

BBTWG CY2006 Meeting Notes

Fairmont Hot Springs, Montana: 3-5 October, 2006

Recorded by Gail Durham
Updated by BBTWG attendees

Acronyms used in these notes include:

BB	bark beetle	
MPB	mountain pine beetle	<i>Dendroctonus ponderosae</i>
JPB	Jeffrey pine beetle	<i>D. jeffreyi</i>
WPB	western pine beetle	<i>D. brevicomis</i>
SPB	southern pine beetle	<i>D. frontalis</i>
SB	spruce beetle	<i>D. rufipennis</i>
RTB	red turpentine beetle	<i>D. valens</i>
FE	fir engraver	<i>Scolytus ventralis</i>
WBBB	western balsam bark beetle	<i>Dryocoetes confusus</i>
Ips	(various <i>Ips</i> species; especially <i>I.confusus</i> in pinyon pines, <i>I.pini</i> in ponderosa and lodgepole pine, <i>I.lecontei</i> in southwestern ponderosa pine)	
BWA	balsam wooly adelgid	<i>Adelges piceae</i>
WSBW	western spruce budworm	<i>Choristoneura occidentalis</i>
PP	ponderosa pine	<i>Pinus ponderosa</i>
LP	lodgepole pine	<i>P. contorta</i>
WBP	whitebark pine	<i>P. albicaulis</i>
JP	Jeffrey pine	<i>P. jeffreyii</i>
WWP	western white pine	<i>P. monticola</i>
ES	Engelmann spruce	<i>Picea engelmannii</i>
DF	Douglas-fir	<i>Pseudotsuga menziesii</i>
GF	grand fir	<i>Abies grandis</i>
WF	white fir	<i>A. concolor</i>
SAF	subalpine fir	<i>A. lasiocarpa</i>

Tuesday, Oct. 3 - AM:

Meeting began at about 8 am 10/3/2006 with introductions by each member. Attendees are listed at the end of these notes. Outside of about 4 people, most attendees have been to fewer than 5 BBTWG meetings. The group is changing: more people, younger, more State attendance, etc.

Brytten Steed (Agenda Chair) and Ken Gibson (Local Arrangements Chair) welcomed the group and covered some of the immediate logistics (bathroom location, lunch arrangements, etc.)

Ken talked about the history of this group and their development of strategic plans over the years. The list of past meetings can be found on the website. Joel McMillin, Ken, and others are working to get PDF copies of past meeting notes onto the website as well.

Iral Ragenovich discussed 1993/5 Strategic Plan and its objective of providing direction for funding of projects (prior to STDP) and identifying information gaps for future research and application needs (tool to use for application, research needs, etc.). Ralph Their continued this discussion.

Brytten and Joel tracked discussion on purpose of a new, updated strategic plan... if the group decided they wanted such a plan.

Audience: BBTWG: clarify what has and has not been done; focus beyond each members own individual work
 Others: Council of Western State Foresters is working on their own documents and this group is doing their updates to the Western Bark Beetle Report (WBBR). PSW's doing updates as well. Possible need to address WO questions (esp. if funding available).

Purpose of a Strategic Plan:

1. To provide focus on technical aspects of BB (List of problems?)
2. Strategic effort that can be integrated into other groups
3. Plan to be prepared for uncertain funding, outbreaks, etc
4. ID specific larger topics for white papers.

Goals of a Strategic Plan:

1. Prolong (slow down) outbreaks
2. Minimize short and long term impacts (tree mortality)
3. Initiate strategy to affect policy/education
4. Don't lose knowledge gained (individuals retiring and taking knowledge base with them)
5. Develop, integrate, & prioritize technical capacity to manage BB populations and the forest in which they occur.
6. Produce guideline paper

Approach to Develop a Strategic Plan:

1. By species
2. Technology focus
3. Short vs. long-term
4. Native vs. Invasive
5. Identify/Revisit priority topics (annual)
6. Media format

Discussion on goal of a 5- or 10- year strategic plan appeared to be mixed with goals for the group. To clarify what the purpose of the BBTWG is Joel read the 2002 Draft Purpose statement:

**BARK BEETLE TECHNICAL WORKING GROUP (BBTWG)
 STATEMENT OF PURPOSE
 DRAFT—07/03/2002**

The purpose of the Bark Beetle Technical Working Group (BBTWG) is to provide a means to address issues associated with bark beetle ecology and management. The BBTWG meets annually or more frequently as needed. The group is composed of professional forest pest management specialists, scientists and resource management

specialists representing federal, provincial, state and local governments, universities and private interests.

Specifically, the BBTWG provides a forum to:

- 1) Discuss current bark beetle conditions in North America.
- 2) Identify and discuss issues and concerns related to bark beetle ecology and management.
- 3) Address short- and long-term research, technology development, and management needs for bark beetles.

Additional comments added to discussion:

John Borden: Western NA is in the middle of severe BB outbreaks: in British Columbia, managers failed to slow down (minimize tree mortality) the MPB outbreak strategically. There is a lack of education and policy to apply known technologies. Goal of technologies is to allow other activities to occur at a measured pace. Develop, integrate, & prioritize technical capacity to manage BB populations (impacts?) and the forest in which they occur.

Dan Miller: Focus on strategy vs. the individual species strategies – i.e. anti-aggregation, etc. Maintain diversity for long term health.

Sheri Smith: Many technologies have been developed and are in place for management of bark beetles, in many cases there are just barriers to implementation; need communication tools such as the WBB Report to keep reminded audiences (Congress, etc.) about declining forest health in the West. BBTWG role in this is to develop strategy to capture the needs of management and capture old timers' knowledge base. Plan should be developed to list our top research priorities for inclusion in the revised WBB report in 2007.

State representatives led discussion about need for individual management for each BB species. Each region needs this information for each species. Ken talked about Region 1's 3-ring management training binder they keep updated with current recommendations for each species.

REGIONAL CONDITIONS REPORTS:

R-1

Gregg DeNitto announced Coeur d'Alene has a vacant group leader position

Ken Gibson/Leah Chapman

MPB in LP increasing for nearly 10 years, expected to continue in 2006; MPB in WBP is also increasing.

DFB decreasing in n ID, w MT; only few areas of current activity.

WBBB – increase in 2005 in SAF (in R-4-ID mortality also due to BWA).

FE in GF decreased in nID; highest in 2004.

