Los Angeles County, Santa Monica Mountains National Recreation Area

EARLY DETECTION-RAPID RESPONSE PLAN
For Invasive Beetles

FINAL

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TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

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1. BACKGROUND

1.1 NEED

Invasive pest species are arriving in the Los Angeles County area at an alarming rate, coming in from ports, airports, and commercial and private vehicles. The United States Department of Agriculture estimates that invasive species cause $120 billion in economic damage annually and have caused devastating ecological damage to urban forests, native ecosystems, and agricultural crops. Trees provide valuable ecosystem services to our community which are lost if they die. A study in the Santa Monica Mountains National Recreation Area found that mortality of thousands of native oaks and riparian species resulted in the loss of over $1 billion worth of carbon sequestration and stormwater runoff benefits (Dagit et al. 2017). The cost of removing infested trees is also extraordinary. San Diego and Orange Counties have spent millions removing trees infested and killed by the gold spotted oak borer (GSOB) and invasive shot hole borer (ISHB) in the past 10 years. Los Angeles County is dedicating over $3 million to the removal and treatment of GSOB in Green Valley alone.

The statewide ISHB initiative has received funding from the legislature and is providing $5 million in funds in 2019-2020 to support additional research, trapping, education and outreach programs with the goal of minimizing tree mortality and preventing the spread of tree pests and pathogens. Los Angeles County Agricultural Commissioner has received a block grant to expand trapping efforts. CalFire has also dedicated $5 million to assist with infested and dead tree removal efforts. The goal is to contain the infestation of ISHB in the presently infested southern counties, and to also detect and contain other pests such as GSOB as well.

It is important to document both presence and absence of the target species, in order to permit a better understanding of the extent of infestations and rate of spread over time. Early Detection-Rapid Response Plans (EDRR) are critical tools that increase the likelihood of detecting new infestations early so they can be contained and eradicated before they spread. They are proactive, coordinated efforts that set the stage for considered and efficient responses to problems. This science-based control and prevention effort is primarily designed as a road map for the County, responsible landowners, and agencies.

1.2 PUBLIC OUTREACH AND EDUCATION

An effective EDRR is closely aligned with a robust public outreach and education program. Concurrent outreach and education efforts that provide concise, consistent, and useful information to the public about the problems with invasive tree pests are also in progress. These programs cover actions the public can take, where to go with questions, where to report infestations, prevention, treatments, proper waste disposal, and ways they can help. Having public and political support to take swift and in some cases drastic action will be crucial to preventing introduction and containment of emerging pests. Outreach and education efforts are being coordinated regionally and statewide through the Emerging Pests Working Group. The University of California Agriculture and Natural Resources (UCANR) team is coordinating efforts in southern California in collaboration with the California Urban Forest Council (CUFC), various Resource Conservation Districts, United States Forest Service, CalFire, California Department of Parks and Recreation and many other concerned agencies and jurisdictions.

Removal of trees can be very emotional for those with ties to trees. Culturally and linguistically appropriate outreach and education on the need for eradication and control, with clear explanations of the procedures involved could help generate support and soften opposition for this critical tactic. Statewide and regional efforts are in progress to inform the public about the potential threats associated with tree loss due to infestation by new pests and diseases. Additional efforts are needed to target local neighborhoods and interest groups; messaging needs to be coordinated and dissemination strategies identified.

1.3 OBJECTIVES

This document provides a road map to achieving the following objectives:

- Establish an effective monitoring program throughout Los Angeles County, starting with a pilot project in the Santa Monica Mountains National Recreation Area.
- Establish a responsible County agency to coordinate all efforts and clarify whom to contact when infestations occur.
- Develop and implement a trapping and visual survey scheme to map current level of infestation and prevent spread.
- Facilitate information sharing between local, city, county, state and federal agencies to identify potential threats, detect actual threats, assess the impacts, respond quickly and appropriately to contain and minimize these threats.
- Ensure that County EDRR activities and resources are coordinated and reported to the statewide data repository to support real time documentation of leading-edge infestations.
- Coordinate development of zones of infestation, provide timely mapping updates, identify who is responsible for rapid response, and provide strategies to treat, manage established infestations, contain new infestations, and minimize the spread.
- Monitor and track implementation and effectiveness so that adaptive management actions can be instituted when needed in a timely manner.
- Identify pathways for spread and work with the regional and state efforts to develop both short- and long-term policies, actions and outreach information to prevent movement of infested wood.

1.4 LEADERSHIP

Los Angeles County covers over 4,000 square miles from the Pacific Ocean on the west to the Transverse and Peninsular Mountains on the east, with a population of over 10 million as of 2017. The County is governed by the Board of Supervisors and the over 156,000-acre Santa Monica Mountains National Recreation Area (SMMNRA) is located within Supervisorial District 3 (Figure 1).

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Figure 1. Location of the Santa Monica Mountains National Recreation Area, site of the pilot EDRR project area.

The County's Healthy Design Workgroup's (HDW) and its County Tree Committee are comprised of all County departments responsible for management, maintenance, or care of trees within the County. Facilitated by the Department of Public Health, the Tree Committee is charged with developing holistic strategies for preserving, maintaining, and expanding the urban forest, with a focus on low income, tree-poor neighborhoods. However, the urban forest also extends into and surrounds the SMMNRA, and the potential for emerging pests to spread from the urban forest into protected wildlands and vice versa is a serious concern. The HDW Tree Committee is a logical fit through which to coordinate implementation of the EDRR, with leadership provided by the Chief Sustainability Office, which is a unit of the Chief Executive Office.

Figure 2 identifies the communication, coordination and organizational framework proposed to implement the EDRR. A pilot project focusing on the SMMNRA will provide opportunity to refine and adapt this framework with the goal of facilitating County wide implementation and coordination with statewide efforts. Each department will have a role to play based on their areas of responsibility. Funds for additional staffing needed to implement the EDRR plan will be solicited.

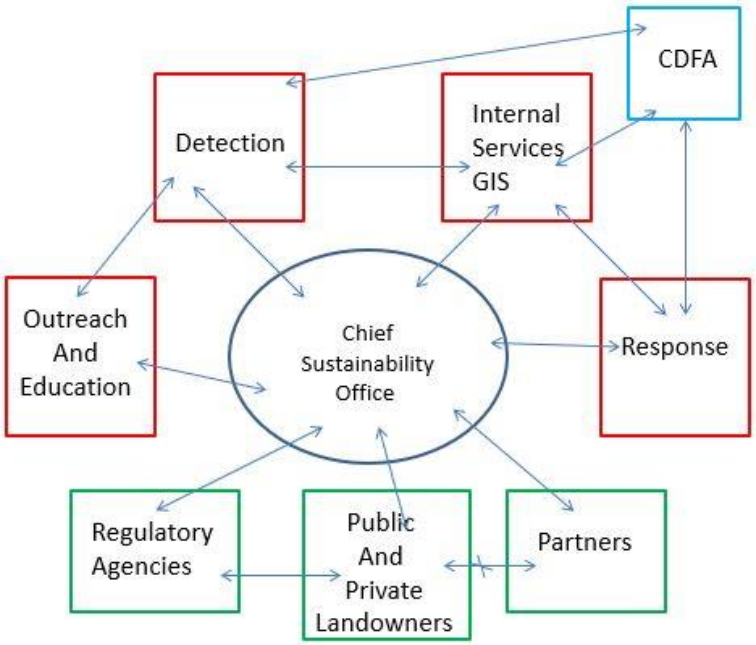

Figure 2. Framework for communication and coordination of the Los Angeles County Santa Monica Mountains EDRR. Red and dark blue boxes are County departments. California Dept. of Food and Agriculture (CDFA) is the statewide coordinator for emerging pests and University of California Agriculture and Natural Resources (UCANR) is the regional coordinator.

1.5 IMPLEMENTATION

Implementation of this plan will depend on the integrated efforts of the five elements of the plan: 1. Coordination, 2. Outreach and Education, 3. Detection, 4. Response, and 5. Data Management.

1.5.1 Coordination (Lead: HDW Tree Committee, Chief Sustainability Office)

It is anticipated that at least part time staff will be needed in order to accomplish these tasks. Overall Coordination Tasks will occur through the HDW Tree Committee with the Chief Sustainability Office as the lead and will include but are not limited to:

- Report regularly to the HDW Tree Committee.
- Coordinate all stakeholders both within the County and with local, state, federal and community partners.
- Participate in regional and statewide invasive pest working groups.
- Identify and solicit funding for implementation.
- Develop and execute Memoranda of Understanding (MOU's) to coordinate permitting with public landowners (state parks, national parks, Mountains Conservation and Recreation Authority, local land trusts, etc.) for Detection and Response implementation.
- Develop and execute MOU's to coordinate permitting with environmental regulatory agencies such as CA Department of Fish and Wildlife, National Marine Fisheries Service, US Fish and Wildlife, US Forest Service.
- Work with Regional Planning and other relevant County departments to develop effective permitting process for removing infested trees.
- Convene annual meeting of all stakeholders to report on program implementation and effectiveness.

- Coordinate EDRR efforts with other groups within the County such as cities, researchers, universities, community science volunteer groups, Non-governmental groups (e.g., Audubon, CA Native Plant Society, Sierra Club, etc.).
- Coordinate Detection and Response Protocols with statewide programs.
- Coordinate Outreach and Education efforts.
- Coordinate data management and reporting.
- Coordinate restoration planting efforts.
- Evaluate program effectiveness and develop adaptive management strategies.

Table 1. County Departments involved in this coordinated effort.

Department	**Responsibility**	**Division/Point of Contact (September 2019)**
LA County Agricultural Commissioner/Weights and Measures Pest Exclusion/ Produce Quality Bureau, Entomology/Plant Pathology Laboratory	Provide assistance with identification, quarantine, and management treatments. Deploys and monitors traps. Coordinates with CDFA	Deputy Director Maximiliano Regis, MRegis@acwm.lacounty.gov
LA County Beaches and Harbors	Manages and maintains trees on county beaches	Kenneth Foreman Division Chief, Operational Services, kforemansr@bh.lacounty.gov
LA County Board of Supervisors	Oversees entire county	District 3 Supervisor Sheila Kuehl, Deputy Director Nicole Englund, nenglund@bos.lacounty.gov
LA County Chief Sustainability Office	Coordinates all county departments	Chief Sustainability Officer Gary Gero, GGero@ceo.lacounty.gov
LA County Information Services	Coordinates data management for all county departments	Steve Steinberg, Geographic Information Officer SSteinberg@isd.lacounty.gov
LA County Department of Parks and Recreation	Manages and maintains trees in County Parks and Recreation lands (through conservation easement with MRT)	Alina Bokde, Deputy Director Planning and Development Agency abokde@parks.lacounty.gov
LA County Department of Public Health	Coordinates Healthy Design Working Group	Jean Armbruster, Director PLACE Program, jarmbruster@ph.lacounty.gov
LA County Department of Public Works	Manage and maintain all trees in right of way	District Tree Superintendent Nathan Birdwell, NBIRDWEL@dpw.lacounty.gov
LA County Department of Regional Planning	Responsible for development monitoring and mitigation including tree removals	Rob Glaser, Principle Regional Planner, rglaser@planning.lacounty.gov

Department	Responsibility	Division/Point of Contact (September 2019)
LA County Fire Department and Forestry Division	Responsible for wildland forest and vegetation management	Acting Assistant Chief Ron Durbin, rdurbin@fire.lacounty.gov

1.5.2. Outreach and Education (Lead: HDW Tree Committee, Chief Sustainability Office)
Communicating a coherent and powerful message to the public about the threats of invasive pests will be critical to developing support for action. The County HDW Tree Committee will provide the venue for regular coordination with County departments, who will develop culturally and linguistically appropriate branding/marking tools that will be used and shared by all; and will coordinate with regional and statewide efforts to avoid duplication. Draft text has been provided to the county in English and Spanish.

Key points included:

- Threats to trees from invasive pests.
- Benefits trees provide (ecosystem services, aesthetic, wildlife, etc.)
- Why tree removal is needed and pros/cons of treatment options.
- What you need to ask your arborist about identification and treatment.
- How you can help – ways to engage public in community science reporting projects, restoration planting, monitoring, etc.

1.5.3. Detection (Lead: Agricultural Commissioner)
The County Agricultural Commissioner's Environmental Protection Bureau's Pest Detection Division have the expertise to coordinate trapping and visual survey protocols, however it is anticipated that additional staff will be needed for implementation. A block grant from the California Department of Food and Agriculture (CDFA) and CalFire will provide funding for a full-time Trapping Coordinator from 2019-2022. Additionally, funding has been obtained to conduct a county wide baseline trapping survey in spring 2020. They will coordinate a systematic survey effort including all County departments with tree oversight, as well as private, regional, state, federal and research projects. Through this effort they will identify the leading edges of infestation, areas where containment is possible and track the spread of pests.

Using a data management system (County centralized database), they will work to provide current and updated information on spread, presence, and levels of infestation, as well as document response to treatments or removal. A survey and data management coordinator will be funded through UCANR and coordinate regional and statewide data efforts. Additionally, partners at the Ventura County Agricultural Commissioner's office will be coordinating their trapping and reporting efforts with LA County to extend coverage throughout the entire SMMNRA, which is considered to be the leading edge of the ISHB infestation as of 2019.

By developing and regularly updating a Priority Survey area and high-risk map, the County trapping and data management Coordinators will identify priority locations for trapping and visual surveys, and direct supporting departments and partners towards a coordinated detection

effort. This will enable potential determination of a Zone of Infestation in cooperation with CalFire, which would then provide additional funding resources for trapping and response.

They will also coordinate sample identification and required chain of custody protocols with CDFA ensuring that accurate information is provided to the statewide database. They will coordinate with other County departments to determine triggers for response, including participating in the Incident Action Plan process.

Key to accomplishing expanded detection is training observers. As part of the licensing process, training on emerging pests, particularly ISHB and GSOB will be integrated into the license renewal program. Partners such as UCANR, Western Chapter International Society of Arboriculture, and RCDSMM will assist with providing various levels of online and field-based training. Additionally, maintenance workers and other ground staff who are routinely observing trees as part of their normal jobs will be trained and encouraged to report new infestations promptly. This would include but not be limited to Beaches and Harbors, Parks and Recreation, Public Works and Flood Control, and Regional Planning.

1.5.4. Response (Lead: Fire/Forestry)

Once presence of a target species has been confirmed especially on private property, appropriate response will fall to the department having oversight responsibility for those trees. County Fire/Forestry will take the lead in developing Incident Action Plans, but actual treatment and possible removal will be accomplished in a variety of ways, depending on location of the infested trees. A funding source must supplement the Fire Department budget for full personnel costs, and there will be numerous approvals required including at minimum: the Fire Chief, County Counsel and CEO. If positions cannot be fully funded, this responsibility should fall to another agency. The departments potentially involved include, but are not limited to: Beaches and Harbors, Parks and Recreation, Public Works, Flood Control, and Regional Planning. Other cities, public open space, and private landowners will be integrated into this response effort as appropriate. Agency landowners such as state and national parks will coordinate with the county but take the lead for their individual lands.

Fire/Forestry will coordinate reporting to the central County database on actions taken and develop a plan with the Agricultural Commissioner's team for follow up monitoring. Restoration actions will be coordinated with regulatory agencies and landowners.

1.5.5. Data Management (Lead: County Geographic Information Services)

The County geographic information services team provides expertise in coordinating a wide variety of datasets that will be important to the implementation of this plan. In addition to helping develop the priority survey high risk maps, the GIS team will work with County Agricultural Commissioner staff, the UCANR Survey and Data Manager, and the response teams on the following tasks:

- Real time updates of trapping and visual survey sites and results.
- Data collection, QA/QC, and sharing with partners and the statewide database.
- Implementing statewide standard protocol data collection and QA/QC protocols.
- Assist with regular analysis and reporting.
- Coordinating centralized database.

- Developing an aerial monitoring program over time.

1.6 PARTNERS

Successful implementation of the EDRR will rely upon a highly cooperative and coordinated effort among all stakeholders within the SMMNRA. The list of partners below provides a basis for establishing a regional team that works together to reduce spread and contain infested areas. Table 2 summarizes landownership (based on GIS categories) within the SMMNRA which provides context about the role of each type of landowner. While private landowner cooperation will be critical, most of the land is owned and managed by various park entities, which also stand to lose important resources should these invasive pests become established in the wildlands

Table 2. Summary of Land Ownership in the SMMNRA.

Landowner	**Area (acre)**
CA Department of Parks and Recreation	36077
Local government park agency	2964
National Park Service	23665
Other government or private utility agency	308
Other local government	6513
Other public agencies	863
Other state government	87
Private	62223
Private conservation organization (MRT only)	1386
Private organization (including HOAs and others)	136
Private owner	1730
State park agency	3037
Stat/local park agency	14773
TOTAL SMMNRA	**153762**

Additionally, developing standing relationships with local cities and representatives of regulatory agencies will facilitate permitting and cooperative response to threats. Figure 3 provides a road map for suggested communication between all landowners and Table 3 provides a list of all the partners within the SMMNRA.

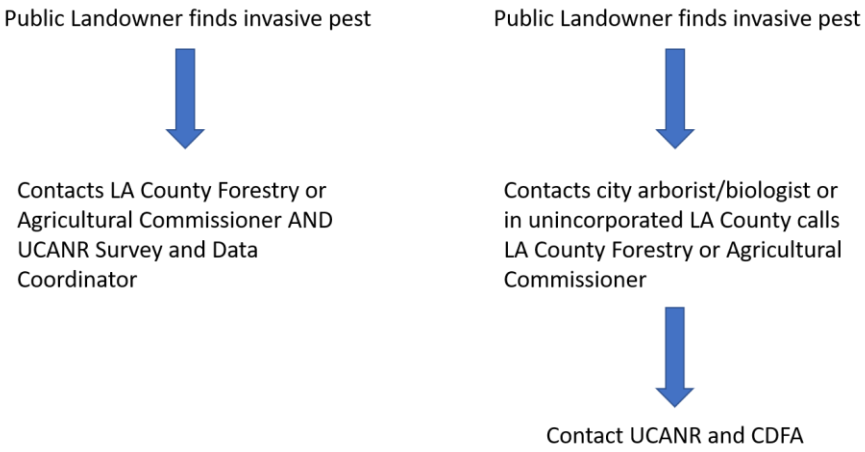

Figure 3. Partner Communication Flowchart.

