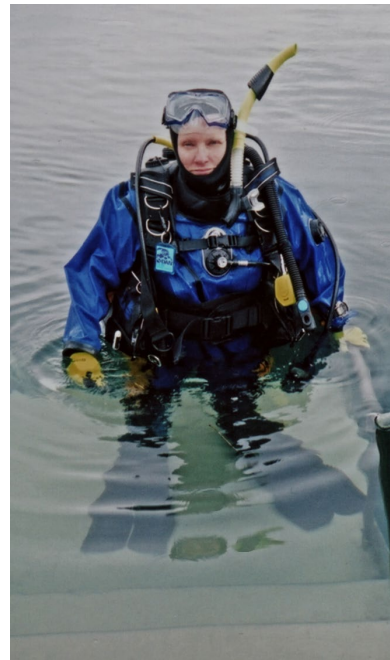


Invasive Non-native Species Pathway Action Plan: Recreation in Wales



May 2026

Lucinda Lintott, Tom Hill, Dr Kate Dey and Dr Paul Stebbing.

With contributions from Holly Peek and Chloe Powell Jennings

APEM Ltd. and Natural Resources Wales

This project was delivered by APEM Ltd. and NRW and funded through the Welsh Government's Nature Networks Programme, to strengthen the resilience of Wales's protected land and marine sites.

Cover page photographs by Amir Gluzman, [CC BY-SA 3.0](#); Thruxton, [CC BY 3.0](#); Atsme, [CC BY-SA 4.0](#) all via Wikimedia Commons

Table of Contents

List of Figures	4
List of Tables	4
Crynodeb Gweithredol	5
Executive Summary	6
Background	8
What are Invasive Non-Native Species (INNS)?	8
What are pathways?.....	9
What is biosecurity?.....	11
A biosecurity framework: what is the context for this Pathway Action Plan?.....	11
Scope, aims and objectives	14
The recreational activities pathway	15
How do INNS impact recreational activities?.....	17
Relevant INNS for recreational activities	18
INNS, Pathways and the Law	28
Biosecurity to Manage the Recreational Activities Pathway	29
Who are the key stakeholders?	29
Existing biosecurity for recreational activities.....	30
Recommended strategic actions for authorities	32
Recommended actions for all stakeholders	37
1. Understanding roles and legal responsibilities.....	38
2. Information and guidance on INNS and biosecurity.....	40
3. Raising awareness.....	43
4. Biosecurity processes and procedures.....	47
5. Biosecurity facilities	50
6. Monitoring and reporting	52
7. Collaborative working.....	56
Action scaling: a kayaking club example	58
Useful resources	60

List of Figures

Figure 1. An overview of the Pathway Action Plans that have been developed for Wales, and the vectors associated with the pathways. Note that the list of vectors is not exhaustive.....	10
Figure 2. A flowchart showing the relationship between the Pathway Action Plans, Species Action Plans and the Biosecurity Action Plans created for the Natural Resources Wales Biosecurity Planning Project with APEM Ltd.....	12
Figure 3. Areas on recreational activity equipment where INNS may stowaway. a) Check Clean Dry guidance for Paddlers from the GB NNSS website. b) Check Clean Dry guidance for Stand Up Paddleboarders from the GB NNSS website. c) Parts of diving equipment to which should be checked for INNS before cleaning and drying. Diving equipment photograph from Scuba Diver Life [permission sought].	16
Figure 4. An extract from the Check, Clean, Dry guidance for Stand Up Paddleboarding, (SUP poster). GB NNSS.	31

List of Tables

Table 1. High and Medium risk INNS established in Wales that are likely to spread via recreational activities.	19
Table 2. Examples of INNS that are not currently recorded as present in Wales (horizon species) but are known to be able to spread via recreational activity vectors.....	26
Table 3. Recommended strategic actions for authorities to address the introduction and spread of marine INNS via all pathways in Wales. The ID letters PS (Pathway Strategic) denote that the actions are aimed at addressing the management of pathways, differing from the ID letters SS (Species Strategic) in the Species Action Plans (SAPs) that are aimed at addressing the management of species.....	33

Crynodeb Gweithredol

- Mae [rhywogaethau estron goresgynol](#) yn rhywogaethau o blanhigion, anifeiliaid neu bathogenau nad ydynt i'w cael yn naturiol mewn ardal ond sydd wedi cael eu symud yno, gan weithgareddau dynol (naill ai'n ddamweiniol neu'n fwriadol) ac sy'n achosi effeithiau amgylcheddol, cymdeithasol neu economaidd sylweddol. Rhai o effeithiau rhywogaethau estron goresgynol yw eu bod yn cystadlu'n llwyddiannus â rhywogaethau brodorol am fwyd a gofod, eu bod yn newid cynefinoedd, lledaenu clefydau ac achosi costau uniongyrchol ac anuniongyrchol i economïau lleol a chenedlaethol.
- Mae symudiad (h.y. cyflwyno a lledaenu) rhywogaethau estron goresgynol yn cael ei hwyluso gan drywyddau a gweithgareddau dynol o'r enw "[Llwybrau](#)", er enghraifft, morgludo, defnyddio cychod hamdden a dyframaethu.
- Mae gweithgareddau hamdden yn cael eu cydnabod fel un o'r llwybrau ble caiff rhywogaethau estron goresgynol eu cyflwyno a'u lledaenu, gyda photensial i weithgareddau hamdden symud anifeiliaid (ar ffurf wyau, larfâu, anifeiliaid ifanc ac oedolion) neu wmon (fel darnau neu sborau).
- Gall rhywogaethau estron goresgynol gael eu cyflwyno a'u lledaenu pan gânt eu dal mewn bylchau bach neu nodweddion sy'n dal dŵr mewn badau dŵr bach ac ar ddillad, offer a'r bad dŵr ei hun.
- Fel arfer ceisir mynd i'r afael â lleihau effaith rhywogaethau estron goresgynol drwy gyfrwng ymdrechion i atal eu lledaeniad ar lefel y 'llwybr'.
- Mae deddfwriaeth a pholisi yn ymwneud â chyflwyno a lledaenu rhywogaethau estron goresgynol yn bodoli yng Nghymru.
- Mae amcanion y Cynllun Gweithredu Llwybr (PAP) hwn fel a ganlyn:
 - Amlinellu'r risgiau bioddiogelwch o ran rhywogaethau estron goresgynol sy'n gysylltiedig â'r llwybr gweithgareddau hamdden.
 - Nodi rhywogaethau estron goresgynol morol allweddol sy'n gysylltiedig â'r llwybr gweithgareddau hamdden.
 - Darparu cyfres o [gampau gweithredu graddadwy](#) i randdeiliaid amgylchedd morol Cymru y gellid eu rhoi ar waith ble mae gweithgareddau hamdden yn digwydd.
- Rhanddeiliaid yw'r rhai sy'n defnyddio, yn elwa o, neu sy'n gyfrifol am (e.e. rheoli, amddiffyn neu reoleiddio) yr amgylchedd morol. Yma, mae hyn yn cynnwys cyrff statudol ac awdurdodau perthnasol, yn ogystal â chyrff llywodraethu, canolfannau hyfforddi, clybiau hamdden, cyflenwyr a gweithgynhyrchwyr offer, busnesau a defnyddwyr unigol sy'n gysylltiedig â'r gweithgareddau a restrir isod.
- Y bwriad yw y bydd y PAP hwn yn berthnasol i weithgareddau hamdden ar draws holl ardaloedd morol Cymru, gan gynnwys, ond heb fod yn gyfyngedig i'r canlynol:
 - Chwaraeon padlo (e.e. rhwyfo, caiacio, canŵio, padlfyrddio)
 - Chwaraeon badau bach sy'n cael eu pweru gan y gwynt (e.e. hwylfyrddio, hwylfyrddio hydroffoil, barcudfyrddio)
 - Deifio SCUBA, snorclo a nofio
 - Arfordira
- Mae gweithgareddau sy'n cynnwys badau dŵr bach personol â phŵer (e.e. jet-sgis) neu ddingis yn cael sylw mewn PAPs eraill (gweler [Adnoddau defnyddiol](#)).

- Mae'r PAP hwn yn amlinellu saith cydran ffocws boddioelwch ar gyfer y llwybr gweithgareddau hamdden o fewn ardaloedd morol Cymru:
 1. [Deall rolau a chyfrifoldebau cyfreithiol](#)
 2. [Hyrwyddo gwybodaeth ac arweiniad ar rywogaethau estron goresgynnol a boddioelwch](#)
 3. [Codi ymwybyddiaeth](#)
 4. [Prosesau a gweithdrefnau boddioelwch](#)
 5. [Cyfleusterau boddioelwch](#)
 6. [Gwyliadwriaeth ac adrodd](#)
 7. [Gweithio ar y cyd](#)
- Y bwriad yw i'r cynllun hwn gael ei ddefnyddio i gefnogi'r [Cynlluniau Gweithredu Rhywogaethau \(SAP\) a'r Cynlluniau Gweithredu Boddioelwch \(BAP\) cysylltiedig](#).

Executive Summary

- [Invasive non-native species](#) (INNS) are plants, animals or pathogens that do not naturally occur in an area but have been moved there, by human activities (either accidentally or deliberately) and cause significant environmental, social or economic impacts. The impacts of INNS include outcompeting native species for food and space, altering habitats, spreading disease and incurring direct and indirect costs for local and national economies.
- The movement (i.e. the introduction and spread) of INNS is facilitated by human mediated routes and activities called "[Pathways](#)", for example, shipping, recreational boating and aquaculture.
- Recreational activities are recognised as a pathway for the introduction and spread of INNS, with potential for activities to move both animals (as eggs and in their larval, juvenile and adult life stages) or seaweed (as fragments or spores).
- INNS can be introduced and spread when caught up in small gaps or water-retaining features in watercraft and on clothing, equipment and the watercraft itself.
- Reducing the impact of INNS is commonly approached through efforts to prevent their spread at the pathway level.
- Legislation and policy related to the introduction and spread of INNS exists in Wales.
- The objectives of this Pathway Action Plan (PAP) are to:
 - Outline the INNS biosecurity risks associated with the recreational activities pathway.
 - Identify key marine INNS associated with the recreational activities pathway.
 - Provide stakeholders of the Welsh marine environment with a [series of scalable actions](#) that could be implemented where recreational activities occur.
- Stakeholders are those that use, benefit from or are responsible for (e.g. managing, protecting or regulating) the marine environment. Here, this includes relevant authorities and statutory bodies, as well as governing bodies, training centres, recreational clubs, equipment suppliers and manufacturers, businesses and individual users associated with the activities listed below.

- This PAP is intended to be applicable to recreational activities across all Welsh marine areas, including, but not limited to:
 - Paddle sports (e.g., rowing, kayaking, canoeing, SUP)
 - Small wind-powered sports (e.g., wind foiling, wind surfing, kite surfing)
 - SCUBA diving, snorkelling and swimming
 - Coasteering
- Activities involving personal powered watercraft (e.g., jet skis) or dinghies are covered in different PAPs (see [Useful resources](#)).
- This PAP outlines seven components of biosecurity focus for the recreational activities pathway within Welsh marine areas.
 1. [Understanding roles and legal responsibilities](#)
 2. [Information and guidance on INNS and biosecurity](#)
 3. [Raising awareness](#)
 4. [Biosecurity processes and procedures](#)
 5. [Biosecurity facilities](#)
 6. [Monitoring and reporting](#)
 7. [Collaborative working](#)
- This PAP is intended to be used in support of the associated [Species Action Plans \(SAPs\)](#), and [Biosecurity Action Plans \(BAPs\)](#).