WPB in PP declined in 2005, most found in nID.

SB in ES generally at endemic levels.

Ips decreased in 2005, most in eMT. Most is drought-related.

R-2**Sheryl Costello:** Lakewood Service Center

MPB in LP on west side of continental divide coming to culmination and starting into LP on CO front range. MPB found attacking 3" LP at base. Oregon and Utah have seen MPB move from LP into PP, which could happen in the next couple of years in Colorado.

SB, Ips and WBBB are going along like last couple of years.

Northern Bark Beetle Cooperative, a group comprising of representatives on the local, state and federal level, is working to address the large scale outbreaks in Summit, Grand, Eagle, Routt and Jackson Counties. Ralph discussed the group's coalition proposal, including such ideas as FH District development and taxing districts to leverage federal funds.

Tom Eager: Gunnison Service Center

MPB – Decrease in amount of MPB in PP, but LPP has increased in other areas. Sometimes these increases are seen adjacent to previously affected PP, but in many other cases the MPB activity in LPP appears to have occurred spontaneously. SB increasing--really hard to pick up signature on aerial survey flights, but on the ground seeing it increase. In the Gunnison Service zone alone, we are aware of at least 40 areas being affected by spruce beetle.

Southern portion of Colorado have seen dramatic increases in FE on Corkbark and WF.

WBBB- pervasive even with wet year this year.

Aspen decline caused by many agents, usually some fungal impacts, but there has been a dramatic appearance in Aspen BB (small scolytid). Media coverage high in Denver, Wall Street Journal, etc. now.

Rapid City Service Center

MPB – PP and LP near Laramie, WY.

Aspen decline in WY on large acreages noted this year--also in BC and other parts of western NA. John Guyon's (FHP-Ogden) aspen plots will help evaluate disease and insects. Wayne Sheppard is retiring in Jan.

In AZ elk have a big effect on Aspen regeneration.

R-3**Joel McMillin:** NM – 2006 data

WPB, Ips and other BBs on PP, ~81,300 acres affected.

DFB down slightly, 11,900 acres.

FE static at 54,000 acres. Looper damage also seen.

SB – slightly up, lot of mapped mortality was older WBBB-killed corkbark fir mixed in spruce.

Pinyon ips slightly increased in 2006 due to weather.

AZ – *Phloeosinus* on shaggy bark juniper.

Pinyon are being attacked by both pinyon ips and twig beetles

Fires: Buprestids, especially *Melanophila*, attracted to damaged trees.

MPB-Limber pine; some but not much mapped.

R-4**Carl Jorgensen: (southern ID)**

Southern ID – Good snow pack year

Western ID – tornado affected stands of PP, DF, LP, and SAF. DFB moved into downed DF.

Salvage underway on private lands

DFB southwest of Salmon and eastern ID dropped off, but still active.

MPB in LPP and WBP in the Stanley area has decreased, but now the heaviest infestations are N & E and West of there. Several large fires burned a lot of habitat.

WPB endemic populations now

WBBB- just keeps going. BWA damage also mixed in – similar signatures; BWA has expanded since 1998 to southern Payette in SAF and GF. BWA found in Priest Lake and expanding along drainage bottoms

Twig beetles in LP and WBP area killing smaller trees, especially transplanted trees for restoration.

WSBW defoliation in some areas; prelude to DFB attack in ID, MT and central UT?

Darren Blackford / Gayle Durham: UT/NV -

SB- Active in UT down to 4" diameters. Active management in some areas working to reduce beetle attacks.

MPB- still active and hitting ??

Pinyon ips still around. Left pieces too big this spring after mastication projects (Indian Ck Campground). Pinyon blister rust also active.

JPB- western NV, increase in number of spots and area infested.

FE – still active in both states.

DFB- Avalanche areas in UT and Sundance, WY. In some areas mass-capture treatment worked.

Brytten Steed: western WY

MPB- Limber and WBP 1st attacked then LP; all in same area so not an elevational movement

DFB- down but still active

R-5

Sheri Smith /Danny Cluck– Hot spring and summer, but second year of above normal precipitation. (Handout)

Warner Mtns on the Modoc National Forest in northeastern CA – Hot spot for MPB in LP and WWP.

I-80 corridor between Truckee and Sacramento – FE in fir spp.; MPB in LP.

Southern Sierras – FE, RTB, WPB, CA Flathead borers, pinyon mortality remains a much lower levels than observed 3 years ago, JPB is increasing south of Lake Tahoe and further south along the Hwy 395 corridor down to Bishop, CA.

NRCS and CDF implemented a program called Forest Care in Southern CA to assist small acreage land owners with forest health improvement projects, primarily tree thinning.

Invasive beetles:

O. erosus - most native pines in CA are susceptible based on work by Steve Seybold.
Diaprepes abbreviatus—sugar cane stalk borer - likely to be the hardest pest for CA to eradicate in 25 years. L.A., Orange and San Diego counties, eradication project likely for the next 5 years. \$6.5 million allocated for FY07. Has a host range of 270 + plants which include primarily agriculture crops but also includes many oak species.

Incense Cedar decline occurring throughout the state--unable to detect what is agent of mortality; likely drought is involved and perhaps shallow root systems in many cases.
 FS contracted high elevation pine surveys. WPBR and MPB caused mortality was detected.
 Plans are to continue to expand the surveys in 2007.

R-6

Iral Ragenovich

2006 data not in yet, fires and smoke limited surveys. Most fires burning BB killed trees.
 Expect increases in BB activity.

2005 ADS

MPB- LP acreage doubled from '04 to '05 but number of trees killed about the same.

PP- increased acreage, not quite double '04 level.

Sugar pine – significant increase.

WWP – increased.

DFB- little bit increased, mostly in WA.

FE- decreased a little bit.

Ips in PP-small trees and tops, decreased acreage, most in south central WA.

WPB-decreased activity, most found in southern WA.

SB- increase slightly.

R-8

TX- Steve Clarke

SPB – MS and AL slacked off activity, SC and NC little bit of activity; very low levels of activity Region-wide.

Ips populations increasing in slash material from hurricanes and trees impacted by drought.

Dan Miller – Red bay ambrosia beetle and tree mortality from wilt disease coming in from exotic *Xyloborus*.

R-10

Jim Kruse / Roger Burnside

Good June. Some Aug. moisture, but overall a droughty year – fourth in a row.

