



RAPID

Reducing and Preventing
Invasive Alien Species Dispersal

Version 1
November 2018

REGIONAL INVASIVE SPECIES MANAGEMENT PLAN (RIMPS): MIDLANDS REGION



EXECUTIVE SUMMARY



This document is a part of the RAPID LIFE Project, a three-year EU Life funded project whose objective is to deliver a package of measures to reduce the impact and spread of IAS in freshwater aquatic, riparian and coastal environments across England. RAPID seeks to bridge the gap between high-level strategies (such as the GB IAS strategy) and action on the ground at local level.



Using a template and guidance developed by national IAS experts, local experts have produced RIMPs for each of five regions in England: North, Midlands, East of England, South West and South East. The RIMPs will deliver consistent (but regionally tailored) recommendations on prevention, early warning, rapid response, eradication and control of IAS (in the above listed target environments) throughout England.



The purpose of the current document is to guide IAS management activities in the Midlands region and to help them to be strategic and coordinated with other regions. The size of the Midlands region is 2.9×10^6 ha. It covers 23 counties.



In the development of this RIMP, two freshwater stakeholder engagement events and individual teleconferences were held to review the draft RIMP, as well as additional feedback from experts. Where appropriate, each RIMP has been modified to incorporate feedback from this consultation. A total of sixty-eight stakeholders were consulted during the development of the Midlands RIMP, with fifteen active consultees.



This document categorises INNS in the Midlands region by priority. It also details pathways of introduction, the hotspots and areas of high conservation value and also the key stakeholders. In this document, IAS are allocated to a priority category for management based on their risk and relative occurrence in the region: Black – prevention; Red – eradicate; Amber & Green – long-term management.



This study has focused on fifty-six priority INNS for the Midlands, which are either established, or have the potential to become established in the future. Of the fifty-six species described, twenty are plants, ten are fish, eleven are crustaceans, four are birds, four are amphibians, three are mammals, three are bivalves and one is a reptile.



The RIMPs also contain information and/or links to information on IAS identification, reporting procedures and best practice management guidelines. All of the RIMPs will need be reviewed periodically and updated as needed to reflect current trends, partnerships and best IAS management practices.

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We would also like to acknowledge the contribution of the following stakeholders: Chantelle Grundy (British Canoeing), Martin Fenn (Environment Agency), Louisa Davis (Severn Trent), Karen Twine (Environment Agency), Peter Powell (Severn Rivers Trust), Tracey Doherty (Warwickshire Wildlife Trust), Emily Smith (Angling Trust), Zara Turtle (Severn Trent), Will Pegg (Environment Agency), Joseph Hamer (Network Rail), Dusi Thomas (Dŵr Cymru), Sarah Baker (GLNP), Ian Rotherham (Sheffield Hallam University), Sophie Cowling (Herefordshire Wildlife Trust) and Chris Jackson (Nottinghamshire County Council).

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INTRODUCTION

The RAPID LIFE Project

Globally, Invasive Alien Species (IAS) are considered to be 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 (2017-2020) overseen by the Animal and Plant Health Agency (APHA), working in partnership with the British Zoological Society (BZS) and Natural England. The project, coordinated by Alexia Fish, aims 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. There is currently no Local Action Group (LAG) or lead LAG which covers the Midlands Region.

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 distinction between 'invasive species' and 'non-native species', is

defined by the GB Non-Native Species Secretariat (GBNNSS) as follows:

"Man first arrived in Britain about 8,000 years ago and virtually all new land animals and plants that have become established since this date have been brought here by man. These are all **non-native species**.

However, we must not think that all non-native species are bad – indeed it is only a minority that have serious negative impacts on our native British species, our health, or our economy. These species we call **invasive non-native species**."

Finally, biosecurity (a core theme of this document and central to INNS management) is defined by the GBNNSS as follows:

"Biosecurity is about reducing the risk of introducing or spreading invasive non-native species (and other harmful organisms such as diseases) in the wild."

See the GBNNSS website for further information:

<http://www.nonnativespecies.org/index.cfm?pageid=64>

THE REGIONAL INVASIVE MANAGEMENT PLANS (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 INNS 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 INNS.

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 ‘hotspots’ for INNS introductions, assisting local stakeholder groups to identify priority 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.

METHODOLOGY

The RIMPs are designed to be a ‘living document’ which will be updated in relation to the current conditions of a RIMP Region. The Midlands RIMP cover a number of counties (Figure 2) and has

been compiled by JBA Consulting ecologists Catherine Porter, Mairi Gillis, Kimberley Jennings & Dr Steven Heathcote, with the help of local experts from the region, using the template provided by **Animal and Plant Health Agency (APHA)**.

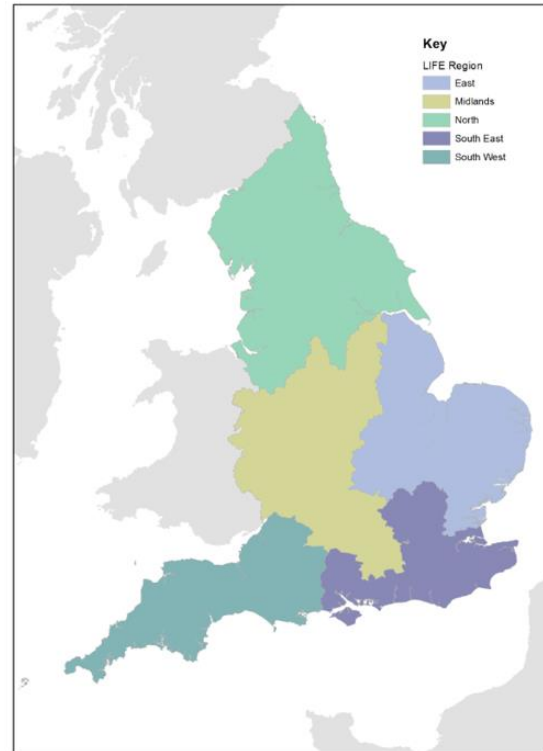


Figure 1: For the purposes of the RAPID LIFE Project, England has been split into five regions. See Appendix D for a larger map.

This RIMP was collated using data from numerous sources including: local records centres, NBN Atlas, JNCC, Magic Map, GBNNSS, Natural England, CABI, Grey Literature, peer reviewed literature, Global Biodiversity Information Facility Secretariat and input from the stakeholder events. Pre-2008 data records were not included following discussion with APHA, in order to try to keep the document as up to date as possible by only using records from the past 10 years.

A series of consultation events were undertaken with local experts and stakeholders. The stakeholder events were held on 17th and 18th July 2018 and covered freshwater and riparian habitats. Further teleconferences were held with other interested stakeholders throughout July, August and September 2018.

The Midlands RIMP identifies regional and local potential pathways and 'hotspots' for the introduction of INNS, to help local stakeholder groups identify priority areas for awareness-raising and modes of delivering educational messages.

Within the Midlands region, sites of high conservation value, which are vulnerable to invasion of INNS have been identified. Figure 4 shows the collective designated sites across the Midlands region. This list was then narrowed down to a more focused list of the most sizeable sites with an aquatic element and specific vulnerabilities to invasive species.

INNS identified within each region have been allocated a priority category for management based on their risk and relative occurrence within a region: Black – prevention; Red – eradicate; Amber & Green – long-term management.

Prevention: Biosecurity targets all INNS, but with an emphasis on GB national 'alert' species and regional 'Black List' species.

Early Detection and Rapid Response: Focuses on the development and surveillance of new INNS (i.e. 'alert' and regional 'Black List' species) and rapid

response mechanisms. If any new incursions of these species are discovered, the species would be immediately included under the 'eradicate' category.

Eradication: Focuses on INNS already found to exist in the region but only in very limited occurrences (Red List Species). The goal is to remove the infestation to prevent further establishment and spread.

Long-term Management: Focuses on existing INNS. The goal is to apply control measures and practice good biosecurity to keep the species from spreading to uninvaded areas. This will involve strategic control through the prioritisation of certain landscapes and/or species. Species are classified as Amber and Green List species.

The Midlands RIMP contains information and/or links to information on INNS identification, reporting procedures and best practice management guidelines from resources including GBNNSS, CEFAS, CEH, Conservation Evidence and the CABI: Invasive Species Compendium.

The GBNNSS are a key contact and their website is a rich resource which should be a point of reference going forward:

See:

<http://www.nonnativespecies.org/home/index.cfm>

More specifically, information on aquatic and riparian INNS can be found on the Angling Trust website. See:

<https://www.anglingtrust.net/page.asp?section=649§ionTitle=Invasive+Non-Native+Species>.

Finally, **we do encourage all readers to submit records of INNS to INNS Mapper:**

<http://www.ywt-data.org/inns-mapper/home> Note: INNS Mapper is connected to iRecord and the NBN.

Alert species records should be submitted directly to GBNNSS/CEH.

See:

<http://www.nonnativespecies.org/alerts/index.cfm> and

<https://www.ceh.ac.uk/data>.

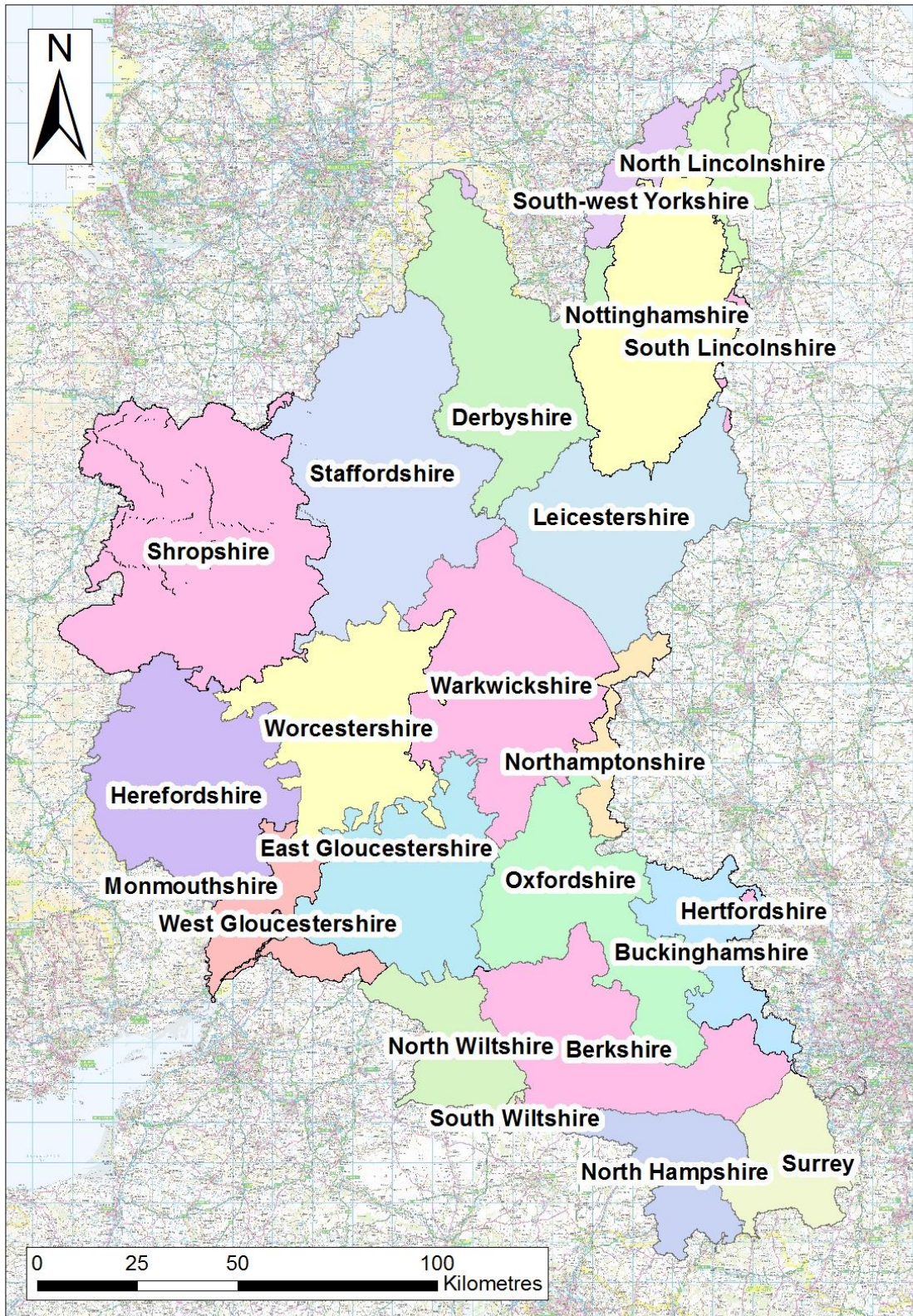


Figure 2: The Midlands region covers a number of English counties. Contains Ordnance Survey Data © Crown Copyright and Database Rights 2018.

The RAPID LIFE Regions have been based on Environment Agency's management catchments shown in Figure 3.

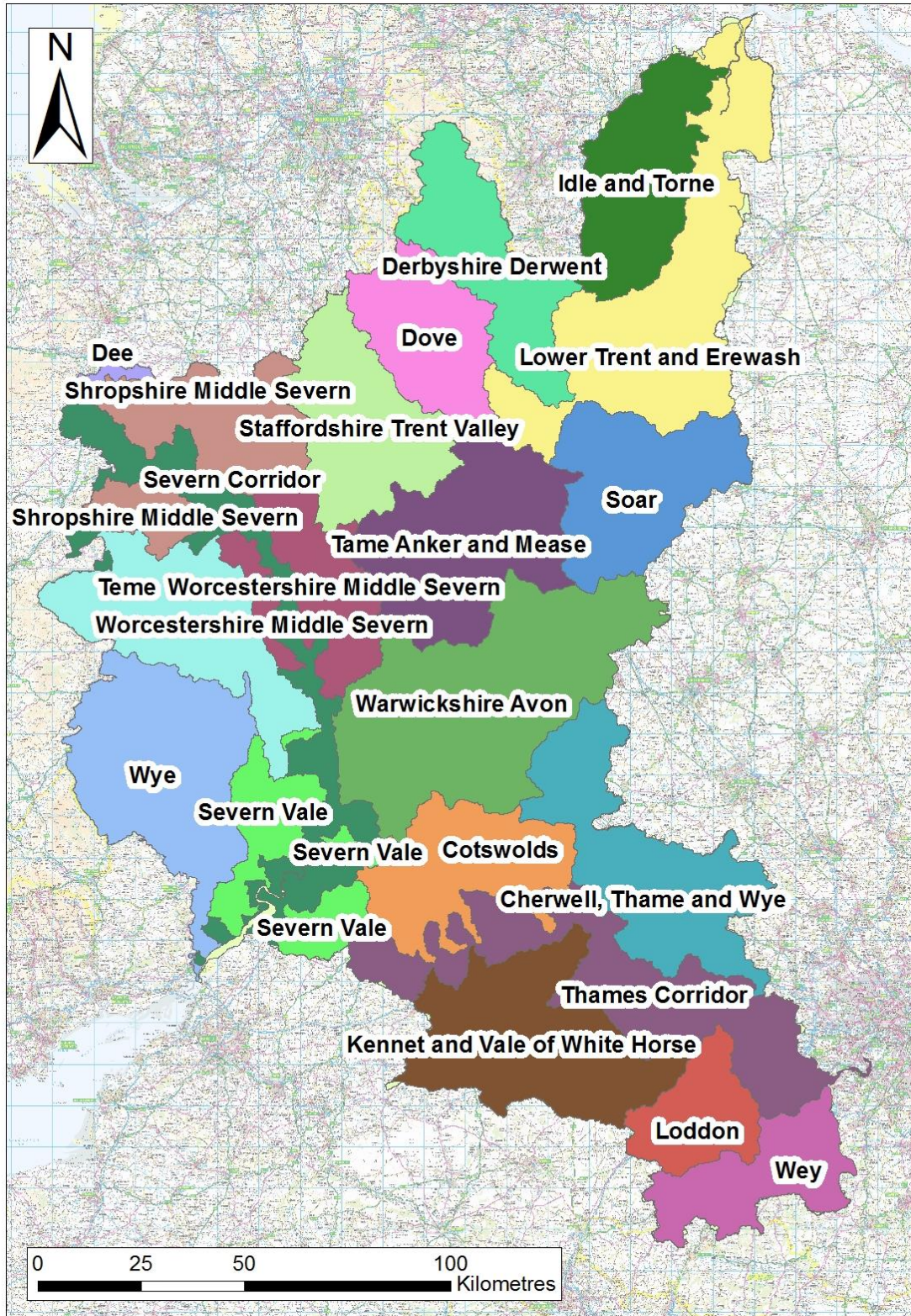


Figure 3: EA Management Catchments in the Midlands Region. Contains Ordnance Survey Data © Crown Copyright and Database Rights 2018.



