

# Shot Hole Borer

Managing the Invasive Beetle



Polyphagous Shot Hole Borer (PSHB) and Kuroshio Shot Hole Borer (KSHB) are invasive beetles that attack native, agricultural and landscape trees. The beetles tunnel into host trees carrying a fungus and spread Fusarium Dieback (FD), a disease known to infect over 137 species, disrupting the transport of water and nutrients in the tree — leading to branch dieback, decline and death.



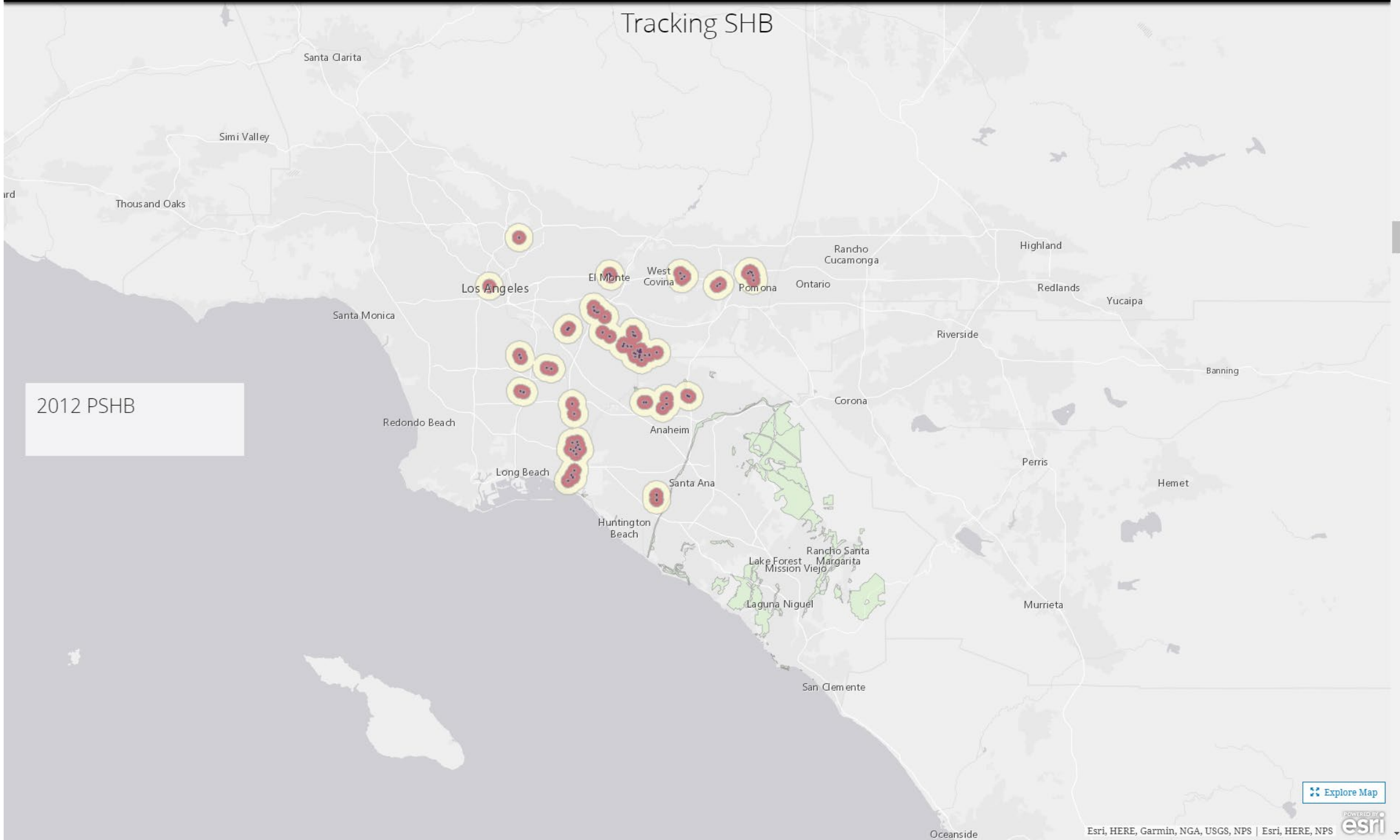
Polyphagous Shot Hole Borer

## Origin and History



# Tracking SHB

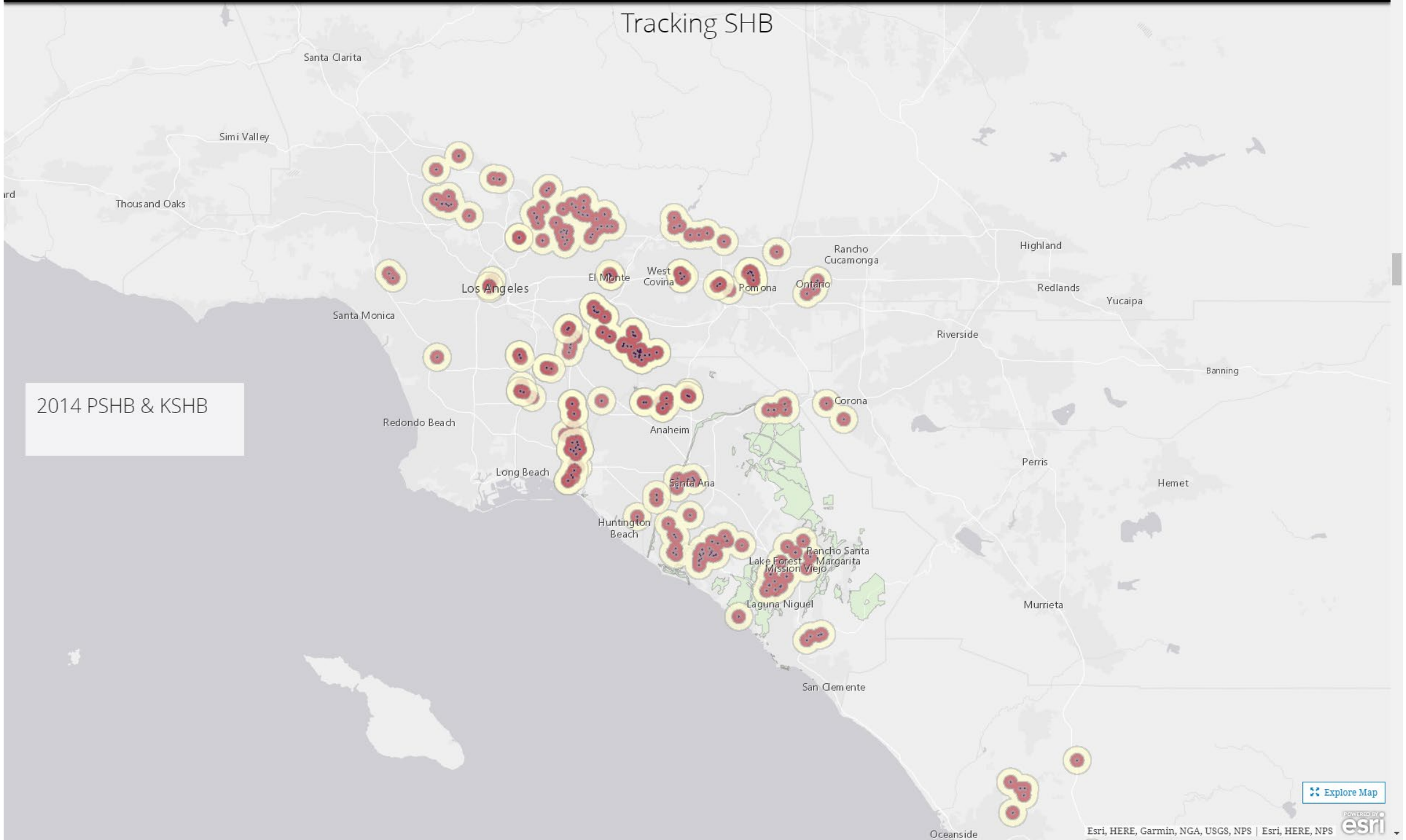
2012 PSHB



[Explore Map](#)

# Tracking SHB

2014 PSHB & KSHB



Explore Map

# Tracking SHB

2016 - 2018

PSHB & KSHB

Lack of infestation does not indicate absence of SHB.



