



RAPID

Reducing and Preventing
Invasive Alien Species Dispersal

Version 1
November 2018

REGIONAL INVASIVE SPECIES MANAGEMENT PLAN (RIMP)

SOUTH WEST ENGLAND



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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 South West region and to help them to be strategic and coordinated with other regions.
- The size of the South West region is 20636 km², and it covers 7 counties.
- In the development of this RIMP, 2 stakeholder engagement workshops and multiple email communications 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.
- This document categorises IAS in the South West 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.
- The RIMPs also contain information and/or links to information on IAS identification, reporting procedures and good practice management guidelines.
- The priority actions highlighted by the South West RIMP are the need for increased awareness and education on IAS pathways across all sectors. The promotion of good practice biosecurity measures where IAS management plans already exist and the development of biosecurity plans in high risk areas.

- All of the RIMPs will be reviewed periodically and updated as needed to reflect current trends, partnerships and best IAS management practices.

Introduction

RAPID LIFE and RIMP

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 running from 2017 – 2020 being overseen by the Animal and Plant Health Agency (APHA), working in partnership with BZS and Natural England, and coordinated by Alexia Fish. RAPID LIFE is working to protect freshwater aquatic, riparian and coastal biodiversity by embedding a coordinated, strategic and evidence-based approach to managing IAS across England. In doing so, this project seeks to bridge the gap between high-level strategies and action on the ground at a local level.

“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 this document.

Regions

The RAPID LIFE project splits England into five regions (Figure 1). An integral component of RAPID is the development of Regional INNS 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 within in each region.

Aim

To protect freshwater aquatic, riparian and coastal biodiversity by embedding a coordinated, strategic and evidence-based approach to managing INNS across

England whilst demonstrating the efficacy of this approach for replication across Europe. The production of the RIMPs will facilitate the completion of the first objective of the RAPID LIFE project and will feed into the other four. An essential part of developing each RIMP is the engagement of regional stakeholders in its production and implementation, this increasing the likelihood that it will be fit for purpose and used to help INNS management planning.

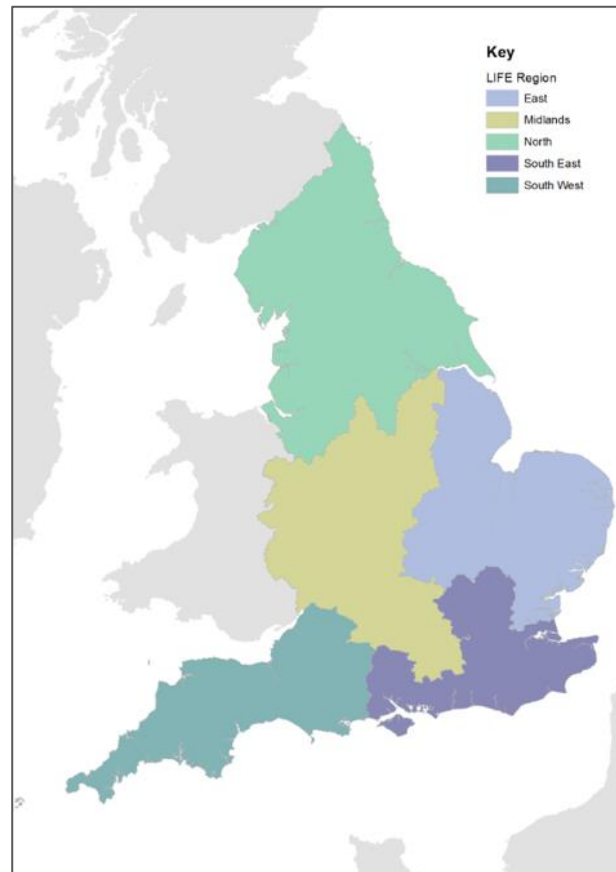


Figure 1. The 5 regions across England for the RAPID LIFE Project.

Objectives

1. Provide an opportunity for stakeholders to work with a locally based expert to identify the key actions to reduce the impact and spread of INNS in their region
2. Provide a framework that local, regional and national stakeholders can use to deliver more strategic and coordinated management based on Regional INNS Management Plans.
3. In concert with other RAPID LIFE actions, prevent the introduction of novel INNS to the project's target environments by increasing biosecurity awareness amongst target audiences through a coordinated programme of engagement.
4. Bridge the gap between high level strategies (such as the GB INNS Strategy) and action on the ground at a local level.

5. RIMPs will facilitate the delivery of full spectrum management of INNS (prevention; early warning and rapid response; long term-management) alongside other RAPID LIFE actions.

The South West RIMP

Wiltshire Wildlife Trust, in partnership with Devon Wildlife Trust, have RIMP for the South West (for coverage of counties see Figure 2). We have researched and collated information relating to the distribution and current management of INNS throughout the South West and identified the distribution of key species, potential high risk areas and hotspots, and pathways of spread with the aim of informing strategic and prioritised management. Most importantly, we engaged with key stakeholders to make sure local knowledge and expertise was captured.

To avoid repetition, the first four sections of this report refer to the entire South West region. Where stakeholders or species are specific to a local area within the region, this has been mentioned within the tables. During our stakeholder consultation it became clear that splitting the High Conservation Value (HCV) Areas and Hotspots into Environment Agency (EA) Management Catchments would be the most useful (Figure 2). The motivation for Local Action Groups (LAGs) to control INNS often comes from a desire to protect their local area. By structuring the report in this way we hope LAGs can pull out the sections of this report that refers specifically to their area, but read it in conjunction with sections one to four to retain the bigger picture and work strategically across the region.

The process of creating the RIMP was extremely collaborative and involved extensive discussions with other INNS experts within the region. The focus of RAPID LIFE is freshwater, riverine, riparian, transitional (estuarine) and coastal environments. Marine species were originally considered outside the scope of the RIMP but it was quickly apparent that in the South West marine biosecurity is a significant aspect of the regions INNS management activities. We have therefore, under the guidance of experts within this field, included some species that have a blurred line between coastal/estuarine and marine habitats.



Figure 2. The South West RIMP region for the RAPID LIFE project, including Environment Agency (EA) Management Catchments.

The methodology used in the creation of the RIMP is outlined in Figure 3. Species distribution was mapped using records from Local Environmental Records Centres (LERCs) and the Marine Biological Association (MBA). Records over 10 years old were disregarded (pre-2008) in order to consolidate the most recent distribution data. Records were then added or removed following stakeholder consultation. For example records of demon shrimp, *Dikerogammarus haemobaphes*, and zebra mussel, *Dreissena polymorpha*, were added for the Kennet and Avon Canal and records for topmouth gudgeon, *Pseudorasbora parva*, were removed, following information that it has been successfully eradicated from areas it has previously been recorded (at time of writing – Sept 2018). The stakeholder workshops provided opportunity to talk through all sections of the RIMP and refine our criteria for selecting and allocating species into the management tables and the methodology for selecting hotspots and areas of high conservation value.

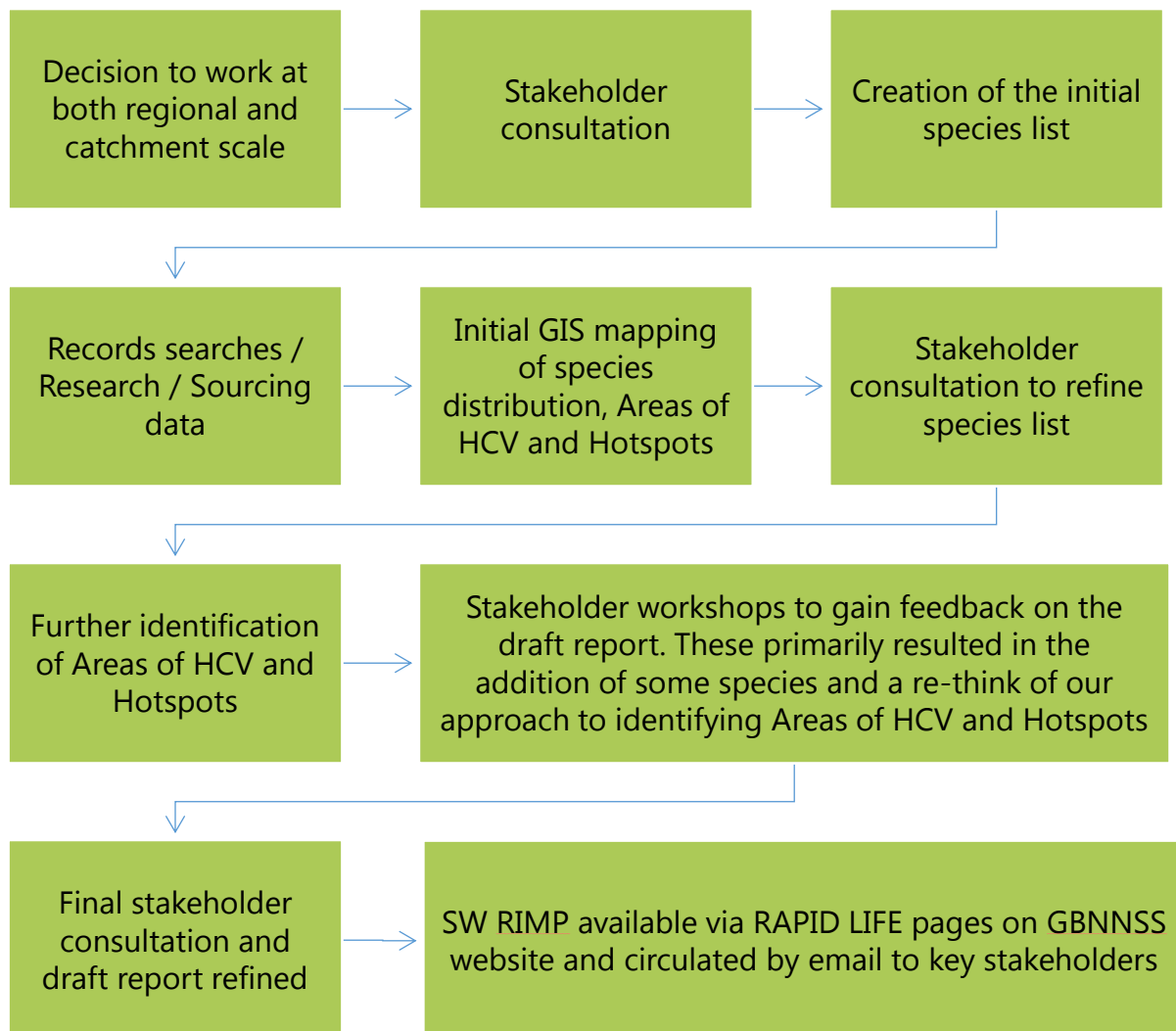


Figure 3. The process of producing the South West RIMP.

Following the production of this RIMP, RAPID LIFE will provide awareness raising materials and training toolkits for water resource managers and user groups. This will include materials to improve uptake of biosecurity to slow the spread and prevent introduction of new INNS in region. During our stakeholder consultation it was highlighted anecdotally that many organisations and hotspot sites have detailed biosecurity plans in place but action to implement these on the ground is still poor. It is therefore essential to ensure biosecurity awareness is not only targeted at creating new biosecurity plans but also towards sites that may have plans in place but may still lack the understanding or willingness to implement them.

RAPID LIFE is led by the Animal and Plant Health Agency (APHA) in partnership with Natural England and Bristol Zoological Society and supported by a number of further technical partners.

Section 1: Key regional and local stakeholders

INNS readily cross geographic and ownership boundaries, hence developing and maintaining cooperative relationships between different stakeholder groups (regulatory agencies and bodies, non-governmental organisations (NGOs), local action groups (LAGs), recreational, industry and voluntary groups) is integral to the management of INNS.

Table 1 indicates the huge range of stakeholders involved with INNS recording or management across the South West. Some of these may be already heavily involved with INNS projects of their own. Others may not yet be fully engaged or aware of the issues INNS can cause and the role they could be playing in their prevention or management (see [Table 3](#)). Some may be a source of funding for potential projects or could provide additional in-kind resources to support INNS work. This very much depends on individual situations and as such has not been summarised here.

When developing an INNS project it is important to identify potential partners and stakeholders early on in order to work strategically and effectively. Improved coordination between all levels of water resource managers, from angling clubs to statutory agencies, is essential. The list in Table 1 is not an exhaustive one. There will be groups, such as individual yachting or angling clubs, which are not included but would need to be considered.

Table 1. Key regional and local stakeholders to engage for partnerships and collaboration in the South West

Stakeholder	Freshwater and Riparian	Coastal and Marine
Government and Agency		
Animal and Plant Health Agency (APHA)	√	√
British Waterways Board (BWB)	√	
Centre for Environment, Fisheries & Aquaculture Science (CEFAS)		√
Dartmoor National Park Authority	√	
Department for Environmental and Rural Affairs (DEFRA)	√	√
Environment Agency (EA)	√	√
Exmoor National Park Authority (ENPA)	√	√
Forestry Commission	√	
GB non-native species secretariat (GBNNSS)	√	√
Harbour Authorities		√
HM Coastguard		√
Inshore Fisheries and Conservation Authority (IFCA)		√

Stakeholder	Freshwater and Riparian	Coastal and Marine
Marine Management Organisation (MMO)		√
Ministry of Defence (Royal Navy and Royal Marines)	√	√
Natural England (NE)	√	√
Industry		
Aquaculture - Pacific oyster		√
Aquaculture - Seaweed		√
Association of British Ports		√
Bournemouth Water	√	√
Bristol Water	√	√
British Marine		√
Brittany Ferries		√
Cornish Fish Producers Organisation		√
Devon Maritime Forum		√
Haslar Marina (Dean and Readyhoff)		√
Highways England	√	√
IMERYS	√	
Lymington Yacht Haven		√
Marine Renewables		√
Mayflower Marina		√
MDL Marinas (Hamble Point & QAB)		√
Network Rail	√	√
Plymouth Yacht Haven		√
Portishead Marina		√
Premier Marinas		√
Riviera Produce	√	
SEAFISH		√
Shellfish Association of Great Britain		√
South Devon and Channel Fishermen		√
South West Fish Producers Organisation		√
South West Water	√	√
SUEZ	√	
UK Major Ports Group		√
Wessex Water	√	√
West Country Producers	√	
Landowners		
Clinton Estates	√	√
Country Landowners Association (CLA)	√	√
Crown Estates	√	√
Duchy of Cornwall	√	√
Funders Ownership of the Seabed		√
Local/Port Authority		

Stakeholder	Freshwater and Riparian	Coastal and Marine
City Councils	√	√
Council of the Isles of Scilly	√	√
County Councils	√	√
Exe Estuary Management Partnership	√	√
Severn Estuary Management Group	√	√
Tamar Estuaries Consultative Forum	√	√
NGOs		
Angling Trust	√	√
AONBs	√	√
Avon Invasive Weeds Forum (Bristol Zoo lead partner)	√	
BASC	√	√
Botanical Society of Britain and Ireland	√	√
British Trust for Ornithology	√	√
BugLife	√	√
Butterfly Conservation	√	√
CABI	√	√
Campaign to Protect Rural England (Devon)	√	√
Canal and Rivers Trust	√	
Catchment Partnerships	√	
County Recorders Groups	√	√
English Heritage	√	√
Exotic Pet Traders	√	√
Farming and Wildlife Advisory Group (FWAG)	√	√
Freshwater Biological Association (FBA)	√	
Freshwater Habitats Trust	√	
Internal Drainage Boards	√	
Landmark Trust	√	
Local Environmental Records Centres	√	√
Local Nature Partnerships	√	√
Lundy Field Society		√
Mammal Society	√	
Marine Conservation Society		√
Marine Pathfinder North Devon		√
MCZ Management Forums		√
National Farmers Union (NFU)	√	√
National Trust	√	√
National Trust South West	√	√
PlantLife	√	√
Rail Companies	√	√
Rivers Trusts	√	
RSPB	√	√

Stakeholder	Freshwater and Riparian	Coastal and Marine
Salmon and Trout Association	√	
South West Lakes Trust	√	√
The Ramblers	√	
The Rockpool Search		√
Torbay Coast and Countryside Trust	√	√
Wildfowl & Wetlands Trust	√	√
Wildlife Trusts	√	√
Woodland Trust	√	
Recreational		
Be Supa	√	√
British Canoeing	√	√
Canoeing and Kayaking Associations	√	√
Green Blue (RYA & British Marine)		√
Moorings Associations	√	√
Recreational Sea Anglers UK		√
Royal Horticultural Society	√	
Royal Yacht Association		√
Visit Cornwall	√	√
Visit Devon	√	√
Wiltshire Fishery Association	√	
Research		
Bristol University	√	√
Bristol Zoo (Lead partner in Avon Invasive Weeds forum)	√	√
British Ecological Society	√	√
Centre for Ecology and Hydrology	√	
Cornwall & Isles of Scilly Federation of Biological Recorders (CISFBR)	√	
Exeter University	√	√
Fisheries Society of the British Isles	√	√
Marine Biological Association of the UK		√
Natural History Museum	√	√
Plymouth Marine Lab		√
Plymouth University	√	√
Plymouth University Marine Institute		√
The Riverfly Partnership (part of FBA)	√	
Voluntary/Citizen Science		
Amphibian and reptile groups UK	√	√
British Sub Aqua Club (BSAC)		√
Capturing Our Coast / Marine Invaders		√
Coastwise (North Devon)		√
Cornwall Invasive Species Forum	√	√
Cornwall Wildlife Trust's Shoresearch		√

Stakeholder	Freshwater and Riparian	Coastal and Marine
Devon birds	√	√
Devon Invasive Species Initiative (Devon Local Nature Partnership)	√	√
Helford Marine Conservation Group		√
Invasive Species Specialist Group	√	√
MCS Seasearch		√
Moor that Meets the Eye	√	
Natural History Museum - Big Seaweed Search		√
North Devon Biosphere Invasive Control Projects	√	√
Otter Valley Association (OVA) - River Otter Himalayan Balsam Project	√	
PADI		√
Plymouth Local Nature Partnership	√	√
River Yealm Environment Group	√	
Student Invasive Non-Native Group (SINNG)	√	√
Tamar Invasive Group	√	√
The Cornwall knotweed forum	√	

Section 2: Pathways and associated stakeholders

The South West RIMP has identified regional and local potential pathways of introduction of INNS and associated stakeholders (Table 2) to facilitate targeting of biosecurity education and awareness-raising ([Table 3](#)).

