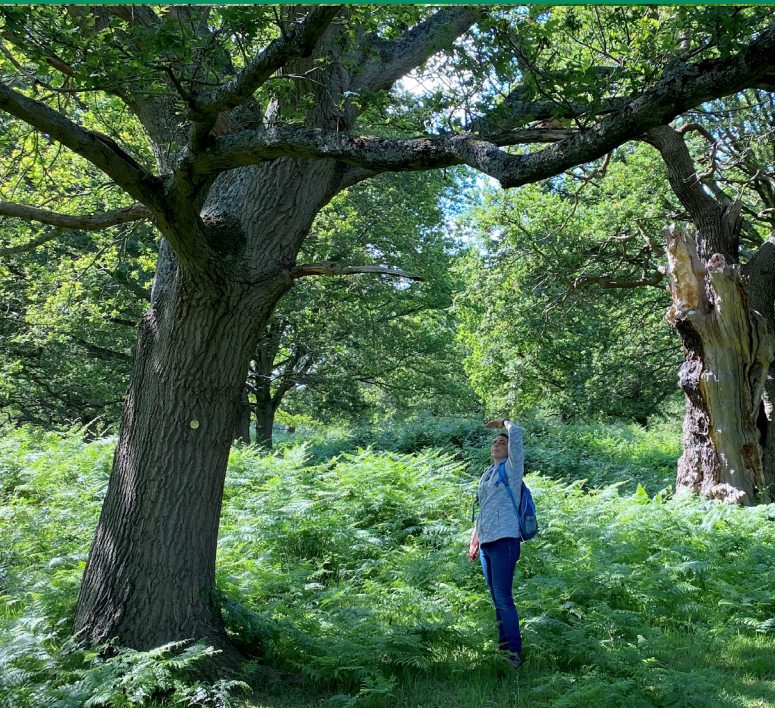


OAK PROCESSIONARY MOTH IN ENGLAND:

A Toolkit for Local Authorities



Executive summary

The UK's oaks are a vital and valued part of our urban and rural landscapes. They are a cornerstone of Britain's biodiversity, providing habitat and food for over 2,300 species of flora and fauna. While native oaks are well-adapted to local pests and diseases, they are increasingly threatened by those introduced from further afield. Oak Processionary Moth (OPM) was accidentally introduced in England in 2005 and is now firmly established in Greater London and some surrounding counties. It is likely to spread to new areas over time. OPM will not be eradicated but, with an informed approach, its impact can be minimised. Those responsible for managing trees need to be aware of the potential spread of OPM into new areas and, where it is present, take a risk-based approach that balances public health with the highly important ecological and social benefits provided by oak trees and their associated biodiversity.

OPM caterpillars are covered in tiny, barbed hairs and contact with them or their nests can cause health issues in people and animals. This can include skin irritation and rashes, eye and throat complaints and, occasionally, breathing difficulties. The caterpillars build nests on oak trees and eat oak leaves; in large numbers they can cause some defoliation. This alone may not cause the death of a tree, but it can increase its vulnerability to other stresses. It is not just the pest itself that represents a threat to oak trees – negative impacts could also arise from actions that may be taken to control it. It is vital to adopt management approaches that are based on a local risk-based approach, and to preserve oak within the landscape wherever possible so that they continue to support biodiversity and deliver critical ecosystem services.

Local authorities have a duty to act if they become aware of the presence of OPM. Other land-owners and managers should also take steps to assess and manage the risk appropriately.

This guide is based on extensive research and collaboration with those local authorities at the forefront of managing OPM in the UK. It seeks to be a helpful resource primarily for local authorities, but also to provide useful advice for others responsible for managing land that is accessible to the public. It provides information about OPM identification and lifecycle, surveying methods, risk assessment and the pros and cons of possible management options. It points to existing sources of information and support, equipping users of the guide with the tools needed to develop an effective, appropriate response to OPM.

This step-by-step guide aims to:

- Increase awareness of the implications of OPM
- Provide a framework for developing a local risk-based management approach
- Direct local authorities and other land managers to resources that will support local action plans
- Collect and share examples of good practice through a series of case studies
- Safeguard oak trees for the future by encouraging a holistic, evidence-based approach.

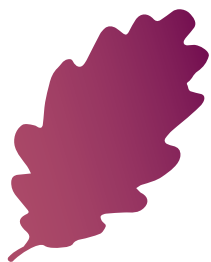
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Introduction





Introduction

WHAT IS OPM AND WHO IS THIS TOOLKIT FOR?

Oak processionary moth (OPM) is a ‘notifiable pest’ that was accidentally introduced into England in 2005. Today, OPM poses a threat to Britain’s oak trees and is hazardous to the health and wellbeing of humans and animals who come into contact with it. Local authorities and other land managers have a crucial role to play in protecting our oak trees and their associated wildlife by managing the spread of OPM, minimising its impact on oak trees and protecting the public.

Britain’s oak trees are a vital component in our urban and rural treescape. They make a huge contribution to our historic landscapes, culturally, economically and to the local ecosystem. They can support over 2,000 species – far more than any other native trees.

In this Toolkit, we set out six key steps that local authorities can use to develop an effective strategy for managing OPM. It has been created by The Tree Council with funding and support from Defra, Forest Research and the Forestry Commission. This Toolkit contains essential evidence, case studies and information that will enable you to react to OPM and when appropriate take a local risk-based approach that protects your local oak population and maintains these valuable assets for generations to come.

The OPM Toolkit will:

- Share learning and best practice from local authorities dealing with OPM
- Provide a common framework for developing a local risk-based approach to managing OPM
- Support the development of an OPM Action Plan where necessary
- Contribute to conserving oak trees and the benefits they provide to society
- Provide guidance on the strategic issues that a local authority or other organisation may face when dealing with OPM.



Oak tree health

Native oak species are well adapted to the UK environment and have a wide array of defences to protect themselves against local pests and diseases. However, climate change and the resulting impacts on local weather conditions, such as prolonged drought and flooding, are causing additional stresses to our oak populations and allowing new pests and diseases to become established in the UK.

In Europe, there are over 130 species of insects considered as oak tree pests - the greatest of any broadleaf tree type. Oaks are highly tolerant to defoliation by insects and can reflush, which means pests rarely kill trees. However, repeated defoliation can act as 'inciting factors', contributing to their decline.

Defoliating caterpillars and wood and bark-boring beetles are the most significant pests affecting European oaks. Of these, oak processionary moth is considered by Defra to be a **high risk pest**.

Other threats to oak tree health include sucking insects, gall wasps, root pests and acorn pests. These are considered lower risk pests. Gall producing species are well-studied and there are around 40 species causing galls on oak, but most have alternating sexual and asexual generations increasing the number of gall causers to 70.

Decline diseases of oak have been documented for over 100 years, but there is limited evidence of cause and effects. Oak declines are complex diseases involving both abiotic predisposing factors and biotic elements acting in a temporal sequence, having a cumulative effect.

The UK's oaks are increasingly under threat from introduced pests and diseases, and changes in the behaviour of indigenous organisms. High priority potential future threats include oak wilt fungus (*Ceratocystis fagacearum*) and the possibility of *Xylella* sub-species. We don't consider these threats in this Toolkit.



Healthy oak trees are a vital part of the British treescape © Slatan / Shutterstock



Oak wilt in the USA - leaves look scorched or brown, starting at the tip of the leaf © Paul A. Mistretta, USDA Forest Service, Bugwood



Why urgent action is needed to tackle OPM

Together, sessile oak and pedunculate oak, our two native oak species, are the most common broadleaved trees in the UK and a vital component in our urban and rural treescape and historic landscape. Oak trees make a huge contribution culturally and economically and provide vital ecosystem services. They support over 2,000 species – far more than any other native trees.

The UK's oak trees face an increasing threat from imported pests and diseases. Over recent decades, a newly-arrived pest called OPM has posed risks to the health of our oak population, as well as impacting the health and wellbeing of humans and animals.

OPM was first identified in the UK in 2005 and has established itself as a growing threat, spreading out from the London area. The caterpillars build nests on oak trees and eat oak leaves and in large numbers could extensively damage the trees, leaving them vulnerable to other stresses such as pests and diseases. However, there are currently no reports of OPM being the primary cause of oak tree death.

The caterpillars are covered in tiny, barbed hairs which can be blown about by the wind and may cause skin irritation, rashes and itching and eye and throat complaints. Occasionally, contact with OPM can cause breathing difficulties in people and animals. While most cases are not serious, the presence of OPM poses a risk to the reputation of local authorities.

The primary concern for land managers is therefore driven by the health issues that the caterpillars can cause to people and animals.

To ensure that oak is conserved in the landscape, land managers need to balance the risk to human and animal health and the associated management of the caterpillar, with the importance of oak conservation and preserving the ecological and social benefits that oak provides.



