

NESS CATCHMENT BIOSECURITY PLAN 2021 - 2030









Scottish Invasive Species Initiative

LOTTERY FUNDED



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What is Biosecurity?

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

What are Invasive Non - native Species?

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



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Acronyms and Abbreviations

NH AAG	North Highland Area Advisory Group
ASSG	Association of Scottish Shellfish Growers
BTA	British Trout Association
DSFB	District Salmon Fisheries Boards
FLS	Forestry and Land Scotland
HISF	Highland Invasive Species Forum
INNS	Invasive Non-Native Species
MS	Marine Scotland
NBFT	Ness and Beauly Fisheries Trust
NDSFB	Ness District Salmon Fishery Board
NNSS	Non-Native Species Secretariat
FMS	Fisheries Management Scotland
SEPA	Scottish Environment Protection Agency
SFCC	Scottish Fisheries Co-ordination Centre
SG	Scottish Government



Executive Summary

This plan describes the biosecurity issues of the River Ness catchment on behalf of Ness & Beauly Fisheries Trust and presents actions that have been agreed with stakeholders for the prevention, early detection, control and mitigation of the introduction and spread of selected invasive nonnative invasive species (INNS), fish diseases and parasites. The vision of this plan is:

'To develop a sustainable framework to prevent, detect, control and eradicate invasive non-native species within the Ness and Beauly fisheries districts through the coordination of data collection, management, liaison and education'

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

- **Objective 1:** Reduce the risk of introduction and spread of identified INN species within the Ness districts.
- **Objective 2:** Establish a framework for the detection and surveillance of identified INN species, linked to rapid response protocols.
- **Objective 3:** Develop coordinated control and eradication programmes for specified INN species.

These objectives are in accordance with established protocols for fish diseases and with the three key elements of the <u>Invasive Non-Native Species Framework Strategy for Great Britain</u>¹:

- Prevention,
- Serly detection, surveillance, monitoring and rapid response,
- Solution Nitigation, control and eradication

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

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

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

- The prevention of the deadly salmon parasite *Gyrodactylus salaris* from entering the Ness fishery district, which would cause catastrophic economic and environmental loss;
- S A strategic, collaborative control programme of riparian INN plants;

¹ www.nonnativespecies.org



- Increased biodiversity and the conservation of important natural habitats for native species such as Otter, Atlantic salmon, European eel and Freshwater pearl mussel;
- S The visual conservation and increased amenity value of local landscapes;
- The protection of the endangered water vole from American mink;
- The prevention of species such as Zebra mussel from entering the district 's watercourse helps protect nationally important hydro - electric, canals etc schemes from extremely costly mitigation measures;
- The prevention of the encroachment of American signal crayfish from the Nairn catchment with associated negative ecological and economic implications; and
- Rapid response mechanisms to contain and where possible eradicate new incidences of identified INNS.



Introduction

This Biosecurity Plan follows on from the previous 2009 to 2015 version produced by the NBFT. Unlike the previous version, it only relates to the Ness catchment, with a separate plan being produced for the Beauly catchment by the Beauly District Fishery Board.

The plan aims provides a platform for local action to address those biosecurity issues. It details work that has been undertaken and recommends actions required to address biosecurity issues within the area. It will remain active, being updated as a result of new research and findings. It has a lifespan of ten years and, as part of an adaptive management cycle, its outcomes and impacts will be reviewed and incorporated in the next generation plan. 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.

This is one of 10 biosecurity plans being produced around 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 but with ten fishery trust and fishery board delivery partners (including the NBFT) and one academic partner (the University of Aberdeen).

The project runs from 2017 - 2021 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 SISI invasive species control is delivered by a combination of staff, contractor and community and volunteer-based control. Further information about the project can be found on its website - <u>www.invasivespecies.scot/</u>.

The need for ongoing action on biosecurity issues has been identified in the latest <u>Ness District</u> <u>Fishery Board Fisheries Management Plan</u>² and the <u>River Basin Management Plan for the Scotland</u> <u>river basin district: 2015–2027</u>³

As the spread of INNS is not isolated to the River Ness catchment this plan will also facilitate coordination and communication with the neighbouring Fisheries Trusts, Boards and other stakeholders of neighbouring areas e.g in Cromarty, Nairn, Findhorn and Lossie, Lochaber and Kyle of Sutherland.

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https://www.dropbox.com/s/u4se06p0avy7our/Ness%20Catchment%20Fisheries%20Management%20Plan%2 0Final%20v1%20%28compressed%29.pdf?dl=0

³ https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basindistrict-2015-2027.pdf



The Context

BIOSECURITY: THE NATURE OF THE PROBLEM

Biosecurity issues are of increasing economic and ecological significance. Globalisation has expanded the possibilities, extent and complexity of world trade and the growth of the tourism market has expanded the number of destinations for activity holidays and travellers.

These trends have led to the increased probability of the unintentional as well as intentional introduction, establishment and spread of INNS, parasites and diseases in Scotland and the UK. In the context of this plan, biosecurity issues in the rivers and lochs of Scotland are considered in relation to the potential introduction and spread of a priority list of INNS and fish diseases.

A <u>survey</u>⁴ commissioned by Scottish Natural Heritage (now NatureScot) in 2000, shows there are approximately 1000 non-native species present in Scotland the majority of which exist in small populations with little impact on native flora and fauna. However, a small but significant proportion of these non-native species are invasive.

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

According to <u>CBD (2006)⁵</u>, **invasive non-native species** (INNS) are the second greatest threat to biodiversity being capable of rapidly colonising a wide range of habitats and excluding the native flora and fauna. Furthermore, over the last 400 years INNS have contributed to 40% of the animal extinctions where the cause of extinction is known.

As water is an excellent transport medium for the dispersal of many of these species, rivers and lochs and their banks and shorelines are amongst the most vulnerable areas to the introduction, spread and impact of these species. The ecological changes wrought by INNS can further threaten already endangered native species and reduce the natural productivity and amenity value of riverbanks, shorelines and their waterbodies.

