

LIFE 13 BIO/UK/000315

LIFE WADERS FOR REAL

C3: Guidance note for farmers on temporary electric fencing to protect wader nests and chicks

8 Wire Temporary Electric Fence

This Guidance Note is directed towards farmers and land managers of privately owned/managed/tenanted lowland wet meadows, as a non-lethal predator control method to exclude mammalian predators for the benefit of ground nesting birds during the nesting season.



Contents

Derogation Advice	2
Introduction	3
Prior Considerations	3
Methods	4
Where to set a temporary electric fencing	4
How to set a temporary electric fence	5
Equipment Required	5
Session 1 – Corner Posts	6
Session 2 – Wires and support stakes etc	7
Connecting wires	8
Creating a current	8
Checks and Maintenance	9
Vegetation management	9
How to take down	10
Health and Safety	11
Points to consider	11

Derogation Advice

A derogation from Natural England needs to be obtained in order to use temporary electric fencing on any fields with an agri-environment option and to manage the vegetation underneath the fence. This derogation is needed as the part of the field within the fence may be managed differently to the rest of the field. Although, during the *Waders for Real* project the fences were not used in fields with stock and were removed before any cutting took place.

In order to receive the derogation, you will need to state:

- When you aim to put the fences up
- How long the fences will be in position
- How you will restrict vegetation growth to prevent it interfering with the fence (i.e. strimming or spraying)
- What area of vegetation will be affected by this strimming or spraying

Each landowner will need to apply for a separate derogation.

Introduction

During the *Waders for Real* project, temporary electric fencing was used as a non-lethal predator control management strategy. Fencing was used, alongside habitat management and bird monitoring, to improve productivity of breeding waders. Low breeding success is a key factor in wader population decline so improving productivity was a crucial part of *Waders for Real*, which was a population recovery project.

Temporary electric fences were used during the breeding season to restrict or reduce ground predators' access to the nests/breeding areas of waders. In the *Waders for Real* project the main predator targeted by fencing was the red fox *Vulpes Vulpes*; a key predator of lapwing on wet grassland. Fences will not exclude all predators; avian predators will still have access and not all large mammals will avoid the fenced areas. The aim of fencing is therefore to reduce predation pressure such that productivity is improved to above that required to maintain a stable population. During the *Waders for Real* project fences were put up around important nesting and chick rearing areas for Lapwing *Vanellus vannellus* and Redshank *Tringa tetanus* to improve survival (see Table 1).

Prior considerations

Lapwing pairs begin setting up territories and looking for appropriate nesting sites in early to mid-March and can continue nesting attempts through to June. This is a sensitive and important period in the life cycle of this species. Disturbance during this time could have a detrimental effect on their breeding success, therefore we advise any fencing activity around breeding waders to be minimal and for the fencing process to be carried out as efficiently and as sensitively as possible, to minimise the risk of birds abandoning potential breeding sites/nests. We also advise that prior assessment of fence locations (monitoring of birds and habitat) needs to be carried out sensitively.

Table 1. Waders for Real Lapwing 2018/19

Nest survival inside and outside temporary electric fencing

Nest Survival	2019	2018
Nest Survival Unfenced	67.5 % (n=37)	50 % (n=24)
Nest Survival Fenced	100 % (n=14)	60 % (n=5)



Figure 1: Lapwing nest

Methods

Where to set a temporary electric fencing

Fence locations should be chosen to maximise the number of breeding birds protected. For some sites, there may be prior knowledge of which areas of habitat are favoured by breeding lapwing: in any case assessing likely use of fields by potential breeding pairs in late February and early March can help indicate potential fence locations. As well as observations of bird behaviour, condition assessments of habitat can also be used to identify likely breeding, and therefore fencing locations. Lapwing favour continuous areas of short sward/vegetation for nesting and may also utilise raised areas (i.e. higher ground, hummocks and uneven bare ground). This early assessment is important to increase the probability of erecting fences in the most effective places.