OPM caterpillar © Jon Stokes / The Tree Council



OPM caterpillars form silken nests
© Jon Stokes / The Tree Council

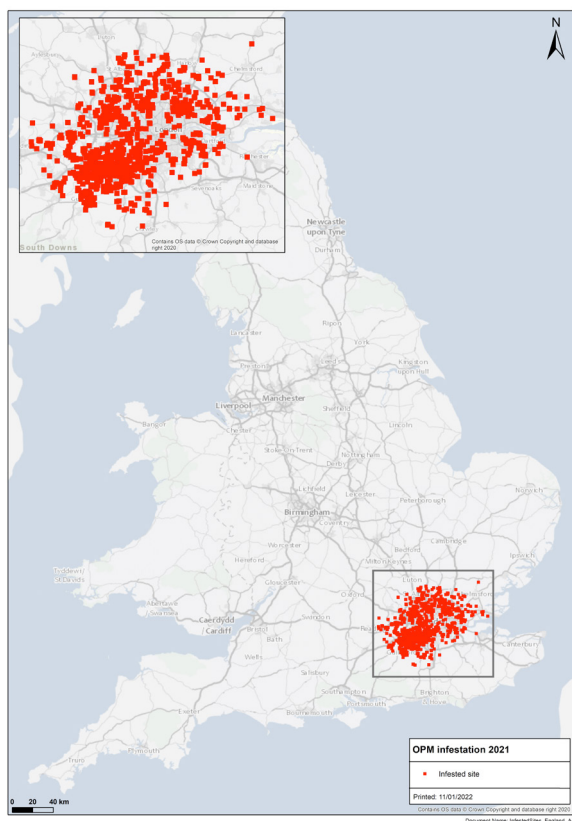


OPM distribution and zoning in England

Local authorities have a duty to act if they become aware of OPM infestations. Under Plant Health Legislation, from 2022 OPM is classified as a quarantine pest present in the UK and any suspected sightings in the Buffer Zone or the Pest Free Area should be reported to [TreeAlert](#), the official tree health reporting tool operated by Forest Research. OPM is also subject to statutory controls, [which vary according to area](#).

Despite early efforts to eradicate it, OPM is now established in most of Greater London and in some surrounding counties. **Modelling performed by Cambridge University has estimated that OPM currently spreads just over 6km every year.**¹

You can [use this map](#) to identify which OPM management zone your local authority is currently in. An up-to-date OPM distribution map can be [viewed here](#).



OPM is currently confined to London and the South East (March 2021) © Forestry Commission/Southampton University



What should local authorities do?

Every local authority has a role in managing the risk of OPM. OPM will not be eradicated which means that in the Established Area, we must learn to live with the pest and minimise its impact. Outside of the Established Area, every effort should still be made to control it.

In 2016, a review of the oak processionary moth ([Reference](#)) Control Programme made recommendations on how OPM should be managed including:

- A review of the existing national OPM strategy and policy which focussed primarily on slowing the spread of the pest.
- A shift from a comprehensive to a selective, risk-based OPM management strategy.

There is no single solution to managing OPM. A local risk-based approach must be informed by your local oak tree population, its associated biodiversity and the severity of OPM infestation. It will also consider your local appetite for risk, the reputational impact to your authority and the availability of staff and budget. **The combination of these factors will help inform a local risk-based approach, which is likely to result in the production of a local statement, policy or development of an OPM Action Plan.**

Awareness of the pest, understanding of the management options and their consequences and preparation are key to avoid knee-jerk, disproportionate and possibly damaging action for both oak tree health and its associated wildlife. Oak trees are a cornerstone of our treescape and must be preserved where possible. A reduction in the number of oak trees in public spaces in Britain is not desirable from many perspectives, including their importance for biodiversity and in terms of social and cultural value. Therefore, in order to safeguard oak trees in the landscape both now and in the future, measured solutions for dealing with OPM must be found.

In this Toolkit, we describe the steps to develop a local risk-based approach to managing OPM. You can read case studies to understand how other local authorities have managed OPM in their areas. These valuable insights can help you create a plan that's affordable, effective and proportionate.



Six-step approach for dealing with OPM

This Toolkit sets out a six-step approach for dealing with OPM that has been informed by the evidence and developed in partnership with local authorities that are dealing with OPM.

The six steps provide a clear and effective way to develop a local risk-based approach to OPM.

Step 1: Raise awareness – Everyone in the local authority with responsibility for oak management should identify potential OPM infestation and where it could be found. Awareness-raising is critical for everyone has the skills to identify OPM early, giving you the best chance of managing it.

Step 2: Assess the scale of OPM – You should understand how to identify how widespread an OPM infestation is and how many oak trees may be affected. Conducting an OPM survey can help you estimate the number of infected oaks and help you establish an effective approach.

Step 3: Determine the risks – A triage assessment of the risks and an estimation of their severity can inform your planning and enable you to create an effective strategy to eradicate the risk.

Step 4: Develop a local risk-based approach – Every oak population is different, and as a result so is every OPM infestation; therefore, authorities must develop a local risk-based approach to dealing with the pest. Base your local plan on your area, your oak tree population and your current level of risk.

Step 5: Take action – Once you have assessed the levels of infestation, you may need to take targeted action. An OPM Action Plan provides a structured way to record the specific circumstances and identify action points to manage and mitigate the risks to the local environment. This essential document can be shared with colleagues, stakeholders and other interested parties.

Step 6: Monitor and re-evaluate – Over time, the risk of OPM may increase or decrease as moth numbers fluctuate, so your plans must be flexible. To manage OPM there will need to be an annual appraisal of the potential risks that may materialise in the following year. This review may lead to a re-assessment of the local risk-based approach and even the development of a local OPM Action Plan.

Step

1

Raise awareness





Step 1 | Raise awareness

Everyone in the local authority with responsibility for oak management should be able to identify potential OPM infestations. Awareness-raising is critical for ensuring everyone has the skills to identify OPM early, giving you the best chance of managing it.

IN THIS SECTION YOU WILL LEARN:

- Preserving oak tree health
- What OPM is and why it's a threat
- The life stages of OPM
- The legal status of OPM.

What is oak processionary moth?

Oak processionary moth (*Thaumetopoea processionea*) originates from central and southern Europe and is named after the habits of the caterpillars that can travel between oak trees in nose-to-tail processions in late spring and early summer.

Prior to 2005, OPM was occasionally found in the UK, in most cases when adult males appeared as vagrants, well outside of their normal range, usually in August on the south coast of England.

OPM was accidentally introduced to England in 2005 and by June 2006, residents on a new housing development in South West London reported numerous cases of itchy rashes to the local environmental



Caterpillars in a nose-to-tail procession
© Forestry Commission



health officer. His visit revealed no apparent infectious cause or plausible environmental exposure, other than numerous visually striking hairy caterpillars infesting a row of fastigiate oak trees approximately 30m from the complainants' houses. These were identified as OPM larvae after visits by an independent entomologist and the Natural History Museum and liaison with the Forestry Commission and Royal Botanic Gardens, Kew, who jointly confirmed that this organism was a non-native species not known to breed in the UK.

Since 2006, the moth has spread naturally and has now become established in large parts of Greater London and in some surrounding counties. It has also been found in other areas of England on imported oak trees from the continent.

During 2019, over **70 cases of OPM** on trees imported from continental Europe were identified. In response, Defra **strengthened measures** on oak imports to enhance protection and reduce the risk of further introductions of OPM. OPM is also covered by **UK Plant Health Regulation**, making it illegal to knowingly keep, store, plant, move or sell trees with OPM.

Despite extensive efforts by Defra, Forestry Commission and Plant Health & Seeds Inspectorate to control OPM, it is likely that it will continue to spread. As a result, it is crucial that local authorities and agencies understand how to identify OPM and manage and mitigate risks at a local level.



Oak processionary moth
© Clare Bowen / The Tree Council



Current OPM distribution

The OPM national distribution map provides and up-to-date information about where OPM has been recorded. It also indicates whether OPM is likely to be present in your area. You can access the map [here](#).

Human health risks

The caterpillars of this moth develop microscopic, irritating hairs from their third growth stage onwards as a defensive mechanism against predation. A fully-grown caterpillar has many thousands of hairs, which are barbed and contain an irritating substance called thaumetopoein. Human contact with the hairs can cause itchy skin rashes and, less commonly, sore throats, breathing difficulties and eye irritations.

A reaction to the hairs can occur if people or animals touch caterpillars, their nests and materials such as bark or grass with hairs sticking to them. The hairs are readily dispersed on local air currents away from the trees containing the caterpillars, increasing the risks over wider areas. Caterpillars can also vigorously arch or flick their bodies if humans get too close, which indicates they are ejecting hairs. If this behaviour is seen, it is important to move away.

The greatest risk period is late May to early September, but hairs can be present on old nests as these decay quite slowly and could be blown or touched at any time of year.



The caterpillar hairs can cause extensive skin rashes © Henry Kuppen



OPM biology

Both of Britain's native species of oak (pedunculate and sessile oak), and other oak species found in the UK, are susceptible to OPM including Turkey oak, chestnut-leaved oak and holm oak.

Adult OPM moths have a wingspan of between 31-35mm in males and 36-41mm in females. The moths have two striking bands on the wings and often appear to have a 'shaggy' head. It can sometimes be confused with the [nut tree tussock moth](#). For more details on how to identify OPM, please [visit here](#). It can be difficult to see an adult oak processionary moth without a moth trap or pheromone trap (see page 27). The moths are grey-brown and can be challenging to distinguish from other harmless species of moth.

Most OPM infestations are identified by the characteristic nests (picture 3), or by identifying the caterpillars themselves (picture 4). The hairy caterpillars can commonly be found on the trunk of a tree or a substantial branch. They feed on oak leaves, creating distinctive patterns of damage, leaving skeletonised leaves with the main veins remaining. Finding a nest is the most reliable indication of OPM presence. Forest Research has provided a useful visual guide to common caterpillars you may confuse with OPM. You can [access it here](#). Observatree has also produced a useful [field identification guide to OPM](#).

