

Western North American Defoliator Working Group
December 9 – 10, 2008,
Bozeman, MT

Attending: Iral Ragenovich, Lee Pederson, Terry Rogers, Kjerstin Skov, Lia Spiegel, Lorraine MacLauchlan, Laura Moffitt, Glenn Kohler, Amy Gannon, Tom Eckberg, Beth Willhite, Kathy Sheehan, Nancy Sturdevant, Beverly Bulaon, Tom Hutchinson (Alberta), Sheryl Costello

Report and Action Items from 2007

- Database—saved for Wed.
- Pesticide application—aerial application expertise raised at Director’s meeting 1½ years ago; since Jesus Cota retired from the WO things are kind of up in the air; the Northeast Area might hold their own training since Washington isn’t acting, but then this training was cancelled. Now we might need to send a letter to the Directors to reiterate the need for training and maybe to emphasize that this issue requires input from the West (not just the East). NFS may not be happy with the training we provide and may be considering taking over the training themselves (hearsay from R3 pesticide coordinator). Do we spray enough to need this training? If we use full-service contracts then we only need involvement for safety and calibration? Terry is going to hand out a DFTM report that includes some notes on the full-service contracting (may link it to the WNADWG website). R3 ended up doing a lot of work on the NEPA b/c they didn’t have anyone down there who could do it and that was the biggest part of their project. Iral mentioned that FS Manual is being revised to clarify that aerial application of virus, Bt, or the use of pheromones is NOT a chemical application that requires an EIS; has been a problem in Region 6, especially with the aerial application of pheromones. NEW ACTION: send a letter to the Directors regarding need for aerial application training (Iral).
- WSBW trap/defoliation paper from Chris Niwa—retired, but emeritus and not planning to publish this; we might lobby for the draft and work with it ourselves to publish it so it can be cited. It is really a set of guidelines (trapping to monitor and predict the subsequent years’ populations) but we don’t know if there is data collected to support it, or if the data needs to be analyzed, etc. It is PNW data and they will probably want to be involved. We want to know what has been done, what will it actually tell us, whether we can make this a publication, etc. ACTION: Iral will follow up on this.
- WSBW in hemlock paper from Carol Randall—lost in the shuffle, Lee will ask her again for next year
- Adelgid collection from spruce for identification—they are on the Nez Perce per Dave Beckman so Laura Moffitt is going to hand this off to Lee Pederson and Dave might help with collection.

- DFTM pheromone mating disruption and elution report—progress report in 2009 for progress report (Iral to do)
- WSBW plots in thinned and unthinned stands in Montana—Nancy passed around a summary in the form of a trip report and will talk more about this tomorrow. There has been mortality attributed to WSBW as well as to WSBW + DFB, in both cases trees were more than 90% defoliated. Defoliation and mortality lower in thinned stands even though the thinning was done during the outbreak. (Lorraine also has a paper out? And more on the way that is looking at spacing and thinning with WSBW and she recently reviewed a paper from someone else that will be coming out soon.) Iral suggested that it might be time to pull together all the thinned/unthinned studies in WSBW and see if we have any actual conclusions. Lorraine suggested we funnel all the little unpublished reports into one place and see if this can be done. Beth suggested meta-analysis. Lia mentioned that Forest Health Monitoring might be able to fund an analyst who can do this if we put in a proposal. For 2009, Nancy will compile a list of projects done and those who have done them. Terry has some reports that he brought and we can get electronic copies.
- WSBW trend plot report from Bruce Hostetler—not done, still working on it, Beth said the data is collected and some has been used on the WSBW model for top kill and damage. He had some plots that had high mortality, Bruce will have to find time to finish it and we can encourage him; Kjerstin volunteered to assist if Bruce wants some help; Beth will let him know. Also may need to decide what to do with all these long-term plots, especially if WSBW is moving back into them, Lia might be able to go back to a subset of these plots, at least if she can get more information on them. At least do a maintenance visit to check the tags and so forth. Lots of discussion on other plots from days of yore that could be revisited in other Regions too. Also might be interesting to see the effects of WSBW on trees infested with the balsam woolly adelgid (Beth saw sites that had this).
- Aspen Decline Project—talk about it on Wednesday
- Remeasure WSBW thinning plots in NM, CanUSA Plots—not going to happen. Sandoval unavailable, and the old 1980's disks and data could not be located and most likely are unreadable. Were demonstration areas, not controlled plots (one control area). There has since been a seed tree cut in the control plot. Also the PIPO planted in this area was off-site and did not do well. The Forest did not follow up on these treatments and they have reverted back to their original condition. Terry has found some old reports but not all. Bottom line, these plots are not worth revisiting.
- WSBW pamphlet from Darren Blackford—done and posted on website
- DFTM pamphlet from Pederson/Blackford—almost done and will be printed and posted soon
- DFTM FIDL—almost has a draft available and Lee is going to make this a priority in the next year. Kathy mentioned that R6 can handle all the layout, printing and mailing for such things (small cost to regions).
- WSBW “how to trap” pamphlet—similar to the Niwa draft, WA DNR put together something similar too. (Glenn has electronic copies...I'll get them) Beth asked if the traps are really that useful...can we get similar information from

- Aerial Detection Survey. Lia says that it has been useful to catch growing populations before defoliation is visible from aerial survey, like early detection. This item is going to be merged with the guidelines from Niwa above.
- DFTM report (Kings Canyon)—they are still cutting trees there and dealing with hazard trees. Bev wants to revisit at the ten year anniversary and maybe get some photos and data then on DFTM impacts. Put this on the list for 2010.
 - Historical trends with ADS overlays in regional reports—no one knew what this was about. Now that we have all this digital information, what good can we do with it? What kinds of historical trends can we measure or show? Show forest planners what has happened over time. No conclusions...we all think it's nice.
 - Defoliator FIDLs—just asking if there is anything new out. Lorraine passed out some pamphlets from BC. Sheryl has an internal pub about Colorado/Wyoming technical report on history and so forth about DFTM. She will send it to Kathy to post on the WNADWG website. Western Tent Caterpillar FIDL is out and they will be distributed soon—we should contact our state cooperators to get their requests.