Trees still stressed but June to Aug moisture helped significantly.

SB in southwestern AK in white spruce increased to 120,000 acres this year; found near small hamlets, wildlife refuge areas, etc.

Ips perturbatus build up from '04-'05 in fire edges. Mortality increasing around edges to 3" diameter range.

Roger added that *Ips* trapout work in the Tanacross area has helped keep the beetle populations down in areas where the Village of Tanacross is doing fire prevention thinnings around the Village

Eastern spruce bud worm outbreak; top kill in spruce. Top rot coming in then beetle attacks later.

Canada

John Borden

Noted importance of getting other Canadians to come!!!

Southern BC, like the northern BC getting MPB in LP. Strategy is salvage harvesting. Fifteen year recovery then economic depression. Blue stain is in the wood coming into US. East movement of MPB across the Rockies- eddies of beetles across the Continental Divide. BC and Alberta have been doing massive spot treatments--cut and burn by helicopter crews. Still many areas being mass attacked. Jack and Scots pine are good hosts for MPB.

Tuesday, Oct. 3 - PM:

UPDATES ON SPECIFIC EFFORTS:

Assessment of the WBB Initiative- Collaborative FS Research and Development and FHP 2004-05 – Joel McMillin:

Report on WO website (<http://www.fs.fed.us/foresthealth/pubsindex.shtml>)

Developed list of 3 priority items based on BBTWG's priority list; noted items that still need to be done.

1. Interaction of BB with fuel mitigation work
2. Management options in critical ecosystems
3. IPM strategies for the protection of critical habitats

Challenge to get meaningful project results done in 1 year. Still a need for semiochemical and technology work. However, need better job done on project work conclusions to get it out to public. Need to have a few things sitting on the shelf ready to go if money becomes available. Not likely to see for a formal BB Initiative in the future (or large quantities of available funding), but need to have a list of high priority projects if funding becomes available.

WBB REPORT #2 – Sheri Smith

Bob Celeya of AZ is in charge of updating the report per the Western Forestry Leadership Coalition (FWLC)- 2 day meeting in Denver in November to rough out a draft. Not a lot has changed in research needs and state of our knowledge. This second report needs better marketing to legislature to be useful or to change current funding statuses. **It would be useful to have this group give input to this update for Nov. meeting.** Research priorities in this document were tied to funding in FY2004 and FY2005

Ralph Thier: Program level dollars need a program level plan! BBTWG has not been formally asked to contribute but Ralph is asking that we do. Why is the revision being done? It is a tool to give interested legislators as they help build a western BB program. Important step is to market the report!!! Otherwise it isn't meeting its purpose. The FS isn't able to 'market' so the WFLC is doing that.

Larry Yarger: BBTWG 'strategic plan' should help direct issues in other reports. The WBBReport is being lead by 'consumers' (WFLC) of our research.

FIDL updates – Iral Ragenovich:

Need updates on many of the Forest Insect and Disease Leaflets (FIDLs). Some are pretty old and outdated. (See updated FIDL list on the BBTWG website to see who signed up for which revisions; <http://www.fs.fed.us/r6/nr/fid/pubsweb/bbtwg.shtml>)

Progress on the Western Forest Insect (WFI) and Eastern Forest Insect updates – Iral Ragenovich: Jan Volney had planned on leading the Western update but his priorities were changed so Iral now heading it. Dick Reardon is working on the Eastern Forest Insect revision at the same time. Frank Sappio (FHTET) has had the WFI book scanned and the OCR copy is being corrected now. Working to get scientific names spelled right, but name changes won't be in there until the specialists edit the sections. Will be setting up websites for each of the two books. Anyone who would like to update / edit a section should contact Iral. Also need people to take on proposals for common names of insects currently without ESA approved names if a common name is to be used in the updated version. Maybe contract it out to retired FS entomologist? Suggestion was made that it would be nice to have more consistent data for each insect (i.e. consistent headings for life cycle of each insect, damage descriptions, management concerns, etc; list unknown if not known).

Brytten passed out limited copies of handout of list of **common names** – ones not yet official with Entomological Society of America - to be worked on as part of the WFI book update. See Western Forest Insect Work Conference (WFIWC) website for CNC updates (<http://www.fsl.orst.edu/wfiwc/>).

Jake Klein- Colorado Counties Public Lands Committee: Helping draft a letter to CO delegation in DC, related to a forthcoming bipartisan bill that will combine the best points of the three very 'local' bills that appear to be 'dead' (Udall and Salazar "Rocky Mountains FIRES Act"; Allard "Headwaters Protection and Restoration Act"; Walden "Forest Emergency Recovery and Research Act"; Smith "Forests for Future Generations Act") – compared all DC bills and met with all agencies to develop a federal bill for US to address insect infestations and wildfire – CO legislature in DC is re-writing bill; 10/13 deadline to get feedback in. Gist of the feedback to DC is a comparison of the bills with comments and suggestions. Left info with the group (copies made available to those interested). Email comments to akarsian@ccionline.org (303) 861-4076. Larry Yarger noted care should be taken about responding as a FS employee.

Verbenone Overview Review Project - Tom Eager: On 3rd Draft now, will finish this project up following the Verbenone session at WFIWC in March. Verbenone is a multi-function pine bark beetle semiochemical - used by various species 1) to attract (host quality per yeast/fungi

releases) 2) sex ratio modulator or 3) anti-aggregant. Functions as an indicator of what the state of attack is on a given tree. The anti-aggregant focus is what is being used for management. Attempts to utilize as a management tool has been largely marked by inconsistency (up to and including the past several years) – failures and successes and everything in between. Many of the failures of Verbenone have not been detailed, and there is a significant body of often unavailable “gray literature”.

Sources of inconsistency include:

- 1) Material Used – right handed or left handed chirality, purity, degradation into inert materials in sunlight, etc, as well as the unknown importance of minor components and synergists (host odors, green leaf volatiles – 6-C chains, etc) are issues affecting success and difficulty in comparing different studies
- 2) Materials Delivery-elution rate – right amount at right time – vials to bubble caps to pouches-labor costs expense to replace throughout season. Micro-delivery devices include impregnated beads, microencapsulated beads, sprayable powders and slurries. Little info on elution rates. Med-e-cels to time release- active unit
- 3) Host Condition – tree susceptibility changes over time i.e. drought conditions over years – Tree and stand conditions are constantly changing over time.
- 4) Beetle status - Evidence of behavioral changes in beetles over time, especially as beetle populations change from endemic to epidemic populations.

