PHC2024/07: The risk of firewood as a dispersal pathway for invasive forestry pests

Background and knowledge gap: Firewood (and timber) can contain hidden pests and pathogens (referred to collectively as pests), such as wood-boring beetles, insect eggs and fungal spores, that can be inadvertently transported to new areas which under natural conditions may not occur at all or may take years to reach due to natural barriers or constraints. Once introduced into a new area, pests can often disperse rapidly if conditions are suitable.

The risks of firewood and other wood products as a transport mechanism for pests is well known[1]. The Asian long-horn beetle has been intercepted several times at UK points of entry and in the wider environment. These findings have been associated with imports of wood packaging material from Asia. The Emerald ash borer (EAB) (*Agrilus planipennis*) was most likely introduced into the USA via untreated wood-packaging imported from Asia. EAB has subsequently moved across into Canada, killing billions of ash trees in the process. EAB can spread naturally via adult flight and can expand infested areas by several kilometres each year. However, long-distance movement of 10s to 100s of kilometres occurs through human intervention via the movement of infected nursery stock, logs and firewood.

In the USA, firewood in particular has been shown as a high risk long-dispersal pathway due to the culture of people taking firewood on camping trips. As a result, the movement of firewood, and other ash wood materials in areas infested with the EAB, has become regulated. Due to the known risk, the EU has placed import restrictions on wood of ash (including firewood) from regions where EAB is present (North America, Russia, China, Japan, Mongolia, North Korea, South Korea).

Fortunately, EAB has not yet taken hold in most of Europe, but modelling has shown that most parts of the continent are suitable for the survival and establishment of EAB, including parts of the UK.

Within Scotland there are established pests that could be spread by firewood. Dutch Elm disease (DED) is a good example. This disease arrived on infected elm logs from the USA in the 1970s and has gone on to have a significant impact across the country. The fungus responsible, (*Ophiostoma* spp.), is disseminated by the elm bark beetle (*Scolytus* spp.). In Europe and the USA, elmwood (firewood and elm timber) is a major contributor to the movement of DED (and its vector) into new areas.

Due to the biosecurity risk of transporting invasive forest pests to new areas by firewood, the USA and Canada have put regulations in place to restrict firewood movement[1]. They also promote other options such as using compressed wood chip products and wood pellets as an alternative source of firewood for camping. In North America and Europe, awareness campaigns also alert people to the phytosanitary risks of firewood movement. https://www.dontmovefirewood.org/

In GB, plant health regulations apply to the import and export of a wide range of wood products, including firewood from outside of the EU and within the EU. This takes the form of a pre-notification system where importers notify the Forestry Commission of the firewood they intend to land at a GB port. This enables the inspectors to target their inspections to high-risk imports (e.g., ash firewood from Eastern Europe where EAB is known to occur). It also enables tracing of infested

wood once an outbreak occurs within GB (i.e., the rest of the consignment can be found and destroyed). There are several challenges with this approach, particularly where firewood is part of a mixed consignment, this is unlikely to be declared or inspected. Once landed, firewood can be moved around the country unhindered.

It is therefore not inconceivable that novel pests could be imported into GB on firewood and moved around the country before it is realised that they are present. In addition, known pests, such as the beetle that spreads DED, could be inadvertently moved from one location to another. This is a significant biosecurity issue in Scotland because DED is one of the biggest threats to the survival and conservation of the few remaining wych elm populations.

In GB, the risks to woodlands and trees posed by firewood are poorly understood and there is very little information on the risk of spreading invasive pests via firewood in publications such as the Scottish Outdoor Access Code. It is therefore essential that the movement of firewood into and around Scotland is clarified so that the biosecurity risks can be mitigated.

Impact:

The proposed work seeks to:

1. Understand the plant health risks posed by firewood movement in Scotland.
2. Determine feasible treatment options for firewood, learning from effective practices overseas, which could be incorporated into an industry standard.
3. Generate best biosecurity practice guidance for handling and moving firewood as a way of ensuring Scotland's forests are safeguarded and conserved.
4. Create a detailed campaign strategy and materials to raise awareness to professionals and the public of the risks posed by firewood as a pathway for the movement of tree pests in Scotland for potential deployment after the project closes.

Objectives and research required for this call:

The objectives of this research will be to use an exemplar pest and host system in Scotland such as DED on elm or ash dieback on ash:

1. Map current players involved in firewood (and timber if relevant) processing, supply, their customers and distributors. It should be noted that because of dying or unsafe trees (particularly ash currently), local authorities (road verges), Transport Scotland (trunk roads), Network Rail, Scottish Power Energy Networks and SSEN are becoming major producers of firewood indirectly through contractors. Understanding the approaches taken, including any contractual rules they impose on tree contractors to use firewood in a responsible would be of value to ascertain.
2. Engage with land professionals, milling companies and firewood and timber suppliers to look at current storage and transport practices and movement pathways in Scotland. This will include surveying as many businesses engaged in the supply of firewood as possible; to

understand the scale and extent of the industry across Scotland (this may take a survey format if there are too many businesses to engage with face to face).

3. Via engagement with overseas scientists/professionals/policy and current literature, research effective methods of treating infected/infested firewood along with current awareness programmes and biosecurity practices, evaluating alternative 'safer options' for diseased trees (e.g., wood pellets, wood chips) if relevant.
4. Through research, investigate treatment interventions in collaboration with relevant milling and firewood suppliers in Scotland to assess the economic viability and practicality of treatment interventions for firewood to mitigate risk of pest spread. As part of this, determine the economic impact of potential treatments and change of practices to the relevant players.
5. Design a multi-media awareness campaign around firewood movement as a pathway for spreading invasive pests. This would be for potential deployment after the project close and should include specifics of who would need to be targeted, the optimal methods to reach these groups, and the generation of appropriate resources (graphics, guidance documents etc.) such a campaign would require.
6. Determine best biosecurity practices for domestic firewood in Scotland to inform policy and industry (such as those groups identified in 2.).

