

Western North American Defoliator Working Group
December 7-8, 2010
Coeur d'Alene, Idaho

Attendees

David Beckman, Beverly Bulaon, Sheryl Costello, Rob Cruz, Tom Eckberg, Joel Egan, Rob Flowers, Andrew Graves, Pat Halseth, Ryan Hanavan, Liz Hebertson, Rose Marie Helmer, Sandy Kegley, Neal Kittelson, Glenn Kohler, Laura Lazarus, Chris Looney, Lorraine Maclauchlan, Connie Mehmel, Stephen Nicholson, Lee Pederson, Don Scott, Kathy Sheehan, Katie Sirianni, Scott Sontag, Nancy Sturdevant, Beth Willhite

Old Business

2009 Action Items

None of the 2009 Action Items were completed or dropped. Progress was made for some items, and some were modified when added to the 2010 Action Items. See "2010 Action Items" at the end of these minutes for updated versions of these 2009 items.

Additional discussion regarding the aerial application training action item:

Steve Nicholson: A small aerial application class was conducted in Michigan this past year, but no other formal training has been available. No recent funding has been forthcoming from WO-FHP for such training. WO-FHP may listen to requests from states re: application training.

Beth Willhite: We should try to pull in Alex Mangini due to his interest in applications targeted against seed and cone insects

Updates

Gray Literature Database – Beth Willhite

History: Efforts to create a gray literature (reports or summaries not formally published) database date back to 2002, when Beth, Beverly Bulaon, Rob Flowers, and Darren Blackford began an EndNotes database for western defoliator reports. In 2003, the Bark Beetle Technical Working Group (BBTWG) proposed a website for western bark beetle literature (Marla Downing was a key contact for that effort). In 2007, the Western Bark Beetle Research Group expressed a strong interest in the FHP gray literature, and this topic was also discussed during the 2007 WFIWC and BBTWG meetings. A pilot project was proposed but not funded in 2008, and then in 2009 a pilot project in CA was funded by FHM as an Analysis and Reporting project.

2010 Pilot Project: A pilot project to scan, catalog, and make accessible the gray literature from one USFS field office (the R6 Westside Service Center in Sandy, OR) was funded in 2010. A part-time library student and Beth attended a 1-week training course at the National USFS Library in Ft. Collins, CO. The general approach is to scan the documents using National Agricultural Library (NAL) standards and deposit the electronic files in NAL's digital repository (Digitop). The documents are cataloged using the USFS Library's "FS INFO" specifications, so they can be accessed through the USFS INFO database. It cost about \$1,000 to scan one file box of documents (using NAL standards). Beth would consider scheduling a workshop or webinar on how to catalog documents, and is writing a manual.

Discussion:

Rob Cruz: Each FHM MegaRegion usually gets \$30,000 each year that can be allocated to an unfunded EM project – and also Analysis & Reporting funds, but the amount varies from year to year. Each Region should have a gray-literature proposal ready to go in case some EM funds become available.

Nancy Sturdevant: Would the USFS be able to fund the acquisition of gray literature from state FHP offices? {no definitive answer to this question}

Laura Lazarus: Joy Roberts has hired a library student to scan their gray literature & slides into EndNotes

Liz Hebertson: Please share the NAL scanning protocols (Beth agreed to send them to the whole group). Should each Region seek funding independently? Beth: A “strike team” that could travel to field offices might work well – could use seasonal/term appointments, with funding provided by the different Regions.

Forest Insect & Disease Leaflets (FIDLs) – Kathy Sheehan

Five new or revised FIDLs were published in FY10, plus another was reprinted (with no changes). While none of those FY10 FIDLs covered western defoliators, several defoliator FIDLs are in the pipeline for FY11: #70 (Nantucket Pine Tip Moth -- *Nowak, Fettig*), #86 (Douglas-fir Tussock Moth -- *Pederson*), #95 (Boxelder Bug – *Ciesla, Hanavan*), and #114 (Pandora Moth – *Ciesla, Eglitis, Hanavan*). Copies of several recent FIDLs were available.

The FIDLs webpage address will change sometime in the coming months as the USFS moves all of its internet websites to a new Portal. The new address will be provided to attendees when available, and should also be included in Ryan H’s website directory (Action Item #15)

State & Regional Reports – Current Defoliator Conditions

Region 1 – Northern ID / MT / ND

Tom Eckberg (IDL): Douglas-fir tussock moth is the big news in northern ID – 8,500+ acres of visible defoliation were recorded during aerial surveys. Much of this defoliation was north of the usual areas that have previously been defoliated. Average 2010 pheromone trap catches were similar to those in 2009, but ~4 times as many of the 2010 plots had 25+ moths per trap. Larval sampling was done at 64 sites in 2010 – larvae were found at 75% of those sites, and ~40% were at suboutbreak level. Based on egg mass sampling at 104 sites, more defoliation is expected in 2011.

Tom also reported on pine butterfly (no defoliation, but many butterflies seen in late summer), western spruced budworm (populations generally are increasing, mostly east of Sandpoint and Coeur d’Alene), WSB trunk injection trials (preliminary results indicate emamectin benzoate may provide protection for multiple years), gypsy moth (no additional moths caught in delimit surveys near previous years’ detections; one European GM found near Meridian, delimit surveys plan in 2011), western hemlock looper (defoliation observed in 2009 in the Clearwater NF continues at about the same level, many moths reported in Clearwater River Valley area, and many WHL in GM and DFTM pheromone traps), and forest tent caterpillar (about 5 acres defoliated west of Rathdrum; over 5,100 acres of defoliation on aspen and other riparian species detected during 2010 aerial surveys).