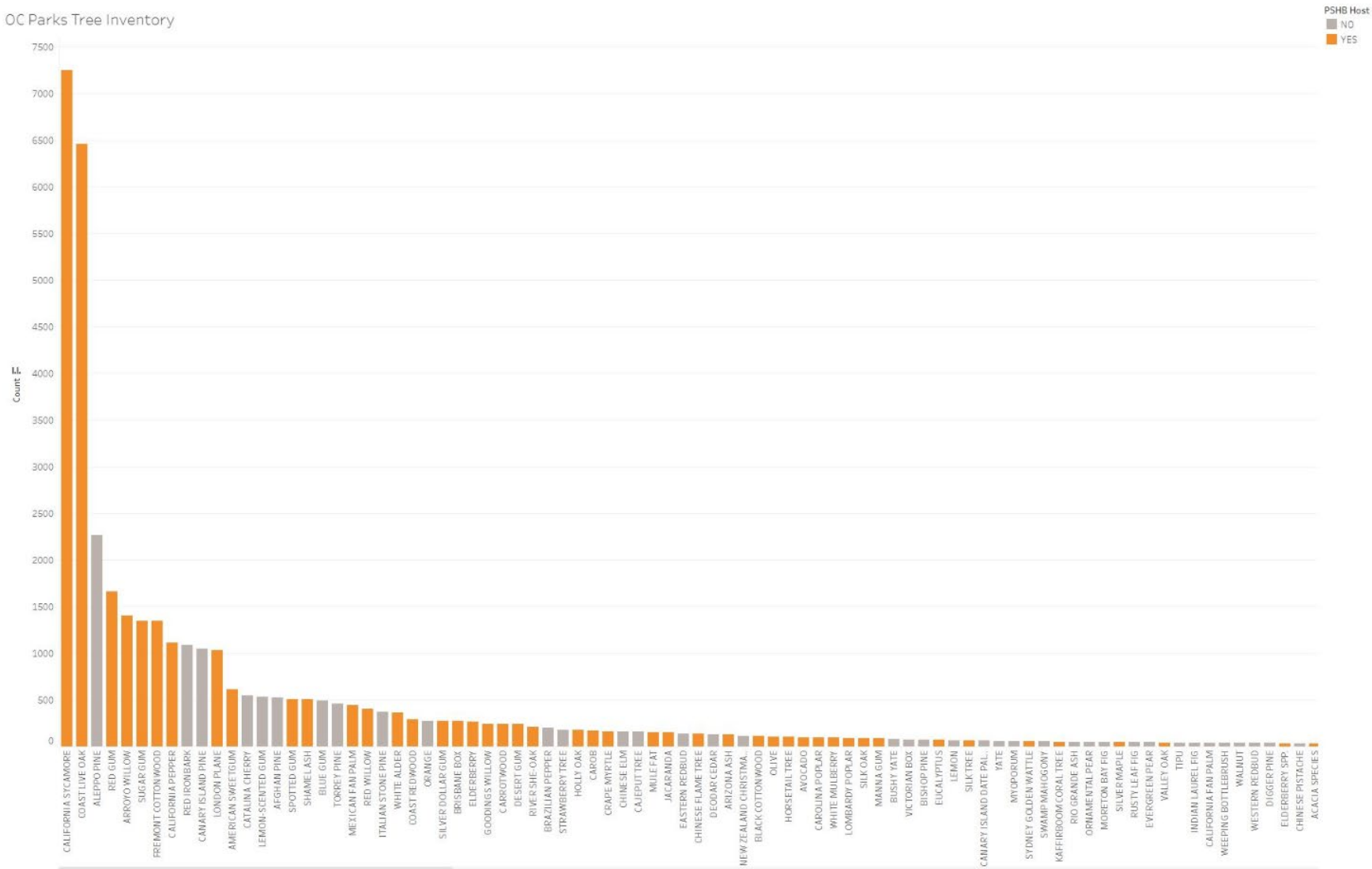
Explore Map

## OC Parks Tree Inventory

40,000 inventoried trees valued at \$184 million.

7,250 California Sycamores, valued at over \$32 million. 3,800 infested, 1,410 removed.

