

Biosecurity Facility Decision Support Tool

User guide and full descriptions of options

1. Introduction

What is this tool for?

The Biosecurity Facility Decision Support Tool was developed for recreational site owners, managers and/or operators to facilitate development of new or enhancement of existing biosecurity facilities for aquatic recreational activities. Sites can include but are not limited to recreational clubhouses (e.g. angling clubs, canoes clubs), marinas and boatyards and/or reservoirs and lakes. The tool also includes options for operators of events where portable biosecurity facilities are needed.

This user guide provides instruction on how to use the tool as well as providing full descriptions of options.

The tool described in this user guide provides biosecurity facility planners with the ability to self-assess sites, producing a personalised constrained output that is dependent upon site-specific details.

Tool overview

The tool has been built in Microsoft Excel® to facilitate accessibility. It has been automated as much as possible so that site data can be easily and efficiently entered by a user, with site specific recommendations generated rapidly. Within the Excel workbook there are two working tabs:

- **Data Input:** This tab is used to input the relevant data to generate the site-specific biosecurity recommendation outputs.
- **Recommendations:** This tab provides a list of site-specific biosecurity recommendations based upon the information entered in the Data Input tab.

To provide versatile and bespoke options to specific site conditions, the tool has had to make assumptions in how it generates the recommendations:

- Assumes that the recommendations requiring supporting infrastructure (e.g. drainage, electricity, running water) will be implemented where that infrastructure is in fact present and accessible to be built around; and
- Assumes every site is an independent unit, with the assumption that there is no connectivity between sites.

2. How to use the tool

Step 1: Site Visit

The user should aim to provide as much site-specific information as possible. Visiting and being familiar with the site plus completing desk-based research is vital for understanding input required for the options guide tool.

Step 2: Data Input

The following information is needed for entry into the 'Data Input' tab of the Biosecurity Facility Options Guide Tool:

- Infrastructure
 - Electricity
 - Cold running water
 - Hot running water
 - Portable water supply
 - Drainage
- Pathways
 - Paddling
 - Swimming
 - Non-motorised watercraft
 - Motorised watercraft
 - Angling
 - Aquatic events
- Funding available
 - Capital costs
 - Operational costs
- Site conditions
 - Permanent or portable

The user will need to use the drop-down menus to answer questions for each criterion. With regards to Infrastructure and Pathways, these are simple 'Yes' or 'No' answer questions and additional information has been given for the variables to provide clarity on what is meant by each. The Capital and Operational cost responses are separated into 5 budget ranges and users should choose which ranges are most appropriate to them. The data input for Site conditions has two options; 'Permanent' and 'Portable' and users should choose their answer based on whether their activity site has a fixed location or not.

Background calculations are contained within hidden spreadsheets in the tool. If any modification to the tool needs to be done, these sheets can be unhid. It is advised, however, that the user should not edit the tool beyond the inbuilt criteria, as this may corrupt the background calculations.

Step 3: Data Output

Following the input of data, a list of appropriate 'constrained' recommendations is produced.

The recommendations have been grouped into the following categories.

- **Infrastructure (IF)** - ensuring there are appropriate systems at sites to facilitate implementation of biosecurity recommendations, e.g. water supply and drainage, or inform users, e.g. signage.
- **Mechanical/Physical treatments (MT)** - using water, heat or manual tools to treat equipment or crafts to effectively remove INNS.
- **Chemical treatment (CT)** - using chemical disinfectants to cause INNS mortality.

Capital cost estimates have used real equipment examples where possible and links to examples of equipment sellers have been included in the facility information tables below. The

main sources for required equipment are from accessible and affordable suppliers, like Direct Water Tanks and Screwfix, to facilitate acquisition by non-commercial buyers.

Operational cost estimates have been calculated based on current (2022) information with regards to electricity supply (£0.34 per kwh), gas supply (£0.15 per kwh) and water supply (£300 per 1000L). Operational costs will also depend on the facility usage which will vary significantly for different sites. Estimates have been calculated based on 4 hours of daily use at the manufacturer-stated wattage of the electrical appliances, or gas consumption of gas-powered appliances, and multiplied over 365 days.