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

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

⁵ http://www.cbd.int/gbo2



- DEFRA⁶ have estimated that INNS cost the UK economy £2 billion per year;
- In the UK Japanese Knotweed is thought to affect an area roughly the size of London and the <u>Review of Non-Native Species Policy (2003)</u>⁷ has estimated the total cost of its removal using current techniques at £1.56bn.
- A <u>Scottish Government report</u>⁸ estimated the potential Net Economic Value loss to Scotland of the introduction of *Gyrodactylus salaris* at £633 million with severe consequences for rural communities.
- A <u>Forestry Research Report</u>⁹ estimates the current cost of clearing the invasive *Rhododendron* ponticum from Argyll and Bute as £9.3m that could rise to £64m in the next 50 years.
- Invasive species have already changed the character of iconic landscapes and waterbodies in Scotland reducing the amenity value of those areas.

There is also a growing recognition of the impacts of **translocated species**. Translocated species are native species that have been transported outside of their natural range and they can also have severe ecological impacts.

Examples of translocated species that are impacting the ecology of Scotland's rivers and lochs are the minnow (*Phoxinus phoxinus*) and ruffe (*Gymnocephalus cernuus*). The ruffe in particular has decimated the once significant and diverse population of the rare and protected Powan (*Coregonus lavaretus*) in Loch Lomond.

Without 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. This plan is the first step to set out and implement such an approach at a local level for selected species and diseases that significantly impact freshwater fisheries and the aquatic environment. This local plan and its implementation are also part of a strategic and coordinated approach to INNS management being undertaken across Scotland.

⁶ http://www.defra.gov.uk/wildlife-countryside/wildlife-manage/non-native/index.htm

⁷ http://www.defra.gov.uk/wildlife-countryside/pdf/wildlife-manage/non-native/review-report.pdf

⁸ www.scotland.gov.uk/resource/doc/1062/0042434.pdf

⁹www.forestresearch.gov.uk/pdf/Argyll_Bute_rhododendron_2008_costs.pdf/\$FILE/Argyll_Bute_rhododendr on_2008_costs.pdf



POLICY AND LEGISLATION

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

The partnership approach encapsulated in this plan is a key requirement for increased public awareness and engagement, optimisation of the use of resources and the provision of clear guidance for inter-agency working necessary to address the biosecurity issues of the Ness and Beauly fisheries districts. These approaches are consistent with the <u>GB Invasive Non Native Species Framework Strategy¹⁰</u> and the <u>Species Action Framework¹¹</u> both of which have been approved by the Scottish Government.

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

- Section 14 of <u>The Wildlife and Countryside Act (1981)¹²</u> makes it an offence to allow any animal (including hybrids) which is not ordinarily resident in Great Britain, to escape into the wild; or release it into the wild; or to release or to allow to escape from captivity, any animals that is listed on Schedule 9 of the 1981 Act. It is also an offence to plant or otherwise cause to grow in the wild any plant listed on schedule 9 of the 1981 Act.
- Local Authorities have powers to take action against giant hogweed 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 <u>Town and Country Planning (Scotland) Act 1997¹³</u> 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 <u>Possession of Pesticides (Scotland) Order 2005¹⁴</u> regulates the use of pesticides and herbicides for the control and eradication of INNS.

¹⁰ www.nonnativespecies.org

¹¹ www.sng.org.uk/speciesactionframework

¹² www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1981/cukpga_19810069_en_1

¹³ www.opsi.gov.uk/acts/acts1997/ukpga_19970008_en_1

¹⁴ www.opsi.gov.uk/legislation/scotland/ssi2005/20050066.htm



- Environmental Protection Act 1990¹⁵ 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 1994¹⁶ 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 1991¹⁷ and the Environmental Protection (Duty of Care) Regulations 1991¹⁸ provide guidance for the handling and transfer of controlled waste.
- The Aquaculture & Fisheries (Scotland) Act 2007¹⁹ that regulates against the unauthorised introduction of fish to inland waters.
- The <u>Prohibition of Keeping or Release of Live Fish (Specified Species) Order 2003²⁰</u> requires that a licence be obtained for the keeping or release of species listed on Schedules 1 and 2.
- Solution The <u>NetRegs²¹</u> website contains useful guidance on INNS and their control

The procedures for the detection, notification and control of fish diseases procedures are already well defined by fisheries legislation. This stipulates that Marine Scotland acts on behalf of the Government in respect to the suspicion of the presence of notifiable fish diseases and organises and coordinates the response to that outbreak. As such the actions in this plan will raise awareness and provide mechanisms for the realisation of those procedures at the local level.

21 http://www.netregs.gov.uk/netregs/default.aspx

¹⁵ www.opsi.gov.uk/acts/acts1990/ukpga_19900043_en_1

¹⁶ http://www.opsi.gov.uk/si/si1994/uksi_19941056_en_1.htm

¹⁷ www.opsi.gov.uk/si/si1991/Uksi_19911624_en_1.htm

¹⁸ www.opsi.gov.uk/si/si1991/uksi_19912839_en_1.htm

¹⁹ http://www.opsi.gov.uk/legislation/scotland/acts2007/asp_20070012_en_1

²⁰ http://www.scotland.gov.uk/resource/doc/47133/0009766.pdf



Scope of the Plan

THE NESS CATCHMENT

The Ness catchment is the largest in the North Highlands and drains 2,103 square kilometres of land. The upper reaches extend almost to the west coast, close to Loch Hourn and Loch Nevis. The land drains east and north through the Great Glen before entering the sea in the Moray Firth at Inverness. For management purposes the district can be sub-divided into seven key management units.



