularly near the mouth of the Spey. Its source in the Spey was as a garden escapee in the upper Mulben Burn. It was not recorded in a comprehensive ecological survey of the Spey mainstem in 1994 (SNH, 1994) but since then it has become established throughout the Mulben Burn and along the Spey mainstem below the Mulben Burn confluence. It also occurs on the mainstem upstream of the Mulben Burn, where it has spread by means other than fluvial. Sporadic occurrences occur across the wider Spey hinterland but public awareness is such that it is generally reported, and treated, before any new stands become established. 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 and deter public 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.
-  Japanese knotweed (*Fallopia japonica*) is present along the lower Spey catchment, from the Glenlivet area downstream, including tributaries. It spreads along rivers by dispersal of plant fragments by water and it has been transferred to other areas through the movement of plant/root fragments, via a variety of mechanisms. 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 also present in the lower Spey catchment, tributaries and coastal burns. It spreads through natural dispersion by wind or water from areas in which it has been introduced, or through the inadvertent, or deliberate, translocation of seeds or contaminated soil. It forms dense monoculture stands, outcompeting native plants reducing plants and denuding river banks of understory vegetation. Winter dieback of the plants exposes soil to erosion. It is known to be present along the Spey mainstem, from Carron downstream, and is well-established along the River Fiddich from Dufftown downstream.
-  White butterbur (*Petasites albus*) has large, rounded leaves, up to 30cm, which grow low, forming dense carpets of leaves. They resemble rhubarb leaves, but slightly more heart-shaped. White butterbur comes into leaf early, and forms a dense overlapping canopy of




leaves through which light cannot penetrate. It forms pure patches many metres across and suppresses any native vegetation growth and reduces the variety of native wildlife on the site. Its main distribution within the UK is concentrated in NE Scotland. It was imported as a garden ornamental from mainland Europe and SW Asia and escaped into the wild. White butterbur is very well established on some tributaries of the Spey and increasingly on the banks of the mainstem. Due to its early flowering, and dense canopy, once established white butterbur completely outshades native plants and prevents even tree regeneration. The banks of the Fiddich are particularly badly affected but SSSI have initiated a range of control, and habitat restoration trials to investigate the best mitigation strategies.

-  *Ranunculus* (*Ranunculus* sp.) is part of the water crowfoot plant family and grows extensively in the mainstem river Spey. It is native to many rivers in the British Isles but not to the Spey where it was inadvertently introduced in the early 1970s, reputedly from a pond near Grantown-on-Spey, and spread rapidly from there downstream. In the early years of this infestation chemical control through “Midstream”, a diaquat based herbicide, was found to be highly effective. However, the active ingredient is now banned for use in freshwater within the EU. Trials using other herbicides have been found to be ineffective. At present the only method of control is manual removal. *Ranunculus* grows in long strands, up to 3m long. The extensive root system encourages the settlement of finer substrates, and in well-established beds, these fine substrates can smother the naturally more diverse substrate. This can make the substrate unsuitable for salmonid spawning and is known to result in the mortality of pearl mussels through root binding and clogging by fine material such as sand²⁸. At peak growth it can completely choke pools rendering them difficult to fish. *Ranunculus* is controlled to some extent by large spates, when it is uprooted and swept away, but it rapidly regrows from root remnants or plant fragments.
-  Pink salmon, or Humpback salmon (*Oncorhynchus gorbuscha*) were, until 2017, a relatively infrequent occurrence in Scotland. In 2017 they appeared in numbers in the Spey and other, mainly east coast rivers. Spawning was observed and experimental monitoring of eggs excavated from redds showed that the alevins developed to the fry stage. This Pacific salmon species has been introduced in a number of non-native locations world-wide, and has succeeded in becoming established in many. The influx of fish in 2017 were thought to have been due to spread from Norway, from fish originally introduced into rivers in the north Russia coast. Pink salmon distribution in Norway has expanded significantly in recent years and they are considered a new, and serious threat to native salmonid species²⁹. Pink salmon have a strict two-year cycle and the odd-year population is currently the only strong one. Lesser numbers were reported in Scotland in 2019, although over a wider geographical range. There is a high risk that pink salmon will become established in Scottish rivers, including the Spey, with as yet unknown impacts on native fish.
-  Other non-native fish (various species, including goldfish, tench, orfe, roach, carp, asp, rainbow trout etc and translocated species such as minnow and perch). Indiscriminate and misguided stocking of the non-native fish species occurred during the late 1990s and has led