The cost estimates should act only as an indication of the potential financial demands of the biosecurity facility options. The tool will not omit biosecurity facility options from the recommendations that exceed the user's stated capital or operational budgets, however, those that do exceed these budgets will be highlighted in red so that they are clearly marked. Additionally, the tool will not omit biosecurity facility options that do not share the same site characteristics (i.e. are permanent or portable). Instead, if, in the 'Data Input' sheet, the site is marked as 'portable', all permanent biosecurity options will be highlighted in red. If the site is marked as 'permanent', however, portable options will remain highlighted in green because it is possible for portable devices to be used at permanent facilities, for example, to enhance or elevate current permanent infrastructure.

Step 4: Additional considerations




- Waste facilities and procedures
 - Waste facilities, like bins and bags, must be provided for users to dispose of material that becomes dislodged while undertaking cleaning procedures.
 - Material that is hazardous or may contain INNS must be disposed of appropriately. This will incur additional fees.
- Operational/Environmental permits and approvals
 - Installing permanent facilities or infrastructure may be subject to planning permission regulations or require approval from environmental bodies.
 - Recreational clubs, organisers and activity providers may wish to update their operational permits to include adherence to biosecurity practices for users of the site, perhaps in the form of a by-law or code-of-conduct.
- Specific washdown Check, Clean, Dry (CCD)
 - Activity-specific washdown guidance, e.g. CCD signage, should be located at the facilities, or at pinch points.
 - Some specialist equipment may have specific washdown procedures and site managers may consider providing facilities that reflect these requirements.
- Carbon cost and the environmental impact of facilities
 - Care should be taken to reduce the carbon cost of installing and operating biosecurity facilities as much as is feasible and prevent any spillage of hazardous or environmentally damaging materials, e.g. disinfectants.
 - When constructing new infrastructure, consider alternatives to concrete use if possible, as concrete has a large carbon footprint.

Biosecurity Facility Options - Information Sheet

IF.1 Signage


Biosecurity option	Signage		
Description and summary of efficacy	Clear signage relevant to the water use describing the reason for biosecurity measures to educate visitors and encourage participation, as well as the actions required. Use national guidance, e.g. "Check, Clean, Dry" campaign.		
Representative image (final product / design may vary)			
Installation considerations	If they are external, they must be weather-proof and visible. The number of signs needed will depend on how large the site is and how many exit and entry areas there are into the water body. Consider the method of erecting the sign, e.g. on a wooden stake in the ground or attached to a chain link fence. Ensure that the message is applicable, and signage is not obstructed or damaged.	CapEx estimate:	£675 / unit (aluminium frame and legs as above right, size A1)
Operational considerations	Periodic cleaning and maintenance of signs may be necessary	OpEx estimate:	~£100 / year
Environmental impact	None.		
Additional information and Links	Labour costs for sign erection are not included. Operational costs refer to sign cleaning and maintenance but damage to or theft of signs, which results in the need for replacement should be considered. An example of a professional sign-making company and their pricings: Shelley Budget Prices 2020.indd (shelleysigns.co.uk)		