Table 3. Partners within the SMMNRA.

Entity	Responsibility	Point of Contact (September 2019)
Arborists	Monitor, maintain public and private properties	Western Chapter ISA Rose Epperson, repperson@wcisa.net
CA Departments of Park and Recreation	Responsible for management of wildlands	Danielle LeFer, Environmental Scientist danielle.lefer@parks.ca.gov
CalFire	Assist with identification, treatment and removal protocols	Kim Corella, Forest Pest Specialist Kim.Corella@fire.ca.gov (805) 528-2160
Caltrans	Road and tree inspectors visit hundreds of trees a week	Conrad Kiernan, conrad.kiernan@dot.ca.gov
City of Agoura Hills	Responsible for permits and planning	Greg Ainsworth city arborist oaktree@ci.agoura-hills.ca.us
City of Calabasas	Responsible for permits and planning	Heather Melton, Landscape Manager hmelton@cityofcalabasas.com
City of Hidden Hills	Responsible for permits and planning	Kerry Kallman, City Manager, kerry@hiddenhillscity.org; Joe Bellomo, contractor with Willdan Environmental Services, jbellomo@willdan.com
City of Los Angeles	Responsible for permits and planning	Rachel Malarich, LA City Forest Manager, rachel.malarich@lacity.org
City of Malibu	Responsible for permits and planning	Dave Crawford, City Biologist DCrawford@malibucity.org
City of Thousand Oaks	Responsible for permits and planning	Garrett Crawford, gcrawford@toaks.org; Kevin Wilson, kwilson@toaks.org

Entity	Responsibility	Point of Contact (September 2019)
City of Westlake Village	Responsible for permits and planning	Audrey Brown, Asst. City Manager, Audrey@wlv.org
Community Science Volunteer Groups	Interested and trained docents, hikers, Fire Safe Council members, etc.	Rachel Burnap, RCDSMM rburnap@rcdsmm.org Jullie Clarke DeBlasio, UCANR jdclarkdeblasio@ucanr.edu
Mountains Recreation and Conservation Authority	Responsible for management of wildlands	Rorie Skei, skei@smmc.ca.gov
Mountains Restoration Trust	Responsible for management of wildlands	D.Ezekial Schlais, ezekial@mountainstrust.org
National Park Service SMMNRA	Responsible for management of wildlands	John Tiszler, john_tiszler@nps.gov
Resource Conservation District of the Santa Monica Mountains	Coordinate with all partners, outreach and education, community science outreach, represents LA County on regional and state committees	Rosi Dagit, Sr. Conservation Biologist, rdagit@rcdsmm.org
Society for Municipal Arborists		Dorothy Abeyta (Davey), dorothy.abeyta@davey.com
Southern CA Association of Governments	Coordinates regional planning efforts.	Sarah Jepson, Acting Director of Planning and Programs, jepson@scag.ca.gov
Southern CA Edison	Line and tree inspectors visit hundreds of trees a week	Carol Green, Project Manager Drought and Bark Beetles Carol.Green@sce.com Matthew Saddler, Planner, Matthew.Saddler@sce.com
UC Cooperative Extension	Coordinate research and communication, community science outreach, Master Gardeners, CA Naturalists	Beatriz Noboa-Behrmann, benobua@ucanr.edu
CA Urban Forest Council	Outreach and projects statewide in urban areas	Nancy Hughes,Director, njhughes@caufc.org
Ventura County Local Enforcement Agency	Provide assistance with waste management treatments	Sean Debley, sean.debley@ventura.org; Gina Libby, gina.libby@ventura.org; Mike Villaraza, mike.villaraza@ventura.org

Entity	Responsibility	Point of Contact (September 2019)
Ventura County Agricultural Commissioner	Provide assistance with identification, quarantine, and management treatments. Deploys and monitors traps. Coordinates with CDFA	John Beall, (805) 933-2926, john.beall@ventura.org; Ed Williams, EWilliams@acwm.lacounty.gov
Ventura County Planning Department	-A tree found within an Environmentally Sensitive Habitat Area -Most native trees over 3" diameter -Heritage trees over 28" -Any historical tree	Justin Bertoline, Planning Justin.Bertoline@ventura.org
Ventura County Agricultural Commissioner	Provide assistance with identification, quarantine, and management treatments. Deploys and monitors traps. Coordinates with CDFA	John Beall, (805) 933-2926, john.beall@ventura.org; Ed Williams, EWilliams@acwm.lacounty.gov

2. DETECTION

2.1 WHO

LA County Agricultural Commissioner, Fire/Forestry, local, state, and national park landowners, local agencies, UCANR, and community science partners are working with the RCDSMM to coordinate outreach and training efforts to develop the team of early detection partners in 2019. Details on recommended trapping protocols are provided in Appendix A.

2.2 WHAT – Target Species

Species of concern will potentially shift over time, but as of 2019 the focal species include:

- Alder bark beetle (*Alniphagus aspericollis)* or Alder borer *(Agrilus sp.)*
- Gold spotted oak borer (*Agrilus auroguttatus*)
- Invasive shot hole borers (*Euwallacea whitfordiodendrus* and *Euwallacea kuroshio)*
- Western oak bark beetle (*Pseudopityophthorus pubipennis* - native but causing mortality by spreading fungus *Geosmithia pallida*)

Each of these species has been shown to cause increased mortality in native and/or ornamental tree species, with some being more host-specific and others more generalist. The pests spread primarily by movement of infested wood following tree death and removal, although their associated pathogenic fungi can also be spread through tools that were not disinfected. More details on the biology, spread, treatment for each species is found at: https://ucanr.edu/sites/socaloakpests/Resources_on_oak_pests/

An additional ambrosia beetle (*Xyloborus monographus*) became a new threat to valley oaks was recently identified in Carmel, CA in fall 2019. It also carried pathogenic fungi and is common throughout Europe where it has caused significant mortality of other white oaks. This is an example of the dynamic nature of pest infestations and highlights the need to coordinate both regionally and statewide in order to stay ahead of the problems.

2.3 WHEN

The most effective trapping schedule is based on the biology and behavior of each specific pest. ISHB flight and activity increases when day-time temperatures between 11 am and 4 pm are over 68^{o}F (20^{o}C). Trapping ISHB is most effective in February to May, and September to October, especially when a warm period follows a colder one. Trapping for GSOB is more effective between late April and October, with peak flights typically in June-July when the adults emerge to feed on foliage. WOBB are more active on drought stressed oaks and have a similar emergence time as GSOB. Alder borers and bark beetle ecology and life history details are not well known but it appears that they attack both drought stressed and hydrated trees. Visual surveys can occur year-round. Beetle flight and boring activity are most likely to be observed in spring (February to April) or late summer (September to October).

2.4 WHERE TO LOOK

Identifying the extent of infestations requires an iterative process of detection and monitoring. In 2017, the RCDSMM initiated a trapping and detection effort throughout the SMMNRA, the Los Angeles County Agricultural Commissioner team also trapped in the SMMNRA, and Los Angeles County Foresters responded to infestations in Green Valley and Idyllwild, CA. The Eskalen lab and UCANR developed an on-line mapping tool (www.pshb.org) to document infestations for ISHB.

High risk areas located along the leading edge of infestation are the highest priority for trapping and visual survey efforts. A "risk" map is in developed and will be updated regularly. Figure 3 illustrates the information available as of October 2019. Due to the large study area, management of this map online will allow opportunity to zoom in on a specific area in more details. Data layers and sites will include, but not be limited to:

- County and SMMNRA boundary
- vegetation layers (NPS 2007) focused on locations host species of concern
- street tree inventories if available
- critical developmental temperature overlays (minimum and maximum temperatures that can limit spread)
- riparian areas and drainages
- locations of endangered and sensitive species
- public open space boundaries (local, County, MRT, MRCA, state, national park lands)
- trailheads and campgrounds
- parks and recreation areas with grills
- botanical gardens
- universities and school campus with susceptible host tree species
- greenwaste and landfill facilities, and routes to them (CalRecycle, CDFA-ACP greenwaste list)
- landscape management areas (Homeowners Association green spaces, etc.)

- tree nurseries, box stores selling trees, firewood
- firewood processing and sales facilities
- wildfire boundaries
- locations of documented infestations
- locations of positive and negative trap and visual surveys
- Craig's list review for firewood sellers

The Los Angeles Agricultural Commissioner utilized the CalTrap grid to coordinate trapping. Each 1 square mile grid is divided into 5 equal sections, center, east, west, north and south. Preliminary analysis of the CalTRap grid map (Figure 4) with current status of risks included found that within the LA County portion of the SMMNRA, there were a minority of quints within each grid that had multiple risk factors. It should be noted that "park" category was fairly limited to GIS designated parks, and probably missed extensive wildland areas and other smaller park areas such as those within developments. A table with the grid quint reference number can be generated associated with the map shown in Figure 4, which will assist in identifying where to deploy traps and direct visual surveys in a systematic way.

The online dynamic risk map that can be manipulated to show any or all of the risk factors is accessible at:
https://lacounty.maps.arcgis.com/apps/webappviewer/index.html?id=f7e8644d085c456c8fd81df20cfb5b73.

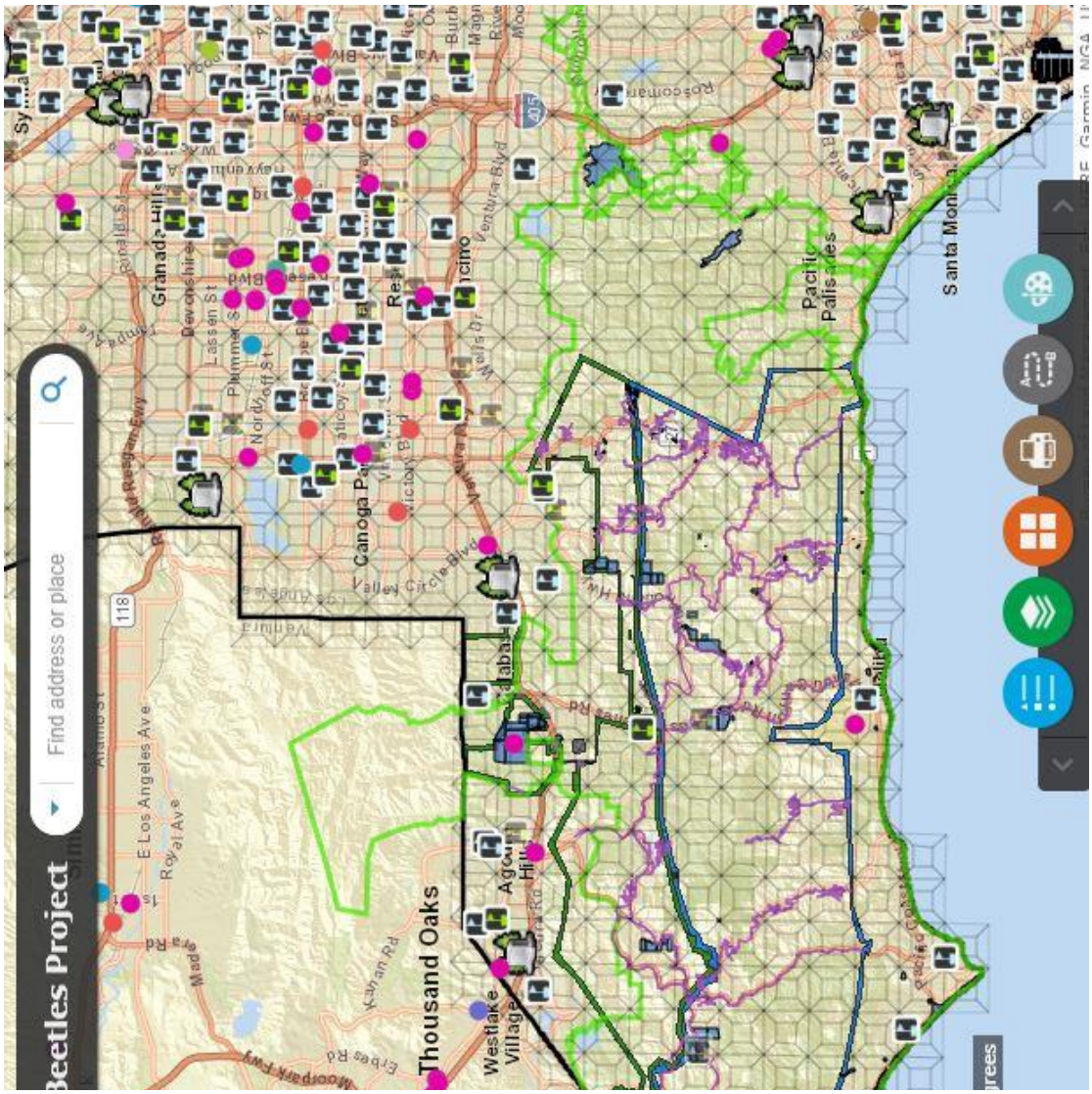

Figure 4. Risk Map for Santa Monica Mountains National Recreation Area, Los Angeles County. FIX WITH NEW ONE

2.5 TRAPPING SURVEY METHODS

The goal of trapping surveys in accordance with the statewide protocol is to:

- delimit the leading edges of the infestation where previously un-infested areas might become infested so that rapid response actions can be implemented to limit further spread,
- monitor high risk locations within un-infested areas,
- monitor sites that are potential sources of long-distance movement into un-infested areas (such as large tree nurseries, firewood and greenwaste facilities, etc.),
- develop a baseline documenting the current presence/absences and extent of infestation beyond known infested areas.

Trapping will be prioritized based on the edges of documented infestations, and in identified high risk areas, starting at the landscape level scale and drilling down to identify specific infested trees as illustrated in Figure 5. Aerial imagery provides broad scale observations of mortality but is not suitable for determining causes. Trapping schemes are helpful to detect pest presence in a broad sense, but again is not sufficient to find the individual tree involved. Visual surveys structured to augment the trapping areas are needed to locate the source of the problem. Once a potentially infested tree is observed, wood samples are collected for confirmation of the pest. Specific details on trapping protocols for each target species are found in Appendix A. Once the 'hot spots" are identified, the County Agricultural Commissioner staff will develop additional detection trapping methods. Trapping is expensive to implement, covers only a limited area and in many cases, it is not possible to implement a full delimiting procedure. Supplemental visual surveys and wood sample collection to augment trapping and expand detection possibilities are also needed.

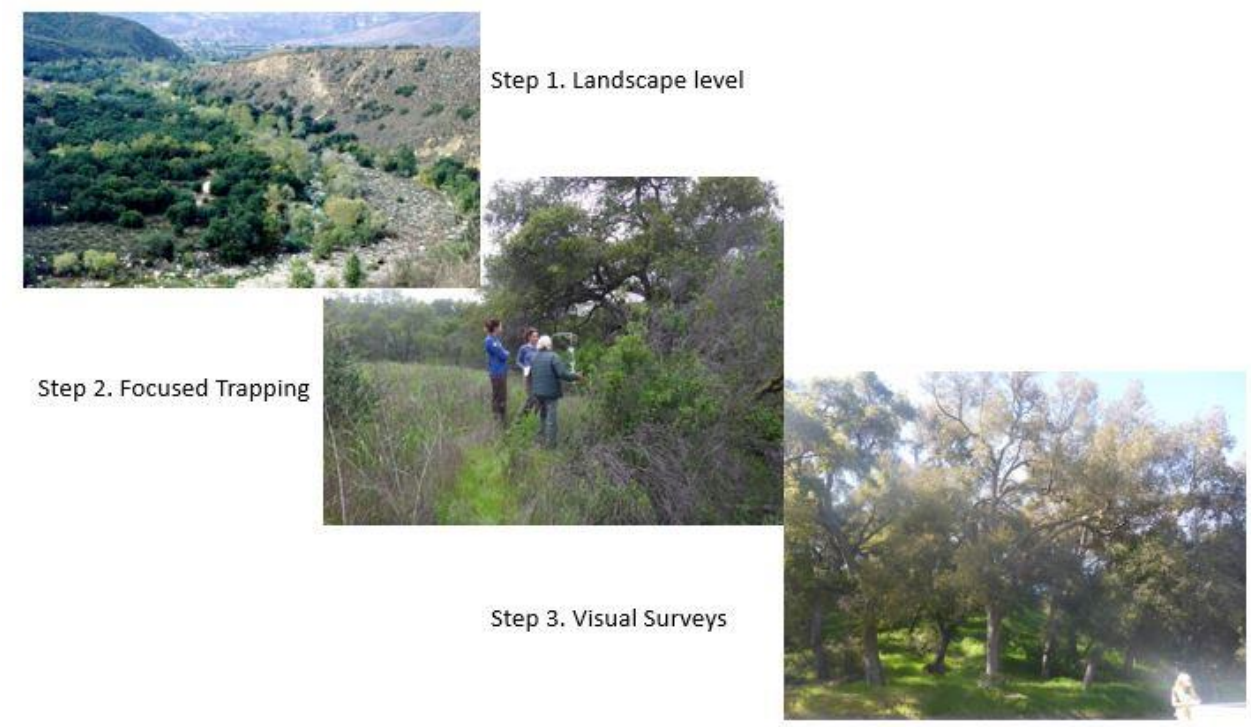

Figure 5. Mapping strategy and degree of certainty.

As of 2019, the boundaries of infested areas in SMMNRA, LA and Ventura Counties are not yet known. To get a baseline snapshot of "hot spots" throughout Ventura County, a Fall 2019 training for visual survey staff and focused trapping is planned. In LA County, a Spring 2020 Trapping Blitz is planned. Using the over 9,000 regularly trapped sites currently monitored by LA County for fruit flies, augmented by locations identified as high risk, the goal is to deploy white sticky traps with ISHB lures at all locations for four weeks. Whenever possible, traps will be co-located and coordinated with other trapping efforts such as fruit flies and glassy winged sharpshooter to increase efficiency. All traps will be returned to LA County Agricultural Commissioner for examination. If any potential ISHB or GSOB are found, they will be sent to either CDFA or an approved lab to confirm identification using standard Chain of Custody procedures.

Trapping priorities focus on detecting new infestations quickly, as well as better understanding the rate of spread from documented infestations. High risk tree species include documented reproductive hosts and high value specimen oaks, sycamores, and box elders. The list of reproductive hosts for ISHB is updated regularly at www.pshob.org.

Permits are needed to deploy traps on public open spaces within state or federal parks. Coordination with agency landowners to develop a MOU that identifies the protocols, locations, restrictions, etc. should be established. See Section 3.2 for more details.