Preface

Safeguarding Wales's marine environment and native biodiversity requires robust biosecurity measures to prevent the spread and impact of invasive non-native species (INNS). The guidance in this Pathway Action Plan outlines actions and guidance to support stakeholders with their biosecurity efforts, with the aim of making Welsh marine recreational activities more sustainable.

It is acknowledged that no single activity is solely responsible for the spread of INNS and all users of the marine environment are encouraged to take the time to understand more about this threat and how they can contribute to tackling it.

Stakeholders are encouraged to share this plan, the guidance within it, the actions that they choose to undertake and to raise awareness of biosecurity. Collective effort is ideal, but individual actions are equally vital. Proactive steps by stakeholders, even when taken independently, strengthen national INNS biosecurity and help to protect our marine environment — every action counts.

The significance of this issue is recognised by Natural Resources Wales, who commissioned, and will manage this plan under a [wider framework of INNS biosecurity planning](#).

Background

What are Invasive Non-Native Species (INNS)?

Non-native species (NNS) are plants, animals or pathogens that do not naturally occur in an area but have been moved there, by human activities (either accidentally or deliberately). NNS are also sometimes referred to as “alien species”, “non-indigenous species” or “exotic species”. Most NNS do not cause issues within the area where they have been introduced. However, 10-12% cause significant environmental, social or economic impacts. These are known as Invasive Non-Native Species (INNS) and, in Wales, include the American slipper limpet, carpet sea squirt and Japanese wireweed, among many others. The impacts of INNS include threats to biodiversity, habitat alteration, fouling underwater structures (including recreational equipment, navigational aids and piers) and the introduction of diseases. The impacts of INNS (in all environments including marine) are estimated to cost the British economy £4 billion per year, of which, £499 million per year is attributed to impacts in Wales (see the [2023 Eschen paper](#)).

Marine INNS are resilient and often capable of surviving harsh and variable conditions, making them particularly challenging to manage. Many species can endure high levels of drying, temperature fluctuations, and low nutrient availability, allowing them to persist in damp conditions for extended periods. For instance, mussels, barnacles and algae can remain viable (i.e., still able to live and/or reproduce) when attached to damp equipment, nets or boat hulls, even after days or weeks out of the water. The resilience enables them to travel long distances, hitchhiking on fishing gear, recreational boats, or clothing/equipment.

What are pathways?

The mechanisms and routes by which INNS are moved from one location to another by humans are termed “pathways”. This movement of species by humans, accidentally or deliberately, allows INNS to overcome natural barriers that would otherwise prevent them from spreading between their native and non-native ranges, e.g., an ocean. For instance, Pacific oysters, native to Japan, would not be able to reach UK waters through natural spread, but when introduced into UK waters by human activity can survive and establish as the environmental conditions in the UK are compatible with their native range.

Animals can be moved as eggs and in their larval, juvenile and adult life stages. Seaweed can be moved as fragments or spores (their reproductive structures). Larvae can be planktonic (drift with currents, unable to propel themselves against water movement) or free-swimming (can actively move and maintain their position in the water column).

Pathways are broadly classified as two types:

- 1) Pathways of initial introduction: Those which transfer NNS to regions or locations that are geographically separate and isolated from their native range (referred to as “introduction(s)” in this document). An example of this would be the movement of transoceanic vessels.
- 2) Pathways of further spread: These facilitate the movement of NNS populations beyond their initial introduction point to a wider area (referred to as “spread” in this document):
 - a. Facilitating the short-range dispersal (i.e. spread from place of introduction to wider area) of an NNS population within a single habitat or location (e.g. paddle boards spreading a seaweed within a bay), or
 - b. Facilitating regional spread where some small barriers exist (e.g., the movement of recreational boats between two nearby but separate harbours).

The frequency and magnitude of pathways in the marine environment have been increasing since the 1800s with the beginning of rapid globalisation. A significant movement of marine INNS has been through the trans-oceanic voyages and shipping that has long supported growing global economies and international supply chains. For more information on other pathways in the marine environment, please see the other Welsh Pathway Action Plans. Links can be found on the [Wild Seas Wales website](#).

Vectors are the specific, discrete parts of a pathway (i.e. the means within a pathway) that facilitate the movement of INNS from one location to another. Vectors for recreational pathways include INNS being taken up in water-retaining features (e.g., in kayaks) and INNS attaching to equipment/clothing. The relationship between pathways and vectors in the marine environment is illustrated in Figure 1.

Natural spread of INNS e.g., larvae distributed along a coastline by tides and currents, may also occur following introductions. However, unlike the spread caused by human activities, natural spread is generally limited by the inherent barriers between locations. Natural spread is generally gradual and organic (i.e. slow outward spread from a point-source of introduction).

Although natural spread is more challenging to manage, improved biosecurity procedures, particularly at high-risk/vulnerable sites, can reduce the risk of impact and improve the chances that introductions are detected early.

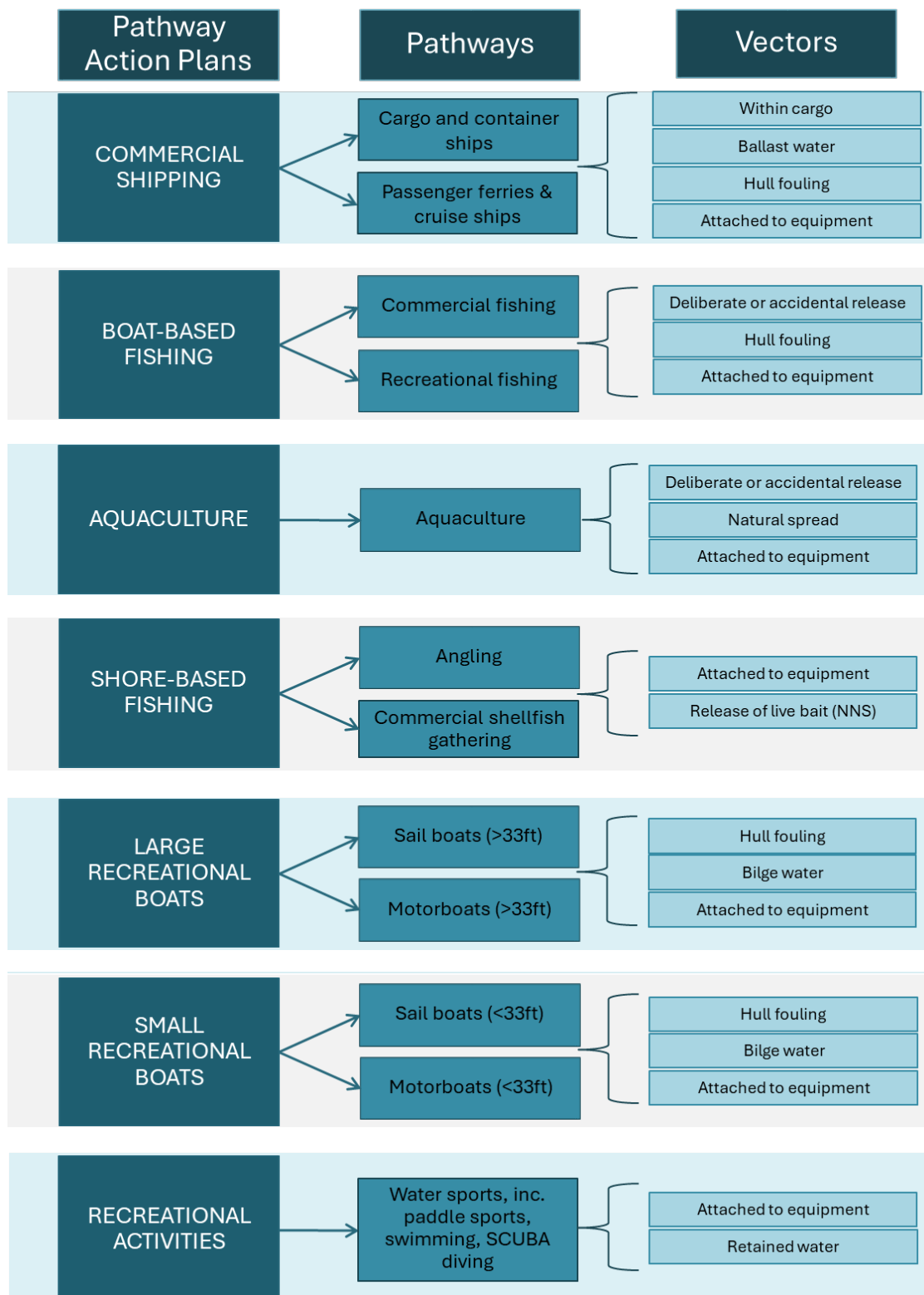


Figure 1. An overview of the Pathway Action Plans that have been developed for Wales, and the vectors associated with the pathways. Note that the list of vectors is not exhaustive.

What is biosecurity?

Biosecurity measures are actions, procedures and behaviours put in place to reduce the risk of INNS introduction and spread into, within and outside of a given area. Biosecurity measures should be realistic, pragmatic and cost-effective. Preventing the introduction and spread of INNS is by far the most effective way to reduce the impact of INNS. Eradication and control of INNS is often not possible in the marine environment and any attempts are more costly, difficult, and time-consuming compared to preventing the arrival and establishment of INNS in the first place. This is especially true in the marine environment, where eradication is near impossible once INNS become established.

A biosecurity framework: what is the context for this Pathway Action Plan?

This Pathway Action Plan forms part of a biosecurity planning framework commissioned and endorsed by Natural Resources Wales. The driver behind the framework is the wider goal of improving the condition of and increasing biodiversity in protected marine sites. Within the marine environment, this goal includes reducing the introduction and spread of INNS. The Species Action Plans (SAPs) and the Pathway Action Plans (PAPs) produced for this framework are intended to provide a basis for biosecurity planning for all marine sites throughout Wales, as well as presenting standalone guidance for pathway management. Figure 2 shows the relationships between each of the action plans.

Pathway Action Plans (PAPs) describe the pathway and list possible actions that could be undertaken to address the risk of the introduction and spread of INNS via that pathway into or around Wales. Links to the other PAPs can be found on the [Wild Seas Wales website](#).

Species Action Plans (SAPs) describe priority INNS and list possible actions that could be undertaken to address the introduction and spread of that species into or around Wales. Links to the SAPs can be found on the [Wild Seas Wales website](#).

Biosecurity Action Plans (BAPs) are site-specific and can be scaled as appropriate. A BAP can be produced for a whole region (i.e. as has been done for the Pembrokeshire Marine, Cardigan Bay, Menai Strait and Conwy Bay and Carmarthen Bay and Estuaries Special Areas of Conservation (SACs)) or for an individual port, harbour or aquaculture site. They will identify the pathways relevant for that site and the species at or near the site that are of concern. The actions listed in the PAPs and SAPs are relevant to all stakeholders (see [Key stakeholders](#)) and should be considered and incorporated into a site's BAP. Due to the wide breadth and scale of the different stakeholder groups, the scope of these actions is equally broad. It is therefore important that individual stakeholders review their activities and use of the site to decide which of the biosecurity actions are applicable and practicable. Individual club level BAPs were not developed as part of this project, however, the information within this PAP (and the other PAPs and SAPs) could be used to produce one.

Biosecurity To-Do-List trackers have been created to make it easier for stakeholders to log what actions they plan to carry out and track what progress is being made on each action. The need for using to-do-list trackers will be dependent on the scope and scale of the BAP. For

example, the BAPs produced for the Welsh SACs cover such large areas that it is necessary to provide individual stakeholders with an additional support tool that makes it easier to log and track their actions. The tracker also enables NRW, as the SAC BAP manager, to effectively oversee the implementation of biosecurity within each SAC, highlighting progress and pinpointing where further assistance or support may be needed. This approach is also intended to facilitate coordinated monitoring and collaborative efforts to share and enhance biosecurity practices between stakeholders. Biosecurity planning at smaller scales (e.g. an individual marina) are unlikely to require a BAP and a to-do-list tracker in parallel. Stakeholders can decide which is the most appropriate method for facilitating their biosecurity efforts.

