

Waterways Ireland and Fáilte Ireland

Blueways Biosecurity

Biosecurity Plan Development Guidance

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Version 2 – Sam Hayes & Tom Hill



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Abbreviations and Definitions

- **IAS: 'Invasive Alien Species'** – organisms that are transferred to new locations by human activities and have the potential to cause ecological and economic damage within Ireland's waterways.
- **Unconstrained [Blueways] biosecurity options** – the initial list of all biosecurity options and recommendations that are broadly appropriate for the activities being undertaken at the Blueways recreational trails.
- **Constrained [Blueways] biosecurity options** – biosecurity options that have been filtered from the unconstrained biosecurity options (see above) based on the specific site parameters and activities at a proposed or existing Blueways recreational trail.
- **Feasible [Blueways] biosecurity options** – finalised biosecurity options that have been selected by a Blueways developer and written into a biosecurity plan for viable implementation (with consideration of the wider information as listed in Step 4 of this guidance) at a proposed or existing Blueways recreational trail.
- **Infrastructure** - supporting construction or facilities (e.g. water supply, electricity, drainage, hardstanding or other landscaping etc.) that enable the installation of biosecurity facilities.

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The Purpose of this Guide

Biosecurity is the implementation of procedures or policies, supported by physical facilities, messaging, training and management, which are designed to reduce the spread of Invasive Alien Species (IAS) to and from Blueway trails.

This user guide provides step-by-step instructional guidance on how to develop a high-level site-specific biosecurity plan for a Blueway recreational trail. It is understood that differences in infrastructure, site characteristics, and Blueways developer capacity and budget can influence how biosecurity can be delivered. By providing a scalable approach, Blueway biosecurity planning is considerate of these factors and allows developers and operators to achieve a level of biosecurity that is appropriate and proportional.

Throughout the entirety of the process, it is important to consider the other resources APEM has provided to the Waterways Ireland and Fáilte Ireland, as members of the Blueway Partnership.

The critical relevant resources for developers and operators are:

- The **Biosecurity for Developers** summary document – *provides the context for Blueways biosecurity and background information on IAS. It is important to read this document before beginning to plan biosecurity.*
- **This Guidance document and its appended resources** – *provides guidance on the process of biosecurity planning at Blueways.*
- The Blueways focused **Biosecurity Recommendation Tool** – *supports planning through the recommendation of biosecurity options.*

Additional optional resources are:

- **Biosecurity on the Blueways: a review of best practice and recommendations for improving biosecurity** – *provides the detailed technical report and justification for the development of the Blueway biosecurity planning approach*
- Four draft / example **Biosecurity Plans** – *these have been prepared by APEM as examples of site-specific biosecurity plans for four existing Blueways.*

What is a biosecurity plan?

A biosecurity plan identifies realistic, pragmatic, and cost-effective procedures, behaviours and facilities (biosecurity measures) that reduce the risk of IAS introduction and establishment. Biosecurity reduces the frequency and number of IAS introduced through human activities. Biosecurity is analogous to prevention and provides the best chance of reducing and potentially negating the need for complex and expensive control/eradication programmes. It must be noted that the removal or long-term management of IAS after they have established represents a significantly larger cost than the provision and maintenance of biosecurity facilities and procedures.

Biosecurity frameworks are not static and should be reviewed to ensure that methodologies are kept up to date and aligned with evolving best practice. The guidance provided in this document has the flexibility to be amended into the future where necessary, and the Biosecurity Recommendation Tool can be refined and upgraded as needed.

The implementation of biosecurity should not be seen as an ‘all-or-nothing’ situation. Any biosecurity measures, no matter the scale, will have a positive impact on the sustainability of Blueways recreational activities.

Who is this Guide for?

This Guide provides support primarily for ‘Blueways developers and operators’ who are seeking accreditation under the Blueway scheme or are making improvements to biosecurity at an already accredited Blueway. The ‘Blueways Developer Biosecurity Summary’ document provides important context for this process and should be read in advance of using this Guide and the associated Biosecurity Tool to produce a biosecurity plan. The ‘Blueways Partnership’ may also offer support to developers and operators with this process, although this is not a prerequisite for developers and operators undertaking biosecurity planning.

There are a number of ‘Blueways stakeholders’ that have been identified as having instrumental roles for the improvement of biosecurity at Blueways. They are defined as:

Primary stakeholders:

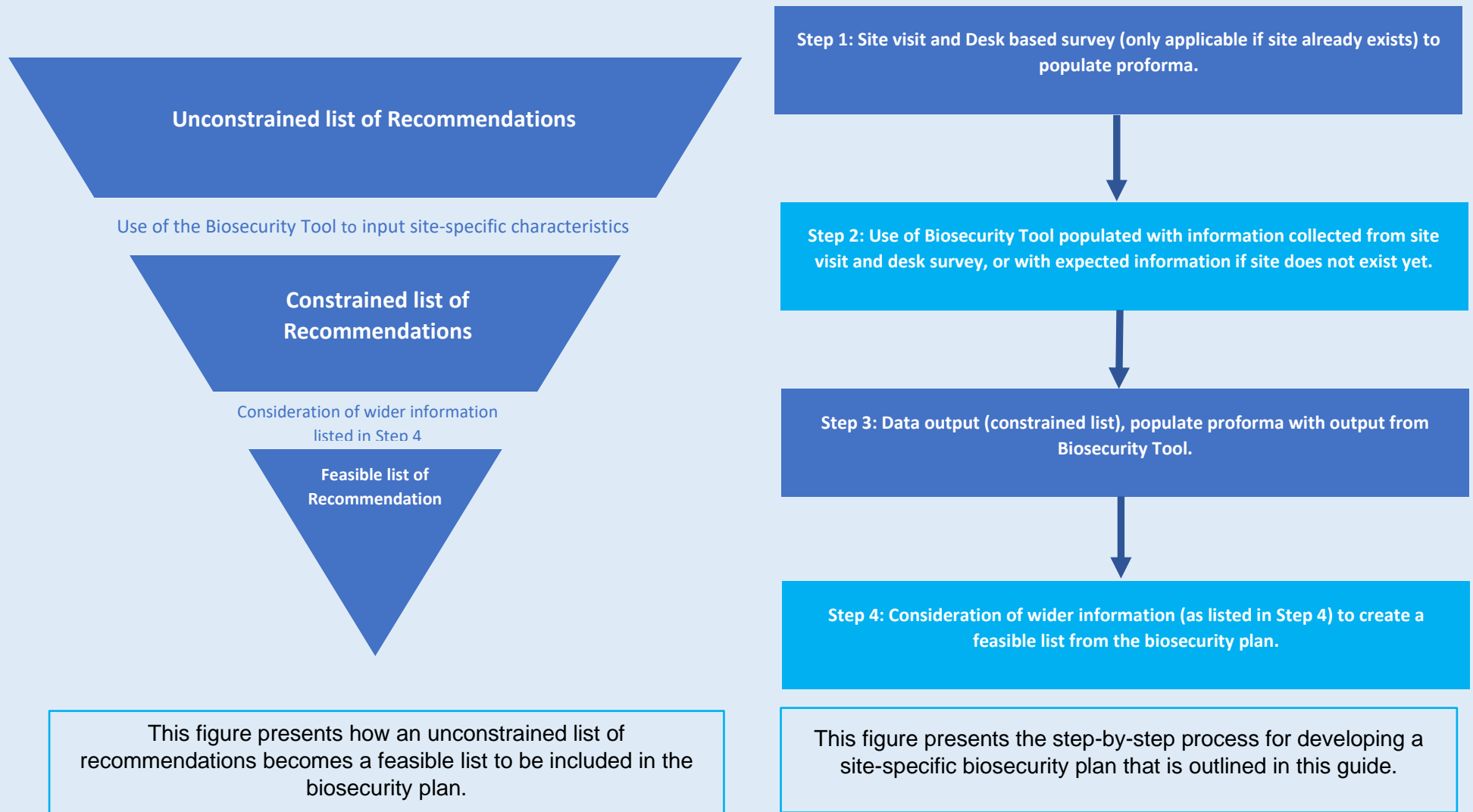
- **Blueways developers and operators** – individuals or organisations that are: 1) planning a recreational trail that will be accredited under the Blueways scheme; and / or 2) responsible for site operations and maintenance at an accredited Blueway. Will be responsible for the development and implementation of site biosecurity plan(s).
- **Blueways partners / partnership** – Waterways Ireland, Failte Ireland, Tourism NI, Sport Ireland and Sport NI. The partnership oversees the development of Blueways in Northern and the Republic of Ireland; this includes setting the standards and guidance for Blueways accreditation. Included in this group are the direct associates employed by the partnership to oversee Blueways development (i.e. Blueways accreditation officers).

Secondary and target stakeholders:

- **Blueways users** – anyone undertaking recreational activities at Blueways.
- **Activity providers** – Blueways affiliated businesses that deliver recreational services at a Blueway(s).
- **Biosecurity support** – individuals or organisations who have the capacity to improve biosecurity or IAS awareness at Blueways but are not directly undertaking recreational activities or involved with the development and operation of a Blueway. Could include clubs, on-site cafés and hospitality, NGBs, Local Sports Partnerships, retailers etc.

The recommendations provided by the Tool and refined using this guidance are intended to be implemented by Blueways developers and operators. They align with and support the sustainability goals and criteria of the Blueways development toolkit and accreditation scheme. Ultimately, the recommendations are intended to arm Blueways users with the ability and increased willingness to make tangible improvements to their biosecurity behaviour when visiting the Blueways.

Biosecurity Plan Development Process



Step 1: Site visits and desk-based surveys

Assessing an existing site

A developer or operator should aim to include as much site-specific information as possible to inform biosecurity decision making. Both visiting and completing desk-based research on an individual site is important for the development of an appropriate and effective biosecurity plan. Sections 1a, 1b and 1c of the biosecurity plan proforma (Appendix 1) provide a template for information collection in a site visit.

Example draft plans have been produced to show the importance of detailed and accurate information collected in stage 1. Three of the example Blueways (Acres Lake, Ballyconnell Lock, Dromineer) were assessed by a site visit in addition to a desk survey. The other example site (Rooskey) was assessed only at a desktop level. The resultant biosecurity plans highlight how important detailed site understanding is to the selection of site-appropriate biosecurity options.

Assessing a site yet to be constructed

For sites that are still in the planning or early construction phase, it is advise that operational biosecurity considerations are made as early as possible. It is recommended that sections 1a, 1b and 1c of the biosecurity plan proforma be completed with predicted information for the site to best reflect the likely biosecurity risks it will be faced. However, this should be continuously reviewed as and when predicted site-specific information changes or is better understood / planned.

Step 2: Data input and use of the tool

Tool Overview

The tool has been built in Excel to facilitate accessibility. It contains the full list of [unconstrained](#) biosecurity options which are automatically filtered based on the site data entered by a developer or operator. The Tool is simple to use and site specific ([constrained](#)) recommendations are generated rapidly.

When the Excel document is opened there are a series of tabs along the bottom of the workbook. The tabs are:

- **Data Input:** This tab is used to input the relevant data to generate the site-specific biosecurity recommendations.
- **Recommendation Output:** This tab provides the list of biosecurity recommendations that is applicable to the site being assessed.

Assumptions have been made to allow the tool to generate recommendations, those being:

- Recommendations requiring infrastructure will be installed in areas of the site where this infrastructure is available.
- There is no connectivity between different sites which existing within a close proximity to each other.
- Stage 4 is undertaken as the developer or operator refines the [constrained](#) list into a [feasible](#) list that can be included in the biosecurity plan.

Data Input

The data input tab has multiple questions which require a yes/no input. These questions relate to the information that is collected when completing sections 1a, 1b and 1c of the proforma.