Hummock



Continuous Sward



Higher ground



Factors to inform setting location:

- A field previously used by breeding lapwing and redshank
- Preferred habitat features that will be used to nest/rear chicks
- An area that will not affect grazing
- An area that will not affect farm access or processes
- Access near to the field to bring in equipment

To consider: Vehicle access

When choosing fence locations, as well as favouring areas likely to be used by breeding waders, there are also logistical considerations.

It may not be possible to access wet meadow habitats using vehicles. As well as the possibility of vehicles getting stuck in soft ground, vehicular traffic could also damage diverse wet meadow grassland communities. It is therefore beneficial to choose fence locations near vehicle access points. This minimises the distance that equipment needs to be transported by foot across soft ground.

Once the fence location and position has been decided, mark out corner locations to reduce setting duration. If there are patches of high vegetation trim vegetation now.

How to set a temporary electric fence

Equipment Required

Below is a list of fencing equipment required to set one 600m temporary electric fence and additional tools to aid setting.

Fence Equipment Item for one fence	Description	Quantity required
Earth Stake	0.5m	1
Corner Pegs	Spiral anchors	8 (2 for each corner)
EF Safety Signs	To warn of potential risk of electrocution	4
Main Post (with 8 screw in insulators attached)	1150mm Wooden Post	1
Screw-in-insulator		8
Corner Posts	75mm wooden post	3
Plastic fence post covers	1.5m	3
Steel Fence Cable	600m	7
Orange Polywire	600m	1
Four-line Reel Post		2
Reel post stoppers		8
Metal Fence Stakes	120cm (25 pack)	1 every 16m
Metal Fence Stake Insulators		8 per stake
Plastic Fence Stakes		1 every 16m
12v Marine Battery	105Ah	1
Solar Panel	10 Watt	1
Solar Panel Stand		1
Additional Equipment for setting one fence	Description	Qty required for
Black and Decker Strimmer	36v Lithium-Ion 2.0 Ah battery	1
MV Digital Fence Voltmeter		
Extra Large Garden Hand Truck Trolley	To access fencing location with equipment	1
Perch spikes	To stop birds perching on posts	4
Nails		
Blue polycord		
Fence rammer		

Fences should be set in two sessions, of no more than 1 hour duration each, to minimise disturbance time spent on meadows. A 4-person team will ensure the most efficient use of setting time.



Figure 2: Main corner post with 2 x four-line reel posts holding metal wire reels and orange polywire, facing in the direction of the adjacent corner post

To consider: *Before arriving on site*

Ensure all equipment is present, and both access point to fence location by vehicle and a route set out to deliver equipment to fencing location on foot, has been determined.

Session 1 - Corner Posts

Setting corner posts should take no more than one hour

1. The main corner post should be set nearest to the access route as this is where fence voltage tests will be carried out every two days. This will reduce checking and maintenance time.
2. Set main post in ground with post rammer and position the two four-line reel posts so the metal wire reels run in the direction of the next corner post (See Figure 2).
3. Set 3 corner posts in remaining marked locations and place the 3 plastic fence post covers over the top of each. The plastic covers spaces wires evenly and allow for wires to be easily tightened during maintenance, as the wires glide through the plastic grooves.
4. Once all 4 posts have been set, anchor two ropes on each post using corner pegs, and nail perch spikes to each corner post. The ropes will provide tension support for the posts when the fence wires are tightened (See Figure 3).
5. Strim vegetation if necessary, one person should do this while others are setting posts.

