

**BARK BEETLE TECHNICAL WORKING GROUP MEETING**  
**Homestead Resort, Midway, Utah**  
**4-6 October 2005**

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## **DAY ONE, TUESDAY 4 OCTOBER; MINUTES:**

Brytten (by default) called the meeting to order at 0800, 4 October 2005. Following a suitable welcome to Utah, and a few “housekeeping” items relative to the venue (Homestead Resort) and agenda for the next three days, we jumped right into brief “conditions” reports from the represented Regions.

### **Regional Bark Beetle Conditions Reports:**

**Region 1** (Ken): MPB remains the most active and widespread of the bark beetle species found in outbreak status in the Region. Nearly 700,000 acres were infested in 2004 (data for '05 not yet available)—most in lodgepole pine, and most in east-central Idaho and west-central Montana. Notably, more than 100,000 of those acres were in whitebark pine stands in northern Idaho, southwestern Montana, and Yellowstone National Park. DFB still found on slightly more than 100,000 acres, most in central and southwestern Montana. Grand fir, killed by FE found on nearly 300,000 acres; most recorded in northern Idaho. WBBB attributed with killing subalpine fir on more than 175,000 acres throughout high-elevation stands in the western part of the Region. Engraver beetles and WPB much less frequently encountered—on approximately 17,000 and 10,000 acres, respectively. Spruce beetle remained at endemic levels except for an 8,000-acre outbreak in the southwestern portion of Yellowstone NP.

**Region 2** (Tom/Sheryl/Roy): Spruce beetle becoming more expansive throughout the Routt and Roosevelt NFs. Better moisture has reduced activity of pinyon *Ips* in southern Colorado; however, there is still some mortality being expressed by a combination of engraver beetles and a twig beetle. DFB is active in some locations, as are FE and WBBB. Most are related to the ongoing dry conditions. MPB populations remain high in some parts of Wyoming and Colorado, in both lodgepole and ponderosa pine stands. There remain significant concerns in the “wildland/urban interface” surrounding many communities. Recent blowdown has triggered spruce beetle concerns in southern Colorado and the issues surrounding them have taken on more political than entomological concerns.

**Region 3** (Terry/Joel): Most bark beetle activity in New Mexico attributed to DFB and pinyon *Ips*. Total affected area, however, has decreased from 800,000 acres to 165,000 from 2003 to 2005. Most remaining activity is in the northern part of the State. In

Arizona, several beetle species which were at high activity level, due mostly to an ongoing drought, as recently as 2003, have decreased significantly in 2005. DFB and true fir beetles (FE and WBBB) still relatively high in some areas. Aerial observers often have difficulty distinguishing DF from WF from the air—has led to some uncertainties about amounts of land infested, and associated mortality. Now that beetle-killed trees from the past few years are beginning to fall, increased fire danger is a concern in some areas of the State. In some parts of the Region, WPB is a problem in ponderosa pine stands.

**Region 4** (Carl/Brytten): In southern Idaho (Sawtooth and Salmon NFs) MPB still extremely active. Outbreaks are continuing to expand in both lodgepole and whitebark pine stands. DFB populations remain high in some parts of the Targhee NF (southeastern Idaho) and Bridger-Teton NF (western Wyoming), and are expanding on the Salmon-Challis NF and Sawtooth NF. Spruce beetle populations are declining in southern Utah, but they are still prevalent in many stands. Pinyon *Ips* is still active in some parts of Nevada. Elsewhere, FE populations have killed noticeable amounts of white fir.

**Region 5** (Danny): Drought effects have declined somewhat, State-wide. As a result, bark beetle populations that had been high for the past 5 years have also declined. In northeast California (Modoc NF), populations of WPB, FE, and MPB are still quite active. Some MPB-caused mortality noted in whitebark pine stands. They are looking more closely at bark beetle/root disease associations. Most of California has had more-normal amounts of precipitation in 2005. As a result, outbreaks of *Ips* (both *pini* and *confusus*) have declined.