Ness System Fishery Management Units

Each of these management units is described in further detail below:

- Ness Coastal Inverness Firth and smaller coastal burns, particularly important for sea trout but also salmon;
- River Ness The temperature of the main River Ness is kept artificially high by Loch Ness, so it has no temperature barrier. This unit also incorporates the key tributaries of the main river, including the Holm Burn and Allt na Skiach Burn;
- Loch Ness and Small Tributaries The famous loch extends to 37km with smaller tributaries, the mouths of which are important spawning areas for salmon, trout and Arctic charr;
- Rivers Enrick and Coiltie Flowing into Urquhart Bay and supporting one of only a few alluvial woods remaining in the United Kingdom, designated as a Site of Special Scientific Interest (SSSI). Also thought to be important spawning areas for summer and autumn salmon and grilse;



- River Moriston Designated as a Special Area of Conservation (SAC) for freshwater pearl mussel and Atlantic salmon. It supports an important 'spring' salmon fishery and is heavily impacted by large scale hydro-electric schemes;
- Rivers Garry and Oich The River Oich runs parallel to the Caledonian Canal, with extensive modifications being made to its course during the construction of the canal. The two rivers are separated by Loch Oich. Both the Garry and Oich support important 'spring' salmon fisheries and are heavily impacted by large scale hydro-electric schemes; and
- Rivers Tarff, Foyers and Farigaig All support salmon populations to a greater or lesser degree and form important juvenile and nursery areas. They are, however, less important in terms of angling. The Tarff and Foyers are impacted by hydro-electric schemes.



The upper falls on the River Moriston at Invermoriston

In addition to the above, the Caledonian Canal intersects the Ness system at various points. The canal runs some 60 miles (97 km) from north-east to south-west. Only one third of the entire length is man-made, the rest being formed by Loch Dochfour, Loch Ness, Loch Oich and Loch Lochy (in the neighbouring catchment).



LAND USE SUMMARY

Land use within the Ness catchment is dominated by sporting estates (mostly deer stalking), rough grazing for cattle and sheep and both commercial timber forestry and native woodland. Arable agriculture is restricted largely to the lowland areas and in particular the coastal region. Major urban conurbations such as Inverness are found largely in the coastal district. Other settlements tend to be relatively small in nature and are found in the lower reaches of rivers e.g. Fort Augustus, Invergarry and Drumnadrochit.



Ness catchment Land use (Land Cover of Scotland data, 1:25,000, MLURI 1993)

The catchment contains large tracts of forestry including areas utilising commercial species and areas of species with a high conservation value (e.g. alluvial alder in Glen Urquhart Bay). Ownership of forestry areas is diverse and includes both the public and private sector. Indications from Forestry



and Land Scotland (FLS) suggest that some areas utilised for commercial tree species e.g. sitka spruce may well be planted with native species once the harvesting cycle has been completed.

The Ness catchment has been the subject of extensive hydro-electric schemes, a process which began with a small scheme in Fort Augustus in c1890 and is continuing to the present day. This includes the construction of the Glen Doe scheme along with several smaller schemes throughout the catchment, for example on the River Enrick. Of particular importance in respect of the salmon populations of the Ness system are the effects of the Glen Garry and Glen Moriston schemes operated by Scottish and Southern Energy (SSE). Overall, hydro-electric development either directly or indirectly affects a considerable proportion of the Ness catchment.

The Caledonian Canal operated by Scottish Canals links Inverness with the Fort William District and incorporates several lochs, including Loch Ness and Loch Oich. The canal and lochs are utilised by a considerable amount of commercial and recreational boat traffic. The use of much of the Ness system for a variety of commercial and recreational activities represents an important source of potential pathways for the introduction and spread of INNS.

BIOSECURITY: CURRENT AND POTENTIAL THREATS

This section identifies 36 INNS, translocated species and fish diseases for inclusion in the Biosecurity Plan of which 15 high priority species already present plus 4 species considered to have a high potential risk of introduction will be the main focus for action. The priority species were identified as those that:

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

Current Biosecurity Issues

Current biosecurity issues are particularly associated with 12 INNS and 3 translocated native species that are currently found in both the Ness and Beauly catchments:

- American mink (Mustela vison) is present in both fishery districts. Mink spread by land based migration to seek new territories before and after breeding seasons and kill water fowl, small mammals and juvenile salmon and trout and have been linked to the decline of water voles in other regions.
- Canadian pondweed (Elodea canadensis) has been recorded in the area, particularly south of Loch Ness. It is spread by disposal of plants or plant fragments near waterways, escapes from garden ponds during flood episodes and possibly by birds and other animals. Canadian pondweed dominates native macrophyte communities which can lead to their extinction and



thereby impacts local invertebrate communities. It can also increase metal loads within waterbodies that compounds its impacts on native flora and fauna.

- Nuttall's Pond weed (Elodea nuttallii) has been recorded at Allangrange on the Black Isle, part of the Ness Fishery District. Nuttall's pond weed dominates native macrophyte communities and this can lead to their local extinction. Impacts have also been recorded on invertebrate communities. All Elodea species take up metals from the sediment and release them into the water. E. nuttallii is very tolerant of Copper in particular.
- Australian swamp stonecrop/New Zealand pigmy weed (Crassula helmsii) has been recorded at a number of locations in the Caledonian Canal. Australian swamp stonecrop can out-compete native species, cause die offs and lead to associated problems such as reduced oxygen levels.
- Rhododendron (Rhododendron ponticum & hybrids) is present in both the Ness and Beauly catchments as well as coastal areas. In some areas such as the Lower Garry it has been the subject of eradication efforts. It spreads by natural seed and vegetative dispersal after intentional planting in gardens, parks and demesnes. It forms dense thickets and out-competes native plants for space and resources with impacts on fish and invertebrate communities as well as preventing site access.
- Japanese knotweed (Fallopia japonica) has been recorded as being present in a number of locations and has been the subject of local eradication efforts, particularly in the Glen Urquhart SAC area. It has spread along rivers by movement of plant fragments by water and is found in many other areas through the movement of plant debris in soil and on vehicles. It forms dense thickets which can exclude native plants and prohibits regeneration. Dense growth of Japanese knotweed can also hinder access, reduce biodiversity and alter the habitat for wildlife.
- Himalayan balsam (Impatiens glandulifera) is present in the area covered by this plan and has been the subject of localised eradication efforts, particularly the Glen Urquhart SAC area. It spreads through natural dispersion by wind or water from areas in which it has been planted or introduced through the transport of contaminated soil. It forms thick monospecific stands that can shade out low level native plants reducing biodiversity and denuding river banks of understory vegetation. Winter dieback of the plants exposes soil to erosion.
- Giant hogweed (Hercaleum mantegazzianum) is present in a number of locations and has been the subject of eradication efforts, particularly in the Glen Urquhart SAC area. It spreads through seed dispersal and the movement of soil contaminated by its seeds. It is a public health hazard due to the toxins in the sap reacting with UV light to blister skin. Dense stands can hinder access. Giant hogweed out competes native vegetation for space and resources, and can result in a loss of plant and invertebrate diversity. Winter dieback exposes soil to erosion with loss of river banks and increased sedimentation.
- Rainbow trout (Oncorhynchus mykiss) have been introduced to ponds/fisheries throughout the area for angling. Farmed fish are a potential source of viral and bacterial diseases affecting wild salmonids and they also compete for resources with native species if allowed to escape.