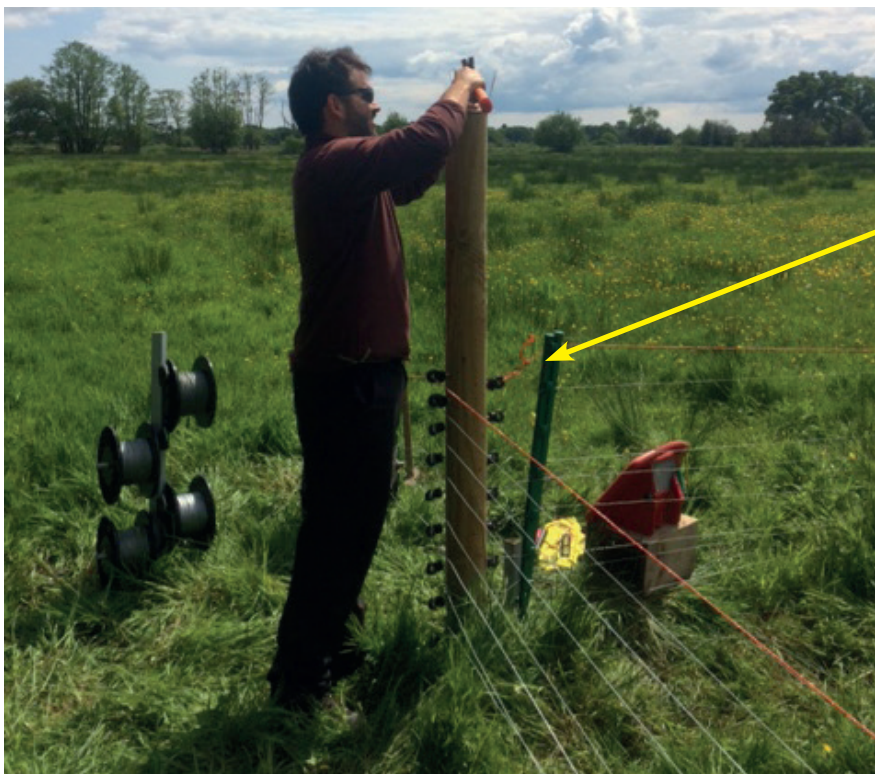


Figure 3: Showing direction tension should be set on corner posts using rope and corner pegs

Session 2 – Wires and support stakes etc

Setting wires and support stakes should take no more than one hour.

1. All equipment should be transferred from vehicles to the fencing location. Seven metal wires and one orange polywire should arrive at fence location first so they can be attached and tied to main post insulators.
2. During this time, two people should position plastic polystakes and metal stakes between corner posts, each stake should be around 8 meters apart with metal and plastic stakes alternated (use more metal in wet unstable areas).
3. At the main post, each wire is attached to an insulator; leaving a trailing length of wire. Orange polywire is fixed as the top line, and metal wires fixed for remaining 7 lines (See Figure 4).



Tied to insulators

Figure 4: Wires are tied to the main post insulators with excess left for connecting the wires together.

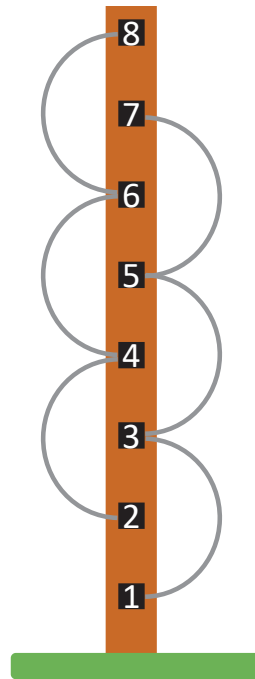
4. In sets of two place a metal rod through the central hole on the wire reels. Two people then walk and un-reel 2 wires around the perimeter of the fence. Repeat this action a further 3 times with the remaining 6 wire reels (2 at a time). Once each reel has been taken around the perimeter; set each wire reel on the corresponding level of the four line-reel post (see Figure 2). Wire reels must be un-reeled around perimeter in order from bottom to top. This will ensure they do not get tangled when setting wires in their respective grooves in the plastic fence post covers, and when threading plastic and metal stakes. A quad bike with fence unreeler can also be used here if available.
5. At the main post set the wires in their correct order using a plastic stake and set it in the ground near the main post.
6. Using another plastic stake, thread the wires in their order and slide the stake along to 'organise' the wires until you reach the next stake. Attach the next stake and continue to the next stake. Continue this process the entire way around the fence.



