West Sutherland

Final Version 1 Biosecurity Management Plan

WEST SUTHERLAND FISHERIES TRUST

REGISTERED CHARITY NUMBER SC24426

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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 plan 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.

Abbreviations

Abbreviation	Organisation
ASSG	Association of Scottish Shellfish Growers
BTA	British Trout Association
DSFBs	District Salmon Fisheries Boards
FCS	Forestry Commission Scotland
FHI	Fish Health Inspectorate
HISF	Highland Invasive Species Forum
MS	Marine Scotland
NNSS	Non Native Species Secretariat
N&WDSFB	North and West District Fisheries Board
RAFTS	Rivers and Fisheries Trusts of Scotland
SEPA	Scottish Environment Protection Agency
SFCC	Scottish Fisheries Co-ordination Centre
SG	Scottish Government
SNH	Scottish Natural Heritage
SSPO	Scottish Salmon Producers' Organisation
TWG	Tripartite Working Group
WSFT	West Sutherland Fisheries Trust

Executive Summary

West Sutherland Biosecurity Plan describes the biosecurity issues of West Sutherland and presents actions that have been agreed with stakeholders for the prevention, early detection, control and mitigation of the introduction and spread of selected invasive non native species (INNS), fish diseases and parasites. It is one of a set of 20 biosecurity plans being produced throughout Scotland as part of a national programme of action implemented through the Rivers and Fisheries Trusts of Scotland with backing and support from the Scottish Government, Scottish Natural Heritage, Scottish Environment Protection Agency, and the Esmeé Fairburn Foundation.

The vision of this plan is:

'To establish a sustainable framework that will lead to the prevention, detection, control and eradication of invasive non-native species within the west Sutherland area. This will be undertaken through the application of appropriate management activities, data collection, liaison, education and legislation'

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

Objective 1: Prevent the introduction and spread of new invasive non-native species and fish diseases within the west Sutherland area;

Objective 2: Establish optimum surveillance, detection, monitoring and rapid response systems for the identified invasive non-native species and fish diseases which pose significant threats to local biodiversity and economy;

Objective 3: Effective control and eradication programmes for existing invasive non-native species and fish diseases are operational and sustainable.

These objectives are in accordance with established protocols for fish diseases and with the three key elements of the GB Invasive Non Native Species Framework Strategy: Prevention; Early detection, surveillance, monitoring and rapid response; Mitigation, control and eradication. The aims and objectives of this plan will be achieved through a partnership approach to implement agreed actions.

The need for action on biosecurity issues has been identified in the West Sutherland Fisheries Trust's Fisheries Management Plan and in the West Highland Area and North Highland Area River Basin Management Plans. This biosecurity plan is a platform for local action to address those biosecurity issues. This plan has a lifespan of six years and as part of an adaptive management cycle its outcomes and impacts will be reviewed and incorporated in the next generation plan. The plan builds partnerships of differing groups of stakeholders to implement the actions required to address the complex issues associated with biosecurity.

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 the second greatest threat to biodiversity, being capable of rapidly colonising a wide range of habitats and excluding the native flora and fauna. Within the west Sutherland area, there are known to be 8 invasive non-native species, including Japanese knotweed, Himalayan Balsam and fish such as the minnow and rainbow trout. There are potential threats which could have drastic effects on the biodiversity of the area, such as the parasite *Gyrodactylus salaris*, which could devastate salmonid fisheries, and the North American signal crayfish, which could colonise freshwaters, modifying the habitat and reducing the productivity of fisheries.

The objectives of this plan will be implemented through agreed actions. The **Key actions and timetables** are:

Action	Lead	Partners	TIMEFRAME								
			2010	2010	2011	2011	2012	2013	2014	2015	2016
Objective 1: Prevent the introduction and spread of INN species within the West Sutherland area.											
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											
Launch of West Sutherland Biosecurity plan through national and local press release	West Sutherland Fisheries Trust			—							
Produce leaflet on legislation including waste management & planning regulations	Highland Council	AAG		—	—						
Produce leaflet(s) on priority biosecurity issues and the reporting system	WSFT /RAFTS	AAG, SNH		—							
Produce posters on biosecurity issues and distribute to the general public	RAFTS	WSFT AAG members Highland Council		.....	.....	.....	.....	.....	.....	.....	.....
Continue to promote and install disinfection facilities for anglers at all angling proprietors fishing huts/parking points	North & West District Salmon Fishery Board		.....	.....	.....	.....	.....	.....	.....	.....	.....

Action	Lead	Partners	TIMEFRAME								
			2010	2010	2011	2011	2012	2013	2014	2015	2016
Develop interim code of practice with Harbour Authority	Port Authorities	WSFT		—	—						
Distribute Codes and posters to relevant retail outlets and clubs at open days and events such as agricultural shows	HISF	WSFT AAG members			.....	.....	.....	.....	.....	.....	
Engage with Landowners and angling clubs to promote awareness of measures to tenants, resource – users, members and visitors	N&WDSFB/WSFT	SEPA, SNH		—	—						
Work with environmental groups and local schools to enhance awareness of INNS	Sutherland LBAP group	N&WDSFB/WSFT Highland Council Ranger Service			.....	.....	.....	.....	.....	.....	
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 INN species in area.											
Train WSFT personnel in the identification of INNS	WSFT /RAFTS	**SEPA**		—	—						
Train WSFT as trainers	WSFT /RAFTS			—							
Work with user and interest groups to identify "reporting network"	WSFT	Highland Council AAG SEPA		—	—						
Training of "reporting network"	WSFT	RAFTS LBAP		—	—		—	—	—	—	—
Establish, test and refine communication mechanisms within 'early warning' system	WSFT Highland Council	RAFTS, SEPA (National)			—						
Produce database to record and manage INNS sightings	RAFTS			—							
Monitor and periodically evaluate efficacy of system	WSFT & other partners			.....	.....	.....	.....	.....	.....	.....	