- Minnow (Phoxinus phoxinus) is a translocated species that has been introduced into the Ness and Beauly catchments by anglers. Data held by the NBFT suggests that it is currently extremely widespread. 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.
- Pike (Esox lucius) have been introduced to both the Ness and Beauly catchments and are now widespread. Pike are significant predators on native fish species and are likely to limit smolt production from some areas.
- Perch (Perca fluviatilis) have been introduced to the Ness catchment and are present in several lochs. There is also anecdotal evidence that they are present within the Beauly Catchment. They are also significant predators on native fish species.
- Phagocata woodworthi is an American flatworm believed to have been introduced to Loch Ness via equipment being used to search for the Loch Ness monster. Likely to compete with other invertebrates for food.
- Pink salmon (Oncorhynchus gorbuscha) has spread naturally to the area, appearing initially in 2017 and in lesser numbers 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.
- American skunk cabbage (Lysichiton americanus) is present in a number of locations, with the main area at a small burn at Dochgarroch, it is thought that this has led to a spread further downstream where single plants are now intermittently appearing. It spreads by natural seed and berry dispersal after intentional planting in gardens. The large leaves outcompete smaller plants and can adversely affect native vegetation.

Potential Biosecurity Issues

The 21 invasive non-native species listed below are <u>not currently present</u> within the Ness and Beauly fishery districts. They have been classified as High or Medium level threats depending on their likely impact on the local economy and biodiversity in combination with the likelihood of their introduction. The level of risk of introduction was based on the pathways for the introduction of INNS, their current geographic proximity and the user groups within the N&BFT district.

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

There are eleven High Threat level species that could be introduced into the Ness and Beauly fishery districts and they include one fish parasite, four fish species, five invertebrates and one aquatic plant species.



SPECIES	RISK OF INTRODUCTION	LOCAL IMPACTS
Gyrodactylus salaris (Freshwater external parasite of salmon)	 High - Through unintentional introduction from angler, water sport enthusiasts through and other water users: Contaminated fish. Clothing/equipment which has been in contact with infected water including canoes. Ballast water. Aquaculture transfers. 	 Projected catastrophic impact on salmon (Salmo salar) populations throughout Scotland. (It has largely exterminated S.salar in 41 Norwegian rivers).
North American signal crayfish (Pacifasticus leniusculus)	High - Through intentional/ unintentional introduction from an existing population nearby. Present in neighbouring Nairn catchment. Reports of presence in Ness catchment but not confirmed by NDSFB staff.	 Burrows into river banks causing destabilisation. Diet includes small fish, fish ova and invertebrates.
Zebra mussel (<i>Dreissena polymorpha</i>) Freshwater Bivalve	High - through unintentional introduction from contaminated boat/canoe hulls and engines and bilge water. Caledonian Canal possible transfer vector.	 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 (Eriocher sinensis) Resides in freshwater but migrates to the sea for breeding.	High - 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 Paragonimus ringer, known to infect humans.

High threat level species their impacts and risk of introduction



SPECIES	RISK OF INTRODUCTION	LOCAL IMPACTS
Ruffe (Gymnocephalus cernuus)	Medium - growth of popularity of Pike angling increases the risk of transfer by visiting anglers.	 Ruffe populations have a minimum population doubling time of less than 15 months and the species is an aggressive predatory species of zooplankton and other food sources of native species of fish as well as fish eggs. The introduction of Ruffe to L. Lomond has had disastrous consequences for the Powan and has significantly altered the ecology of the loch.
Roach (<i>Rutilus rutilus)</i>	Medium - Roach have become established in several large Scottish still waters. Movement by anglers is the most likely means of introduction.	 The introduction of Roach would significantly alter the ecology of a water body.
Stone Loach (barbatula barbatula)	Medium - Stone loach have been introduced to the Kyle of Sutherland district probably by visiting Trout anglers.	 Stone loach occur in very high densities and are likely to compete for habitat and food with native salmonids.
Bullhead (Cottus gobio)	Medium - Translocated species recorded in central Scotland that could be introduced deliberately or as live bait.	 Bullhead occur in very high densities and are likely to compete for habitat and food with native salmonids.
Slipper limpet (<i>Crepidula fornicata</i>)	Medium - The presence of port in Inverness increases the risk of introduction to the Moray Firth. The likely pathways of introduction are by hull fouling and in ballast water.	 Inhabits shallow subtidal area below low water mark often attached to oysters and mussels. In France has altered benthic habitat through smothering of sediment beds with densities of 000's/m² that trap suspended silt, faeces and pseudofaeces. Exclude other bivalves including oysters to whose beds they are a serious threat. Also, a major threat to other protected species.