Figure 5: Wires supported by plastic and metal posts

The metal stakes provide rigidity to the wire fence, while the plastic stakes allow for flexibility where needed (e.g. over wetter areas/around vegetation).

7. Take out any twists in the wires that may have occurred.
8. Tighten wires at the reel post. The wires should be tight enough to remove all unwanted slack and have no bounce, they can then be locked in position using the reel post stoppers.



Connecting wires

The current of electricity for the fence will flow alternately through the 8 wires. Wire 2, 4, 6 and 8 will have a current and the remaining wires will be earthed. To achieve this, tie the excess wire thread from line 1 to line 3, line 3 excess to line 5, and line 5 excess to line 7. Repeat this process tying line 2 excess to line 4, 4 excess to line 6 and line 6 excess to line 8 see diagram above.

Creating a current

Set solar panel stand in the ground near the main post and mount the solar panel on the stand. Place the earth rod into the ground near to the wire fence and attach the earth cable/wires to the rod and to wire 1 of the fence. Make sure the live (red) and earth (green) cables are correctly attached to the solar panel and clip the earth green wire to wire 1 of the fence and the live red wire to wire 2 of the fence. Inform people who are present that the fence is about to become live. Switch the solar panel on and use the MV Digital Fence Voltmeter to test the voltage running through wires 2, 4, 6 and 8. Voltage should be maintained at 5kV or above, but no more than 10kV.

Attach EF Safety signs on fence where appropriate.

Checks and Maintenance

Fence checks should be carried out every two days. All checks and maintenance should be carried out as quickly and efficiently as possible, with the aim of ensuring the fence voltage is kept above 5kV.

When arriving on site, take a voltage meter reading using a MV Digital Fence Voltmeter near the main fence post. If the voltage reading is below 5kV, there are several possible maintenance actions which could increase voltage:

- Check solar panel is working and all solar panel connectors are attached correctly.
- Consider the weather conditions. Weather will affect the performance of the solar panel, so a slight drop in performance may be a lack of battery charge through a reduction in solar energy. In this case it may be that no remedial action can be taken; the voltage will improve when conditions become more favourable.
- Ensure the wires are taut. Any sag in the wires could mean strands are touching and the circuit is shorting. It is also beneficial to keep wires taut generally to ensure the fence is structurally effective against any mammalian attempts to breach the fence.
- Check wires have not come out of their insulator holders on the plastic and metal stakes. Deer can sometimes attempt to jump the fence and disturb the metal and plastic stakes.
- Check vegetation length as growth will reduce voltage performance (see Vegetation management below).

Vegetation management

Vegetation rapidly grows through the spring and summer months. If vegetation is touching the wires voltage will be reduced due to the fence short-circuiting. Vegetation growth can therefore cause high voltage loss (see Figure 6). It is crucial that vegetation under and around the fence is managed so the fence voltage remains at an effective level (> 5kV). Vegetation length will need to be monitored throughout the breeding season and cut when and where necessary.