Table 2. Pathways and associated stakeholders in the South West

Pathway	Regional Associated Stakeholder
Freshwater and Riparian	
Intentional introduction or planting	Riparian landowners, members of the public, local councils, Environment Agency, DEFRA, Natural England.
Fouling and ballast water from freshwater vessels	Port authorities, Environment Agency, DEFRA, water sports organisations, members of the public, NGOs
Sale from garden/pond centres	Horticultural Trade Association, ornamental fish producers
Accidental /waste disposal or faith based live releases.	Religious groups, restaurants/establishments dealing with animal or plant materials, housing developers and local authorities
Litter	Waterway users, local council
Escape from ponds, gardens, farms, wildlife parks and zoos	CEFAS, local council, local fishery management, local wildlife parks
Public access e.g. walking, cycling, horse-riding	Local authorities, public rights of way teams, ramblers associations, local clubs
Coastal and Marine	
Fouling and ballast water of marine vessels (shipping, cruise, commercial etc.)	Local port authorities, Environment Agency, Seabed User and Developer Group, RYA, local marine water sports organisations, IFCAS, DEFRA, MMO, ferry/cruise liner operators, sea freight operators, M.O.D, fisheries (recreational & commercial)
Fishing gear (nets, dredgers, landing gear etc.)	DEFRA, Environment Agency, IFCAs, local port authorities, tackle/bait shops, fisheries (recreational & commercial)
Accidental/waste disposal or faith based live releases	Ferry/cruise liner operators, religious groups, restaurants
Marine litter	Local authorities, shipping and commercial vessel operators, NGOs, water companies, fisheries
Dredging and disposal	Marine Management Organisation, M.O.D, Natural England
Both	
Fish from aquaculture industry as disease vectors	CEFAS, local fisheries managers, shellfish association of Great Britain, SEAFISH, IFCA

Pathway	Regional Associated Stakeholder
Escapes from aquaculture and stocked fisheries industry	CEFAS, local aquaculture/fisheries managers, Shellfish Association of Great Britain, SEAFISH
Contaminated aquaculture equipment	CEFAS, local aquaculture/fisheries managers, Shellfish Association of Great Britain, SEAFISH
Transport, packaging and dumping of live bait for fishing	Fisheries (recreational and commercial), tackle & bait shops, retail/online companies (e.g. Amazon)
Contaminated water sports equipment from recreation e.g. angling, boating and kayaking	Local watersports organisations, local authority, members of the public, RYA, marinas, retail/tackle shops
Creation or movement of infrastructure and engineering	Oil and gas companies, offshore renewables companies, local authorities, DEFRA, Environment Agency, Marine Management Organisation, port & harbour authorities
Aquarium Trade	Pet shops, exotic fish shops, rare breed organisations, general public
Improper control and disposal methods	Local councils, Environment Agency, riparian and coastal landowners, contractors, general public
Natural spread due to climate change	Government, research institutions, NGOs/citizen science, general public
Travel	Government, local authorities, highways agencies, Network Rail, ferry and cruise operators, Civil Aviation Authority, general public

Section 3: Priority areas for education and awareness-raising

In order to reduce the impact and spread of INNS in freshwater, riparian and coastal environments across the South West it is critical that key players understand the basics about invasive species – e.g. what are INNS, what risks they pose, how they are introduced, what to do when an INNS is discovered, and how to control invasions. There are various means by which INNS can be introduced and/or spread, so it is important that education is targeted at as wide a spectrum of stakeholders as possible in order to maximise awareness, which can support prevention and early detection of INNS.

Table 3. Priority areas for education and awareness raising in the South West

Stakeholder Group	Priority Area	Delivery Mechanism
Freshwater and Riparian		
Contractors/Ground Maintenance Workers	Promote awareness & impact of INNS Rapid response & reporting for high risk species	Awareness raising workshops Work with local experts to ensure dissemination of good practices Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNS website, RAPID
Plant Nurseries and Plant/Pond/Aquarium Retailers	Promotion of INNS biosecurity. Target gardeners to dispose of plant material and/or soils responsibly	Biosecurity training APHA/local stakeholders to work with retailers to encourage distribution of codes and posters (available from APHA/Plantlife) and to advise the general public of INNS issues. Be Plant Wise campaign, http://www.nonnativespecies.org/beplantwise/
Public Rights of Way Teams, Ramblers Associations, Local Outdoor Adventure and Activity Clubs	Promotion of biosecurity procedures specific to riverine areas. Promotion of good practice guidelines to report and prevent the spread of INNS	Targeted information such as signage in areas of high risk, walking festivals and competitions Liaison with relevant retailers/organisers to facilitate education Social media campaigns

Stakeholder Group	Priority Area	Delivery Mechanism
Coastal and Marine		
Port & Harbour Authorities	Promote awareness & impact of INNS Avoid pumping out unsterilized ballast water in harbours Role of hull & equipment fouling in introduction and spread of INNS Promote knowledge of biosecurity measures Rapid response & reporting for high risk species	Awareness raising workshops Promote implementation of code of practice requiring unsterilized ballast water to be discharged away from harbour Local experts to work with industry to promote good practice, e.g. anti-fouling, disinfection of equipment and use of appropriate facilities to eliminate the risk of accidental transfer of INNS Distribution of posters & information Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
Offshore Industry (renewables, oil & gas)	Promote awareness & impact of INNS Role of infrastructure fouling in introduction and spread of INNS Promote knowledge of biosecurity measures Rapid response & reporting for high risk species	Awareness raising workshops Local experts to work with industry to promote good practice, e.g. anti-fouling, disinfection of equipment and use of appropriate facilities to eliminate the risk of accidental transfer of INNS Distribution of posters & information Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
Private Marina Groups	Promote awareness & impact of INNS Avoid pumping out of unsterilized ballast water in marinas Role of hull fouling in introduction and spread of INNS Promote regular flushing of locked marinas Rapid response & reporting for high risk species	Awareness raising workshops Promote implementation of codes of practice requiring flushing of ballast or other waste to be discharged away from marina Local experts to work with industry to promote good practice, e.g. anti-fouling, disinfection of equipment and use of appropriate facilities to eliminate the risk of accidental transfer of INNS APHA (Animal & Plant Health Agency) to assist with supply of awareness materials for display & signage

Stakeholder Group	Priority Area	Delivery Mechanism
		Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
Ferry & Cruise Operators	Promote awareness & impact of INNS Avoid pumping out of unsterilized ballast water in ports/harbours Role of hull fouling in introduction and spread of INNS Promotion of existing codes of practice covering security & disposal of INNS Rapid response & reporting for high risk species	Awareness raising workshops Promote implementation of good practice codes regarding: discharge of ballast water; hull cleaning; disinfection of equipment & use of appropriate facilities to lower risk of transfer of INNS Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
Industry Regulators (IFCA, MMO, NE, MOD)	Promote awareness & impact of INNS Role of hull fouling in introduction and spread of INNS Promotion of existing codes of practice covering security & disposal of INNS Rapid response & reporting for high risk species	Awareness raising workshops Promote implementation of biosecurity monitoring & INNS policy into long term management plans Local experts to work with regulators to promote good practice & monitoring of other vessels & activities Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
Both		
Aquaculture (CEFAS, MMO, DEFRA, local aquaculture managers)	Promote awareness & impact of INNS Use of screens and other biosecurity measures Dangers of importing stock from contaminated areas Controls on movement of stock & water Rapid response & reporting for high risk species	Awareness raising workshops Liaise with local industry and trade associations to advise members regularly of good practice Incorporation of INNS codes of good practice into industry codes of practice

Stakeholder Group	Priority Area	Delivery Mechanism
		Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
Recreational Fisheries, e.g. angling, potting etc.	Promote awareness & impact of INNS Promotion of existing codes of practice covering security & disposal of INNS and/or live bait Discourage purchase of imported live bait Rapid response & reporting for high risk species	Awareness raising workshops Angling Trust: https://www.anglingtrust.net/page.asp?section=649&sectionTitle=Invasive+Non-Native+Species Local experts to work with associations to promote good practice, i.e. hull cleaning, disinfection of equipment and use of appropriate facilities to eliminate the risk of accidental transfer of INNS Social media campaigns APHA/local stakeholders to work with associations to encourage distribution of codes and posters Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
Commercial Fisheries	Promote awareness & impact of INNS Role of hull & equipment fouling in introduction and spread of INNS Controls on movement of stock & water Rapid response & reporting for high risk species	Awareness raising workshops Local experts to work with associations to promote good practice, i.e. disinfection of equipment and use of appropriate facilities to eliminate the risk of accidental transfer of INNS Promote implementation of good practice codes regarding: hull cleaning; disinfection of equipment & use of appropriate facilities to lower risk of transfer of INNS Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section

Stakeholder Group	Priority Area	Delivery Mechanism
Local Authorities & Estuary Management Groups	Promote awareness and impact of INNS Promote knowledge of biosecurity measures amongst relevant staff Rapid response & reporting for high-risk species	Awareness raising workshops Incorporation of INNS policy and codes of good practice into long term management plans Promote biosecurity guidance & control measures Appropriate signage on owned land Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
Water User Associations (paddle sports, sailing, angling, diving clubs etc.)	Promote awareness & impact of INNS Promote knowledge of biosecurity measures Rapid response & reporting for high risk species	Awareness raising workshops Social media Local experts to work with associations to promote good practice, i.e. disinfection of equipment and use of appropriate facilities to eliminate the risk of accidental transfer of INNS Appropriate signage to reduce threats from INNS Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
Water Companies	Promote awareness and impact of INNS Promote knowledge of biosecurity measures amongst staff and general public Rapid response & reporting for high-risk species	Awareness raising workshops Incorporation of INNS policy and codes of good practice into long term management plans Promote biosecurity guidance & control measures Appropriate signage on owned land Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
Land Owners	Promote awareness & impact of INNS Promote knowledge of biosecurity measures amongst tenants and resource users	Awareness raising workshops Work with local experts to disseminate good practice and appropriate signage to reduce threats from INNS

Stakeholder Group	Priority Area	Delivery Mechanism
	Rapid response & reporting for high risk species	Promote biosecurity guidance & control measures Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNS website, RAPID section
Aquarium Retailers & Tackle/Bait Shops	Promote awareness & impact of INNS Promotion of existing codes of practice covering security & disposal of INNS Discourage sale of imported live bait Rapid response & reporting for high-risk species	Awareness raising workshops APHA/local stakeholders to work with retailer to encourage distribution of codes and posters Distribution of RAPID Life project leaflet Check Clean Dry campaign posters http://www.nonnativespecies.org/checkcleandry/ GBNNS website, RAPID section
Restaurants and Retail	Promote awareness & impact of INNS Discourage importation & sale of high-risk species Promotion of existing codes of practice covering security & disposal of INNS Encourage reporting of high-risk species if they do occur	Incorporation of INNS policy and codes of good practice into long term plans Visits to local restaurants and national chains and/or invite managers to awareness workshops Distribution of RAPID Life project leaflet as widely as possible GBNNS website, RAPID section
Research Groups and Universities	Promote awareness and impact of INNS Encourage monitoring & dissemination of latest research Rapid response & reporting for high-risk species	Awareness raising workshops Promote biosecurity guidance via local experts Work with local experts to disseminate good practice and appropriate signage to reduce threats from INNS Distribution of RAPID Life project leaflet Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNS website, RAPID section
Education Establishments (schools, colleges, universities)	Promote awareness & impact of INNS Promote knowledge of biosecurity measures Rapid response & reporting for high risk species	Awareness raising workshops with science/eco clubs Encourage field trips & in situ surveys Engage local NGOs and INNS projects to help deliver

Stakeholder Group	Priority Area	Delivery Mechanism
		Distribution of RAPID Life project leaflet Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
Local NGOs/Conservation/Citizen Science Groups	Promote awareness & impact of INNS Encourage monitoring of INNS Rapid response & reporting for high-risk species	Awareness raising workshops Work with local experts to disseminate good practice and appropriate signage to reduce threats from INNS Distribution of RAPID Life project leaflet Check Clean Dry campaign posters http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section
General Public	Promote awareness & impact of INNS Promote knowledge of biosecurity measures Rapid response & reporting for high risk species	Awareness raising workshops Social media Local media campaigns Promote biosecurity guidance via local experts Distribution of RAPID Life project leaflet Check Clean Dry campaign http://www.nonnativespecies.org/checkcleandry/ GBNNSS website, RAPID section

Section 4: INNS in Prioritised Management Categories

Species for Prevention

Focused on the prevention of new invasions, this category addresses invasive species not currently recorded the region but potentially on their way. The goal is to prevent new invasive species from entering the region.

More details on species ID, impacts and additional information can be found on the [GBNNS website](#). Records should be submitted to the [INNS Mapper](#) in addition to GBNNS where detailed in the Management section of the below tables.

Table 4. Species not yet in the South West Region for Prevention

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Freshwater and Riparian						
American Bullfrog <i>Lithobates catesbeianus</i>	Likely	Bullfrogs have been deliberately released as unwanted pets and have escaped from garden ponds where they had been confined as tadpoles. Others have been imported	Discovered in East Sussex and Essex where breeding populations have been removed.	Both predation and competition may adversely affect populations of native frogs, toads and newts. American bullfrogs and other non-native amphibians may carry the chytrid fungus <i>Batrachochytrium dendrobatidis</i> , and can spread the disease	Bullfrogs are up to twice the length of the native common frog, and draw attention by their loud, deep calls. Their ear drum is obviously larger than the eye, with a conspicuous dark outer ring. The lack of skin folds along the back, and the single vocal sac positioned beneath the chin, help to distinguish this from other non-native frogs	Eradication if found. Natural England in the process of an eradication plan. https://www.conservationevidence.com/data/index?synopsis_id%5B%5D=18

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
		accidentally with fish stocks or aquatic plants.		chytridiomycosis to native amphibians.	in GB. GBNNS ID Guide: http://www.nonnativespecies.org/downloadDocument.cfm?id=80	
Killer shrimp <i>Dikerogammarus villosus</i>	Very likely	Spread through contaminated ballast water, fouled waders, boats and angling equipment.	Present in the east of England.	Highly aggressive species, preys on native shrimp, mayflies, damselflies, leeches, snails, fish eggs and larvae (and others). Decline in other ecosystem processes as reduction in other macroinvertebrates. Also impacting fish and fisheries.	GBNNS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=474	Biosecurity is the main precaution to be taken in order to reduce the likelihood of spread. Check, clean, dry.
Quagga Mussel <i>Dreissena bugensis</i>	Very likely	Recreational boating, contaminated ballast water, angling, natural spread through canals and other water bodies.	Canals, rivers, lakes, wetlands.	High filtration capacity, capable of out-competing native species, short reproduction cycle, changing nutrient availability and macrophyte populations. Cause likely declines in bivalves and gastropods. Potentially	Sessile bivalve of triangular shape and usually less than 5 cm length. It commonly has alternating light and dark brown stripes, but can also be solid light brown or dark brown.	No official strategy, however water users such as anglers, fishing groups etc. are being encouraged to implement biosecurity methods i.e. Check, clean, dry.

