



Biosecurity Plan 2021-26

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SUMMARY

The second Findhorn, Nairn and Lossie Biosecurity Plan, 2021-2026, describes the biosecurity issues of the Rivers Findhorn, Nairn and Lossie rivers and updates on actions and progress made against the initial objectives outlined in the first [Plan](#).

Since the first Plan the Trust has become a lead organisation in the control of non-native species and in the last few years helped to establish control programs for Giant hogweed, Japanese knotweed and Himalayan balsam across the Findhorn, Nairn and Lossie catchments. As a result the distribution and abundance of these plants is beginning to reduce in many areas - though there remains much work to do to continue this progress. The control of American mink has also continued to restrict numbers of this predator mainly to coastal areas - sightings along rivers has greatly reduced.

Control of American signal crayfish was continued by members of the Nairn Angling Association and a PhD study completed examining control methodology and eradication. The study provided excellent data but so far further funding to continue the work has not been realised.

This second Plan builds on the experiences of the first and provides key targets and strategies for continuing to raise awareness on the dangers of invasive non-native species (INNS), and maintaining and expanding the existing control programs.

The control programs so far have been delivered with and relied upon the support of a wide variety of organisations, landowners, farmers and volunteers. A key objective of this plan is to maintain this partnership approach to continued management and control. Significant funding has also been secured from a range of sources, most recently the Scottish Invasive Species Initiative (SISI) - which has supported the preparation of this Plan, and whilst the Trust will endeavour to secure further funds in the future it will also start to develop alternative control strategies to continue this work in challenging financial and funding environments.



INTRODUCTION

This document follows on from the first [Biosecurity Plan](#) produced in 2012 by the Findhorn, Nairn and Lossie Fisheries Trust (the Trust) which covered the period 2012-2017. It provides details of work carried out under the previous plan and outlines further actions required to address biosecurity issues within the area. Biosecurity is also identified as a key issue in the Trust's new Fisheries Management Plan which will be published in early 2021 and the [River Basin Management Plan for Scotland 2015-2027](#).

This plan is one of a set of 10 biosecurity plans being produced in the north of Scotland as part of a regional programme of action implemented through the [Scottish Invasive Species Initiative](#) (SISI) with backing and support from the [National Lottery Heritage Fund](#) (NLHF) and [NatureScot](#).

SISI operates over approximately 29,500 km² of northern Scotland and is a partnership project led by NatureScot and includes ten fishery trust and fishery board delivery partners and one academic partner, the University of Aberdeen. The project runs from 2017- 2021 (though the work may be extended into 2022) and is delivering a programme of prioritised management and control of a suite of invasive plant species (Giant hogweed, Himalayan balsam, Japanese knotweed, American skunk cabbage and White butterbur) and the American mink as well as raising public and community awareness of invasive non-native species and biosecurity issues. In the Scottish Invasive Species Initiative control is delivered by a combination of staff, contractor and community volunteer-based groups. Further information about the project can be found at www.invasivespecies.scot.

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.

The plan builds on the stakeholder partnerships developed in the first Biosecurity Plan and seeks to continue to implement the actions required to address the complex issues associated with biosecurity. This plan represents an agreed approach for the prevention, early detection and control of non-native invasive species, fish diseases and parasites. As the spread of INNS is not isolated to the Findhorn, Nairn and Lossie catchments, this plan will also facilitate coordination and communication with the neighbouring fisheries Trusts, Boards, local authorities and other stakeholders of neighbouring areas.

BIOSECURITY

2.1 What is Biosecurity?

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

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.

There are approximately 1000 non-native species present in Scotland - the majority of which exist in small populations with little impact on native flora and fauna. However, a small but significant proportion of these non-native species are invasive.

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

According to [CBD \(2006\)](#), **invasive non-native species** are the second greatest threat to biodiversity, being capable of rapidly colonising a wide range of habitats and excluding the native flora and fauna. Furthermore, over the last 400 years INNS have contributed to 40% of the animal extinctions where the cause of extinction is known. As water is an excellent transport medium for the dispersal of many of these species, rivers and lochs and their banks and

shorelines are amongst the most vulnerable areas to the introduction, spread and impact of these species. The ecological changes wrought by INNS can further threaten already endangered native species and reduce the natural productivity and amenity value of riverbanks, shorelines and their waterbodies.