New Business

- Forest Insects and Diseases of Hardwoods Guide—Region 6 coordinating and would like folks to sign up to help write this guide; there are now coordinators of different groups. Lia is the coordinator of the defoliators part. We are exploring the option of expanding to a bigger geographical region with Regions 1 and 4 and maybe northern California. Passed out an example of what kind of writing we would be doing. Focusing on native tree species (exception might be black locust, naturalized exotics, or VERY significant invasives). List of trees included in the spreadsheet. Combining groups of insects (like the aphids). Maybe contact B.C. and Alberta to participate.
- See action items list...

Regional Reports (see regional report handouts for more details)

- Region 1
 - Montana USFS—2008 data not available yet but expecting the numbers to increase and even double for WSBW (intensity and extent), mostly on the east side forests (Nancy)
 - Northern Idaho USFS—DFTM outbreak from the late 1990's to early 2000's has dropped off and stayed low, nursery in Cd'A just did some spraying of sentinel trees for DFTM, not as much WSBW on the hemlock and less on DF, most of the WSBW is east of Cd'A and north to Lake Pend Oreille and it is all either light or heavy, Lee showed pictures of four different budworm species (or at least morphotypes) that were found in one location, BWA plots still underway

- Montana State—similar larch phenomenon as Idaho of frost damage around a 4500' elevation. BWA found on a FIA plot supposedly but the exact location is a secret so Amy is still trying to find a confirmed sample. Pine tussock moth outbreak from last year or the year before could not be found this year (near Ekalaka) but trees around Columbus, MT are hammered, there is also an outbreak in Roundup, MT.
- Idaho State—DFTM defoliation still down but trap catches starting to rise. Most of the WSBW seems to be on federal land. More areas with BWA around the St. Joe area, BWA plots that Ladd and Dave put out were on IDL land and mostly got whacked. European gypsy moth heterozygous for Asian genes found by Hayden and two more found near Boise. No larch casebearer reports on state/private for 2008 but widespread reports of damage where there is larch and into eastern WA—Tom found a big temperature drop in June that may be responsible. Sawfly in PIPO near Lake Cd'A that Tom collected and would like to ID.
- Region 2—DFTM around 1,800 acres in 2008 which is an increase west of Colorado Springs and trap catches decreased from 2007. WSBW throughout Colorado but mostly chronic populations in southern Colorado in the San Juans and Sangre de Christos. Decrease overall in acres with WSBW defoliation in R2 though. Some light WSBW defoliation in WY. Tent caterpillar in Sangre de Christos is declining and the 2008 acres have dropped significantly. Sheryl showed great pictures of refoliation after tent caterpillar. Spraying for tent caterpillar in Telluride seemed to be effective. See report...
- Region 3
 - New Mexico. WSBW decreased in 2008 but is still around 360,000 acres, mostly in the northern part of the state but also some east of Alamogordo. Pinyon needles scale went from 33,000 to about 5,000 acres. DFTM small outbreaks from last year did not show up on aerial survey this year (one infestation was suppressed). *Nepytia janetae* decreased to almost 5,000 acres, east of Alamogordo. Decreases in needles cast mapped too. Aspen defoliation in north central NM and a little west of Albuquerque. Pinyon needle scale southwest of Albuquerque.
 - Arizona. And unknown defoliator on 16,000 acres in treetops of white fir and Douglas-fir trees in 2008. WSBW decreased from almost 8,000 to just over 2,000. Looper (*Enypia griseata*) in White Mountains increased dramatically in 2008. Aspen defoliation increased a lot too, mostly on the Kaibab and in east central AZ. No DFTM or sawfly defoliation recorded. Almost 2,000 acres of drought mortality reported.
- Region 4 (I was talking so I didn't type. See handout. ☺)
- Region 5—Gypsy Moth is the most exciting thing—seven caught in Ventura County in Ojai, CA near a parked trailer from Michigan and found many egg masses on local oak and fencepost. They are going to do more trapping and quarantine and will spray with Bt in 2009. Also caught around some ports in southern CA. Oakleaf miner of unknown species in black oak defoliation levels but not acres increased around Placer, CA. White fir sawfly defoliated about 1000 acres in northern CA, near Eagle Lake. CA tortoiseshell butterfly on 600

acres of *Ceanothus* in northern CA almost completely defoliated. DFTM has decreased to zero acres in 2008 (7,400 acres in 2007 on the Shasta-Trinity). Jeffrey Pine needleminer on five acres of private land by Lake Tahoe. Lodgepole needleminer has been in Yosemite since the early 1990's (no data for 2008 but expecting to see more). Light brown apple moth was found in 2007 by Berkeley and now has been found in 12 counties (mostly in Santa Cruz and Monterey counties). 12,000 moths have been trapped as of November. They have found larval and pupal stages in nurseries/greenhouses and have a quarantine. Been very difficult to treat because of false information on internet and in media despite the great threat to the agricultural industry (as well as native tree including coastal redwood), though they have been doing some.