IF.2 Water supply


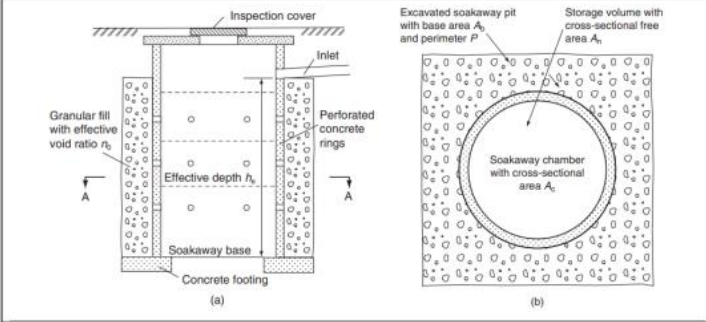

<p>Biosecurity option</p>	<p>Water supply</p>	
<p>Description and summary of efficacy</p>	<p>A water supply on site is critical for Check, Clean, Dry protocols to be carried out. Water can be supplied via a water main, or by the provision of a tanked supply. Intermediate Bulk Carriers (IBCs), towable water bowser (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.</p>	
<p>Representative image (final product / design may vary)</p>	<div style="display: flex; justify-content: space-around; align-items: center;">    </div> <p>Sources: https://www.directwatertanks.co.uk/grp-one-piece-tank-12000-litres-6160-x-2160-x-1130mm (left) https://www.directwatertanks.co.uk/1000-litre-new-schutz-ibc-steel-pallet-un-approved (centre) https://www.directwatertanks.co.uk/1125-litres-highway-water-bowser (right)</p>	
<p>Installation considerations</p>	<p>Minimal installation considerations if using tanked supply. Potentially areas of hardstanding or buried tanks needed.</p> <p>Mains connection could potentially be costly and logistically difficult, particularly at remote sites. This option 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> <p>Water provider may have additional connection charge.</p>	<p>CapEx estimate:</p> <p>£220 / unit (1000 L IBC, reconditioned options available from ~£100) £9000 / unit (1125 L bowser) £6600 / unit (12,000 L permanent tank) >£60 / m water main installation (pipework only)</p>

Operational considerations	Tanks would require regular filling either by operational staff or by a third-party contractor. Mains water supply requires minimal maintenance or operational input after install. Cost of increased water usage.	OpEx estimate:	Negligible ongoing cost unless replacement / repair required; however, operational burden could be high. £300 / 1000 L delivery (estimate)
Environmental impact	Carbon-cost of water deliveries is high.		
Additional information and Links	<p>Cost of mains water supply may vary dependent on usage frequency.</p> <p>Permanent tank, non-insulated starting price: GRP One Piece Tank - 12000 Litres - 6160 x 2160 x 1130mm - Direct Water Tanks</p> <p>Temporary tank, new (on steel pallets): 1000 Litre New IBC - Plastic Pallet - Direct Water Tanks, reconditioned (on steel pallets) 1000 Litre Reconditioned Water Tanks - From £49 - Direct Water Tanks</p> <p>Towable water bowser: 1125 Litres Highway Water Bowser - Direct Water Tanks</p>		

IF.3 Bunded areas

Biosecurity option	Construction of a bunded area		
Description and summary of efficacy	A raised wall or lip around an area where water and biological and/or hazardous waste is contained from cleaning watercraft or equipment. Waste would either seep into surface, be pumped out of the bunded area for treatment/disposal or be left to evaporate after use.		
Representative image (final product / design may vary)	 <p>Source: https://soligo.com.au/</p>		
Installation considerations	Placed in such a way so as to capture waste and waste water from the biosecurity facility.	CapEx estimate:	~£1000 / per 10x5m excl. labour / excl. installation of any drainage
Operational considerations	Bunded areas would only be viable where the volume of waste water is fairly low, or infrequently used.	OpEx estimate:	~£500 / year (general maintenance)
Environmental impact	Carbon-cost to build. Permanent artificial infrastructure.		
Additional information and Links	<p>Costs have been estimated based on a basic concreted area measuring 10m x 5m with no built-in drainage. Building and material costs will vary significantly depending on the size of the bunding area and any additional equipment or drainage systems employed (e.g. a pump).</p> <p>In a quote from a concrete supplier (Rapid ReadyMix, SM4 4LT), concrete was costed at £137.50 per m³ (ex VAT), for 10m x 5m x 10cm (5m³) concrete would cost £825 (inc VAT), not accounting for delivery or labour cost.</p>		

IF.4 Soakaways

Biosecurity option	Waste management (waste removal and drainage).		
Description and summary of efficacy	Drainage system whereby waste water is directed to a sub-ground level pit where it seeps into the surrounding substrate. No attachment to mains sewers is required. INNS are unlikely to survive drain to soakaway. INNS waste treated as hazardous could be disposed of by a specialist contractor.		
Representative image (final product / design may vary)			
Installation considerations	Specialist advice and design should be commissioned before installing a soakaway. 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. An INNS waste bin could be provided at washdown facilities to allow large INNS fragments to be disposed of. Not all INNS waste has to be treated as hazardous, but consideration to treat all INNS as such would be prudent.		CapEx estimate: >£1500 / soakaway £350 / unit (waste bin)
Operational considerations	Minimal operational burden for the maintenance of a soakaway other than removing / reducing blockages. There is an operational burden, however, in ensuring that the INNS waste bins are cleaned and emptied regularly. Also, there would need to be provision to ensure that waste bins are only used for INNS waste.		OpEx estimate: ~£500 / year (general maintenance)
Environmental impact	Permanent artificial structure.		
Additional information and Links	The cost of appropriate waste disposal must be considered.		