²⁸ <https://onlinelibrary.wiley.com/doi/pdf/10.1002/aqc.821>

²⁹ <https://www.vitenskapsradet.no/Portals/vitenskapsradet/Pdf/Status%20of%20wild%20Atlantic%20salmon%20in%20Norway.pdf>

to the establishment of populations of some of these species in a limited number of lochs and ponds within the catchment. These can compete with existing fish populations for food and habitat. Minnows are a translocated species which is found through the mainstem Spey and in many of the tributaries and lochs. 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. A large population of perch has recently become established in Loch Alvie following an earlier introduction. This predatory species is not native in the upper Spey and there is a risk it could spread into the Spey mainstem, and lochs, where it could harm native species such as salmon, or arctic charr. There are several commercial, or recreational, fisheries in the catchment which stocked farmed rainbow, or brown trout, and increasingly non-native coarse fish. Whilst it is known that rainbow trout can breed in the UK they are only known to do so in a limited number of locations. Introductions of coarse fish continue to be licenced, often on the basis that they will not be able to reproduce. With increasing temperatures forecast that could change and some of these species could start to breed. Removal of an introduced fish species and although unlicensed introductions are illegal, as is live baiting by anglers, it is likely that clandestine introductions still occur.

-  American Skunk Cabbage (*Lysichiton americanus*) is present in a number of locations throughout the Spey catchment, including within the CNPA. Another garden escapee, it thrives in wet or boggy ground, and it usually found growing in backwaters or wet woodland margins. It is less invasive than the plant species listed above but it can grow into extensive stands. It can be controlled by foliar spray herbicides.
-  New Zealand pygmy weed/Australian swamp stonecrop (*Crassula helmsii*) is known to be present in one mill pond in the middle reaches of the Spey but may be present in others. It was sold through the garden trade as a pond plant but if it spreads into the wild it can form dense carpets over the water surface preventing light penetrating and choking subsurface plants.
-  Rhododendron (*Rhododendron ponticum* & hybrids) is present in many locations throughout the middle and lower Spey and coastal river catchments but it does not seem as invasive, in the drier east coast, as it is in the west coast of Scotland. 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.

5.2 Potential biosecurity risks

The invasive non-native species listed below (Table 5.2.1) are believed not to be currently present within the Spey district. They have been classified as High or Medium level threats depending on their likely impact on the local community and biodiversity in combination with the likelihood of their introduction. The level of risk of introduction was based on the potential pathways for the introduction of INNS, their current geographic proximity and land use within the Spey district. It is possible to generate a very extensive list of other potentially invasive species but they are considered lower risk, or not present in close proximity to the Spey.

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

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

Table 5.2.1 High and medium threat level species, their impacts, and risk of introduction

SPECIES	RISK OF INTRODUCTION	LOCAL IMPACTS
<i>Gyrodactylus salaris</i> (Freshwater external parasite of salmon)	<p>High - Through unintentional introduction by anglers and water sport enthusiasts through:</p> <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 largely exterminated <i>S. salar</i> in 41 Norwegian rivers). Expensive restoration programmes, utilising live gene banks to maintain genetic diversity, have been successful in re-establishing some of these populations.
North American signal crayfish (<i>Pacifasticus leniusculus</i>)	<p>High - Through intentional/unintentional introduction from an existing population. The nearest known population is in the River Nairn.</p>	<ul style="list-style-type: none"> ▪ Burrows into river banks causing destabilisation. ▪ Diet include small fish, fish ova, invertebrates and aquatic vegetation. ▪ High abundances attract predators such, as mink, to feed.
Killer shrimp ³⁰ (<i>Dikerogammarus villosus</i>) & Demon Shrimp ³¹ (<i>Dikerogammarus haemobaphes</i>)	<p>High - Present in a range of waters in England, including in the north. Unintentional introduction by anglers and water sport enthusiasts through:</p> <ul style="list-style-type: none"> ▪ Clothing/equipment which has been in contact with infected water including canoes ▪ Transfer via tanks used for stocking fish 	<ul style="list-style-type: none"> ▪ Species of crustacean native to eastern Europe, but which has become invasive the western part of the continent. ▪ Predator that preys on a range of native species including young fish and invertebrates, and can significantly alter ecosystems.