Bark beetle semiochemical systems consist of many different materials that include compounds produced by the host, bark beetle associates and the different sexes. Some materials are present in small amounts, but are very important. The complete sequence of semiochemical production (timing and relative amounts) has not been completely elucidated for any bark beetle.

Sequence of inquiry is elucidation in the lab > testing in the lab > testing in the field with traps > testing in the field with trees. This latter step is huge. One impediment to routine usage has perhaps been a tendency to “rush to the field” before all the details have been made clear. Not trying to exactly duplicate natural system, but are looking for “Good Enough” duplication of natural system that is not too expensive or toxic.

Black holes of info – still don’t have time sequences and roles of various components entirely worked out (i.e. SPB – endo-brevicomin). There are many other areas where some basic research is needed. Many discoveries of the mechanics of the system have become evident only after advances in analytical chemical techniques have occurred.

May be impossible to get answers using truly scientific methodology due to the various sources of inconsistency, but there is still a place for verbenone in bark beetle management. The use of verbenone is not just a scientific proposition, economic and social values are just as important in the decision to deploy or not. Valuable in high value recreation sites, water sites, remote locations. Probably not appropriate over large outbreak areas. Is a band aid to symptom of the real problem; lack of management and silvicultural treatments, etc.; not a silver bullet, needs to be used appropriately. Report failures as well as successes.

Spray treatments much more reliable than Verbenone usage.

Discussion: Phero Tech verbenone pouch is no longer EPA registered in 2006. CTI/Synergy verbenone products expected to be EPA registered by Dec. 2006. Both (-) verbenone for western Dendroctonus and (+) verbenone for SPB will be available.

Discussion about verbenone potentially being attractive to MPB at low doses. David Wakarchuk and A. Stock's poster was posted at the meeting. This experiment used a low dose of verbenone added to an MPB funnel trap lure and the resulting trap catches were slightly inhibited but not statistically different than a standard lure without low dose verbenone. MCH for DFB success discussed per beetle ecological roles of beetles and chemicals. Need to be upfront about the variability of results when recommending Verbenone's usage – if used more may learn more about its usage over time.

John Borden-Phero Tech- good job on report, Bt did not work at first either. Agrees with Ken; it may not be perfect but better than nothing. This is why he's working for a semiochemical company—it feels good trying to do some good. Has Verbenone registered in specific states – new pouch coming this spring, field tested this year. Question raised as to whether low levels of verb are contributing to attraction – need higher release rate than 2-3 mg/day on trees to get anti-aggregate effect.

Wednesday, Oct. 4 – AM:

Brytten discussed sign up for FIDL revision and thanked volunteers who signed up. Brytten passed out the priority list of 'questions needing answers' developed during the CY2005 BBTWG meeting to be reviewed in preparation for Thursday's revision of the list.

Steve Munson – Executive summary passed out on “The Effectiveness of Vegetation Management Practices for Mitigating the Impacts of Insects on Forest Ecosystems”

Developed in response to the Xerces Society white paper that discussed the ineffectiveness of silviculture treatments designed to mitigate the effects of bark beetles. Hazard/risk rating systems were highlighted in the manuscript. The document is a summary of reviewed literature and is not designed to be a “cookbook” to develop silvicultural prescriptions. No information is available that discusses silvicultural treatments for true fir. Some references were included that discussed disease impacts as a result of silvicultural manipulations. The manuscript has been accepted by Forest Ecology and Management for publication.

Steve Clarke gave Don Grossman's Power Point presentation on the injection studies

On going right now – takes at least a month for injection to be uptaken in trees in the south \ Could be used in tall trees or riparian areas that you can't spray with carbaryl (Verbenone being used there now):

Started with Ips trials in TX – log and standing tree trial FIP (Fipronil) and EB (Emamectin Benzoate) were completely effective against Ips.

MS- SPB/Ips trial 2005-06 – SPB very low so switched to Ips – EB so far effective – but beetles get in and inoculate tree with blue stain, but not breeding in the trees.

AL- SPB trial 2006 EB and FIP – not enough tree mortality (<60%) to show valid results, but SPB does not appear successful in treated trees - will re-bait trees next year

EB – Emanmectin Benzoate – for Ips and SPB efficacy duration for 2 years. CO hopes to request and have Emergency Use Permit to use next spring for protection against MPB. MT, WY, UT and CA may follow suit.

FIP - Fipronil was not as effective and may not be retested

John had questions on registration through Arborjet – referred him to Arborjet on coordinated registration.

Darren had questions on costs – referred to Arborjet - it is expected to be expensive due to cost of Arborist as well as the material.

Carl talked about injections in 2005 for MPB with EB and FIP with 37%-25% fading on EB and FIP and check trees, but 0% on Carbaryl; lack of effectiveness for MPB injected in LP in the June-7,000 ft elevation.

Questions arose about what happens with the injected chemical long term and its affects on non-target organisms – especially important for FS evaluations.

Cam Oehschlager discussed that EPA will require the company to show all effects were considered for toxicity on non-targets and residual data for registration. Currently they are registered as sprayables now so what needs to be done for injectables- new formulation?

Ralph thinks that we should not pursue this any more due to the lack of inject formulation registration.

Steve Munson talked about Chris's study on PP-WPB in May of 2005, evaluated June, 2006; Bifetherin -0% mortality, EB-0% mortality, FIP-17.2% mortality with control (untreated having 36.7% mortality so does not meet standard for efficacy per Shea, 1984).

Steve Munson did Spruce injection studies this year – fades following year – lots of boring dust/pitch tubes on controls and injected trees being seen so far – will check for galleries next week.

10:30 – 12:00

Brytten handed out 1) attendee roster, 2) 2003-04 Priority Topics for WBB Research, 3) 02 BBTWG Statement of Purpose,

Discussion on determining 06 Top Priorities:

- Sheri wants to make sure we update the WBB Report with current bark beetle research needs if they are different from those included in the previous WBB report.
- Joel wants to use CY2005 priority list to create CY2006 priority list (for use until CY2007 mtg)
- Ken thinks that the CY2005 list is much of what is in the 5 yr strategic plan and may be incorporate it into WBB Report as well.
- Items 1-5 in the CY2005 priority list are goals while the lower case letters under each priority are objectives or examples.
- Group noted that at least one goal needs to be added on silvicultural treatments for BB control.