IF.5 FiltaBund system


Biosecurity option	FiltaBund system: Wash water collection mat and marine wash water recycling		
Description and summary of efficacy	This option could be considered for marinas and boatyards where boats are hauled out for washdown (using a power washer; details and price not incl. here) and/or storage. Wash water collection mats are ideal for sites with limited space or where haul out is confined to a few days a year (mats can be easily rolled up and stored). Water from the mats is removed using either a specialist puddle pump or a pumped vac and is sent on for processing. Marine wash water recycling systems consist of a bag pre filter followed by multi stage interception with automatic coagulant dosing. pH is then adjusted for copper and zinc removal. The processed water is sent through a sand filter to the reuse tank or discharged back to the marina or sewer.		
Representative image (final product / design may vary)	 <p>Source: K. O'Shaughnessy (left); Susan Scott (centre); FiltaBund: https://www.filtabund.com/marine (left)</p>		
Installation considerations	Some space is needed to lay out large mat for capture of waste and waste water from boats as well as space for treatment unit.	CapEx estimate:	Estimated £14k - >£25k but highly dependent on existing infrastructure
Operational considerations	This option should be undertaken by trained staff only. Annual running costs are highly dependent on scale of use and type of facility.	OpEx estimate:	Estimated ~ £1k but highly dependent on site
Environmental impact	During wash down, antifouling paints and other toxins may be washed off boats. This should all be captured in the collection mat, but staff should be cognisant of any toxins or waste that lands outside of the mat, as this debris should not be washed back into the water.		
Additional information and Links	FiltaBund: https://www.filtabund.com/marine		

IF.6 Dedicated washdown facility


Biosecurity option	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. 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)	<div style="display: flex; justify-content: space-around;">   </div> <p>Sources: https://www.britishcanoeing.org.uk/news/2021/new-biosecurity-facilities-in-the-south-west (left) https://parks.tas.gov.au/explore-our-parks/know-before-you-go/biosecurity (right)</p>		
Installation considerations	<p>Washdown facilities must be well positioned, either at a pinch-point location, where users must pass through to gain entry or exit to the water, 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.</p>	CapEx estimate:	Will vary significantly. Estimated between £25k - £150k
Operational considerations	<p>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 of waste, ensuring drainage is functional, monitoring usage and awareness.</p>	OpEx estimate:	Unknown, but may be relatively high. Frequency of maintenance may be high.

Environmental impact	Carbon-cost to build. Permanent artificial infrastructure, including concrete base. Electrical supply – if powered washer installed.
Additional information and Links	None.

MT.1 Hosepipe

Biosecurity option	Hosepipe		
Description and summary of efficacy	A hose pipe (ideally plus spray head) can be used to apply clean freshwater to a variety of equipment. It is typically attached to an external water tap. This is the most basic biosecurity infrastructure that can be provided at a site.		
Representative image (final product / design may vary)	 <p>Source: https://www.screwfix.com/p/hozelock-hose-cart-40m/3023v</p>		
Installation considerations	Placement depends on activities present on-site. Can be used at pinch points, such as near slipways or at entrances to sites. Must also consider appropriate drainage, as ideally, waste water would not be permitted to return to the water body.	CapEx estimate:	£70 / unit
Operational considerations	Little maintenance needed beyond ensuring that the hose and water supply is working appropriately. The provision of several attachments e.g. brushes, spray heads, etc. should be considered to improve the efficacy of application.	OpEx estimate:	Water supply ~£300 per 1000L
Environmental impact	none		
Additional information and Links	40m hose with cart for storage Hozelock Hose Cart 40m Hoses & Hose Reels Screwfix.com		