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

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 fish 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.

Significant advances in the control of non-natives have taken place on the Findhorn, Nairn and Lossie catchments. However, there is still much work to do and this Plan outlines the next steps.

2.2 Policy and Legislation

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

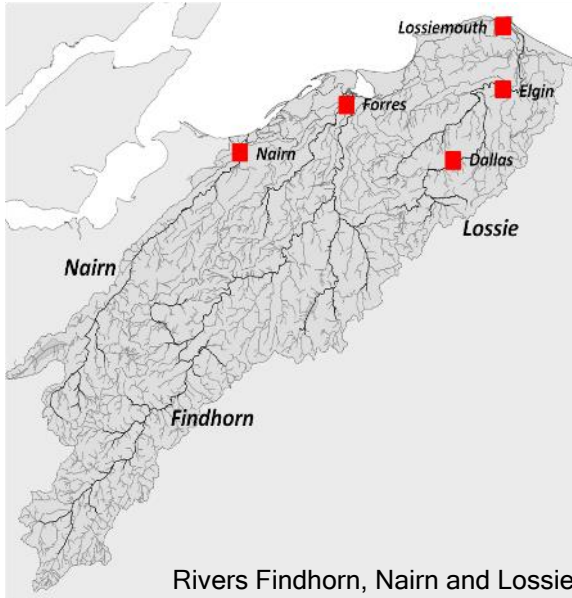
- 🌿 [Section 14 of The Wildlife and Countryside Act \(1981\)](#) (as amended in Scotland by the [Wildlife and Natural Environment \(Scotland\) Act 2011](#)) makes it an offence to release an animal, allow an animal to escape from captivity or otherwise cause an animal not in the control of any person 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.
- 🌿 Local Authorities have powers to take action against giant hogweed and Japanese knotweed where it is a threat to the local amenity of an area or if it is considered a statutory nuisance.
- 🌿 Section 179 of the [Town and Country Planning \(Scotland\) Act 1997](#) empowers local authorities to serve notice requiring an occupier to deal with any land whose condition is adversely affecting the amenity of the other land in their area.
- 🌿 The [Possession of Pesticides \(Scotland\) Order 2005](#) regulates the use of pesticides and herbicides for the control and eradication of INNS.
- 🌿 [Environmental Protection Act 1990](#) 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](#) 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](#) and the [Environmental Protection \(Duty of Care\) Regulations 1991](#) 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 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.

SCOPE OF THE PLAN

3.1 Operating area



The Findhorn, Nairn and Lossie Biosecurity Plan (FNLBP) covers the river catchments of the Findhorn, Nairn and Lossie along with a number of coastal burns.

The rivers are within the Highland Council and Moray Council regions.

3.2 Current Threats

The first [FNL Biosecurity Plan](#) identified priority species for action which included the following non-native species that were already in the three rivers and required immediate action:

American Mink (Photo Laurie Campbell)



American mink (*Neovision vison*) is present throughout the three districts and along the coast. Mink spread by migration and kill water fowl, small mammals and juvenile salmon and trout. Mink are linked to the decline of water voles in the Cairngorms National Park area with 94% of sites occupied by water voles in the 1950s now being unoccupied.



American Signal Crayfish

North American signal crayfish (*Pacifasticus leniusculus*) is present in the Geddes Burn, a tributary of the River Nairn, and in the main stem. Within the Water Framework Directive all burns should try and achieve “good” or “excellent” status by 2027 under a range of criteria. However, the Geddes Burn has been given the less stringent target of “moderate” by SEPA due to there being currently no feasible way of effectively removing the crayfish.



Giant Hogweed

Giant hogweed (*Hercaleum mantegazzianum*) is widespread in all catchments. It spreads through seed dispersal and is a public health hazard due to the toxins in the sap reacting with UV light to blister skin. Dense stands can hinder public access. Giant hogweed out competes native vegetation for space and can result in a loss of native plant and invertebrate diversity. Winter dieback exposes soil to erosion with loss of riverbanks and increased sedimentation.



Japanese Knotweed

Japanese knotweed (*Fallopia japonica*) is extensive in all three rivers and crops up on roadsides, industrial estates, farmyards, etc. It does not produce seeds but spreads by the movement of plant fragments in water, in soil and on vehicles. It can form very dense thickets which hinder public access and alter the habitat for native wildlife. Winter dieback exposes soil to erosion with loss of riverbanks and increased sedimentation.