Sandy Kegley (FS-R1, northern ID; report submitted with Lee Pederson): Defoliation by WSB decreased by ~30% compared to 2009, and was located in the same general areas. DFTM defoliated ~8,500 acres (detected during aerial surveys) in 2010, compared to zero acres detected in 2009; trap catches decreased in 2010, and no plot mean was larger than 9 moths per trap. After causing no detectable defoliation in 2009, western hemlock looper caused “landscape defoliation” (particularly on subalpine fir) on the Clearwater and Nez Perce NFs in 2010, and clouds of adults were observed; the last recorded WHL outbreak was in 2001-2. Pine sawflies (*Neodiprion autumnalis*) continued to defoliate a 37-acre ponderosa pine seed orchard on the Nez Perce NF, despite last year’s carbaryl treatment

and resolution of an over-watering problem; carbaryl was applied again in 2010, and the plantation will be monitored in 2011. Larch casebearer populations remain low (only 340 acres defoliated, on the Kaniksu NF), but needle diseases defoliated over 127,500 acres on the Kaniksu and Clearwater NFs. No gypsy moths were caught on USFS land. Acres affected by balsam woolly adelgid continued to decline, from ~40,000 acres (2008) to 4,700 acres (2009) to 2,200 acres (2010), primarily on the Clearwater, St. Joe, and Kaniksu NFs; some of this apparent decline may be due to differences among aerial observers. Finally, higher-than-usual adult pine butterflies were seen on ponderosa pine in northern ID, but no defoliation was detected.

Nancy Sturdevant (FS-R1, MT; with contributions from Scott Sontag and Joel Egan): No defoliation by DFTM was detected in 2009 or 2010; no DFTM trapping was done in MT in 2010. Pine sawfly (*Dasychira pinicola*) populations in eastern MT have been much lower in 2009 and 2010 compared to 2008, when ~10,600 acres were defoliated by this sawfly. Defoliation by western spruce budworm declined sharply from 3 million acres in 2009 to ~600,000 acres in 2010, though the acres surveyed also decreased by 25%; most defoliation was on USFS land, particularly the Kootenai NF (which historically has not been significantly defoliated), the Helena NF, and the Gallatin NF. Douglas-fir beetle generally was unchanged from 2010, though DFB activity did increase on the Gallatin, Bitterroot, and Lewis & Clark NFs and Yellowstone NP, following high levels of defoliation by WSB in 2009.

David Beckman (IDL, retired): No defoliation by western spruce budworm was detected during the 2010 aerial survey for northern ID, but he saw defoliation in some of that area later in the season.

Region 2 – CO, Eastern WY, SD, NE, KS

Sheryl Costello (FS-R2): Colorado – DFTM populations remain very low, and only 1 moth was caught in 9 plots (5 traps/plot). WSB populations declined from ~383,000 acres in 2009 to ~216,000 acres in 2010, but long-term, chronic defoliation continues in many areas; specific areas with defoliation by WSB include the Rio Grande, Uncompahgre, San Juan, White River, and San Isabel NFs and the Culebra-Sangre de Cristo Range. Western tent caterpillar continues to defoliate aspen, particularly in the North Fork Purgatory River drainage (fifth consecutive year) and Grouse Mountain in the San Juan Mountains; also, no Marssonina blight (which was a primary cause of defoliation in 2009) was reported in 2010. WTC continued defoliating mountain mahogany and other hosts in northern CO, but at lower levels than the previous two years. In southern CO, large aspen tortrix defoliation was noted northeast of Blanca Peak of the Sangre de Cristo Range, and a needle miner (probably *Coleotechnites ponderosae*) continues to cause light defoliation on ponderosa pine. No gypsy moths were caught delimiting traps in locations where 3 GMs were caught in 2009, and one GM was caught in 2010 in Longmont, CO. Sheryl also noted that aspen dieback continues to receive media attention in CO. She reported that most successional aspen stands are recovering; for climax aspen stands, however, some are not recovering while others have carpets of regeneration.

Wyoming – Defoliation caused by WSB populations on the Medicine Bow NF declined to 350 acres in 2010 (~1,400 acres had been defoliated in 2009); WSB populations in this area had collapsed in 2009 following a DFB outbreak that killed many host trees. In northern WY on the Absaroka Mountains, Wind River Mountains, and Wind River Indian Reservation, defoliation by WSB increased from 3,200 acres in 2009 to 3,970 acres in 2010 – this area has already been severely impacted by bark beetles.

South Dakota – In western SD, defoliation by fall webworm was reported on chokecherry, ash, cottonwood, and other hosts. In southwestern SD, sawfly (*Neodiprion autumnalis*) was reported in scattered areas in the Southern Black Hills and Pine Ridge Reservation – similar to 2009 observations. As in past years, few gypsy moths were caught in SD.

Nebraska – In the panhandle of NE (Wildcat Hills), ponderosa pines on the grassland-forest ecotone have been defoliated by sawflies (*Neodiprion autumnalis*) for the past 6 years. This defoliation, in combination with *Ips* species attacks, has led to 10-20% tree mortality.

Region 3 – AZ, NM

Ryan Hanavan (FS-R3): Arizona – Pinyon needle scale increased in 2010 to historically high levels, and small pockets of defoliation by sawflies on pinyon were also recorded during aerial surveys. Ryan also noted that more pinyon type was surveyed in 2010 than in the past, and they will try to survey even more pinyon-juniper type in 2011. No spruce aphid was recorded in 2010, though field checks to confirm aphid levels are planned for 2011. On aspen, defoliation and mortality have been recorded separately since 2009.

New Mexico – WSB defoliated many more acres in NM than in AZ. On the other hand, virtually no looper defoliation was detected – a sharp decrease from previous years.

