

Goldspotted Oak Borer and Oak Mortality

Quarterly Situation Report

April 1 through June 30 2011

San Diego GSOB Steering Committee

The Steering Committee met at Rancho Bernardo on May 16th. The 2011 GSOB Incident Action Plan and has been approved. Several members of the Steering Committee participated in a meeting with Senator Diane Feinstein's field representatives at her San Diego office on May 19th. San Diego CAL FIRE Unit Chief Howard Windsor, USFS Cleveland National Forest Supervisor Will Metz, UC Cooperative Extension Specialist Dr. Tom Scott and GSOB Coordinator Kevin Turner attended the meeting. Tom and Kevin also provided the senator's office with additional information they requested about the latest estimate of total tree mortality and approximate expenditures to date for tree removals by all parties, agency response efforts and other related costs. That meeting has resulted in a letter from Senator Feinstein to Secretary of Agriculture Tom Vilsack requesting that the USDA's New Pest Advisory Group review and reconsider its finding that GSOB is a "non-actionable" pest. The next Steering Committee Meeting is August 23rd, 1PM in Rancho Bernardo.

City of San Diego Department of Water Resources

Kevin Turner and Tom Scott met with Jeff Pasek, Watershed Manager for the City of San Diego near Barrett Reservoir on April 19th to tour and evaluate some of the thousands of acres of oak woodlands owned by the city that surround their expansive reservoir system. Unfortunately, many areas have already been attacked by GSOB; newly infested areas are being considered for IPM strategies.

Activities in San Bernardino County

On April 20th Kevin Turner made a GSOB presentation to the San Bernardino Mountain Mutual Aid organization (a multi-agency group of emergency responders) at Lake Arrowhead. Later that same day he attended the NRCS Emergency Watershed Protection Program partners recognition celebration which was attended by over 300 people (including Congressman Jerry Lewis and Deputy Under Secretary of Agriculture Ann Mills) and was able to put in a "plug" for the GSOB problem and threat as did Marty Leavitt from the Greater San Diego RCD. The evening of the 20th, Tom Scott and Kevin Turner gave a presentation to a joint meeting of the

Chino Hills Property Owners Association and Carbon Canyon Fire Safe Council. The Chino Hills area, which includes Chino Hills State Park, is one of San Bernardino's County's biggest coast live oak populations at risk to GSOB. Out of that meeting has come a request for a presentation for concerned citizens in Silverado and Modjeska Canyon in Orange County.

On May 24th Tom Scott and Kevin met with the newly-formed GSOB subcommittee of the San Bernardino County Mountain Area Safety Taskforce (MAST) where potential GSOB action items were discussed. Tom and Kevin agreed to participate in the June 2nd MAST GIS/Fuels subcommittee to discuss mapping of oak stands at risk, GSOB-infested firewood recognition training for various MAST agencies' staffs and a GSOB public outreach/education approach.

Activities with Los Angeles County

Tom Coleman and Kevin Turner are working with local, state and federal agencies in LA County to incorporate that county into the GSOB Early Warning System.

Activities in Orange County

Tom Scott and Kevin Turner have been contacted by members of the Silverado Modjeska Recreation and Parks District in Orange County regarding concern of GSOB-susceptible oaks in Orange County. Plans are being made for public presentations about GSOB and a June 9th article has been posted on their website: <http://smrpd.org/>

Greater San Diego Resource Conservation District – Danielle Campbell

We have marked 340 trees on 224 parcels in Descanso 2nd pass, Pine Valley, and Guatay. We have been seeing additional mortality since we left Descanso last winter. We continue to hear about various pesticide treatments that homeowners are trying on their trees.

GSOB FHP Entomology – Tom Coleman USFS FHP

Survey, Detection, Monitoring

- Forest Health Protection placed 40 purple prism traps for monitoring GSOB across 20 sites throughout San Diego, Riverside, Orange, and San Bernardino Cos. FHP also partnered up with many people and agencies to establish GSOB traps throughout the region.

