



FREQUENTLY ASKED QUESTIONS:

Shot Hole Borers

What is the Shot Hole Borer?

The Shot Hole Borer is an invasive boring beetle that drills into tree trunks and branches, bringing with it a pathogenic fungus along with other fungi that are conducive to establishing and nurturing Shot Hole Borer colonies. The Shot Hole Borer is dark brown or black and very small – measuring 0.05 and 0.1 inches. The holes they bore measure approximately 0.85 mm inches in diameter (about the size of the tip of a ballpoint pen). Pregnant females bore into the tree bark and create galleries in which they can lay eggs. Once the eggs hatch, the larvae eat the fungus – gaining the nutrients they need to enter adulthood in about a month. Mature siblings mate with each other inside these galleries and then leave their host tree to affect others in the area. This activity attacks the tree’s vascular tissue and disrupts water and nutrient flow. The fungus that is produced is also harmful to the tree.

What types of trees are susceptible to Shot Hole Borers?

Shot Hole Borers are known to have attacked more than 300 species of native, exotic and agricultural trees in Southern California and have been found in a number of environments – from urban landscapes to commercial groves, and now native riparian habitats like those within the Tijuana River Valley. More than 50 tree species have been documented as reproductive hosts for Shot Hole Borers.

How does the Shot Hole Borer spread?

The Shot Hole Borer can crawl and it can fly. It can also spread via dead tree limbs that fall into waterways and are washed downstream, or via the transportation of infected wood from one park to another. For this reason, campers in County Parks are required to purchase firewood from the park where they are staying; firewood cannot be brought in from another source. This is the premise behind the [“buy it where you burn it”](#) campaign.

What happens to trees that are affected by Shot Hole Borers?

Symptoms of Shot Hole Borer attacks vary by tree species, but infections are detrimental to a tree’s health. A fungus may appear on the surrounding tree bark, the bark might change color, the leaves might change color and wilt, and branches may experience dieback (loss of life from the limbs, inward – toward the trunk).

A healthy tree can fight an infection, but a thirsty one is susceptible to illness and in some situations, death. Trees affected by invasive pests may experience limb failure, and falling limbs can pose a safety risk to parkgoers if they occur on/near trails, in staging areas and other recreational spaces. It’s standard practice for park staff to regularly patrol major thoroughfares within our parks and preserves, to look for signs of infection and to remove or schedule removal of limbs or trees that pose a safety risk.

Cut limbs and trees can be put toward secondary use, for example, they can be used as firewood, chipped to provide mulch for trails and parking lots, or milled to create park features like benches. Wood that is infected with the Shot Hole borer can serve the latter two purposes – but before it can be placed it must be chipped and solarized for a minimum of 6 months to ensure it is rid of these invasive species.



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What County Parks are at risk?

All parks are at risk that are near infected areas, or where infected wood is introduced to a park. In 2016 only one County Park showed signs of Shot Hole Borer infestation. Mid-way through 2016, three additional parks showed signs of infection, including Flinn Springs County Park, San Elijo Lagoon and Ecological Preserve and Guajome Regional Park. At this time we cannot confirm the total number of trees that are infected.

Humans are not directly impacted by Shot Hole Borer infestations. Trouble areas are documented and limb removals are scheduled on a regular basis to ensure safe passage through County parks and preserves.

What actions are being taken to prevent the spread of this invasive species?

We've partnered with other agencies to learn everything we can about Shot Hole Borers, and to develop action plans for identifying, tracking and combatting species expansion. We're focused on finding a solution, and to ensuring our response is based on the most accurate and up-to-date information.

Early detection is key, along with understanding proper isolation and [disposal techniques](#) – and these are focal points in training regimens for all park staff. Proven techniques like chipping and solarizing to remove infected wood and prevent further spread. This is part of a robust, multi-agency action plan that includes the following components: education, assessment and species management.

We have begun to request funding for further research, to develop potential treatments and/or remove trees infected by the Shot Hole Borer. And we're discussing local impacts at the regional and state level, to support a more uniform and comprehensive approach.

We are hopeful that with additional research and the ability to test solutions, we can take steps to reduce the number of trees affected by the Shot Hole Borer, county-wide. A similar invasive species – the Goldspotted Oak Borer (GSOB) – has been threatening Oaks in County Parks since 2010 but we are now in a position to test solutions at several locations such as William Heise County Park and Dos Picos County Park, as part of our overarching endeavor to minimize tree loss.

What does this mean for the future of our trees?

We're doing what we can to protect our trees and to be forward-thinking when it comes to ways to save them. Our county-wide Heritage Tree Program was initiated to catalog existing trees and to establish requirements for maintaining tree density and diversity in all County parks. County Parks' vision is to have a no-net-loss tree canopy in San Diego; we're re-planting trees 2:1 wherever possible and as new resources become available.

Who is the County working with to combat this issue?

The County of San Diego is working with a number of land owners and agencies to collaborate a unified approach to the documentation, research and mitigation of Shot Hole Borer infestation. We are



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currently working alongside the County of San Diego Farm & Home Advisor/University of California Riverside UC Cooperative, the County of San Diego Department of Agriculture Weights & Measures and the California Avocado Commission. Other partners include: County of San Diego Public Works and GIS departments, San Diego County Fire Authority, CAL-FIRE, California State Parks, California Department of Agriculture, California Water Quality Control Board, SANDAG, Tijuana River Valley Recovery Team, the City of San Diego Transportation and Stormwater Departments, Army Corps of Engineers, Orange County Parks, Natural Resources Conservation District, Southwest Wetlands Interpretive Association, Sweetwater Authority, Nature Conservancy, U.S. Fish and Wildlife Service, U.S. Customs and Border Protection, and various environmental consulting firms.

How can I identify if my trees have been infected by the Shot Hole Borer?

[This pamphlet](#) and [this handout](#) can help you to identify external [signs and symptoms](#).

What can I do to prevent my trees from being attacked by the Shot Hole Borer?

Keep trees healthy by watering them regularly (at least once per month) – this gives them an extra boost to help build up their natural defenses to this invasive species, i.e. the ability to produce sap. Learn more at <http://ucanr.edu/sites/pshb/id-mgmt/prevention/>.

What should I do if my trees have already been infected by the Shot Hole Borer?

Review the documentation, look-alike symptoms and impact area map. If you are certain the symptoms you are seeing are those of the Shot Hole Borer, you may report the infestation. Report suspected tree infestations to eskalenlab@gmail.com (regional task force) and/or sdcawm@sdcounty.ca.gov (local San Diego County Agriculture Weights and Measures) if:

- Evidence of an attack is seen (review real versus look-alike symptoms at <http://ucanr.edu/sites/pshb/files/238249.pdf>)
- Evidence of an attack is found in a tree species that is not listed a known reproductive host (view the list at <http://ucanr.edu/sites/pshb/overview/Hosts/>)
- Evidence of attack is found in a tree species that is listed as a reproductive host, but not yet identified in your city (view the map at <http://ucanr.edu/sites/pshb/Map/>)

Other helpful links:

www.pshb.org

www.eskalenlab.ucr.edu

www.cisr.ucr.edu

[PSHB profile sheet](#)

[Map of affected areas in Southern California](#)

[County of San Diego Department of Agriculture, Weights and Measures](#)

[County of San Diego Farm and Home Advisor Office/UC Cooperative Extension](#)