Region 4 – Southern ID, UT, NV, Western WY

Liz Hebertson & Laura Lazarus (FS-R4, with contributions from Gail Durham - NV): Defoliation in R4 increased to ~1.75 million acres in 2010, a ~70% increase over 2009 levels and a 10-fold increase from the average for 2003-2008. Most of this defoliation was caused by pinyon needle scale in NV and western spruce budworm in UT and southern ID.

Douglas-fir Tussock Moth – In southern ID, the DFTM outbreak in the Big Wood River Valley (Sawtooth NF) is over. While trees have mostly recovered, some mortality occurred along ridges and in most heavily defoliated areas. In 2010, small pockets of defoliation were found along ridges between Mackay and Arco (Cooper Basin) on the Challis NF. In UT, the small area of DFTM previously mapped in Payson Canyon (Uinta-Wasatch-Cache NF) declined in 2010.

Western Spruce Budworm – WSB defoliated ~720,000 acres in R4 in 2010, including all NFs in southern ID where defoliation increased compared to 2009. In UT, WSB is spreading south on the Dixie NF, with highest intensities around Duck Creek. WSB continues to affect Douglas-fir, subalpine fir, and spruce on the Aquarius Plateau, but populations may be declining. DFB-caused tree mortality – mostly associated with previous defoliation by WSB – has increased in both previously mentioned areas. On the Fishlake NF, WSB is active on Douglas-fir and subalpine fir on Monroe Mountain (Richfield RD), but declining on the Beaver RD after much activity during the past 10 years.

Pinyon Needle Scale & Pinyon Sawfly – Over 1 million acres of defoliation by PNS were mapped in 2010 in NV. Some of those acres were also affected by other agents (tip moth, pinyon needle miner, etc.), but PNS was the predominant agent. Defoliation by pinyon sawfly was mapped on ~26,000 acres in NV in 2010.

Other Agents – During delimitation surveys from 2006 to 2010, balsam woolly adelgid was found scattered north of I-84 on state, private, and USFS lands; because there is no practical aerial survey signature for BWA in southern ID, mortality of subalpine fir is attributed to either WBBB or SAF Decline. Forest tent caterpillar defoliated ~3,250 acres in UT in 2010. No gypsy moths were caught in southern ID in 2010.

Aspen decline was mapped on ~35,500 acres, though many clones showed improving conditions. Pine butterfly adults were at outbreak levels in August 2010 on the Payette, Boise, and Salmon-Challis NFs, and egg masses were abundant; however, no defoliation was visible in 2010.

Region 5 – CA, HI, Pacific Islands

Beverly Bulaon (FS-R5): During the 2010 aerial survey, over 300,000 acres of tree mortality or damage were mapped in CA. Nearly 90% of those acres were attributed to bark beetles.

Black Oak Leaf Miner (*Eriocraniella aurosparsella*) caused light defoliation on ~500 acres in the Blue Canon area (Tahoe NF), a sharp decrease from the ~7,000 acres reported in 2009. This decline might be due to the cold and wet spring weather in 2010 – the snowpack that was present during the adult emergence period might have caused adult mortality.

DFTM defoliated WF on ~192 acres south of Big Bear Lake on the Mountaintop RD (San Bernadino NF) for a second year; significant tree mortality has not yet been observed, but may occur as some areas have 70-90% defoliation.

Pinyon sawfly was observed on 10,000+ acres of single-leaf pinyon pine in Death Valley National Park in 2010; defoliation was moderate to severe, and nearly half of all trees in affected areas were nearly 100% defoliated – though no mortality was observed.

Ponderosa Pine Twig Scale (*Matsucoccus bisetosus*) caused branch mortality on ~80 acres of ponderosa pine forest. This rare outbreak mostly affected pole-sized trees, and was not severe enough to cause significant damage. Birds feeding on these scales have removed the outer bark on the upper boles of some trees. A previous outbreak in Greagle (Plumas Co., CA) lasted 2 years.

Gypsy Moth -- One European GM was trapped in Palo Alto (Santa Clara Co., CA) in 2010, and no additional moths were trapped during subsequent delimitation trapping.

Region 6 – OR, WA

Rob Flowers (ODF): In 2010, ~307,000 acres of defoliation were mapped during the annual aerial survey, a 42% increase over the 2009 observations.

Western Spruce Budworm – WSB defoliation was detected on ~108,000 acres in 2010, a significant increase from the 41,000 detected in 2009. Damage was generally rated as light to moderate in severity, and was mostly found on the Ochoco and Malheur NFs in northeastern OR.

Balsam Woolly Adelgid – Over 170,000 acres affected by BWA were detected during aerial surveys in 2010 (a 12% increase since 2009), and true fir decline and mortality continues to rise, particularly in subalpine fir stands. Scattered damage is present in the Cascade Range from the Mt. Hood NF south to the Rogue-River NF, while more intense and widespread damage was found in northeastern OR (Wallowa-Whitman, Umatilla, & Malheur NFs; Hells Canyon National Recreation Area).

Pine Butterfly – After defoliation by PB was detected on 4,000 acres in 2009, over 24,000 acres were defoliated in 2010. Additional defoliation was visible on the ground, and multiple ownerships have been affected (Malheur NF, BLM, and private lands). Pine sawflies (*Neodiprion* spp.) were commonly associated with PB populations, and may be the

primary defoliator in some areas. Defoliation intensity was moderate to severe in some areas, and some tree mortality is expected.