Action	Lead	Partners	TIMEFRAME 2010	2010	2011	2011	2012	2013	2014	2015	2016
Output 2.2 – Develop strategic monitoring of INN species in area.											
Develop and agree protocols	SFCC	SEPA/SNH									
Produce database to manage INNS survey data	SFCC	SEPA SNH									
Training of Trust and other agency staff in monitoring methods	WSFT	SFCC/RAFTS SEPA Highland Council									
Develop monitoring manual	SFCC	RAFTS, SFCC, SEPA (National)									
Output 2.3 – Rapid response mechanism established for new INN species which pose significant threats to local biodiversity and economy.											
Formulate contingency plans for key species	RAFTS WSFT	Highland Council, SEPA and SNH,									
Identification of personnel for response teams	WSFT,	Highland Council, SEPA and SNH,									
Training of personnel to execute contingency plans	WSFT,	Highland Council, SEPA and SNH									
Identification of funding resources	WSFT	Highland Council, SEPA and SNH, RAFTS									
Refresher training	WSFT										
Monitor populations/treated areas	WSFT	SNH, SEPA									
Objective 3: Develop coordinated control and eradication programmes for INN species											
Output 3.1 – Coordinated control, eradication and habitat restoration programmes established and operational											
Initiate catchment wide surveys by trained personnel	WSFT	SFCC									
Develop GIS database for recording and mapping INNS within West Sutherland area	WSFT	SFCC, RAFTS, SEPA									
Implementation of phase 1 of control/ eradication programme see table 10 for details of proposed works	WSFT	Estates SEPA[1]									

[1] May be eligible for funding from the Restoration Fund

Action	Lead	Partners	TIMEFRAME								
			2010	2010	2011	2011	2012	2013	2014	2015	2016
Implement habitat restoration scheme within successful control areas taking into account all relevant species	WSFT	Highland Council, SEPA[2]									
Monitor the effectiveness of control programmes	WSFT	SEPA									
Marine Scotland monitoring Red vent syndrome	Marine Scotland										
Output 3.2 *Coordinate activities of Highland Invasive Species Forum and SEPA AAG to ensure sufficient funding and resources in place to continue prevention and control of INNS within the WSFT area*											
Complete draft Biosecurity plan	WSFT										
Consultation with all stakeholders to agree Biosecurity plan	WSFT	AAG members									
Represent West Sutherland INNS issues at Highland Invasive Species Forum and SEPA AAG	WSFT	Highland Invasive Species Forum SEPA AAG									
Identify and develop opportunities for future funding of eradication projects	WSFT	Highland Invasive Species Forum SEPA AAG FC SNH									

To ensure the effective implementation of this plan, it is vital that the outcomes and impacts of the actions are monitored and reviewed to ensure that the objectives are being met. Thus a coordinated monitoring programme will be established to ensure efficacy and sustainable treatment initiatives. Monitoring activities will be undertaken by the Invasive Species Forum and the WSFT in conjunction with stakeholder representatives who will be aware of local initiatives and priorities for action. A timetable for monitoring the implementation of the plan will be agreed following the consultation period and launch of the plan.

[2] May be eligible for funding from the Restoration Fund

Contents

Cover pictures: *Top left – Canadian pondweed; top right Himalayan Balsam; bottom right – North American Signal Crayfish; bottom left – Japanese knotweed. Top pictures courtesy of C. Daphne, bottom pictures courtesy of GB Non-Native Species Secretariat. Subject to Crown Copyright.*

1. Scope and Purpose

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

'To establish a sustainable framework that will prevent, detect, control and eradicate invasive non-native species within the area through appropriate management, data collection, liaison, and education'

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

> **Objective 1: Prevent the introduction and spread of identified INN species within the area.**
>
> **Objective 2: Develop optimum detection and surveillance of, and rapid response to, identified INN species**
>
> **Objective 3: Develop effective control and eradication programmes for selected INN species**

These objectives are in accordance with established protocols for fish diseases and with the three key elements of the Invasive Non Native Species Framework Strategy for Great Britain[3]:

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

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

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

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

[3] www.nonnativespecies.org

- The prevention of the deadly salmon parasite Gyrodactylus salaris from entering the West Sutherland Fisheries Trust area which would cause catastrophic economic and environmental loss.
- Increased biodiversity and the conservation of important natural habitats for native species such as Otter, Atlantic salmon, European eel and Freshwater pearl mussel.
- The visual conservation and increased amenity value of local landscapes.
- The prevention of species such as American Mink and American Signal Crayfish from entering the watercourses thereby helping to protect vital habitats and fisheries, as well as the endangered water vole.
- The prevention of species such as Zebra mussel from entering the watercourses helps to protect vital local businesses such as hydro-electric generating stations.

2. Background

Although prepared by the West Sutherland Fisheries Trust (WSFT), this plan is one of a set of 20 biosecurity plans being produced throughout Scotland as part of a national programme of action implemented through the Rivers and Fisheries Trusts of Scotland (RAFTS) with backing and support from the Scottish Government (SG), Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA) and the Esmeé Fairbairn Foundation (EFF).

The need for action on biosecurity issues has been identified in the Trust's Fisheries Management Plan (Fishery Management Plan for the area covered by the West Sutherland Fisheries Trust, 2008-2013[4]), the West Highland Area Management Plan[5] 2009-2015 and the North Highland Area Management Plan[6] 2009-2015. 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 was produced using a participatory planning process coordinated by the West Sutherland Fisheries Trust through which stakeholders identified and agreed the aims, outputs and actions presented in this plan. The plan builds partnerships of differing groups of stakeholders to implement the actions required to address the complex issues associated with

[4] http://www.rafts.org.uk/projects/fisheriesmanagementplanning
[5] http://www.sepa.org.uk/water/river_basin_planning
[6] http://www.sepa.org.uk/water/river_basin_planning

biosecurity. This plan therefore represents the agreed approach of the West Sutherland Fisheries Trust, stakeholders and appropriate local regulatory for the prevention, early detection and control of non native invasive species, fish diseases and parasites. As the spread of INNS is not isolated to west Sutherland this plan will also facilitate coordination and communication with the neighbouring Fisheries Trusts, Boards, local authorities and other stakeholders of neighbouring areas e.g Wester Ross and Kyle of Sutherland.

3. The Context

3.1 Biosecurity: The Nature of the Problem

Biosecurity issues are of increasing economic and ecological significance. Globalisation has expanded the possibilities, extent and complexity of world trade and the growth of the tourism market has expanded the number of destinations for activity holidays and travellers. These trends have led to the increased probability of the unintentional as well as intentional introduction, establishment and spread of INNS, parasites and diseases in Scotland and the UK. In the context of this first plan, biosecurity issues in the rivers and lochs of Scotland are considered in relation to the potential introduction and spread of a priority list of INNS and fish diseases.

A survey[7] commissioned by Scottish Natural Heritage in 2000, shows there are approximately 1000 non native species present in Scotland the majority of which exist in small populations with little impact on native flora and fauna. However, a small but significant proportion of these non native species are invasive.

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

According to CBD (2006)[8], **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

[7] www.snh.org.uk/pdfs/publications/review/139.pdf

[8] http://www.cbd.int/gbo2

native species and reduce the natural productivity and amenity value of riverbanks, shorelines and their waterbodies.

