MARINE BIOSECURITY PLANNING

GUIDANCE FOR PRODUCING SITE AND OPERATION-BASED PLANS FOR PREVENTING THE INTRODUCTION AND SPREAD OF INVASIVE NON-NATIVE SPECIES IN ENGLAND AND WALES.

November 2015

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England and Wales version edited by Natural England and Natural Resources Wales

Cyfoeth Naturiol Cymru Natural Resources Wales

Department for Environment Food & Rural Affairs

Llywodraeth Cymru Welsh Government

Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

Firth of Clyde FORUM

Contents

Note: This Marine Biosecurity Planning Guidance was originally written as a report to the Firth of Clyde Forum and Scottish Natural Heritage (SNH) as part of the Marine Pathways Project http://www.nonnativespecies.org/index.cfm?sectionid=105. This guidance has been published by SNH and can be found here: http://www.snh.gov.uk/policy-and-guidance/guidance-documents/document/?category_code=Guidance&topic_id=1628

As the guidance was well received in Scotland, it was decided that a version for England and Wales would be useful. The aim of the editors has been to highlight the wider applicability of this guidance to other sectors as well as making the legislation and case studies more relevant to English and Welsh users. The editors have also responded to feedback from industry representatives to simplify the content and reduce the length whilst maintaining the core messages of the original document.

SUGGESTED CITATION: "Cook, E.J., Macleod, A. Payne, R.D., and Brown, S. (2014) edited by Natural England and Natural Resources Wales (2015). *Marine Biosecurity Planning – Guidance for producing site and operation-based plans for preventing the introduction and spread of non-native species in England and Wales*."

PLEASE NOTE: Further background information on this guidance document can be found in the report entitled "Cook, E.J., Payne, R.D. and Macleod, A. (2014). *Marine Biosecurity Planning – Identification of best practice: A Literature Review*. Report by SRSL Ltd. in conjunction with Robin Payne to the Firth of Clyde Forum and Scottish Natural Heritage Commissioned Report No. 748 - 45 pp."

FOREWORD

Invasive non-native species (INNS) - also known as alien, non-indigenous or exotic - are species or subspecies that occur outside of their natural range and are introduced into new waters by human action.

There are approximately 2000 non-native species in Great Britain, and about 300 of these are invasive. While the majority of INNS pose little or no risk, some do and can cause significant impacts to our native biodiversity through competition and disease and to our economy, as they are often costly to control or eradicate.

We are committed to tackling invasive species in England and Wales and working with all sea users to raise awareness of these species. By working together and being vigilant we can tackle any new arrivals at an early stage, thereby preventing their establishment and reducing any likely impacts.

The production and implementation of biosecurity plans for specific operations or events is considered a matter of good practice. Plans can make a positive contribution towards controlling the introduction and spread of INNS in our waters.

RHAGAIR

Rhywogaethau neu isrywogaethau sydd i'w cael y tu hwnt i'w cynefin naturiol ac a gyflwynir i ddyfroedd newydd yn sgil gweithredoedd pobl yw rhywogaethau estron goresgynnol – y'u gelwir hefyd yn rhywogaethau anfrodorol neu egsotig.

Ceir oddeutu 2000 o rywogaethau estron ym Mhrydain Fawr, ac mae rhyw 300 o'r rhain yn rhywogaethau estron. Tra bod y rhan fwyaf o rywogaethau estron goresgynnol yn gwbl, neu'n weddol, ddiniwed, mae rhai yn cael effaith sylweddol ar ein bioamrywiaeth frodorol yn sgil cystadleuaeth a chlefydau, a hefyd ar ein heconomi gan fod y dasg o'u rheoli neu eu difa yn ddrud yn aml.

Rydym wedi ymrwymo i ymdrin â rhywogaethau goresgynnol yng Nghymru a Lloegr ac rydym yn gweithio gyda phawb sy'n defnyddio'r môr er mwyn codi ymwybyddiaeth ynghylch y rhywogaethau hyn. Trwy weithio gyda'n gilydd a thrwy fod yn wyliadwrus, gallwn ymdrin â rhywogaethau goresgynnol newydd yn ddi-oed, a thrwy hynny eu rhwystro rhag ymsefydlu, a lleihau unrhyw effeithiau tebygol.

Ystyrir bod llunio a gweithredu cynlluniau bioddiogelwch sy'n ymwneud â digwyddiadau neu weithrediadau penodol yn arfer da. Gall cynlluniau gyfrannu mewn modd cadarnhaol at reoli cyflwyniad ac ymlediad rhywogaethau estron goresgynnol yn ein dyfroedd.

SECTION 1 - INTRODUCTION

Aim

This guidance has been produced in line with the ambitions of the GB Non-Native Species Strategy which seeks to promote:

- widespread awareness and understanding of the risks and adverse impacts associated with invasive non-native species, and greater vigilance against these;
- a stronger sense of shared responsibility across government, key stakeholder organisations, managers and the general public for actions and behaviours that will reduce the threats posed by invasive non-native species or the impacts they cause.

Current legislation in England and Wales does not provide for biosecurity plans to be in place unless it is a requirement of a licence condition (in which case it would be a legal requirement). This document is therefore intended to provide best practice guidance on developing biosecurity plans.

Scope

This document provides guidance to a wide range of marine users such as the owners, operators and users of harbours, visitor moorings, mooring associations, boatyards, marinas, ports and slipways when developing a site-based biosecurity plan for INNS. The guidance also covers the development of a biosecurity plan for a time-limited operation in the marine environment, such as a construction project or a major recreation event.

Shellfish and finfish farms have to develop *Biosecurity Measures Plans* to cover disease risk as a condition of their licence. This guide can also be used to expand these biosecurity measures plans to address INNS issues.

Most site biosecurity plans will cover recreational and commercial users of a facility, as well as the role of the site operator. However, it is recognised that **n*ot all activities can be controlled by the site operator***. The role of this guidance document is therefore to help the site operator encourage, promote and facilitate good practice, by both staff and users of the facility or event.

You can find a template for completing a simple biosecurity plan in section 6. Sections 3, 4 and 5 explain how to complete the boxes in the template.

What is biosecurity?

Biosecurity, in relation to INNS, is about having procedures or measures in place to reduce the risk of introducing or spreading INNS (and other harmful organisms such as diseases) in the wild.

> A simple definition of biosecurity in the context of this guide is
>
> ***'taking action in order to minimise the introduction, spread and establishment of invasive non-native species'***.

Movement of vessels, equipment and/or stock can cause both the introduction of a new INNS and the spread of an INNS already established at a site to new locations.

In the marine environment, the complete eradication of INNS is rarely possible or affordable and control is usually only effective on a local scale. A precautionary approach, which seeks to reduce the likelihood of introducing an INNS in the first place, is more suitable to this environment.

Biosecurity measures, therefore, typically focus on minimising the introduction and immediate spread, i.e., "prevention" and do not cover the long-term control and management of INNS where they are well established and widespread.

Why does marine biosecurity matter?

We all rely on the health of our marine environment to prosper. Once INNS become established they can threaten the diversity of life in our seas and coasts, as well as impacting on our livelihoods and our sport, leisure and enjoyment of the marine environment.