Caterpillars can remain hidden at ground level around the base of the tree. If you identify feeding damage but find no signs of larvae, you should continue to monitor the tree. This includes trees in containers and pots. Remember that anyone planning to survey for OPM should develop a site- and pest-specific risk assessment.

An understanding of OPM life stages can be useful in helping you identify the pest. The table on the following page, shows the known life cycle of OPM. However, it is worth noting that changes in weather patterns, for example cold spring weather, can lead to staggered hatch rates, resulting in caterpillars developing at different rates and being at different points in their life cycle on the same tree.



Oak processionary moth
© Jon Stokes / The Tree Council



Pictures 3: A classic OPM nest high in an oak tree
© Jon Stokes / The Tree Council



Pictures 4: An OPM caterpillar in May/June
© Jon Stokes / The Tree Council



OPM life cycle

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
EGGS	●	●	●	●			●	●	●	●	●	●
CATERPILLAR				●	●	●	●					
PUPAE						●	●	●				
MOTHS							●	●	●			

Egg stage - July to April

- Up to 300 eggs per batch are laid in contiguous rows along one- to two-year-old twigs and covered by hairs of the female, usually in the top of the tree.
- The egg plaques remain on the trees during the autumn and winter.

Caterpillar stage - April to early July

- The caterpillars pass through six stages (L1–L6) over the course of three months.
- April to May: The timing of the eggs hatching is coordinated with the budding of the oak trees.
- The newly hatched caterpillars are 3mm long and red and have no toxic hairs.
- Mid May: Within a few weeks, they turn black but still lack hairs.
- Mid to late May: The caterpillars 'process' down from the canopy and begin developing irritating hairs.
- Early June: They start to form a silk nest, incorporating hairs and frass.
- June to early July: The caterpillars are nocturnal, feeding on the leaves at the edges of the canopy at night and process back to their nest during the day.
- During cold spells in June and July, the caterpillars have been observed congregating on the south side of the tree or on the ground or pavement, seemingly to get warm.
- Mid June to July: The caterpillars reach adult size (up to 45mm long).
- The nests of white silken webbing quickly become discoloured and harder to see.
- Nests can become dislodged from the trees especially in strong winds. They can also collapse under their own weight when larger populations use the same nest.

April to May



Newly hatched caterpillars are 2-3 mm long (April-May) © Forestry Commission

Early May



Caterpillars sometimes congregate at the base of the tree © Bartlett's Tree Experts

Mid to late May



Caterpillars form hairs (mid to late May)
© Jon Stokes / The Tree Council

Early June



Caterpillars start forming silk nests (early June)
© Jon Stokes / The Tree Council

June to July



Nests can become hard to see © Max Blake

June to September



From June to September, caterpillars pupate
in their nest (which can sometimes become
dislodged) © Shutterstock

August to September



Moths emerge in August to September
and only live for four to five days
© Jon Stokes / The Tree Council

Pupa stage - June to early August

- Between June and early August, the caterpillars retreat into their nests and moult to the pupal stage.
- Pupae remain in the nests until they are ready to emerge as adult moths.

Moth stage - July to September

- There is only one generation of adult OPM each year.
- Both sexes live for only three to four days as adults.
- Males are strong flyers, capable of flying many kilometres, while females don't appear to travel as far from their 'home' tree.
- Between July and September, the adult moths emerge, mate and lay their eggs in masses, or plaques.

Natural predation

Research on the natural parasites and predators of OPM has been carried out across Europe over the last 50 years to see if any of them can significantly reduce populations of the moth. As OPM is a relatively recent colonist of the UK, knowledge of natural predators is currently limited here and research is currently underway to build an understanding of their potential impact.

A recent report by [Dutch researchers de Boer and Harvey](#) describes how, like all processionary moths, OPM is well defended against natural enemies during all life stages thanks to protection from urticating hairs.

However, across Europe there are a range of chalcid wasps, tachinid flies (including *Carcelia iliaca* and *Pales processionea*) and ichneumon wasps (*Pimpla rufipes*, *Coccygomimus turionellae*, *Theronia atalantae*) that predate the species. There are also beetles (*Calosoma inquisitor* and *C. sycophanta*) and a silphid beetle (*Xylodrepa quadripunctata*) that have been seen to eat the larvae.

Unfortunately, many of the insect species that predate on OPM naturally have not yet been found in the UK and therefore cannot help control the populations of the moth.

However, in 2014, the presence of one of these species, *C. iliaca*, was discovered for the first time in the UK in [Richmond Park](#) in south-west London. [Sands](#) describes *C. iliaca* as looking like a grey-dusted housefly/bluebottle which can be seen running over the nest webs where it lays its eggs on the surface of the silken nests. The fly's larvae hatch and seek out the moth's caterpillar.

For a field identification guide of *Carcelia iliaca*, visit the [Forest Research website](#).



Carcelia iliaca fly predating OPM nest
© Forestry Commission



Carcelia iliaca © Shutterstock - Jaco Visser



Great tits prey on processionary moth caterpillars
© Shutterstock / ArCaLu



High rates of caterpillar parasitism, of up to 76%, have been reported in Belgium, France and the Netherlands. In Sand's study of OPM in Richmond Park he found that the fly was responsible for the death of 37% of caterpillars. However, he suggests that the practice of nest removal to reduce the human health risks, also appears to reduce the population of the flies, and that the **nests should be left in situ for longer, to allow *C. iliaca* numbers to increase**. Retaining nests that do not pose a risk to human health is now official Forestry Commission guidance.

By 2020, *C. iliaca* had been observed at other sites in the London area.

Some birds including the blue and great tit have also been seen to take the caterpillars. In France, research has shown that a great tit with young can consume 500 processionary moth caterpillars per day. The suggestion therefore **is that it is worth encouraging great tits to infested areas by providing nest boxes, to help reduce caterpillar numbers**.

De Boer and Harvey conclude that there needs to be a better understanding of possible biological controls and conservation management of OPM to allow a "change from current short-term control of processionary moth outbreaks, with potentially severe non-target effects, to a management strategy that is sustainable in the long-term and may even positively influence biodiversity in the environment where OPM and pine processionary moth currently thrive."



Legal obligations regarding OPM

The Government has separated the UK into distinct nationally defined geographical zones for OPM management. Each area has clearly defined responsibilities for managing OPM.

As a local authority or other agency, your legal obligations to deal with OPM will vary depending on which zone you are in and the location of infested trees and sites.

What happens if you find an OPM?

If an OPM adult, caterpillar or their nests are identified they must be reported to the Forestry Commission to enable the distribution to be monitored. The process is as follows:

- Report any OPM sightings or nests immediately using the [Tree Alert on-line pest reporting tool](#). You will need to upload a clear, well-lit photograph to Tree Alert, but do not risk contact with caterpillars or nests or linger close to the nest. OPM sightings of caterpillars or nests can be reported at any time of year.
- In the event of a discovery in the Buffer Zone and Pest Free Area, a Statutory Plant Health Notice (SPHN) may be issued. The Forestry Commission and other plant health authorities issue these notices, requiring the owner or manager to take action - instructions will be set out in the SPHN and these should be followed.
- If an SPHN is issued, the recipient must follow any instructions provided within the document.
- If you have any questions about an SPHN, [contact the Forestry Commission](#).
- **Failure to comply with the requirements of an SPHN can result in enforcement action and prosecution.**



The OPM Control Programme

OPM has a limited distribution within England, with the main area of infestation centred on Greater London. A central goal of government policy on OPM is focused on protecting the areas of the country which are free from the pest, which is achieved through measures such as import restrictions on high-risk oak trees, extensive surveillance and targeted treatment of findings of OPM within a Buffer Zone to minimise the risk of spread.

An OPM Control Programme is in place, which is led by the Forestry Commission in collaboration with landowners. This programme is designed to slow the spread of OPM, reduce levels of pest prevalence and protect the oak resource. It also supports landowners to manage the risks associated with OPM in the areas where OPM is established. Currently the OPM Control Programme focuses on the following areas:

- **Pest Free Area.** This is an area designated 'free from the pest.' This area covers most of the country and here central government funds an extensive programme of surveillance to monitor for OPM, to demonstrate an absence of the pest. Any outbreaks of OPM within this area are managed by central government with the objective of eradicating the outbreaks.
- **Buffer Zone.** In this area, there is an annual OPM programme of surveillance and control, led by Forestry Commission. This programme involves detecting the pest and treating infested oak trees (and those trees in close proximity). Statutory Plant Health Notices are served in the Buffer Zone but in most cases currently treatment of oak trees is done on behalf of the landowner by the Forestry Commission.

- **Established Area.** The area where OPM is defined as being established was expanded in December 2021 to better reflect the current known distribution of OPM. This enables landowners and managers to take a flexible approach to the management of OPM based on their own local risk-based approach. In this area, landowners and managers are responsible for the management of OPM and they are assisted with a package of guidance and support. During 2022, two additional initiatives are being piloted to support landowner action, including an OPM facilitation grant and a pilot with private residents. More details of these are available [here](#). An up-to-date OPM distribution map can be viewed [here](#).

Step

2



Assess the scale of OPM in your area





Step 2 | Assess the scale of OPM in your area

It is important to understand how to identify the extent of an OPM infestation and how many oak trees may be affected. Conducting an OPM survey can help you estimate the number of infected oaks and help you establish an effective approach.

IN THIS SECTION YOU WILL LEARN:

- How to determine your local distribution of OPM
- How to survey for OPM nests, caterpillars, moths and egg masses.

