



Local environment risk assessment for plant protection products (LERAP)

Broadcast air-assisted sprayers

A step-by-step guide to reducing aquatic
buffer zones in the horticulture sector

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Introduction

This booklet applies to broadcast air-assisted sprayers only. Different rules apply to horizontal boom sprayers.

The booklet assumes that all necessary planning for the crop, the spray operation and product selection has been done in advance and that requirements of the Code of Practice for Using Plant Protection Products are followed throughout.

The LERAP scheme applies only to reducing buffer zones laid down to protect water. You cannot reduce buffer zones designed to safeguard hedges, field margins and the like under the LERAP scheme.

This scheme applies to all plant protection products (PPPs) which carry the requirement for a buffer zone to protect water and which are applied with a broadcast air-assisted sprayer. No compounds or groups of compounds are excluded from the scheme. Look at the product label carefully; different products carry different buffer zones.

What is a LERAP and why is it important?

- A LERAP helps protect aquatic life from contamination by keeping PPP sprays out of water.
- A LERAP allows you to reduce aquatic buffer zones according to your local circumstances.
- **The continuing authorisation of some products may depend on you fully complying with the LERAP scheme.**

Sites of special scientific interest (SSSI)

It is an offence for any person intentionally or recklessly to destroy or damage an SSSI. Before using a PPP within an SSSI, you must consult the appropriate conservation agency. In view of the sensitivity of such sites, you should also consider the potential impact of applying a PPP next to an SSSI. If you are not sure about the adequacy of the LERAP or no spray zone to protect the site, you should ask the appropriate conservation agency (see Contacts).

Living windbreaks

You can include a living windbreak as a factor in your LERAP assessment if it meets the following conditions:

- It is formed from broad-leaved trees or shrubs, not conifers. (Conifers may deflect spray down onto the watercourse behind them).
- It is managed to protect the crop from the effects of wind or to minimise spray drift.
- It is at least 2 metres higher than the crop to be sprayed.
- It extends for the full length of the boundary between the treated crop and the watercourse.
- It has no gaps over this length including those resulting from systematic stripping of lower branches.
- Leaves are visible over its entire length.

Reduced dose rates

Where a reduced dose rate is used in order to reduce a buffer zone, this must be applied to the area within 50 metres of a watercourse and not just the buffer zone. This is to ensure adequate watercourse protection.

Wind speed and direction

Wind speed and direction have not been included as LERAP factors. They do, of course, influence the amount of spray drift. However, they can vary over the time taken to plan and carry out a spray operation and their inclusion in the scheme would be impossible to enforce.

Crop types covered

The scheme covers any crop to which PPPs are applied using broadcast air-assisted sprayers. All these crops are treated alike.

Equipment types covered by this scheme

This scheme covers broadcast air-assisted sprayers (any equipment which broadcasts spray droplets, by means of an air stream produced by forced air, which carry outwards and upwards from the source of the spray).

The scheme does not cover horizontal boom sprayers (equipment of the spray boom type which applies PPPs via a boom operating in a horizontal plane) which have their own aquatic buffer zones and LERAP rules. Neither does it cover sprayers such as tunnel sprayers, which are neither broadcast air-assisted nor ground crop sprayers. Where sprayers such as tunnel sprayers are used to apply a PPP for which a buffer zone is set, this buffer zone has a default of 5 metres which cannot be reduced following a LERAP assessment.

Annex A is a guide to help users identify equipment, and where appropriate, details of the National Proficiency Tests Council (NPTC) Certificates are given for each sprayer type.

How to carry out a LERAP

If you choose to use a LERAP qualifying product, the following **4 steps** will guide you in carrying out a full LERAP and show you if and by how much you can reduce the statutory aquatic buffer zone.

Step 1: Gathering Information

Is the watercourse dry at the time of spraying?

If a ditch is dry at the time of spraying, a 5-metre buffer zone applies which you cannot reduce further with a LERAP assessment.

You cannot use the width of a watercourse as a factor to reduce the aquatic buffer zone because, as the watercourse widens, drift-fallout levels do not decrease rapidly enough to reduce the total amount of drift entering the water.

Will you be spraying near a watercourse shielded by a living windbreak?

You can reduce the buffer zone if the watercourse is protected by a living windbreak which satisfies the conditions listed above.