IMPACTS OF INNS IN MARINAS AND PORTS

In marinas, INNS can cause increased biofouling on hard structures such as pilings, moorings, ropes, chains and boat hulls.

Problem species may include a marine tube worm called *Ficopomatus enigmaticus*. This species is known to colonise hard structures such as buoys, tyres, fenders and any plastic or smooth surfaces in marinas where there is an inflow of freshwater. Due to its calcareous nature, the growths can scratch boat hulls and foul/clog intakes and moving parts. It is also difficult to remove as it is sharp and can easily cut you.

Photo: *Ficopomatus enigmaticus* Caernarfon Victoria Dock Marina in North Wales © J.Bishop MBA

There has been a dramatic increase in the spread of INNS around the world over the last few decades. It has been estimated that the direct cost of INNS to marine industries in Great Britain is approximately **£40 million per year**[1] . These marine industries include aquaculture, shipping, recreational boating, fisheries and power generation.

There are a growing number of INNS that have been identified in British and Irish waters (including Republic of Ireland and Northern Ireland). Their arrival is believed to be principally due to shipping, including ballast waters and sediments, fouling of hulls and other associated hard structures, and imported consignments of cultured species. Most marine INNS in Britain originate from parts of the world with a similar latitude to ourselves (e.g., North Pacific, North-west Atlantic).

For further information on INNS :

- GB Non-Native Species Secretariat
- The GB Non-Native Species Strategy- https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/455526/gb-non-native-species-strategy-pb14324.pdf

[1] Report for Defra 'The Economic Cost of Invasive Non-Native Species on Great Britain', Williams et al., 2010 www.nonnativespecies.org/downloadDocument.cfm?id=487

SECTION 2 - WHY DOES MY SITE, OPERATION OR EVENT NEED A MARINE BIOSECURITY PLAN?

Damage to the marine environment can lead to financial losses to marine industries such as additional costs for removing biofouling on structures or damage to farmed shellfish and reduce the yield. Effective biosecurity planning can help reduce these impacts. There are three key reasons for preparing a biosecurity plan:

a) We all share a concern for the environment

The value of a healthy marine environment has been widely accepted and understood for some time. What is changing is that we are becoming increasingly aware that the biodiversity of our seas provides us with a wide range of benefits, often called 'ecosystem services' for example provision of food and energy, on which our lives and livelihoods depend. Invasive non-native species can threaten those marine ecosystems services.

b) Marine INNS can affect your business

Having a biosecurity plan in place to minimise the introduction or spread of INNS to your facility or operation can help you avoid potential cleaning or removal costs if a species does cause an impact e.g. additional biofouling. It also shows your business' green credentials and how it is responding responsibly to a serious environmental threat by following best practice. Eradication or control is often not cost effective in the marine environment.

CARPET SEA SQUIRT, *DIDEMNUM VEXILLUM* ERADICATION IN HOLYHEAD MARINA, NORTH WALES

Photo: The carpet Sea Squirt (front) and native sponge (back) © C. Beveridge, SAMS.

The carpet sea squirt *Didemnum vexillum* was first recorded in the UK in north Wales and Plymouth, in 2008. Surveys in north Wales determined it was confined to the marina structures and was nowhere else in Wales. Eradication started at this site in 2009, using isolation and stagnation methods with a chemical accelerant to speed up the process. Further monitoring, eradication and control is still being undertaken and this continued intervention has been successful in containing this species at a low level within the marina. The total cost of this has so far been approximately £800,000. Although numbers have been reduced, it has taken a significant amount of time and resource and highlights the difficulty of control and eradication in the marine environment once a species has been introduced.

c) It keeps you compliant with relevant legislation and international commitments.

The **Marine Strategy Framework Directive** requires Member States to put in place measures to achieve Good Environmental Status (GES) in their marine waters by 2020. Descriptor 2 requires that "non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem". Biosecurity planning would help to deliver two of the three targets for achieving GES which are:

- Reduction in the risk of introduction and spread of non-native species through improved management of high risk pathways and vectors' and
- species specific management plans for high risk invasive alien species identified as already present or likely to be introduced into the UK in place by 2020'.

The **Water Framework Directive** (WFD) is designed to improve and integrate the way water bodies are managed throughout Europe. Member States must aim to reach good chemical and ecological status in inland and coastal waters by 2015. One of the aims is to enhance the status and prevent further deterioration of aquatic ecosystems. The United Kingdom Technical Advisory Group (UKTAG) which advises on the implementation of the (WFD) considers that non-native species are one of the significant pressures that could result in a water body failing to meet environmental objectives (such as failing to achieve good ecological status). By helping to prevent or limit spread of aquatic invasive non-native species to as yet uninfected areas, biosecurity plans will help to raise awareness of INNS good practice, which in turns helps to meet WFD aims.

It is illegal under section 14 of the **Wildlife and Countryside Act 1981** (as amended) to release or allow to escape into the wild any animal which is not ordinarily resident in Great Britain and is not a regular visitor to Great Britain in a wild state, or is listed in Schedule 9 to the Act. It is also illegal to plant or otherwise cause to grow in the wild any plant listed in Schedule 9 to the Act. Biosecurity planning will help to raise awareness of INNS good practice, and lessen the likelihood of people releasing INNS back into the wild and committing an offence under this Act.

The **EU Invasive Alien Species regulation** came into force in January 2015. The list of species to which the regulation applies is still being developed. However a requirement of the legislation is to have in place pathways action plans to control the introduction and spread of listed species. Pathways action plans for marine species may include future requirements for biosecurity plans.

USEFUL LINKS – ENGLAND AND WALES

Marine Strategy Framework Directive

https://www.gov.uk/government/publications/2010-to-2015-government-policy-marine-environment/2010-to-2015-government-policy-marine-environment#appendix-2-implementing-the-marine-strategy-framework-directive

Water Framework Directive and United Kingdom Technical Advisory Group

http://www.wfduk.org/

Wildlife and Countryside Act

http://www.legislation.gov.uk/ukpga/1981/69/section/9

EU Invasive Alien Species Regulation

http://www.nonnativespecies.org/index.cfm?sectionid=7

SECTION 3 - WHAT KIND OF BIOSECURITY PLAN DO I NEED?

Before starting to prepare your biosecurity plan it's helpful to consider three questions:

A 'site' or 'operations' plan – which type will my plan be?

A ***site*** biosecurity plan covers the long-term on-going activities at a single location. A biosecurity plan for an ***operation*** is drawn up to cover a time-limited set of activities at one or more locations. This could be the construction of a new bridge, the upgrade of a set of slipways or a major sailing regatta using several harbours.

Both plan types are covered by this guidance and the biosecurity planning process is the same for both. There will be some differences though and it's worth being aware of these when you start. For example a site plan is likely to be in place for a longer period and have an emphasis on routine activities and biosecurity control measures repeated many times. It will be suited to periodic monitoring and review. An operations plan will have a shorter lifespan and is likely to cover a sequence of activities which may only be carried out once (e.g. movement of a construction barge to build a pier). There is less opportunity here for fine tuning and biosecurity measures are likely to be time-critical.