Himalayan Balsam

Himalayan balsam (*Impatiens glandulifera*) is also present in all three rivers. It spreads through seed dispersion by wind or water from areas in which it has been planted or introduced and 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.



Rhododendrum ponticum

Rhododendron (*Rhododendron ponticum & hybrids*) is present in many locations throughout the three river catchments. Currently it is not considered a significant threat, but it is spreading in several locations. It spreads by seed and vegetative dispersal after intentional planting in gardens, parks and demesnes. It forms dense thickets which affect access and out-competes native plants for space and resources.

Minnow (*Phoxinus phoxinus*) is found in all three rivers. They are a translocated species introduced by anglers who used them as live-bait for other fish species. 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.



Minnow



Red Vent Syndrome caused by *Anasakis sp.*, infection (Photo Gordon Rennie)

Anasakis sp is a nematode worm that causes Red Vent Syndrome (RVS) in Atlantic salmon. [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 it may also affect humans who become infected from eating raw meat for example sushi.

3.3 Potential Biosecurity Threats

The initial [Plan](#) provided a list of invasive non-native species which are not currently present within the Findhorn, Nairn and Lossie catchments.

The potential threats have been classified as High/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 Findhorn, Nairn and Lossie catchments.

High Threat:	<u>Species with Severe consequences for local biodiversity and economy and a High to Medium risk of introduction</u>
Medium Threat:	<u>Species with Moderate consequences for local biodiversity and economy with a Low to High risk of introduction</u>

There are five High Threat level species that could be introduced into the Findhorn, Nairn and Lossie districts (**Table 1**).

Table 1 High threat level species their impacts and risk of introduction

SPECIES	RISK OF INTRODUCTION	LOCAL IMPACTS
<i>Gyrodactylus salaris</i> (Freshwater external parasite of salmon)	High - Through unintentional introduction from anglers and water sport enthusiasts through: <ul style="list-style-type: none"> Contaminated fish Clothing/equipment which has been in contact with infected water including canoes Ballast water 	Projected catastrophic impact on Atlantic salmon (<i>Salmo salar</i>) populations throughout Scotland.
New Zealand Pigmy Weed (<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 	Suited to a wide range of freshwater systems. Forms dense carpets choking ponds and ditches and out competes native species.
Zebra Mussel (<i>Dreissena polymorpha</i>) Freshwater Bivalve	Medium - Through unintentional introduction from contaminated boat/canoe hulls and engines and bilge water.	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.	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
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 	Forms 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 nine Medium Threat level species and five low risk species (Table 2).

Table 2 The risk of introduction of Medium and Low Threat level INNS.

SPECIES		RISK OF INTRODUCTION
Ruddy Duck (<i>Oxyura jamaicensis</i>)	Medium	Could migrate from a number of locations in eastern Scotland
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 A few locations within the Cromarty Firth
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 1 and 2, the potential pathways or means of introduction of both High and Medium Threat level species into the Findhorn, Nairn and Lossie rivers 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.

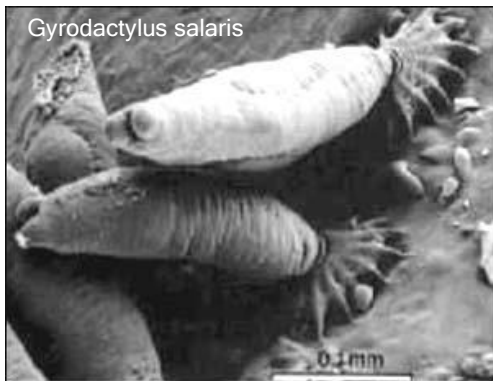
The majority of these high and medium level threats are still absent from the three rivers. However, as more information on non-native species has been gained several additional troublesome non-native plant species have been identified within the catchments. A short review of several key species using the Botanical Society of Britain and Ireland ([BSBI](#)) website maps indicated that, New Zealand Pigmy Weed (*Cressula helmsii*), Canadian Pondweed (*Elodea canadensis*) and Nuttall's Waterweed (*Elodea nuttallii*) have all been recorded in the three river catchments. [Loch Flemington](#) to the west of Nairn has contained NZ Pigmy Weed and Canadian Pondweed for several years and although a control program was initiated both are likely to still be present. NZ Pigmy Weed has also been observed on the Black Burn, (Lossie) by SISI staff undertaking INNs surveys.