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

- DEFRA[9] 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 Review of Non-Native Species Policy (2003)[10] has estimated the total cost of its removal using current techniques at £1.56bn.
- A Scottish Government report[11] estimated the potential Net Economic Value loss to Scotland of the introduction of *Gyrodactylus salaris* at £633 million with severe consequences for rural communities.
- A Forestry Research Report[12] 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

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

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

[11] www.scotland.gov.uk/resource/doc/1062/0042434.pdf

[12]http://www.forestresearch.gov.uk/pdf/Argyll_Bute_rhododendron_2008_costs.pdf/$FILE/Argyll_Bute_rhododendron_2008_costs.pdf

aquatic environment. This local plan and its implementation is also part of a strategic and coordinated approach to INNS management being undertaken across Scotland by RAFTS members.

3.2 Policy and Legislation

Given the high costs for the mitigation, control and eradication of INNS and fish diseases once they are established this plan emphasises the need for prevention and rapid response to the introduction of INNS **before** they become established. Furthermore, the host of pathways for entry and spread as well as the persistence of many of these 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 west Sutherland area. These approaches are consistent with, and support, the GB Invasive Non Native Species Framework Strategy[13] and the Species Action Framework[14] both of which have been approved by the Scottish Government.

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

- Section 14 of The Wildlife and Countryside Act (1981)[15] makes it an offence to allow any animal (including hybrids) which is not ordinarily resident in Great Britain, to escape or be released into the wild; or to release or to allow to escape from captivity, any animals that are 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 Town and Country Planning (Scotland) Act 1997[16] 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[17] regulates the use of pesticides and herbicides for the control and eradication of INNS.

[13] www.nonnativespecies.org
[14] www.sng.org.uk/speciesactionframework
[15] www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1981/cukpga_19810069_en_1
[16] www.opsi.gov.uk/acts/acts1997/ukpga_19970008_en_1

- Environmental Protection Act 1990[18] 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[19] 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[20] and the Environmental Protection (Duty of Care) Regulations 1991[21] provide guidance for the handling and transfer of controlled waste.

- The Aquaculture & Fisheries (Scotland) Act 2007[22] regulates against the unauthorised introduction of fish to inland waters.

- The Prohibition of Keeping or Release of Live Fish (Specified Species) Order 2003[23] requires that a licence be obtained for the keeping or release of species listed on Schedules 1 and 2.

- The NetRegs[24] website contains useful guidance on INNS and their control

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

3.3 Existing Planning Framework

This Biosecurity Plan links Government policy, legislation and strategic action with local actions, and reflects the provisions and requirements of the following existing plans (see also Table 1):

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[17] www.opsi.gov.uk/legislation/scotland/ssi2005/20050066.htm
[18] www.opsi.gov.uk/acts/acts1990/ukpga_19900043_en_1
[19] http://www.opsi.gov.uk/si/si1994/uksi_19941056_en_1.htm
[20] www.opsi.gov.uk/si/si1991/Uksi_19911624_en_1.htm
[21] www.opsi.gov.uk/si/si1991/uksi_19912839_en_1.htm
[22] http://www.opsi.gov.uk/legislation/scotland/acts2007/asp_20070012_en_1
[23] http://www.scotland.gov.uk/resource/doc/47133/0009766.pdf
[24] http://www.netregs.gov.uk/netregs/default.aspx

- The Fishery Management Plan for the area covered by the West Sutherland Fisheries Trust 2008-2013,
- The North Highland Area, West Highland Area and River Basin District Management Plans,
- Existing Local Biodiversity Action Plans.

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

Table 1 Identified Actions in the West Sutherland Biosecurity Plan (WSBP) supporting provisions or requirements of other relevant plans

Provision or Requirement of Existing Plan	Action in DFD Biosecurity Plan
Plan: Fishery Management Plan for the area covered by the West Sutherland Fisheries Trust[25] 2008-2013. **Provision/s**: Produce and implement a Biosecurity plan for the area.	This plan fulfils the requirement of the FMP to produce a biosecurity plan. Its key elements are to prevent introduction of new high impact INNS as well as the control and where possible eradication of existing populations.
Plan: ***Gyrodactylus salaris* (Gs) Contingency Plan**[26]**:** **Provision/s**: A strategy to rapidly contain and eradicate Gs if introduced to Scotland.	Formulates rapid response protocols for new INN species which pose significant threats to local biodiversity and economy
Plan: **Local Biodiversity Action Plan for Sutherland**[27] **Provision/s**: To undertake a speedy and effective response to the occurrence of unwanted invaders such as mink.	Develops a monitoring network to identify new species and rapid response strategies to effect their removal.
Plans supporting designated conservation areas (SACs and SSSIs). Scotland's Biodiversity: A strategy for the conservation and enhancement of biodiversity in Scotland[28].	Supports the conservation of biodiversity target species through the control and eradictaion of INNS detrimental to their ecology

[25] www.rafts.org.uk/projects/fisheriesmanagementplanning.asp
[26] www.scotland.gov.uk/Topics/Fisheries/Fish-Shellfish/18610/diseases/g-salaris/GsCGrev
[27] www.highlandbiodiversity.com
[28] www.scotland.gov.uk/Publications/2004/05/19366/37239

Provision or Requirement of Existing Plan	Action in DFD Biosecurity Plan
The RBMP for Scotland and the North Highland and West Highland Area Management Plans[29] **Provision:** • identification of appropriate actions to manage species that threaten high and good status sites, together with identification of potential sources of re-infestation in the surrounding area; • establishment of detection /surveillance /control strategies for problem species; • risk assessment of pathways for entry of problem species into the Scotland river basin district; • research and development to define species causing deterioration of good ecological status/ potential and to identify new methods of control; and • development of biosecurity plans to prevent movement of species between catchments and respond quickly to new infestations	RBMPs can help facilitate a coordinated and widespread response to biosecurity issues through the area advisory groups (AAGs) and the implementation of the area management plans by: • Raising awareness of biosecurity issues • Acting as a conduit for national initiatives into the local management sphere • Develop and encourage catchment-based approach to control and eradication • Ensure control methods do not impact on the water environment • Monitoring and reporting progress

4. Scope of the Plan

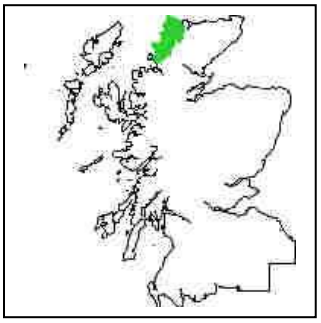
4.1 West Sutherland Fisheries Trust area

The West Sutherland Biosecurity Plan (WSBP) covers the management area of the North & West District Salmon Fishery Board (NWDSFB) within Sutherland. This area extends from the River Hope in the north to Achiltibuie in the south, taking in all river catchments flowing west within this region. This gives an area of approximately 1794 km^2, and contains the catchments for over 150 rivers of varying sizes. There are also innumerable freshwater lochs within this area.

