



Freshwater Biosecurity: Good Practice Guidance for Water Users and Site Managers

There are many things that a site manager or freshwater user can do to lower the risk of spreading non-native species (NNS). The principles of [Check, Clean, Dry](#) are broadly relevant to boating, angling and other recreational users, but sector specific guidance may be useful as well.

Advice by Sector

Inland water users: biosecurity measures

- Angling
- Canoes/kayaks/windsurfers
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- Drying racks
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Event organisers

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Reporting NNS

References

Inland water users: biosecurity measures

Keep in mind that the most effective and easiest way to avoid spread of invasive non-native species (INNS) and diseases is to follow the [Check, Clean, Dry](#) advice: removing all visible debris, washing all kit, and drying equipment, including nets and boots, for 48 hours with exposure to sunlight, if possible. Posting 'Check, Clean, Dry' signs, posters and leaflets for participants and including this advice in any training and induction for event staff can be an effective means of promoting biosecurity. Downloadable materials are available at the [Check, Clean, Dry](#) website.

Angling

A recent [study](#) found that 64% of anglers used their equipment or boats in different water bodies and 12% do so without cleaning or drying, creating a potential pathway for spread of invasive species. The [most effective and easiest way](#) to avoid such transport is to follow the [Check, Clean, Dry](#) advice: removing all visible debris, washing all kit, and drying equipment, including nets and boots, for 48 hours with exposure to sunlight, if possible.

A number of fisheries are installing [dip stations](#) and signs to inform anglers that they must dip their keep nets, landing nets or carp sacks and then rinse with clean water prior to fishing. Some fisheries (and some countries) ban equipment which has been used overseas and some places in the UK, such as the River Dee, require boots to be sprayed with disinfectant on arrival. Any such use of disinfectant should follow manufacturers' Health and Safety guidelines on usage and disposal. While disinfectant can help to prevent the spread of fish diseases and crayfish plague, disinfection alone is often not sufficient to eliminate most INNS and Check, Clean, Dry should still be followed. <https://www.anglingactive.co.uk/magazine/disinfection-fishing-equipment/>

Anglers should be particularly aware of biosecurity when they use bait from other sites or imported from other countries which may contain INNS (or are INNS themselves, such as worms). [The same study](#) indicated that 16% of anglers in the UK collected bait at a different site than where they used it and 7% released unused bait from a different site into the river/lake. Best practice would be to only use indigenous bait which has been sourced locally.

This is a brief overview of biosecurity issues and measures that can be taken to reduce the spread of INNS. More detailed information is available from the sources below.

Useful resources

Further guidance and video for angling biosecurity:

<http://www.nonnativespecies.org/checkcleandry/biosecurity-for-anglers.cfm>

Biosecurity for anglers video:

<http://www.nonnativespecies.org/checkcleandry/ccdVideos.cfm?video=8>

European code of conduct on recreational fishing and invasive alien species:

<https://rm.coe.int/1680746983>

Canoes/kayaks/windsurfers

A recent [study](#) found that 79% of canoeists used their craft and equipment in different water bodies and 50% do so without cleaning or drying, creating a potential pathway for spread of invasive species. The best way to avoid such transport is to follow the [Check, Clean, Dry](#) advice: drain all water from the craft and thoroughly check for and remove any visible debris or organisms, rinse the watercraft, paddles and kit, and dry all equipment, including wetsuits/drysuits, harnesses, buoyancy aids, etc., for 48 hours.

This is a brief overview of biosecurity issues and measures that can be taken to reduce the spread of INNS. More detailed information is available from the sources below.

Useful resources

Further guidance and video on canoeing/kayaking biosecurity:

<http://cfins.scrt.co.uk/biosecurity/biosecurity-for-boat-and-kayak-users/>

Biosecurity for canoes and kayaks

<http://www.nonnativespecies.org/checkcleandry/ccdVideos.cfm?video=3>

RYA: Check, clean, dry your windsurfer video

<https://www.youtube.com/watch?v=oijFB7pWIkQ>

British Canoeing Good Practice

<https://www.britishcanoeing.org.uk/go-canoeing/access-and-environment/environment-good-practice>

Dinghies/RIBs/Small boats

Small craft that can be transported to different water bodies are a potential pathway for the spread of invasive species. Some of these species, such as the killer shrimp and zebra mussel, lodge in tyre treads on launching trollies or trailers, or inside outboard engines. The best way to avoid such transport to other water is to follow the [Check, Clean Dry](#) advice: drain all water from the craft and thoroughly check for and remove any visible debris or organisms, rinse watercraft and kit whenever possible, and dry all equipment for 48 hours.