MT.2 Pressure Washer

Biosecurity option	Pressure washer		
Description and summary of efficacy	A professional pressure washer could be made available to users to clean their equipment before and after entering the water. These can be mobile systems or an external wall-mounted system could be installed. Pressure washing is effective against many INNS, including macrophyte species and the high impact species <i>Dikerogammarus villosus</i> .		
Representative image (final product / design may vary)	 <p>Sources: Pressure Washers Screwfix.com (left); Nilfisk MH 4M-100/680 cleaningsuperstore.co.uk (centre left); https://www.karcher-center-trafalgar.co.uk/karcher-hds-815-e-stainless-steel-pressure-washer (centre right); https://www.directwatertanks.co.uk/1125-litres-3000-psi-highway-pressure-washer (right)</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>£500 / unit (mobile, cold water)</p> <p>£3100 / unit (mobile, hot water capability)</p> <p>~£4500 / unit (static, hot water capability)</p> <p>~£7600 / unit (towable, cold water)</p>
Operational considerations	Efficacy is affected by user technique.	OpEx estimate:	<p>£300 / 1000L (water)</p> <p>~£1000 / year (electricity)</p>

	<p>Health and safety concern associated with misuse means that equipment should be provided with caution.</p> <p>These facilities could be run under a cost-recovery model, with a charge for their use.</p>		
Environmental impact	Carbon-cost of heating water is high.		
Additional information and Links	<p>If the site does not have a power supply, a generator should be used to power the pressure washer. If the site does not have access to a water supply, a temporary water source (e.g. an IBC) should be used. Estimates do not include the cost of any fuel or water heating (for systems with hot water capabilities).</p> <p>Professional pressure washer unit: Bosch GHP 5-65X 160bar Electric Professional High Pressure Washer 2400W 220-240V Pressure Washers Screwfix.com</p> <p>Hot water capable: Nilfisk MH 4M-100/680 PAX UK Including Hose Reel (cleaningsuperstore.co.uk)</p> <p>Petrol-powered generator: IMPAX IM1800IFG 1800W Inverter Frame Generator 240V Generators Screwfix.com</p> <p>1000L IBC: 1000 Litre New IBC - Plastic Pallet - Direct Water Tanks</p> <p>Towable bowser, pressure washer with own water and power (need to add fuel): 1125 Litres 3000 PSI Highway Pressure Washer - Direct Water Tanks</p>		


MT.3 Hot water supply

Biosecurity option	Hot water application
Description and summary of efficacy	<p>This can either be supplied through an instantaneous (electric or gas) point of use system, or by a more traditional water heater and storage tank. A hot water supply increases the efficacy of Check, Clean, Dry, particularly regarding INNS priority species such as <i>Dikerogammarus villosus</i>. Hot water improves effectiveness of biosecurity measures, as hot water ($\geq 60^{\circ}\text{C}$) applied for a short period of time (10 seconds) in a spray has been shown to kill some INNS. The hot water must be applied close to the equipment to be effective. Alternatively, the equipment should be submerged in hot water.</p>


<p>Representative image (final product / design may vary)</p>	 <p>Source: https://www.aquahot.co.uk/rinnai-hd55e-infinity-external-multipoint-water-heater-526kw-natural-gas</p>		
<p>Installation considerations</p>	<p>Joining up a washdown facility to an existing hot water already on site, for example at cafés or other infrastructure, is the most cost-effective way of obtaining hot water. 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. Placement depends on activities present. Can be used at terrestrial or aquatic pinch points - such as near slipways. Must also consider appropriate drainage as well.</p>	<p>CapEx estimate:</p>	<p>£2200 / unit external water heater (other costs dependent on requirement)</p>
<p>Operational considerations</p>	<p>Increased electrical or gas cost. Some ongoing maintenance required. Health and safety concern associated with misuse means that best procedure is to only allow trained users access.</p>	<p>OpEx estimate:</p>	<p>~£1500 / unit / year hot water boiler</p>
<p>Environmental impact</p>	<p>Carbon-cost of heating water is high.</p>		
<p>Additional information and Links</p>	<p>Cost of mains water supply vary dependent on usage frequency.</p>		