Other plants such as American skunk cabbage, Giant rhubarb, White butterbur, Rhododendron and Bamboo are also established in some areas and have the potential to become problematic in the future.

3.4 Invasive Non-native control activities

Following the introduction of the first Biosecurity Plan a range of control programs were initiated to tackle priority non-native species. Awareness raising was also increased and progress on each of the priority species is outlined below.

Gyrodactylus salaris



General information on *G. salaris* is available [here](#) and the threat of *G. salaris* to the three rivers was highlighted back in the [December 2010 newsletter](#), which also gave instructions on how to prevent infection. The threat is continually highlighted through annual reports, [website](#) and other means to Fishery Boards and other river users. The Trust also promotes the “[Check, Clean, Dry](#)” campaign. Biosecurity forms have been created for the River Findhorn which anglers on several key fishing beats complete indicating where they have been fishing and informing them on equipment cleaning procedures.

American Mink



SISI project officer, James Symonds, with pupils from Daviot and Farr Primary Schools who helped confirm the presence of mink on the upper Nairn in 2019.

The Trust participated in the Scottish Mink Initiative (SMI) from 2011 to 2015. The project established a network of monitoring rafts, run by local volunteers and was highly successful. Mink numbers were significantly reduced with 58 captured across the three rivers restricting the population to the coastal areas from Burghead to Lossiemouth. After the SMI project concluded

resources were limited but a small network of rafts was maintained, and staff responded to any sightings by rapidly installing traps. Sightings on the rivers remained low but the coastal population continued to thrive. In 2018 the SISI project re-established a wider network of rafts

and strengthened the volunteer network. Captures of mink have increased up to 43 by the end of 2020 with the majority taken from the coast. Encouragingly sightings along the coast have dropped indicating the population may at last be reducing in size. However, members of the Nairn AA spotted mink on the Nairn after several years of absence illustrating the need for continued surveillance and trapping. Mink control, through the [SISI project](#), will now continue at least through 2021.

Giant hogweed, Japanese knotweed and Himalayan balsam

The Trust have developed a lead role in the control of these invasive plant species within the catchments and work closely with landowners and other groups to provide a coordinated control strategy. For plants this involves identifying the upper limit of the infestation and then working downstream in a coordinated manner using a range of techniques. Surveys of these species have been completed on all three rivers providing data on the distribution and abundance and helping to direct control activities.



Treatment of Giant hogweed was prioritised due to the risks to public health. Working with landowners, farmers and volunteers on the Nairn and the Findhorn densities have been significantly reduced. Progress on the River Lossie has taken longer but in the last three years better progress has been made. For Japanese

knotweed the pattern is similar. Some control of Himalayan balsam has also been completed particularly on the River Nairn.

However, there is still much to do to build on this good start. The lower River Findhorn remains heavily infested with both Giant hogweed and Japanese knotweed, and while good progress is being made on the River Lossie tackling the very dense stands of Japanese



knotweed in the middle river is proving a slow and formidable task. Other areas of infestation have also been noted such as the Linkwood Burn and the Lhanbryde Burn and isolated outcrops are also reported.



Skunk Cabbage

Other plants such as American skunk cabbage, Giant rhubarb, White butterbur, Rhododendron and Bamboo are also established in some areas and could become problematic in the future. Some work on American skunk cabbage and white butterbur has been completed but no control has been undertaken on the other species.



Giant Rhubarb (*Gunnera*)

The INNs control is currently supported through [SISI plant project](#) and with funds from WREN, Scottish Landfill Communities Fund, EB Scotland, Sita Trust, Postcode Lottery, Berry Burn Community Fund, Findhorn Fishery Board as well as a considerable commitment from local estates, farmers and volunteer groups. Priority for this plan will be to build on this good start, continue to source additional funds and develop longer-term control strategies.

American signal crayfish

Trapping under licence was maintained by members of the Nairn Angling Association for approximately 10 years and this helped to containing the population. Aberdeen University completed a PhD study into improving control methods of crayfish on the Geddes Burn and the results were promising - indicating that sustained trapping approach combined with additional techniques could potentially eradicate the crayfish. However, a lack of support and funding has so far prevented further direct work on the crayfish population in the River Nairn.