Trolleys should be removed from water and props should be lifted whenever they are not in use for extended periods of time. Water-cooled engines should be rinsed thoroughly with tap water.

This is a brief overview of biosecurity issues and measures that can be taken to reduce the spread of INNS. More detailed information is available from the sources below.

Useful resources

The Green Blue Guide

<https://www.thegreenblue.org.uk/News/2016/March/New-green-guide-to-CCD-for-inland-sailing-clubs>

Further guidance and video on biosecurity for boats:

<http://cfinns.scrt.co.uk/biosecurity/biosecurity-for-boat-and-kayak-users/>

Royal Yacht Association

<http://www.rya.org.uk/newsevents/e-newsletters/club-room/july-15/Pages/biosecurity-stickers-available-for-club-ribs-and-boats.aspx>

RYA: Check, clean dry your power boat video

<https://www.youtube.com/watch?v=m78FlukYz3I>

RYA: Check, clean dry your dinghy video

<https://www.youtube.com/watch?v=Vn1-Th6TeGw>

RYA: Check, clean, dry your PWC

<https://www.youtube.com/watch?v=IWIEomDRoA0>

EU Code of Conduct on Recreational Boating and IAS

<https://rm.coe.int/1680746815>

Site managers

There are many things that a site manager can do to lower the risk of spreading non-native species. The type and number of actions you wish to undertake will vary depending upon the individuals, businesses and organisations involved and the location of the site. In general however, measures will focus on the following aspects of control and awareness raising:

- **Remove** unrequired man-made structures from the water. Often, invasive species prefer artificial structures and removing what you can is an easy to do basic biosecurity measure. This could include temporary removal or moving structures out of the preferred growth zone (e.g. storing mooring buoys in winter on land). It also means running a tidy site and not allowing old fenders, warps, keep nets etc. to stay in the water.
- **Air dry** what you can, when you can. Most, if not all, aquatic invasive species are killed by dehydration. Identify opportunities to dry out equipment or infrastructure as often as possible.
- **Raise awareness** as many people are unaware of aquatic invasive species and the threats associated with them. Raising awareness often empowers people to take action. Your biosecurity actions should include opportunities for training and dissemination of information e.g. through [public signage, posters or ID guides for staff and volunteers](#).

On site facilities

- Drying racks
- Washing stations: installed stations
- Air drying: boats
- In water cleaning

Drying racks



Photo © Gander Mountain Gear



Photo ©jaxkayakfishing.com



Photo ©jaxkayakfishing.com

Consider installing racks for drying kayaks and canoes or racks and hooks in clubhouses, bait shops or other buildings where water users can hang equipment to dry while they are onsite. Installing a dehumidifier indoors can help dry equipment more quickly. An area like this would be a good place to post information on the [Check, Clean, Dry](#) procedure to inform everyone about INNS and the most effective way to stop the spread.

Installed washing stations



Example installed washing station

Photo used with permission from Cox's Boatyard, Norfolk



Example installed washing station

Photo © www.portwhangarei.com

Washing down of larger boats is part of a regular maintenance programme for most owners. In the past, run-off water has often been allowed to run back into the nearest watercourse unchecked and untreated. This is no longer legal as it is considered a

“[water discharge activity](#)”, meaning discharge to inland freshwaters of any polluting matter or waste matter. Thus, interest is increasing in installing wash down facilities which contains and filters run-off at marinas and boatyards.



Public washing station

Image © <https://www.umowa.org>

The site will need a concrete pad / hard standing for the system and requires a source of clean water with sufficient pressure to remove muck and debris. This could range from a large, lifting and washing station to a hose with spray nozzle and a rack to hang equipment for washing. Routine hull cleaning and re-application of any antifouling coatings will remove virtually all growth from vessel hulls and can be completed, for typical leisure and power boats, in less than a day. All debris, which could contain a mixture of live material and antifouling, should be collected and disposed of in bins.

Further information on boat hull cleaning systems can be found in the RYA The Green Blue's [Green Guide to Boat Washdown Systems](#) that details various hull jet-washing systems with water recycling / filtration and disposal. The Green Blue also has a [factsheet](#) documenting the whereabouts of closed loop washdown systems in the UK.

Air drying: boats

Probably the most effective and least damaging approach to removing fouling organisms is to dry the structures by removing them from the water. This is most cost effective for smaller vessels such as recreational boats. Complete mortality can be achieved within a few days in dry, hot (or very cold) conditions. For this reason, drying moorings, used by many recreational boats, offer protection against INNS but are not 100% effective.