When assessing an existing site, if supporting infrastructure is not present, but a Blueway developer or operator plans to install it in the future – ‘Yes’ should be selected as the appropriate response.

Step 3: Constrained Data Output

The Biosecurity Tool outputs a [constrained](#) list of biosecurity recommendations. Some of the recommendations are applicable to all sites and will not change regardless of the data input. However, some recommendations are dependent on the data input and these will automatically change the output recommendation tab. The [constrained](#) output should be copied into Section 2 of the proforma (Appendix 1) – note this is a manual copy and paste operation; the Tool cannot do this automatically.

Step 4: Assessing feasibility

The steps up until this point allow the user to produce a draft biosecurity plan with a selection of [constrained](#) recommendations that are broadly applicable to a specific site. This list is still fairly extensive and will contain options that are not intended to be implemented together (for example hoses and pressure washers and steam cleaners. Complete biosecurity plans should present a clear and feasible outline of what the site will look like after biosecurity implementation, and how this will be achieved in a proportional way.

Blueway developers and operators can define their own criteria for filtering the [constrained](#) into a [feasible](#) list, however, the ‘Biosecurity Summary for Developers’ document and the principles below should be considered:

- The **number and placement of individual recommendations** required on site (e.g. three boot brushes located at site entrance/exit). This is important in effectively implementing measures in areas with high visitor numbers to maximise usage and ensuring that all areas of the site have accessible biosecurity. This must also consider the supporting infrastructure required for the recommendation, where this is placed currently, or the viability of intended placement. Particular consideration can be paid to the annual visitor numbers, the IAS currently present on site, and the presence of protected species or [vulnerable] habitats. Biosecurity should be considerate of stopping IAS leaving the site as well as preventing IAS from entering.
- **Budget** is an important limiting factor in decision making. Balancing budget and biosecurity efficacy is important in determining an effective list of [feasible](#) options. Though the ‘gold standard’ site biosecurity would encompass a range of options catering to many different activities, in smaller sites with fewer visitors and activities, a selection of down-scaled recommendations – for example unpressurised hose, and simple boot brushes and drainage – may still meet the site-specific biosecurity requirements in a more cost-effective and proportional way.
- The **timescale for implementation** often determines the extent of initial biosecurity implemented on site and is influenced by many of the other considerations listed here. It important to note that biosecurity is continuously evolving and requires continuous

review, so there is no timescale in which biosecurity is 'complete' – beyond that of the initial installation of biosecurity measures. Measures which require the construction or connection to supporting infrastructure (for example a large washdown facility) may have a long timescale for implementation, whereas biosecurity signage will have a shorter timescale.

- **Funding mechanisms** are closely linked to budget. For example, the three sites visited by APEM will receive funding from Failte Ireland to provide visitor facilities for water sports users, which may provide some additional budget allocation for biosecurity facilities.
- Many of the recommendation have **operational considerations** throughout their lifetime (e.g., maintenance, cleaning, updating information, etc.). The capacity of the Blueway developer or operator that will burden the ongoing costs and responsibility associated with these recommendations is a crucial consideration; a lack of upkeep and resultant deterioration and datedness of recommendations will discourage their use.
- **Inter-site consistency** is crucial in encouraging uniform behaviour and expectations for visitors between different sites. This consideration is primarily aimed at biosecurity signage and communication, though may have application in the use and usability of washdown equipment.
- The **environmental impact of installation** may need to be considered from a carbon offsetting point of view. This is especially important for the larger recommendations that have a bigger disturbance upon the site.
- The **consideration of available resourcing** links closely into both budget, timescale, and operational considerations. There are many Blueway sites that may require biosecurity to be implemented which are unlikely to be completed parallel to each other. This is where an element of site prioritisation, determined by Blueway developers and operators, as to which sites to complete first. This will require consideration of factors like visitor numbers per annum and the risk posed by existing IAS on site.
- **Cost-benefit analysis** which considers existing site risk (e.g., number of IAS already present, number of visitors per annum, etc.) against cost to install. This encapsulates many of the other principles listed here. With the vast number of Blueways sites, maximising cost-benefit is a crucial step in achieving widespread and appropriate biosecurity.

Following the consideration of these wider principles, sections 3a and 3b of the proforma can be completed. This should include a site-specific map of the biosecurity measures selected – including their locations – as well as a commentary of details and justifications for the decisions made (why recommendations were included and excluded). Further information such as funding and implementation timescales should be provided in the context of Blueways Development.

Please note that the Blueway Partnership has not defined a minimum level of biosecurity that is required at a Blueway. However, developers and operators should attempt to reach the highest level of biosecurity possible as this will increase the environmental sustainability of their activities and reduce the chances that costly IAS eradication programmes will be needed in the future.

Appendix

Appendix 1: Biosecurity Plan Proforma (please use blank template provided separately)

<see next page>

Site Name:

Date of Field Assessment:

Trailhead Section:

Location Lat/Long:

1a) Facilities:

Are there any biosecurity facilities/signage currently present on site? If so, please note where...

Facility	Mark if present on site including location and accessibility for new infrastructure.
Electricity	
Running Water (hot/cold)	
Drainage	

Other Facilities of note....

Please note the location of any pinch points on site...

1b) Activities:

Do clubs operate on the site? If so, are these clubs Blueway affiliated or not? Please detail...

Activity	Mark if present on site including extent of enabling infrastructure (e.g. slipways)
Terrestrial Activities	
Paddling	
Swimming	
Sailing	
Powered Boating	
Angling	
Events	

Please detail any other activities on site of note...

Please list any enabling infrastructure on site and its location (e.g. slipways, canoe steps, fishing pegs, etc.):

1c) Further Information:

Please list any Invasive Alien Species known to be present on site:

Please provide an estimated site popularity per annum and popularity breakdown between seasons (if known):

Do external contractors visit the site (e.g., those undertaking ecological or engineering work)?