MT.4 Steam cleaners


<p>Biosecurity option</p>	<p>Steam cleaner</p>
<p>Description and summary of efficacy</p>	<p>High pressure steam cleaning system that can be used on watercraft, or other equipment. However, it should be considered that this approach may not be appropriate for more delicate equipment. The steam must be applied close to the equipment to be effective.</p>

<p>Representative image (final product / design may vary)</p>	<div style="text-align: center;">  </div> <p>Source: https://www.machinemarket.co.uk/p/sip-ph900200hds-hot-steam-pressure-washer/ (left) ; https://www.bgclean.co.uk/product/ehrle-hsc-cabinet-steam-cleaner/ (right)</p>		
<p>Installation considerations</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. Placement depends on activities present. Can be used at terrestrial or aquatic pinch points - such as near slipways. Must also consider appropriate drainage as well.</p>	<p>CapEx estimate:</p>	<p>£3300 / unit (mobile steam cleaner) ~£5600 / unit (static, industrial, steam cleaner)</p>
<p>Operational considerations</p>	<p>Increased electrical or gas cost. Some ongoing maintenance required. Efficacy is affected by user technique. Health and Safety concern associated with misuse means that equipment should be provided with caution.</p>	<p>OpEx estimate:</p>	<p>~£2000 / unit / year for 1000L</p>
<p>Environmental impact</p>	<p>Carbon-cost of heating water is high.</p>		
<p>Additional information and Links</p>	<p>Cost of mains water supply vary dependent on usage frequency. Portable steam cleaner: SIP Tempest PH900/200HDS 5.5kW Hot Steam Pressure Washer (400V) - Machine Mart - Machine Mart Cabinet (static) steam cleaner: Ehrle HSC Static Cabinet Steam Cleaner B&G cleaning systems Ltd (bgclean.co.uk)</p>		


MT.5 Pump-out and treatment unit

Biosecurity option	Pump-out and treatment unit		
Description and summary of efficacy	The unit is generally composed of an auto pump vacuum that pumps waste water from a containment mat (see 'Watercraft washdown units' above) to treatment tanks. Treatment can be via a variety of methods, such as UV or chemical dosing. Treated water can either be reused for washing of boats or discharged to the water body.		
Representative image (final product / design may vary)	 <p>Source: https://www.screwfix.com/p/karcher-sp7-dirt-inox-750w-dirty-water-pump/5301k (left); https://www.tanks-direct.co.uk/enduratank-500-litre-horizontal-static-water-tank/p479 (centre); Truro Boat Services (right)</p>		
Installation considerations	It should be located in an area of boat storage or near a slipway associated with forklift/haul-out system. Near to water and energy sources.	CapEx estimate:	£500 / unit (for pump, tank and hose)
Operational considerations	Treatment system may need regular maintenance checks. Approval from EA is required for discharge back to marina and approval from sewer operator is required for discharge to sewer.	OpEx estimate:	£370 / year (estimated electricity costs)
Environmental impact	Disinfectant (if used) has inherent toxicity		
Additional information and Links	Pump: Karcher SP7 Dirt Inox 750W Dirty Water Pump Water Pumps Screwfix.com 500L Tank: Enduratank 500 Litre Horizontal Static Water Tank Tanks Direct Ltd - Tanks Direct (tanks-direct.co.uk) Reinforced suction/delivery hose: Reinforced Suction / Delivery Hose Green 10m x 2" Water Pumps Screwfix.com		