It is important to clean the boat and any associated equipment such as trailers and ensure water is drained properly before drying. [RYA guidance](#) advises:

- Use freshwater to wash down all parts of the boat that have been in contact with the water. Pay attention to any crevices.
- Drain all water from the boat, including bilges.
- Flush the engine with clean fresh water before leaving the site using appropriate equipment, flush muffs or in accordance with manufacturer's recommendations. Allow the water to drain completely from the engine in a vertical down position.

If boats and boatyard structures can be removed from the water seasonally, for example over winter or when not in use, this is sufficient to kill off all attached growth. A number of marinas now offer a '[dry stack](#)' service where craft can be retrieved and launched when the customer requests. [Modular pontoons](#) have also been designed to make components easy to disassemble and swap on a rotational basis (e.g. every 6-9 months).

Boat lifts such as the "[Hydrohoist](#)" system are designed to keep boat hulls out of the water without needing to remove the boat to hard standing. The system comprises of a cradle supported on floodable pontoon floats that lift the boat out of the water when air-filled via a small compressor and re-flooded to launch the boat.



Sunstream boat lift supporting a rigid hulled inflatable at Deganwy marina, Conwy. Image courtesy of Rohan Holt, Natural Resources Wales

[Sunlift](#) systems adopt the same principle of keeping the boat's hull suspended above the water when not in use but make use of hydraulic legs attached to the lake bed. The system is suitable for areas that have no intertidal range.



Sunlift systems to use in freshwater situations. Images courtesy of Sunstream Boat Lifts and Cover Systems <http://sunstreamcorp.com/>

Biosecurity benefits are gained both through reducing the risk of transporting an invasive species that might already be established in a marina and through the air drying.

In water cleaning

If it is not possible to remove the boat for washing, in-water cleaning can be effective in the interim for removing light fouling. This should certainly been done prior to long trips to prevent transfer of INNS from one water body to another.

Before undertaking any in-water cleaning, check for any local regulations regarding the in water cleaning of boat hulls or the discharge of chemicals. There is currently no national policy on in water cleaning of recreation craft and most regulations are aimed at marine environments, such as the Wildlife and Countryside Act, Section 66, which requires a license, permit or exemption if there will be any deposits on the seabed, and the Water Resources Act 1991 which regulates any polluting matter entering controlled waters.

In water cleaning systems are available in some marinas, or the process can be carried out by hand:

- A sponge or a long handled brush can be used to clean as much material off as possible, working either in the water or from a pontoon or the boat to clean off the material. Remember to pay particular attention to propeller, prop shaft, bottom of the keel, anchor chains and water inlets and outlets which can harbour INNS.
- Though many inland boats (e.g. narrow boats, motor cruisers) do not have any anti-fouling coating, if the boat has such a coating, take care to minimize release of toxic substances and the degradation of coating system by only using gentle cleaning tools and cleaners.

- Be aware that many common cleaning products contain substances such as antimicrobials, chlorine or bleach, which can be harmful in aquatic environments. The [Green Directory](#) gives information products and services that are more environmentally sensitive.
- Collect material into a bucket or bag for disposal on land where practical.
- In water cleaning should not be used in order to delay haul-out and cleaning.

Useful resources

RYA Cleaning Your Boat

<http://www.rya.org.uk/knowledge-advice/environmental-advice/Pages/cleaning-your-boat.aspx>

The Green Guide to Inland Boating

<https://www.thegreenblue.org.uk/-/media/TheGreenBlue/Files-and-Documents/Leaflets/Guide-to-Inland-Boating>

Event organisers

Taking part in outdoor events is a great way to explore the natural environment, but comes with a responsibility to protect them. Following a good biosecurity routine will help to reduce the risk of introducing and spreading freshwater invasive species and fish pathogens, which can easily be transported on clothing, footwear and equipment.

As an event organiser you are an essential partner in helping to protect the environment by adopting simple biosecurity measures. Participants should be asked to arrive at the event with all their kit clean and dry. It is recommended to set up a cleaning station for those who turn up with damp or dirty kit and for use after the event.

What you can do?

The essence of good biosecurity for one-off events is to identify the high-risk activities and then ensure that everyone plays their part in reducing the risk. The table below provides a checklist for you to assess the biosecurity risks for your event and should be used in conjunction with the [Event Biosecurity Support Pack](#).