Science Activities and Findings

- Forest Health Protection collaborated with UCR, UCD, Cuyamaca Rancho State Park, and Cal Fire to test several grinding sizes (9-minus, 3-minus, 2-minus, 1-minus, and controls) for sanitizing infested oak wood. Additional studies between FHP, UCD, and FS Research are assessing debarking as a method for removing GSOB populations. These studies continue to be monitored.
- Forest Health Protection continued and treated new oaks this year with Astro, Warrior, Sevin, Imidacloprid, and Emamectin Benzoate. Treatment efficacy was evaluated by lab feeding and walking assays and larval insertions. Forest Health Protection also conducted feeding assays with GSOB adults and *Bacillus thuringiensis*. Forest Health Protection and UCD conducted no-choice feeding assays with GSOB adults and several native and ornamental oak species in California for host preference tests. All these assays are complete and data are being analyzed.
- Several new trap colors were established by Forest Health Protection to evaluate GSOB trap catch. These traps were based on lab work by Damon Crook (APHIS). Traps are being monitored throughout the summer. Trees tagged by FHP and FS Research are being followed for new GSOB activity and tree physiology. Trap collections and tree measurements will continue throughout the year.
- Forest Health Protection and Mark Hoddle (UCR) traveled to Chiapas, Mexico in mid-April to survey for natural enemies of GSOB (*A. coxalis*). GSOB Populations were found and a mite species was the most prominent natural enemy associated with all life stages within the bark of infested trees. This mite species has been found in all regions with GSOB (CA, AZ, and MX).

- Forest Health Protection and FS Research published another GSOB publication with *The Coleopterist Bulletin* title "Collection History and Comparison of the Interactions of the Goldspotted Oak Borer, *Agrilus auroguttatus* Schaeffer (Coleoptera: Buprestidae), with Host Oaks in Southern California and Southeastern Arizona, U.S.A. This manuscript outlines the past collection history for GSOB (*A. auroguttatus* and *A. coxalis*) and observations from AZ. Another publication has been accepted in a special issue of *Biocontrol* by FHP, FS Research, and UCR, Entomology, which is titled "Can the destruction of California's oak woodlands be prevented? Potential for biological control of the goldspotted oak borer, *Agrilus auroguttatus*." This manuscript outlines the initial genetic work between CA, AZ, and MX GSOB collections and the natural enemies associated with GSOB across the three regions.

Public Outreach, Media Coverage, Technical Assistance

- Forest Health Protection will be working with La Jolla Reservation to develop a management plan for limiting firewood into their campground. Ground surveys were conducted at Pechanga and Jamul Reservation for new GSOB infestations. No GSOB was found on either reservation. Forest Health Protection attended the earth days at La Jolla and Pechanga to provide education about GSOB.

Descanso Ranger District, Cleveland National Forest – Maureen Anderson

The acorn plantings at USFS Descanso Fire Compound received their 16 week growth check. 74 (88%) of the 84 plantings had seedlings ranging from 2.5"-8", the average of the varying heights being 4.8". Approximately 40 oaks were removed from the compound in the last few years due to mortality, from an area of 2-3 acres with little or no threat from deer. Two types of tree shelters were used for a comparison study, 2' Tubex and 2' Tree Sentry. The seedlings will be monitored again at 6 months growth.

Right: Oak seedlings in Tree Sentry protective shelters



University of California ARRA Grant Activities – Tom Scott, Brett Goforth, Cara Washington, Kevin Turner

Sequential Aerial-Photoimagery

We have recently acquired 2011 aerial imagery from Eagle Aerial Imaging in two sections that cover the entire GSOB infestation and margin areas within San Diego County. We are currently utilizing this imagery to review, analyze and correct previously completed oak woodland vegetation maps that have been created by various agencies. The previous county vegetation map was created for general vegetation identification and was mapped at a regional scale versus the management scale that we are conducting our oak woodland canopy surveys. Photographic imagery used to date includes 1928-1932 black & white imagery from a previous study, 1996 false-color infrared imagery from the CA state GIS data clearinghouse (CAL-ATLAS), and purchased 2002 to 2011 imagery from Eagle Aerial Imaging in Tustin, CA.

