

**Bark Beetle Technical Working Group
Rapid City, SD
October 5-7, 2010**

AGENDA

- 8:00 – 8:20 Welcome, housekeeping items, local information, etc.
- 8:20 – 10:00 Status of bark beetles by Region (Conditions Reports)
* 15 min max per Region *
- 10:00 – 10:30 Break
- 10:30 – 11:30 continue Regional Bark Beetle Reports
- 11:30 – 12:30 Lunch (on your own)
- 12:30 – 2:30 Bark Beetle R&D Projects—completed and/or planned.
* MPB * DFB * ESB
* JPB * WPB * Ips spp.
* SPB * FE * WBBB
* Others: Invasives, pheromones, pesticides...
- 2:30 – 3:00 Break
- 3:00 – 5:00 Bark Beetle R&D Projects (continued)

Wednesday, Oct 6

- 8:00 – 9:30 Breakout sessions for informal small group discussions –lobby/coffee shop
- 9:30 – 5:00 Field trip to Black Hills Nat'l Forest (including thinning plots) and Monument of Democracy (Mt. Rushmore).

Thursday, Oct 7

- 8:00 – 9:00 Bark Beetle R&D Projects (continued)
- 9:00 – 10:00 Region and State bark beetle prevention, suppression & restoration projects
- 10:00 – 10:30 Break
- 10:30 – 11:30 FHP/State discussion of research needs
- 11:30 – 12:30 Lunch (on your own)

- 12:30 – 2:30 Updates on specific areas of interest:
- News from WO FHP: *Bob Rabaglia*
 - EDRR update: *Bob Rabaglia*
 - Discussion of 4AA/verbenone registration: *Bob Rabaglia*
 - Western Bark Beetle Research Group: *Rob Progar*
 - FIDL updates: *Iral Ragenovich*
 - Update of “Western Forest Insects”: *Iral Ragenovich*
 - FHTET funding for special projects: possibility for funds in 2011 *Harold Thistle*
 - SAF update: *Rob Progar*
 - EM or STDP projects submitted for FY2011
 - 2011 risk map update - ?
 - NAFIWC update: *Darrell Ross*
- 2:30 – 3:00 Break
- 3:00 – 4:30 Continue general discussions as needed...
- 4:30 – 5:00 Meeting location and chair for 2011
- Include discussion of meeting timing

MINUTES

By Gail Durham and Bill Schaupp

Tom Eager, Chair and Meeting Leader

Tuesday, October 5, 2011

Conditions Reports:

R-1 --- Brytten Steed

2010 – flight data not available in R1 until Jan/Feb 2011

2009 – flew ~40 million acres (**MA**), up from <38 million in 2008; this is ~90% of the Regions forested area

MPB (all hosts): nearly double acres in 2009 to 4.4 MA from 2.4 MA in 2008; however, only 24% increase in estimated number of trees killed (18 million in 2008 to 24 million in 2009)

MPB in LPP: up from >2 MA in 2008 to 3.5 MA

MPB in PP: <430 thousand acres (**TA**), up from 55 TA in 2008; over ½ of this was on Helena NF

MPB in 5-needle pine (mostly WBP): nearly doubled to 4.4 TA, partly due to increased survey; some areas with >90% mortality

2010 ground survey in MT

- MPB and Cold Temps: larval mortality seen this spring due to October 2009 freeze, maybe significant, LPP hit in '09 are still green in 2010 (limited blue stain found in trees where larvae died early in cycle).
- 2010 attacks very late in season; some not starting until mid-August

DFB – endemic levels still.

FEB -- decrease due to good precipitation.

WBBB -- increase (more surveyed).

IPS – coding problem 2009, smaller trees called MPB; still a bit high.

WPB -- decrease in west MT.

Spruce Beetle – low levels detected but 2010 has had several local outbreaks that won't fade until 2011.

R-2--- Sheryl Costello, Bill Schaupp, Tom Eager

Costello – N. CO & S. WY

Shows PPT slide – *2010 preliminary aerial survey data*.

MPB in N. CO -- Grandby area & high country, LPP “all” dead & grey; heavy outbreaks “moved” to NE. CO, E. of Continental Divide, scary huge expansion into PP as well in LPP as before, S. WY looks as bad as N. CO; spots everywhere of 5-100+ pockets in PP vs. widespread LPP landscape mortality; not as intense in southern Front Range.

Schaupp – WY, SD & NE

MPB -- Black Hills epidemic on ≈380,000 ac in PP since 1996, lots of activity; E. of Continental Divide in WY, vast increase in white bark/limber pines & LPP getting hit hard as well; Big Horn NF less activity in PP and little (yet) in LPP; in western NE, MPB sightings in native PP, *Ips calligraphus* as well, feel MPB may have blown in from CO/WY epidemics, some unseasonable development, in Plains communities most attracted to planted Scots pine but not good host, see live green trees heavy with cream colored pitch tubes, some few killed have no pitch tubes, all far from native PP forest.

SB still active, although much already dead.

DFB has taken out most of trees already, use of MCH on Shoshone NF in pockets effective.

Eager – R-2, with slides of aerial detection survey summaries across years

MPB big story, but in S. CO not so much; SB activity increase over the last 8-9 years in south & central CO; DFB decreased since 2007 but slight increase in 2010; WBBB slight increase from 2009; FEB down to endemic; all folks in CO have “bark beetle fatigue”, but FHP keeps warning, esp. re rising SB in CO; in southern CO, both mills closed this summer, so no more large mills in CO; cold snap in Oct. w/ no apparent effect in R-2 like that seen in R-1.

R-3 --- Joel McMillin

2010 aerial survey data: NM bark beetles ≈22,000 ac impacted across all forest types, esp. in PP adjacent to burns; AZ bark beetles ≈15,800 ac, very dry year so expect increase there next year.

DFB -- light activity.

WBBB in Spruce/Fir -- affected ≈16,539 ac in NM, majority of mortality seen in NM.

NM -- PP has scattered mortality.

AZ -- 10-fold increase in PP in acres impacted, AZ 5-spined Ips is main agent with some WPB. Aerial surveyors mapped large areas of thin PP crowns, drought related w/ older needle loss, not due to defoliators.

R-4 --- Darren Blackford

Do not have 2010 aerial survey data compiled yet, so this is mostly as of 2009.

SAF mortality complex/WBBB – down ≈30% in 2009, most activity in WY.

DFB -- 2009 down a bit from 2008, esp. down from 2004, mostly in south ID; in 2010 increased a bit around Sun Valley, ID, where treated with MCH flakes [Munson: 2000 ac on ski area, 2 applications, 45 day window efficacy]; very active in Great Basin NP, NV.

FEB -- down consistently since 2004, mostly in NV where down in 2010

JPB -- low, down in 2009 from 2008, mostly is CA flathead borer + Ips.
MPB -- doubled in 2009 from 2008, level to up in 2010; LPP all over; moving from WBP down slope to limber in Jarbidge, NV; in PP at Flaming Gorge NRA; in WBP and some bristlecone in Great Basin NP up high, intermixed with Ips; central ID with large numbers in LPP, cut/solarized contra MPB, sprayed in June, but already attacked by Ips from buildups in down pine so sprayed LPP faded/died.

Ips confusus and *I. pini* -- ≈87,000 ac in 2009, staying same or less in 2010.

SB – level or a bit down overall, on the rise in 2010 in NV & northern UT.

SB pest management -- State of UT + landowners + USFS treating/spraying in canyons with ski areas and at base of ski slopes on USFS and private, although ownership & access & wilderness issues mean they'll get hit eventually; Brighton Ski Area w/ big project of sanitation where accessible & spraying, SB pressure not so bad, so need only spray tree base for now; in north UT, more contiguous spruce stands, more mortality and higher SB; in middle UT, more dispersed spruce/mixed stands, so not as bad, SB on doorstep of Big & Little Cottonwood Canyons outside Salt Lake City (note: Alta and Snowbird Ski Areas there); in south UT, so far 60-65% spruce component lost, Brian Head now open bowl ski resort due to intense spruce mortality; often pruning lower branches to get spray coverage on boles, may need bucket trucks to spray higher when needed; advanced regen where present helps keep spruce post-SB, some planting where spruce not coming back naturally, but still SAF coming in.

2010 NV Data --- Gail Durham

Map presentation showing new pinyon needle scale/sawfly in NV, estimating close to 1 million acres again.

R-5 --- (no report)

R-6 --- Iral Ragenovich

2010 preliminary trends, NW of WA not yet surveyed, some from just last week so this is preliminary data.