SPECIES	RISK OF INTRODUCTION	LOCAL IMPACTS
Didemnum Tunicates/Sea Squirts <i>Didemnum vexillum</i>	Medium - Vectors for introduction are uncertain but fouling of ocean-going vessels and/or contamination of aquaculture produce are possibilities. The presence of a port in Inverness increases the risk of introduction to the Cromarty Firth district. Once established, it can spread rapidly by both sexual reproduction and asexually by fragmentation of the colonies.	 Marine habitat changes through overgrowth of sedentary benthic organisms such as seaweed, scallops, mussels, and oysters. Produces chemicals that deter most fish and other animals. Increases fouling of underwater structures such as docks, moorings, and boat hulls.
Curly waterweed (Lagarosiphon major)	 Medium - found in a small number of locations throughout Scotland especially in the central belt area and spread through: Disposal of garden waste. Animals and human activity. Fragmentation by wind dispersal, boat movement, angling equipment and possibly water fowl. 	 Capable of forming very dense infestations in suitable habitats and occupying the full water column in waters up to 6m deep with significant impacts on native plants, insects and fish. It is a serious threat to tourism, angling, boating and other recreational pursuits as well as conservation goals.

There are also ten Medium Threat level species of which there are five species with a medium risk of introduction and five species with a low risk of introduction. The <u>UK TAG website²²</u> lists other alien species which may also be at risk of introduction.

The risk of introduction of Medium Threat level INNS.

SPECIES		RISK OF INTRODUCTION
Water primrose (Ludwigia grandiflora)	Medium	Unintentional introduction from boat hulls and ponds.
Orfe (<i>Leuciscus idus</i>)	Medium	Through intentional/unintentional introduction from an existing population nearby.
Water fern <i>(Azolla filiculoides)</i>	Medium	Through intentional/unintentional introduction from numerous locations throughout Scotland, especially central belt.
Wireweed (Sargassum muticum)	Medium	Through unintentional introduction.
Cord Grass (Spartina anglica)	Medium	Present within neighbouring Cromarty Firth catchment.

²² http://www.wfduk.org/tag



SPECIES		RISK OF INTRODUCTION
Large flowered waterweed (Egeria densa)	Low	Only found to date in East Lothian. Possible introduction from ponds.
Floating pennywort (Hydrocotyle ranunculoides)	Low	Currently only in England up to the midlands. Possible introduction from ponds.
Parrot's feather (Myriophyllum aquaticum)	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 (Pseudorasbora parva)	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 main pathways or means of introduction of both High and Medium Threat level species into the Ness fishery district are:

- Intentional introduction or planting.
- Souling and ballast water of marine vessels.
- Souling and ballast water of freshwater vessels.
- Secapes from garden ponds.
- Solution Contaminated water sports equipment, e.g. from anglers, canoeists.
- Solution Movement of contaminated soils or vehicles.
- Improper control and disposal measures, e.g. cutting and dumping without treatment, fish factory waste.
- S Introduction of live fish, contamination of water used to transport live fish.

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



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 following:

Policy and Legislation	Land Resources	> Water Resources
Scottish Government Edinburgh	Forestry and Land Scotland	North Highland Area Advisory
NatureScot	Highland Council	Group
Scottish Environment Protection	National Farmers Union	Scottish Environment Protection Agency
Agency	Highland Invasive Species Forum	Scottish Water
Marine Scotland	Scottish Land and Estates	Scottish and Southern Energy
Fisheries Management Scotland	> Industry	Scottish Canals
	Aquaculture companies	Inverness Harbour Trust
	Building contractors	Inverness Marina
		Moray Firth Partnership
Fisheries Management	Recreation	Conservation and Biodiversity
Ness District Fishery Board	Inverness Canoe Club	Scottish Wildlife Trust
Beauly District Fishery Board	Commercial canoeing companies	Royal Society for the Protection of
Ness & Beauly Fisheries Trust	Ramblers Association	Birds
Association of Still Water	Local Angling Associations	Scottish Native Woods
Fisheries		Inverness & Nairn Local
	Inverness Marina	Biodiversity Action Group
Fisheries Management Scotland	Inverness Marina Caley Cruisers	Biodiversity Action Group
Fisheries Management Scotland	Inverness Marina Caley Cruisers	Biodiversity Action Group
Fisheries Management Scotland	Inverness Marina Caley Cruisers West Highland Sailing	Biodiversity Action Group Plant Life Highland Biological Recording
Fisheries Management Scotland	Inverness Marina Caley Cruisers West Highland Sailing Scottish Canals	Biodiversity Action Group Plant Life Highland Biological Recording Group
Fisheries Management Scotland	Inverness Marina Caley Cruisers West Highland Sailing Scottish Canals	Biodiversity Action Group Plant Life Highland Biological Recording Group

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



Pathway	Stakeholders
Intentional introduction or planting.	Plantlife, riparian landowners, members of the public,
	Marine Scotland, local councils.
Fouling and ballast water of marine vessels.	Inverness Harbour Trust/British Waterways.
Fouling and ballast water of freshwater vessels.	Inverness Harbour Trust/British Waterways/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.	Ness District Salmon Fishery Board, local canoe/water
from anglers, canoeists).	sports organisations, anglers, angling associations, fishing
	agents and tackle shops/SEPA.
Escapes from fish farms, ponds, gardens etc.	Marine Scotland/ Planning Authorities/ Aquaculture
	companies/Plantlife/riparian owners/ members of the
	public.
Movement of contaminated soils or vehicles.	Local Councils/SEPA/quarries/ building contractors.
Introduction of live fish, contamination of	Aquaculture companies/Marine Scotland/Still Water
water used to transport live fish.	Fisheries/Angling Associations.
Improper control and disposal measures e.g.	Local councils/SEPA/environmental health/
cutting and dumping without treatment.	Plantlife/riparian owners/members of the public.