SECTION 1: INNS PATHWAYS AND ASSOCIATED REGIONAL STAKEHOLDERS

INTRODUCTION

Table 1-1 below details the pathways by which INNS are introduced within the Midlands region. These mechanisms of introduction represent key vulnerabilities for the Midlands that need to be carefully monitored and controlled. Where possible, preventative measures should be taken to halt further spread of INNS by these mechanisms.

REGIONAL PATHWAYS AND STAKEHOLDERS

For each pathway of introduction, Table 1-1 lists the associated regional stakeholder for whom there is a responsibility to prevent further spread of INNS. This information is useful for identifying the target audience for education and awareness raising.

Table 1-1: Pathways for the introduction of INNS and associated stakeholder groups in the Midlands

| Pathway | Regional associated stakeholder | Local context |
|--|---|--|
| Intentional introduction or planting. | Riparian landowners, members of the public, local councils (see Table 3-1)/EA (Environment Agency)/DEFRA (Department for Environment, Food and Rural Affairs)/NE (Natural England)/Plantlife/APHA (Animal and Plant Health Agency)/ RHS/ gardeners. | The River Sheaf on the very northern boundary of the Midlands region is choked with signal crayfish. It is thought that children have facilitated the spread of this INNS throughout the catchment via capture and release (personal communication, stakeholder). It is likely that this is true of other urban areas within the Midlands where signal crayfish are present. |
| Fouling and ballast water of marine vessels. | EA/DEFRA/ water users/ estuary managers/ fisheries. | The Midlands Region includes two estuaries-The Humber and Severn. Ports here represent sites where marine vessels could provide a source of INNS. |
| Fouling and ballast water of freshwater vessels. | EA/DEFRA/APHA; local canoe and water sports organisations; Royal Yachting Association (RYA); River Trusts/ fisheries. | A number of key freshwater waterways within the Midlands act as a source of INNS via ballast water. For example, the Rivers Trent, Severn, Wye and Thames. |

| Pathway | Regional associated stakeholder | Local context |
|---|---|---|
| Sale from pet stores. | Birdlife International/ RSPB/ BTO/ pet shops/ Canal and Rivers Trust. | This transmission pathway ties in with 'intentional introduction' as exotic INNS/pets are often released into the environment when their owner tires of them or they grow too large. The release of INNS via this means is often focused around urban areas e.g. Birmingham, Nottingham and Leicester. |
| Sale and release from garden or pond centres (ornamental horticulture). | Ornamental fish producers/ Horticultural Trade Association/ pet trade/ plant trade/ Royal Horticultural Society/ Angling Trust/ garden centres. | water lettuce <i>Pistia stratiotes</i> is susceptible to frost and hence more prevalent in the southern Midlands. Garden centres are breeding more hardy varieties which if subsequently released, could establish within northern counties such as Derbyshire. |
| Contaminated agricultural equipment. | EA/DEFRA/APHA; farming and Wildlife Advisory Group; Campaign for the Farmed Environment; farmers and landowners. | Seeds from Himalayan balsam <i>Impatiens glandulifera</i> are easily spread via farm machinery. This is especially true of farms in the rural Midlands with a riverine element. Himalayan balsam is widespread across the Midlands and hence this applies to a high percentage of the area but is likely to be more problematic in locations such as rural Oxfordshire where Himalayan balsam is present but less concentrated. |
| Recreation (i.e. mountain biking, horse riding etc.). | Forestry Commission/ Wildlife Trusts/ Woodland Trust/ Natural England/ members of the public. | Scattered across the Midlands are a number of key recreational sites where members of the public have the potential to spread INNS. For example, Cannock Chase, Staffordshire and Sherwood Forest Country Park, Nottinghamshire. |
| Waterway network. | Canal and Rivers Trusts/ EA/ Defra/ Natural England / British Canoeing. | A number of key freshwater waterways within the Midlands act as a source of INNS via see transfer and natural colonisation. For example, the Rivers Trent, Severn, Wye and |

| Pathway | Regional associated stakeholder | Local context |
|---------|---------------------------------|--|
| | | Thames and Canals such as Coventry and Oxford. |

RECREATIONAL PATHWAYS

Table 1-2 expands on recreation as a high-risk pathway within the Midlands region and lists areas in the Midlands which are more likely to be susceptible to INNS invasions. This includes areas where INNS have not been present before, or areas which may be susceptible to additional INNS invasions than those already present. These areas have been identified in relation to their high level of recreational traffic from a number of identified high-risk activities.

Table 1-2 can be used to target specific sites for educational awareness raising and INNS monitoring programmes at the local level.

Table 1-2 Regional high-risk areas in the Midlands Region

| Site | Location | Habitat | Risk Activities |
|------------------------------|---|---------------------|---|
| Pennine Way | Derbyshire | Various | Long distance walking |
| Staffordshire Way | Staffordshire | Various | Long distance walking |
| Heart of England Way | Staffordshire, Warwickshire & Gloucestershire | Various | Long distance walking |
| Cannock Chase | Staffordshire | Woodland; grassland | Cycling, walking |
| Branston Water Park | Staffordshire | Pools | Swimming, water sports, boating |
| Kingsbury Water Park | Warwickshire | Pools | Swimming, angling, sailing, boating, water sports |
| West Midlands Angling Centre | Staffordshire | Freshwater | Angling |
| Hunnington Coarse Fishery | Worcestershire | Freshwater | Angling |
| Elmbridge Fishery | Worcestershire | Freshwater | Angling |
| Bransford Game Fisheries | Worcestershire | Freshwater | Angling |
| Woodland View Fishery | Worcestershire | Freshwater | Angling |
| Broad Acre Lake Fishery | Worcestershire | Freshwater | Angling |
| Solhampton Fishery | Worcestershire | Freshwater | Angling |
| The Well Top Barn Farm | Worcestershire | Freshwater | Angling, walking |
| Alvechurch Fisheries | West Midlands | Freshwater | Angling |

| Site | Location | Habitat | Risk Activities |
|--|------------------|---|---|
| Moorlands Farm Coarse Fishery | West Midlands | Freshwater | Angling |
| Bells Mill Fishery & The Cabin Café | West Midlands | Freshwater | Angling |
| Monkhall Fishery | Shropshire | Freshwater | Angling |
| Woodside Fishery | Shropshire | Freshwater | Angling |
| Springwood Fisheries | Derbyshire | Freshwater | Angling |
| Andy's Fishing Lake | Herefordshire | Freshwater | Angling |
| Evesbatch Old Lake Carp Fishing | Herefordshire | Freshwater | Angling |
| Docklow Pools | Herefordshire | Freshwater | Angling |
| Spring Grange Fisheries | Leicestershire | Freshwater | Angling |
| Mallory Park Fisheries | Leicestershire | Freshwater | Angling |
| Foxholes Fisheries | Northamptonshire | Freshwater | Angling |
| Pitsford Fishery | Northamptonshire | Freshwater | Angling |
| Ecton Lakes | Northamptonshire | Freshwater | Angling |
| Springvale Fishing Lakes | Nottinghamshire | Freshwater | Angling |
| Portland Fishing Lakes | Nottinghamshire | Freshwater | Angling |
| Quintons Orchard Fish Farm | Staffordshire | Freshwater | Angling |
| Heronbrook Fisheries | Staffordshire | Freshwater | Angling |
| Seighford Lakes Fishery | Staffordshire | Freshwater | Angling |
| Cudmore Fisheries | Staffordshire | Freshwater | Angling |
| Millbrook Fisheries | Staffordshire | Freshwater | Angling |
| Doglane Fishery | Warwickshire | Freshwater | Angling |
| Weston Lawns Fisheries | Warwickshire | Freshwater | Angling |
| Tunnel Barn Farm | Warwickshire | Freshwater | Angling |
| Bristol Channel Fisheries | Gloucestershire | Freshwater | Angling |
| Linch Hill Leisure Park - Linch Hill Fishery | Oxfordshire | Freshwater | Angling |
| Sherwood Forest Centre Parcs | Nottinghamshire | Freshwater | Water sports |
| Attenborough Sailing Club | Nottinghamshire | Freshwater | Sailing & water sports |
| Sherwood Forest Country Park | Nottinghamshire | Woodland | Walking, cycling, horse riding |
| Amber Valley | Derbyshire | Freshwater ponds, woodlands, grasslands | Boating, cycling, walking, horse riding |
| Berrington Hall | Herefordshire | Freshwater lake, woodlands, grasslands | Boating, walking |

| Site | Location | Habitat | Risk Activities |
|--|--------------------------------|---------------------------------------|---|
| Queenswood & Bodenham Lakes | Herefordshire | Freshwater lake, woodland | Boating, walking, swimming |
| Abbey Park | Leicestershire | Freshwater lake | Boating |
| Corby Boating Lake | Northamptonshire | Freshwater lake, grassland | Boating, walking, angling |
| Grendon Lakes | Northamptonshire | Freshwater lake | Boating, water sports |
| Nene Valley Waterski Club | Northamptonshire | Freshwater lake | Water sports |
| Highfields Park Boating Lake | Nottinghamshire | Freshwater lake, grassland | Boating, walking |
| The Mere | Shropshire | Freshwater lake | Boating, walking |
| Rudyard Lake | Staffordshire | Freshwater lake | Boating |
| Whitemoor Lakes | Staffordshire | Freshwater lake | Activity centre, water sports, boating |
| Staffordshire and Worcestershire Canal | Staffordshire & Worcestershire | Freshwater canal | Stafford Boat Club, boating |
| Cannon Hill Park | West Midlands | Freshwater lake, grassland | Boating, walking, cycling |
| Lenches Lakes | Worcestershire | Freshwater lake | Boating, swimming, walking |
| Shatterford Lakes | Worcestershire | Freshwater lake | Angling, walking |
| Cotswold Water Park | Gloucestershire, Oxfordshire | Freshwater lakes | Water sports, swimming, cycling, walking |
| Queenford Lakes Water Sports Centre | Oxfordshire | Freshwater lakes | Water sports, swimming |
| Hardwick Parks Watersports Park | Oxfordshire | Freshwater lake | Water sports, angling |
| Hinksey Park | Oxfordshire | Freshwater Lakes, grassland, woodland | Swimming, cycling, walking, angling, scuba-diving |
| River Mease | Leicestershire & Staffordshire | Freshwater | Boating |
| River Teme | Shropshire | Freshwater | Boating, walking, cycling |



SECTION 2: PRIORITY AREAS FOR EDUCATION AND AWARENESS RAISING

INTRODUCTION

Using the key pathways and stakeholders identified in the Section 1, Table 2-1 below identifies the priority areas for education and awareness raising within the stakeholder groups. Table 2-1 specifies a delivery mechanism for how this might be achieved.

Education and awareness raising relies on communicating the basic facts surrounding INNS, their impacts, and how they can be controlled by a given stakeholder group. Awareness raising should also be used to encourage and implement local-level monitoring programmes which can feed into national data sets on INNS. For example, the INNS Mapper, developed by the Yorkshire Wildlife Trust (<http://ywt-data.org/inns-mapper/home>) which now has capacity for national level data sets and coverage of INNS. It is hoped this approach can be used to help stakeholders to recognise introductions of INNS as soon as possible and act quickly to eradicate them via data sharing platforms.

Table 2-1: Priority areas for education and awareness-raising

| Stakeholder Group | Priority Area | Delivery Mechanism |
|---|---|---|
| Plant nurseries and plant/pond/aquarium retailers | <ul style="list-style-type: none"> - Promotion of existing codes of best practice covering the security and disposal of INNS, such as the “Be Plantwise” campaign. - Target gardeners to dispose plant material and/or soils responsibly. - Encourage gardeners to buy alternatives to INNS. | <ul style="list-style-type: none"> - APHA/local stakeholders to work with retailers to encourage distribution of codes and posters (available from APHA/ GB non-native species secretariat (GBNNS)/Plantlife) and to advise the general public of INNS issues. - Crack down on mislabelling of aquatic invasive alien plants and online sale where possible. - Conservation NGOs to produce materials promoting alternative garden plants to INNS and to advise on subjects such as the appropriate disposal of green waste (Hulme <i>et. al.</i> 2018). - APHA/local stakeholders to encourage celebrity gardeners to raise awareness of INNS issues (Hulme <i>et. al.</i> 2018). - Local stakeholders to target local gardening clubs/horticultural societies etc. for volunteer recruitment of INNS control (e.g. balsam bashing) to foster behavioural change (Hulme <i>et. al.</i> 2018). |
| Water user associations (canoeists, sailing) | <ul style="list-style-type: none"> - Promote knowledge of biosecurity issues to clubs, participants and visiting users and | <ul style="list-style-type: none"> - Locally based experts to work with associations to promote disinfection of equipment and use of appropriate facilities to |

| Stakeholder Group | Priority Area | Delivery Mechanism |
|----------------------|--|--|
| clubs/angling clubs) | <p>awareness of the dangers arising from INNS.</p> <ul style="list-style-type: none"> - Limit the spread of INNS between waterbodies. | <p>eliminate the risk of accidental transfer of INNS.</p> <ul style="list-style-type: none"> - Check, Clean, Dry campaign. - GBNNSS website, particularly RAPID section. - Work with locally based experts to disseminate best practices and appropriate signage to reduce threats from INNS. - Promote INNS surveying amongst large membership of paddlers, within organisations such as British Canoeing; to encourage behavioural change and to raise awareness of the impact of INNS to public / recreational users. - For competitions, ensure that people arrive with clean boats/gear (cleaned out of the water-see RAPID LIFE webpages for detailed guidance: http://www.nonnativespecies.org/index.cfm?pageid=621), before they're allowed to compete – can make this clear in competition packs/adverts beforehand - Biosecurity videos made by APHA as part of RAPID to be circulated. |
| Landowners | <ul style="list-style-type: none"> - Promote knowledge of biosecurity issues amongst tenants and resource users. | <ul style="list-style-type: none"> - Work with locally based experts to disseminate best practices and appropriate signage to reduce threats from INNS. - GBNNSS website awareness, particularly RAPID section. - Biosecurity videos made by APHA as part of RAPID to be circulated |
| General public | <ul style="list-style-type: none"> - General awareness of impacts and measures to prevent/control INNS. - Correct disposal of unwanted pets. - Priorities for education include: <ul style="list-style-type: none"> - Go back to basics- 'what is an invasive alien species?' - Why INNS cost the economy so much. - How INNS impact the public. - Link between INNS and flooding. | <ul style="list-style-type: none"> - Local media campaigns. - Use (and awareness) of websites (GBNNSS). - RAPID LIFE project leaflet promoting awareness the dangers arising from INNS and the reporting system. - Promote the biosecurity guidance to all via locally based experts. - Establish a local action group for the Midlands region to target efforts for education and awareness across the region. - Use social media (e.g. Twitter), to raise awareness, especially during invasive species week. - Promote the 're-home; don't release' message to raise awareness of the impact of dumping goldfish and other exotic pets. - Use festivals and other events to promote good biosecurity e.g. using Check, Clean, Dry posters etc. at Countryfile Live and agricultural |