**Region 6** (Dave): MPB up to 720,000 acres in 2005; WPB down to 79,000 acres. *Ips* activity is down and widely scattered. DFB has declined to 75,000 acres; spruce beetle populations are still high in north-central Washington. FE activity declined in '05; but it is still quite active.

**Region 8** (Steve/John): Little SPB activity being reported in Texas and Louisiana; populations have been low there since 1998. A few more spots (SPB) were found in Alabama and Mississippi. Millions of windthrown trees, the result of Katrina and Rita, litter the southern Gulf States. There are concerns about engraver beetles, but little time to assess that potential yet. SPB beetle populations in the eastern part of the Region (Georgia, Virginia, and Florida) have been low since 2003.

**Region 10** (Jim): Spruce beetle activity at low levels through most of the State, but somewhat higher southeast of Anchorage. Still about 200,000 acres infested to some extent, now found on more marginal sites. Some WBBB-caused mortality reported in the southeast, and some *Ips* activity associated with recent fires.

**Canada/British Columbia** (John): Most significant MPB outbreak ever recorded—anywhere! More than 7 million hectares were reported infested in 2004. That may have increased to 10 million in 2005. In many of those affected stands (virtually all is lodgepole pine), mortality has exceeded 80%. Economic impact of these outbreaks may

last decades. Studying relationship(s) to *Ips* activity. What is the relationship to climate change? Other beetles in western Canada have been dealt with very little in the last year or so. Efforts underway to prevent MPB spread into Alberta.

**Mexico** (Joel/Brytten): *Ips* spp outbreaks have about run their course in northern Mexico. FHP assistance has been very helpful to them.

**Central America** (Steve): SPB populations have declined throughout the region. Reports of a new *Dendroctonus* species in C.A. Not sure about its behavior—or even its existence...

### **2005 Bark Beetle-Related Projects (By Beetle Species):**

#### **Mountain Pine Beetle:**

Verbenone STDP (R-1): Ken, failing to put any positive spin on the fiasco at all, reported their project to evaluate the efficacy of the Synergy 7.5-gram verbenone pouch and a 10-gram hexanol pouch in protecting lodgepole pine from MPB attack, was a complete bust! Someone forget to tell them to take the pouches out of their protective packaging... They were attempting both area and individual-tree protection.

In a similar (but much more successful—someone told them!) project, Barb reported on the same Synergy verbenone pouch and hexanone pouch in protecting whitebark pine from MPB attack. Not all their data has been analyzed, but results were not pronounced. In their project, an individual-tree test, associated studies seem to indicate both 1- and 2-year life cycle beetles in whitebark stands in which they were working. Barb also reported on a project conducted by Matt Hansen and Nancy Gillette, testing aerial application of verbenone-impregnated Hercon flakes to protect whitebark pine from MPB attack. Results were promising.

Carol reported on her use of the registered, 5-gram Phero Tech verbenone pouch to protect “leave strips” of MPB-susceptible lodgepole pine at Lookout Ski area in northern Idaho. This was the third year of operational use. So far, results are favorable. Darren reported on operational use of verbenone in some campgrounds in Utah with not-as-good results. On the other hand, Ken noted a third year of campground use in Montana with very good results. Verbenone use in several other campgrounds in Montana, for the first time in '05, provided good results. Dayle also noted its use on the Challis NF in central Idaho in both whitebark and lodgepole pine stands. He was not certain of results.

John related Phero Tech's efforts to produce a more effective MPB trap lure by using various semiochemical blends. The use of tyrpinolene and myrcene seemed to greatly enhance trap catches—but needs to be confirmed. He has learned that trap catches are much higher when traps are placed in a less densely stocked forest setting. More beetles were caught in more open stands. He also reported on the use of verbenone to protect urban trees from MPB attack in British Columbia. Extreme beetle populations made results difficult to interpret, but verbenone, in combination with other principles of

IPM—such as sanitation salvage and hazard reduction—seems to effectively protect trees in many instances.

Liz talked about her work in developing fuel models following MPB outbreaks—a discussion highlighted on Wednesday's field trip.