Pathways and stakeholder groups in the Ness districts

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

EXISTING INNS CONTROL ACTIVITIES

There have been a number of previous prevention and control activities concerning INNS within the Ness catchment, some clearance of invasive alien plant species previously funded by NatureScot in relation to designated sites, particularly Himalyan balsam and Japanese knotweed in Urquhart Bay Woods SAC. Rhododendron removal has also been historically undertaken by a partnership of private interest and public bodies on the River Garry catchment. Much of the current work is overseen by Ness District Salmon Fishery Board (on behalf of Ness and Beauly Fisheries Trust) as part of the Scottish Invasive Species Project, with funding from NLHF and NatureScot.



- Himalayan balsam (Impatiens glandulifera) Historical control in the form of hand pulling has taken place at Glenurquahart Woods SAC by contractors and volunteers. This area was visited in 2019 and again in 2020 by NDSFB staff and volunteers under the SISI project. Approximately 2km of river bank was cleared in 2020 with an area of approximately 40000m². Additional smaller stands were cleared in 2018 on the Avoch Burn by Ness and Beauly Fisheries Trust staff and volunteers from the APEX group in Invernes. This area was revisited in 2020 by NDSFB staff and volunteers. These controls were carried out as part of the SISI project.
- Giant hogweed (Hercaleum mantegazzianum) Chemical control was carried out in 2018 on 3.6km of both banks of the Littlemill Burn and in Munlochy along with associated areas at Knockbain church by Ness and Beauly Fisheries Trust staff and volunteers. An area of approximately 24500m² was treated. These areas were revisited and again treated in 2020 by NDSFB staff and volunteers where a marked reduction in plant numbers and density was observed. A 1km stretch of the right bank of the River Ness was treated in 2018 and a further 3km of the same river bank in 2020 by NDSFB staff and volunteers. In addition, small stands were treated at Avoch beach in 2020.
- Japanese knotweed (Fallopia japonica) The Glenurqhuart bay woods SAC is an area of concern regarding Japanese knotweed, with large stands occurring on both banks of the rivers Enrick and Coiltie, these stands extend into the surrounding woodland. In 2019 a small area on the right bank of the River Coiltie/Enrick was treated by NDSFB staff and volunteers via stem injection with Glyphosate. This area was revisited and treated in 2020 by NDSFB staff and volunteers, a marked reduction in densities was observed. A further 4km of both banks along with the surrounding area was also treated with an area of approximately 12000m² now undergone stem injection. The extent of Japanese knotweed infestation here is large and continuous effort is required. In 2020 approximately 3.5km of the right bank of the River Ness was treated via stem injection along with a small area on the Littlemill Burn at Munlochy and the Milton of Leys drainage channel. In total approximately 7000 individual stems of Japanese knotweed were injected in 2020.
- American skunk cabbage (Lysichiton americanus) A 200m section of the Dochgarroch Burn covering an area of approximately 1000m² underwent control in the form of hand pulling and digging in 2020. In addition, a number of single plants were removed from the right bank of the River Ness. These areas are likely to see further outbreaks until control at the source can be achieved once it has been identified. Further reports of Skunk cabbage have been noted on the South shore of Loch Ness around Loch Mhor and funding is currently being sought by a local community group assisted by local contractors.
- American mink (Mustela vison) have been found regularly within the area, mink have been trapped and humanely dispatched throughout the catchment and are reported on a regular basis. Breeding populations do occur and it is thought the Great glen way acts as a through route from East to West. Currently there is a network of 21 volunteers in the Ness catchment, monitoring and trapping as required under the direction of SISI.



- Fish Species: Ness DSFB water bailiffs routinely liaise with anglers to check that live fish are not being used as bait and enforce laws relating to their use. In particular minnows have, and on occasion, are still being used by visiting anglers.
- Aquatic INNS: The possibility of a trial to eradicate New Zealand pigmyweed from a small pond in Inverness is currently being investigated by Highland Council. This is likely to take the form of shading using Jute matting.
- Gyrodactylus salaris: The Ness District Fishery Board have disseminated information in the form of leaflets and publicity material regarding the possible introduction of the parasite to the area. Information notices have also been placed at key locations (i.e. those frequently utilised by anglers and watersports enthusiasts) within the Ness catchment. Letting agents, angling clubs etc supply their clients with information and require a declaration form to be signed prior to the granting of permission to fish. British Waterways also provide an information leaflet for canal users.

Ness District Salmon Fishery Board, promote and advise on biosecurity and the prevention of introduction and spread of INNS. This has taken the form of talks, displays at outreach events, discussion with landowners, local businesses and anglers, the use of social media, on the website and through printed materials.



Biosecurity Management Strategy

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

- Prevention;
- Sarly detection, surveillance, monitoring and rapid response; and
- Solution Mitigation, control and eradication.

OBJECTIVES AND OUTPUTS OF THE **N**ESS CATCHMENT BIOSECURITY PLAN

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

Objective 1: Prevent the introduction and spread of INN species within the Ness catchment.

Output 1.1 – All key stakeholders aware of:

- 1. The ecological and economic impacts of INNS
- 2. The potential pathways for introduction and spread.
- 3. Management best practices to prevent introduction and spread.

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

- INNS are any non-native animal or plant that has the ability to spread causing damage to the environment, the economy, or health and the way we live;
- Invasive non-native species damage our environment, the economy, our health and the way we live;
- We require the support of stakeholders to increase awareness and better understanding of INNS issues and impacts; and
- Invasive Non-Native Species:



- o Threaten our native plants, animals and habitats
- Cost the British economy between £2 and £6 billion pounds each year
- Can threaten our health

The local priorities for awareness will focus on disrupting the pathways for the introduction and spread of INNS in the Ness catchment. The key stakeholders, the identified areas of priority and the proposed mechanisms for delivery are presented below, as are the roles and actions of key government agencies and non-government bodies in promoting awareness of INNS issues

Stakeholder Group	Priority Area	Mechanism of Delivery
Local Fish Farms	 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. 	 NDSFB to encourage local fish farms to adopt the Association of Scottish Still Water Fisheries Code of Good Practice. NDSFB to work with local industry and trade associations to advise members regularly of best practice in respect of INNS. Enforcement agencies (DSFBs) to undertake site visits to discuss and advise on issues involving INNS e.g. rainbow trout <u>Invasive Species Scotland</u>²³ website.
Port Authorities	 Avoid pumping out of non-sterilised ballast water in harbour when possible Role of hull fouling in the introduction and spread of INNS. 	- Continue best practice requiring sterilised ballast water to be discharged or non- sterilised ballast water to be discharged away from harbour where possible
British Waterways	 Avoid discharge of ballast in freshwater Role of hull fouling in the introduction and spread of INNS. 	 NDSFB to assist with the supply of posters and other awareness material for display and signage. <u>Invasive Species Scotland</u> website.