What dose of PPP will you use?

You should always apply the lowest dose that is appropriate to control the target weed, pest or disease. Seek advice on this if necessary. If the dose you intend to use is less than the maximum permitted dose for a single application then you may be able to reduce the buffer zone. If unsure, seek advice on the most appropriate dose to control the target weed, pest or disease.

Calculate the dose you intend to use as a percentage of the maximum dose shown on the label for any crop. For the purposes of a LERAP: 0-25% is considered to be $\frac{1}{4}$ rate; 25.1-50% is considered to be $\frac{1}{2}$ rate; 50.1-75% is considered to be $\frac{3}{4}$ rate and 75.1-100% is considered to be full rate.

You can reduce the buffer zone if you reduce the dose for all applications within 50 metres of a watercourse. The minimum buffer zones permitted on the basis of **reduced doses** alone is **7 metres for all crops**. When including other reduction aspects, for example, reduced dose, low- drift sprayers and living windbreaks, the **absolute minimum buffer zone is 5 metres**.

If you use a reduced dose rate to reduce the buffer zone you cannot repeat the application within 48 hrs.

If you are applying more than one product in a tank mix the product with the widest buffer zone requirement will determine the buffer zone for the tank mix as a whole. You do not have to add the buffer zones of the individual products together.

Will you use a sprayer that qualifies as a LERAP Low Drift sprayer?

Manufacturers of broadcast air-assisted sprayers can apply to have their equipment officially graded for 'LERAP-Low Drift' status, and grading is by star ratings.

Equipment that offers the greatest reduction in spray drift gets a

3-star rating. You must use the equipment

according to the conditions applied to the official grading, referring to the operating instructions supplied with individual types of equipment. Don't forget to record the LERAP- Low Drift star rating as part of your LERAP record.

A [list of spray equipment](#) that has achieved a star rating is available <https://secure.pesticides.gov.uk/SprayEquipment/Search.aspx>.

Step 2: Work out the width of the buffer zone for your spraying operation

Using the information from Step 1, you can now work out what unsprayed buffer zone reduction may be allowed.

If the watercourse is dry at the time of application, you can reduce the buffer zone to 5 metres. However, if you are using a star rated LERAP low drift sprayer, applying the PPP at less than the maximum permitted rate or if there is an eligible living windbreak, you will need to work out the minimum buffer zone. In order to do this, you will now need to refer to Tables 1 and 2 below.

Annex B has two example tables showing the actual buffer zones that can be applied when a LERAP assessment is carried out for a product with an 18-metre buffer zone.

1. Identify the appropriate table. This will depend on whether you wish to use an eligible living windbreak to reduce the buffer zone.
2. Read down the left-hand column of the table to select the row that matches your sprayer type.
3. Read across the top row of the table, to select the column which matches the dose rate you want to apply.
4. The box at which the row and the column intersect gives the amount (in metres) by which the buffer zone shown on the label may be reduced. (Because different products carry different buffer zones for use with broadcast air-assisted sprayers, it is not possible to show the reduced buffer zone distance in the table. Nor is it practicable to show 'final distance' tables owing to the number of products and buffer zones.)
5. Please note that there is a **minimum permitted buffer zone distance which cannot be further reduced** even if a smaller buffer zone is suggested by using the tables.

The absolute minimum buffer zone is 5 metres. This cannot be reduced further even if you use a reduced dose, a LERAP low drift star rated sprayer and an eligible living windbreak.

If you only reduce the applied dose and do not use a LERAP low drift star rated sprayer or an eligible living windbreak, the minimum buffer zone is 7 metres.

Table 1 Reduced dose WITHOUT windbreak				
Applied Dose Sprayer type	Full Rate (75.1-100%)	3/4 Rate (50,1-75%)	1/2 Rate (25.1-50%)	1/4 Rate (0-25%)
Standard	no reduction	reduce buffer zone by 3m	reduce buffer zone by 6m	reduce buffer zone by 12m
LERAP Low drift 1 star	reduce buffer zone by 3m	reduce buffer zone by 6m	reduce buffer zone by 9m	reduce buffer zone by 15m
LERAP Low drift 2 star	reduce buffer zone by 6m	reduce buffer zone by 9m	reduce buffer zone by 12m	reduce buffer zone by 18m
LERAP Low drift 3 star	reduce buffer zone by 9m	reduce buffer zone by 12m	reduce buffer zone by 15m	reduce buffer zone by 21m