Understand local OPM distribution

The [national distribution map](#) provides details on the known distribution of OPM. If you are in an area where there have been sightings and reports, you will need to conduct a local survey to assess the level and severity of infestation.

A local survey can take several forms, including:

- An ad-hoc approach relying on existing information channels such as local media reports or complaints; or having an email or web page where people can report sightings
- An informal inspection relying on staff or volunteers to report OPM if they find it in particular areas the authority manages, such as parks
- A formal, structured, annual inspection using staff or volunteers targeting sites with high levels of oaks, or particular trees with known OPM issues
- A combination of the above (see [Case Study 1](#) and [Case Study 3](#)).



OPM is notifiable, regardless of the survey technique used, and should be reported to [TreeAlert](#), even if found in a designated zone.

It is useful to identify areas of your local authority where there are high numbers of oak trees, and locations where the public may interact with potentially infected trees. Areas could include street trees, public or private gardens, schools, footpaths, hospitals or parks/open spaces with high visitor numbers.

Consultation and information sharing with neighbouring authorities is vital. Communication and collaboration across boundaries improves local understanding of the pest and enables a quick and coordinated response to an OPM infestation. Use local Tree Officer networks to share knowledge among colleagues and other stakeholders about OPM risk levels. If OPM is discovered in an area or region, it should become an agenda item on all future Tree Officer meetings. Information sharing enables you to monitor the spread of the pest across boundaries.

If populations of the moth become established, there is likely to be a need to undertake a formal, structured survey. The following guidance provides a useful guide to the process.

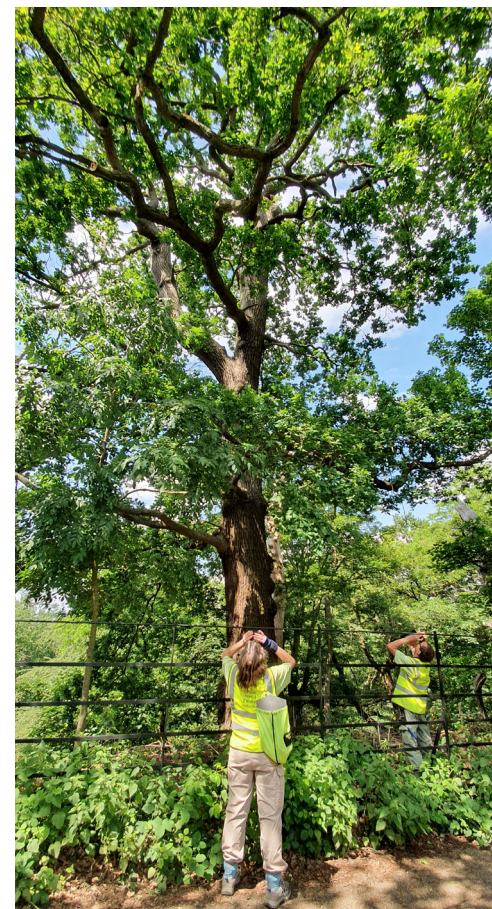
OPM survey options

The Forestry Commission's OPM manual states that surveys for OPM can be performed at any time of the year. Between June and August is an ideal time for spotting caterpillars and/or their nests. Surveys can also be conducted during winter, where you examine trees for old nests which may remain visible.

The number and the height of the oak trees you manage may influence the time of year when surveys are carried out, the number of times each tree is surveyed and the life-cycle stages you are looking for. Different approaches to surveys are described below, including some useful case studies.



OPM nest close to a public right of way
© Forestry Commission



Volunteers surveying oak trees with binoculars to limit contact with OPM nests.

© Clare Bowen / The Tree Council



Surveying for active nests and silk trails



April to August
Volunteer survey
Professional survey
© Jon Stokes

Caterpillars



April to August
Volunteer survey
Professional survey
© Forestry Commission

Adult moths



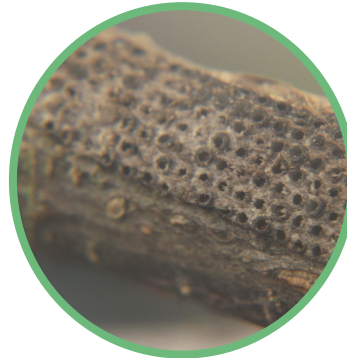
June to August
Pheromone trapping
Light trapping
Professional survey
© Clare Bowen / The Tree Council

Surveying for spent nests



August to April
Volunteer survey
Professional survey
© Forestry Commission

Egg Masses



August to April
Professional survey only
© Bartletts Tree Experts

For the timings of the different stages of the moth, consult the life cycle chart on page 15.



Surveying for nests and silk trails

Nest surveys should be carried out in late spring and summer when the caterpillars are active and building their nests. OPM does not build nests among the leaves, so nests can be found on the branches and trunks at any height. Almost white when new, the nests and trails soon become discoloured to a dirty brown or grey and are harder to see as a result.

Nests can be in a variety of shapes and sizes, from hemispheres (half a ball) a few centimetres wide, to blanket-like forms stretching several feet up a trunk. They can sag or collapse to resemble a bag clinging to the trunk or branch.

The safety of surveyors is paramount when looking for nests and silk trails as close contact may cause health and safety issues. Survey planning should include the development of a site and pest specific risk assessment. An example risk assessment from the Forestry Commission is available [here](#).



Caterpillars build their nests in late spring and summer © Jon Stokes

Case study

1

Case Study 1: Guildford Borough Council - a structured survey

In 2014, a significant OPM outbreak was discovered at Wisley Gardens in the north east of Surrey. The local authority, Guildford Borough Council (GBC), was concerned that the moth would spread more widely within the Council's area and infest council-owned trees so they conducted a structured survey to establish pest levels. [Click here for further details.](#)

Case study

2

Case Study 2: Working with volunteers to survey OPM

Richmond Park, a Royal Park in south west London, has an established, annual volunteer survey programme that plays a key role in gathering data on the distribution of OPM which informs the subsequent pest management within the park. [Click here for further details.](#)



Surveying for caterpillars

OPM caterpillars can be found in all parts of the tree, including the trunk, branches and leaves, and also on the ground. Although OPM caterpillars appear from April, the best time to survey for them is from June to August when they are large enough to be easily identified. The caterpillars are approximately 2mm long when they first emerge and tend to remain high in the trees until they grow older and larger, which makes them difficult to spot in the early stages of their development.

If there are only one or two oak trees on a site, it is worth visually inspecting them for the presence of OPM frequently. The Forestry Commission recommends examining each tree from the ground, from several angles. Using binoculars can limit the potential for contact with OPM hairs which can be harmful to human health.

During their third developmental stage (L3) the caterpillars remain small, at approximately 1cm (0.4 inches) in length. At this stage they begin to produce the hairs which can be harmful to human health (see [Case Study 2](#)).

Depending on the management treatment choice (see page 46), it may be important to identify caterpillars when they are in their early stages. This is because some of the treatment products are less effective against older, larger caterpillars.

Therefore, for young OPM caterpillars surveying must be done in the spring, from late March to May, between the caterpillars' emergence from the eggs and the time they start building their nests. The caterpillars are only about 2mm long when they emerge, and tend to remain high in the trees until they are older and larger. They are still only about a centimetre (0.4 inches) long when they reach their third developmental stage, or instar, known as L3, after which they become tolerant of the preferred treatment products.



Caterpillars can be found in all parts of the tree
© Bartlett Tree Experts



Surveying for adult moths

Adult OPM emerge from the pupae stage from the middle of July to early September. A pheromone trap which attracts and captures the male is a cost-effective and reliable way to survey for the presence of OPM.

If pheromone traps are deployed around the periphery of known distribution areas, the results can provide an indication of whether moths are found in the area. For more details see Case Studies 1 and 3.

However, the presence of adult moths in a trap does not necessarily signify a local breeding population. Males from the UK, and even from continental Europe, can undertake mass eruptive movements. Most recently, this happened in August 2020, when hundreds of male moths were reported along the south and east coast of England.

Finding OPM in a trap indicates that further visual surveys are necessary to clarify whether an infestation is present.

Case study 3

Case Study 3: Test Valley and New Forest – structured cross-authority OPM pheromone traps

In 2018, the Test Valley Tree Officer obtained funding to set pheromone traps on oak trees on the local authority land following a review of the number of oaks from their tree management database. This was based on concerns that OPM may be present in the borough given the rapid spread and recent more local reports in neighbouring areas. [Click here for further details.](#)



Adult male OPM
© Jon Stokes / The Tree Council



An OPM pheromone trap with saline solution
© Forestry Commission



Surveying for spent nests

Surveying for spent, or used, nests can be carried out at any time, but they can be easier to see in winter when there are no leaves on the trees. Also check the ground under oak trees for old nests which have fallen out. Finding old nests will provide early warning of the likely presence of caterpillars the following spring (see [Case Study 1](#)). Survey planning should include the development of a site- and pest-specific risk assessment. An example risk assessment from the Forestry Commission is available [here](#).



Adult male OPM
© Jon Stokes / The Tree Council



Caterpillars emerging from eggs
© Forestry Commission

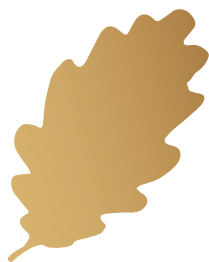


Step

3

Determine the risks





Step 3 | Determine the risks

A triage assessment of the risks and an estimation of their severity can inform your planning and enable you to create an effective strategy to manage OPM.