| Stakeholder Group | Priority Area | Delivery Mechanism |
|---|---|---|
| | | <p>shows, boating events and competitions for example.</p> <ul style="list-style-type: none"> - GBNNSS online training promoted as a point of reference. |
| Schools/young people | <ul style="list-style-type: none"> - General awareness of impacts and measures to prevent/control INNS. | <ul style="list-style-type: none"> - School visits focusing on ecological issues and encouraging appropriate field trips. - Local wildlife charities/council community initiatives/locally based experts. - Target after school clubs e.g. sea cadets to promote good biosecurity. |
| Contractors/ground maintenance workers | <ul style="list-style-type: none"> - General awareness of impacts and measures to prevent/control INNS. | <ul style="list-style-type: none"> - Work with locally based experts to ensure dissemination of best practices. - GBNNSS website, particularly RAPID LIFE section. - Biosecurity measures to be included in method statements as standard. - Encourage sites to have their own biosecurity plan and procedures (guidance available on RAPID webpage) - Local environmental organisations to present talks on INNS to contractors. - Push from local authorities to ensure biosecurity is pushed at the planning stage of a project. |
| Water mgt. bodies (e.g. EA and water companies) | <ul style="list-style-type: none"> - Encourage recording of INNS to better understand the distribution and hence scale of problem for specific INNS in the region and promote awareness. | <ul style="list-style-type: none"> - Encourage employees to upload sightings to online database – INNS Mapper. - Make EA biosecurity internal e-training mandatory to EA employees. - Identification workshops and ID cards for employees to help facilitate more accurate recording, especially for confusion species. - INNS of the month and INNS newsletter. - INNS factsheets on key INNS including guidance on how to deal with the most significant INNS. - Sharing of data between organisations e.g. as a GIS shapefile. |
| Bee keepers | <ul style="list-style-type: none"> - Awareness raising as to impact of Himalayan balsam <i>Impatiens glandulifera</i> and alternatives to this species for honey production. | <ul style="list-style-type: none"> - Local action groups to present talks within bee keeping clubs and societies. |
| Tourists | <ul style="list-style-type: none"> - Targeted education for hotspots and high-risk areas | <ul style="list-style-type: none"> - Biosecurity awareness raising signs will be placed at key sites in each region as part of RAPID LIFE. |
| Athletes | <ul style="list-style-type: none"> - Raise awareness of the potential for athletes to spread INNS whilst | <ul style="list-style-type: none"> - Race organisers to plan responsible routes. - Briefing before race starts to avoid areas of Himalayan balsam etc. and how to recognise. |

| Stakeholder Group | Priority Area | Delivery Mechanism |
|-------------------|--|--|
| | participating in cross country, triathlon races and orienteering etc. | <ul style="list-style-type: none"> - Aim to prevent disturbance and hence spread of seeds and also raise awareness of impact of INNS. - Ensure people arrive with clean kit, shoes etc. |
| Local authorities | <ul style="list-style-type: none"> - Raise awareness of INNS within local authorities. - Ensure that INNS control is considered during local plan formation for a regional/joined up approach to INNS control. | <ul style="list-style-type: none"> - Embed INNS control into local plans and local strategies. - APHA to provide briefing documents to planners on local INNS and best practice for control. |



SECTION 3: KEY REGIONAL STAKEHOLDERS

INTRODUCTION

In order to successfully manage INNS within the Midlands region, it is necessary to encourage collaboration across geographic and ownership boundaries and coordinate shared responsibilities across all regions in England.

Table 3-1 below is a comprehensive list of relevant stakeholders within the Midlands region to engage going forward in order to achieve the aims of the Midlands RIMP. The list is divided by county boundaries where applicable. Every effort has been made to include as many relevant stakeholders as possible, but this list is by no means exhaustive, but rather a starting point for collaboration.

Stakeholders which were contacted as part of the RIMP development process are listed in Appendix C.1. All stakeholders which attended events or provided information to the project are included in Appendix C.2.

Table 3-1: Key regional and local stakeholders to engage for partnerships and collaboration

| Stakeholder group | Stakeholder |
|------------------------------|--|
| Government and agency | |
| | Environment Agency |
| | Department for Environment, Food and Rural Affairs |
| | Joint Nature Conservation Committee |
| | Animal and Plant Health Agency |
| | GB Non-native Species Secretariat |
| | Natural England |
| | Forestry Commission England |
| | Highways England |
| Local authority | |
| Derbyshire | Derbyshire County Council |
| | Derby City Council |
| | South Derbyshire District Council |
| | Peak District National Park Authority |
| South Yorkshire | Doncaster County Council |
| | Rotherham Metropolitan Borough Council |
| Nottinghamshire | Nottinghamshire County Council |
| | Nottingham City Council |
| Shropshire | Shropshire County Council |
| | Telford and Wrekin Council |
| Herefordshire | Herefordshire County Council |
| Worcestershire | Worcestershire County Council |
| Gloucestershire | Gloucestershire County Council |

| Stakeholder group | Stakeholder |
|--|--|
| Oxfordshire | Oxfordshire County Council |
| Warwickshire | Warwickshire County Council |
| | Coventry City Council |
| Leicestershire | Leicestershire County Council |
| | Leicester City Council |
| | Blaby District Council |
| | Charnwood Borough Council |
| Staffordshire | Staffordshire County Council |
| | Stoke-on-Trent City Council |
| | Staffordshire Moorlands District Council |
| Surrey | Surrey County Council |
| Berkshire/West Berkshire | West Berkshire Council |
| | Reading Council |
| | Bracknell Town Council |
| | Bracknell Forest Borough Council |
| | Borough of Wokingham Council |
| | Royal Borough of Windsor and Maidenhead |
| | Slough Borough Council |
| Lincolnshire | North Lincolnshire County Council |
| | Lincolnshire County Council |
| Wiltshire | Swindon Borough Council |
| | Wiltshire County Council |
| Buckinghamshire | Buckinghamshire County Council |
| Hampshire | Hampshire County Council |
| West Midlands | Sandwell Metropolitan Borough Council |
| | Birmingham City Council |
| | Dudley Metropolitan Borough Council |
| | Walsall Metropolitan Borough Council |
| | City of Wolverhampton Council |
| Non-governmental organisations (regional scale) | |
| | The River Restoration Centre |
| | RSPB - Eastern England |
| | RSPB - Midlands |
| | RSPB - South West England |
| | Trent Rivers Trust |
| | Severn Rivers Trust |
| | Wye and Usk Foundation Rivers Trust |
| | Cotswolds Rivers Trust |
| | Thames 21 and Thames Rivers Trust |
| | River Thames Conservation Trust |
| | Angling Trust Midlands Region |
| | The Canal and River Trust-East Midlands Region |
| | The Canal and River Trust-West Midlands Region |

| Stakeholder group | Stakeholder |
|-------------------|--|
| | The Canal and River Trust-Kennet and Avon |
| | The Canal and River Trust-Manchester, Pennine & Potteries |
| | The Canal and River Trust-North Wales and Borders |
| | The Canal and River Trust-South Wales and Severn |
| | CABI-Invasive Species Compendium |
| | The Centre for Ecology and Hydrology |
| | The Countryside Restoration Trust |
| | Farming and Wildlife Advisory Group - East Midlands |
| | Farming and Wildlife Advisory Group - West Midlands (Chris Seabridge & Associates Limited) |
| | Farming and Wildlife Advisory Group - South West (including Herefordshire) |
| | Field Studies Council |
| | Aston University |
| | Birmingham City University |
| | University of Birmingham |
| | Buckinghamshire New University |
| | University of Buckingham |
| | Newman University, Birmingham |
| | Coventry University |
| | University of Derby |
| | Harper Adams University College |
| | Loughborough University |
| | University of Leicester |
| | De Montfort University |
| | University of Oxford |
| | Oxford Brookes University |
| | Nottingham Trent University |
| | University of Nottingham |
| | University of Reading |
| | Staffordshire University |
| | University of Surrey |
| | The University of Warwick |
| | University of Wolverhampton |
| | The Open University |
| | The National Trust |
| | Natural Environment Research Council |
| | Nature Metrics |
| | Royal Society of Biology |
| | British Ecological Society |
| | Plantlife |
| | Chartered Institute of Ecology and Environmental Management |
| | Shropshire Hills Area of Outstanding Natural Beauty Trust |
| | Cannock Chase Area of Outstanding Natural Beauty Trust |

| Stakeholder group | Stakeholder |
|-----------------------|--|
| | Malvern Hills Area of Outstanding Natural Beauty Trust |
| | Wye Valley Area of Outstanding Natural Beauty Trust |
| | Cotswolds Area of Outstanding Natural Beauty Trust |
| | North Wessex Downs Area of Outstanding Beauty Trust |
| | Surrey Hills Area of Outstanding Natural Beauty Trust |
| | Woodland Trust |
| | People's Trust for Endangered Species |
| | Association of Drainage Authorities |
| | National Biodiversity Network |
| | Royal Horticultural Society |
| | National Farmers Union (West Midlands) |
| | National Farmers Union (East Midlands) |
| | Salmon & Trout Conservation UK |
| | Wild Trout Trust (Midlands) |
| | Campaign for the Farmed Environment (East Midlands) |
| | Campaign for the Farmed Environment (West Midlands) |
| | Campaign for the Farmed Environment (South East) |
| | Freshwater Habitats Trust |
| | Habitat Consultancy |
| | Inland Waterways Association |
| | Severn Trent Water |
| Thames Water | |
| South Staffs Water | |
| Dwr Cymru Water Board | |
| Derbyshire | Derbyshire Wildlife Trust |
| | Derbyshire Biological Records Centre |
| | The National Forest |
| | Derbyshire County Angling Club |
| | Beresford Fishery |
| | Birdsgrove Fishing Club |
| | Bradford River Action Group |
| | Grayling Society |
| | Leek & District Fly Fishing Association |
| | Norbury Fishing Club |
| | Osmaston Park |
| South Yorkshire | Doncaster Biological Records Centre |
| | Rotherham Biological Records Centre |
| | Yorkshire Wildlife Trust (Potteric Carr) |
| | Yorkshire Naturalists Union |
| | Doncaster Naturalists Society |
| | The Don Network (Don Catchment Rivers Trust) |
| Nottinghamshire | Nottinghamshire Biological and Geological Records Centre |
| | Nottinghamshire Wildlife Trust |

| Stakeholder group | Stakeholder |
|--------------------------------------|--|
| Shropshire | Shropshire, Telford and Wrekin Local Nature Partnership |
| | Shropshire Wildlife Trust |
| | Shropshire Ecological Data Network |
| | Rural Hub Herefordshire |
| Herefordshire | Herefordshire Wildlife Trust |
| | Association of Drainage Authorities-Marches Branch |
| | Herefordshire Biological Records Centre |
| | Wye Salmon Association |
| Worcestershire | Worcestershire Wildlife Trust |
| | Worcestershire Biological Records Centre |
| Gloucestershire | Gloucestershire Wildlife Trust |
| | Gloucestershire Centre for Environmental Records |
| | Countryside and Community Research Institute |
| Oxfordshire | Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust |
| | Thames Valley Environmental Records Centre |
| | Wild Oxfordshire |
| Warwickshire | Warwickshire Wildlife Trust |
| | Warwickshire Biological Records Centre |
| Leicestershire | Leicestershire and Rutland Wildlife Trust |
| | Leicester and Rutland Environmental Records Centre |
| | Melton and Oakham Waterways Society |
| Staffordshire | Staffordshire Wildlife Trust |
| | Staffordshire Ecological Record |
| | South Staffordshire Water |
| Surrey | Surrey Wildlife Trust |
| | Surrey Biodiversity Information Centre |
| Berkshire/West Berkshire | Berks Bucks & Oxford Wildlife Trust |
| | Thames Valley Environmental Records Centre |
| | Action for the River Kennet |
| Lincolnshire | Lincolnshire Wildlife Trust |
| | Lincolnshire Environmental Records Centre |
| Wiltshire | Wiltshire Wildlife Trust |
| | Wiltshire & Swindon Biological Records Centre |
| Buckinghamshire | Berks Bucks & Oxford Wildlife Trust |
| | Buckinghamshire and Milton Keynes Environmental Records Centre |
| Hampshire | Hampshire and Isle of Wight Wildlife Trust |
| | Hampshire Biodiversity Information Centre (HBIC) |
| West Midlands | Wildlife Trust for Birmingham and the Black Country |
| | EcoRecord |
| Recreational (regional scale) | |
| | Royal Yacht Association Midlands |
| | Royal Yacht Association North East |

| Stakeholder group | Stakeholder |
|-------------------|---|
| | Royal Yacht Association South |
| | Royal Yacht Association South West |
| | British Canoeing East Midlands |
| | British Canoeing West Midlands |
| South Yorkshire | South Yorkshire Branch British Naturalist Association |
| | Rother Valley Country Park |
| | Derbyshire County Angling Club |
| | Doncaster and District Angling Association |
| Nottinghamshire | Nottinghamshire Branch British Naturalist Association |
| | Nottingham Anglers Association |
| | Ashfield Angling Club |
| | Hucknall Anglers F C |
| | Midland Angling Society |
| | Newark & District Piscatorial Federation |
| | Nottingham Yacht Club |
| Shropshire | Shropshire Anglers' Federation |
| | Kinver Freeliners Angling Club |
| | Shropshire Sailing Club |
| Herefordshire | Hereford & District Angling Association |
| | Hereford Fly Fishing Club |
| | Hereford Rowing Club |
| Worcestershire | Astwood Bank Angling Club |
| | Evesham and District Angling Association |
| | Worcester and District United Anglers Association |
| | Worcester District Amateur Angling Club |
| | Severn Motor Yacht Club |
| Gloucestershire | Oxfordshire and Gloucestershire Branch British Naturalist Association |
| | Breakingstone Angling Club |
| | Gloucester Angling Club |
| | Watermark Fisheries |
| Oxfordshire | Andy Grey Fly Fishing |
| | Littlemore Angling Society |
| | Oxford and District Anglers Association |
| | The Masons Angling Club |
| | Yarnton & District Angling Club |
| | Oxford Sailing Club |
| Warwickshire | Plough Angling Society |
| | Barford Angling Association |
| | Mid Warwickshire Yacht Club |
| Leicestershire | Wigston Angling Society |
| | J & S Fishing Club |
| | Loughborough Soar Angling Society |
| Staffordshire | Uttoxeter Fly Fishing Club |

