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Forest pest contingency plan guidelines for Europe and Central Asia



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Introduction

Pest contingency plans are used by national or regional plant protection organizations to ensure a plan is in place for when a new pest is detected in a particular country or region, and thus to facilitate a rapid and effective response to manage the situation. They can also be developed in response to a currently occurring pest – for example a native pest whose prevalence is generally low, but where sporadic outbreaks occur that require intervention. Pest contingency plans can be pest-specific, when the plan is focused on a specific species; or generic, which provides the broad principles to follow in response to a new report of any pest or a group of pests (for example, bark beetles). Pests as defined by the International Standard for Phytosanitary Measures (ISPM) No. 5 Glossary of Phytosanitary Terms includes “any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products” (IPPC Secretariat, 2023, p. 19).

A pest contingency plan (PCP) is activated in response to a new report of a pest or a pest outbreak, for example from official surveillance,

reports from the public, or to an interception by an importing country. It is important to have a PCP in place before the pest is reported (or outbreak reported) to facilitate timely action, and so that responses such as eradication may still be feasible. Having a PCP in place before a pest outbreak is reported allows time to properly assess the different response options available, and to identify and address knowledge and capacity gaps needed to respond accordingly. In addition, it allows time to identify and obtain input from the various stakeholders relevant to that particular PCP. A PCP starts with anticipation and assessment of potential threats, and includes preparation, response and recovery.

Pest contingency plans can be developed for pests of agricultural, forestry, environmental, veterinary or medical importance. Those can include insect pests, pathogens (fungi, viruses, bacteria), plants (invasive weeds), mammals and other invasive species or groups. The focus of this guide is on forest pests, specifically insect pests and pathogens.

Scope of the guide

This guide outlines and discusses the elements and steps needed to formulate and implement a contingency plan for forest pests. The process of developing a PCP for a forest pest is largely the same as that required for an agricultural pest, but the details sometimes differ. For example, the sampling technique and programme for a delimiting survey is influenced by the area to be covered, accessibility to the sites, and type of pest; and these factors can differ considerably between an agricultural pest and a forest pest. Pest management methods can also differ between agricultural and forest pests – the use of pesticides is generally more feasible for agricultural pests, while biological control is a common management method for forest insect pests.



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It is important to note that when developing a PCP, knowledge from previously developed PCPs on different pests can be used as a guide, as some of the steps will be similar or at least relevant. There should also be mechanisms in the country to decide which PCPs need to be written, and to prioritize them according to when they should be written.

Suggestions are provided on the main steps, or elements, in a PCP for forests pests. This is to highlight the main information that should be included, but the exact headings and order of these steps can differ from one PCP to another. The steps covered in this guide are:

1. Define the scope of the pest contingency plan.
2. Background information on the target pest.
3. Preparation (for the potential arrival of the pest).
4. Identify roles and responsibilities.
5. Criteria to implement the pest contingency plan.
6. Official actions after final confirmation.
7. Management response.
8. Review measures in case of prolonged official action.
9. Determine completion of official action.
10. Review and update pest contingency plan.
11. References.

For some of the steps, examples are provided on the details that would be included for specific pests. These pests are the emerald ash borer *Agrilus planipennis*, a potential insect pest introduction into parts of Europe and Central Asia; the eight-toothed spruce bark beetle *Ips typographus*, native to many parts of Europe and Asia, but where outbreaks can cause substantial tree mortality; and pitch canker *Fusarium circinatum*, a potential fungal pathogen introduction into parts of Europe and Central Asia. Most of the content of the guide is relevant for the development of PCPs across different regions. However, the examples provided are specific to Europe and Central Asia.



Key elements of a pest contingency plan

Other requirements for a PCP are also discussed in this guide – these are not PCP specific, but rather broader issues that need to be considered to support the PCP process. These include effective internal and external communication, staff training, surveillance programmes, diagnostics, and collaboration with research organizations.



1. Define the scope of the pest contingency plan

The first step in developing a PCP should be to clearly define its scope. This includes the following information:

- The pest for which the PCP is being prepared.
- The organization that is in charge of the preparation of the PCP. This could be a single organization, or division, or a number of different organizations.
- The version of the PCP – for example, it could be the first version, or an updated version of a previous PCP.