Priority areas for awareness and delivery mechanisms according to stakeholder group

²³ www.invasivespeciesscotland.org.uk



Stakeholder	Priority Area	Mechanism of Delivery
Group		
Local Garden Centres	- Promote existing codes of practice covering the security and disposal of INNS to all garden centres.	NDSFB to work with garden centres to encourage distribution of codes of practice and posters (available from Plantlife).
	- Target gardeners to dispose plant material and/or soils in a responsible manner.	www.nonnativespecies.org/beplantwise/
Local Aquarium and Pond stockists	- Promote code of practice to all pet shops and suppliers of ornamental fish.	NDSFB to work with retailers to encourage distribution of codes and posters (available from Plantlife). - <u>www.nonnativespecies.org/beplantwise/</u>
Water User associations (canoeists, sailing clubs)	- Promote awareness to clubs and participants of the dangers arising from INNS.	NDSFB to work with associations etc to promote disinfection of equipment and provide appropriate facilities to eliminate the risk of accidental transfer of INNS - FACT campaign and web site. www.invasivespecies.scot/biosecurity
Landowners	 Promote knowledge of biosecurity issues amongst all tenants and resource users Identification of suitable persons to act as "eyes" for the N&BFT. 	NDSFB to work with landowners to ensure dissemination of best practices and appropriate signage to reduce threats from INNS NDSFB to offer training for "eyes" - <u>Invasive Species Scotland</u> website
Angling clubs	 Promote knowledge of biosecurity issues amongst all members and visiting anglers. Promote the distribution of information and erection of signage in fishing huts and recognised car parks. Recommend suitable members to act as "eyes". 	 NDSFB to ensure dissemination of best practices and appropriate signage to reduce threats from INNS. NDSFB to work with associations etc to promote disinfection of equipment and provide appropriate facilities to eliminate the risk of accidental transfer of INNS. NDSFB to offer training for "eyes". NDSFB to supply disinfection chemicals. <u>Invasive Species Scotland</u> website



Stakeholder	Priority Area	Mechanism of Delivery
Group		
General	- General awareness of impacts and	- Local Media Campaigns.
Public	measures to prevent/control INNS.	- Use of websites (FMS, SISI,NNSS).
	- Promote the Biosecurity Plan to all retail	
	outlets who deal with NNS e.g. pet shops,	- NDSFB to develop a leatlet to promote the Biosecurity plan, the dangers arising FROM
	garden snops.	INNS and the reporting system.
		- Invasive Species Scotland website.
Schools	- General awareness of impacts and	- School visits.
	measures to prevent/control INNS.	- Field trips.
		- <u>www.invasivespecies.scot/alien-detectives</u> website.
Contractors /	- General awareness of impacts and	- Ensure dissemination of best practices.
Ground	measures to prevent/control INNS.	- Training for "eyes".
Workers		Invasive Species Scotland website

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

Organisatio	Role and/or action	Delivery Mechanisms
n		
Ness DSFB	 Continue to promote awareness to anglers and angling clubs of the dangers arising from INNS. Promote awareness to general water users promoting the Biosecurity Plan and highlighting the dangers from INNS 	 Continue to promote disinfection of equipment and provide appropriate facilities. Holding of open days, field visits and demonstrations. Promote and launch of Biosecurity Plan Develop a leaflet to promote the Biosecurity plan, the dangers arising from INNS and the reporting system and ensure appropriate distribution to stakeholders See actions for NDSFB above
Highland Council	 Promote use of codes of best practice for construction, haulage, horticulture, aquaculture amongst local business and relevant departments particularly construction, garden and pet trade. Promote awareness of planning, waste disposal and transport regulations amongst local business. Promote awareness of the GB communications strategy to the general public. 	 Councils to promote codes of best practice at every opportunity e.g. including them with planning applications and building warrants. Production (by Council's legal department) and distribution of information leaflets on all relevant legislation relevant to INNS. Holding of awareness event/open days to promote biosecurity issues.
Forestry	- Committed to maintaining and	- Continual improvement in forestry design planning
and Land	enhancing the quality of the	seeks to improve riparian zones for the broad range of



Organisatio n	Role and/or action	Delivery Mechanisms
Scotland	environment. - Priorities tend to be led by legal designations first i.e. SACs, SSSIs, SPAs in favourable status lead the work programme.	habitats and species that exist within these zones. - Control of INNS.
SEPA	 Clarify SEPA responsibilities for INNS to both staff and customers. Incorporate INNS issues into relevant guidance documents (as they are developed or updated). <u>https://www.gov.scot/publications/</u><u>non-native-species-code-</u><u>practice/pages/10/</u> SEPA has moved to a sector approach to improve how businesses are regulated. <u>https://sectors.sepa.org.uk/</u> INNS work is an area of work that cuts across all sectors. 	 Page on website with links to relevant SEPA information and other sites e.g. Non-Native Species Secretariat, FMS, Scottish Canoe Association. Digital documents available for download on SEPA Website. https://www.sepa.org.uk/environment/biodiversity/inv asive-non-native-species/
NatureScot	 National: Promotion of good practice in the prevention, control and eradication of INNS. 	 Holding of NatureScot Sharing Good Practice events. Grant funding may be available for some projects.
Marine Scotland	 Fish Health Inspectorate part of Marine Scotland is lead body with respect of fish diseases and escapes 	 Undertake site visits to discuss and advise on issues involving INNS. Promote disinfection of equipment and provide appropriate facilities to eliminate the risk of accidental transfer of INNS.