The area has a typical highland landscape of glacially carved mountains, bordered by a heavily indented coastline, which is skirted by many small islands and rocks. The mountains range up to 927 m in height, including Ben Hope, Foinaven and Stac Pollaidh, and many have steep gradients from a low level. The coast is broken by the deep narrow lochs of Eriboll, Inchard, Laxford and Chàirn Bhàin, together with more gentle inlets and bays. The coastline comprises mainly of cliff, intersected by sizable sandy beaches including Canna Bean, Ballnakiel, Sandwood Bay, Oldshoremore, Clashnessie, Achmelvich and Garvie Bay, and estuaries including the sizeable Kyle of Durness.

[29] www.sepa.org.uk/water/river_basin_planning.aspx

On the land, Assynt and Eddrachillis alone contain over 1,000 fresh water lochs of a huge variety of depths, shapes and sizes, and this is repeated throughout west Sutherland. The remaining area is primarily mountainous heath bog intersected with numerous streams and rivers. Indeed, Sutherland and Caithness between them house the biggest treeless oceanic blanket bog in Europe, extending to some 2000 km^2.



Map 1 West Sutherland District

4.2 Summary of district land use

The major land uses within the area are rough grazing and deer stalking, with heather moor dominating the vegetation. There are approximately 2000 crofts in the area, and 1046 km^2 of common grazing. Small areas of conifer woodland exist, approximately 74200 hectares in total, and more recently there have been numerous native plantations established, comprising predominantly birch, hazel, oak and alder.

There are 4 main settlements in the area, Durness, Scourie, Lochinver and Achiltibuie, with numerous scattered dwellings in the remaining area. In 2001 there were 13778 people registered as resident in Sutherland, although only a small proportion of these live in the area covered by the WSFT. Much of the housing is now used as 'holiday lets' or second homes, for example within Scourie itself, just under a quarter of the housing stock is listed in this way (Scourie Wildlife Group 2006).

Other activities, including walking, golf, bird watching, canoeing and other riverside activities, rely in part upon the quality of the aquatic and riparian environments to enhance the visitor experience. A 2004 survey[30] of the economic impact of game and coarse angling in Scotland commissioned by the Scottish Government revealed that angling is extremely important to Scotland's economy, particularly in rural areas with anglers spending about £113M annually (see Table 2 for Highland information). When substitution effects are taken into account, this produces an estimated £100M of output in the Scottish economy, and supports around 2,800 full time job equivalents. In addition to fishery proprietors, many businesses, such as hotels, guest houses, restaurants and tackle shops are to a greater or lesser extent dependent upon angling for their continued trade.

Table 2 Angler expenditure table (£ 000s) for Highlands (Highland, Moray, Argyll and Bute)

Fishery	Value (£ 000s)
Salmon & sea trout	£35,408
Brown trout	£5,088
Rainbow trout	£1,752
Coarse fish	£715
Total	**£42,963**

4.3 Biosecurity: Current and potential threats

This section identifies 26 INNS and fish diseases for inclusion in the WS Biosecurity Plan of which 12 high priority species will be the main focus for action. The priority species were identified as those that:

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

4.3.1 Current biosecurity issues

Current biosecurity issues are associated with five INNS, two translocated native species and one fish parasite that are currently found in the west Sutherland area:

[30] http://www.scotland.gov.uk/Publications/2004/06/19506/38879

- Himalayan balsam *(Impatiens glandulifera)* is present in 2 known places, both within Assynt, at Clashnessie and Nedd. 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.

- Japanese knotweed *(Fallopia japonica)* is located in 22 known small satellite populations within the area, primarily within gardens. It does not appear to be spreading at present, although it can spread along rivers by movement of plant fragments by water and into 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.

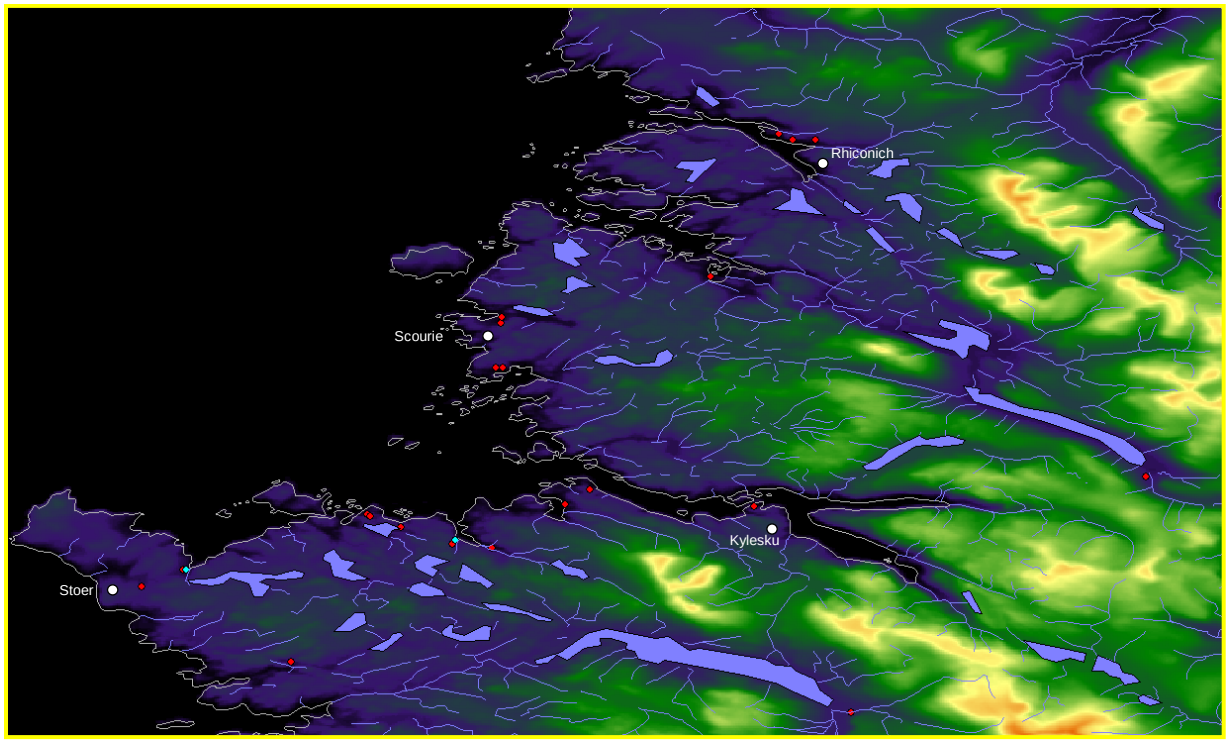
- Minnow *(Phoxinus phoxinus)* is a translocated species that has been introduced into the area and is now known to be resident in a large number of catchments. Minnows compete for food and territory with native species but they also provide another food resource for herons, sawbill ducks and other larger fish species.