MPB --- 418,000 ac in OR & 206,000+ac in WA, both down a bit; in OR, up & most in LPP (≈50% total), steady in PP, some increase in high elevation white pines/WBP, primarily active in south-central OR (Winema NF); in WA, less in LPP, steady in PP, less in white pines but still need to survey, northeast WA hit

WPB -- doubled vs. 2009, mostly around Burns, OR; mixed with MPB on Fremont & Winema NFs.

Pine Butterfly --- outbreak on PP, so anticipate increased BB in these areas [Progar: First known episode in Blue Mtns., 3,000 ac defoliated in 2009 then 70,000 ac in 2010, has plots doing intensive study, previous outbreaks in OR & WA didn't trigger BB outbreaks but were followed by some mortality].

Ips is non-existent

DFB -- looks down but not all area flown, need to add aerial surveys especially since blowdown in those areas (expect increase); in OR, mainly scattered in NE; in WA, throughout D-f range.

SB -- significant decline, although not all surveyed and already lost most of large spruce type, mostly in WA.

FEB -- continued to decline, low # trees per ac across landscapes, mixed & hard to distinguish within lots of WSBW defoliation; a lot in WA and some in OR.

Silver Fir Beetle -- increasing but still at ≈3,000 ac due to limited host type along Cascade crest.

Flatheaded fir borer -- southwest corner of OR, huge 12 fold increase in big D-f, now ≈**16,000** ac. on Siskiyou & Rogue River NFs.

FHP staffing notes --- Bruce Hostetler retires in December, position to be refilled by forest pathologist; Don Goheen to retire in February '11, outreach expected this November.

R-8 --- Steve Clarke

SPB --- extinct west of the Mississippi? Almost no activity this year, less than 20 infestations reported totaling < 10 acres across the south; NJ has had infestations in pitch pine for several years now and activity appears to be increasing; some SPB activity in MD and VA, too.
Ips mortality – increased proportional to the drought, though not tracked officially yet.
Steve is doing a great job at keeping the SPB populations down since he started working in R-8.

Puerto Rico --- Nettleton

Lots of invasives, but no bark beetles to report.

R-10 --- Roger Burnside

Surveyors contracted this year so no aerial survey data yet.

SB -- dropped a bit from 2009, hard to detect in rain as symptoms probably not as apparent & 2010 very very wet year, affected ≈100,000 ac; over past decade, has affected 100,000 - 200,000 ac/yr in south-central and interior Alaska, following huge epidemic of the 1990s.
Ips perturbatus – active from 2005 –'06, but last couple of years cooler wetter weather so declining BBs.

Ips --- about the same, 40,000 - 50,000 ac probably.

EDRR – samples from southeast, south-central and interior with elevated ambrosia beetle catch.

North to South Insect Trapping Transect -- [Lundquist: in Seward area, SB hard to find any this year & Ips catch, too, seems low; ambrosia beetles are really abundant this year, 2 species predominantly; he's attempting to use ambrosia beetle data in modeling effort to infer activity between flight lines of aerial detection survey.]

How to do Conditions Reports at these meetings? *Discussion:* Knowing what is happening west-wide is appreciated. Suggested that we prepare and distribute brief handouts; appreciated earlier efforts with graph/bar charts showing trends (i.e. past 5 years); may then make verbal update for current year, if data not yet available, yet using previous year's numbers in trend charts; maybe include acres flown with acres affected for aerial surveys; also maps of infestations would be nice. May not have time to do these charts if trying to crunch preliminary new year data. Provide suggestions on handout format as part of the announcement for next year's meeting. [NOTE: refer to "*Suggestions from last year's meeting*" under agenda item entitled "Status of bark beetles by Region (conditions reports)" on page one of the 2009 BBTWG meeting notes.]

Bark Beetle R&D Projects — completed and/or planned:

MPB --- Steve Munson

Several previous studies done from his shop on fire behavior and bark beetles (handout), working in D-f, LPP & spruce; products incl. fuel models & photo appraisal guides for fine & coarse fuels; models developed based on outbreak conditions, needle drop = decrease fire start, but change based on tree fall, photo models based on forest type; recently funded to look at fire/fuel loading at high elevation (WPB and limber pine). [Copy and paste address into

browser & see website: <http://www.usu.edu/forestry/disturbance/bark-beetles-fuels-fire/index.cfm>

- ◆ Quantifying the short and long term impacts of MPB outbreaks on forest fuels and other stand attributes in the Intermountain West (LPP only) --- C. Fettig, J. Negrón, S. Munson, C. Jorgensen, B. Steed. EM-funded, 5-yr study, much data many plots many cooperators, requested by USFS Regions 2 & 4 w/ CO, UT, MT, WY & ID as candidate users; plots w/ minimum 10 LPP hit by MPB, 2 - 3 hits w/in 2 years of establishment; no controls, observe what regenerates, how & characterize fuels; year 1 completed; additional plots to put in other states in next years.

- ◆ Tree Injection with Emamectin Benzoate and Propiconazole (Alamo® fungicide) for Protection of LPP from MPB --- C. Fettig, S. Munson, D. Grossman & ?. Bush. Trunk injections [Arborjet system] every 4-5 inches around circumference, spring & fall treatments & controls; 30 baited trees, 25 m apart; MPB pheromone traps to assess BB pressure; weather data & tissue samples at 1, 2 & 3 m heights + foliage; losing > 60% control trees so far; Alamo translocated up to 3 meters in the fall & into foliage; Emamectin Benzoate alone may have failed, lost most of trees, fading delayed [Strom: EB reduces BB gallery length in south]; Alamo alone and especially EB+Alamo looks like working so far despite huge # attacks [Strom: Alamo has big impact on southern bluestains]; preliminary now, will take final look next year. NOT labeled for this yet. Did another study with Fipronil injection – did not work. Discussion: For EAB, highly successful w/ EB injections with 2 years of efficacy, arborists charge \$ 2-300/tree, wounding big issue & cumulative impact of treatments, chemical impact worse than physical, but issues with primary branch attacks causing issues beyond the boles; EB may work better on *Agrilus* spp. than MPB as borer larvae make departures from phloem into xylem; maybe EB leaks into phloem, Sheri Smith and Strom used EB contra MPB in western white pine & trees killed but did see strips of effectiveness under bark (leaking near injection pts?); is Alamo acting as growth regulator improving conifer tree defense like Mark Stennis & Shigo's work showed w/ hardwoods?; heavy pressure (MPB or EAB) gets overwhelmed; does EAB adult die when maturation feeding on foliage of treated trees? current folklore, yes, not shown, differs from GSOB; Carl Jorgensen w/ Arborjet injected (EB?) into LPP @ 3-4 points around bole, got MPB protection only near injection points not elsewhere & lack of efficacy also for Ingrid Aguayo & Sheryl Costello in CO w/ same method/material; therefore in this study they injected every 4-5 inches around bole.

- ◆ Efficacy of spring and fall applications of Carbaryl for protecting Individual LPP from MPB attack --- C. Fettig, K. Gibson, D. Bennett, S. Munson. Know spring gives 2 yrs of efficacy, but do not know w/ fall application. Fall timing considered to avoid snow, water/creekside & non-target (bee) kills; sprayed this fall, will spray, bait and check next year. Discussion: Common complaint from NFs to Munson, "Carbaryl doesn't work" is all about application error --- too little material, poor bole coverage, wrong pH, spraying infested trees --- it is not about the carbaryl, which works; this complaint came from Mt. Rushmore NM, too, to John Ball, Joel McMillin, and Kurt Allen; the pH buffer is inexpensive but applicators do not know that; treated water if often too alkaline; did the mix get left in the tank overnight?; one must continually monitor the contracted applicators; put a checklist right into the contract (Blackford does this), folks can forget so make a list [NOTE: Darren sent his checklist and other contract specs to BBTWG email list after meeting]; J. Ball's lab can easily check for quantified amounts of carbaryl break-down products, offered to help Munson, send him some samples; Strom sez Japan has an ELISA kit for carbaryl, they'll look into it, low detection limits may be hard to achieve, submitted STDP proposal via Sheri Smith to look at this; Steed & Costello report ≈5% loss of sprayed trees, reaffirm need to monitor applicators; one person/tank & one person/applicator; sometimes spray dry hits & sometimes refuse to spray

pitchouts; spray jockeys need breakout session tomorrow morning [**any notes available to include in minutes? if so, please submit/include**].