| Stakeholder group | Stakeholder |
|-----------------------------------|--|
| | Burslem Izaak Walton |
| | Cheadle Angling Club |
| | Victoria & Biddulph Angling Society |
| | South Staffordshire Sailing Club |
| | Stafford Boat Club |
| Surrey | Guildford Angling Society |
| Berkshire/West Berkshire | The Reading and District Angling Association |
| | Thatcham Angling Association |
| | Burghfield Sailing Club |
| Lincolnshire | Scunthorpe Pisces Angling Club |
| Wiltshire | South Cerney Sailing Club |
| | South Cerney Angling Club |
| Buckinghamshire | Marlow Angling Club |
| | Aylesbury Sailing Club |
| | Royal Air Force Sailing Association |
| | Marlow Sailing Club |
| Hampshire | Basingstoke Canal Angling Association |
| | Farnham Angling Society |
| | The Wey Valley Disabled Anglers Association |
| West Midlands | Barnt Green Fishing & Sailing Club |
| | Birmingham Anglers Association Limited |
| | Rowley and District Angling Society |
| | Victoria Mews Angling Club |
| | Midland Sailing Club |
| | Bartley Sailing Club |
| | Aldridge Sailing Club |
| | Sandwell Valley Sailing Club |
| | Birmingham Brookvale Sailing Club |
| | Olton Mere Sailing Club |
| | Himley Hall Sailing Club |
| | Dudley Sailing Club |
| Sutton Sailing Club | |
| Voluntary (regional scale) | |
| | Peak District and Lowland Derbyshire Non-native Species Initiative |
| | Nottinghamshire Biodiversity Action Group |
| | South Yorkshire Biodiversity Research Group and Network SYBRG (South Yorkshire Econet) |
| | Student Invasive Non-Native Group (SINNG) |
| | Return of the Natives |
| | Asian Hornet Action Team |
| | British Trust for Conservation Volunteers |
| | Keep Britain Tidy |
| Shropshire | Upper Onny Wildlife Group |

| Stakeholder group | Stakeholder |
|----------------------------------|--|
| Staffordshire | Staffordshire Wildlife Trust (Gayton Brook and Cannock Chase Local Action Group) |
| Industry (regional scale) | |
| | Construction Industry Research and Information Association |
| | Cemex |
| | Hanson plc |
| | Tata Steel |
| | Cemex UK Operations |
| | Aggregate Industries Europe Ltd |
| | Salop Sand & Gravel Supply Co. Ltd. |



SECTION 4: REGIONAL SITES OF HIGH CONSERVATION VALUE

INTRODUCTION

To ensure that resources available for the control of INNS within the Midlands are prioritised for management, monitoring and awareness raising; a number of high value conservation sites have been identified.

Sites of high conservation value are both sensitive and high value areas, which are defined as follows by APHA: Sensitive areas are sites that may be invaded (and would suffer significant impacts should they be they invaded), and high value areas are sensitive areas of conservation importance.

Within the Midlands region there are a high number of statutory designated conservation sites which include:

- Ramsar sites
- Special Protection Areas (SPAs)
- Special Areas of Conservation (SACs)
- Sites of Scientific Interest (SSSI)
- National Nature Reserves (NNRs)
- Local Nature Reserves (LNRs)

Other designated areas present include National Parks and Areas of Outstanding Natural Beauty (AONB).

Figure 4 below highlights the cover of designated areas across the Midlands region as a whole. As each designated site could not be looked at in isolation, the ten largest sites which contained aquatic habitats were used as examples for the purpose of this RIMP.

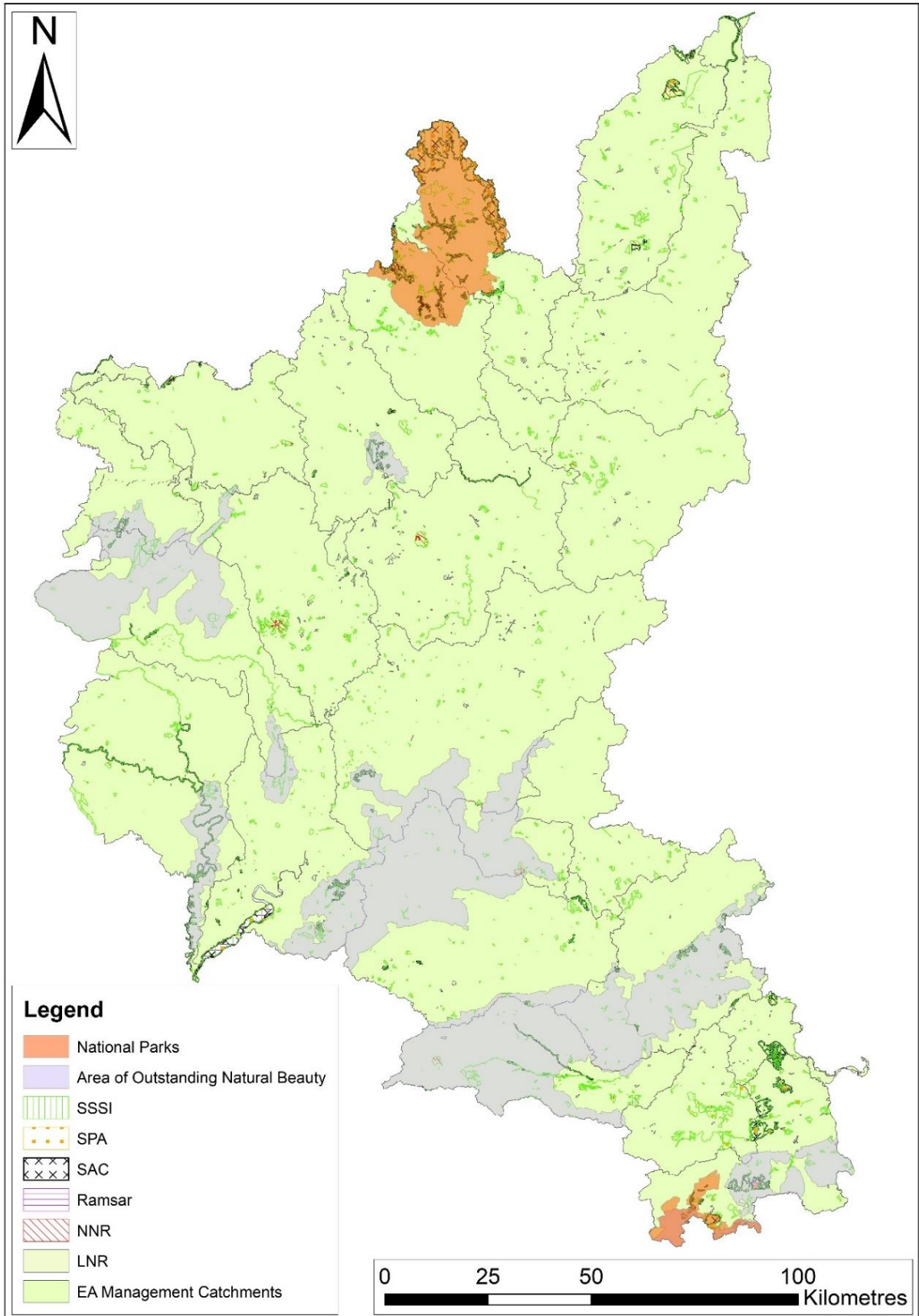


Figure 4: Designated sites within the Midlands Region (see MAGIC website for a more detailed map of designated sites across the region: <https://magic.defra.gov.uk/>)

SITES OF HIGH CONSERVATION VALUE

Table 4-1 below details sites of high conservation value within the Midlands region which need to be protected from INNS invasion. These sites are often especially susceptible to INNS on account of strongholds of sensitive endemic species which are vulnerable to specific INNS e.g. water vole *Arvicola amphibius* at risk of American mink *Neovison vison* predation.

INNS management should be strategically directed at these sites of high conservation value. The information below is sourced from the Natural England website: <https://designatedsites.naturalengland.org.uk/>, the MAGIC website: <https://magic.defra.gov.uk/> and the JNCC website: <http://jncc.defra.gov.uk/>.

Table 4-1: High conservation value sites in Midlands Region

| Site | Location | Habitat | INNS species risks | Links to further info. |
|--|----------------------------|--|---|---|
| South Pennine Moors Special Area of Conservation (SAC) | Derbyshire & Staffordshire | Blanket bogs; European dry heaths; wet heaths with <i>Erica tetralix</i> ; western acidic oak woodland; transition mires and quaking bogs. | <p>Reports of bracken <i>Pteridium aquilinum</i> and rhododendron <i>Rhododendron ponticum</i> across the site that will need to be controlled to avoid the suppression of the SAC heath, blanket bog and mire communities.</p> <p>Potential for other INNS in this SAC include: signal crayfish <i>Pacifastacus leniusculus</i>, Himalayan balsam, Japanese knotweed <i>Fallopia japonica</i>, giant hogweed <i>Heracleum mantegazzianum</i> and Australian stonecrop <i>Crassula helmsii</i> as these species have been recorded within the Peak District National Park. The plant species may have the potential to damage the wet heaths and mires by choking out other plants if they are established. white clawed crayfish <i>Austropotamobius</i></p> | <p>See the following link on the Natural England website for site specific details and further sources of information:</p> <p>https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK0030280&SiteName=South Pennine Moors &countyCode=&responsiblePerson=&SeaArea=&IFCAArea=</p> |

| Site | Location | Habitat | INNS species risks | Links to further info. |
|--|-----------------------------------|--|---|--|
| | | | <i>pallipes</i> recorded in the SAC may be outcompeted by the larger invasive alien signal crayfish. | |
| Thursley, Ash, Pirbright & Chobham SAC | Surrey | European dry heaths; northern Atlantic wet heaths with <i>Erica tetralix</i> . | Rhododendron and <i>Gaultheria</i> control is ongoing and piri-iri-bur <i>Acaena novae-zelandiae</i> has been found on site and monitoring of its spread is desirable, though so far there aren't any obvious impacts. The SAC overlaps with a large number of Sites of Special Scientific Interest (SSSI) and a couple of Special Protection Areas (SPAs). One of the SSSIs (Basingstoke Canal) has the potential to encourage the spread of various water dependent INNS through boat access. | See the following link on the Natural England website for site specific details and further sources of information: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK0012793&SiteName=Thursley, Ash, Pirbright &countyCode=&responsiblePerson=&Sea Area=&IFCAArea= |
| Thorne Moor SAC | Yorkshire & northern Lincolnshire | Degraded raised bogs | Thorne Moor is vulnerable as it has few INNS at present but has the potential for them to establish. Nearby parts of Thorne & Hatfield Moors SPA, which overlaps the SAC in some areas, has an established population of Australian stonecrop that has the potential to spread to the Thorne Moor SAC. | See the following link on the Natural England website for site specific details and further sources of information: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK0012915&SiteName=Thorne Moor &countyCode=&responsiblePerson=&Sea Area=&IFCAArea= |
| River Wye SAC | Gloucestershire & Herefordshire | Transition mires and quaking bogs; rivers with floating vegetation often dominated by water-crowfoot | Himalayan balsam, Japanese knotweed, giant hogweed (and hybrids) are present throughout the catchment and these require control. In addition, a management strategy is required for signal crayfish which are also present within the | See the following link on the Natural England website for site specific details and further sources of information: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK0012915&SiteName=Thorne Moor &countyCode=&responsiblePerson=&Sea Area=&IFCAArea= |

| Site | Location | Habitat | INNS species risks | Links to further info. |
|----------------------------------|-----------------------------------|---|--|--|
| | | <i>Ranunculus aquatilis</i> . | catchment and SAC. A biosecurity strategy for this area is required. The River Wye converges with the Severn Estuary and there is therefore potential for INNS from the Estuary to make it into the River Wye. | il.aspx?SiteCode=UK0012642&SiteName=River Wye&countyCode=&responsiblePerson=&SeaArea=&IFCAArea= |
| Upper Severn Estuary SSSI | Gloucestershire | Saltmarsh, swamp & grassland habitats, estuaries | No reports of INNS within the SSSI, however there are recent reports of marine invasive non-native species - the Australian barnacle <i>Austrominius modestus</i> , Chinese mitten crab <i>Eriocheir sinensis</i> , and the Pacific oyster <i>Magellana gigas</i> in the Severn Estuary SPA/SAC (or the Bristol Channel) which overlaps with the SSSI, but the current abundance and impact of these species there is unclear. These species could spread upwards to the SSSI. | See the following link on the Natural England website for site specific details and further sources of information: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1002458&SiteName=UpperSevernEstuary&countyCode=&responsiblePerson=&SeaArea=&IFCAArea= |
| Upper Humber Estuary SPA and SAC | Yorkshire & northern Lincolnshire | Atlantic salt meadows; coastal lagoons; dunes; embryonic shifting dunes; estuaries; mudflats and sandflats; fixed dunes; subtidal sandflats; shifting dunes. Supports grey seal <i>Halichoerus grypus</i> , river lamprey <i>Lampetra</i> | Reports of a few INNS already at this site: floating pennywort <i>Hydrocotyle ranunculoides</i> , water fern <i>Azolla filiculoides</i> , Himalayan balsam, giant hogweed, Japanese knotweed, slipper limpet <i>Crepidula fornicata</i> and Chinese mitten crab. This site provides the largest single input of freshwater from Britain into the North Sea. This connection with the North Sea and the many tributaries that flow into the Humber Estuary make it an extremely vulnerable site. It could contract INNS from any of the tributaries, but also | See the following link on the Natural England website for site specific details and further sources of information: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9006111&SiteName=humber&countyCode=&responsiblePerson=&SeaArea=&IFCAArea= |

| Site | Location | Habitat | INNS species risks | Links to further info. |
|-------------------------|----------------------------|---|--|---|
| | | <i>fluviatilis</i> and sea lamprey <i>Petromyzon marinus</i> . | from abroad etc through shipping with an excess of 32,000 ship movements occurring every year. | |
| Peak District Dales SAC | Derbyshire & Staffordshire | Calcium-rich springwater-fed fens; calaminarian grasslands of the <i>Violetalia calaminariae</i> ; base-rich scree; plants in crevices in base-rich rocks; European dry heaths; semi-natural dry grasslands and scrublands on chalk or limestone; mixed woodland on base-rich soils associated with rocky slopes. | Reports of signal crayfish already within the SAC. These have thought to have wiped out populations of white clawed crayfish. Signal crayfish also have the potential to threaten brook lamprey <i>Lampetra planeri</i> and bullhead <i>Cottus gobio</i> via predation of eggs and fry. Due to the popularity of the Peak District, this site highly vulnerable to spread of INNS through recreational activities. | See the following link on the Natural England website for site specific details and further sources of information: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK0019859&SiteName=Peak District Dales &countyCode=&responsiblePerson=&SeaArea=&IFCAArea= |
| Cromford Canal SSSI | Derbyshire | Eutrophic freshwater habitat with a rich submerged and emergent aquatic flora and a diverse marsh-wet grassland margin. | No reports of INNS within the SSSI, however if Himalayan balsam were to spread here, it could devastate the marginal vegetation that the SSSI is designated for. | See the following link on the Natural England website for site specific details and further sources of information: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1000209 &SiteName=Cromford Canal &countyCode=&responsiblePerson=&SeaArea=&IFCAArea= |
| Ashby Canal SSSI | Leicestershire | Communities of aquatic and emergent plants that are | No report of INNS, but as with the Cromford Canal SSSI, if INNS were to invade, it could have | See the following link on the Natural England website for site specific details |

| Site | Location | Habitat | INNS species risks | Links to further info. |
|----------------------------|----------------------|--|---|--|
| | | representative of eutrophic standing water bodies in the English lowlands. | devastating effects on the flora communities in such a small site. Native white clawed crayfish are also found in its waters, which would be harmed if signal crayfish were to invade. | and further sources of information: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1001311&SiteName=Ashby Canal &countyCode=&responsiblePerson=&Sea Area=&IFCAArea= |
| Montgomery Canal SAC, SSSI | Northwest Shropshire | Mesotrophic, slow-moving canal habitat. Largest population of floating water-plantain <i>Luronium natans</i> in Britain. | At high risk as in the process of being reconnected to the wider canal network and if Water Fern was to spread to the site, it would be extremely detrimental to the floating water-plantain populations. | See the following link on the Natural England website for site specific details and further sources of information: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1000275&SiteName=Montgomery &countyCode=&responsiblePerson=&Sea Area=&IFCAArea= |



SECTION 5: REGIONAL HOTSPOTS FOR INNS

INTRODUCTION

Regional hotspots are sites within the Midlands where large numbers or big populations of INNS are established. The stakeholder events, engagement with regional experts and data from by local records centres provided local-level information regarding the distribution of INNS across the Midlands region.