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
				large economic impact e.g. blockage of pipes, filters, turbines etc.		
Raccoon <i>Procyon lotor</i>	Likely	Escape from pet trade, zoos and wildlife parks. Deliberate introduction.	Established populations in western Europe.	Raccoons may threaten vulnerable bird species and displace native carnivores.	A grey animal, about the size of a large cat, with distinctive dark eye-patches and a thick furry tail with a series of black rings. They like to feed in water or to douse their food in water before eating.	Link to GBNNSS Risk Assessment https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=621
Raccoon dog <i>Nyctereutes procyonoides</i>	Likely	Escape from pet trade, zoos and wildlife parks. Deliberate introduction.	One record in the UK, from Berkshire in 2005. Widespread across Europe.	They may compete for food and dens with native animals such as red fox and badger and their predation on birds and amphibians may at times affect prey populations. They are carriers of diseases such as sarcoptic mange, rabies and tapeworms that can affect native mammals.	A fox-sized mammal with short legs and tail and mainly blackish-grey fur. There are raccoon-like black markings across the face but this species lacks the raccoon's long banded tail.	Report to GBNNSS if found. Link to RAPID INNS Toolkit management plan on GBNNSS website. http://www.nonnativespecies.org/index.cfm?pageid=623
Topmouth gudgeon	Very likely	Entered through contaminated fish farm trades	Close to the region, present in	An effective invasive species, broad diet, rapid sexual maturity,	Small elongated body (adults grow up to 11cm), flattened sides and an	The EA are currently in the process of an eradication programme. Gained 5 year

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
<i>Pseudorasbora parva</i>		back in 1984, further spread through fish trade.	Southampton. Ponds, small lakes, small river channels.	prolific breeders (up to four times a year), preys on native fish eggs, and ability to disperse easily allows it to out-compete native fish species. Can also carry diseases and parasites that can harm native species.	upturned mouth, dorsal and anal fins short, dorsal fin deeply forked. Adults occur in cool, shallow water, either still or slow-flowing, especially with abundant macrophytes.	funding through Water Framework Directive, beginning in 2010, with the aim to eradicate the species by 2017. Methods mainly included biocontrol using perch and the use of the piscicide, Rotenone.
Coastal and Marine						
American oyster drill <i>Urosalpinx cinerea</i>	Possible	Aquaculture & shipping/aquaculture (brought in with American oysters)	Currently limited to Essex and Kent coasts. Low risk of spreading due to lack of free-swimming larval stage. Once established however, will grow to dominate a small area.	Preys heavily on native oyster, mussel and barnacle spat. May compete with native whelks. Local populations increase rapidly as dispersal is limited. Could have major economic impact on oyster and mussel farming.	Yellowish or grey tall spiral shell up to 4cm long with up to 8 turns. Shell opening oval with thickened lips in mature specimens. Short open canal running forward from opening. Orange-yellow plate closes opening when snail withdraws. Similar to native sting wrinkle.	Importation of shellfish from invaded areas should be avoided. Research currently being carried out in USA (Smithsonian Invasions Lab) Visit www.cabi.org

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
American lobster <i>Homarus americanus</i>	Likely	Commercial fishing boats; food waste dumped overboard by cruise liners; released into the wild by ethical/religious groups.	Unofficially present in the UK but has only been identified in British waters on 26 occasions between 1986 and 2011. Isolated reports along the south coast between Plymouth and Exeter (Salcombe region) and Solent region.	Risk of introducing diseases to native species, competition for space and food, American Lobsters naturally more competitive and larger in size. Also risk of interbreeding, where subsequent males also become infertile.	Dark blue/green to green/brown body colour, red tint on claws and body, and green tint on walking legs. Larger than native UK lobsters, up to 50cm in size and up to 20kg. Can occupy inshore and offshore locations, inhabiting bedrock, mud, clay, cobble, eelgrass beds, peat reefs and sandy depressions in its native range. GBNNSS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1177	Not listed on EU list of Invasive Alien Species, therefore live lobster are still imported. Awareness and enforcement of The Lobsters (Control of Deposit) Order 1981 is most viable option currently. Individuals should be destroyed once ID confirmed.
Asian shore crab and brush clawed crab <i>Hemigrapsus sanguineus</i> and <i>Hemigrapsus takanoi</i>	Likely	Mainly through contaminated ballast water and then natural larval dispersal. Hull fouling and via aquaculture also possible	Large established population in East Anglia. Also recorded in Channel Islands, Glamorgan,	Significant reduction in native shore crab & mussel density reported in Europe and N. America. Could pose a threat to mussel and oyster farming & potential competition	Small squarish shaped crabs with three carapace 'teeth' behind well-spaced eyes. Both species are variable in colour from orange-brown to greenish-black. Carapace can be up to 4.5 cm across in <i>H.</i>	Ensure ballast waters emptied before entering at risk areas. Individuals should be destroyed once ID confirmed.

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
			South Wales and Medway Estuary	with commercial species for space, incl. edible crab.	<i>sanguineus</i> and up to 2.5 cm in <i>H. takanoi</i> . Both species have distinctly white claws. GBNNIS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1162	
Chinese mitten crab <i>Eriocheir sinensis</i>	Likely	Mainly through contaminated ballast water Individuals may cling to boat hulls and transported via aquaculture.	Established in R. Thames, Medway Estuary, East Anglia & R. Ouse Individual records from Mersey Estuary, Swansea and Brownsea Island.	Voracious predator affecting both marine and freshwater ecosystems. Eats a range of invertebrates and fish eggs, impacting populations. Burrows into river banks causing erosion & collapse and increasing river turbidity & increasing siltation on gravel beds vital for fish spawning. Also carries disease. Can damage fishing gear, block intake screens and increased repairs to flood defences.	Square olive coloured body, long pale legs, very distinctive matted furry front claws. Juvenile crabs found in estuaries/saline environments, adults further upstream in fresh/brackish water environments. GBNNSS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=367	Difficult to monitor due to life cycle and physiology. Physical methods are preferred e.g. traps, barriers etc., however methodologies should be adaptive. Individuals should be destroyed once ID confirmed.

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Tree groundsel <i>Baccharis halimifolia</i>	Likely	Planted for ornament in gardens or as a hedging plant in coastal areas.	Currently surviving (but not spreading) at one coastal site in South Hampshire where it was introduced in the 1920s.	<i>Baccharis halimifolia</i> has the capacity to form a dense understorey in coastal wetlands, saltmarshes, and woodlands, suppressing native species and altering habitat composition and ecosystem properties.	<i>Baccharis halimifolia</i> is an autumn-flowering dioecious, salt-tolerant shrub growing to about 4 m high. It's simple, alternate, thick, egg-shaped to rhombic leaves mostly have coarse teeth, with the uppermost leaves entire. Their flowers are borne in numerous small, compact heads in large leafy terminal inflorescences, with the snowy-white, cotton-like female flower-heads.	Check, clean, dry. Tree groundsel management manual: http://www.euskadi.eus/contenidos/documentacion/baccharis/en_def/adjuntos/BaccharisHalimifoliaManagementManual_%20EN.pdf

Species for Prevention or Local Eradication

Priority for early detection and eradication from either the region as a whole or locally where LAGs feel it is feasible. Focused on preventing the spread of invasive species already found to exist in the region but either in very limited amounts, or not in every catchment.

For coastal and marine species, eradication is challenging due to the nature of the environment, therefore the focus is on preventing the spread of species to unaffected areas.

The goal is early detection and rapid response, relevant authorities should be alerted to presence of these species immediately.

Table 5. Species for Prevention or Local Eradication in the South West Region

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Freshwater and Riparian						
American mink <i>Neovison vison</i>	Likely	First spread through escape from mink farms.	Widespread across the UK but decreasing due to control measures. Not present in all catchments across the southwest.	Impact on native species can occur through predation, competition, and potentially also by acting as a vector of disease. Significant population declines of ground-nesting birds and small mammals have resulted from mink predation in its introduced range. European mink now restricted to fragmented	GBNNSS ID guide: http://www.nonnativespecies.org/downloadDocument.cfm?id=38	Focus efforts on local eradication and prevention of spread to un-invaded regions. Control by shooting as part of mink management plan. Link to RAPID INNS Toolkit management plan on GBNNSS website. http://www.nonnativespecies.org/index.cfm?pageid=624

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
				populations across Europe.		
American skunk-cabbage <i>Lysichiton americanus</i>	Very likely	Horticulture, widely planted in bog gardens.	Concentration in South East England, most notably in Hampshire, Surrey and Sussex. Outside, it appears to have a rather northern and western lowland distribution. It is virtually absent from the drier past of Eastern England. Bog and wetland areas.	Displacement and local extinction of competitor species via competition. High economic impact of removal.	GBNNS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=484	Link to RAPID INNS Toolkit management plan on GBNNS website. http://www.nonnativespecies.org/index.cfm?pageid=624

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Demon shrimp <i>Dikergammarus haemobaphes</i>	Very likely	Spread through contaminated ballast water, fouled waders, boats and angling equipment.	Demon shrimp present in the Kennet and Avon canal and Bristol Avon.	Highly aggressive species, preys on native shrimp, mayflies, damselflies, leeches, snails, fish eggs and larvae (and others). Decline in other ecosystem processes as reduction in other macroinvertebrates. Also impacting fish and fisheries.	GBNNSS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=474	Biosecurity is the main precaution to be taken in order to reduce the likelihood of spreading <i>Dikergammarus</i> spp. to other water bodies. Check, clean, dry.
Floating pennywort <i>Hydrocotyle ranunculoides</i>	Very likely	Introduced to GB as an ornamental plant for garden ponds and aquaria. Spread through birds and other animals, recreational boating, and carried downstream in the water.	Widespread across the South. Freshwater: still or slow-flowing water in lakes, ponds, streams, ditches and canals.	Forms dense coverage disrupting natural erosion-deposition processes, the movement of animals, predator-prey relationships, wind mixing, and out-competing native aquatic plants. Die back can increase nutrient loads to the water.	GBNNSS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=31	Link to RAPID INNS Toolkit management plan on GBNNSS website. http://www.nonnativespecies.org/index.cfm?pageid=624

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Giant hogweed <i>Heracleum mantegazzianum</i>	Very likely	Introduced via gardens. Spread through dumping of waste, animal movement, public use of waterways, e.g. towpaths.	Widespread along river and canal verges in the UK.	Forms dense stands reducing species diversity. The plant produces phytotoxic sap. The sap contains photosensitizing furanocoumarins, which in contact with human skin and combined with UV radiation cause skin burnings. The danger to human health complicates eradication efforts.	GBNNSS ID guide: http://www.nonnativespecies.org/downloadDocument.cfm?id=30	Focus on local eradication and the prevention of spread to clean catchments. The danger to human health complicates eradication efforts. The application of herbicides over several years, prior to seed set, has been proven effective for both control and eradication. It is important to remember that the seeds of this plant can remain viable for 7 years. Good practice management guide: http://www.nonnativespecies.org/downloadDocument.cfm?id=999
Parrot's feather <i>Myriophyllum aquaticum</i>	Very likely	Cultivated in the UK and spread through dumping of garden waste.	Abundant throughout Southern England. Floodplain lagoons, river backwaters, lakes, ponds,	Dense growth can cause flooding, disruption of erosion-deposition, block light from water, prevent wind mixing leading to oxygen depletion and out-compete native species.	GBNNSS ID guide: http://www.nonnativespecies.org/downloadDocument.cfm?id=66	Focus efforts on local eradication and prevention of spread to un-invaded regions. Managed through chemical treatment, mechanical dredging and manual pulling. Method dependent on state of

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
			marshes, fens and ditches.			infestation. http://www.nonnativespecies.org/index.cfm?pageid=623
Ruddy duck <i>Oxyura jamaicensis</i>	Likely	Arrived through aviculture.	A population of up to 6,000 birds had become naturalised in GB but has been reduced to fewer than 20 birds by an ongoing programme of control. Recent winter sightings in the Bristol area.	Competition with endangered white-headed species in the UK.	Invasive species factsheet on GBNNSS website: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=67	Control by shooting as part of ruddy duck management plan. Link to Ruddy Duck Project page on GBNNSS website. http://www.nonnativespecies.org/index.cfm?pageid=244
Signal crayfish <i>Pacifastacus leniusculus</i>	Very likely	The signal crayfish was introduced to be farmed for food, but escaped through water courses and	Widespread across the southwest but absent from certain catchments in Cornwall that	Signal crayfish are driving native crayfish towards extinction through the spread of crayfish plague and competition for	GBNNSS ID guide: http://www.nonnativespecies.org/downloadDocument.cfm?id=68	Focus efforts on local eradication and prevention of spread. Priority for eradication and prevention in catchments with populations of white-clawed crayfish.

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
		across land, quickly spreading across GB.	still contain white-clawed crayfish.	resources (refuges in particular)		Eradication is possible at a catchment scale where numbers remain small.
Water primrose <i>Ludwigia grandiflora</i>	Very likely	Previously introduced and sold through the ornamental plant trade, but banned selling in 2014. Improper removal of waste plants into wild can cause spread.	Variable distribution across West Cornwall and Southampton. Riverbanks and wetlands.	Rapidly growing seasonal plant which out competes native species. This can clog waterways and contribute to flooding. Spreads by stem fragments and also by seeds, making containment difficult.	Long oval leaves like a willow and a large, bright yellow flower like that of a primrose. It can be distinguished <i>from L. peploides</i> by differences in morphology, most notably the dull, cuneate leaves, pointed stipules, larger sepals (> 10 mm), and presence of pneumatophores. GBNNSS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=861	Link to RAPID INNS Toolkit management plan on GBNNSS website. http://www.nonnativespecies.org/index.cfm?pageid=623
Zebra mussel <i>Dreissena polymorpha</i>	Likely	Spread through ballast water and fouled boating and angling equipment.	Widespread across the UK, absent from some catchments in the southwest.	They disrupt the ecosystems by monotypic colonization, and damage harbours and waterways, ships and boats, and water treatment and power	Small shellfish named for the striped pattern of its shell. Colour patterns can vary to the point of having only dark or light coloured shells and no stripes. GBNNSS ID guide:	Focus efforts on local eradication and prevention of spread to un-invaded regions. Check, clean, dry. GBNNSS RAPID Toolkit: https://secure.fera.defra.gov.uk/nonnativespecies/do

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
				plants. Water treatment plants are most affected because the water intakes bring the microscopic free-swimming larvae directly into the facilities. Zebra mussels also cling to pipes under the water and clog them.	https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=365	wnloadDocument.cfm?id=1786
Coastal and Marine						
Carpet sea squirt <i>Didemnum vexillum</i>	Likely	Contaminated ballast water & hull fouling of leisure craft	Present in the Solent, along SE coast and East Anglia. In SW currently only established in the R. Dart.	Capable of forming large colonies, competes with other sessile species. Can have major impact on aquaculture & shellfish industry.	Pale orange/cream/off-white colonies, thin sheets (2-5mm). Small pores in surface, firm leathery texture, marbled/veined appearance. GBNNSS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=364	Focus efforts on local eradication and prevention of spread to clean areas. Check, clean dry. Must be reported within 24 hours. If found remove structure/surface from the water. Good Practice Management webpage: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1813

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Orange ripple bryozoan <i>Schizoporella japonica</i>	Likely	Ballast water from shipping and leisure craft, hull fouling of leisure craft.	Holyhead and Plymouth.	Fouling and smothering native shellfish.	Bright orange encrusting bryozoan. Forms sheets with rounded lobes, often with raised areas. MBA INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Preventative antifouling measures. Lifting of pontoons and scraping or drying out. Biosecurity Check, clean, dry. http://www.nonnativespecies.org/checkcleandry/
Trumpet tube worm <i>Ficopomatus enigmaticus</i>	Likely	Hull fouling; possible larval transport in ballast water.	Already established in a few marinas and harbours in SW, particularly Portishead Marina & Poole Harbour	Ecosystem engineer forming large aggregations & reef-like structures. May negatively impact other benthic species. Serious fouling pest in marinas/harbours, can clog propellers and cause engine failures. Can block pipes and cooling systems in power stations.	Clumps or reefs of upright, white, intertwined chalky tubes (1-3mm diameter) with flared collars at intervals, attached at base to solid surface. MBS INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Preventative antifouling measures. Open lock gates regularly to flush larvae out and maintain salinity Clean equipment regularly Biosecurity - Check, clean, dry http://www.nonnativespecies.org/checkcleandry/

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Worm wart weed <i>Gracilaria vermiculophylla</i>	Likely	Pacific oyster aquaculture	First record in Dorset 2009. Brownsea Island, Poole & Christchurch harbours. 1 record from Salcombe-Kingsbridge Estuary.	Forms algal mats which outcompete and smother native seagrasses and modify intertidal saltmarshes. Can attain high biomass once established and displace native seaweeds. Can also increase biodiversity. Potential to clog propellers and foul nets & has blocked cooling plant in USA.	Dark red, almost black, elongated with slender branched fronds, growing up to 2m. Attach by small discoid holdfast. Branches are circular to slightly compressed in cross-section. Branches can feel elastic. MBA INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Removal by hand possible Monitor spread in region.

Species for Long Term Management: Medium Priority

Focused on invasive 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 good practice biosecurity guidelines to keep the species from spreading to uninvaded areas.