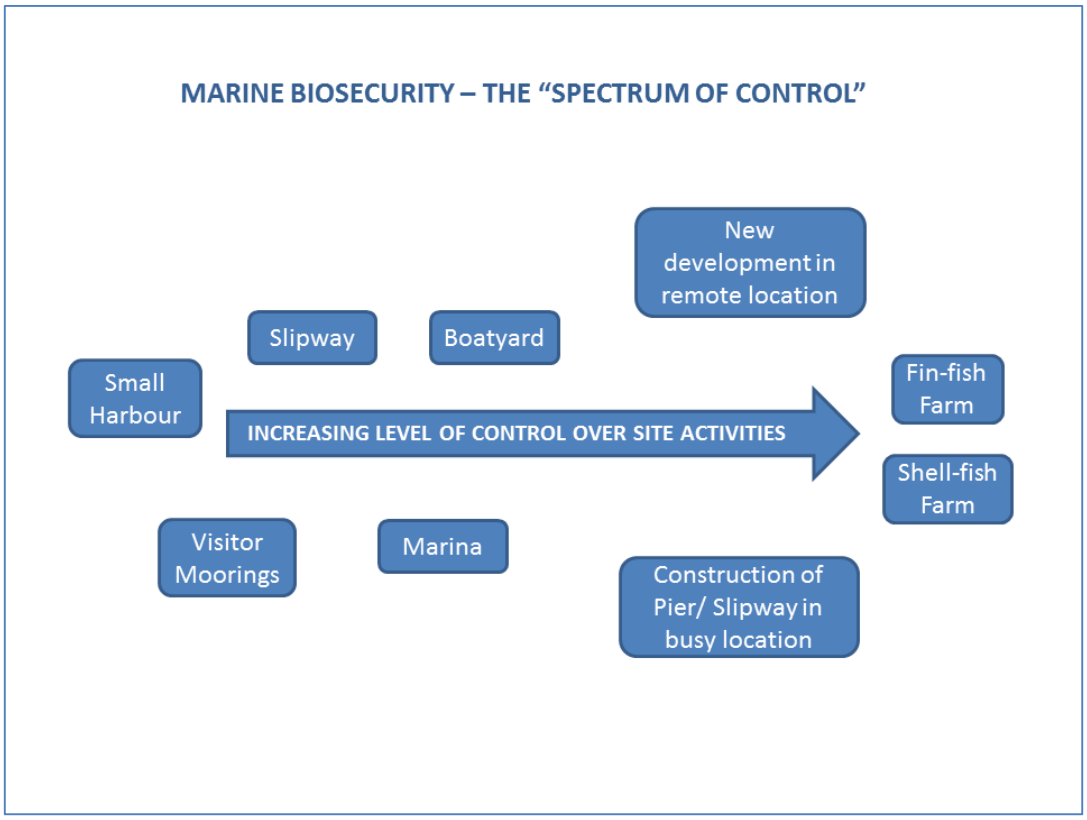
The plan can only 'make' people do so much, it's voluntary isn't it?

An effective biosecurity plan should identify the realistic actions that can be implemented and achieved. An important influence on almost every aspect of the plan will be the *degree of control* the plan will have over the activities taking place on the site or as part of the operation. These two examples illustrate either end of the spectrum of control.

Low level of Control	High level of Control
E.g. a small busy harbour. One member of staff only part of the day. 24 hour activity of a variety of vessels, all privately owned arriving and departing as and when they choose.	E.g. repair to a private jetty for a quarry. Planned activity with main contractor and sub-contractors all bound through contract terms to clear biosecurity measures and procedures. All vessels owned and operated by site owner/contractors. No other users of the facility.

Typically, sites open to a variety of marine users have to accommodate a range of activities and the majority of these will be at the '*low control'* end of the spectrum, whilst planned operations and sites with regulated access (e.g. finfish farms) will be at the

'*high control*' end. The figure below gives an overview of the typical levels of control over site activities. However, individuals/operators have to make an assessment of the level of control on a case by case basis regardless of the activity.



Where direct control of activities isn't possible (e.g. private boat owners), then there should be aspects within the plan which emphasise the need to influence and encourage best practice where possible.

Understanding the level of control that the plan will have over activities gives a good guide to the balance between compulsory procedures and voluntary good practice. For example, it would be impractical to expect a marina manager to have the time to inspect every vessel entering the marina or to enforce biosecurity procedures on private boat owners. By contrast the repair of a slipway in a site designated for its marine life should be planned so that biosecurity is both built-in and fully applied.

So what type of plan do I need, what are the key issues?

Section 3 will guide you through the plan preparation process. The table below sets out the main categories of plan types for a site or operation, the likely key issues and where the emphasis of the plan should be. This is not intended to be prescriptive, but is to be used as a broad guide.

If you operate a shellfish or finfish farm you can use this methodology to develop a biosecurity site plan for INNS. However, we would also suggest that you refer to the

statutory biosecurity guidance you already use for your operation for minimising the introduction and spread of disease, as this guidance could be adapted to incorporate INNS.

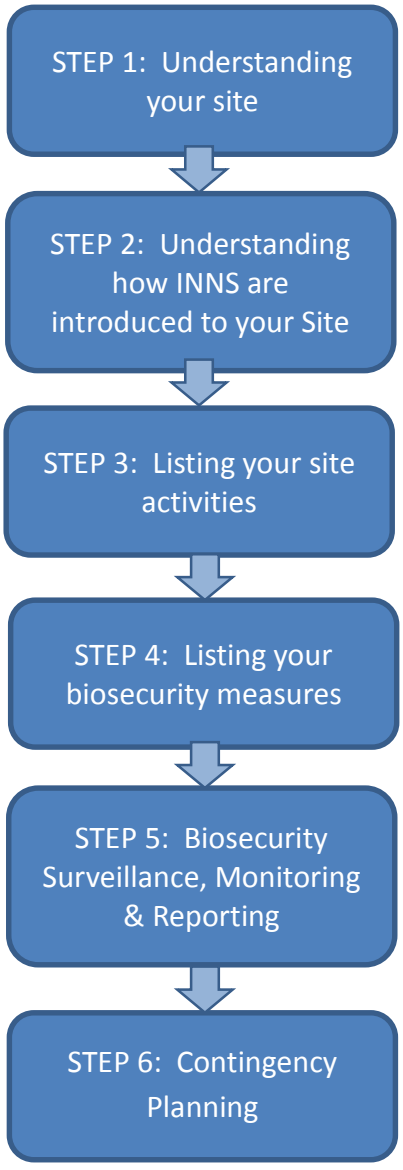
PLAN TYPE	MAIN VECTORS	LIKELY ISSUES	PLAN EMPHASIS
SITE PLANS			
Marina	Yachts, motorboats, tenders	Biofouling Floating structures Associated boatyard activities Vessel cleaning	Biosecurity actions for marina staff Biosecurity facilities for boat owners Promoting good practice Surveillance and monitoring Careful/appropriate disposal scrapings from hulls and other structures after cleaning.
Ports and harbours	Recreational and commercial vessels	Biofouling Diversity of vessel types and activities Floating structures Vessel cleaning	Biosecurity actions for harbour staff Biosecurity facilities for boat owners Promoting good practice Surveillance and monitoring Careful/appropriate disposal scrapings from hulls and other structures after cleaning.
Boatyard	Recreational and commercial vessels	Cleaning vessels	Surveillance and monitoring Careful/appropriate disposal of hull scrapings after cleaning.
Slipway	Recreational and commercial vessels	Biofouling	Promoting good practice Biosecurity facilities for boat owners Careful/appropriate disposal scrapings from hulls and other structures after cleaning.
Shellfish farm	Harvesting vessels, imported stock	Biofouling Links/ overlap with pathogen plan Contamination of imported stock	Biosecurity control measures for all staff, visitors and sub-contractors Surveillance and monitoring
OPERATION/EVENT PLANS			
Construction/ Developments/ Ongoing maintenance of sites listed above	Slow-moving vessels, barges, service vessels, equipment	Biofouling Construction materials Dredging	Analysis of biosecurity risk and development of control measures and control points (see Annex B) Bio-secure design of new facilities and installations. Biosecurity control measures for all staff, visitors and sub-contractors
Boat race/fishing competition	Yachts and other recreational vessels, equipment	Biofouling Origin of vessels	Advanced Planning Communicating good practice and event requirements Monitoring compliance