³⁰ <https://species.nbnatlas.org/species/NHMSYS0020475521>









³¹ <https://www.apemltd.co.uk/finding-demon-shrimp/>

SPECIES	RISK OF INTRODUCTION	LOCAL IMPACTS
<p>Zebra mussel (<i>Dreissena polymorpha</i>) Freshwater Bivalve</p>	<p>Medium - through unintentional introduction from contaminated boat/canoe hulls and engines and bilge water.</p>	<ul style="list-style-type: none"> ▪ Major economic impact on all subsurface water structures e.g., blocking pipes and impacting upon abstractions. ▪ Varied and unpredictable ecological impacts including changes to freshwater nutrient cycles, extinction of local mussels and changes to stream substrate affecting spawning areas.
<p>Chinese mitten crab (<i>Eriocheir sinensis</i>) Resides in freshwater but migrates to the sea for breeding.</p>	<p>Medium - through unintentional introduction from boat hulls and live food trade.</p> <ul style="list-style-type: none"> ▪ Absence of a harbour at the mouth of the Spey limits potential for spread here. 	<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 ringeri</i>, known to infect humans.
<p>Curly waterweed³² (<i>Lagarosiphon major</i>)</p>	<p>Medium - found in a small number of locations throughout Scotland especially in the central belt area and spread through:</p> <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"> ▪ It is a serious 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.

³² <https://insideecology.com/2017/11/15/invasive-non-native-species-uk-curly-waterweed/>

6. Pathways of introduction

From the table above the main pathways or means of introduction of both High and Medium Threat level species into the Spey 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 & canoes).
-  Movement of contaminated soils or vehicles.
-  Improper control and disposal measures e.g. cutting and dumping without treatment.
-  Poor biosecurity by those working in or on areas infected by invasive species.

The risk of introduction of any of these species could be reduced through the implementation of strict biosecurity measures.

6.1.1 Intentional introduction

There is undoubtedly a section within society who continue to wilfully, or through ignorance, release known invasive species into the wild, often actively moving species between catchments. This applies in particular to fish species and once introduced are often impossible to eradicate.

6.1.2 Garden escapees

It is estimated that nationally, 60% of invasive plants have been introduced through horticultural use (Plantlife/Royal Horticultural Society, 2010). In 2014, five non-native invasive aquatic species were banned from sale in the UK (Brockman and Holden, 2015). The spread of invasive non-native plant species from private gardens can be a result of direct or indirect dispersal. It is common for gardeners to dump cuttings, and often this occurs along riverbanks, aiding the transport of these cuttings downstream.

6.1.3 Tourism/Leisure

The Spey catchment, the Moray coast and the Cairngorms National Park are all busy tourist destinations, in particular in the summer, but in the case of Aviemore, and surrounding areas, in the winter for snow sports. Invasive species can be inadvertently spread by people using the catchment for general leisure and tourism purposes, including activities such as walking and cycling (Brockman and Holden, 2015). By highlighting attractions and locations which may pose a risk of spreading INNS, it allows for considerations to be made regarding potential biosecurity procedures which could be adhered to, to reduce the risk.

The Spey is a popular river for water sports activities such as canoeing, rafting and canyoning (in specific tributaries). With good accessibility, through the road and rail network, travelling the full length of the UK within less than 12 hours is regularly done. Wet equipment, or even water in the sumps of boats/canoes for example, could easily be used in two different locations within the space of 24 hours. It is important that users of the water are aware of the risks associated with INNS and know how to reduce the risk of spread.

6.1.4 Angling

Angling is a potential route of introduction as a consequence of anglers traveling from catchment to catchment and reusing equipment that may not have been cleaned and dried properly. Damp nets could provide a refuge where plant propagules, invertebrates, parasites or disease vectors could remain viable and be inadvertently introduced into another catchment.

6.1.5 Contractors

Equipment such as excavators, dump trucks, mover and hand tools are used by a wide range of contractors; both local and national, and local authority crews. Sporadic occurrences of invasive species are often associated with contracting activities such as road ditching, road or yard construction, drainage, roadside vegetation maintenance etc. Large infrastructure projects often include biosecurity control measures but this is not universal. Local contracting or local authority works often have no biosecurity procedures.

This risk also applies to surveyors, even Fishery Board staff, which may be spending a lot of time in and around watercourses. Plant propagules e.g. Himalayan balsam seeds could easily be transferred from one location to another within a catchment on uncleaned footwear or within clothing. There is a need to raise awareness of basic biosecurity measures across a wide range of stakeholders.