Sheryl noted Jose Negron's work on exploring correlations between MPB and dwarf mistletoe in ponderosa pine.

Finally, Andy questioned the cross attraction of secondary bark beetles to MPB pheromones. That has not been looked at too closely—though probably should be.

### **Douglas-fir Beetle:**

Joel reported on studies in the Southwest showing relationships between DFB and dwarf mistletoe in DF. They are developing a SW-oriented hazard-rating system for Douglas-fir that incorporates the presence or absence of dwarf mistletoe. They believe it will be more applicable to areas where Douglas-fir dwarf mistletoe is more prevalent.

Nancy described her work with Jose in trying to quantify the benefits of thinning Douglas-fir to reduce DFB-caused mortality, and also comparisons of benefits and liabilities of fall and spring burning following thinning in Douglas-fir stands. Thinning levels will approximate BA of 80, 100, 120 and 150; or a specific SDI. This will be a long-term study, extending to the next 2-3 years.

Barb noted she and Sharon Hood (RMRS Fire Lab) have similar (burn) studies following the Moose (Montana) and Green Knoll (Wyoming) fires of 2001. They are developing guidelines to help define the affects of varying levels of scorch.

Sheryl mentioned another of Jose's studies in which he is attempting to model DFB interactions with its host. That is ongoing.

A somewhat general discussion followed concerning the effects of MCH over the course of the season. No one has noticed a lessening of effectiveness through most of the beetle flight period.

### **Spruce Beetle:**

Few studies being conducted with spruce beetle populations at present. Still some preventive measures being taken where populations remain high.

### **Jeffrey Pine Beetle:**

Pretty much the same situation with JPB. Few studies being conducted in R-5.

### **Western Pine Beetle:**

Chris (Fettig) reported that results of the West-wide bifenthrin studies will soon be published. Results were about as anticipated: Good results with a couple of pyrethroid compounds for one year; but Sevin remains the only chemical producing good 2-year protection from bark beetle attack.

Chris also reported preliminary results of fire-surrogate studies in California ponderosa pine stands. Looking at slash treatments, verbenone applications, etc. Verbenone treatments (50/acre) looked good after 3 years. Also evaluating some non-host volatiles at varying elution rates. Evaluating individual-tree protection as well as area protection. Obtaining positive results, but all need further evaluation. Also testing some insecticide injector systems. More evaluation needed there, as well.

### **Southern Pine Beetle:**

John (Nowak) described the SPB prevention program, which is in its 4<sup>th</sup> year. Has become a “political” issue in some cases—Federal money is being allocated to private land owners on a 50/50 cost-share basis. Over 2,000 private land owners have been involved in the Southeast; and 250,000 acres have been treated thus far. Literature, workshops, computer programs have been developed. Goal is to treat 2 million acres in 10 years. An estimated \$47 million will have been spent on the program through 2006. Some suggested FHP should simply proclaim a victory over SPB and let it go at that!

Steve noted “Version 6” of the SPB Management Guide is about completed. Field collected data will be incorporated into the program to help determine the most appropriate management strategies. Some suggest SPB should be treated like fire—“putting out” hot spots.

### **Engraver Beetles:**

Don introduced the project he has been working—one showing promising results in, while not preventing bark beetle attacks, has prevented tree mortality by quickly killing attacking beetles. Two systemic insecticides, emamectin and fipronil, injected into tree boles have been effective against engraver beetles. It appears long-term (2-3 years) tree protection may be possible with a single injection of 8-16 ml insecticide per inch dbh. Additional studies will be conducted against other bark beetles in 2006.

Andy described his work in Alaska against *Ips perterbatus* in which he has been evaluating both attractants and anti-attractants. Methyl jasmonate, injected into tree boles was not successful in preventing beetle attacks. However, he used beetle attractants and wonders if he may have had more success if not. He also learned that MJ, at some concentrations, is lethal to trees all by itself!

Chris (Hayes) and Tom described their work with slash control in Arizona. They are evaluating slash piece size on engraver beetle behavior. Shorter lengths were attacked less frequently and had lower brood survival. Also evaluating stand density on brood

production and development, as well as timing of beetle attacks. October and January attacks produced more brood, and did attacks in stands of lower density. They are still measuring population levels in adjacent stands.