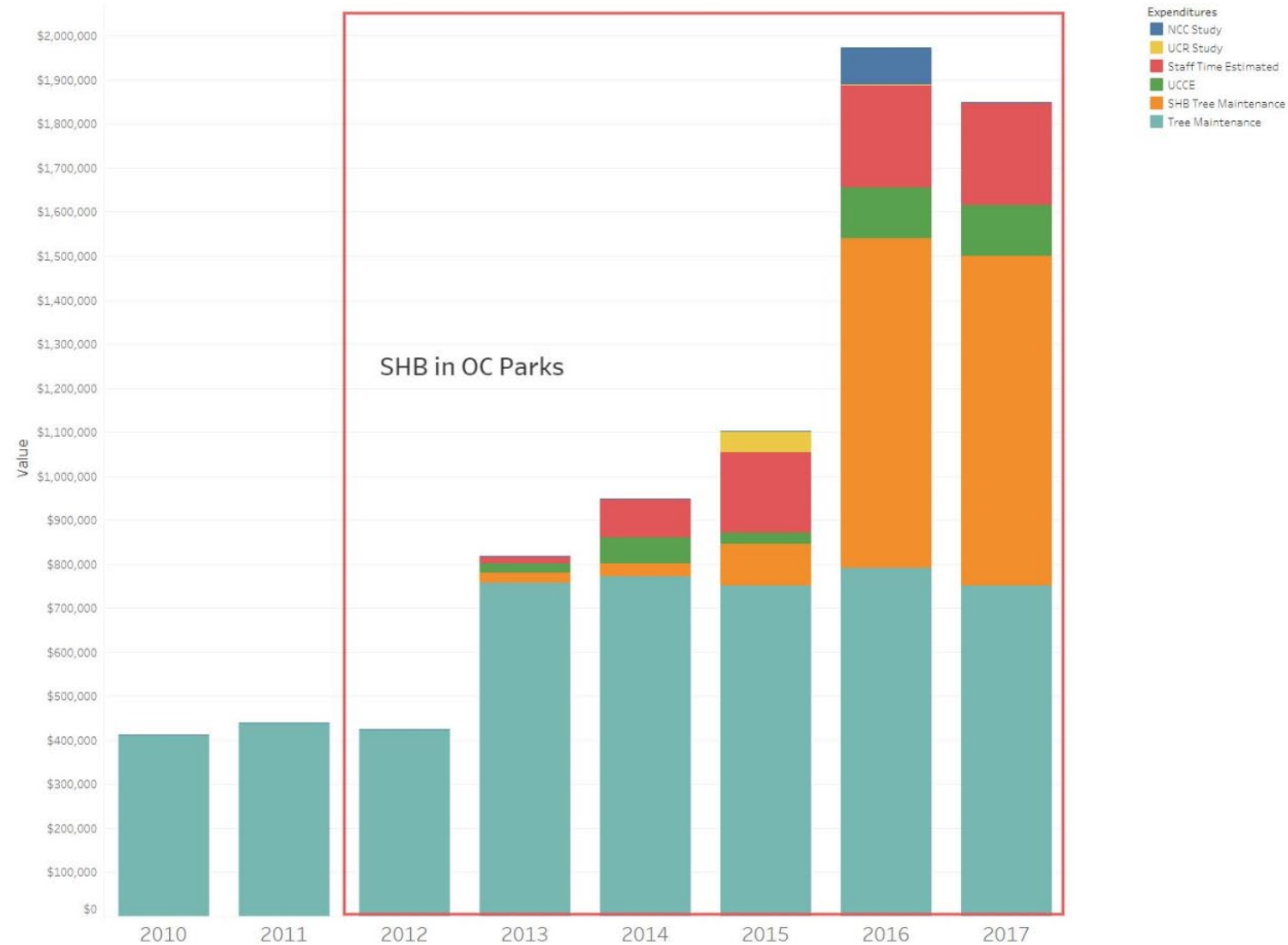
OC Parks Tree Inventory



## OC Parks Financial Impacts

Over \$2.98 million managing SHB from 2013 through 2017.

1,524 trees removed, 2,228 trees treated.