The main focus in the last few years has been to highlight the issue through promoting the “[Check, Clean and Dry](#)” campaign and encouraging the disinfection of fishing tackle and waders to limit the inadvertent spread of the crayfish by anglers and others.

Fish Species

Minnows are recorded when captured during electrofishing surveys but no program to examine their effects on native fish or eradication has been started. The ban on using live bait for fishing has largely prevented any further introductions. The Trust will continue to collect data and review research on minnows but consider this a low priority.

Pike (*Esox lucius*) has been present in several lochs in the area for a considerable time. However, it recently appeared in Lochandorb, an important trout loch, and it is high likely it was deliberately introduced. As a result, pike angling has established on the loch and there have been some issues with discarded tackle affecting protected birds. Removing the pike would be very difficult but the Trust will look into improving the data on pike within the loch.



Pink salmon (*Oncorhynchus gorbuscha*) have been recorded in all three rivers, appearing initially in 2017 and again in 2019. The impacts of a spawning Pink salmon population on the native species within our waters are currently unknown but may include competition for resources both in freshwater and marine areas. Where animals are caught during routine activities they are dispatched and retained.

Rainbow trout (*Oncorhynchus mykiss*) have been stocked into a number of fisheries within the three rivers. Occasional escapes are recorded and anglers are encouraged to dispatch and report them. They present a low threat to the river ecology but the




Rainbow trout for stocking can originate from areas where other non-native species, such as American signal crayfish, are present so there is a risk of introduction of other more problematic species during the transfer for stocking. The Trust will also continue to highlight the problems associated with transferral and introduction of fish species.

Staff have completed fish disease training with the Marine Scotland Fish Inspectorate, however, although Red Vent Syndrome (RVS) has been reported it has proved difficult to get samples from fish with the condition. Anglers are encouraged to report and photograph fish with RVS and/or other diseases. Where possible additional samples and biological data will be collected from infected fish.

BIOSECURITY MANAGEMENT STRATEGY

This Plan will continue to raise awareness of the threats posed by invasive non-native species and build on the existing control programs. This will be achieved by continuing source funds and to engage with a wide range of stakeholders and river user groups.

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

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

4.1 Stakeholder Groups

Table 3 details the key groups involved in this, their potential role and possible actions to take. The roles and actions of key government agencies and non-government bodies in promoting awareness of INNS issues is presented in **Table 4**. This plan seeks to engage and involve a wide range of decision makers operating at the local, regional and national scales, most of which have their own policies and plans that influence or cross-over with river management issues:

Policy and Legislation

Scottish Government and Marine Scotland, NatureScot, Scottish Environment Protection Agency, Fisheries Management Scotland, Police Scotland Wildlife Crime Officers.

Land Resources

Forestry and Land Scotland, Highland Council, Moray Council, National Farmers Union, Highland Invasive Species Forum, Scottish Land and Estates.

Water Resources

Scottish Water, Distillers.

Fisheries Management

All local Moray Firth Fishery Boards, Association of Still Water Fisheries, Fishery Management Scotland

 **Recreation**

Local Angling Associations, Canoe Clubs, Rafting Companies, Scottish Canoe Association

 **Conservation and Biodiversity**

Scottish Wildlife Trust, Royal Society for the Protection of Birds, Local Biodiversity Action Groups, Plant Life, Highland Biological Recording Group, The Conservation Volunteers, WildThings! NESBRC.

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 Findhorn, Nairn and Lossie catchments.

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)	DSFBs, Local canoe/water sports organisations, anglers, angling associations, fishing agents and tackle shops.
Escapes from fish farms, ponds, gardens, and demesnes.	Marine Scotland/SEPA/Planning Authorities/Plantlife/riparian owners/members of the public
Movement of contaminated soils or vehicles	Local Councils/SEPA/quarries/ building contractors/Network Rail/road authorities/land managers
Improper control and disposal measures e.g. cutting and dumping without treatment	Local councils/SEPA/environmental health/ Plantlife/riparian owners/members of the public

4.2 Prevention

This will require the various stakeholders to implement biosecurity protocols and promote their use. Prevention of INNS introduction and spread requires vigilance from all stakeholders and their clients. **Table 6** lists many of the activities that can be undertaken by the different stakeholders within the area, although should not be considered exclusive.

