



Standard design & assembly for WRT smart rafts

Raft

Filcris edged mink raft with 215mm high tunnel walls and no hole for a clay pad - marketed as 'Fenland Edged'.

Cost - roughly £110+VAT or £105 +VAT for orders of 30+ (prices subject to change)

Notes: This raft does not shed polystyrene balls and should have an almost unlimited working life. Doing away with the hole in the floor eliminates any risk that mink may not like to walk on wire mesh, and increases the retention of scent from previous mink.

Cage trap

Perdix mink trap. Comes with green powder coating as standard.

Cost - £35+VAT (price subject to change)

Notes. *Perdix* cage traps are sturdy and well made; more so than other, less expensive makes. They are fitted with wire mesh doors, which allow the quick and easy attachment of the cable from the alarm unit magnet. As with other cage traps, each unit must be checked and adjusted before being deployed. See instructions below.

Trap monitoring unit (Remote Monitoring Device - RMD)

Remoti.

Cost £95+VAT for unit and one year of operation. The cost thereafter is about £27 per year.

Notes. The only viable alternative to *Remoti* at present is Mink Police. *Perdix* is now selling a trap alarm, but it is triggered by a technology that has been inadequately tested thus far. Mink Police are currently being marketed commercially in the UK at £170+VAT (e.g. Fourteenacre Ltd), so are almost double the price of *Remoti*, though the price will be lower for bulk orders.

Remotis are normally very reliable, and the manufacturer (Ben Morley) will readily replace any that fail. Their main disadvantage compared to Mink Police is that they have no antenna cable extension option, but in most cases these would not be helpful, anyway.

RMD setup

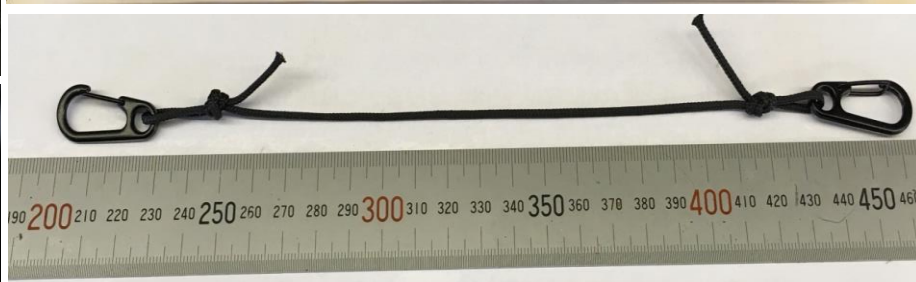
Remoti mounted on top of the cage trap with cable ties. Sticky-backed foam strips support the magnet in place on the *Remoti* housing, and allow the magnet to be reset in the correct position every time. The magnet cannot slip downwards and set off the alarm when the raft is agitated by wind or boat wash. Having the *Remoti* on top of the trap, under the tunnel roof, prevents animal interference with the magnet or the cable attached to it. Another significant advantage of this configuration is that the cable twist magnet and trap door is short, and does not need to negotiate any bends when being pulled by the door. If anything, on average the signal strength of the *Remoti* is higher when the unit is placed horizontally.

The magnet is the standard one supplied by Remoti, to which a key-ring style spiral clip is attached. It is connected to the trap door by a short piece of braided nylon cable (2mm black cable costs £6.45 for 50m on EBay). The cable is secured in place at each end by a mini karabiner clip (23p each on EBay, in packs of 10-50). The karabiners allow a cable to be replaced in 20 seconds, and can be re-used many times.

The cable that connects the trap door to the magnet may be chewed by a captured animal, whether it's a mink, rat or water vole. Given that failure of the cable could be disastrous (in that the trap door could close but the alarm not be triggered) we have opted for a cable that is cheap and easy to replace if damage is even suspected. In reality, the cable requires replacement only in 10-20% of trap alarms. Tying a chewed cable back together is inadvisable because the knot may get caught on the trap mesh.

Identifying plaque

For any raft on a river or other public place, it's helpful to place on it a plaque or label that will allow it to be returned if it gets washed away, and for people to see that the equipment is owned by an identifiable person or group. The plaques are made of stainless steel, and are screwed to the roof of the tunnel (using stainless steel screws or rivets).



Left column: Neoprene strips supporting the Remoti magnet in place. Note the spiral clip attached to the magnet.

Top: Perdix cage trap with top-mounted Remoti. The cable linking the magnet to the trap door is in place.

Above: Braided nylon cable linking trap door to Remoti magnet. The mini karabiner clips are available on EBay.



Left: Stainless steel plaque.

Below: Steps in the assembly of a standard WRT smart raft, comprising raft, live (cage) trap and remote monitoring device (RMD; Remoti).