- Region 6
 - OR—All defoliation acres decreased from 317,000 to 195,000 but visible signature was delayed by weather conditions so the actual 2008 acres may be higher. WSBW in eastern OR are still high but full effects did not show up on aerial survey. BWA decreased in 2008 (to 123,000 acres) throughout Cascades and in NE OR. Larch casebearer also decreased from 82,000 to 55,000 acres and is scattered throughout northern OR (east, west and central). Satin moth on 3,000 acres in aspen in SE OR though not much mortality. Black pineleaf scale increasing to 1,400 acres in NE and north central OR and associated with spraying at nearby orchards or for mosquitoes in nearby WUI. Hemlock sawfly on 170 acres in western OR. Spruce aphid on 170 in Tillamook, Coos and Curry counties. DFTM on 100 acres on Wallowa-Whitman is first aerial detection since 2003. Pandora moth has collapsed and no defoliation observed in 2008. Gypsy moth trapping statewide had 12 captures in 2008 for NAGM, by Eugene and Portland. No more gypsy moth found in the three recent eradication sites in Bend, St. Helens (Asian strain), and Shady Cove.
 - WA State—BWA activity in the Blue Mts. didn't make it onto the map that he handed out. WSBW in eastern and south central WA. Acres increased in 2008 (see Glenn's submission to the notes). Two new outbreaks of DFTM in far north central WA and trap catches have increased in Okanogon County. Light brown apple moth traps around nurseries that might receive stock from CA and did not catch anything. About 24,000 Gypsy moth traps caught 21 NAGM, mostly in western WA. No eradication conducted in 2008 or planned for 2009. About 500 acres of western hemlock looper defoliation, mostly on western slope of Mt. Baker (there since at least 2006). 62,000 acres or so of larch casebearer complex, mostly in eastern WA. BWA observed on 33,000 acres in 2008 (down from 59,000), mostly on Olympic Peninsula, in Blue Mt.s and in Cascades. Black pine needle scale near some orchards but only 90 acres. Some PIPO needle miner in low elevation PIPOs near Wenatchee, but didn't get picked up by aerial survey.
- British Columbia—Most of the defoliation is in the south. WSBW on 783,000 Ha in south central BC (some in stands with DFTM) but this number may be low due to weather effects on mapping. Outbreaks of WSBW seem to have longer

duration and shorter intervals between outbreaks. Substantial DFB outbreaks in WSBW defoliation are hard to detect without foliage. Been treating about 40-60 thousand Ha every years since about 2001. 2-year cycle budworm on almost 57,000 Ha. Western hemlock looper on almost 900 Ha. Trapping in the Revelstoke drainage hasn't collected too many moths, but traps in the North Thompson area have huge increases in catches in 2008. DFTM on 2,597 Ha and is possibly in year one of a four-year outbreak cycle so expect and increase. It is a big issue for recreation and habitation and so treatment with virus has already started. Also don't want to loose DF since so many pines have been killed. Outbreak is late based on historical periodicity and the trap catches from the last few years have been unusual. Western blackheaded budworm on 185 Ha. Large aspen tortrix on almost 100,000 Ha in the north. Aspen serpentine leaf miner on more than 16,000 Ha. FTC on over 10,000 Ha, mostly in southern part of the province. Birch leafminer on 738 Ha.

- Alberta—SBW mostly in northeastern Alberta in 2007. More in 2008 plus in the NW. More than 160,000 Ha of defoliation in 2008 and more of it is severe defoliation. Expecting more again in 2009 based on trap catches, especially in the NE. WSBW defoliation in SW Alberta is starting to kill Douglas-fir. Aspen defoliation by caused primarily by Forest Tent Caterpillar (with some ares of tortrix and Bruce Spanworm) is mostly in the NE and SW parts of province. Affected acres have decreased to about 3,000,000 Ha! No suppression projects planned (or conducted in many years). GREAT photos of defoliation and caterpillars. We've been doing FTC egg mass surveys over the winter and we expect FTC caused defoliation to decrease significantly in 2009.

Gypsy Moth Activity in the West

- APHIS in R3 wants us to replace our gypsy moth traps mid-season because they think the pheromone isn't lasting. R3 puts them out at Memorial Day and the thinking is that the pheromone runs out by July, especially in the Southwest. They usually pick them up in October. State cooperators are not happy about this extra work.
- B.C. is probably going to spray next year in Harrison (east of Vancouver).
- International activities—see Steve Munson's report in the Region 4 report

Douglas-fir Tussock Moth in the West

- Early Warning System—R6 DFTM EWS shows continuing periodicity of populations, even if there isn't an outbreak. Overall decline in OR in 2008, but some Forest populations are increasing and others are decreasing. It is typical, that as the populations increase to higher levels, the trap catches decrease.
- Effectiveness and Elution Rates of Biodegradable Flake Formulation for Mating Disruption—Z-6-heneicosen-11-one is the pheromone for the DFTM. Want to release a consistent amount of pheromone for a 60-day period. The currently

registered formulation is a plastic laminate flake. 2001 test was inconclusive partly because some populations collapsed due to virus and others were on private land that was treated during the study. Want to try again and try different application methods and release rates. Used Hercon Bioflakes and laminated flakes, and SPLAT in elution rate tests in Flagstaff, AZ and near Bend, OR. All of the cards have been collected but the GLC analysis work still needs to be done. Oven tests conducted by Hercon at 30, 35, and 40 degrees C show very little elution, although the pheromone did elute faster at the higher temperatures. Hercon is working to improve this. In a separate small side study, we evaluated the effectiveness of MicrTac and MicroTac II (organic formulation of the sticker used to hold the flakes to the needles. In the field, the MicroTac II only held the bioflakes on the screens for only about a week. The laminated flakes lasted about 14 days, but after 14 days almost all flakes were off of the screens. Proposals has been submitted to STDP and SERG-I for funding to conduct mating disruption trials in the field.