Traps are most effectively deployed two times in one year: once in spring between the months of February and April, and once in the late summer between the months of September and October. Traps should remain at sites for four weeks (i.e., duration of 1 lure life). Sites selected in Season 1 can be used again in Season 2. Sites should be visited by crews a total of six times in one year. The number of crew visits can be shortened to four times in one year if the trap check is not performed. A proposed schedule is outlined in Table 4.

Table 4. Potential Trapping Schedule.

Trapping Season 1 (February-April)		
Crew visit 1	Week 1	Deploy trap
Crew visit 2	End of Week 2 (optional)	Check trap
Crew visit 3	Week 4	Collect trap
Trapping Season 2 (September-October)		
Crew visit 1	Week 1	Deploy trap
Crew visit 2	End of Week 2 (optional)	Check trap
Crew visit 3	Week 4	Collect trap

Lures specific to each of the target species will be identified and deployed appropriately. Details on setting up the traps, obtaining and preparing the lures, trapping transects general guidelines, and trapping in riparian corridors and natural areas are found in Appendix A.

It is critical to minimize the time between collection and sorting, identification, and preservation so that prompt reporting can happen. If beetles are caught in traps located in previously un-

infested or non-reported infested areas, those could be colonizers or recently established offspring dispersing. Given the potential for rapid reproduction and spread, it is essential that protocols for responding quickly are in place. Trap results and data will be regularly submitted to the statewide database for inclusion in the updated statewide map. See Section 2.8 for more details.

2.5.1. Sample Collection and Processing

LA County or Ventura County Agricultural Commissioner's staff or other trained partners will monitor and collect traps. All safety and Best Management Practices disinfection protocols will be implemented to prevent inadvertent spread. Staff will then sort, preliminarily identify, and record any of the target species found. If any ISHB, GSOB, WOBB or Alder beetles are collected, Agricultural Commissioner's staff will collect samples for further identification by CDFA or other entomologist to confirm identification.

If trapping is conducted by an outside organization or researcher, any samples should be submitted to the LA County Agricultural Commissioner's office for preliminary identification and trapping information shared. Sample collection, preservation methods, processing protocols, and chain of custody requirements are found in Appendix B.

If traps are positive for any of the target species of concern, then focused visual surveys should be initiated to further delimit the extent of the infestation. Visual survey protocols are described below.

2.5.2 Trigger and Timeline for Rapid Response

Once a positive identification of ISHB, GSOB, (or other potential pest) has been made, County Agricultural Commissioner or Fire/Forestry will respond by initiating additional visual surveys within 100 meters (or further if suitable host trees are present). Following a thorough visual survey that confirms infestation, the appropriate rapid response protocols should be activated as soon as possible.

2.6 VISUAL SURVEY METHODS

The priority for visual surveys is to expand the potential for detection beyond that available by trapping alone. A variety of visual survey methods and observers can be utilized to expand the search areas and compliment trapping survey efforts. Each tier level of monitoring entails different levels of training, coordination, and review to ensure high quality data acquisition. We envision using a suite of different survey methods to involve the widest possible number of observers and cover the most ground. It is important to note that unlike in the trapping methods, visual survey protocols are basically the same for all target species but use different reference tools for confirmation and to direct searching. Visual survey methods and protocols are found in Appendix C.

2.6.1 TIER 1. Professional/Trained

2.6.1.1 WHO: Trained professionals who have:

- passed the UCANR online test for ISHB and GSOB,

- have also passed an in-field test supervised by UCANR or other trainers,
- have completed LA County license requirements, and/or
- have been approved to input data.

These trained observers will conduct regularly scheduled, planned surveys directed by and coordinated with the local lead agency to provide infestation information.
Examples of such trained professionals may include but are not limited to: Agricultural pest inspectors, Fire and Forestry staff, line monitoring by SCE, Caltrans, DPW, other utilities, Parks and Recreation staff, biologists, licensed landscape professionals including arborists, landscapers, and tree trimmers.

2.6.1.2 Training and Recruitment
UCANR is hosting an online course that provides information on ISHB/FD impact, biology, identification, and management. This online course (https://ucanr.edu/sites/pshb/For_More_Information/Trainings/) provides a first toolkit to identify ISHB. UCANR also hosts a website (www.gsob.org) that provides information on GSOB.
However, due to the large number of hosts for ISHB and because each host reacts differently to the infestation, an online course is not enough. Field training is necessary in order to achieve proficiency in identifying and quantifying ISHB infestations. The online course should be accompanied by field training, where the participants get to see the infestation symptoms first-hand, and practice how to differentiate ISHB infestations from other look-alikes. These online and field courses will be modeled after several successful projects in Minnesota, Oregon, and Wisconsin and offered by UCANR.

Field trainings will include:

- Identifying ISHB symptoms in several species, including but not limited to the most common hosts, including California sycamore (*Platanus racemosa*), London plane (*Platanus* x *acerifolia*), willows (*Salix* spp.), cottonwoods (*Populus* spp.), and box elder (*Acer negundo*).

- Distinguishing between active and inactive holes.

- Distinguishing ISHB symptoms from other look-alike pests.

- Identifying GSOB, WOBB, and Alder Beetle symptoms in oaks and alders.

- Trapping and collecting beetles for identification.

- Collecting tissue samples for DNA confirmation of the fungus or beetle.

Outreach to County staff, SCE and other utility staff, Caltrans, and ISA arborists and tree workers will be needed to recruit observers to assist with this effort.

2.6.1.3 Where

1) Regular, scheduled surveys of high priority areas adjacent to or on the leading edge of either known infestations or high value areas of special concern (riparian corridors, etc.) selected and coordinated by Agricultural Commissioner, Public Works and Flood Control staff and others.

2) Opportunistic incidental reports when observers are examining trees for other reasons (line clearance, park or landscape maintenance). This effort will be coordinated with SCE, Caltrans and other utility companies.

2.6.1.4 Why

Management and responsible agencies will coordinate efforts to ensure that early detection surveys are conducted regularly and identify high risk areas of concern to provide essential information for rapid response efforts. However, available funding and staffing could limit these efforts. Given the wide geographic range of these pests and problems with access to private property, expanding training to other professional observers can provide valuable information about intensity in already infested areas where we are concerned about potentially new hosts or reproductive hosts, as well as leading edge observations, tree response over time, etc.

2.6.1.5 Protocols

The protocol selected will vary and is dependent on the purpose of the survey (Table 6). Variables include: is the survey scheduled due to high risk? Is it associated with trapping efforts? Is a tree inventory available?

The following protocols have been implemented and vetted but can be modified as needed to accommodate local conditions. Survey protocols also include methods for collecting data in the field (iPad mini, phones with and without connection, hard copies), data input and uploading methods, and identify who is responsible for data quality review. Visual survey methods and protocols are found in Appendix C.

Table 5. Professional/Trained Survey Protocols.

Information Goal	Survey Protocol Recommended
Identify baseline conditions in un-infested areas – with tree inventory data (cities, city parks, etc.)	CDFW 2017 Visual Survey Protocol (CalFire 2019 Modification)
Identify baseline conditions in un-infested areas – no species data (campgrounds, parks, etc.)	CDFW 2017 Visual Survey Protocol (CalFire 2019 Modification)
Identify new infestations and track spread in High Risk areas (riparian corridors, parks, wildlands)	CDFW 2017 Visual Survey Protocol
Track rate of spread and density of infected trees in infested areas	CDFW 2017 Visual Survey Protocol (CalFire 2019 Modification)

Information Goal	Survey Protocol Recommended
Incidental reports by trained professionals examining trees for other reasons	iNaturalist Survey Protocols UCANR Survey Coordinator Procedures (in development)
Focused high-risk tree species surveys (box elders, sycamores, etc.)	CDFW 2017 Visual Survey Protocol (CalFire 2019 Modification)
Incidental reports by trained professionals examining trees for other reasons	iNaturalist Survey Protocols UCANR Survey Coordinator Procedures (in development)

2.6.1.6 Reporting Tools
County GIS staff will coordinate and administer the management of all data collected and will develop a procedure for timely sharing of this information with UCANR Survey and Data Coordinator, CA Department of Food and Agriculture (CDFA), UCANR and CalFire FRAP, who will be managing data for the state. UCANR received funding for a Survey and Data Coordinator who will develop the protocols to gather, review for Quality Assurance/Quality Control, and share all data.

Understanding that each agency tends to have constraints about data management and access, we recommend that all County departments and partner agencies, researchers, and volunteers that are collecting data utilize the statewide standardized data fields so that integration with the statewide database is facilitated. If tools such as Collector, Survey 123 via ArcGIS, UCANR Qualtrics online reporting tool (link is http://ucanr.edu/vcurbanshb), excel spreadsheets, and track log mapping are used, a procedure will be needed to review and evaluate data (Quality Assurance/Quality Control) and then coordinate uploading data to a centralized. This data will then be regularly shared with the statewide database managed by the statewide administrator and data manager at UCANR and UC Davis.

The reporting procedure for independent certified professionals (i.e. arborists, line clearance observers, landscapers, etc.) should be through either providing data entry privileges through the UCANR Qualtrics online reporting tool, or through the projects in iNaturalist. Making this data entry easy and available will be key.

2.6.2 TIER 2. Community Science Volunteers:

2.6.2.1 Who
Self-selected interested volunteers recruited from docent training, Audubon, Sierra Club, CNPS, CA Naturalist, Master Gardener and other garden groups, students, etc.

2.6.2.2 Training and Recruitment
Training for the Santa Monica Mountains Bad Beetles Watch iNaturalist volunteers will consist of a three-hour field class in a location where ISHB infestation can be observed. Training will include setting up the iNaturalist app on their phones, what to look for, tree species identification, capturing observations, connecting to ISHB projects, and learning how to take helpful photos. Volunteers will be encouraged (but not required) to take the online training class provided at

https://ucanr.edu/sites/pshb/. Information on additional training opportunities will be posted at pshb.org and rcdsmm.org.

Volunteers will also be trained on setting up both regular survey locations based on areas that are accessible and meaningful to them as well as how to conduct random survey walks in wildland areas. We will also provide our "wishlist" sites, primarily high-risk priority areas such as urban parks and greenways.

2.6.2.3 Where

1) Regular, scheduled surveys of high priority areas adjacent to or on the leading edge of either known infestations or high value areas of special concern (riparian corridors, etc.) identified and coordinated by the Agricultural Commissioner, Public Works and Flood Control staff and GIS map team in coordination with local volunteer groups.

2) Opportunistic incidental reports along hiking trails, recreation areas, backyards, city/County parks and open spaces, and other areas of interest to, and determined by the observer.

2.6.2.4 Why

Although there is a higher likelihood of incorrect observations, these observers cover the widest geographic area and are potentially the most likely to find new infestations especially in wildland areas that are not regularly surveyed.

2.6.2.5 Protocols and Reporting

A traditional iNaturalist project, the "Santa Monica Mountains Bad Beetle Watch" is currently set up and being used to collect pictures and specific observations. Users, or contributors, must first set up an iNaturalist account, then join this specific project. All users will be trained on identifying ISHB through the UCANR online training tool, and then be taught specific guidelines for taking research-quality photographs, how to make observations through iNaturalist, and how to collect specific data. Weekly-monthly administration of these observations requires dedicated time by a designated person/group/agency. A potential limitation of this type of data collection is that this could generate many incorrect observations, but the benefit is that these volunteer observations cast a wide net in terms of geographic area and could result in detection of new infestation locations (Table 7). A lead agency (RCDSMM for 2019) would then coordinate QA/QC and upload confirmed and verified results to the statewide data repository. These protocols are found in Visual Survey Methods and Protocols in Appendix C.

The UCANR www.pshb.org reporting tool is a two-part linked Qualtrics survey. The first part is essentially a decision support tool designed to guide a tree owner through pest diagnosis – if they end up reporting a tree that seems to be a probable candidate and is in a new area, they get automatically connected into the 2nd survey to report the tree. This weeds out reports from known infested areas. UCANR would then coordinate QA/QC and upload confirmed and verified results to a centralized database system. It is also possible to provide trained observers with the direct link to the second survey portal, which has detailed location, infestation level, and condition information that is similar to the fields used in the statewide data repository or other Collector or Survey 123 tools.

Table 6. Community Science Volunteer Survey Protocols.

Track rate of spread and density of infected trees in infested areas	UCANR Sycamore Survey Protocol iNaturalist Project Protocol "Santa Monica Mountains Bad Beetle Watch"
Identify new reproductive hosts	iNaturalist Project Protocol "Santa Monica Mountains Bad Beetle Watch"
Incidental reports by trained professionals examining trees for other reasons	-iNaturalist Project Protocol "Santa Monica Mountains Bad Beetle Watch" -www.pshb.org online assessment tool

2.7 CONFIRMING IDENTIFICATION

Using the protocols provided in Appendix C, it is recommended that samples of beetles be collected if possible, as well as wood samples collected by the Agricultural Commissioner staff or trained personnel. If collected by someone other than Agricultural Commissioner staff, these samples should be sent to LA County Agricultural Commissioner Pest Identification laboratory for confirmation. In cooperation with the Agricultural Commissioner, the labs of Dr. Richard Stouthamer and CDFA will accept samples to confirm both beetle and fungal identification. A sample submittal protocol will be developed and available on the web.

2.8 IMMEDIATE REPORTING AND COORDINATED DATA MANAGEMENT

The County data manager, working with the UCANR Survey and Data Coordinator will develop the protocols to gather, review for Quality Assurance/Quality Control, and share all data. All teams conducting visual surveys will submit their data to the County GIS central database within a week of the surveys, if not earlier. Preliminary QA/QC will be completed by the observers, with a follow up conducted by the data management team. Using these updates, the risk map will be revised, and any potential new infestations identified reported promptly to Fire/Forestry, who will coordinate the response.

All data should be submitted to the statewide administrator and data manager at UCANR and UC Davis at least quarterly and on-going updates to the maps and infestation locations be shared as quickly as possible. A protocol will be developed to illustrate where infestations were controlled by tree removal, or other treatments.

2.9 INSPECTION PROCESS

Once a location of concern is identified, the Landowner will be notified by either the Agricultural Commissioner or Fire/Forestry staff. A site visit will be scheduled with Agricultural Commissioner staff or Forester with the appropriate landowner representative. Written or verbal permission to inspect trees is needed before entering the property.

2.9.1 If pest is found:

1. Collect individual tree data (diameter at standard height (dsh), height, canopy condition, other problems, removal access notes).
2. Mark tree and collect specimen voucher or photos that will permit identification. (See Appendix B for directions).

3. Discuss treatment options and removal protocols to prevent spread. Further details on Best Management Practices and up to date treatment options are detailed below (Section 3.5)
4. Obtain landowner permission for treatment or removal.
5. Notify appropriate permitting agency and provide BMP's for timing and removal process.

2.9.2 If pest is NOT found:

1. Collect individual tree data (diameter at standard height (dsh), height, canopy condition, other problems, removal access notes).
2. Mark tree and collect specimen voucher or photos that will permit identification.
3. Discuss protocols to prevent infestations.
4. Train landowner so they know what to look for and how to get help if infestation begins.
5. Request that they contact Fire/Forestry immediately if there is a change.
6. Establish a suitable monitoring timeline and set up follow up visit.

2.9.3 Trigger and Timeline for Further Monitoring and Rapid Response

Once a positive identification of ISHB, GSOB, or other pest, has been made, Agricultural Commissioner or Fire/Forestry should respond within a week by initiating additional visual surveys within 100 meters (or further if suitable host trees are present). Following a thorough visual survey, the appropriate rapid response protocols should be activated as soon as possible.

3. RAPID RESPONSE

3.1 IMPACT ASSESSMENT

Based on monitoring data, the extent, severity, and impacts of infestations at each location, especially along the leading edge, will be evaluated. Treatment options will be evaluated, and response levels identified. The responsible leaders for this step of plan implementation will be coordinated and led by Fire/Forestry reporting to the statewide administrator and data manager at UCANR and CDFA. The FD will not be treating trees or performing removals: this will all be completed by contractors assuming adequate funding is available.

Assessment will differ based on host species. A conceptual framework for evaluating factors such as the location and value of a particular tree, the environmental impacts (active nests, endangered species, etc., the level of infestation), is needed for each target pest species. This analysis should direct the response level of treatment, removal and monitoring.

If the infestation is located on private property, permission from the landowner to remove or treat the tree is required. If the property owner resists removal of a high amplifying tree (such as box elder), then it should be evaluated for potential as a nuisance or hazard tree that would require removal under authority of the County or other agency depending on the location, such as within the Local Coastal Zone or Significant Ecological Areas. Permits may be required however the Fire Department has jurisdiction over dead trees within 200 feet of structures or within 10 feet of a fire access road.

If the infestation is found on public property, permission from the landowner is also required. A Right of Entry permit should be coordinated for the specific tree removal.

If the infestation is found in a commercial nursery, box store, or firewood purveyor that could potentially transport trees to a non-infested area, then further coordination and inspections will be initiated by the Agricultural Commissioner and movement or disposal of infested materials guided by statewide protocols.

3.2 PERMITS NEEDED

Removal of infested trees from private property in the SMMNRA is permitted once LA County approved experts confirm the infestation and an emergency infested tree removal permit is issued by either Regional Planning or Forestry. The Department of Regional Planning should be consulted prior to the removal of an oak tree or other protected native tree to determine if a permit is necessary from the County. In some cases, removal of an oak tree may qualify for an emergency removal and if not part of a larger habitat, may be authorized by the County Fire Department Forestry Division. In other cases, the removal of an oak or other native tree may require a discretionary permit, that could result in a more complex and costly permit. The Agricultural Commissioner also has authority to authorize removal of infested trees and implement containment strategies. The SMMNRA contains areas within the Local Coastal Zone which requires additional levels of permitting at present and the Santa Monica Mountains North Area Plan which is in development but anticipated to have equally stringent requirements protecting native trees.

Right of entry permits are needed for removal of any trees on state or national park lands, as well as if County agencies are removing trees on private property. It is recommended that the County proactively establish MOU's with public land agencies to facilitate prompt and timely actions, especially in the face of new infestations.

In riparian corridors and locations hosting state or federally listed species of special concern, rare, threatened or endangered species, additional coordination with the responsible agencies (such as CA Coastal Commission, CDFW, NMFS, and USFWS) will be necessary (Figure 6). Utilities, public works departments, parks departments, Caltrans, cities, and other agencies that remove trees in public parks and along public right of ways also need to participate in this permitting process. Again, proactively setting up MOU's regarding protocols, allowable actions and mitigation requirements should be initiated as soon as possible and be in place to facilitate rapid response.