Table 6. Species for Long Term Management: Medium Priority in the South West Region

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Freshwater and Riparian						
Giant knotweed <i>Fallopia sachalinensis</i> and Himalayan Knotweed <i>Persicaria wallichii</i>	Likely	Spread into the wild is almost invariably by vegetative means, as garden throw-outs and ground works. Seed, though rarely viable, floats and can be carried considerable distances in water, or by wind.	Found around Bath, Bristol and the Isle of Wight. More widespread in Eastern counties.	Forms very tall and dense thickets that compete with native vegetation for space, light, nutrients and water. Secondary losses of native species are often caused when they succumb to the herbicides which are sprayed on the knotweed in an attempt to control or eradicate it. Large colonies have the potential to rapidly change the structure and species composition of local ecosystems, having a knock-on effect on many	Link to invasive species information on GBNNSS website. http://www.nonnativespecies.org/factsheet/downloadFactsheet.cfm?speciesId=1498	Eradication can be achieved by the removal of the whole plant and the contaminated soil to landfill sites but this is far from sustainable. RAPID Good Practice Management Guide https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1765

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
				plant and animal species, especially in riparian situations.		
Himalayan balsam <i>Impatiens glandulifera</i> and Orange Balsam <i>Impatiens capensis</i>	Very likely	Seeds spread through water courses, and human and animal movement.	Widespread and common across the whole of the UK. Orange less common than Himalayan. Primarily on riverbanks and in other damp areas.	Outcompetes native species, dominating riparian areas.	GBNNS ID guide: http://www.nonnativespecies.org/downloadDocument.cfm?id=33	Manual destruction allowing native species to take hold. RAPID Good Practice guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1766
Japanese knotweed <i>Fallopia japonica</i>	Very likely	Plants and fragments of root, if discarded, can become established in the wild, particularly along riverbanks where propagules are easily dispersed.	Very widespread in GB, although it is generally not very abundant except in urban areas - particularly some cities in South Wales.	It usually occurs in highly degraded urban situations where the native flora is already impoverished. However, alteration in habitat structure and biological communities (caused by Japanese Knotweed and other riparian invasive non-native species) is known to impact directly on	GBNNS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=369	https://www.gov.uk/guidance/prevent-japanese-knotweed-from-spreading . RAPID Good Practice guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1767

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
				salmonid fisheries. As well as hindering conservation efforts & the viability for angling, the presence of these plant species pose great management and access concerns if left uncontrolled.		
Montbretia <i>Crocsmia x crocosmiiflora</i>	Very likely	Very commonly grown in gardens, where it tends to spread and form large clumps. Many gardeners dump the excess plants on roadsides and in woods.	Widespread	Pushes out native flowers and dominates habitats.	GBNNS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=362	Manual removal, all of plant and root system must be removed.
New Zealand pigmyweed <i>Crassula helmsii</i>	Likely	The movement of vegetative fragments on boats, machinery used to manage water bodies, clothing and possibly wildfowl. It is possible that	Widespread and abundant throughout most of England, particularly the south, as well as Cumbria and scattered	Except in deep water, New Zealand pigmyweed tends to form dense mats, from 0.5m above water to depths of 3m under water, which apparently shade out other plants. These can also apparently cause oxygen depletion of the	GBNNS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=360	A mix of physical, chemical and environmental control is advised. RAPID Good Practice guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1768

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
		there are still some new introductions by people discarding pond plants.	localities in Wales, the Isle of Man, Scotland and eastern Ireland. Typically in ponds, lakes and reservoirs.	underlying water leading to a decline in invertebrates, frogs, newts and fish.		
Noble crayfish <i>Astacus astacus</i>	Likely	Escape from markets and deliberate introduction.	Its range is still limited to the southwest, and there are only three or four viable populations still found within or near the River Chew catchment.	Noble crayfish feed largely on plant material, and so could significantly impact macrophyte abundance and habitat structure. They will switch to an omnivorous diet if food becomes limited and so could affect food webs at several trophic levels.	Adults grow slowly but may reach 15cm or more in length. They are variable in colour and range from shades of brown and beige, to bright red and occasionally blue. There are ridges on the carapace and spines on the shoulder of the carapace. Spines and absence of a white-turquoise patch on the claw differentiate the noble crayfish from the otherwise similar signal crayfish. Crayfish	Link to invasive species action plan on GBNNSS website. https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=233 Note – listed as Vulnerable on the IUCN Global Red List of Threatened Species and Annex 5 of the EU Habitats Directive.

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
					information booklet: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1169	
Turkish crayfish <i>Astacus leptodactylus</i>	Likely	Escape from markets and deliberate introduction.	Recorded in Bath, Launceston, Shaftesbury and Salisbury.	Turkish crayfish are omnivorous and could affect populations of macrophytes and invertebrates, and perhaps affect food chain interactions. Threat to white-clawed crayfish is considered to be low because Turkish crayfish are not carriers of crayfish plague, but it is likely that the non-native species would outcompete the native species if ranges overlapped.	Adults are usually about 15cm long, but can reach up to 30cm in length. They have long, narrow claws that are rough on the upper surface, ridges behind the eye sockets and a long rostrum with parallel sides. They vary in colour from a pale sandy yellow or pale green to dark green or occasionally blue. Crayfish information booklet: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1169	https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=234
Water fern <i>Azolla filiculoides</i>	Likely	The dispersal vector is not known but it has been shown to be	Widespread and abundant through the lowlands of	Water fern can achieve 100% cover over the water surface as a carpet occasionally up to 30cm	GBNNS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/d	Biological control using the <i>Azolla</i> weevil <i>Stenopelmus rufinusus</i> is

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
		transported on machinery and may well survive dispersal on the clothes of people working in gardens.	GB. Typically occurs in ponds, lakes, ditches, canals and slow flowing parts of rivers.	thick. At such times, it blocks out light, preventing photosynthesis in aquatic plants and preventing or compromising oxygen diffusion. It also prevents amphibians and invertebrates from reaching the surface and may disrupt movement of animals on the water surface.	ownloadDocument.cfm?id=350	proved the most effective.
Coastal and Marine						
American slipper limpet <i>Crepidula fornicata</i>	Very likely	Likely imported with American oysters. May also arrive via other aquaculture, ballast water and hull fouling.	All along the south coast and spreading northwards.	Forms reefs smothering seabed species and outcompeting native mussels and oysters. May also consume planktonic larvae of some species. Fouls farmed species such as oysters & artificial structures and equipment having a major effect on fisheries. Loss of amenity value due to infestation	Domed, oval shaped shell, up to 5cm long, with internal flat shelf. Outer surface pale, with growth lines and brown patches. Often aggregate into chains or leaning stacks of individuals, larger towards base. GBNNSS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/d	Beyond hand removal in many areas. Mechanical removal is possible but expensive and extremely destructive. RAPID Good Practice Management Guide: https://secure.fera.defra.gov.uk/nonnativespecies/d

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
				and impacts on recreational fishing.	ownloadDocument.cfm?id=361	
Devil's tongue seaweed <i>Grateloupia turuturu</i>	Very likely	First UK record in 1969 via aquaculture, but recently spreading more aggressively, possibly through boating, shipping vessels, ballast water, hulls of leisure craft.	Established in Falmouth and Plymouth plus other areas of the South coast. Spreading widely across rocky shores in the region.	Fouling and competition with native species. Large size and high reproductive output. Tolerant of variable temperature and salinity regimes and has potential to outcompete native algae for space; Can lead to habitat loss through shading and alter trophic patterns.	Red blades, often with narrow extensions from the margins. Small area of attachment and very short stalk. Slippery to the touch. Frequently found on pontoons and marine structures, also shallow subtidal and intertidal pools in sheltered locations. MBA INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Removal from shores and marinas by hand possible but time consuming. Preventative antifouling measures. Clean equipment regularly Biosecurity - Check, clean, dry http://www.nonnativespecies.org/checkcleandry/
Green sea fingers <i>Codium fragile</i>	Likely	Initial pathway unknown but secondary dispersal through aquaculture, hull fouling and natural spread	Native to N. Pacific. First UK record on R. Yealm in 1939 growing on oyster shells. Records in Portland Harbour. Also	Alters benthic communities and habitats. Dense fronds hinder movement of large invertebrates and fish along the bottom and increases sedimentation. Can foul aquaculture equipment, boats, fishing	Dark green seaweed with velvety, finger-like branches. The plump, round branches are 3-10mm wide and 5-40mm long. Branches repeatedly divide equally in two. Attached by a small, spongy base. Similar to	Hand removal possible but time consuming. Mechanical removal possible but destructive. Biological control possible using predatory sea slug

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
			occurs on some rocky shores in SW region.	nets, wharf pilings and jetties. Causes a nuisance to humans when washes ashore and rots.	native Codium species. MBS INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	
Harpoon weed <i>Asparagopsis armata</i>	Very likely	Originally introduced to Europe with oyster imports (aquaculture). Most likely spread to GB from Europe by rafting and drifting on currents.	Very widespread.	Can dominate algal assemblages in some locations and can undergo bloom-like outbreaks which can smother species and clog fishing gear.	Rosy pink, densely tufted branches form an elongated, feather-shaped growth up to 30cm long. Harpoon-like branches with barbs that attach to other algae. MBS INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Beyond hand removal in many locations. Cultivated in Ireland for use in cosmetics.
Hottentot fig <i>Carpobrotus edulis</i>	Very likely	Imported as an ornamental plant & has since spread to the wild. Has also been used to stabilise	Common throughout SW region.	Forms dense, impenetrable mats that carpet warm, sunny, coastal cliffs to the exclusion of all other species.	Fleshy, narrow and triangular succulent leaves and large yellow flowers up to 10cm across that fade to pink Flowers April-July Creeping, low plants which can spread for	Prevention: Restrict sale through garden centres/retail outlets. Eradicate from known wild locations but difficult on steep cliffs and can lead to erosion. Engage stakeholders to

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
		sand dunes and spread from there.			many metres. GBNNSS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=357	provide advice to eradicate from private gardens.
Japanese skeleton shrimp <i>Caprella mutica</i>	Very likely	Unknown but likely associated with shipping, ballast water and aquaculture.	Records from Scotland, Essex and in SW along south coast.	Rapidly invading species, with lab studies showing aggressive competitive behaviour displacing native skeleton shrimps. Potential to have significant impact on benthic communities. High densities in summer can block water intake pipes and mass settlements on mussel lines.	Large skeleton shrimp up to 5cm in length. A slender, reddish body with spines along back & two elongated segments behind the head, the hindmost of which has a pair of grasping appendages. Females have a red-spotted brood pouch on underside. MBS INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Unknown, but biocontrol could be a possibility as a variety of fish and crabs prey upon the Japanese skeleton shrimp. Preventative antifouling measures. Clean equipment regularly. Biosecurity - Check, clean, dry http://www.nonnativespecies.org/checkcleandry/
Leathery sea squirt <i>Styela clava</i>	Likely	Hull fouling of Navy vessels returning after Korean war. Additional spread	All SW marinas & Falmouth harbour.	Can dominate shallow sheltered habitats, affecting other suspension-feeding native organisms.	Solitary brown sea squirt, up to 20cm tall, attached by a narrow stalk and with two siphons close together at free end.	Preventative antifouling measures. Clean equipment regularly. Biosecurity - Check, clean, dry

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
		via oyster transport (aquaculture).	Some shores including Plymouth Sound.	Can also have positive biodiversity impacts. Potential to heavily foul aquaculture equipment and reported as a serious pest in overseas long line mussel farms.	Siphons have dark brown stripes on the inside Surface is tough, leathery and warty. GBNNSS ID guide: http://www.nonnativespecies.org/downloadDocument.cfm?id=153	http://www.nonnativespecies.org/checkcleandry/
Manilla clam <i>Ruditapes philippinarum</i>	Likely	Boating, shipping vessels, ballast water, hull fouling of leisure craft.	In Britain reproducing populations are established in Poole harbour and parts of the Solent.	Carry disease and compete for resources with native species resulting in a reduction in biodiversity amongst filter feeders.	A thick oval shell up to 8 cm in length with weak concentric ridges, and more pronounced straight ridges that radiate outward from the centre to the shell margins. Usually cream or grey, sometimes with green or brown tones. Dark, overlapping triangular markings may be apparent. MBS INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Ensure ballast waters emptied before entering at risk areas. Preventative antifouling measures Clean equipment regularly. Destroy individuals once ID confirmed. Biosecurity - Check, clean, dry http://www.nonnativespecies.org/checkcleandry/

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Orange cloak sea squirt and San Diego sea squirt <i>Botrylloides violaceus</i> and <i>Botrylloides diegensis</i>	Likely	Through boating, shipping vessels, ballast water, hull fouling of leisure craft.	Widespread in UK marinas & both species well established in SW marinas. Now being found on rocky shores in region.	Capable of forming large colonies, compete with other sessile species. Impact on shellfish industry. Also, able to block inlet pipes.	Colonial species' bright red/orange in colour. Firm texture underneath clear layer of jelly covering surface. Distinctive pattern of individual tunicates forming the colony. MBA INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Hand removal on high priority shores where smothering could be a problem. Preventative antifouling measures Clean equipment regularly. Biosecurity - Check, clean, dry http://www.nonnativespecies.org/checkcleandry/
Pacific oyster and Portugese oyster <i>Magallana gigas</i> and <i>Magallana angulata</i>	Very likely	Deliberately introduced in 1960s for aquaculture. Larval escapees survived and spread in the wild.	Heavy infestations throughout region around artificial structures, marinas/harbours and some estuaries and shores.	Ecosystem altering species forming dense reefs, displacing native oysters and other native species. Wild populations can foul artificial structures and make shores dangerous to boat users and other visitors.	Thick, rough, hinged shells up to 18cm long with lower half often cemented to a solid surface; strong raised ribs lead into markedly wavy, frilly or saw-toothed shell margin. MBA INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Local monitoring & removal underway in SW region. Focus removal on high conservation value areas & areas where not already heavily established. Visit Good Practice Management webpage: http://www.nonnativespecies.org/index.cfm?pageid=624
Pom-pom weed	Likely	Unknown but originally from NW Pacific, so	First UK record 2004 on South	Fast spreading, turf forming, could occupy space and displace other	A small, bright-red to red-brown seaweed up to 3cm high, forming springy	Increased monitoring required to determine areas affected. Hand

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
<i>Caulacanthus okamurae</i>		aquaculture, hull fouling and/or ballast water all possible.	coast. Present in Salcombe.	species, e.g. barnacles. Unknown Economic and Recreational Impacts.	clumps of tangled pom-poms attached by many scattered holdfast pads. Each pom-pom has roughly cylindrical main branches and short, incurved, thorn-like, forked side branches. MBS INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	removal possible but time consuming.
Wakame <i>Undaria pinnatifida</i>	Very likely	Secondary introduction from France and Europe via aquaculture (P. oyster) and hull fouling.	All along the south coast. Big populations in and close to marinas; Estuaries and some rocky shores.	Competes for space with native seaweed. Can foul aquaculture installations, jetties, vessels, mooring and buoys. High density patches can clog machinery and restrict water circulation.	Large, brown kelp 1-3m in length, blades have a distinct midrib. Tolerant of a range of temperatures and salinities. GBNNSS ID guide: http://www.nonnativespecies.org/downloadDocument.cfm?id=152	Hand removal possible but time consuming. Possibility of harvesting for food. Preventative antifouling measures Visit MBA Wakame Watch https://www.mba.ac.uk/projects/wakame-watch
Wireweed <i>Sargassum muticum</i>	Very likely	Aquaculture (brought in with Pacific oysters) & Ship ballast water.	Heavy infestations throughout region on artificial	Potential to outcompete native algae for space; grows fast forming dense carpets across rock pools, altering light and	A large olive-brown seaweed with fronds often over 1m long. One main axis with alternating branches, giving 'washing	Beyond management in certain areas but needs to be controlled/hand removed where seagrass

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
			structures, marinas/harbours, many estuaries and rocky shores.	temperature underneath. But can have positive biodiversity impacts. Has potential to foul aquaculture installations & can become a nuisance in harbours and a hazard to boat users, entangling propellers and other equipment.	line' appearance out of water. Branches with small flattened leaflets and small spherical gas bladders. GBNNSS ID guide: http://www.nonnativespecies.org/downloadDocument.cfm?id=74	or other HCV features present.

Species for Long Term Management: Low Priority

Focused on invasive 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 good practice biosecurity guidelines to keep the species from spreading to uninvaded areas.

Table 7. Species for Long Term Management: Low Priority in the South West Region

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Freshwater and Riparian						
Giant rhubarb <i>Gunnera manicata</i>	Very likely	First introduced as a garden ornamental in 1867, it has since been widely promoted as an architectural herb for planting around ponds and in damp areas. Large size means it quickly outgrows ornamental areas.	Found in Minehead and Penzance. Also other areas of Eastern England.	The enormous leaves of the plant prevent other species from growing beneath them and colonies can suppress natural biodiversity and alter ecosystems.	GBNNSS ID guide: https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=371	Link to invasive species action plan on GBNNSS website. http://www.nonnativespecies.org/downloadDocument.cfm?id=1406

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Monkeyflower <i>Mimulus guttatus</i>	Likely	Monkey flower spreads both by seed and by stolons; it may also be able to grow from detached pieces of the lower stem or rhizomes.	Monkey flower is established throughout most suitable habitat in GB, it is absent only from extensive areas of East Anglia and the East Midlands.	Although it can occasionally form quite dense, monospecific stands; it is very unlikely that it has any significant impact on natural ecosystems.	A tall, upright plant with opposite, slightly fleshy and strongly toothed, sessile or shortly petiolate leaves which produces large, showy yellow flowers. It is very stoloniferous and so tends to form extensive stands in suitable conditions.	Link to invasive species information on GBNNS website. http://www.nonnativespecies.org/downloadDocument.cfm?id=1409
Coastal and Marine						
Hook weed <i>Bonnemaisonia hamifera</i>	Very likely	Unknown but likely hull fouling and via transport of oysters (aquaculture).	Common in SW where it grows on shores attached to rocks or other seaweeds.	Unknown	Brownish-red or purplish-pink, delicate, feathery fronds with a slightly flattened erect main axis up to 1mm wide and 25cm long. Usually attached to other algae by crozier-shaped hooks. MBA INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Unknown - more monitoring required on rocky shores.