2) Biosecurity Recommendations:

Please paste using 'destination styles (s)' to ensure formatting is maintained as adjust column/row sizes as appropriate

3a) Site Map with recommendation locations


3b) Details and Justification

Appendix 2: Biosecurity Option Information Sheets


The tables below provide quick reference information for some of the biosecurity options recommended by the tool. Please refer to the **Biosecurity on the Blueways: a review of best practice and recommendations for improving biosecurity** report for more options, details and context.

<see next page>

Boot brushes

Biosecurity option	<p>Boot brushes (design 1): Simple dry boot brushing system.</p> <p>External (treated) timber frame containing sand and gravel. Posts (x2) to mount brushes and signage.</p> <p>Commercially available product (BootStation, from https://www.bootwash.co.uk/product/bootstation/) also shown. <i>Note that sand and gravel base is still recommended.</i></p>		
Description and summary of efficacy	Effective at removing IA plant seeds and propagules if used correctly.		
Representative image (final product / design may vary)	 <p>Images from https://ourstoriesandperspectives.com/2012/04/02/new-boot-brush-stations-curb-hitchhiking-seeds/ & https://www.bootwash.co.uk/product/bootstation/</p>		
Installation considerations	<p>Very simple to manufacture and install. No supporting infrastructure needed.</p> <p>Semi / non-permanent facility located at identified locations where footfall is significant or at a 'pinch-point' where users must pass to access the trail.</p>	CapEx estimate:	<p>€300.00 / unit.</p> <p>€630.00 / BootStation unit.</p>
Operational considerations	<p>Depending on frequency of use, will require operational cleaning (<30 mins / week).</p> <p>Brushes will need to be replaced as they become worn and unserviceable.</p> <p>Gravel will need to be topped up occasionally.</p>	OpEx estimate:	<€100.00 / unit / year.
Environmental impact	None, other than carbon-cost to manufacture	If yes, what mitigation:	n/a
Additional information	None.		


Boot wash

Biosecurity option	<p>Boot brushes and wash (design 2): Running water and drained wet washing facility.</p> <p>Many commercial products are available (e.g. Safe Fence Ltd., Icon Engineering). Plastic or metal troughs with brushes, sprays and drainage.</p>		
Description and summary of efficacy	<p>Effective at removing IA plant seeds and propagules if used correctly. Sprays and handheld brushes could also be used to clean other limited equipment and PPE, such as lifejackets, waders, dry suits etc.</p>		
Representative image (final product / design may vary)	 <p>Images from https://www.materialshandling.com.au/products/boot-cleaning-station/</p>		
Installation considerations	<p>Semi / non-permanent facility located at identified locations where footfall is significant or at a 'pinch-point' where users must pass to access the trail.</p> <p>Will require a water source – hot, mains water is the preference, but could be supplied with cold water from a storage tank if mains supply is not possible. Drainage / waste water handling is required – soak away drain is preferred but locating the facility on hardstanding or other “unfavourable” substrate could be considered.</p>	CapEx estimate:	<p><€1500 / unit. Estimate does not include additional infrastructure (e.g. drains).</p>
Operational considerations	<p>Depending on frequency of use, will require operational cleaning (<30 mins / week).</p> <p>Will require water supply and functional drainage.</p> <p>Brushes will need to be replaced as they become worn and unserviceable.</p>	OpEx estimate:	<p><€200 / unit / year.</p> <p>Estimate does not include the cost of maintaining water supply.</p>
Environmental impact	Increased carbon cost if supplied with hot water	If yes, what mitigation:	Use of on-demand hot water rather than storage tank
Additional information	None.		

Disinfection troughs / footwells / mats


Biosecurity option	Disinfection troughs / footwells / mats. Simple facilities to allow the 'handsfree' application of disinfectant to footwear or vehicle tyres. Users walk / drive through the disinfectant to remove pathogens from footwear / tyres.		
Description and summary of efficacy	Effective at removing pathogens from footwear. Not effective against plant and animal IAS, particularly on larger equipment.		
Representative image (final product / design may vary)	 <p>Images from https://feedbins.uk.com/footbaths/1782-large-personnel-disinfectant-footbath-fbp05.htm, https://agricle.com/en/suevia-boot-bath-160-108 & https://www.quillproductions.co.uk/products/quill-boot-dip</p>		
Installation considerations	Would need to be placed at every access point where foot / vehicular traffic occurs.	CapEx estimate:	<€100 / unit
Operational considerations	<p>Mats are most appropriate for public use sites where footwear may not always be waterproof.</p> <p>Foot troughs and footwells are not recommended where general public access occurs.</p> <p>Significant operational burden to keep disinfectant replenished and facilities clean.</p> <p>Only likely to be of cost benefit during disease outbreaks (this is particularly the case for tyre troughs).</p>	OpEx estimate:	<p>Negligible ongoing cost unless replacement required; however, operational burden is high.</p> <p>€0.32 / litre of (e.g.) Virkon</p>
Environmental impact	Disinfectant has inherent toxicity	If yes, what mitigation:	Use a product which degrades to a non-toxic product. Such as Virkon
Additional information	None.		

Disinfection stations

Biosecurity option	Disinfection stations. Dip tanks to allow the totally immersion of equipment in disinfectant, or the provision of sprayers to allow for cleaning of larger equipment and possible water craft. Dip tanks are a simple [deep] bucket of trough.		
Description and summary of efficacy	Effective at removing pathogens and may broadly assist with cleaning (if detergent / surfactant). Should not be considered effective against plant and animal IAS, particularly on larger equipment.		
Representative image (final product / design may vary)	 <p>Image from https://thefishsite.com/articles/biosecurity-in-aquaculture-part-1-an-overview and https://www.screwfix.com/p/solo-so453-transparent-wheeled-trolley-sprayer-11ltr/199CF?tc=ET8&ds_kid=92700052138697960&ds_rl=1249410&gclid=EAlaIqObChMim_TLnMaH-AIVdJB0CR1iKQ0LEAQYBCABEgIka_D_BwE&gclidsrc=aw.ds</p>		
Installation considerations	More applicable to angling or during times of disease outbreaks. However, could have use for cleaning wetsuits, paddles, and other equipment. Would need to be placed effectively to ensure user uptake.	CapEx estimate:	<€100 / unit
Operational considerations	<p>Significant operational burden to keep disinfectant replenished and facilities clean.</p> <p>As disinfectant is depleted dip tanks can actually become a reservoir for IAS.</p> <p>Health and Safety concern associated with misuse means that best procedure is to only allow trained users access.</p> <p>However, could be useful to supply activity providers with this facility particularly if disease is a concern.</p>	OpEx estimate:	<p>Negligible ongoing cost unless replacement required; however, operational burden is high.</p> <p>€0.32 / litre of (e.g.) Virkon</p>


Environmental impact	Disinfectant has inherent toxicity	If yes, what mitigation:	Use a product which degrades to a non-toxic product.
Additional information	None.		

