

**Maryland Department of Natural Resources
Forest Service**

**Pesticide Environmental and
Social Risk Assessment**

Pesticide Active Ingredient: Imidacloprid

Version 1.1

2021



Appendix 2: National Guidance ESRA for Imidacloprid

Environmental National Assessment

Pesticide:	Imidacloprid		Specific Formulation:
Hazard Status:	Imidacloprid is a highly hazardous pesticide (HHP) based on its classification in the Acute Toxicity hazard group and demonstration of the potential for acute toxicity to mammals and birds (Criterion 2) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN). However, risks from other FSC hazard groups and toxicity categories were not precluded from this assessment.		PrimeraOne Quali-Pro
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
Environmental	Soil (erosion, degradation, biota, carbon storage)	<p>Minimal indication of adverse effects to soil was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>No indication of adverse effects on soil microorganisms, although transient changes in soil microorganism population have been documented (1).</p> <p>The most affected terrestrial soil invertebrate is the earthworm, with only transient effects on earthwork populations (1).</p>	<p>Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below, as well as application-, Organization-, or location-specific strategies.</p> <p>General consideration of exposure variables designed to mitigate risk:</p> <ul style="list-style-type: none"> -Know and understand the specific pesticide formulation and/or tank mixture, as its unique formulation may provide a different risk characterization. -Understand how the mixture of active ingredients affects the pesticides risk profile.
	Water (ground water, surface waters, water supplies)	<p>Risk to aquatic species with minimal overall risk to human water resources.</p> <p>Accidental spill into small pond presents highest risk for contamination of water, along with potential contamination of surface water due to soil injection (1).</p> <p>These do not present a considerable risk to human water resources but may adversely affect aquatic invertebrates (1).</p> <p>Risk varies among groups of aquatic invertebrates, with severe risk characterization for sensitive groups.</p>	

		<p>Sensitive groups of aquatic invertebrates include: Ephemeroptera, Ostracoda, Diptera, and Hemiptera. Bivalves, most species of Cladocera and Artemia are four among the least sensitive groups of aquatic invertebrates (1).</p> <p>Substantial adverse effects on sensitive aquatic invertebrates in the event of an accidental spill. For non-accidental applications, highest risk is associated with soil injection. Less analysis of tree injection exposure risk exists: adverse effects will depend on the volume of water contaminated by falling leaves and the total number of leaves transported to the body of water (1).</p>	<p>-Seek to minimize the frequency, interval, and amount of application.</p> <p>-Use the most efficient and effective method of application by seeking to minimize risk to environmental and social values.</p> <p>-Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and humidity) conditions and the likely effect on risk to environmental and social values.</p> <p>-Have appropriate waste management systems in place.</p> <p>Mitigating Risk to the Environment: <i>reduce contact with water resources and minimize application amounts and number of applications.</i></p>
Environmental	<p>Atmosphere (air quality, greenhouse gasses)</p>	<p>Minimal indication of adverse effects to atmosphere was found when imidacloprid is used according to label instructions in forestry applications.</p>	<p><i>General and non-target species:</i></p> <p>-This product is highly toxic to bees exposed to direct treatment or residues on blooming plants or weeds. Do not apply product to blooming plants or weeds if bees are foraging in the treatment area (2).</p>
	<p>Non-target species (vegetation, wildlife, bees and other pollinators, pets)</p>	<p>Risks to non-target species are mainly to terrestrial and aquatic invertebrates, and minimal risk to terrestrial and aquatic vertebrates, terrestrial and aquatic macrophytes, and algae was identified (1). Additional considerations are provided below.</p> <p>All application methods present risk to terrestrial invertebrates. Specifically, risks to honeybees and phytophagous insects exceed the level of concern. Honeybee concern is greatest with maple and less certain for ash and hemlock (1).</p> <p>Classified by EPA as moderately toxic to mammals; moderately toxic to practically nontoxic in birds; toxic to fish and other aquatic organisms; very highly toxic to bees and aquatic invertebrates (1).</p> <p>Risks to vertebrates (mammals, birds, and fish) are largely benign. Toxicity exposure would be surrounding contaminated surface water. While contaminated vegetation cannot be ruled out as an</p>	<p><i>Water:</i></p> <p>-Do not allow to get into surface water, drains and ground water (2).</p> <p>-Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water (2).</p> <p>-Do not apply when weather conditions favor runoff or drift (2).</p> <p>-Do not apply near lakes, streams, rivers, or ponds (2). Use buffer strips between application areas and sensitive areas.</p> <p>-Do not apply to soils which are waterlogged or saturated (2).</p> <p>-Do not allow pesticide to enter or run off into storm drains, drainage ditches, gutters, or surface waters. Applying this product in calm weather when rain is not predicted for the next 24 hours</p>