We encourage recreational users to consider the benefits of improved biosecurity to both the sustainability and enjoyment of their activities.

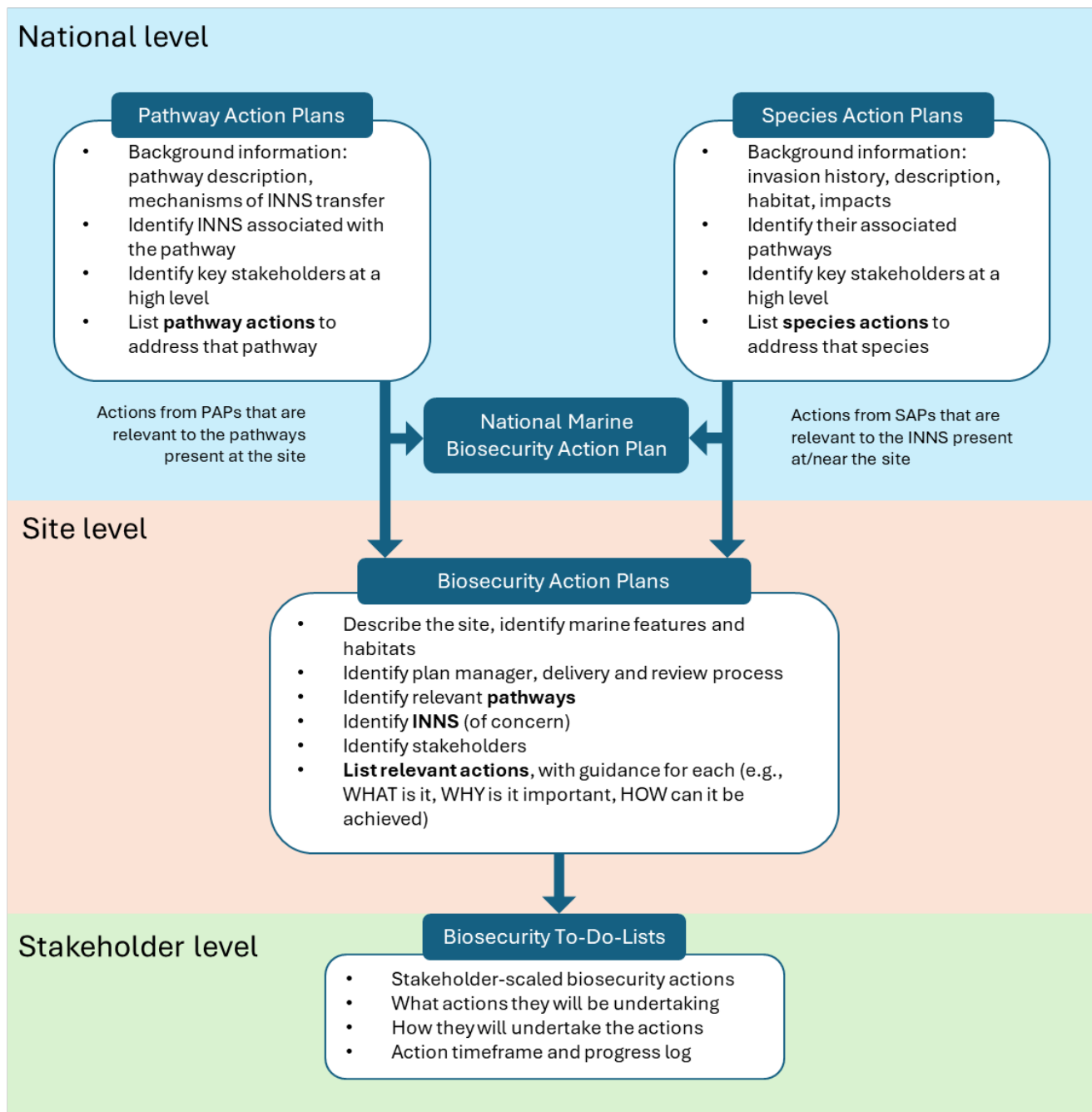


Figure 2. A flowchart showing the relationship between the Pathway Action Plans, Species Action Plans and the Biosecurity Action Plans created for the Natural Resources Wales Biosecurity Planning Project with APEM Ltd.

Scope, aims and objectives

Scope

This Pathway Action Plan (PAP) is intended to be applicable to recreational activities undertaken across all Welsh marine and coastal areas. Activities addressed in this plan include, but are not limited to:

- Paddle sports (e.g., rowing, kayaking, canoeing, stand-up paddleboarding (SUP));
- Small wind-powered sports (e.g., wind foiling, wind surfing, kite surfing)
- SCUBA diving
- Snorkelling and swimming
- Coasteering

This document does not apply to the use of powered personal watercraft (e.g., jet-skis) or dinghy sailing (see Recreational Boating for Small Vessels PAP in [Useful resources](#)). Stakeholders undertaking the activities listed above for the purpose of fishing/angling (e.g., fishing from a sea-kayak) should also review the Shore-based Fishing PAP (see [Useful resources](#)).

This document, and the biosecurity measures outlined within it, are intended to be applicable to individual recreational users, suppliers and manufacturers of recreational equipment, recreational clubs, organisations and businesses, and national governing bodies (see [Key stakeholders](#) for more information). The actions encompass several dimensions of INNS management for the pathway including:

- Strategies for effective INNS biosecurity
- Strategies to enable early detection and quick reaction to new records
- Coordination of efforts, resource sharing and collaboration
- Research, development and innovation
- National policy and regulatory frameworks

Aim

The overall aim of this PAP is to reduce the risk of the introduction and spread of marine INNS via marine and coastal recreational activities.

This document aims to complement the existing national approach to biosecurity ([for further information see legislation](#)), providing recreational activity-specific information to aid a pathway-based approach to biosecurity. It also seeks to put forward actions that can be applied at national (Welsh), regional and local levels. The goal is to use existing communications and resources wherever available and adapt them to fit specific requirements. This approach aims to avoid any duplication or unnecessary additional effort. This will facilitate a consistent approach to biosecurity for this pathway across Wales.

Objectives

- Outline the biosecurity risks associated with recreational activities.
- Identify marine INNS associated with recreational activity pathways.
- Provide a list of clear and practical biosecurity actions to address the pathway. These can subsequently be appropriately scaled and applied to a specific site and its stakeholders.

The recreational activities pathway

In the marine environment, recreational activities are recognised as potential pathways for INNS introduction and spread. This is attributed to animals (as eggs and in their larval, juvenile and adult life stages) or seaweed (as fragments or spores) being transferred by watercraft, equipment and clothing between locations. INNS can be caught up in small gaps or water-retaining features in watercraft (e.g., kayak hulls), on equipment (e.g., buoyancy aids and SCUBA diving regulators), and on clothing (e.g., wetsuits). Equipment and clothing that is left damp can provide a surface on which INNS can survive and then be subsequently spread to a new area when it is used again.

Paddle boards, especially inflatable models, have become popular in recent years due to their relatively low cost and the ability to easily transport them from one location to another. However, the packing and folding away of such boards soon after use may prevent it from completely drying and, as such, increases the likelihood that any INNS that may have attached to the equipment can survive and be spread to another location. Paddle boards and other light watercraft that are easily transported and deployed may be used relatively frequently, potentially making cleaning and drying more difficult or onerous for the user, especially if cleaning facilities are not readily available. Boards and small watercraft (e.g., canoes and kayaks) can be easily taken over land to different waterbodies, thereby connecting many different locations. Furthermore, short transit times between waterbodies may further increase the potential for organisms to survive.

Various pieces of equipment used for rowing, paddling and surfing (e.g., paddles and wind foils) can be easily forgotten about when it comes to cleaning. They may also be logistically difficult to clean, particularly large wind foils. Additionally, some INNS can be hard to see, especially in their egg or larval stages, and users may not be aware that they are on or in their equipment. This also applies to smaller equipment (e.g., snorkels, regulators and buoyancy control devices) used for SCUBA diving and clothing (e.g., swimwear and wetsuits). Wetsuits are particularly good at retaining water in which organisms could survive and will take longer to clean and dry than thinner swimwear such as swimming costumes. Furthermore, recreational users, especially those without large equipment (e.g., swimmers and snorkellers) may visit multiple sites within one day, increasing the risk of INNS being transferred.

Figure 3 shows some locations on equipment for paddling, paddleboarding and SCUBA diving where INNS might be retained.

Recreational activity events and competitions, such as sea-rowing regattas and triathlons, can present an even greater pathway risk as multiple watercrafts may have come from outside the region to take part in the event. This can facilitate the initial introduction of INNS if watercrafts have come from international or distant locations, or the secondary spread of an INNS if they have come from other nearby locations within the same region.

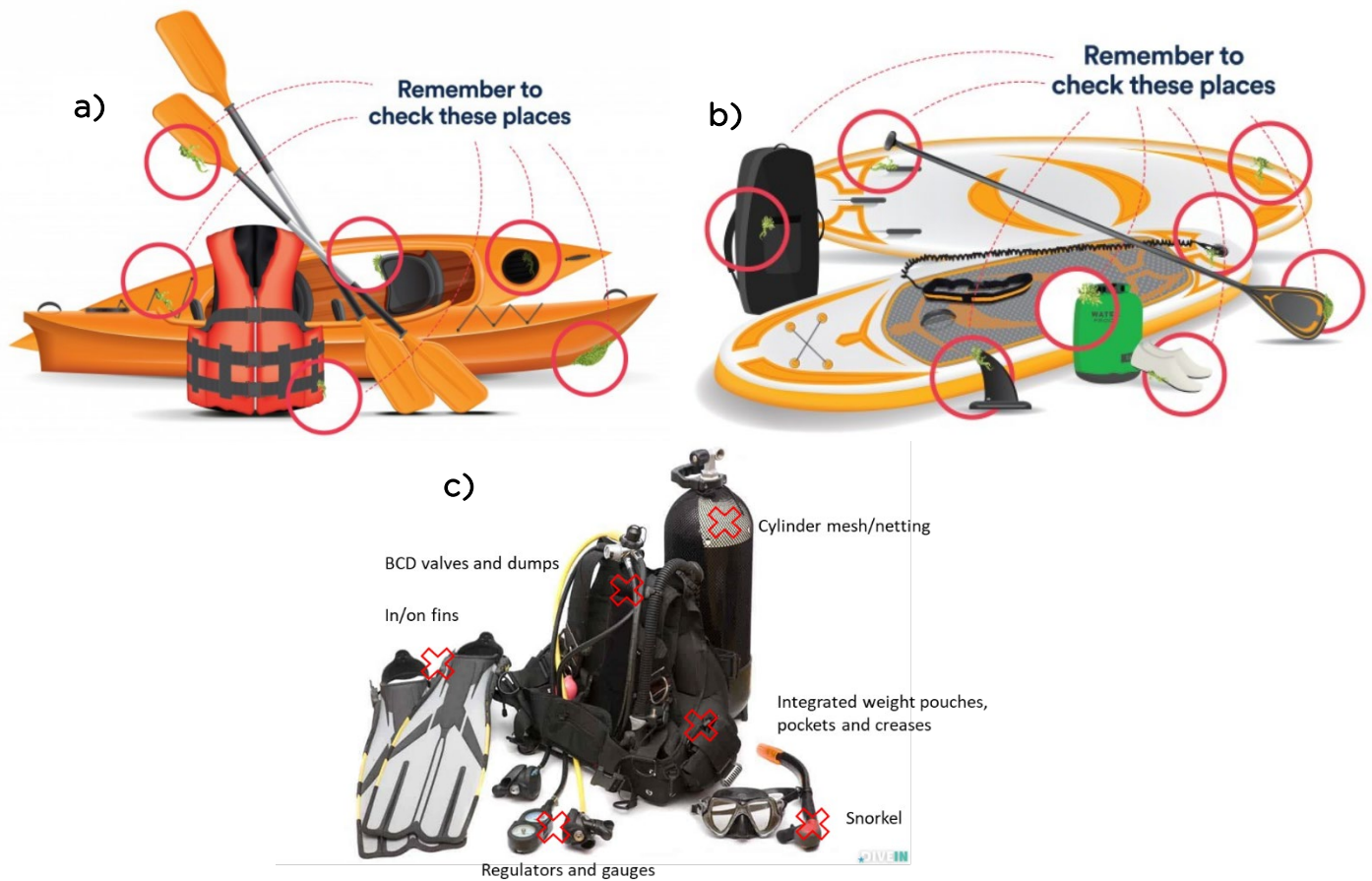


Figure 3. Areas on recreational activity equipment where INNS may stowaway. a) Check Clean Dry guidance for Paddlers from the GB NNSS website. b) Check Clean Dry guidance for Stand Up Paddleboarders from the GB NNSS website. c) Parts of diving equipment to which should be checked for INNS before cleaning and drying. Diving equipment photograph from Scuba Diver Life [permission sought].

