



# How to Install a Pine Marten Den Box

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## Introduction

This guidance document describes how to attach a Vincent Wildlife Trust (VWT) pine marten den box to the trunk of a tree approximately 2m-3.5m above ground level by a team of two to four people.

A VWT den box weighs approximately 15kg and the installation method uses a pulley system to lift the den box safely off the ground to the required height. The pulley system is to be used only for lifting and lowering den boxes and is not to be used for lifting and lowering people.

This guidance, suggested equipment and other material in this document is for information only and should be used in conjunction with professional advice and practical training for den box installation, such as that provided by VWT or other relevant professional organisations.

Working at height and in woodland areas can be very dangerous and we advise that everyone carries out appropriate training in the use of safety equipment and ladders in accordance with all relevant legislation and carries out appropriate risk assessments before undertaking any relevant activities.

This guidance replaces and supersedes all previous guidance published by VWT relating to the installation of pine marten den boxes.

***VWT does not accept any liability or responsibility arising from any reliance on this guidance.***

## Other publications

If you would like to see other pine marten publications or guidance documents published by VWT, visit [www.pinemartens.uk](http://www.pinemartens.uk)

## Contact us

If you require further guidance or you would like to provide feedback on this guidance, please contact us at

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## Site Visit Preparation

### Health and Safety

- A risk assessment for the site visit and den box installation should be prepared and all necessary risk control measures reviewed and implemented.
- All personal protection equipment (PPE) and field kit should be checked prior to visiting the site. Any equipment deemed not to be safe and fit for purpose should be repaired or replaced as required.
- Before leaving for the site, ensure that mobile phones are fully charged.

### Access and restrictions

To assist with accessing the site safely and selecting a suitable location for the den box, review aerial images and maps of the site and its surroundings. There are free online resources such as *Google Earth* or *Where's The Path* that are useful for this. This exercise will help to provide an overview of the site conditions (such as steep slopes, water bodies, edges, etc.) and identify preferable access routes. It will also provide information about the size and composition of the woodland and wider woodland connectivity within the landscape, which can help determine the best location within the site for den box installation.

When selecting a location for installing a den box, note that den boxes are likely to be of most benefit when they are installed in woodlands that:

- are large or immediately adjoin a large woodland or forest block;
- contain a diversity of fruiting species and habitat that supports prey species (eg, adjacent rough grassland, deadwood piles);
- are lacking in natural den sites such as cavities in old broadleaf trees;
- are connected to other woodlands in the wider landscape;
- are not heavily disturbed by forestry activities or high footfall.



## Installation equipment and set up

Any equipment listed is included as a suggestion only and other equipment or systems may also be suitable. All equipment should be obtained from reputable suppliers, be appropriate for their intended use and checked for damage or defects by a competent person regularly and prior to each use.

### Anchor chain

Ø = diameter

- **Chain** 5mm Ø long-link stainless steel chain, 1.6-2m length
- **Carbine hook A** 8mm Ø stainless steel locking carbine hook

**Set up** The carbine hook should be clipped to one end of the chain and locked. (Figure 1).



Figure 1 Carbine hook A attached to the chain.

### Hauling system

Ø = diameter

- **Carbine hook B** 8mm Ø stainless steel locking carbine hook with eye
- **Fixed pulley** 45mm/size 3 plain single block swivel with becket
- **Moving pulley** 45mm/size 3 plain single block swivel
- **Hauling rope** 8mm Ø, 32 plait (eg, polyester) braided rope, 15m

**Set up** The *hauling rope* should be passed through the middle of the *fixed pulley*, then the *moving pulley*, and finally attached to the *fixed pulley* via the *becket* (the small integral loop at the bottom of the fixed pulley – Figure 2) by tying a poacher's knot to the end of the rope (Figure 3 – also known as a *sliding barrel* or *double scaffold knot*). The shackle at the end of the fixed pulley should be attached to the eye of the carbine B hook.



Figure 2 The hauling system set up.

### Poacher's Knot

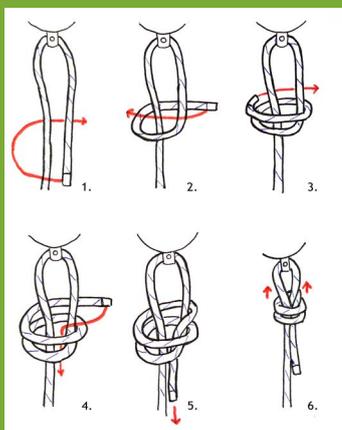


Figure 3 Tying a poacher's knot.

