

GUIDANCE ON THE USE OF ARTIFICIAL REFUGE TRAPS FOR THE MONITORING AND CONTROL OF FRESHWATER CRAYFISH



1. Introduction

Artificial Refuge Traps (ART's), also known as 'pan pipe' traps, were originally developed by the Hampshire & Avon Environment Agency (EA) team. They act by providing dark, safe refuges to which crevice seeking crayfish will be attracted to. They provide considerable advantages over baited traps in that they do not 'trap' the animals, meaning that they can be left in situ for long periods of time and will not harm non-target species. They are less biased - attracting a far wider range of size classes than baited traps (5 – 65mm carapace length) and equal proportions of males and females. They also attract ovigerous (berried) females and can be used to monitor population structure, reproduction and moulting patterns.

The original design has been improved and developed since 2007 to produce the current standard ART, which is cost effective, lightweight and durable. It provides a range of pipe sizes that will attract both native and non-native crayfish species of a variety of age classes. The base plate is constructed from perforated aluminium sheet which is lightweight and rust proof and the pipes are riveted to the base plate to make the trap more durable. Additional designs are now available that can be used for specific habitats, have higher capacity or attract certain sizes classes of individual – for more information see www.crayfishuk.org/wp/artificial-refuge-traps.

2. Use of ARTs

The ART comes with a durable carry yoke to which a suitable rope or cord should be attached in order to secure the trap to the bank. Baler twine is a cheap and durable option. Standard ARTs are most widely used on shallower rivers and should be placed within areas of suitable habitat as close to horizontal as possible, in water less than 50cm deep (to enable them to be weighed down). Suitable habitat consists of sand, gravels, pebbles up to large cobbles in low to moderate flow. Fast flowing or excessively silty areas should be avoided. Place the trap upside-down i.e. tubes on the substrate, to make it flush with the substrate and easier to weigh down, and as level as possible. The ART should be placed with the tubes at right angles to any flow; if placed in the same direction of the flow crayfish could either be washed out or become trapped inside by water pressure. They are normally placed with the entrances facing towards the bank, though they can also be placed with them facing outwards; this may depend on the habitat – for instance if the bankside habitat is of lesser quality than an area of low flow with suitable foraging habitat mid- stream.

If using in running water the ART needs to be weighed down with rocks to prevent it being dislodged by the current; this also helps disguise them. One large stone is preferable to several small ones. The trap should be then secured to a feature such as a tree. Do not tie to a non-secure feature that could be washed away during times of high flow. ARTs should not be deployed in high flow as crayfish are unlikely to be active in such conditions and the risk of loss or dislodgement is greatly increased. Also bear in mind that traps may need to be moved in response to increases or decreases in flow rates.

When siting ARTs, avoid areas vulnerable to disturbance such as those used by the public, also livestock drinking areas and wild animal (e.g. deer) crossing points. Always gain the permission of the relevant landowner prior to any survey.

ARTs have not been widely used in lentic systems but initial trials show them to be as effective as baited traps. They can be simply 'thrown in' to a pond or similar and will settle to a horizontal position providing the substrate is level. They can also be dropped into deep pools in a river in the same way. Heavy weight traps such as the Double Decker or XL are more suitable for stillwaters and are recommended for waters more than 5m deep. A second yoke with weight is also recommended to prevent the trap from drifting and maintain a vertical position as the trap is hauled in to prevent crayfish from escaping. It is important to allow sufficient rope for the likely highest water level to prevent the ART from hanging above the substrate if water levels rise. ARTs with galvanised steel bases are available where additional weight is required.

If being used to survey for White-clawed crayfish, ARTs should only be used during the recommended survey season, i.e. between the beginning of July and end of September in the UK. If used for non-native crayfish surveys or control they can be deployed from April to November in rivers and year-round in stillwaters; surveyors should, however, be confident that native crayfish will not be present in the survey areas.

3. Licensing & data recording

In the UK ARTs **cannot** be used without a trapping consent issued by the local Environment Agency team; they will require that the traps are fitted with numbered tags prior to use. If being used to survey for native crayfish the surveyor must hold a White clawed crayfish conservation license issued by Natural England.

When deploying ARTs it is recommended that the following location data is recorded to assist in recovering them successfully: -

- Tag number
- Left or right bank (in watercourses)

- Colour of securing rope
- Location description, e.g. species of tree the refuge is tied to, river feature e.g. riffle, glide and description/proximity of any notable features close to the refuge.

4. Deployment

ARTs do not work in the same way as baited traps and therefore need to be left in situ for longer than baited traps in order to attract crayfish. Although ARTs are effective after 24 hours deployment, it is recommended that they are left in situ **for at least one week** before checking. It is recommended that in order to determine presence/absence, of native crayfish, refugia should be left in place for a minimum of 3 weeks and be checked once every one or two weeks. Less frequent checks are not advised in watercourses as the refugia could become dislodged in the interim and therefore be of no use to the survey effort. In small stillwaters such as ponds ARTs can be left for several weeks between checks.

ARTs should be spaced at roughly 10m – 20m intervals depending on the purpose of the trapping exercise and likely population density.

Note that this guidance is not an approved survey standard and negative results cannot be used as proof of absence. ARTs should be used in conjunction with other survey methods such as manual searches.

5. Emptying an ART

When checking an ART, firstly remove the stones covering the refuge (if used, and it's a good idea to keep them to hand to be used in redeployment) and gently lift up using the rope, allowing the ART to hang vertically, thereby retaining any animals in the trap. At this point crayfish can be seen within the tubes, though if there is debris within do not assume that the trap is empty. Carefully tip the contents of the ART into a suitable sized container – soft plastic 'Tubtrugs' as used by horse owners are ideal. It is helpful to place an inch or two of water into the container prior to emptying the contents of the refuge. If the water is silty or the trap full of debris carefully empty the water out whilst looking for crayfish. Swilling the container with fresh water – like panning for gold – is a useful technique in very murky water. Occasionally juvenile crayfish will be found in gaps between the tubes – these cannot be extracted but can be killed using a stick if known to be non-native. Replace and weigh down the refuge after emptying.

If crayfish are present, standard practice is to record sex, carapace length and signs of damage/disease and forward the information to Natural England's National Crayfish Database. Any native specimens should be carefully put back in the water close to the original location of the ART, out of any strong currents and downstream/away from where the surveyors are likely

to step. Any non-native crayfish should be destroyed at the bankside, either by crushing or cutting through the centre of the carapace from rear to front with a sharp knife. It is illegal to transport live non-native crayfish.

6. Biosecurity/health & safety

When moving between sites ARTs (and all other survey equipment) should be thoroughly cleaned then either sterilised using 'Virkon' or similar, immersed in hot water (<45C) for 15 minutes or allowed to dry out completely following the Environment Agency's 'Check, Clean Dry' protocol.

Surveyors should follow health and safety protocols such as working in pairs in/near water, use of life jackets etc.

7. Care of ARTs

ARTs have been designed to be long lasting and durable. The aluminium bases can become bent out of shape if washed out during high flow events but can be easily bent/knocked back. It is recommended that the knots on yokes are checked regularly as they may work loose in time.

ARTs are manufactured and supplied by Nicky Green

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A scientific paper comparing ARTs to baited traps can be found here : -

<https://www.kmae-journal.org/articles/kmae/abs/2018/01/kmae170112/kmae170112.html>