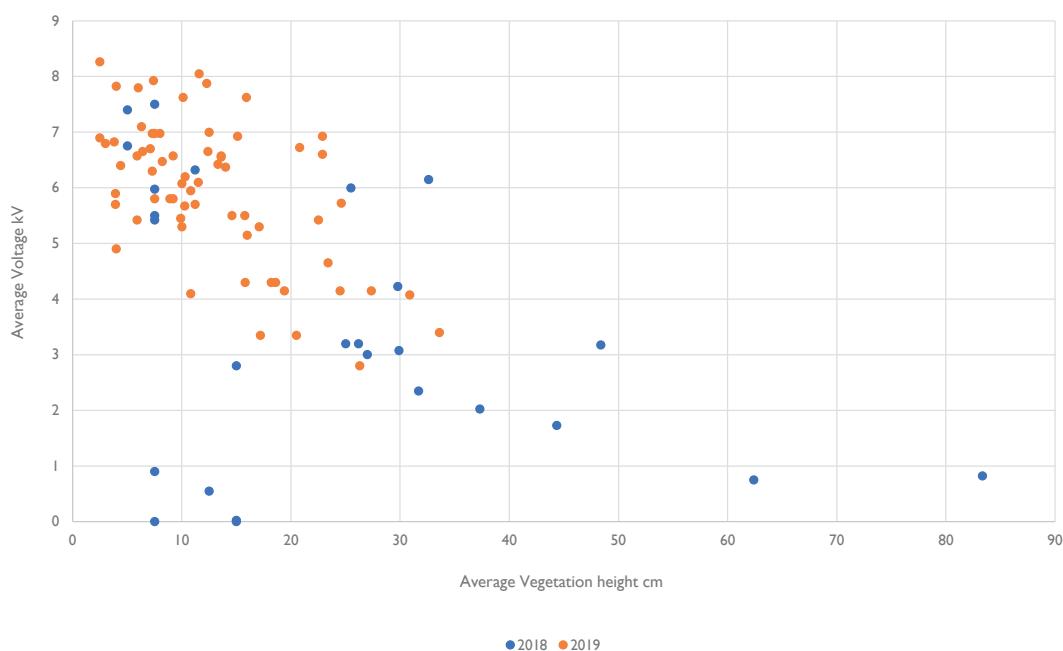


Figure 6: Vegetation growth in relation to decreased voltage levels

During the *Waders for Real* project we trimmed a metre strip directly under the wires due to farmers concerned of the effect of spraying on weed abundance. We completed a full cut on setting of the fence and assessed the need for further cutting during maintenance checks.

We used a 36v Lithium-Ion 2.0 Ah battery trimmer (with back up battery as the power duration is not exceptionally long) to cut vegetation, as this tool does not produce much noise and reduces disturbance (see Figure 7).

Through direction of a derogation, vegetation can be kept short by cutting or spraying (dependent on preference) - See *Derogation Advice* on page 2



Figure 7: Strimming of vegetation under fence wires to mitigate against voltage loss

How to take down

The electric fences are only taken down once birds are no longer using the area. This means that minimising the length of time of the fence take down session is not as critical as for the setting sessions. Nevertheless, an efficient take down should still take place to minimise disturbance to general wildlife in the area.

1. When arriving on site, the solar panel should be switched off and wires checked to make sure they are no longer live.
2. Once the fence is no longer live, untie the wires from the insulators on the main post and in 2 person teams, pull and reel the wires in one by one, starting from top to bottom. If any wire will not pull in, then it may have a snag somewhere around the perimeter and it will need manually correcting.
3. Collect metal and plastic stakes and ensure all rope and wooden pegs which tension the corner posts, are collected – **these must be removed to avoid interference with farming practices.**
4. Collect the corner posts and plastic covers and remove the main post and four-line reel post. It is important that no equipment is left on site.
5. Once all equipment has been collected, it is important to walk round the fence area to double check no stakes etc have been left.



Figure 8: Removing all equipment from the site is crucial to not affect farming practices

Health and Safety

Setting temporary electric fencing in wetland habitats can be hazardous. It is important to conduct the setting in a safe but efficient manner; using the following methods and protective clothing:

- Ear defenders
- Gloves
- Protective eye goggles
- Steel toes cap footwear
- Long leg wear
- Communication during testing
- Do not carry equipment that is too heavy
- Lift equipment correctly

Points to consider

Obtaining a derogation to set fences and manage vegetation – see page 2.

Putting plastic insulators on metal stakes – the metal stakes do not arrive from the distributor with the plastic insulators attached. The time for this activity will need to be carried out prior to arriving on site to set a fence.

Spare wire reels – extra wire reels should be taken on site when setting a fence in case there are issues with any of the wires reels to be used.

Flooding – fences set in floodplains are always at risk of being flooded. If this does happen then bottom wires which may be submerged can be disconnected, and other wires connected to still create a current through the remainder of the fence.