SECTION 4 – WRITING THE PLAN

This section of the guidance will provide you with a step by step guide to preparing a marine biosecurity plan for your site or operation. The main aim of your plan will be to prevent the introduction of INNS to your site or to the location where you are about to undertake an activity. It will also help you to prevent the spread of INNS already present on your site to new locations.

The first task is to appoint someone to become responsible for managing biosecurity on your site or operation. This person will be responsible for producing the biosecurity plan, checking the biosecurity log book (a record book that can be used to document biosecurity actions), training staff in the control measures, ensuring that all sub-contractors, visitors to the site etc. are aware of the aspects of the plan that apply to them and reporting any 'unusual' sightings to the appropriate contact.

The preparation of the plan is then based on the following of six steps:



STEP 1 - UNDERSTANDING YOUR SITE

As a first step, it's important to think carefully about your site or where your operation/ event will be taking place. To do this you may need to walk the site, ask some questions or gather some information. Consider the following points:

How 'salty' is the water at your site?

The majority of marine animals and algae can't tolerate freshwater for any length of time so the more freshwater you have flowing into your site the less hospitable it will be for an INNS. The risk increases as the water gets more and more salty, with the greatest risk of marine INNS establishment occurring when the water is fully saline (i.e. without any freshwater input from any river or drainage channels within 1 km of your site) or if it only has occasional freshwater input (i.e., from storm drains). Note: There are also brackish/freshwater INNS species that are tolerant of low salinity and therefore these species are actually more likely to establish in low saline environments.

How many man-made structures are in the water?

The risk of successful establishment of INNS is also increased by the presence of artificial structures (e.g., concrete slipways, floating pontoons, steel or fibreglass hulls, mooring chains and plastic mooring buoys), as these species typically prefer to settle on man-made structures rather than natural surfaces. Any structure that has been in the water for just a few weeks, particularly in the summer months when INNS typically reproduce, without an anti-fouling coating will be at risk from INNS settlement.

Are INNS already present on your site?

There is a reasonable chance that some species of INNS are already present on your site, either with or without your knowledge, especially if your site is fully saline (i.e. no freshwater input close by). The biosecurity plan should concentrate on reducing the risk of introducing new INNS to your site, but also consider how best to prevent any INNS already present on the site being moved elsewhere.

If species records, survey reports and other accounts of an INNS on the site already exist then these should be included in the biosecurity plan. However, even if you have no evidence of INNS on your site, you should still follow the precautionary principle and assume that they *might* be present and act as if they *are* present.

Check the following website for more information on the 'risk' status and distribution of individual species:

- GB Non-native Species Secretariat to see if any species found at your site are classified as high risk. Follow links 'Species information', then 'Risk assessments'

Think through the factors that affect the risk that your site and its location pose in relation to the risk of introducing or spreading INNS.

DOES YOUR SITE…	
• **HAVE A FRESHWATER SUPPLY FROM A LOCAL RIVER** • **HAVE A BREAKWATER OR WALLS AROUND MOST OF THE SITE** • **HAVE STRUCTURES THAT HAVE AN ANTI-FOULING COATING OR REMOVED FROM THE WATER AND AIR DRIED ON A REGULAR BASIS (~ EVERY 6 - 12 MONTHS)**	• **HAVE FULLY SALINE WATER (I.E. MINIMAL FRESHWATER INFLOW)** • **HAVE STRUCTURES WITHOUT ANTI-FOULING COATING AND/OR SUBMERGED FOR LONGER THAN 6 MONTHS AT A TIME** • **HAVE FIXED STRUCTURES THAT CAN ONLY BE CLEANED *IN SITU***
= LOW RISK	***= SIGNIFICANT RISK***

Photo © E. Cook, SAMS

LOW RISK: A marina in the Firth of Clyde was constructed by breaching a small section of the outer wall of a quarry, so that seawater could flood the site. A river discharges freshwater into the marina and, together with the enclosed nature of the site, this means that the salinity of the water is kept at a low level, preventing the survival and establishment of marine NNS.

LOW RISK: In the Isle of Man, the main marina is built at the seaward end of the River Douglas, with the freshwater providing a natural barrier to the survival and establishment of marine NNS.

Photo © E. Cook, SAMS

SIGNIFICANT RISK: Steel pontoons covered in marine bio-fouling from a fully saline site which are potentially being moved to a new site and therefore risk introducing INNS. Bio-fouling accumulates on these structures which require effort to remove from the water to clean or recoat with anti-fouling paint.

Photo © C. Maggs, Queen's University, Belfast.

STEP 2 - UNDERSTANDING HOW INVASIVE NON-NATIVE SPECIES CAN BE INTRODUCED TO YOUR SITE

In addition to thinking about your site or location of event, the structures on site and any INNS already present you will need to consider how INNS can be introduced to your site. What are the movements of vessels and equipment into and around your site?

To assess which activities are likely to present a greater risk of introducing INNS consider the following questions whilst completing this section of your biosecurity plan.

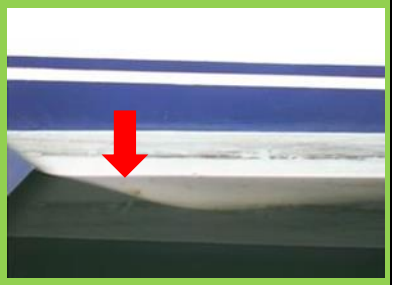
	Yes = HIGH	Yes = MED	Yes= LOW
1. Has the vessel/ equipment just arrived from the local area?			
2. Has the vessel/ equipment had an anti-fouling coating applied to submerged structures within the last 12 months (or time recommended by manufacturer)?			
3. Are all the visible submerged surfaces free of bio-fouling (a green 'slime' is OK)?			
4. Do the visible submerged surfaces have more than a green 'slime' coating?			
5. Does the vessel/ equipment have noticeable clumps of algae and/ or animals clinging to the visible parts?			
6. Has the vessel/ equipment just arrived from another country or region with similar environmental conditions (e.g., seawater temperature)?			
7. Has the vessel/ equipment just arrived from a water body known to have INNS present?			
8. Does the vessel/ equipment spend long periods of time stationary at sites in between anti-fouling treatments?			
9. Is the vessel 'slow moving', such as a construction barge or drilling rig?			