- *Anasakis sp* is a nematode worm that causes Red Vent Syndrome (RVS). RVS has been found in salmon in over 50 Scottish rivers since June 2007. It can cause varying degrees of bleeding and swelling to salmon vents and may also affect humans who become infected from eating raw meat for example sushi.

- Canadian pondweed *(Elodea Canadensis)* is present in various locations throughout the area but is not seen as a significant threat at the present time. It has not currently been mapped within West Sutheralnd. 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.

- Rhododendron *(Rhododendron ponticum & hybrids)* is present in several locations throughout the area but is not a significant threat to rivers and does not appear to be showing significant spread. Most stands are fond around Lodges. 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.

- Rainbow trout (*Oncorhynchus mykiss*) have been stocked into the Lagg Fishery, near Drumbeg. There are also historical records of stocking. However, with the exception of Lagg there does not appear to be any rainbow trout currently within the area. Steelheads have, however, been caught in several rivers over the past 10 years. The source(s) of these fish are unknown.



Areas within West Sutherland that invasive species Japanese Knotweed (indicated by red dots) and Himalayan Balsam (indicated by cyan dots) have been identified (data courtesy of I. Evans).

4.3.2 Potential biosecurity issues

The invasive non native species listed below are not currently present within west Sutherland. They have been classified as High or Medium level threats depending on their likely impact on the local economy and biodiversity in combination with the likelihood of their introduction. The level of risk of introduction was based on the pathways for the introduction of INNS, their current geographic proximity and the uses within the west Sutherland area.

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 four High Threat level species that could be introduced into the west Sutherland area and they include one fish parasite and three freshwater invertebrates (Table 3).

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

SPECIES	RISK OF INTRODUCTION	LOCAL IMPACTS
Gyrodactylus salaris (Freshwater external parasite of salmon)	**High**- Through unintentional introduction from anglers, fish farmers and water sport enthusiasts through: ▪ Contaminated fish ▪ Clothing/equipment which has been in contact with infected water including canoes ▪ Ballast water	▪ 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)*	**Medium**- Through natural spread or intentional/ unintentional introduction from an existing population nearby.	▪ Burrows into river banks causing destabilisation ▪ Diet include small fish, fish ova and invertebrates
Zebra mussel (*Dreissena polymorpha)* 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 *(Eriocher sinensis)* 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 *Paragonimus ringer,* known to infect humans

There are also 14 Medium Threat level species of which there is a high risk of introduction for 3 species, a medium risk for five species and a low risk for six species (see Table 4 below).

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

SPECIES		RISK OF INTRODUCTION
Didemnum Tunicates / sea squirts *(Didemnum vexillum)*	**High**	Unintentional introduction from marine fishing boat hulls
Wireweed *(Sargassum muticum)*	**High**	Through unintentional introduction
American mink (*Mustela vison*)	**High**	Could migrate from neighbouring populations from the south and east
Ruddy duck *(Oxyura jamaicensis)*	**Medium**	Could migrate from a number of locations in eastern Scotland

SPECIES		RISK OF INTRODUCTION
Water primrose *(Ludwigia grandiflora)*	**Medium**	Unintentional introduction from boat hulls and ponds
Slipper limpet *(Crepidula fornicate)*	**Medium**	Through unintentional introduction
Ruffe *(Gymnocephalus cernuus)*	**Medium**	Currently recorded in central Scotland and could be introduced as live bait
Bullhead *(Cottus gobio)*	**Medium**	Translocated species recorded in central Scotland that could be introduced deliberately or as live bait
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 *(Cabomba caroliniana)*	**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 or as releases from aquaria
Curly waterweed (Lagarosiphon major)	**Low**	Currently found in a small number of locations throughout Scotland especially in the central belt area. Could be spread through disposal of garden waste, angling equipment and possibly water fowl

From Tables 3 and 4, the main pathways or means of introduction of both High and Medium Threat level species into the west Sutherland area are:

- Intentional introduction or planting
- Fouling and ballast water of marine vessels
- Escapes from garden ponds
- Contaminated water sports equipment (e.g. from anglers, canoeists)
- Movement of contaminated soils or vehicles
- Improper control and disposal measures e.g. cutting and dumping without treatment.

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

4.3.3 Fish Health and Genetic Issues

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

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

Parasites & diseases

Restrictions on the import into the UK of live fish have played a major part in preventing the introduction and spread of serious fish diseases. Health conditions of aquaculture animals are today governed by the Fish Health Regulations 1997 legislation that have three categories of Notifiable [31]Diseases in Fish depending on their potential impact on the Scottish aquaculture industry and wild fish stocks.

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

Infectious Salmon Anaemia (ISA)

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

Viral Haemorrhagic Septicaemia (VHS)

Infectious Haematopoetic Necrosis (IHN)

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

Infectious Pancreatic Necrosis (IPN)

Bacterial Kidney Disease (BKD)

Furunculosis

Spring Viraemia of Carp (SVC)

Gyrodactylus salaris (Gs)

Enteric Redmouth Disease (ERM)

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

Non-native genotypes

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

[31]http://www.marlab.ac.uk/Delivery/Information_resources/information_resources_view_document.aspx?resourceId=23697&documentId=1922

produce offspring that have reduced survival and lower reproductive success[32]. Preventing release of non-native genotypes likely to interact with wild populations is essential to avoid biosecurity issues and short and long term biological (genetic) and ecological (competition) impacts on wild fish populations.