MPB --- Sheryl Costello

Problem statement: Additional secondary BB in MPB hit areas killing younger LPP (2-8" DBH), incl. *Pityogenes knechteli*, *Ips* spp., others. Going across grey areas and killing the regen, not just attacking twigs, but can get *Pityogenes* on bole. *Discussion*: seeing more like that this year, too, a mix of *Pityogenes*, and *Ips*; prob. building-up in MPB hits, spotty across landscapes; Canadians working on this, never quantified across landscape before; most papers on *Ips* vs. *Pityogenes* pheromones, w/ share components; seeing MPB in small stuff, maybe mixed with *Ips*.

13:00 pm – BB Research Projects [Continued]

MPB – Brytten Steed and Joel Egan (new R-1 FHP ento & the contact person)

- ◆ STDP proposal -- variable retention treatments using 2 silvicultural techniques on clumped and even spacings in LPP contra MPB; questions on creating/maintaining uneven aged stands and what that means for fire and MPB issues.
- ◆ EM proposal -- (with Bob Keane) effects of fire and MPB in even and uneven aged LPP stands (actual and modeled).
- ◆ FINDIT program update: working with several others to find a way to update this older program to make data import/export more useable; may add additional calculations if possible (e.g. fuels production). Is predicted loss for LPP using FINDIT correct? We've been looking at looking at possible 'max' and 'ave' or 'low' loss levels for LPP; need more info on PP outside of Black Hills.

MPB -- Darren Blackford

- ◆ MPB and fire in PP and LPP on Ashley NF (northeast UT) --- with Ken Raffa & MS student Andy Lurch (U of Wisconsin). Coordination to look at MPB in fire-damaged PP and LPP stands, see which BB are in these damaged stands and what is the association of MPB w/ fire damage; comparing burned and unburned plots, Hood+Bentz methods, caged trees and passive flight traps; 2010 is year 3; in year 1, charred trees were more attacked by MPB and *Ips*, MPB more successful in PP vs. LPP in severely charred trees, but 2nd year less of a difference btw. burned and unburned, it appears. The first year after the fire was the highest hit rate, lower after that. Poster coming on this year, see it at NAFIWC. Have monitored a prescribed fire in PP nearby: year 1, 10% hit but by year 3 it is $\approx \frac{1}{3}$ hit and moving out into unburned areas; aerial survey maps show MPB is active ≈ 2 drainages away.

MPB --- Rob Progar

Several studies using verbenone with and without sanitation to reduce mortality from MPB.

- ◆ By way of reviewing, Sawtooth NRA study (2 published papers): needed protection of LPP from MPB in campground near water with no numerical goal to define success; verbenone pouches not yet labeled, so was administrative study; $\frac{1}{2}$ acre treatment + $\frac{1}{2}$ ac untreated; 5 g pouches @ 40/ac rate once per season, no tree removal in any years and no buffer around the trees; first year good efficacy but 2nd year warmer and MPB populations built-up excessively, so less protection; when 50% attacked and killed, verbenone lost its efficacy, therefore "bought time" not protected throughout episode; over course of study, MPB killed 90% control & 70% treated, though this 20% difference was not statistically significant; larger

diameter LPP killed first in both treated and control, but could not test this explicitly, too few LPP. Lots of ideas about why this inconsistent result was obtained

- ◆ Multi-year evaluation of verbenone to reduce MPB attacks of LPP in ID and UT --- with C. Jorgensen, D. Blackford, P. Mocettini and R. Halsey. (see handout). Initiated in 2003, treatments began in 2005, have 6 yrs data so far, no 2010 data in yet, will continue treatments as operational trial until no more MPB-caused mortality on plots for one year. 1 ac plots, 6 treated + 6 control per locale at 2 locales (Stanley Lake in central ID & nr. Heber, UT); 7.5 g verbenone pouches (Synergy Semiochemicals Corp.) @ 20/ac (label says 20-60 pouches/ac); no tree removal in any years and no buffer around the trees. Similar mortality among plots per location ('03 & '04); after treatment began, mortality increased faster in untreated plots in UT & about same in ID; has maintained about 10% average difference in mortality, treated lower, in UT & difference seems increasing, at about 20% less in 2009, in UT; overall, not enough difference to show verbenone efficacy; unclear how host depletion of preferred size hosts in controls will impact future MPB behavior/results --- ignore verbenone or attack smaller trees?

- ◆ Multi-year evaluation of verbenone and sanitation to reduce MPB attacks of LPP in CA, CO, ID, and WY --- with D. Cluck, S. Costello, T. Eager, C. Jorgensen, S. Munson & B. Steed. (see handout). Year 1 of a 3-year STDP, intend study to last until either beetles or the trees gone. Design based on John Borden's project in BC [in Jour. Arboriculture] where 1 yr. project showed strong treatment efficacy; 6 treated + 6 control plots per locale; 7.5g pouches 40/ac + timely sanitation of infested; no sanitation in controls; have MPB data for 2006 – 2008 for plots, began treatment in 2009; buffers around plots; locations incl. near Susanville, CA, Fairfield, ID, Leadville, CO, Ft. Collins & Denver, CO, Alpine & Wise River, WY. Study showed less attack in treated stands at varying % - 20% better but not significant (study wise). Still collecting 2010 data.

Discussion of what losses we can tolerate with these various treatments using verbenone:

what size of effect is enough? how well does it have to work for us to say it is successful? loose 75% or less? losing 10% would be great, but 70% won't cut it; even 5% loss/year with carbaryl is too much due to cumulative effect, idea applies to verbenone, too; a 2%/year loss of American elms from DED is something we've come to live with, we still have elm; concurrence that verbenone can buy time; use on FS lands trying to buy time until can get into a site and manage the stand; buy time only to clearcut it later? concern that w/ loss of 25 -30% LPP, stand will start to unravel, be it in a campground or other site (windthrow, etc); better to put the money spent on verbenone into vege mgmt.? should 30% or 50% survival across an outbreak be deemed successful protection? shape of curve on a graph of treatment efficacy vs. beetle population pressure is what we're chasing here; parallel slopes of losses with and without treatment over time seen so far; it seems to work best where we need it least; we know verbenone works at low beetle pressure; discussion about doing forest management vs. band aid solutions; how much mortality is too much or when do we quit treatments?

Discussion about what to recommend, based on infestation, host species, verbenone, etc.: J. Ball discussed his operational use of verbenone in limber pine pockets w/in PP stands (Black Hills) and how it appeared to be very effective, since almost all limbers survived while nearly all PP were killed; verbenone protects WBP for 5 yrs (Dana Perkins) but fails in 1 yr in limber pine (Sheryl Costello); all may vary in different areas for treatments: is MPB really the same creature across its range? don't host pines vary a lot across their ranges, too? legislators tell folks 'do X here because it worked at Y other place'; a buffer around treatments will help retain plume on site; we have the \$ to buy it, we have the \$ to put it out, why don't we have the \$ to figure this out?!?

Discussion about building a database to get all these treatments and research results captured, follow all these plots for several years to find out what works, to seek common ground, develop a “gestalt for verbenone”; maybe model it after R-8 databases or gypsy moth databases [discussion tabled until end of last day].

MPB --- Brian Strom

- ◆ Emamectin benzoate in northern CA – with Sheri Smith. Poor results on the Modoc NF protecting western white pine at high MPB pressure and sugar pine at low MPB pressure; did some spring and fall injections; year 1, used Arborjet, injected 4 sites/tree, all killed; year 2 used Quickjet every 3” of bole circumference, all killed; injected at root collar; bole work shows more attacks on EB treated trees; EB not as mobile as imidacloprid, less water soluble, MPB have to eat it; attacked, injected pines stay green up to 6 mo. longer, then fade/die; lots of gallery construction w/ blue stain between injection sites; doing residue analyses now, otherwise ready to punt; may work better with Alamo.

MPB --- Joel McMillin

- ◆ Fuels & salvage study in PP on Black Hills -- with C. Sieg, K. Allen, C. Hoffman. Treatments = no salvage, salvage with low residual BA, salvage with high residual BA, controls; ongoing.

MPB --- Sheryl Costello

- ◆ Individual tree protection using verbenone flakes and green leaf volatiles in high density MPB populations in CO --- with Nancy Gillette. STDP funded. Treatments: verb flakes on individual trees with and without GLV and a control in WBP and limber pine; baited the trees; used a paint roller to cover stems up to 15 ft.; just done, looking at data now w/ is not fully analyzed, but mortality by treatment looks like 90% w/ verbenone vs. 50% w/ (verb+GLV) vs. 90% control; so far it looks like a significant difference between V and V+GLV treatments, but still a lot of mortality, not very good. Sandy Kegley came to CO to help Sheryl w/ was good; Nancy is also doing this trial in ID & MT, may be a difference in MT vs. CO results.