IN THIS SECTION YOU WILL LEARN:

- The risks of OPM to organisational reputation, human and animal health, biodiversity and oak tree health
- Health risks to professionals who work with oak trees
- Potential risks of OPM management to operational budgets
- How to triage risks and create a risk-assessment plan.



Risks of OPM

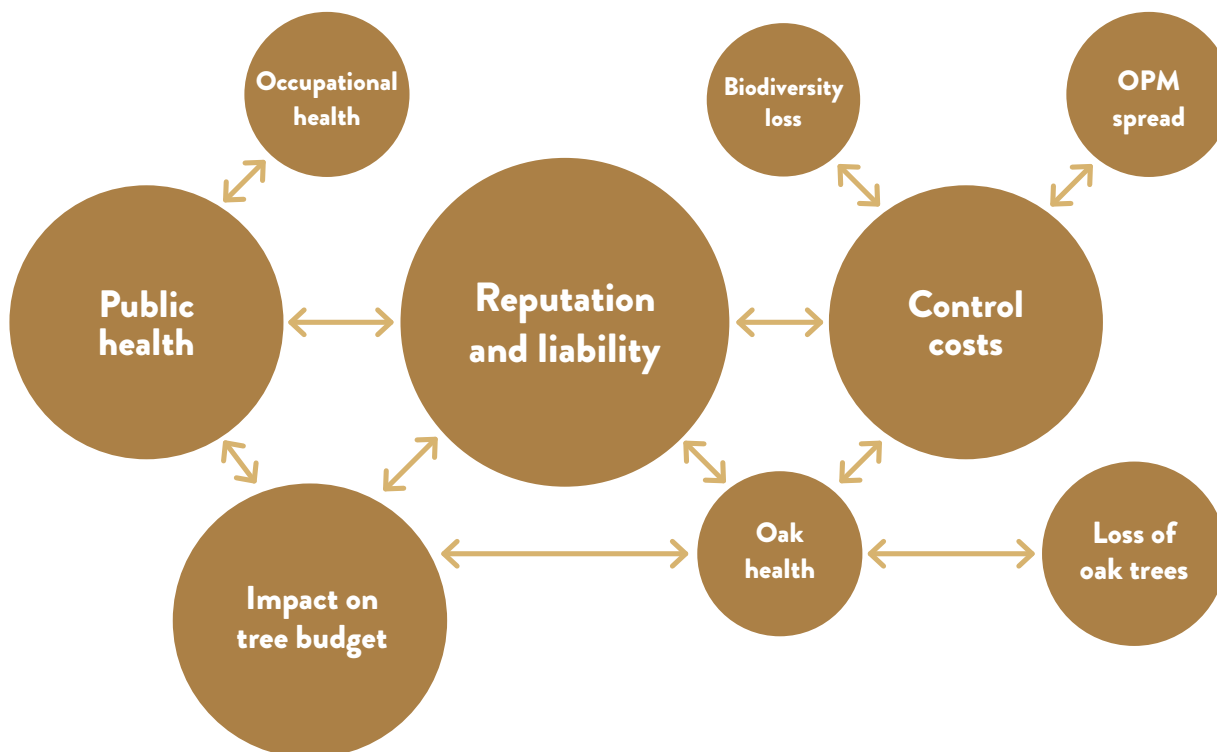
OPM management decisions must be made with a true understanding of the actual risk it presents to your area, rather than perceived risk. Research suggests the perception of OPM risk is highest amongst those who are facing imminent decisions about dealing with the threat.

There are six main direct and indirect risks associated with OPM:

- 1. Reputational risk** – The reputation of your organisation may be at stake if you fail to manage OPM effectively.
- 2. Economic risk** - The costs of OPM management may result in significant strain on operational budgets.
- 3. Human and animal health** – OPM can present human and animal health risks.
- 4. Biodiversity risk** - Biodiversity can be adversely affected by certain OPM management techniques.
- 5. Oak health** - The health of an oak can be impacted if OPM is not controlled.
- 6. Oak loss** - The felling of oak trees as a reaction to the presence of OPM.

The size of the circles indicates the collective importance placed on those risks by a group of local authorities who contributed to the exercise. Reputational risk and public health emerge as a key driver of OPM management action.

Figure 4: Results from the analysis of risk during the research. Size of circle indicates degree of risk. Future Proofing Plant Health report, Defra 2019.



Reputational risk

Discussions with affected local authorities indicates that the risk to corporate reputation is felt most acutely at the strategic level.

OPM research undertaken during 2019 and 2020 by Forest Research revealed that currently there is still a great deal of uncertainty expressed by local authorities about the scale and degree of impact of OPM on public health.

There is a risk for local authorities that public concern could provoke a disproportionate response within a local authority area – such as the felling of oak trees.

Therefore it is essential that OPM management decisions are evidence-based and made with a true understanding of the actual risks and not as a ‘knee-jerk’ reaction to perceptions of risk.

This research suggests that there is a need to develop a detailed public engagement plan for OPM when it reaches a new local authority area (see page 51). This needs to set out clearly the public health issues of OPM without raising undue concern, as well as explaining any management action identified in a local risk-based Statement/Policy/Plan (see page 52 for the communication plan).

To avoid disproportionate responses, OPM needs to be managed through a balanced risk appraisal by undertaking a triage of the risks (see [Case Study 4](#)) and understanding the consequences of each management action (see page 46).



Economic risks of managing OPM

There is broad agreement among local authorities managing OPM that the costs of control and management of OPM do not form a significant risk as a proportion of a local authority's **total** budget. However, costs implications for tree management budgets can be significant. Local authorities agree that passing a nominal threshold of between £5,000 and £10,000 to manage OPM, currently represents a genuine threat to budgets.

The specific costs of dealing with OPM will vary considerably depending upon local area and circumstances, but indicative prices for a few of the possible treatments include:

- **Zoning of local sites:** In-house staff time
- **Nest removal:** £100/tree (based on two-person team with a mobile platform dealing with six trees/day)
- **Spraying with Bt:** £950/day (based on spraying 15-40 trees/day depending on their location) – which typically requires repeat treatment.

However, nest removal costs can vary considerably as it depends on the number of nests and size of tree; for example, a single mature oak with high numbers of nests could take many hours to treat, increasing the cost per tree. When planning a budget, it is therefore vital to seek local quotes to ensure that budgeted figures are accurate. There are considerable differences in price between treatments and different levels of risk and effectiveness (see pages 46-48). Within a risk-based approach, you must weigh up the cost and risks associated with performing an action and not performing it.

Unplanned tree safety management activity can place a strain on fixed budgets. Additional and unexpected demands to deal with OPM can potentially reduce the service provided by Tree Officers. While small numbers of isolated cases can usually be managed within existing budgets, more widespread presence and/or high OPM population levels may require a systematic and strategic response, with a separate, ring-fenced budget.



OPM nest removal using a vacuum
© Shutterstock / Ronald Jansen



Network Rail managing OPM on their lineside
© Forestry Commission

Human health risks

There is little evidence that OPM has a serious impact on human health ([Public Health England, 2015](#)). However, public perception of risk to health and the potential for litigation, bad publicity or the avoidance of a particular site may influence management decisions to dealing with OPM.

Human contact with the caterpillar hairs can cause a range of health issues, including itchy skin, rashes, sore throats, breathing difficulties and eye irritations.

A systematic review of the evidence around the [health effects associated with exposure to hairs \(setae\) of OPM larvae](#) and a summary of the findings was prepared by Public Health England in 2015. It concluded the following:

- Touching caterpillars or nests, or just walking through areas with heavy OPM infestation, can cause symptoms.
- Because OPM spend most of their time high in canopies, airborne contact is more common than direct contact.
- The two largest epidemiological studies showed that 5–7% of the population exposed to OPM reported health complaints, with the majority being skin problems.
- Most people who suffer reactions are unlikely to require medical treatment, although severe eye or respiratory symptoms may require interventions.
- There have been no reported cases of anaphylaxis or death arising from contact with OPM in the UK.
- The risks to children are substantially higher as they are more likely to come into contact with OPM.
- Repeated exposure may cause some individuals to become sensitised and suffer worsening reactions.

Risk to professionals

Those who work closely with oak trees, including forestry workers and arborists are at greater risk than the public of experiencing health impacts due to close contact and repeated exposure to OPM, despite the mandated wearing of PPE. The effects of OPM on professionals working around trees must be taken seriously. Individuals must be vigilant, and their employers must employ an adequate occupational health monitoring system and effective risk assessments.



Rash caused by OPM
© Bartlett Tree Experts



Skin irritation caused by OPM
© Bartlett Tree Experts



For further guidance on prevention, mitigation and treatment, employer and employee responsibilities, see [guidance from the Forestry Commission's OPM Manual here](#).

Animal health risks posed by OPM

Currently there are very few reports of animals being affected by OPM. However, dogs, cats and browsing and grazing livestock such as cattle, horses, sheep, goats, deer and pigs, are all susceptible to contact with OPM hairs. Cats and dogs can get hairs on their paws which they then lick to try to relieve the irritation, transferring the irritating hairs to their mouths. The hairs can also enter the mouth and nose by sniffing, licking and picking up caterpillars or nests. The resulting irritation to tissues in and around the mouth and nose can cause swelling and consequent breathing difficulties and distress.

Livestock can come into mouth and nose contact with hairs on the grass or on other plants they eat. Hairs carried on the wind can be transferred directly onto the skin and into the eyes and ears of all animals or collected from shed hairs on the ground where animals sit or lie down.