Other Agents – Larch casebearer damage declined from 15,000 acres in 2009 to ~2,000 acres in 2010, mostly scattered in previously affected areas on the Mt. Hood, Umatilla, and Wallowa-Whitman NFs and private lands in northeastern OR. Defoliation by satin moth increased slightly to 1,800 acres in 2010, primarily in scattered small aspen stands in southcentral and northeastern OR; ground surveys by ODF and WDNR indicated that some of the defoliation previously attributed to satin moth may have been caused by other agents, stand succession, and ungulates. Conifer sawflies (*Neodiprion* spp.) defoliated ~300 acres of Douglas-fir and noble fir in 2010 on the Willamette NF in western OR; other localized outbreaks of *Neodiprion* species on various hosts (western hemlock; ponderosa, lodgepole, & ornamental pines) have caused moderate to severe defoliation in some areas, but then usually subsided quickly with little to no mortality. Black pine leaf scale (*Nuculaspis californica*) was detected on 300+ acres in 2010, but also affected several thousand acres in the Hood River Valley of north-central OR, causing progressive decline and mortality of mature ponderosa pine; outbreaks of this scale are usually associated with disruption of parasitoid activity due to pesticide drift, road dust, or air pollution. Unusually high levels of damage by fall webworm were reported in southwestern OR in 2009 and 2010, particularly on Pacific madrones and ornamental hardwoods.

Pheromone Trapping – DFTM: Initial results indicate that moth catches have declined in 2010. Defoliation detected during aerial surveys was very limited since the last outbreak in 2001, but light to moderate defoliation was found in some areas on the Wallowa-Whitman and Umatilla NFs in recent ground surveys. GM: Only 1 moth was trapped in 2010 – the lowest number for OR since trapping began in 1979 – and no eradication project is planned for the second year in a row.

Glenn Kohler (WDNR): About 432,000 acres affected by defoliating insects and diseases were detected during the 2010 aerial survey – slightly above the 10-year average of 407,000 acres. Major defoliating agents in 2010 were WSB (86% of total defoliation), BWA (8%), and larch needle cast (5%).

Douglas-fir Tussock Moth – Defoliation caused by DFTM in Okanogan County (northcentral WA) decreased from 3,500 acres in 2009 to 650 acres in 2010. Two suppression projects were conducted in 2010 in the Methow and Twisp River Valley areas: ~13,000 acres of NF lands were treated with DFTM virus (TM-Biocontrol1), and 965 acres of private land were treated with Btk (see “DFTM in the West” section for more information). A new outbreak covering ~570 acres was detected in eastern Spokane County (northeastern WA), where pheromone trap catches increased in 2008 and remained high through 2010. This new outbreak coincides with a ~9,000 acre outbreak in the ID panhandle.

Western Spruce Budworm – WSB defoliated ~373,000 acres on the eastside of the WA Cascade Mountains and in northeastern WA. Defoliated areas expanded since 2009 in Kittitas, Chelan, Okanogan, and Ferry Counties, and especially heavy defoliation detected in Kittitas County. Pheromone trap catches in most of those counties remained high in 2010, indicating moderate to heavy defoliation in some areas.

Larch Needle Cast (caused by *Meria laricis*) was recorded on ~22,000 acres in eastern WA (primarily in Yakima, Kittitas, and Pend Oreille Counties) in 2010 – a dramatic increase from the 205 acres mapped in 2009. This increase is probably associated with the unusually wet spring and summer weather that occurred in eastern WA in 2010.

Green Alder Sawfly, a non-native species whose U.S. distribution was previously thought to be limited to AK, was detected in 11 WA counties by cooperators from WSDA, WDNR, and other agencies.

Other Agents – Balsam woolly adelgid affected few acres in 2010 (~34,800 ac) than in 2009 (~68,700 ac), mostly at high elevations of the Blue Mountains, Olympic Mountains (east slopes), Cascade Mountains, and scattered areas in northeastern WA. Defoliation caused by forest tent caterpillar in 2010 decreased to 10 acres on alder (down from 233 in 2009) and 484 acres on other host species. Satin moth was reported to have defoliated ~620 acres throughout Okanogan County and in scattered areas in Ferry and Kittitas Counties in 2010; most ground checks in 2010 found no signs of satin moth (exceptions: 3 locations in the Loomis State Forest, Okanogan Co.), satin moth activity is more evident in the spring and early summer, prior to aerial survey flights. Slug sawflies (*Caliroa* species) were monitored in 2010 on Oregon white oak in southwestern WA after first being reported in 2009; larvae were collected in the spring, and adults were collected on sticky traps but have not yet been identified to species. A relatively low total of 13 gypsy moths were trapped in 5 areas in western WA (including 7 moths in 1 trap near Puyallup); an eradication project has been proposed for the Puyallup site in 2010.

Region 10 – AK

Jim Kruse (FS-R10, from a report sent in his absence) –

Green Alder Sawfly – GAS was found in every thinleaf alder stand surveyed adjacent to roads throughout southcentral AK and the Kenai Peninsula in 2010, but not in coastal areas of southwestern AK or Kodiak. The highest populations were around Kenai and Anchorage, and caused up to 80% defoliation, while populations were extremely low and little defoliation was observed in the Fairbanks area.

Aspen Leaf Miner (*Phyllocnistis populiella*) – In the tenth year of the current outbreak, about 454,000 acres of aspen forests in interior Alaska were defoliated in 2010, an increase over 2009 acres but much less than the acres reported for 2008 (~800,000 acres). As in recent years, affected trees were common from the south slopes of the Brooks Range to the west side of Galena, south to Talkeetna and east to Tok, with the heaviest infestations found west of Fairbanks on the Nenana Ridge. Moderate to heavy ALM defoliation was also observed in Canada through the Yukon Territory, lighter to Laird (SK), and spotty south past Muncho Lake (BC).