7. 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:

➤ **Policy and Legislation**

Scottish Government
NatureScot
Scottish Environment Protection Agency
Marine Scotland
Association of Salmon Fishery Boards

➤ **Land Resources**

Cairngorms Nation Park Authority
Forestry and Land Scotland
Moray Council
Highland Council
National Farmers Union
Highland Invasive Species Forum
Scottish Land and Estates

➤ **Water Resources**

Scottish Water
Scottish and Southern Energy

➤ **Fisheries Management**

Spey District Salmon Fishery Board
Association of Still Water Fisheries

➤ **Recreation**

Local Angling Associations
Canoe Clubs

Ramblers Association

➤ **Conservation and Biodiversity**

Scottish Wildlife Trust

Royal Society for the Protection of Birds

Scottish Native Woods

Local Biodiversity Action Groups (Cairngorms and Highland)

Plant Life

Highland Biological Recording Group

The Conservation Volunteers (Scotland)

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 7.1.

Table 7.1 Pathways and stakeholder groups in the Spey 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)	SFB, 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 to reduce the opportunities for the introduction and spread of INNS and fish diseases.

8. Existing INNS control activities

A range of INNS control programmes have been undertaken within the Spey district, in many of which the Spey Fishery Board was one of the leading partners. The culmination of the invasives management locally is the current Scottish Invasive Species Initiative (SISI). SISI commenced in 2017, initially as a four year project ending in October 2021 but now with plans to be extended for a further year.

Prior to SISI a range of INNS control programmes were undertaken. Mink control in the catchment commenced with the Cairngorm Water Vole Conservation Project 2006. This was followed by the Scottish Mink Initiative in 2011³³. These projects established successful principles which have been further developed by SISI³⁴.

³³ <https://scottishwildlifetrust.org.uk/news/new-initiative-begins-to-remove-mink-in-north-scotland/>

³⁴ <https://www.invasivespecies.scot/american-mink-0>

INNS plant management in the Spey District commenced in 2011 with a survey of the upper Spey, primarily within the CNPA (Burgon & Macleod, 2011) . This was followed by a lower Spey survey in 2012. Control of invasive plant species on the Spey began in 2015 with herbicide control of Giant hogweed in the lower river. Control has been undertaken since then annually, including in the Mulben Burn, the original source of the infestation on the Spey.

After commencing in 2017, 2018 saw the practical implementation of the Scottish Invasive Species Initiative, a 4 year INNS project covering North Scotland. The SFB was one of the areas to be allocated a project officer. The project officer's role is to recruit and train volunteers/land managers, manage contractor budgets and generally co-ordinate the INNS effort within the catchment.

To date, £37,000 has been spent on contractor control for Giant hogweed and Japanese knotweed through SISI, and by the project end almost £60,000 will have been allocated to control by contractors. Over 100 individuals volunteers have been involved in INNPS removal, contributing over 1000 hours of their own time. Japanese knotweed and Giant hogweed infestations have been dramatically reduced within the control areas.

The river has been surveyed in 2019 and 2020 in line with the 2012 survey and reduction in plant densities are being recorded.

A White butterbur trial site has been established on the Fiddich to investigate and advise on the most effective control methods for the species.

The Scottish Mink Initiative ran from 2011 until 2015. During this time a project officer established a network of mink rafts across the catchment. At its peak there were in excess of 50 rafts in operation. The network was partially maintained from 2015 until 2018 by SFB staff but coverage was much reduced and without a dedicated PO active raft numbers fell significantly, although sightings were responded to with additional captures.

SISI adopted the same approach to the SMI and in 2018 restored the raft network and there are now over 40 rafts active on the system. Detection rates are relatively low with populations seemingly confined to the lower river and some tributaries. Sightings on the main stem above Fochabers are rare. Capture rates from the coastal strip from Lossiemouth to Burghead suggest there remains a large population in the area which presents a risk of repopulation of the Spey if left unchecked. This area is heavily trapped by SISI.

The significance of the Ranunculus problem on the Spey was such that considerable efforts have been expended on developing management options including herbicide control. Effective control of Ranunculus had been previously realised using chemical treatments with the active ingredient Dichlobenil (e.g "Midstream"). However, Dichlobenil has been banned for use in leaving only manual control as the only means of removal. In deep fast flowing rivers this is not a realistic option. There remains a need for the development and testing of effective control of nuisance aquatic plants such as Ranunculus.