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
Orange striped anemone <i>Diadumene lineata</i>	Unknown	Unknown but likely hull fouling and via transport of oysters (aquaculture).	Generally found in marinas & ports along South coast. Records in Fal, Tamar & Kingsbridge-Salcombe Estuaries. Greater concentrations in the Solent.	Unknown but can tolerate a wide range of salinities. Could potentially compete with native anemones. Could potentially become a fouling nuisance.	Small, greenish/grey smooth column up to 20mm with vertical orange stripes visible. MBA INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Unknown - more monitoring required. Biosecurity - Check, clean, dry http://www.nonnativespecies.org/checkcleandry/
Red ripple bryozoan <i>Watersipora subarta</i>	Likely	Leisure boating, shipping vessels, ballast water, hulls of leisure craft.	Dominant fouling species in Falmouth.	Fouling, copper tolerant therefore forms an interface between anti-fouling surfaces and other fouling organisms.	Orange to dark red brittle encrusting bryozoan. Colonies form mats of rounded, raised lobes that are made up of individuals with dark spots. MBA INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf	Preventative antifouling measures. Clean equipment regularly. Biosecurity - Check, clean, dry http://www.nonnativespecies.org/checkcleandry/
Solitary sea squirt <i>Corella eumyota</i>	Very likely	Introduction from Southern Hemisphere via aquaculture of	Recorded from Oban around south coast of England to	May have negative impact on other shallow-water suspension feeders.	A smooth, slightly translucent solitary sea squirt, up to 8cm, generally lying flat	Populations fluctuating in different areas so ongoing monitoring required. Preventative antifouling

Species Name	Risk of Introduction	Pathways	Areas affected	Impacts	Identification	Management
		<p>imported bivalves</p> <p>Long distance hull fouling also possible</p> <p>Spread through Europe likely encouraged by leisure craft.</p>	<p>Lowestoft by 2009</p> <p>Mainly marinas and harbours, but capable of colonising natural habitats e.g. Yealm Estuary and Plymouth Sound.</p>	<p>Formation of dense clumps could foul mussel and oyster gear and smother associate species. Could also block intake pipes.</p>	<p>One siphon at free end and second on upper surface slightly to the right. Some individuals entirely orange or off-white with brighter orange 'tip'. MBA INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf</p>	<p>measures. Clean equipment regularly.</p> <p>Biosecurity - Check, clean, dry</p> <p>http://www.nonnativespecies.org/checkcleandry/</p>
<p>Tufty buff bryozoan <i>Tricellaria inopinata</i></p>	<p>Likely</p>	<p>Likely hull fouling & by association in marinas and ports.</p> <p>Transport with oysters (aquaculture) also possible.</p>	<p>First detected in Poole Harbour in 1998.</p> <p>Now present in SW Marinas, esp. along English channel coast.</p> <p>Also found on shores attached to algae.</p>	<p>Attaches to solid surfaces, especially in harbours and marinas and can become very dense, affecting other shallow water suspension-feeders.</p> <p>Rapidly colonises hulls of leisure craft and may have negative impact on aquaculture.</p>	<p>Hard to identify in situ.</p> <p>Buff-brown, flexible, densely branched colony growing as a tuft 1-4cm high. Branches with two series of individuals. MBA INNS guide: https://www.mba.ac.uk/sites/default/files/downloads/ID%20NNS%20English.pdf</p>	<p>Preventative antifouling measures. Clean equipment regularly.</p> <p>Biosecurity - Check, clean, dry</p> <p>http://www.nonnativespecies.org/checkcleandry/</p>

Section 5: High Conservation Value Areas and Hotspots

We have separated High Conservation Value Areas (HCVs) and Hotspots into EA management catchments (Figure 3) for the South West Region.

Areas of High Conservation Value

Areas protected under the following designations were used to create the list of HCVs for the South West region.

- Sites of Special Scientific Interest (SSSIs)
- Special Protected Areas (SPAs)
- Special Areas of Conservation (SACs)
- Marine Conservation Zones (MCZs)

HCVs for INNS management for each catchment were chosen by using GIS software to select those sites which had records of our red table species (for prevention or local eradication ([Table 5](#))) recorded within 1km in the last 10 years. Areas that only had American mink (*Neovision vision*) present were removed from the list because the hundreds of sites that have only mink recorded would have made this report unfeasible. This methodology was selected following feedback from our stakeholder workshops for the South West region (Figure 2). It is taking a very high level view of the region and has two main limitations; it relies on a fixed species distribution dataset and it does not take into account the reasons for designation (and therefore whether the presence of INNS will impact a specific designation). It will however act as a guide and starting point for prioritisation of work for Local Action Groups in the area. As mentioned above it is our recommendation that any new projects carry out an up-to-date records search and stakeholder liaison for their local area.

Hotspots

Hotspots are areas of high recreational use (e.g. fishing or water sports), commercial use (e.g. busy international ports), or sites of economic value for the region which are either currently threatened by INNS or pose a risk of spread to other sites. This list has been compiled through consultation with stakeholders across the region and feedback from the stakeholder workshop (Figure 3).

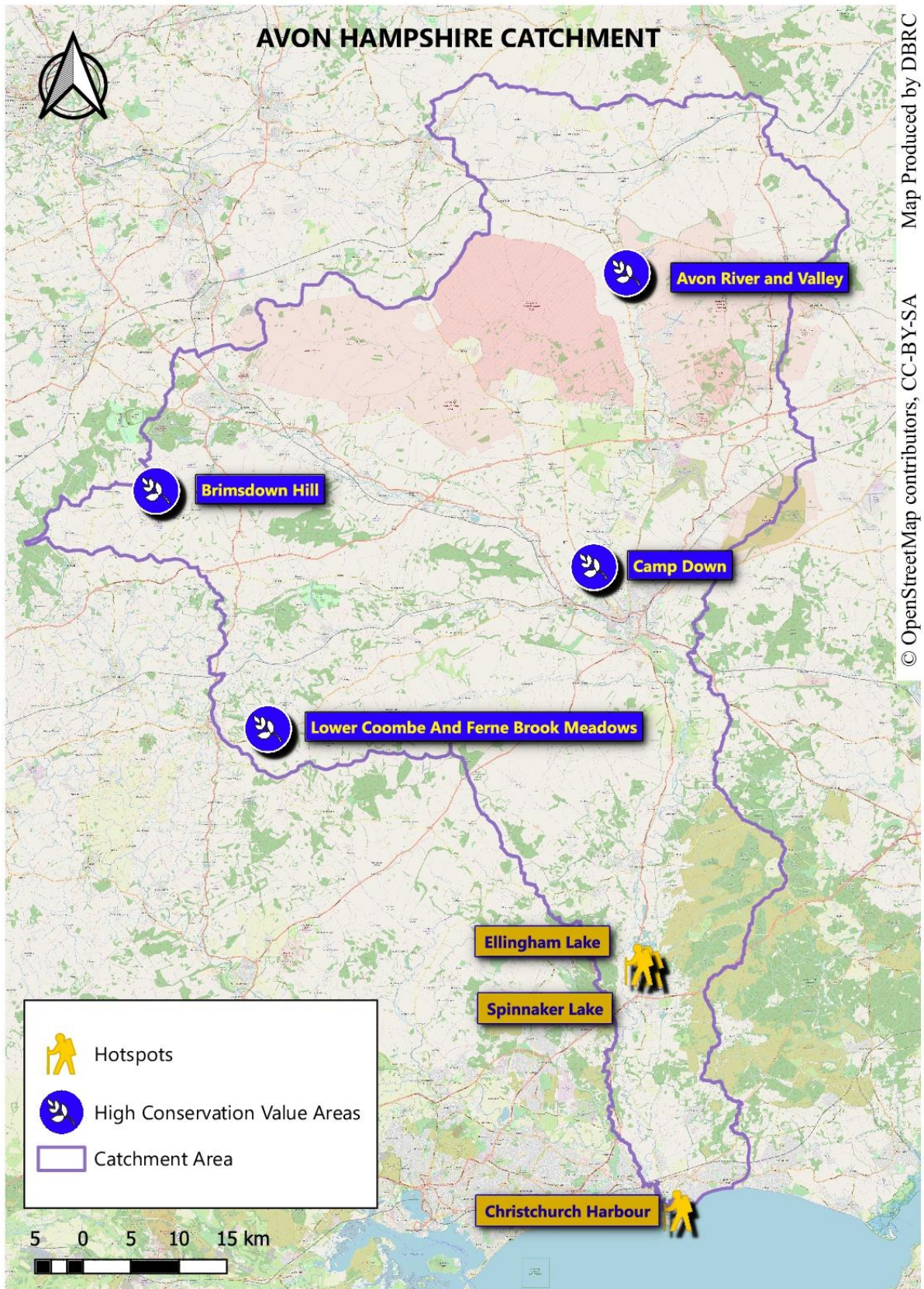


Figure 4. Map of HCVs and Hotspots within the Avon Hampshire Catchment with INNS Risk.

Table 8. Regional sites of high conservation value in the Avon Hampshire Catchment with red table species recorded within 1km

Site	Grid Reference	Habitat	Category	INNS Species Recorded
Avon River and Valley	SU13995299	Freshwater and Riparian	SAC, SPA	<i>Heracleum mantegazzianum</i> <i>Lysichiton americanus</i> <i>Pacifastacus leniusculus</i> <i>Ludwigia grandiflora</i>
Brimsdown Hill	ST 832 388	Freshwater and Riparian	SSSI	<i>Pacifastacus leniusculus</i> <i>Heracleum mantegazzianum</i> <i>Neovison vison</i>
Camp Down	SU 119 338	Freshwater and Riparian	SSSI	<i>Lysichiton americanus</i>
Lower Coombe And Ferne Brook Meadows	ST905232	Freshwater and Riparian	SSSI	<i>Lysichiton americanus</i>

Table 9. Regional hotspots within the Avon Hampshire Catchment with INNS Risk

Site	Grid Reference	Habitat	Risk Activities	INNS Recorded/Risk
Christchurch Harbour	SZ1757591556	Coastal and Marine	Angling, boating/sailing, general recreation, associated harbour activities.	<i>Gracilaria vermiculophylla</i> <i>Crepidula fornicata</i> <i>Sargassum muticum</i>
Spinnaker Lake	SU156076	Freshwater and Riparian	Angling, boating/sailing, general recreation.	<i>Crassula helmsii</i> <i>Impatiens glandulifera</i>
Ellingham Lake	SU 14942 07680	Freshwater and Riparian	Boating, general recreation.	<i>Crassula helmsii</i> <i>Impatiens glandulifera</i>

Avon Bristol and North Somerset Streams Catchment

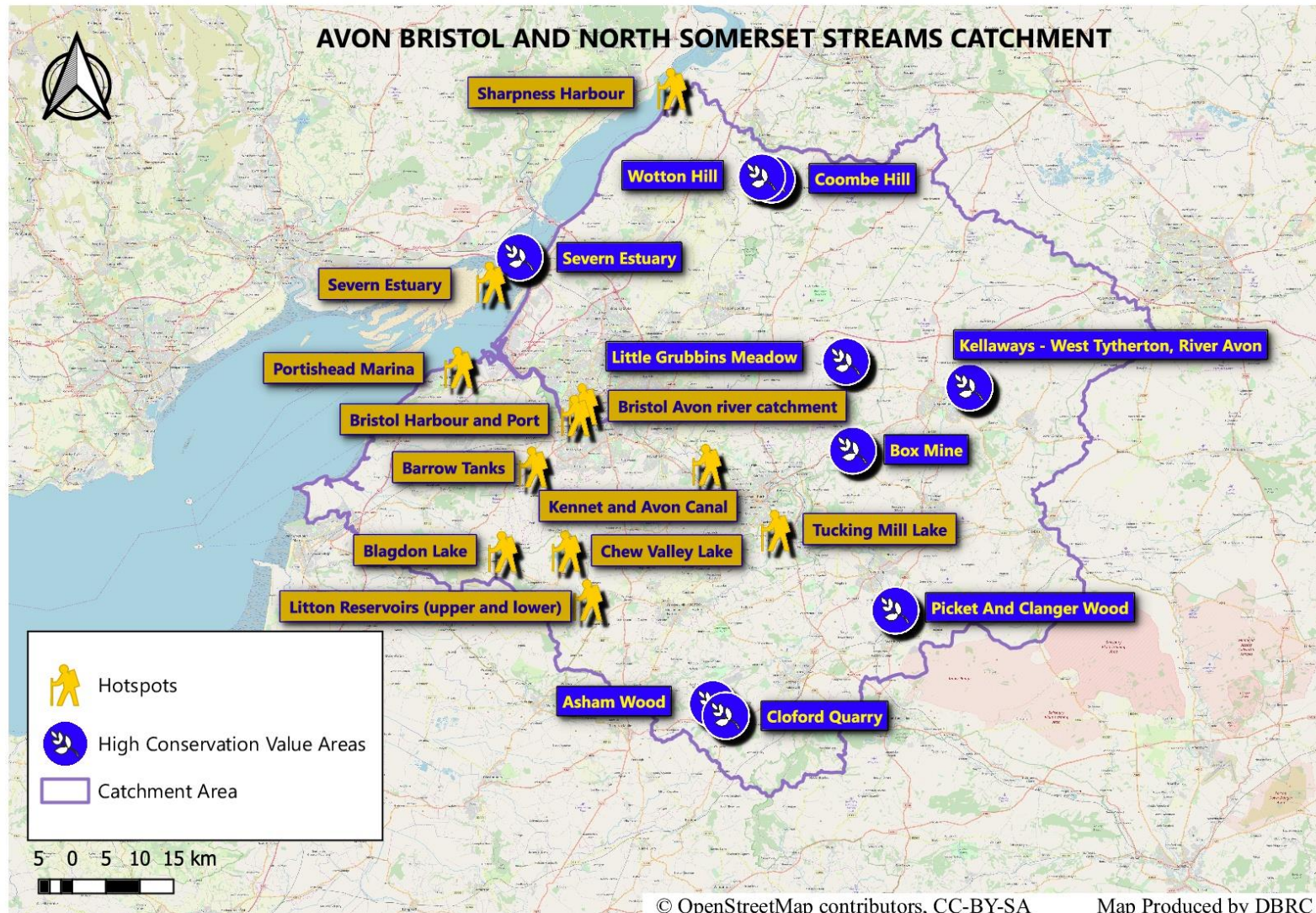


Figure 5. Map of HCVs and Hotspots within the Avon Bristol and North Somerset Streams Catchment with INNS Risk.

Table 10. Regional sites of high conservation value in the Avon Bristol and North Somerset Streams Catchment with red table species recorded within 1km

Site	Grid Reference	Habitat	Category	INNS Species Recorded
Asham Wood	ST 705 456	Freshwater and Riparian	SSSI and SAC	<i>Pacifastacus leniusculus</i>
Box Mine	ST 836 690	Freshwater and Riparian	SSSI and SAC	<i>Heracleum mantegazzianum</i>
Cloford Quarry	ST 717 445	Freshwater and Riparian	SSSI	<i>Pacifastacus leniusculus</i>
Coombe Hill	ST 762 940	Freshwater and Riparian	SSSI	<i>Pacifastacus leniusculus</i>
Kellaways - West Tytherton, River Avon	ST 944 748	Freshwater and Riparian	SSSI	<i>Neovison vison</i> <i>Myriophyllum aquaticum</i>
Little Grubbins Meadow	ST 830 772	Freshwater and Riparian	SSSI	<i>Pacifastacus leniusculus</i>
Picket And Clanger Wood	ST 875 542	Freshwater and Riparian	SSSI	<i>Pacifastacus leniusculus</i>
Severn Estuary	ST 529 870	Freshwater and Riparian	SSSI, SPA, SAC	<i>Oxyura jamaicensis</i> <i>Eriocheir sinensis</i> <i>Hydrocotyle ranunculoides</i>
Wotton Hill	ST 753 942	Freshwater and Riparian	SSSI	<i>Pacifastacus leniusculus</i>

Table 11. Regional hotspots within the Avon Bristol and North Somerset Streams Catchment with INNS Risk

Site	Grid Reference	Habitat	Risk Activities	INNS Recorded/Risk
Barrow Tanks	ST5398867631	Freshwater and Riparian	Angling, general recreation.	<i>Impatiens glandulifera</i>
Blagdon Lake	ST5111859843	Freshwater and Riparian	Angling, general recreation.	<i>Fallopia japonica</i>
Bristol Avon river catchment	ST811813 to ST515785	Freshwater and Riparian	Angling, recreational boating.	At risk from the majority of freshwater and riparian INNS (Table 4 – 7)
Bristol Harbour and Port	ST5799372370	Coastal and Marine	Boating/sailing, general recreation, commercial cargo and the provision of associated port services.	<i>Fallopia japonica</i>
Chew Magna Reservoir	ST5700659857	Freshwater and Riparian	Angling, general recreation.	<i>Fallopia japonica</i> <i>Pacifastacus leniusculus</i>