Awareness activities will continue to be focussed on addressing the identified local priorities as well as supporting the GB [Check, Clean, Dry](#) and [Be Plantwise](#) campaigns and their key messages to the general public:

Check

- Check your equipment and clothing for living organisms.
- Pay particular attention to areas that are damp or hard to inspect.

Clean

- Clean and wash all equipment, footwear and clothes thoroughly.
- If you do come across any organisms, leave them at the water body where you found them.

Dry

- Dry all equipment and clothing.
- Make sure you don't transfer water elsewhere.

This has been adopted as working practice by the Trust, NatureScot and SEPA whose personnel work within the catchment, taking invertebrate samples, electric-fishing etc. Any INNS, such as North American signal crayfish, etc, captured during surveys should be dispatched/killed since it is illegal to return them once captured. Additionally, when surveying along watercourses, they work from upstream to downstream to avoid transfer of organisms above barriers (man-made and natural) that would otherwise restrict their movement. Any outside environmental consultancy firms brought in to the catchment to undertake surveys should be required to follow the same practices.

Be Plantwise and don't dump aquatic plants in the wild.

The local priorities for awareness will focus on disrupting the pathways for the introduction and spread of INNS in the Findhorn, Nairn and Lossie rivers. The key stakeholders, the identified areas of priority and the proposed mechanisms for delivery are presented in Table 6. 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	Be aware of the 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.	Work with local industry and trade associations to advise members regularly of best practice in respect of INNS Work with Marine Scotland Fish Health Inspectorate to undertake site visits to advise on issues involving INNS
Local Garden Centres	Promote existing codes of practice covering the security and disposal of INNS to all garden centres.	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	Risk of cross catchment transfer of INNS.	Liaise with these agencies to minimise risks.
Local Aquarium and Pond stockists	Promote code of practice to all pet shops and suppliers of ornamental fish.	Work with retailers to encourage distribution of codes of good practice and posters (available from Plantlife and Be Plantwise).
Staff, students, other research and volunteer staff	Promote awareness of INNS to all staff, visiting students, researchers and volunteers.	Maintain INNS issues in Health and Safety Policy and briefings Work with staff and other organisations and raise awareness where possible.
Water User associations and companies (canoeists, sailing clubs)	Promote awareness to clubs, companies and participants of the dangers arising from INNS.	Work with staff and other organisations and raise awareness where possible.
Landowners & Farming Units	Promote knowledge of biosecurity issues amongst all tenants and resource users.	Continue to raise awareness, ensure dissemination of best practices and appropriate signage to reduce threats from INNS.
Angling clubs	Promote knowledge of biosecurity issues amongst anglers.	Continue to ensure dissemination of best practices and appropriate signage to reduce threats from INNS.
Schools	Promote awareness of impacts and measures to prevent/control INNS.	Continue to promote Alien Detectives within local schools.
Contractors / Ground Maintenance Workers	Improve awareness of impacts and measures to prevent/control INNS.	Continue to ensure dissemination of best practices to reduce threats from INNS.

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
FNLRT	Promote awareness of the Biosecurity Plan and dangers from INNS to key water user groups	Promote and launch revised Biosecurity Plan
DSFBs	Promote awareness to anglers and angling clubs of the dangers arising from INNS.	Promote awareness through Board meetings, newsletters and other media.
Highland and Moray Councils	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	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 Display posters on INNS in appropriate public places
SEPA	SEPA has Habitat Responsibilities for Freshwater (still and flowing waters) as referenced in The River Basin Management Plans (RBMP), including species found within the water body itself including emergent plants. More information can be found at: https://www.gov.scot/publications/non-native-species-code-practice/pages/10/ SEPA has moved to a sector approach to improve how businesses are regulated. https://sectors.sepa.org.uk/ INNS work is an area of work that cuts across all sectors.	Information and relevant links can be found here: https://www.sepa.org.uk/environment/biodiversity/invasivenon-native-species/ Work in collaborative partnership with other agencies to tackle INNS across Scotland's Environment - Digital documents available for download on SEPA Website . INNS issues to be incorporated into all relevant guidance documents, sector plans and placemaking projects as appropriate
NatureScot	National: Promotion of good practice in the prevention, control and eradication of INNS Local: Implementation of good practice for local contractors.	Holding of NatureScot Sharing Good Practice events. Continue to provide advice and guidance. Grant funding may be available for some projects.
Marine Scotland	Fish Health Inspectorate is the lead body with respect to fish diseases and escapes	Discuss and advise on issues involving INNS and fish disease. Collect samples from diseased fish where possible and advise on outcome.