Risks to oak health

Direct impacts of OPM on oak health

OPM caterpillars are specialist herbivores, eating only oak leaves. They can cause some defoliation of oak trees although there is little evidence of severe defoliation events in the UK. Studies in France by [Thomas Damestoy \(2019\)](#) have shown that severe defoliation was greater in monocultures than in mixed woodlands and higher for sessile oaks compared to pedunculate oaks.

Oaks are naturally adapted to defoliation such as the production of so-called 'lammas' growth in mid- to late summer, after most of the caterpillars have pupated. However, any loss of leaves can increase the risks to a tree of secondary pests and other stress factors.



Defoliated oak canopy due to OPM caterpillars
© Max Blake



Defoliation could be particularly serious in ancient oaks such as the Queen Elizabeth Oak in West Sussex © Jon Stokes / The Tree Council



Therefore:

- If trees are already suffering from other pests and diseases, such as acute oak decline or oak powdery mildew, OPM defoliation will increase stress to the tree.
- OPM defoliation could be an increased risk to ancient oak trees which have naturally fewer leaves. OPM defoliation will increase stress to the tree.
- OPM defoliation could be a significant risk to veteran/ancient oak trees that already have slower growth rates.

Risks to biodiversity

Direct impacts of OPM management on biodiversity:

Over 2,300 species are associated with the two native species of oak tree, pedunculate oak and sessile oak, with 125 macro-moths and butterflies using the *Quercus* genus as a food plant in the UK ([Mitchell et al., 2019](#)). The treatment of OPM can impact this native oak-associated biodiversity, the extent of the impact being highly dependent on the treatments used and the method of application.

Different OPM treatment options have different impacts on biodiversity, for example:

- OPM surveillance and nest removal is likely to have the lowest impact on oak-associated biodiversity, but nest removal may also impact populations of parasitoids and other beneficial insects (Down & Audsley, 2018*)
- In particular, nest removal can impact on populations of a new tachinid fly in the UK, *Carcelia iliaca*, which is a parasitoid of OPM. Where it is present, *C. iliaca* can be responsible for the mortality of around 37% of moth pupae on average ([Sands, 2017](#)).
- *Bacillus thuringiensis var kurstaki* (Bt), which is used in the current FC-funded control programme, has been shown to be effective in reducing populations of OPM caterpillars. Although it is the most selective sprayed control option, Bt can impact other, non-target species of butterflies and moths that feed on oak leaves at a similar time to OPM. This can in turn jeopardise food sources for many species of nesting birds.
- The use of less selective insecticides can have severe negative impacts on a broad range of other insects, arthropods, aquatic life and mammals (including humans) due to pesticide drift onto surrounding vegetation (Down & Audsley, 2018*).



Winter moth: Species most likely to be impacted due to pesticide drift
© Shutterstock / Henri Koskinen



Green Tortrix moth: Species most likely to be impacted due to pesticide drift
© Shutterstock / Tomasz Klejdysz

*Down, R., Audsley, N., 2018. *Review of the impacts of Oak Processionary Moth (Thaumetopoea processionea) control methods on oak tree biodiversity*, DEFRA, London.



Indirect impacts of OPM on both oak health and biodiversity:

However, the greatest risk to biodiversity and oak tree health, will be if owners and managers of oak trees with OPM decide to fell the oak trees, such as in a school, park or playground. Local authorities or owners who struggle to meet annual costs for OPM management may also choose to fell oak. Oak trees may not be included in a planting prescription due to their perceived risk.

The Tree Council strongly believes that a reduction in the number of oak trees in public spaces in Britain is not desirable. Oaks are valuable for their contribution to biodiversity and their importance in terms of social and cultural value.

It will be important therefore that existing strategic guidance around valuable trees and Tree Preservation Orders (TPOs) are used to safeguard the future of oak trees.

One local authority is testing their legal instruments for ensuring retention of infested oak trees – see Case Study 4 below.



Green Tortrix moth: Species most likely to be impacted due to pesticide drift © Shutterstock / Tomasz Klejdysz

Case study 4

Case Study 4: Testing legal options for oak tree retention

The local authority is located in the Established Area with increasing infestations spread across the entire borough. There are many private estates, and large residential properties with oak trees on their land or gardens. Due to the limited local authority budgets and the prevalence of OPM they have adopted a risk-based management strategy. Therefore, the local authority are testing their legal instruments for ensuring retention of infested oak trees. [Click here for further details.](#)



Local risk: triage

Each local authority must establish an organisational balance between OPM risk factors to inform proportionate and reasonable local actions. By performing a triage process, you can systematically assess all the risks, and establish an organisational position. This has been undertaken successfully by West Sussex County Council – see Case Study 5 below.

It should not be assumed that the arboricultural section of a local authority takes sole responsibility for OPM decision-making. The allocation of responsibility for OPM management should be established as part of the process of adding OPM to an authority's risk register.



Case Study 5: Pest and disease triage and risk registers

West Sussex County Council developed a 'triage' system to assess the risk posed by any pest or disease. The system enabled them to add ash dieback and OPM to their emerging corporate risk register. The approach developed by West Sussex County Council provides a useful framework for other local authorities to follow. [Click here for further details.](#)



Step

4

Develop a local risk-based approach





Step 4 | Develop a local risk-based approach

Every OPM infestation is different, so local authorities must develop a local risk-based approach to deal with the pest. Base your local plan on your area, your oak tree population and your current level of risk.

IN THIS SECTION YOU WILL LEARN:

- What a local risk-based approach to OPM management is
- Why your local area plan must be tailored to your location
- How to find the correct balance between risk and outcome
- OPM management options
- Potential costs for managing OPM
- How to prepare an OPM action plan

A local risk-based approach

The exact nature of a local authority's development of a local risk-based approach will be unique and depend on the results of the first three steps taken in the Toolkit, including the risk triage exercise (see Step 3 on page 30).

When managing OPM, finding a balance between the potential and the actual risks to both the health and safety of humans and to the ecosystem and biodiversity values provided by oak can be challenging.

For example, local management actions could be beneficial in reducing the numbers of OPM caterpillars but result in a loss of biodiversity through insecticide spraying or the removal of oak trees from public spaces.



The choice of management actions will therefore need to be a local decision, based on a local authority's or landowner's local assessment of which risks are the most significant to them and their appetite for risk and available budget.

OPM management options are wide ranging and can be categorised on a spectrum from *low-input/resource-light*, to *high-input/resource-intensive* management actions.

- **Low-input/resource-light options** – These include cordoning off the trees and installing appropriate signage. Such interventions have low costs, but provide little protection from the insect spreading and the infestation growing. This could lead to high resource input as a result of dealing with complaints and risking the reputation of the landowner.
- **High-input/resource-intensive options** – These include interventions such as nest removal or insecticide spraying, which may have significant impacts on biodiversity depending on the product used. These interventions can be financially and/or ecologically costly but are effective in reducing pest numbers.

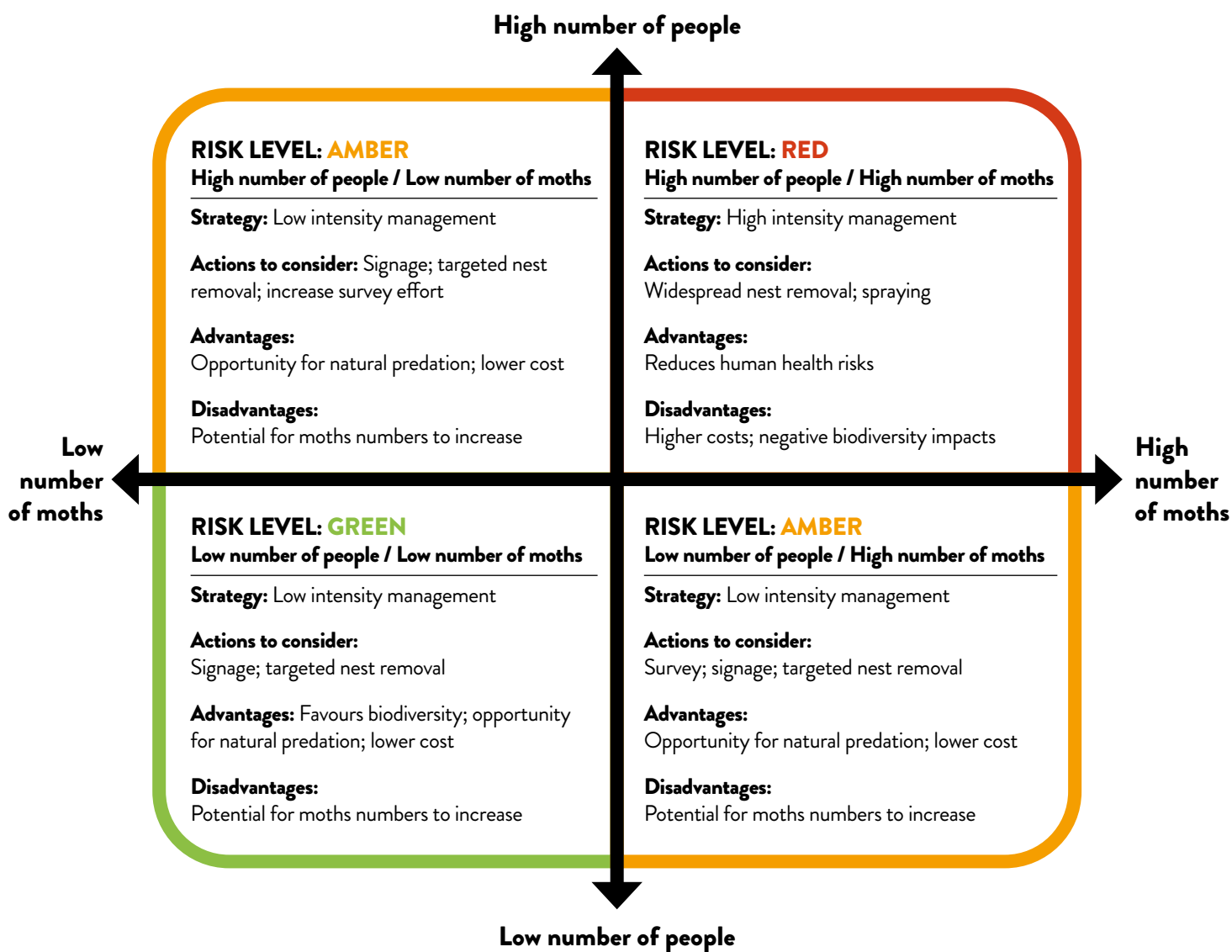
Finding an acceptable balance between the low-input/resource-light and high-input/resource-intensive risk management options will depend on various local factors such as:

- Potential financial impact of management on the organisation from actions, including spraying trees
- Potential financial impact of inactivity on the organisation. For example, the loss of revenue from public events if the public perception is that the site is risky and visitors stay away
- The local importance placed on the value of oak trees
- Current and future budget
- Public anxiety and number of complaints
- Costs of ongoing spraying versus an assessment of the value lost as a result of a decision to fell an oak tree
- Importance of biodiversity such as in a national nature reserve, public space or SSSI
- Lack of perceived value of biodiversity in an oak tree
- Number of people and animals exposed to the potential risk from OPM hairs
- Number of people actually reporting health problems.



The balance between these risks is perhaps illustrated by Figure 5 below. To achieve its aims, a local authority must make careful decisions from all available management options (see pages 46-48) which may differ from site to site.

Figure 5: OPM risk management scenarios. This is an example of an OPM risk management matrix. Within the matrix, there are many potential management choices (see page 47 for further details), and decisions will depend on local circumstances – the local risk-based approach.



Triage outcome scenarios

By using West Sussex's Red/Amber/Green triage framework, a local authority or landowner can make a local risk-based decision about the potential impact of OPM. They will then need to undertake a series of actions to manage their OPM infestation.

We have set out three triage scenarios below with possible courses of action to deal with the infestation. The action lists are purely illustrative, as the specific local reaction to each triage outcome will be determined by each organisation.

Scenario 1 - OPM is not in your area but is close by, or is detected by pheromone trapping at low levels, or your area has very few oaks. The local triage assessment is: **Green.**

As a Green risk, the locally adopted course of action may be:

1. Review national and local status of pest at least once a year to be aware of increasing threats if it spreads to your area and reassess triage outcomes.
2. Develop formal or informal monitoring and reporting system for OPM (e.g. via Tree Wardens), see [Case Study 2](#).
3. Develop a communications plan, which includes a guidance package for staff and information for residents and the community as appropriate.
4. Organise site zoning or other appropriate management (if necessary).
5. Review annually and update action plan accordingly.



Scenario 2 - OPM is not in your area, or is at low levels in your area, but numbers are increasing and the moth is spreading rapidly. The local triage assessment is: **Amber.**

As an Amber risk the locally adopted course of action may be:

1. Review national and local status of pest at least twice a year by checking local data and [the national OPM maps](#) on the portal.
2. Develop formal or informal monitoring and reporting system of moths (e.g. via Tree Wardens), [see Case Study 2](#).
3. Create an OPM policy/management statement.
4. Create a communication plan to alert local residents to the possible presence of OPM with an instruction that they should report it if is spotted - see page 51.
5. Deliver a local communication plan within the community - see page 52.
6. Provide a guidance package for staff, for example providing a guide on what to do if you find OPM to staff and community - see page 52.
7. Undertake any necessary management treatments (for example, zoning, nest removal and or spraying).
8. Review annually and update your policy/statement/action plan accordingly.



Scenario 3 - OPM moths are in your area and are at high levels in many areas and sites. The local triage assessment is: **Red.**

As a Red risk the locally adopted course of action may be:

1. Review national and local status of pest regularly by checking local data and the [national OPM maps](#) on the portal.
2. Increase formal surveillance and monitoring.
3. Create an OPM local risk-based policy/management statement and write an OPM Action Plan (see Appendix 1).
4. Create a communication plan targeted to each audience. This should include a public information programme and information targeted at specific landowners (schools, businesses and residents).
5. Develop a position statement on impacts on biodiversity in general and specifically the diversity of the treescape and retaining oak.
6. Deliver a communication plan.
7. Provide a guidance package for staff, for example providing a guide on what to do if you find OPM to staff and community - see page 52.
8. Organise site zoning (if necessary).
9. Undertake regular management treatments (nest removal and/or spraying).
10. Review regularly and update your policy/statement/ action plan accordingly.



Management options

Defra has identified a variety of management options available to tackle the risks posed by OPM, outlined below. The options you choose to use locally will depend on a range of factors, including:

- OPM management zone
- Levels of risk – high risk (schools) or lower risk (e.g. low-usage footpaths)
- Reputational impacts of different management options
- The number of trees infested with OPM and the levels of OPM population
- The potential threat levels to neighbours and others in proximity to the trees
- Budget availability
- Staff/contractor availability
- The level of public awareness and attention being given to OPM.

To support your decision making, information about potential OPM management options can be accessed [here](#).

In the table below, the pros and cons of the different methods are set out, ranging from *low input/resource light* to *high input/resource intensive*. Some of these methods can be used in combination.

Site zonation

PROS	CONS
Communication and awareness raising of OPM	Risk of increased spread of OPM
No cost of treatment except appropriate signage if used	Risk of ecological impacts if OPM causes significant decline of oak trees
OPM may reach a 'natural balance' with natural enemies, and could have low long-term impacts on oak, ecosystem or human health even without intervention. The levels of harm caused by OPM in the absence of treatment in the UK are unknown.	Risk of reputational damage if OPM causes widespread damage



Nest removal

PROS	CONS
Reduces current and subsequent populations	Difficult to remove nests in upper canopies
Reduces later urticarial impacts as hairs are removed in nests	Extreme care and use of PPE required
Vacuum removal minimises operator and environmental contamination with hairs and reduces need for MEWPS or tree climbing	Costly
	Natural enemies within nests may also be removed, reducing natural build up of biocontrol
	Nest removal does not prevent defoliation and urticating hairs from earlier larval stages
	Destroying nests with blowtorches not recommended, as it causes caterpillars to eject hairs
	Capacity for significant levels of nest removal needs to have been arranged/procured well in advance of OPM season. It is unlikely sufficient capacity will be available from local suppliers if this is approached reactively

Bacillus thuringiensis var kurstaki

PROS	CONS
Biopesticide (bacteria)	Less effective on older caterpillars, must be eaten by caterpillars to have effect
Non-persistent	Less effective in larger trees due to poor penetration into the canopy from ground-based spraying operations
Long track record of efficacy in treating OPM and other pests	

Deltamethrin (synthetic pyrethroid)

PROS	CONS
Rapid effect and longer window for effective use, single application needed	Broad-spectrum pesticide with inevitable impacts on wide variety of non-target organisms
Targeting and timing is not required to be so precise as it is toxic on contact as well as by feeding	Acutely toxic to mammals, including humans
Not considered to be very bioaccumulative or very persistent	Toxic to fish and other aquatic organisms – must not be used near to watercourses/standing water
	Moderately persistent in soil (conflicting reports of persistence)
	Considered to be dangerous to the environment with potentially severe negative impacts on non target insect species



Costs of managing OPM

In the Buffer Zone or Pest Free Area, Government leads on the management of OPM. If a local authority, agency or landowner is served with a Statutory Plant Health Notice (SPHN) they must comply with the instructions set out within it, which may involve actions such as allowing access to the Forestry Commission to carry out survey and control operations spraying (see page 47). In the Established Area, SPHNs are not served and a local authority or other agency can make their own decisions about how they will manage the risk that OPM presents.

Modelling the costs

To illustrate the potential costs local authorities may face, Guildford Borough Council (in the Established Area) has modelled their costs. Within the model, they compare the full control costs (where they deal with every outbreak), with the costs if they use a risk-based system, focussing on their priority risk zones (oaks close to residential or school buildings or in the very highest target municipal parks, for example). These figures are shown in Table 1.

Table 1: Annual cost estimation

		Risk-based approach	Full control
Survey Cost		£8,000	£22,000
Nest removal only	Lower	£109,000	£506,000
	Upper	£262,000	£1,214,000
Bt spraying and nest removal	Lower	£133,000	£609,000
	Upper	£226,000	£838,000

Annual cost estimation: risk-based versus full control*

– BASED ON:

- Lower – 30% trees infested, upper – 80% trees infested
- Nest removal – £100/tree, 2 man team with MEWP, average 6 trees/day
- Bt spraying – £950/day
– 40-50 trees/day easy access, 15-20 trees/day spread out, some sites not accessible at all
- Treatment areas being kept free of nests from outset

* Full control still only includes oaks along rides in large Guildford Borough Council owned oak woodlands

These figures clearly show the differences in cost between a full control programme and a prioritised risk-based control programme. If OPM continues to spread and more areas enter the Established Area, then setting out a local approach to OPM will be vital to manage expectations for both risk and costs.