- The 2002 report lists 4 strategies that were the basis for the CY2005 BBTWG Priorities 1-4. What would the BBTW Group like to add? Discussions occurred about what various states needs are for BB Mgmt via research
- Decision: We will keep our update to a one page update of the CY2005 list, adding a few other items of importance. But it may still require we identify top 2 items to fund – maybe add asterisks to highest priority items? Maybe ID long term and short term priorities? To be worked on Thursday.

Begin discussion of bark beetle projects (any relevant projects done or planned)

- * **MPB**
- * **DFB**
- * **SB**
- * **JPB**
- * **WPB**
- * *Ips sp.*
- * **SPB**
- * **FE**
- * **WBBB**
- * **Others (e.g. invasives)**
- * **(related pheromone and pesticide projects)**

VARIOUS REPORTS from people leaving early:

Matt Hansen discussed spruce beetle study with Steve Munson and Jose Negron – Previous silvicultural treatments in Engelmann spruce were examined throughout Utah to determine residual stand structure following spruce beetle disturbance. Levels of spruce beetle activity varied significantly among treatments. Many of the prescriptions were not designed to mitigate spruce beetle activity. Ten acre fixed radius plots were evaluated in 27 treated/untreated pairs. To summarize the findings:

- 1) Untreated plots have more infested stems and infested BA than treated plots. Not surprising because of greater population of susceptible material in untreated blocks.
- 2) Untreated plots have higher rates of mortality, expressed as either proportion of stems or BA infested.
- 3) However, untreated plots also have greater TPA and BA of living, residual ES than treated stands. This trend even holds if just looking at the Dixie NF where mortality levels are extremely high.
- 4) Treated stands have significantly more ES regeneration than untreated blocks.

If additional funding can be attained, the project will continue in Idaho and Wyoming.

Jim Vandygriff: discussed PP plots 15 year revisit in southern UT, and CO. MPB pressure still light there.

Nancy Sturdevant– DF study with Jose Negron: Installed thinning plots in MT – BA reduction, SDI treatments in DF and DFB activity in 3 different forests, so far DFB is low in silviculturally treated areas. And spring vs. fall burning in DF stands to assess DFB reaction,

Barb Bentz: Just completed 4 yr response after wildfires, lots of DFB response. Quantified damage most susceptible to DFB – models developed. Photo guide also developed for this as well to go with model. Canadian Journal of Forestry article to come out. Similar study in PP also done with spring and fall burns – will come out next spring.

Joel McMillin (and others) did a study in PP in MT, AZ and CO: In Forest Science Journal – model developed to predict mortality of fire damaged PP– best predictors included crown scorch, crown consumption (important to keep these 2 separate), *Ips* attack and tree size.

Discussion by group of how fire injured trees are more susceptible to BB activity even a number of years afterward. Sheri and others has paper in press from PSW where they developed probability of mortality models based on tree data collected in CA.

Darren Blackford: Presented Liz Hebertson’s study on Characterization of Fuels Complexes in stands affected by BBs. Hand out

Wednesday, Oct. 4 – PM:

Field Trip—Butte Ranger District

Ken and Bruce Schuelke discussed the Beaverhead-Deerlodge NF’s efforts over the last 14 years to get silvicultural treatments installed in order to “beetle proof” some important stands prior to infestation. Dealt with problems associated with local and out-of-area appeals and litigation that kept the plans from being implemented. MPB in LP has increased exponentially in this area.

Thursday, Oct. 5 – AM:

Conclude discussions about an updated Strategic Plan. All voted to stick with a small one page list of priorities and that an update to the 1993-95 Reports would be handled by smaller group, if at all.

Harold Thistle has \$20,000 dollars for FY2007 for a research project that FHP votes to be a priority item. Send in 1 year proposals to Sheri Smith. The acting FHP subgroup of the BBTWG (Ken, Tom, Joel, Brytten/Steve, Sheri, Iral/Dave, Steve Clarke, Mark Schultz/Jim Cruse) will evaluate the proposals using the BBTWG’s 1 page list of priorities and recommend one to Harold for funding. Send proposals by November 24th to Sheri. Dollars should be dispersed by the first part of ‘07. Sheri asked that date be changed to 13th in an attempt to complete the recommendation process prior to the holiday season.

Breakout into small groups to work on priority lists for 2006 to flesh it out to a final version of the one page BBTWG priority list valid until next meeting. Discussion by ‘priority subgroup’ during rewrite:

- P1 - combined items into objectives – each group may have taken a different approach – so look at all as a group. Some more specific than others.
- P2 - was more broadly described – and moved 3 items into Q5 Silvicultural
- P5 - Group – more specific- look at histories and evaluate and document and demo areas and redo Q2 questions to statements later.
- P3 - kept as questions but can be made to statements.
- P4 - axed most of theirs and summarized into fewer bullets and focused on getting the info out to the public – web-based clearinghouse, etc.
- P6 - combined a and b and would like to add the need for more summary info
- P7 - wordsmith the original statements.

Sheryl Costello will put all into statements vs. questions later and finalized the list. This list will be put on the website. Until then, we will use the wording as it was roughed out during the meeting (attached at end of meeting notes).

Continue discussion of bark beetle projects (any relevant projects done or planned)

- * **MPB** * **DFB** * **SB**
- * **JPB** * **WPB** * *Ips* sp.
- * **SPB** * **FE** * **WBBB**
- * **Others (e.g. invasives)**
- * **(related pheromone and pesticide projects)**

MOUNTAIN PINE BEETLE

Jim Reinholt started with 2 handouts on BB for Central ID

MPB – carbaryl spraying trees mostly done with some thinning. Done some contractor training. Jim is FS employee but through S&PF is able to work with private landowner education, etc. On thinning on LP – careful not to over thin due to blow over, but where treatments have commenced the tools are working well and sharply contrast where it is not treated.