- The organizations or groups that will be involved in the implementation of the PCP. This could be a specific department or division, or multiple users.
- The documents, if any, that provide relevant information for the PCP and supports its implementation – for example, detailed information on the biology of the pest, surveillance methods, or control methods. There is no need to include detailed information in the PCP that is available elsewhere. However, documents referred to should be easily accessible to the users of the PCP.
- Provide a brief outline of the content of the PCP.
- Clearly define the objectives of the PCP. A PCP provides a mechanism for rapid and effective response and management following the report of a pest, and ensures that appropriate communication is followed (internal and external). However, other objectives such as raising awareness of the relevant stakeholders may also be included.

2. Background information on the target pest

A PCP should provide background information on the pest for which the PCP is being developed. This would include information on the taxonomy, basic biology and identification methods, along with information on pest risks that provides the reasoning behind the PCP. This information could be within the main text, in appendices, or in a combination of both. The information can be sourced from scientific publications, internal reports, websites, or other sources. When the information is obtained from non-peer reviewed sources, it is important to validate the accuracy

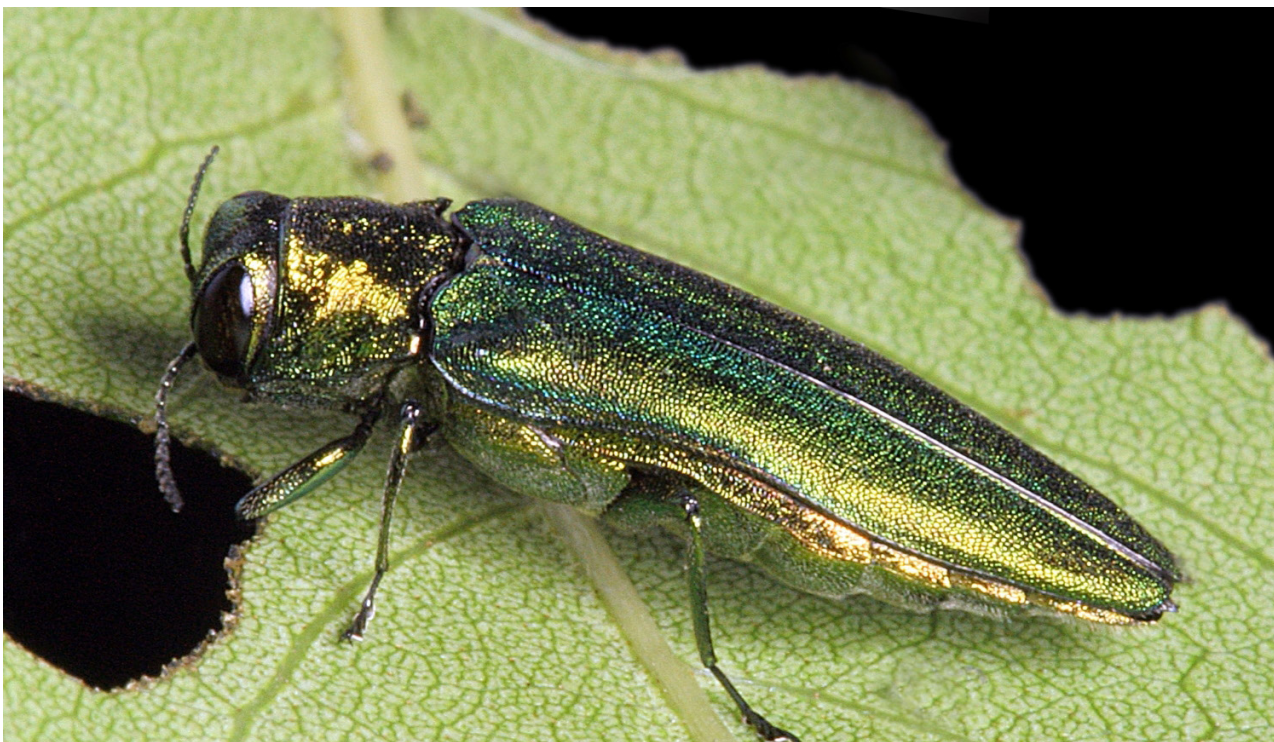
of the information. Experts can be consulted to contribute or to validate the information in this section. All sources of information used, including contributions from experts, should be referenced.