MT.6 Boot wash

Biosecurity option	Boot and waders brushing and washing facility.		
Description and summary of efficacy	Plastic or metal troughs with brushes, sprays and drainage. Effective at removing aquatic INNS, plant seeds and propagules from boots and waders if used correctly. Sprays and handheld brushes could also be used to clean other equipment and PPE, such as lifejackets and dry suits.		
Representative image (final product / design may vary)	 <p>Source: https://www.materialshandling.com.au/products/boot-cleaning-station/</p>		
Installation considerations	Semi / non-permanent facility located at locations where footfall is significant, at a 'pinch-point' where users are required to pass and/or next to another facility such as a dip tank. 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 – soakaway drain is preferred but locating the facility on hardstanding or other “unfavourable” substrate could be considered.	CapEx estimate:	£1200 / unit.
Operational considerations	Depending on frequency of use, will require operational cleaning. Will require water supply and functional drainage. Brushes will need to be replaced as they become worn and unserviceable.	OpEx estimate:	~£200 / unit / year.
Environmental impact	Increased carbon cost if supplied with hot water.		
Additional information and Links	Estimates do not include the cost of additional infrastructure (e.g. drains) or the cost of a water supply. 2-person bootwash station https://www.tanks-direct.co.uk/2-person-bootwash-station/p45449		




MT.7 Waterless cleaning system

Biosecurity option	Water-less cleaning systems		
Description and summary of efficacy	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 the watercraft is dried via manual or air drying.		
Representative image (final product / design may vary)	 <p data-bbox="633 799 999 823">https://www.cd3systems.com/PRODUCTS/</p>		
Installation considerations	If permanent, it should be placed in an area of boat storage or near a slipway. Remote location is possible as water and energy sources not required.	CapEx estimate:	Unknown – US system (CD3) is POA
Operational considerations	Drying can be achieved passively, by leaving the boat to dry for at least 5-7 days before use. However, boats are often used in multiple waterbodies within a 5 day period so active drying techniques, such as using towels and sponges might be more practical to allow activities to be more frequent. However, the reason for drying should be to ensure INNS have desiccated - be aware that NNS may survive the process of manually drying.	OpEx estimate:	Unknown – US system (CD3) is POA, unknown subscription cost in addition
Environmental impact	-		
Additional information and Links	<p data-bbox="633 1174 2065 1238">Searches have not shown a comparable waterless cleaning system to those sold by CD3 that exists in the UK market. It is recommended that users interested in learning more about the CD3 systems should follow the link below.</p> <p data-bbox="633 1254 2065 1331">CD3 Systems (USA) Invasive species prevention products and waterless cleaning equipment that help stop the spread of AIS. Kill invasive species by clean drain dry tools and equipment. (cd3systems.com)</p>		

MT.8 Mobile watercraft washdown


<p>Biosecurity option</p>	<p>Mobile watercraft washdown units</p>																															
<p>Description and summary of efficacy</p>	<p>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 to capture waste and waste water.</p>																															
<p>Representative image (final product / design may vary)</p>	 <p>https://www.canr.msu.edu/clean_boats_clean_waters/Mobile-Boat-Wash/mobile-boat-wash-parts. (left) Western Aquatic Invasive Species Center: https://www.westernais.org/. (right)</p>	<table border="1"> <thead> <tr> <th>Section</th> <th>Low Estimate</th> <th>High Estimate</th> </tr> </thead> <tbody> <tr> <td>Heating System - Low Pressure</td> <td>\$8,000.00</td> <td>\$38,000.00</td> </tr> <tr> <td>Heating System - High Pressure</td> <td>\$2,700.00</td> <td>\$24,000.00</td> </tr> <tr> <td>Recycle System</td> <td></td> <td>\$50,000.00</td> </tr> <tr> <td>Interior Heater</td> <td></td> <td>\$1,000.00</td> </tr> <tr> <td>Water Pickup</td> <td></td> <td>\$5,000.00</td> </tr> <tr> <td>Recycle System</td> <td></td> <td>\$50,000.00</td> </tr> <tr> <td>Enclosure</td> <td>\$1,700.00</td> <td>\$24,000.00</td> </tr> <tr> <td>Installation</td> <td>\$0 (Included)</td> <td>\$12,500.00</td> </tr> <tr> <td>Freight</td> <td>\$0 (Included)</td> <td>\$8,500.00</td> </tr> </tbody> </table>	Section	Low Estimate	High Estimate	Heating System - Low Pressure	\$8,000.00	\$38,000.00	Heating System - High Pressure	\$2,700.00	\$24,000.00	Recycle System		\$50,000.00	Interior Heater		\$1,000.00	Water Pickup		\$5,000.00	Recycle System		\$50,000.00	Enclosure	\$1,700.00	\$24,000.00	Installation	\$0 (Included)	\$12,500.00	Freight	\$0 (Included)	\$8,500.00
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<p>Installation considerations</p>	<p>They can be mounted on a trailer and mobilised, or a permanent 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.</p>	<p>CapEx estimate:</p>	<p>Unknown, but estimates between £25K to > £150K (table shows approximation of cost of watercraft inspection and decontamination units in the US).</p>																													
<p>Operational considerations</p>	<p>There will be a baseline maintenance and operational burden associated with these facilities – this will include the appropriate removal of waste, monitoring usage and awareness.</p>	<p>OpEx estimate:</p>	<p>Unknown</p>																													
<p>Environmental impact</p>	<p>Increased carbon-cost.</p>																															
<p>Additional information and Links</p>	<p>None.</p>																															