Ken discussed MPB test with Verbenone: Mount Edith / Lime Kiln 2006. WBP at Mount Edith: MPB started in WBP about 3 years ago. WBP at about 8,000 feet; moved into LP below (instead of other way around). Tested Verbenone and Hexanol; 3 treatments: 2 Verb 7.5-gram pouches, 1 verb and 1 Hexanol (10-gram) pouch, and control. Tested in LP and WBP in 2006. MPB tree baits on posts (or non-hosts) 5 feet from treated tree. Verb and Hex +Verb had significant protection compared to checks (about 80%) equally in WBP. Similar results in LP but Verb alone was less effective. Hexanol is much cheaper and if proven effective could reduce Verbenone usage—and expense—significantly. Have not tried Hexanol alone on MPB but is a repellent on coffee berry borer (according to Cam).

John Borden discussed Verbenone/MPB in BC: MPB – 500 Verbenone pouches on immature LP and removed infested trees – 2 strips of Verbenone between public forest – 50% infestation in outlying forest, 30 % in buffer, and 3-4% on treated lots. Over winter adjacent park removed all infested trees, but crown forest did not harvest, some lots sprayed with carbaryl. Spot surveys showed 89% infested in park, so have to use Verbenone with infested tree removal for success. Need IPM with Verbenone.

John did Verb pouch and new pouch (improved longevity and release rate) study – New pouch had no mass attack but 16% attacked vs. 8% mass attacked and 25% attacked on the old pouch. Cost of new pouch should be about the same as the old one. The control had 25% mass attack and 8% attack. So unbaited control and regular Verbenone both had a total of 33% attacked. Verbenone is registered in MT, CO, AZ, ID, NM, ND, OR, SD, UT, WA, WY – not in CA.

Sheri Smith, Danny Cluck, and Brian Strom are working on MPB in northern CA: Very few beetles trapped in the Lake Tahoe Basin Management Unit several years ago with the standard MPB bait. In 2006 we used Myrcene (M), Terpinolene (T), and 50M:50T Blend on PP

and mixed conifer stands, 0.1 mile apart (15 traps total – 5 per treatment chemical). Blend was best for capture. Also, tried a 75M:25T blend which was even better; but trials are still in progress. John Borden has been recommending the blend for 2 years now for aggregation of MPB. Recommends putting traps into a non-host stand or pasture, etc. to avoid spillover

Sheryl Costello - MPB in LP on ski hill using lethal kill trees – carbaryl spray on trees in center of plot with aggregation baits on sprayed trees. All sprayed trees survive first year but finding some failing – question of 1 year or 2 years of efficacy – is failure due to applicator problems?

Steve Munson and others agree that most failures are applicator error – treatment has to be applied to all bole faces to the point of runoff up to 40-50 feet depending on the diameter of the tree. Sufficient insecticide must reach all bark cracks and fissures in addition to exposed portions of the root collar to ensure treatment effectiveness. Some ineffective applications are the result of using older insecticide that were improperly stored Carl Jorgensen (Idaho FHP) has 2 years of insecticide efficacy on treated LPP in Idaho. Ken Gibson has observed 95% efficacy for 2 years on treated LPP in Montana.

The group discussed carbaryl's mode of action. Does it act as a repellent or are adult beetles killed as they bore into the treated bark surface. John Borden has seen evidence in Germany that it acts as a contact insecticide for *Ips typographus*. John felt that it would lose any repellent effect a month following application.

Sheryl continued the discussion describing bear attacks on funnel traps containing beetles in the cup. Panel traps vs. funnel trap effectiveness was discussed

Beth Willhite– MPB in California Gulch, Baker City, OR area. MPB Study thinning in second growth natural regeneration PP: 25-acre treatment study (case study) – MPB pressure had been in the area for a few years beforehand – 12X12, 15X15, 18X18, 21X21 spacing treatments and a control. 12X was not effective--same as no treatment. Better results on wider spacings 18X and 21X. 2002 district accidentally burned all but 3 plots – treatment plot's new trees were killed but not the large left trees – young poles only, but some MPB came in the burned areas afterwards on scorched trees. 15 year data available, re-sampling stand exams every 5 years for 40 years now, fire set some of the trees back, but the wider spacing is growing very well. District interested in setting this up as a demonstration area - an example for new homeowners to do thinning treatments for beetle abatement and forest health. Charlie did a 5 year evaluation that was published.

(side track to a few leaving early):

Tom De Gomez – study on slash diameter and length preference of pine BBs on PP: Different diameter slash logs below 24 inch - trials in three different canopy levels – 2004-5 wettest winter on record and had high exit holes # except on 6" diameter logs by *Ips* spp., next year driest winter on record – with much lower # of exit holes due to drier conditions this last year. No info on canopy cover differences yet. Weather has a lot to do with how *Ips* will use slash.

Steve Munson – shared publication on Bark Beetle’s in the Intermountain West developed for the general public (Information pamphlet for R-1 and R-4 with State and Federal contact information on back) –8,000 printed for distribution- 100 copies will be distributed to each State Forest Health Specialist that attended the meeting. A PDF version of the publication can be downloaded at <http://www.fs.fed.us/r1-r4/spf/fhp/publications/byregion.html>

Thursday, Oct. 4 – PM:

MOUNTAIN PINE BEETLE cont.

Steve Munson – Carbaryl spray drift study with Chris Fettig & Bob Borys-2006: Pressure and orifice size tested (325 & 400 psi with 8, 10 & 12 orifices) were evaluated for spray drift.. 30 LPP and 30 Engelmann spruce were sprayed with carbaryl up to 50 feet on the tree bole with wind speeds averaging less than 8 mph. Petri dishes with deposit filters were placed every 45° at 25, 50, 75 and 125 foot intervals. University of Georgia is doing the spray deposit analysis of the 1,920 filter disks collected following treatment. A published manuscript should be available for distribution sometime in late 2007. Discussion about spray drift retardants by members of the bark beetle working group. Those that added retardants to the formulation noticed significant drift reduction and not a lot of additional costs. Particularly important where higher bole applications have been administered. No one recalled any adverse human or non-target effects as a result of spray drift.

Carl Jorgensen – talked about various Verbenone studies in UT and ID– results forthcoming.

JEFFREY PINE BEETLE

Sheri Smith and Bob Borys - There is no lure currently available for JPB: No Verbenone studies on record; yet Shea did Heptanol trap catches in mid 90’s so look at this again? Not sure how effective. Seybold and Paine have some publications out on JPB. Jose Riba did some work on diameter to beetle numbers research and brood production. Robert Borys, Sheri Smith, Darren Blackford, Brytten Steed and Gail Durham may work together to summarize what is and isn’t known about JPB semiochemicals.

