RAPID

Reducing and Preventing
Invasive Alien Species Dispersal

REGIONAL INVASIVE SPECIES MANAGEMENT PLAN (RIMP): NORTH REGION

Animal & Plant Health Agency

NATURAL ENGLAND

Bristol Zoological Society

Life

NATURA 2000

Cumbria Freshwater Invasive Non-Native Species Initiative

SCRT South Cumbria Rivers Trust

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Introduction

The RAPID LIFE Project

Globally, invasive alien species (IAS) are one of the most significant causes of biodiversity loss, second only to habitat destruction (Convention for Biological Diversity)

RAPID (Reducing And Preventing IAS Dispersal) LIFE is a three-year EU funded project working to protect freshwater aquatic, riparian and coastal biodiversity by embedding a coordinated, strategic and evidence-based approach to managing IAS across England. In doing so, this project seeks to bridge the gap between high-level strategies and action on the ground at a local level.

Please note that "IAS" is the European term for invasive species, but as "INNS" (invasive non-native species) is the most commonly used term in the UK (and is synonymous with IAS), this term will be used for the most part throughout the rest of this document.

The RIMPs

The RAPID LIFE project splits England into five regions (Figure 1). An integral component of RAPID is the development of Regional IAS Management plans (RIMPs). Using a template and guidance developed by national IAS experts, local experts will produce RIMPs for each of five regions in England. These plans aim to deliver consistent, but regionally relevant, information and advice for prevention, early warning, rapid response, eradication and control of IAS.

Each RIMP focuses on three key elements for invasive species management: 1) building partnerships and collaborations; 2) education and awareness raising; and 3) control and management. Each RIMP works to identify regional and local potential pathways and 'hotpots' for IAS introductions, assisting local stakeholder groups to identify priority

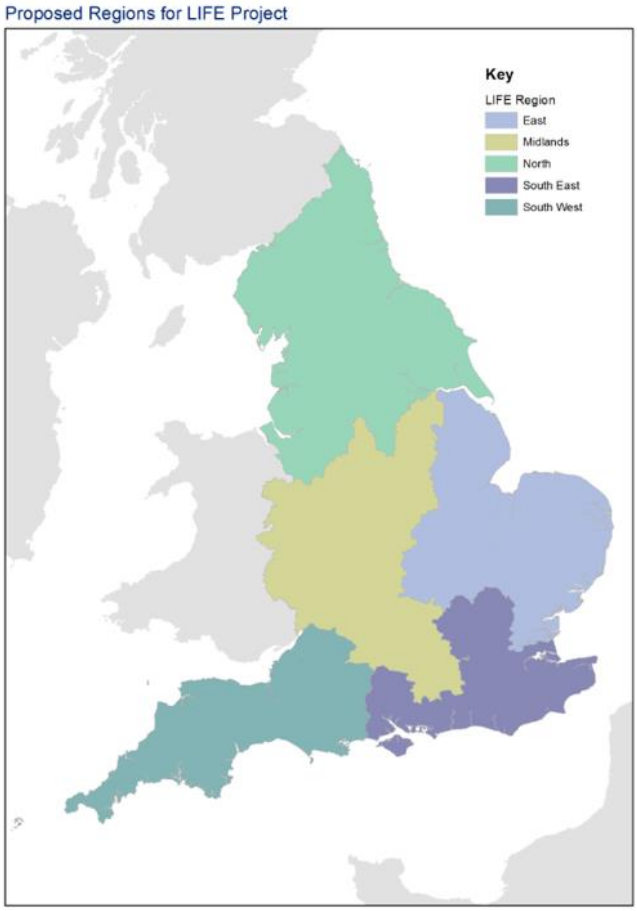


Figure. 1 For the purposes of the RAPID LIFE Project, England has been split into five regions.

areas for awareness-raising and modes of delivering educational messages.

INNS will be allocated to a priority category for management based on their risk and relative occurrence in each region.

The Northern RIMP.

This Invasive Alien Species Management Plan addresses freshwater, riparian and coastal invasive species across the Northern region.

It is for use by all stakeholders in the region and to be used as a guidance document. It is a living document and aims to equip stakeholders with the information they may need to make informed decisions on prioritising future works and funding.

This RIMP aims to address issues associated with INNS within the region and presents strategic actions. It reflects the current work, aspirations and strategic priorities of stakeholders throughout the region.

The RIMP has a focus of working with others, building upon and strengthening partnerships with a wide range of groups.

The development of this RIMP has been inclusive and has involved a range of stakeholders. A draft version has been shared with APHA and wider stakeholders within the region and has been amended considering feedback.

It was initially intended to hold two workshops (one for coastal stakeholders, the other for freshwater and riparian). However, due to the time of year and timescales, consultations took place through one-to-one discussions, meetings and interviews.

During the consultations, it became apparent that local priorities and requirements for information differed from that suggested by the RIMP Guidance/ Template. It was decided that in this case it would be less useful to list all the protected sites[1] in the region as these are available online.

This RIMP is intended to help stakeholders to work more efficiently together, to make informed decisions as to where for concentrate efforts, time and funding and to identify key actions to reduce the impact and spread of INNS in the region.

It is to bridge the gap between high-level strategies such as the GB Invasive Non-native Species Strategy and action on the ground at a local level.

[1] Magic Map Application. Designations-Land based designations-Statutory-identify.

It has an adaptive lifespan and implementation will rely on the formation of strong local and regional partnerships.

Northern Region

Figure 2. North of England RAPID LIFE region, which includes the following counties; Cumbria, Northumberland, Durham, North Yorkshire, East Yorkshire, South Yorkshire, West Yorkshire, Greater Manchester, Cheshire, Merseyside and Lancashire.

1. Stakeholders

Invasive Non-Native Species (INNS) readily cross geographic and ownership boundaries. Developing and maintaining cooperative relationships between different stakeholder groups is integral to the management of INNS.

An extensive list of stakeholders throughout the region known to be working on or concerned with INNS were contacted and were invited to input into the development of this Plan.

Table 1 lists national stakeholders.

For the purposes of this Plan, the North region has been divided into 28 areas (or sub-regions) using the Environment Agency Management Areas and Catchment Based Approach (CaBA)[2] regions. These can be seen in Figure 2 and Table 2. Those organisations consulted during the development of this RIMP are in italics.

The coastal areas have been divided into East and West.

There are also a range of projects (listed in Table 2) that are associated with the above stakeholders that specifically focus on INNS. Some of these cover multiple catchment management areas, some are specific to catchments. Many of the above organisations 'work' on INNS in some shape or form. Works vary from controlling widespread INNS to rising awareness of biosecurity.

2 https://www.catchmentbasedapproach.org/catchment

Table 1. National stakeholders**.**

Stakeholder Group	Stakeholder
Government and Agency	Department for Environment, Food and Rural Affairs
	Animal and Plant Health Agency
	GB Non-native Species Secretariat
	Environment Agency
	Natural England
	Centre for Environment, Fisheries and Aquaculture Science
	Marine Management Organisation
	British Waterways Board
	Highways England
	Ministry and Defence
	Harbour Authorities
	HM Coastguard
	Inshore Fisheries and Conservation Authority (IFCA)
	Marine Management Organisation (MMO)
	Ministry of Defence (Royal Navy and Royal Marines)
Local Authority	County Councils, District Councils, National Park Authorities,
Non-Governmental Organisations	The Wildlife Trusts
	Royal Society for the Protection of Birds (RSPB)
	The Rivers Trusts
	The Canal and Rivers Trust
	Angling Trust
	National Trust
	Universities
	Biodiversity Data Centres
	Marine Conservation Society
	Coastal Forum
	Areas of Outstanding Natural Beauty (AONBS)
	County Recorders Groups
	Freshwater Biological Association
	Mammal Society
	Plant Life
Recreational	Royal Yacht Association
	Local yachting / boating clubs
	British Canoeing
	Local canoe clubs
	Local Angling clubs and associations
	Moorings Associations
	Recreational Sea Anglers UK
Voluntary / Citizen science	Local Action Groups (LAGS)
	Capturing Our Coast

	Amphibian and reptile groups
	British Sub Aqua Club
	RiverFly Partnership
Industry	Utility Companies
	Farming community
	Fishing industry
	Power stations
	Local Businesses
	Association of British Ports
	Harbours
	Marinas
	Boat hire companies
	Developers
	Construction companies
	Consultancy
	Inshore Fisheries and Conservation Authorities (IFCA)
	Hydropower
	Food, Paper, Chemical industries
	Network Rail
Other	Catchment Partnership Hosts
	Cumbria Freshwater Invasive Non-Native Species (CFINNS) Initiative
	Lancashire Invasive Species Project (Ribble Rivers Trust)
	Bollin Environmental Action and Conservation group (BEACON)
	Yorkshire Invasive Species Forum
	Yorkshire Dales Biosecurity and INNS Working Group
	Tees Rivers Trust Invasive Non-Native Species project
	North-West Wildlife Trust's Irish Sea MARINE Advocacy Programme
	Capturing our Coast
	Landowners
	Schools
	Universities
	Museums

Figure 3. Map of Environment Agency Catchment Management Areas in the region.

A list has been put together during the consultation of the RIMP of stakeholders within catchment management areas, as well as coastal areas. This is by no means an exhaustive list, but it gives an indication of the many organisations and existing partnerships in the region.

The Catchment Based Approach (CaBA)[3] embeds collaborative working at a river catchment scale to deliver cross-cutting improvements to freshwater and coastal environments. CaBA Partnerships[4] are already engaging lots of stakeholders who should be engaged in any future INNS work.

*Catchment Partnership Hosts
Italics – consulted as part of the development of this RIMP.

Table 2. Key local stakeholders in the North Region.

Catchment Management Area	Stakeholders	
Aire and Calder	*University of Leeds*	The Calder and Colne Rivers Trust
	Environment Agency	Leeds City Council
	Forest of Bradford	Aire Action Leeds
	Leeds City Council	Bradford Council
	Aire Rivers Trust*	Calder & Colne Rivers Trust*
	Open Source Arts	Calderdale Council
	River Stewardship Company	*Canals & Rivers Trust*
	Craven Council	Natural England
	Groundwork Trust	Trust for Conservation Volunteers
	Kirklees Council	Wakefield Council
	RSPB	West Yorkshire Ecology
	Yorkshire Water	*Yorkshire Wildlife Trust*
Derwent Humber	*Yorkshire Wildlife Trust**	Bubnell Fly Fishing Club
	*Yorkshire Rivers Trust**	Bullbridge and Sawmills Area Civic Society
	North York Moors NPA	Campaign for the Farmed Environment
	Advyce (Transition Belper)	*Canal and Rivers Trust*
	Amber Valley Borough Council	Chatsworth Estate
	Amber Valley Ramblers	Cromford Fly Fishers
	Amber Valley Ramblers	DEB
	Banks Group	Denby Pottert
	Blackwell Parish Council	Derbyshire Wildlife Trust
	British Canoeing	Derwent Fly Fishing Club
	British Geological Survey	DerwentWISE

[3] https://www.catchmentbasedapproach.org/
[4] https://www.catchmentbasedapproach.org/catchment