How do INNS impact recreational activities?

INNS can cause a problem for recreational activities. The impacts of INNS can be extensive and varied and include the following:

- **Impeding activity:** large aggregations of seaweeds like Japanese wireweed (*Sargassum muticum*) and worm wart weed (*Gracilaria vermiculophylla*) can create an unpleasant environment in which to undertake submerged activities (e.g., SCUBA diving, snorkelling, and swimming). These seaweeds can create vast floating mats which can become tangled around people and equipment (e.g., in [Merseyside](#), 2019). Furthermore, the mats can block out light or sink and smother seabed habitats, impacting the marine life that may have drawn SCUBA divers and snorkellers to visit. Additionally, algal mats can prevent boards, canoes, kayaks and other similar vessels from being able to move through the water ([see more information in this 2021 paper](#)).
- **Creating an unpleasant environment:** These seaweeds can wash up on to beaches, often in very large quantities (i.e. a greater volume than a native species), where it can rot, releasing unpleasant or noxious odours (e.g., in [Christchurch Harbour](#), 2017). INNS can also create unpleasant and even hazardous conditions for recreational users. For example, the Japanese skeleton shrimp (*Caprella mutica*) can become attached to swimwear, equipment and hair in large numbers and the Pacific oyster (*Magallana gigas*), which has a sharp, jagged shell and forms dense reefs in intertidal (area of shore between low and high tide) areas, can cause cuts and scrapes to people and pets (e.g., in [Devon and Cornwall](#), 2021).

In addition, there is [legislation](#) that recreational users should be aware of to understand their responsibilities in relation to INNS.



Japanese wireweed (*Sargassum muticum*) © Kit Beard

Relevant INNS for recreational activities

The tables below present INNS that are likely to spread via recreational activities. Table 1 describes High and Medium risk INNS from the [Welsh Priority Monitoring and Surveillance List](#) (WPMSL) that are known to be present and breeding in Wales. Table 2 describes INNS that are not currently recorded as present in Wales (known as horizon species) but should be monitored for. It is important to identify species that may be on the horizon so that appropriate biosecurity actions can be put in place to prevent their introduction, or surveillance programmes can be implemented to aid timely detection and response. Some species are on the horizon for the UK and some are on the horizon for Wales. These species represent some of the most likely to be transported via recreational activities. Note that this is not an exhaustive list, as there are other INNS known to be transported by recreational activities that are not listed as High or Medium risk on the WPMSL.

The current distributions of INNS around Wales (and the UK more broadly) can be viewed by searching the database and maps on the [National Biodiversity Network Atlas](#) (NBN Atlas).

An overview of the different lists of INNS that are of interest to Wales can also be found on the [NBN Atlas](#). The current distribution of INNS included on those national lists can be found on the [Wales INNS Portal](#).

Further information and links to resources developed to aid identification of INNS are available below. Further species-specific information is also available from the searchable GB NNSS [Information Portal](#).

Table 1. High and Medium risk INNS established in Wales that are likely to spread via recreational activities.

INNS Name	Potential impacts	Image	Additional information
Japanese skeleton shrimp (<i>Caprella mutica</i>)	Likely to displace other native amphipod species & potentially compete with sessile suspension feeders for food.	 Photo credit: Lucinda Lintott [some rights reserved]	There is minimal movement of adults, so they are predominantly moved as 'hitchhikers'. Adults (often <50mm) and juveniles can be transported in water-retaining features (e.g., kayak cockpit/hull) or attached to clothing and equipment. They have a wide temperature tolerance range (-2-28°C) but cannot tolerate low salinities (<18ppt). For further information see the GB NNSS Information Portal, Risk Assessment and NBN Atlas.

INNS Name	Potential impacts	Image	Additional information
Japanese wireweed (<i>Sargassum muticum</i>)	Can interfere with recreational & commercial use of waterways, especially when detached & forming large floating masses; known for fouling fishing gear & boat props, as well as blocking intake pipes; impacts subtidal native ecosystem by overgrowing & shading underlying species, with particular concern for seagrasses.	 Photo credit: Susan Marley [CC BY, via iNaturalist]	Strands and fragments can become entangled in or caught around equipment or can be transported in water-retaining features (e.g., kayak cockpit/hull). Fragments viable for up to 3 months. Wide tolerances of temperature (10-30°C) and salinity (7-34ppt). For further information see the GB NNSS Information Portal, Risk Assessment and NBN Atlas.

INNS Name	Potential impacts	Image	Additional information
Carpet sea squirt (<i>Didemnum vexillum</i>)	Major fouling organism on artificial and natural surfaces; potentially decreases local biodiversity due to competition for resources; smothers substrate (including other species) and its acidic surface hinders settlement on it by other species. Costly to the recreational and aquaculture sector.	 Photo credit: Javier [CC BY, via iNaturalist]	Small fragments can be transported in water-retaining features (e.g., kayak cockpit/hull) or on clothing and equipment. Larvae are planktonic for a few hours (low dispersal risk), whereas fragments are viable for up to 30 days (high dispersal risk). Tolerant to temperatures between -2-24°C and salinities >26ppt. Reproduction occurs between 14-20°C. For further information see the GB NNSS Information Portal, Risk Assessment, NBN Atlas and the 2023 alert poster. A link to the Species Action Plan can be found on the Wild Seas Wales website.

INNS Name	Potential impacts	Image	Additional information
Chinese mitten crab (<i>Eriocheir sinensis</i>)	Erosion of river / stream banks; affect fisheries by damaging nets, killing netted fish, consuming bait & damaging gear; clog water intake pipes; compete for food & space and predate on native species in freshwater & marine, including fish eggs; burrowing activities affect water quality.	 Photo credit: The Food and Environment Research Agency [via GB NNSS]	Larvae (and juveniles) can be transported in water-retaining features (e.g., kayak cockpit/hull) or juveniles attached to equipment/clothing. Reproduction occurs in brackish/marine waters (15-30 ppt salinity). Larvae are planktonic in the marine environment for up to 2 months (high dispersal risk). For further information see the GB NNSS Information Portal, Risk Assessment and NBN Atlas. A link to the Species Action Plan can be found on the Wild Seas Wales website.

INNS Name	Potential impacts	Image	Additional information
Devil's tongue weed (<i>Grateloupia turuturu</i>)	Outcompetes native algae and seagrasses, leading to changes in local ecosystems. Rapid growth and dense mats can smother other marine life, reducing biodiversity. Alters habitats by changing the structure of the seafloor, which affects the species that rely on these habitats for food and shelter. Can have cascading effects throughout the marine food web.	 Photo credit: Elena_Shrehora [CC BY, via iNaturalist]	Spores and fragments can be transported in water-retaining features (e.g., kayak cockpit/hull) or on clothing and equipment. Spores can develop at temperatures ranging between 15-20°C. Developed strands have a wide temperature tolerance (4-29°C). For further information see the GB NNS Information Portal and NBN Atlas.

INNS Name	Potential impacts	Image	Additional information
Japanese Kelp / Wakame (<i>Undaria pinnatifida</i>)	It potentially reduces local biodiversity by outcompeting and displacing native species. It can heavily foul boats thereby reducing their efficiency.	 Photo credit: Kathryn Birch, NRW [via GB NNSS]	Spores and fragments can be transported in water-retaining features (e.g., kayak cockpit/hull) or on clothing and equipment. Fertilisation can occur between 10-15°C with optimum growth for spores between 15-20°C. Spores can survive in temperatures between -1 and 30°C. Spores can be vegetative and remain viable for up to 2 years under certain conditions. For further information, see the GB NNSS Information Portal, Risk Assessment and NBN Atlas.

INNS Name	Potential impacts	Image	Additional information
Trumpet tubeworm (<i>Ficopomatus enigmaticus</i>)	Major fouling organism on artificial surfaces; is a nuisance in ports & marinas where it clogs pipes and blocks tide-gates; known as an “ecosystem engineer” as it can alter the substrate (e.g., create a reef); can affect water quality.	 Photo credit: Cricket Raspit [CC BY, via iNaturalist]	Larvae can be transported in water-retaining features (e.g., kayak cockpits/hulls). Planktonic larval stage 1-3 months (high dispersal risk). Minimum water temperature of 18°C needed for reproduction. Wide salinity tolerance (1.6-55 ppt) but preference for brackish environments. For further information see the GB NNS Information Portal and NBN Atlas. A link to the Species Action Plan can be found on the Wild Seas Wales website.

Table 2. Examples of INNS that are not currently recorded as present in Wales (horizon species) but are known to be able to spread via recreational activity vectors.

Horizon INNS name	Potential impacts	Image	Additional information
HORIZON SPECIES: Veined rapa whelk (<i>Rapana venosa</i>)	Predator of shellfish including commercially important species, has the potential to decimate bivalve fisheries, with associated economic loss.	 Photo credit: Nikita Gerasin [CC BY, via iNaturalist]	Larvae may be in water-retaining features (e.g., kayak cockpits/hulls). Planktonic larval phase of 24-80 days (high dispersal risk). Successful establishment of reproductive populations seen to occur between 18-26°C. For further information see the GB NNSS Information Portal, Risk Assessment and the NBN Atlas.

Horizon INNS name	Potential impacts	Image	Additional information
HORIZON SPECIES: Brush clawed shore crab (<i>Hemigrapsus takanoi</i>)	Direct competitor of native shore crabs (in Holland, led to a drastic reduction in the juvenile native common shore crab and replaced the common shore crab in Dunkirk harbour). Predate on newly settled shellfish (e.g., mussel and oyster spat).	 Photo credit: Demian Hiß [CC BY, via iNaturalist]	Larvae (and adults, depending on size) may be transported in water-retaining features such as bilge water. Natural range expansion following initial introductions occurs when pelagic larvae are dispersed by currents. After hatching, larvae are planktonic for up to a month (depending on temperature). For further information see the GB NNSS Information Portal and NBN Atlas.

INNS, Pathways and the Law

The following points provide a brief summary of relevant legislation (at time of writing):

- Pathway management and the development of pathway action plans are specifically mentioned under the [EU Regulation \(1143/2014\)](#) on the prevention and management of the introduction and spread of invasive alien species. This regulation was retained in domestic law under the European Union (withdrawal) Act 2018 as the [Invasive Alien Species \(Enforcement and Permitting\) Order 2019](#).
- [The Wildlife and Countryside Act 1981](#) makes it an offence to release or allow to escape into the wild any plant or animal which is not ordinarily resident in Great Britain (i.e. non-native) and is not a regular visitor to Great Britain in a wild state (i.e. migratory).