Sensitive Riparian Species
Permits may be needed from:
CA Department of Fish and Wildlife
National Marine Fisheries Service (if steelhead habitat)
U.S. Fish and Wildlife Service

Protected Native Trees
Permits may be needed from:
City or County Planning Department
CA Department of Fish and Wildlife
U.S. Fish and Wildlife Service

Figure 6. Permit requirements.

Timing of tree removal is also subject to permitting in order to comply with the Migratory Bird Treaty Act which prohibits removal of any nesting habitat.

Within designated Zones of Infestation, CalFire is permitted to remove infested trees on state and federal lands. This requires submittal of an Environmental Checklist that is modeled on CEQA but modified to address tree specific actions. The County can develop a programmatic project description that covers the range of possible treatment and removal strategies and any potential effects on the environment. As the lead agency, CalFire makes a determination of the level of potential impacts on environmental resources associated with the proposed treatments/removals. These include protected species impacts, aesthetics, cultural resources, water quality, etc. Both onsite (actual tree removal impacts) and off-site (transport to disposal facility, etc.) need to be identified and described. Permit contacts and the California Environmental Quality Act checklist are found in Appendix D.

3.3 ESTABLISHING A ZONE OF INFESTATION

In order to implement a zone of infestation as designated by CalFire, clear and definitive evidence documenting the impacts to the forest in the affected area is needed. This includes information documenting the levels of insect/disease impacts and what actions have been implemented thus far to stop spread.

Information required includes: outreach & education, trainings, research, biology, damage done to trees, status of the outbreak, number of parcels and acres of landowner's ownerships affected, significant economic costs, distribution of tree species affected, proposed management and control options and cost/benefit analysis of doing and not doing management, ecological, cultural, and aesthetic losses to the region. Also, a description of the proposed zone with corresponding maps will need to be included in the packet of information.

This documentation is reviewed by the affected CalFire unit foresters, who are then responsible for moving forward the approval process. The Director of CalFire then recommends approval by the CA Board of Forestry. CalFire pest management staff make the presentation to the board. Sections of the Public Resources Code that further define the conditions and benefits of working within a Zone of Infestation are found in Appendix D.

The value of establishing a ZONE OF INFESTATION is linked to:

- Fostering collaborative efforts with both current and potential local, state and federal agency partners working on ISHB and GSOB prevention, containment, control and remediation.
- Communicating the concern of both the Department and the Board for the ISHB and GSOB issue and its current and potential impact in California to the public.
- Showing support from both the Department and the Board for efforts to seek funding, research, education outreach, best management practices for control, management efforts in managing ISHB and GSOB infested wood, and other ISHB and GSOB related activities.
- Creating a directive that ISHB and GSOB suppression and control measures be feasibly addressed in Timber Harvesting Plans within the ZOI (applicable only in mixed conifer stands where susceptible hosts are being harvested incidentally along with commercial species of conifers and a THP would be required).
- Establishing an official mapped boundary of the known ISHB and GSOB infestation which can serve to notify communities within the current infested area and to alert communities in neighboring non-infested areas of proximity, spread and threat of ISHB and GSOB.
- Expressing the concern to the state legislature and governor's office about the potential impact and harm that ISHB and GSOB could have statewide.
- Partnering with local governments in efforts to help stop the spread.
- Supporting the use of California Conservation Camp crews in control or management projects for ISHB and GSOB on private and state lands.

For example, a ZOI has been established for the current GSOB infestation Los Angeles County (Figure 7).

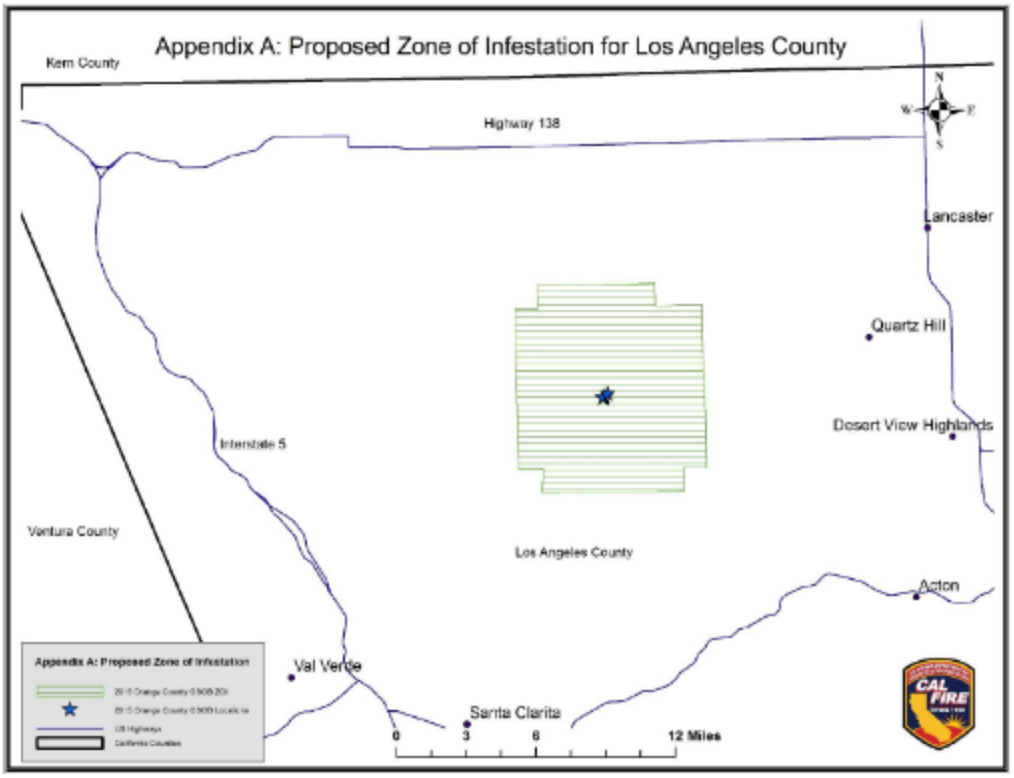

Figure 7. A ZOI established for the GSOB in Los Angeles County. Map made by the Los Angeles County Fire Department, Forestry Divison, and CALFire.

3.3.1 Establishing Quarantine Areas

The LA County Agricultural Commissioner can also use the establishment of a Zone of Infestation to support further actions. Once an invasive pest is detected, review/assessment of the threat to agriculture and the environment are undertaken by CDFA and federal agencies. Based on the distribution and abundance of the infestation, and whether it is within an oak woodland, riparian or urban forest, or agricultural property, a plan for treatment, tree removal, suppression and management is developed. Both ISHB and GSOB have been listed as "B" rated pests which limits statewide quarantine delineation. In an urban forest or agricultural area where it is deemed feasible to eradicate using tree removal or to suppress these pests, an incident action plan would be developed by the Agricultural Commissioner and Fire/Forestry in coordination with CDFA.

3.4 INCIDENT ACTION PLANS

Outbreak Containment Plan Teams will be convened as needed and be composed of landowner representatives, County departments (such as Agricultural Commission, Fire/Forestry, and Regional Planning). Each site-specific Incident Action Plan (IAP) will follow an agreed upon template and identify who is responsible for what containment and treatment actions, the timeline, the geographic extent of the area of concern, and produce a report documenting results. Treatments protocols may provide a substitute for a full IAP in certain circumstances. An example of an IAP is found in Appendix E.

3.4.1 Steps for implementation of the Incident Action Plan:

- Landowner notified.
- Site visit scheduled with LA County Agricultural Commissioner's staff, Forester and appropriate landowner representative.
- Permit obtained.
- Determine a geographic area of concern using the potential flight patterns of the beetles (2 miles recommended for ISHB and GSOB).
- Evaluation of impacts and level of infestation.
- Coordinate appropriate stakeholders to implement treatments.
- Monitor effectiveness of the treatments.
- Identify possible restoration actions.

3.5 TREATMENT and REMOVAL PROTOCOLS

As of spring 2019, chemical treatment protocols for ISHB, GSOB, WOBB and Alder borers are quite limited, and applicable only for important landscape trees located away from drainages, waterways, lakes, ponds, or open space areas (Mayorquin et al. 2018). An exception is the use of trunk injection application if a valuable or exceptional tree is not located in standing water. A variety of research projects are underway examining the effectiveness of other potential treatments such as direct injection into active holes, bio-controls (bacteria, fungi, predators and parasites), etc. but at this time, the only sure way to control these beetles, especially in riparian areas, is removal of the infested tree. Each of the target pest species responds differently to chemical treatments. As that data is constantly evolving, specific treatments are not detailed here but the most up to date information can be found on www. gsob.org and www.pshb.org.

It is critical that any removal or treatment strategies implemented are documented and uploaded into the statewide data repository. This will provide LA County the ability to track effectiveness of treatments over time as well as support statewide tracking efforts.

For known infested areas in the urban forest, irrigated urban parks or agricultural areas, the treatment matrix developed by Orange County Parks (2016) and updated by UCANR (2019) provides guidance, however the current statewide threshold for removal is >150 ISHB holes and dead canopy (Figure 8). For locations along the leading edge of the infestation, as well as for extremely active reproductive hosts such as box elder, removal is recommended based on <10 holes due to the high potential for amplification. A management matrix which can be modified based on whether the location is within oak woodland, riparian or urban forest should be developed by the state and provided to the counties and cities.

Figure 8. ISHB management matrix for infested urban forests and locations on the leading edge of the infestation. The matrix was developed by Dr. Beatriz Nobua- Behrmann (UCANR), Monica Dimson (UCLA), Shannon C. Lynch (UCSC), John Kabashima (UCANR) and Akif Eskalen (UCD). Revised July 2019.

3.6 BEST MANAGEMENT PRACTICES

Once an infested tree has been identified, strict adherence to Best Management Practices (BMPs) that can reduce risk of spread are critical. ISHB survive in infested trees by cultivating fungi, primarily *Fusarium* spp., which are the ultimate cause of mortality of the trees. GSOB survive and reproduce in the bark. The UCANR flyer detailing BMP's is found on www.gsob.org and www.pshb.org and provides guidelines for reducing the risk of spreading the fungus by outlining tool, chipper, and truck disinfection protocols.

3.6.1 Infested Wood Disposal Protocols

Disposal protocols for infested materials vary depending on the pest but all share the requirement for proper procedures to be implemented. If infested material is buried in a landfill, it will be entombed and safe. Fusarium or the other pathogens are not able to move through the soil and ISHB will not successfully burrow out of the soil. Landfills are capped when full. A point to consider is that woodchips will no longer be considered as Alternate Daily Cover (ADC which is spread over a landfill to control smell/ flies etc.) beginning January 2020 but will be considered solid waste (not counted for required recycling mandates by the state). However, composted material will still be eligible for consideration as ADC past 2020. Table 8 provides a list of approved disposal sites as of September 2019 and to find a list of incinerators that will use tree waste for bioenergy see the UCANR website (ucanr.edu/sites/WoodyBiomass/). This list will be updated by the Los Angeles and Ventura County Local Enforcement Agencies as things change.

Agencies removing trees should contact the Los Angeles County's Public Health Department's Solid Waste Management Inspection & Enforcement Program - Local Enforcement Agency (LEA) for guidance on where to route green waste.

Table 7. Approved Disposal Sites for infested materials near SMMNRA.

Name	County	Address
Agromin	Ventura	201 Kinetic Drive, Oxnard, 93030
Calabasas Landfill	Los Angeles	5300 Lost Hills Rd, Calabasas 91301
Whittier Fertilizer Company	Private	9441 Kruse Rd. Pico Rivera, 90660

Based upon the Jones and Paine (2015) study, chipping infested material to a $\leq$ 1" particle size kills most of the ISHB and GSOB and composting or solarization can kill the rest. Composting or solarizing on-site may not always be an option (small homeowners' yards or no open space with enough sun exposure). While keeping GSOB chips onsite is considered preferable, hauling chipped vs. bulk material to another site for treatment often occurs, even though the chipping on-site does not achieve the 1" standard. If material is transported off site, the load needs to be securely tarped to prevent beetles from escaping.

Do not leave piles of untreated, infested wood uncovered. All removed trees should be processed the same day. If for some reason the wood cannot be chipped immediately, tightly wrap the cut logs in plastic tarp and ensure an air-tight seal around the wood in order to contain any emerging beetles. Follow directions for solarization or kiln-drying infested wood to kill the ISHB or GSOB in order to render it safe for transport.

Avoid leaving firewood-size logs on site as an attractive nuisance which may be picked up and transported randomly by someone looking for free firewood.

It is critical that any infested material is securely covered with a solid tarp if being transported off site and taken to an approved disposal facility (Table 8).

If material is being sent to a bioenergy, wood utilization, or recovery facility, then coordinated monitoring around that location is needed to ensure that there is no spread.

The County will continue working with the statewide committees for the ISHB, GSOB, and other pests, to coordinate appropriate guidelines and regulations for removal, storage, re-use, and transport of infected materials. Updates will be posted at www.pshb.org, www.gsob.org, and the UCANR website.

3.7 POST TREATMENT MONITORING

Once a decision to monitor, treat, or remove a tree is made, appropriate follow up monitoring is required to document the results of the action. Table 9 provides a decision matrix for applying post treatment monitoring. Depending on the location and level of establishment for a given infested area, additional personnel may be needed for inspections, monitoring, removal and treatment. Recommended protocols are provided in Appendix F. Reports on post treatment condition should be submitted to the County GIS central database regularly and to the statewide data repository at least yearly.

Table 8. Post Treatment Monitoring Protocols

Action	Follow Up Protocol
Monitor (trees <150 holes)	Monthly visual surveys for reproductive hosts, bi-monthly for other hosts 100 m from the infested treated tree(s).
Pruning/chemical treatment	Monthly visual survey for first year, if no further infestation after a year, then quarterly for year 2-3.
Removal	Quarterly visual survey of surrounding 100 meters to detect any additional infestation.
Post-removal Trapping for Amplifier trees	If amplifier tree removed, monitor changes in ISBH activity in the area within 100 meters fall and spring for the following year.

4. RESTORATION AND MITIGATION

Loss of trees throughout the SMMNRA, as well as anywhere in Los Angeles County could potentially result in significant aesthetic, ecological, social, and economic effects. Trees provide quantifiable ecosystem services such as carbon sequestration and storage, reduce air pollution, mediate thermal extremes and reduce stormwater runoff. Trees also provide a variety of health and environmental benefits.

While this EDRR emphasizes detection to reduce infestation and minimize spread, the reality is that given the limited number of available treatments, removal, especially of potential amplifier trees will occur. By proactively establishing relationships and guidelines with local, state and federal landowners and permitting agencies, the County can best coordinate any required mitigation and restoration efforts. To that end, the County is developing a Native Tree Priority Planting Plan for the SMMNRA (2019) that identifies areas where projected climate changes will have the least impact on restoration planting efforts. It is further recommended that all plant material used in restoration efforts be tested by the County Agricultural Commissioner for the presence of Phytophthora species.

By utilizing all relevant scientific investigations and analyses, the County can develop a restoration strategy for high risk areas that will fulfill regulatory agency requirements as well as strategically address future climate change and fragmentation issues.

5. EFFECTIVENESS EVALUATION

The expense associated with implementing the EDRR warrants careful documentation of effectiveness. It is recommended that analysis of implementation be conducted after the first year, and then every two years thereafter.

Effectiveness can be defined on several levels, from the overall implementation functionality of the EDRR, as well as by specific metrics that should include, but not be limited to:

- how to improve communication and coordination,
- training procedures
- timeliness of detection
- timeliness of response
- effectiveness of different response methods for containment and management
- coordination with statewide efforts to reduce firewood and greenwaste movement
- policy and regulatory changes needed
- identify appropriate adaptive management adjustments needed

6. FUNDING NEEDED

Implementation of the EDRR will require dedicated staff and funds for responding to infested trees. While grants are being sought to get this started as a pilot project in the SMMNRA, more secure funding will be needed in order to expand this county-wide.

Funding needs break down into several categories:

6.1 Plan Coordination and Implementation:
Provide sufficient staff for the County to conduct EDRR and to manage and share all data collected within the County and to the state. This will include but not be limited to:

- Coordinator in the Chief Office of Sustainability who can coordinate all county departments as well as outreach and education throughout the County (estimated annual cost $ 250,000),
- Trapping coordinator for Agricultural Commissioner (estimated annual cost $50,000),
- Data management coordinator for GIS (estimated annual cost $250,000) and,
- Rapid Response coordinator for Deputy Forestry (estimated annual cost $200,000),
- Regional Planning staff biologist (estimated annual cost $250,000).

6.2 Detection:
Annual trapping augmentation to track leading edge and rate of spread (estimated annual cost of $250,000 for personnel costs, traps, lures, ancillary expenses).

6.3 Response:
Provide funding for a Forestry Assistant to conduct rapid response, identify treatment options, and to supervise contractors as Subject Matter Experts by (estimated annual cost $170,000).

Provide funding for infested tree removal (estimated annual cost $ 250,000 with ability to roll over into following year).
Note that the Agricultural Commissioner has received a grant for $600,000 to remove infested trees in 2020-2021. This effort will be implemented by tree removal vendors but coordinated by County Agricultural Commissioner staff and the Lead Enforcement Agency to direct proper disposal and waste management.

Provide funding for post treatment monitoring and reporting by a Forestry Assistant (estimated annual cost $170,000).

Identify funding opportunities to assist private property owners with rapid tree removal costs.

7. RECOMMENDATIONS

1. Designate a responsible County department and provide funding for a County tree pest coordinator to ensure that all data is collected, undergoes QA/QC, and is shared with the statewide data repository in a rapid and efficient way.
2. Develop a secure funding source to accomplish the detection, response, removal and post-treatment monitoring that will not be limited to use within a given year, providing flexibility for response to respond to the impacts.
3. Develop a County wide culturally and linguistically sensitive Tree Appreciation and Threats outreach effort. Build upon the state and regional efforts at outreach and education.
4. Initiate and execute MOU's with all local, city, state and federal landowners to outline communication and procedures for rapid response to new infestations, including tree removal.
5. Initiate and execute MOU's with relevant resource agencies (CA Coastal Commission, CDFW, USFWS, NMFS) to outline communication and procedures for rapid response to new infestations, including tree removal.
6. Revise County code in the local coastal zone to develop a no-cost emergency tree removal permit process due to pest infestations and safety hazards.
7. Provide no-cost emergency tree removal permit process due to pest infestations and safety hazards in the Santa Monica Mountains North Area Plan as well.
8. Require all County contracts to specify Best Management Practices for removal, treatment, transport and disposal of any infested materials according to current standards of practice and comply with statewide protocols.
9. Require implementation of Best Management Practices to contain and minimize spread from greenwaste handlers, transporters and facilities, as well as nurseries and firewood vendors.