We are near completion of the eight large-scale plots, with three plots completed (Samataguma Ranch, 11 years [1928, 1996, 2002-2010 completed]; Oak Grove, 10 years [1928, 1996, 2002, 2004-2010 completed]; Santa Ysabel, 10 years [1928, 1996, 2002-2006, 2009-2010 completed]). Other large-scale plots have approximately 70% of oak canopy/condition mapping completed for all available years. A small plot mapping protocol was successfully created and implemented and we have so far completed 42 small woodland plot locations throughout central San Diego County that range in size from 10-25 hectares. These plots recorded approximately 5000 trees dead or in irreparable decline over 2500 acres, with highest concentrations of about 15 dead trees/acre in a rural community with a dense oak woodland.

We began data collection to analyze the contribution of soil, slope and other physical characteristics to GSOB-related oak mortality and morbidity. Data on the following variables have been collected for seven out of fifteen large plot locations: slope, aspect, elevation, precipitation, temperature, soil type, soil infiltration rates, depth to bedrock and parent material. This information is being collected and analyzed to create a predictive model of areas or conditions that may encourage GSOB infestation.

Dating outbreaks by Dendrochronology

We have expanded the collection of oak wood samples to include approximately 1440 oak trees (2148 wood samples), housed in two storage units at the UC Riverside Agricultural Experiment Station. A review of our sample handling and containment procedures was recently completed by the California Department of Food and Agriculture Plant Health and Pest Prevention Services on June 30, 2011, which issued Dr. Tom Scott a permit approving of continued collection and transport wood samples from San Diego County to UCR for analysis (Permit Number 2822). The California Department of Parks and Recreation issued a permit to Dr. Brett Goforth and Dr. Scott allowing for expanded collection of wood samples at the Green Valley and East Mesa vicinities of the Cuyamaca Rancho State Park where oak die-off has been extensive. This expanded ground based sample compliments the sequential aerial photogrammetric surveys in concurrent progress.

Observations of interest: A central effort during the current progress report period has been to permanently record the condition of collected wood samples for archiving and digital analysis of the tree growth rings. A high optical-resolution desktop scanner is being used to record images of each wood sample in microscopic detail. The sanded surfaces of wood samples are scanned at 1200 dpi producing an image which shows tree growth rings and characteristic wounds caused by GSOB. To date, we have scanned 631 wood samples from 367 trees from 31 collection localities in San Diego County. The scanned images are saved in the bitmap raster format, with individual images having file sizes from 200 mb to 800 mb (depending upon the size of the wood sample), and archived on a 3 tb hard drive.

A dendrochronology software program called CDendro (version 7.4, March 31, 2011 release, Cybis Elektronik & Data AB, Sweden) is being used to analyze tree growth ring patterns. Use of this new software program allows us to digitally measure the width of each growth ring to a 100th of millimeter precision. The objective is to compare ring width patterns among trees in order to cross-date samples that were aged by ring counts under the microscope, as well as to quantify differences in tree growth before and after GSOB attack. This approach will allow us to consider at multiple scales, from individual tree age-classes, to whole stands of mixed age trees, patterns of oak susceptibility to GSOB attack.

Bark Surface Barrier Test update

This quarter screened-in enclosures were constructed and monitoring began of GSOB-infested oak bolts that were treated by one of five available topically applied pesticides plus a control group. As of 6/23/30, a limited emergence of adult beetles has occurred only on the “control” bolts. In discussion with Dr. Tom Coleman and others, this later than normal emergence seems to be occurring in other GSOB studies as well and may be a result of the exceptional cool, long, and wet spring.

On June 23rd, additional GSOB-infested bolts were collected and treated, half with XT-2000 Orange Oil (active ingredient d-Limonene) and the other half left untreated as a control group. Results of the test should be known by the fall.

Early Warning System Update (Citizen Scientist Program)

Dr. Scott is in the process of recruiting and hiring a replacement EWS Coordinator. GSOB Early Warning System (EWS) field training was held at Heise County Park in Julian CA on April 29th which was attended by over 30 professional and lay people that will serve as EWS volunteers throughout southern California.