- Goose Lake Colony—We have an agreement with NE Station to maintain the colony; John Podgwaite is in charge. Most of the colony has now been moved from the Pacific Forestry Centre to the NE Station. Amount of virus available is decreasing due to use and loss of virulence related to shelf life. (Canada has already almost run out of their stores of virus.)
- Low dose virus treatment—testing to compare stored vs. newly produced Virtuss, Virtuss vs. TM Biocontrol-1, alternate swath applications, and a 2/3 dose. Trials went from 1991-1993, though populations were naturally declining. Full dose Biocontrol and Virtuss reduced populations to endemic. Alternate swath application appeared to be as effective as full coverage in number of larvae found in treatments but it took a little longer to produce results. 2/3 dosage rate of both viruses were as effective but took longer to take effect (though it was tested during final part of the outbreak). Used alternate swath treatment operationally this summer and it worked fine.
- There is a database for the DFTM Early Warning System maintained by R6 where you can enter data you've collected and view long term trends at different geographic scales and make cool graphs, etc. Send more data to Kathy Sheehan! ☺ You can download the database and use it yourself too.
- DFTM in SW has longer periodicity (maybe 20 years), outbreaks are over faster, and there is no naturally occurring virus there (based on soil tests and moth tests)

Other Defoliators

- Balsam Woolly Adelgid in Eastern R6—killing a lot of SAF in the Blue Mountains and may be moving east. Used a BWA Rating system based on the mistletoe rating system on permanent plots. Correlation between gouting severity (number of nodes with gouting) and BWA rating. Percent of SAF alive may be lowest at mid-elevations compared to high and low elevations. Observed that weather conditions may be important to BWA such that it behaves like a disease.

- Some discussion on where BWA has spread in the last 5-8 years, whether it may be more common in riparian areas in ID and the Cascades but not the Blue Mts., how it may be in the tops of Grand Fir but not near the ground or on the bole so it may be in a place and we haven't noticed it. In the Willamette Valley, BWA is reducing GF reproduction and, therefore, causing loss of GF. You may see more mortality when BWA first comes into an area because it takes out most susceptible trees, and after that it is more chronic and kills trees slowly. Cd'A will be looking at relationships with root disease in future and considering watershed, riparian area, and climate issues with BWA in SAF. It would be good to know more about long-term impacts and how slowly impacts are seen in Regions (permanent plots important).
- *Nepytia spp*—boom and bust insect that does its feeding in the winter. Sprayed Foray in a buffer around Cloudcroft, NM in November 2007. Population in adjacent, untreated area collapsed to endemic levels after the spray so the same may have happened in the treatment area; mostly a political/PR success. In AZ, defoliation in spruce trees has caused increased mortality due to the spruce beetle.

Defoliator Literature Database

- To be combined with the bark beetle database efforts to be a insect information clearinghouse?
- We're going to focus on the gray literature that is deteriorating and difficult to access. Issues of firewalls and costs of cataloging have been a challenge but a pilot project was planned in cooperation with the Forest Service Library and FHTET.
- Fire borrowing caused this pilot project to be postponed and now it is losing some support from FHTET, or possibly being absorbed into a much bigger effort.
- Research is putting their station publications into Treesearch and maybe we can partner with them.
- R3 has already made some good progress with this—contact Dan Ryerson. Terry will send a cd of scanned documents to Beth.
- MT DNR tried something similar and has made some progress but it is a lot of work. Will send a bibliography to Beth.
- We should investigate the types of pdf we are producing or can produce relating to federally mandated accessibility criteria, capabilities of scanners and pdf software, searchability of documents, possible links to maps or geographic software, etc.

Forest Insect and Disease Leaflets (FIDLs)

- Kathy is the national coordinator for this effort and she gave us a handout with a list of regional contacts
- 173 active FIDLs in the USA from 238 authors

- 19 revisions and 3 new FIDLs are currently planned (DFTM and Large Aspen Tortrix for defoliators)
- New FIDL website is www.fs.fed.us/r6/nr/fid/wo-fidls/
- Refer to the website to find out what is in revision or to help with revisions
- When a FIDL is proposed the Region or Regions that want it have to sponsor it financially (printing and contracting costs) and this can be coordinated through your Regional contact person. Region 6 has offered to do the layouts for free, and to keep things fairly uniform.
- There is a distribution list where you can request printed copies (Kathy will send everyone the spreadsheet) so new FIDLs can be easily mailed by R6 at no additional cost

Western Forest Insect Book Revision

- Website is www.fs.fed.us/r6/nr/fid/wfi/index.shtml
- You can sign up to work on a section and download any section to have or work on
- Sections under revision or revised are noted and you can link to revisions
- Usually revisions should be done with Track Changes
- See Guidelines for Authors link for more information—please help!
- Some sections have already been completed or are near completion
- Couple new insects are being added
- Discussion on changes in taxonomy

Region 4 Aspen Project

- Data collected in Montana this year from this Region 4 study
- Bark beetles are having minor effects, woodborers are most important insect affecting aspen (poplar borer and bronze poplar borer), several defoliators have minor effects, some aphids and mites, etc
- Some browsing and abiotic (frost) damage in aspen
- Region 2 are finding lots of aspen mortality—overmature stands with resprouting in the north and dying stands without regeneration in the Gunnison area, aspen bark beetles are commonly found in CO