10. Coordinate with local utilities (SCE, etc.), Caltrans, and other larger landowners/cities to communicate new infestations, removals and other treatments.
11. Work with state and federal agencies to develop regulations for firewood dealer certification, heat treatment and labeling.
12. Evaluate the potential for purchasing chippers and tub grinders that can grind material down to less than 1 inch and stage in infested areas to promote proper disposal.

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APPENDIX A

TRAPPING PROTOCOLS

Trap and Lure General Guidelines
Lures specific to each of the target species will be identified and deployed appropriately.

-Invasive Shot Hole Borers
Panel Traps with Quercivorol Lure: this method utilizes large sticky panel traps and a quercivorol lure that will help attract beetles to the traps. More information on these three types of traps and installation procedures is available at https://ucanr.edu/sites/pshb/files/271363.pdf.

-Gold Spotted Oak Borer
Purple-prism sticky traps are used to monitor and capture GSOB. Quercivorol lure will also attract this beetle.

Note on Quercivorol – this lure degrades very quickly when exposed to water. Special attention should be paid when deploying traps to ensure that sprinklers do not spray the lure. Rain events will also adversely affect the lure, and they will need to be replaced after it rains.

-Alder bark beetle (*Alniphagus aspericollis)* and/or Alder borer *(Agrilus sp.)*
Unbaited intercept traps are used to capture the alder beetle. Lures to use include a generic hardwood lure or a low rate menthenols with ethanol.

Trapping Guidelines
Traps can be deployed two times in one year: once in spring between the months of February and April, and once in the late summer between the months of September and October. Traps should remain at sites for 4 weeks (i.e., duration of 1 lure life). Sites selected in Season 1 can be used again in Season 2. Sites should be visited by crews a total of 6 times in one year. The number of crew visits can be shortened to 4 times in one year if the trap check is not performed. An example of a trapping schedule and number of visits needed is found in Table 1.

Table 1. Example of trapping schedule and number of visits needed.

Trapping Season 1 (February-April)		
Crew visit 1	Week 1	Deploy trap
Crew visit 2	End of Week 2	Check trap
Crew visit 3	Week 4	Collect trap
Trapping Season 2 (September-October)		
Crew visit 1	Week 1	Deploy trap
Crew visit 2	End of Week 2	Check trap
Crew visit 3	Week 4	Collect trap

Trapping Transects General Guidelines

- The statewide trapping grid overlay (1 square mile with quints) will be used to standardize trapping deployment, especially along the leading edge of known infestation. Within those cells, identify a smaller grid overlay (25 or 50 meter square) with a random number generator to select trap plot locations within identified high risk areas along the

leading edge of larger riparian corridors, open space parks, at greenwaste, firewood and landfill facilities, and along the wildland/urban interface. See Figure A1.

- Quantity/density: Ten white sticky traps per square mile is a typical deployment plan but traps may be placed at higher densities in more high-risk areas, such as 25 to 35-meter intervals throughout the monitored area (or 2-5 traps per acre). A higher concentration of traps/lures is not advised.
- Collect GPS coordinates of each trap to help facilitate maintenance and inspection.
- Place traps within 100 meters of most preferred host species are found (such as sycamore, box elder, willow, cottonwood, castor bean).
- Public visibility: Traps should be accessible for maintenance, but away from high-traffic areas to prevent vandalism.
- Do NOT hang traps: in or under tree canopies, in areas exposed to high winds, or where traps may get wet (i.e. irrigated lawns or planters).
- Do NOT hang traps: directly onto the host tree as the lure might attract ISHBs to un-infested trees.
- For point locations of concern (such as nurseries, campgrounds, trailheads, etc.) deploy traps within 100 meters of potential pathways for introduction.
- When trying to investigate spread from known infestations, prioritize deployment of traps near high risk tree species within 1 mile.

Trapping in Riparian Corridors and Natural Areas

Option 1: Three 10th acre plots per 1 acre of continuous riparian host area (Figure A2).

1. Deploy 1 trap per plot (trap can be placed at an optimal place within the plot—it does not have to be located at plot center).
2. Locate and record plot center and divide plot into quadrants.
3. Identify box elder in quadrants and perform visual survey on stems >5" DBH (diameter at breast height).
4. If box elder is not present in plot, perform visual survey of all stems >5" DBH of 15 most susceptible host species (See www.pshb.org for current list).

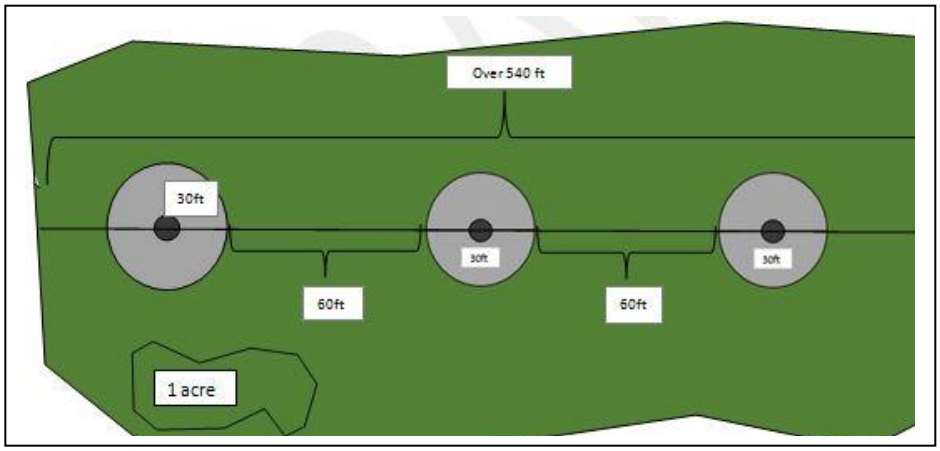


Figure A1. Option 1- Example of trap deployment.

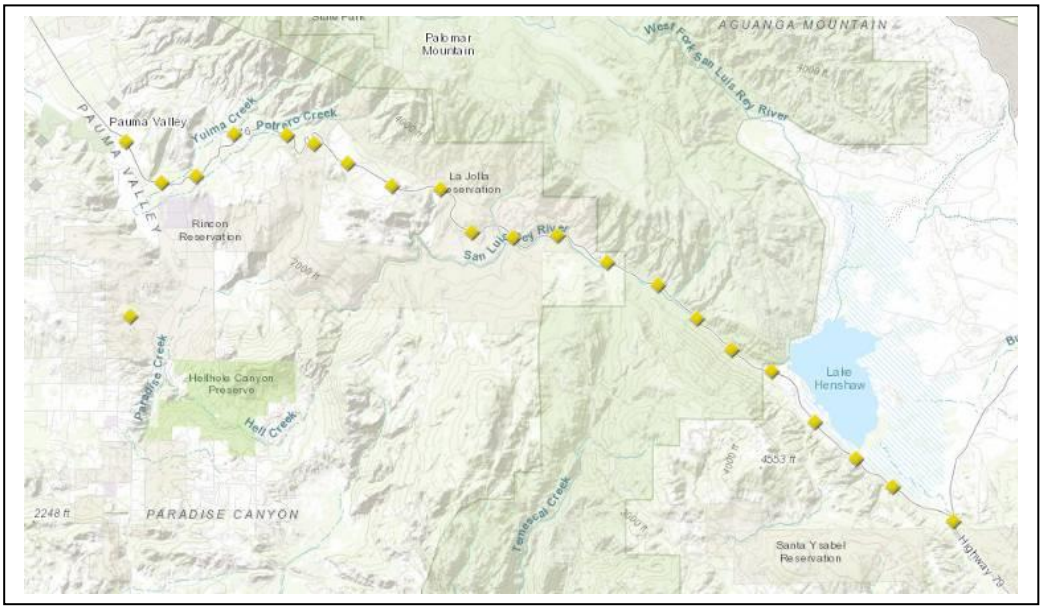


Figure A2. Option 2 – Example of trap deployment in a riparian corridor. Place one trap near each host at one-mile intervals.

APPENDIX B

SAMPLE COLLECTION AND PROCESSING PROTOCOLS

Sample Processing
LA County Agricultural Commissioner staff or other trained partners will monitor and collect traps. Staff will then sort, preliminarily identify, and record any of the target species found. If any ISHB, GSOB, Western Oak Bark Beetle (WOBB) or Alder beetles are collected, Agricultural Commissioner staff will collect samples for further identification by CDFA or other entomologist to confirm identification.

Sample Collection and Preservation Protocols
Wood samples and/or dead beetles should be carefully collected, preserved, and sent to the appropriate lab for confirmation. Do not send live beetles!

1. California Department of Food and Agriculture Plant Pest Diagnostics Branch-Entomology Lab (Submission protocols are found below and available at file:///E:/EDRR%209.9.19/Sample%20Submission%20Forms/Submission_guidelines_Entomology.pdf)
   Mailing Address: CDFA -Plant Pest Diagnostics Center c/o Entomology Laboratory 3294 Meadowview Rd. Sacramento, CA 95832

2. Los Angeles County Agricultural Commissioner Pest Identification laboratory

3. The lab of Dr. Richard Stouthamer, if, or the CDFA and/or other designated lab for confirmation

Wood Sample Collection and Preservation
The complete sampling protocols to collect from wood are found below and are available at https://ucanr.edu/sites/pshb/files/204933.pdf and https://www.cdfa.ca.gov/plant/PPD/PDF/ppath_sampling_guidelines.pdf.

1. Remove any sap or powdery exudate covering the entry/exit hole of the beetle gallery. If the beetle is trapped in the sap, you can include it in your sample. Do not include live beetles.
2. Carefully remove the bark surrounding the entry/ exit hole with a clean knife. You do not need to include the bark in your sample. This reduces the number of contaminants and increases the chances of detecting the fungi in the lab.
3. Make a box-shaped incision around the entry/exit hole. The box should be at least 1 cm deep and include both dead and living tissue. Dead or diseased tissue is often stained brown or black.
4. Carefully pry the sample out with a sturdy knife or chisel.
5. Place the sample in a sealed plastic bag and fill out the Specimen Submission form at eskalenlab.ucr.edu.
6. Disinfect all sampling tools used to prevent inadvertent spread. Soak tools in 5% bleach, 70% ethyl alcohol (rubbing alcohol), or Lysol® spray.

Dead Beetle Collection and Preservation
To sample a specimen caught in a tape trap, avoid smashing the specimen. Instead, carefully remove the specimen with tweezers and place in appropriate container such as a sealable bag with a cushion of air, a small glass or plastic jar, or the section of the sticky trap it was captured in. Or it may be easier to send the entire trap. Alcohol may help preserve the specimen in a jar. Disinfect all sampling tools used to prevent inadvertent spread. Soak tools in 5% bleach, 70% ethyl alcohol, or Lysol® spray to prevent inadvertent spread.

Sample Processing and Chain of Custody Requirements

Samples should be accompanied with the proper forms required by the laboratory sent to. Current and updated forms are available at:

Who to send beetles to? Los Angeles County Agricultural Commissioner Pest Identification laboratory and/or other designated lab for identification and confirmation. Or CDFA?

INVASIVE SHOT HOLE BORER + FUSARIUM DIEBACK

Guidelines for how to sample a suspect tree

cdfa

PLANT PEST DIAGNOSTICS CENTER

Signs and Symptoms

Sampling

1. Remove any sap or powdery exudate covering the entry/exit hole of the beetle gallery. If the beetle is trapped in the sap, you can include it in your sample. Please transfer any live beetles to vials of ethanol.

2. Remove the bark surrounding the entry/exit hole with a clean knife. Excluding the bark in your sample reduces the number of contaminants and increases the chances of detecting the fungi in the lab.

3. Make a box-shaped incision around the entry/exit hole. The box should be at least 1 cm deep and include both dead and living tissue. Dead or diseased tissue is often stained brown or black.

4. Carefully pry the sample out with a sturdy knife or chisel. Please **freeze** samples overnight to prevent sending live beetles.

5. Place the sample in a sealed plastic bag and fill out the attached specimen submission form (PDR).

Please send samples to:

California Department of Food and Agriculture
Plant Pest Diagnostics Center
3294 Meadowview Road
Sacramento, CA 95832

Information and photos provided by the Eskalen Lab. Visit the lab's webpage for more information.
https://ucanr.edu/sites/eskalenlab/Handouts_and_Posters/

Contact Albre Brown at (916) 738-6693 or albre.brown@ca.cdfa.gov for any additional questions. The link to general sampling guidelines is as follows:
https://www.cdfa.ca.gov/plant/PPD/PDF/ppath_sampling_guidelines.pdf

Available from https://www.cdfa.ca.gov/plant/PPD/PDF/ppath_sampling_guidelines.pdf.

Polyphagous Shot Hole Borer + Fusarium Dieback
How to Sample a Suspect Tree

WHY SAMPLE?

Suspected infestations of Polyphagous Shot Hole Borer/ Fusarium Dieback can be verified by lab tests. Signs and symptoms of PSHB/FD (multiple entry holes about the size of the tip of a ball point pen with staining/gumming/sugar exudate) can look very similar to those caused by other pests and may occur on the same hosts.

This is the process for properly collecting a sample from a suspect tree. Species pictured is Goldenrain tree (*Koelreuteria paniculata*).

Photos provided by Akif Eskalen, Ph.D (UC Riverside).

DISINFECT YOUR TOOLS!

Any sampling tools that come into contact with potentially infected wood must be disinfected to prevent spreading the fungi to other plants. Used tools can be sprayed with or soaked in one of the following solutions:

- 5% bleach
- 70% ethyl alcohol
- Lysol® spray

UNCOMFORTABLE WITH SAMPLING?

You may also report suspected tree infestations in Orange County to pshb.ucce.oc@gmail.com. Outside of Orange County, report trees to UC Riverside at eskalenlab@gmail.com. Submit the following information:

- Your contact info (name, city, phone number, email)
- Suspect tree species
- Description of suspect tree's location (and/or GPS coordinates)
- Description of suspect tree's symptoms
- Photos of suspect tree and close-up photos of symptoms

UC will use symptom photos and descriptions to decide whether a field assessment is needed.

CONTACT

Questions or suggestions? Please contact the Eskalen Lab at eskalenlab@gmail.com.

Printed 12/2014

THE PROCESS

1 Remove any sap or powdery exudate covering the entry/exit hole of the beetle gallery.

If the beetle is trapped in the sap, you can include it in your sample. Do not include live beetles.

2 Carefully remove the bark surrounding the entry/ exit hole with a clean knife. You do not need to include the bark in your sample. This reduces the number of contaminants and increases the chances of detecting the fungi in the lab.

3 Make a box-shaped incision around the entry/exit hole. The box should be at least 1 cm deep and include both dead and living tissue.

Dead or diseased tissue is often stained brown or black.

4 Carefully pry the sample out with a sturdy knife or chisel.

5 Place the sample in a sealed plastic bag and fill out the Specimen Submission form at eskalenlab.ucr.edu.

UC CE | University of California Agriculture and Natural Resources

UC RIVERSIDE

Available from https://ucanr.edu/sites/pshb/files/204933.pdf.

Sample Preparation and Submission
to the Plant Pest Diagnostics Branch
Entomology Laboratory

cdfa
CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

PLANT PEST DIAGNOSTICS CENTER

The entire booklet can be found at
https://www.cdfa.ca.gov/plant/ppd/PDF/Submission_guidelines_Entomology.pdf.

APPENDIX C

VISUAL SURVEY METHODS AND PROTOCOL

Survey Protocols for Tier One: Professional and Trained Personnel

WHO: Trained professionals who have:

- passed the UCANR online test for ISHB and GSOB,
- have also passed an in-field test supervised by UCANR or other trainers,
- have completed LA County license requirements, and
- have been approved to input data,
- know and practice the necessary protocols to prevent the spread of beetles to other survey sites.

Examples of such trained professionals includes but are not limited to: Agricultural pest inspectors, Fire and Forestry staff, line monitoring by SCE, Caltrans, DPW, other utilities, Parks and Recreation, biologists, licensed landscape professionals including arborists, landscapers, and tree trimmers.

Table 1. Professional and Trained Personnel Survey Protocols

Information Goal	Survey Protocol Recommended
Identify baseline conditions in un-infested areas – with tree inventory data (cities, city parks, etc.)	CDFW 2017 Visual Survey Protocol (CalFire 2019 Modification).
Identify baseline conditions in un-infested areas – no species data (campgrounds, parks, etc.)	CDFW 2017 Visual Survey Protocol (CalFire 2019 Modification)
Identify new infestations and track spread in High Risk areas (riparian corridors, parks, wildlands)	CDFW 2017 Visual Survey Protocol (CalFire 2019 Modification)
Track rate of spread and density of infected trees in infested areas	CDFW 2017 Visual Survey Protocol (CalFire 2019 Modification)
Incidental reports by trained professionals examining trees for other reasons	iNaturalist Survey Protocols. Available at: www.rcdsmm.org.
Focused high-risk tree species surveys (box elders, sycamores, etc.)	CDFW 2017 Visual Survey Protocol (CalFire 2019 Modification)

Where:

1) Regular, scheduled surveys of high priority areas adjacent to or on the leading edge of either known infestations or high value areas of special concern (riparian corridors, etc.) selected and coordinated by Agricultural Commissioner staff.
2) Opportunistic incidental reports when observers are examining trees for other reasons (line clearance, park or landscape maintenance).

Survey Protocols for Tier Two: Community Science Volunteers

Who:

- Self-selected interested volunteers recruited from docent training, Audubon, Sierra club, CNPS, CA Naturalist, master gardener and other garden groups, students, etc. All volunteers are encouraged to take the UCANR online class for ISHB and GSOB. All

volunteers must know and practice the necessary protocols to prevent the spread of beetles to other survey sites.