Photo right: April 29th, 2011 Dr. Tom Scott (University of California) was one of three principal instructors at GSOB “Early Warning System” training held at Heise Park near Julian CA. Co-instructors were Dr. Paul Zambino (USFS Forest Health Protection pathologist) and Dr. Tom Coleman (USFS Forest Health Protection entomologist). Over 30 EWS volunteers attended the training.



GSOB Integrated Pest Management (IPM) Field Trip

In early May several San Diego County Park locations where an informal committee of researchers and foresters from the U.S. Forest Service, CAL FIRE, University of California and the UC IPM program visited four different county parks (Stelzer, El Monte, Dos Picos, Vulcan) to determine each park's suitability for field testing GSOB IPM strategies. The group agrees on the need to develop and prove strategies for treating new infestations of GSOB before they become well established. San Diego County Parks is very interested in being a co-participant; they have already spent \$1 million in removing GSOB-killed trees and their parks have oak trees as a primary attraction.

Wood Chip Fire Behavior Testing

The Riverside Forest Fire Laboratory and cooperating agencies continue their testing of wood chip fire behavior characteristics. The goal is to develop guidelines to enhance firefighter safety, structure survivability in wildfire situations and protect against negative environmental effects associated with the inappropriate use of chips (depth, type, location, etc.). Oak chips have been added to the test specifically because oak limb and branch wood from GSOB-killed trees frequently is chipped on site and spread back over the ground as mulch.



Left: Oak wood chips are tested for ease of ignition, spread rate, flame height, heat output, duration of flaming and non-flaming combustion and total consumption at the Riverside Forest Fire Laboratory. Field burn tests will supplement the laboratory tests. The results and recommendations coming out of the study will be of value in recommending how to manage wood chips created from GSOB-killed oak trees. Roger Covalt of County Parks provided the chips and Kevin Turner is coordinating with the fire lab.

Goldspotted Oak Borer Education and Outreach Program– Jan Gonzales

GSOB Website Use Data

	Quarter 4 (Apr-Jun 2011)	Cumulative (Sep09-Jun11)
Hits	44,126	322,813
Page Views	15,098	98,316

Social Media:

- Began writing brief articles for weekly posts to the GSOB blog. Articles planned range from basic to more in-depth information on topics related to GSOB, including GSOB events and research updates; oaks and oak woodlands; invasive pests and integrated pest management; and firewood issues.
- Initiated and began posting on the public GSOB Facebook fan page and Blog. Coordinating posts and monitoring activity for both of these communication channels will be on-going tasks.
 - GSOB on Facebook: <http://www.facebook.com/pages/Goldspotted-Oak-Borer/197672396939909>
 - GSOB Blog: <http://ucanr.org/blogs/GSOB/>

University of California Cooperative Extension
Goldspotted Oak Borer

Welcome to the GSOB Blog!
 Author: Lorin Liikoi Lima June 24, 2011

We are launching this page to raise awareness about the goldspotted oak borer and it's threat to oak trees and you. Check out www.GSOB.org You'll find news, information, resources and tools to help you and your community deal with the GSOB threat. GSOB information is also being featured at the San Diego County Fair as part of the Forest Area Safety Taskforce (FAST) education display. If you're there, stop by and visit us in the O'Brien building just off the Avenue of Palms and the Landscape and Garden area.