MPB --- Chris Peterson (SRS)

- ◆ What is the concentration of carbaryl sprayed onto pine bark to protect from MPB? What happens when that bark is burned? FSPIAP funded study: Presence of Carbaryl in the Wood Smoke of Lodgepole and Ponderosa Pine. Costello sending Peterson samples of sprayed bark for analysis; he is analyzing the bark and also burning it in a tube furnace and examining emissions [info from Strom & Costello].

MPB and other BB --- Rob Progar

- ◆ Pine Butterfly in PP on Malheur NF --- with Don Scott. EM proposal submitted for this year to evaluate the level of defoliation, loss of tree vigor, natural enemies, and BB attack on defoliated trees. Did one year 2010 using R-6 funding.
- ◆ Tree survival after fire. Wrapping-up 7 year study looking at BB, wood borers and combinations incl. w/o insect impact; 25 fires, 18 tree spp.; 5 years of visiting each tree each year; working up the data, hope to present at NAFIWC.
- ◆ Survival of large pines following prescribed fire. R-6 funded; 3 yr old study looking at raking vs. not raking under large pines, pulling fuels/needles away from the base of the pines prior to burning. Should be burning some this month.

MPB --- Steve Munson

- ◆ Individual tree protect of LPP with verbenone and verbenone plus green leaf volatiles -- with C. Fettig. Got GLV from John Borden; no idea yet of results; hint is that Verb+ GLV better.

DFB -- Joel McMillin

- ◆ Fuels & salvage study in D-f, Shell Canyon, Big Horn NF -- with C. Sieg, K. Allen. Treatments = no salvage vs. salvage, could not set-up controls; ongoing.

- ◆ Fuels & salvage study in D-f, Shoshone NF -- with C. Sieg, K. Allen. Treatments = no salvage vs. salvage & controls; ongoing.

SB --- Steve Munson

- ◆ Response of SB to a novel semiochemical blends in trapping and tree protection studies -- with Dave Warkarchuck and C. Fettig. Funded by FHTET (Harold Thistle). At low densities, MCH repels, but at high densities, it does not, so seeking better repellants. Using 16 unit Lindgren funnel traps, 10 per treatment, treatments are: 1 - Frontalin, MCOL & reconstituted Engelmann spruce terpenes (as their "GLV"); 2 - MCH & attractant; 3 - GLV-1-hexanol + Z-3 hexanol + SB Attractant; 4 - MCH, GLV + SB Attractant. Populations at infestation level but not major outbreak; caught far fewer SB w/ GLV treatments; so far #1 works best, has least hits; will repeat this year.

- ◆ Holocene records of SB & fire in the subalpine forest of UT – with Jesse Morris & Andrea Brunelle. Using lake cores to examine 10,000 year record of deposits; in limestone lakes w/ high pH macro fossils decompose, so looked at pollen changes over time. Linkages to climate change, forest composition, SB infestations, and beetle/fire interaction; recent work by Veblen & Kulakowski show no relation btw fire & SB outbreaks. Found 600 year average interval btw SB outbreaks (spruce pollen reduction, others no change or go up) and 400 year average interval for fire (charcoal deposits); found more SB activity now than across entire record; found for UT, wildfire events are not following SB outbreaks; think that spruce was more scattered in distribution earlier. Published, 3 more papers due out.

JPB --- Brian Strom

- ◆ Disruptants and trapping JPB – with S. Smith. 3 years so far, Luther Pass, CA, "not strongest dataset". Frontalin discovered to be disruptant by Tim Paine; used verbenone & GLV & mixes; included frontalin last year, found it was really active as an anti-aggregant, caught 40-50/trap w/ attractant, shut down to almost 0/trap if added frontalin; Verb and GLV may help but the frontalin was the big player.

WPB -- no projects

Ips --- Roger Burnside

- ◆ Factors influencing northern spruce engraver (*Ips perturbatus*) colonization of slash and residual trees following land use changes in Alaska --- with C. Fettig, M. Schultz, C. J. Hayes, S. McKelvey, and J. Kruse. Year 2 of a 3-year STDP.

[excerpted from progress report submitted post-meeting] The overall objective is to develop guidelines for managing white spruce (*Picea glauca*) slash to minimize northern spruce engraver (*Ips perturbatus*) attacks and associated levels of tree mortality in newly disturbed sites. We observed that *Ips perturbatus* attack densities were inversely related to secondary bark beetle attack densities, which we suspect results from components of the aggregation pheromone of competing bark beetle species (e.g., *Dryocoetes* [likely *autographus* or *affable*], *Polygraphus* spp.) inhibiting the response of *Ips perturbatus*. To that

end, we plan to explore this further through the use of trapping bioassays and rearing of naturally infested logs in FY2011 to determine whether or not this relationship can be exploited to develop a novel pest management tool. *Ips perturbatus* attack (and emergence) densities recorded in FY2010 were lower than anticipated. Although we will fully determine the impact of this on the utility of our data this winter, we suspect it will be necessary to reproduce some of these treatments on a smaller spatial scale using a baited system in FY2011 to ensure significant numbers of attacks to elucidate differences among treatments. Established and fully executed study at Tok, Alaska analyzing the effectiveness of verbenone and conophthorin for protecting white spruce slash from colonization by northern spruce engraver. Significant differences in both attack density ($n = 10$, $t = 3.85$, $P = 0.001$) and emergence density ($n = 10$, $t = -3.92$, $P < 0.001$) were observed. All slash was sampled for *Ips* (and other) attack densities in mid- to late July (960 logs X 3 blocks = 2880 logs sampled). Data have been archived and collated and preliminary data analyses were conducted, which indicated a high level of heteroscedasticity. Accordingly, we will be working with a statistician to aid in the future analyses of these data this winter.

[addl info from meeting notes] White spruce treatments incl. log scoring, teepees, stack decks, cutting timing; so far only Fall treatments 2009 and spring 2010 at 3 sites from Tok to Delta Jct to Anchorage areas; wet summer and spring, so little *Ips* populations, more SB attacks. Did a verb + conophthorin study on slash decks without baiting to see if it's repellent & looks like may have worked.

SPB/*Ips* – Brian Strom

Assay of EB injections at 4 rates and at different heights. 3 yr. study looking at residues and bolt utilization; bolts cut from trees post-treatment and offered to BB, as feeding necessary for EB to be effective; no SPB around, so exposed to bolts in lab; *Ips* studied in field with this small bolt assay.

Discussion on vendors contacting WO about researching their newest products: In response to such requests and to assist the WO, a committee and a process have been developed to deal with these contacts, incl. a screening checklist for manufacturers to follow prior to having products tested; strongly advise purchasing products if want to test them rather than obtaining gratis from manufacturer [e.g. wait to buy Hercon flakes, as of now must be part of exptl. study to use]; some results of product testing incl. use of cedar oil (cedar oil + 10% microbes) as preventive contra *Ips avulsus*, negative results at 30 days, needed to coat tree every 2 weeks, costs \$200/gallon so Onyx both cheaper and effective, manufacturer not sure test conducted correctly; use of chitosan, field study without any beetles involved, not much activity seen, does not work on loblolly pine at all, lots of press incl. by CO State Univ., have submitted a manuscript, not sure if it'll be published.

Discussion on elution rates: Strom's group continuing to do elution rate testing on products, will do it if you need it; they checked some *Sirex* α -pinene studies, the "hot as Hades study" when product lasted 2 weeks only; discussion about elution rates as affected by temperature [e.g. Alaska has very low elution rates due to low temperatures] & humidity & how elution rates usually are reported from trials @ constant 20° C.; very hard to quantify at differing temps and humidity; Harold Thistle trying to look into this.

SPB – Steve Clarke

◆ EB + Propiconazole contra SPB – with D. Grossman. 3 yr study; baited trees; does not seem fungicide helps; EB has some activity.

- ◆ SPBIS database --- new version almost ready, needs manual; functions as a management tool as well as an historical database, can run analysis with GIS ArcInfo as well; waiting for SPB to see how it performs.
- ◆ SPB Data Portal database – for all land ownerships; record keeping, monitoring & tracking tool; need to enter values for 7 specific core variables.
- ◆ Low density SPB populations – with J. Riggins (Mississippi State Univ.). Trapping and rearing Ips-infested tree bolts to see if SPB are in them; Where are the SPB hanging out ? Hiding with Ips ? Have not seen evidence of this in the past.
- ◆ SPB attraction to lightning struck trees. Why are they attractive to SPB ? Host volatiles usually do not attract SPB; SPB has two chemicals in common as attractants with black turpentine beetle, frontalin & Endo-brevicomin, and so using them to check if minute rates of these volatiles brings SPB into these lightning struck trees; got some odd results trapping for SPB using host volatiles.
- ◆ Attack behavior and attack heights of SPB or maybe new BB sp. in Central America --- with J. Macias and B. Sullivan. “SPB” attacks there are not what would expect based on southeast USA experience; e.g. patch attacks and attacks up higher in tree, even to the base of the tree crown, tree tops and branches vs. only on the main bole in the southeast USA; maybe looking at a new species of *Dendroctonus*, likely distinct from *D. frontalis* (putatively *D. woodi*); taking many measurements/many studies in progress; some mating infertility, as different in # chromosomes; cuticular hydrocarbons differ, too; as yet unpublished, hope to have it out by next year, so can get other related articles out for publication.