Assembly instructions

Remoti unit

Items required

Remoti unit (and associated accessories)
 Activating magnet
 Batteries (4 x Duracell Procell alkaline)
 Duct tape
 Sticky-backed neoprene foam
 25mm diameter key ring
 Phillips (cross-head) screwdriver

WARNING - be extremely careful not to cross-thread the machine screws that hold the two halves of the Remoti unit together. This can render the unit unserviceable. See below.

1. Screw the 4 captive screws all the way into their holes in the back of the unit (the half with no electronics). You can use a powered screwdriver for speed. Do not join the two halves of the box at this stage.
2. Check that the gasket groove in this back plate is clean and undamaged. Gently place the gasket into it, flat side up or down. Use a blunt pencil or similar to encourage the gasket into the groove, ensuring that it's not twisted or stretched. It should fit perfectly.
3. Place the four batteries into the holder in the upper part of the box. Ensure they are the right way round, and pushed firmly into place. Place a piece of duct tape over the batteries,



Duct tape over batteries. Note orientation. Tape mustn't touch electrical components.

oriented in the same direction as the batteries, *not* across them. Allow about 10mm of tape to overlap at each end, and firmly push that down on the flat ends of the battery holder. This will prevent the batteries shaking loose.

As soon as the batteries are in place, the LED light (tip of arrow opposite) should start flashing red. This is normal.

4. Carefully unite the two halves of the box. Placing the unit on a flat surface with the screw heads facing up, use a cross-headed hand screwdriver to very carefully engage each screw into its respective hole in the other half of the box. Turn the screw anti-clockwise for half a turn before then proceeding normally. This should reduce any chance of cross-threading. There should be very little resistance. If any is

encountered, stop immediately and go into reverse before trying again. In a tiny minority of cases, these screws can cross-thread if inadequate care is taken. If this happens, the unit is sometimes unusable.

Once each screw is engaged and turning freely, continue turning it until resistance is felt and you can see the two halves of the box being pulled together in that corner. Stop and move on to the next screw. When all 4 are at this stage, drive each by one revolution, move to the next and keep repeating until all have gone as far as they can. Do not over-tighten, otherwise you can break the plastic.

5. Cut two pieces from the neoprene strip, one about 20mm long and one 15mm. Split the longer piece down the middle, and keep one half for the next Remoti. Now place the rectangular magnet onto the box in the marked place. You will find that the 'sharp' edge of the magnet housing naturally fits into the groove between the two halves of the box. This is



good. Now gently slide the magnet towards the rounded edge of the box, keeping the magnet housing in the groove, and stop just before the magnet reaches the curved corner. This is where we want it to sit. Now peel the backing off the shorter piece of neoprene strip and carefully place it up against the bottom of the magnet, keeping it off the join between the two parts of the box. Press it firmly down. Next, remove the backing from the long, slim piece of neoprene and carefully place it along the long side of the magnet,

avoiding the groove. Press it down. You now have a niche into which the magnet can quickly be placed, even in poor light.

6. Attach the key ring to the plastic buckle on the back of the magnet, using the side that doesn't have the cable through it.

Cage trap

Items required

Cage trap

Wooden dowel and hammer to hand in case of need

Adjustable water pump pliers to hand in case of need

1. The trap comes ready assembled, but may need adjustment to allow it to work properly.
2. Firstly, check that the door will open and close smoothly. Use your fingers to lift the bar that holds the door closed, then swing the door inwards and move it up and down several times to see if it catches on the bar either side. If it does, allow the door to close, then place the end of a wooden dowel on to the base of the bar structure and gently tap the other end of it with a hammer. The idea is to nudge the structure across the trap by just a few mm so it no longer impedes the door. Check whether your nudging has done the trick and, if not, repeat the process until the door moves up and down freely.
3. Secondly, check that the treadle lays flat, or almost flat, on the floor of the cage. If it doesn't, you may find that the activation bar that holds the door open will not pull

backwards far enough to allow the door to close. In these circumstances, get a pair of adjustable water pump pliers or similar, gently grip each hinge of the treadle in turn, and bend the treadle down by a few mm on each side, using a finger. This will then cause the treadle to lie flat.

Connecting cable

Items required

420mm of suitable cord (2mm diameter black braided nylon works well)

2 small karabiner clips.



1. Place one end of the cable through the hole in the bottom of a clip, pull it through by about 65mm and grip that end against the cable with finger and thumb. With your other hand, tie an overhand knot in the doubled part of the cable, as though the karabiner clip was not present. The knot will appear below the clip and is totally secure - the clip cannot slip off.