- 1 Thread one end of the hauling rope through the becket at the bottom of the fixed pulley.
- 2 Wrap end around both strands of rope.
- 3 Wrap it once again.
- 4 Pass end through the 2 loops you have made.
- 5 Pull down to tighten.
- 6 Slide knot up towards the becket to finish.

## Den box attachments

Ø = diameter

- **Hauling sling** 25mm high strength 240cm endless webbing sling
- **Carbine hook C** 10mm Ø stainless steel carbine hook
- **Fixing rope** 45mm/size 3 plain single block swivel
- **Hauling rope** 12mm Ø black polypropylene rope 2.5m length. Where grey squirrels could chew on the rope, we recommend the use of plastic-covered 2.5-3mm stainless steel wire rope.

**Set up** Carbine hook C is clipped into the **hauling sling** (Figure 4). The hauling sling is placed around the box and secured using Carbine hook C (Figure 5). Carbine hook C is clipped to the moving pulley during the den box installation (Figure 6).



Figure 4 Carbine hook C, which is attached to the hauling sling.



Figure 5 Carbine hook C attached to the hauling sling around a den box.

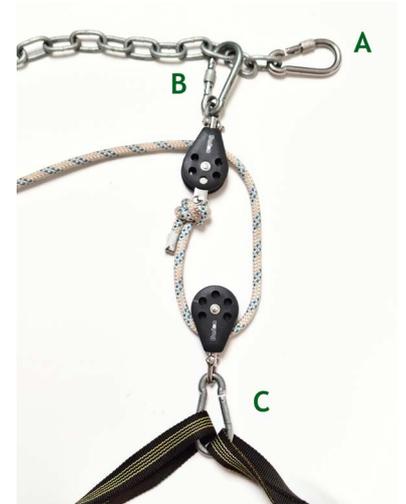


Figure 6 The different carbine hooks and their placements.

## Other equipment

- **Ladder** double extension aluminium ladder. 4-5m extended
- **Screwdriver or socket** to open the den box lid, depending on which screws/bolts are being used to attach the lid of the den box to the main section
- **Ladder attachment strap** either a strap or rope approximately 2m long to secure the top of the ladder to the tree when required
- **Folding pocket saw** for removing or trimming branches where necessary
- **Woodshavings** for den box bedding
- **Compass** to help determine which way the den box should face

## Personal Protective Equipment

Personal protective equipment should always be used to minimise the risk of injury – and it is the responsibility of all involved to ensure that they are using the appropriate safety equipment. As well as the equipment listed below, appropriate clothing should be worn, including sturdy footwear.

- **Climbing harness** Adjustable-size harnesses designed for group activities, such as the Petzl Aspir harness (Figure 7), can provide a cost-effective option. Gear loops on the harness are useful for transporting equipment safely up and down the ladder. Specialist arborist harnesses often provide the most flexibility with attachments, but they can be very expensive.
- **Fall restraint lanyard** We recommend the use of an adjustable work positioning lanyard, designed for use as personal protection to prevent a fall from height. This should be secured around the tree before installing the hauling equipment. The system used by VWT staff is an ISC mini rope grab with a 3m length, 11mm static rope, which is attached to the harness with locking carabiners. This system allows for easy adjustment of position when at height (Figure 8).
- **Helmet** Anyone working at height, footing the ladder or assisting with guiding the den box from the ground should wear appropriate head protection. We recommend the use of a climbing helmet for anyone working at height to allow for greater head movement.
- **Eye protection** Clear safety glasses should be worn by those wearing helmets to protect against eye injury from foliage and falling debris.
- **Gloves** Safety gloves can be worn to protect the skin against rope burn, scratches and tree resin.



Figure 7 Adjustable climbing harness.



Figure 8 Fall restraint lanyard attached to harness.



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## Tree selection

Selecting the most appropriate tree in which to install the den box will vary between sites. You may be unable to find a tree that includes all ideal qualities as listed below, and will need to compromise – or you may be spoilt for choice! The following lists the key factors to consider.