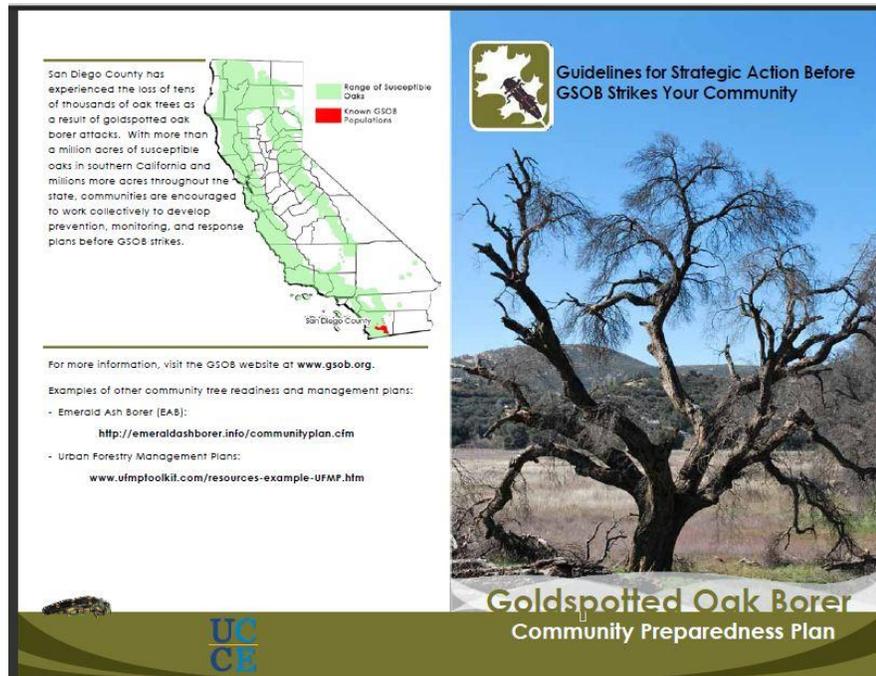
Recent Posts
 - What is GSOB?
 - Welcome to the GSOB Blog!

Archives
 - June 2011

Categories
 - California oaks (1)
 - goldspotted oak borer (1)
 - GSOB (1)
 - invasive pests (1)
 - oak mortality (1)

Feeds
 - RSS

- Developed GSOB Community Preparedness Guidelines in collaboration with Kevin Turner, Janice Alexander, Katie Palmieri and Lorin Lima. These guidelines provide information on things communities should consider and actions they can take before GSOB infestation. A downloadable PDF brochure of these guidelines has been posted to the GSOB website.



Other news of interest:

In early May, the KPBS interviews with Dr. Tom Coleman (USFS Forest Health Protection) and Dr. Tom Scott (University of California regarding the GSOB problem and threat went state-wide courtesy of KQED: <http://t.co/leeTKQV>

In late June, PBS radio broadcast an interview with Dr. Mark Hoddle of UC Riverside regarding research on biological control of GSOB: http://radio.seti.org/episodes/Alien_Invasion

Presentations Meetings this Quarter:

6/23/2011 - 6/27/2011	<u>June 23 FAST Meeting</u>	<u>Kevin Turner</u>
6/10/2011 - 7/4/2011	<u>San Diego County Fair</u>	<u>Lorin Lima</u>
6/6/2011	<u>Tecate Customs</u>	<u>Tracy Ellis</u>
6/2/2011	<u>San Bernardino MAST GIS/Fuels Treatment Committee</u>	<u>Kevin Turner</u>
5/28/2011	<u>Palomar Mountain Community Meeting</u>	<u>Kevin Turner</u>
5/24/2011	<u>San Bernardino County GSOB Committee Meeting</u>	<u>Kevin Turner</u>
5/17/2011	<u>Wrightwood Fire Safe Council</u>	<u>Kevin Turner</u>
5/13/2011	<u>IPM Landscape Professionals</u>	<u>Tracy Ellis</u>
5/4/2011 - 5/9/2011	<u>Wildlife Cooridors Authority JPA (LA County)</u>	<u>Kevin Turner</u>
4/29/2011 - 5/9/2011	<u>Early Warning System Training for Volunteers</u>	<u>Kevin Turner</u>
4/20/2011	<u>San Bernardino Mountain Mutual Aid Presentation</u>	<u>Kevin Turner</u>
4/20/2011	<u>Carbon Canyon FSC and Chino Valley HOA jt. mtg.</u>	<u>Kevin Turner</u>
4/1/2011	<u>Operation Snapshots at International Border (3)</u>	<u>Tracy Ellis</u>

San Diego County Parks Report – Roger Covalt

Roger and District 3 County Parks staff are surveying and recording GSOB activity in their parks. County Parks is sharing some of the information they are collecting and would appreciate feedback or suggestions as to what data should be collected and how it can be collected.