The greatest risk of introducing INNS is when a vessel (particularly slow moving barges for example), equipment or stock arrives at your site from another country, region or water body, with similar environmental conditions (e.g., temperature, salinity) to your own site. The risk is also increased if the vessel, equipment or stock is covered in biofouling (i.e., anything more than a thin, green 'slime' coating for vessel hulls) or contains additional algae and animals (otherwise known as 'hitch-hikers') within other parts of its structure or amongst the stock.

There is also a greater risk of introducing INNS when a vessel with fouling on the hull has just arrived from a site that is known to contain INNS. However, just because INNS haven't been reported at a particular site, does not mean that they are not present there. It may just mean that this site hasn't been surveyed yet for INNS.

LOW RISK: A recreational vessel showing no signs of bio-fouling on the hull on either just on or below the water line (see arrow) would be considered as low risk for the introduction of INNS.

Photo © E. Cook, SAMS



SIGNIFICANT RISK: Work vessels/ barges that move from site to site, and have to hold position for long periods of time or spend extended periods of time in port, may be more vulnerable to having NNS settling on their hull and, therefore, more likely to introduce NNS to a site.

Photo © A. Macleod, SAMS

SIGNIFICANT RISK: Repairs were planned for a small pier at Beaumaris on the Isle of Anglesey. The pier lies within the Menai Straight Special Area of Conservation (SAC). As part of the work a construction barge needed to be brought to the site from a distant location. Further investigation revealed that the barge hadn't been cleaned for some time and was heavily biofouled. To ensure best practice biosecurity and to meet the requirements of the marine licence condition for undertaking work within the SAC the barge was taken away for specialist cleaning.

Photo: © www.capita.co.uk

STEP 3 – IDENTIFYING ACTIVITIES WHICH RISK INTRODUCING INVASIVE NON-NATIVE SPECIES

The next step in preparing your biosecurity plan is to think about the main activities which take place at your site or as part of the operation/ event, particularly those that could lead to the introduction or release of INNS to the wider environment.

Some activities will clearly carry almost no risk at all. However, it is advisable to consider all the activities that will take place in or around the water and include both vessels and structures.

A **simple approach** is to list all the activities which take place on your site or which make up your operation/ event that you think may carry a significant risk of introducing or releasing INNS and then take that list on to the next step to develop control measure.

A guide to activities which carry a risk of introducing or releasing INNS

This table lists some of the most common activities that may take place on your site or may be part of your operation/ event, which carry a significant risk of introducing INNS. Use it as a starting point when drawing up your list of activities, but remember that every site and operation is different, so it's more than likely that there will be other activities which you will have to add that will be specific to your site or operation.

When drawing up your list, think carefully about the information that you've gathered together for STEPS 1 and 2 about your site/operation and the vessels movements associated with it. Use this information to help you identify activities which carry a significant risk. Move on to Step 4 once you have completed your list.

Broad Category – these are example categories only and not a comprehensive list	**Example Activities**
Construction and/ or maintenance of slipways/ jetties/ coastal defence structures etc.	• Use of construction barge and slow moving vessels • Using vessels from locations outside local water body • Importation of materials • Removal of old structures/ equipment • Disposal/ re-use of old structures/equipment
Shore-based boat repairs and/ or over-winter storage	• Moving and haul out of vessels from locations outside local water body • Provision of temporary mooring for boats awaiting haul out • Cleaning of hull and associated structures • Disposal of damaged structures and biofouling removed during cleaning process
Provision of berthing and facilities for recreational vessels	• Operating moorings for visiting and resident boats • Operating pontoon berths for visiting and resident boats

	• Maintaining associated structures e.g. moorings and pontoon berths • Removal of old structures/ equipment • Disposal of biofouling removed during maintenance of berthing facilities
Provision of berthing and facilities for commercial vessels e.g. ports and harbours	• Operating dockside berths for visiting vessels • Maintaining associated structures • Disposal of biofouling removed during maintenance of facilities • Removal of old structures/ equipment
Culture of shellfish	• Maintenance of culture infrastructure (e.g., long-lines, anchor chains, buoys) • Use of slow moving vessels (e.g., harvesting barge) • Importation of stock • Maintenance of equipment and vessels • Disposal of biofouling and waste water during cleaning process for stock and equipment
Culture of finfish	• Maintenance of culture infrastructure (e.g., cages, netting, buoys, anchor chains) • Use of vessels that remain in position for long periods of time (e.g., feed barge) • Importation of smolts via slow moving vessels from locations outside local water body • Maintenance of equipment and vessels • Disposal of biofouling during cleaning process for equipment

STEP 4 – BIOSECURITY CONTROL MEASURES

Now that you have a list of activities which carry a risk of introducing INNS you can develop measures to control that risk.

It's important that these measures are:

- Effective
- Clear
- Realistic (taking into account staff resource, cost, amount of planning time etc.)
- Easy to communicate to others

At all times, think about how much control you have over the site and its activities (as discussed in Section 3) when implementing biosecurity measures and design your measures with this in mind. For example, control measures which apply to private boat owners will only be taken up if they are simple and make sense to the boat owner. By contrast, a sub-contractor working on a new development can have a control measure written into the method statement for their contract and that measure is then obligatory.

Generally, you will be expected to cover the costs, if any, that carrying out control measures may incur. Some funding may be available if your site, or the INNS concerned, is covered by a specific initiative or project, you can contact your local NE or NRW Office for more advice on this.

To make the control measures effective think about:

- **Who** will carry out the action
- **What** will they be doing to reduce the risk of introducing INNS
- **Where** will the control measure be applied
- **When** will the control measure be applied, at what stage in a process

We are constantly developing our understanding of INNS and the activities that lead to their introduction and spread. At the same time technologies, such as anti-fouling paints, vessel cleaning facilities and tracking of vessel movements are developing also. The focus of this guidance is therefore on how to develop and implement marine biosecurity control measures rather than the measures themselves. The measures will adapt over time to reflect a change in culture as biosecurity is more widely adopted.