2. Repeat the process with the other end of the cable.

Placing the Remoti on the trap

Items required

Cage trap

Remoti & magnet

3 cable ties of 3-4 mm width (the shorter the better)

Clippers

Connecting cable

1. With the open end of the trap to your left, place the Remoti on top of it in the position shown below, ensuring that the magnet position is towards the front of the trap. The front of the Remoti is just less than 3 meshes back from the front of the trap handle.

2. Insert each cable tie in turn through a hole in the Remoti, bring the end round the back of a mesh, insert it back into the clasp and pull through, *but don't tighten any yet*. Once all three cable ties are in place, progressively tighten them in turn. Pull them hand tight only. Wiggle the unit by hand to ensure it doesn't move very much, then cut off the surplus cable tie with the clippers. Note that the cable ties on the side away from the magnet go down through one hole in the wire mesh and come up through the diagonally adjacent hole - this

prevents the Remoti from moving. Note also that no cable tie is needed on the corner of the Remoti near the magnet.



Position of the Remoti unit on the cage trap. The easiest way to get this right is to ensure that the bottom left cable tie, at tip of red arrow above, spans the cross wires 3 meshes back from the leading edge of the trap handle, and 1 mesh in from the trap edge.



3. Open the trap door and hold it up with the connecting bar. You will need to locate the bar through the hanging cradle first, and sometimes this is a fiddle, especially if the bar is trapped on the floor. Be patient as you wiggle it free; do *not* bend the bar.



4. Pick up the connecting cable; clip one end onto the key ring on the magnet. Drop the other clip through the trap roof 2 meshes back from where the door reaches when it's held open, and in line with where the magnet will sit on the Remoti unit. Now pull the clip towards the trap front and attach it to the door.

5. Take the end of the black cable that came with the magnet, and tie it on to a convenient place on the trap roof, roughly midway between Remoti and door. This acts as an anchor to prevent the magnet being lost in the event that a captive animal chews through the other cable.

RAFT

Items required

Raft base

2 tunnel sides

Tunnel roof

Shuffle step (black plastic rectangle with two pre-drilled holes; supplied by manufacturer)*

2 plastic pegs (or more if you don't hit them straight!)*

2 end stops (black plastic curly things or, on more recent rafts, a simple wedge of plastic)

2 dowels

Hammer

5.5mm diameter drill bit*

Electric drill*

Small piece of wood or plywood

Emory paper strip 15cm long

N.B. The items marked with an asterisk are only needed if the raft does *not* have both shuffle steps already in place. As of late 2022, Filcris supplies their rafts with them in place, saving us lots of faffing about.

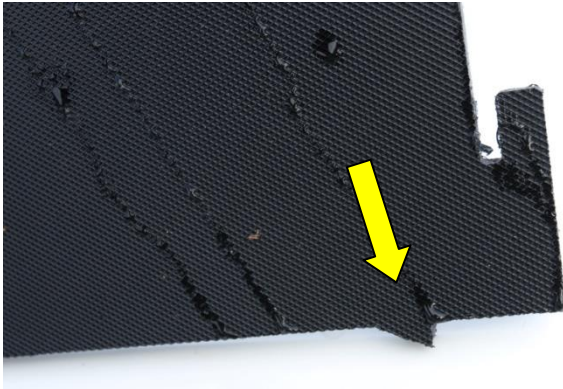


1. Lay out the raft base on a flat floor, with room to work around it. You will see that there are two parallel rows of machined slots. At one end of the slots, already in place, will be a plastic rectangular shuffle step with two large holes drilled into it, to take the dowels (bottom of photo). This is the **front** end of the raft. *If there is a second step already in place (red arrow), go directly to step 3 below.*

2. Place the loose shuffle step on the raft in the position shown (red arrow), at the opposite end of the row of slots to the dowel holes. It needs to be central and with its front edge just behind the back of the rearmost slots. Holding this piece of plastic firmly in place, put the tip of the 5.5mm drill bit into one of its holes and drill *vertically* down until suddenly you go into the polystyrene underneath. Withdraw the drill *still holding the step in*

exactly the same place. Use your free hand to find a plastic lug and put the tip of it into the same hole on the step. Now pick up the hammer and strike the lug firmly and **vertically** repeatedly until the cap is flush with the step. You **MUST** hold the step in place throughout, otherwise you are doomed. Similarly, you **MUST** hit the lug vertically, otherwise it will bend and you will be doomed. With one end of the step now secure, hold the other end in the right place and repeat the drilling etc. This process is simple if done correctly, and a nightmare if not. Don't be afraid to hand the job to a more experienced driller/hammerer if need be. Much better that than have a pile of damaged and incomplete rafts.

3. Insert the lugs on the bottom of a tunnel wall into the raft slots *ensuring that the end with the little sharp protrusion (shown by the yellow arrow below) is pointing towards the pre-installed step or the pre-drilled holes.* This is the front of the tunnel. Repeat on other side.