Table 2. Community Volunteer Survey Protocols

Track rate of spread and density of infected trees in infested areas	iNaturalist Survey Protocols. Available at: www.rcdsmm.org.
Identify new reproductive hosts	iNaturalist Survey Protocols. Available at: www.rcdsmm.org.
Incidental reports by trained professionals examining trees for other reasons	-iNaturalist Survey Protocols -www.pshb.org online assessment tool

Where:

1) Regular, scheduled surveys of high priority areas adjacent to or on the leading edge of either known infestations or high value areas of special concern (riparian corridors, etc.) identified and coordinated by the Agricultural Commissioner staff and GIS map team in coordination with local volunteer groups.
2) Opportunistic incidental reports along hiking trails, recreation areas, backyards, city/County parks and open spaces, and other areas of interest to, and determined by the observer.

Invasive Shot Hole Borer (Polyphagous or Kuroshio) Visual Surveys of San Luis Obispo County Parks - CALFIRE-March 2019

Invasive Shot hole borer (ISHB) will be surveyed by a crew of 1 or 2 depending on the location. For large areas, the crew will consist of 2 people for purposes of increased detectability and safety. The goal of the visual inspection surveys is for presence/absence of ISHB and to what extent and is not meant to determine population size but can possibly give an indication of level of infestations. Surveys will be thorough to determine if an area is clear for ISHB by surveying the most susceptible trees first in the county parks.

Equipment

ISHB survey observers would need the following equipment and supplies before conducting survey;

1) First aid kit
2) Water
3) Sunscreen
4) Proper clothing (i.e., boots, long sleeve shirts, etc.)
5) Survey123 App on phone
6) Spray bottle of disinfectant liquid for knife
7) Knife (dis-infect after every sample)
8) Collection vials and labels

9) Tweezers
10) Magnifying Loupe (16X minimum)
11) Camera
12) ISHB field guide

Survey Method: Dependent on terrain, density, and species present, either survey of all susceptible trees in the parks will be conducted or a visual survey method will be used.

At end of the survey be sure **no beetles, or other invasive species,** are on you or gear, clothing or boots, by visual inspection before entering the vehicle. This is very important to ensure we are not transporting the beetle or another invasive species*Survey All Susceptible Trees Method*

Suitable applications include survey areas that are open with relatively lower amounts of host species present. Observers will look at the susceptible hosts that are listed on www.pshb.org. If the survey area is very dense with susceptible hosts then hosts near the trails, roads, streams will be looked at in the park. Observers will look at 2-3 trees from the roads, trails.

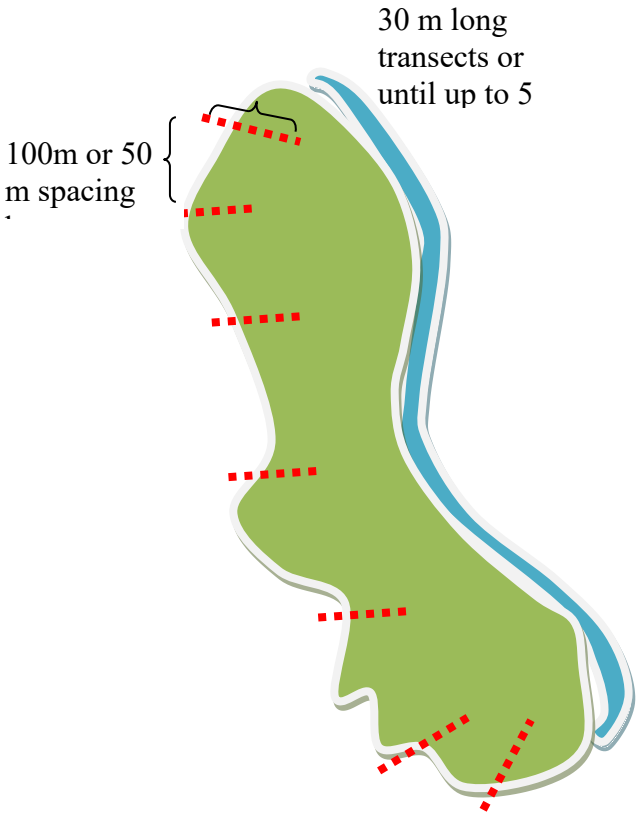
Visual Survey Method

Suitable applications include survey areas that are dense with relatively high amounts of host species present. There are two possibilities that could occur during this type of survey.

1) Depending on terrain, observers will spread out perpendicular to riparian area. Observer closest to riparian area will be spaced far enough from riparian to cover 2-3 trees. The vegetation will determine these distances with safety being the most important factor. Such spacing can be as short as 1-2m and as long as 20m depending on how thick the cover is. Observers should look for obvious signs and symptoms of infestations opportunistically as they proceed throughout the study area. Observations will be recorded for each host plant on Surevey123 app. Observations will continue to be made until the end of the property has been reached or it is deemed too thick in vegetation density (i.e., visibility less than 2 meters), or unsafe due to topography and/or water bodies are present. If this is the case, then a perimeter search of the tree stand with random interior point will be conducted if possible (#2).

2) Perimeter search of the tree stand with random interior point will be conducted.

Specifically, a survey will be conducted every 100 meters around or within the tree stand. In cases where 100-meter spacing is not possible due to access, or other limitations, points with 50 m spacing may be used as an alternative. The observers will enter the dense tree stand and survey up to 5 susceptible trees on the 30m transect or as far as the vegetation allows. These random interiors transects will cover the tree stand but not open spaces. Often, riparian stands may be too narrow to have both permitted and interior survey points.



Data collection

Observers will enter the data into Survey 123 app. Observers inspect main stem up to 10 feet high of trees for ISHB sign. Be sure to cover all sides of tree for inspection to ensure nothing was missed. If all sides of the tree can't be surveyed, then focus on the North side of the tree. Shrubs will not be inspected unless there are questionable symptoms or no other host trees are within the survey area.

If a tree is found to have ISHB or is in question, note in the Survey123 app, a picture, mark the tree with flagging, and sample the tissue and/or beetle for verification. Be sure to disinfect knives for fungus. Tissue samples will be taken from trees with green cambium with procedures laid out in University of California Agriculture and Natural Resources website

http://ucanr.edu/sites/pshb/files/204933.pdf No more than 10 minutes will be devoted to collect tissue samples to reduce overall survey time on host trees.
And to reiterate for good practice, at the end of survey be sure **no beetles or other invasive species** are on you or gear, clothing or boots, by visual inspection before entering the vehicle. This is very important to ensure we are not transporting the beetle or another invasive species.

For good practice, it is crucial to make sure that at the end of each survey, there are not any beetles or other invasive species on you or your gear, clothing, or boots. Do a quick visual inspection before entering the vehicle to make sure we are not transporting any beetles or other invasive species.

Data management
Survey123 data collected will be uploaded to the database setup by CALFIRE forest pest management staff to be analyzed.

iNaturalist Bad Beetle Watch Survey Protocols

iNaturalist Bad Beetle Watch Survey Protocols- Plant Identification Guide

Available at: https://www.rcdsmm.org/wp-content/uploads/2019/10/SMM-Bad-Beetle-Plant-ID.pdf.

Santa Monica Mountains Bad Beetle Watch Plant Identification

Box Elder Tree (*Acer negundo*)

-Found in the riparian or creek zone

-Native

Photo from National Park Service SMMNRA Wildflowers website

Arroyo Willow (*Salix lasiolepis*)

-Riparian

-Looks more like a large shrub than tall, vertical tree

-Bark is usually smooth

-Native

Photo from CalFlora

Red Willow (*Salix laevigata*)

-Riparian

-Looks more like tall, vertical tree

-Bark is rough

-Native

Photo from CalFlora

London Plane Sycamore
(*Platanus x acerifolia*)
-Non-native sycamore

-Not found in wildlands; always planted

-Does not hybridize with native sycamore

Photo from tree-guide.com

California or Western Sycamore
(*Platanus racemosa*)

-Native sycamore

-Riparian

Photo from Photo from National Park Service SMMNRA Wildflowers website

Coast Live Oak

(*Quercus agrifolia var. agrifolia*)

-Native

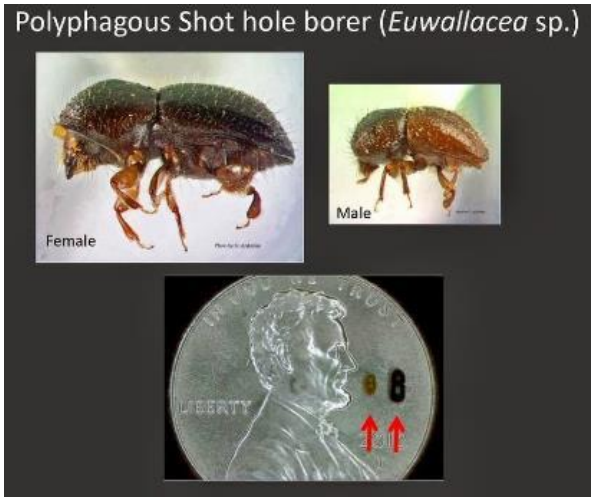
Photo from National Park Service SMMNRA Wildflowers website

iNaturalist Bad Beetle Watch Full-length Survey Protocols

Available at: https://www.rcdsmm.org/resources/caring-for-your-oak-trees/.

RCD
RESOURCE CONSERVATION DISTRICT
OF THE SANTA MONICA MOUNTAINS

SANTA MONICA MOUNTAINS BAD BEETLE WATCH



Goldspotted Oak Borer

Photos courtesy of the University of California Agricultural and Natural Resources

WELCOME!

Thank you for joining our volunteer community science team to learn more about the Polyphagous and Kuroshio Shot Hole Borer beetles (collectively known as Invasive Shot Hole Borers, ISHB, or BAD BEETLES) and other emerging tree pests!

ISHB are invasive wood boring beetles that attack numerous native and non-native trees in Southern California, including commercial avocado groves. While these beetles mechanically damage trees by boring galleries (caves) into trunks and branches, both beetles also carry a fungal disease called Fusarium Dieback. This fungus is "farmed" by the beetles as food and supports their reproduction. Trees that become infected with this fungal disease are prone to branch dieback, canopy loss, and mortality. Mortality can occur quickly within 1-5 years. A conservative estimated rate of spread is 1.5 to 2 miles a year. This is, however, drastically increased by humans as we transport infected wood. In Southern California, the drought has already weakened many trees and now they must fight infestations as well! To learn more about the pests threatening native oak trees, visit https://ucanr.edu/sites/socaloakpests/Resources_on_oak_pests/.

Your participation will detect early infestations and allow us to get a clearer picture of the spread of ISHB in the Santa Monica Mountains National Recreation Area. This knowledge will assist us, and many other conservation agencies, plan for management. While this beetle/disease complex can affect hundreds of tree species, this survey will focus on six species: a native box elder, two native willows, two sycamores (one native and one non-native) and one oak tree species. These species are a few of many known reproductive hosts (these are trees where all life stages of the beetle have been found. For a complete list, visit www.pshb.org). Box elder trees (*Acer negundo*) are few in the Santa Monica Mountains and are found in the sensitive riparian zone. The arroyo willow (*Salix lasiolepis*) and red willow (*Salix laevigata*) are early detection systems, and often the first species to show infestation. They are also found in the sensitive riparian zone. The non-native London plane sycamore (*Platanus x acerifolia*) is commonly found planted in wildland-urban and urban areas. The native California or western sycamore (*Platanus racemosa*) is commonly found in wildlands (usually near a creek, or riparian, environment) and planted in urban areas. The coast live oak (*Quercus agrifolia*) is also found in both wildland and urban environments. All are highly susceptible to pests, and both the trees and the pest damage are easy to see.

The Goldspotted Oak Borer (GSOB) is another beetle threatening to spread into the Santa Monica Mountains. This borer attacks only oak species and is usually found in the bark. While it is not found in our mountains yet, we must keep an eye out! Evidence of GSOB attack includes staining, oozing, chipping on bark from a woodpecker eating the larvae, and small D-shaped exit holes on only oak trees. In 2017, one GSOB was found in Idyllwild by a volunteer who had attended a GSOB education and outreach event. The volunteer then used the online reporting system at www.gsob.org to report the find. Early detection systems work!

FREQUENTLY ASKED QUESTIONS

Where can I learn to identify invasive shot hole borers?
Go to www.pshb.org for an amazing online class that takes less than half hour to complete. Visit www.gsob.org to learn what a GSOB looks like!

Can I set up my survey along my daily/weekly hike route?
YES PLEASE!

What if I don't find anything?
Please let us know where you looked. It is super important as well! Knowing where the trees are impacted as well as where there is no infestation is important to help us follow changes and rate of spread over time.

Do I have to do this regularly or is a random hike through the Santa Monica Mountains helpful as well? Repeat visits to one location are preferred, as that will more clearly show changes over time. If, however, you are hiking somewhere else and see some trees that look infested, it is also helpful for you to take an observation in iNaturalist.

WHERE TO LOOK

Anywhere you regularly walk or hike! The more eyes looking the better.
Identifying the extent of infestations requires an iterative process of detection and monitoring.

California's statewide monitoring system has a list of high-risk areas. Most of these areas are in places where wood is being transported, processed, and/or used, such as:

- trailheads and campgrounds
- parks and recreation areas with grills
- botanical gardens
- universities and school campuses with susceptible host tree species
- green waste and landfill facilities, and routes to them
- landscape management areas (Homeowners Association green spaces, etc.)
- tree nurseries, box stores selling trees and firewood
- firewood sellers, Craig's list review for firewood sellers
- firewood processing facilities
- wildfire boundaries

Other areas that are at high risk of infestation are:

- located along the leading edge of a known infestation
- contain a host species of concern (such as a box elder or California sycamore)
- a sensitive location, such as riparian areas and drainages, or where endangered species are found

A map of where ISHB have been found is available at https://ucanr.edu/sites/pshb/Map/.

HOW TO START

IMPORTANT: Do this FIRST where you have service or connection to the internet!!

iNaturalist is a commonly used tool to help quickly identify various types of species. You will be using this app to help detect and report instances of bad beetles. Thank you!

Task #1 – Install iNaturalist on your smartphone:

-For Apple iPhones-

1. Tap the app store on your phone.
2. Go to search and type in iNaturalist.
3. Download the free iNaturalist app (just the plain iNaturalist, not Seek by iNaturalist). Seek is also a fun app and totally recommended!

-For Android smartphones-

1. Tap the apps icon from your phone's home screen (it looks like several dots or small circles in a square).
2. Go to the Play Store.
3. Find the search bar at the top and type in iNaturalist.
4. Download the free iNaturalist app (just the plain iNaturalist, not Seek by iNaturalist). Seek is also a fun app and totally recommended!

VERY IMPORTANT FOR ALL SMARTPHONES!!!!

Task #2 – Check that location services are turned on in your phone:

Be sure to turn on the GPS locater on your phone. This is ESSENTIAL for determining your location. Even if you do not have cell phone service at the time when you take photos with iNaturalist or your phone's camera, your GPS location will be saved to that photo.

How to turn on location services on your phone:

-For Apple iPhones (may vary depending on iPhone version) -

1. Go to Settings.
2. Look for the Privacy menu. Look for Location Services and make sure this is turned ON.
3. Scroll down until you find iNaturalist. ALLOW LOCATION ACCESS while using the app.
4. Or, in case you need to use your phone's built-in camera, be sure to find Camera in the same menu as iNaturalist. ALLOW LOCATION ACCESS while using the app.

-For Android smartphones (may vary depending on phone version) -

1. From your home screen, enter Settings menu.
2. Tap on Location Services or Location Access.
3. If your phone shows "High Accuracy" anywhere, turn that on as well.

Alternatively, if you choose to use a digital camera with GPS capability, please turn on that capability. We should be able to collect GPS information from the photo files you submit. You will need to collect data then email photos and data sheet to Rachel Burnap at rburnap@rcdsmm.org.

Task #3 – Join iNaturalist:

1. Sign up for an account through the app on your phone or on your computer at iNaturalist.org.
2. Join the Santa Monica Mountains Bad Beetle Watch project.
3. To do this on your phone's iNaturalist app, click on the three "dots" in the lower right corner.
4. Bring up a search bar by clicking on the small magnifying glass in the top right corner. Type in "Santa Monica Mountains Bad Beetle Watch". Once it goes to that page, find and click the "Join" button. That's it! You are ready to make your first observation!

If you want to know more about using iNaturalist, please visit these online tutorials:
-Getting Started - (https://www.inaturalist.org/pages/getting+started)
-Video Tutorials - (https://www.inaturalist.org/pages/video+tutorials)

Learn more about the ISHB and GSOB directly from the iNaturalist app. From the iNaturalist phone app, click on ACTIVITY (to the left of the Observe button), then NEWS (at the upper right corner). This will show clickable links to an online plant ID pdf, ISHB and GSOB guides online.

COLLECTING DATA

Task #1 – Pick a location with trees you want to monitor:

1) Choose a location close to you or another location where there is a mature stand of red or arroyo willows, California sycamores, coast live oaks, or London plane trees. Pick trees that have a diameter at breast height over 4" (trees under 4" are rarely infected). If it is winter and the deciduous trees (all trees but the coast live oak) have lost their leaves, look at the ground for a leaf to examine. Pick a stand of trees that will be easy to remember the location of. Riparian areas with willows and landscape areas with box elder trees are also of concern. The ideal stand for monitoring is 3-6 trees but could be an individual tree in your back yard, or a stand of 10 trees in a park or along a trail.

- **Keep in mind that it must be SAFE location and one where you have permission to enter. Be aware of traffic – cars, bikes, etc. and uneven surfaces. When examining trees that may be off trail, be sure to look where you are walking! Keep an eye out for large amounts of ants, rocks, gopher holes, and rattlesnakes. When working in long grasses, check your surrounding (and yourselves!) for any other animals, such as ticks. We always recommend working in pairs!**

2) While not necessary, determine if you want to monitor multiple stands in one site (for example, Harmon Park in Ventura has sycamores on both sides of a flood control channel. Each side containing a group of 4-5 trees would be considered a separate stand).
3) For each stand of trees at the site, choose a photo point that you can **easily locate again**. Ideally, you want to return to the same point to take a picture each time you visit. Good candidates for photo point "markers" are a street corner, a unique rock or plant, features found along a sidewalk, or bathrooms/water fountain/tennis court/playground, etc.