KEY SOURCES OF ADVICE

- **GB NNSS Website**
  - Biosecurity in the field (including biosecurity for boat users, submerged structures and event biosecurity support pack) http://www.nonnativespecies.org/index.cfm?pageid=174
- **RYA -** www.rya.org.uk/go/alienspecies
- **The Green Blue**
  - Antifoul and Invasive Species http://thegreenblue.org.uk/Boat-Users/Antifoul-and-Invasive-Species
  - The Green Guide to Boat Washdown
- **Cefas Biosecurity Measures Guidance**
  - Shellfish biosecurity measures plan http://www.defra.gov.uk/aahm/files/Book-Shellfish-BMP.pdf
  - Finfish biosecurity measures plan https://www.gov.uk/prevent-fish-or-shellfish-diseases#prevent-the-spread-of-disease-in-fish-and-shellfish
- **Invasive Species Ireland**

- Aquaculture Code of Good Practice http://invasivespeciesireland.com/cops/aquaculture/
- Marina Operators Code of Good Practice http://invasivespeciesireland.com/cops/marina-operators/
- Water Users Code of Good Practice http://invasivespeciesireland.com/cops/water-users/

- **Firth of Clyde Biosecurity Plan**
  - Invasive non-native species – A biosecurity plan for the Firth of Clyde

- **IMO Guidelines For The Control And Management Of Ships' Biofouling To Minimize The Transfer Of Invasive Aquatic Species**
  - http://www.imo.org/blast/blastDataHelper.asp?data_id=30766&filename=207(62).pdf
- **IMO Guidance For Minimizing The Transfer Of Invasive Aquatic Species As Biofouling (Hull Fouling) For Recreational Craft**
  - http://www.imo.org/en/OurWork/Environment/Biofouling/Documents/MEPC.1-Circ.792.pdf

The table below gives examples of some of the biosecurity measures which could be appropriate for the activities described. It should be used as a guide.

Activity type	**Example biosecurity measures**
Preventing biofouling	• Use the right type of anti-fouling for your site and vessel usage – take advice from manufacturer or chandlery where possible • Replace anti-fouling coating at regular intervals as specified by the manufacturer's instructions or if damage occurs to any surface in the meantime • Consider applying anti-fouling to surfaces not typically coated (e.g., mooring buoys, pontoon floats), if fouling is particularly intense • Use any freshwater inflows to best advantage to reduce fouling on equipment and vessels
Removing biofouling	• Avoid biofouling scrapings entering the water by collecting in tarpaulin • Provide wash down facilities which collect biofouling material during the wash down
Operation of facilities for berthing vessels	• Gather biosecurity information from visiting vessels at the earliest opportunity; including port of origin and when anti-fouling was last applied to hull • Direct all visiting vessels, which are from distant ports to berths closest to the freshwater inflow, if available • Carry out rapid visual hull inspection on 'high risk' vessels • Provide biosecurity information to allow boat owners to 'self-assess' their risk • Ask boat owners not to dispose of any water contained on the vessel (e.g., ballast tanks, bilge water, anchor lockers) into the water at your site • Provide 'quarantine' facilities, if possible, for vessels with obvious biofouling on hulls (e.g., berth nearest to any freshwater inflow to site)
Operation of public slipway/ visitor moorings	• Mount permanent and weather proof biosecurity guidance notices on wall post adjacent to slipway/ padlocked barrier to slipway or access point for moorings • Print biosecurity information on reverse side of licence/season ticket for slipway or receipt for moorings

	• Make adhering to biosecurity guidance a condition of annual licence
Monitoring and surveillance	• All relevant staff to receive a copy of the site/ operation biosecurity plan summary and instructions sheet • All relevant staff to received training in NNS identification • All staff encouraged to report any 'suspect' marine plant or animal to the biosecurity manager
Importing shellfish or finfish stock	• Gather biosecurity information from vessels transporting stock including when anti-fouling was last applied to hull • Carry out rapid visual inspection of vessels, on entering site and direct all vessels with visible biofouling to quarantine site or nearest haul out and wash down facilities • Gather biosecurity information on stock itself, particularly if NNS exist in area of origin • Carry out rapid visual check of stock prior to release at site for any 'hitch-hikers'
Repair and maintenance of jetties/slipways	• Gather biosecurity information on all vessels, including barges and other slow-moving vessels which will be used during the project; including anti-fouling maintenance history, sites/ regions visited since last anti-fouling applied • Carry out rapid visual inspection of vessels and check biofouling log book (if available), on entering site and direct all vessels with visible biofouling to quarantine site or nearest haul out and wash down facilities

New developments in the marine environment – building in biosecurity measures from the start

Incorporating biosecurity measures into future coastal developments (e.g. ports, marinas, offshore energy generation) should be considered at the very start of any design process. Building in biosecurity design features at the development stage can help to reduce risk of INNS introductions in the future.

Key features likely to improve biosecurity include; high freshwater input, lock gates and novel pontoon designs. In addition, facilities which reduce the time and cost of vessel hull maintenance would encourage better practices amongst vessel owners.

Novel Design Features

Siting new developments in areas of high freshwater input would help reduce the likelihood of marine INNS surviving and becoming established at a particular site. This could be achieved by locating new developments in rivers or by river mouths, or in urban settings, by re-routing storm drains.

Incorporating lock gates into new port and marina designs would also allow these facilities to be rapidly quarantined and treated if an INNS was reported. For example, the £4.2 million project at Burry Marina in Wales has added lock gates to the marina to prevent it from drying out at low tide. These gates, however, could also act as a

barrier to prevent the release of an INNS during an eradication programme and for freshwater to be used as a treatment option, if available.

Rotating pontoon floats under trial in North Wales. Photo © Rohan Holt. NRW

The majority of biofouling occurs on novel, man-made structures, especially pontoons and pontoon floats and vessel hulls. Therefore, including design features and facilities, which reduce biofouling on these structures should be considered when planning new developments. A design concept in the test phase is rotating pontoon floats (see photo). Automated rotation of rolling pontoon floats would allow surfaces to be exposed above the water line where they can be air dried in sections for prolonged periods, killing many fouling organisms both native and INNS. Another design feature that may be used are locking pontoons, which could be 'locked' at the top of high tide, exposing the underside of the pontoon surface when the tide drops. This would allow either air drying or chemical treatment of surfaces to eliminate biofouling species. Other surfaces, prone to biofouling, including pilings and other underwater structures would need to be engineered for easy removal of biofouling.

Other options, could include provision of freshwater washdown facilities in new marinas, clubs or training centres with appropriate drainage facilities. Boat lifts and power wash or brush systems can also be used for quick in water cleaning where boats have not moved in a few weeks. Providing closed loop wash down systems could be considered in larger commercial facilities.

For operations related to recreational activities, provision of tanks for soaking gear in freshwater and drying facilities could be provided.

It is important that new developments also provide facilities that enable hull fouling to be removed from vessels efficiently and cost effectively, whilst containing any waste and preventing its return to the marine environment. This is especially important in the case of quarantining vessels, which should not be seen as a deterrent to visiting a harbour or marina. Concerns over cost and time implications of cleaning vessels may be addressed using various technologies both in existence and under development.

Boat hoists are available on the market which are able to lift and clean between 10 and 15 boats per day. New designs under development include a wet-dock quarantine facility, which a vessel could enter, have its hull treated with chemicals, and then depart without leaving the water. Both systems incorporate facilities to contain the waste water and any chemicals for appropriate disposal on land.

Floatation system used to store vessels out of the water whilst not in use. Photo © E. Cook, SAMS

In addition, facilities which keep boats out of the water until they are needed would benefit boat owners by reducing hull fouling (see photo). Although this is not practical with large vessels, systems are currently used , to dry dock smaller individual boats quickly and efficiently. Although the floats and other underwater parts of these systems may get fouled, they can be routinely cleaned and will prevent the INNS from being transported to another site on the vessel hull.