THIS PLAN WILL INCLUDE AND SUPPORT ONGOING EXISTING INNS CONTROL PROGRAMMES.

Gyrodactylus salaris

During 2007 as part of a national campaign, the Spey Fishery Board 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. This effort is ongoing each year.

Highland Invasive Species Forum³⁵

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 SISI also supports control work of riparian INNS being undertaken by four fisheries trusts in the Highlands.

SISI work closely with the forum. Sharing information and delivering workshops on best practice for 4 out of the 5 priority species identified above with the exception being *Rhododendron ponticum*.

9. Biosecurity Management Plan 2021-2025

The objectives of this plan are based on four elements:

- Prevention,
- Early detection, surveillance, monitoring and rapid response,
- Mitigation, control and eradication
- Development of community capacity and resilience to current and new INNS

9.1 Objective and outputs of the Spey District Biosecurity Plan 2012-2025

The involvement and participation of stakeholders will be essential to achieve the objectives of this plan.

This section describes the expected outputs from implementation of the plan objectives and the actions required for their realisation. 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

³⁵<https://www.highland.gov.uk/info/1210/environment/68/biodiversity/2>

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 will be realised through supporting SISI in its strategy to upskill and empower community volunteers. Control activities will be undertaken in a coordinated and systematic manner to eradicate identified INNS where feasible.

Objective 1: Reduce the risk of the introduction and spread of identified INNS within the Spey district.

Output 1.1: Raising awareness of:

- The ecological and economic impacts of INNS
- The potential pathways for introduction and spread of INNS
- Management best practice to prevent the introduction and spread of INNS.

The River Spey district contains various INNS and stopping the further spread of these species and preventing the colonisation of new INNS offers the most efficient and effective means of control. Awareness-raising activities will be focussed on addressing local priorities as well as supporting the Scottish Government Code of Practice on Non-Native Species, and its key messages to the general public. The key stakeholders, the identified areas of priority and the proposed mechanisms for delivery are presented in Table 7.1. The roles and actions of key government agencies and non-government bodies in promoting awareness of INNS issues is presented in Table 9.1.1. The website <https://www.invasivespecies.scot/> also contains a wealth of information relevant to these priority areas.

Table 9.1.1 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"> - SFB to work with local industry and trade associations to advise members regularly of best practice in respect of INNS - SFB and FHI to undertake site visits to discuss and advise on issues involving INNS e.g. rainbow trout
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"> - SFB to work with garden centres to encourage distribution of codes of practice and posters such as Be Plantwise and Scottish Plantlife campaigns.
Hydro and water transfer agencies	<ul style="list-style-type: none"> - Risk of cross catchment transfer of INNS 	<ul style="list-style-type: none"> - SFB to liaise with these agencies to minimise risks
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"> - SFB to work with retailers to encourage distribution of codes and posters (available from Plantlife and Be Plantwise)
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"> - SFB to work with associations to promote disinfection of equipment and provide appropriate facilities to eliminate the risk of accidental transfer of INNS - RYA campaign

Stakeholder Group	Priority Area	Mechanism of Delivery
Landowners & Farming Units	<ul style="list-style-type: none"> - Promote knowledge of biosecurity issues amongst all tenants and resource users - Identification of suitable persons to act as monitors for the SFB 	<ul style="list-style-type: none"> - Work with SLE to ensure dissemination of best practices and appropriate signage to reduce threats from INNS - SFB to offer training for monitors
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 monitors 	<ul style="list-style-type: none"> - Local Angling Associations work with SFB to ensure dissemination of best practices and appropriate signage to reduce threats from INNS - SFB to work with associations to promote disinfection of equipment and provide appropriate facilities to eliminate the risk of accidental transfer of INNS - SFB to offer training for monitors
Schools	<ul style="list-style-type: none"> - General awareness of impacts and measures to prevent/control INNS 	<ul style="list-style-type: none"> - SISI Project Officer (for project duration) and SFB to promote biosecurity during school visits - SISI Project Officer and SFB to promote biosecurity during Field trips, outing and talks with community groups
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"> - SFB to work with industry bodies, local authorities and contractors to ensure dissemination of best practices - SFB to offer training for monitors

The roles and actions of key government agencies and non-governmental organisations in promoting awareness of INNS issues are presented in Table 9.1.2.

Table 9.1.2: Roles and/or actions of key government and non-governmental organisations in promoting awareness of INNS.