How to prepare an OPM Action Plan

As OPM infestation increases in a local area, the triage rating may progress from Green to Amber or Red. If the threat worsens, you may need to take targeted action and produce an OPM Action Plan.

An Action Plan provides a structured way to record the specific circumstances and identify action points to manage and mitigate the risks to the local environment. This essential document can be shared with colleagues, stakeholders and other interested parties. The exact nature of the action plan will depend upon the needs of the organisation and the issues it faces.

The suggested contents of an OPM Action Plan have been outlined in Appendix 1, see page 59.



Case Study 6: Preparing a local action plan

Between 2016-19, the Test Valley Borough Council (TVBC) Tree Officer had been monitoring the spread of OPM in neighbouring areas. In the summer 2019, OPM was found on recently imported oaks, less than 20 miles from land owned by TVBC.

In October 2019, a draft OPM Action Plan for TVBC was prepared. The TVBC case provides an example of the benefits of early preparation for OPM management and the importance of early information gathering, assessment of the scale and risk of OPM and engagement of council colleagues and other stakeholders. [Click here for further details](#), including a link to their draft Action Plan.



Step

5

Take action





Step 5 | Take action

Once a local risk-based approach has been developed, which may include an OPM Action Plan if appropriate, the response to OPM will move into the Action phase where the focus will be around communications and management activity.

IN THIS SECTION YOU WILL LEARN:

- Where to access key information you can use with the public
- What to include in your OPM communications plan
- Useful up-to-date resources for dealing with OPM.

OPM communications plan

Your local communications plan is a crucial document that explains to audiences, including internal and external stakeholders, what you are doing and why. The plan must outline both the risks that OPM poses and the organisational response to the threat.

Certain documents are already in existence to help shape an OPM communications plan. These include:

- [A public information leaflet from Forestry Commission](#)
- [A guide to similar caterpillars](#)
- [OPM public information poster \(PDF, 800.1kB\)](#)
- [OPM Public information banners \(PDF, 1.4MB\)](#)

You can also keep up to date by signing up to the [Forestry Commission OPM Control Programme newsletters here](#).



An effective communication plan should include:

- An information campaign for residents with key messages about OPM with clear guidance on how to recognise OPM, health risks and how to alert the authority
- A dissemination plan – outline specific comms channels to share information e.g. emails/website/social media/leaflet drops/posters/local press/radio or TV interviews
- Information for practical briefings for local politicians/decision makers
- Guidance for engaging local authority colleagues in OPM planning and management
- A 'Frequently Asked Questions' resource that includes public ready information that can be used by any staff to answer questions from the press or public.



Case Study 7: Creating local OPM resources

Hertfordshire went from having around 30 OPM nest reports in 2019 to almost 700 reported cases in 2020.

To deal with the rapidly developing situation, the County Council developed four sets of resources for critical stakeholders. These include an OPM decision tree, recognition guidance for volunteers, OPM mapping and a management plan for a National Nature Reserve impacted by OPM. [Click here for further details.](#)



Useful OPM resources

To help improve the local management response to OPM, Defra and the Forestry Commission have produced information and tools on a central Resource Hub that can be [viewed here](#).

The available information includes:

1. **OPM Distribution Map** - An interactive map showing the locations of recent confirmed reports of OPM and the national management zones is available here. This will help landowners and managers to see which management zone their land is in and to evaluate the risk to a given site or location based on up-to-date reports of OPM presence.
2. **Biodiversity Map** - An interactive risk map showing lepidopteran biodiversity in OPM-affected areas is available here. This will support land managers to understand the risks of some OPM control techniques to the wider moth and butterfly fauna.
3. **OPM Management Options** - Information about a number of management options available to site owners and managers in the Established Area, including chemical control, nest removal, signage, restricting access, communications and natural predation.
4. **Plan and Manage Risks Guide** - Guidance for landowners and site managers who have oak on their land, and for people who work on oak trees to plan for and manage the risks associated with OPM. This includes information on surveying for OPM including pheromone traps, control methods and occupational health.
5. **OPM Management Plans** - A template and detailed guidance for creating a management plan for dealing with OPM at a site level.
6. **Communications and Events** - A page hosting the latest communications and events information for OPM.
7. **How to identify and report OPM** - Guidance for private residents to help look for and identify caterpillars and nests of oak processionary moth and information on how to report sightings.
8. **Risks to people and animals** - Guidance for private residents on the risks to people and animals from OPM. This includes how people and animals can be exposed, what to do if this happens and information on how to reduce the risk.



Step

6



Monitor and re-evaluate





Step 6 | Monitor and re-evaluate

Over time, the risk of OPM may increase or decrease, so your plans must be flexible. Annual monitoring provides a robust, local risk-based response to OPM and supports targeted investment in the right place at the right time.

Annual review

OPM is a variable pest, with infestation levels and severity changing each year. It is essential that you re-assess your plans annually and confirm that the action you are taking is proportionate and effective. OPM may also experience 'plague years' when the OPM population (and therefore threat) increases exponentially, so plans must be flexible to deal with these events.

During your annual review, you should check Steps 2 to 5 of this Toolkit, to reassess the risks of OPM and how to effectively plan and manage these risks.

The annual re-evaluation should:

1. Monitor, review, create or amend (if necessary) existing strategies and practices, for example:
 - a. frequency of tree inspections (may need to be increased as OPM spreads)
 - b. planning policies regarding TPOs and development sites
 - c. biosecurity strategy.
2. Consider OPM issues at a national/regional level (including new and existing research) to develop alternative management approaches and management options.
3. Inspect your trees and set out priorities for which sites, or areas within a site.

See [Case Study 3](#) for recommendations on amending annual surveys according to local circumstances.



Summary



SUMMARY

Despite the activities of Government, local authorities and other landowners, OPM is likely to continue to spread across the UK, threatening the health of our oak trees. We're unlikely to be able to contain it so, in the Established Area, we must learn to live with it and manage its impact. As it spreads, more organisations and people are going to come into contact with nests and caterpillars, and the need to balance the risks and management options will increase. The management approach to OPM in the Established Area is likely to be unique to each local authority and site and needs to be based on careful consideration of:

- The need to reduce the human health risks from OPM
- The risks to biodiversity and oak tree health
- Public perceptions of management choices
- Reputational risk to the organisation
- The costs and risks associated with various management options.

However, based upon the literature and actions of a number of local authorities, a local risk-based approach can be developed which provides a logical and robust response to OPM. It can be built on the following steps:

- **Step 1: Raise awareness of OPM**
- **Step 2: Assess the scale of OPM in an area**
- **Step 3: Determine the local Risks of OPM**
- **Step 4: Develop a local risk-based approach**
- **Step 5: Take appropriate action**
- **Step 6: Monitor and re-evaluate**

Since oak is a vital component in the urban and rural treescape of the UK, The Tree Council strongly believes that a reduction in the number of oak trees in public spaces in the UK is not desirable. To safeguard oak trees in the landscape both now and in the future, measured solutions for dealing with OPM must be found.

Remember that under the **NERC Act (2006)**, public authorities in England have a duty to have regard to conserving biodiversity as part of their policy or decision making. Local authorities should be able to show their duty to have regard for conserving biodiversity when they manage their land and buildings, woodlands and nature reserves, gardens, parks and public open spaces and community amenities (for example, sports grounds and cemeteries).



APPENDIX 1: A DRAFT STRUCTURE FOR A LOCAL OPM ACTION PLAN

An executive summary of the OPMAP

OPM information

- OPM: biology, life cycle
- Distribution of OPM (national/local).

Current status of OPM

- Locations and scale of OPM spread across the area
- Locations and scale of OPM spread in proximity to publicly accessible areas.

The potential impacts of OPM in your area including:

- What are the risks from OPM
- What are the potential local impacts of OPM on:
 - Landscape and biodiversity
 - Local landowners, land managers and homeowners
 - Local utilities and infrastructure organisations.

Potential impacts of OPM on the work of your organisation and other organisations in your area:

- What are the current national management controls for OPM
- Assessment of local oak trees/risk areas
- Assessment of local sightings.

Local OPM approach:

- Assessment of local costs
- Local management approach
- The delivery plan including priority actions, estimated costs, lead delivery partners and development of new approaches to tree management (for example, spraying techniques)
- Prevention, mitigation and treatment strategy within local area, including employer and employee responsibilities.



OAK PROCESSIONARY MOTH IN ENGLAND:

A Toolkit for Local Authorities

WHO HAS CONTRIBUTED TO THE OPM TOOLKIT?

This Toolkit features case studies which illustrate work being undertaken by several local authorities at the forefront of dealing with OPM and provides examples of the steps they have taken to deal with the pest. It has been developed in partnership with The Tree Council, Forest Research, the Forestry Commission and Defra. There is still so much to learn about the the best approaches for dealing with OPM but as we learn more, we will update and review this document.

This Toolkit has been prepared with assistance from:

- Richmond Council
- Hertfordshire County Council
- Merton Council
- West Sussex County Council
- Surrey County Council
- Butterfly Conservation
- Guildford Borough Council
- The Royal Parks
- Woking Borough Council
- And many others!
- Test Valley Borough Council

Legal disclaimer

This document provides general guidance about developing management strategies for OPM that a local authority or landowner could adopt. The authors do not accept liability for any loss incurred as a result of relying on its contents. Landowners and land managers should seek independent professional and legal advice where necessary.