Budworm Activity in the West

- Systemic insecticide trials—Tom Eckberg handed out a copy of his powerpoint. Trials of a couple delivery systems of insecticide in 2006 and 2008. Active ingredients are imidacloprid, acephate, and emamectin benzoate that are injected under the bark. Number of drill sites for injection depends on the circumference of the tree. 2006 test was five treated and five untreated trees and observed an

- 80% reduction in defoliation (per Fettig method) but this was not a statistical comparison. 2008 study had three host species (GF, DF, and SAF) and 120 trees. One challenge was applying injections when tree is transpiring enough to take up all the material—may require more than one injection, so the tree can take up enough chemical. Evaluating these in future...
- 2007 test of injections for larch casebearer on orchard trees in Cd'A. Had ten treated and ten untreated trees. The wedge injection does not require drilling tree and there was some leaking. Significant reduction in number of larch casebearer per larch rosette but it wasn't a large reduction. Jeff isn't quite ready to recommend this method because of leaking with injection method.
 - Update on management/mortality/strategy for WSBW—Objectives: 1) review strategies and tactics used, 2) summarize current knowledge (particularly options available to USFS), 3) convene a workshop to review and critique the summary and research needs, and 4) develop public information tools. Fourteen people from FHP, USFS research, Canada, States, and one tribe volunteered to help. Current status: Kathy has cataloged 98 suppression projects from 1970 to the present and has started cataloging silvicultural treatments. There is a website: www.fs.fed.us/r6/nr/fid/budworm. Kathy hopes to convene a committee to start working on this soon. Anyone with treatment reports or literature should send any references to Kathy to help with the cataloging and collection of pertinent information (you can check the website to see if she already has it).
 - Nancy handed out an FHP report entitled "Establishment Report: Permanent Plots to Monitor Douglas-fir Mortality Due to Western Spruce Budworm and Douglas-fir Beetle Interactions". More trees with 50% or more defoliation by WSBW were attacked by DFB. 8% of trees killed by defoliators alone. 68% of trees in stand killed by WSBW or DFB. DFB has since spread into surrounding areas. This was done in DF stands with heavy defoliation. They are still following up on this.
 - Nancy will send some pictures and information about the thinning study in DF with WSBW and DFB to the meeting notes.
 - OR, WA, and ID have started installing permanent longterm monitoring plots to evaluate impacts of BWA on true fir.

Summary of Aerial Application Expertise Questionnaire

- Survey two years ago about expertise in the west
- Responses from 36 people around the west except Regions 3 and 5
- Will mail results to add to the minutes but found that most of respondents had little to no experience and 66% of those that had lots of experience were verging on retirement
- A third of those with experience last worked on a project around ten years ago
- We are losing lots of expertise, and need address this.

Other

- Entomology job opening in Flagstaff soon.
- Jeff Fidgen is leaving IDL and going up to Canada (Sault St. Marie) to work with Peter DeGroot on invasives
- Bruce Hostettler is retiring in 2010 (January?)
- Albuquerque is in the process of putting all old reports on cds
- Lorraine will send some links to new publications and a new website coming out very soon
- Reminder that WNADWG has a cool website:
<http://www.fs.fed.us/r6/nr/fid/pubsweb/westdef.shtml>
- Next meeting is about the same time next year in Portland



Balsam Woolly Adelgid
East of the Cascades
in the Pacific Northwest



Lia Spiegel, US Forest Service
La Grande, Oregon

Balsam Woolly Adelgid

- 1900, in New England, from Europe
- 1928 San Francisco
- 1970's throughout Coast and Cascade Ranges, in OR, WA, BC
- 1974 East of Cascades
- 1983 Idaho



The Balsam Woolly Adelgid is a small, aphid-like sucking insect that infests only true firs. Originally from Europe, it is now established on the east and west coasts and has come as far inland as Idaho. I believe more western Abies forests could see this invasive in the future.