SOUTHERN PINE BEETLE

Brian Strom - SPB Med-e-Cell testing: 3 years of work – Verbenone dispenser does not working because Verb is attacking the membrane. Steve Munson had similar problems with MCH – the compound dissolved the membrane in the Med-e-Cell devices. A timed-release application device would significantly reduce losses of the product compared to a passive release bubble cap or pouch. The device could be programmed to release a pheromone plume during the daylight hours when the adults are actively flying. Further research needs to be conducted in this area.

Steve Clarke – SPB Prevention and Restoration Program handout from John Nowak:

- SPB Hazard Rating systems are being developed and tested
- History of SPB on the web now - including economic losses, etc.

- SPBIS database is working now
- State involvement in development of a SPB database now- Jim Meeker, FHP, and Bud Mayfield from Florida spearheading this effort
- Hurricanes – team formed for preparedness for Catastrophic Events FHP participated in this and Steve dev SPB preparedness guide at low and high populations.
- SPB spot mapping and monitoring – GPS locations uploaded into database, etc.
- SPB Model Revision on going
- Brian Sullivan’s SPB pheromone work with +endo-brevicommin: has been considered an anti-aggregant, but is being shown to be an aggregant if 4-12 meters away from trap. Acts as anti-aggregant when on the tree. The antennae electrical signal is very low for the (-) vs. the (+) by as much as 100 times. Will start fall trapping away from pine stand to monitor populations.
- *Dendroctonus woodi* – secondary or primary BB? Down in South America – studies in MX – behaves differently than the SPB.
- SPB population phases – endemic and epidemic not used due to confusion to exact meanings (e.g. endemic meaning native and epidemic as a medical term); Specify 3 population phases as ‘latent’, ‘intermediate’, and ‘outbreak’
- Consider susceptibility, hazard and risk terminology- develop commonality:
 - Susceptibility: will the stand sustain and active, increasing infestation? Yes or No
 - Hazard: Degree of vulnerability of the stand to a particular pest. Based on stand attributes.
 - Risk: Likelihood that a pest species will occur in a stand. Involves pest population levels and stand hazard.

DOUGLAS-FIR BEETLE

Joel McMillin – DFB & dwarf mistletoe (DMT) Hazard Rating in SW: In AZ, DFB is a minor component in stands (20%), but a lot of DFB DMT and potentially root disease. DMT broom volume ratings of 4-6 ratings had high probability of DFB attack. As DFB population increases it will start to attack the lower class of DMT infected trees. Also DMT proportional to dbh: DFB prefers trees with heavy DMT infection and >20” dbh. Collected phloem and sapwood samples to determine ethanol and alpha pinene production on trees with different levels of DMT infection to see if there are any patterns with DFB attack preference.

Have been collecting DFB trapping data on San Francisco Peak area at 8,500 ±500 ft elevation with first week of July peaking out in 2005 and late June in 2006. Looked at Seudenol and MCOL in the lure; Seudenol caught more DFB in ‘05 and ‘06 but may not be significant difference between the two compounds. John suggested trying blend of two which may repel the predators as well.

Ken Gibson – Darrell Ross noted that he would like to do a MCH test next year on DFB: 30 bubble caps on fewer locations. Let Darrell know if you have any good sites with DFB activity

WESTERN PINE BEETLE

Sheri Smith – WPB: Two Grad students (SCEP program). One is doing a comparison of trees burned in spring / fall prescribed fires looking at resin flow and how WPB brood production and attack patterns vary. The other student is working in the Warner Mts. doing a retrospective study of previous management projects including thinning in natural stands, sanitation, plantation thinning and overstory removal comparing the amount of bark beetle-related mortality to treatments.

Carl Jorgensen: Talked about Laura Moffit (Boise, ID FHP) conducting a "catch and release" study on the efficiency of trapping system for WPB as part of a larger project with Jane Hayes.

Bob Borys: Discussed Chris Fettig's work with WPB bait, NAV's, non-host angiosperm volatiles, and Verbenone, packaged in bubblecap strips and attached to ponderosa pine trees, looking at WPB attraction and disruption. Final analysis late fall. - also did MPB trapping in the Uinta N.F., Utah using MPB lure + Terpinoline, Verbenone and a minimum NAV blend. Very effective in reducing trap catches. He can put something out on this if we want.

John Borden – WPB: Outbreak in Okanaogan Valley and mass trapping going on around towns up north. Also using Verbenone, which has been verbally confirmed as being successful. Sheri has not seen any positive results with Verbenone against WPB in CA.

SPRUCE BEETLE

Steve Munson – Fire and Spruce Beetle: Tom Veblen at the Univ. of CO found no linkage between fire and spruce beetle outbreaks at a study site in western Colorado. Steve is working with Andrea Brunelle at the Univ. of Utah to examine lake sediment cores for charcoal and beetle deposits in a project funded by the Joint Fire Science Program. This study proposes to provide four Holocene (~10,000) year records of fire, climate, and vegetation change from spruce-fir forests in Utah using lake sediment analyses. Looking at Holocene records will allow us to understand how fire regimes have responded climate changes in the past that are good analogues for changes we can expect as a result of global warming. By using multiple proxy (e.g., charcoal, pollen, macrofossils) we will also be able to evaluate the interrelationships among fire, climate, and vegetation composition. Additionally this study will also contribute information about past infestations of spruce beetle and how historically, infestations relate to climate, fire, and vegetation change. This knowledge will be of particular use for land managers as large patterns of spruce beetle disturbance are currently affecting spruce-fir forests in Utah. Little is known about the role of fire in Utah's subalpine ecosystem.

Sediment cores will be collected from an anchored platform in the center of the lakes. The uppermost unconsolidated sediments will be retrieved with a plastic tube outfitted with a piston (Klein corer) and sampled in the field at 1-cm thick increments. This work was completed on the Wasatch Plateau site in 2006. Long cores of the consolidated sediment will be obtained using a modified Livingstone corer where the short cores resulted in locating bark beetle sediments. Three other high elevation lakes will be sampled in 2007.