Deliverables required from individual project:

- Final Report with executive summary on investigations, to contain key sources, analysis, findings and recommendations for implementation or further work. Report to include the feasibility of treatment options for firewood, giving clear practical recommendations on the use of wood treatments. Reports should be a maximum of 20 pages of text (30 pages including figures but excluding appendices and references). Cover image(s) with associated photo credits should also be supplied.
- Brief policy summary (2 pages maximum) explaining how the work has contributed to filling evidence gaps and the context in which the findings can be used by policy makers and practitioners. The report should contain the best recommendations on best biosecurity practice for policy based on knowledge of overseas practice and current firewood practices in Scotland.
- The blueprint of a campaign strategy with information and multi-media resources on firewood as a pathway for pest spread that can be used to run future awareness campaigns.
- Presentation at Scotland's Plant Health conference and any other relevant stakeholder meeting(s) to disseminate findings and contribution to other KE output such as the PHC virtual poster room or blogs.
- An article on the project in a relevant trade magazine. In addition, a scientific paper will be prepared with the prospect of submission to a peer-reviewed journal, should the data warrant it.
- 200 word lay summary for project overview at outset, and of findings at completion (for website and newsletter).
- Slide deck of the key project findings.

Meetings

- Project meetings throughout project lifecycle to include PHC manager, PHC Sector Lead, and Scottish Government policy contact.
- Meeting/s with relevant PHC Impact Officer and Communications Officer to plan dissemination of project findings and impact strategy.
- Attendance at briefing discussion with PHC Steering group to discuss findings and next steps.

Indicative key dates:

- Deadline for submission of applications: **12pm on Friday 17th January 2025**
- Project start: 1st April 2025
- Overview of plans and project start-up meeting with PHC Directorate: 18th April 2025
- Final report and policy summary: 31st March 2026
- Project outputs signed off by PHC Sector Lead: 30th April 2026

Detailed milestones to be confirmed by bidder.

Date all work needs to be completed by: 31st March 2026

Maximum funding available exclusive of VAT[1] (where applicable) and including any knowledge exchange activities: £40,000

[1] Please note that costs should be submitted net of VAT recovered by the applicant. Applicants should seek advice on appropriate VAT treatment of proposed funding.

Submitting an application form

Applicants should use the PHC Application Form when applying for projects and must ensure they are able to accept the PHC Funding Terms and Conditions before submitting an application.

It is possible to request a start date or project duration that differs from the project specification. This should be requested in the application form (section 1.4) and is subject to approval and the requirements of individual projects.

Applicants should note that after submission of the Final Report and Policy Summary, there is a review process that includes rounds of assessment by the project's assigned sector lead, policy contact and the PHC Steering Group prior to final sign-off and publication. At each stage there is the potential for revisions to be requested of the project team, and this should be taken into consideration when costing projects

Completed applications should be submitted to info@planthealthcentre.scot for evaluation by 12pm on 17th January 2025. Successful applicants will be notified by 14th February 2025 and we may request

further clarification on any aspect of the application prior to contract award. You should highlight any potential conflicts of interest in your proposal.

Please contact the Centre Manager if you have any queries (info@planthealthcentre.scot). Answers to any non-confidential questions will be published on our website.

Review of application

Applications will be reviewed by a panel selected from the PHC Directorate, Scottish Government, PHC partners and/or commissioning stakeholder, as appropriate.

Expectations for section 1 of the application form:

Expectation	Descriptor
Duration	The proposed duration will align closely to the details provided in the anticipated timescales section of the specification.
Staff time and effort	The proposed allocation of staff time and effort is appropriate and includes all deliverables. The proposal must also provide a commitment that named staff members will be available to work on the contract if the bid is successful.
Project costs	The estimated breakdown of project costs is realistic and inclusive of all deliverables.

Expectations for section 2 of the application form:

Expectation	Descriptor
Background	The proposal should include an introduction which demonstrates a clear understanding of the project requirements. This should include the need for this research; the project aim; and how the proposal will address this aim.
Proposed methodology and outcomes	The proposal should demonstrate a high quality and workable methodology, including: how the evidence will be identified, reviewed and assessed, consulting relevant stakeholders and/or experts where appropriate, to address the key questions and produce the deliverables in the timescales required.
Milestones	The project milestones are logical, practical and include all deliverables.
Project Management	The staff, resources and expertise are appropriate for conducting the proposed project. The proposal should name the project lead.
General and specific topic expertise and experience	The proposal should provide details of individual staff members who will work on this project and demonstrate how they will meet the project requirements, specifically: - general research experience and expertise - specific experience and expertise relevant to the call
Risk	The proposal should provide a risk assessment matrix detailing any risks identified in relation to the delivery of this contract, and proposed mitigation measures to minimise their probability and impact, focused particularly on risks to completion on time.

Reference:

1 - Solano, A., Rodriguez, S. L., Greenwood, L., Dodds, K. J., & Coyle, D. R. (2021). Firewood Transport as a Vector of Forest Pest Dispersal in North America: A Scoping Review. Journal of Economic Entomology, 114(1), 14-23. doi:10.1093/jee/toaa278