## Laguna Niguel Regional Park

June 2015





## Laguna Niguel Regional Park

October 2018  
561 trees removed  
264 infested trees remain





## Tijuana River Valley, San Diego County

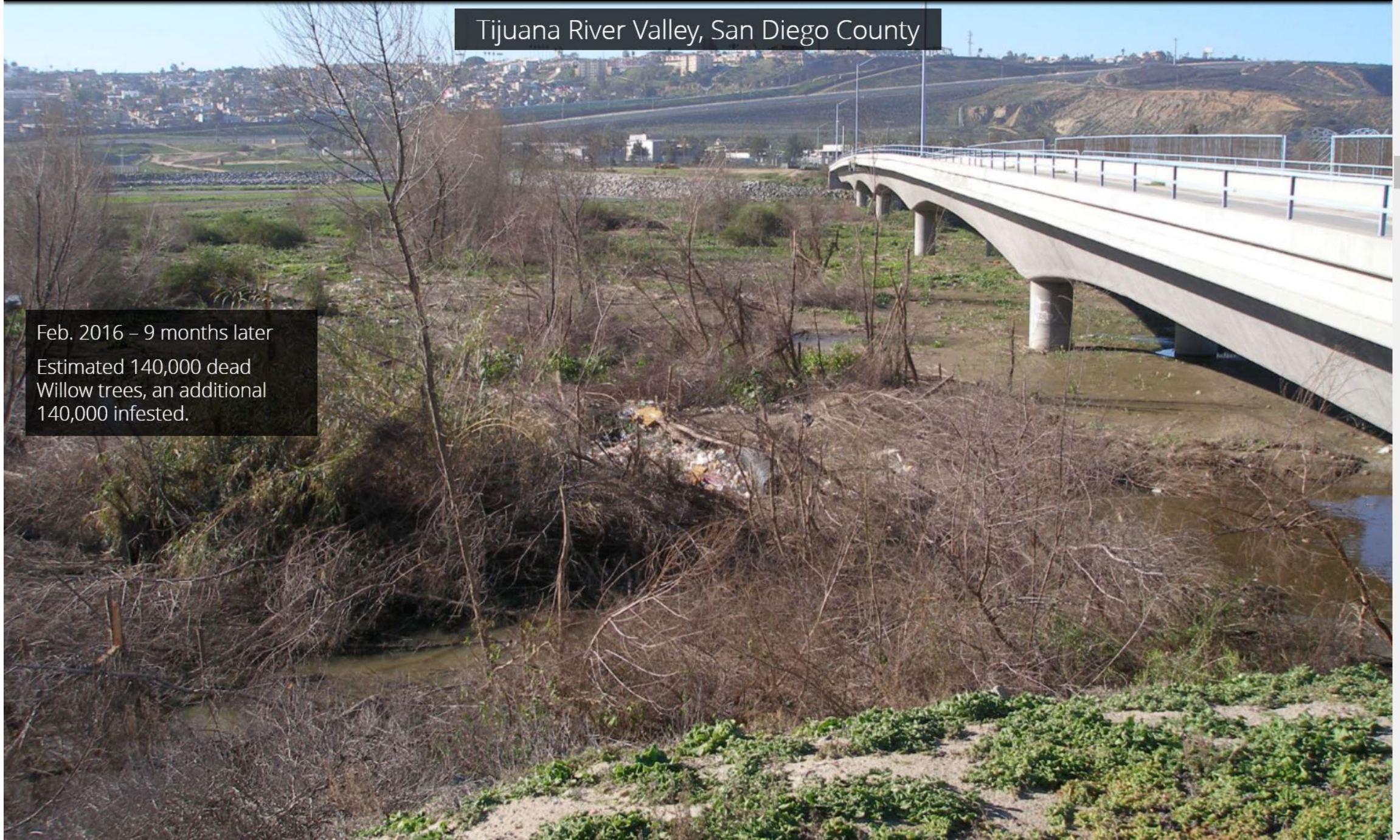
May 2015





## Tijuana River Valley, San Diego County

Feb. 2016 – 9 months later  
Estimated 140,000 dead  
Willow trees, an additional  
140,000 infested.





## Management

Researchers believe SHB will not be eradicated in Southern California.

No scientifically proven control measures.

Drought likely slowed the spread of SHB.

Experts recommend removing heavily infested trees.

Treatment on less infested trees with systemic insecticide and/or fungicide is an option.

Treatments are costly, last a few months to a year, and may have regulatory restrictions in riparian areas.





