



## DEPARTMENT OF FORESTRY AND FIRE PROTECTION

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December 5, 2014

Keith Gilles, Chairman  
State Board of Forestry and Fire Protection  
P. O. Box 944246  
Sacramento, CA 94244-2460

Re: Expansion of Zone of Infestation (ZOI) for Goldspotted Oak Borer

Dear Chairman Gilles:

In accordance with Public Resource Code (PRC) 4716, I request the Board to establish the existence of a Zone of Infestation (ZOI) for Goldspotted Oak Borer in Riverside County, and to support an amendment to the existing ZOI for areas in San Diego County, as defined in the attached document.

Staff will be available to discuss this proposal at the upcoming meeting in Sacramento and can provide staff support to assist in developing a rule to plead, if necessary.

Sincerely,

A handwritten signature in blue ink that reads "Ken Pimlott".

KEN PIMLOTT  
Director

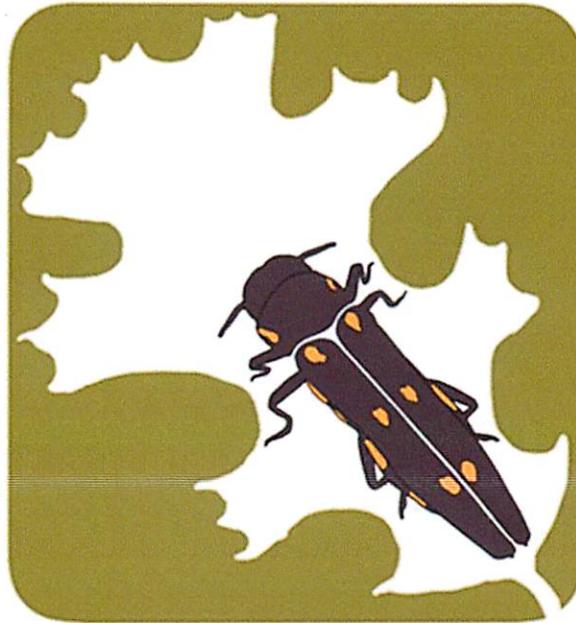
Enclosure

cc: Duane Shintaku  
Dale Hutchinson  
Thom Porter  
Glenn Barley  
Dennis Hall

ZONE OF INFESTATION EXPANSION PROPOSAL:

GOLDSPOTTED OAK BORER

Riverside/San Diego County



Prepared by:

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Kevin Turner, GSOB Program Coordinator - UCR

December 1, 2014

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## REQUEST

It is requested that pursuant to Public Resource Code (PRC) 4716, the Director of the Department of Forestry and Fire Protection (Director), with the approval of the Board of Forestry and Fire Protection (Board) declare the existence of a Zone of Infestation for the goldspotted oak borer (GSOB) in Riverside County, with boundaries as defined in this document. In addition, it is also requested that the Director, with the approval of the Board, amend the existing Zone of Infestation for goldspotted oak borer in San Diego County to include areas as defined in this document.

This document is provided in support of these requests.

## INTRODUCTION

The non-native goldspotted oak borer (GSOB - *Agrilus auroguttatus*) was first identified in San Diego County in 2008. Subsequent dendrochronology studies have determined that the pest was actually first introduced in the county in the mid-90s, but it was masked by drought-caused tree mortality. GSOB has killed tens of thousands of trees in several communities in San Diego County resulting in millions of dollars of remediation costs and property value loss. A GSOB Zone Of Infestation (ZOI) was identified and approved by the Director and the Board in the fall of 2012 to help significantly bolster the effort against GSOB and elevate the level awareness of its potential threat to the state.

Unfortunately, in November 2012, the first GSOB-positive oak tree was identified in Riverside County. To date, there have been a total of 58 GSOB-infested trees identified in the mountain communities of Idyllwild and Pine Cove. Over the last two years, a coordinated multiagency effort by government agencies and non-profit groups has made an intensive effort to slow the spread of the beetle. By establishing the GSOB zone of infestation in Riverside County, even greater public attention will focus on GSOB and raise the awareness of the surrounding counties and the rest of the state. In addition, the ZOI provides specific authority to the Department of Forestry and Fire Protection to control and limit the spread of the infestation under certain circumstances.

## DISCUSSION

In November 2012, the first positive goldspotted oak borer tree was identified in Idyllwild, CA, a small mountain community located in the San Jacinto Mountains. Since its first detection in 2012, GSOB has attacked more than fifty-eight (58) oaks in the forested settings in and around the mountain communities of central Riverside County (Appendix A). Forest entomologists suspect GSOB was introduced into Riverside County through importation of infested firewood. It is unknown if this infestation originated from a single load of infested firewood, or multiple loads delivered around the community. To date, no infestation has been detected on surrounding intervening national forest or state park land.