Semiochemical release/recapture rates in the field --- Tom Eager

Measure semiochemical release/recapture rates in the field using solid phase micro extraction fibers (SPME) + mass spec/gas chromatography – with R. Progar & B. Sullivan. Direct measurement of BB semiochemicals in the field at two sites [in LA and CO]; How much semiochemical is out there ? How does our management use of semiochemicals relate to natural populations ? Can we correlate this with plume model ? Method advantage is captures chemicals well, no solvents involved & high sensitivity, but quantification is approximate and high cost [about \$100/each], relatively fragile fibers; frontalin, alpha-pinene, and verbenone (used in a quasi management sense) were the first chemicals to be checked; 2 sets of experiments using sponge release of these different chemicals in different areas; SPME fibers (look like hairs in a tube) exposed to site to capture chemicals; checked at 5, 10 & 40 meters from release sites; picked up a lot of alpha-pinene as background noise near pine stands, but were able to pick up the other two chemicals even in pine stand; able to detect up to 120 m away so far; mostly presence/absence testing for now, reduced release rates; is the material degrading? how far out can it be detected?

Discussion of field release/recapture: This approach could address lots of questions...how much to use to get a response in the field ? relate results to electro-antennogram results; SPME not new, can put fibers directly into GLC, quantity is the trick, used with moths a lot; 20 yrs ago Peter Turchin spoke to flux in # beetles incoming, how do you know if, say, 50% of the BB are headed towards the trap? need whole bugs in mark/release/recapture evidence, but why are the recapture rates so low [e.g. 5%] ? so far depletion rates from Eager et al. follow plume model fairly well, depletion curves were developed for quantification.

Plume Model --- Harold Thistle

Harold is Applications Program Manager with FHTET, 18 years associated with BBTWG; if you have an problem, esp. engineering aspects, let him know; solicits proposals now.

◆ has plume model developed, now needs elution studies to plug into it [e.g. studies by B. Sullivan]; has provided \$ to use to study entomology that can help build this physical model, so has funded 3 proposals for \$15,000 each; again solicits proposals, will evaluate, expects ca. \$30,000; studies dealing with tree spacing, attraction, stand data, meteorology & elution rate in field [talk to B. Sullivan], etc would be applicable for this funding; be clear as to who is doing what. Harold is developing a portable meteorological station for use, has a few ready, can provide; wants a sensitive meteorological system, needs better station for dense canopies, especially at low wind speeds, important to semiochemical elution and dispersal; have proposals in by end of January to Iral, so to review group much earlier; an announcement with guidelines will be sent out.

Wednesday, 10/6/2010

Field trip: MPB research plots & MPB management at Mt. Rushmore NM

Stop 1: Presentation about and tour of partial cutting experimental plots in ponderosa pine against mountain pine beetle near Brownsville, SD; part of long-term experiment set-up in Black Hills in PP and northern CO/southern WY in LPP by John M. Schmid & Steve Mata, USDA-FS, Rocky Mountain Research Station, Ft Collins (retired); hosted by Kurt Allen, FHP-Rapid City, SD and John Schmid; thinnings to lowest basal area (i.e. 60 sq. ft./ac) have none to little mortality under extreme MPB pressure, with increasing levels of mortality associated with higher growing stock level (GSL, roughly equivalent to basal area); association of MPB attack with Armillaria root disease; PP currently infested by MPB in denser plots.

Stop 2: Presentation about and tour of management activities on Mt. Rushmore National Memorial (sanitation, thinning, individual tree protection with carbaryl); hosted by Bruce Weisman, National Park Service at Mt Rushmore NM, John Ball, and Kurt Allen.

Thursday, 10/7/2010

BB Research Projects [Continued]

Mediterranean pine engraver --- Steve Munson

◆ Studies on dispersal, location & impact of an exotic BB, the Mediterranean pine engraver (MPE) = *Orthotomicus erosus* -- with S. Seybold, former Seybold post-doc.[name = ?], R. Bennett, B. Bulaon & C. Jorgensen. STDP funding. MPE looks a lot like *Ips latidens*, as does its galleries; Seybold developed good attractant [host + chemical], only catches MPE & *I. latidens*; MPE only established in CA so far; acts more like a secondary; drought may insight it; can kill trees; have some other biological data; summary of studies:

1-Dispersal rapid and small fraction of the population can move more than 5.5 km in a day;

2-Higher elevation sites in CA, native forest are being invaded by MPE; most of the population movement is to the east;

3 -Cold tolerance studies show that MPE freezes at 17° C in Oct, -22° C in December, and January and 16° C in March;

4 -North American physiological host range = all *Pinus* and *Picea* species tested, *Pseudotsuga menziesii* and *Larix*

Discussion of MPE potential: in South Africa, MPE was big pest in loblolly and slash pine plantations; hard to predict pest status of exotics based on behavior at home or elsewhere, APHIS has a list of high risk candidates, some not big trouble once arrived; dispersal capability

of MPE significant, as mark/recapture expt. with release at low elevation in dry lake bed made recapture at 5,000 ft. elevation.

Plume Model: connecting it to beetles --- Iral Ragenovich

- ◆ DFB and MCH dispersion runs of plume model -- with Tara Strand. Using data from & based on work done by Ross and Daterman (1995) and Ross et al. (1995 to 2002); examined dispersion runs with different arrays of MCH bubble caps around perimeter of circular plot at same concentration with bubble caps either clumped or separated; Ross & Daterman put DFB traps in center of plots, Tara used plume model to fill in between their data points and added H. Thistle's meteorology data from dense LPP stand in MT (upper end of simulation) & PP in OR & some data from thinned stand in southern pine [but no met. data avail. from D-f stands, so PP meteorology data prob. most similar to D-f], then simulated with plume model; tried higher release rates to make the treatments more efficient with dispersal; release rates tested in the field 1, 3, and 9 times the standard rate and with correspondingly wider spacing to keep amount of pheromone released per unit area the same in all treatments & also simulated 4, 6, and 8 times the standard rate; higher doses farther apart seems to break down and the trees were attacked; lower doses 3X amount closer together worked better; simulations suggest that release rates up to 6 times the standard may be effective; stands in simulation were LPP @ 1500 stems /ha, PP @ 389 stems/ha and DF stand 135 stems/ha [Ross & Daterman]; with 7 mg/day elution & 1,3,4,6,8 & 9 bubble caps/tree, run hour by hour, Tara's results as follows (showed graphics of results on screen): in LPP, pheromone stayed in stand, not moving around, good concentration throughout, dense stand structure probably affecting it; in PP, stand more widely spaced, getting better coverage, but holes in the concentration plume due to spacing, can see point sources (bubble caps) in graphic of simulation; showed they can tie model runs to field data & start looking at refinement of deployment strategies; trying to determine what is the most effective concentration needed of MCH for DFB.

Discussion on plume model runs: Spreading releasers improves coverage & clumping them causes fingers of low concentration where beetles may attack; we do not know the effect of concentration on the beetles (& also do not know when they are flying); value of the plume model runs is that one can refine optimal spacing to design field experiments & help determine/identify effect of concentration on DFB; maybe the spacing in a dense stand is not as critical as it is in an open stand.

Research at Synergy Semiochemicals Corporation --- Jorge Macias

- ◆ Jorge is research leader there, a former J. Borden student who's now his competitor; Synergy Corp. is 5 yrs. old, 4 FT staff; now establishing lines of research on BB as follows:
 - ◆ Semiochemicals that advertise host decline/dying/death
 - e.g. tree & microbes & beetles all release verbenone, want to look at other volatiles from tree, microbes or colonizers; note individual trees can be protected from MPB by verbenone esp. with added GLV, but protection of areas fails; study other insects attracted specifically to verbenone [e.g. some Buprestidae come to MPB attractants + verbenone].
 - ◆ Semiochemical analogs that can lower cost in use
 - e.g. MCH vs. isopherone: isopherone decreased the number of DFB (in traps) but never as much as MCH, but 30% cheaper.