4.4 Stakeholders

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 fishery management issues:

Policy & legislation

- Scottish Government, *Edinburgh*
- Scottish Natural Heritage, *Golspie; Ullapool*
- Scottish Environment Protection Agency, *Dingwall; Thurso*
- Marine Scotland

Land resources

- Crofters Union
- Landowners Association

Water resources

- North Highland and West Highland Area Advisory Groups (River Basin Plans)
- Scottish Water

Fisheries

- West Sutherland Fisheries Trust
- The North & West District Salmon Fishery Board

Aquaculture

- Tripartite Working Group
- Scottish Salmon Producers' Organisation
- Loch Duart Ltd
- Scottish Sea Farms

Conservation & biodiversity

- Scottish Wildlife Trust
- Royal Society for the Protection of Birds
- Sutherland Local Biodiversity Partnership

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

Table 5 Pathways and stakeholder groups in the West Sutherland area

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	SEPA, UK Government, 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	N&WDSFB, canoe and water sports organisations, anglers, angling associations and fishing agents.
Escapes from fish farms, ponds, gardens, and desmesnes.	Marine Scotland, SEPA, Planning Authorities, Plantlife, riparian owners, members of the public, Aquaculture Companies
Movement of contaminated soils or vehicles	Local Councils, SEPA, quarries, building contractors
Improper control and disposal measures e.g. cutting and dumping without treatment	Local councils, SEPA, environmental health, Plantlife, riparian owners, members of the public

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

4.5 Existing INNS control activities

There are a limited number of control activities concerning INNS within the area. The Reay Forest Estate have been active in the attempted control of Japanese Knotweed at Kinloch (Grid Ref. 234700 934700) and Bad na Baighe (Grid Ref 222100 946700) through spraying with pesticides. Rhodedron management is also undertaken sporadically within the Hope and Laxford catchments, primarily along roads. This work is undertaken and funded by the appropriate Estates.

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

Gyrodactylus salaris

Since 2005 the WSFT and the NWDSFB have undertaken a publicity campaign to prevent the introduction and spread of the parasite *Gyrodactyus salaris*. This took the form of talks to local businesses and groups and the use of publicity articles. Information and warning signs have also been installed at access points to rivers and disinfection materials distributed to local Hotels and Estates.

Highland Invasive Species Forum
Formed in June 2008 its aims are to:

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

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

5. Biosecurity management strategy

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

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

5.1 Objectives and outputs of West Sutherland Biosecurity Plan

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

Objective 1: Prevent the introduction and spread of INN species within the West Sutherland area.

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 our health and the way we live
- We require the support of stakeholders to increase awareness and better understanding of INNS issues and impacts
- Invasive Non Native Species:
    - Threaten our native plants, animals and habitats
    - Cost the British economy between £2 and £6 billion pounds each year
    - Can threaten our health

The local priorities for awareness will focus on disrupting the pathways for the introduction and spread of INNS in the West Sutherland area. The key stakeholders, the identified areas of priority and the proposed mechanisms for delivery are presented in Table 6 below. The roles and actions of key government agencies and non government bodies in promoting awareness of INNS issues is presented in Table 7.

Table 6 Priority areas for awareness and delivery mechanisms according to stakeholder group

Stakeholder Group	Priority Area	Mechanism of Delivery
Aquaculture (SSPO, TWG) and local fish farm companies	- 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	- WSFT to work with local industry and trade associations to advise members regularly of best practice in respect of INNS -Participation in the Area Management Agreement process and the requirements to follow the Industry Code of Good Practice with respect to INNS, e.g. escapes and sourcing of stock - Enforcement agencies (FHI & NWDSFB) to undertake site visits to discuss and advise on issues involving INNS - Incorporation of INNS codes of good practice into SSPO industry codes of practice -Invasive Species Scotland[33] website
Port Authorities	- Avoid pumping out of non sterilised ballast water in harbour - Role of hull fouling in the introduction and spread of INNS	-Promote implementation of code of practice requiring non-sterilised ballast water to be discharged away from harbour -WSFT to assist with the supply of posters and other awareness material for display and signage. -Invasive Species Scotland website

[33] www.invasivespeciesscotland.org.uk

Stakeholder Group	Priority Area	Mechanism of Delivery
Water User associations (canoeists, sailing clubs)	-Promote awareness to clubs and participants of the dangers arising from INNS	-WSFT to work with associations to promote disinfection of equipment and provide appropriate facilities to eliminate the risk of accidental transfer of INNS -FACT campaign and web site -Invasive Species Scotland website
Landowners	- Promote knowledge of biosecurity issues amongst all tenants and resource users - Identification of suitable persons to act as "eyes" for the WSFT	-Work with WSFT to ensure dissemination of best practices and appropriate signage to reduce threats from INNS -WSFT to offer training for "eyes" -Invasive Species Scotland website
Angling clubs	- Promote knowledge of biosecurity issues amongst all members and visiting anglers - Promote the distribution of information and erection of signage in recognised car parks -Recommend suitable members to act as "eyes"	-Work with WSFT to ensure dissemination of best practices and appropriate signage to reduce threats from INNS -WSFT to offer training for "eyes" -Invasive Species Scotland website
General Public	-General awareness of impacts and measures to prevent/control INNS -Promote the Biosecurity Plan to all relevant parties e.g. hotels and Bed & Breakfasts	-Local Media Campaigns -Use of websites (RAFTS, NNSS; Sutherland Partnership) -WSFT to develop a leaflet to promote the Biosecurity plan, the dangers arising form INNS and the reporting system -Invasive Species Scotland website
Schools	- General awareness of impacts and measures to prevent/control INNS	-School visits -Field trips -Invasive Species Scotland website

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
WSFT	- Promote awareness to general water users promoting the Biosecurity Plan and highlighting the dangers from INNS	- Promote and launch of Biosecurity Plan to coincide with National Biosecurity Action Day -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 WSFT above
NWDSFB	-Continue to promote awareness to anglers and angling clubs of the dangers arising from INNS.	-Continue to promote disinfection of equipment and provide appropriate facilities

Organisation	Role and/or action	Delivery Mechanisms
Highland Council	- Promote use of codes of best practice for construction, haulage, horticulture and aquaculture amongst local business and relevant departments particularly construction, garden and pet trade - Promote awareness of planning, waste disposal and transport regulations amongst local business - Promote awareness of the GB communications strategy to the general public	- Councils to promote codes of best practice at every opportunity e.g. including them with planning applications and building warrants - Production (by Council's legal department) and distribution of information leaflets on all relevant legislation relevant to INNS -Holding of awareness event/open days to promote biosecurity issues -Distribute leaflets with council tax bills - Display posters (produced by RAFTS) in council offices, libraries and other public places
SEPA	- Clarify SEPA responsibilities for INNS to both staff and customers - Incorporate INNS issues into relevant guidance documents (as they are developed or updated)	- Page on website with links to relevant SEPA information and other sites e.g. Non-Native Species Secretariat, RAFTS, Scottish Canoe Association. - Digital documents available for download on SEPA Website
SNH	-National: Promotion of good practice in the prevention, control and eradication of INNS -Local: Implementation of good practice measures for local contractors and promotion of the Biosecurity Plan.	- Holding of SNH Sharing Good Practice events. - SNH will continue to support and advise the WSFT - Grant funding may be available for some projects.
Marine Scotland	-Fish Health Inspectorate part of Marine Scotland is lead body with respect to fish diseases and escapes	- Undertake site visits to discuss and advise on issues involving INNS - Promote disinfection of equipment and provide appropriate facilities to eliminate the risk of accidental transfer of INNS

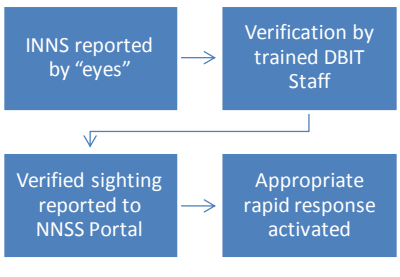
The delivery mechanisms form the basis for the actions required to promote awareness amongst the key stakeholders of the West Sutherland area. These are presented in Section 5.2 along with the responsible agency and a timeframe for their implementation.