	Earl of Harrington's Angling Club	Duffield Parish Council
	Ecclesbourne Fly Fishing Club	Ecclesbourne Valley Railway
	Derby and Saniacre Canal Trust	*Environment Agency*
	Derby City Council	*Forestry Commission*
	Derby Railway Angling Club	Friends of Ecclesbourne Way
	Derbyshire County Angling Club	Friends of Markeaton Brook
	Derbyshire County Council	Friends of Ripley Greenway
	Derbyshire Dales District Council	Hanson
	Derbyshire Dales Ramblers	Keep Britain Tidy
	Hilcote Environmental Leisure Project	Lowland Derbyshire Biodiversity Partnership
	Lafarge Tarmac	Matlock Angling Club
	Matlock Canoe Club	*Natural England*
	Moors for the Future	Old Waltonians Fly Fishing Club
	National Farmers' Union	Trent Rivers Trust
	National Trust	Turnditch Orchard Project
	Peak District National Park Authority	University of Derby
	Peak Paddlers	*Wild Trout Trust*
	Royal Society for the Protection of Birds	Wilkworth Town Centre
	Severn Trent Water PLC	Trent and Peak Archaeology
	The Grayling Society	*St Nicks Environment Centre*
Don and Rother	Don Catchment Rivers Trust*	Internal Drainage Boards
	Sheffield Wildlife Trust	*Environment Agency**
	Rotherham MBC	Don Consultative
	Yorkshire Wildlife Trust	Canal & River Trust
	Don Gorge Community Group	Doncaster MBC
	Don Catchment Rivers Trust	*Yorkshire Water*
	SY Forest Partnership	*Natural England*
	Tata Steel	Sheffield Area Geology Trust
	Wild Trout Trust	Sheffield & Rotherham Wildlife Trust
	Sheffield City Council	*Forestry Commission*
	Walkers are Welcome	Steel Valley Partnership
	Penny Anderson Associates	Barnsley MBC
	River Stewardship Company	Upper Don Walk Trust
	Moors For the Future	East Peak Innovation Partnership Penistone
	Barnsley Biodiversity Trust	Moss Valley Community Group
	Chesterfield Canal Trust	*National Trust*
	Derbyshire Wildlife Trust	SPRITE (Sheffield Partnership for Rivers in Town Environments)
	British Canoe	Manvers Waterfront Boat Club
	RSPB and Dearne Valley Green Heart NIA	Denby Dale Parish Council
Esk and Coast	Esk and Coastal Streams Catchment Partnership	Catchment Sensitive Farming

	Yorkshire Wildlife Trust	*Yorkshire Water*
	Environment Agency	Durham University
	*North York Moors National Park Authority**	Yorkshire Esk Rivers Trust*
Hull and East Riding	Hull and East Riding Catchment Partnership	Beverley and North Holderness Internal Drainage Board
	East and North Yorkshire Waterways Partnership	East Riding of Yorkshire Council
	Environment Agency	Hull City Council
	Natural England	Ouse and Humber Drainage Board
	South Holderness Internal Drainage Board	*Yorkshire Water*
	East Yorkshire Rivers Trust*	*Yorkshire Wildlife Trust**
Ribble	*Ribble Rivers Trust**	NFU
	Tennant Farmers' Association	Ribble Fisheries Consultative Association
	Hodder Consultative (fisheries),	Calder Consultative (fisheries)
	RSPB	*Woodland Trust*
	Lancashire Wildlife Trust	*Natural England*
	Catchment Sensitive Farming	*Yorkshire Dales National Park*
	Yorkshire Dales Millennium Trust	*Forestry Commission*
	Forest of Bowland AONB	*Environment Agency*
	Lancashire County Council	Yorkshire Country Council
	Borough Councils	*British Canoe*
	The Ramblers Association	*United Utilities*
	Myerscough College	
Wharf and Lower Ouse	Addingham environment group	*Environment Agency*
	Forestry Commission	*Yorkshire Dales National Park*
	Nidderdale AONB	Salmon and Trout Association
	Campaign for the Farmed Environment	*National Trust*
	*Yorkshire Dales Rivers Trust**	Yorkshire Peat Partnership
	Swale and Ure Drainage Board	Yorkshire Farming and Wildlife Partnership
	Natural England	Dales to Vales Catchment Partnership
Swale, Ure, Nidd and Upper Ouse	Nidderdale AONB	East Keswick Wildlife Trust
	Knaresborough Anglers Club	*Yorkshire Dales Rivers Trust*
	Environment Agency	*Natural England*
	Catchment Sensitive Farming	NFU
	Campaign for the Farmed Environment	*Forestry Commission*
	Yorkshire Water	*Yorkshire Dales National Park**
	Yorkshire Wildlife Trust	North Yorkshire County Council
	City of York Council	Brompton Flood Prevention Group

	Friends of St Nicholas Fields	Yorkshire Farming and Wildlife Partnership
	local Internal Drainage Boards	Ure Salmon Trust
	Salmon and Trout Association	Yorkshire Dales Environment Network
	Bradford City Anglers	Dales to Vales Catchment Partnership
Northumberland	*Environment Agency*	*Natural England*
	Northumbrian Water	Northumberland Wildlife Trust
	National Farmers Union	Northumberland County Council
	Northumberland AONB	Northumberland Rivers Trust*
	Northumbrian Water	
Tyne	Country Land & Business Association	Durham Wildlife Trust
	Environment Agency	*Forestry Commission*
	*Tyne Rivers Trust**	*Groundwork*
	Gateshead Council	*Natural England*
	National Farmers Union	North Pennines Area of Outstanding Natural Beauty Partnership
	Newcastle City Council	Northern Farmers & Landowners Group
	North Tyneside Council	Northumberland County Council
	Northumberland Community Flooding Partnership	Northumberland Wildlife Trust
	Northumberland National Park Authority	Port of Tyne
	Northumbrian Water	
Tees	*Tees Rivers Trust**	*Groundwork North East**
	Environment Agency	Durham County Council
	Stockton Borough Council	Darlington Borough Council
	Hartlepool Borough Council	Middlesbrough Council
	Hurthworth Parish Council	Neasham Parish Council
	Middleton St George Parish Council	Middlesbrough Football Club
	Chemoxy International Ltd	Rockliffe Hall Hotel and Golf Club
	MAK Distribution	PD Ports
	Wrightson Estate	Cliffe Estate
	Winston Bridge Country Park	E.E.
	Cummins Engineering	Northumbrian Water
	Tees Water Sports Centre	Angling Clubs
Till	*Tweed Foundation/ Forum**	*Environment Agency*
	Federation of Border Angling Associations	Forestry Commission Scotland
	National Farmers Union Scotland	*Natural England*
	Northumberland County Council	Northumberland National Park
	Northumberland Wildlife Trust	Northumbrian Water
	River Tweed Commission	*RSPB*
	Scotland's Rural College	Scottish Borders Council
	SEPA	Scottish Government
	Scottish Land and Estates,	Scottish Natural Heritage

	Scottish Water	Visit Scotland
	Southern Uplands Partnership	Borders Forest Trust
Derwent North West	*Allerdale Borough Council*	*West Cumbria Rivers Trust**
	Derwent Owners Association	*Lake District National Park Authority*
	Natural England	*National Trust*
	United Utilities	Forestry Commission
	Woodland Trust	*Cumbria County Council*
	Cumbria Wildlife Trust	Farmer Network
	Foundation for Common Land	NFU
	Cumbria Woodlands	Countryside Landowners Association
	Lake District National Park	Highways England
	Iggesunds	Lancaster University
	Love My Beach	Cumbria Freshwater Invasive Non-Native Species Initiative
	Allerdale Borough Council	Derwent Owners Association
	Dovenby Parish Council	Flimby Flood Action Group
	Braithwaite Flood Action Group	Workington Flood Action Group
Eden and Esk	*Eden Rivers Trust**	Cumbria Freshwater Invasive Non-Native Species Initiative
	Galloway Fisheries Trust*	Ullswater Steamers
	Allerdale District Council	Foundation for Common Land
	Friends of the Lakes	Carlisle City Council
	Highways England	Countryside Landowners Association
	Lake District National Park	Cumbria County Council
	Lancaster University	Cumbria Farm Enterprise Partnership
	National Trust	Cumbria Wildlife Trust
	Natural England	Cumbria Woodlands
	Network Rail	Durham University
	Newground	Eden District Council
	NFU	North Pennines AONB
	Environment Agency	RSPB
	Forestry Commission	The Farmer Network
	United Utilities	Woodland Trust
	United Utilities	Yorkshire Water
	Yorkshire Dales National Park	
Kent and Leven	*South Cumbria Rivers Trust**	*Arnside and Silverdale AONB*
	South Lakeland District Council	*Windermere Lake Cruises*
	Lake District National Park Authority	*Natural England*
	Environment Agency	*Cumbria Wildlife Trust*
	United Utilities	*Morecambe Bay Partnership*
	The National Trust	*Woodland Trust*
	Freshwater Biological Association	RSPB Leighton Moss
	Forestry Commission	Cumbria Freshwater Invasive Non-Native Species Initiative
South West Lakes	*West Cumbria Rivers Trust**	*South Cumbria Rivers Trust*

	Natural England	*Lake District National Park Authority*
	United Utilities	*National Trust*
	Woodland Trust	Forestry Commission
	Cumbria Wildlife Trust	*Cumbria County Council*
	Foundation for Common Land	Farmer Network
	Cumbria Woodlands	NFU
	Lake District National Park	Countryside Landowners Association
	Iggesunds	Highways England
	Love My Beach	Lancaster University
	Bootle Parish Council	Copeland Borough Council
	Cumbria Freshwater Invasive Non-Native Species Initiative	
Waver and Wampool	*Allerdale Borough Council*	*West Cumbria Rivers Trust**
	Derwent Owners Association	*Lake District National Park Authority*
	Natural England	*National Trust*
	United Utilities	Forestry Commission
	Woodland Trust	*Cumbria County Council*
	Cumbria Wildlife Trust	Farmer Network
	Foundation for Common Land	NFU
	Cumbria Woodlands	Countryside Landowners Association
	Lake District National Park	Highways England
	Iggesunds	Lancaster University
	Love My Beach	*Solway Firth Partnership*
	Cumbria Freshwater Invasive Non-Native Species Initiative	
Lune	*Lune Rivers Trust**	*Lancashire Wildlife Trust*
	Living Lune	*Yorkshire Dales National Park*
	United Utilities	Lower Lune Catchment Sensitive Farming
	Environment Agency	*Morecambe Bay Partnership*
	RSPB	Bentham Anglers
	Tebay Anglers	Wyre Borough Council
	Cumbria County Council	Forest of Bowland AONB
	Carnforth Anglers	Keer Regeneration Group
	Arnside and Silverdale AONB	Lune and Wyre Fisheries Association
	Restoring Roeburn	LEC, Lancaster University
	Lancaster City Council	
	Carnforth Town Council	
Irwell	*Salford Council*	*Mersey Rivers Trust*
	Bury Council	*Lancashire Wildlife Trust*
	Ircamp (Groundwork/ Lancs Wildlife Trust)	*Canal and Rivers Trust*
	The Conservation Volunteers	*Groundwork (Manchester Salford Stockport Tameside and Trafford)**
	Manchester City Council	*Environment Agency*

	Groundwork BBOR Bolton Bury Oldham Rochdale	*National Trust*
	Woodland Trust	*Forestry Commission*
	Manchester University	*Salford University*
	Manchester Met University	*Peel Holdings*
	Groundwork Blue Sky	*Salford Friendly Anglers*
	Moors 4 the Future	University of Salford
	Wildfowl and Wetland Trust	Angling Trust
	The Wild Trout Trust	
	United Utilities	University of Manchester
	City of Trees	Healthy Waterways Trust
	Broughton Trust	CityCo (Private)
	Local Authorities/Councils - Salford, Rossendale, Bury, Bolton, Manchester, Oldham, Rochdale, Combined Greater Manchester Authorities	South Pennines Natural Capital Group (Greater Manchester),
Wyre	*Wyre Rivers Trust**	*Environment Agency*
	United Utilities	Blackpool and the Fylde College
	Lancaster University	The Friends of Garstang Walking Festival
	Garstang Millennium Green Trust	Wyre Borough Council
	Grosvenor Estates - Abbeystead	The Lune and Wyre Fisheries Association
Douglas	Groundwork: Cheshire, Lancashire and Merseyside*	United Utilities
	Lancashire Wildlife Trust	Environment Agency
	NFU	Councils- Wigan, Chorley, West Lancashire and South Ribble
	Ribble Rivers Trust	South Ribble Council
	City of Trees	Cuerden Valley Park Trust
	Canal and Rivers Trust	Mersey Forest
	Friends of the Yarrow Valley	
Alt and Crossens	*Mersey Rivers Trust**	*Environment Agency*
	United Utilities	Local Authorities (Sefton, Knowsley, Wirrel and Lancashire)
	National Farmers Union	RSPB
	Mersey Forest	*Lancashire Wildlife Trust*
	Natural England	Mott MacDonald
	Wildfowl and Wetland Trust	
Upper Mersey	*Mersey Rivers Trust**	Local Authorities – Tameside, Trafford, Oldham, Stockport, High PEAK, Cheshire East, Manchester Local and Combined Authorities
	Environment Agency	*United Utilities*
	Natural England	GMEU