Region and State bark beetle prevention, suppression & restoration projects

Restoration and revegetation treatments -- Joel McMillin

◆ Restoration on Coconino NF, Snowbowl Road area near Flagstaff, AZ; whole tree removal, cut to low BA, but combo of heavy DMT in residual trees, recent surface fire and dry conditions in 2009 contributed to increased BB activity; previous studies show Ips preference for heavy DMT trees; did a prescribed surface broadcast burn in area June 2009, a dry year, setting up an Ips feast in overstory, DMT-infected trees and then WPB moved in and continued the mortality.

◆ Grand Canyon NP, South Rim Restoration & Revegetation Project, included realignment of roads, a visitors' center & traffic flow changes; put in new road and transplanted a number of larger pinyon & juniper trees; many of the replanted pinyon were infected with DMT and thus got lots of mortality; Ips attacked stressed pinyon; contractor had to replace dead up to 1 yr. later, so started to spray trees with carbaryl; loss in construction zone of pinyon & juniper due to root disturbance; heavy equipment parked in shade of pinyon, but its engine exhaust cooked the canopy; plans to create a "pit of death" where green, cut material would be placed [& breed BB] was quashed; Grand Canyon NP put in for prevention/suppression/restoration \$ for rehabbing these areas and spraying the pinyon.

SPBeetle restoration/prevention program -- Wes Nettleton [giving John Novak's talk]
Program started in 2003 from Congressional mandate on heels of major SPB episodes in southern Appalachian Mtns. & Alabama; most of R-8 involved, managed by R-8 FHP in 12 NFs and 13 states; significant funding [\$21 Million to NFs & \$60 Million to states over the years]; so far treated 920,000 acres, mostly prevention, close to 800,000 acres on private land; on the ground accomplishments = 75-80% done, lowered fire risk, protected watersheds, improved wildlife habitat & monitored for *Sirex noctilio*; landowner education efforts 15-20% of total effort; technology development and other enhancements; engaged the NFs, a big benefit as got 'em going, also state forestry engaged (cost share & stewardship); on the ground activities = pre-commercial thinning and first thinning, restore some SPB kill areas, Rx burns, plant @ wider spacing; education efforts reached foresters, landowners, kids, etc. with workshops, printed literature, TV info, radio, billboards, websites --- all this successfully increased awareness; low cost for large impact, as most "people don't understand the impact of bark beetles"; utilizing the risk map v. 2.5 & a more refined SPB Risk Map @ 30 meter resolution; Arkansas and Texas have really been good partners; increased emphasis on using SPB hazard maps, funding lower and similar in 2011 probably; tax exclusion for cost share program for FH treatments now is nationwide; 10,000 landowners assisted so far; 15 year target of 2 million acres by 2018, already have 1 MA done; ingrowth is so fast there must return in 5-10 yrs to thin; 50 MA is high risk to SPB overall, so scratching the surface acre-wise but redirecting the reactive paradigm of suppression; focus on planting longleaf pine [vs. prior planting too much slash pine] & maybe hardwoods.

SPB restoration/prevention program & timber sale contracting -- Steve Clarke

◆ cut and remove strategy calls for 15 – 20 day interval between spot detection and implementation, but contracting on USFS lands now takes > 30 days; puts FHP at odds with RO timber staffs, whose primary interests are preventing waste & abuse and who now also require separating green from red tops and require readvertising if > 50% of contract terms exceeded; huge buffer areas often added to contracts to account for/encompass expected spot growth during contracting phase; conference call due soon to explore options incl. revert to older system w/ area contracts & sale by weight or other ideas; no biomass market right now, although still have hope for that; private landowners, having no such delays, tie up available operators & mills by the time the USFS is ready with contracts; huge capacity loss with decline in timber value; more mechanical harvesting now and fewer sawyers.

FHP/State discussion of research needs

STDP proposals on BB:

***Ips perturbatus* treatments -- Roger Burnside**

◆ with “team Fettig”; no Ips pressure in recent trails due to weather & spruce beetle interference in slash, so seek other methods to deal with slash problems; may look at competitor beetles [e.g. *Dryocoetes* spp.], resort to attractants to get beetle pressure, see what baits work best; does scoring, time of cutting reduce amount of attacks on cut and leave sites? work this year in Tok area.

SPB stand model -- Brian Strom

◆ with Jim Meeker and a retired mathematician, 3 year project; last year to link SPB stand model to Stand Visualization System; adding thinning tools to the model to take out cut trees; using stand data from H. Burkhart w/ industry \$; max 40 year output from model.

Carbaryl testing -- Brian Strom

◆ STDP project with S. Smith and C. Peterson; focused on GSOB and other BB; testing Carbaryl tank mixes; try out ELISA kit made in Japan to detect various concentrations, cost \$1000/ea; try to develop something, perhaps with ELISA, that lowers cost of testing; as of now, can send samples to Chris Peterson [different lab from Strom] for High Pressure Liquid Chromatography/Mass Spectrometry analysis; Strom, too, can take samples now if not too many until run out of \$ for that; with GSOB, spraying carbaryl as a test and then checking the carbaryl concentrations; widespread concern with carbaryl tank mix quality and need to test heard from attendees at this meeting is news to Strom, he wants to assist FHP and meet this need, so will talk with Smith & Peterson to appropriately amend proposal.

Discussion: What is deadline for receiving STDP proposals at WO-FHP? November 1 each year. What about FSPIAP ? (replaced NAPIAP w/ was a national program from USDA) There is a review group that meets, has done so past 2 years at least, does fund projects, contact at WO-FHP is Hank Appleton, deadline for proposal submission to WO also November 1, it's a technology development program designed to fill data gaps/application needs, need to involve registered pesticides; John Ball will send his (pesticide) analysis protocols to Sheryl who'll send it around to share.

Emamectin benzoate to protect Koa trees – Brian Strom

◆ with S. Smith

Other projects -- Brian Strom

◆ oaks & GSOB plus bark beetles, something about residues

MPB --- Brytten Steed

◆ see pg. 7, projects/proposals already described

Invasives monitoring – Gail Durham

◆ citizen monitoring of invasives, teach Master Gardeners to train citizens to do monitoring/detection, will use GIS and smartphone to collect data, funding from Rob Mangold

Testing walnut twig beetle attractant – Steve Munson

- ◆ with Steve Seybold; STDP proposal, may submit one to EM ; Andy Graves (now FHP R-3, Albuquerque) may lead/submit something on this

Economic parameters for spraying 5 needle pines – Tom Eager

- ◆ with Harold Thistle & some folks in MT; cost to actually protect 5-needle pines, esp. those plus trees with some white pine blister rust resistance; ferrying the materials and equipment in; water availability is a big issue; What is the economic threshold for protecting these high value white pines up to high elevations? Thinking about helicopters and mules in wilderness areas.

WO Update --- Bob Rabaglia

2010 Funded Projects, Western BB

Prevention: 30,000 ac for \$10,600,000

Suppression: 15,500 ac for \$2,400,000

Other: 12,100 acres for \$6,300,000 under ARRA

2010 Funded Projects, SPB

128,000 ac for \$9,400,000

2011 Budget

No budget predictions for 2011, looked at last years figures to compare if continuing resolutions (CR) are continued; CR through December right now; may delay STDP/EM/FSPIAP funding from getting out; uncertainty makes project allocation difficult.

EDRR update

- ◆ review of EDRR program 2007 – 2009 completed, report due out soon
- ◆ in 2010, concentrated trapping in 13 higher risk States with \$700,000 funding, utilized more sites per state (12), spent about \$650,000; started identifying fungal associates of new BB finds with Diana Six & student, will continue this; pilot tested a few pheromones of Cerambycidae (from Hanks) in OR, Louisiana & NH, caught 20-25, seeking a good generic lure; new exotic BB found in 2010 = *Xylosandrus amputatus* in FL, a hardwood ambrosia beetle, found only in traps not in trees so far.
 - ◆ EDRR catches exotics, but so far not early...how does this blend with goals such as eradication ?
 - ◆ rate of introductions overall and quality of reporting both greatly increased; # new species before 1980 = 29, now rate has doubled, in 2000s = 12 so far; most of new ones not causing huge damage so far;
 - ◆ from 2007 – 2010, EDRR caught ≈370,000 beetles, no big surprises re genera captured, really; in 2007 no new finds, but in 2008 *Xyleborinus octiesdentatus* found; used 3 lures --- ipsilure, ethanol and (alpha-pinene + ethanol) --- in 3 traps/site.
 - ◆ ZooKeys, an on-line systematics journal, has a special issue in 2010 (v. 56) celebrating influential scolytid expert Stephen Wood [a festschrift, memorial & articles incl. one by R. J. Rabaglia et al.] See <http://pensoftonline.net/zookeys/index.php/journal/issue/view/58>

Discussion on trap lures and deployment: continue EDRR with existing lures ? would prefer fine-tuning lures to better match risk data, favor potential high risk introductions; no actual way

to know which lures and how many would be enough, but feedback from trappers can help clarify; is there anything like EDRR trapping being done in countries of origin? not much, if any, but would really like to have that happen (before we get 'em all here)

Discussion on trapping network versus introduction pathways: CAPS traps at ports & warehouses under APHIS using similar lures but different protocols, done without regard for habitat, look for target species and do not identify all caught; EDRR under USFS-FHP focuses on habitat (e.g. trap in forest near port) and identifies everything captured in traps; APHIS & FHP have talked about sharing data, now do that right away with new captures, but there is no overall coordination; CAPS will try to conduct a review, too, and is talking with Dan Miller a lot.