The majority of the mortality created by GSOB in Riverside County has been in California black oak (*Quercus kelloggii*), while only having one GSOB-positive canyon live oak (*Quercus chrysolepis*) affected by the pest. All land ownerships on the mountain - federal, state, tribal,

county as well as private properties have potential to be impacted by GSOB. The only land ownerships currently impacted by this problem are private properties, as well as CALTRANS and Riverside County Road Department (TLMA) rights of way. Southern California Edison (SCE) has also removed several GSOB-killed trees that threatened their lines.

Over the past two years, GSOB has already caused some economic, ecological, and aesthetic losses to the mountain area. Estimated cost and losses associated with mitigating this pest is currently \$202,478. This cost includes direct tree removal and disposal costs through a county program to assist private landowners, and overhead costs for multiple agencies combined efforts in planning and mitigating for the pest. SCE, CALTRANS and TLMA have also expended funds for removal and disposal and are included in the total. If this pest continues to spread within Riverside County and to adjacent counties, it will create significant fiscal impacts to private property landowners, utilities and public agencies. The high potential for further significant economic, ecological, cultural, and aesthetic impacts is of great concern.

In December of 2012 the Riverside Mountain Area Safety Taskforce (MAST) discussed the first GSOB occurrence during their quarterly meeting. An Incident Action Plan (IAP) was created in response to the potential impact GSOB may create to the community and the surrounding forest. MAST cooperators were identified and an open discussion resulted in defined roles. MAST is the coordinating group for GSOB in the San Jacinto Mountains. With help from the Riverside County Board of Supervisors, informational letters about GSOB were sent out to every property owner in the mountain communities. As part of the effort to provide the public with coordinated services to address GSOB, a mountain communities Town Hall informational meeting for the general public was held on January 19, 2013. Presenters included CAL FIRE, the US Forest Service, UC Extension and the Mountain Communities Fire Safe Council (MCFSC). At the conclusion of the meeting, a sign-up sheet was passed around the audience for any landowners who wanted a site visit on their property to inspect for GSOB.

After the public meeting, CAL FIRE officials decided to enlist the help of the Woodies, a volunteer auxiliary of the Mountain Communities Fire Safe Council, and Idyllwild Garden Club members as volunteers to conduct site visits on public and private properties. On February 5, 2013, with the assistance of UCCE and the US Forest Service GSOB experts, a field training for these two groups and CAL FIRE personnel was conducted to teach them how to identify GSOB attack and collect data during site visits. After the field training was completed, a protocol was created for the volunteers to follow when conducting site visits. A GSOB phone "hotline" was established for members of the public to request site visits. If the volunteer inspectors discover potential signs of GSOB, a CAL FIRE representative makes a follow up visit to confirm if GSOB is present. If GSOB attack is confirmed or it is determined to be a "suspect" tree, the landowner is provided with information on management options to help them make the best decision for their situation. Currently, there are State Fire Assistance program federal grant dollars administered by the Riverside County Fire Department that provide private landowner assistance with the removal of the tree(s) and proper disposal.

The volunteers visit all residents that request an evaluation of their trees and/or firewood (to ensure it does not have GSOB) and take that opportunity to distribute published GSOB materials while inviting them to visit the [www.GSOB.org](http://www.GSOB.org) website for more information.

## DESCRIPTION OF PROPOSED ZONE

### RIVERSIDE:

Mapping criteria were developed to determine the proposed ZOI Expansion boundary. The mapping criteria are the same as were used for the original ZOI parameters and are as follows: known locations of GSOB infestation plus the estimated flight range of GSOB (The average emerald ash borer flight per year distance of 4-miles/year was utilized, Siegert et al., 2008), location of susceptible host species (*Quercus kelloggii*, *Q. chrysolepis*, *Q. agrifolia*) and the public land survey system (section, township and range). The latest vegetation data sets from California Department of Fish and Wildlife (CDFW) and The Classification and Assessment with Landsat of Visible Ecological Groupings (CalVeg), US Forest Service, UCCE/UCR and CALFIRE were used to determine the proposed ZOI Expansion boundary. Two vegetation datasets were used ensuring accuracy of tree species distributions. The CDFW contracted with California Native Plant Society (CNPS) and Aerial Information Systems (AIS) to produce small scale detailed classification map of tree species locations for western Riverside County and CalVeg dataset provided the dominant species and vegetation types over as large scale area. CalVeg provides dominant species datasets for the state of California.

The analysis of the mapping criteria resulted in the identification of one contiguous area within Riverside County. The description of the boundaries for the area is detailed in Table 1. The area for the Riverside ZOI is 60,550 acres.

Table 1: Boundary Description of the ZOI Expansion for GSOB in Riverside County.