CT.1 Disinfectant dip tanks

<p>Biosecurity option</p>	<p>Disinfectant dip tank</p>		
<p>Description and summary of efficacy</p>	<p>Dip tanks to allow the total immersion of equipment in disinfectant. These are a simple [deep] unit or trough. They are 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.</p>		
<p>Representative image (final product / design may vary)</p>	<div style="display: flex; justify-content: space-around; align-items: center;">    </div> <p>Sources: South West Water (left); Angling Trust (centre); Direct Water Tanks (right)</p>		
<p>Installation considerations</p>	<p>More applicable to angling. However, could have use for cleaning wetsuits, paddles, and other equipment. Would need to be placed effectively to ensure user uptake.</p>	<p>CapEx estimate:</p>	<p>£280 for 200L tank (right photo). £2,000 for metal tank in a wooden enclosure with tap on the bottom to allow for drainage.</p>
<p>Operational considerations</p>	<p>Operational burden to keep disinfectant replenished and facilities clean. As disinfectant is depleted, dip tanks may actually become a reservoir for INNS. Health and safety concerns arise from the handling of potentially harmful chemicals.</p>	<p>OpEx estimate:</p>	<p>~£375 / year (maintenance) £300 / 1000L (water)</p>

	<p>Could be useful to supply activity providers with this facility particularly if disease is a concern.</p> <p>Industry standard is to install a soakaway at the base of dip tank to capture any leakage.</p>		
Environmental impact	Disinfectant has inherent toxicity. Use a product which degrades to a non-toxic product such as Virkon Aquatic®.		
Additional information and Links	<p>Estimates do not include the cost of disinfectant products, like Virkon Aquatic®, which must be regularly replenished</p> <p>Information on the use of Dip Tanks from Angler's Net - Disinfectant Dips - Anglers' Net (anglersnet.co.uk)</p> <p>Option for a tank (200L), lid is available 200 Litre GRP Open Top Water Tank - Direct Water Tanks</p>		

CT.2 Disinfectant sprayers

Biosecurity option	Disinfectant sprayers		
Description and summary of efficacy	<p>Versatile tools that can be used on a variety of equipment including boating, paddling and angling equipment, as well as PPE and footwear.</p> <p>Sprayers can be hand-held or mounted on wheeled platforms depending on volume and requirement.</p>		
Representative image (final product / design may vary)	 <p>Source: Garden Sprayers Screwfix.com</p>		
Installation considerations	Would need to be placed at access points where recreational activities occur.	CapEx estimate:	Estimated <£75
Operational considerations	<p>Depending on frequency of use, disinfectant solution should be replenished at least every 2 weeks in order to remain effective, but more frequent replacement may be needed in cases of high use areas and/or competitions.</p> <p>Health and safety concerns arise from the handling of potentially harmful chemicals.</p>	OpEx estimate:	~£32 per 100L disinfectant (e.g. Virkon Aquatic®) and ~£300 per 1000L water for dilution.

Environmental impact	Disinfectant has inherent toxicity.
Additional information and Links	Estimates do not include the cost of any PPE that may be required when using the facility. Automatic/powered sprayers are also available and may be preferable for sites requiring more frequent disinfectant application. Manual compression sprayer, 7L Solo SO457 White Manual Pressure Sprayer 7Ltr Garden Sprayers Screwfix.com