	City of Trees	Moors for the Future
	BEACON	Manchester Met University
	Tatton Estate	*Cheshire Wildlife Trust*
	Lancashire Wildlife Trust	Peel Holdings
	Groundwork	*Canal & River Trust*
	Angling Trust	*National Trust*
	Manchester University	Salford University
	Reaseheath Collage	
Lower Mersey	*Mersey Rivers Trust**	Mersey Gateway
	Environment Agency	United Utilities
	Local Authorities – Cheshire West and Chester, Warrington, Wirral, Wigan, Halton	National Farmers Union
	Mersey Forest	Unilever
	SSE	City of Trees
	Groundwork	*Cheshire Wildlife Trust*
	Inspiring Healthy Lifestyles	
Weaver Gowy	*Environment Agency*	*United Utilities*
	Cheshire West & Chester Council	*Cheshire Wildlife Trust*
	Groundwork Cheshire Lancashire and Merseyside*	Grosvenor Estate
	Cholmondeley Estate	Healthy Waterways Trust
	Eaton Estate	Inland Waterways Association
	Jeff Clarke Ecology	University of Liverpool
	Manchester Metropolitan University	Meres & Mosses Landscape Partnership
	National Farmers Union	*Natural England*
	Reaseheath College	Campaign for the Farmed Environment (Cheshire)
	South West Peak Landscape Partnership	Staffordshire Wildlife Trust
	Sustrans	The Land Trust
	The Mersey Forest	*RSPB*
	Vale Royal Environmental Network	Wirral Borough Council
	Woodland Trust	Northwich Anglers
	Winsford Anglers	Friends of Anderton & Marbury
West Coast	*Peel Ports*	Dee Estuary Conservation Group
	ABP Ports	Mersey Estuary Conservation Group
	Whitehaven Marina	NW Coastal Forum
	Sefton Coast Partnership	*Morecambe Bay Partnership*
	Arnside and Silverdale AONB	*Solway Firth Partnership*
	Barrow Wildlife and Heritage Advisory Committee	*Inshore Fisheries and Conservation Authorities (IFCA)*
	North West Wildlife Trust's Irish Sea Marine Advocacy Programme	The Green-Blue
	Marine Scotland	Marine Biological Association

	Natural England	
East Coast	Living Seas CENTRE (Yorkshire Wildlife Trust)	Capturing our Coast project
	Sea-Search North East	Marine Biological Association
	Inshore Fisheries and Conservation Authorities (IFCA)	The Green-Blue
	Natural England	

2. High Risk Areas

High Risk Area' = areas that are very likely to be invaded

Coastal sites in the region

The coasts in the North region hosts a variety of habitats and species leading to a diverse range of fisheries. Shellfish fishing dominates the West coastal area including fisheries for cockles, mussels, whelks, nephrops, shrimps and potting for lobsters and crabs. There are also finfish fisheries (fish with fins, as opposed to shellfish) in the area including netting for cod, whiting and plaice, and trawling for turbot and sole.

Commercial fishing, recreation and charter vessels are common along the East Coast. Bridlington Port is the largest port in Europe for shellfish landings (mainly crabs and lobsters).

There are a considerable number of large ports, harbours and marinas in the region. There are over 40,000 ship movements every year within the Humber Estuary alone. There is also vessel movement associated with several wind farms and ferry and cargo ports as well as ports to ocean-going cruise ships. There are various recreational uses of the marine environment including recreational angling, sailing, kitesurfing, scuba-diving and jet-skiing

INNS threaten native species, ecosystems, natural features (such as mussel beds), or interfere with man-made structures and businesses. The introduction of disease to shellfish and finfish is also a significant threat.

Freshwater sites in the region

The freshwater resources of the region – it's many tarns, lakes, rivers and becks, are of great ecological and economic significance.

In ecological terms, many are designated conservation areas in the region including:

- Sites of Special Scientific Interest (SSSIs)
- Special Areas of Conservation (SACs)
- Special Protection Areas (SPAs)
- Ramsar[5] sites
- National Nature Reserves
- Wildlife Trust Reserves
- Local Nature Reserves
- RSPB Reserves
- Woodland Trust Reserves
- A multitude of large still waters

Many of which support iconic protected species such as the otter, native white-clawed crayfish and freshwater pearl mussel. Many rivers support healthy fish populations, which in turn support economically important recreational fisheries.

In economic terms, many of the major lakes have been modified to function as water supply reservoirs, and lakes and rivers are a significant draw to visitors, many of whom use the water environment for activities such as angling, boating and swimming.

Assessing a high-risk area

In the development of this RIMP and through consultation with key stakeholders, it has become clear that identifying and listing all of the 'high risk areas' in the Northern region would very subjective and numerous.

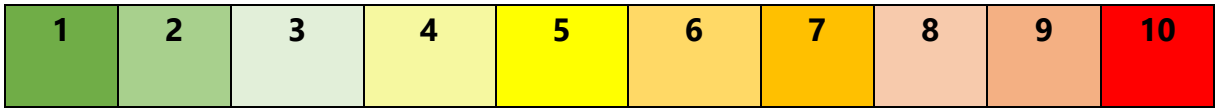
When deciding what is a 'high risk site' there are many variables that must be taken into consideration. If risks cannot be reduced/ mitigated for at a site, then efforts should not be spent there.

Therefore, instead of producing an extensive list of sites, this RIMP will set out the criteria to help in assessing risks at sites. See Table 3.

[5] A Ramsar Site is a wetland site designated to be of international importance under the Ramsar Convention. The Convention is an intergovernmental environmental treaty established in 1971 by UNESCO and came into force in 1975.

Local knowledge and understanding of sites will be needed to complete this, stakeholders will need to work collaboratively to think through the process to decide which areas they want to priorities for future work.

Criteria to help identify high-risk freshwater areas



To determine a high risk site, use the table below to give a numerical figure to each/ as many check points that are relevant to your site. Give each check point a risk rating from 1 – 10 depending on the risk factors. To determine the overall risk rating for a site and see where it is on the scale above:

Total risk rating / no. of check points used = Site risk rating (1-10)

Table 3. Criteria to help identify high-risk freshwater sites

Check point	**Risk Factors**			**To consider/tools to help**	**Risk rating**
	Low Risk (1 -3 points)	**Medium Risk (4 - 7 points)**	**High Risk (8 - 10 points)**		
Habitat characteristics – suitability for establishment of INNS	Harsh environment Fast flowing Nutrient poor Cold deep waters Minimal human	**conditions that are neither low risk or high risk.*	Slow moving/ still Nutrient rich Warm shallow waters High human impacts / disturbance	General trend: in harsh climatic conditions and nutrient-poor habitats, invasion levels are low; in nutrient-rich and man-made habitats INNS tend to thrive. [6] Which species could become established?	

[6] http://ec.europa.eu/environment/integration/research/newsalert/pdf/6si2_en.pdf

	impacts / disturbance				
Connectivity / Network	Isolated area		Part of a catchment / network and well connected to other waterbodies (e.g./ canal)		
Pathways	No access – private No events No recreational activities No other waterbodies nearby No or few pathways found		Unrestricted access Multiple access points Multiple events take place High recreational activities take place Multiple pathways found	The Stepping-stone principle – if an INNS is introduced and becomes established, what are the pathways out of the site and into others? See Pathways section.	
Visitors	Limited use of site with very few visitors / users		High number of visitors / users of site	What is the main use of the site?	

	Single use		Multiple activities for visitors to do		
Accessibility of site	Single access point to site Entry restricted Remote location with difficult access		Multiple access points to site Multiple access points and unrestricted Close to a main road with public parking available Jetty or launch point		
Impact – environmental	Low ecological value site INNS present Minimal impacts to fish		High ecological value site Currently free of INNS	Look at Magic Map - https://magic.defra.gov.uk/[7] Look at INNS Mapper - http://ywt-data.org/inns-mapper/[8] Should we prioritise more intact sites and ecosystems	

[7] The MAGIC website provides authoritative geographic information about the natural environment from across government. The information covers rural, urban, coastal and marine environments across Great Britain. It is presented in an interactive map which can be explored using various mapping tools that are included. Natural England manages the service under the direction of a Steering Group who represent the MAGIC partnership organisations.

[8] 'INNS Mapper' is web-tool that aims to provide a comprehensive map of INNS distribution throughout England which can be used to inform co-ordinated and targeted management planning for any organisations working to fight these damaging plants and animals. INNS Mapper allows users to record information on presence of INNS, indicate areas of absence of INNS and, crucially, any management being undertaken.

	(feeding and resting sites)			over those that are already invaded?	
Impact – economic	No businesses affected and no monetary losses. No drainage issues so will not increase risks of flooding		Businesses affected, and establishment of INNS will cause monetary losses. Significant financial cost implications – operational through impacts; mitigation/ control measures; incur a fine for not delivering obligations. Damage the reputation of a business Increased risks of flooding	See '**The Economic Cost of Invasive Non-Native Species on Great Britain'**[9] Take into consideration management costs, devaluation of site, restoration costs, impacts on leisure, tourism and recreation etc.	
Existing biosecurity measures	Cleaning station / area on site.		No cleaning station or awareness	See RAPID INNS Management Toolkit:	

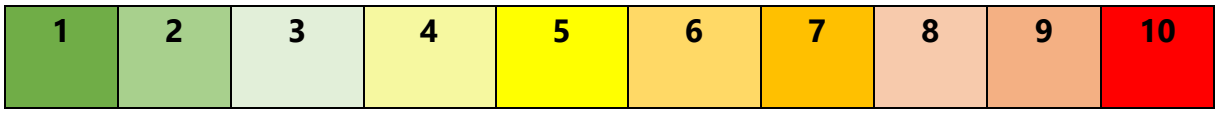
[9] The Economic Cost of Invasive Non-Native Species on Great Britain is a report on the negative economic impact of INNS.

	Awareness and training materials available on site. Water users actively engaged with biosecurity measures.		material available.	Freshwater Biosecurity Resources [10] See Biosecurity and Prevention [11]	
Existing understanding of INNS in area	Good understanding of INNS or of biosecurity and carrying out of biosecurity measures. Network of people monitoring the site who know how and who to report a new INNS sighting.		No understanding or engagement of INNS or biosecurity No trained people in identification of INNS or reporting procedures	What is the current level of understanding / awareness of INNS and their impact? Do users know how and where to report a new INNS? Is there a network of people at the site monitoring / aware of what to look out for? Will it be reported to the correct organisation? How quickly can a response be mobilised?	
Total Risk Rating =					**X**

[10] RAPID LIFE resources are freely available to be used for training and development of biosecurity actions.

[11] NNSS webpage provides guidance on various aspects of biosecurity.

Example of assessing high risk sites.



Using the check points in Table 3 above, below is an example comparing two waterbodies in the Lake District. The check points should be used as a guide to help assess risk of introduction of INNS. From this assessment, it is possible to then decide where to prioritise action and funding.

Table 4. Example of using the criteria to identify high-risk sites.