4) **Remember, trees that are infected and are NOT infected are both important!**

Task #2 – Observe the first tree:

1) Walk around the tree and look for signs of infestation: staining, gumming, frass, exuding sugar, and any visible bore holes. Pay special attention to the north side of the tree but do walk around the entire tree. Focus your effort 2 feet above and below (for a total of 4 feet) the 4.5 ft (breast height) above the ground. This does not need to be exact. On willows and sycamores, often the first signs of infestation are conveniently found near eye level, but ideally you should examine from about 2 feet to 6 feet off the ground. Oak infestation is usually seen first on the branches.

Task #3 – Take four photos of each tree with iNaturalist:

1) You will take four photos for EACH TREE in your chosen stand/s. To help with locating your trees next time, you may choose to assign a reference number to each tree. You could number trees from left to right, or clockwise if that makes more sense to you. One idea is to place a piece of duct or painters' tape with the reference number on it. This way your photo will include the reference number.
2) From the iNaturalist app, click the OBSERVE button on the screen bottom to bring up the camera. Following the photo guidelines found below, take the first photo. If you are satisfied with it, click on the green NEXT button. To take photo 2 of the same tree, click on the BOX WITH THE PLUS sign in the upper left corner. Take the next two photos in the same manner for a total of four photos.
3) **Alternatively,** you can take each picture with the normal camera app and then click OBSERVE and select the images from your photo timeline. Again, make sure that location services are turned on.
4) **INaturalist will save your photos in the app and in the app where your phone's pictures are stored.**

Some photo guidelines to keep in mind:

- The image must be very clear (we can't tell anything from an image that is out of focus).
- Please wipe off your camera lens.
- Having the sun at your back will reduce glare in your photo.
- Please take each set of photos in the same sequence.

Photo 1 – Close-up of the hole with a pen or pencil.

The first image should be of the beetle hole and include the point of a pen or pencil for scale and to point out the exact location of the suspected or known beetle hole. Make sure not to cover the hole itself but be within ¼ inch of the hole. In some cases, you make be able to see a black roundish thing poking out of the hole; this is a beetle abdomen.
If no holes are found and the tree is absent of beetles, skip this photo. Beetle-free trees will only contain three photos.

Photo 2 – Photo of the tree trunk showing distribution of holes on trunk and/or branches.
Place a piece of brightly colored painter's tape or flagging at the highest and lowest point of distribution. This will be the second tree in your series if your first photo contained a beetle hole. If this tree is absent of beetles, take a picture of the tree's trunk.

Photo 3 – IMPORTANT: Photo of leaves, flowers, and/or fruit to identify tree species.

Photo 4 – Photo of entire tree canopy.
This will be the hardest photo to take. Step back far enough from the tree to see the entire tree canopy. For the best photo, aim to have the sun behind you. Watch your step. If your tree is found in a stand, please place a piece of brightly colored flagging or painter's tape on the trunk of observed tree (not shown in the example photograph).

Task #4 – Provide data for THIS individual tree:
Repeat for each tree!

1) Note: INaturalist may have different common names for each species. These are the correct common and Latin names:
   -Western or California sycamore (*Platanus racemosa*)
   -London plane (*Platanus x acerifolia*). INaturalist uses this common name for a different species.
   -Coast live oak (*Quercus agrifolia*)
   -Red willow (*Salix laevigata*)
   -Arroyo willow (*Salix lasiolepis*)
   -Box elder or Boxelder maple (*Acer negundo*)
2) If confident with species identification, enter the correct species in the search bar. Otherwise, ignore "What did you see?"
3) Under "Notes," type in ground conditions around the tree – clear dirt, maintained grass, mulch, etc. This is helpful but not required.
4) Leave date, time, and location as is.
5) Under "geoprivacy" please leave as open or obscured. One note about geoprivacy: if you keep your geoprivacy open, everyone on iNaturalist can see the location at which you took the photo. This may or may not matter to you. If you choose to keep the geoprivacy obscured, a location will be shown but it will not be the true location. It will still be visible to project curators. Private observations show nothing on the map and make it hard for curators to see.
6) Ignore Capture/Cultivated.
7) Click on "Projects" and turn on Santa Monica Mountains Bad Beetle Watch. This will reveal eight data prompts:

    a. **Infestation Level** – 0, 1-50, 50-150, or greater than 150. Required.
    b. **Canopy Health** – Select yes or no. A healthy canopy is over 75% green. Required.
    c. **Crown Dieback** – Select the percent of crown dieback to the nearest 5%. Required.
    d. **Tree Circumference at Breast Height** – In inches. You will only need to do this for each tree at the first initial visit. There is no need to repeat. It is not a required field. TO DO: Measure 4.5 ft from the base of the tree up the trunk. HINT – if it's easier, measure 4.5 feet on yourself at home, then use that as your reference point. Also, take note of where 4.5 feet is on you to use for your monthly survey. Wrap either the measuring tape or a piece of string around the trunk – then measure the length of the string. You've now measured the circumference of the tree! If it is a multi-trunk tree, measure the diameter of the largest stem and enter the number of stems. Not required.
    e. **Number of Stems**. Only for a multi-trunk tree. Again, no need to repeat after first visit.
    f. **Evidence of Staining, Frass, Both, or None**. Not a required field.

g. **Presence of Live Beetles** – None, live beetles found in hole, climbing on trunks, or in flight. Not a required field.
h. **Direction that Most Beetle Holes are Facing** – East, West, North or South. Not a required field.

8) Click the back arrow.
9) IMPORTANT: Check to see if your phone has geotagged your correct location by clicking on the location bar (found below the date). Choose either hybrid or satellite view (at the bottom of your screen). You can zoom in and out of the image by moving two fingers together or apart. If you need to correct it, you can move the image to place the tree in the center of the circle than hit save. Note that the accuracy is improved.
10) Click the SHARE button and you've made an observation! You may edit your entries through the app or online.

Task #5 – If documenting more than one tree, repeat tasks #2-#4.

What will we do with the data you just collected?

We will check it first then share it with local county and state agencies.

Task #6 – In about a month, do over again with, ideally, the same trees. However,

any data that is collected is helpful and needed!

To edit your data:

-From the app on your phone-

1) Click on ME, found at the bottom of the screen, to the right of the observe button. A list of all observations made will be shown.
2) Click on the appropriate one to edit. Click EDIT at the top right corner. From here, anything can be edited.
3) To edit observations, click on PROJECT, then turn OFF ISHB of the Santa Monica Mountains. Then turn it back on. All previous answers will still be saved. Make any needed changes.
4) Click on back arrow.
5) Click DONE at the upper right corner. It is edited and saved!

-Online at iNaturalist-

1) Log into your account.
2) Under the account name, click on OBSERVATIONS.
3) Find the entry to be edited. To edit, click on EDIT. It consists of a *small font size* and is found to the far right of the observation entry.
4) Please check location and edit if necessary.
5) To look at or edit observation data, click on the down arrow button located to the right of Start Typing Fields. A menu of data fields will appear. Click on each one to see or edit.
6) Click SAVE OBSERVATION.

Other ways to enter data:

-Online at inaturalist.org-

1) Log into your account.
2) Click on UPLOAD at upper right corner. Find and place all photos for a SINGLE TREE.
3) Enter species name if confident on species identification.
4) IMPORTANT: Check metadata associated with photo. Check timestamp (date photo taken), and location. Change if needed.
5) Under projects, find ISHB of the Santa Monica Mountains.
6) Under fields, enter the observation data.
7) At the upper right, click on SUBMIT.

-Email photos and data-

-From your phone or computer, please place all pictures from a SINGLE tree and corresponding data into an email and send to rburnap@rcdsmm.org. Data includes the eight observation fields from Task #4, Step #7 above. Infestation Level, Healthy Canopy, Crown Dieback, Tree Circumference at Breast Height (only at first visit), if a multi-trunk tree then Number of Stems (only at first visit), Evidence of Staining, Frass, Both, or None, Presence of Live Beetles, and Direction that Most Beetle Holes are Facing.

Please submit any questions or comments to Rachel Burnap: rburnap@rcdsmm.org

iNaturalist Bad Beetle Watch Short Version Survey Protocols

Available at: https://www.rcdsmm.org/wp-content/uploads/2019/10/Santa-Monica-Mountains-Bad-Beetle-Watch-Short-Version.pdf

Santa Monica Mountains Bad Beetle Watch

Become a detection detective

We need your help! Contribute valuable data on the distribution and spread of the Invasive Shot Hole Borers (Polyphagous and Kuroshio) and the Goldspotted Oak Borer!

Get Started:

1. Focus on six species. It does not matter where they are located.

-Box elder (*Acer negundo*) -Arroyo willow (*Salix lasiolepis*)
-Red willow (*Salix laevigata*)
-California or western sycamore (*Platanus racemosa*)
-London plane sycamore (*Platanus x acerifolia*)
-Coast live oak (*Quercus agrifolia*)

Handy to have:
Medium ball point pen (MUST), flashlight, magnifier, scraping tool, alcohol / cloth for disinfecting scraping tool

2. Take the ISHB online training at www.pshb.org

3. Download the iNaturalist app. Join the "Santa Monica Mountains Bad Beetle Watch" project. (Won't work unless you have cell service)

4. Be safe! Watch your step, look up, look down.

5. IMPORTANT: Turn on location services for your phone, iNaturalist app, and camera.

6. Find a tree from the above list. One tree or more (in a stand)? You choose! Pick trees with at least a 4" diameter. No evidence of infestation? We want this data too!

7. You are ready to make your first observation!!

Collect Data (Make an observation)

1. Click the OBSERVE button in iNaturalist
2. Walk around the tree. Look up, look down. Take 4 photos for each tree (examples on back).
3. What do you see? Enter your species
4. Check your map
5. Geoprivacy- open or obscured.
6. Projects-Santa Monica Mountains Bad Beetle Watch
7. These data fields:

For 1st visit if monitoring the same tree, multiple times. **Tree Circumference at Breast Height* - In inches. Measure about 4.5' above ground. If multi-trunk tree (tree has many "stems" sprouting from ground), measure the largest one. **Number of Stems* - Only for a multi-trunk tree.

Every visit.

**Infestation Level* - 0, 1-50, 50-150, or greater than 150. Required. Look from ground to ≈6'. **Canopy Health* - Select yes or no. A healthy canopy is over 75% green. Required. **Crown Dieback* - Select the % to the nearest 5%. Required. **Evidence* of Staining, Frass, Both, or None. **Presence of Live Beetles* - None, live beetles found in hole, climbing on trunks, or in flight. *Direction that Most Beetle Holes are Facing - East, West, North or South. **Curator_notes* - leave blank.

Editing tips. To change data in the above fields, turn the project button on/off, check data then hit back button. Click done to save.

You are done! Thank you!

Photo 1 – **MUST INCLUDE MEDIUM BALL POINT PEN**
Include beetle hole and pen for scale and point out exact location of the suspected or known beetle hole. Make sure not to cover the hole itself but be within ¼ inch of the hole. In some cases, you make be able to see a black roundish thing poking out of the hole; this is a beetle abdomen. If no holes are found and the tree is absent of beetles, skip this photo. Beetle-free trees will only contain three photos.

Photo 2 – Photo of the tree trunk showing distribution of holes on trunk and/or branches. Place a piece of brightly colored flagging or tape with the reference number at the highest and lowest point of distribution. This will be the second tree in your series if your first photo contained a beetle hole. If this tree is absent of beetles, take a picture of the tree's trunk.

Photo 3 – IMPORTANT: Photo of leaves, flowers, and/or fruit to identify tree species.

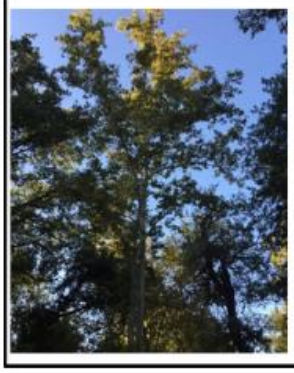


Photo 4 – Photo of entire tree canopy. This will be the hardest photo to take. Step back far enough from the tree to see the entire tree canopy. For the best photo, aim to have the sun behind you. Watch your step.

APPENDIX D

PERMIT CONTACTS AND ENVIRONMENTAL CHECKLIST

Permit Contacts

For Private Landowners on Private Property in the Santa Monica Mountains National Recreation Area

Agency	Contact Person (As of Fall 2019)	Protected Status	Phone Number
City of Agoura Hills	Greg Ainsworth (Private Consultant for protected oak trees w/in city)	Oak trees	(818) 597-7384
City of Calabasas	Planning Department	Oak trees	(818) 224-1600
City of Hidden Hills	Bob Coffee (HOA)	No trees are protected but all trees may be subjected to permitting	(818) 227-6657
City of Los Angeles	Urban Forestry Division	-Oak trees -Black walnut trees -Heritage trees -Special habitat value trees -Common park trees	(213) 847-3117
City of Malibu	Dave Crawford	Oak trees	(310) 456-2489 x277
City of Thousand Oaks	Planning Department	Oak trees	(805) 449-2323
City of Westlake Village	Planning Department	Oak trees	(818) 706-1613
LA County Agricultural Commissioner	Main Office	Call for tree inspection	(626) 574-5453
LA County Dept. Regional Planning (unincorporated LA County/within Local Coastal Zone)	Rob Glaser	All native trees over 5” diameter	213.974.6467

Agency	Contact Person (As of Fall 2019)	Protected Status	Phone Number
LA County Dept. Regional Planning (unincorporated LA County/outside of Local Coastal Zone)	Rob Glaser	All oak trees over 8" diameter	
LA County Fire / Forestry (unincorporated LA County)	Ron Durbin	Oak trees	818.890.5719
Ventura County Agricultural Commissioner	John Beall	Call for tree inspection	
Ventura County Dept. of Regional Planning (outside of Coastal Zone)	Justin Bertoline (County's tree permit planner)	-Oak trees over 9.5" -Sycamores over 9.5" -Heritage trees over 90" -Any historical tree -Misc. species over 9.5"	(805) 654-2466
Ventura County Dept. of Regional Planning (inside Coastal Zone)	Justin Bertoline (County's tree permit planner)	-A tree found within an Environmentally Sensitive Habitat Area -Most native trees over 3" diameter -Heritage trees over 28" -Any historical tree	(805) 654-2466

On Public Property in the Santa Monica Mountains National Recreation Area

Right of Entry Permits may be required for access to all public lands. Additional permits may be required depending on the location of the trees to be removed and/or treated.

Agency	**Contact Person (As of Fall 2019)**	**Email**	**Phone Number**
California Department of Parks and Recreation	Danielle LeFer	danielle.lefer@parks.ca.gov	(818) 880-0365
California Department of Forestry and Fire Protection	Kim Corella	kim.corella@fire.ca.gov	
Agency	**Contact Person (As of Fall 2019)**	**Email**	**Phone Number**
Mountains Restoration Trust	Ezekiel Schlais	ezekiel@mountainstrust.org	(530) 492-0241
National Park Service	Joseph Algiers	joseph_algiers@nps.gov	(805) 370-2393
Santa Monica Mountains Conservancy/Mountains Recreation and Conservation Authority	Paul Edelman	edelman@smmc.ca.gov	(310) 589-3200 ext. 128

In Riparian Zone, other Sensitive Resource Areas or Threatened or Endangered Species Critical Habitat Areas

Agency	Area of Interest	Contact Person (As of Fall 2019)	Email	Phone Number
California Department of Fish and Wildlife	-Riparian zone -Threatened or endangered species	Audrey Kelly	Audrey.Kelly@wildlife.ca.gov	(858) 467-4201
National Marine Fisheries Service	-Riparian zone -Threatened or endangered species	Brittany Struck	Brittany.struck@noaa.gov	(503) 230-5400
US Fish and Wildlife	-Riparian zone -Threatened endangered species	Chris Dellith	Chris_dellith@fws.gov	(916) 414-6464
US Army Corp of Engineers	Riparian Zone	Stephanie Hall	Stephanie.J.Hall@usace.army.mil	(213) 452-3425

Environmental Checklist

It is recommended to adhere to an environmental checklist, such as the California Environmental Checklist, listed below. It is available at http://resources.ca.gov/ceqa/guidelines/Appendix_G.html.

1. Project title: 2. Lead agency name and address: 3. Contact person and phone number: 4. Contact person and phone number: 5. Project location:
6. Project sponsor's name and address: 7. General plan designation:
7. Zoning:
8. Description of project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)
9. Surrounding land uses and setting. Briefly describe the project's surroundings:
10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

Aesthetics; Agriculture Resources; Air Quality; Biological Resources; Cultural Resources; Geology/Soils; Hazards and Hazardous Materials; Hydrology/Water Quality; Land Use/Planning; Mineral Resources; Noise; Population/Housing; Public Services; Recreation; Transportation/Traffic; Utilities/Service Systems; Mandatory Findings of Significance. (Specific questions for each section are listed below).