Below are some suggestions on information that may be included in this section:

- The basic characteristics of the pest and symptoms of its presence that can be used for detection and identification. It is helpful to include informative photos that can be used as a practical and simple tool for preliminary identification, for example by the public or different non-expert stakeholders. Contact details should be provided to notify relevant official bodies of the presence or suspected presence of the pest. Information on diagnostic methods recommended for the identification of the pest may be provided, along with sources (such as links to websites), where more detailed information is available.
- A general description of the biology of the pest. This section should include information on the lifecycle of the pest. The symbiotic relationships of the pest that are relevant to its management may also need to be discussed. For example, for ambrosia or bark beetles details on associated

fungal pathogens should be included and the relevant roles of the different species involved discussed. This can also include vectors – for the pine wood nematode *Bursaphelenchus xylophilus*, information on known and potential vectors should be included, as well as basic information on the interaction between the species involved.

- Distribution. Provide details on the known native (origin) and introduced range, and provide information on its spread in the introduced range – that is to say, the dates of first detection in different countries. Maps can be used to illustrate the distribution.
- Host plants. Information on host plants for the pest of concern, and on their distribution in the country, for which the PCP is being developed. Information on the distribution of host plants in the pest's native country may be included, if relevant. Closely related hostplant species in the country of introduction that could potentially be hosts to the newly introduced pest, but for which information on host suitability and preference is currently not known, can also be mentioned, as can unconfirmed hosts (meaning hosts that are mentioned in the literature but with a lack of supporting evidence).



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- Factors influencing outbreak dynamics. This is especially for PCPs focused on the response to outbreaks of already present species (native or previously introduced). These factors will depend on the pest species, but are often related to climate variables.
- Damage, impact and control measures. Provide information on both the native and introduced range. Where available, provide information on economic losses. Information on control measures should include their reported effectiveness, and challenges or restrictions in implementation; for example, regulations on the use of chemicals or biological control agents.
- Main pathways for entry and further spread. This information can be obtained from reports of other countries, from interception data, or can be concluded from the biology of the pest. Examples of pathways may include trade in nursery plants, importation of wood products, or movement of firewood across countries or provincial borders. This information is very relevant for the PCP, as it informs many of the approaches used in the preparation step (for example early detection, identification of high-risk pathways), as well as actions undertaken when the presence and identity of the pest have been confirmed (delimiting surveys, tracing forwards or backwards).
- Methods used in surveillance activities, including early detection surveys, delimiting surveys and monitoring surveys. Details can

be provided on the sampling technique – for example the use of traps (baited or non-baited) – and the sampling programme, such as the number of traps and timing of placement. Such information will generally be available from countries where the pest has become invasive, or from the scientific literature. For less studied pest species, specific surveillance methods may not have been developed or studied. In such cases, potential surveillance methods should be discussed, for example based on the biology of the pest, or methods used for similar species.

- The reason for the PCP, such as why it is anticipated as a potential introduction or outbreak species. This could be linked to current distribution, host range, interceptions, risk from current or expected trade, pest status in other countries, and so on.

It is important that the information provided in this section on the identification, biology and motivation for the PCP is presented in a way that is easily understood by different stakeholders. It is thus suggested to avoid unnecessary technical details, and to explain scientific terms used that may not be commonly known. If necessary, a glossary can be included in the PCP.

An example of what information would be included for different pest species is provided below. The actual PCP would expand on these topics.