Table 2 Reduced dose WITH windbreak				
Applied Dose Sprayer type	Full Rate (75.1-100%)	3/4 Rate (50,1-75%)	1/2 Rate (25.1-50%)	1/4 Rate (0-25%)
Standard	reduce buffer zone by 6m	reduce buffer zone by 9m	reduce buffer zone by 12m	reduce buffer zone by 18m
LERAP Low drift 1 star	reduce buffer zone by 9m	reduce buffer zone by 12m	reduce buffer zone by 15m	reduce buffer zone by 21m
LERAP Low drift 2 star	reduce buffer zone by 12m	reduce buffer zone by 15m	reduce buffer zone by 18m	reduce buffer zone by 24m
LERAP Low drift 3 star	reduce buffer zone by 15m	reduce buffer zone by 18m	reduce buffer zone by 21m	reduce buffer zone by 27m

Step 3: Record your LERAP decision

The LERAP scheme legally requires you to record each LERAP you conduct.

Your LERAP record must include the following information as a minimum:

- date of assessment;
- type of sprayer used (in particular any LERAP Low Drift star rating);
- the PPP you applied;
- the dose at which it was applied;
- the result of the LERAP decision (namely, the width of unsprayed buffer zone set);
- the name of the person who carried out the LERAP;
- width of the watercourse.

You will already be recording much of this information as part of your standard operating procedures for applying PPPs, as recommended in the Code of Practice for Using Plant Protection Products. An example record layout is shown in Figure 2, which you can use if you wish. There is no laid-down record format, but your record must include the information set out in the example record sheet.

You **must** keep all records of LERAPs conducted on your land for 3 years from the date of the spray operation for inspection because it is a legal requirement to do so (see the Code of Practice for Using Plant Protection Products section 6 'Keeping Records' for further details).

No matter how you decide to apply the PPP, you are **legally required to record your decision**.

Step 4: Carry out the spray operation

Ensure that the spray operation is carried out according to the results of your LERAP and that the spray operator knows the width of the unsprayed buffer zone to be used.

If a row is just inside the buffer zone you must not spray it. Spray up to and including the outermost row only. In other words, the distance between the outermost row to be treated and the top of the bank, must match the width of the buffer zone.

You must switch off the sprayer output on the watercourse side when treating the outermost row to the buffer zone, to protect the watercourse from spray drift fallout.

See Figure 1.

Record keeping

Extra paperwork can be a burden, but you can reduce it as follows:

- If the watercourse is a **dry ditch**, you may use and record an **unsprayed buffer zone** width of **5 metres** for all PPPs covered by the LERAP scheme regardless of the rating of the sprayer.
- If using a **tunnel sprayer**, use and record an **unsprayed buffer zone** width of **5 metres**.
- If applying the **same PPP**, at the **same dose** rate, using the **same equipment** on subsequent sprays in the **same area**, there is **no need to recalculate** the LERAP unless the width of the watercourse changes but you must still record the spray operation and the LERAP decision.
- If you want to stick to the **product label buffer zone** rather than using a LERAP to reduce it, just make a single entry of this decision in the spray records for that area.