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

- ☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

- ☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

- ☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

- ☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only

the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
4) "Negative Declaration: Less Than Significant with Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).
5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
    a) Earlier Analysis Used. Identify and state where they are available for review.
    b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used, or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:
   a) the significance criteria or threshold, if any, used to evaluate each question; and
   b) the mitigation measure identified, if any, to reduce the impact to less than significance

	Potentially Significant Impact	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
AESTHETICS- Would the project:				
a) Have a substantial adverse effect on a scenic vista?	□	□	□	□
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	□	□	□	□
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	□	□	□	□
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	□	□	□	□
II. AGRICULTURE RESOURCES- In determining	**Potentially Significant**	**Less Than Significant with Mitigation**	**Less Than Significant**	**No Impact**

whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:	**Impact**	**Incorporated**	**Impact**	
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	□	□	□	□
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	□	□	□	□
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	□	□	□	□
III. **AIR QUALITY**- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?	□	□	□	□
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	□	□	□	□
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard	□	□	□	□

(including releasing emissions which exceed quantitative thresholds for ozone precursors)?				
d) Expose sensitive receptors to substantial pollutant concentrations?	□	□	□	□
e) Create objectionable odors affecting a substantial number of people?	□	□	□	□
IV. **BIOLOGICAL RESOURCES**- Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	□	□	□	□
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	□	□	□	□
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	□	□	□	□
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	□	□	□	□
e) Conflict with any local policies or				

ordinances protecting biological resources, such as a tree preservation policy or ordinance?	□	□	□	□
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	□	□	□	□
V. **CULTURAL RESOURCES**- Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	□	□	□	□
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	□	□	□	□
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	□	□	□	□
d) Disturb any human remains, including those interred outside of formal cemeteries?	□	□	□	□
VI. **GEOLOGY AND SOILS**- Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	□	□	□	□
-i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	□	□	□	□
-ii) Strong seismic ground shaking?	□	□	□	□

-iii) Seismic-related ground failure, including liquefaction?	□	□	□	□
-iv) Landslides?	□	□	□	□
b) Result in substantial soil erosion or the loss of topsoil?	□	□	□	□
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	□	□	□	□
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	□	□	□	□
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of waste water?	□	□	□	□
VII. **HAZARDS AND HAZARDOUS MATERIALS-** Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	□	□	□	□
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	□	□	□	□
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	□	□	□	□
d) Be located on a site which is included on a list of hazardous	□	□	□	□

materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	□	□	□	□
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	□	□	□	□
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	□	□	□	□
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	□	□	□	□
VIII. **HYDROLOGY AND WATER QUALITY**- Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Violate any water quality standards or waste discharge requirements?	□	□	□	□
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which	□	□	□	□

permits have been granted)?				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	□	□	□	□
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	□	□	□	□
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	□	□	□	□
f) Otherwise substantially degrade water quality?	□	□	□	□
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	□	□	□	□
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	□	□	□	□
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	□	□	□	□
j) Inundation by seiche, tsunami, or mudflow?	□	□	□	□
IX. **LAND USE AND PLANNING**- Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Physically divide an established community?	□	□	□	□

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	□	□	□	□
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	□	□	□	□
X. **MINERAL RESOURCES**- Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	□	□	□	□
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	□	□	□	□
XI. **NOISE**- Would the project result in:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	□	□	□	□
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	□	□	□	□
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	□	□	□	□
d) A substantial temporary or				

periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	□	□	□	□
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	□	□	□	□
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	□	□	□	□
XII. **POPULATION AND HOUSING**- Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	□	□	□	□
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	□	□	□	□
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	□	□	□	□
XIII. **PUBLIC SERVICES**	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other				

performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☐
Police protection?	☐	☐	☐	☐
Schools?	☐	☐	☐	☐
Parks?	☐	☐	☐	☐
Other public facilities?	☐	☐	☐	☐
XIV. **RECREATION**	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☐
XV. **TRANSPORTATION/TRAFFIC**- Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☐	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☐

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	□	□	□	□
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	□	□	□	□
e) Result in inadequate emergency access?	□	□	□	□
f) Result in inadequate parking capacity?	□	□	□	□
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	□	□	□	□
XVI. **UTILITIES AND SERVICE SYSTEMS**- Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	□	□	□	□
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	□	□	□	□
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	□	□	□	□
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	□	□	□	□
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it	□	□	□	□

has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	□	□	□	□
g) Comply with federal, state, and local statutes and regulations related to solid waste?	□	□	□	□
XVII. **MANDATORY FINDINGS OF SIGNIFICANCE**	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	□	□	□	□
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	□	□	□	□
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	□	□	□	□

APPENDIX E

INCIDENT ACTION PLAN TEMPLATES

Incident Action Plans

The following incident action plan is only an example and should be changed to be agency and site-specific. Site-specific Incident Action Plans (IAP) should identify who is responsible for what containment and treatment actions, produce a timeline and report documenting results.

EXAMPLE Gold Spotted Oak Borer Incident Action Plan
Operational Period: July 1, 2017 through June 30, 2017
Incident Objectives (ICS 202)

1. Facilitate effective communication and collaboration between San Diego GSOB Steering Committee members, public and private individuals and organizations, and local, tribal and state governments and agencies.
2. Identify agencies, groups, and individuals involved in developing methods for controlling and limiting the spread of GSOB and support the implementation efforts.
3. Identify stakeholders and develop a communications plan to effectively communicate GSOB environmental, socio-economic, and public safety issues.
4. Support and guide applied entomological, pathological and wood handling research to assist in effective GSOB management.
5. Encourage lead agencies and stakeholders to maximize support, including funding and staff, to address the complex issues associated with GSOB.

Organization & Assignment List (ICS 203)
Coordination and Management

Steering Committee (voting) Members	
Will Metz	US Forest Service, Cleveland National Forest (USFS CNF)
Tony Mecham	California Department of Forestry and Fire Protection (CAL FIRE) San Diego Unit
Mike Puzzo	California State Parks
Ha Dang	San Diego County Agriculture, Weights and Measures (AWM)
Casey Smith	San Diego City Parks and Recreation
Andy Yuen*	US Fish and Wildlife Service
Ed Pert*	California Department of Fish and Wildlife
(*were invited to join the Steering Committee due to ISHB, but have not yet participated)	

Steering Committee Staff Support	
Andy Quinn	San Diego County Department of Parks and Recreation
Joyce Schlacter	US Bureau of Land Management (BLM)
Robert Heiar	Descanso District Ranger USFS CNF
Chris Dowling	Palomar District Ranger USFS CNF
Jeff Hays	USFS CNF
Anabele Cornejo	USFS CNF
Eric Just	CAL FIRE San Diego
Sheryll Landrum	Greater San Diego Resource Conservation

	District
Travis Elder	San Diego County Agriculture, Weights and Measures
Tracy Ellis	San Diego County Agriculture, Weights and Measures
Betsy Miller	San Diego City Parks and Recreation

Regional Representatives	
Sheri Smith	USFS State and Private Forestry (S&PF)
Kevin Turner	CAL FIRE SoCal Invasive Pest Coordinator
To Be Determined (TBD)	California State Parks
Lendal Miller	Bureau of Indian Affairs (BIA)
TBD	BLM

Technical Specialist Advisors	
Andrea Hefty	USFS FHP Entomologist
Stacy Hishinuma	USFS FHP Entomologist
Cheyenne Borello	CAL FIRE Monte Vista Unit Forester I
Kim Camilli	CAL FIRE Forest Pest Specialist
Tom Smith	CAL FIRE Forest Pathologist
Lynette Short	CAL FIRE Urban Forestry Program for San Diego
Tom Scott	University of California Cooperative Extension (UCR)
Larry Swan	USFS S&PF, Forest Products Utilization/Marketing
Jan Gonzalez	UCCE San Diego

Group Assignment Activity Detail (ICS 204)
Regulatory Activities Group: Will Metz; TBD, Leaders

Assigned Personnel	
TBD	USFS S&PF CNF
Kevin Turner	CAL FIRE
TBD	San Diego County AWM
Tom Scott	UC Cooperative Extension
TBD	San Diego County Planning Department

Operations
The regulatory activities group will perform those activities needed to obtain the appropriate classification of and regulation of GSOB to limit infestation and minimize impacts of existing infestation on the environment and economy.
To accomplish this goal the group will perform the following:

Assignment	Responsible Party	Timeframe	Completed?
Explore potential regulations to curtail the movement of infested firewood, both intra-county and inter-county by collaborating with ISHB-groups and other counties or interested parties.	USFS CNF, CAL FIRE, San Diego AWM, UCCE, USFS S&PF.		
Update GSOB "White Paper" for various elected officials; review describing GSOB problem & threat including potential economic & environmental impacts with recommend policies/actions.	K. Turner in collaboration w/ others in the group. Final approval by the Steering Committee voting members before distribution.	2017. Updated as needed thereafter.	
Establish dialogue with cities recently affected by GSOB.	Steering Committee heads, K. Turner.	2017	
Establish/prioritize funding needs.	Steering Com. & staff.	2017	

Survey, Detection & Monitoring Group

Assigned Personnel	
Hefty/Hishinuma	USFS (S. Cal), Forest Health Protection
Tracy Ellis	San Diego County AWM
Mike Puzzo	California State Parks
Jeff Hayes	USFS, Cleveland National Forest
Nick Basinski	San Diego County AWM
Tom Scott	UC Cooperative Extension
Kim Corella	CAL FIRE
Kevin Turner	CAL FIRE
Jan Gonzales	UCCE San Diego
Lendal Miller	Bureau of Indian Affairs
Joyce Schlacter	Bureau of Land Management

Operations

Coordinate survey, detection and monitoring of GSOB spread amongst agencies and applied science communities. To accomplish this goal the group will perform the following:

Assignment	Responsible	Timeframe	Completed?
Prepare & maintain maps depicting various levels of GSOB infestation to facilitate management decisions.	Scott, Hefty, Hishinuma, Hayes, Ellis, Corella, Gonzales.	2017 and ongoing.	
Prepare and periodically update GSOB spread progression map.	Scott, Hefty, Hishinuma, Hayes, Ellis, Corella, Gonzales.	2017.	
Train agency, university & tree industry personnel outside of known infestation how to ID GSOB.	Scott, Hefty, Hishinuma, Corella, Turner, Gonzales.	Ongoing.	
Monitor areas of respective responsibility for level of infestation.	All assigned personnel in the group.	Ongoing.	
Conduct annual aerial surveys of GSOB spread.	Z. Heath, USFS FHP.	Annual.	
Investigate reports of GSOB infestation submitted on GSOB.org and by other methods.	Coordinated between members of the group & others as needed.	Ongoing.	

Applied Research/GSOB Management Strategies Group

Assigned Personnel	
A. Hefty, S. Hishinuma	USFS (S. Cal), Forest Health Protection
Sheri Smith, Steve Seybold	USFS (N. Cal), Forest Health Protection
Mike Puzzo	California State Parks
Tracy Ellis	San Diego County Agriculture, Weights and Measure
Mary Lou Flint	UC IPM Program
Tom Scott	UC Cooperative Extension

Kim Corella/K. Turner	CAL FIRE
(These personnel also comprise the Integrated Pest Management group)	

Operations

Coordinate survey, detection and monitoring of GSOB spread amongst agencies and applied science communities. To accomplish this goal the group will perform the following:

Assignment	Responsible	Timeframe	Completed?
Develop landowner/manager guide, an IPM matrix based upon level of GSOB infestation/location.	IPM Group.	2017.	
Determine what (if any) tree characteristics make GSOB attack more probable or less likely.	Scott, Hefty, Hishinuma, others.	2017.	
Determine if there are resistance characteristics of hybridized trees & evaluate using them for restoration/reforestation.	Scott, Hefty, Hishinuma, others.	2017.	
Evaluate/report the effectiveness of recurring pesticide applications on various land ownerships.	IPM Group.	2017.	
Evaluate GSOB literature and the GSOB website are up to date.	IPM Group with J. Gonzales, A. Cornejo.	2017.	
Evaluate the effectiveness of rapid response removal of infested trees in previously un-infested areas to contain, control or eradicate a satellite GSOB infestation.	IPM Group.	2017.	

Oak Woodland Management and Restoration Group

Assigned Personnel	
M. Anderson	USFS CNF Descanso RD
Kevin Turner	CAL FIRE

Mike Puzzo	CA State Parks
Tom Scott	UCCE

Operations

Develop management strategies for high value sites that mitigate tree related hazards and address the need/opportunity for reforestation on sites hit hard by GSOB.

To accomplish this goal the group will perform the following:

Assignment	**Responsible**	**Timeframe**	**Completed?**
Create oak woodland reforestation plan for on NFS land.	Jeff Hays.	2017.	
Involve local schools in oak woodland restoration work.	M. Anderson.	12/2010.	Ongoing.
Evaluate stump sprouting as an option for regeneration and evaluate methods of promoting successful sprouting.	M. Puzzo, T. Scott, USFS FHP?	Begun in 2015 and ongoing.	
Encourage agencies, organizations and the public to propagate oaks using acorns or seedlings in areas being attacked or threatened by GSOB.	K. Edwards, T. Scott.	Ongoing.	
Evaluate the appropriateness of recommending planting of alternative oak species that are not susceptible to GSOB (Engelmann oak, others) & consider consult with Research Group on hybrids.	All Restoration Group Members.	2017.	

Utilization, Sanitation and Disposal Group

Assigned Personnel	
Tracy Ellis	San Diego County Agriculture, Weights and Measures
TBD	San Diego County Public Works, Cal Trans, Sempra
Kathleen Edwards	CAL FIRE
Jeff Hays	USFS
S. Hishinuma/A. Hefty	USFS FHP
TBD	Cleveland NF
Mike Puzzo	CA State Parks
Larry Swan	USFS S&P Forestry
Tom Scott	UC Coop Ext
Eric Just	CAL FIRE San Diego

Operations

Stop the movement of GSOB-infested outside of the currently infested area. Foster alternative utilization opportunities to minimize the pressure to move infested firewood to non-infested areas.

To accomplish this goal the group will perform the following:

Assignment	Responsible	Timeframe	Completed?
Ensure that only GSOB-free wood is leaving USFS lands.	Jeff Hays, Bob Heiar, Chris Dowling.	Ongoing.	
Ensure that only GSOB-free wood is leaving non-federal lands.	Ellis, Just, Turner, Scott, Puzzo.	Ongoing.	
Work with Cal Trans, County Public Works, utility companies to ensure infested wood from trees is not being carted off after hours.	Group and affected agencies and utilities.	Ongoing.	
Educate oak woodland owner and land managers about GSOB.			
Educate wood cutters, brokers, and retailers about GSOB and evaluate	Group.	Ongoing.	

a certification program.			
Educate firewood consumers about GSOB in firewood.	Group.	Ongoing.	
Educate communities and local government about GSOB in wood.	Group.	Ongoing.	
Collaborate with the private sector and government to foster utilization vs. disposal of infested oak wood into the solid waste stream.	L. Swan, J. Gonzales, K. Turner, RCD and USFS CNF staff.	Ongoing.	
Participate in CA Firewood Task Force efforts.	Various individuals from group.	Ongoing.	

Public Education, Outreach and Media Group

Assigned Personnel (contact info available on ANR Collaborative Tools)	
Anabele Cornejo (Group Leader)	USFS
Jan Gonzales	UC Coop Ex San Diego
Tracy Ellis	San Diego County Agriculture, Weights/Measures
Joyce Schlacter	BLM
Kevin Turner	CAL FIRE
TBD	SD County Parks
TBD	Greater San Diego RCD
Tom Scott	UC Coop Ext. Berkeley/Riverside
Betsy Miller	City of San Diego Parks
Chris Viveros	Rincon

Objectives:

1. Develop and maintain outreach and educational materials as needed to keep the public informed.
2. Assist in planning identification, coordination and execution of any public educational event and resources when called upon.
3. Foster partnerships and participation for continued input from a variety of perspectives

Operations

The GSOB Communication Program will work together to deliver credible messages in a timely manner that considers the needs of all groups. To accomplish this goal the group will perform the following:

Assignment	Responsible	Timeframe	Completed?
Update outreach information and materials for professionals (land managers, natural resource educators, retailers of consumer products and services, etc.).	T. Scott, K. Corella, J. Gonzales, A. Cornejo.	2017.	
Update outreach information and materials for laypersons (adults and children, owners and renters, tribes and in other languages, etc.)	T. Scott, M. Aguilera, M. Anderson, A. Cornejo.	2017.	
Cooperate/Coordinate resource development and outreach of information to various levels of government and policy makers	A. Cornejo and Public Outreach Group.	2017.	
Respond to requests for public meetings and training by coordinating a cadre of instructors	Outreach and Education Committee members.	2017.	
Update and maintain GSOB website with the latest information.	Jan Gonzales and the E & O committee members.	2017.	

Public Education, Outreach and Media Group Supplemental:

Vision

The GSOB Communication Program will deliver credible messages in a timely manner that considers the needs of all groups.

Goals

1. Develop and maintain outreach and educational materials as needed to keep the public informed.

2. Establish a Communications Advisory Committee and identify roles and responsibilities. This committee would define the procedures for multi-agency communication.
3. Assist in planning identification, coordination and execution of any public educational event and resources when called upon.
4. Foster partnerships and participation for continued input from a variety of perspectives.

USDA Forest Service, CALFIRE, San Diego County leadership, employees, partners, local, state and federal officials and the general public are the audiences for this Communication Plan. It calls for communication strategies that include an active Web presence, media outreach, outreach to partners and coordination to elected officials. Establish a small, core committee, to manage and direct communication; membership should include local, state, federal, cooperative extension and other key partners.

Membership could include industry groups such as professional landscapers and arborists, lumber and wood industry, nursery owners, environmental organizers, and other groups. This group will be an invaluable network for the dissemination of messages and information.

It is vital that the value and benefit of the GSOB Task Force's contribution to the community's forested lands be clearly communicated.

Special Instructions

To ensure both good communications within the organization and a unified and consistent message to the public, media and elected officials, the following communication protocols shall be utilized by all assigned to GSOB.

1. Sharing of information and open communications between personnel and organizations party to this plan is both appropriate and encouraged.
2. Normal point of contact between Group leaders and the Steering Committee will be through the Executive Officer.
3. All outside release of information shall be cleared through the Executive Officer who will in turn consult with the Steering Committee prior to release.
4. Communications must not be confused with directives and tasking. Chain of command as outlined in this document should be followed for all directives and tasking. Conversely, questions regarding assignments should be routed through the designated group lead or Executive Officer as appropriate.

It is understood that assigned personnel must still maintain reporting requirements within their respective organizations. This plan is designed to limit outside comments that may be interpreted as "Official" statements of the unified GSOB response. Attached as page two of this plan is the contact information for all assigned personnel and other useful contact information.

APPENDIX F

POST-TREATMENT PROTOCOLS

Post-treatment Protocols

Once a tree has been visually surveyed, found infected, and a decision to monitor, treat, or remove a tree is made, appropriate follow up monitoring is required to document the results of the action. Up-to-date best management practices, including identification, treatment options, reducing the risk of spread are available at https://ucanr.edu/sites/pshb/. Table 1 provides a decision matrix for applying post-treatment monitoring. Reports on post-treatment condition should be submitted to the County GIS central database regularly and to the statewide data repository at least yearly. Data sheets will be provided by data management as it becomes available.

Table 1. Post Treatment Monitoring Protocols

Action Taken	Follow Up Protocol
Monitor (trees <150 holes)	Monthly visual surveys for reproductive hosts, bi-monthly for other hosts
Pruning/chemical treatment	Monthly visual survey for first year, if no further infestation after a year, then quarterly for year 2-3
Removal	Quarterly visual survey of surrounding 100 meters to detect any additional infestation. New sprouts, once they reach a diameter of 4", must also be monitored for re-infestation.

Once an infested tree has been identified, strict adherence to Best Management Practices (BMPs) that can reduce risk of spread are critical. The UCANR flyer found on www.pshb.org provides guidelines for reducing the risk of spreading the fungus by outlining tool, chipper, and truck disinfection protocols. Inspection of all equipment, including truck beds, personal gear, boots, and clothing is important to prevent beetle spread.