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

Output 2.1 - 'Reporting system' established for key INN species in district

A local surveillance network will be the "eyes" of the early warning system and will consist of members of the public, bailiffs, ghillies, canoeists and walkers with reported sightings verified by trained NDSFB staff. A sighting of a GB or local high priority species will be verified within 48 hours. If confirmed, it will initiate the appropriate GB or local high priority response (see Output 2.2 below). Reports of priority species will be verified as time permits.

Output 2.2 – Develop strategic monitoring of INN species in districts.

The NDSFB will work with Scottish Fisheries Coordination Centre, SEPA and NatureScot to develop and agree national protocols for INNS surveying and monitoring as well as ensuring that INNS data is stored in a format which can readily be shared. NDSFB will incorporate improved recording of INNS into its survey programmes, habitat surveys etc.

Output 2.3 – Rapid response mechanism established for new INN species which pose significant threats to local biodiversity and economy.



The type of response will depend on the severity of the species detected 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; and
- S A priority local rapid response

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

Response level for 35 invasive INNS and translocated species.



GB Response	High Priority Local Response	Priority Local Response
		Nuttal's pondweed
		Phagocata woodworthi

There are likely to be some species which will not qualify for a GB rapid response which are considered priorities at a Scottish level and action may therefore be instigated by Scottish agencies or the Scottish Government.

A confirmed sighting of a GB priority species will trigger the GB contingency plan for that species e.g. *Gyrodactylus salaris*. However, there is still a need for local level protocols to link with the GB response as well as for local level contingency plans for local priority species. The elements to be included in the response to detection of a GB priority species or the contingency plans for local priority species are outlined below.

GB Response	Local High Priority Response	Local Priority Response
- Report to local and GB	- Report to local and GB	- Report to local and GB Institutions
institutions	institutions	
		- Determination of the extent of
- Determine the extent of	- Determine the extent of	infestation
infestation	infestation	
		- Surveys in course of normal work to
- Isolation of area where	- Isolation of area where	establish and map distribution
practicable	practicable	
		- Inclusion of new areas in existing
	Establish source and check	eradication/control programmes
	related sites	
		- Identification and closure all
	- Closure of all pathways	pathways
		p
	- Decision on appropriate action	- Monitor as part of planned
	eradication/containment	catchment monitoring programme
	eradication/containment.	
	- Approved eradication	
	mothedelegy	
	methodology	
	Monitor	

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

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

Output 3.1 – Coordinated control, eradication and habitat restoration programmes established and operational

Surveys will identify INNS distributions within the Ness catchment. Survey information will be recorded and analysed to target nascent and "upstream or source" populations of INNS that are potential sources of spread and re-infestation. Control and eradication programmes will be phased with treatment commencing at the upstream point of distribution and then systematically progressing downstream. A combination of trained volunteers and Ness DSFB staff will be used depending on the management requirements of the area involved. Envisaged mitigation, eradication and control measures for the INNS present in the Ness catchment are presented below. Eradication and control activities will be undertaken in a strategic and systematic way that supports existing works and those in adjacent areas.

SPECIES	ACTION	TREATMENT/POST TREATMENT ACTIONS
Japanese knotweed	Control/Eradication	- Chemical control with Glyphosate via stem
	Identify and close	injection/spray.
	pathways.	
Himalayan balsam	Control/Eradication	- Manual removal.
	Identify pathways and	
	close	
Giant hogweed	Control/Eradication	- Chemical control with Glyphosate via Spray
	Identify pathways and	
	close	
American mink	Control/Eradication	- Continued support to volunteers and further expansion
		to the volunteer network within the Ness catchment
American skunk	Control / Eradication	- Manual removal and/or chemical control.
cabbage		
Canadian pond weed	Monitor distribution	
Minnow / pike / perch	Restrict to present	- Monitor distribution and reduce spread and introduction
	distribution	to watercourses utilising existing fisheries protection
		activities.
Phagocata	Restrict to present	
woodworthi	distribution	

Invasive Non-Native Species Control and Eradication in the Ness catchment



Monitoring and Review

Biosecurity promotion and measures are being initiated within the Ness catchment area by the Ness DSFB on behalf of Ness and Beauly Fisheries Trust. However, the continuation of this, for example after the end of the SISI programme, will be dependent on available resources and uptake by other stakeholders and partners. Any work completed will, however, be monitored and the results evaluated particularly in the light of changing circumstances e.g. climate change.

To ensure the effective implementation of this plan, it is vital that the outcomes and impacts of the actions are monitored including a mid - plan review in 2025 to ensure that the objectives are being met. Thus, a fully coordinated monitoring programme must be established to ensure efficacy and sustainable treatment initiatives and include:

- Searching Search
- Soccurrence and distribution of the selected INNS within the district
- Seffectiveness of control/eradication programme, including:
 - o Application/delivery of effective concentrations of biocides
 - o Checking that treatments have been effective
 - Re-treating immediately where there is doubt
 - Monitoring any apparent resistance to treatments and investigate
 - Surveying the area for signs of dormant plants becoming activated
- Searching Search
- Monitoring the effectiveness of all legislation and codes of practice especially those which are aimed at restricting/closing pathways
- Monitoring general activities within the district and assessing them in terms of risk for the introduction of INNS.

A monitoring programme will be developed based on the agreed objectives and outputs of this plan. Monitoring activities will be undertaken by NDSFB staff in conjunction with stakeholder representatives who by virtue of their work are out in the catchment on a regular basis e.g. roads department and access officers employed by local councils.

This plan has an operational period of 10 years covering the years 2021 - 2030. It will be subject to a mid - plan review in 2025 where significant changes or revisions can be made or updates included.