Event biosecurity risk assessment for all events:

Check points	Risk factors	Biosecurity requirement
Information for participants <input checked="" type="checkbox"/>	Participants not aware of invasive non-native species or biosecurity measures. Participants have not checked cleaned and dried their kit prior to the event.	When participants register, make them aware of their personal responsibility for maintaining biosecurity through applying CHECK, CLEAN, DRY. SEND OUT ADVISORY INFORMATION IN ADVANCE... through email, website blog and social media to all participants.
Signage <input checked="" type="checkbox"/>	No information displayed about biosecurity measures.	Adequate signage or guidance should be in place (e.g. slipways and entry points), making all participants aware of the risk, and providing advice on how to prevent spread. 'Check, Clean, Dry' posters and flyers are available at: www.nonnativespecies.org.uk
Access to water <input checked="" type="checkbox"/>	Multiple access points with unrestricted access or limited access points but entry not restricted/monitored.	Entry and egress points to the water should be kept to a minimum. Areas with known invasive species should be avoided and roped off from participants to prevent further spread.
Cleaning station <input checked="" type="checkbox"/>	No cleaning station available on site or facilities available but not promoted or monitored.	Contact the site manager in advance about provision of wash down facilities or services (water supply). If no facilities are present on the site, set up a dedicated cleaning station through which all

Check points	Risk factors	Biosecurity requirement
		<p>participants, staff and support crew who are to enter the water will have to pass. Information on setting up a portable wash station for smaller sites is provided in a following section.</p> <p>Participants who arrive with damp or dirty kit will be required to visit the cleaning station prior to the event. Participants should log in and out, confirming that they have cleaned and inspected their equipment.</p>
<p>Equipment and training for support crew</p> <p><input checked="" type="checkbox"/></p>	<p>Event staff and support crew not aware of biosecurity measures and use of cleaning equipment.</p>	<p>Ensure that staff and support crew can use cleaning equipment and materials (such as disinfectants) safely and in accordance with the manufacturer's instructions.</p> <p>Run a pre-event staff and support crew biosecurity training session to reinforce 'Check, Clean, Dry' messages.</p> <p>Provide copies of ID guides – available at www.nonnativespecies.org.uk.</p> <p>Ideally, all cleaning and inspection operations should be supervised by a member of staff or a volunteer.</p>
<p>Use of in-water equipment and structures</p> <p><input checked="" type="checkbox"/></p>	<p>Movement of pontoons, buoys, anchor chains and underwater equipment and not cleaned, especially those from a distant location.</p>	<p>Check with the site manager in advance what equipment and facilities are already in place.</p> <p>All equipment that is to be used in the water (lanes/floats/race buoys/matting etc.) should be 'CHECK, CLEAN, DRIED' before being used. If hiring or buying equipment confirm with the supplier that this must be done prior to delivery.</p>

Boating events

Along with the biosecurity checklist, there are some other actions that can be taken for boating events. For trailers and boats entering the venue, check that they have been washed, drained and dried from any previous use. Any that have not been cleaned should be directed to a wash down facility away from the water's edge. This could include a list of suitable car wash facilities for smaller vessels and trailers.

Before leaving the site, any water that collects in bilges or inside kayaks and canoes must be completely emptied before leaving the site. Water-cooled engines must be

washed through with tap water to ensure the system does not harbour non-native species.

Risks can be reduced by reducing the contact time in which equipment is exposed to the water. This is particularly important for items such as trailers, which have cavities that may retain water and be hard to inspect. If possible, trailers and launching trolleys should be provided at the site and used in preference to personal equipment.

Along with raising awareness of INNS before the event, make clear the right to refuse entry of heavily fouled vessels at registration. The six point biofouling scale, reproduced below, can be used and any vessel scoring level 3 or above should be directed to the wash down facilities.

Hull Fouling Ranking Table

Rank	Description	Visual estimate of fouling cover
0	No visible fouling. Hull entirely clean, no biofilm* 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 macrofouling.	Nil
2	Light fouling. Hull covered in biofilm and 1–2 very small patches of macrofouling (only one taxon).	1–5 % of visible submerged surfaces
3	Considerable fouling. Presence of biofilm, and macrofouling still patchy but clearly visible and comprised of either one single or several different plants and animals.	6–15 % of visible submerged surfaces
4	Extensive fouling. Presence of biofilm and abundant fouling assemblages consisting of more than one plant and/or animal.	16–40 % of visible submerged surfaces
5	Very heavy fouling. Diverse assemblages covering most of visible hull surfaces.	41–100 % of visible submerged surfaces
*Biofilm: Thin layer of bacteria, microalgae, detritus and other particulates.		