Willow Leafblotch Miner (*Micurapteryx salicifoliella*) – Over 514,000 acres were affected in 2010 in many areas across interior AK, with over half of those acres found throughout the upper Yukon River Valley and its tributaries from Beaver to Circle, and another third along the Tanana and Kantishna Rivers. Branch dieback and some mortality has occurred in many heavily infested stands, leading to concerns about effects on suitability for moose forage.

Other Agents – Large Aspen Tortix: Nearly 8,600 acres were defoliated by LAT in 2010, returning to 2008 levels after its near absence in 2009. Defoliation was scattered in areas near Healy, east of McGrath, east of Aniak, and at the western edge of the Innoko Wildlife Refuge. Spruce Budworm – No defoliation by was detected in 2010; also, the numbers of adults trapped and larvae observed declined for the third consecutive year. The most recent outbreak peaked in 2004 then declined dramatically in 2007. Miscellaneous – In 2010, a variety of larvae defoliated birch (33,000+ acres), alder (6,000 acres), cottonwood (~14,000 acres), and other hardwoods (2,200 acres) in AK. Loopers heavily defoliated

birch, alder, and willow trees in the Eagle River, Peters Creek, and Chugiak areas in June, 2010. From mid-August through early October, large numbers of adult moths in areas that had been heavily defoliated in mid-summer, including autumnal moth (*Epirrita autumnata*), *Eulithis propulsata*, and Bruce spanworm (*Operophtera bruceata*)

British Columbia

Lorraine Maclauchlan (BCMF)

The note-taker was mesmerized by this fabulous PowerPoint presentation – especially those great graphics -- and apologizes for not taking many notes.

DFTM in the West

2010 WA Suppression Projects – Glenn Kohler (WDNR) & Connie Mehmel (FS-R6)

In 2010, DFTM populations were treated with TM-BioControl1 (a DFTM nucleopolyhedrosis virus product) on ~13,000 acres on the Methow Valley RD (Okanogan-Wenatchee NFs, northcentral WA), and with *Btk* on 965 acres of private land (~200 different landowners) in the upper Methow Valley. The virus treatments targeted first instar populations, while the *Btk* treatments targeted second instars. Based on pre- and post-treatment samples, DFTM populations apparently collapsed in both treated and untreated areas; treatments on private lands were not monitored as closely as those on USFS lands, so there is less certainty about the results of those treatments. Average treatment costs were ~\$35/acre for the USFS treatments and ~\$65/acre for the much smaller private treatments.

Prior to the 2010 DFTM treatments, Glenn Kohler (WDNR) and Roy Magelssen (USFS) evaluated virus infection rates for DFTM egg masses. Egg masses were collected in the fall of 2009, stored in a refrigerator for 4 months, and then warmed to promote egg hatch; those larvae were reared to determine the percentage of first instars affected by the virus. Nick Conder (Canadian USFS's Pacific Research Centre) provided advice on conducting these bioassays. No virus was detected in larvae hatching from egg masses collected in proposed USFS treatment areas – yet the virus appeared to cause DFTM populations to collapse even in untreated areas.

2010 BC Suppression Projects – Lorraine Maclauchlan (BCMF)

In most areas of BC, populations were nearing collapse, but they remained high in localized areas; the 2010 treatments were aimed at reducing populations and defoliation in some of those areas with high populations. BCMF used several combinations of treatments (*Btk* – 1 treatment, *Btk* – 2 treatments, *Btk* + virus, virus only); the virus was applied when egg hatch was complete, and the *Btk* was applied at the peak of second/third instars. Treated populations were lower than untreated ones after 3 weeks, but were at similar densities after 6-7 weeks.

Lorraine also presented information about the effectiveness of lower virus doses, based on work she did in cooperation with Iral Ragenovich (FS-R6). They compared applications at the full rate, ½ rate, and ¼ rate, and found that while the virus does cause mortality at the lower doses, defoliation still occurs.

DFTM in Northern ID – Tom Eckberg (IDL) and Neal Kittelson (IDL)

DFTM populations are rising in northern ID. Larval sampling is done in areas of concern, and 2009 larvae were found at over half of the sampling sites (with 5 sites at suboutbreak levels). In 2010, 75% of the sites had larvae present, and nearly 40% were at suboutbreak levels.

Temperature Effects on DFTM Virus – Katie Sirianni (FS-PNW Research)

Katie reported on greenhouse studies of the effects of mean temperature on virus efficacy and short-term decay rates. “Warm” and “cool” areas were created by heating one side of a greenhouse and separating that side from the cool side with large hanging plastic sheets, creating a temperature difference of ~1-2 degrees C. Second instars (from egg masses collected in the fall of 2009) were placed on seedlings, which were then bagged. These seedlings were sprayed with virus either 3 days before placement, 2 days before placement, or on the day of larval placement. Generally ~60 larvae were placed per sample, with new samples placed on seedlings at weekly intervals throughout the season. Larval mortality was delayed on the cool side, but there was no significant difference in the decay time.