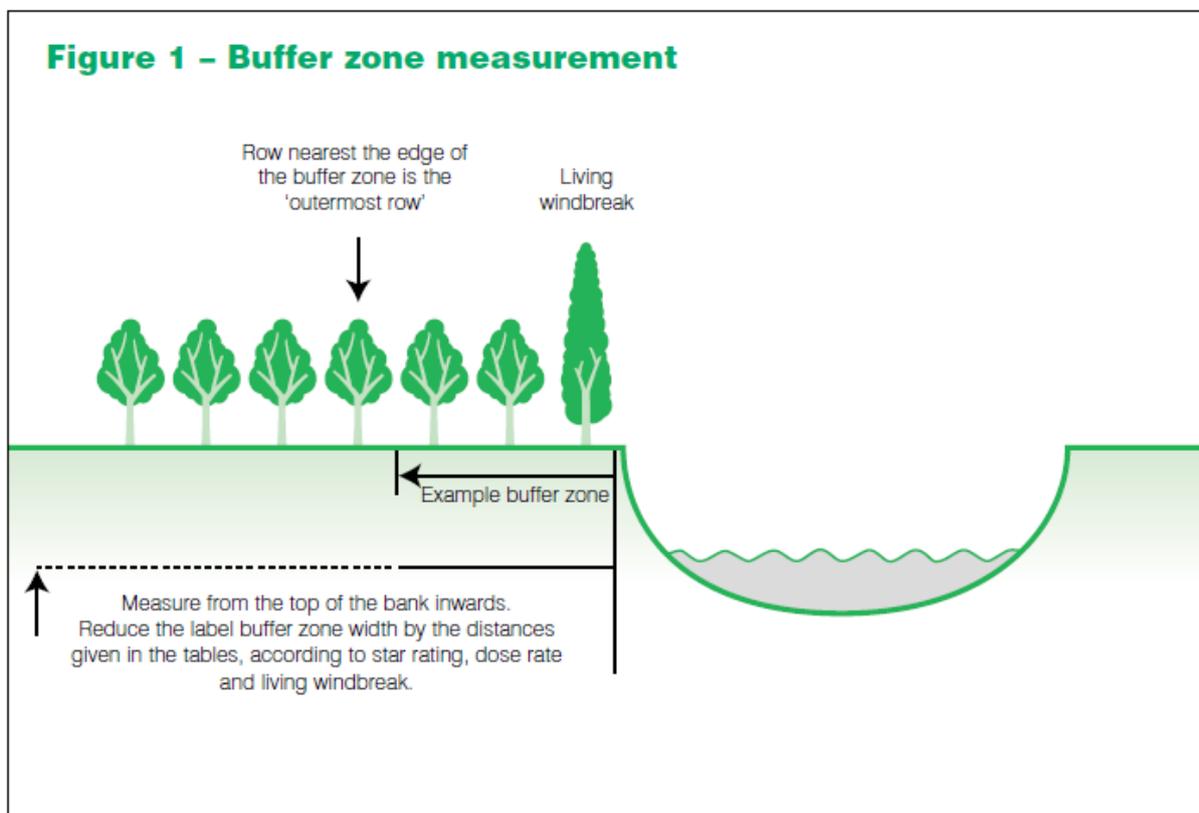


Figure 2: Example LERAP records

If you applied the buffer zone shown on the label, complete **Section A only**. If you used a LERAP to reduce your aquatic buffer zone, please complete Section B as well.

Section A:

Date	<input type="text"/>
Field name or number	<input type="text"/>
Crop to be treated	<input type="text"/>
Reason (name pest or disease)	<input type="text"/>
Product(s) used	<input type="text"/>
Weather conditions	<input type="text"/>
Buffer zone shown on the label	<input type="text"/>

Section B:

Dose	Full	<input type="checkbox"/>	3/4	<input type="checkbox"/>	1/2	<input type="checkbox"/>	1/4	<input type="checkbox"/>
Sprayer	Standard	<input type="checkbox"/>	1-star	<input type="checkbox"/>	2-star	<input type="checkbox"/>	3-star	<input type="checkbox"/>
Living windbreak included	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>				
Width of buffer zone after LERAP	<input type="text"/>							
Date of LERAP	<input type="text"/>							
Name of person who carried out LERAP	<input type="text"/>							

Annex A: Broadcast air-assisted equipment

Equipment included in the term 'broadcast air-assisted' to which any stipulated broadcast air assisted buffer zone distance applies. This is not an exhaustive list.

Standard axial flow sprayer

Commonly referred to as 'air blast'. Uses an axial fan to produce a large volume of air at low pressure to propel spray formed by standard hydraulic nozzles.

NPTC Module PA3A

Cross flow sprayer

Uses a cross flow fan to produce a low-pressure air stream to project spray laterally from standard hydraulic nozzles.

NPTC Module PA3A

Spinning disc or cage atomisers used with sideways and upwards air assistance

A controlled droplet applicator (CDA) nozzle/assembly that is positioned in an air stream. This produces an evenly sized spray that is propelled by a simple fan.

NPTC Module PA3A

Air shear nozzle type with sideways and upwards air assistance

Uses a fan (normally centrifugal) to produce a high-pressure air stream of varying volumes. This air stream is used to break up the spray liquid into droplets and to project the spray to the target.