- **Quiet but accessible** The host tree should be in an area where it is unlikely to be interfered with or disturbed by humans and so should ideally be away from paths, especially if they appear well-trodden. However, areas that are too remote or inaccessible may also be unsuitable for installing den boxes since regular return journeys for monitoring and maintenance may be too difficult to manage.
- **The right size** The tree should be large enough to easily accommodate the size and weight of the box and to ensure the supports on the back of the den box will comfortably sit against the trunk (Figure 9). It is, however, also important to ensure that the girth of the tree is not so large that the hauling equipment cannot be easily reached and secured safely around the trunk, or that the fixing rope cannot reach around the trunk to be knotted. Both feet must remain on the ladder at all times and the fixer should not have to lean out to the side to secure the hauling equipment around the trunk of the tree.
- **Marten climbing features** Certain features make it easier for pine martens to climb in and out of the den box. These are especially important for young kits practising tree climbing. Horizontal branching (dead or alive) immediately below and leading up to the entrances of the box is ideal (Figure 9). Rough bark or ivy can also be useful to aid climbing.



Figure 9 A conifer with an ideal girth for den box placement and safe installation, as well as good horizontal branches for martens to use for climbing.

- **Trail cameras** If using a trail camera to monitor the den box, think about where you could install it when you are installing the den box. When someone is checking the camera, that person must always remain at least 5m away from the den box, so think about its location and also the route to that location. All volunteers and professionals monitoring pine marten den boxes should refer to [Monitoring Pine Marten Den Boxes: Guidance for Effective Camera Trap Set Ups](#) produced by NatureSpy in collaboration with VWT for information on den box monitoring in accordance with the law.
- **Forestry activities** Avoid trees or forest areas that are likely to be the subject of forestry operations in the near future. For the same reason, avoid dead or visibly diseased trees as these may need to be felled for safety reasons.

## Installation procedure

### The installation team

#### A team of four

This is the ideal team size for installing a den box. The core team includes a fixer and a hauler. The fixer attaches the hauling equipment to the tree using the ladder to reach the correct height. The hauler pulls up the den box from the ground. A third person foots the ladder and a fourth person guides the box as it leaves the ground. Having four people also makes it easier to carry the equipment to the installation site.

#### A team of three

If only three people are available, the third person should ideally foot the ladder throughout the installation (Figure 10). If they are required to help guide the box from the ground (for example if there are horizontal branches that may obstruct the path of the box when being lifted), the top of the ladder should be independently secured to the tree with a rope or strap by the fixer before the third person steps away from footing the ladder.

#### A team of two

If only two people are available to install the den box, the hauler should foot the ladder until the fixer has independently secured the top of the ladder to the tree.



Figure 10 A team of three people.

### Before starting an installation

- Talk through the procedure with your team, explaining the equipment, the role that each person will carry out and any safety precautions needed. Check that everyone is wearing the correct personal protective equipment for their role.
- Carry out final checks on your installation kit. Check that each piece of equipment is in good order and securely fastened and locked where appropriate. In particular, check that the pins on the shackles on the pulleys are screwed in tight, as these can slowly loosen in a bag.

## Think about placement

The den box entrances should be protected from the weather, and ideally face away from the prevailing wind, which is southwesterly in most parts of Britain and Ireland. However, you should think about how the local topography might affect this. The den box should be positioned at a height between 2m and 3.5m above the ground. A height of between 2m and 2.5m is sufficient to ensure the den box is out of reach of predators such as foxes and the den box should only be positioned higher when there is a potential risk of human disturbance (such as when a den box is installed on publicly accessible land near to known pathways). If human disturbance is a consideration, the den box should ideally be positioned out of human hand reach, where safe to do so. The anchor chain will need to be placed at least 0.5m above the estimated position of the top of the den box.

The den box should be positioned so that horizontal branches sit just below the box entrances, allowing for the pine martens to have an easy exit and entry, as shown in Figure 11.

If necessary, use a folding saw to cut any branches located between the den box and the tree so the box can be flush with the trunk. Avoid removing branches unnecessarily, as pine martens use horizontal branches to help them climb the tree. If branches must be removed, leave branch stubs of more than 10cm wherever possible.

## Setting up the den box

Open the lid of the den box and place clean, soft woodshavings into the central chamber up to a depth of approximately 15cm. Replace the lid and screw it securely shut only on the side nearest to where the ladder will be placed. Avoid over-tightening the screws, as this may create problems when the lid needs to be opened for maintenance.

**Set up** With the new style VWT, the fixing rope or wire should be threaded through both holes in the vertical battens at the back of the box (Figure 12). Consider which side of the box will be closest to the fixer when they are up the ladder. On this side of the box, the fixing rope should be shorter, leaving around 30-40cm of length hanging from the hole. The end furthest away from the fixer is longer so that the fixing rope can reach around the tree trunk and be secured at a point closest to the fixer.