BACKGROUND INFORMATION ON THE PEST

<i>Agrilus planipennis</i>	<p>Identification: descriptions and photos of different life stages (eggs, larvae, pupae and adults); information and links to DNA sequence data and morphological keys.</p> <p>General biology: information on lifecycle, link to when different symptoms and life stages are likely to be observed.</p> <p>Distribution: information on native range (parts of Asia) and introduced range (North America and Europe–Russian Federation).</p> <p>Host plants: information on the hosts confirmed in different regions, e.g. various <i>Fraxinus</i> species, as well as secondary (<i>Chionanthus virginicus</i>) and unconfirmed (e.g. <i>Ulmus</i> sp.) hosts.</p> <p>Damage, impact and control: not a pest in native range, highly damaging in introduced range (provide examples); discuss details on control options, e.g. sanitation (removal of infested trees), restricting movements of plants and firewood; chemical control (mention main products) and biological control (mention most important natural enemies/biocontrol agents).</p> <p>Pathways: for example, via various wood products and packaging material (crating, dunnage, pallets, logs, firewood), plants for planting, natural spread, other human-assisted pathways.</p> <p>Detection and surveillance methods: ground surveys, baited traps.</p> <p>Motivation: highly aggressive, already widely spread; availability and susceptibility of host species (<i>Fraxinus</i>).</p>
<i>Ips typographus</i>	<p>Identification: descriptions and photos of different life stages (eggs, larvae, pupae and adults) and tunnels/galleries; information and links to DNA sequence data and morphological keys.</p> <p>General biology: information on lifecycle, link to when different symptoms and life stages are likely to be observed; association with fungal symbionts; discuss aggregation pheromones.</p> <p>Distribution: information on native range (Europe) and introduced range; emphasize that it is a native pest; discuss where severe outbreaks have been reported.</p> <p>Host plants: information on the hosts confirmed in different regions, e.g. various <i>Picea</i>, <i>Pinus</i> and <i>Abies</i> species, as well as secondary and unconfirmed hosts.</p> <p>Damage, impact and control: discuss its normal role as a secondary pest and what factors lead to outbreaks (e.g. after severe climate events causing windthrow); discuss details on control options, e.g. salvage (harvest windthrown timber); sanitation (removal of infested trees); chemical control (mention main products) and biological control (mention most important natural enemies/biocontrol agents).</p> <p>Pathways: not as relevant because it is a native pest, but can discuss natural dispersal ability, i.e. distance that can be covered in a certain period of time.</p> <p>Detection and surveillance methods: discuss aggregation pheromone and use in baited traps; other methods, e.g. remote sensing.</p> <p>Motivation: highly aggressive, severe impact (ecological and economic) from outbreaks.</p>
<i>Fusarium circinatum</i>	<p>Identification: characteristics of sexual and asexual forms; symptoms on infected trees (distinguish between seeds, seedlings and older trees); information and links to DNA sequence data and new diagnostic tools, e.g. LAMP PCR.</p> <p>General biology: information on disease cycle; mechanism of dispersal, including the role of insect vectors, wind and wounds.</p> <p>Distribution: information on native range (United States of America) and introduced range, e.g. South Africa, Chile, parts of Asia and Europe.</p> <p>Host plants: information on the hosts confirmed in different regions, e.g. various <i>Pinus</i> species, as well as secondary (e.g. <i>Pseudotsuga menziesii</i>) and unconfirmed hosts.</p> <p>Damage, impact and control: discuss damage within plantations and established forests (mature trees), nurseries (seedlings) and orchards; discuss details on control options, e.g. sanitation (removal of infested trees); breeding for resistance; silvicultural practices, e.g. limiting pruning to certain seasons.</p> <p>Pathways: natural dispersal, including assisted by wind and insects; movement in trade and transport, including plants, wood products, seed and soil.</p> <p>Detection and surveillance methods: field surveys/extension.</p> <p>Motivation: significant disease of pine affecting forests, seed orchards and nurseries; present in surrounding countries.</p>

3. Preparation (for the potential arrival of the pest)

In this section, you report on the steps (outside the PCP) that have been implemented or are in the process of being implemented in response to the risk of introduction (or outbreak). Thus, these are actions that have been taken in preparation for the potential arrival of the pest, which can include:

- Listing as a quarantine pest for the country or area.
- Placing on national and/or regional phytosanitary organization and other lists, as a quarantine pest or a pest alert.
- Import restrictions and regulated areas around outbreak areas.
- Any legislation to mitigate risk from trade (commodities), travel or movements, for example the removal of bark of imported products if the pest is a wood boring insect.
- Other relevant legislation and measures to regulate and monitor potential pathways.
- Identification of high-risk pathways/ commodities.
- Any pest risk analysis that has been completed in the country of pest introduction or any other country. Indicate the date of the pest risk analysis and if it needs to be updated.
- Conduct an analysis (such as CLIMEX) , to predict suitable and high-risk areas should the pest become established, is valuable in providing an indication of potential distribution and impact, but also to inform and prioritize surveillance activities.
- Actions to prevent outbreaks – for example, for pests already present, such as native pests or previously introduced invasive pests. Actions will depend on the pest species and the specific factors related to its outbreak dynamics, but could for example include the removal of

dead host plants to reduce population build-up. These actions would often be linked to surveillance activities.

- Surveillance activities. These would include early detection surveys, such as traps at potential points of entry. For PCPs in response to pest outbreaks, surveillance activities could include annual surveys of pest incidence to determine the increase in population.

4. Identify roles and responsibilities

The overall authority to formulate and implement the PCP needs to lie with the national plant protection organization. However, there will likely be numerous players involved in the various actions required. The roles and responsibilities for the different actions should be mentioned throughout the PCP, but it is helpful to provide a summary in a dedicated section of the PCP. This summary can include a flow diagram that shows the different steps and linked responsibilities.