Danny has been trapping *Ips confusus* in an attempt to determine flight periodicity in northern California. Peak flight occurred in April/May, although there were flights most of the year. Beetle behavior is affected by weather—flights are later in cooler and wetter conditions. Populations have declined in their part of the State, so studies were not as definitive as hoped.

Brytten continued to assist with *Ips pini* work in northern Mexico. By evaluating the attractant pheromones, they have been able to provide a monitoring and management tool for the Mexicans. Studies on other *Ips* species in a plantation setting have also been started and will be continued in 2006.

Tom and Kelly Barton (Univ of Arizona) have been looking at the affect of elevation on bark beetle populations in ponderosa pine stands in Arizona. *Ips* spp were more active at lower elevations, *Dendroctonus* spp were less affected by elevation. They are also looking at wood borer and predator complexes. Work is continuing. They have found both SPB and WPB in the same locations in Arizona—and are considering the possibility of hybridization.

In associated studies, Chris (Hayes) has questioned exactly what do trap catches mean? Any correlation between trap catches and adjacent stand mortality? Not sure. More work needs to be done to address those questions.

### **Red Turpentine Beetle:**

What effect of spring versus fall burning in ponderosa pine stands on RTB attacks? Still evaluating, but because beetles are found low on tree bole, and sometimes below ground level, timing of burns seemed to have little effect on beetle behavior. (Not sure who reported this... Sheri, maybe?)

### **2002 Western Bark Beetle Report—Update:**

Sheri is heading up an effort to update the report completed in 2002. Frank Cross is FS liaison to the Council of Western State Foresters who would like to have the report updated because of all the bark beetle activity in the West since 2002. Sheri will work with at least on representative from each FS Region in the West, and the BBTWG will serve as a reviewing body. Work is scheduled to begin sometime this coming winter, with a completion date of December '06.

**END DAY ONE.**

**DAY TWO. FIELD TRIP TO MIRROR LAKE, MURDOCH BASIN, PINE VALLEY CAMPGROUND. (See notes provided in meeting packet.)**

**POSTER SESSION. WEDNESDAY EVENING. Posters/discussion of WBBI-funded projects for 2005 (see below).**

**DAY THREE, THURSDAY 6 OCTOBER; MINUTES:**

**Western Bark Beetle Initiative-Funded Projects, 2005:**

(Summaries presented here, not in the order given at the meeting, but rather to coincide with information provided in meeting packet. See that listing for additional details.)

1. Determine the effectiveness of thinning and fertilizing Lutz spruce to increase resistance to spruce beetles in south-central Alaska (Werner). No report.
2. Thinning guidelines to prevent ponderosa pine bark beetle outbreaks in the Southwest (Edminster). Report by Joel. Trying to determine if thinning guidelines developed in other parts of the country are applicable in SW. Ongoing studies, but preliminary results showed higher numbers of beetles caught in thinned stands, but more attacks in stands of higher densities.
3. Non-host angiosperm volatiles and verbenone for disrupting western pine beetle attraction to pheromone-baited trees (Fettig). Chris reported verbenone and NHV reduced WPB trap catches significantly. Studies continuing.
4. Systemic insecticide injections for protection of western conifers from bark beetles (Fettig). Don Grosman reported on this study—the initial phase of which was done in *Ips* spp in the SE (see above under Engraver Beetles). Will be expanded '06 to include other western bark beetles.
5. Evaluation of the anti-aggregant verbenone and application strategies in management of western pine beetle in old-growth ponderosa pine (Hayes). Report by Dave Bridgwater. Looking at area protection. Not all results have been analyzed, but initial results are promising.
6. Use of verbenone and non-host volatiles to reduce engraver beetle attacks on ponderosa pine slash in Arizona (Edminster). Report by Tom. Slash piles treated with verbenone and ground, non-host material. Applications appear to significantly reduce beetle attacks, but reduction in attacks was low. Hope to look at higher treatment rates next year.
7. Evaluation of a verbenone/non-host volatile/trap-out strategy for protection of high-elevation whitebark pine against mountain pine beetle attack (Bentz). Barb reported that trapping efforts are mostly helping to define MPB life cycles at high-elevation sites. May have both 1- and 2-year cycles. Evaluating differing stand conditions and beetle populations, so effects of verbenone and NHV not clear.