Boundary	Inland Area
Western	Lands east of Section 32, T.5S. R.2E. SBM, then east of Section 29, T.5S. R.2E. SBM, then east of Section 19, T.5S. R.2E. SBM, then east of Section 18, T.5S. R.2E. SBM, then east of Section 7, T.5S. R.2E. SBM, then east of Section 6, T.5S. R.2E. SBM, then east of Section 31, T.4S. R.2E. SBM, then east of Section 30, T.4S. R.2E. SBM.
Southern	Lands north of Section 33, T.5S. R.3E. SBM, then north of Section 5, T.6S. R.3E. SBM, then north of Section 6, T.6S. R.3E. SBM, then north of Section 1, T.6S. R.2E. SBM, then north of Section 2, T.6S. R.2E. SBM, then north of Section 3, T.6S. R.2E. SBM, then north of Section 4, T.6S. R.2E. SBM.
Eastern	Lands west of Section 27, T.4S. R.3E. SBM, then west of Section 34, T.4S. R.3E. SBM, then west of Section 2, T.5S. R.3E. SBM, then west of Section 11, T.5S. R.3E. SBM, then west of Section 14, T.5S. R.3E. SBM, then west of Section 23, T.5S. R.3E. SBM, then west of Section 27, T.5S. R.3E. SBM, then west of Section 33, T.5S. R.3E. SBM.

Northern	Lands south of Section 30, T.4S. R.2E. SBM, then south of Section 20, T.4S. R.2E. SBM, then south of Section 21, T.4S. R.2E. SBM, then south of Section 15, T.4S. R.2E. SBM, then south of Section 14, T.4S. R.2E. SBM, then south of Section 13, T.4S. R.2E. SBM, then south of Section 19, T.4S. R.3E. SBM, then south of Section 29, T.4S. R.3E. SBM, then south of Section 28, T.4S. R.3E. SBM, then south of Section 27, T.4S. R.3E. SBM.
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**DESCRIPTION OF PROPOSED ZONE**

**SAN DIEGO COUNTY:**

The original proposed areas were intended to be amended as GSOB moved outside of the designated areas. Two new detections of GSOB warrant this proposed extension to the existing GSOB ZOI in San Diego County. One of the new GSOB locations was found outside the existing ZOI in Ranchita, and the second location was found on the existing zone border by Highway 76. The mapping criteria used to create the new extension were the same as those used for the original ZOI. The proposed extension to the GSOB ZOI includes two new locations in San Diego County (Appendix B). The acreage for the proposed extension to the San Diego ZOI totals 56,357 acres bringing the total acreage for the GSOB ZOI in San Diego County to 1.16 million acres.

Table 2: Proposed Addition to San Diego Zone of Infestation (in red text).

Boundary	Coastal Area	Inland Area
Western	Lands east of the Pacific Ocean	Lands east of Valley Center Rd., then east of South Centre City parkway, , then east of interstate highway 15, then south of Bernardo Center Dr., then east of Can Crisalida, then south of San Diego Corporate Boundary, then east of Black Mountain Rd, then east of Second San Diego Aqueduct, then east of Interstate Highway 15, then north of Miramar Naval Air Station, then east of Fanita parkway, then north of Carlton Oaks Dr., then east of Carlton Hills Blvd., then north of Mission Gorge Rd., then east of Olive Lane, then southeast of Via Zapador, then east of Prospect Avenue, then east of Forester Creek, then east of North Marshall Avenue, then north of Interstate Highway 8, then east of Ballantyne Street, then east of Avacado Avenue, then east of Campo Rd., then north of Highway 94, then east of Tecate Rd.
Southern	Lands north of Interstate Highway 8	Lands north of the San Diego County line
Eastern	Lands west of Interstate Highway 15	Lands west of the San Diego County line, then south of state land parcels (06-073-5293100100, 06-073-5290801200, 06-073-5292900100, 06-073-5292500300, 06-073-5292400400, 06-073-5292701100 and 06-073-5293703600), then west