Site	Grid Reference	Habitat	Risk Activities	INNS Recorded/Risk
Chew Valley Lake	ST5700659857	Freshwater and Riparian	Angling, general recreation.	<i>Impatiens glandulifera</i> <i>Heracleum mantegazzianum</i>
The Kennet and Avon Canal	N/A	Freshwater and Riparian	Angling, recreational boating.	<i>Dikerogammarus haemobaphes</i> <i>Impatiens glandulifera</i> <i>Dreissena polymorpha</i> <i>Impatiens capensis</i> <i>Fallopia japonica</i> <i>Neovision vision</i> <i>Pacifastacus leniusculus</i> <i>Crassula helmsii</i>
Portishead Marina	ST472769	Coastal and Marine	Boating/ sailing, general recreation, commercial shipping, associated port activities.	No species records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Sharpness Harbour	SO6708702361	Coastal and Marine	Boating/sailing, general recreation, commercial shipping, associated port activities.	No species records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Severn Estuary	ST5024084721	Coastal and Marine	Angling, boating/sailing, commercial shipping, general recreation, associated port activities.	No species records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Tucking Mill Lake	ST7645861602	Freshwater and Riparian	Angling.	<i>Dreissena polymorpha</i> <i>Impatiens glandulifera</i>

South and West Somerset Catchment

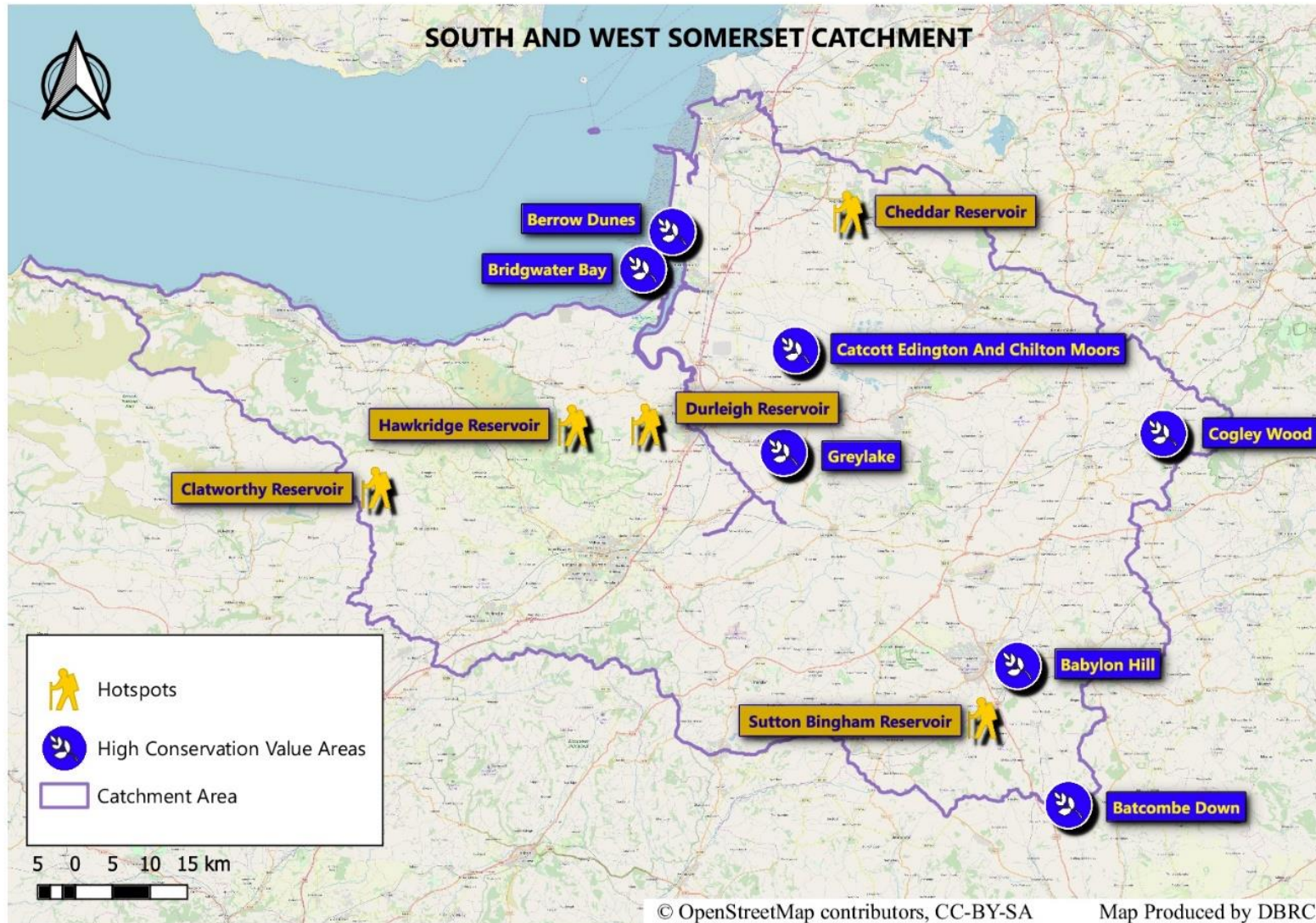


Figure 6. Map of HCVs and Hotspots within the South and West Somerset Catchment with INNS Risk.

Table 12. Regional sites of high conservation value in the South and West Somerset Catchment with red table species recorded within 1km

Site	Grid Reference	Habitat	Category	INNS Species Recorded
Babylon Hill	ST 579 157	Freshwater and Riparian	SSSI	<i>Heracleum mantegazzianum</i>
Batcombe Down	ST 621 040	Freshwater and Riparian	SSSI	<i>Lysichiton americanus</i>
Berrow Dunes	ST 293 522	Freshwater and Riparian	SSSI	<i>Myriophyllum aquaticum</i>
Bridgwater Bay	ST268491	Freshwater and Riparian	SSSI, SAC, SPA	<i>Myriophyllum aquaticum</i> <i>Dreissena polymorpha</i> <i>Ludwigia grandiflora</i>
Catcott Edington And Chilton Moors	ST 395 422	Freshwater and Riparian	SSSI	<i>Dreissena polymorpha</i>
Cogley Wood	ST 703 350	Freshwater and Riparian	SSSI	<i>Heracleum mantegazzianum</i>
Greylake	ST 384 337	Freshwater and Riparian	SSSI	<i>Hydrocotyle ranunculoides</i>

Table 13. Regional hotspots within the South and West Somerset catchment with INNS Risk

Site	Grid Reference	Habitat	Risk Activities	INNS Recorded/Risk
Cheddar Reservoir	ST4403853675	Freshwater and Riparian	Angling, general recreation.	No species records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Clatworthy Reservoir	ST0416831285	Freshwater and Riparian	Angling, general recreation	<i>Crassula helmsii</i> <i>Impatiens glandulifera</i>
Durleigh Reservoir	ST269362	Freshwater and Riparian	Angling, boating/sailing, general recreation.	<i>Impatiens glandulifera</i>
Hawkridge Reservoir	ST2075736201	Freshwater and Riparian	Angling, general recreation.	<i>Crassula helmsii</i> <i>Impatiens glandulifera</i> <i>Fallopia japonica</i>
Sutton Bingham Reservoir	ST5492411338	Freshwater and Riparian	Angling, boating/sailing, general recreation.	<i>Crassula helmsii</i>

Dorset Catchment

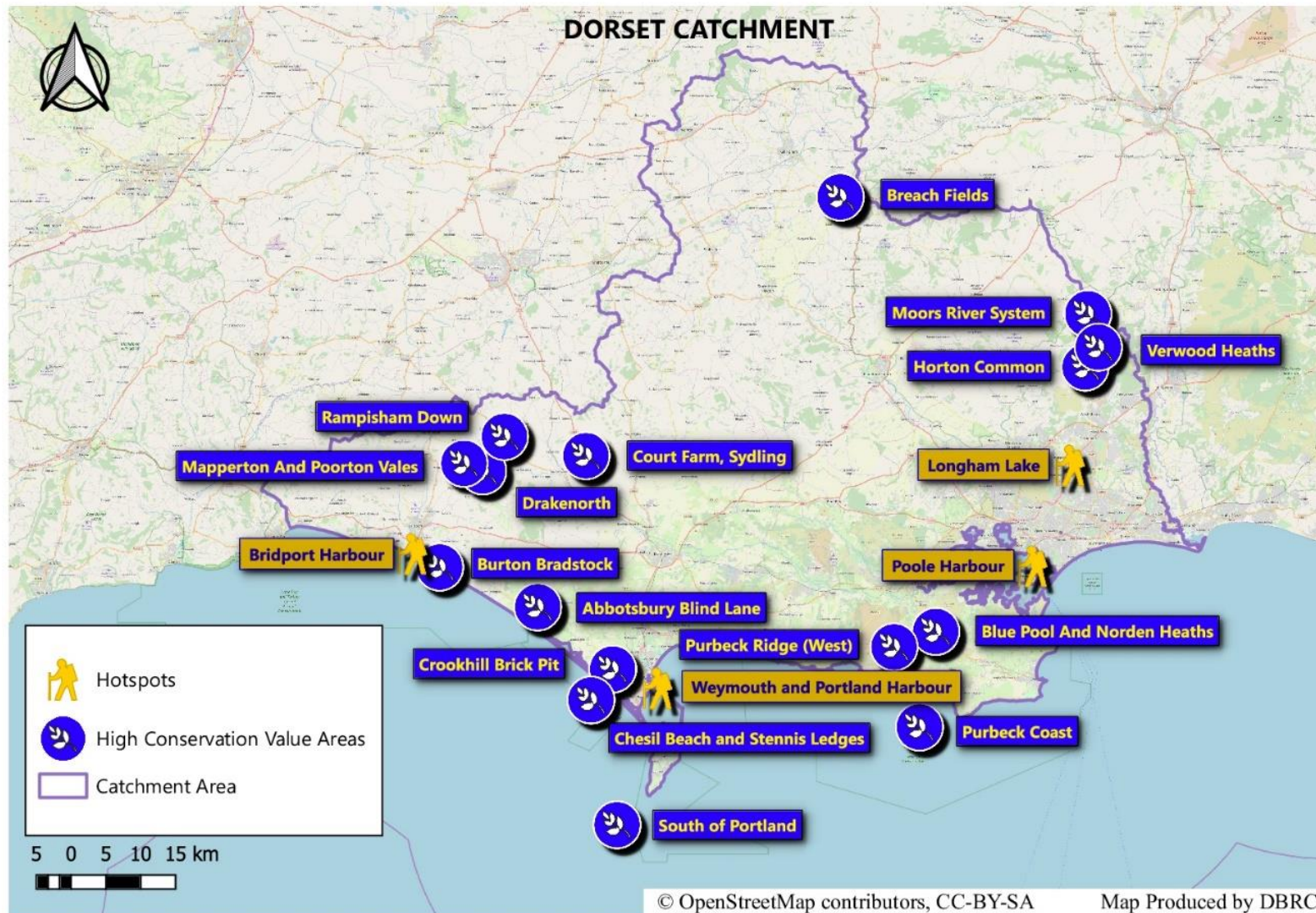


Figure 7. Map of HCVs and Hotspots within the Dorset Catchment with INNS Risk.

Table 14. Regional sites of high conservation value in the Dorset Catchment with red table species recorded within 1km

Site	Grid Reference	Habitat	Category	INNS Species Recorded
Abbotsbury Blind Lane	SY576855	Freshwater and Riparian	SSSI	<i>Myriophyllum aquaticum</i>
Blue Pool And Norden Heaths	SY939831	Freshwater and Riparian	SSSI	<i>Myriophyllum aquaticum</i>
Breach Fields	ST853225	Freshwater and Riparian	SSSI	<i>Ludwigia grandiflora</i>
Burton Bradstock	SY487992	Freshwater and Riparian	SSSI	<i>Heracleum mantegazzianum</i>
Chesil Beach and Stennis Ledges	SY624770	Coastal and Marine	MCZ	<i>Grateloupia turuturu</i> <i>Undaria pinnatifida</i> <i>Ficopomatus enigmaticus</i>
Court Farm, Sydling	SY621992	Freshwater and Riparian	SSSI, SAC	<i>Pacifastacus leniusculus</i>
Crookhill Brick Pit	SY644798	Freshwater and Riparian	SSSI	<i>Heracleum mantegazzianum</i>
Drakenorth	SY527979	Freshwater and Riparian	SSSI	<i>Pacifastacus leniusculus</i>
Horton Common	SU075071	Freshwater and Riparian	SSSI	<i>Myriophyllum aquaticum</i>
Mapperton And Poorton Vales	SY510986	Freshwater and Riparian	SSSI, SAC	<i>Lysichiton americanus</i>
Moors River System	SU07741192	Freshwater and Riparian	SSSI	<i>Myriophyllum aquaticum</i>
Purbeck Coast	SY924744	Freshwater and Riparian	MCZ	<i>Undaria pinnatifida</i>
Purbeck Ridge (West)	SY901817	Freshwater and Riparian	SSSI	<i>Myriophyllum aquaticum</i> <i>Lysichiton americanus</i>
Rampisham Down	ST547010	Freshwater and Riparian	SSSI	<i>Heracleum mantegazzianum</i>
South of Portland	SY647656	Coastal and Marine	MCZ	<i>Undaria pinnatifida</i>
Verwood Heaths	SU087089	Freshwater and Riparian	SSSI	<i>Myriophyllum aquaticum</i>

Table 15. Regional hotspots within the Dorset Catchment with INNS Risk

Site	Grid Reference	Habitat	Risk Activities	INNS Recorded/Risk
Bridport Harbour	SY4623490424	Coastal and Marine	Boating/sailing, general recreation, associated harbour activities.	<i>Crepidula fornicata</i>
Isle of Portland to Studland Cliffs SAC*	SY815799	Coastal and Marine	General recreational activities.	No INNS records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Longham Lake	SZ0616598176	Freshwater and Riparian	Angling.	<i>Crassula helmsii</i>
Poole Harbour	SZ0277089023	Coastal and Marine	Boating/sailing, general recreation, fishing, commercial cargo shipping, associated port activities.	<i>Crepidula fornicata</i> <i>Sargassum muticum</i>
Weymouth and Portland Harbour	SY6850678008	Coastal and Marine	Boating/sailing, general recreation, cruise ships, tankers, commercial cargo shipping, , associated port activities.	<i>Crepidula fornicata</i> <i>Sargassum muticum</i>

*Site added from anecdotal stakeholder recommendation, not highlighted through RIMP methodology.

East Devon Catchment



Figure 8. Map of HCVs and Hotspots within the East Devon Catchment with INNS Risk.

Table 16. Regional sites of high conservation value in the East Devon Catchment with red table species recorded within 1km

Site	Grid Reference	Habitat	Category	INNS Species Recorded
River Axe	SY279969	Freshwater and Riparian	SSSI	<i>Heracleum mantegazzianum</i>
River Barle	SS876308	Freshwater and Riparian	SSSI	<i>Neovison vison</i> <i>Pacifastacus leniusculus</i>
South Exmoor	SS 842 323	Freshwater and Riparian	SSSI, SAC	<i>Neovison vison</i> <i>Pacifastacus leniusculus</i>

Table 17. Regional hotspots within the East Devon Catchment with INNS Risk

Site	Grid Reference	Habitat	Risk Activities	INNS Recorded/Risk
Exe Estuary	SX 994 830	Coastal and Marine	Recreational sports: rowing kayaking diving sea angling, movement of infrastructure - pontoons/floats/pilings and moorings, sea angling Jetty/slips/harbour walls, aquaculture movement of species and gear, sailing/ wash-down, contractor dredging, lifeboat operations and fishing.	<i>Hydrocotyle ranunculoides</i>
Exeter Canal	SX935896	Freshwater and Riparian	Angling, recreational boating.	<i>Dreissena polymorpha</i>
Exmouth Harbour	SX 99401 80686	Coastal and Marine	Boating/sailing, general recreation, associated harbour activities.	<i>Crepidula fornicata</i> <i>Codium fragile</i> <i>Grateloupia turuturu</i> <i>Sargassum muticum</i>
Lyme Regis Harbour	SY3391291574	Coastal and Marine	Boating/sailing, general recreation, commercial shipping, occasional cruise ships, associated port activities.	<i>Crepidula fornicata</i> <i>Sargassum muticum</i>
Wimbleball Lake	SS9715630418	Freshwater and Riparian	Boating/sailing, general recreation.	<i>Crassula helmsii</i>