Section 14 (4A) of the Wildlife and Countryside Act read together with Schedule 9A of the Act enables an environmental authority to enter into a species control agreement and make species control orders to ensure, in certain circumstances, that landowners take action on invasive non-native species, or permit others to enter the land and carry out those operations, to prevent their establishment or spread in [England](#) and [Wales](#).

- [The Marine Strategy Regulations 2010](#) transpose into domestic law the EU Marine Strategy Framework Directive. The Directive aims to reduce human impacts on the marine environment, including INNS. The programme of measures is intended to reduce the introduction and spread of INNS. INNS pathway management helps to deliver the 2010 Regulations.
- [The Water Environment \(Water Framework Directive\) \(England and Wales\) Regulations 2017](#) transpose into domestic law the EU Water Framework Directive. The Directive establishes a framework for national measures to achieve or maintain a good ecological status, including transitional and coastal waters. While INNS are not specifically mentioned within the 2017 Regulations they could affect the ecological status of waterbodies. Pathway management is a key aspect of managing the potential spread of INNS.

Biosecurity to Manage the Recreational Activities Pathway

The following sections present information on existing biosecurity within recreational activities as well as actions that, if undertaken, would improve biosecurity in this sector and, ultimately, reduce the risk of INNS impacting recreational users and other relevant stakeholders.

Who are the key stakeholders?

Within the context of this PAP, a stakeholder is anyone who uses, benefits from or is responsible for (e.g. managing, protecting or regulating) the marine environment.

Biosecurity for recreational activities requires engagement and actions taken at national, regional and local scales by specific stakeholders including, but not limited to individuals, businesses, site managers, associations, statutory bodies, and authorities. To note, the term “authorities” here refers to bodies with powers to introduce, amend and enforce regulations, legislation and policy.

For the successful implementation of the actions recommended in this PAP and across the [biosecurity framework](#), stakeholders must work together to engage, support and secure resources where needed.

Examples of relevant stakeholders include:

Authorities

- Government departments, organisations and agencies (e.g., Welsh Government)
- Regulatory bodies (e.g., Natural Resources Wales)
- County councils and local authorities
- National Park Authorities

National stakeholders

- Managing bodies for protected sites (e.g., National Trust)
- Recreational activity governing bodies (e.g., Paddle UK, Canoe Wales, Welsh Sea Rowing Association, Welsh Surfing Federation, Stand Up Paddle Wales)
- Environmental charities and Non-Governmental Organisations (NGOs) (e.g., the Marine Biological Society, Surfers Against Sewage and Wildlife Trusts)
- Major landowners (e.g., the Crown Estate)
- National trade associations (e.g., British Marine)

Local stakeholders

- Local environmental groups

- Recreational activity tour operators and training centres
- Recreational activity event organisers
- Recreational clubs and activity organisations
- Managers/owners of sites where recreational activities occur (e.g., marina managers or local landowners)
- Individual recreational water users

Existing biosecurity for recreational activities

This PAP and [the wider biosecurity framework](#) (within which this PAP sits) are intended to complement and improve any existing biosecurity actions that are being undertaken within the recreational activities sector. This includes existing guidance from governing bodies, like Paddle UK, and the GB Non-Native Species Secretariat. Resources that have been developed for recreational activities can be found in [Useful resources](#).

Club or site-specific biosecurity planning

Club and site-specific biosecurity action planning is an important useful tool to help ensure that a thorough approach to biosecurity is taken. The [framework associated with this PAP](#) allows for biosecurity planning to be scaled as deemed appropriate by stakeholders. Stakeholders, such as tour operators, recreational clubs or site managers (for sites where recreational activities occur, e.g., a marina), could create biosecurity plans that take into account all pathways that are relevant to the club or their site. At whatever scale, plans should include:

- A summary of the site or club background, the relevant activities that are undertaken and staff/club overview (e.g., environmental information, INNS present, site use, club member/site personnel numbers).
- A broad assessment of the INNS pathways that might be present at the site (i.e., identify the pathways and vectors / determine how INNS might be spread to and from the site).
- Appropriate and proportional biosecurity actions to address the risks identified (see [Action scaling: a kayaking club example](#)).
 - If there are multiple pathways at the site, consider what other actions there may be to address these risks. These can be found in the other PAPs (see [Useful resources](#))
- Plan details (e.g., biosecurity manager/responsible staff, review period).

As well as the biosecurity to-do-list trackers that form part of the biosecurity framework, the following resources provide additional guidance for producing a site-specific biosecurity plan:

- [Marine Biosecurity Planning \(2015\)](#)
- [INNS Management Toolkits](#)

Plans should be regularly evaluated to review the progress, successes, failures and modifications of the actions within them. They should then be updated to reflect these outcomes by, perhaps, amending approaches, altering timescales or allocating additional

resources. The plan could also be updated with current information on the distribution of any key INNS or changes to site use.

Check Clean Dry

The [Check, Clean, Dry](#) (CCD) campaign is a national campaign in the UK to improve aquatic biosecurity by outlining three key steps to preventing the spread of INNS (see Figure 4). A key approach to biosecurity is to promote the procedures that ensure that equipment, clothing and any personal protective equipment (PPE) is cleaned of organisms and completely dried out between uses.

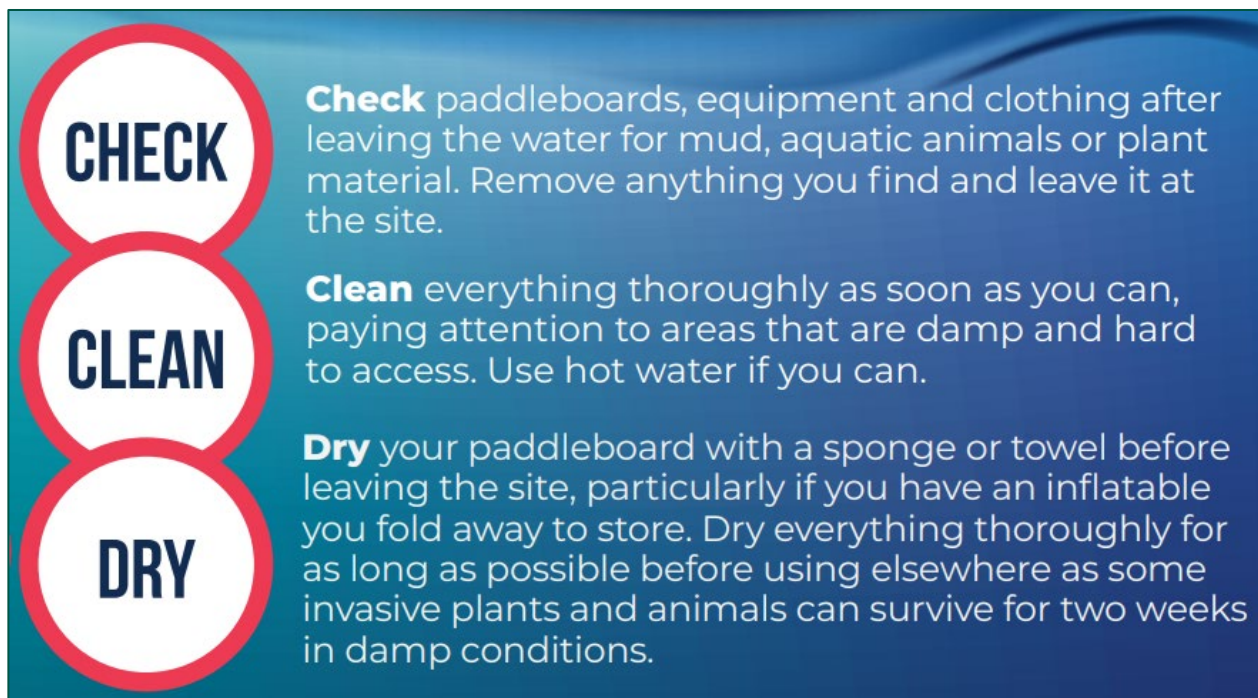


Figure 4. An extract from the Check, Clean, Dry guidance for Stand Up Paddleboarding, ([SUP poster](#)). GB NNSS.

Recommended strategic actions for authorities

Table 3 contains a list of possible strategic actions which could be taken by national authorities. Achievement of these actions support a solid statutory basis for robust management of all marine INNS pathways in Wales, including recreational activity pathways. However, it is acknowledged that any statutory changes require extensive and time-consuming legislative assessments and consultation which is at odds with the urgency required for pathway and INNS management at present. It is therefore recommended that these strategic actions act as long-term goals for authorities and that priority is placed on actions that can be undertaken and achieved on shorter timescales by all stakeholders (see [Recommended actions for stakeholders](#)).

Table 3. Recommended strategic actions for authorities to address the introduction and spread of marine INNS via all pathways in Wales. The ID letters PS (Pathway Strategic) denote that the actions are aimed at addressing the management of pathways, differing from the ID letters SS (Species Strategic) in the Species Action Plans (SAPs) that are aimed at addressing the management of species.

ID	Strategic action	Purpose
PS-1	Develop a national (Welsh) position statement for key pathways in the marine environment	The statement (and its guidance) should: • Set out the position of the Welsh Government on pathway management and lay out a national approach for addressing key marine INNS pathways. • Provide a clear objective for all marine stakeholders, supported through guidance and assistance where available. Top-down direction is a critical need for the facilitation of national, regional and local biosecurity planning. • Make it clear that improved biosecurity is the priority; however, also include goals in relation to pathway risk, surveillance and monitoring, and INNS early detection, rapid response and management. • Aim to clearly state what is expected of all stakeholders and provide realistic, measurable and agreed targets. The position should conceptually align with other GB strategies and existing regulation to ensure a consistent approach to pathway management throughout the British Isles. However, it must be grounded within a realistic Welsh focus, taking current limitations into account. To achieve the best outcomes, stakeholders should be consulted in policymaking, and policymakers should support the integration of industry expertise and experience into marine INNS management strategies.
PS-2	Review existing legislation	A review should be undertaken of current legislation in Wales and the wider UK relating to INNS pathways to identify legislative gaps and highlight opportunities to strengthen INNS and biosecurity legislation. The review should identify primary legislation under which INNS management can be enforced (e.g., Wildlife and Countryside Act, 1981). The outcomes of this review could provide evidence, justification, and legislative support for national position statements or for introducing / amending legislation relating to pathways in Wales.

ID	Strategic action	Purpose
PS-3	Introduce legislation relating to pathways in Wales	The introduction of new legislation (or the amendment of existing legislation) in Wales relating to marine pathways can ensure a consistent and enforceable approach to biosecurity. Authorities should use evidence gathered as part of the review of existing legislation (see PS-2) as justification for new legislation. For example, the adoption of existing international resolutions (e.g., the International Maritime Organisation resolution MEPC.207(62) on biofouling) can facilitate a robust approach to pathway management in line with international standards. Legislation may not be required for, or applicable to all pathways.
PS-4	Review and prioritise resource allocation in support of policy and legislation related to INNS	Enforcement / enactment of existing and new policy and legislation should be considered. Resources, roles and responsibilities should be agreed and assigned to ensure that prioritised policy and legislation is being effectively enacted (e.g., provisions for enforcement officers to carry out inspections). Incentives for following legislation could be outlined in biosecurity-related award schemes or accreditations, which should be investigated, created and/or developed and endorsed by the Welsh Government or Natural Resources Wales. Penalties for offences could include fines or suspension of relevant licences as per The Invasive Alien Species Order 2019 . Importantly, legislative policy needs to be clearly communicated to stakeholders.
PS-5	Identify and prioritise high risk areas/locations for marine INNS introductions and impacts	Pathway and species risk assessments are a valuable tool for identifying and prioritising high-risk locations for marine INNS and more effectively allocating resources. Data gathered from previous reports (e.g., NRW evidence report 459 and NRW evidence report “Marine Protected Areas: Features at risk from marine invasive non-native species” (pending publication) and information from the SAPs and PAPs in the biosecurity framework should be used to inform strategies for species and pathway management and surveillance. It is recognised that data used to inform pathway and species risk assessments is currently limited and further data collection is required.