The sites therefore have the potential to act as 'transfer stations', facilitating the spread of INNS across the region. For example, sites which have a lot of INNS and are hotspots for recreational activity and hence with the potential to transmit INNS more widely.

DISTRIBUTION OF HOTSPOTS

Figure 5 maps a sub-sample of high priority INNS across the Midlands to illustrate their distribution of INNS in relation to locating regional hotspots where these species are established. Aquatic pathways have also been mapped to highlight potential pathways. All the data used in Figure 5-1 is from local data centres which supported the RIMP (please see acknowledgements).

Table 5-1 details the species present within these areas and any key sites across the catchment.

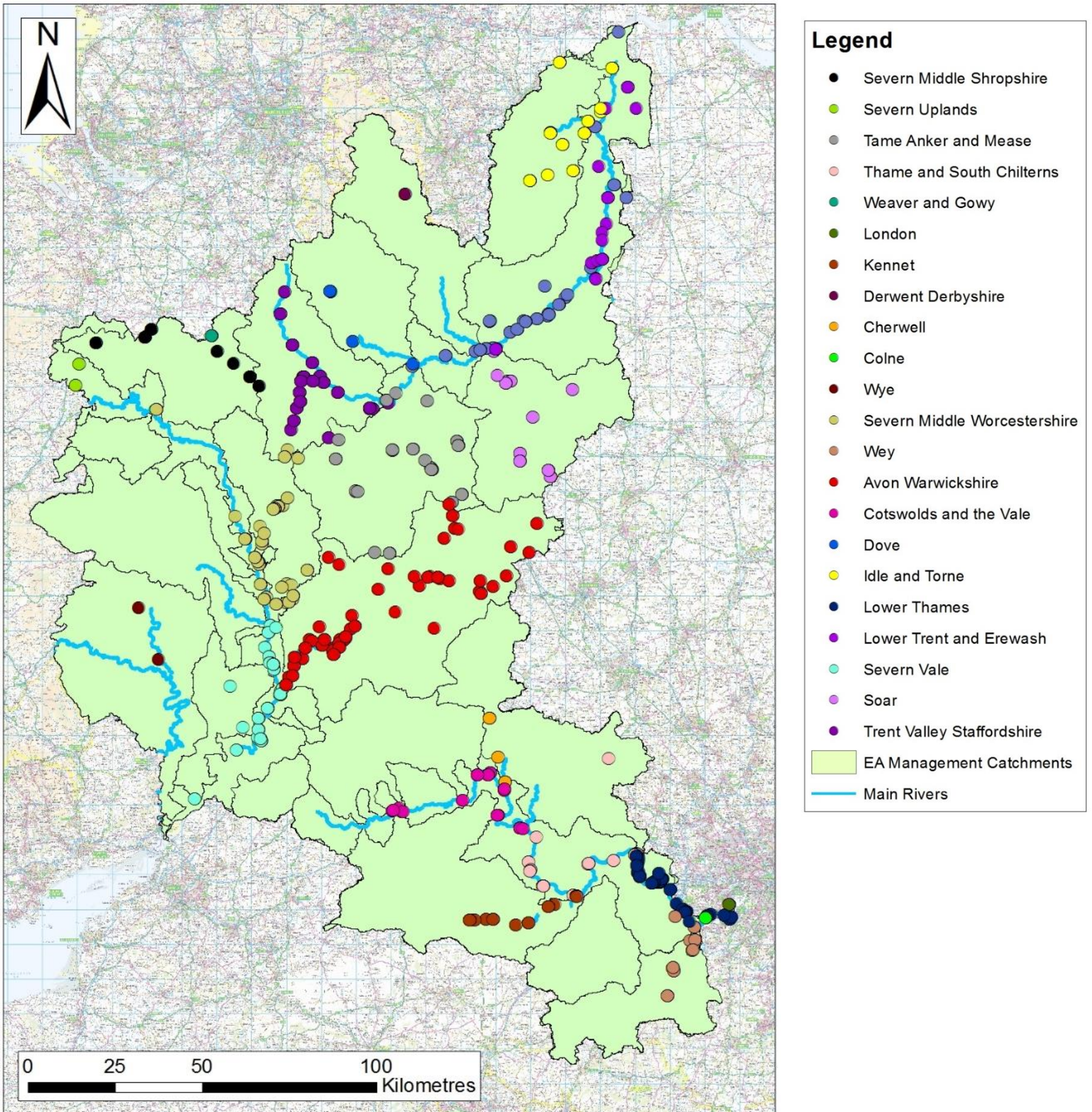


Figure 5: Hotspots for INNS within the Midlands Region. Records above represent high priority species split by catchment. Data is sourced from local record centres and the NBN. Contains Ordnance Survey Data, NBN and Record Centre Data © Crown Copyright and Database Rights 2018.

Table 5-1: Hotspots for INNS within Midlands Region by catchment.

| Catchment | Key sites | Species present |
|------------------------------|--------------------|---|
| Avon Warwickshire | Evesham | Wels catfish Water primrose Topmouth gudgeon Asiatic clam Water lettuce Caspian mud shrimp |
| Cotswolds and the Vale | Lechlade on Thames | Asiatic clam Caspian mud shrimp |
| Dove | Burton Upon Trent | Asiatic clam Caspian mud shrimp |
| Idle and Torne | Bircotes | Wels catfish Asiatic clam Caspian mud shrimp |
| Lower Thames | Slough | Quagga mussel Large flowered waterweed Asiatic clam Caspian mud shrimp |
| Lower Trent and Erewash | Newark-on-Trent | Wels catfish Large flowered waterweed Asiatic clam Chinese mitten crab |
| Severn Vale | Upton Upon Severn | Water primrose Topmouth gudgeon Large flowered waterweed Asiatic clam Water lettuce Caspian mud shrimp |
| Soar | Loughborough | Asiatic clam Caspian mud shrimp |
| Trent Valley Staffordshire | Stafford | Asiatic clam Caspian mud shrimp |
| Thame and South Chilterns | Goring | Caspian mud shrimp |
| Kennet | Newbury | Caspian mud shrimp |
| Severn Middle Worcestershire | Stourbridge | Pickerelweed Large flowered waterweed Caspian mud shrimp |
| Wey | Byfleet | Marsh frog Chinese mitten crab Caspian mud shrimp |



SECTION 6: INNS MANAGEMENT PRIORITIES

INTRODUCTION

Sections 6-1 to 6-4 below detail a hierarchical control framework for INNS management. This is prioritised according to the key Midlands INNS and ranked according to prevention, eradication and long-term management. These categories are based on both impact risk and prevalence within the region. The management recommendations tie together GB-level strategy with a region-specific advice. Prevention, eradication and long-term management are defined below:

1. **PREVENT** – Prevent introduction, spread and establishment (**BLACK** priority species)
Focused on the prevention of new invasions, this category addresses invasive alien species not yet found in the region but potentially on their way. The goal is to prevent new invasive alien species from entering the region. This includes National GB Alert Species

2. **ERADICATE** – Priority for early detection and eradication (**HIGH** priority species)
Focused on preventing the spread of invasive alien species already found to exist in the region but only in very limited amounts. The goal is early detection and rapid response.

3. **LONG-TERM MANAGMENT** – Priority for containment and reduction (**MEDIUM** to **LOW** priority species)
Focused on invasive alien species found within the region, but eradication is not a viable option. The goal is to apply strategic control measures (e.g. prioritising vulnerable areas) where possible and follow best practice biosecurity guidelines to keep the species from spreading to uninvaded areas.

Up to date species distribution maps for the below species can be found via the NBN website (<https://species.nbnatlas.org/>).

SECTION 6-1: PREVENTION

Prevention represents the most cost-effective method for INNS control. Monitoring is key to early detection of the **BLACK** priority species and education should focus on helping regional stakeholders to recognise INNS on this list in the tables below. A rapid response is key should these species be detected in the Midlands region. Initially, for all species in this category it is essential to alert the relevant authorities to its presence including to GBNNSS, CEH and the relevant EA area officer. A list of key contacts is provided at the end of Section 6-1.

The 'Risk' column refers to 'Risk of Introduction' to the Midlands region. Reference (GBNNSS, 2018), unless otherwise stated.

Table 6-1: Black List Species

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|--|---|---|--|--|
| <p><i>Dikerogammarus villosus</i> - killer shrimp</p> <p>(GB national alert species)</p> | Very likely | Accidental introduction: ballast from boats/water users. | Not currently recognised on NBN as being present in Midlands. Aquatic: Reservoirs predominantly in GB. Freshwater and brackish water. | Aggressive predator with effects felt across trophic levels; disrupts ecosystem processes; detrimental to fisheries e.g. vector of disease. | <p>Please see the GB Non-Native Species Secretariat website for links to species ID sheets:</p> <p>http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1219</p> | <p>Check of ballast water.</p> <p>Check, Clean, Dry.</p> <p>Good biosecurity and awareness raising.</p> <p>http://www.nonnativespecies.org/checkcleandry/</p> |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|---|-------------|--|---|---|---|--|
| <i>Procambarus marmoratus</i> – marbled crayfish | Likely | Via pet trade and fish markets; natural means. | No Records for marbled crayfish in the Midlands. Aquatic: Freshwater. Rivers/lakes/canals. | Aggressive predator. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2837 | May be outcompeted by signal crayfish / trapping / extra vigilance around pet trade / fish markets. |
| <i>Astacus astacus</i> – noble crayfish (Note: Vulnerable on IUCN Global Red List & listed in Annex 5 of EU Habitats Directive). | Likely | Fisheries/pet trade/fish markets/anglers. | Established in rest of UK but horizon species in Midlands. Just on the SW border of Midlands. Aquatic: freshwater. Rivers/lakes/canals. | Disrupts ecosystem processes, undermines bank structures (via burrowing), outcompetes native crayfish and detrimental to fisheries. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=380 | May be outcompeted by signal crayfish / trapping / extra vigilance around pet trade / fish markets. |
| <i>Oncorhynchus gorbuscha</i> – Pacific Salmon (Ref: BBC, 2017; Copp, 2017). | Very Likely | From Russian and Scandinavian waters-via fisheries and natural migration. Climate change is likely to facilitate invasion. | Established in rest of UK but horizon species in Midlands. Not currently present in Midlands. Marine and Freshwater. | Competes with native Atlantic Salmon for food. Vector of sea lice. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2419 | Educate relevant stakeholders regarding adverse impacts and correct identification. Encourage anglers to report and dispatch all catches. |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|---|-------------|---|---|---|---|--|
| <i>Lithobates catesbeianus</i> – American bullfrog | Likely | Via pet trade and from garden ponds. Via fish stocks or attached to aquatic plants. | Unconfirmed sighting in Stoke on Trent, otherwise absent from Midlands. | Aggressive predator of a wide range of species; competitively excludes local amphibians; vector of disease (Chytridiomycosis) and expensive to control. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2040 | Vigilance around pet trade, fisheries and garden centres. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |
| <i>Cercopagis pengoi</i> – fish-hook water flea (Ref: CABI, 2018d; Gallardo & Aldridge, 2013; Gallardo et. al., 2015). | Very likely | Accidental introduction: Boaters (ballast)/water users. | Horizon (not established in UK). Brackish estuaries and lagoons/freshwater irrigation channels, lakes and reservoirs. | Economic impacts on fisheries through clogging nets and fishing gears; zooplankton predation leading to higher concentrations of phytoplankton and thus eutrophication problems; competition for food with zooplanktivorous fish, fish larvae and mysids; allergic reactions in humans when removing from nets (fisheries). | Please see the Minnesota Sea Grant website for information on species identification: http://www.seagrants.mn.edu/ais/waterflea | Management of ballast waters, ship hull cleaning (cleaned out of the water-see RAPID LIFE webpages for detailed guidance: http://www.nonnativespecies.org/index.cfm?pageid=621). Vigilance for boat users (ballast). Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|--------------------|---|---|---|---|--|
| <p><i>Neogobius melanostomus</i> - round goby (Ref: CABI, 2018b; Gallardo & Aldridge, 2013; Gallardo et. al., 2015).</p> | <p>Very likely</p> | <p>Accidental introduction: Boaters (ballast)/water users.</p> | <p>Horizon (not established in UK). Bottom dweller in nearshore area of lakes/rivers.</p> | <p>Economic impacts on fisheries; predation on native species; can cause bioaccumulation of contaminants through predation of water-filtering bivalves; competition with natives for food and spawning habitat.</p> | <p>Please see the GB Non-native Species Secretariat website for information on species identification: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2342 Portal for information on species identification.: http://species-identification.org/species.php?species_group=fnam&id=1636 Other goby species to be aware of include: <i>Proterorhinus semilunaris</i> – freshwater tubenose goby <i>Proterorhinus marmoratus</i> – tubenose goby <i>Neogobius gymnotrachelus</i> - racer goby (Ref: Gallardo & Aldridge, 2013; Gallardo et. al., 2015).</p> | <p>Vigilance for boat users (ballast) and canal users. Educate anglers about the negative impacts of introduction e.g. economic. Encourage anglers to dispatch catches rather than release. Record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/</p> |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|--------|---|---|--|---|--|
| <i>Xenopus laevis</i> - African clawed toad | Likely | Deliberate and accidental introduction via pet trade. | Established in UK but Horizon for Midlands. Established in Wales close to border and hence potential threat in Midlands in future. Ponds. | Vector of amphibian disease-carries chytrid fungus. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=3762 | Stamp out sale. Vigilance and record sightings. Biosecurity: Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |
| <i>Baccharis halimifolia</i> – tree groundsel | Likely | Deliberate planting for ornamental purposes in gardens. | Currently surviving at one coastal site in south Hampshire. | Environmental impacts: Forms dense understory in coastal wetlands, saltmarshes and woodlands, suppressing native species and altering habitat composition and ecosystem properties. Economic impacts in agriculture: Can become a weed in agricultural pasture where it competes with forage species and is toxic to livestock. Its control and eradication can be very expensive and time-consuming. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=452 | Biosecurity: Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|--------|---|---|--|---|--|
| <i>Procyon lotor</i> – racoon | Likely | Accidental or deliberate release from pet trade, zoos and wildlife parks. | Horizon (not established in UK). Woodlands near water/ urban areas. | Predator to native birds and may displace native carnivores. Vectors of rabies and carry a roundworm parasite <i>Baylisascaris procyonis</i> . They also can transmit canine distemper and toxoplasmosis. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/downloadFactsheet.cfm?speciesId=2839 | Monitoring of pet trade and maintain records of captive individuals. Prohibition of keeping outside licensed zoological collections. |
| <i>Nyctereutes procyonoides</i> – raccoon dog | Likely | Accidental or deliberate release from pet trade, zoos and wildlife parks. | Horizon (not established in UK). One record in Berkshire. Damp forest habitats with abundant undergrowth. | Competition with native species such as red fox and badger for food and dens. Predator to native birds and amphibians. Transmission of diseases such as sarcoptic mange and tapeworms to native mammals. Vector of rabies. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/downloadFactsheet.cfm?speciesId=2377 | Monitoring of pet trade and maintain records of captive individuals. Prohibition of keeping outside licensed zoological collections. |
| <i>Ameiurus melas</i> - black bullhead | Likely | Deliberate release. Escapees from aquaculture trade. | Present in south eastern England. One known population eradicated. | Increased competition with native species. Predation of native species | Please see the CABI website for information on species identification: https://www.cabi.org/isc/datasheet/94466 | Rotenone / depletion used to eradicate. Awareness raising and record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |

KEY REGIONAL CONTACTS

In the event that a Black List species is recorded the following organisations should be informed. In the event that any other species prioritised on the Red, Yellow and Green lists in this document are found; records should be submitted directly to CEH and the GB-NNSS.