4.3 Control Protocols

Where INNS have been identified within an area, control and eradication is the next step. There is a response level for many INNS within Britain (**Table 8**) and the appropriate reporting protocol should be followed (**Table 9**). The type of response will depend on the severity of the species detected (**Table 8**) and is proportionate to the threat posed. There are three levels of response:




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

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

GB Response	High Priority Local Response	Priority Local Response
<i>Gyrodactylus salaris</i>	American signal crayfish	Canadian pondweed
Asian Topmouth Gudgeon	American mink	Japanese knotweed
Ruddy Duck	Non-native fish species	Himalayan balsam
Didemnum spp	Mitten crab	Giant hogweed
Wireweed	Zebra mussel	Rhododendron
Water Primrose	NZ Pigmy Weed	Red vent syndrome (RVS)
	Curly waterweed	Nuttall's pondweed
		Water fern
		Common cord grass
		Fanwort
		Floating pennywort
		Parrot's feather
		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**.

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
Report to local and GB institutions	Report to local and GB institutions	Report to local and GB institutions
Determine the extent of infestation	Determine the extent of infestation	Determine the extent of infestation
Isolation of area where practicable	Isolation of area where practicable	Surveys in course of normal work to establish and map distribution
	Establish source and check related sites	Inclusion of new areas in existing eradication/control programmes
	Closure of all pathways	Identification and closure of pathways
	Decision on appropriate action eradication/containment	Monitor as part of planned catchment monitoring programme
	Implement approved eradication methodology	
	Monitor outcome	

4.4 Findhorn, Nairn and Lossie INNS control

The Trust will continue to maintain a co-ordinated control programme for priority invasive non-native species across the three rivers. Priorities will continue to be Giant hogweed, Japanese knotweed, Himalayan balsam and American mink. Where funds and time allow work on American skunk cabbage, and other INNS plants will also be tackled. Funding for resurrecting American signal crayfish control will also be pursued.

Table 10 Invasive Non-native Species Control and Eradication in the Findhorn, Nairn and Lossie Districts.

SPECIES	ACTION	TREATMENT/POST TREATMENT ACTIONS
Japanese knotweed	Control/Eradication Identify and close pathways.	Foliar spraying and stem injection with Glyphosate Spraying/inject in autumn over a 5 year period. Clearance of dead stems during winter to improve access. Establish longer-term control agreement programs
Himalayan balsam	Control/Eradication Identify pathways and close	Set up a programme to clear the Findhorn, Nairn and Lossie. Clearance by hand pulling, cutting or spraying with Glyphosate, during June to September over a 5 year cycle. Monitor catchment for activation of dormant sources of infestation
Giant hogweed	Control/Eradication Identify pathways and close	Foliar spraying with Glyphosate. Chopping of flower plants prior to seed development. Spraying to take place spring and autumn over a 10 year cycle. Monitor catchment for activation of dormant sources of infestation
American mink	Control/Eradication	Co-ordinated monitoring and trapping. Support work of SISI Project Officer, to help recruit, train and retain volunteers
North American signal crayfish	Control/Eradication	Continue to explore sources of funding to restart control.
Red vent syndrome	Monitor	Encourage anglers to report and photograph infected salmon/sea trout Collect samples when possible Complete fish disease sampling course refresher

A key objective of this plan is to maintain this partnership approach to continued management and control. Significant funding has also been secured from a range of sources, most recently the Scottish Invasive Species Initiative (SISI) - which has supported the preparation of this Plan, and whilst the Trust will endeavour to secure further funds it will also start to develop alternative control strategies to continue this work in the future.

MONITORING

A monitoring programme will be developed based on the agreed objectives and outputs of this plan. Monitoring activities will be undertaken by FNL staff in conjunction with stakeholder representatives who by virtue of their work are out in the catchment on a regular basis.

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