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 INN species in area.

The "eyes" of the early warning system (Box 1) will be trained members of the public, bailiffs, ghillies, canoeists and walkers with reported sightings verified by trained WSFT personnel. A sighting of a GB or local high priority species (Table 9) will be verified within 48 hours. If confirmed, it will initiate the appropriate GB or local high priority response (see Output 2.2 below). Reports of priority species will be verified as time

Box 1. Early warning system



permits. All verified sightings will also be entered onto the WSFT Geographic Information System to monitor INNS distributions within the West Sutherland area. Actions to establish the early warning system are described in Section 5.2.

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

The WSFT will work with Scottish Fisheries Coordination Centre, SEPA and SNH 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 using GIS. A standardised SFCC recording sheet and data storage protocol would ensure compatibility with existing SFCC habitat data. Manuals on methodologies will be produced and staff trained to ensure that high quality data is collected, stored and shared between agencies.

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 (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
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	Slipper limpet	Giant hogweed
Water primrose	Zebra mussel	Rhododendron
	Australian swamp stonecrop	Rainbow trout
		Minnow
		Red vent syndrome (RVS)
		Orfe
		Nuttal's pondweed
		Water fern
		Common cord grass
		Fanwort
		Large flowered waterweed
		Floating pennywort
		Parrot's feather
		Curly 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 with this work being taken forward by the Scottish Working Group on Invasive Non-Native Species. Once agreed, this will be circulated to all interests.

A confirmed sighting of a GB priority species will trigger the GB contingency plan for that species e.g. *Gyrodactylus salaris*. However, there is still a need for local level protocols to link with the GB response as well as for local level contingency plans for local priority species. The elements to be included in the response to detection of a GB priority species or the contingency plans for local priority species are outlined in Table 9. The actions required to establish and maintain the RRM are presented in Section 5.2

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

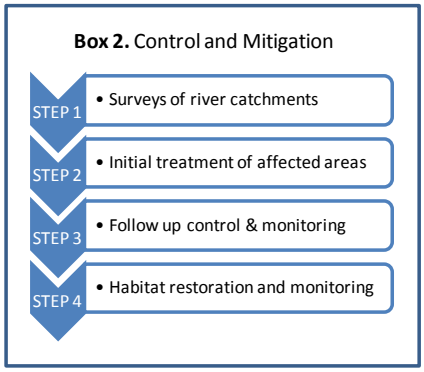
GB Response	Local High Priority Response	Local Priority Response
-Report to local and GB institutions -Determine the extent of infestation -Isolation of area where practicable	- Report to local and GB institutions - Determine the extent of infestation - Isolation of area where practicable - Establish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

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

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

Surveys have largely identified INNS distributions within the west Sutherland area. Survey information has been entered onto GIS and analysed to target upstream extent of 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 specialist contractors, volunteers and WSFT 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

West Sutherland catchments are presented in Table 10. The actions required to establish the proposed control/eradication programme are presented in Section 5.2.



Most of the clearance and spraying works can be carried out by volunteers and Estate staff. Estate staff are already trained chainsaw operators and can carry out felling works supported by volunteer labour for dragging and burning of rhododendron.

WSFT staff should be trained in spraying techniques and equipped so that they can assist with spraying of rhododendron regrowth, Japanese knotweed and giant hogweed. This capacity building is important so that after main eradication works are completed annual monitoring by WSFT staff can be linked to further treatment as required.

Table 10 Phase 1 of Invasive Non Native Species Control and Eradication in the West Sutherland area

SPECIES	ACTION	TREATMENT/POST TREATMENT ACTIONS
Japanese knotweed (JK)	Control/Eradication Identify and close pathways.	-Leaf spraying with Glyphosate by WSFT/Estate staff for existing populations with follow up of stem injection treatment to maintain control if required. -Spraying to take place spring and autumn over a 5 year period on the rivers identified patches. -buffer strips identified cleared and maintained where road and rail pathways for re-infection intersect with watercourses. -Requirements for riparian zone habitat restoration assessed and implemented
Himalayan balsam (HB)	Control/Eradication Identify pathways and close	-Hand pull. -Set up 5 year programme with volunteers. -Monitor catchment for activation of dormant sources of infestation -Habitat restoration if required
Giant hogweed (GH)	Prevention	-Maintain vigilance of 'eyes' to the presence of this species. -Establish a containment policy in the event of entry into the area
American mink	Prevention	-Maintain vigilance of 'eyes' to the presence of this species. -Establish a containment policy in the event of entry into the area
Rhododenron (R)	Control / Eradication	-Maintain vigilance of existing populations to prevent spread
Canadian pond weed	Monitor distribution	
Minnow	Restrict to present distribution	

SPECIES	ACTION	TREATMENT/POST TREATMENT ACTIONS
Red vent syndrome	Monitor	-Joint monitoring project with Marine Scotland to begin in 2009.

Output 3.2 Coordinate activities with Highland Invasive Species Forum and SEPA AAG to ensure sufficient funding and resources in place to continue prevention and control of INNS within the WSFT area

The delivery of the aims of this plan would be assisted by the coordination of activities with the existing Highland Invasive Species Forum and SEPA Area Advisory Group relating to INNS in the West Sutherland area. Interaction with both of these bodies by WSFT / DSFB will help with coordination planning and resourcing of actions.

5.2 Actions and Timeframes

The table below presents the actions required to realise the objectives and outputs described in Section 5.1 along with the lead agency, key partners and timeframe required for their implementation.