Water supply


Biosecurity option	It is critical that for Check, Clean, Dry protocols to be carried out on site (where applicable) a water supply is provided. Water can be supplied via a water main, or by the provision of a tanked supply. Intermediate Bulk Carriers (IBCs), towable water bowzers (which can come fitted with a portable pressure washer), or semi-permanent storage tanks provide a range of flexible option for ensuring water is available on sites.		
Description and summary of efficacy	Clean water provides the supporting supply for other cleaning methods.		
Representative image (final product / design may vary)	 <p>https://www.directwatertanks.co.uk/1000-litre-new-schutz-ibc-steel-pallet-un-approved, https://www.directwatertanks.co.uk/1125-litres-3000-psi-highway-pressure-washer,</p>		
Installation considerations	<p>Minimal installation considerations if using tanked supply. Potentially areas of hardstanding or buried tanks need.</p> <p>Mains connection could potentially be costly and logistically difficult. Particularly at remote sites.</p> <p>Is only feasible if there is an existing mains supply on / near / adjacent to site that can be extended to meet the washdown facility demands of the site.</p>	CapEx estimate:	<p>€250 / unit (1000 L IBC)</p> <p>€9000 / unit (1125 L bowser w/ pressure washer)</p> <p>€3500 / unit (1125 L bowser)</p> <p>>€60 / m water main installation (pipework only)</p> <p>– water provider may have additional connection charge</p>
Operational considerations	Tanks would require regular filling either by operational staff or by a third-party contractor.	OpEx estimate:	Negligible ongoing cost unless replacement / repair

	Mains water supply requires minimal maintenance or operational input after install. Cost of increased water usage.			required; however, operational burden could be high. €300 / 1000 L delivery (estimate)
Environmental impact	Carbon-cost of water deliveries is high.	If yes, what mitigation:	Install water main as preference.	
Additional information	Cost of mains water supply may vary dependent on billing tariff and / or usage frequency.			

Hot water supply




Biosecurity option	Hot water can either be supplied through an on demand (electric or gas) point of use system, or by a more traditional water heater and storage tank.		
Description and summary of efficacy	A hot water supply increases the efficacy of Check, Clean, Dry, particularly regarding IAS priority species such as <i>Dikerogammarus villosus</i> .		
Representative image (final product / design may vary)	 <p>https://www.aquahot.co.uk/rinnai-hd55e-infinity-external-multipoint-water-heater-526kw-natural-gas</p>		
Installation considerations	<p>Connecting a washdown facility to an existing hot water supply already on site, for example at cafés or other infrastructure, is the most cost-effective way of obtaining hot water; however, this is only likely to be feasible at a handful of sites.</p> <p>There are standalone external systems available (also see pressure washer options) which would require power / gas supply, and potentially a small building or shelter to house.</p>	CapEx estimate:	<p>€2500 / unit external water heater (other costs dependent on requirement)</p> <p>>€60 / m pipework installation</p>
Operational considerations	<p>Increased electrical or gas cost. Some ongoing maintenance required.</p> <p>Health and Safety concern associated with misuse means that best procedure is to only allow trained users access.</p>	OpEx estimate:	
Environmental impact	Carbon-cost of heating water is high.	If yes, what mitigation:	Installing a system that works on demand
Additional information	Cost of mains water supply vary dependent on billing tariff and / or usage frequency.		

Pressure washers and steam cleaner

Biosecurity option	An external wall mounted system could be installed and be made available to users to clean their equipment before and after entering the water		
Description and summary of efficacy	Pressure washing and steam cleaning are effective against many IAS, including macrophyte species and the priority species <i>D. villosus</i> .		
Representative image (final product / design may vary)	 <p>https://www.karcher-center-traffic.co.uk/karcher-hds-815-e-stainless-steel-pressure-washer; https://www.bgclean.co.uk/product/mac-avant/, and https://makitauk.com/product/dhw080zk (images not to scale)</p>		
Installation considerations	<p>As electricity and water connection may not always be available, alternative options such as fuel or (small) cordless battery powered systems could be considered. Cordless units could be provided to activity providers.</p> <p>Consideration must be given to appropriate placement, user instruction / assistance, and waste management.</p>	CapEx estimate:	<p>€2200 / unit (mobile, semi-industrial, cold water only)</p> <p>€3000 / unit (mobile, industrial hot water capability)</p> <p>€4500 / unit (static, industrial, hot water capability)</p> <p>€5500 / unit (static, industrial, steam cleaner)</p> <p>€500 / unit (cordless, handheld, pressure washer)</p>

Operational considerations	Efficacy is affected by user technique. Health and Safety concern associated with misuse means that equipment should be provided with caution.		OpEx estimate:	Water and electricity cost; however, these facilities could be run under a cost-recovery model, with a charge for their use.
Environmental impact	Carbon-cost of heating water is high.	If yes, what mitigation:	Approach manufacturers to provide the most efficient system. Limit user usage.	
Additional information	None.			