Check Points	**Windermere**	**Risk Rating**	**Wastwater**	**Risk Rating**
Habitat characteristics and risk for establishment of INNS	Nutrient rich waters (eutrophic) Data indicating water temperatures rising High level human impacts and activity Large water body – 14.7km2 Slow moving water with long residency time north basin - 221 days Highly likely that all freshwater INNS could survive / thrive in this waterbody	10	Nutrient poor waters (oligotrophic) Very deep thermocline (mean depth is 40.2m) – cold Large water body 2.9 km2 Slow moving water with a long residency time - 352 days Highly unlikely that many INNS could survive/ thrive in this waterbody.	1
Connectivity / Network /	The Windermere catchment in which it sits is 230.5 square km To the north of Windermere lie Grasmere and Rydal with Loughrigg tarn and Elterwater to the north west. Blelham Tarn and Esthwaite Water are located to the west and several other small tarns occur within the catchment	10	Single catchment Isolated	2

Pathways	Busiest and best known of all the lakes in the Lake District National Park and is the tourism 'honeypot' in the county. Public right of navigation. Recreational activities – flyboarding, sailing, canoeing, kayaking, waterskiing, rowing, wakeboarding, paddleboarding, swimming, ghyll-scrambling, diving, fishing Commercial interests – boat clubs, commercial jetties and marinas, outdoor pursuit and activity centres, lake cruises, access ferry. Over 20 large planned public events held on the water each year (E.g./ Great North Swim – over 1,000 participants; Windermere Triathlon – over 250 participants)	10	Main pathway is through recreational events. Limited activity on lake	3
Visitors	Within the Lake District National Park Over 1,000 visitor public motorised boats launched every year. Approximately 12,000 participants in water-based events each year.	10	Within the Lake District National Park Events run on the lake – mainly triathlons.	3
Accessibility of site	7 public jetties around the lake. Multiple access points for public– many of them unrestricted / unmonitored.	10	No public access to the lake for recreation Access only during events which are strictly monitored	1

	Multiple parking/ access facilities for public for launching boats, swimming etc. Multiple private access sites. Whole lake is accessible by A and B roads. 20 minutes away from M6.		One road into and out of the valley which runs alongside the lake. Relatively inaccessible.	
Impact – environmental	Currently relatively free of freshwater INNS. Known to only have *Crassula helmsii* and *Eldoea nuttali* present. Also present around the catchment are Himalayan balsam, Japanese knotweed, giant hogweed and American skunk cabbage but are under control. American signal crayfish have been found in three small tarns close to the catchment.	5	Designated as a SAC and SSSI based on its aquatic flora. Currently believed to be free of INNS.	10
Impact – economic	The establishment of INNS will have serious negative impacts on local businesses as well as businesses that use the lake to run events. Recreational business will be seriously affected if species such as floating pennywort invade as will the cruise boats, recreational users and access ferry. Windermere is also a reserve drinking water supply which can be abstracted under licence when water levels drop at Haweswater and Thirlmere Reservoirs and help safeguard longer-term	10	Minimal impact of local businesses Minimal recreational opportunities on water currently exist Impact of blocking drainage may have negative implications further down the catchment	3

	supplies for public use. INNS establishment may have a significant negative impact on the ability to abstract.			
Existing biosecurity measures	There are currently no cleaning stations available around the lake. There are 15 'Check Clean Dry' signs installed around the catchment. Over 200 people in the catchment have been trained in biosecurity and basic identification of INNS. No legal consenting required for events to take place.	9	There are currently no cleaning stations available around the lake. There are 3 'Check Clean Dry' signs installed around the catchment. National Trust staff in the catchment have been trained in biosecurity and basic identification if INNS. National Trust and Natural England staff for consenting events trained in biosecurity. In order for an event to be allowed on this site, permission has to be granted by both NT and NE. A biosecurity risk assessment must be carried out and submitted to NT and NE as part of this process.	5
Existing understanding of INNS in area	Although multiple organisations around the catchment have been trained and understand the issues – the main risks are from people visiting the area – either on holiday or through events. We are currently researching the level of understanding/ awareness of INNS and biosecurity of these people. There is a network of trained individuals throughout the catchment aware of what species to look out for and how to identify them. Reports get sent through to the CFINNS Initiative for confirmation and to the local recording centre. Future records	10	National Trust and Natural England staff for consenting events are trained in biosecurity measures and requirements.	2

	should be sent to INNS Mapper. There are currently no local response units able to be mobilised if a high priority species is identified due to lack of funding.			
Total Risk rating		84		30
OVERALL RISK	**HIGH**	84/9 = **9.3**	**LOW**	30/9= **3.3**

From the table above, it is clear why all the criteria must be considered when assessing where to work. By simply choosing one or two of the check points will not give the whole picture. For example – prioritising Wastwater, just because it is a designated site does not mean that it is the most important site to focus biosecurity efforts on.

Now more than ever, it is important to focus the limited resources available for INNS management.

Each organisation and funding body will each have its own agenda and focus. Areas of work and priorities will be different throughout the region, but all must align with the GB Invasive Non-Native Species Strategy objectives of:

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

A strong emphasis must be placed upon prevention and biosecurity. Acting on identifying and blocking pathways of introduction is critical.

3. Pathways

Water is an excellent medium for the dispersal of species and the impact of INNS in water environments is predicted to increase significantly as climate change develops. In 2015, 6% of recorded non-native species in terrestrial environments in GB were reported as having non-minimal impacts, compared to 60% in freshwater and 22% in marine environments.[12] In addition to this, many of the most concerning INNS introduced to GB in recent years have been in the freshwater environment.

The best response to the threat posed by INNS is to prevent them from arriving in the first place, if they do so, reduce the risk of their further spread through management/ treatment, and undertaking enhanced pathway management and promoting biosecurity.

Key pathways need to be recognised and stakeholders need to work together to develop optimal messaging and install sufficient biosecurity measurements to enable the behaviour change required to reduce the spread of INNS.

By utilising the networks of stakeholders in the region, there is an opportunity to make a significant difference in reducing the risks of introduction and spread of INNS.

This will require:

- Social – community engagement
- Capital works – installation of targeted biosecurity cleaning stations
- Policy – Biosecurity bylaws, procedure requirements.

Below is a list of suggested objectives, outputs and actions. Each of these steps will require a significant amount of work to achieve.

Objective: Reduce the risk of the introduction and spread of INNS.

Output 1: Identify, address and prioritise pathways

- Identify pathways for specific sites and prioritise based on potential impact and the effectiveness of pathway management
- Develop Pathway Action Plans for priority pathways

[12] Non-Native Species in Great Britain: establishment, detection and reporting to inform effective decision making

Output 2: Ensure stakeholders aware of the impacts of INNS, means of introduction and spread and acting on their responsibilities to reduce the risks.

- Establish baseline understanding of biosecurity (public perceptions and behaviour)
- Promote better access to information about INNS and biosecurity to targeted users

Output 3: Embed biosecurity behaviours into stakeholders.

- Work with stakeholders to ensure that biosecurity is included into plans, policies, procedures and action on the ground.

For the purposes of this RIMP, a list has been collated of possible INNS pathways, their associated stakeholders and possible preventative actions. This list is in no way exhaustive. It is merely to act as a guide to assist stakeholders when assessing risks associated with specific locations and activities.

Ways in which to block pathways for the introduction or spread of INNS should be considered when assessing future priorities.

The GB Strategy calls for the development of Pathway Action Plans (PAPs) for priority pathways of introduction of INNS. The first of these PAPs, the Zoos Pathway Action Plan[13], has been drafted and the Freshwater Recreation PAP is currently in development. These PAPs could be used as a template by stakeholders to develop site and activity specific plans.

[13] Zoo Pathway Action Plan - http://www.nonnativespecies.org/index.cfm?pageid=586

Table 5. Coastal INNS Pathways and Associated Stakeholders.

Pathway	Stakeholders	Possible preventative action
Ballast Water	Port Authorities, Harbour Masters, vessel owners and users	Do not pump non-sterilised water out in harbours.
Hull fouling	All vessel owners and users – fisheries, recreational boating, shipping companies, boat/kayak designers	Annual haul-out and anti-fouling of vessels. Hull design to prevent fouling and encourage easy cleaning. Marinas implement a 'clean hull' policy.
Port infrastructure as a receptor	Port Authorities, Local Authorities	Good housekeeping Training to identify marine/ coastal INNS and report any sightings.
Fouling of fishing equipment	All fishing sectors and associations using equipment including hand-gatherers.	Biosecurity of all equipment and clothing used in the marine and intertidal between use and before moving from one area to another.
Fouling of recreational equipment	All marine groups and associations using equipment including angling, scuba diving, sailing etc	Biosecurity of all marine equipment and clothing between use and before moving from one area to another.
Relocation of structures and equipment	Port Authorities, marinas, fisheries, renewables industry.	Biosecurity of all structures and equipment before moving from one area to another.

		Check for INNS.
Attached to marine debris /litter	All shipping, Local Authorities, fisheries, Marine Conservation Society, public.	Minimise marine debris/ litter, beach cleaning activities and campaigns.
Escape or release of plants and animals from aquaria	Aquarium stockists / customers, public.	Do not release plants or animals from aquaria.

FRESHWATER

Table 6. Freshwater INNS Pathways and Associated Stakeholders.

Pathway	Stakeholders	Preventative Action
Boating	Recreational water users Boat operators Local canoe and water sports organisations / clubs Resource/ Landowners Event organisers	Biosecurity training. Building washdown facilities. Providing mobile cleaning kit for events Enforcing bylaws
Angling	Recreational water users Anglers Local angling organisations / clubs Resource/ Landowners Event organisers Environment Agency	Biosecurity training Building washdown facilities. Providing mobile cleaning kit for events Enforcing bylaws
Operations / Maintenance	Resource /Landowners Local Councils NGOs	Biosecurity training Building washdown facilities Providing mobile cleaning kit for workforce Biosecurity Policy and procedures Enforce contractual requirements
Capital works	Resource/ Landowners Local Councils, Planning departments Government Agencies – NE/ EA prior to consent	Enforcing contractual requirements on construction partners Biosecurity training Biosecurity Policy and procedures
Surveys / sampling of sites	Resource/ Landowners NGOs Ecologists Researchers	Biosecurity training Building washdown facilities Providing mobile cleaning kit for workforce Biosecurity Policy and procedures

		Enforce contractual requirements
Raw water transfer	Utility Companies	Risk assessments across transfer networks Mitigation measures put into place Changes in raw water routing and abstraction times etc
Grounds management	Resource/ Landowners Local Councils	Biosecurity training Building washdown facilities Providing mobile cleaning kit for workforce Biosecurity Policy and procedures Enforce contractual requirements Training of proper control and disposal measures for INNS.
Farming	Resource / Landowners Rural surveyors Agricultural colleges Contractors	Biosecurity training Funding necessary requirements for disease control on farms
Public recreation	All	Education of biosecurity training at car parks / access points Building accessible and free washdown facilities Training of staff to engage with the public
Intentional introduction (live releases or planting of)	Local Councils Planning departments Gardeners / landscape/ grounds management contractors Public Environment Agency	Training of staff and public Enforcing contractual requirements on grounds management partners Enforcing ban of live baiting

4. Management Priorities

During the consultation period, it became clear that current freshwater / riparian management priorities in the region are focussed around long-term management of widespread and well-established INNS. Coastal/ Marine actions are currently focussed on early detection.

Availability of funding for prevention, early detection and rapid response has been very limited, with the primary funding focus being on the national scale campaign of 'Check Clean Dry'[14].

There are five types of INNS 'Management':

1) **Prevention (black listed species)** All efforts are on biosecurity and detection.

2) **Early detection and rapid response**

3) **Eradication (red listed species)**
   High priority to eradicate as soon as detected.

4) **Long-term management (amber and green listed species)** Widespread and well-established species.

5) **Treatment and restoration**

Information gathered for this RIMP is based on current knowledge and data previously recorded and/or via consultation. There are many areas and species for which knowledge is missing.