8. Drift resulting from ground applications of insecticides to individual trees (Fettig). Chris reported this study has been postponed until June '06 due to illness of applicator. Will be attempting to assess applications of drift in concentric circles from application point with varying p.s.i. and nozzles.
9. Flight temperature thresholds for southwestern ponderosa pine bark beetles (Edminster). Report by Joel. Attempting to determine when beetles become active—have shown threshold temperature more effective determinant than degree-days. Activity for Ips around 20 degrees C. RHPB about 15 C.
10. Verbenone test to reduce mountain pine beetle attack of lodgepole pine in R-1 and R-4 (Progar). Rob noted data collection in R-4 is ongoing. Results are promising. No results from R-1.
11. Influence of host volatiles as pheromone lure synergists for southern pine beetle and western pine beetle in Arizona (Edminster). Report by Joel. Attempts to improve bark beetle catches. More SPB caught than WPB. Adding alpha-pinene doubled trap catches. Hopeful of reducing trap catches of predators.
12. Evaluating microencapsulated MCH beads for protecting Douglas-fir stands from Douglas-fir beetle attacks in Colorado (Negron). Sheryl reported this study is ongoing.
13. Bark beetle catches in pheromone traps, tree mortality, and coarse woody debris (Negron). Report by Sheryl. Study continuing.
14. Lastly, Darrell reported on an on-going study begun by Kimberly Wallin in 2004. Looking at the effect on DFB-caused mortality by single-trap catches. Study being conducted in southwestern MT. Data collected in 2005 still being analyzed.

#### **Future FHP/Research Funding: Discussion led by Ralph Their/Rob Mangold**

What are we getting for FHP/Research dollars spent? What has been accomplished by WBBF funds expended in 2004 and 2005? Are we improving tools for land managers? If not, why not? What can we do differently, or better, if additional money becomes available in future years (none available for 2006).

What is, or should be, the relationship between FHP and FS Research? Is there an opportunity for better coordination in the future? Can/should FHP influence R&D programs? Can assessments of past programs benefit future efforts?

Decided results from WBBF programs in 2004 and 2005 will be forwarded to Ralph. May try to incorporate some results into update of Western Bark Beetle Report (see Sheri's assignment, above).

Where do we (FHP and FS Research) go from here? Need a synthesis of recent work accomplished and how well we have addressed questions posed in recent years (notes from recent BBTWG meetings). The following questions are posed for consideration:

1. What's been recently accomplished?
2. What are "researchable" questions (from 2002 Western Bark Beetle Report)?
3. What is a workable review and funding process?
4. What is our "Five-Year Action Plan?" Do we have one?
5. Appropriate committees should address these issues:
  - a. WBB format. Review committee of Regional representatives
  - b. Western Bark Beetle Report—II. Sheri will head committee
  - c. BBTWG as a reviewing body
  - d. Develop a review process for 2007. Barb, Chris (Fettig), and Rob are willing to represent FS Research.