Coordination of the multiple players will be required and the mechanism for this should be clearly stated in the PCP. For example, this could be through the establishment of a Pest Contingency (Response) Steering Committee, with different stakeholders represented. Ideally, such structures should be in place before pest detection, as part of the PCP, although adjustments can be made after initiating the PCP, for example due to changes in organizational structures or mandates.

For the different actions, there are often different levels of decision-making required, and different organizations or people responsible for those decisions. It should be clearly indicated who is responsible for each level of decision-making. This may differ depending on the particular action. The levels of decision-making can be divided into:

- Strategic – responsible for policy and decision-making related to a particular action or decision.
- Tactical – responsible for the transfer of the policy (decided above) to practical instructions.
- Operational – responsible for the implementation of the instructions decided above.

The different actions for which roles and responsibilities should be clearly defined include, but are not limited to:

- evaluating the threat – deciding on whether to initiate a PCP;
- surveillance activities;
- management activities;
- mobilizing and managing resources;
- communication with collaborative agencies/ organizations;
- and communication with the public and other stakeholders.

5. Criteria to implement the pest contingency plan

Confirmation of the pest in the country for which the PCP has been developed is normally the main criteria leading to the implementation of the PCP. The various details relating to the process of confirmation of pest presence, or other triggers that could lead to a response (implementation of PCP), should be described in this section. Details to include in the section are:

- The different mechanisms by which a first report may be obtained. For example, this could be through surveillance activities or reports from the public.
- Specific symptoms or diagnostic aids that can be used for pest identification. This will generally refer to step 2, Background information on the target pest. It is important to include information to help prevent possible misdiagnosis. For example, provide information on other species that are similar or have similar symptoms, and how these

can be distinguished from the pest species in question. For a PCP developed to respond to an outbreak of an existing pest, it is important to indicate what criteria will determine an outbreak of that pest. This will likely be based on survey data, such as trap catches, and incidence of tree mortality.

- Provide information on the sampling methods that will assist in the rapid identification of the potential pest – for example, what plant material to collect and how, and if the pest is an insect, what life stage to collect. Include also details on where to send samples and how the samples should be sent.
- Indicate the key information to collect following a potential detection of the pest (or report of an outbreak). For example, this could include the details on the site where the pest was detected, such as ownership, host species, access and surroundings. It could also include the level of incidence of the pest or extent of damage, and the potential pathway for its introduction (for example, the recent import of host plants/ firewood). This information will inform the official actions should the pest presence be confirmed, and thus facilitate a rapid response to the new detection.
- Cautionary actions while waiting for confirmation of pest presence. There may be a stage that diagnosis is suspected but unconfirmed, for example waiting for the results from the laboratory. In such cases, cautionary actions can and often should be taken. These could include restricting movements from the affected site and starting the procedure of forward and backward tracing (described below). These cautionary actions will cease if the pest report comes back negative.



An example of what information would be included for different pest species is provided below:

CRITERIA TO IMPLEMENT THE PEST CONTINGENCY PLAN	
<i>Agrilus planipennis</i>	<p>Mechanism of first report: describe likely mechanisms such as via general surveillance activities, report from public.</p> <p>Pest confirmation: report could be from collected insects or observation of symptoms, e.g. D-shaped exit holes; confirmation by morphology or molecular diagnostic techniques; provide information on how to send insect samples.</p> <p>Key information to collect: owner of land or nursery; host species; access and surroundings; level of incidence.</p> <p>Cautionary actions: restrict movement of plants (ash) and firewood.</p>
<i>Ips typographus</i>	<p>Mechanism of report of outbreak: describe likely mechanisms such as via general surveillance activities and remote sensing.</p> <p>Pest confirmation: report could be from collected insects or observation of symptoms, e.g. galleries under bark; confirmation by morphology or molecular diagnostic techniques; provide information on how to send insect samples; provide details of what will constitute an outbreak, e.g. area of infected trees.</p> <p>Key information to collect: owner of land and; host species; access and surroundings; level of incidence.</p> <p>Cautionary actions: may not be relevant for outbreak of native pest, e.g. if outbreak is caused by a weather event then there are no cautionary actions to follow.</p>
<i>Fusarium circinatum</i>	<p>Mechanism of first report: describe likely mechanisms such as via general surveillance activities, report from public, samples sent from nurseries.</p> <p>Pest identification and confirmation: report could be from observation of symptoms, e.g. cankers and copious resin exuding from mature trees, damping-off on seedlings; confirmation based on molecular diagnostic techniques; provide information on how to sample from infected host (differ between mature tree, seedling and seed).</p> <p>Key information to collect: owner of land or nursery; plant part affected; host species; access and surroundings; level of incidence.</p> <p>Cautionary actions: holding consignments of plants; planting restrictions; restrict movement from affected area; stop movement of seed.</p>