STEP 5 - SURVEILLANCE, MONITORING AND REPORTING

The early detection of INNS on a site is important as this will increase the likelihood of successful containment and the potential for full eradication.
Staff and other site users should be encouraged to report any unusual sightings, even if this turns out to be a native plant or animal, as all knowledge of species in an area develops our understanding of biodiversity.

ASIAN SHORE CRAB

In May 2014, an eagle eyed member of the public fishing near Aberthaw spotted an unusual crab on the shore. The crab was identified as the non-native Asian shore crab *Hemigrapsus sanguineus* and was the first record of this species in Wales and the UK Mainland.
The Asian shore crab is native to the western Pacific Ocean and has the potential to cause changes in the food web of inshore marine and estuarine habitats. It has a very broad diet and an intertidal distribution that overlaps with juveniles of the native common shore crab *Carcinus maenas* and edible crab *Cancer pagurus*. The find triggered a survey carried out by Natural Resources Wales which despite an extensive search failed to find any more of the crabs on the shore at this location.

Photo: Asian shore crab *Hemigrapsus sanguineus* © NRW

Monitoring the visible signs of biofouling on any vessels, shellfish stock or equipment that enters a site should be encouraged to help determine the presence of INNS and help to reduce the risk of introducing or spreading INNS into our waters. In New Zealand, a ranking scheme was recommended where vessel with *Rank 3 or above* were subject to further biosecurity measures. This may be useful to apply in your own biosecurity plan.

Rank	Description	Visual estimate of biofouling cover
0	No visible fouling. Hull entirely clean, no biofilm[a] on visible submerged parts of the hull.	Nil
1	Slime fouling only. Submerged hull areas partially or entirely covered in biofilm, but absence of any plants or animals.	Nil
2	Light fouling. Hull covered in biofilm and 1–2 very small patches of one type of plant or animal.	1–5 % of visible submerged surfaces
3	Considerable fouling. Presence of biofilm, and fouling still patchy, but clearly visible and comprised of either one or more types of plant and/or animal.	6–15 % of visible submerged surfaces
4	Extensive fouling. Presence of biofilm and abundant fouling assemblages consisting of more than one type of plant or animal.	16–40 % of visible submerged surfaces
5	Very heavy fouling. Many different types of plant and/ or animal covering most of visible hull surfaces.	41–100 % of visible submerged surfaces

[a]Biofilm: Thin layer of bacteria, microalgae, detritus and other particulates.

Training staff in biosecurity actions can be highly effective. Instructions should be clear and concise and inform staff of the procedures to follow (the what to do, where and when) if things go wrong or if they spot anything they think is out of the ordinary or of potential concern. Staff training should be a process of continuous learning to ensure staff develop an understanding of the importance of following biosecurity measures.

As part of staff training, consideration should be given to basic identification skills of INNS that may exist in your area. Training and identification guides are available to help you develop this training. Information is provided in the box below:

LINKS TO NNS TRAINING AND IDENTIFICATION GUIDES

- GB Non Native Species Secretariat – Identification Guides & Images http://www.nonnativespecies.org/index.cfm?sectionid=47
- Marine Aliens Project – Identification Guide http://www.marlin.ac.uk/marine_aliens/latest_news.php

It is important that any records of species sightings, or unidentified plants and animals of concern are reported as soon as possible, especially in the case of high alert species. It may be necessary to send samples of the suspect plants or animals to specialists. Guidance on reporting INNS can be found in the box below:

GUIDANCE ON REPORTING INVASIVE NON-NATIVE SPECIES

- For marine species, reports should be made to the Marine Biological Association on their website www.mba.ac.uk/recording
- If unsure of species identification, send a photo to recording@mba.ac.uk
- The GB Non-native Species Secretariat provides links to different recording apps and databases http://www.nonnativespecies.org/index.cfm?sectionid=81

When developing your biosecurity plan it is advised that you include details on:

- Who is responsible for surveillance and monitoring of the site
- Actions to encourage any users of the site to be vigilant and report any sightings of concern
- Contact details for Natural England enquiries@naturalengland.org.uk or Natural Resources Wales for advice enquiries@naturalresourceswales.gov.uk

STEP 6 - CONTINGENCY PLAN

Even with good planning it is recognised that things can go wrong. This section of the guidance explains how to build instructions and procedures into your biosecurity plan and details what to do if your biosecurity measures for INNS fail.

The contingency plan doesn't need to be a complex document which anticipates every problem. It should be clear, concise and accessible to everyone who might need to use it. Ideally, it should be:

- Short (single page of advice and instructions)
- Provide a step by step guide of actions to follow immediately
- Accessible - it should be pinned up in a site office and/or laminated to carry around on site.

Think through the most likely biosecurity issues that might take place on your site or during your event/operation. Review your list of site activities, and biosecurity and control measures. Consider what would happen if these fail. Issues may include:

- The discovery of an unknown species on the site which you suspect may not be native.
- A vessel which had been wrongly assessed as low risk, originally came from a distant port, has been berthed on the site for some time and has heavy biofouling which was difficult to see on the day of arrival.
- A high alert species is reported from a nearby site, where vessels from your site frequently travel to and from.
- Unexpected bad weather overnight has forced a construction barge en route to a construction site to seek shelter in your harbour and it is covered with biofouling.

Consider the issues above and work through the actions that will be needed at each stage and identify who will carry out these actions. Actions are likely to include:

- Quick and simple survey to determine the extent and distribution of a newly discovered species
- Informing the relevant authorities, other water-users and vessel operators
- Seeking advice and information on the species and its management.
- Marking areas to be avoided
- Containment measures to help prevent a high-alert NNS spreading such as sealing off part of a construction site from further work
- Monitoring, especially if a species is considered to be low risk
- Precautionary restrictions on vessel movements
- Precautionary requirements for vessel/equipment cleaning
- Actions to be followed if a particular high alert species is discovered

Example of Contingency Plan Actions for the discovery of a high alert INNS

Ensure that any special equipment needed such as marker buoys, signs, underwater camera on a pole etc. is listed along with its storage location.

Action	Responsibility
Stage One – Suspected arrival of high alert species	
Collect sample, place in plastic bag and contact the GB Non Native Species Secretariat to find out where to send sample.	e.g., harbour master, marina berthing manager, site manager, Ecological Clerk of Works (ECOW)
Inform site users and mark the area (e.g. marker buoys)	Site manager/harbour master/staff
Stage Two – Presence of high alert species confirmed	
Initiate immediate containment measures, including restricted vessel movements	e.g., marina berthing manager
Carry out wider survey of vessels and structures	Harbour staff
Stage Three – Eradication/long-term control measures in place	

THE SLIPPER LIMPET, AN EXAMPLE OF A RAPID RESPONSE TO A BIOSECURITY ALERT

Slipper limpets sitting on top of one another on a mussel shell. Photo © GBNNSS

In 2006, a successful rapid response and eradication of the non-native slipper limpet (*Crepidula fornicata*) was undertaken in the Menai and Conwy Bay Special Area of Conservation, North Wales. The slipper limpets were 'hitch-hikers' in a consignment of seed mussels from a site in the English Channel. By the time it was discovered that the mussel seed was contaminated it had been laid on the seabed in the Menai Strait as part of the growing method used there. The rapid response included the removal of the contaminated mussels by dredgers, followed by smothering of the area with a dense layer of mussels sourced from an unaffected area. Subsequent monitoring surveys have since found no sign of live limpets.