Organisation	Role and/or action	Delivery Mechanisms
SFB	<ul style="list-style-type: none"> - Promote awareness to key water user groups - Promote the Biosecurity Plan and highlighting the dangers from INNS - Continue to promote awareness to anglers and angling clubs of the dangers arising from INNS, disease and other pathogen risks. - Disseminate material from broader awareness campaigns - Promote the use of biosecurity best practice amongst contractors operating within district 	<ul style="list-style-type: none"> - Promote and launch revised Biosecurity Plan - Distribute information to stakeholders via website and social media - Continue to promote disinfection of equipment and provide appropriate facilities - Continue to raise the profile of biosecurity at open days, field visits and demonstrations - Respond to consultations, site visits to local works
Highland and Moray Council, Cairngorms National Park	<ul style="list-style-type: none"> - Promote use of codes of best practice for construction, haulage, horticulture, aquaculture amongst local business and relevant departments particularly construction, garden and pet trade - Encourage responsibility within Local Authorities for the effective management and control of all INNS on public land 	<ul style="list-style-type: none"> - Councils to promote codes of best practice at every opportunity, including INNS guidance within planning applications and building warrants - Holding of awareness event/open days to promote biosecurity issues - Issue INNS ID and guidance cards to appropriate council staff - Consider distribution leaflets with council tax bills - Display posters (Check, Clean, Dry) in council offices, libraries and other public places - Promote biosecurity at access points within National Park
SEPA	<ul style="list-style-type: none"> - Clarify SEPA responsibilities for INNS to both staff and customers - Incorporate INNS issues into relevant guidance documents (as they are developed or updated) 	<ul style="list-style-type: none"> - maintain page on website with links to relevant SEPA information and other sites e.g. Scottish Invasive Species Initiative - Ensure relevant documents available for download on SEPA Website
NatureScot	<ul style="list-style-type: none"> - Promotion of legislative requirements and operational good practice in the prevention, control and eradication of INNS 	<ul style="list-style-type: none"> - Holding of NatureScot Sharing Good Practice events. - Grant funding may be available for some projects
Forest Enterprise	<ul style="list-style-type: none"> - Promote a co-ordinated approach to awareness raising and control of INNS within the FE estate 	<ul style="list-style-type: none"> - Promoting staff training to raise staff knowledge base - Issue INNS ID and guidance cards to appropriate staff - Ensure that Forest contractors and operators work to high biosecurity standards

Organisation	Role and/or action	Delivery Mechanisms
Marine Scotland	- Fish Health Inspectorate part of Marine Scotland is lead body with respect to fish diseases and escapes	- Undertake site visits to discuss and advise on issues involving fish health - Proactively provide and disseminate information of current fish health status

Objective 2: Maintain a framework for the detection and surveillance of INNS, linked to a protocol to ensure a rapid management response.

Output 2.1: Identify mechanisms and resources for maintaining long-term reporting system for INNS within the Spey District

Early Warning System

The monitors of the early warning system will be trained members of the public, anglers, bailiffs, ghillies, canoeists and walkers, but could also be members of the general public interested in these issues. Reported sightings verified by trained SISI/SFB personnel. A sighting of a national or local high priority species (Table 5.2.1) will be verified as soon as possible by appropriate personnel. If confirmed, it will initiate the appropriate Scottish, GB or local high priority response (see Output 2.3 below). All verified sightings of SISI targeted species will also be recorded by SISI project team and incorporated into survey data. Actions to establish the early warning system are described in Output 2.3.



Output 2.2: Maintain and develop strategic monitoring of INNS in Spey District.

SISI will record all treatment effort across the catchment for targeted species and conduct an annual DAFOR survey of INNPS to include photographic evidence.

SISI will maintain a robust network of mink monitoring rafts at key locations across the catchment recording both mink detected and mink captured.

Output 2.3: Develop rapid response protocol for significant new threats biodiversity.

The type of response will depend on the severity of the species detected (Table 9.2.1) 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 9.2.1 Response level for invasive non-native species

Scottish/GB Response	High Priority Local Response	Priority Local Response
<i>Gyrodactylus salaris</i> Asian topmouth gudgeon Wireweed Water primrose Pink Salmon	American signal crayfish New non-native fish species Chinese mitten crab Zebra mussel Killer shrimp Demon shrimp	<i>Ranunculus sp.</i> American mink Japanese knotweed Himalayan knotweed Himalayan balsam Giant hogweed White butterbur Rhododendron <i>Anisakis sp.</i> Escaped farm salmon Nuttal's pondweed Water fern Common cord grass Fanwort Floating pennywort Parrot's feather New Zealand pygmyweed Curly waterweed Large flowered waterweed

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 9.2.2.