6. Official actions after final confirmation

This section provides details on the different actions that should be implemented after the report of the pest (or outbreak) is confirmed. Three of the initial steps in response to a pest introduction, and which should be discussed in a PCP, are as follows:

1. Notify the necessary authorities of the new detection report. This includes trading partners, following the procedures described by the national plant protection organization, and the PCP. Provide information on which organizations should be contacted, in which order, and by whom.
2. Set up necessary meetings to inform relevant parties and disseminate information. Provide information on who (which organization) will arrange the meetings, which parties should be included in the meetings (there may be multiple

meetings with different parties involved), and how the information will be disseminated.

3. Communication with internal and external stakeholders. Outline the lines of communication with any internal or external stakeholders not already covered in the previous two steps.

The next steps to be discussed in this section deal with the containment and assessment of the spread, and origin of the pest. For all these steps it is important to discuss who is responsible and the methods that should be used.

- Containment. Outline the different strategies that should be implemented to prevent the pest from spreading, or to minimize the prevalence of the pest. This could include removing infected material and restricting movement in areas where the presence of the pest has been confirmed. Ensuring that the containment strategies are clearly outlined in the PCP will facilitate their prompt implementation after pest confirmation.

- Delimiting surveys. This can include intensive surveys, where all trees within a certain area are checked; or transect surveys, where trees along transects going from the original detection point are checked, for example checking a tree every 50 m along a 5 km transect line. Depending on results from original surveys, the range of the intensive or transect surveys may be extended until the boundaries of the infestation are known. Specific information on the methods should be provided, such as the size of the survey area, length of transect, number of trees to be checked, and what criteria are used to decide on whether to extend the boundary of the survey. Previous survey activities or studies on the same (or similar) pest should be consulted.
- Demarcated zones/quarantine area. These are established to minimize the risk of further spread. Describe the methods to establish this area and the responsible parties. For example, provide details on the size of the area; what will be prohibited, and the conditions that would lead to an increase in the size of the area – such as the results from delimiting surveys.
- Tracing forwards/backwards. This is to identify the potential pathways and origin from which the pest was introduced (backwards), and the potential pathways that could lead to further spread of the pest (forwards). Again, it is important to indicate who is responsible and the methods that should be used for the tracing. This will depend on the confirmed pathway, for example contacting garden centres if the pest is likely to spread through the movement of infected plants.

7. Management response

Management responses include eradication, or pest suppression. A pest suppression strategy can have a broad objective of reducing the spread and impact of the pest, or a more specific objective of the pest incidence not exceeding a certain level, or being contained within a certain area. It is important to clearly indicate who is responsible for these management responses.

Eradication

- Clearly state under which conditions eradication will be an option. The feasibility of eradication can depend on a number of factors, such as the size and area of the infected area (or number of trees). Confidence in the information of the infected area – for example, if it is difficult to identify infected trees, the data will be less reliable – and the logistical and financial feasibility of removing all infected material, should also be considered.
- Include details of the methods to be used for eradication, such as fell and destroy, or the use of lethal traps. Provide details on a disposal plan for infested plant material. This is also relevant for other management approaches where trees are felled. Provide clarity on the procedures to follow if the pest occurrence is on private land. This should include who will cover the cost for the eradication (removal of infected plants).
- Provide details on the surveillance methods to be used to evaluate the success of the eradication strategy. This includes how frequently these surveys should be repeated (for example, annually), and for how long the surveys should be continued after no further signs of the pest have been observed. Methods could include baited traps, on-ground surveillance, and remote sensing.

Management responses to slow the spread of the pest and reduce impacts

- Discuss the management responses and provide details on the methods. The approach to use will depend on the particular pest. Options include biological and behavioural control (such as mating disruption for some insect species), silvicultural control (removing infected trees, or dead trees), and chemical control.
- Indicate which surveillance activities should be used to support the management approaches, and provide details. Management responses should be accompanied by surveillance activities to assess the pest incidence (the pest itself or damage as a proxy) over time, and thus to determine if management intervention has been successful. This can also include surveys of the vector.

For both eradication and management strategies for pest suppression, details on the estimated budget should be provided, including the source of funding. It is important that the management approaches outlined in the PCP are realistic with regard to available resources, to ensure that

responses are not unnecessarily delayed due to a lack of funding.