Status of TM-Biocontrol1 – Iral Ragenovich (presented by Kathy Sheehan; both FS-R6)

Background: TM-Biocontrol1 is a supply of freeze-dried DFTM virus owned by the USFS and registered by EPA for use against DFTM on federal or state lands. This virus product was created by the USFS by infecting laboratory-grown DFTM with the virus, filtering and cleaning the cadavers, and then freeze-drying and packaging the somewhat purified product. Virus production by the USFS ended ~1995, and currently about 70,000 acre-doses remain in storage, based on bioassays performed in 2000; however, the true amount remaining is probably less, because the virulence has probably decreased in the 10 years since those bioassays. The current EPA registration is tied to tests done on a specific DFTM colony (the Goose Lake colony), which is maintained by the USFS at a rearing facility in CT; EPA would probably require a virus product from a different DFTM strain to go through the same testing process as would be required for a new insecticide. In 2001, a USFS study by Don Scott estimated that in-house production of additional virus would require ~\$730,000 in start-up costs plus ~\$420,000 in annual costs to produce ~5,000 acre-doses per year. At about that same time, one company (Silvar) responded to a request for proposals with a bid of ~\$2,000,000 (not sure about the details of that proposal). In the 2 most recent outbreaks in OR & WA (2000-01 and 2010), virus was probably applied too late in the outbreak cycle to be effective – perhaps the “sub-outbreak” populations (or even the “low” populations) as defined in the DFTM Compendium* are usually already at the “outbreak” stage, or the “25+ moths per trap” threshold for action is too low.

* Brookes, Martha H, RW Stark, and RW Campbell (eds.) 1978. The Douglas-fir Tussock Moth: A Synthesis. USDA USFS Tech. Bull. 1585, 331 p. Link: http://books.google.com/books?id=BWEWAAAAYAAJ&pg=PA81&lpg=PA81&dq=Douglas-fir+tussock+moth+synthesis&source=bl&ots=2_dhAy4JVX&sig=DsCOcMUj9IcelUNa96qEx9FZZHw&hl=en&ei=oeo9Te-iClIusAPrtcXNAw&sa=X&oi=book_result&ct=result&resnum=10&ved=0CFMQ6AEwCQ#v=onepage&q&f=false

Questions: Do we think TM-Biocontrol1 will be used in the future? How many acre-doses will be needed? Is TM-Biocontrol1 effective? Is *Btk* an acceptable alternative in most situations? Do we need to reconsider the current strategy for using TM-Biocontrol1?

Discussion:

Laura Lazarus: We definitely want to keep virus in our toolbox. *Btk* might reduce the populations for one year, but not trigger the collapse that’s typical of a virus epizootic (populations might rebound the year after a *Btk* treatment because virus has not built up). The Early Warning System pheromone traps are less of a priority for our region.

Andy Graves: Virus might be our only option on some lands (such as tribal lands). Mating disruption via pheromones might be a viable alternative in some circumstances.

Beth Willhite: We need to consider risk management – the acceptable risk of no action probably varies among landowners. We could consider applying virus to high-value sites every year (several years in a row) when the next outbreak is due. Perhaps we should invest funds in mating disruption rather than virus production.

Steve Nicholson: The USFS usually takes 2-3 years to decide to implement a treatment, then doesn't defend that decision. Also, some tribes will use *Btk* – depends on the treatment objectives and the specific tribe.

Lorraine Maclauchlan: It would be nice to have both virus and *Btk* available, especially for situations that don't just involve impacts on timber. Canada might be interested in producing virus – or perhaps contributing to the registration costs. Mating disruption is not acceptable to some people – as was demonstrated by the light-brown apple moth controversy.

Glenn Kohler: Would the USFS change its management strategy to remove fir if the virus wasn't available?

General consensus: It would be a good idea to suggest this topic (something like: "Strategies for Using NPV when Managing DFTM Populations") for a NAFIWC workshop in May 2011.

Other Defoliators

Pine Butterfly – Don Scott (FS-R6)

Pine butterfly is a native insect that feeds primarily on pines, though it has many other hosts. Outbreaks might be synchronized throughout the west -- Don has done some sleuthing in USFS records from OR and WA (for example, an outbreak is mentioned in a USFS silviculturist's report from 1911), and would welcome information about the timing and extent of outbreaks in other states. Sometimes PB outbreaks coincide with other defoliators such as pine needle sheathminer (*Zellaria haimbachi*) or – as in the current outbreak – sawflies (*Neodiprion* sp.). Natural enemies such as an ichneumonid parasitoid (*Theronia* sp.) might be responsible for the collapse of outbreaks.

The current outbreak in the Blue Mountains of northeastern OR was first reported in 2008, when many adults and light defoliation of ponderosa pine were observed on the Emigrant Creek RD (Malheur NF). Over 3,800 acres of defoliation were detected during the 2009 aerial survey, and ground checks confirmed the presence of both PB and a *Neodiprion* sawfly (PB to sawfly ratio = 2.6). Nearly 69,000 acres with defoliation by PB (again with some sawflies, too) were detected by ground surveys in 2010. Eighteen long-term monitoring plots were established in 2010, where population density, defoliation, and natural enemy activity will be tracked.

Poplar Sawfly – Neal Kittelson (IDL)

In 2009, a second year of defoliation by sawflies (species not known) was observed in a 40-acre poplar stand. In 2010, swarms of adults were seen in the same stand in late April, and egg hatch occurred in mid-May. Synchrony of egg hatch and leaf expansion greatly affected subsequent defoliation: at least 3 different poplar crosses were planted in this area, and those that leafed out early were the most heavily defoliated. Poplar crosses that leafed out later – after the adult sawflies laid eggs – had very little defoliation.

Green Alder Sawfly – Glenn Kohler (WDNR), Chris Looney (WSDA), & Kathy Sheehan (FS-R6)

As reported by Jim Kruse (FS-R10) at last year's WNADWG, this non-native sawfly is part of an insect/disease complex causing serious damage to thin-leaf alder stands in AK. In April 2010, a private citizen posted photos of GAS adults taken in Vancouver, WA. An informal network of

entomologists from many agencies (WSDA, WDNR, USFS, Canadian FS) used small passive sticky traps to catch adults in April and May in multiple locations in British Columbia (mainland and Vancouver Island), along the I-5 corridor in WA, and Clark and Skamania Counties in southwestern WA. Single adults were also trapped in Stevens County (eastern WA) and Portland, OR. Defoliation of red alder was also observed in June, 2010, in many locations where adults had previously been trapped; defoliation was general light in southwestern WA. Grant proposals for 2011 would (if funded) support more extensive trapping of adults throughout OR and WA within stands of alder, other hardwoods, and some conifers.