4. Hold the piece of wood flat against the front edge of one wall and firmly tap it with the hammer to push the wall backwards until it can go no further. The wood prevents you damaging the plastic with the hammer. If the wall doesn't move at first, it's probably because the lugs are not fully slotted in. Repeat on other side.

5. Take the wedge-shaped plastic end stop and insert the point into the slot in front of one wall. Tap it several times with a hammer until it won't go further without real force. You are aiming to force the wall backwards as far as it can go. If your raft was made in 2021 or later, you will see a hole drilled in both the wedge and the front of the tunnel wall. Pass a cable tie through these and back on itself and hand-tighten it. This just stops the wedge from being lost if it pops out. Repeat on other side.

6. Place the tunnel roof on top of the walls *ensuring that the pre-drilled holes are towards the front of the raft*. Both sides of the roof are the same, but front and back may be different (depending on when the roof was made). Locate the wall lugs into the slots on the roof. Take the hammer and force the roof down onto the lugs, one by one. This takes some serious force and straight hitting. DO NOT hit the lugs. You will need to hit the roof as close as possible to the lugs, and with strength. Tapping it will fail miserably. If you can't do this easily, give this job to someone who can. The risk is that you may damage the lugs and perhaps even have to throw away the damaged walls.

7. Tear off a 15cm section of the emory paper strip, then split it in half longitudinally by tearing. Place a piece through one of the tethering loops, grab the loose end and start smoothing off the sharp edges on the inside of the hole by dragging the paper against them in a sawing motion. 30 secs should be enough.

8. Put a dowel in each of the circular holes on the tunnel roof and engage each in the corresponding hole in the floor.

9. Job done.

Testing the Remoti unit

Remotis are normally extremely reliable, but it is very important to test each one before you put it into the field. To do this properly, you will need the unit to be registered and activated on the Remoti system, and that requires your action, because they are not activated when you get them through the post. Activate the unit via the Admin section of the Remoti portal. Do this at least 3 hours before installing the batteries, as described above, and preferably the day before.

Having activated your Remoti unit, assembled and mounted it on a trap, you are ready to test it. Take the trap to a place a little away from buildings if you can, and put it on the ground or a table. If the magnet is on the Remoti already, pull it off and wait two minutes. Check that the cable to the trap door has been attached at both ends, and that the door is correctly held up by the activation bar. Then put the magnet on the Remoti unit in the assigned place, and start watching the small circular window on the top of the box. After 10-15 seconds you should see a red LED light flashing very rapidly for a few seconds, then slowly. This is the unit waking up and starting to search for a phone mast within range. If it finds such a mast, often after 10-20 seconds, the flashing will go a little bit faster. After a further 10-20 seconds, the flashing red goes faster still, followed by a steady green light for 10 seconds, then off completely. Only after the green light has appeared and disappeared do you know that the Remoti system has acknowledged that the unit is armed.

Once the green light has gone, wait 5 seconds and push the treadle down with a finger through the mesh, until the trap door closes with a bang. This will whip the magnet off the Remoti, and the same sequence of flashing red lights, followed by 10 seconds of green, should start. Repeat this whole testing sequence, then go to the Remoti portal and check that the Remoti system has correctly logged each set/unset process. If it has, the trap is fit to deploy. IF YOU DO NOT GET A GREEN LIGHT, THE UNIT IS NOT FIT TO BE DEPLOYED.

Assigning the Remoti unit to a Location

The Remoti system works as follows:

The network Administrator (perhaps a WRT Project Officer, say) enters the name of a '*Location*' and then assigns particular Remoti unit numbers to that *Location*. Confusingly, a *Location* in this context means an area within which one or more Remoti units are placed. When each Remoti is assigned to the *Location*, the Administrator must provide a name for the actual site of that unit (confusingly called Location description on the Remoti website), so when an alarm is sent for that Remoti, the message will identify Location and Site - for example, Littleport: Brown's Bridge.

The Administrator must then tell the Remoti system which Users are to be notified when an alarm goes off on any unit assigned to a *Location*. It is not possible to have a particular User alerted by alarms on some units at a Location, but not others.

It is crucial to understand that people will only be alerted to a trap door closing if every link in the alarm chain is in place. These are the links -

1. The door of the trap must be securely attached to the Remoti magnet.
2. The Remoti unit must have been properly *armed*, or *SET* (culminating in the green light)
3. The unit must have been assigned to a *Location* by the Administrator
4. One or more *Users* must have been allocated to that *Location*
5. In the case of text messages, those Users must have been authorised to receive them on the Remoti website.

6. The Users must be alert to the possibility of an alarm being sent (i.e. they must be able to receive a text message and/or an email).