ID	Strategic action	Purpose
PS-6	Develop a national plan for monitoring marine INNS pathways	A national plan should develop a standardised approach to monitoring marine pathways and implementing monitoring programs in high-risk locations (see PS-5). The procedures within this plan should be applicable and practical at local, regional and national levels with provisions included for necessary resources or support required to undertake actions. The plan could be developed in consultation with stakeholders from all levels. A cost-benefit analysis could also be undertaken to ensure that the implementation of inspections will not damage Welsh businesses.
PS-7	Continue to develop contingency plans for key marine INNS	Contingency plans put forward protocols for situations when a new record of an INNS is made in an area it has not been previously recorded. This can include INNS that are new to Wales and INNS that are found in some regions of Wales but not others. The protocol typically involves contacting relevant authorities and taxonomic experts for positive identification, as well as putting in place rapid actions to contain the spread of the new species. General contingency plans for marine INNS have been developed for England by the GB NNSS and a general INNS contingency plan for Wales is in draft (at time of writing, July 2025).
PS-8	Improve collaboration and links between stakeholders and authorities	Invite stakeholders to participate in existing platforms and/or forums for ongoing communication, collaboration, and knowledge exchange, such as the British Ecological Society Invasion Science Special Interest Group. Platforms like this serve as a hub where researchers, policymakers, government agencies, industry representatives, and wider stakeholders come together to share expertise, data, and resources related to INNS management. Key features should include: 1. Regular meeting and workshops; 2. Agreements for data sharing and data integration; 3. Collaborative research, leveraging the expertise and experience of the industry; 4. Capacity building; and 5. Research and monitoring priorities communicated between stakeholders. Promote the Natural Resources Wales list of high priority evidence needs and research ideas page: Natural Resources Wales / Marine and coastal evidence priorities.

ID	Strategic action	Purpose
PS-9	Improve national data flow	Data flow is fragmented, data administration slow, and existing mechanisms for priority species reports reaching authorities are inconsistent, which may delay management response. Different recording schemes have variable verification and data upload timescales as well as variable data restrictions and some records are lost in the data flow process. Authorities should work with partners including The UK Centre For Ecology & Hydrology, The Marine Biological Association, The National Biodiversity Network and Local Environmental Records Centres to ensure records arrive at the appropriate destination in a timely manner and are accessible to all. This may include continuing work with Defra on their ‘improving marine NIS data access and flow efficiency’ project.

Recommended actions for all stakeholders

The sections below outline seven components of biosecurity focus for the recreational activities pathway within Welsh marine areas. Stakeholder-specific guidance, including example actions for each component, is provided to support the development of tailored actions. Stakeholders are encouraged to define their own biosecurity actions, appropriately scaled and proportional to their activities, using the guidance provided.

The biosecurity components in this plan complement those outlined in the SAPs and other PAPs. They can serve as a foundation for creating a new biosecurity plan or modifying and enhancing existing procedures. For each component, high-level 'priority issues' have been identified through discussions with stakeholders. These priority issues inform the initial context for developing tailored actions.

These components are:

1. [Understanding roles and legal responsibilities](#)
2. [Information and guidance on INNS and biosecurity](#)
3. [Raising awareness](#)
4. [Biosecurity processes and procedures](#)
5. [Biosecurity facilities](#)
6. [Surveillance and reporting](#)
7. [Collaborative working](#)

1. Understanding roles and legal responsibilities

To ensure that all stakeholders are aware of the relevant and current INNS legislation and national policy that relate to recreational activities.

PRIORITY ISSUE: There is a lack of clarity within stakeholder groups (for all pathways) regarding the legal requirements for INNS management. Stakeholders require more guidance on how their activities intersect with INNS legislation, and what is required under current policy (if anything) to achieve compliance (i.e. voluntary vs. mandatory actions).

Responsible stakeholder	Guidance for Development of Actions	Example actions
Authorities	Authorities should produce a policy position or statement (see actions PS-1 to PS-4), relevant to existing or new INNS-focused legislation and regulation. This policy(s) should provide stakeholders with an improved understanding of how INNS legislation or regulation affects them. This needs to be communicated via an appropriate information cascade to include all relevant stakeholders. If legislation or regulation exists, but enforcement policy is undefined, it is recommended that stakeholders are still offered advice on this matter.	- Consult with relevant stakeholders on the implementation and feasibility of INNS focused policy. - Collaborate with the marine and coastal recreational industry to develop appropriate and achievable policy, without undue impact to Welsh blue growth and individual operators. - Ensure consistency with wider legislation and regulation. - Establish a policy(s) for relevant regulation(s) and release a statement to provide stakeholders with a clear definition of what is expected under the legislation.

Responsible stakeholder	Guidance for Development of Actions	Example actions
National & local stakeholders	Official statements (as above) should be summarised and shared between relevant stakeholders, using plain, accessible language. Information could be included in trade association newsletters or governing body communications to relevant stakeholders (e.g., updates from national recreational governing bodies, harbour safety updates, etc.) so that all stakeholders are aware of any legal responsibilities with regards to INNS. In cases where an authority-produced statement is unavailable, national and local stakeholders are encouraged to independently review the relevant regulation and provide advice to their members as appropriate.	• Issue a press-release that summarises current national policy, highlighting the requirements for compliance with the legislation or regulation. • Work collaboratively to review current regulations and produce an accessible guide for members to follow.
Recreational clubs	It is essential to ensure a clear understanding of the Welsh Government/ NRW policy on INNS and the associated legislation. This should be communicated to club members. For example, a short summary of the Wildlife and Countryside Act 1981 could be included in club information or codes of practice: <i>“Don’t release or allow the escape of any species (plant or animal) into the wild that is not ordinarily resident (i.e., a non-native species) or is on the WCA Schedule 9 list.”</i>	• Include an overview of the requirements under legislation and policy in club information guides. • Promote/encourage biosecurity awareness with Check, Clean, Dry protocol and communicate this through appropriate signage and external communications.

2. Information and guidance on INNS and biosecurity

To ensure that information and guidance on INNS and biosecurity within Welsh marine areas are consistent, high-quality and appropriate for recreational activity pathways.

PRIORITY ISSUE 1: Resources for INNS and biosecurity awareness are abundant but can be fragmented, making it difficult for stakeholders to navigate and identify the most relevant and appropriate information, especially without a prior understanding of biosecurity.

PRIORITY ISSUE 2: Targeted, sector-specific (i.e. pathway specific) biosecurity guidance is limited, resulting in stakeholders being unsure of what to do and when to do it.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders	This biosecurity component aims to address information resources on INNS for recreational users, ensuring that these resources are appropriate for the pathway. However, it should be noted that the provision of INNS information resources is expected to overlap significantly across all marine PAPs, SAPs and BAPs. Therefore, it is critical that authorities, as well as local and national stakeholders, take a holistic approach by integrating and co-ordinating their biosecurity activities. By doing so, they can ensure a cohesive and unified effort that builds on and enhances existing measures, maximising the effectiveness of INNS management across all marine pathways and action plans. Targeted guidance is needed to help integrate proportional, beneficial and focused biosecurity actions into existing practices. Engaging stakeholders in consultation during policy-making, co-developing best practice advice, and fostering collaborative efforts to raise INNS awareness in Welsh marine areas are essential steps toward achieving balanced and effective biosecurity improvements.	- Download or request a hard copy of the NRW marine INNS identification guide (see Useful resources). Identification sheets for several marine species can also be found on the GB NNSS website. - Refine guidance to increase relevance for the different recreational users (e.g., SCUBA divers, coasteerers, kayakers etc.) or to the activities at their site. - Advocate biosecurity awareness with Check, Clean, Dry and communicate this protocol through appropriate signage and external communications.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All Stakeholders continued	All stakeholders should ensure that resources are appropriate for recreational users, tailoring specific guides to relevant activities and risk factors. Authorities could consider leading a consultation with other stakeholders on the production/review of a code of practice.	• Produce recreational activity guidance relevant to the activity and risk (e.g., kayak cockpits/hulls can transfer spores and strands of high-risk Devil's tongue weed).
Authorities	To improve INNS biosecurity in Welsh marine areas, authorities should consider creating/aligning a national-level marine INNS and biosecurity awareness raising campaign. This should provide common resources and consistent messaging for all marine stakeholders. Key highlights of the campaign could include: • A centralised location for biosecurity and INNS awareness-raising materials. While there is considerable existing material available for this action, ensuring a common repository and "endorsement" of primary materials will help stakeholders maintain consistency. • A defined list of priority INNS of concern. • Publication of INNS alerts when a population is newly established or spreading. • Clear points of contact for stakeholders seeking support and advice.	• Print and disseminate INNS ID guides to as many relevant stakeholders as possible (e.g., clubs and marinas). Update guides regularly to include newly introduced and horizon INNS. • Send out automated alerts to recreational users when an INNS population is newly established or is spreading. • Produce pathway-specific training resources which can be provided to other stakeholders. • Consult with stakeholders on the update / production / endorsement of best practice codes for INNS, and biosecurity related to recreational activities. • Create an accessible central website to host biosecurity resources and information to make navigation to the most relevant information easier.

Responsible stakeholder	Guidance for Development of Actions	Example actions
National & Local stakeholders	In the absence/interim of the action above, national stakeholders should consider the INNS information and decide whether it is suitable for / relevant to their operating practices. Relevant information that could be integrated into activity-specific material could include: • Key INNS to look out for • Impacts of INNS • Biosecurity best-practice Material could include self-produced resources; however, a lower effort option could review and compile the existing material already in existence (see Useful resources). Sources of existing, high-quality INNS biosecurity information include the GB NNSS, the RYA and Paddle UK (see Useful resources for links). Where possible, information material should prioritise increasing knowledge of relevant INNS (to pathway or region) and key biosecurity messages.	• Review existing biosecurity information and tailor to recreational activity pathways. • Compile a database of resources relevant to the recreational pathway.
Club Owners	Club owners are well placed to advocate the Check, Clean, Dry principles and provide INNS guidance to recreational club users with free awareness raising resources such as posters, signs leaflets and other communications. If possible, install cleaning facilities for water users by access points to make it easy to clean equipment.	• Install awareness raising material relevant to the recreational activity within prominent places in and around club houses and visitor centres. • Review the Event Biosecurity Support Pack and disseminate to appropriate staff members. • Consider installing cleaning facilities appropriate to the pathway risk (e.g., type of wash down station required for the activity). • Display boat cleaning guidance on clubhouse noticeboards and at club owned or managed entry points.

3. Raising awareness

To facilitate and encourage the active sharing of information and guidance, relevant to recreational activity pathways, among all stakeholders within Welsh marine areas.