Table 6-2: Key Contacts

| Contact | Organisation |
|-----------------------------------|--|
| National | |
| GB Non-Native Species Secretariat | Email: nss@apha.gsi.gov.uk http://www.nonnativespecies.org/alerts/index.cfm |
| Centre for Ecology & Hydrology | https://eip.ceh.ac.uk/contact and https://www.ceh.ac.uk/data |
| Regional | |
| Angling Trust – Midlands | admin@anglingtrust.net |
| Canal & Rivers Trust – Midlands | enquiries.westmidlands@canalrivertrust.org.uk enquiries.eastmidlands@canalrivertrust.org.uk |
| Environment Agency | enquiries@environment-agency.gov.uk |

SECTION 6-2: ERADICATE (HIGH PRIORITY)

Species that are classified as 'eradicate' are the highest priority for action in the region.

Eradication is only realistically possible where species are present in low numbers within the region and where effective management techniques exist. The tables below list species which fall into this category. The goal for species within this category is at the very least to prevent spread and establishment of INNS, but where practical eradication should be attempted. This is applicable to recent invasions with low numbers.

Monitoring is key to establish a good ecological baseline and inform any eradication effort. This information can then be used to coordinate a rapid response. Any species on the 'prevent' list that are detected are immediately added to the 'eradicate' list. Reference (GBNNS, 2018), unless otherwise stated.

Table 6-3: High Priority List Species

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|---|--------|---|---|--|---|--|
| <i>Oxyura jamaicensis</i> – ruddy duck | Likely | Escapees from captive collections in member EU countries. | There are thought to be less than 20 individuals left in the UK. Freshwater/lakes/reedbeds/reservoirs. | Threat to endangered white-headed ducks. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2486 | Control by shooting since 1999. Species monitoring and awareness raising. |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|--|--|--|---|---|
| <i>Egeria densa</i> – large-flowered waterweed | Likely | Unintentional introduction via water users. | Very scattered/sparse distribution across Midlands e.g. from Lower Trent and Erewash in north to Lower Thames in the south. Aquatic: Canals, ponds and quarry pools. | Dense vegetation in channel may impede navigation, reduces water quality, light and oxygen and poses a flood risk. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1290 | Vigilance for pond owners. Vigilance for canal users. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |
| <i>Pelophylax ridibundus</i> – marsh frog | Likely | Deliberate translocation. | Localised distribution across Midlands e.g. near Worcester. Fisheries/marshes/slow flowing water. | Predator, forms hybrids with native species and vector of disease (Chytridiomycosis). | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2577 | Trapping. Awareness raising and record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |
| <i>Ludwigia grandiflora</i> - water primrose (GB National Alert Species) | Very likely | Water plant trade; natural means; accidental introduction: via water users; cultivation. | Very localised. Recorded on the Avon Warwickshire and also the Severn Vale. Slow flowing water. | Flood risk; outcompetes native species; depletes watercourse of oxygen and light; blocks waterways. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2087 | Control sale by adding to Schedule 9. Spraying with glyphosate (detrimental to other native species). |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|-----------------------------|--|--|---|---|
| | | | | | | <p>Awareness raising amongst gardeners and general public.</p> <p>Record submission.</p> <p>Check, Clean, Dry. http://www.nonnative-species.org/checkcleandry/</p> <p>Please see link below to good practice management guidance on INNS toolkit on RAPID LIFE webpage: http://www.nonnative-species.org/index.cfm?pageid=624</p> |
| <i>Pseudorasbora parva</i> - topmouth gudgeon | Very likely | Via anglers and fish farms. | Very scattered distribution and uncommon. Records near Birmingham; the Avon, Warwickshire but also the Severn Vale. Pools/streams/lakes. | Outcompetes native species; eutrophication; vector of disease. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2876 | <p>Rotenone / depletion used to eradicate.</p> <p>Check, Clean, Dry. http://www.nonnative-species.org/checkcleandry/</p> <p>Awareness raising and record submission.</p> |

SECTION 6-3: LONG-TERM MANAGEMENT (MEDIUM PRIORITY)

The following list includes widespread and well-established species that can have high impacts in a localised area, but with lesser impacts elsewhere. This list may also include some species that cannot be feasibly eradicated due to a lack of effective management techniques. The goal is to apply strategic control measures through the prioritisation of vulnerable areas and where control efforts will have the greatest benefits, to prevent INNS spreading to uninvaded sensitive areas within the region. Reference (GBNNSS, 2018), unless otherwise stated.

Table 6-4: Long-term Management (Medium Priority Species)