**NB** VWT has updated its recommended specifications for pine marten den boxes to include battens that are fixed vertically rather than horizontally, significantly improving the box's durability and safety. See VWT's *Den Box Construction Guide* available at [pinemartens.uk](http://pinemartens.uk) for further information.



Figure 11 A den box entrance positioned so that a horizontal branch allows for easy access.



Figure 12 Fixing rope threaded through both holes in the battens at the back of the box.



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## Setting up the ladder

The ladder should be placed against the tree so that it sits in a secure and stable position on both the ground and the tree. It may be possible to gain additional stability on soft ground by firmly pushing the bottom of the ladder into the ground.

The ladder should ideally be positioned against the trunk at just over 90 degrees to the desired position of the den box (Figure 13). This is to allow for the fixer to be out of the way of the box as it is being hoisted, and be in a convenient position to place the hauling system and secure the box to the tree.

## Setting up the anchor and the hauling system

The fixer should carefully carry the fall restraint lanyard, the anchor chain and hauling system up the ladder. There must be someone footing the ladder while the fixer is climbing up the ladder. (Figure 14).

- The anchor chain and fall restraint lanyard can be laid over the **fixer's** shoulders when climbing the ladder, to keep the fixer's hands free. **Rope or chain must never be wrapped around (or be placed in front of) the neck**, as this risks serious injury in the event of a fall. It is recommended that the hauling system is clipped by carabine hook B to a gear loop on the harness when ascending the ladder.
- The fixer must ensure that the fall restraint lanyard is easily accessible when at the top of the ladder.
- The fixer must also ensure that they are in a safe and secure position on the ladder and properly secured with a fall restraint lanyard before beginning to fix the anchor chain and the hauling system to the tree.
- If the installation is being carried out by a team of two, the fixer should ensure that the ladder is secured to the tree with an additional rope or strap before the hauler steps away from footing the ladder.
- Once the fixer is satisfied that they are secure, attach the anchor chain around the tree trunk at least 0.5m above the estimated position of the top of the den box.
- One end of the chain should be passed from one hand to the other hand around the back of the tree trunk and then threaded through carabine hook A until snug against the tree (Figure 15). The end of the chain should be resting down against the trunk directly in line with where the centre of the box will be positioned.
- Clip carabine hook B (attached to the fixed pulley) into the chain link immediately below carabine hook A (attached to the chain), and lock gate (Figure 16). Carefully lower the moving pulley to the ground.

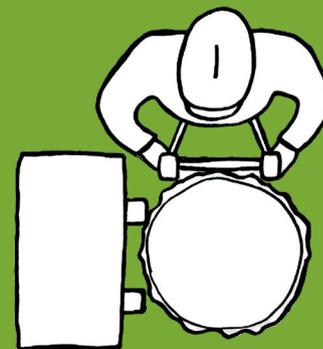


Figure 13 Aerial view showing position of the ladder against the trunk in relation to the den box.



Figure 14 Footing the ladder.



Figure 15 Anchor chain set up on tree and looped through Carbine hook A.



Figure 16 Carbine hook B clipped into anchor chain.

## Preparing the den box to be hauled up

The hauling sling should be placed around the whole of the den box and secured together in the centre of the top of the den box lid with carbine hook C (Figure 17). If the box is slightly smaller than the standard specifications, one end of the hauling sling may be threaded through the other end of the hauling sling to ensure that the sling is tight around the box (Figure 18).

The den box should be placed on the ground just below its intended final position on the tree, with the entrances and securing batons facing towards the tree. The carbine hook should be attached to the moving pulley (Figure 19).

The long end of the hauling rope should be positioned so that it is on the opposite side of the den box from the ladder (Figure 20).



Figure 17 Hauling sling around den box.



Figure 18 Hauling sling threaded through itself to fit a smaller den box.



Figure 20 Position of ladder and hauler.



Figure 19 Moving pulley clipped into hauling sling.



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## Hauling up

The **fixer** is in charge of the hauling operation at this point and should ensure that everyone present is ready for the den box to be hauled up.