Eastern (cont.)		<p>Anza-Borrego Desert State Park, then west of state land parcels (06-073-4141200100, 06-073-4142000100, 06-073-4141600300, 06-073-4141300300), then west of S2 rd (Imperial highway), then south of San Felipe Rd., then west of Anza Borrego Desert State Park western boundary, then west of Section 1, T.12S. R.4E. SBM, west of Section 36, T.11S. R.4E. SBM, then west of Section 25, T.11S. R.4E. SBM, then west of Section 24, T.11S. R.4E. SBM, then west of Section 18, T.11S R.5E. SBM, then west of Section 7, T.11S. R.5E. SBM, then west of Section 6, T.11S. R.5E. SBM, then west of Section 31, T.10S. R.5E. SBM, then west of Section 30, T.10S. R.5E. SBM, then west of Section 19, T.10S. R.5E. SBM, then south of Section 24, T.10S. R.4E. SBM, then south of Section 23, T.10S. R.4E. SBM, then south of Section 15, T.10S.R.4E. SBM, then east of Section 22, T.10S. R.4E. SBM, then south of Section 28, T.10S. R.4E. SBM, then south of Section 29, T.10S. R.4E. SBM, then south of Section 30, T.10S. R.4E. SBM, then south of the Cleveland National Forest boundary, then south of parcel 06-073-1361604100</p>
Northern	<p>Lands south of Fenton Rd., then west of Cam Ruiz, then south of Mira Mesa Blvd, then west of Cam Santa Fe., then south of Los Penasquitos Creek, then south of Interstate Highway 5, then south of Genesee Ave, then south of N. Torrey Pines Rd., then south of Torrey Pines Scenic Dr.</p>	<p>Parcel lands of 06-073-1361604100, then south of Section 36, T.9S. R.2E. SBM, then south of Section 35, T.9S. R.2E. SBM, then east of Section 2, T.10S. R.2E. SBM, then east of Section 11, T.10S. R.2E. SBM, then south of Section 15, T.10S. R.2E. SBM, then south of Section 16, T.10S. R.2E. SBM, then south of Section 17, T.10S. R.2E. SBM, then west of Section 7, T.10S. R.2E. SBM, then west of Section 6, T.10S. R.2E. SBM, then south of Section 1, T.10S. R.1E. SBM, then south of Section 2, T.10S. R.1E. SBM, then south of Section 3, T.10S. R.1E. SBM, then south of Section 16, T.10S. R.1E. SBM, then south of Section 17, T.10S. R.1E. SBM, then south of highway 76 until intersection of Valley Center rd.</p> <p>west of parcels (06-073-2510200600, 06-073-1972500900, 06-073-1972201500, 06-073-1971801000, 06-073-1971201100, 06-073-1972901100, 06-073-1391502700, 06-073-1391502000, 06-073-1391501700), then south of valley that crosses Borrego Palm Canyon at 4600' elevation, then south of federal parcel 06-073-1383303200, then west of Sukat Rd, then at intersection of Sukat Rd and Hot Springs Mtn Rd. east of of Hot Springs Mtn. Rd., then south of small valley, then south of federal parcel 06-073-1381800300, then east of parcel 06-073-</p>

Northern (cont.)		1370800200, then east of parcel 06-073-1370800500.
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**TREE SPECIES DISTRIBUTION**

The San Jacinto Mountains are diverse in tree species from the low elevations to the highest peak. The mountain areas are dominant mixed conifer stands including ponderosa pine (*Pinus ponderosa*), Jeffrey pine (*Pinus jeffreyi*), sugar pine (*Pinus lambertiana*), Coulter pine, (*Pinus coulteri*), and incense cedar (*Calocedrus deccurens*). Intermixed with the conifers are three primary oak species native to the San Jacintos; coast live oak (*Quercus agrifolia*); California black oak (*Quercus kelloggii*); and canyon live oak (*Quercus chrysolepis*). The black oak and canyon live oak occur in the forested mountain areas, while coast live oak occurs in lower elevations of Riverside County (Appendix C). The deciduous California black oak is widely distributed amongst the conifer forest in and around the San Jacinto mountain communities. The non-deciduous canyon live oak is also dispersed throughout the mixed conifer stands but is most frequently found as large trees in canyons or areas where the conifer over-story doesn't dominate, or growing more as a shrub when under the conifer's canopy. Coast live oak occurs in oak woodlands located on the outer edges in the San Jacinto mountain area and becomes most prominent in lower elevations in the mountains of western Riverside County where GSOB has not yet been discovered. All three of these species are known hosts of GSOB, though canyon live oak seems to be the least preferred of the three. Another oak species, interior live oak (*Quercus wislezini*), is located in certain areas of the San Jacintos; it has proven not to be susceptible to GSOB in San Diego County, therefore, it is believed it will not be at risk to GSOB in Riverside. Engelmann oak (*Quercus engelmannii*) occur in the western mountains of Riverside County, but, like interior live oak, has not proven to be susceptible to successful GSOB attack.

**DAMAGE TO AFFECTED STANDS AND TREES**

Damage caused by the goldspotted oak borer infestation include decline in growth, decreased tree vigor, and mortality, resulting in a decline/loss of oaks within the mixed conifer stand. To date, GSOB has attacked two of the susceptible native oak species in Riverside, California black oak and canyon live oak. Fifty seven of the fifty eight trees attacked have been black oak while only having one attack on a canyon live oak. The canyon live oak had several other health issues and GSOB was not the primary demise of the tree but several beetles had attacked it.

The first infested tree detected was located on Highway 243 in the middle of Idyllwild. Hwy 243 is the state route that runs through the mountain communities. That first GSOB tree, a deciduous black oak, had a dead crown which had not lost its leaves as is normal in the Fall of the year. There was but one GSOB exit hole located; after the tree was inspected more closely, there were over 150 larvae discovered in the outer bark in their pre-pupae stage. Subsequently, there were two more infected trees located later in the same vicinity. As the infestation has spread beyond the original discovery site, it has so far been confined to private property and public roadside rights of way within the community. There has been no discernable pattern of spread or movement of the pest. There have been two areas in the southeast portion of Idyllwild that are special areas of concern; a concentration of infested trees have been

observed to have GSOB in a very small area. Beyond that, the trees are distributed evenly throughout the town of Idyllwild with four GSOB trees killed in the nearby community of Pine Cove. The majority of the mortality created by GSOB has occurred on highly-valued, large oaks on private property.