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|---|-------------|--|---|---|---|---|
| <p><i>Chelicorophium curvispinum</i>– caspian mud shrimp</p> <p>(Ref: CABI, 2018c; GBIF, 2017; Gallardo & Aldridge, 2013; Gallardo <i>et. al.</i>, 2015)</p> | Very likely | Accidental introduction: Boaters (ballast)/water users. | Well established in South England and Midlands. Found in upper middle and southern regions of Midlands (from Shropshire/Leicestershire southwards). High densities in Worcestershire. Scattered/sparse records in other northern Midland regions. Freshwater, brackish environments/rivers/estuaries. | Predation on native species; outcompetes for substrate colonization; disrupts ecosystem processes and services; modifies nutrient regime and alters trophic levels. | Please see the CABI website for information on species identification: https://www.cabi.org/isc/datasheet/108307 | Education of, and vigilance for boaters (ballast water). Good biosecurity: Check, Clean, Dry. http://www.nonnative-species.org/checkcleandry/ |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|--|---|---|---|--|
| <i>Corbicula fluminea</i> – Asiatic clam | Very likely | Deliberate and accidental introduction: boaters (ballast)/water users/anglers/pond and aquaria owners. | Scattered distribution across Midlands e.g. from the Idle and Torne in the north of the region to the Lower Thames in the south. Aquatic: lotic and lentic environments. | Disrupts ecosystem processes; an aggressive filter feeder which produces high concentrations of pseudofaeces. Outcompetes native bivalves. High densities of clam shells can block water intakes etc. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=897 | Vigilance for water users and boaters. Monitor / raise awareness of removal from ornamental ponds and aquaria. |
| <i>Eriocheir sinensis</i> - Chinese mitten crab | Very likely | Boaters (ballast water) and other water users. | Established in rest of UK but horizon species in Midlands. Very localised. Records around Oxford and on the Lower Trent and Erewash as well as the Wey. Terrestrial stages: fresh and brackish water e.g. Rivers/marshes. | Out-competes native species e.g. crayfish. Vector of disease. Extensive burrowing undermines banks and contributes to siltation. Detrimental to fisheries (via predation and competition). | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1379 | Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ Awareness raising to specific groups (anglers) and record submission. |
| <i>Dreissena rostriformis bugensis</i> - quagga mussel (GB National Alert Species) | Very likely | Unintentional introduction via anglers/watercraft users. | Established in rest of UK but horizon species in Midlands. Wraysbury reservoir near Egham, Surrey and Lower Thames. Aquatic: habitats e.g. rivers and reservoirs. | Filter feeder: removing zooplankton from waterbodies and blocking pipes. Full eradication may not be possible. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/alerts/index.cfm | Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ Awareness raising and record submission. |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|---|--|---|---|--|
| <i>Mesotriton alpestris</i> - Alpine newt | Likely | Via gardeners/natural means. | Locally abundant near Birmingham: gardens/ponds. | Vector of chytridiomycosis; decline native amphibians. (see Froglife website for more information on Alpine newts and chytridiomycosis: https://www.froglife.org/info-advice/amphibians-and-reptiles/alpine-newt/ .) | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2215 | Public awareness / vigilance in transporting water plants. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ . Awareness raising and record submission. |
| <i>Silurus glanis</i> - wels catfish | Very likely | Intentional / accidental introductions: anglers/water users. Escapees from aquaculture trade. Flooding spates from lakes. | Scattered distribution across Midlands e.g. from the Idle and Torne in the north to the Avon Warwickshire in the Midlands. | Increased competition with native species. Predation of native species. Wels catfish are carriers of viral pathogens; spring viraemia of carp (SVC) and European sheatfish virus (ESV), which may adversely impact native fish including salmonids and amphibians. Hosts of specialist parasites such as <i>Trichodina siluri</i> , <i>Myxobolus miyarii</i> , <i>Leptorhynchoides plagicephalus</i> and <i>Pseudotrachealiastes stellifer</i> which may be detrimental to native fish survival. | Please see the Canal and Rivers Trust website for information on species identification: https://canalrivertrust.org.uk/enjoy-the-waterways/fishing/fish-species/invasive-and-non-native-fish/catfish-wels | Control on trade / accidental or deliberate release. Education on species to water users. Awareness raising and record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|--|---|---|--|--|
| <i>Lepomis gibbosus</i> - pumpkinseed fish (pond-perch) | Likely | <p>Contaminant of legal fish stock from EU mainland.</p> <p>Accidental introduction: anglers/water users.</p> <p>Intentional release from ponds / aquaria</p> <p>Dispersal from lentic to lotic environments where there is a hydrological connection.</p> <p>Flooding</p> | <p>South and south east of England.</p> <p>Reproduction confined to freshwater waterbodies.</p> | <p>Aggressive behaviour can adversely impact native fish species in terms of foraging success, reproduction and microhabitat selection.</p> <p>Increase in competition for food sources with native fish species. Predation of small fish and macroinvertebrates.</p> <p>Host to parasite <i>Onchocleidus dispar</i> which is also an INNS in UK.</p> <p>Climate change scenarios are expected to facilitate the invasion of <i>L.gibbosus</i>. Impacts of this are as yet unknown.</p> | <p>Please see the fish identification website for information on species identification:</p> <p>http://www.fish-identification.com/ffdetails.asp?fish=pumpkinseed</p> | <p>Control of fish movements.</p> <p>Depletion of known populations via trapping and draining waterbodies.</p> <p>Awareness raising and record submission.</p> <p>Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/</p> |
| <i>Rhodeus amarus</i> - bitterling | Very likely | <p>Deliberate release.</p> <p>Natural dispersal along waterways linked to the distribution of unionid mussels.</p> | <p>North west of England.</p> <p>Lowland ponds/ canals /slow-flowing rivers / backwaters/ oxbows.</p> | <p>Largely unknown.</p> <p>May impact unionid mussels through parasitism.</p> <p>May predate fish eggs.</p> | <p>Please see the GB Non-native Species Secretariat website for links to species ID sheets:</p> <p>http://www.nonnativespecies.org/factsheet/downloadFactsheet.cfm?speciesId=3001</p> | <p>Control on trade / accidental or deliberate release.</p> <p>Awareness raising and record submission.</p> <p>Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/</p> |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|--|---|--|---|--|
| <i>Pontederia cordata</i> - pickerelweed | Likely | Escapes from aquaculture / garden centre trade. Deliberate planting | Very few records/records focused around Birmingham and Manchester e.g. on the Severn Middle Worcestershire. | Displaces native plants. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2794 | Check, Clean, Dry for plant fragments. http://www.nonnativespecies.org/checkcleandry/ Future inclusion on Schedule 9 of Wildlife and Countryside Act to make spread illegal. Prevent plant being stocked in garden centres. |
| <i>Hydrocotyle ranunculoides</i> – floating pennywort | Very likely | Accidental introduction: anglers/water users. | Scattered distribution across Midlands. Pools/lakes/wetland/streams/ditches/canals (slow flowing). | Forms dense mats which shade the water below; outcompetes native species; oxygen depletion (disrupts ecosystem processes); blocks pipes. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1766 | Awareness raising and record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ Good practice management guidance on INNS toolkit on RAPID LIFE webpage: http://www.nonnativespecies.org/index.cfm?pageid=624 |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|---|--|---|---|---|
| <i>Pacifastacus leniusculus</i> - signal crayfish | Very likely | Deliberate introduction; natural means. | Widespread across Midlands. Freshwater and Brackish: streams/canals/ponds/lakes/ivers. | Threat to native crayfish (via competition/vector of disease) and other aquatic life e.g. amphibians; weaken banks causing a flood risk; predate juvenile fish. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2498 | -Trapping and potentially castration of species. Awareness raising and record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |
| <i>Dreissena polymorpha</i> - zebra mussel | Very likely | Accidental introduction: boaters (ballast)/fisheries. | Widespread across Midlands- fresh and brackish water/flowing and stagnant. | Disrupts ecosystem processes; blocks pipes; smother native species; sharp shells for bathers. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1250 | Awareness raising and record submission. Check, Clean, Dry for boats, ballast water and fish bait: http://www.nonnativespecies.org/checkcleandry/ Good practice management guidance on INNS toolkit on RAPID LIFE webpage: http://www.nonnativespecies.org/index.cfm?pageid=624 |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|---|-------------|--|--|---|---|---|
| <i>Neovison vison</i> - American mink | Very likely | Natural dispersal. | Widespread and common across Midlands. Rivers/lakes/wood/scrub | Predates ground nesting birds, water vole and chickens/game birds; potential vector of disease. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2272 | Please see link below to good practice management guidance on INNS toolkit on RAPID LIFE webpage: http://www.nonnativespecies.org/index.cfm?pageid=624 |
| <i>Crassula helmsii</i> - New Zealand pigmyweed (Ref: Suffolk Wildlife Trust, undated) | Very likely | Accidental introduction: anglers/water users; natural means. | Widespread across Midlands. Lakes/ditches/ponds/canal/reservoirs. | Mat forming; blocks drainage; exacerbates flooding; outcompetes native species. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1017 | Listed on Schedule 9 prohibits spread in wild. Awareness raising and record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ Herbicide / mechanical control can be used, however, very difficult to eradicate. Good practice management guidance on INNS |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|---|---|---|--|---|
| | | | | | | <p>toolkit on RAPID LIFE webpage: http://www.nonnativespecies.org/index.cfm?pageid=624</p> |
| <i>Azolla filiculoides</i> - water fern | Very likely | Transmission of fragments on machinery and clothes. Via plant trade. | Widespread across Midlands. Ponds/ditches/lakes/slow flowing rivers/canal. | Carpet forming; disrupts ecological processes; impedes navigation. | <p>Please see the GB Non-native Species Secretariat website for links to species ID sheets:</p> <p>http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=451</p> | <p>Greater vigilance at garden centres (carried on other water plants).</p> <p>Awareness raising and record submission.</p> <p>Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/.</p> <p>Control via natural predator (weevil) release.</p> |
| <i>Cyprinus carpio</i> - common carp | Very likely | <p>Accidental introduction anglers / water users.</p> <p>Continued introductions.</p> | Widespread across Midlands. Aquatic: Lowland rivers and lakes/freshwater. | Detrimental to water and habitat quality; disrupts ecosystem functioning; detrimental to native species; reduces bathing quality; reduce water quality for livestock. | <p>Please see the GB Non-native Species Secretariat website for links to species ID sheets:</p> <p>http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1135</p> | <p>Use of integrated techniques as eradication very difficult e.g. Trapping and education.</p> <p>Educate anglers about the negative impacts of</p> |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|---|--|--|--|---|
| | | Natural reproduction. / dispersal | | | | <p>introduction e.g. economic.</p> <p>Encourage anglers to dispatch catches rather than release.</p> <p>Record submission.</p> <p>Check, Clean, Dry. http://www.nonnati-vespecies.org/checkcleandry/</p> |
| <p><i>Stizostedion lucioperca</i> – zander (Ref: Canal and Rivers Trust, 2018).</p> | Very likely | <p>Accidental introduction anglers / water users.</p> <p>Natural reproduction /dispersal.</p> | River Trent and Lower Severn. Aquatic: Canals and deep rivers. | Top/aggressive predator; threat to native fish; responsible for severe gudgeon declines (potentially beyond recovery). | <p>Please see the CABI website for information on species identification: https://www.cabi.org/isc/datasheet/65338</p> | <p>Educate anglers about the negative impacts of introduction e.g. economic.</p> <p>Use of trapping.</p> <p>Encourage anglers to dispatch catches rather than release. Record submission.</p> <p>Check, Clean, Dry. http://www.nonnati-vespecies.org/checkcleandry/</p> |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|--------|--|---|--|---|--|
| <i>Persicaria wallichii</i> - Himalayan knotweed | Likely | Human via fly tipping and dumping. Natural spread where stands exist. Seeds spread by wind. Rhizome and stem fragments in waterways. | Localised distribution across Midlands e.g. especially around Birmingham. | Dense stands; competitive exclusion of native species; costly and difficult to remove. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2603 | Hand pulling and digging. Can regenerate from rhizomes so employ Check, Clean, Dry on all sites: http://www.nonnativespecies.org/checkcleandry/ Repeated cutting on small populations. Herbicide application. |
| <i>Lysichiton americanus</i> - American skunk-cabbage | Likely | Via horticultural trade e.g. deliberate release. | Widespread and common across Midlands. Wet woodland. | Dense stands outcompete and shade native species. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2110 | Dissuade gardeners from planting deliberately. Education and awareness. Good practice management guidance on INNS toolkit on RAPID LIFE webpage: |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|--------|--|--|--|---|--|
| | | | | | | http://www.nonnativespecies.org/index.cfm?pageid=624 |
| <i>Aix sponsa</i> - Carolina wood duck | Likely | Escape from captivity. | Scattered distribution across Midlands. Slow flowing water. Lakes/woodland. | Competition for nest sites with native birds. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=103 | Control by shooting. Encourage species monitoring and record submission. |
| <i>Anser indicus</i> - bar-headed goose | Likely | Escape from captivity/natural means. | Widespread across Midlands. Lowland waters/meadows/arable. | Vector of disease e.g. avian influenza. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=252 | Stamp out sale. Control by shooting. Encourage species monitoring and record submission. |
| <i>Astacus leptodactylus</i> – Turkish crayfish | Likely | Via pet trade and fish markets; natural means. | Scattered distribution across Midlands. Aquatic: Freshwater. Rivers/lakes/canals/brackish water. | Potential to outcompete native crayfish; resource competition with fish. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=381 | May be outcompeted by signal crayfish. Trapping and dispatch. Vigilance around pet trade and fish markets. |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|---|-------------|--|---|---|--|--|
| | | | | | | <p>Awareness raising and record submission.</p> <p>Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/.</p> |
| <i>Impatiens capensis</i> - jewel-weed (orange balsam) | Likely | Seeds easily spread along watercourses and accidentally transported by wildlife and humans. Ornamental plant trade i.e. deliberate introduction. | Scattered distribution across Midlands. Terrestrial including riparian corridors. | Impacts thought to be similar to Himalayan balsam though less aggressive. | <p>Please see the GB Non-native Species Secretariat website for links to species ID sheets:</p> <p>http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1809</p> | <p>Hand pulling.</p> <p>Grazing.</p> <p>Herbicide application.</p> <p>Awareness raising and record submission.</p> <p>Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/.</p> |
| <i>Trachemys scripta</i> - red-eared terrapin AND <i>Emys orbicularis</i> - European pond terrapin | Very likely | Via pet trade/deliberate release and natural means. | Scattered distribution across Midlands. Parks/ponds/lakes. | Vector of disease; aggressive predator and competitor within freshwater ecosystems. | <p>Please see the GB Non-native Species Secretariat website for links to species ID sheets:</p> <p><i>Red-eared terrapin</i></p> <p>http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=3566</p> | <p>Stamp out sale.</p> <p>Raise awareness about releasing animals to general public.</p> <p>Good practice management guidance on INNS</p> |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|---|-------------|--|---|---|--|--|
| | | | | | <p>European pond terrapin</p> <p>http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1318</p> | <p>toolkit on RAPID LIFE webpage:</p> <p>http://www.nonnativespecies.org/index.cfm?pageid=624</p> |
| Lagarosiphon major - curly waterweed | Very likely | Accidental introduction: anglers/water users. Via plant trade e.g. deliberate release. | Scattered distribution across Midlands esp. south Birmingham. Canals/lakes/gravel pits/pond. | Outcompetes native species; disrupts ecosystem processes; mosquito breeding facilitated; impedes fishing and water sports/blocks hydroelectric intakes. | <p>Please see the GB Non-native Species Secretariat website for links to species ID sheets:</p> <p>http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1888</p> | <p>Check, Clean, Dry.</p> <p>http://www.nonnativespecies.org/checkcleandry/.</p> <p>Ban sale in UK.</p> <p>Please see link below to good practice management guidance on INNS toolkit on RAPID LIFE webpage:</p> <p>http://www.nonnativespecies.org/index.cfm?pageid=624</p> |
| Heracleum mantegazzianum - giant hogweed | Very likely | Deliberate release for ornamental purposes. | Widespread and common across Midlands. Associated with water course/waste ground. Wasteland/along streams and rivers. | Outcompetes native plant species; skin burns; flood risk. | <p>Please see the GB Non-native Species Secretariat website for links to species ID sheets:</p> <p>http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1705</p> | <p>Difficult to control owing to health risk ad classified as controlled waste.</p> <p>Can use grazing to control.</p> |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|--------------------|---|--|--|--|---|
| | | | | | | <p>Herbicide application.</p> <p>Awareness raising and record submission.</p> <p>Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/</p> <p>Good practice management guidance on INNS toolkit on RAPID LIFE webpage: http://www.nonnativespecies.org/index.cfm?pageid=624</p> |
| <p><i>Impatiens glandulifera</i> - Himalayan balsam</p> | <p>Very likely</p> | <p>Seeds easily spread along watercourses and accidentally transported by wildlife and humans. Ornamental plant trade i.e. deliberate introduction.</p> | <p>Well established across Midlands. River banksides</p> | <p>Flood risk; outcompetes native species; exacerbates bank erosion.</p> | <p>Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1810</p> | <p>Use of volunteer groups. Start management at top of catchment to ensure results of:</p> <ul style="list-style-type: none"> -Hand pulling -Grazing -Herbicide application |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|--------------------|--|--|--|--|---|
| | | | | | | <p>Awareness raising and record submission.</p> <p>Check, Clean, Dry. http://www.nonnative-species.org/checkcleandry/</p> <p>Good practice management guidance on INNS toolkit on RAPID LIFE webpage: http://www.nonnative-species.org/index.cfm?pageid=624</p> |
| <p><i>Fallopia japonica</i> - Japanese knotweed</p> | <p>Very likely</p> | <p>Via inappropriate waste disposal and deliberate release. Fragments easily spread.</p> | <p>Well established across Midlands esp. urban areas. Along watercourses/disturbed habitats.</p> | <p>Detrimental to salmonid fisheries; causes structural damage; nuisance; exacerbates flooding and erosion; out competes native species.</p> | <p>Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1495</p> | <p>Can control by herbicide spraying and injection.</p> <p>Very expensive to eradicate of and dispose of waste (classified as hazardous waste). Awareness raising and record submission.</p> <p>Check, Clean, Dry. http://www.nonnative-species.org/</p> |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|-----------------------------------|--|---|---|---|
| | | | | | | vespecies.org/checkcleandry/ Good practice management guidance on INNS toolkit on RAPID LIFE webpage: http://www.nonnativespecies.org/index.cfm?pageid=624 |
| <i>Branta canadensis</i> – Canada goose | Very likely | Translocations and natural means. | Widespread and common across Midlands. Freshwater/fields/urban. | Grazing; trampling (crops); droppings pose a health hazard. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=533 | Control by shooting. |

SECTION 6-4: LONG-TERM MANAGEMENT (LOW PRIORITY)

The following lists includes widespread and well-established species with relatively moderate or low impacts, or where there are no effective management techniques available. Control will largely be limited to awareness-raising and the promotion of good biosecurity practice to minimise further spread within the Midlands region. Reference (GBNNS, 2018) unless otherwise stated.

Table 6-5: Long-term Management (Low Priority) Species

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|---|---|---|---|---|
| <i>Hemimysis anomala</i> -bloody-red mysid | Very likely | Accidental introduction: anglers/water users. | Originated in the Midlands and has spread to Eastern England. Aquatic: Lakes, rivers and reservoirs. Freshwater and brackish. | Cascading trophic effects; disrupts ecosystem processes; can cause population crashes; exacerbates bioaccumulation; detrimental to fisheries. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1698 | Awareness raising and record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |
| <i>Dikerogammarus haemobaphes</i> -demon shrimp (GB National Alert Species) | Very likely | Accidental introduction: anglers/water users. | Widespread across Midlands. Aquatic: Freshwater. | Aggressive predator e.g. of young fish. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=3888 | Awareness raising and record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|---|-------------|--|---|---|---|---|
| <i>Myriophyllum aquaticum</i> - parrot's feather | Very likely | Accidental introduction: anglers/water users. Via horticultural trade e.g. deliberate release. | Scattered distribution across Midlands. Found in nutrient rich and relatively stagnant waterbodies. Ditches/canals ponds/flooded mineral workings/reservoirs. | Wide ranging impacts from disrupting ecological processes in waterbodies to transmitting disease. Likely to be a future threat once widely established. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=2285 | Ban sale Awareness raising and record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |
| <i>Solidago canadensis</i> - Canadian goldenrod | Very likely | Via horticultural trade. | Localised distribution across Midlands e.g. immediately south of Birmingham. Disturbed land/banksides/grassland/scribb | Dense stands difficult to remove. Outcompetes native species. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=3323 | Vigilance especially gardeners e.g. dumping plant remains. Grazing. Awareness raising and record submission. Biosecurity: Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|--------|---|---|---|---|---|
| <i>Gunnera tinctora</i> - giant rhubarb | Likely | Via horticultural trade/natural means. | Very scattered distribution across Midlands. Sunny sites/wet ground. | Outcompetes native species; widespread ecosystem effects; threat to better quality habitat; exacerbates erosion; blocks drains and streams; flood risk. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1647 | Very tricky to eradicate (costly). Awareness amongst gardeners. Record submission. Treat soil as controlled waste - must be disposed of at licenced facility. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |
| <i>Carassius auratus</i> - goldfish | Likely | Via aquarium/pet trade and fisheries (deliberate release of unwanted pets). | Scattered distribution across Midlands. Still/slow flowing water with dense vegetation. | Outcompetes natives; hybridises with native carp; detrimental to water quality; disease transmission; predation. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=655 | Educate public about release. Drain small waterbodies where they are present. Trap and dispatch. Awareness raising. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|--|-------------|--|---|---|---|--|
| <i>Elodea canadensis</i> - Canadian waterweed | Very likely | Accidental and deliberate release from aquarium trade. Spread by water users as fragments. | Widespread across Midlands. Lakes/ponds/streams. | Blocks waterways; poses a flood risk; outcompetes native species. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1303 | Awareness raising and record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |
| <i>Elodea nuttallii</i> - nuttall's waterweed | Very likely | Accidental and deliberate release from aquarium trade. Spread by water users as fragments. | Widespread across Midlands but more sparsely distributed than Canadian waterweed and found in water with a higher concentration of nutrients. Lakes/ponds/streams | Blocks waterways; poses a flood risk; outcompetes native species. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1304 | Awareness raising and record submission. Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ |
| <i>Gammarus tigrinus</i> - sideswimmer | Very likely | Accidental introduction: Boaters (ballast)/water users. | Scattered distribution across Midlands, with focus around Birmingham. Fresh/brackish water. Flowing and stagnant. Bottom dweller. | Outcompetes native sideswimmers; damaging to fishing equipment; detrimental to fisheries. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=1572 | Awareness raising and record submission. Check, Clean, Dry (especially ballast water): http://www.nonnativespecies.org/checkcleandry/ . |

| Species name | Risk | Pathway | Areas affected | Impacts | Identification | Management guidance |
|---|---|---|--|--|---|---|
| <i>Pistia stratiotes</i> – water lettuce | Very likely should hardy varieties take hold. | Unintentional introduction via water users. | Two records south of Birmingham. Canals/slow-flowing rivers/ponds. | Potential to clog waterways, transmit disease and disrupt ecosystem processes (produces dense mats). Exacerbates flooding. | Please see the GB Non-native Species Secretariat website for links to species ID sheets: http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=3808 | Check, Clean, Dry. http://www.nonnativespecies.org/checkcleandry/ Awareness raising and record submission. |



SECTION 7: CONCLUSION



The Midlands region is largely landlocked with an estuarine element to both the Northern and Southern perimeter. There is an extensive network of waterbodies within the region, representing a key pathway for transmission of Invasive Non-Native Species (INNS).



There is a high proportion of universities within the Midlands region and numerous recreational bodies, particularly focussing on the aquatic environment. These contacts will be key in the implementation of the Midlands RIMP.



Currently, the Environment Agency, the Wildlife Trusts and Rivers Trusts are amongst the leading stakeholders for INNS management across the region.



This extensive freshwater environment presents opportunities for education and awareness raising amongst recreational water users, e.g. paddlers.



A key priority for management within the Midlands region is to establish a Local Action Group (LAG) to coordinate efforts to control INNS within the region and to protect areas of conservation value. LAGs should collaborate with specialists to develop INNS plans.



There is a need for a better understanding of the distribution of INNS within the Midlands. This can be achieved through on-the-job recording via established environmental organisations such as The Environment Agency, Natural England and Local Records Centres.