South Devon Catchment

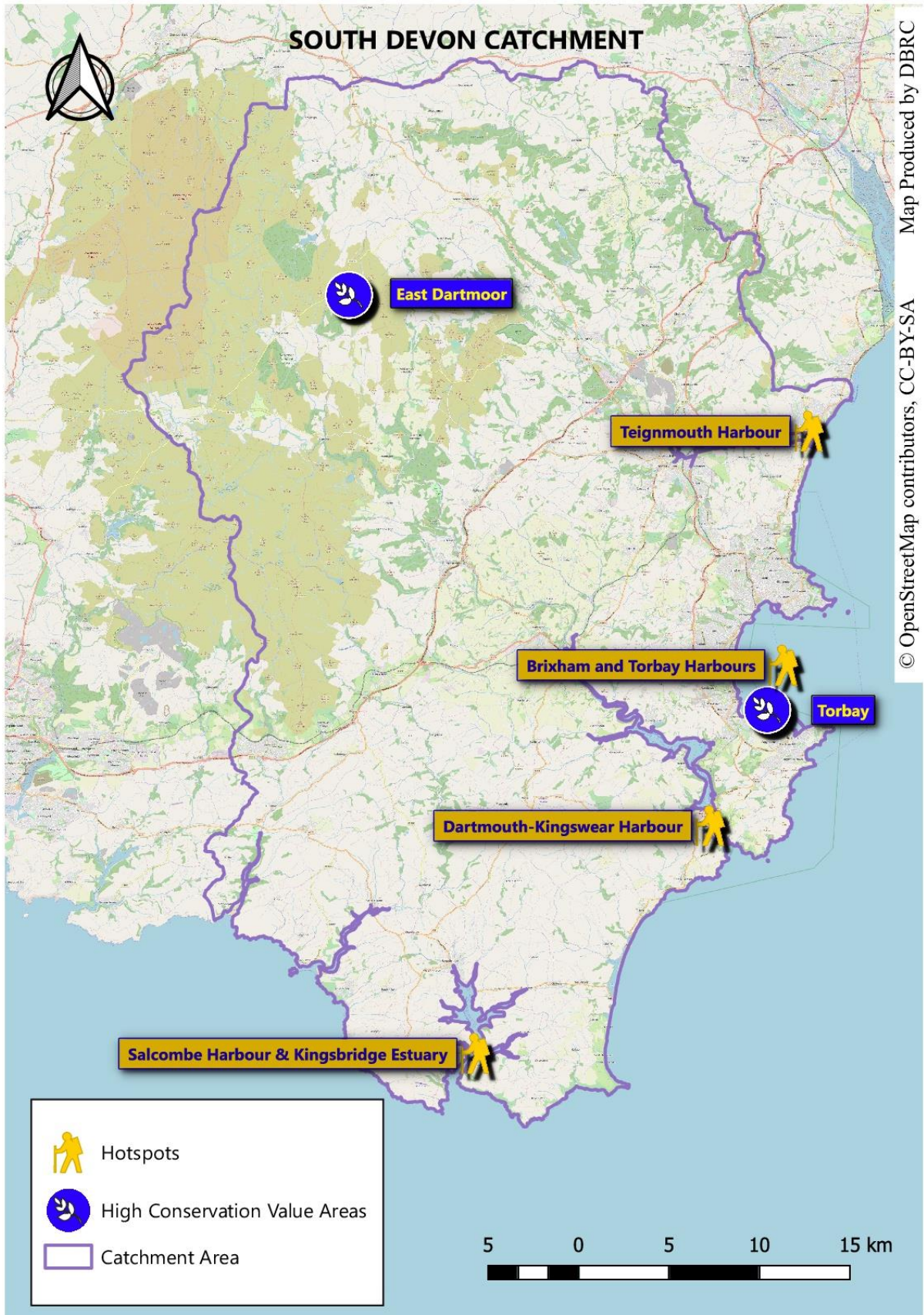


Figure 9. Map of HCVs and Hotspots within the South Devon Catchment with INNS Risk.

Table 18. Regional sites of high conservation value in the South Devon Catchment with red table species recorded within 1km

Site	Grid Reference	Habitat	Category	INNS Species Recorded
East Dartmoor	SX 687 810	Freshwater and Riparian	SSSI	<i>Lysichiton americanus</i> <i>Neovison vison</i>
Torbay	SX911577	Coastal and Marine	MCZ	<i>Undaria pinnatifida</i> <i>Grateloupia turuturu</i>

Table 19. Regional hotspots within the South Devon Catchment with INNS Risk

Site	Grid Reference	Habitat	Risk Activities	INNS Recorded/Risk
Brixham and Torbay Harbours	SX9204360139	Coastal and Marine	Angling, Boating/sailing, general recreation, associated harbour activities.	<i>Sargassum muticum</i> <i>Crepidula fornicata</i>
Dartmouth-Kingswear Harbour	SX8784851385	Coastal and Marine	Boating/sailing, general recreation, cruise ships, angling, fishing boats, associated harbour activities.	<i>Magallana gigas</i> <i>Crepidula fornicata</i> <i>Undaria pinnatifida</i> <i>Corella eumyota</i> <i>Grateloupia turuturu</i> <i>Sargassum muticum</i>
Salcombe Harbour & Kingsbridge Estuary	SX7463339106	Coastal and Marine	Cruise ships, freight shipping, Fishing vessels, Recreational vessels (power and sail) including yachts, motor cruisers, day sailor/trailer launched boats and kayakers, aquaculture, marine engineering, live release, marine debris and litter.	<i>Magallana gigas</i> <i>Crepidula fornicata</i> <i>Sargassum muticum</i> <i>Undaria pinnatifida</i> <i>Didermnum vexillum</i>
Teignmouth Harbour	SX9370872962	Coastal and Marine	Boating/sailing, general recreation, associated harbour activities.	<i>Crepidula fornicata</i>

North Devon Catchment



Figure 10. Map of HCVs and Hotspots within the North Devon Catchment with INNS Risk.

Table 20. Regional sites of high conservation value in the North Devon Catchment with red table species recorded within 1km

Site	Grid Reference	Habitat	Category	INNS Species Recorded
North Dartmoor	SX 593 862	Freshwater and Riparian	SSSI, SAC	<i>Lysichiton americanus</i>

Table 21. Regional hotspots within the North Devon Catchment with INNS Risk

Site	Grid Reference	Habitat	Risk Activities	INNS Recorded/Risk
Bideford Harbour	SS 45412661	Coastal and Marine	Ferries to Lundy, recreational use.	No INNS records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Ilfracombe Harbour	SS52284783	Coastal and Marine	Ferries to Lundy, recreational use.	No INNS records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Lundy Island	SS13574574	Coastal and Marine	Boating, sailing, movement of vessels including ferries.	<i>Sargassum muticum</i> <i>Asparagopsis armata</i>
Taw/Torridge Estuary	SS463322	Coastal and Marine	Fishing, commercial shipping, associated estuary activities.	No species records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.

Tamar Catchment



Figure 11. Map of HCVs and Hotspots within the Tamar Catchment with INNS Risk.

Table 22. Regional sites of high conservation value in the Tamar Catchment with red table species recorded within 1km

Site	Grid Reference	Habitat	Category	INNS Species Recorded
Devon Great Consols	SX 431 734	Freshwater and Riparian	SSSI	<i>Heracleum mantegazzianum</i>
Eglarooze Cliff	SX 344 539	Freshwater and Riparian	SSSI	<i>Myriophyllum aquaticum</i> <i>Neovison vison</i>
Greystone Quarry	SX 363 804	Freshwater and Riparian	SSSI	<i>Heracleum mantegazzianum</i>
Tamar Estuary Sites	SX439612	Coastal and Marine	MCZ	<i>Grateloupia turuturu</i>
Tamar - Tavy Estuary	SX438632	Freshwater and Riparian	SSSI, SAC, SPA	<i>Heracleum mantegazzianum</i> <i>Neovison vison</i> <i>Pacifastacus leniusculus</i>
Whitsand and Looe Bay	SX332518	Coastal and Marine	MCZ	<i>Urosalpinx cinerea</i>

Table 23. Regional hotspots within the Tamar Catchment with INNS Risk

Site	Grid Reference	Habitat	Risk Activities	INNS Recorded/Risk
Burrator Reservoir*	SX553682	Freshwater and Riparian	General recreational activities.	No species records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Lopwell Dam*	SX471647	Mixed	General recreational activities.	No species records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Plymouth Harbour/ Plymouth Sound	SX4691153585	Coastal and Marine	Boating/sailing, general recreation, marinas, commercial cargo, continental ferryport, cruise liner operations,	<i>Crepidula fornicata</i> <i>Styela clava</i> <i>Sargassum muticum</i> <i>Bonnemaisonia hamifera</i>

			commercial fishing, associated port activities.	<i>Magallana gigas</i>
Roadford Lake	SX4261391318	Freshwater and Riparian	Angling, boating/sailing, general recreation.	<i>Crassula helmsii</i>
Upper and Lower Tamar Lakes	SS2910111496	Freshwater and Riparian	Angling, watersports, general recreation.	<i>Dreissena polymorpha</i>
Yealm Estuary	SX544478	Coastal and Marine	Recreational sports: rowing kayaking diving sea angling, movement of infrastructure, aquaculture movement of species and gear, sailing wash-down, contractor dredging, lifeboat operations, fishing.	No species records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
*Site added from anecdotal stakeholder recommendation, not highlighted through RIMP methodology.				

North Cornwall, Seaton, Looe and Fowey Catchment

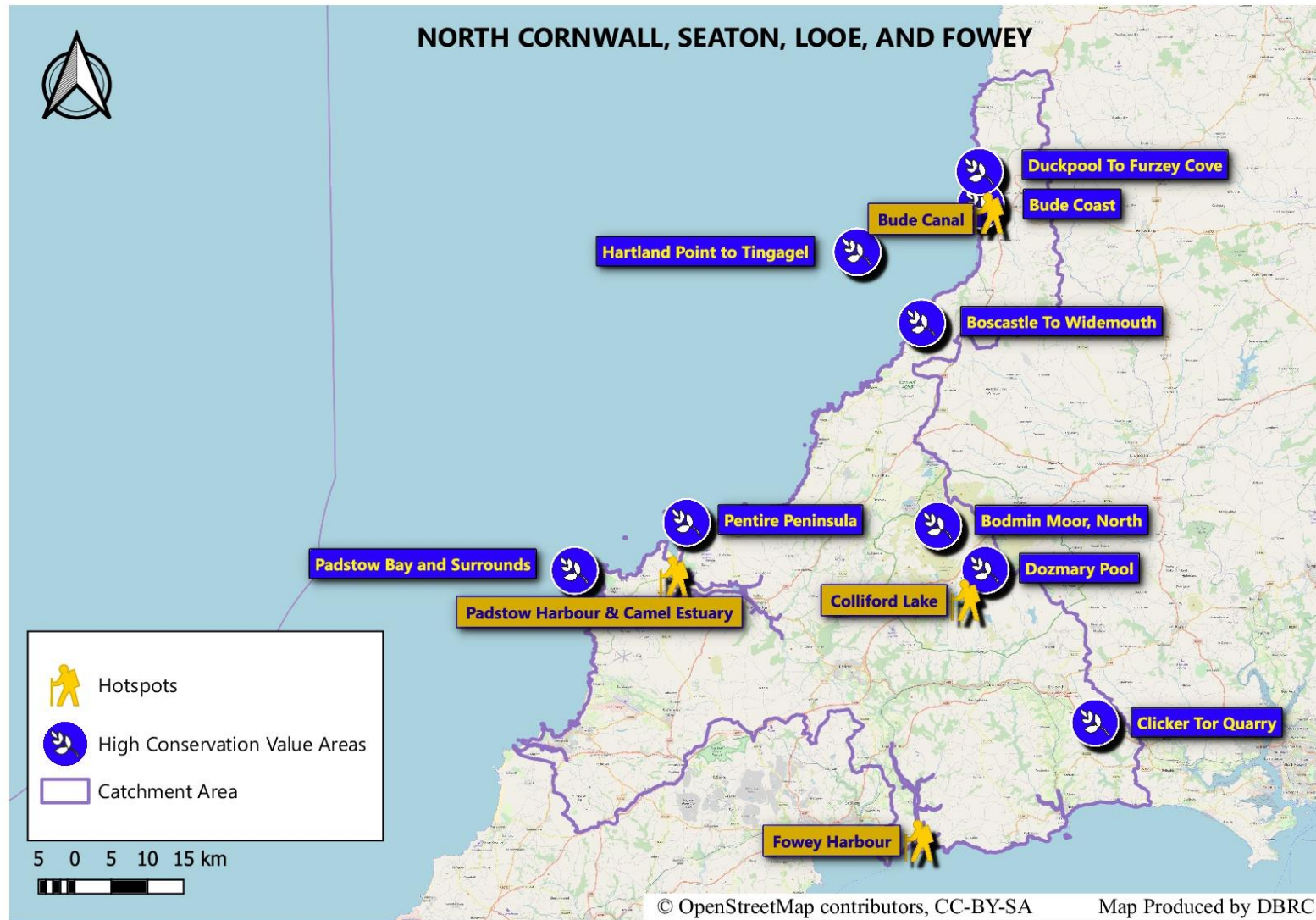


Figure 12. Map of HCVs and Hotspots within the North Cornwall, Seaton, Looe and Fowey Catchment with INNS Risk.

Table 24. Regional sites of high conservation value in the North Cornwall, Seaton, Looe and Fowey Catchment with red table species recorded within 1km

Site	Grid Reference	Habitat	Category	INNS Species Recorded
Bodmin Moor, North	SX153790	Freshwater and Riparian	SSSI, SAC	<i>Myriophyllum aquaticum</i>
Boscastle To Widemouth	SX145967	Freshwater and Riparian	SSSI, SAC	<i>Lysichiton americanus</i> <i>Myriophyllum aquaticum</i> <i>Neovison vison</i>
Bude Coast	SS200068	Freshwater and Riparian	SSSI	<i>Dreissena polymorpha</i> <i>Neovison vison</i>
Clicker Tor Quarry	SX285613	Freshwater and Riparian	SSSI	<i>Pacifastacus leniusculus</i>
Dozmary Pool	SX193750	Freshwater and Riparian	SSSI	<i>Neovison vison</i>
Duckpool To Furzey Cove	SS200097	Freshwater and Riparian	SSSI	<i>Heracleum mantegazzianum</i>
Pentire Peninsula	SW933801	Freshwater and Riparian	SSSI	<i>Heracleum mantegazzianum</i>

Table 25. Regional hotspots within the North Cornwall, Seaton, Looe and Fowey Catchment with INNS Risk

Site	Grid Reference	Habitat	Risk Activities	INNS Recorded/Risk
Bude Canal	SS2073106039	Freshwater and Riparian	Angling, boating/sailing, general recreation.	<i>Dreissena polymorpha</i>
Colliford Lake	SX1752172391	Freshwater and Riparian	Angling, boating/sailing, general recreation.	<i>Crassula helmsii</i>
Crowdy Reservoir*	SX145836	Freshwater and Riparian	Fishing and general recreational activities.	No species records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Fowey Harbour, adjacent to MCZ	SX 12677 51457	Coastal and Marine	Commercial shipping, cruise liners, out of port towage, aquaculture, sailing, contractor dredging, lifeboat operations, fishing, recreational sports,, movement of infrastructure.	<i>Crepidula fornicata</i> <i>Corella eumyota</i> <i>Styela clava</i> <i>Botrylloides violaceus</i> <i>Tricellaria inopinata</i> <i>Magallana gigas</i> <i>Sargassum muticum</i> <i>Asparagopsis armata</i>
Newquat and the Gannel MCZ*	SW801609	Coastal and Marine	Fishing and recreational boating.	No species records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Padstow Harbour and Camel Estuary, adjacent to MCZ	SW9201175376	Coastal and Marine	Boating/sailing, general recreation, aggregate shipping, associated port activities.	<i>Sargassum muticum</i> <i>Bonnemaisonia hamifera</i> <i>Asparagopsis armata</i>
*Site added from anecdotal stakeholder recommendation, not highlighted through RIMP methodology.				

West Cornwall and the Fal Catchment

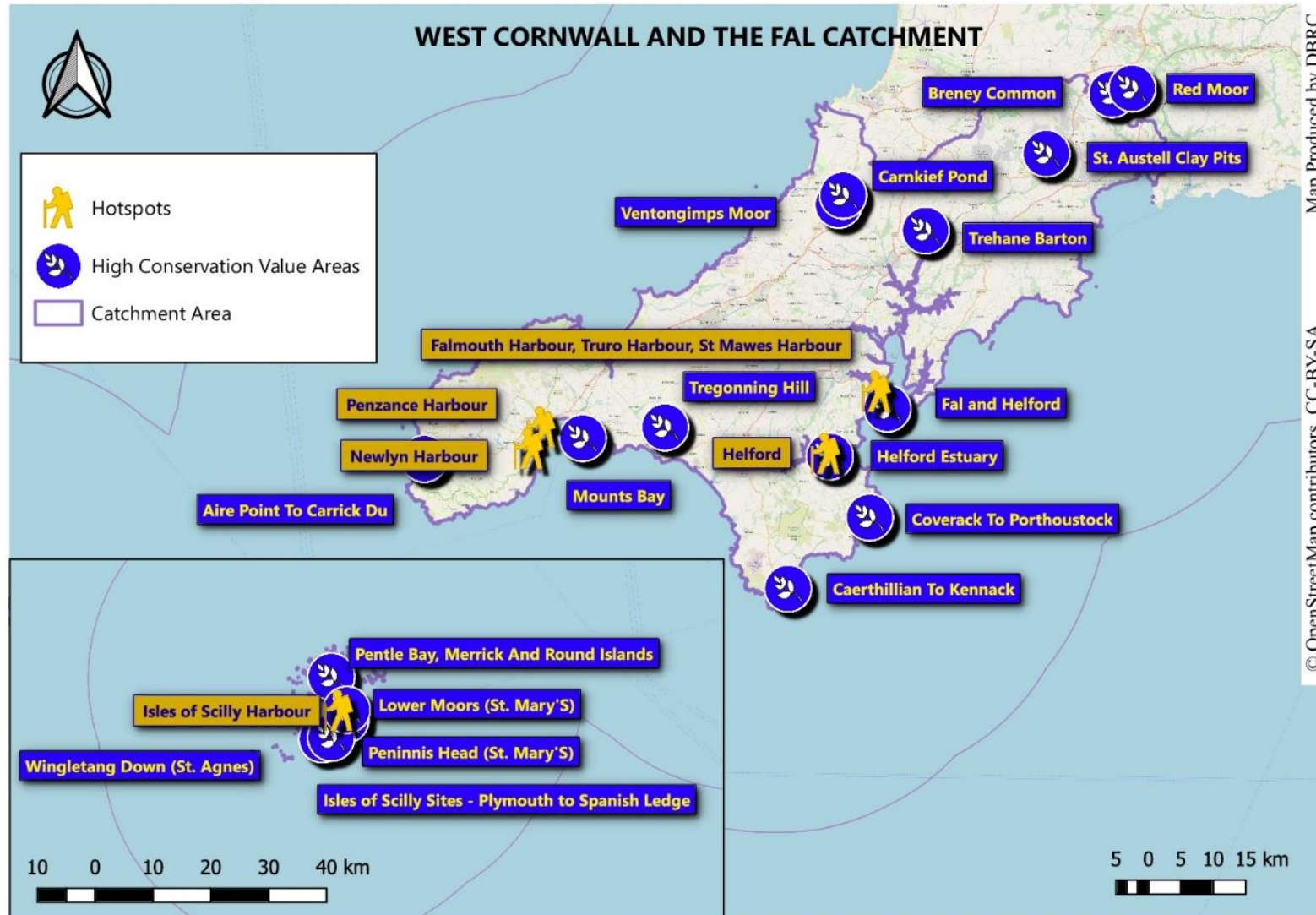


Figure 13. Map of HCVs and Hotspots within the West Cornwall and the Fal Catchment with INNS Risk.