PRIORITY ISSUE: Some stakeholders operating within Welsh marine areas are not aware of INNS and their impacts, or what biosecurity is. All stakeholders would benefit from more exposure to INNS awareness raising activities. All stakeholders could also facilitate the spread of information and awareness raising about INNS and biosecurity.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders	This biosecurity component aims to increase the awareness of INNS biosecurity with recreational users. The materials produced under component 2 are intended to provide consistent and appropriate biosecurity information for recreational activity pathways. However, it should be noted that raising awareness is expected to overlap significantly across all marine PAPs, SAPs and BAPs. Therefore, it is critical that all stakeholders (including authorities) integrate/coordinate their activities. By doing so, they can ensure a cohesive and unified effort that maximises the effectiveness (and reach) of INNS information-sharing. All stakeholders can have a role in raising awareness of INNS and biosecurity by promoting and disseminating existing information regarding INNS and key biosecurity messages. This could be achieved both digitally (e.g., through social media and relevant websites) and in print (e.g., in harbour offices, newsletters and magazines). Information (e.g., as leaflets) could also be made available to customers at point of sale (e.g., watersports equipment shops). There is no requirement for burdensome changes to current activities, but consideration of INNS within outwards facing communications or marketing can benefit the sustainability of all activities within Welsh marine areas.	- Engage in Invasive Species Week. Use approved or provided biosecurity resources in communications and training. A marine INNS workshop kit comprised of preserved specimens and information sheets can be borrowed from Amgueddfa Cymru (see Useful resources). - Become familiar with existing and newly developed recreational activity-focused guidance. - Share information resources with other stakeholders as widely as possible. - Provide ad hoc information/facts on INNS to staff, colleagues, members of the public, customers etc. - Sign up to an environmental pledge.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders continued.	The Useful resources within this PAP include links to existing high-quality information sources that can be used as the basis for awareness raising from, for example, the GB NNSS, national governing bodies and the Wales Biodiversity Partnership. However, it is hoped that as national awareness increases, recreational users will expand their knowledge and activities in this area, eventually producing their own tailored resources (where they have not already done so), further amplifying awareness and engagement. Biosecurity signage is known to be successful in raising awareness, especially among the wider public or stakeholders who are not affiliated with clubs or who may not be reached through typical communications (e.g., social media or newsletters). Where appropriate (e.g., at popular slipways or entry points) signage can be installed in visible areas. Information contained within signage can range from general actions and national guidance (e.g., the GB NNSS Check, Clean, Dry campaign), to site specific biosecurity protocols, depending on the intended audience (see Useful resources for links to signage resources). Landowner permission should be considered (if applicable or required). Equipment cleaning guidance (e.g., the GB NNSS Check, Clean, Dry campaign) should be shared by all relevant organisations and staff. Guidance should include information on removing standing / entrained water from water-retaining features and thorough drying. Existing guidance on equipment cleaning is available from sources like GB NNSS (see Useful resources). Equipment-specific cleaning guidance should also be provided to users at the point of sale or rental. Guidance at sites (for site workers/operators) should include information for how to check and clean submerged equipment/infrastructure (e.g., trestles, pontoons, buoys etc.).	• Provide or undertake INNS workshops and training. A marine INNS workshop kit comprised of preserved specimens and information sheets can be borrowed from Amgueddfa Cymru (see Useful resources). • Install (club owners) biosecurity signage in visible areas and ensure users follow this protocol. • Provide cleaning guidance for equipment An example of an existing environmental pledge is the Green Blue pledge (although this is for recreational boating). • Review the Event Biosecurity Support Pack and disseminate to appropriate staff members.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders continued.	Promoting pledges for environmental awareness can facilitate commitment from recreational clubs and their members to environmental good practice. However, biosecurity aspects in existing pledges are currently limited. Activity providers / guides or club members could be given INNS and biosecurity best-practice information as part of club inductions or regular training. Workshops and educational events could be organised through local groups, covering introductions to INNS, equipment biosecurity guidance and best-practice for equipment transport. Material could be developed in collaboration with equipment manufacturers. Training and educational resources are available on the GB NNSS website (GB NNSS Training resources). Recreational events and competitions can be used as an opportunity to undertake awareness-raising actions, spreading INNS information to a wider audience of participants and members of the public. During high-risk events (e.g., competitions supporting international participants), a short talk or briefing before each event should be given to explain the importance of biosecurity as well as to remind participants to engage with the site biosecurity. Staff or volunteers could be in attendance to raise awareness of INNS and assist with any biosecurity actions required. Event organisers could link with local NGOs (e.g., Wildlife Trusts) to set up INNS information stands and provide attendees with relevant resources (e.g., biosecurity best-practice guidance and INNS guides).	See actions above.

Responsible stakeholder	Guidance for Development of Actions	Example actions
Authorities	Authorities should ideally be a primary source for INNS and biosecurity information in Wales. Information on available funding and resources for biosecurity should be shared with stakeholders. Messaging should ensure that stakeholders are aware of critical information, such as updates to policies or species records/alerts.	• Issue regular updates/social media posts offering INNS and biosecurity advice. • Continue to engage with stakeholders, with a particular focus on improving communication links with recreational users. • Include links or QR codes to online resources (including ID guides) with communications. Where appropriate, stock/disseminate hard copies of resources.
National stakeholders	To ensure INNS and best-practice information is provided to users undertaking courses in recreational activities, national stakeholders (e.g., national recreational governing bodies) should consider adding information on INNS and biosecurity best-practice to training course syllabuses for recreational activities (e.g., Royal Yachting Association Windsurfing Courses, SUP Wales courses). This information could also be included in instructor courses with guidance on how to communicate key messages to their students.	• Include INNS and biosecurity information in training courses.

4. Biosecurity processes and procedures

To improve INNS biosecurity procedures being undertaken by stakeholders relevant to the recreational activities pathway, ensuring consistency and efficacy.

PRIORITY ISSUE: Although many recreational facility owners have varying levels of INNS biosecurity measures in place, continuous improvement and the inclusion of best practice in standard procedures should also be considered.

Other stakeholders (such as NRW, local authorities (LAs), and county council (CC) field or operational teams) should also consider reviewing and updating their own biosecurity procedures on a regular basis.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders	This biosecurity component is primarily intended to encourage recreational users operating in Wales to enhance biosecurity procedures for INNS. However, this guidance is also relevant to other stakeholders interacting with the marine and coastal environment. At the most basic, INNS biosecurity can be achieved simply through ‘Check Clean Dry’ procedures (see GB NNSS information). At a high level, stakeholders are encouraged to review and update their protocols and practical procedures to ensure that operational biosecurity comprehensively addresses INNS and is consistently applied. Continuous improvement should also be a priority. <u>Appoint Biosecurity Managers or Champions</u> For operations of varying scales, appointing a biosecurity manager or champion can be beneficial.	• Authorities could provide support to national and local stakeholders for the implementation of improved biosecurity at sites where recreational activities are a priority pathway. • Consult and collaborate with the industry to ensure best practice is encouraged and enabled. The onus should be placed on pragmatic changes to procedures which do not negatively impact Welsh blue growth or individual operators. • Appoint a biosecurity manager or champion to act as a central point of contact for INNS related queries. • Implement enhanced biosecurity procedures for events and competitions.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders continued	This individual, equipped with relevant knowledge and a defined responsibility for biosecurity, can oversee and ensure that biosecurity actions are conducted appropriately and effectively for their site, club, business, or organisation. For example, the biosecurity manager/champion could help to ensure that equipment cleaning is done properly and that any available biosecurity facilities are used appropriately. The biosecurity manager could be a staff or club member who is familiar with biosecurity best-practice and/or the site. They could be trained in the role and provided with the tools to train other club members or, for businesses, other staff. <u>Biosecurity clauses</u> Biosecurity clauses could be included in club memberships or codes of practice to encourage recreational users in clubs to undertake biosecurity actions. Biosecurity best-practice should be outlined and reiterated in club information. Examples could include the following: • Always clean kit with freshwater and leave it to dry (in designated dry rooms, if available) after use. • Record and report INNS (if unsure, record it and ask the biosecurity manager). • If fishing from your watercraft, use only dead or native bait. A biosecurity clause example has been developed for recreational boating in the GB Recreational Boating PAP, which could be used as a basis for a clause that is more relevant to other recreational activities. The biosecurity clause could also link with any club-wide requirements as part of environmental pledges.	• Implement a biosecurity clause and best-practice principles in Codes of Conduct and Terms and Conditions (e.g., Our Club expects members to follow the principles of Check Clean Dry, etc). • Record and Report suspected INNS sightings on iRecord (see surveillance and reporting for more information). • Increase biosecurity measures for events and competitions (e.g., additional staff and/or cleaning facilities). • Disseminate biosecurity information/requirements as part of event entry conditions within advanced communications.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders continued	<u>Biosecurity for events</u> Implement enhanced biosecurity protocols for events and competitions to account for the increased risk associated with events. If biosecurity measures are already in place for a recreational club or at a key activity site, there should be a general increase in these measures (e.g., increase the number of responsible biosecurity personnel present) at all events that take place where the number of visitors is greater than non-event days. The biosecurity risk of the event should be assessed ahead of time and enhanced biosecurity actions developed. If applicable, increase the availability and use of site biosecurity facilities and equipment. Additionally, biosecurity should be included in event entry conditions / prerequisites for competitions. Biosecurity information and requirements should be sent out with any advanced communication, such as event registration. Disqualification from the event (if applicable and possible) should be imposed if biosecurity requirements are intentionally disregarded	See actions above.
Authorities	Some marine licensed activities require the submission of a marine INNS biosecurity risk assessment and Management Plan (see marine licencing guidance). Strengthening these requirements could involve offering additional guidance to applicants who are updating or expanding sites to include the addition (or improvement) of biosecurity facilities that can be used by recreational users (see Component 5).	Strengthen the biosecurity requirements within marine licensing and planning.

5. Biosecurity facilities

The availability of a biosecurity facility (or the supply of appropriate equipment) can help promote effective cleaning, reducing the risk of INNS being transferred to or from a location.

PRIORITY ISSUE: Washdown facilities are critical for enabling the physical cleaning of equipment and PPE. Enhancing the availability and accessibility of these facilities can substantially improve biosecurity effectiveness.

To note: A review of available washdown facilities within Welsh marine areas was not included in the scope of the biosecurity framework, leaving the overall status of such facilities unknown.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders	Stakeholders who manage or own assets (e.g., marina operators, clubs with clubhouses, or local authority-managed assets where recreational activities occur etc.) should consider the installation of biosecurity facilities. It is acknowledged that biosecurity facilities may be multi-purpose at many locations and that facilities do not need to be overly complicated or technical (e.g., using hot water over cold water, or freshwater over seawater). When planning installations, the following requirements, among other aspects like space and financial resources, should be considered: • The scale of the facility in proportion to the risk posed by the activity. • Infrastructure required for the collection and disposal of wastewater and waste material in a biosecure way to prevent INNS re-entering the environment (e.g., water tanks and biological waste bins). • Supply of necessary resources, like water and electricity.	• Install a washdown facility at a site (e.g., freshwater) and, if possible, a hot water supply at a marina or clubhouse. • Ensure that waste is controlled in a way that minimises the risk to wider habitats. • Make use of existing washdown facilities (following improved protocols that may be outlined in Component 4). • Provide cleaning guidance for equipment.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders continued	Some facilities that may be relevant to a range of recreational activities include: • Supply of a freshwater hose and brushes to clean equipment. • Dip tanks (with appropriate disinfectants) to clean equipment. • Provision of areas to leave craft, equipment and clothing to dry thoroughly (e.g., dry rooms). • Supply of power washers and steam washers for use on equipment. • Fabrication of a designated cleaning area to capture all waste material and waste water. Guidance on the use of equipment at the facilities should be prominently displayed to ensure the correct application of the biosecurity measures. It should be reiterated that biosecurity facilities do not need to be complex and could just represent a minor upgrade to existing facilities. Funding sources may be available to facilitate the purchase, installation and operation of biosecurity facilities. Additional note: It is difficult to provide a one-size-fits-all recommendation for biosecurity facilities without understanding the nuances of a particular site. The GBNNSS provides good background information and a biosecurity facility support tool, which offers a useful overview of facilities.	See actions above.