### **TERRAIN AND COVER IN RESPECT TO CONTROL**

The terrain within the area of infestation varies in slope and elevation. Slopes range from flat to steep and include all aspects, but the area where the mortality has occurred has been on flat to gentle slopes. The infested area has been discovered between 5,000 and 6,200 feet in elevations in Riverside County. Access and terrain currently have not hampered treatments. Most homeowner and campground sites that may be subject to infestation and subsequent treatment are relatively flat terrain. However, moderately steeper sites may eventually need to be treated but have reduced treatment options due to equipment slope limitations.

### **PROPOSED CONTROL METHODS**

The proposed control methods were framed as objectives in the original ZOI request and serve as a guide in Riverside County to minimize the spread of GSOB. Some of those control methods have already been utilized in Riverside County. We plan to utilize all previously recognized methods from the San Diego's ZOI request. GSOB ZOI expansion objectives are described as follows: (2012 San Diego ZOI; [gsob.org](http://gsob.org))

- 1) Protect forest, woodlands and communities from the oak tree killing pest known as Goldspotted Oak Borer (GSOB), *Agrilus auroguttatus*.
- 2) Contain GSOB pest within the ZOI Expansion boundary in Riverside County
  - a. Limit the spread and severity of GSOB infestations within the ZOI by implementing Integrated Pest Management (IPM), providing educational outreach and utilizing CAL FIRE resources where appropriate, including resource management personnel, conservation camp crews, other personnel and/or equipment.
    - i. Minimize the fiscal hardship caused by GSOB attacks on private and publicly-owned lands.
    - ii. Protect natural and cultural resources threatened by GSOB attack.
  - b. Direct Timber Harvesting Plans that harvest GSOB susceptible oak species within the ZOI to comply with the Forest Practice Rules (14 CCR 957.9 Prevention Practices) and utilize feasible measures guided by IPM.
  - c. Prepare for and coordinate a rapid response should GSOB spread outside the ZOI expansion, including conducting an assessment and implementing mitigation measures with partner agencies, in order to contain the spread and limit the severity of the new GSOB population.
    - i. Network with the appropriate agencies and groups of counties and communities at risk and encourage them to develop GSOB preparedness plans.
    - ii. Evaluate the need to change the ZOI boundary for any new infestation occurring outside the current boundary.

- 3) Improve knowledge and understanding of the GSOB pest by supporting and guiding studies and research efforts in order to develop effective Integrated Pest Management and Best Management Practices for GSOB.
- 4) Minimize public hazards created by GSOB-killed trees and resulting fuel build-up through coordinated abatement.
- 5) Foster oak wood product utilization that minimizes the chance of spreading GSOB.
- 6) Seek funding, whenever grant or other funds become available, to assist with activities associated with containing the spread of the GSOB pest and mitigating its impact in infested areas.
- 7) Keep local/state/federal elected representatives, other state agencies, local/federal agencies, interest groups and the public apprised of the status and threat posed by GSOB and updated on containment and management efforts.

#### Partnering for Effective Education Awareness

Local, state and federal agencies, the University of California, and non-profit organizations have partnered together to help educate the public on the recognition of GSOB. Together they have participated in, producing handouts and flyers, preparing news articles and public service announcements about GSOB, and ensuring a consistent and uniform message about the pest as well as effective management practices. Town hall meetings, workshops and other public meeting engagements have been developed and delivered with the same consistent and uniform message. MAST created an Incident Action Plan (IAP) in 2012 to respond to the threat posed by the discovery of GSOB.

#### Infested hazard tree/brood tree removal

GSOB-infested oaks on private lands are being removed to abate life and property hazards as well as removing brood trees. Because GSOB can live in infested wood for up to a year until after the tree dies, it is critical to dispose of the material in a way which will prevent further GSOB spread. Tree removal and subsequent "safe" disposal of infested wood are currently being funded by a federal grant that was awarded to Riverside County Fire. The grant dollars were originally for pine trees infested with bark beetle but a waiver from the US Forest Service allowed including GSOB-infested oak trees. Determinations are underway to address the immediate and future needs for hazard tree abatement including funding requirements because current funding sources will expire in 2015. At this time, the only method of direct control used in Riverside County is complete tree removal and transfer to a grinding facility for proper disposal of the infested wood.

#### Individual tree protection - Systemic and Contact Insecticides

Topical insecticide application on the boles and large branches of selected high value trees can be performed by licensed private companies in Idyllwild. One particular licensed Qualified Applicator is currently performing this treatment at no cost to the landowner because the applicator is concerned and actively helping with the GSOB issue. Some other companies may be using systemic pesticides. Potentially, future funding sources could aid to subsidize the cost of prophylactic insecticide applications to protect high-value trees.