An example of what information would be included for different pest species is provided below:

MANAGEMENT RESPONSE	
<i>Agrilus planipennis</i>	<p>Eradication</p> <p>Conditions: for example, eradication may be feasible if no adults have emerged or only one generation has emerged and with limited spread; eradication will also be more viable if the infestation is in a small number of isolated ash trees.</p> <p>Methods: fell (provide specific methods) and destroy via chipping or burning.</p> <p>Surveillance: use of trap trees; use of baited multi-funnel traps; repeat annually until not reported for four years.</p> <p>Slow spread/reduce impact</p> <p>Methods: sanitation (fell and destroy infested trees); chemical control (discuss products and application); biological control (discuss processes for importing and releasing biocontrol agents).</p> <p>Surveillance: ground-based surveys; use of baited multi-funnel traps; annual surveys to monitor spread and abundance.</p>
<i>Ips typographus</i>	<p>Eradication</p> <p>Not relevant for native pests</p> <p>Slow spread/reduce impact</p> <p>Methods: removal of worst affected species/areas, e.g. target areas with windblown and newly dead trees; debark, chip or burn removed trees; mass trapping with baited traps; chemical control (discuss products and application); biological control (e.g. assess role of present natural enemies, implement conservation biological control).</p> <p>Surveillance: ground-based surveys; use of baited multi-funnel traps; annual surveys to monitor infestation levels.</p>
<i>Fusarium circinatum</i>	<p>Eradication</p> <p>Conditions: eradication may be feasible if initial surveys indicate infections of a small number of trees in an isolated area (if reported on mature trees); or in a single nursery (if reported on seedlings).</p> <p>Methods: for mature trees fell (provide specific methods) and destroy via chipping and composting or burning (do not distribute soil or plant parts in process); for seedlings, remove and destroy infected seedlings and possibly surrounding seedlings in nursery, or even destroy all susceptible species in the nursery.</p> <p>Surveillance: delimiting surveys; repeat annually until not reported for two years.</p> <p>Slow spread/reduce impact</p> <p>Methods: sanitation (fell and destroy infested trees); planting more resistance trees (where viable).</p> <p>Surveillance: ground-based surveys; annual surveys to monitor spread.</p>

8. Review measures in case of prolonged official action

Eradication and other management approaches are sometimes unsuccessful, or may take a prolonged time until they achieve the desired success. In such cases, the current measures need to be reviewed, to consider if changes in the strategy are required.

Issues to include in this section:

- Define the criteria used in the review, to determine if the PCP has been successful or unsuccessful.
- Indicate which stakeholders should be consulted in the review.
- Indicate what should be considered in the review, such as the economic impact and cost effectiveness of continuing with the current

approaches, availability of other options (and their costs and potential effectiveness), interactions and influence on community and other affected stakeholders (should the current management response be continued, or discontinued), impact on export market (if not eradicated), and biodiversity and other unintended impacts of the current methods.

9. Determine completion of official action

Details are needed on when the official action, as described in the PCP, can be regarded as completed. The criteria will largely depend on the management action taken, but the following should be included in this section:

- The time and frequency that the completion of the management action should be reviewed.
- The criteria that should be used to determine whether the action is completed. For eradication, this could entail the absence of the pest in survey activities for a certain period (for example, five years). For a pest suppression management strategy, this could entail evidence that the pest population has been suppressed or contained.