Washdown / make-ready area


Biosecurity option	Washdown area (full, permanent facility). Installation of an integrated washdown facility; to include a permanent location, running water, area of hardstanding with effective drainage. Isolated from the water body by at least a soak away drain. With supporting procedures for waste disposal.
Description and summary of efficacy	A well designed and positioned washdown facility could dramatically improve the uptake and ability for users to perform Check, Clean, Dry.
Representative image (final product / design may vary)	   <p>https://www.britishcanoeing.org.uk/news/2021/new-biosecurity-facilities-in-the-south-west & https://parks.tas.gov.au/explore-our-parks/know-before-you-go/biosecurity</p>

Installation considerations	Washdown facilities must be well positioned, either at a pinch-point location, where users must pass through to gain entry or exit to a Blueway trail, or at another prominent location. Facilities must be designed and maintained to ensure that cleaning ‘workflow’ is fast and effective. Drainage is critical and waste water must be isolated from the waterbody. Other capital considerations may include: taps, pipework and fittings; trestles or benches; subsidiary cleaning tools and equipment; and electrical hook-up.		CapEx estimate:	Cost dependent on many variables, but estimated €5,000 – 25,000
Operational considerations	Operational considerations for specific washdown equipment (e.g. pressure washers) are addressed in other summary tables. However, there will be a baseline maintenance and operational burden associated with washdown facilities – this will include the removal or waste, ensuring drainage is functional, monitoring usage and awareness,		OpEx estimate:	€200 / yr Plus staff time
Environmental impact	Carbon-cost to build. Permanent artificial infrastructure, including concrete base. Electrical supply – if powered washer installed.	If yes, what mitigation:	Cost-benefit to biosecurity is acceptable.	
Additional information	None.			


Biosecurity kit 1

Biosecurity options	Biosecurity kits for operational staff (design 1, Disinfection Bag, from: Biosecurity Guidance and Protocols for Waterways Ireland Staff and Associates [Draft], INVAS Biosecurity)		
Description and summary of efficacy	<p><i>The INVAS Biosecurity Disinfection bag is designed to be a convenient, effective and easy to use portable disinfection unit for use in the field and near watercourses. Includes: small bag, 500ml spray gun, gloves, and brush.</i></p> <p>Virkon Aquatic is intended for use against pathogens, and although may have effect against other IAS organisms, it should be noted that it is not approved for this use. The act of boot scrubbing is likely to remove other IAS but may not result in lethal effect.</p> <p>However, this is a cheap option that would result in a net gain to biosecurity for operational staff.</p>		
Representative image (final product / design may vary)	 <p>Image from: Biosecurity Guidance and Protocols for Waterways Ireland Staff and Associates [Draft], INVAS Biosecurity</p>		
Installation considerations	n/a	CapEx estimate:	€16.00 ex VAT
Operational considerations	<p>Virkon has finite lifetime and will need to be replenished.</p> <p>Kit is simple to use and easy to carry. Care would need to be taken to ensure that IAS plant seeds, for example, are not scrubbed off at different sites or carried in the bristles.</p>	OpEx estimate:	€16.75 / 50 virkon aquatic tablets
Environmental impact	Virkon is environmentally passive if used correctly.	If yes, what mitigation:	Ensure users are trained.
Additional information	none		

Biosecurity kit 2



Biosecurity options	Biosecurity kits for operational staff (design 2, Disinfection Kit Box, from: Biosecurity Guidance and Protocols for Waterways Ireland Staff and Associates [Draft], INVAS Biosecurity)		
Description and summary of efficacy	<i>The INVAS Disinfection KIT Box is ideal for field work, inspections and sampling work. It fits neatly into the back of your car. Includes: container box with lid and handle, 1L handheld sprayer, 5L clean water container, Boot bath, Box with 100 latex gloves, Box of J Cloths, and Brush. Virkon Aquatic is intended for use against pathogens, and although may have effect against other IAS organisms, it should be noted that it is not approved for this use. The act of boot scrubbing is likely to remove other IAS but may not result in lethal effect; however, the addition of the boot bath will provide a mechanism for capturing any IAS knocked off the boots. Disposal can then be handled in a more controlled way (in comparison to design 1) and cleaned using a more appropriate CCD protocol.</i>		
Representative image (final product / design may vary)	<div></div> <p>Image from: Biosecurity Guidance and Protocols for Waterways Ireland Staff and Associates [Draft], INVAS Biosecurity</p>		
Installation considerations	n/a		CapEx estimate: €75.98 ex VAT
Operational considerations	Virkon has finite lifetime and will need to be replenished. Kit is simple to use and easy to carry – although less mobile than design 1. The boot bath and associate tools would need to be clean and dried to ensure that it does not become a reservoir for IAS.		OpEx estimate: €16.75 ex VAT / 50 virkon aquatic tablets
Environmental impact	Virkon is environmentally passive if used correctly.	If yes, what mitigation:	Ensure users are trained.
Additional information	none		

Biosecurity kit 3

Biosecurity options	Biosecurity kits for operational staff (design 3, Disinfection ProBox, from: Biosecurity Guidance and Protocols for Waterways Ireland Staff and Associates [Draft], INVAS Biosecurity)		
Description and summary of efficacy	<p><i>The INVAS Disinfection ProBox is a rugged container made for daily work and rough handling; it is ideal for working from the back of trucks and jeeps. Includes: . Disinfection box with lid and handles, 3lt durable sprayer, 5lt clean water bottle, Boot bath, Box containing 100 latex gloves, Box of J Cloths, and Brush.</i></p> <p>Virkon Aquatic is intended for use against pathogens, and although may have effect against other IAS organisms, it should be noted that it is not approved for this use. The act of boot scrubbing is likely to remove other IAS but may not result in lethal effect; however, the addition of the boot bath will provide a mechanism for capturing any IAS that are knocked off the boots. Disposal can then be handled in a more controlled way (in comparison to design 1) and cleaned using a more appropriate CCD protocol.</p> <p>Although there is an increased capacity of this design, and some additional cleaning tools, efficacy is not likely to be significantly improved in comparison to design 2.</p>		
Representative image (final product / design may vary)	 <p>Image from: Biosecurity Guidance and Protocols for Waterways Ireland Staff and Associates [Draft], INVAS Biosecurity</p>		
Installation considerations	n/a	CapEx estimate:	€96.64 ex VAT
Operational considerations	Virkon has finite lifetime and will need to be replenished.	OpEx estimate:	€16.75 ex VAT / 50 virkon aquatic tablets