## **ESTIMATED CONTROL COSTS/BENEFITS**

### Value of Potential Tree Loss

The current cost associated with the removal of GSOB trees in Riverside County is \$218,478. That cost is currently addressing fifty-eight (58) GSOB trees and has been accumulated in less than 2 years. Assuming that our current rate continues at one positive tree every two weeks the mountain communities could incur \$182,000 in cost by the end of 2015. The dollar amount and number of trees is not as impressive as San Diego's loss but that is currently due to the fact that the current infestation is occurring in a mixed conifer setting. Riverside County has valuable pure oak woodlands in county parks, reserves and private properties in various parts of county. An outbreak in those stands would be catastrophic. GSOB is impacting private and public agencies. In Riverside alone, costs of tree removal has been incurred by Transportation and Land Management Agency, Southern California Edison, CAL TRANS, Riverside County Fire, and CAL FIRE

The cost of dead and hazardous tree removal and disposal is just one aspect of GSOB's potential economic impact. Large majestic oaks are being lost due to the pest which impacts property values. Watershed values are another point of concern. The San Jacinto Mountains are the source for potable water to several communities on the mountain and in the valley below. Lake Hemet Water District, Idyllwild Water District, Fern Valley Water District, and Pine Cove Water District all rely on the mountain area for quality water. Riverside County Flood Control and Water Conservation District has been concerned about watershed protection in the San Jacinto's and has been an active partner with CAL FIRE in the San Jacinto Zone of Infestation (for pine bark beetles).

### Cost of Tree Removals by Property Owners and Agencies

The current cost of tree removal is estimated at approximately \$102,478 in Riverside County (Table 3).

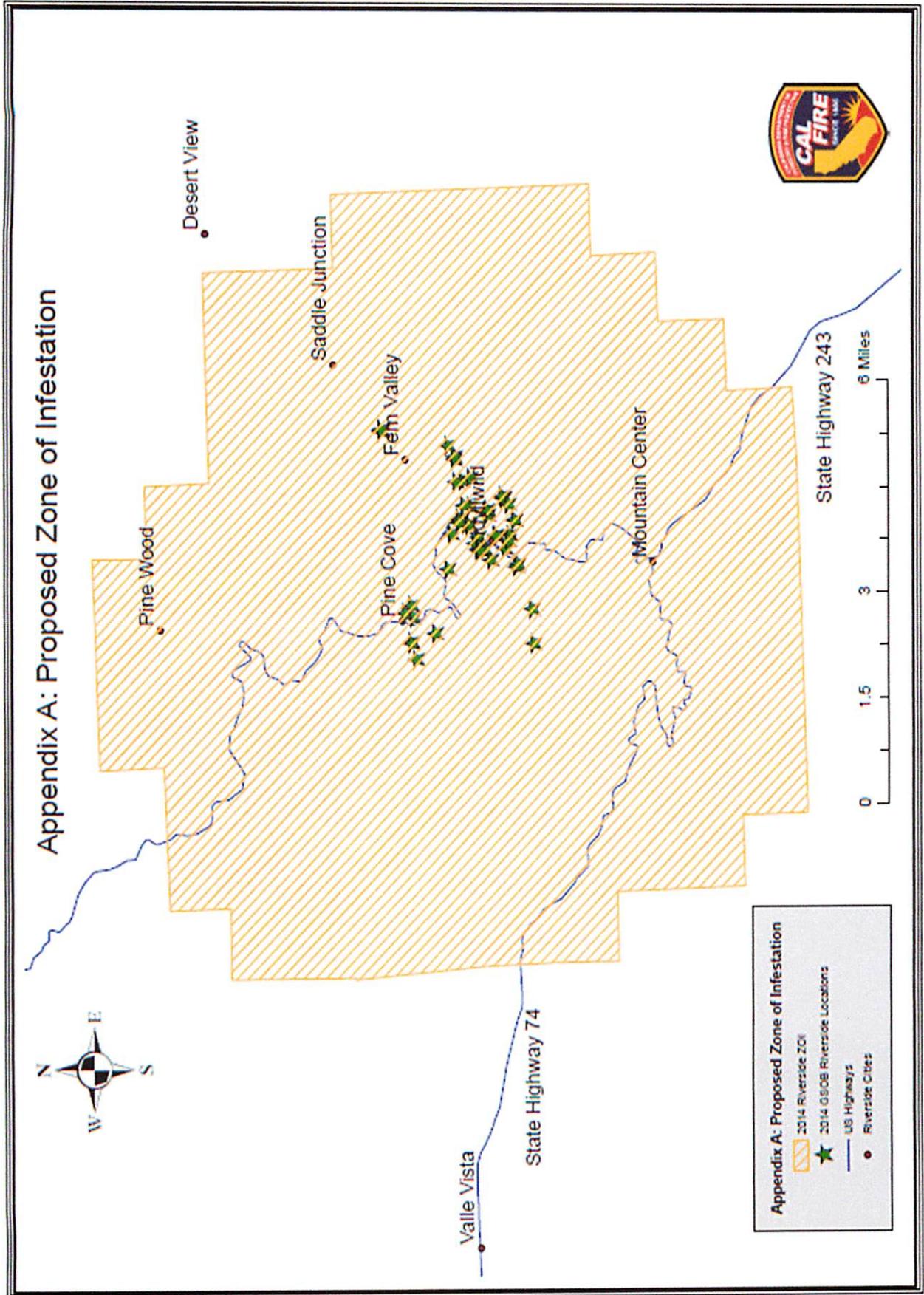
Funding Source and/or landowner	Tree Removal Direct and Indirect Costs	Opportunity Costs (Lost Revenue)	Other Associated Costs
Riverside County Fire	\$82,478	na	
CAL TRANS	\$7,000	na	
Transportation & Land Management Agency (TLMA)	\$4,000	(unknown)	
Southern California Edison	\$9,000	(unknown)	