Table 9.2.2 Elements of contingency plans or protocols for response to GB priority, local high priority and priority species

Scottish/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: Coordinated management, control, eradication & habitat restoration programmes for INNS

Output 3.1: Develop shared mechanisms for the sustained control of INNS with the objective of eradication where possible.

For effective INNS control and eradication programmes, it is essential that the current distribution and abundance of INNS is known. Within the Spey District there is a reasonably comprehensive understanding of the distribution of INNS in the River Spey catchment based on recent surveys and monitoring carried out as part of control programmes. There are no formal surveys of the coastal burns within the District, therefore, knowledge of INNS distribution within these parts of the district is relatively poor.

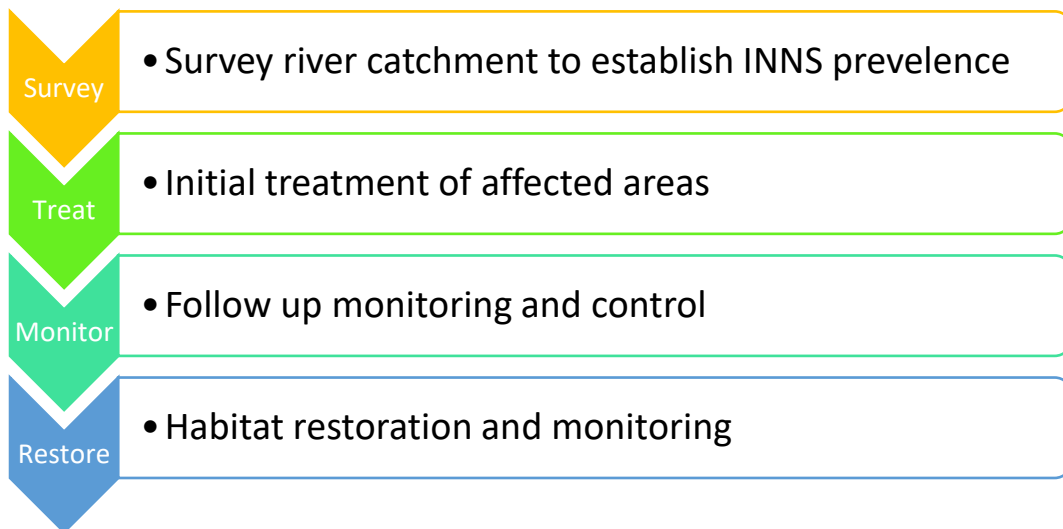
Action: Plan, resource and deliver INNS survey of coastal burns in Spey District

SISI has developed a wide ranging and effective control programme in the Spey district using a combination of volunteers, staff and contractors. Control techniques vary according to species but includes manual activities such as digging, cutting and pulling, along with herbicide application via backpack spraying or stem injection. This programme has been highly successful in reducing the incidence of INNS within the district, with eradication is a longer-term aspiration. SISI has been able to engage with a wide range of stakeholders from community groups and land users to riparian owners and industry.

SISI is due to conclude at the end of October 2021 – though a project extension to October 2022 is being considered, and the momentum, goodwill and progress made must be sustained. The legacy of SISI will be a trained and motivated community qualified, skilled and motivated in INNS identification, control and management. However, experience with the Scottish Mink Initiative has shown that once the project focal point is removed volunteer engagement rapidly diminishes. In order to sustain the progress made through SISI there will be a need to maintain some level of coordination of activity to ensure that there is not a resurgence in the target INNS. The SFB is the obvious organisation within which to house this perhaps by embedding invasive species management within the role of an existing or new staff member.

Action: Identify and secure resource coordination of INNS management post SISI.

The general principles of INNS management are encapsulated within the following diagram:



The mitigation, eradication and control measures for the INNS present in the Spey district are presented in Table 9.3.1.