Saltcedar Flea Beetle – Liz Hebertson (FS-R4)

Saltcedar was introduced to the US for erosion control in the 1880s, but had unintended consequences and now dominates over 1.6 million acres. A biological control program sponsored by USFS R1+4 introduced the saltcedar flea beetle (*Diorhabda elongata*), a predator native to China. The initial releases were not successful because the beetles' photoperiod was not synchronized with local conditions, but later releases of beetles collected at similar latitudes resulted in successful establishment of the beetle in local areas, followed by heavy defoliation and mortality of saltcedar within a few years. However, the southwest willow flycatcher (a Threatened or Endangered Species) has adapted to saltcedar for nesting sites -- and this beetle defoliates the saltcedar during nesting season (lack of shade then causes nestling mortality). This biocontrol program was shut down in June, 2010, and no movement of this beetle is allowed. Restoration projects are underway aimed at re-establishing native vegetation.

Forest Tent Caterpillar and Western Hemlock Looper – Tom Eckberg (IDL)

Heavy defoliation by forest tent caterpillar was reported on a 5-acre cottonwood stand. Also, "clouds" of western hemlock looper were observed in the Clearwater area – they even clogged some gypsy moth traps.

Budworm Activity in the West

Western Spruce Budworm Treatments Database Update – Kathy Sheehan (FS-R6)

This database has focused primarily on direct suppression treatments conducted against western spruce budworm in 1970. The current website (www.fs.fed.us/r6/nr/fid/budworm/) will move to the new USFS Portal at some point in the near future. Due to time constraints and other assignments, this database has not been expanded as originally planned.

Western Spruce Budworm – MT 2010 Project – Nancy Sturdevant and Joel Egan (both FS-R1)

About 500 acres of prime budworm habitat in the Bridger Bowl ski area (Gallatin NF) were treated with *Btk* (48 BIU) on July 19, 2010. This treatment's objective was to protect foliage from defoliation for one year. The timing was about 1.5 weeks later than expected due to cool weather, and there were big differences in phenology among spray blocks due to aspect, slope, etc. This project was planned and implemented in 4 weeks, in part because a Categorical Exclusion was used for this application. During the summer after treatment, the trees appeared "green and healthy", in contrast to previous years. Additional budworm population sampling will be done in spring, 2011.

Systemic Injections to Reduce Budworm Defoliation – Tom Eckberg (IDL)

Initial injections of emamectin benzoate were conducted on 5 pairs (treatment, control) of trees in 2006, and the initial results were encouraging. An additional 60 pairs of trees (20 trees each for Douglas-fir, grand fir, and subalpine fir) were treated in 2008. Defoliation was rated using the 10-category method of Fettes (1950). For all three hosts, these injections have reduced defoliation in both 2009 and 2010. Defoliation on the treated and control trees will be rated again in 2011.

Budworm Treatments in the BC Southern Interior Region – Lorraine Maclauchlan (BCMF)

About 48,000 hectares were treated with Btk in 2010. BCMF had planned to treat more hectares, but were limited by cool, wet weather in the spring. Budworm synchrony with the expanding host foliage was very important this year.

General Discussion

Sandy Kegley has seen buds killed on western white pine, and is wondering how to distinguish WSB from sugar pine tortrix. Connie Mehmel noted that she has seen lots of WSB feeding on WWP when its regular hosts are abundant nearby. Nancy Sturdevant commented that sugar pine tortrix pupae and moths are smaller than WSB.

Laura Lazarus asked whether anyone has documentation/references about the effects of WSB on fine fuels or other fire-related aspects. Beth Willhite mentioned a paper by Susan Hummel on this topic. Laura said R4 has some long-term impact plots, and wondered if (should?) we seek funds to remeasure those plots. Rob Cruz suggested that FHM's Evaluation Monitoring program might be an appropriate funding source.

Beth Willhite mentioned that FS-R6 (Julie Johnson, Keith Sprengel) are working on an ARCGIS defoliation analysis tool that will summarize defoliation recorded during aerial surveys for a specified number of years.

Additional Topics

NPDES – Liz Hebertson (FS-R4)

In response to several lawsuits regarding pesticide applications on forest and agricultural lands, the US Environmental Protection Agency has developed a National Pollutant Discharge Elimination System. Starting on April 9, 2011, a NPDES permit will be required for any aerial- or ground-based treatments where the product may land on water (including ephemeral streams). Biological pesticides are covered by this new requirement. EPA's draft NPDES permit has not yet been published; some states will probably adopt the EPA permit, while others may develop their own permit. It's not clear whether an agency or a contractor/ applicator would be responsible for obtaining this permit. In some situations, the permit might be good for 3-5 years. The expected cost of these permits is currently unknown.

Risk Map – Holly Kearns (FS-R1)

Holly presented a plea for help in constructing models to represent the effects of forest insects and diseases within the 2012 Risk Map. Even if a specific insect or disease by itself is predicted to produce less than 25% mortality during the next 15 years, several agents combined may reach that threshold – and thus would be included in the new risk map. Joy Roberts (FS-R4) is the Interior West contact for insect models – the group suggested that Holly contact Joy regarding defoliator models and Laura Lazarus regarding a BWA model. The attached spreadsheet provided by Holly displays information needed for each model.