		<p>exposure pathway for vertebrates, it is not quantifiable. Potential secondary effects to nontarget species exist; for example, "adverse effects on terrestrial invertebrates may reduce populations of insectivorous birds" (1).</p> <p>Secondary effects could occur for virtually all nontarget organisms. These secondary effects caused by insecticide or mechanical methods could either be detrimental or beneficial to affected species (1).</p>	<p>will help to ensure that wind or rain does not blow or wash pesticide off the treatment area (3).</p> <ul style="list-style-type: none"> -Do not apply near fish pools, ponds, streams, or lakes (3). -Rinsing application equipment over the treated area will help avoid run off to water bodies or drainage systems (2).
Environmental	<p>Non-timber forest products (as FSC-STD-01-001 V5-2 FSC Principles and Criteria, criterion 5.1)</p>	<p>Minimal indication of adverse effects to non-timber forest products was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>Potential for secondary effects on terrestrial or aquatic animals and plants, including changes in food availability and habitat quality (1).</p>	
	<p>High Conservation Values (particularly HCV 1-4)</p>	<p>Minimal indication of adverse effects to High Conservation Values was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>Unintentional secondary effects on habitat, landscape and ecosystem could occur (1).</p>	
	<p>Landscape (aesthetics, cumulative impacts)</p>	<p>Minimal indication of adverse effects to landscape values was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>Potential for secondary effects on terrestrial or aquatic animals and plants, including changes in food availability and habitat quality (1).</p>	
	<p>Ecosystem services (water, soil, carbon sequestration, tourism)</p>	<p>Minimal indication of adverse effects to ecosystem services was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided, below.</p>	

		Potential for secondary effects on terrestrial or aquatic animals and plants, including changes in food availability and habitat quality (1).	
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¹ Mitigation strategies have been categorized to avoid redundancy

Sources

- (1) USDA/Forest Service. (2016). Imidacloprid: Human Health and Ecological Risk Assessment Corrected FINAL REPORT. Prepared by Syracuse Environmental Research Associates, Inc. under USDA Forest Service Contract AG-3187-C-12-0009. Retrieved from <https://www.fs.fed.us/foresthealth/pesticide/pdfs/ImidaclopridFinalReport.pdf>.
- (2) Bayer AG (2014). Bayer Advanced 12 Month Tree & Shrub Protect & Feed Concentrate II Safety Data Sheet. Retrieved from: <https://images.homedepot-static.com/catalog/pdfimages/c7/c7e7c72a-29c8-419d-8d80-476506c265b2.pdf>.
- (3) Bayer AG (2016). Bayer Advanced Complete Imidacloprid Product Label. Retrieved from https://www3.epa.gov/pesticides/chem_search/ppls/072155-00031-20160822.pdf.

Social National Assessment

Pesticide:	Imidacloprid		Specific Formulation:
Hazard Status:	Imidacloprid is a highly hazardous pesticide (HHP) based on its classification in the Acute Toxicity hazard group and demonstration of the potential for acute toxicity to mammals and birds (Criterion 2) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN). However, risks from other FSC hazard groups and toxicity categories were not precluded from this assessment.		PrimeraOne Quali-Pro
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
	High Conservation Values (especially HCV 5-6)	Minimal indication of adverse effects to high conservation values was found when imidacloprid is used according to label instructions in forestry applications.	Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below as well as application-, Organization-, or location-specific strategies.
	Health (fertility, reproductive health, respiratory health, dermatologic, neurological and gastrointestinal problems, cancer and hormonal imbalance)	<p>Minimal indication of adverse effects to health values was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>As long as one adheres to proper worker protections there is no substantial risk for workers or members of the general public (1).</p> <p>Imidacloprid is neurotoxic to humans in acute exposures but “neurotoxicity is not generally noted in subchronic or chronic toxicity studies” (1). Effects occurring at lowest exposures (most sensitive effects) are on the endocrine system (1). Some accidental exposures (i.e. wearing contaminated gloves) are of concern: as with any pesticide; use of proper safety procedures render this risk insignificant (1).</p> <p>“Exposure scenarios would involve consumption of contaminated surface water following an accidental spill, or concentrations in surface water following soil injections” (1).</p>	