1970
Abies
And
BWA
Distribution

Greenbank 1970

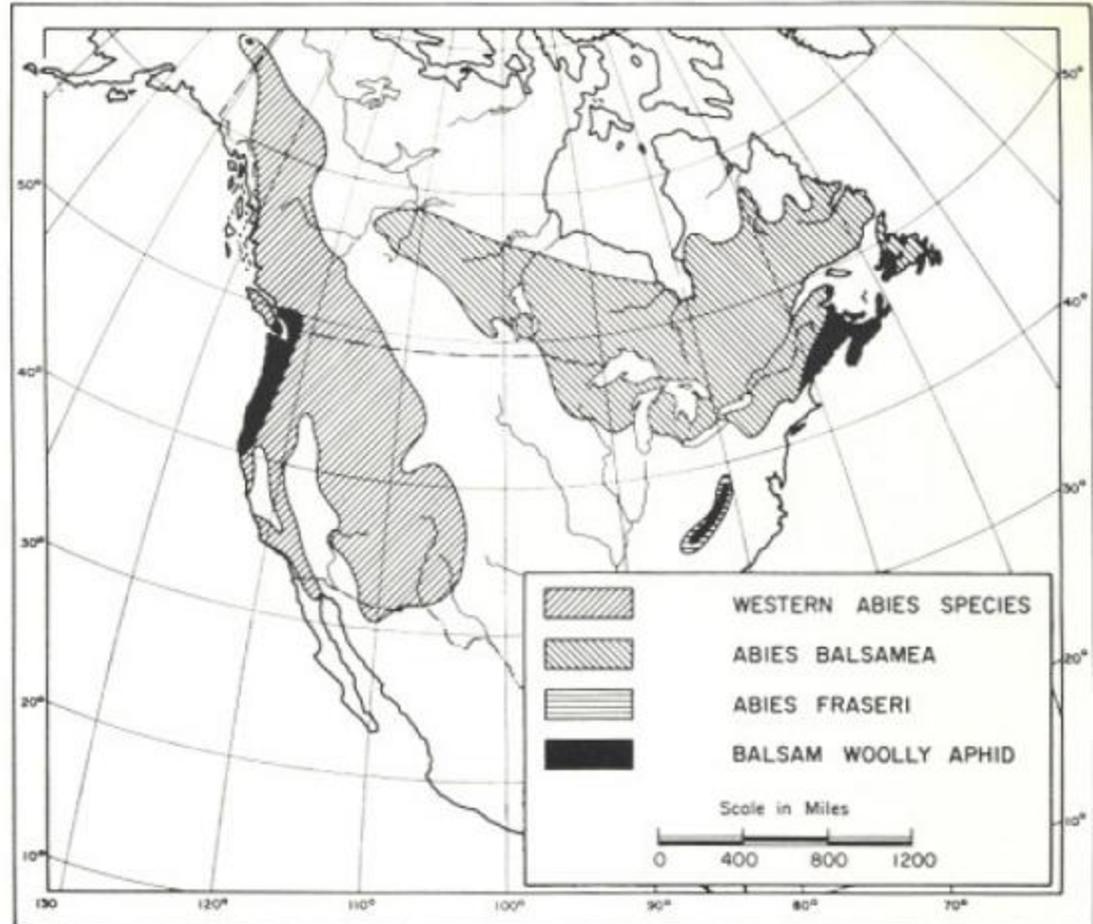


FIG. 1. Distributions of *Abies* spp. and the balsam woolly aphid in North America.

The documented distribution of BWA in the 1960's – note it is restricted in the west to the west coast.

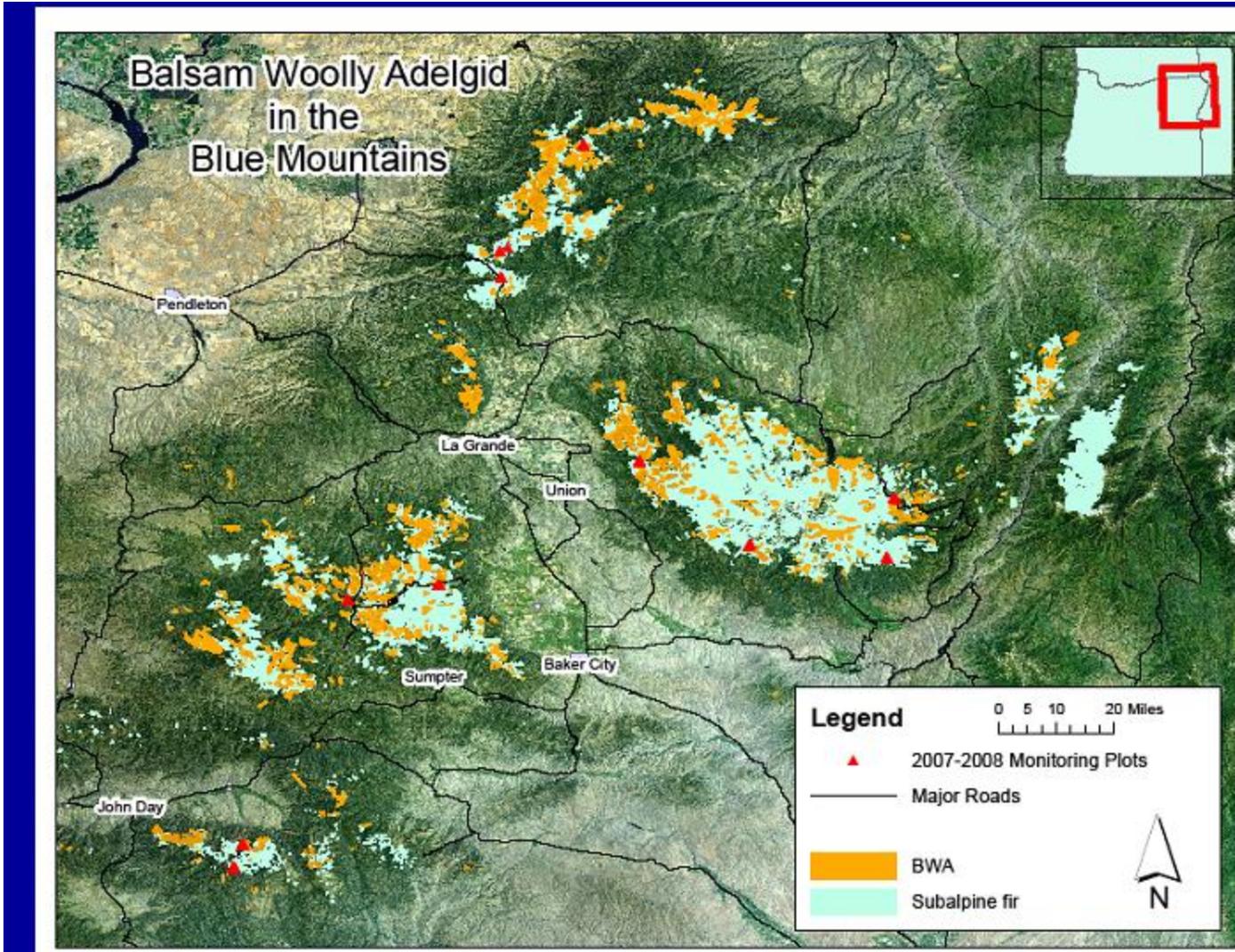
BWA Distribution 2006



Range of balsam woolly adelgid infestation in North America

BWA FIDL 2006

BWA has advanced a little further west in the northeast, into NY State.
And is also now documented in NE Oregon/SE Washington, and N Idaho.