The below table shows the current state of play (2018). Please note that this is likely to change so should be used as a guide only. Consult INNS MAPPER[15] and your local Biological Recording Centre[16].

[14] http://www.nonnativespecies.org/checkcleandry/

[15] http://ywt-data.org/inns-mapper/home

[16] https://www.brc.ac.uk/recording

Key stakeholders, the GB Non-native Species Risk Assessments[17], the UK Technical Advisory Group Classification of aquatic alien species and the WFD:[18] according to their level of impact; the EU Species of Concern and the GB NNSS Alert Species have been considered in the creation of the table below.

INNS Management Categories

Black-listed species are **currently** not known to be present in the region, but potentially on their way. The goal is to prevent these species from being introduced, spread or established in the region.

They are classified as high-level threats due to their likely **impact on biodiversity** and the **local economy** in combination with the **likelihood of their introduction**.

Red-listed species are high impact and are present in some regions but not well established or abundant. It may be cost effective to seek eradication (where effective control methods exist) before becomes established.

Amber-listed species are well established and for which eradication is not currently feasible, but control is important due to their impact. Medium priority.

Green-listed species are well established and for which eradication is not currently feasible and management is not a priority due to low impact or where the cost effectiveness of control is poor. Low priority.

A description of the impacts of the black and red listed species has been detailed below. For the amber and green listed species, there is information readily available via the NNSS website as well as the 'Good Practice Management' toolkit available on the RAPID LIFE website which should be used.

17 http://www.nonnativespecies.org/index.cfm?pageid=143

18 https://www.wfduk.org/sites/default/files/Media/Assessing%20the%20status%20of%20the%20water%20environment/UKTAG%20classification%20of%20alien%20species%20working%20paper%20v7.6.pdf

(!) = On the 'List of Invasive Alien Species of Union concern'
(*) = GB Alert Species

Black List species which are detected should be moved to the Red List.

Table 7: Black listed species.

	Name	Impacts
Black list species	American bullfrog (!) *Lithobates catesbeianus*	Predation and competition may affect native populations of newts, frogs and toads. Can carry chytrid fungus to native amphibians.
	American oyster drill *Urosalpinx cinereal*	Predation of native oysters, mussels and barnacles. Could have significant economic impact on mussel and oyster farming.
	Asian clam *Corbicula fluminea*	High filtration rate which affect water quality, stripping nuterients and altering dynamics. Outcompete other species (represents over 95% of benthic biomass in some freshwaters). Biofouling (has caused closure of a nuclear power plant!) and significant impacts on power generating and water treatment industry.
	Asian shore crab *Hemigrapsus sanguineus*	Significantly reduce native shore crab and mussel density.
	Bloody red shrimp *Hemimysis anomala*	Direct competitor of native shrimp (such as the opossum shrimp *Mysis relicta).* Disrupts sensitive food chains and alters nutrient cycles.
	Broadleaved watermilfoil (!) *Myriophyllum heterophyllum*	Outcompetes other freshwater plants. It forms dense submerged mats which can prevent water flow, reduce sunlight and reduce oxygen availability. The resulting low oxygen conditions can harm or kill aquatic organisms. Impact on recreational use of water bodies.
	Carpet sea-squirt (*) *Didemnum vexillum*	Forms large colonies, having considerable effects on preexisting sessile hard-surface communities
	Cauliflower sponge *Celtodoryx ciocalyptoides*	Smothering other species and habitat. Particularly detrimental to bivalves and may impact aquaculture.
	Creeping water-primrose (!) (*) *Ludwigia peploides*	Can block slow-moving waterways and impacts irrigation and drainage in lakes, ponds and ditches.
	Curly waterweed (!) *Lagarosiphon major*	Can block slow-moving waterways and impacts irrigation and drainage in lakes, ponds and ditches.
	Egyptian goose (!) *Alopcochen aegyptiacus*	Can impact on other wetland birds for food and resources. May also compete with hole-nesting species such as barn owls (the Egyptian Goose nests in elevated nest holes). May damage crops and habitats via trampling and grazing.
	Fanwort (!) *Cabomba caroliniana*	Dense populations can interfere with recreational activities and matted vegetation can decrease aesthetic value.
	Japanese skeleton shrimp *Caprella mutica*	May compete and be aggressive with native shrimp populations. Significant impact on benthic communities. High densities may block water intakes on pumps and settle on mussel lines.

	Killer shrimp (*) *Dikerogammarus villosus*	Aggressive behaviour towards native invertebrates. Due to its large body size and well-developed mouthparts it is an effective predator which kills or simply bites off much more prey than it can consume.
	Leathery sea squirt *Styela clava*	Can dominate shallow sheltered habitats, affecting other suspension-feeding native organisms. Can also have positive biodiversity impacts. Potential to heavily foul aquaculture equipment and a serious pest on long-line mussel farms.
	Marbled crayfish (!) *Procambarus marmorkrebs*	A single specimen is sufficient to create a new population (capable of asexual reproduction) which can reproduce all year round. They are voracious feeders and consume a broad range of aquatic plants and invertebrates. This poses a risk that they may have a direct impact on native aquatic fauna and flora if released to natural waters.
	Quagga mussel (*) *Dreissena rostriformis bugensis*	Attach to hard surfaces and can impact drainage, irrigation and in-flow pipes, attach to and damage hulls, docks, locks and sluice gates. It is a filter feeder so may filter nutrients from water bodies, taking this resource away from native species and fundamentally changing the water quality.
	Racoon (!) *Procyon lotor*	May reduce and displace birds. They may reduce natural food resources for native species. They carry a roundworm parasite, are carriers of rabies and cause canine distemper and toxoplasmosis. They often raid rubbish bins and so will cause social and economic issues. The raiding of fruit crops will also result in economic losses.
	Racoon dog (!) *Nyctereutes procyonoides*	May compete for food and dens with native animals such as badgers and foxes. They are carriers of diseases such as sarcoptic mange and tapeworm affecting other mammals. They are also one of the main vectors of rabies in Europe.
	Red swamp crayfish (!) (*) *Procambarus clarkii*	Produce large numbers of offspring so populations increase rapidly. Can affect turbidity of waters and reduce native species. A carnivorous animal it can directly impact on native species such as invertebrates, fish and molluscs.
	Slipper limpet *Crepidula fornicata*	Forms reefs smothering seabed species and outcompeting native mussels and oysters. May also consume planktonic larvae of some species. Fouls farmed species such as oysters & artificial structures and equipment having a major effect on fisheries. Loss of amenity value due to infestation and impacts on recreational fishing.
	Spiny-cheek crayfish (!) *Orconectes limosis*	Contributing to the rapid decline in native white-clawed crayfish due to transmission of crayfish plague and competition. Predate a wide range invertebrates and fish so may impact on other native species and food webs. The species creates deep and interconnecting tunnels in the riverbanks which can lead to bank instability and erosion, increased flood risk and economical costs.

	Topmouth gudgeon (*) *Pseudorasbora parva*	Competes for food with native and farmed fish species and competition for space and spawning habitat. Direct impacts via predation on invertebrates and fish eggs.
	Tree groundsel *Baccharis halimifolia*	Forms a dense understory in coastal wetlands, salt marshes and woodlands, supressing native species and altering local habitat/ecosystem. Toxic to livestock and can cause allergic reactions to humans.
	Virile crayfish (!) *Orconectes virilis*	Contributing to the rapid decline in native white-clawed crayfish due to transmission of crayfish plague and competition. Predate a wide range invertebrates and fish so may impact on other native species and food webs. The species creates deep and interconnecting tunnels in the riverbanks which can lead to bank instability and erosion, increased flood risk and economical costs.
	Wakame / Japanese kelp *Undaria pinnatifida*	Competes with other seaweeds for space resource.
	Water hyacinth (!) *Eichhornia crassipes*	Can alter water clarity and decrease phytoplankton production, dissolved oxygen, nitrogen, phosphorous, heavy metals and concentrations of other contaminants.
	Water primrose (!) (*) *Ludwigia grandiflora*	Can significantly impact on native flora due to allelopathic (produces biochemicals that influence the germination, growth, survival, and reproduction of other organisms) activity which affects water quality. It also overshadows and smothers other aquatic flora and so impacts in several ways. In France it has been seen to block slow-moving waterways, hinder navigation and impact on drainage in lakes, ponds and ditches. Once established the cost to control the species is considerable.
	Wireweed *Sargassum muticum*	Outcompetes native seaweed and algae species. Grows fast forming dense carpets across rock pools, altering temperatures and light underneath. Fouls commercial oyster beds/fishing gear. Can impair recreational activities becoming a hazard to boat users, entangling propellers etc.

Table 8: Red listed species.

	Name	Impacts
Red list species	(*) Demon shrimp *Dikerogammarus haemobaphes*	Highly aggressive species, preys on native shrimp, mayflies, damselflies, leeches, snails, fish eggs and larvae. Profound impact on the balance of our whole aquatic ecosystem.
	Ruddy Duck *Oxyura jamaicensis*	Threatens the endangered white-headed duck (*Oxyura leucocephala*) with extinction due to hybridisation and competition.
	Floating pennywort *Hydrocotyle ranunculoides*	Very invasive and fast growing. Can quickly cover a waterbody, blocking out light and outcompeting native vegetation. Can impact on access and navigation and choke waterbodies.
	American skunk cabbage *Lysichiton americanus*	Displacement and local extinction of species via competition. High economic impact of removal.
	American signal crayfish *Pasifastacus leniusculus*	Contributing to the rapid decline of the native white-clawed crayfish due to transmission of crayfish plague and competition. They also predate a wide range of animals and so may impact on other native species and food webs. The species creates deep and interconnecting tunnels in the riverbanks which can lead to bank instability and erosion, increased flooding.
	Chinese mitten crab *Eriocheir sinensis*	Voracious predator affecting both marine and freshwater ecosystems. Eats a range of invertebrates and fish eggs, impacting populations. Burrows into river banks causing erosion & collapse and increasing river turbidity & increasing siltation on gravel beds vital for fish spawning. Can damage fishing gear, block intake screens and increased repairs to flood defences.
	Parrots feather *Myriophyllum aquaticum*	Can increase the risks of flooding by blocking watercourses and drainage channels. Can rapidly dominate a water body displacing native species, disruption of erosion-deposition, block light from water, prevent wind mixing leading to oxygen depletion and out-compete native species.
	Zebra mussel *Dreissena polymorpha*	Can filter about a litre of water a day which can reduce oxygen and nutrients in the water for other fauna. It will attach itself to native mussel which can result in their death and further reduced population. Can clog water pipes, filters and turbines so effect water treatment works and power station intakes. Can impact on fisheries aquaculture and shipping due to attaching itself to equipment. Sharp shells may cause injury.

Table 9: Amber and Green listed species.

Amber list species	Green list species
Giant hogweed *Heracleum mantegazzianum*	New Zealand pigmyweed *Crassula helmsii*
Himalayan balsam *Impatiens gladulifera*	Canada goose *Branta canadensis*
Japanese knotweed *Fallopia japonica*	Canadian waterweed *Elodea canadensis*
Giant knotweed *Fallopia sachalinensis*	Nuttalls waterweed *Elodea nuttallii*
Hybrid knotweed *Fallopia x bohemica*	American mink *Neovison vison*
Himalayan knotweed *Persicaria wallichii*	Monkey flower *Mimulus guttatus*
Water fern *Azolla filiculoides*	

Response Protocols

There are five key elements of response protocols that need to be considered. Stakeholder responsibilities and funding of these actions will need consideration as it is likely that swift action will be required.

Table 10. Key elements of response protocols.