- The fixer should direct the hauler to steadily pull on the rope to raise the den box. To avoid undue strain on the hauler's arms and hands, we suggest they pass the rope around their back but without wrapping it around their body (Figure 21) and either use their arm strength to hoist the rope or walk backwards to lift the box after first ensuring that there is a clear and safe route behind them.
- If the ladder is secure by either someone else footing it or by the ladder being tied to the tree, and an additional person is available to help, that additional person should stand in front of the den box and gently guide it up so that it does not get caught on bark or branches (Figure 22). Once the box is too high to be guided by hand, that person must step back to a safe distance. **No one should ever stand directly underneath the den box!**
- The fixer can also help to avoid snags by carefully pushing the rope outwards, away from the tree, ensuring they avoid the moving parts of the pulley system and do not overreach while on the ladder.
- When the box is at its intended fixing height, the hauler should keep tension on the hauling rope with both hands while the fixer guides the den box into its final position and secures the den box to the tree (Figures 23 and 24).
- The fixer should pass the long end of the fixing rope (or wire, if being used) around the tree and tie it to the shorter end with a reef knot (Figure 25). Any leftover 'tails' should be neatly tucked in.
- When using wire, the fixer should take a further turn of the wire around the tree and through the holes in the back of the den box, and make a second reef knot (Figure 26). We have found that this method so far has been used successfully for securing den boxes, but we are continuing to trial new methods to maximise the longevity and security of this fixing method.



Figure 25 The den box is held in position with the haulage system while the fixer attaches it to the tree.



Figure 26 Wire is taken twice around the tree and secured with a second reef knot.

## Please get in touch with VWT if you would like further guidance.

- To check that the box is securely in position, the fixer can request the hauler to allow some slack in the hauling rope whilst still holding the rope with both hands.
- Once the fixer is satisfied that the box is securely in position, the hauling system and all other equipment can be removed from the tree (Figure 27). The hauling sling and hauling system are detached first, before carefully being lowered or carefully dropped into a clear space on the ground.

The anchor chain and fall restraint lanyard are then detached respectively from the tree and carried back down the ladder.



Figure 27 The box in its final position and with all the installation equipment removed



Figure 21 Rope is passed around the hauler's back and held securely.



Figure 22 Assisting the path of the den box.



Figure 23 Keeping the rope taut as the fixer guides the box into its final position.



Figure 24 Den box is held in position with the haulage system while the fixer attaches it to the tree.

## Trail cameras

If a trail camera is being installed, remove any foliage that may grow to obscure sight of the den box, or accidentally trigger the camera's motion sensor.

For further guidance on setting up trail cameras, please see [Monitoring Pine Marten Den Boxes: Guidance for Effective Camera Trap Set Ups](#), produced by NatureSpy in collaboration with VWT.

Those without a pine marten disturbance licence should not approach within a 5m radius of a den box, unless under the direct supervision of an accompanying licensee. For this reason, trail cameras must not be positioned closer than 5m from the den box.

## Before leaving

It is very important that you make the following checks.

- 1 The location (eg, GPS coordinates or eight-figure grid reference) of the den box.
- 2 Any useful information on the best way to approach the den box or trail camera to minimise disturbance.
- 3 Check the ground carefully for any equipment or litter that may have been missed.



# Health and Safety

- It is your duty to ensure that you and anyone working under your supervision complies with the requirements of any relevant legislation in the country in which you are working. Please note that England, Wales, Scotland, Northern Ireland and the Republic of Ireland may each have different rules and requirements.
- Generic and specific risk assessments must be in place and available to all involved with the installation, checking and maintenance of den boxes.
- Before visiting the site, ensure that the risk assessment has been reviewed. Ensure you have emergency procedures in place, including a First Aid kit, the location of the nearest hospital, adequate mobile phones and signal with emergency contact numbers already stored, and that the installation team includes at least one person with appropriate first aid qualifications.
- Employers and those in control of any 'work at height' activity must make sure work is properly planned, supervised and carried out by competent people. This includes using the right type of equipment and having appropriate training and certificates for working at height.
- Anyone carrying out these installation procedures should have sufficient skills, knowledge and experience to perform the activities they are undertaking, or, if they are being trained, that they work under the supervision of somebody suitably experienced.
- Regular checks of all equipment should be undertaken and recorded by a competent person. Any defective equipment should be taken out of service, labelled as such and replaced.
- Certain landowners may have prescribed work practices concerning working at height, including a requirement to obtain a ladder certification or restricting the maximum height of ladder use. You must establish whether such restrictions are in place before visiting the site and carrying out any den box installations on their land.



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