NPTC Module PA3A

Air knife with sideways and upwards air assistance

Uses a standard flat fan hydraulic nozzle and a separate stream of air of low volume and pressure.

NPTC Module PA3A

Sprayer with air assistance where the boom is designed to be used between the horizontal and the vertical planes

Conventional nozzles or other atomisers that operate on a boom with air assistance along the length of the boom or at each nozzle. Similar to ground-based sprayers, they can be included in this scheme when operating in a non-horizontal boom mode.

NPTC Module PA3B

Hand-held mist blowers

Conventional nozzles or other atomisers operating on a hand-held sprayer that use air assistance to project the spray to the target.

NPTC Module PA6

Not included in 'broadcast air-assisted' definitions above, but to which the vehicle mounted/drawn buffer zone default of 5 metres applies:

Sprayers without air assistance where the boom is designed be used between the horizontal and the vertical planes

When operating in non-horizontal boom mode.

NPTC Module PA3C

Tunnel sprayers

With or without air assistance.

Annex B: Buffer zone reduction examples

Example 1: buffer zone reduction for star rated equipment for a product with an 18-metre buffer zone without windbreak

Unlike Tables 1 and 2, (which show how much you can reduce buffer zones by), this table shows what you can reduce the 18-metre buffer zone to.

Table 3 Buffer zone reduction WITHOUT windbreak				
Applied Dose / Sprayer type	Full Rate (75.1-100%)	3/4 Rate (50,1-75%)	1/2 Rate (25.1-50%)	1/4 Rate (0-25%)
Standard	18m	15m	12m	7m
LERAP Low drift 1 star	15m	12m	9m	5m
LERAP Low drift 2 star	12m	9m	6m	5m
LERAP Low drift 3 star	9m	6m	5m	5m

Example 2: buffer zone reduction for star rated equipment for a product with an 18-metre buffer zone with windbreak.

As with Table 3, this table shows what width you can reduce your buffer zone to.

Table 4 Buffer zone reduction WITH windbreak				
Applied Dose / Sprayer type	Full Rate (75.1-100%)	3/4 Rate (50,1-75%)	1/2 Rate (25.1-50%)	1/4 Rate (0-25%)
Standard	12m	9m	6m	5m
LERAP Low drift 1 star	9m	6m	5m	5m
LERAP Low drift 2 star	6m	5m	5m	5m
LERAP Low drift 3 star	5m	5m	5m	5m
Application by tunnel sprayer	5m	5m	5m	5m
Dry ditch connected to river system	5m	5m	5m	5m

Contacts

Sites of Special Scientific Interest (SSSIs)

For England: [Natural England](https://www.gov.uk/government/organisations/natural-england)

(www.gov.uk/government/organisations/natural-england)

For Scotland: [ScotNature](http://www.nature.scot/) (www.nature.scot/)

For Wales: [Natural Resources Wales](https://naturalresources.wales/?lang=en)

(<https://naturalresources.wales/?lang=en>)

For Northern Ireland (ASSIs): [DAERA](http://www.daera-ni.gov.uk/topics/land-and-landscapes/areas-special-scientific-interest) (www.daera-ni.gov.uk/topics/land-and-landscapes/areas-special-scientific-interest)

HSE

Chemicals Regulation Division

Mallard House

Kings Pool

3 Peasholme Green

York

YO1 7PX

Email: CRD.Information.Management@hse.gov.uk

Further information

- PPP Codes of Practice
(<http://hseonline/website/drafts/lee/pesticides/topics/using-pesticides/codes-of-practice.htm>)
- Code of Practice for Using Plant Protection Products
(<http://hseonline/website/drafts/lee/pesticides/topics/using-pesticides/codes-of-practice/code-of-practice-for-using-plant-protection-products.htm>)
- [Plant Protection Product Search](https://secure.pesticides.gov.uk/pestreg/PMSearch.asp)
(<https://secure.pesticides.gov.uk/pestreg/PMSearch.asp>)
- [HSE LERAP \(Local Environment Risk Assessment for Pesticides\)](https://www.hse.gov.uk/pesticides/using-pesticides/spray-drift/local-environment-risk-assessment-for-pesticides-le.htm)
(<https://www.hse.gov.uk/pesticides/using-pesticides/spray-drift/local-environment-risk-assessment-for-pesticides-le.htm>)

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