

FD – ISHB Management Matrix - Infested Urban and Peri-urban Forest

			ISHB Infestation Level & Management Options				
LOW VALUE TREES ¹	Host Type	Hazard Level ¹	No Infestation	Low	Moderate I	Moderate II	Heavy
	Reproductive Host	Low	Monitor	Monitor & Spot Inject	Monitor ² Remove Actively Infested Branches	Monitor ² Remove Actively Infested Branches	Remove Actively Infested Tree ² & Stump
		High	Monitor	Monitor & Remove Hazard Branches	Monitor ² Remove Hazard Branches	Remove Hazard Branches, or Remove Tree & Stump	Remove Tree ² & Stump
	Non-Reproductive Host	Low	Monitor	Monitor	Notify UC ANR ; consult with FD – ISHB experts to determine if species is a new reproductive host		
High		Monitor	Monitor				

			ISHB Infestation Level & Management Options				
HIGH VALUE TREES ¹	Host Type	Hazard Level ¹	No Infestation	Low	Moderate I	Moderate II	Heavy
	Reproductive Host	Low	Monitor	Treat/Remove Infested Branches ³	Treat/Remove Actively Infested Branches ³	Treat/Remove Actively Infested Branches ^{2,3}	Remove Actively Infested Tree ² & Stump
		High	Monitor	Treat/Remove Hazard Branches ³	Treat/Remove Hazard Branches ³	Remove Infested Branches, or Tree ² & Stump	Remove Tree ² & Stump
	Non-Reproductive Host	Low	Monitor	Monitor	Notify UC ANR ; consult with FD – ISHB experts to determine if species is a new reproductive host		
High		Monitor	Monitor				

¹ Definitions for tree value and hazard level vary. Classification must be determined by site and site use (e.g., economic or cultural value and risk to people or property).

² Confirm if beetle is actively reproducing in galleries by [painting over select entry holes with water-based latex](#); gallery is active if entry hole is re-opened on painted area.

³ If ISHB attack is confined to the branches of host tree, prune affected branches immediately to prevent advancement to the trunk. Prune hazardous branches on high-value hosts and treat pruning wounds to prevent re-infestations.

FD – ISHB management matrix for infested urban forests and locations on the leading edge of the infestation. The matrix was developed by Beatriz Nobua-Behrmann (UC ANR), Monica Dimson (UCLA), Shannon C. Lynch (UCSC), John Kabashima (UC ANR), and Akif Eskalen (UCD), and revised July 2019.

Tree Value¹

Low	Species of low economic value; smaller and/or younger trees; trees with undesirable form, structural issues (e.g., codominant branches), or other issues (e.g., other pests)
High	Species of high economic or cultural value (e.g., heritage trees); larger and/or older trees

Host Type

Reproductive	Plant species suitable for beetle reproduction and growth of <i>Fusarium euwallaceae</i> or <i>F. kuroshium</i> (see pshb.org for updated list of ISHB-FD reproductive hosts)
Non- Reproductive	Plant species that have not yet proved suitable for beetle reproduction; however, these species may be susceptible to <i>Fusarium euwallaceae</i> or <i>F. kuroshium</i>

Hazard Level¹

Low	Trees that pose a low risk to people or property
High	Trees that pose a high-risk to people or property (e.g., trees adjacent to walkways, playgrounds, high-use lawns, parking lots)

Infestation Level

Low	<50
Moderate I	≥50 and <150
Moderate II	≥150
Heavy	≥150 + dieback

Treatment Options

Reproductive Host (infested)	<ul style="list-style-type: none">• Imidacloprid drench, trunk or soil injection.• Emamectin Benzoate trunk or spot injection• Propiconazole trunk or spot injection• Optional - Pentra Bark + <i>Bacillus subtilis</i> and/or bifenthrin trunk spray• Optional - Pentra Bark + tebuconazole and/or bifenthrin trunk spray
Reproductive Host (no infestation)	Monitor - Preventative treatment not recommended.
Non-Reproductive Host (Infested)	Notify UC ANR; reclassify species as reproductive host in consultation with PSHB/FD experts
Non-Reproductive Host (no infestation)	Monitor - Preventative treatment not recommended.
Tree Removal	Remove tree and grind or bury stump. Treat stump with bifenthrin or <i>Bacillus subtilis</i> .
Agricultural Trees	Monitor, remove infested branches, or remove tree.