Table 9.3.1: Treatment and control measures for existing INNS present in the Spey District

Species	Action	Treatment/Post Treatment Actions
Japanese knotweed	Control/Eradication Identify and close pathways	<ul style="list-style-type: none"> - Foliar spraying or Stem injection with Glyphosate for existing populations with follow up treatment to maintain control if required. Minimum 3 year monitoring post treatment - Spraying to take place during late summer/autumn from flower emergence to first frost - Buffer strips identified cleared and maintained where road and rail pathways for re-infection intersect with watercourses - Requirements for riparian zone habitat restoration assessed and implemented
Himalayan balsam	Control/Eradication Identify pathways and close	<ul style="list-style-type: none"> - Set up a programme to clear the Spey and coastal river catchments in that order of priority - Monitor catchment for activation of dormant sources of infestation - Habitat restoration if required
Giant hogweed	Control/Eradication Identify pathways and close	<ul style="list-style-type: none"> - Foliar spraying with Glyphosate. Spraying to take place spring and summer. Any flower stems to be cut to base prior to seed formation - Monitor catchment for activation of dormant sources of infestation - minimum 10 years - Habitat restoration if required

American mink	Control/Eradication	- Co-ordinated monitoring and trapping. Support work of SISI Officer (to project end), help liaise with volunteers, storage and delivery of equipment, use bailiffs to help with trapping and involve
Aquatic plants e.g., Ranunculus & Canadian pond weed	Monitor distribution	- Survey of current distributions
Non-native fish species	Restrict to present distribution	- Investigate control options
Red vent syndrome	Monitor	- Record instances - Raise public awareness of health issues associated with human consumption

Output 3.2: Identify and implement habitat restoration for sites where INNS have been controlled/removed

The field of habitat restoration post INNS control is under-developed. However, SISI as part of its remit, aims to test restoration techniques at a number of treatment sites. This will support regeneration of native vegetation and prevent susceptibility to new infestations. Native vegetation coverage close to river areas will reduce the risk of erosion and re-invasion, and shade out invasive non-native plants. SISI will enable volunteers to carry out restoration tasks that will involve planting native riparian trees and native seed mixtures.

The monitoring undertaken within the SISI project will update and improve our understanding of restoration post INNS treatment. It may be that simply leaving nature to re-colonise it the best strategy. However, depending on the INNS involved, and the control technique used, habitat restoration may be required. This could apply, in particular, to foliar herbicide spraying, where dense, well established stands of INNS are involved. In these cases, the herbicide treatment can often remove all other existing vegetation leaving bare river banks, which may be prone to erosion. This is not always the case, however, and if treatments are applied in the spring, at the peak of the growing season, recolonisation of treated ground by native vegetation can be quick.

Stem injection, of Japanese knotweed, for example, is a more targeted method and the die-back of the knotweed is usually followed quickly by the re-establishment of natural grasses and herbs.

Some treatment sites may be more exposed to erosion. In these cases, reseeding with an appropriate mix of native seeds may be required.

SISI has initiated and is assessing the efficacy of the use of dense tree/shrub planting as a control and restoration measure for sites infested with White butterbur. Once complete these trials will help inform future management strategies for this species.

Objective 4: Develop community capacity to detect, monitor and respond rapidly to new INNS

Output 4.1: Resilient communities with the knowledge and understanding of INNS and the threats they pose to the local environment

INNS are one of the most significant threats to northern Scotland's freshwater heritage. Effective INNS control will improve the quality of life experienced by communities through:

- improving access to rivers and river banks
- providing a safer community environment, free of the risk of damage from noxious plants such as Giant Hogweed
- improved aesthetic and amenity value of environments important for recreation
- help restore native biodiversity, from the mundane safe riverbanks to the rare and endangered freshwater pearl mussel
- engagement of more people in the protection of their valued natural heritage

INNS management within the Spey District has provided opportunities for volunteers from local communities to obtain the skills needed to record wildlife, detect, control and monitor INNS. Throughout the initiative area, awareness raising activities have encouraged the general public and target audiences to learn about their freshwater heritage and record INNS and native species.

INNS are one of the most significant threats to native biodiversity, water quality and community interest. By engaging community support and interest, economic activities that support rural communities in northern Scotland will be developed. The natural environment, including the freshwater heritage is of vital economic importance to communities across the area. The SISI strategy is long-term, and devolved to local organisations, centred in local communities and will help build sustainable management centred on local communities.

Developing partnerships between organisations and the community: SISI will employ locally based project officers who will co-ordinate community-wide opportunities for training, monitoring and re-connection with the local environment. The aim of SISI is to develop community engagement through a long-term collaborative management system of INNS and to improve community resilience.

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