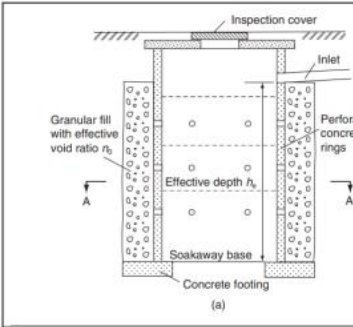
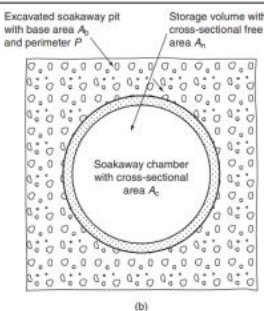

	Kit is simple to use and easy to carry – although less mobile than design 2. The boot bath and associate tools would need to be clean and dried to ensure that it does not become a reservoir for IAS.			
Environmental impact	Virkon is environmentally passive if used correctly.	If yes, what mitigation:	Ensure users are trained.	
Additional information	none			

Mobile watercraft washdown

Biosecurity option	Mobile watercraft washdown units and water-less cleaning systems		
Description and summary of efficacy			
Representative image (final product / design may vary)	 <p>https://www.canr.msu.edu/clean_boats_clean_waters/Mobile-Boat-Wash/mobile-boat-wash-parts</p>  <p>https://www.cd3systems.com/PRODUCTS/</p>		
Installation considerations	Watercraft washdown units are essentially refined, stand-alone, pressure washing and waste collection systems, designed for the cleaning of boat hulls with hot and / or pressurised water hoses and a containment mat. They can be mounted on a trailer and mobilised, or a permanent	CapEx estimate:	Unknown. Estimated minimum €25,000

	facility can be located near to or within the site boundaries. The containment mat is emptied via a pumped hose system and the collected wastewater can then be disposed of appropriately. Water-less units are similar to pressure washers in scope but require no running water.			
Operational considerations	Water-less boat cleaning is a relatively novel method. Grabber tools and brushes are used to remove visually identified plant fragments, animals and mud. Subsequently, water lying in the boat is drained (wastewater is disposed of appropriately) and vacuumed and then the watercraft is dried. There will be a baseline maintenance and operational burden associated with these facilities – this will include the removal or waste, monitoring usage and awareness,		OpEx estimate:	
Environmental impact	Increased carbon-cost	If yes, what mitigation:	Cost-benefit to biosecurity is acceptable.	
Additional information				

Waste management


Biosecurity option	Waste management (waste removal and drainage).		
Description and summary of efficacy	<p>IAS are unlikely to survive drain to soakaway.</p> <p>IAS waste treated as hazardous could be disposed of by a specialist contractor.</p>		
Representative image (final product / design may vary)	<div style="display: flex; align-items: center;">  <div style="margin: 0 20px;">   </div>  </div> <p>Figure 1: A potential design of a soakaway with pipe inflow and inspection cover for maintenance (Credit: Chen and Stevenson, 2008)</p> <p>https://mslandscapes.co.uk/portfolio/soakaway-in-corfe-mullen-dorset/ & https://anglingtrust.net/wp-content/uploads/2021/08/Biosecurity-wash-down-guidance-for-angling-clubs-and-fisheries_FINAL.pdf & https://www.manutan.co.uk/en/key/large-four-wheel-wheelie-bin-1100l-a333819?shopping=true&gclid=EAlaIqobChMIn86wifYj-</p>		
Installation considerations	<p>Specialist advice and design should be commissioned before installing a soakaway. However, a soakaway is essentially a trench that feeds waste water via a pipe to a pit backfilled with hardcore or an assemblage of soakaway crates.</p> <p>An IAS waste bin could be provided at washdown facilities to allow large IAS fragments to be disposed of. Not all IAS waste has to be treated as hazardous, but consideration to treat all IAS as such would be prudent.</p>	CapEx estimate:	>€1500 / soakaway €350 / unit (waste bin)
Operational considerations	<p>Minimal operational burden for the maintenance of a soakaway other than removing / reducing blockages. There is an operational burden, however, in ensuring that the IAS waste bins are cleaned and emptied regularly. Also, there would need to be provision to ensure that waste bins are only used for IAS waste.</p>	OpEx estimate:	Waste disposal cost.

Environmental impact	None.	If yes, what mitigation:	
Additional information	None.		

IAS survey and monitoring programmes

Biosecurity option	Surveys and monitoring.		
Description and summary of efficacy	An effective programme of IAS survey and monitoring can provide a baseline of IAS presence and allow for effective rapid response should a new IAS be detected. IAS monitoring can take the form of user vigilance, sighting records review, or formal surveys by stakeholders or third-party consultants, all of which improve the chances of discovering a new IAS introduction.		
Representative image (final product / design may vary)	n/a		
Installation considerations	An ecological survey or monitoring programme can be difficult to effectively design and is potentially an ongoing activity. User vigilance / citizen science is a useful way of improving data but is limited by expertise and coverage.	CapEx estimate:	€3000 / formal survey (approx.)
Operational considerations	Minimal operational burden for a formal monitoring programme if outsourced to a consultancy; however, managing an inhouse programme and / or planning and communicating citizen science activities can present a significant burden. Likely to be managed by the biosecurity manager (or equivalent) role.	OpEx estimate:	
Environmental impact	None.	If yes, what mitigation:	
Additional information	None.		