EPA re-registration, labels and FHP input

- ◆ Stephen Covell is new USFS-FHP, Pesticides and State & Private Forestry Invasive Plants Program Manager in WO, seeks comment from BBTWG and others for EPA.
- ◆ “Atonik” re-registration by EPA: proposed re-registration of Atonik, thought to contain verbenone plus 4AA, a host-produced plant growth regulator purported to have anti-aggregant properties; comments: clarification from EPA called for first, does Atonik contain both compounds? If yes, we do not care if product is re-registered, because 4AA has no utility and is not needed as an ingredient.
- ◆ Comments on Verbenone registration/label issues: current label lists many target species, including SPB, but the “+” enantiomer is needed and one can only get the “-“ enantiomer; also do not think maximum deployment amount allowed on label is high enough.

Western Bark Beetle Research Group update --- Rob Progar

WBBRG formed 5 yrs ago at request of Station Directors at PSW, PNW & RMRS; first meeting in WA, many from BBTWG attended, developed structure, guidelines; gave presentations at SAF symposium in Portland organized by Lundquist, w/ was also published in proceedings (USFS Research GTR) and in Journal of Forestry article by J. Negrón et al.; have monthly conference calls 1st or 2nd Tuesday; poster describing group & goals made/displayed; wrote/published in Bioscience (this month) an article on BB and climate change, longer version of this paper published by USFS's Western Threat Center; personnel: Jane Hayes changed jobs, moved to PSW, not sure if she will continue with the group; WBBRG maintains surprisingly high sustained energy level and participation. Discussion: What are Jose Negrón and Barbara Bentz doing now research-wise? WBBRG generally discusses group projects, not specific individual activity; they've tossed around two ideas for future projects, a semiochemical review (Nancy Gillette) and economics of BB (John Lundquist); any news of replacement for Jane Hayes? not sure if she'll be replaced at PNW by ento or patho or anyone, current rumor favors patho because PNW does not have one.

SAF Update --- Rob Progar

Momentum increasing w/in SAF for bugs 'n' cruds, esp. driven by WBBRG; Progar and David Shaw on bugs 'n' cruds committee (D-5) in SAF since Portland, was Lundquist on D-5 before that; committee organized symposium at Reno and last year in Disney World meetings; this year in Albuquerque, NM at the end of October, they got awarded 3 symposium slots for entomology and pathology, tied topics to meeting theme and our latest 'n' greatest hits, titles/content are (1) BB outbreaks in NA: SPB [S. Clarke], Ips in the west [J. McMillin] & MPB [T. Eager]; (2) Invasive forest insect and diseases in NA: EDRR [B. Rabaglia], Invasive insects of the west [S. Seybold], WPBR [Patricia Malone]; and (3) 'Fire, Bugs N Cruds': BB & fire [C.

Fettig], SOD and fire [D. Rizzo], fire and DMT [D. Conklin]. In 2011, the SAF convention is in Hawaii; invasive should be a strong part of that, expect R-5 involvement.

13:00 pm

FIDL updates --- Iral Ragenovich

2 handouts distributed: timeline of new & revised FIDLs graphed by year & FIDL Facts, both from Kathy Sheehan, who is National Coordinator for publishing FIDLs & webmaster; each USFS Region has a FIDL contact; there are 174 active leaflets, 3 discontinued (combined into other ones), of which 66 eastern, 62 western USA, and 46 transcontinental; recent and planned activity in writing/revising/printing documented on "FIDL Facts" handout; R-6 website has them all [see <http://www.fs.fed.us/r6/nr/fid/wo-fidls/>], as well as at MT DNRC Forestry Division website [<http://dnrc.mt.gov/forestry/Assistance/Pests/FullFIDL.asp>]; generally costs \$2,000 to print a run & Kathy saves any excess \$ in slush fund for future print runs.

Western Forest Insects --- Iral Ragenovich

WFI book is being redone and revised, retaining integrity of original, effort still moving along; status of recent efforts: *Scolytus* done (Mal Furniss), *Dendroctonus* drafted needs editing (5 authors), *Neodiprion* & *Zadiprion* done, when DFTM completed (L. Pedersen) then Lymantriidae will be done; paying the retirees to help do the revisions; keeping it primarily as an ID guide with latest info added [e.g. Alaska insects will be improved considerably]; no anticipated date of completion yet.

Discussion of WFI revision: book size/length is growing a lot, so how to keep it reasonable? e.g. Part 1, introduction to forest entomology, is 50 pages long, is it still needed? Some say no, omit it, there are textbooks for that, but others not so sure, certainly the intro is way out of date, so revise or omit most/all of it; What about odd stuff? There are sections such as springtails, spiders, bed bugs, etc., how necessary? keep it, many say; make sure that we keep the host as well as insect biology in the book [e.g. that info is why it is so well used in S. America]; Strom offered to do high quality 3-D photos for the revision effort using Automontage [see *Sirex* book for example], need to supply the insects, but they can do the high resolution photography of real critters; 10 years ago we said we needed an overall editor to tie it together and get it done; we have to have all the sections written before we hire an editor to finalize the book.

Other Publications

- ◆ Ragenovich --- Pacific Northwest Region is doing an I&D guide to hardwoods.
- ◆ Costello – Rocky Mountain Region I&D Guide should be out by Christmas.
- ◆ Clarke --- Southern Pine Beetle Book, Second Edition, should be on line soon, everything including technical editing being done and being printed.

2012 Risk Map Update --- Rob Cruz

Host layers issued by FHTET in spring, reviewed by Regions, now back to FHTET to review parameters – BA, QMD, SDI, etc. -- by Nov. 5th or so; no more annual FHM Mtg. to discuss the risk map reviews, etc, so "Risk Map Meeting" tentative for Denver, CO, maybe combined with FHP Directors meeting; each FHM mega-region will have meeting for R-Map Tools and models, West Coast did meet on this, Interior West has a conference call to set up a meeting, maybe do a webinar, South planning a webinar on this; final map due in 2012.

NAFIWC --- Darrell Ross

emails sent out, all should have gotten notice by now, NAFWIC set for May 9-12, 2011 in Portland, OR at Portland Marriott Downtown Waterfront. Location of the website is <http://kelab.tamu.edu/nafiwc2011/>, still don't have the registration fee set, so the registration tab does not work yet, will have reduced rate for students. Can make hotel reservations now, advised to do that early – at per diem \$118/night – limited # rooms, fill 'em up now so Darrell can get hotel to provide more. No field trip planned at this time. Organizing committee = Dan Herms, Darrell Ross, Rusty Rhea, and Kimberly Wallin. Deadline for content suggestions November 15, poster titles due by March 15. Student poster competition needs judges (see Lynn Raske). In 2005 at last NAFIWC, >350 registrants & about 130 posters. No WFIWC this year due to NAFIWC, though Skeeter Werner & Ed Holsten are WFIWC Founders Award co-winners for 2010, will try to find some way to honor them although not the usual WFIWC way, perhaps with an 'old timers and up and new comers session'.

ESA --- Bill Schaupp

Entomological Society of America annual national meeting December 12-16, 2010, to be held in San Diego, CA; 2 sessions honoring the career of David Wood; Ken Raffa to receive the Founders Award honoring A. D. Hopkins & give talk; more forest ent than usual.

General Discussions, as needed...