This map shows the estimated distribution of subalpine fir in NE Oregon, with aerial detection survey flights of BWA damage from 1999-2008 overlaid in orange. The red triangles are the locations of my monitoring plots.

Adelgid Measures

- Crown ratio
- Bole infestation
- Branch gouting
- BWR rating



FHM grant to look at extent and severity of BWA in Oregon and Washington.

Decided on 4 measures to get at severity.

Crown ratio – impact to crown

Bole counts

Branch gouts – one symptom that may show severity in the number of nodes with gouting. Nodes can swell year after year with successive attacks, some trees have only a few nodes swollen, some have more than 12.

BWR rating – to better quantify crown effects, due to the uneven effect on the crowns

BWR Rating

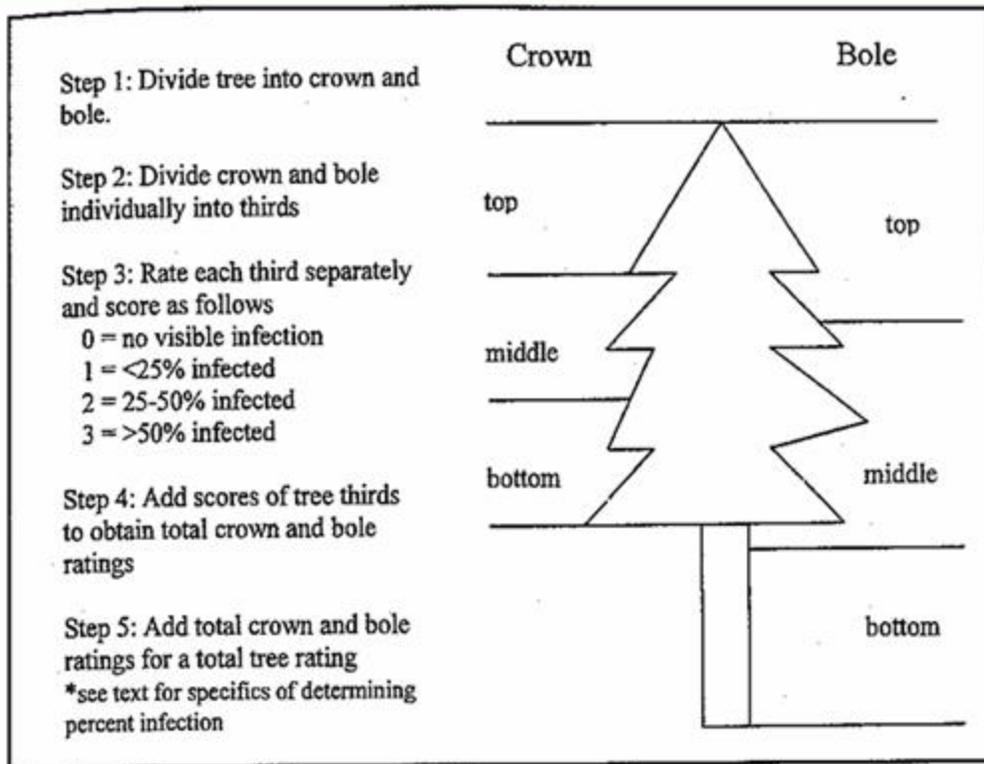


Figure 1. The white pine blister rapid infection severity rating system for white bark pine.

2005, D. Six and M. Newcomb, Northwest Science, 79(2-3):189-

We used the Crown part of this rating adapted by Diana Six. We added one more level of infection, 4 = crown third dead, and rather than just % crown third **infected**, we included **affected and dead**. So that if 30% of a crown third was dead, it received a 2 rating. This assumes that crown effects are attributable to BWA.

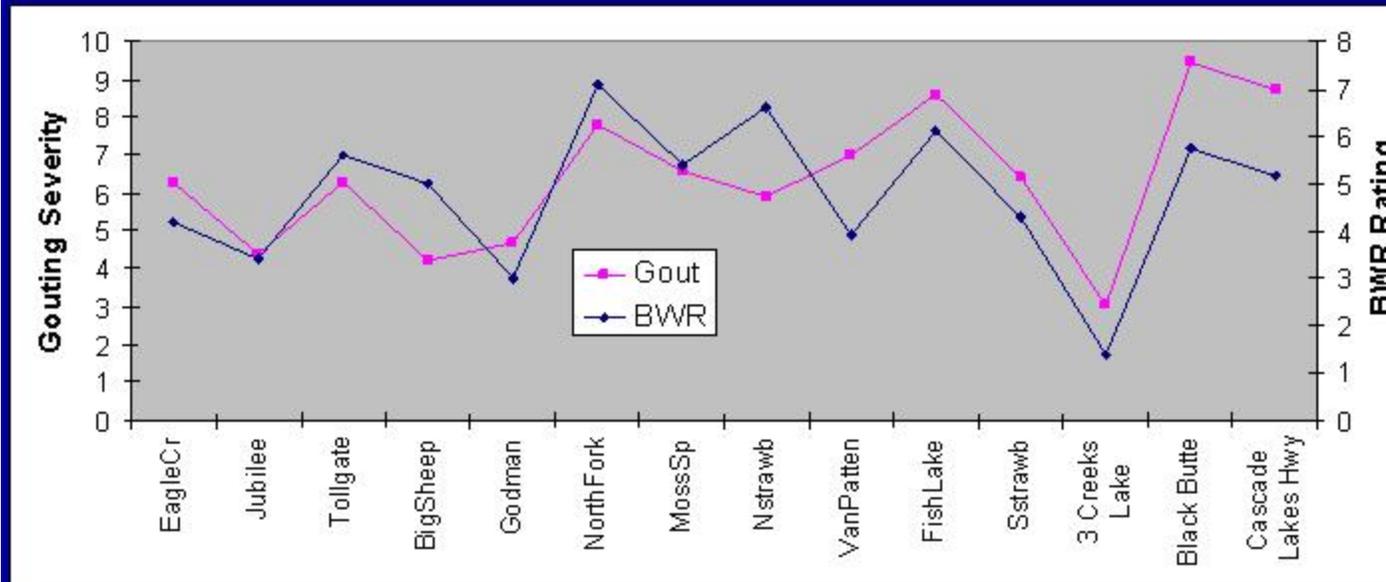


BWR

- The most difficult measure we used
- Categories broad enough to get consistent results across crew members