Table 26. Regional sites of high conservation value in the West Cornwall and the Fal Catchment with red table species recorded within 1km

Site	Grid Reference	Habitat	Category	INNS Species Recorded
Aire Point To Carrick Du	SW360279	Freshwater and Riparian	SSSI	<i>Neovison vison</i> <i>Heracleum mantegazzianum</i> <i>Myriophyllum aquaticum</i>
Breney Common	SX055609	Freshwater and Riparian	SSSI, SAC	<i>Myriophyllum aquaticum</i>
Caerthillian To Kennack	SW715134	Freshwater and Riparian	SSSI, SAC	<i>Lysichiton americanus</i> <i>Neovison vison</i>
Carnkief Pond	SW786520	Freshwater and Riparian	SSSI	<i>Lysichiton americanus</i> <i>Myriophyllum aquaticum</i>
Coverack To Porthoustock	SW799201	Freshwater and Riparian	SSSI, SAC	<i>Myriophyllum aquaticum</i> <i>Heracleum mantegazzianum</i>
Fal and Helford	SW821308	Freshwater and Riparian	SAC	<i>Didemnum vexillum</i>
Helford Estuary	SW762263	Coastal and Marine	MCZ	<i>Urosalpinx cinerea</i>
Lower Moors (St. Mary'S)	SV 912 106	Freshwater and Riparian	SSSI	<i>Heracleum mantegazzianum</i> <i>Hydrocotyle ranunculoides</i>
Peninnis Head (St. Mary'S)	SV 910 095	Freshwater and Riparian	SSSI	<i>Myriophyllum aquaticum</i>
Pentle Bay, Merrick And Round Islands	SV 897 144	Freshwater and Riparian	SSSI	<i>Myriophyllum aquaticum</i>
Red Moor	SX 075 614	Freshwater and Riparian	SSSI	<i>Myriophyllum aquaticum</i>
St. Austell Clay Pits	SW 988 553	Freshwater and Riparian	SSSI, SAC	<i>Myriophyllum aquaticum</i>
Tregonning Hill	SW 600 299	Freshwater and Riparian	SSSI, SAC	<i>Myriophyllum aquaticum</i>
Trehane Barton	SW 866 482	Freshwater and Riparian	SSSI	<i>Pacifastacus leniusculus</i>
Ventongimps Moor	SW 781 511	Freshwater and Riparian	SSSI	<i>Lysichiton americanus</i> <i>Myriophyllum aquaticum</i>
Wingletang Down (St. Agnes)	SV 883 075	Freshwater and Riparian	SSSI	<i>Dreissena polymorpha</i>

Table 27. Regional hotspots within the West Cornwall and the Fal Catchment with INNS Risk

Site	Grid Reference	Habitat	Risk Activities	INNS Recorded/Risk
Falmouth Harbour, Truro Harbour, St Mawes Harbour	SW8108532535	Coastal and Marine	Through traffic to Falmouth docks, and the ports of Truro and Penryn, boating/sailing, general recreation, ship repair, cargo handling and the provision of a full range of port services.	<i>Crepidula fornicata</i> <i>Bonnemaisonia hamifera</i> <i>Sargassum muticum</i> <i>Grateloupia turuturu</i>
Helford	SW7580626638	Coastal and Marine	Boating/sailing, general recreation, associated harbour activities.	<i>Crepidula fornicata</i> <i>Bonnemaisonia hamifera</i> <i>Sargassum muticum</i>
Isles of Scilly Harbour	SV9031410578	Coastal and Marine	Boating/sailing, general recreation, associated harbour activities.	<i>Sargassum muticum</i> <i>Asparagopsis armata</i> <i>Bonnemaisonia hamifera</i>
Newlyn Harbour	SW464284	Coastal and Marine	Fishing, commercial shipping, associated port activities, limited leisure craft activity.	No species records however a high risk area of the movement and introduction of INNS. A focus area for biosecurity management.
Penzance Harbour	SW4771030459	Coastal and Marine	Boating/sailing, general recreation, cargo handling to and from Isles of Scilly, fishing, associated port activities.	<i>Sargassum muticum</i> <i>Codium fragile</i> <i>Sargassum muticum</i> <i>Bonnemaisonia hamifera</i> <i>Styela clava</i> <i>Undaria pinnatifida</i>

Section 6: Recommendations for Future Action

The information within this document is based on existing knowledge and data previously recorded and/or gathered through consultation. Consequently, there are areas where there are gaps in knowledge and understanding for species and management approaches. This RIMP is intended to be a 'live' document, regularly updated to reflect the change in status of any INNS across the South West region, such as species presence, distribution and management approaches.

- Support and encourage ongoing data recording for INNS across the region. It is recommended that records be entered into [INNS Mapper](#).
- Review and develop management good practice approaches for INNS.
- Improve coordination between all levels of water resource managers, from angling clubs to statutory agencies.
- Prioritise pathways for INNS and increase awareness and education.
- Target INNS education and awareness raising at as wide a spectrum of stakeholders as possible in order to maximise awareness, which can support prevention and early detection of INNS.

RAPID LIFE provides awareness raising materials and [training toolkits](#) for water resource managers and user groups. This includes materials to improve uptake of biosecurity to slow the spread and prevent introduction of new INNS in region. During our stakeholder consultation it was highlighted anecdotally that many organisations and hotspot sites have detailed biosecurity plans in place but action to implement these on the ground is still poor. It is therefore essential to ensure biosecurity awareness is not only targeted at creating new biosecurity plans but also towards sites that may have plans in place but may still lack the understanding or willingness to implement them.

[GBNNS](#) will play a key role in the longevity of RAPID LIFE and are a source of information on presence, spread and management of INNS across the region.

Appendices

Appendix I: Glossary

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**.

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

Term	Explanation
Alert Species	Specific INNS species of concern.
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 IAS 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.
Dissemination	The act of spreading something, especially information, widely.
Early Detection	When an IAS 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 IAS 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.
High Risk Area	An area that is very likely to be invaded (e.g have a lot of recreational traffic coming through, particularly from abroad).
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 IAS.
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).

Term	Explanation
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 Figure 1) for INNS management purposes.
RIMPs	Regional INNS 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.
Sensitive Area	An area of significant ecological value that may be invaded and would suffer significant impacts were it invaded.

Appendix II: Species recorded in the South West but not included in the RIMP

We had thousands of species records returned by Local Environmental Records Centres in response to our request for INNS records for the South West. The list below contains the records not included in the report. There are various reasons why these have been removed, for example no realistic chance of management or prevention, judged low risk in terms of invasion or impacts or simply lacking information or knowledge on threat/distribution. These records have been left in raw data form.

Common Name	Latin Name
a flatworm (unidentified)	
a flowering plant (unidentified)	
a giant rhubarb (unidentified)	
a kontikia flatworm	<i>Kontika</i>
a waterweed (unidentified)	
Alga	<i>Antithamnionella spirographidis</i>
Alga	<i>Grateloupia filicina</i>
Alga	<i>Neosiphonia harveyi</i>
Alga	<i>Solieria chordalis</i>
Alpine Newt	<i>Ichthyosaura alpestris</i>
American jack knife clam	<i>Ensis directus</i>
American Piddock	<i>Petricolaria pholadiformis</i>
Australian Flatworm	<i>Australoplana sanguinea</i>
Bar-headed Goose	<i>Anser indicus</i>
Barnacle	<i>Austrominius modestus</i>

Common Name	Latin Name
Barnacle	<i>Elminius modestus</i>
Bryzoan	<i>Bugula neritina</i>
Butterfly-bush	<i>Buddleja</i>
Canada Goose	<i>Branta canadensis</i>
Canadian Waterweed	<i>Elodea canadensis</i>
Cape Pondweed	<i>Aponogeton distachyos</i>
Carolina Wood Duck	<i>Aix sponsa</i>
Carp	<i>Cyprinus carpio</i>
Common rhododendron	<i>Rhododendron ponticum</i>
Compass seasquirt	<i>Asterocarpa humilis</i>
Coppery Monkeyflower	<i>Mimulus burnetii</i>
Corophium sextonae	<i>Corophium sextonae</i>
Cotoneaster	<i>Cotoneaster</i>
Cotoneaster horizontalis	<i>Cotoneaster horizontalis</i>
Creeping sea squirt	<i>Perophora japonica</i>
Crocsmia x crocosmiiflora	<i>Crocsmia x crocosmiiflora</i>
Curly Waterweed	<i>Lagarosiphon major</i>
Duck-potato	<i>Sagittaria latifolia</i>
Egyptian Goose	<i>Alopochen aegyptiaca</i>
False Virginia-creeper	<i>Parthenocissus inserta</i>
Few-flowered Garlic	<i>Allium paradoxum</i>
Floating Heart	<i>Nymphoides peltata</i>
Giant Butterbur	<i>Petasites japonicus</i>
Goldfish	<i>Carassius auratus</i>
Gunnera peltata	<i>Gunnera peltata</i>
Harlequin Ladybird	<i>Harmonia axyridis</i>
Himalayan Cotoneaster	<i>Cotoneaster simonsii</i>
Hollyberry Cotoneaster	<i>Cotoneaster bullatus</i>
Hottentot-fig	<i>Carpobrotus edulis</i>
Japanese Rose	<i>Rosa rugosa</i>
Jenkins' Spire Snail	<i>Potamopyrgus antipodarum</i>
Mandarin	<i>Aix galericulata</i>
Northern River Crangonyctid	<i>Crangonyx pseudogracilis</i>
Nuttall's Waterweed	<i>Elodea nuttallii</i>
Orfe	<i>Leuciscus idus</i>
OysterThief	<i>Colpomenia peregrina</i>
Perfoliate Alexanders	<i>Smyrnum perfoliatum</i>
Pirri-pirri-bur	<i>Acaena novae-zelandiae</i>

Common Name	Latin Name
Polysiphonia harveyi	<i>Polysiphonia harveyi</i>
Portuguese Oyster	<i>Crassostrea angulata</i>
Purple pitcherplant	<i>Sarracenia purpurea</i>
Qahog clam	<i>Mercenaria mercenaria</i>
Rainbow Trout	<i>Oncorhynchus mykiss</i>
Red alga	<i>Bonnemaisonia hamifera</i>
Red Alga	<i>Trailiella intricata</i>
Red seaweed	<i>Antithamnionella ternifolia</i>
Red-crested Pochard	<i>Netta rufina</i>
Red-eared Terrapin	<i>Trachemys scripta elegans</i>
Red-rust bryozoan	<i>Watersipora subtorquata</i>
Saltwater clam	<i>Ensis americanus</i>
Sand Gaper	<i>Mya arenaria</i>
Snow Goose	<i>Anser caerulescens</i>
South-American Water-weed	<i>Egeria densa</i>
Stinking Willie	<i>Jacobaea vulgaris</i>
Three-cornered Garlic	<i>Allium triquetrum</i>
Tunicate	<i>Botrylloides violaceus</i>
Variiegated Yellow Archangel	<i>Lamiastrum galeobdolon subsp. Argentatum</i>
Virginia-creeper	<i>Parthenocissus quinquefolia</i>
Wels Catfish	<i>Silurus glanis</i>
Winter Heliotrope	<i>Petasites fragrans</i>
Wright's Golden Membrane Weed	<i>Chrysomenia wrightii</i>

Appendix III: IAS of European Concern

Latin Name	Common Name
Flora	
<i>Alternanthera philoxeroides</i>	Alligator weed
<i>Asclepias syriaca</i>	Common milkweed
<i>Baccharis halimifolia</i>	Eastern baccharis
<i>Cabomba caroliniana</i>	Carolina fanwort
<i>Eichhornia crassipes</i>	Water hyacinth
<i>Elodea nuttallii</i>	Nuttall's pondweed
<i>Gunnera tinctoria</i>	Chilean rhubarb
<i>Heracleum mantegazzianum</i>	Giant hogweed
<i>Heracleum persicum</i>	Persian hogweed
<i>Heracleum sosnowskyi</i>	Sosnowsky's hogweed

Latin Name	Common Name
<i>Hydrocotyle ranunculoides</i>	Floating pennywort
<i>Impatiens glandulifera</i>	Himalayan balsam
<i>Lagarosiphon major</i>	Curly waterweed
<i>Ludwigia grandiflora</i>	Water-primrose
<i>Ludwigia peploides</i>	Floating primrose-willow
<i>Lysichiton americanus</i>	American skunk cabbage
<i>Microstegium vimineum</i>	Japanese stiltgrass
<i>Myriophyllum aquaticum</i>	Parrot's feather
<i>Myriophyllum heterophyllum</i>	Broadleaf watermilfoil
<i>Parthenium hysterophorus</i>	Whitetop weed
<i>Pennisetum setaceum</i>	Crimson fountaingrass
<i>Persicaria perfoliata</i>	Asiatic tearthumb
<i>Pueraria lobata</i>	Kudzu vine
Fauna	
<i>Alopochen aegyptiacus</i>	Egyptian goose
<i>Callosciurus erythraeus</i>	Pallas' squirrel
<i>Corvus splendens</i>	Indian house crow
<i>Eriocheir sinensis</i>	Chinese mitten crab
<i>Herpestes javanicus</i>	Small Asian mongoose
<i>Lithobates catesbeianus</i>	American bullfrog
<i>Muntiacus reevesi</i>	Muntjac deer
<i>Myocastor coypus</i>	Coypu
<i>Nasua nasua</i>	Coati
<i>Nyctereutes procyonoides</i>	Raccoon dog
<i>Ondatra zibethicus</i>	Muskrat
<i>Orconectes limosus</i>	Spiny-cheek crayfish
<i>Orconectes virilis</i>	Virile crayfish
<i>Pacifastacus leniusculus</i>	Signal crayfish
<i>Percottus glenii</i>	Armur sleeper
<i>Procambarus clarkii</i>	Red swamp crayfish
<i>Procambarus fallax f. virginialis</i>	Marbled crayfish
<i>Procyon lotor</i>	Raccoon
<i>Pseudorasbora parva</i>	Stone moroko
<i>Sciurus carolinensis</i>	Grey squirrel
<i>Sciurus niger</i>	Fox squirrel
<i>Tamias sibiricus</i>	Siberian chipmunk
<i>Threskiornis aethiopicus</i>	Sacred ibis
<i>Trachemys scripta</i>	Red-eared, yellow-bellied and Cumberland sliders
<i>Vespa velutina nigrithorax</i>	Asian hornet

Appendix IV: Stakeholders who attended the RIMP workshops

The following stakeholders attended the RIMP workshop for the South West region. Detailed liaison was undertaken with these, among many other stakeholders before and after the workshop regarding this RIMP. Please see Table 1 for a list of stakeholders.

Freshwater and Riparian

- Cornwall County Council
- Cornwall Wildlife Trust
- Dartmoor National Park Authority
- Devon County Council
- Environment Agency
- Exeter Biosciences
- National Trust
- South West Lakes Trust
- South West Water
- Wessex Water
- Wildfowl and Wetlands Trust

Coastal and Marine

- Cornwall Council
- Cornwall Wildlife Trust
- Devon and Severn IFCA
- Exe Estuary Management Partnership
- Falmouth Harbour
- Fowey Harbour
- Marine Biological Association of the UK
- Marine Management Organisation
- National Trust
- Natural England
- Plymouth City Council, Tamar Estuaries Consultative Forum
- Queen's Harbour Master, Plymouth
- South West Water
- University of Exeter

Appendix V: Sources of Data

Data was sourced through data search requests from the following locations:

- The Environmental Records Centre for Cornwall and the Isles of Scilly
- Devon Biodiversity Records Centre
- Dorset Environmental Records Centre
- Wiltshire and Swindon Biological Records Centre
- Hampshire Biodiversity Information Centre
- Bristol Regional Environmental Records Centre
- Marine Biological Association
- National Biodiversity Network
- Anecdotal records from stakeholders