Duration of Carbaryl Efficacy--- Steve Munson

R-4 & R-2 foresters are recommending annual protective treatments with carbaryl on LPP contra MPB. We need to be recommending a 2-year interval instead; when applied correctly on LPP, carbaryl efficacy is well documented for 2 seasons, well established duration of protection [e.g. Pat Shea publication shows 18 months] & need to be consistent with carbaryl recommendations on LPP, it works for 2 years; problems on USFS NFs and RDs are with application &/or spraying dry hits/dead trees; use check list to monitor application, give NFs \$ to pay for good monitoring and avoid them sending out a seasonal with insufficient knowledge/power to monitor effectively, make sure the trees are not hit before spraying, need to really look before spraying. Discussion: Many applicators have switched to ASTRO® (Permethrin) instead of carbaryl, efficacy not as long-lasting as carbaryl, some confuse two materials and appropriate spray intervals; need to do more study on PP for efficacy duration to have the data; C. Fettig et al. in 2006 [J. Econ. Entomol. 99(5): 1691-1698] in PP with carbaryl got 0% loss first year and 24% second year in Black Hills, concluded carbaryl efficacious for 2 field seasons, but 24% seems really high losses to declare it effective for second season; Joel McMillin did research on PP in Black Hills similar to Fettig's and found efficacy for 2 years with carbaryl, with less on Permethrin, etc.; carbaryl lasts 2 years on spruce and on pinyon contra BB.

WBBRG & BBTWG & FHP --- Steve Munson

Concern that we did not learn about the activities of BB researchers who did not attend this meeting; request that if researchers cannot attend, please at least provide a short summary of latest research work being done to the next BBTWG meeting. FHP & others would like to know what research is being done. The bark beetle meeting used to be attended mostly by researchers (Federal & University), some FHP & a few from States, now BBTWG attendees are mostly FHP, a few researchers & a few from States. Discussion: Rob Progar will pass issue on to WBBRG at the next conference call; we would all like to work together with the WBBRG; FHP is the user group for USFS research, used to be good interactions with research

and liked it; rumor that FHP is not interested in what researchers are doing so researchers do not come to BBTWG meeting; doesn't WBBRG need to interact with FHP to show they are satisfying the Station Directors wishes that WBBRG form and get things done together? it is not just to produce joint publications that WBBRG exists; perhaps someone from BBTWG & NAFIWG should be on WBBRG conference calls; all of them attended BBTWG when FHP had \$\$\$ to offer; a more integrated composition of BBTWG would be good; group cannot be too big or too formal; with such a small community, it is imperative to work together.

PTIPS --- Tom Eager

Anyone know if the PTIPS program is still viable? Funded ? No one is sure what is the status. Suggest contacting regional PTIPS current or former coordinators.

STDP deadlines --- Rob Progar

Isn't STDP proposal submission deadline earlier than November 1 ? Regions do things earlier and have earlier individual proposal submission deadlines in order to review/prioritize & be prepared to meet the national deadline of November 1; each Region has an STDP Coordinator, talk to 'em; typically want things by end of September into Regions, to the WO by November 2nd this year; can vary [e.g. in R-2, not all FY2011 slots filled yet so still accepting proposals]; thought that the 2009 STDP process went very well; reminder to EXPLICITLY follow directions in proposals. This will be also for EM proposals.

Verbenone Operational Use Database, further discussion

Concept discussed starting a few years ago: documentation of verbenone use to gather pertinent data, create an operational database to capture variables that are not reported in literature, make a way to start looking at other conditions and examine efficacy of treatments, to standardize deployment and data collection; Bob Rabaglia wants to know if the BBTWG sees value in such an effort, would group like him to get it started; parameters are very different among uses, lures, hosts, pouch sizes, bubble caps, etc., how to capture that? often successes are reported but failures are not; on USFS Ranger Districts, it is not just all about science; Tom Eager has reviewed verbenone use twice in white papers, one non-technical document for FHP Directors on what it does – chemistry, how it works, etc. – and one with references added; could do a review paper, but we still know it does not always work, so an operational database (treatment assessment database) would be valuable as well; R-1/4 and R-2 are the primary verbenone users, more than 10,000 pouches were used in R-1/4 just last year alone, but at high elevation, verbenone is used all over the west; need to look at how effective it is economically; need to check for/document different host types, stand parameters, etc., so set up column headings that we want filled-in for this database (e.g. BA, host type, spacing of verbenone, timing, monitoring data when they are flying, sanitation of stand, etc) and have users enter these data; we can get together a small group to develop these parameters; are the folks on the ground able to collect and contribute to the database ? several replied that it would not be a big problem for them to do so; FHAD = Forest Health Accomplishment Database may be a vehicle for this; collected data needs to be comparable --- main parameters must be represented --- minimum of 10 parameters; need a short list of meaningful variables to collect; BB pressure could be estimated such as hit tree numbers in area, too; a lessons-learned approach is important, learn why it works in some cases [e.g. Grand Teton NP with WBP, two pouches per tree, E & W sides, ring tree with 4 more pouches] and not in other places/cases; essential to capture negative results; Bob R., Sheryl C., Steve M., Darren B., Brytten S., Rob P., Iral R., Sheri Smith (volunteered) & Tom could be involved; discussed the need to do this in order to make sure we are spending tax payer dollars

effectively; is there support for this at the field level ? YES. Try to have the database available before next season.

Next Meeting, Next Chair

◆ **Where:** volunteered locations named & pros and cons discussed by the group, locations with (votes) as follows: Fairbanks/Anchorage (3), San Diego (9), Pittsburg (5); majority voted for San Diego and it was heard “Let Sheri decide when she can get it set up” & thus **Sheri Smith** is to be the **next Chair**.

◆ **When:** 2011; Avoid the 2011 SAF national meeting on Nov 2-4th, 2011, so 2 weeks after or before would be preferred [Sheri’s email of 5/17/2011 designates San Diego, CA on October 4-6, 2011 as next meeting].

2010 BBTWG Attendees:

John Ball *	SD DOA/SDSU	john.ball@sdstate.edu
Darren Blackford	FHP, Ogden, UT	dblackford@fs.fed.us
Roger Burnside	Alaska DNR, Div of Forestry	roger.burnside@alaska.gov
Bob Cain *	FHP Lakewood, CO	rjcain@fs.fed.us
Stephen Clarke *	USFS, R-8 Lufkin, TX	sclarke@fs.fed.us
Sheryl Costello *	FHP, Lakewood, CO	scostello@fs.fed.us
Rob Cruz	FHM, Ogden UT	rcruz@fs.fed.us
Gail Durham	NV DNR, Div Forestry	gdurham@forestry.nv.gov
Tom Eager	USFS, Gunnison, CO	teager@fs.fed.us
Brian Garbisch	SD Res. Cons & Forestry	brian.garbisch@state.sd.us
John Lundquist	FHP, Anchorage, AK	jlundquist@fs.fed.us
Jorge Macias	Synergy Semiochemical	jorge@semiochemical.com
Joel McMillin*	FHP, Flagstaff, AZ	jmcmillin@fs.fed.us
Steve Munson	FHP, Ogden, UT	smunson@fs.fed.us
Wes Nettleton	FHP, Atlanta, GA	wnettleton@fs.fed.us
Rob Progar	FHP/PNW, LaGrande, OR	rprogar@fs.fed.us
Bob Rabaglia*	FHP, WO	brabaglia@fs.fed.us
Iral Ragenovich *	FHP, Portland, OR	iragenovich@fs.fed.us
Darrell Ross *	Oregon State University	darrell.ross@oregonstate.edu
Bill Schaupp	FHP, Rapid City, SD	bschaupp@fs.fed.us
John Schmid*	RMRS, Ft Collins (retired)	jmschmid@juno.com
Brytten Steed*	FHP, Missoula MT	bsteed@fs.fed.us
Brian Strom	SRS, Prineville, LA	brianstrom@fs.fed.us
Harold Thistle	Technology ET USFS	hthistle@fs.fed.us

* comments or edits to notes received & incorporated

Some help with some Abbreviations

ARRA	American Recovery & Reinvestment Act
DMT	dwarf mistletoe
DFTM	Douglas-fir tussock moth
EAB	emerald ash borer
EDRR	Early Detection & Rapid Response [FHP program]

EB	emamectin benzoate
EM	Evaluation Monitoring [FHP program within Forest Health Monitoring]
FIDL	Forest Insect and Disease Leaflet
FSPIAP	Forest Service Pesticide Impact Assessment Program
GLV	green leaf volatiles
GSOB	golden spotted oak borer
LPP	lodgepole pine
NAFIWC	North American Forest Insect Work Conference
PTIPS	Pest Trend Impact Plot System [FHP]
SOD	sudden oak death
STDP	Special Technology Development Program [FHP Program]
WPBR	white pine blister rust