Training, awareness and accreditation programmes

Biosecurity option	Training, education, awareness and accreditation programmes		
Description and summary of efficacy	<p>Raising awareness of IAS at all levels is a critical and demonstrable mechanism for increasing the uptake of biosecurity. For general users: awareness can be raised through a number of mechanisms, such as on-site signage and leaflets, information from activity providers, general online messaging, and targeted messaging through National Governing Bodies, clubs, and other community awareness campaigns.</p> <p>Activity providers and more directly involved stakeholders can be engaged through a more formal approach, including training programmes, and / or ongoing competency assessment leading to biosecurity accreditation. They can also be used to provide updates and training to general users.</p> <p>Operational staff could have biosecurity guidance provided for them – this should be regularly reviewed and update, particularly as biosecurity equipment is installed and policy changes.</p> <p>Education and awareness is arguably the most important aspect of biosecurity but must be conscious of the need for physical facilities to fully enable effective biosecurity.</p>		
Representative image (final product / design may vary)	 <p>https://www.nonnativespecies.org/assets/Document-repository/APHA_Stop_the_spread_Washdown_signs_AW_Paddling1.pdf &</p>		
Installation considerations	<p>Signage should be placed in locations where it will be seen. Too much signage can also cause messaging fatigue, so quantity should also be considered alongside placement. All awareness raising activities should follow the Check, Clean, Dry campaign and ensure that messaging is consistent.</p> <p>Training programmes for activity providers should be simple and concise – with messaging limited to the critical requirements. There are free online training resources, such as those</p>	CapEx estimate:	<p>€25 / sign</p> <p>Accreditation could possibly be cost-recovered from activity providers.</p> <p>Initial development of a training programme will</p>

	provided by the GB Non-native Species Secretariat, that could be utilised as a cost-effective way of providing training. There are examples of biosecurity accreditation (e.g. AQUA) for the aquaculture sector which could provide a model for application to the Blueways. The existing Blueways accreditation could be modified to include assurance and accreditation of the biosecurity activities of the activity providers.		require some cost and effort to implement. Difficult to cost without knowing scale of programme and the cost of WI staff time. Most other activities are likely to be of operational cost.	
Operational considerations	There will be an ongoing operational burden for all parts of these options. Training and awareness need continual review and improvement. Accreditation will need to be re-assessed periodically. Signage will need repair and replacement and they weather or are otherwise damaged.		OpEx estimate:	Mostly operational time, small budget for signage maintenance.
Environmental impact	None.	If yes, what mitigation:	n/a.	
Additional information	None.			

Management and policy

Biosecurity options	Biosecurity management and policy. A biosecurity manager should hold the responsibility for implementing and managing the biosecurity strategy as well as owning and updating strategic biosecurity plans. The role would provide an interface between all stakeholders and be positioned to influence all levels of activities at the Blueways.		
Description and summary of efficacy	Managing biosecurity from a central location and providing top-down strategic direction, funding and engagement will improve the consistency and effectiveness of biosecurity implementation across all sites. The role would provide a point of contact for all stakeholders. Bylaws and legislation could be enacted or modified to better account for biosecurity requirements at Blueways sites – depending on policy this could allow power of prosecution for lack of adherence to biosecurity at the Blueways.		
Representative image (final product / design may vary)	n/a		
Installation considerations	A strategic decision is required on whether Biosecurity roles are fulltime posts at the Blueways partner / accreditation level or could be filled part time by existing staff at the Blueway developer / site manager level. Ensuring there is process in places that the interests of all stakeholders are effectively represented. Enacting bylaws may give the wrong message to users and could be difficult to police.	CapEx estimate:	n/a
Operational considerations	New yearly salary, or increased wages for existing staff.	OpEx estimate:	<€40,000 pa (depending on how the role is recruited)
Environmental impact	None.	If yes, what mitigation:	
Additional information	None.		

Rapid response and contingency planning

Biosecurity option	<p>Rapid response / contingency planning. Formalised planning to identify and priorities high impact IAS and develop contingency plans for the event of their introduction.</p> <p>Plans could simply be high-level instructions or procedures, but the “gold-standard” would be species / site specific plans, detailing the habitats, the IAS life cycles / histories, and the available management / eradication tools.</p>		
Description and summary of efficacy	Ineffective at preventing introductions; but, critical for improving the chances of removing IAS post-introduction.		
Representative image (final product / design may vary)	n/a		
Installation considerations	Development and implementation of contingency planning requires significant time, effort and understanding of the IAS, site operations, organisational dynamic, and funding streams.	CapEx estimate:	<p>Approx. €3000 / plan.</p> <p>Estimate only includes the time to develop a plan.</p> <p>Actual cost to implement will vary.</p>
Operational considerations	Plans must be regularly reviewed to ensure that best practice and management options are considered.	OpEx estimate:	<€500 / year. Estimate only includes the time to review.
Environmental impact	Could be significant depending on the contingency / management chosen.	If yes, what mitigation:	Ensure that environmentally “friendly” contingencies are given priority (where all other considerations are equal e.g. efficacy)
Additional information	None.		

Contractor awareness procedures

Biosecurity option	Contractor awareness procedures.		
Description and summary of efficacy	<p>Contractors should provide contractual assurance that they will work in a biosecurity way, and on a risk basis, provide a formal plan of IAS management and biosecurity that is linked to their activities.</p> <p>Contractors should be provided with the site biosecurity plans, or a rules for contractors guidebook, well in advance of the visit. Upon arrival contractors should be thoroughly briefed by site managers and biosecurity procedures reiterated. It may be necessary to accompany contractors during the visit, but this can be determined on a case-by-case basis.</p> <p>Controlling the activities of visiting contractors in a biosecure manner could significantly reduce the possibility of IAS transfer during construction and other works.</p>		
Representative image (final product / design may vary)	n/a		
Installation considerations	There would be an initial requirement to draft rules for contractors and potentially update any contractual agreements to include clauses for biosecurity.	CapEx estimate:	<€2,500 (uncertain)
Operational considerations	The requirement to brief and possibly accompany contractors during their visit would increase operational burdens. Procedures would need review and some continued consumable budget would be needed.	OpEx estimate:	<€1,000 /yr (uncertain)
Environmental impact	None.	If yes, what mitigation:	n/a
Additional information	None.		

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