### Estimated Costs of BMP Treatment Types

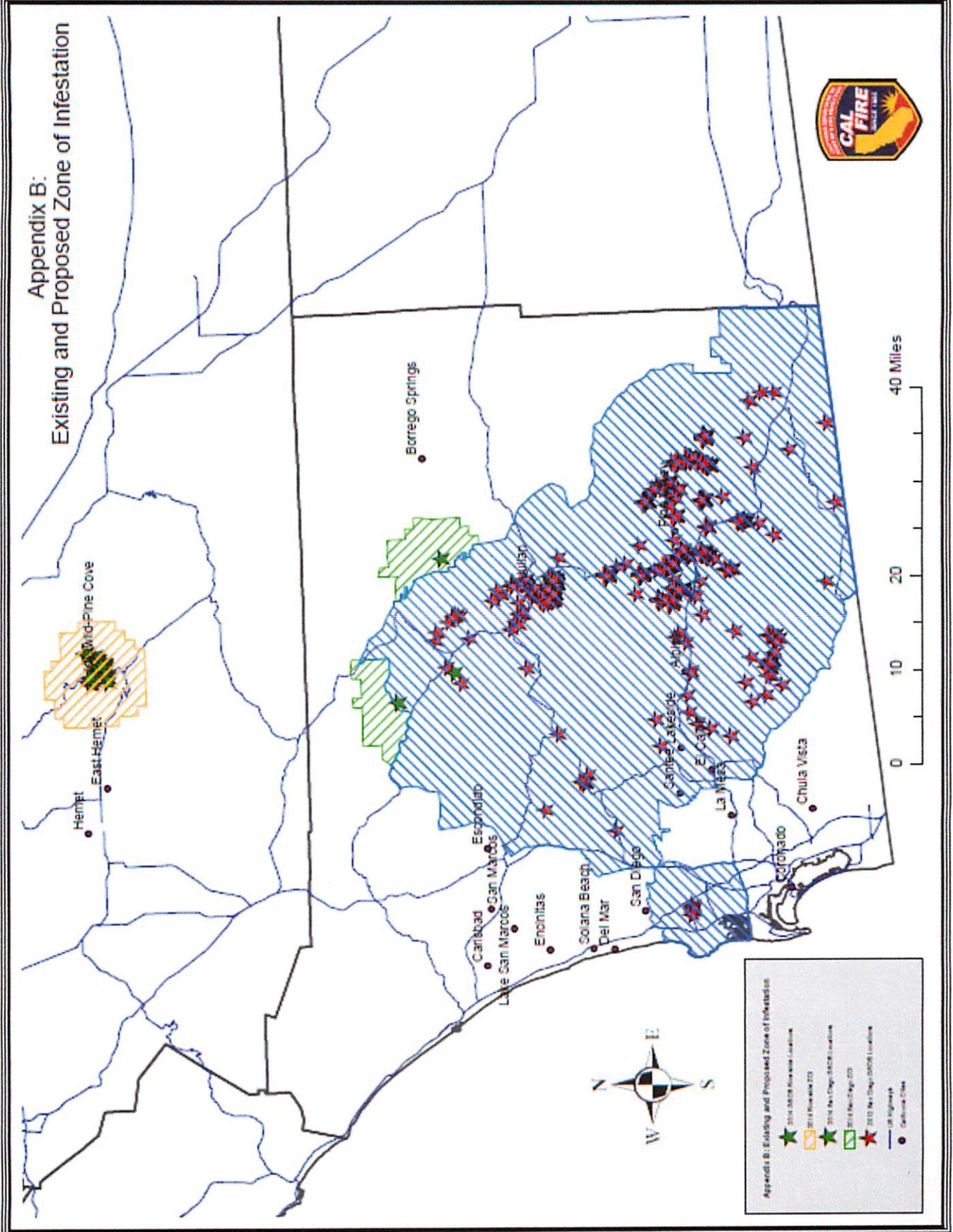
The costs of treatment types that have been incurred in Riverside County, felling/removing, grinding, hauling, covering (tarping), debarking and using insecticides. These estimated costs may be of assistance to various agencies and organization seeking funding to minimize the spread of GSOB (Table 3). Site conditions likely will influence the actual cost.