Roger Burnside - SB in AK: Talked about Ed Berg's manuscripts on spruce beetle disturbance history and fire history of white and Lutz spruce forests on the Kenai Peninsula in J. For. Ecol. Mngt (Volume 227, issue 3, June 2006) special issue "Spruce beetles and forest ecosystems of south-central Alaska. Selected papers from the symposium entitled 'A changing Alaskan ecosystem: effects of spruce beetle outbreaks and associated management practices on forest ecosystems of south-central Alaska' held in Homer, AK; eds. S.M. Matsuoka, E.H. Holsten, M.E. Shephard, R.A. Werner & R.E. Burnside".

Of note is that SB outbreak return intervals were estimated at 52 years; fire return intervals were estimated at 80 years for black spruce and 400-600 years in white and Lutz spruce.

Joel McMillin– SB in AZ: Compared α -pinene and terpene mix attractant on the San Francisco Peaks near Flagstaff. Terpene mix increasing trap catches of SB with peak of early July to end of July. Also caught a lot of ambrosia beetles. In 2005 used spruce stands with traps hanging in dead trees, but in 2006 hung traps in aspen or cork bark fir stands to minimize spillover. Steve Munson mentioned that he collaborated with Darrell Ross and Gary Daterman on a similar study in Utah published in *Western North American Naturalist* 65(1), © 2005, pp. 12.3-126

IPS ENGRAVER BEETLES

Joel McMillin and Tom DeGomez - Ips work: 3-year trapping study in PP in SW across elevational gradient – affects on BB community structure and populations. More *Ips* caught at lower to mid with *Dendroctonus* at higher elevations. Predators also seem to vary by elevation. See Handout.

Eric Smith - Pinyon ips: Looking at FIA pinyon mortality data they determined year of death to evaluate mortality differently than John Shaw did in his paper. Will also take aerial detection survey (ADS) layers and compare mortality for areas common to all ADS surveys. Cumulative mortality from FIA data is about 20% - varying from state to state. Consistent mortality across the various density classes or tree diameter. Steve Munson inquired who is responsible for publishing the results of this evaluation monitoring project. Eric was not sure.

OTHER

Eric Smith talked about FHTET's National Risk Map: Final version based on models and used best available data. No good BA maps so talking about developing BA layer to better match the models.

Also working with RSAC to create change detection map early in the year to prioritize where to fly based on satellite data. Also, they have a plane, operator, digital IR camera – no film or processing that is available on a 'cost re-imbusement' basis.

Beth Willhite shared that the Western Defoliator Working Group tasked to create website: Thought it might be combined with other forest insect websites such as the Western Bark Beetle Information Services site (<http://ftcweb.fs.fed.us/wbb/index.asp>). Joel McMillin suggested we could call it the Western Forest Insect site. Maybe bring this issue and others related to the

website up at the Western Forest Insect Meeting in March in Boise? Also, maybe add this work to Priority #7 (especially the development of citation databases). Does anyone oversee citation input? What about uploading PDF's and copywrites? What is of particular interest is the 'gray' literature that is not on the other formal search engines.

CY2007 location and chair people - Darrell Ross offered to host it in Corvallis, Oregon next year. Group agreed to do it there. There is no known rule that FHP needs to host or chair it. Ken Gibson will be Agenda Chair for next year – date will need to be set. Maybe could be set to later into November?

CY2006 BBTWG attendants list:

	last name	first name	email	2006	Affiliation
1	Aguayo	Ingrid	iaguayo@colostate.edu	x	Colorado state
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Attached is the roughed out 2007 Research Priority list of the WBBTG **not** listed in priority order:

Bark Beetle Technical Working Group Research Priorities List for CY2007

1. Improve methods to predict where, when, and how much bark beetle activity will occur on forest landscape
 - a. Evaluate methods for determining the relationship between tree physiology and susceptibility to bark beetle attack, including stress factors and constitutive and induced resistance.
 - b. Define methods for predicting the occurrence, rate of spread, size, duration and impact of outbreaks for individual bark beetle species.
 - c. Refine methods of evaluating landscape – level susceptibility to bark beetle outbreaks.
 - d. Determine the role of climate change in predicting bark beetle outbreaks.
 - e. Utilize information from all possible sources to define what constitutes an outbreak.
 - f. Integrate all of the above into operational, predictive models for significant bark beetle – host systems.

2. Clarify results and interactions between bark beetle populations, wildfires, and prescribed fire
 - a. Fire, fuels, and beetles. Define short & long-term ecological relationships associated with bark beetle populations, wildfires and prescribed fire.
 - b. Projects should meet National Fire Plan objectives.
 - c. Develop tech transfer tools for bark beetle/fire interactions for the general public.

3. Evaluate, quantify, and describe the effects of no action.
 - a. What are post-outbreak conditions on treated versus untreated lands?
 - b. Is it possible to see differences in species composition, diversity or species shifts as a result of not taking specific management actions?
 - c. What are the consequences of bark beetle outbreaks to forest ecological function, e.g. 1990's spruce beetle outbreak in Alaska?
 - d. What are the costs of "do nothing" alternatives?
 - e. Document and summarize case histories.

4. Develop additional technologies for using natural attractants and repellents such as pheromones to protect forest resources
 - a. Summarize what is currently known about the effectiveness of semiochemicals.
 - b. Develop an appropriate "clearing house" for semiochemical information (webpage, case studies, etc.)
 - c. Develop new and improve existing semiochemical technologies

5. Validate silvicultural techniques to meet various management objectives
 - a. Evaluate and document current conditions of previously installed (10+ years) silvicultural treatments to determine risk to bark beetle (LPP)
 - b. What are slash-treatment alternatives?
 - c. What fuels treatments may change hazard ratings for bark beetles?
 - d. "What are the effects of fuel reduction treatments, including thinning, on bark beetle populations"
 - e. Install demonstration areas where stands are silviculturally manipulated according to established risk rating to geographically refine risk models

6. Develop additional technologies and strategies for using insecticides to selectively protect priority resource values on forest landscapes
 - a. Evaluate insecticide delivery systems such as sprays, electrostatic, or injections.
 - b. Determine the effectiveness of insecticides for less studied conifer species.
 - c. Determine the effectiveness of using lethal trap trees.
 - d. Summarize what is currently known about the effectiveness of insecticides.
 - e.

7. Facilitate technology transfer, improve communication with land managers, and inform the general public.
 - a. Strengthen resource education and technology transfer.
 - b. Strengthen taxonomy expertise and encourage training sessions to foster identification skills.
 - c. Inform land managers and general public of the political/legal ramifications of what we do/don't do and should do/can't do.