A rapid response to alerts and biosecurity breaches is key for minimising the risk of INNS spreading.

The table above provides useful information for a mini rapid response plan. If an incident occurs consideration should be given to what might become a barrier to a quick and effective action and plan to avoid these barriers. Barriers, for example can be caused by lack of clarity about who should do what and when as well as a lack of information about what to do. Clear direction, information and communication is necessary when dealing with an incident.

When plans are developed, good practice would be to test the plan and actions to help identify any gaps before an incident occurs. For example you could develop a scenario for your site or operation where biosecurity has failed. Engage a wide range of organisations, staff, vessel owners, sub-contractors etc. as you feel necessary for the exercise.

SOURCES OF INFORMATION

- GB NNSS Website – Species Alert Page (see Asian Hornet Rapid Response Plan) http://www.nonnativespecies.org/alerts/index.cfm

SECTION 5 – EVALUATION AND REVIEW

Reviewing the Implementation of the Plan

Once the biosecurity plan has been written, it is important that a clear recording system (i.e. a logbook) is put in place for the results of any checks or actions taken and formal steps are put in place to ensure the biosecurity manager is quickly informed of any potential introduction of INNS.

EXAMPLES OF INFORMATION TO BE RECORDED IN LOGBOOK:

- Routine inspections of equipment and vessels for INNS and biosecurity measures taken if INNS found at site or on equipment.
- Application of antifouling or cleaning of equipment or vessels at site.
- Inspection of any high 'risk' vessels; including any details of when biosecurity manager has been informed of a potential 'high risk' vessels and the additional biosecurity measures that have been undertaken.
- Awareness raising events.

All records entered in the logbook should be given a date and signed by the biosecurity manager.

Plan review and refinement

Site Plans: A plan is a paper document or electronic file but it only has life and purpose if it is implemented and can adapt to changes. Changes can take place throughout the year, activities can be modified and re-designed, new activities can start up. Regular reviews, for example once a year, will ensure that the plan remains relevant and effective. If new activities that carry a significant risk of introducing or spreading INNS are commenced then control measures should be identified before the activity starts and need not wait for the annual review.

Operation Plans: Biosecurity plans for operations can cover activities which are novel and untested taking place in new locations and are likely to need more frequent review that site plans. The complexity of the operation and the number of activities which risk spreading INNS will influence just how frequently the plan or key parts of the plan such as the control measures are reviewed.

SECTION 6. MARINE BIOSECURITY PLAN TEMPLATE

1. Introduction

Background information and overview about the planned activity

1.1. Development Name:
1.2. Description of Operation: e.g. *Shipping Plan, CEMP, OEMP.*
1.3. Site/Operation Location(s):
1.4. Plan period: *Start and end dates*
1.5. **Biosecurity Manager/Officer:** *Individual responsible for implementing the plan*

2. Information related to the Environmental conditions affecting biosecurity

Salinity	*For a shipping plan this would include source and destination conditions*
Marine features present	*May include risks associated with the development once constructed (e.g. artificial/man-made structures)*
Non-native species known to be present	*In both source and destination locations.*

3. Vessel types using the site and/or involved in the operation

Vessel name	**Photo reference** (images to be inserted in appendix)	**Vessel type**	**Details & Risk factors; Pathway, speed, biofouling control, Inspection history, Internal treatment history,**	**Risk: High/Medium/Low**
		e.g. Barge, Jack-up rig etc	*See IMO Biofouling Guidance**	

3.1. Deployment & Port Visit History

Vessel name	Port of origin	Ports visited on route	Date and duration

3.2. Information related to any slow or stationary periods or climatic conditions that may increase biosecurity risk?

Insert information here

4. Site Activities which have a significant risk of introducing or spreading non-native species

Activity Description	
1.	*e.g. Dredging, Import of raw materials for construction etc..*
2.	
3.	
4.	
5.	
6.	

4.1. Details of how each of the activities have the potential to increase the risk of introduction or onward spread of marine non-native species?

Insert information here

5. Biosecurity Control Measures – Instructions for staff/contractors/site users

Who	What	Where	When

6. Site surveillance and reporting procedure:

Information to be inserted related to any planned surveillance and reporting procedures

7. Contingency Plan

Action	Responsibility	Location of Equipment
e.g. Use of alternative equipment, vessels or methodologies	*Who will oversee this action?*	

8. Location of biosecurity logbook

9. Plan Review Date

Useful reference documents

IMO Guidelines for the control and management of ships biofouling to minimize the transfer of invasive aquatic species

http://www.imo.org/blast/blastDataHelper.asp?data_id=30766

Shetland Biosecurity Plan

http://www.nafc.uhi.ac.uk/departments/marine-science-and-technology/BiosecurityPlan.pdf

Marine Biosecurity Planning Guidance (SNH, Payne, Cook Macleod February 2014)
http://www.snh.gov.uk/docs/A1294630.pdf

GB non-natives species secretariat

Marine biosecurity - key guidance documents and websites

Non - native species records can be accessed via the local record centres

http://www.lrcwales.org.uk/?AspxAutoDetectCookieSupport=1

or the National Biodiversity Network

http://www.nbn.org.uk/

or the marine biological Association

http://www.mba.ac.uk/

NRW marine experts can also give advice on Non-native species records.

Appendix

Additional supporting material to be added here e.g. vessel/equipment photographs

ANNEX A: GLOSSARY

- **Native Species:** Also known as indigenous species or alien species, means a species occurring within its natural range (past or present) and dispersal potential, i.e. within the range it occupies naturally or could occupy without direct or indirect introduction or care by humans

- **Non-Native Species:** Non-native species (also known as alien, non-indigenous, foreign or exotic) means a species or subspecies occurring outside its native range i.e. the range it occupies naturally without the intervention of human activity. This includes any part of the species that might survive and subsequently reproduce.

- **Invasive Non-Native Species:** An invasive non-native species (INNS) is defined as a 'non-native' species that threatens native biological diversity, human health or economic activity.

- **Invasive Alien Species:** Invasive Alien Species are animals and plants that are introduced accidently or deliberately into a natural environment where they are not normally found, with serious negative consequences for their new environment. Definition used by EU and the terminology used in Regulation 1143/2014 on invasive alien species

- **Biofouling:** Biological growth which develops on manmade structures in the aquatic environment.

- **Introduction:** Refers to the movement by human means, indirect or direct, of a species outside its natural range. This movement can be within a country or between countries.

- **Establishment:** Refers to the process of a non-native species in a new location successfully producing viable offspring with the likelihood of continued survival.

- **Biosecurity**: Taking action in order to minimise the introduction or spread of invasive non-native species or disease.

- **Biosecurity Plan:** A written document which details site/ operation activities and actions that will be undertaken to minimise the introduction or spread of a specified threat (i.e. invasive non-native species).

- **Control Measures:** Refers to actions which are undertaken in order to prevent the introduction or spread of an invasive non-native species.