**Questions Needing to be Addressed (in 5 somewhat inclusive categories):**

1. Improve Methods to Predict Bark Beetle Activity
  - a. Duration of outbreak (rate of spread); when will it occur? Traps, Risk Map.
  - b. Other sources to predict landscape outbreak/susceptibility/impacts. Remote sensing, climatology, FIA data.
  - c. Stress physiology and climate change.
  - d. Long-term management affects.
  - e. Quantification of low, moderate, high bark beetle activity (species specific).
  - f. What constitutes an "outbreak?" Use of SPB model definition?
  - g. Spruce beetle activity in blue spruce.
  - h. Is MCH affective against spruce beetle? If so, at what levels?
2. Clarify Interactions between Bark Beetles and Fire
  - a. Fire, fuels, and beetles. Interactions among efforts is needed to define long-term ecological relationships. How do dwarf mistletoes or other pathogens interact in these relationships?
  - b. How does the above mesh with National Fire Plan?
  - c. Are applicable study plans available?
  - d. What are slash-treatment alternatives?
  - e. What fuels treatments may change hazard ratings (for bark beetles)? How do those principles apply to southern hardwoods?
3. Develop Technologies for Using Bark Beetle Pheromones
  - a. Need to emphasize the semiochemicals are only a part of a sound IPM program.
  - b. What is the effectiveness of semiochemicals at varying spatial scales?

- c. Can we summarize what is currently known about the effectiveness of various semiochemicals?
  - d. What is an appropriate “clearing house” for semiochemical information?
  - e. How does the genetic makeup of hosts affect semiochemical behavior—and can that be manipulated to our advantage?
  - f. What is the cost-effectiveness of semiochemical applications?
  - g. What is the effectiveness of mass trapping? When does it work, when doesn't it?
  - h. Do “push-pull” strategies work?
  - i. Are there more effective releasers available? Med-i-cell, for example?
4. Develop Methods to Protect High-Value Resources
- a. Evaluation of spray delivery systems such as electrostatic, or injections.
  - b. What is the effectiveness of preventive sprays for true firs?
  - c. Can we/should we develop guidelines for preventive treatments, or use of semiochemicals to protect trees?
  - d. How effective are NHV (or green leaf volatiles) in protecting conifers and hardwoods?
  - e. What is the role of silviculture (and/or other IPM strategies) in protecting trees or stands?
5. Other/Miscellaneous
- a. Use of lethal trap trees with systemic chemicals.
  - b. Education technology and methods.
  - c. Taxonomy and identification skills are lacking. How best to strengthen?
  - d. In all the above categories, how can we better implement the need for sound IPM strategies?
  - e. What are the political/legal ramifications of what we do?

### **What's Being Proposed for 2006?**

- Bark beetles and climate change—measuring long-term susceptibility in Canada (Borden)
- DFB/pathogen (dwarf mistletoe) interactions in the Southwest. DFB hazard rating for SW (RMRS, R-3)
- Larch sawfly/*Dendroctonus simplex* interactions in Alaska (R-10)
- MCH flakes to protect stands from DFB attack (R-1, R-4, PSW)
- Continuing evaluation of 7.5-gram verbenone pouch and green-leaf volatiles to prevent MPB attacks in LPP (R-1)
- Verbenone, fire, other management activities to reduce MPB-caused mortality I LPP (R-4)

- Evaluation of verbnone-impregnated flakes (R-4/PSW)
- Slash treatments to reduce *Ips* activity in SW (R-1, R-6, PNW)
- Trapping to reduce mortality caused by WPB (R-6, R-4, R-3, PNW)
- Trapping methods for woodborers (R-6, PNW)
- Injection of insecticides to protect trees from bark beetle attacks (PSW, TXFS)
- Evaluating MPB-caused mortality and resulting fire hazard (RMRS, R-2)
- Evaluating thinning treatments done in LPP stands 25+ years ago (RMRS, R-1, R-2)
- Exploring the resistance of LPP to MPB (PNW, Canada)
- Modeling long-term effects of bark beetle activity (FHTET)

**Results of Bark-Beetle-Guessing “Contest:” 935,200 DFB in a 6.5-gallon jar! (Won by Chris Hayes)**

**Conclusion:**

As meeting concluded, a general discussion ensued relative to 5- or 10-year working plan for BBTWG. Old-timers agreed we used to have one. Brytten “volunteered” to see if an old one could be resurrected and presented at the 2006 meeting.

And speaking of which, the 2006 meeting will be held in western Montana (site to be determined soon), 3-5 October. Brytten will be Chair, Ken will handle local arrangements. Comments or suggestions for the 2006 meeting would be welcomed by either.

2005 meeting adjourned at 1600, 6 October 2005.