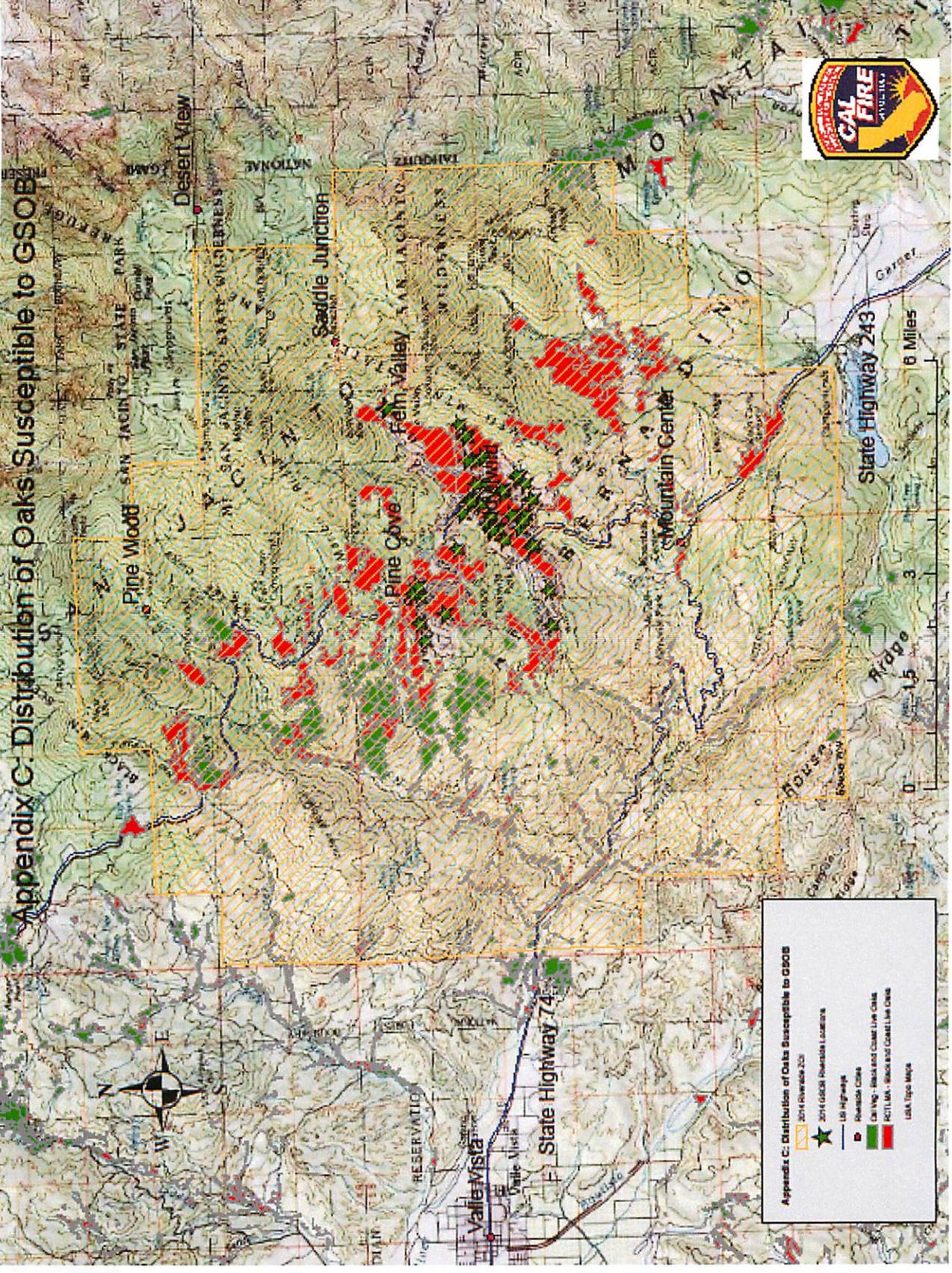
Table 4: Cost of BMP Treatment Types in Riverside County.

Treatment Type	Estimated Cost	
Tub Grinding Costs	\$36	Per ton. Does not include haul costs to/from site.
Haul Cost	\$250	Per Load (8 ton/load)
Hazard Tree Removal (Average Tree 15" DBH, 40 height)	NA	Per Parcel
	NA	Per Acre
	\$500 - \$1,500	Per tree oak
Clear Plastic Tarp Costs (6 millimeter, ultraviolet resistant)	\$39 - \$880	Per roll depending on length and width
Contact Insecticide Costs	\$6 - \$20	Per 20" DBH oak tree - chemicals only
Systemic Insecticide Costs	\$50 - \$70	Per 20" DBH oak tree - chemicals only
Debarking Costs	\$70	Per cord



# Appendix B: Existing and Proposed Zone of Infestation





Appendix C: Distribution of Oaks Susceptible to GSOB