6. Monitoring and reporting

To establish a robust understanding of what INNS are present in Welsh marine areas and facilitate the early detection of introductions and spread.

To ensure that INNS sightings are reported to an appropriate platform and records are included in national databases.

To ensure that up to date species distribution data is available to facilitate rapid responses to new INNS introductions or spread events.

PRIORITY ISSUE: INNS monitoring and surveillance are insufficient in certain regions, with stakeholders often unaware of what to report or where to report sightings. Additionally, data flow is fragmented, data administration slow, and existing mechanisms for priority species reports reaching authorities are inconsistent, which may delay management response.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders	This focus area aims to increase the INNS monitoring and surveillance effort by recreational stakeholders. Stakeholders should take an integrated approach to monitoring (see action PS-6). By doing so, they can ensure a cohesive and unified effort that builds on and enhances existing programmes, maximising the effectiveness of monitoring across all marine pathways and action plans. Simple training and guidance should be provided to staff or club members, focusing on recognising priority INNS, and encouraging the reporting of “unusual” growth, species or fouling. This ad hoc monitoring can be done when visiting activity sites, especially as users might already have a good knowledge of the "normal" plants and animals at their regular site. Reporting unexpected fouling or growth noticed during visits can provide valuable information and trigger a quick response.	- Promote and encourage the use of reporting / recording platforms. - Ensure that appropriate INNS training opportunities and educational resources are available. Borrow the marine INNS workshop kit to run training in identification. The kit is comprised of preserved specimens and information sheets and can be borrowed from Amgueddfa Cymru (see Useful resources). - Check biosecurity communications for opportunities to coordinate monitoring and collaborate.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders continued	Confirmed or suspected INNS should be reported. This will help to notify the authorities and stakeholders, which could lead to measures being implemented to reduce their spread. Information on how and where to report sightings should be included in all biosecurity materials and resources. NRW recommend that INNS sightings should be reported to: • iRecord online [www.irecord.org.uk/]; and • iRecord App [available on Google Play].  Potential INNS sightings can also be reported directly to NRW at: invasive.non.native@naturalresourceswales.gov.uk Reporters should take photos and make a note of the sighting location (ideally GPS coordinates). If possible, they should take notes about the surroundings (e.g., substrate type, other species in the area, tidal height). The reporting platform should be mentioned / linked on club websites materials, in educational material and in social media (see Component 2).	• Be vigilant during activities for unusual species or growth (checking the site and equipment). • Consider joining proactive monitoring efforts through existing citizen science programmes (e.g., Seasearch or Shoresearch). • Promote opportunities for integrated or collaborative monitoring efforts. • Report new/unusual species or growth/fouling to iRecord or NRW.

Responsible stakeholder	Guidance for Development of Actions	Example actions
Site managers / owners	Stakeholders who own or manage assets (e.g., marina operators, local authority managed assets where recreational activities occur etc.) should consider implementing regular monitoring for INNS. Monitoring can either be undertaken and reported by stakeholders individually or could be through a collaborative effort with other stakeholders, for example authorities or those in academia. It is best to use standard procedures for monitoring high-risk INNS. Procedures may be directed from a new national approach or from existing monitoring. The best approach to monitoring for current and horizon INNS is to employ multiple methods in tandem to achieve maximum coverage of habitat and species detection. Some of the monitoring methods that could be employed include: • Rapid Assessment Surveys (optimal for detecting fouling organisms but not for planktonic or soft bottom habitat species). • Environmental DNA (eDNA) (used to ascertain which species are present at a site using the genetic material that can be obtained from an environmental sample such as water). • Settlement plates/panels (panels placed in key areas for a pre-determined amount of time and checked periodically for marine growth or analysed in a lab). Site operators should also remain vigilant for unusual growth, species or fouling, and be encouraged to report concerns. Stakeholders can contact NRW for guidance on monitoring INNS at their site at: invasive.non.native@naturalresourceswales.gov.uk	• Implement a more formalised monitoring / surveillance program (e.g., install a settlement panel). • Brief employees on the importance of INNS monitoring. • Be vigilant for unusual growth, species of fouling. • Report new/unusual species or growth/fouling to iRecord or NRW.

Responsible stakeholder	Guidance for Development of Actions	Example actions
Authorities	It has been recognised that the reporting of INNS sightings is not as efficient as it could be. Authorities should therefore engage with local groups, citizen science surveying groups (e.g., Seasearch and Shoresearch), Local Environmental Records Centres (LERCs) and non-governmental organisations (NGOs) (e.g., Wildlife Trusts) to set up or improve data-sharing links and ensure that sightings of high-risk species or new incursions of horizon species are passed to the relevant authority and acted on in a timely manner. This could involve establishing a list of National alert species and disseminating this list to all relevant parties (e.g., national governing bodies and NGOs). A critical analysis of the dataflow for national INNS records should be considered, with the primary aim to improve the consistency, accuracy and timeliness of reports.	• Undertake a critical analysis of the data-flow for national INNS reports. • Ensure that priority INNS reports are flagged with relevant stakeholders (e.g. iRecord species notifications).

7. Collaborative working

To improve the collaboration between all stakeholders within Welsh marine areas where recreational activities take place.

To foster open communication, build trust, and align on shared goals to drive effective outcomes.

To cooperate in decision-making, share resources, and leverage the experience of all stakeholders to address challenges and achieve success together.

PRIORITY ISSUE 1: Stakeholders remain uncertain about advancing biosecurity implementation without clear guidance and support from regulators and authorities. Top-down leadership is crucial, complemented by inter-stakeholder collaboration. Mechanisms for sharing information, practical advice, and bespoke guidance tailored to both national and local stakeholder needs must be developed and prioritised.

PRIORITY ISSUE 2: Opportunities for coordinated and collaborative biosecurity can be missed due to limitations in communication, leading to duplicated effort and gaps.

Responsible stakeholder	Guidance for Development of Actions	Example actions
All stakeholders	All stakeholders should work to strengthen communication and collaboration mechanisms, ensuring that practical improvements and best practices are effectively shared and considered within national or regional biosecurity implementation. Open communication channels will facilitate the flow of information from authorities to stakeholders within key sectors (i.e., those whose operations may act as pathways of introduction and spread). Open channels will also facilitate the sharing of information from stakeholders to authorities. For example, carpet sea squirt sightings in new areas.	• Engage in the biosecurity framework for Welsh marine areas in some capacity. • Consider mechanisms for collaboration and integration with other stakeholders and projects.

Responsible stakeholder	Guidance for Development of Actions	Example actions
Authorities	Authorities could consider taking a leadership/coordinating role in this process by setting clear frameworks, facilitating dialogue, and ensuring that all voices are heard. Impartial guidance is critical in driving coordinated efforts, updates to national policy, maintaining transparency, and promoting a proportional approach. Authorities should ensure close working and collaboration with relevant authorities (and other stakeholders) in England (e.g., the Environment Agency) and Europe.	• Ongoing stakeholder engagement to keep INNS at the forefront of stakeholders' activities and awareness. • Establish/task an existing working group with coordinating collaborative working. • Engage and coordinate with stakeholders to monitor progress and assess future support needs.

Action scaling: a kayaking club example

The following section provides examples of how the biosecurity components and actions listed above (in “Recommended actions for all stakeholders”) could be scaled and implemented by a kayaking club within a club-specific biosecurity plan. The actions should be tailored to the site and the relevant stakeholders.

Component	Example approach for a kayaking club
1. Understanding roles and legal responsibilities	Add a summary of INNS legislation to the club membership information.
2. Information and guidance on INNS and biosecurity	Make sure to regularly check Paddle UK & British Canoeing for updates to biosecurity information/guidance and training courses.
3. Raising awareness	Add in a link to biosecurity information on the GB NNSS website in club-member update emails. Share social media posts about INNS on club pages using information from the GB NNSS. Obtain hard copies of INNS ID guides for the club. Include links to the online INNS ID guides in club emails and on the club website. Put up identification images of key INNS at the club house with a QR code to the iRecord web browser. Install Check Clean Dry signs at equipment stores and add equipment cleaning guidance and links to the Check Clean Dry campaign to the club website.
4. Biosecurity processes and procedures	Include site-specific biosecurity policies in membership conditions, news updates, event booking confirmation emails and T&Cs of mooring. Include expected biosecurity behaviours in the club rules. Appoint a biosecurity manager to coordinate the implementation of biosecurity by club members. Send out biosecurity information in advance of all club-organised events (e.g., at registration). Provide a briefing for club members (and all other participants) before an event to raise awareness of biosecurity.
5. Biosecurity facilities	Make a hose available in a hard standing area with a drain where members can rinse equipment. Increase the availability of the cleaning facilities during club-managed events and ensure that the biosecurity manager has adequate assistance to coordinate biosecurity actions.
6. Monitoring and reporting	Encourage club members to join a citizen science survey group (e.g., Shoresearch). Encourage club members to download the iRecord app onto their phones. Upload records of INNS in a timely fashion.

Component	Example approach for a kayaking club
7. Collaborative working	Share information with other recreational users, attend relevant workshops / events and provide feedback to authorities.

Useful resources

- [NBN Atlas](#)
- [GB NNSS resources:](#)
 - [General Check Clean Dry guidance](#)
 - [Canoe and paddle users](#)
 - [Clubs and managers of waterbodies](#)
 - [Guidance for events](#)
 - [GB NNSS marine biosecurity information page](#)
 - [GB NNSS Recreational Boating PAP](#)
 - [Guidance for biosecurity planning](#)
 - [E-learning portal](#)
- [Ecostructure Project e-learning tool](#)
- [Wales Biodiversity Partnership INNS Group](#)
- [British Canoeing guide for Biosecurity at paddling events](#)
- [The Green Blue video guides on Check Clean Dry](#)
- [Natural Resources Wales evidence report on the impacts of marine INNS on MPA features](#)
- [Natural Resources Wales evidence report on marine INNS pathways in Wales](#)
- [Welsh marine INNS priority list](#)
- [Natural Resources Wales marine INNS guide in Welsh](#)
- [Natural Resources Wales marine INNS guide in English](#)
- [Marine Biological Association INNS ID guide](#)

- **Welsh marine INNS workshop kit:** May be borrowed by anyone who is running a supervised workshop for adults. It includes specimens, images, distribution maps and species information. For more information or to borrow the kit, contact: anna.holmes@museumwales.ac.uk.
- **Informative videos:**
 - [Natural Resources Wales - Marine invasive non-native species in Welsh waters](#)
 - [Cyfoeth Naturiol Cymru - Rhywogaethau estron goresgynol yn nyfroedd Cymru](#)
 - [Invasive species film by the Rapid LIFE Project](#)
- **Full reference to the 2023 report by Eschen:**
 - Eschen, R., Kadzamira, M., Stutz, S., Ogunmodede, A., Djeddour, D., Shaw, R., Pratt, C., Varia, S., Constantine, K. and Williams, F., 2023. An updated assessment of the direct costs of invasive non-native species to the United Kingdom. *Biological Invasions*, **25**, 3265-3276
- **Links to other Pathway Action Plans (PAPs) and Species Action Plans (SAPs):**

Links to the action plans listed below can be found on the [Wild Seas Wales website](#).

- American slipper limpet, *Crepidula fornicata* SAP
- Chinese mitten crab, *Eriocheir sinensis* SAP
- Carpet sea squirt, *Didemnum vexillum* SAP
- Trumpet tubeworm, *Ficopomatus enigmaticus* SAP
- American oyster drill, *Urosalpinx cinerea*, & Japanese oyster drill, *Ocenebrellus inornatus* SAP
- Recreational Boating (large boats) PAP
- Recreational Boating (small boats) PAP
- Commercial Shipping PAP
- Aquaculture PAP
- Shore-based Fishing PAP
- Boat-based Fishing PAP