		Evidence of non-carcinogenicity in humans as classified by EPA (1).	humidity) conditions and the likely effect on risk to environmental and social values. -Have appropriate waste management systems in place.
Social	Welfare	Minimal indication of adverse effects to welfare was found when imidacloprid is used according to label instructions in forestry applications.	Mitigating Risk to Workers: <i>When applying pesticides, label instructions should be followed.</i>
	Food and water	Minimal indication of adverse effects to food and water was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided below. Very low likelihood of incidental exposures surrounding contaminated vegetation, which therefore cannot be estimated quantitatively (1). Risk associated with non-accidental exposures would involve water contamination due to leaf fall from treated trees (1). This would likely have negative effects on aquatic invertebrates, depending on the volume of contaminated water and concentration of imidacloprid in leaves (1).	<i>Adhere to the below exposure controls (2):</i> -Chemical resistant nitrile rubber gloves -Safety glasses with side-shields -Wear long-sleeved shirt and long pants and shoes plus socks. -Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, using the toilet or applying cosmetics. -In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off immediately with plenty of water for at least 15 minutes. Call a physician or poison control center immediately (2). Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust (3).
	Social Infrastructure; (schools and hospitals, recreational infrastructure, infrastructure adjacent to the management unit)	Minimal indication of adverse effects to social infrastructure was found when imidacloprid is used according to label instructions in forestry applications.	<i>Safe handling:</i> -Maintain exposure levels below the exposure limit through the use of general and local exhaust ventilation. -Handle and open container in a manner as to prevent spillage (2).
	Economic viability (agriculture, livestock, tourism)	Minimal indication of adverse effects economic viability was found when imidacloprid is used according to label instructions in forestry applications. However, secondary effects due to lower invertebrate populations may be detrimental to some species and beneficial to others; for example, reduction in bird populations may result from imidacloprid use (1).	<i>Storage requirements:</i> -Store in original container and out of the reach of children, preferably in a locked storage area (2). Mitigating Risk to Public Access/Public Welfare:

		High risk to honeybees if imidacloprid is administered in maple trees prior to flowering and bee foraging in the spring. Risks are highest for foliar applications and soil injection applications and lowest for bark applications (1).	- Keep people and pets away from treated area until it has been watered and allowed to dry (3). -Reduce the possibility of public consumption of contaminated wild food (e.g., fruit or fungi) and public exposure to pesticides through public outreach and engagement, limiting access, and/or appropriate signage. For instance, users of the forest may be excluded from the area using barriers or signage until the pesticide dries.
Social	Rights (legal and customary)	Minimal indication of adverse effects to rights was found when imidacloprid is used according to label instructions in forestry applications.	-In case of accidental release: Isolate hazard area. Keep unauthorized people away. Avoid contact with spilled product or contaminated surfaces (2).
	Others	No additional values were identified in this assessment.	-Consider effects on local communities and indigenous peoples when considering limiting access to treatment areas. -Do not allow children or pets to enter the treated area until it has dried (2).

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Sources:

- (1) USDA/Forest Service. (2016). Imidacloprid: Human Health and Ecological Risk Assessment Corrected FINAL REPORT. Prepared by Syracuse Environmental Research Associates, Inc. under USDA Forest Service Contract AG-3187-C-12-0009. Retrieved from <https://www.fs.fed.us/foresthealth/pesticide/pdfs/ImidaclopridFinalReport.pdf>.
- (2) Bayer AG (2014). Bayer Advanced 12 Month Tree & Shrub Protect & Feed Concentrate II Safety Data Sheet. Retrieved from: <https://images.homedepot-static.com/catalog/pdfimages/c7/c7e7c72a-29c8-419d-8d80-476506c265b2.pdf>.
- (3) Bayer AG (2016). Bayer Advanced Complete Imidacloprid Product Label. Retrieved from https://www3.epa.gov/pesticides/chem_search/ppls/072155-00031-20160822.pdf.