Response	Action	How?
Early detection	Raise public and other stakeholder awareness of invasive non-native species. The 'eyes' of the early warning system are trained members of the public and stakeholders Promote how and where to report sightings	Training workshops press releases Presentations Interpretation boards Posters Leaflets Report via INNS Mapper[19] and local biological recording centre
Interception and preventing establishment	Contain / prevent from spreading any further or elsewhere	Biosecurity measures Biosecurity inspections Awareness raising
Eradication where possible	If within a limited geographical area or areas and an effective methodology available	Alert Species Contingency Response Process [20]

[19] http://ywt-data.org/inns-mapper/

[20] http://www.nonnativespecies.org/index.cfm?pageid=623

		Strategy – working together to systematically eradicate
Long-term management	Where eradication is no longer possible due to the number and extent of outbreak, or lack of effective control methods;	Good practice management [21] Seek advice and guidance on control methods

There are three levels of response for **blacklisted** species:

- GB priority response – led by national government organisations
- Local response at selected areas
- Contain and slow the spread

Table 11. Response Protocols

Response	Protocol	Summary
GB priority response	Report to the Non-Native Species Secretariat or CEH immediately. GBNNSS Invasive Species Action Plans (ISAPs). ISAPs are used to help coordinate the response	• Consider use of legislation to prevent sale, release and improper disposal in GB. • Increase public awareness about this species. • Eradicate the known populations • Set up suitable monitoring of water bodies • Maintain surveillance and rapidly respond if found. • Minimise the risk of re-establishment from releases and movement from existing locations.

[21] http://www.nonnativespecies.org/index.cfm?pageid=624

	to key invasive non-native species across England, Scotland and Wales. The plans provide a short and strategic overview identifying the key aims, objectives and actions.	Only two of the GB freshwater priority species have completed national contingency plans written for them, which will be triggered when reported. These are Water primrose and Topmouth gudgeon which both have an 'Invasive Species Action Plan'[22] (ISAPs). A draft ISAP is under development for Floating pennywort and can be found in the Guidance for RBP Cycle 2, August 2013.
Local response at selected areas		• Action Plan • Risk assessment • Identification documents • Management options Where INNS is a reason for a Natural Protected Area failing its conservation objectives, then measures will be included within the Site Improvement Plan (SIP). The SIP will be included in the River Basin Management Plan as part of management required to bring the Natura Protected Area into favourable condition. Natural England will also include control requirements for Sites of Special Scientific Interest (SSSI) where these are failing their Biodiversity 2020 requirements due to invasive non-native species.
Contain and slow the spread	Biosecurity measures. Currently no technically feasible method of eradication so main approach is to contain and to slow the spread.	• Establish the location and distribution of outbreak through a walk over survey. • Establish the pathway or potential pathways of introduction. • Contain the outbreak if possible. • Implementation of appropriate biosecurity measures to prevent a further introduction through the same pathway or suspected pathways. • Awareness and engagement of all key stakeholders / site users.

[22] https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=92

5. Current State of Play (2018)

During the development of this RIMP, stakeholders were asked to contribute their organisations current actions and thoughts on the following:

- Prevention / biosecurity
- Early detection and rapid response
- Eradication of high priority INNS as soon as detected
- Long-term management of widespread and well-established INNS

Results are shown in a visual form where possible and other comments have been bullet pointed.

Prevention - biosecurity

How does your organisation raise awareness / carry out biosecurity actions?

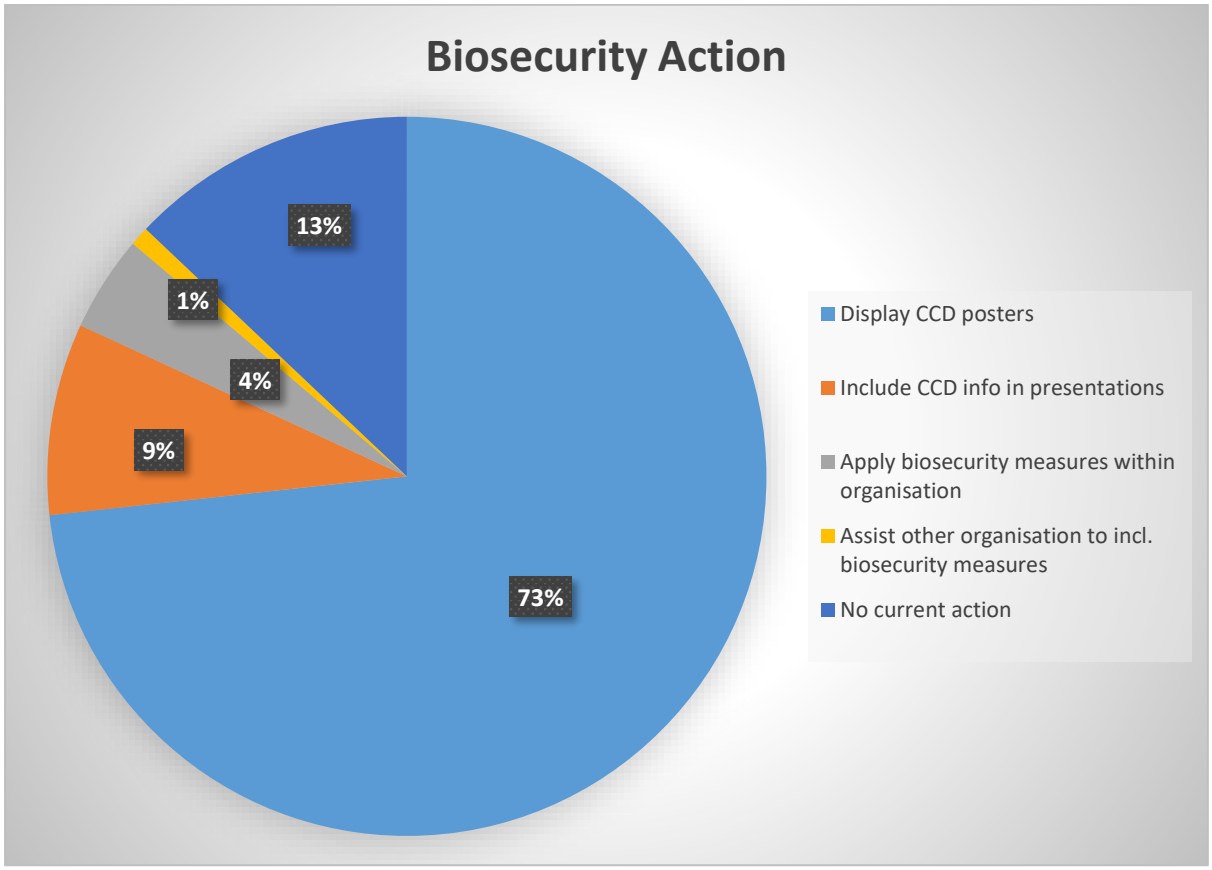


Figure 4. Current biosecurity action and promotion.

What do you think are the main reasons for people not carrying out biosecurity?

Figure 5. Perceived barriers to carrying out biosecurity.

What does biosecurity mean to you?

Figure 6. Meaning of biosecurity.

* Most stakeholders were aware of the word 'biosecurity' but not exactly what it meant and how to implement it. The term 'biosecurity' was often been confused with INNS.

- Very little targeting of pathways – mainly freshwater recreation through secondary accidental spread.

- Stakeholders are still playing catch-up rather than having a strategic roll out of biosecurity.

- Where biosecurity is a focus – it tends to be either through providing funding for research or through collaborative working and developing protocols/ best practices.

Early detection and rapid response

Would you be confident in identifying a report of a new INNS?

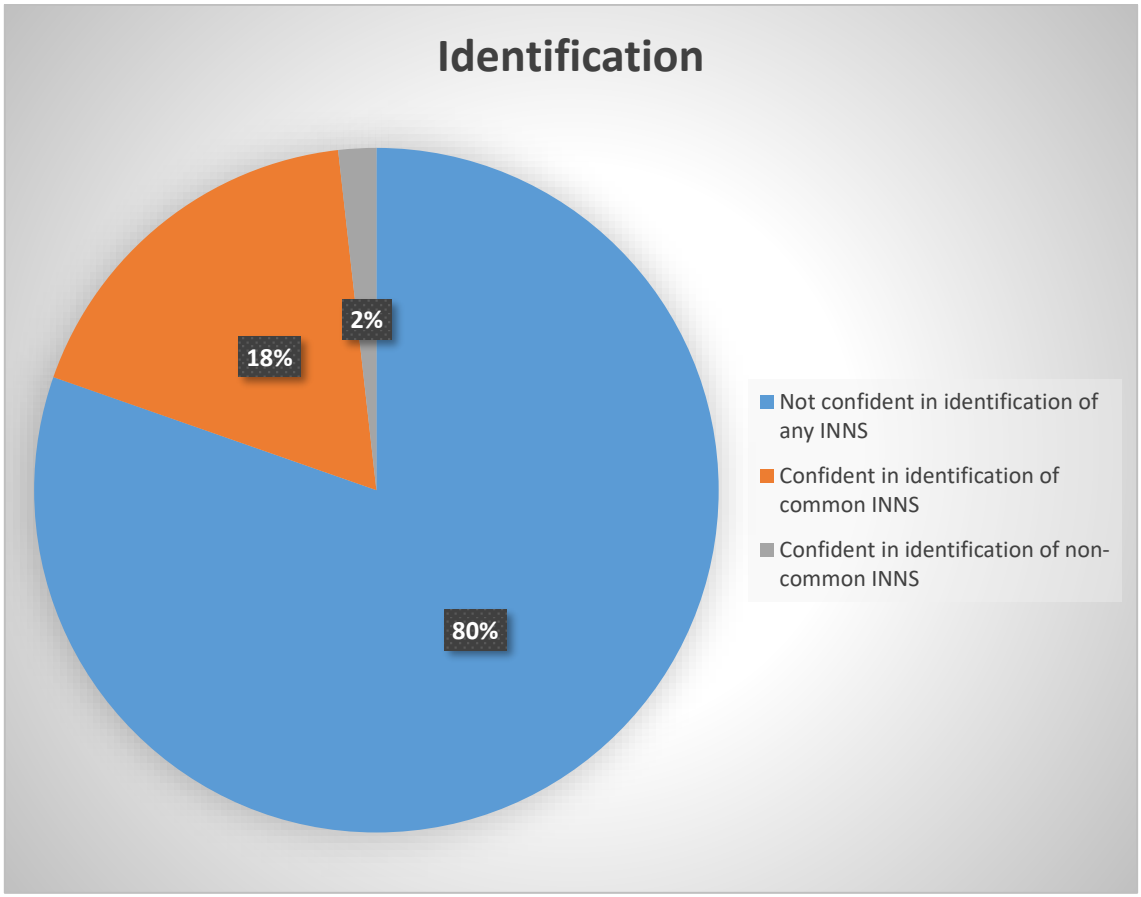


Figure 7. Confidence in identification.

- 'Common INNS' included Himalayan balsam, Japanese knotweed and Giant hogweed only. Non-common included all freshwater and marine INNS.

- Very few stakeholders had trained personnel in identification of INNS. Those that had, said that they required regular refresher training for the high-risk species (the ones they didn't see every day).

- Lack of understanding of what a high priority INNS is, how to contain and eradicate, who is responsible and where the funds come from.

Where or who would you report an INNS to?