GSOB Situation Report - April 1 thru June 30, 2011

<u>Unit name</u>	<u>Location of following</u>	<u>New GSOB trees</u>	<u># of Trees dropped due to GSOB</u>	<u>Other GSOB concerns</u>
Barnett Ranch	Mid central extending east and lower west extending to the middle.			20% mortality. Most medium branches have fallen off Oak trees. Bark chunks falling off, crown thinning. Some trees are thinly leaved. Woodpecker damage. Hard to see staining due to darken bark from 2007 fire.
Dos Pico	Campground & Area 2	??	2	
Luelf Pond	Northern Section from east side to middle			10% Mortality rate to date. Crown thinning, bark falling off in chunks, woodpecker damage to trunks, curled-exposed branches with no leaves. This riparian zone is mostly live oaks. Harder to rate staining due to darken bark from 2007 fire.
Ramona Grasslands	Central area extending north and south			10 to 15% mortality in oak riparian zones. Still need to survey north end of Eagle-Davis and north end of Gildred Ranch.
	Oak Country 2 (a Ramona Grassland parcel)			10-15% mortality. Some live oaks have fallen over with roots cracked at the trunk's base (they died while fully leaved) Normally with GSOB deaths we see no leaves on the trees once the tree dies.
Santa Ysabel East				
Oak Alley	On public Coast to Crest Trail in first oak canopy along Santa Ysabel Creek and up hillside after 2nd creek crossing to Kanaka Loop.			No noticeable crown thinning yet-but major limb die-back and different color (grey-green). Mostly Coast Live Oaks in this area. Severe damage after last winter snow. GSOB seems more prevalent along creeks, drainages and roads. 20% infestation

San Diego County Parks, District 3

<u>Unit name</u>	<u>Location of following</u>	<u>New GSOB trees</u>	<u># of Trees dropped due to GSOB</u>	<u>Other GSOB concerns</u>
Santa Ysabel East				
Horseshoe Loop to Triangle	Gate on Hwy 78 in the San Diego River Drainage up along Coast to Crest public trail to picnic table at Triangle			Occasional whole tree death and noticeable canopy color change. Same as in Oak Alley. Infestation in Black Oaks in this area seems higher or perhaps more noticeable. Cedar Fire went through this area.
North Road	Green gate at 2nd creek crossing on closed North road along Santa Ysabel Creek and Boundary fence with reservation.			This area has some very large old growth Canyon Oaks. They all have evidence of infestation. Large limb drop very common, as is staining on trunks. Infestation very high in this area. 75-100%
Simon Preserve				
	East side			Oak trees in this area appear to be up to 200 years old. This area burned in 2007. There is present a 10-20% mortality. Remaining trees have crown thinning, bark falling off in chunks (Due to canker?), dead branches and medium size branches falling off trees.
William Heise Park				
	Picnic Area # 1	15 dead	15	Many live/black oaks with thinning crowns.
	Area # 1	9 dead	6	Many live/black oaks with thinning crowns.
	Loop 2 North	15 dead	5	Many live/black oaks with thinning crowns.
	Loop 2 South	5 dead	2	Many live/black oaks with thinning crowns.
	Tent Area	16 dead	10	Many live/black oaks with thinning crowns.
	Cabin Loop	1 dead	7	Many live/black oaks with thinning crowns.
	Ranger residence # 1	0 dead	2	Many live/black oaks with thinning crowns.
	Ranger residence # 2	14 dead	0	Many live/black oaks with thinning crowns. Most of mortality has occurred in the last month.

San Diego County Parks, District 3

<u>Unit name</u>	<u>Location of following</u>	<u>New GSOB trees</u>	<u># of Trees dropped due to GSOB</u>	<u>Other GSOB concerns</u>
Volcan Mtn				
Volcan Mtn Road	Along paved road in closed area from old north gate to Southern Radio Tower overlooking Simmons Flat.			38 dead oaks along paved road. Also lots of dead cedars next to dead oaks. Crown thinning. Infestation more noticeable due to large limb drop and many dead limbs.
Fire Road	Road opened to public as trail.			Black Oaks have secondary mistletoe infestation.
Simon Preserve				
	East side			Oak trees in this area appear to be up to 200 years old. This area burned in 2007. There is present a 10-20% mortality. Remaining trees have crown thinning, bark falling off in chunks (Due to canker?), dead branches and medium size branches falling off trees.