Adapted from Floerl et al. 2005 by Sarah Brown at C2W

Useful resources

The Green Blue Guide for Inland Sailing Clubs

<https://www.thegreenblue.org.uk/News/2016/March/New-green-guide-to-CCD-for-inland-sailing-clubs>

Angling events

Along with the biosecurity checklist, there are some other actions that can be taken for angling events. On the day of the event, equipment should be checked at registration to ensure it is clean and dry. It is advisable to supply equipment such as anchors, drogues, keep nets and unhooking mats for competitors, if possible. After the event, participants should be directed to a washing station for any equipment going offsite.

Anglers should be particularly aware of biosecurity when they use bait which may contain invasive species. Best practice would be to only use indigenous bait which has been sourced locally. If you use bait which has come from further afield, take time to clean it (e.g. with freshwater, disposing of the waste water onto the grass or into the foul sewer, not back into the waterbody it came from) and take care not to release live animals into the wild as this would be an offence under the Wildlife and Countryside Act (1982).

CEFAS has [advice on disinfection](#) that can be downloaded, aimed at anyone in competitions where the use of keep nets, landing nets and weigh slings are used. However, disinfection is not particularly effective for many non-native species, so all participants also should be instructed to follow the [Clean, Check, Dry](#) procedure as well, removing all visible debris, washing all kit, and drying equipment, including nets and boots, for 48 hours with exposure to sunlight, if possible. Providing leaflets and further information at registration, in clubhouses, etc. is useful as well.

Biosecurity example from the Wild Trout Trust

<http://www.wildtrout.org/content/biosecurity>

Triathlons/swimming events

Along with the biosecurity checklist, there are some other actions that can be taken for these events. On the day, equipment should be checked at registration to ensure it is clean and dry. After the event, participants should be directed to a washing station where all wetsuits, goggles, caps, etc. should be checked for debris and washed. Many events require this to be done and signed off before the contestant can move to the next stage of an event, particularly in sensitive areas such as SSSIs where this monitoring is often required. Participants also should be advised to follow the [Check, Clean, Dry](#) procedure. Providing leaflets and further information at registration is useful as well.

Biosecurity example from Keswick Mountain Festival Triathlon

<http://www.keswickmountainfestival.co.uk/sporting-events/keswick-mountain-festival-long-triathlon>

Portable washing stations for events



Example portable cleaning stations for events
Photo © CFINNS Initiative

The easiest facility for managing events in relatively small areas is a portable cleaning or disinfection station.

Advisory notes for the cleaning station:

- Must be readily accessible for all participants and equipment.
- Must be well away from a water course and drainage into sewers prevented – you do not want to be washing the ‘hitchhikers’ straight into the water systems.
- Must have a surface (such as gravel / hard standing / grass) where washings should be contained and not able to enter any watercourse / drainage system.
- A hosepipe or pressure washer may be useful if available/practical, but a water/power supply will need to be available.
- Wash buckets in sets of three. All buckets to contain clean water, changed frequently. The first is for removing any mud and organic matter, the second for cleaning or disinfecting and the third for rinsing.
- Any bio-fouling must be thoroughly removed well away from a water course or drainage system and allowed to dry out or should be collected and disposed of in bins.
- Any large equipment (such as canoes, paddles, safety boats, launching trolleys, windsurfing boards, wetsuits etc.) should be washed using a hosepipe with spray head or power washer.

Keep in mind that the [most effective and easiest way](#) to avoid such transport is to follow the [Check, Clean, Dry](#) advice: removing all visible debris, washing all kit, and drying equipment, including nets and boots, for 48 hours with exposure to sunlight, if possible. Posting 'Check, Clean, Dry' signs, posters and leaflets for participants and including this advice in any training and induction for event staff can be an effective means of promoting biosecurity. Downloadable materials are available at the [Check, Clean, Dry](#) website.

Useful resources

Cumbria Freshwater Invasive Non-native Species Initiative

[Event biosecurity support pack](#)

Guidance on the GB non-native species secretariat website

[Check, Clean, Dry](#)

Reporting Non-native Species

Report any sightings of non-native species, including photo if at all possible, to the Environment Agency by emailing: alertnonnative@ceh.ac.uk via an app such as Plant Tracker or AqualInvaders, or directly enter records into iRecord.

You can also enter records via an app such as Plant Tracker or AqualInvaders, or directly enter records into iRecord.

References

Anderson LG, White PCL, Stebbing PD, Stentiford GD, Dunn AM (2014) Biosecurity and Vector Behaviour: Evaluating the Potential Threat Posed by Anglers and Canoeists as Pathways for the Spread of Invasive Non-Native Species and Pathogens. PLoS ONE 9(4): e92788. <https://doi.org/10.1371/journal.pone.0092788>

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Some of these materials are adapted from materials produced by Sarah Brown at C2W