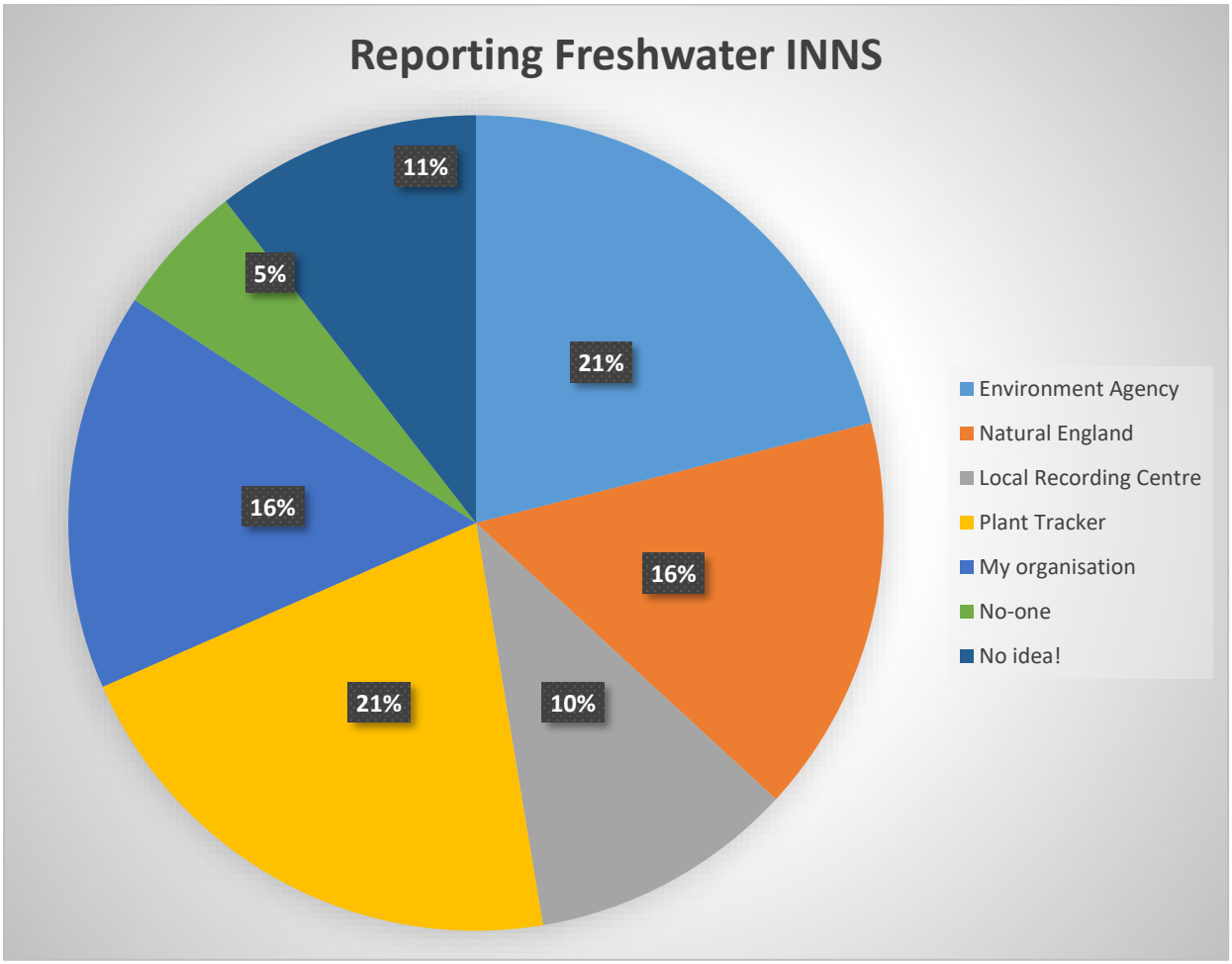


Figure 8. Reporting of an INNS record.

- All coastal/ marine stakeholders said that they would report an INNS to Natural England initially.
- Very little coordinated monitoring or surveillance being carried out. Where it is, there is a specifically funded project coordinating it.

- Still currently unclear as to who to report an INNS sighting to. (This should be to INNS Mapper)

- Coastal INNS management is primarily monitoring

- Lack of understanding of what a high priority INNS is, how to contain and eradicate, who is responsible and where the funds come from.

- There is a lack of knowledge of contacts, responsibilities, action and funding available for rapid response of high priority INNS.

- Stakeholders suggested that best-practice or case studies be made available to help informed decisions to be made. (Good Practice Management Guide)

Long-term management of widespread and well-established INNS.

Which species do you currently focus your control efforts on?

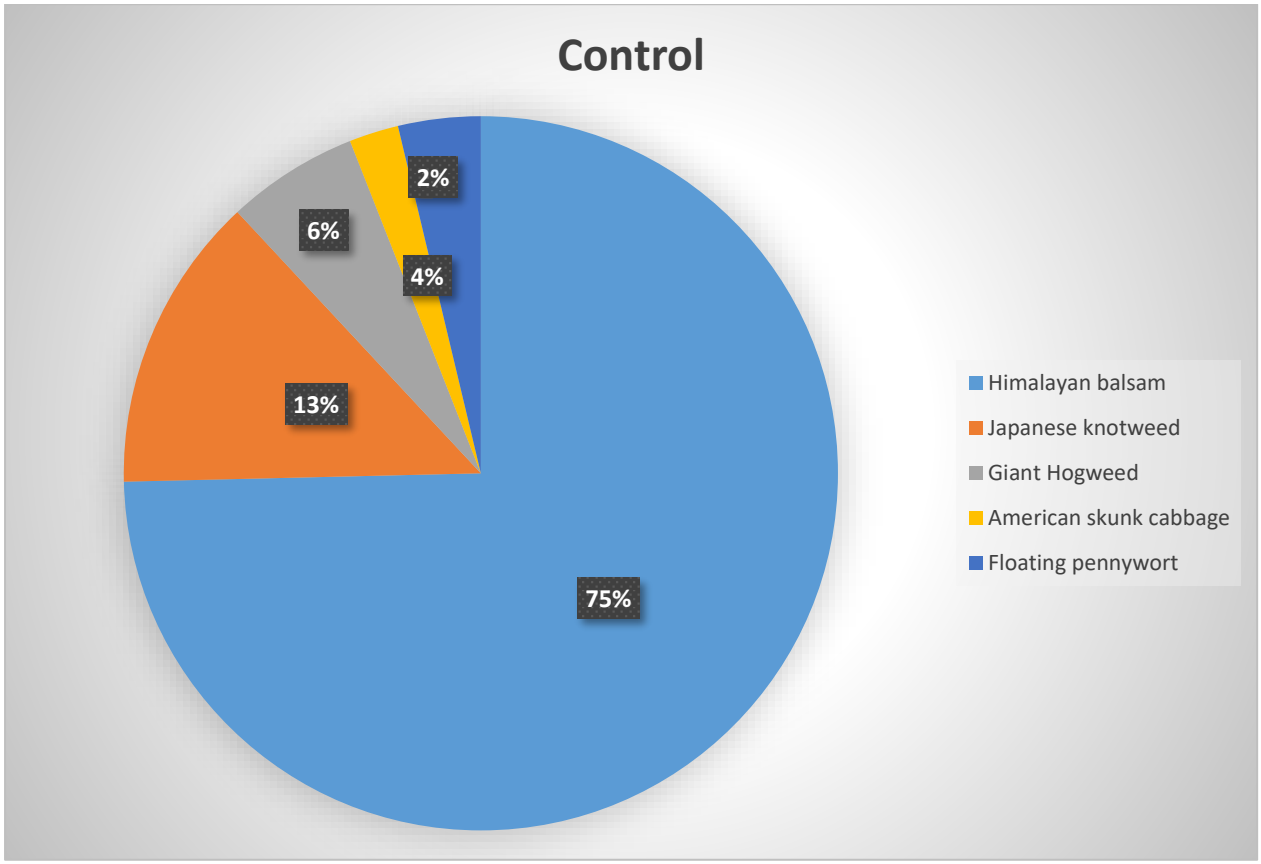


Figure 9. Species receiving control efforts.

- Funding for control works has been mainly from Environment Agency with regards to flooding, and Natural England with regards to protected sites.

- It has been easier to get funding for an INNS that is established than a threat, although funding available for wide-spread INNS control is now reducing.

- Himalayan balsam is easy to get volunteer groups together to control.

- Many of the Stakeholders are supporting the biocontrol trails for Himalayan balsam and Japanese knotweed taking place.

Where do you get your funding from for long-term control?

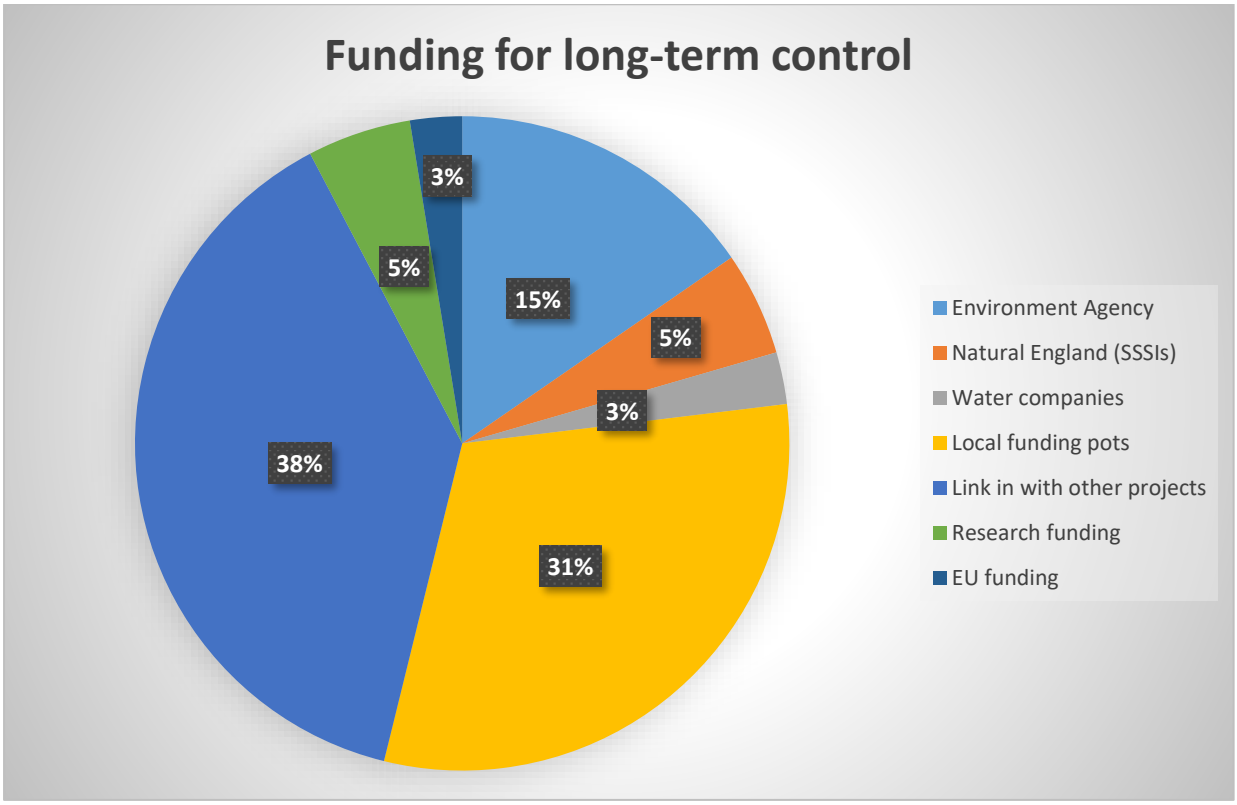


Figure 10. Reporting of an INNS record.

- Funding availability has reduced significantly in recent years for control work

- Much of the control work is reliant on volunteers but there are no funds to coordinate it strategically

- Many projects now incorporate INNS control into other projects

6. Suggested Future Actions

There is a clear need for a strategic, coordinated approach to the management of INNS. It is apparent that there is a significant gap between action on the ground, and national strategy.

Below is a list of objectives and outputs suggested to assist stakeholders when considering future priorities. Each of these actions will require a considerable amount of work.

Objective 1: Reduce the risk of the introduction and spread of INNS

Output 1.1 – Identify, address and prioritise pathways

- Identify pathways and prioritise based on potential impact and the effectiveness of pathway management
- Develop Pathway Action Plans for priority pathways

Output 1.2 – All stakeholders aware of the impacts of INNS, means of introduction and spread and acting on their responsibilities to reduce the risks

- Establish baseline understanding of biosecurity – public perceptions and behaviour
- Promote better access to information about INNS and biosecurity to targeted users

Output 1.3 – Embed biosecurity behaviours into stakeholders and other companies, organisations and water users

- Work with stakeholders, other companies, organisations and water users to ensure that biosecurity is included in plans, policies and procedures.