This RIMP identified the Ponto-Caspian Invaders as likely to become key INNS going forward. Other priority species include those not currently present within the Midlands e.g. killer shrimp. Every effort should be made to prevent their introduction in the future.



This document should be updated periodically to ensure that the guidance contained within it is still applicable to the Midlands region. Once established, the LAG should lead in developing resources with the assistance of other key stakeholders.



The next phase of the RAPID LIFE project will be to establish conservation actions on the ground within the Midlands region.

APPENDIX A: GLOSSARY

| Term | Explanation |
|--------------------|--|
| Alert Species | Specific INNS species of concern. |
| APHA | The Animal and Plant Health Agency (an executive agency of DEFRA). |
| Biocontrol | The use of a natural enemy or predator to control an invasive non-native species |
| 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 invasive non-native species for which there are measures in place to prevent its entry to a country or region. Black list species are associated with high risk of severe detrimental impacts on native biodiversity, health or economy. |
| DEFRA | Department for Environment, Food and Rural Affairs |
| Dissemination | The act of spreading something, especially information, widely. |
| EA | The Environment Agency |
| Early Detection | When an INNS arrives and it is quickly noticed or recorded and this information is passed on to the relevant authorities. |
| Eradication | Removing a species entirely from the region, or country, using INNS control and management methods. |
| GB INNS Strategy | A document put together by the GBNNSS (2008, 2015) outlining a series of aims and objectives underpinning action on INNS in Great Britain until 2020. |
| GBNNSS | The Great Britain Non-Native Species Secretariat. |
| Hotspot | Areas at greatest risk of INNS impact, introduction or transfer. |
| IAS | Invasive Alien Species. Also known as INNS (Invasive Non-Native Species) |
| INNS | Invasive Non-Native Species (also known as Invasive Alien Species IAS) |
| LAGs | Local Action Groups - groups of people (both professional and voluntary) in different areas that work on managing INNS. |
| MMO | The Marine Management Organisation |
| NGO | Non-governmental Organisation |
| Non-native Species | Non-native species are species that have been introduced to areas outside their natural range by man. |
| Pathway | A broad term used to describe the way in which an INNS is introduced or spread (encompasses, for example, the purpose, route and mode of introduction). |
| Prevention | Stopping a species of INNS coming into the region or into the country through counter measures (usually biosecurity). |
| RAPID LIFE | RAPID is a three-year EU Life funded project whose objective is to deliver a package of measures to reduce the impact and spread of INNS in freshwater aquatic, riparian and coastal environments across England. |
| Rapid Response | The instigation of action against an INNS threat at a stage when a locally, regionally or nationally important strategic win might still be achievable. |
| Regions | The 5 English regions that RAPID has delineated (see Appendix 1) for INNS management purposes. |
| RIMPs | Regional IAS Management Plans, an integral component of RAPID, where local experts produce an INNS management plan for their region (as defined above). |
| Riparian | Referring to habitats along the sides of river banks, lakes or wetlands. |
| RSPB | Royal Society for the Protection of Birds. |
| RYA | Royal Yacht Association. |

APPENDIX B: INNS OF EUROPEAN UNION CONCERN

| Common Name | Scientific Name |
|--------------------------|------------------------------------|
| Flora | |
| Alligator weed | <i>Alternanthera philoxeroides</i> |
| Common milkweed | <i>Asclepias syriaca</i> |
| Eastern baccharis | <i>Baccharis halimifolia</i> |
| Carolina fanwort | <i>Cabomba caroliniana</i> |
| Water hyacinth | <i>Eichhornia crassipes</i> |
| Nuttall's pondweed | <i>Elodea nuttallii</i> |
| Chilean rhubarb | <i>Gunnera tinctoria</i> |
| Giant hogweed | <i>Heracleum mantegazzianum</i> |
| Persian hogweed | <i>Heracleum persicum</i> |
| Sosnowsky's hogweed | <i>Heracleum sosnowskyi</i> |
| Floating pennywort | <i>Hydrocotyle ranunculoides</i> |
| Himalayan balsam | <i>Impatiens glandulifera</i> |
| Curly waterweed | <i>Lagarosiphon major</i> |
| Water-primrose | <i>Ludwigia grandiflora</i> |
| Floating primrose-willow | <i>Ludwigia peploides</i> |
| American skunk cabbage | <i>Lysichiton americanus</i> |
| Japanese stiltgrass | <i>Microstegium vimineum</i> |
| Parrot's feather | <i>Myriophyllum aquaticum</i> |
| Broadleaf watermilfoil | <i>Myriophyllum heterophyllum</i> |
| Whitetop weed | <i>Parthenium hysterophorus</i> |
| Crimson fountaingrass | <i>Pennisetum setaceum</i> |
| Asiatic tearthumb | <i>Persicaria perfoliata</i> |
| Kudzu vine | <i>Pueraria lobata</i> |
| Fauna | |
| Egyptian goose | <i>Alopochen aegyptiacus</i> |
| Pallas' squirrel | <i>Callosciurus erythraeus</i> |
| Indian house crow | <i>Corvus splendens</i> |
| Chinese mitten crab | <i>Eriocheir sinensis</i> |
| Small Asian mongoose | <i>Herpestes javanicus</i> |
| American bullfrog | <i>Lithobates catesbeianus</i> |
| Muntjac deer | <i>Muntiacus reevesi</i> |
| Coati | <i>Nasua nasua</i> |
| Coypu | <i>Myocastor coypus</i> |
| Raccoon dog | <i>Nyctereutes procyonoides</i> |
| Muskrat | <i>Ondatra zibethicus</i> |
| Spiny-cheek crayfish | <i>Orconectes limosus</i> |
| Virile crayfish | <i>Orconectes virilis</i> |
| Ruddy duck | <i>Oxyura jamaicensis</i> |
| Signal crayfish | <i>Pacifastacus leniusculus</i> |

| Common Name | Scientific Name |
|--|---|
| Armur sleeper | <i>Perccottus glenii</i> |
| Red swamp crayfish | <i>Procambarus clarkii</i> |
| Marbled crayfish | <i>Procambarus fallax f. virginalis</i> |
| Raccoon | <i>Procyon lotor</i> |
| Stone moroko | <i>Pseudorasbora parva</i> |
| Grey squirrel | <i>Sciurus carolinensis</i> |
| Fox squirrel | <i>Sciurus niger</i> |
| Siberian chipmunk | <i>Tamias sibiricus</i> |
| Sacred ibis | <i>Threskiornis aethiopicus</i> |
| Red-eared, yellow-bellied and Cumberland sliders | <i>Trachemys scripta</i> |
| Asian hornet | <i>Vespa velutina nigrithorax</i> |

APPENDIX C: STAKEHOLDER ENGAGEMENT

APPENDIX C.1: STAKEHOLDERS CONTACTED DURING PROJECT

This table lists the all stakeholders who were contacted initially to engage with the project upon inception. Only a small proportion of this list contributed to the development of the management plan. These stakeholders are listed in Appendix C.2.

| | |
|---|--|
| Network Rail | Derbyshire County Angling Club |
| RSPB – Midlands | The Don Network (Don Catchment Rivers Trust) |
| RSPB - South West England | Ecus Ecological Consultants |
| Wye and Usk Foundation Rivers Trust | South Yorkshire Branch British Naturalist Association |
| Cotswolds Rivers Trust | Rother Valley Country Park |
| Thames 21 and Thames Rivers Trust | Nottinghamshire County Council |
| River Thame Conservation Trust | Nottingham City Council |
| Angling Trust Midlands Region | Nottinghamshire Biological and Geological Records Centre |
| The Canal and River Trust-East Midlands Region | Nottinghamshire Wildlife Trust |
| The Canal and River Trust-West Midlands Region | Nottinghamshire Branch British Naturalist Association |
| The Canal and River Trust-Kennet and Avon | Midland Angling Society |
| The Canal and River Trust-North Wales and Borders | Nottingham Yacht Club |
| The Canal and River Trust-South Wales and Severn | Shropshire County Council |
| CABI-Invasive Species Compendium | Shropshire Wildlife Trust |
| The Centre for Ecology and Hydrology | Rural Hub Herefordshire |
| Farming and Wildlife Advisory Group - East Midlands | Upper Onny Wildlife Group |

| | |
|--|---|
| Farming and Wildlife Advisory Group - West Midlands (Chris Seabridge & Associates Limited) | Shropshire Anglers' Federation |
| Plantlife | Herefordshire Wildlife Trust |
| Shropshire Hills Area of Outstanding Natural Beauty Trust | Association of Drainage Authorities-Marches Branch |
| Cannock Chase Area of Outstanding Natural Beauty Trust | Hereford & District Angling Association |
| Malvern Hills Area of Outstanding Natural Beauty Trust | Worcestershire Wildlife Trust |
| Wye Valley Area of Outstanding Natural Beauty Trust | Worcester and District United Anglers Association |
| Cotswolds Area of Outstanding Natural Beauty Trust | Gloucestershire Centre for Environmental Records |
| North Wessex Downs Area of Outstanding Beauty Trust | Countryside and Community Research Institute |
| Surrey Hills Area of Outstanding Natural Beauty Trust | Oxfordshire and Gloucestershire Branch British Naturalist Association |
| People's Trust for Endangered Species | Gloucester Angling Club |
| Freshwater Habitats Trust | Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust |
| Inland Waterways Association | Oxford and District Anglers Association |
| Severn Trent Water | Coventry City Council |
| Thames Water | Warwickshire Wildlife Trust |
| South Staffs Water | Warwick Uni Life Sciences Dept. |
| Dwr Cymru Water Board | Leicestershire and Rutland Wildlife Trust |
| Royal Yacht Association Midlands | Staffordshire County Council |
| Royal Yacht Association North East | Staffordshire Wildlife Trust |

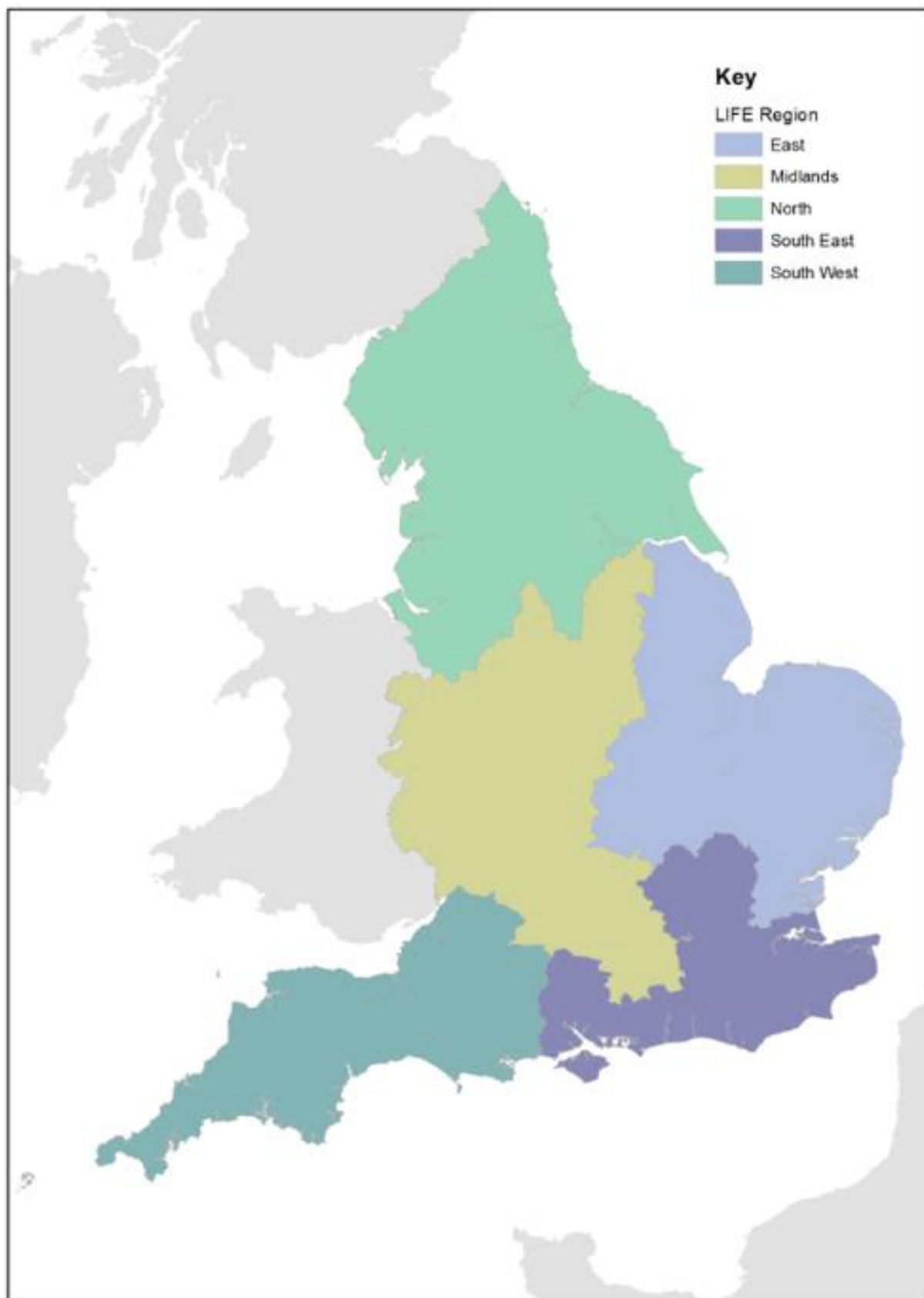
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| Royal Yacht Association South | Staffordshire Wildlife Trust (Gayton Brook and Cannock Chase Local Action Group) |
| Royal Yacht Association South West | Surrey Wildlife Trust |
| British Canoeing East Midlands | Action for the River Kennet |
| British Canoeing West Midlands | The Reading and District Angling Association |
| Nottinghamshire Biodiversity Action Group | Burghfield Sailing Club |
| Student Invasive Non-Native Group (SINNG) | Lincolnshire Wildlife Trust |
| British Trust for Conservation Volunteers | Wildlife Trust for Birmingham and the Black Country |
| Natural England | Birmingham Anglers Association Limited |
| Derbyshire Wildlife Trust | Victoria Mews Angling Club |
| The National Forest | Midland Sailing Club |
| Land Water management / CEH | The Environment Agency |
| Severn Rivers Trust | Dŵr Cymru |
| Greater Lincolnshire Nature Partnership (GLNP) | Sheffield Hallam University |

APPENDIX C.2: STAKEHOLDERS ENGAGED DURING PROJECT

This table lists the key stakeholders who were contacted during the project and who contributed to the development of the management plan.

| Stakeholder | Organisation |
|------------------|--------------------------------|
| Chantelle Grundy | British Canoeing |
| Martin Fenn | Environment Agency |
| Louisa Davis | Severn Trent |
| Karen Twine | Environment Agency |
| Peter Powell | Severn Rivers Trust |
| Tracey Doherty | Warwickshire Wildlife Trust |
| Emily Smith | Angling Trust |
| Zara Turtle | Severn Trent |
| Will Pegg | Environment Agency |
| Joseph Hamer | Network Rail |
| Dusi Thomas | Dŵr Cymru |
| Sarah Baker | GLNP |
| Ian Rotherham | Sheffield Hallam University |
| Sophie Cowling | Herefordshire Wildlife Trust |
| Chris Jackson | Nottinghamshire County Council |

APPENDIX D: RAPID LIFE regions



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