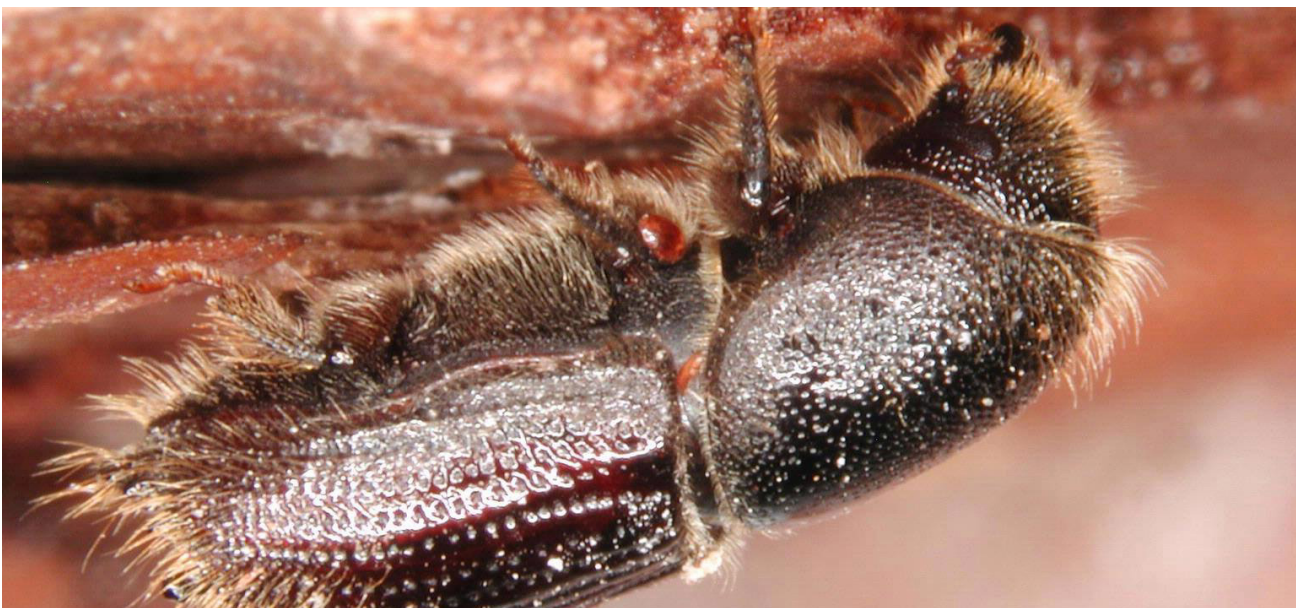
- The stakeholders who should be consulted in the decision.
- Any recovery requirements that should be considered. For example, if the management action (such as eradication) was destructive, then the rehabilitation of the affected area should be discussed.
- Under what conditions the management actions should be reinitiated. For example, this could be if new information becomes available, such as a new detection of the pest after it was thought to be eradicated.

10. Review and update pest contingency plan

Discuss when the PCP should be updated. Ideally, this should occur every year to ensure that new information relevant to the PCP is included. This could include information on the biology and distribution of the pest, new surveillance and management methods, or changes in roles and responsibilities.

11. References

Include a reference list with relevant references.



Requirements for the implementation of a pest contingency plan

There are various requirements for the successful implementation of a PCP. The national plant protection organization, and other relevant stakeholders, should ensure that these are in place and maintained. Key (capacity) requirements include:

- **Internal communication.** An important factor contributing to the success of a PCP is to establish clear lines of internal communication, which is generally within the national plant protection organization, but can also include the different organizations involved in the implementation of the PCP. It is advisable that a spokesperson be appointed in order to facilitate effective communication.
- **External communication (and education).** Efficient communication with the public and other stakeholders is important. It is recommended that the public are engaged with throughout the process and are viewed as partners in the implementation of the PCP, for example with early pest detection. To facilitate public involvement, it is important to provide correct and clear information about the pest and the planned response. Promotional and awareness campaigns, and the use of different media (including mobile apps) can assist in informing and involving the public, and sensitizing them to potential pathways by which the pest (and pests in general) can spread. Communities should also be informed about new detections in their area. Efficient communication with the public will assist in obtaining their support for the implementation of management strategies.
- **Training.** Staff responsible for the formulation and implementation of the PCP need to be adequately trained. Such training should include the key players in the PCP, such as managers, extension services, and decisionmakers. The training can be on a national or regional level, for example to facilitate interprovincial or international interactions. It can include workshops, informal discussions, and the use of simulated scenarios and rehearsals.
- **Surveillance programmes.** This includes the capacity for surveillance activities and access to effective surveillance tools. This is important for early detection (or outbreaks) of pests that will initiate the PCP, and surveillance activities such as delimiting surveys and monitoring that are implemented as part of the PCP. Capacity to optimize current surveillance tools and develop new tools, for example through visual and chemical ecology and remote sensing, will be very valuable. In addition, effective systems and platforms for data capture, and visualization from surveillance activities, are important.
- **Diagnostics.** A PCP requires the capacity for rapid and effective diagnosis of potential new pest introductions. Thus, access to and proficiency in the use of relevant diagnostic tools is important.
- **Collaboration with relevant research organizations.** It is important that the national plant protection organization has access to the relevant expertise and information to inform the PCP. This will often be through relationships or collaboration with research organizations (in the same or other countries) that work on the species of interest. These relationships and collaborations should preferably be established prior to the pest introduction.



Source: FAO

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