# OC Parks Strategy

Prioritization to identify high-value trees and areas.

Adapted management matrix developed by UCCE to guide treatment and removal decision making.

OC Parks Shot Hole Borer Management Guideline

**Management Matrix:**

Evaluation		Infestation Level & Management Options					
Low Value	Reproductive	Risk	None	Low	Moderate I	Moderate II	Heavy
	Yes	Low	Monitor	Monitor	Monitor	Remove	Remove
		High	Monitor, Prune, Rmv	Monitor, Prune, Rmv	Monitor, Prune, Rmv	Remove	Remove
		Low	Monitor	Monitor	Monitor	Remove	Remove
	No	High	Monitor, Prune, Rmv	Monitor, Prune, Rmv	Monitor, Prune, Rmv	Remove	Remove
		Low	Monitor	Monitor	Monitor	Remove	Remove
High Value	Reproductive	Risk	None	Low	Moderate I	Moderate II	Heavy
	Yes	Low	Monitor, PT, I, IF	Monitor, I, IF	Monitor, IF	Remove	Remove
		High	Mon, PT, Prune, Rmv	Mon, I, IF, Prune, Rmv	Mon, I, IF, Prune, Rmv	Remove	Remove
		Low	Monitor	Monitor, I	Monitor, I, IF	Remove	Remove
	No	High	Monitor, Prune, Rmv	Mon, I, Prune, Rmv	Mon, I, Prune, Rmv	Remove	Remove
		Low	Monitor	Monitor	Monitor	Remove	Remove

Treatment: PT = Preventative Treatment I = Insecticide F = Fungicide







## OC Parks Firewood Policy: Buy It Where You Burn It

There are known pests and pathogens that can be moved from place to place in firewood. The Goldspotted Oak Borer (GSOB) and Polyphagous Shot Hole Borer (PSHB) are invasive pests contributing to on-going tree mortality in California. Campgrounds around the state are taking steps to limit the movement of firewood in an effort to slow the spread of tree pests. We all have a responsibility to conserve our trees, so OC Parks has implemented a firewood policy.

Firewood from any outside source must be commercially produced, kiln dried and heat treated, bundled, labeled and certified as "Pest Free" or "Safe to Move." Shipping pallets, scrap lumber, wood purchased from tree trimming services, etc. are prohibited. Gathering of dead wood or other plant material within the park is not permitted. Firewood bundles are available for purchase at the park office for a very reasonable price.

Thank you for doing your part to protect the campsites you love and conserve our natural resources. To find out more about the pests and firewood, please go to:

- California Firewood Task Force: [www.firewood.ca.gov](http://www.firewood.ca.gov)
- Don't Move Firewood.Org: [www.dontmovefirewood.org](http://www.dontmovefirewood.org)
- Goldspotted Oak Borer (GSOB): [ucanr.edu/sites/gsobinfo/](http://ucanr.edu/sites/gsobinfo/)
- Polyphagous Shot Hole Borer (PSHB): [ucanr.edu/sites/pshb/](http://ucanr.edu/sites/pshb/)

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# Closing

Current expectation is that the infestation will continue to spread. Long-term control is years away.

US Forest Service urban area estimates (Inland Empire, Coastal Southern California, Southwest Desert): 38% of 70.8 million trees at risk; cost for removing and replacing \$36.2 billion; loss in annual ecosystem services \$1.4 billion.

It is important for Southern California agencies to participate in regional working groups to obtain state or federal funding.

Funding is required to track infestation and fund research for long-term solutions such as biological control. Recently passed California Senate Bills AB2054, effective July 1, 2018, will provide \$5 million and AB2470, effective January 1, 2019, will provide \$2 million in funding.

<https://oc-parks-gis.maps.arcgis.com>

## OC Parks Thanks

UCR PSHB Research	Akif Eskalen Ph.D.
UCR PSHB Research	Timothy Paine Ph.D.
UCCE	Darren Haver Ph.D.
UCCE	John Kabashima Ph.D.
UCCE	Monica Dimson
UCCE	Hannah Vasilis
UCCE	Matthew Dimson
PSHB.org	UCANR
Tijuana River Valley Study	John Boland Ph.D.
US Forest Service	Greg McPherson
OC Parks	October 2018