Objective 2: Develop and establish detection and surveillance of, and rapid response mechanisms to new incidences of INNS.

Output 2.1 – Early warning and reporting systems established and maintained.

- Deliver identification training workshops to develop and grow the early warning and reporting systems
- Promote a single point of contact/ resource for reporting new incidences of INNS
- Establish local / regional rapid response teams. Find resource for training and response actions.

Output 2.2 – Response mechanisms established for new INNS

- Create Species Response Plans for high priority INNS (blacklisted or red-listed species).

Objective 3: Maintain (and create where non) a sustainable management framework for the prioritisation and control of established INNS.

Output 3.1 – Prioritised and coordinated control and habitat restoration programmes established and operational.

- Facilitate catchment wide surveys by suitably trained personnel
- Identify and implement methods of monitoring and restricting the spread of INNS where no adequate control mechanisms currently exist.
- Facilitate control programmes for established INNS
- Support the national biocontrol programmes through putting forward potential sites for release and monitoring effects
- Aid and implement habitat restorations schemes within successful eradication areas if needed
- Identify and develop opportunities for future funding of long-term management work projects.

Objective 4: Establish a sustainable long-term legacy for the prevention, detection and control beyond existing INNS / Biosecurity specific projects

Output 4.1- Stakeholders to implement coordinated biosecurity, awareness, surveys and management of INNS without external input.

- Identify needs and support building capacity for all stakeholders.
- Identify funding to support initial steps required.

Appendices

Appendix A: Glossary

Term	Explanation
Alert Species	Specific INNS species of concern
Biosecurity	A set of preventative measures designed to reduce the likelihood of transferring INNS to another area, such as by following the 'Check Clean Dry' campaign guidelines.
Black List	A list of INNS for which there are measures in place to prevent it's entry to a country or region. Black list species are associated with high risk of severe detrimental impact on native biodiversity, health or economy.
Early Detection	When an INNS arrives, and it is quickly noticed / recorded and this information is passed on to the relevant authorities
Eradication	Removing a species entirely
Hotspot	Areas at greatest risk of INNS impact, introduction or transfer
IAS	Invasive Alien Species
INNS	Invasive Non-Native Species
Invasive non-native species	Also known as INNS or IAS. Species that have been introduced to areas outside of their natural range by man that have become invasive
LAGs	Local Action Groups
NGO	Non-Governmental Organisation

Pathway	A broad term used to describe the way in which an INNS Is introduced or spread. Also known as a vector.
Prevention	Stopping an INNS coming into an area – usually through counter measures such as biosecurity
Rapid Response	The instigation of action against an INNS threat at a stage when a locally, regionally or nationally important win might still be achievable
RIMP	Regional INNS Management Plan.
Riparian	Habitats along the sides of river banks, lakes or wetlands.

Appendix B: Useful links

- Non Native Species Secretariat
  http://www.nonnativespecies.org/home/index.cfm
  Home of all things non-native. This website provides tools and information for those working to support the GB Invasive Non-native Species Strategy.

- GB Invasive Non-native Species Strategy.
  http://www.nonnativespecies.org/index.cfm?sectionid=55
  The GB Invasive Non-native Species Strategy, originally published in 2008 and updated on 19th August 2015, is intended to provide a strategic framework within which the actions of government departments, their related bodies and key stakeholders can be better co-ordinated.

- RAPID LIFE – Reducing and Preventing Invasive Alien Species Dispersal
  http://www.nonnativespecies.org/index.cfm?pageid=615
  RAPID LIFE is a three-year project (2017-2020) piloting innovative approaches to IAS management in freshwater aquatic, riparian and coastal environments across England. The project has two strands: one strand engages regional stakeholders in the production and implementation of five Regional IAS Management Plans (RIMPS) delivering consistent, regionally tailored prevention, early warning, rapid response, eradication and control of IAS throughout England. A second phase will produce awareness raising materials and training toolkits for water resource managers and user groups along with materials to improve uptake of biosecurity to slow the spread and prevent introduction of new IAS in regions.

- INNS MAPPER
  http://ywt-data.org/inns-mapper/

  INNS MAPPER is web-tool that aims to provide a comprehensive map of INNS distribution throughout England which can be used to inform co-ordinated and targeted management planning for any organisations working to fight these damaging plants and animals. INNS Mapper allows users to record information on presence of INNS, indicate areas of absence of INNS and, crucially, any management being undertaken.

- Identification Guides
  http://www.nonnativespecies.org/index.cfm?sectionid=47
  ID sheets have been developed to provide identification assistance. These can be freely downloaded, printed, used for stakeholder engagement and linked to from external websites.

- RAPID INNS Management Toolkit: "Alert" species
  http://www.nonnativespecies.org/index.cfm?pageid=623

  Alert species are organisms that are considered highly likely to invade the UK or are already present and likely to spread. They are species that have the potential to cause signification harm economically or to native species and ecosystems. On this webpage, there are presentations on identification of species and on the contingency process as well as links to ID sheets for the species. These materials are freely available to download and use for training

- RAPID INNS Management Toolkit: Good Practice Management
  http://www.nonnativespecies.org/index.cfm?pageid=624
  Good Practice Management Guides set out management options for established invasive species based on available evidence.

- Cumbria Freshwater Biosecurity Plan (2010-2015)
  http://cfinns.scrt.co.uk/wp-content/uploads/2014/06/CFBPlan_final.pdf
  This plan can be used as a template for others to address INNS either within a catchment, county or region. It presents actions for the prevention, early detection, control and mitigation of the introduction and spread of INNS.

- Marine Invasive Non-Native Species in the Solway First 2018-2021
  http://www.solwayfirthpartnership.co.uk/uploads/Marine%20Invasive%20Non-native%20Species/Marine%20INNS%20in%20Solway%202018-2021.pdf

  This plan describes the biosecurity issues of the Solway and presents actions that have been agreed with stakeholders for the prevention, early detection, control and mitigation of the introduction and spread of Marine Invasive Non-Native Species(INNS) and those INNS of freshwater and brackish water that impact on the marine and coastal environment.

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- GB Non-native Species Risk Assessments
  http://www.nonnativespecies.org/index.cfm?pageid=143
  Risk assessment is used to assess the risk of a non-native species entering, establishing, spreading and causing impacts in GB. These pages provide information on GB risk assessment scheme developed and used in GB. Completed risk assessments are also posted here.

- UK Technical Advisory Group Classification of aquatic alien species and the WFD.
  https://www.wfduk.org/sites/default/files/Media/Assessing%20the%20status%20of%20the%20water%20environment/UKTAG%20classification%20of%20alien%20species%20working%20paper%20v7.6.pdf
  Classification of aquatic alien species found in the UK in terms of their impact on native habitats and biota.

- Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species.
  https://eurlex.europa.eu/legalcontent/EN/TXT/?qid=1483614313362&uri=CELEX:32014R1143
  The core of Regulation (EU) 1143/2014 is the list of Invasive Alien Species of Union concern (the Union list), which is updated regularly. Both the European Commission and the Member States can propose additional species for inclusion on the Union list, according to Article 4(4) of the Regulation including a risk assessment.

- List of Alien Invasive Species of Union Concern
  http://ec.europa.eu/environment/nature/invasivealien/list/index_en.htm
  Also see Appendix C for the list.
  The species included on the Union list are subject to restrictions and measures set out in the Regulation. These include restrictions on keeping, importing,

selling, breeding and growing. Member States are required to take action on pathways of unintentional introduction, take measures for early detection and rapid eradication of these species, and to manage species that are already widely spread in their territory.

- Invasive Alien Species of Union Concern - Brochure
  http://ec.europa.eu/environment/nature/pdf/IAS_brochure_species.pdf
  This brochure presents at a glance the currently listed invasive alien species of Union concern, offering brief, non-technical and informal summaries of their origin, their present distribution in the EU, how they threaten our native biodiversity, and how the applicable restrictions and obligations will help mitigate their negative impacts.

- Better Biosecurity training tool
  https://www.nercdtp.leeds.ac.uk/news/invasive/
  Leeds York NERC Doctoral Training Partnership (DTP) students Cat Shannon and Will Fincham, along with supervisor Dr Alison Dunn, have developed an online 'Better Biosecurity' training tool to raise awareness of the threat of invasive species to natural habitats. This tool is derived from their PhD research and aims to educate all environmental researchers on how they can ensure better biosecurity in their daily activities, especially while on fieldwork.

- NNSS e-learning
  http://www.nonnativespecies.org/elearning/
  The NNSS has developed a range of freely available e-learning modules to provide an introduction to non-native species and how to identify them and biosecurity.

- Non-Native Species in Great Britain: establishment, detection and reporting to inform effective decision making
  https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwitxei74f7dAhXICSwKHaKRBjQQFjAAegQICRAC&url=http%3A%2F

%2Fwww.nonnativespecies.org%2FdownloadDocument.cfm%3Fid%3D753&usg=AOvVaw3hOqG9a0qP_qPGnaanec4o

A report on a three-year Defra-funded study to enhance the ability to detect and report non-native species in GB.

Appendix C: List of Species of European Union of Concern

PLANTS

Scientific name	English/ common name
Alternanthera philoxeroides	Alligator weed
Asclepias syriaca	Common milkweed
Baccharis halimifolia	Eastern baccharis
Cabomba caroliniana	Fanwort
Eichhornia crassipes	Water hyacinth
Elodea nuttallii	Nuttall's waterweed
Gunnera tinctoria	Chilean rhubarb
Heracleum mantegazzianum	Giant hogweed
Heracleum persicum	Persian hogweed
Heracleum sosnowskyi	Sosnowsky's hogweed
Hydrocotyle ranunculoides	Floating pennywort
Impatiens glandulifera	Indian balsam
Lagarosiphon major	Curly waterweed
Ludwigia grandiflora	Water-primrose
Ludwigia peploides	Floating primrose-willow
Lysichiton americanus	American skunk cabbage
Microstegium vimineum	Japanese stiltgrass
Myriophyllum aquaticum	Parrot's feather
Myriophyllum heterophyllum	Broadleaf watermilfoil
Parthenium hysterophorus	Whitetop weed
Pennisetum setaceum	Crimson fountaingrass
Persicaria perfoliata	Asiatic tearthumb
Pueraria lobata	Kudzu vine

ANIMALS

Scientific name	English/ common name
Alopochen aegyptiacus	Egyptian goose
Callosciurus erythraeus	Pallas' squirrel
Corvus splendens	Indian house crow
Eriocheir sinensis	Chinese mitten crab
Herpestes javanicus	Small Asian mongoose
Lithobates catesbeianus	American bullfrog
Muntiacus reevesi	Muntjac deer
Myocastor coypus	Coypu
Nasua nasua	Coati
Nyctereutes procyonoides	Racoon dog
Ondatra zibethicus	Muskrat
Orconectes limosus	Spiny-cheek crayfish
Orconectes virilis	Virile crayfish
Oxyura jamaicensis	Ruddy duck
Pacifastacus leniusculus	Signal crayfish
Percottus glenii	Amur sleeper
Procambarus clarkii	Red swamp crayfish
Procambarus fallax f. *virginalis*	Marbled crayfish
Procyon lotor	Raccoon
Pseudorasbora parva	Stone moroko
Sciurus carolinensis	Grey squirrel
Sciurus niger	Fox squirrel
Tamias sibiricus	Siberian chipmunk
Threskiornis aethiopicus	Sacred ibis
Trachemys scripta	Red-eared, yellow-bellied and Cumberland sliders
Vespa velutina nigrithorax	Asian hornet