Action	Lead	Partners	TIMEFRAME								
			2010	2010	2011	2011	2012	2013	2014	2015	2016
Objective 1: Prevent the introduction and spread of INN species within the West Sutherland area.											
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											
Launch of West Sutherland Biosecurity plan through national and local press release	West Sutherland Fisheries Trust			—							
Produce leaflet on legislation including waste management & planning regulations	Highland Council	AAG		—	—						
Produce leaflet(s) on priority biosecurity issues and the reporting system	WSFT /RAFTS	AAG, SNH		—							

Action	Lead	Partners	TIMEFRAME								
			2010	2010	2011	2011	2012	2013	2014	2015	2016
Produce posters on biosecurity issues and distribute to the general public	RAFTS	WSFT AAG members Highland Council		.....	.....	.....	.....	.....	.....	.....	.....
Continue to promote and install disinfection facilities for anglers at all angling proprietors fishing huts/parking points	North & West District Salmon Fishery Board		.....	.....	.....	.....	.....	.....	.....	.....	.....
Develop interim code of practice with Harbour Authority	Port Authorities	WSFT		———	———						
Distribute Codes and posters to relevant retail outlets and clubs at open days and events such as agricultural shows	HISF	WSFT AAG members			.....	.....	.....	.....	.....	.....	.....
Engage with Landowners and angling clubs to promote awareness of measures to tenants, resource – users, members and visitors	N&WDSFB/WSFT	SEPA, SNH		———	———						
Work with environmental groups and local schools to enhance awareness of INNS	Sutherland LBAP group	N&WDSFB/WSFT Highland Council Ranger Service			.....	.....	.....	.....	.....	.....	.....
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 INN species in area.											
Train WSFT personnel in the identification of INNS	WSFT /RAFTS	**SEPA**		———	———						
Train WSFT as trainers	WSFT /RAFTS			———							
Work with user and interest groups to identify "reporting network"	WSFT	Highland Council AAG SEPA		———	———						

Action	Lead	Partners	TIMEFRAME								
			2010	2010	2011	2011	2012	2013	2014	2015	2016
Training of "reporting network"	WSFT	RAFTS LBAP		—	—		—	—	—	—	—
Establish, test and refine communication mechanisms within 'early warning' system	WSFT Highland Council	RAFTS, SEPA (National)		—	—						
Produce database to record and manage INNS sightings	RAFTS			—							
Monitor and periodically evaluate efficacy of system	WSFT & other partners			·····	·····	·····	·····	·····	·····	·····	·····
Output 2.2 – Develop strategic monitoring of INN species in area.											
Develop and agree protocols	SFCC	SEPA/SNH	—	—							
Produce database to manage INNS survey data	SFCC	SEPA SNH		—							
Training of Trust and other agency staff in monitoring methods	WSFT	SFCC/RAFTS SEPA Highland Council		·····	·····	·····	·····	·····	·····	·····	·····
Develop monitoring manual	SFCC	RAFTS, SFCC, SEPA (National)		—	—						
Output 2.3 – Rapid response mechanism established for new INN species which pose significant threats to local biodiversity and economy.											
Formulate contingency plans for key species	RAFTS WSFT	Highland Council, SEPA and SNH,		—	—						
Identification of personnel for response teams	WSFT,	Highland Council, SEPA and SNH,		—							
Training of personnel to execute contingency plans	WSFT,	Highland Council, SEPA and SNH		—	—						
Identification of funding resources	WSFT	Highland Council, SEPA and SNH, RAFTS		·····	·····	·····	·····	·····	·····	·····	·····
Refresher training	WSFT						—	—	—	—	—
Monitor populations/treated areas	WSFT	SNH, SEPA		·····	·····	·····	·····	·····	·····	·····	·····
Objective 3: Develop coordinated control and eradication programmes for INN species											

Action	Lead	Partners	TIMEFRAME 2010	2010	2011	2011	2012	2013	2014	2015	2016
Output 3.1 – Coordinated control, eradication and habitat restoration programmes established and operational											
Initiate catchment wide surveys by trained personnel	WSFT	SFCC		—	—	—	—	—			
Develop GIS database for recording and mapping INNS within West Sutherland area	WSFT	SFCC, RAFTS, SEPA		—							
Implementation of phase 1 of control/ eradication programme see table 10 for details of proposed works	WSFT	Estates SEPA[34]		- -	- -	- -	- -	- -	- -	- -	- -
Implement habitat restoration scheme within successful control areas taking into account all relevant species	WSFT	Highland Council, SEPA[35]			- -	- -	- -	- -	- -	- -	- -
Monitor the effectiveness of control programmes	WSFT	SEPA		- -	- -	- -	- -	- -	- -	- -	- -
Marine Scotland monitoring Red vent syndrome	Marine Scotland			—	—	—	—	—	—	—	—
Output 3.2 *Coordinate activities of Highland Invasive Species Forum and SEPA AAG to ensure sufficient funding and resources in place to continue prevention and control of INNS within the WSFT area*											
Complete draft Biosecurity plan	WSFT		—								
Consultation with all stakeholders to agree Biosecurity plan	WSFT	AAG members	—								
Represent West Sutherland INNS issues at Highland Invasive Species Forum and SEPA AAG	WSFT	Highland Invasive Species Forum SEPA AAG		—	—	—	—	—	—	—	—

[34] May be eligible for funding from the Restoration Fund
[35] May be eligible for funding from the Restoration Fund

Action	Lead	Partners	TIMEFRAME								
			2010	2010	2011	2011	2012	2013	2014	2015	2016
Identify and develop opportunities for future funding of eradication projects	WSLFT	Highland Invasive Species Forum SEPA AAG FC SNH									

6 Monitoring

Biosecurity is being initiated within the West Sutherland area by the WSFT. It must be recognised that if current resources are not increased that progress will be limited. However, despite limitations, any work completed by the WSFT will be monitored and the results evaluated particularly in the light of changing circumstances e.g. climate change. In this respect, the WSFT will endeavor to evaluate its work and strategy on a 5-year basis.

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

- Assessment of efficacy of surveillance and rapid response systems
- Occurrence and distribution of the selected INNS within the area
- Effectiveness of control/eradication programme including:
    - Application/delivery of effective concentrations of biocides
    - Checking that treatments have been effective
    - Re-treating immediately where there is doubt
    - Monitoring any apparent resistance to treatments and investigate
    - Surveying the area for signs of dormant plants becoming activated
- Assessment of the ability to close established pathways of transmission
- Monitoring the effectiveness of all legislation and codes of practice especially those which are aimed at restricting/closing pathways
- Monitoring general activities within the district and assessing them in terms of risk for the introduction of INNS.

A monitoring programme will be developed based on the agreed objectives and outputs of this plan. Monitoring activities will be undertaken by WSFT 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.