Final Business

2010 Action Items *(also attached as a spreadsheet)*

#	Item	Action	Who
1	Long-term plots	Reply to an email (to be sent by Iral), providing info. about current long-term defoliator plots: target agent, # of plots, when established & remeasured, \$ and tasks needed to maintain these plots.	All WNADWG Members
2	Letter to Directors	1. reiterate the need for aerial application training 2. emphasize the importance of revisiting long-term defoliator plots (based on input from Item #1)	Iral Ragenovich
3	WSBW trap guidelines from Niwa	Finish working with Chris Niwa and Dave Overhulser on the manuscript, then publish	Iral Ragenovich
4	adelgids in spruce collection	collect from the Nez Perce for identification (not done in 2010 due to early snow)	Lee Pederson
5	DFTM pheromone elution, mating disrupt.	Publish as a chapter in FHTET book on pheromones	Iral Ragenovich
6	WSBW, DFB, & thinning treatments	compile work done and results so far; look into possibility of FHM funding for review paper	Nancy Sturdevant
7	WSBW trend & impact data from Hostetler	finish analysis and publish. Bruce will be retiring at the end of 2010. Data is in good shape -- anyone interested in helping with analyses? Contact Beth if interested.	Bruce Hostetler Beth Willhite
8	DFTM FIDL	in progress, to be finished in early 2011	Lee Pederson
9	WSBW strategies and research workshop	continue working on cataloging effort, set up a meeting in conjunction with next WNADWG meeting	Darren Blackford? (Kathy Sheehan)
10	DFTM - Kings Canyon	Write report for 2011	Beverly Bulaon
11	NAFIWC Workshop - Gray Literature - Scanning Protocol	Contact the NAFIWC program committee to suggest a workshop (or perhaps an informal meeting) about how to prepare gray literature for scanning & what protocols should be used when scanning. Alternative approach: set up a series of webinars? Check with FS-INFO staff.	Beth Willhite
12	NAL scanning protocols	Send out the NAL scanning protocols to be used if anyone starts scanning gray literature	Beth Willhite
13	Funding for Scanning	Seek funds for scanning gray literature -- perhaps a "strike team" that could travel to various field offices. Beth to send example proposals to other Regions.	Beth Willhite
14	R6 FHP review - presentation	During the 5-year review of R6-FHP (scheduled for June 2011), give a presentation to Rob M & review team re: importance of gray literature efforts	Beth Willhite
15	Central location for website links	Since all USFS websites are migrating to a new Portal (and many familiar links will no longer work), develop a central location with links related to western defoliators	Ryan Hanavan
16	AS Code Coordination	Coordinate aerial survey codes and protocols for BWA+SAF Decline+WBBB	Glenn Kohler

Next Meeting

Meeting Organizers: Beverly Bulaon, Laura Lazarus, perhaps Gail Durham and Tom Coleman

Location: Southern NV / AZ / southern CA – field trip to view pinyon pine ecosystems?

Dates: To be determined at the discretion of the meeting organizers. Recent meetings have been held during the two weeks after Thanksgiving – if held sooner, preliminary aerial survey results might not be available, while later dates would conflict with many holiday activities.

Possible Topics: Pinyon Insects, Balsam Woolly Adelgid, NPDES, Long-term Studies of WSB/DFB Effects on Trees, WSBW Management, Long-term Plots

Feedback re: Conditions Reports: People generally favored saving time by having just one person (State or USFS; perhaps they could alternate in different years) present a combined report for each state (or region). Some people wanted less time for conditions reports and more time for reports & discussion on specific projects or issues, while other people favored the opposite approach (more time for conditions, less time for projects/issues) – no consensus was reached.

Acronyms / Scientific Names			
<i>used in WNADWG 2010 Meeting Notes</i>			
BCMF	British Columbia Ministry of Forests	LC	Larch Casebearer (<i>Coleophora laricella</i>)
Btk	<i>Bacillus thuringiensis kurstaki</i>	NAFIWC	North American Forest Insect Work Conference
BWA	Balsam Woolly Adelgid (<i>Adelges picea</i>)	NAL	National Agricultural Library
DFB	Douglas-fir Beetle (<i>Dendroctonus pseudotsugae</i>)	ODF	Oregon Department of Forestry
DFTM	Douglas-fir Tussock Moth (<i>Orgyia pseudotsugata</i>)	PB	Pine Butterfly (<i>Neophasia menapia</i>)
FHM	Forest Health Monitoring	PNS	Pinyon Needle Scale (<i>Matsucoccus acalyptus</i>)
FHP	Forest Health Protection	PS	Pinyon Sawfly (<i>Neodiprion edulicolus</i>)
FIDL	Forest Insect and Disease Leaflet	SM	Satin Moth (<i>Leucoma salicis</i>)
FTC	Forest Tent Caterpillar (<i>Malacosoma disstria</i>)	WBBB	Western Balsam Bark Beetle (<i>Dryocoetes confusus</i>)
FW	Fall Webworm (<i>Hyphantria cunea</i>)	WDNR	Washington Department of Natural Resources
GAS	Green Alder Sawfly (<i>Monsoma pulveratum</i>)	WFIWC	Western Forest Insect Work Conference
GM	Gypsy Moth (<i>Lymantria dispar</i>)	WHL	Western Hemlock Looper (<i>Lambdina fuscicollis lugubrosa</i>)
IDL	Idaho Department of Lands	WSB	Western Spruce Budworm (<i>Choristoneura occidentalis</i>)
LAT	Large Aspen Tortrix (<i>Choristoneura conflictana</i>)	WSDA	Washington State Department of Agriculture