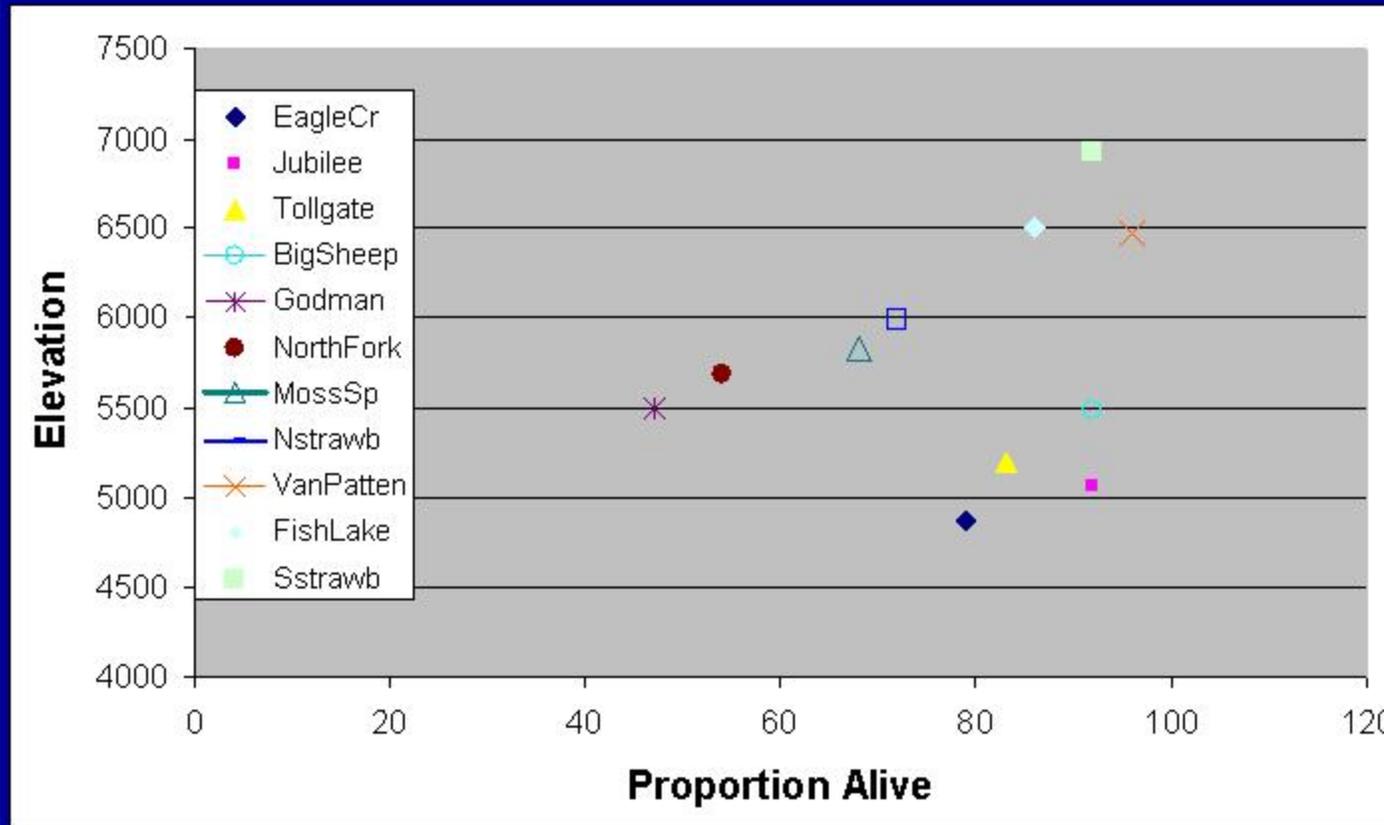
We wanted to document how the subalpine trees were faring and hope to remeasure and compare in 5-10 years. This rating should be robust enough to pick up changes.

Correlation between BWA Measures



Of the Four damage measures we took, crown ratio, bole infestation, gouting severity and BWR, Gouting and BWR seem to be the best. Crown ratio is influenced by many other factors than BWA, and that probably explains its lack of a relationship with the other measures. Some reports have documented that thin stands with full crowns have more damage, possibly because of the protective from weather needles might offer to this insect.

Living Subalpine Fir by Elevation



The mid-elevation plots (Godman, NorthFork, Moss Springs, and N Strawb) had the highest mortality to trees greater than 1" dbh. However, Godman, with the lowest survival, was at the same elevation as BigSheep, which had pretty high survival. Not a strong effect. The only preliminary data available so far.

WNADWG – Oregon Defoliator Conditions for 2008

Prepared by Rob Flowers, Oregon Department of Forestry

Summary:

In 2008, there were 195,000 ac of defoliation detected by aerial survey in Oregon, a decline from the 317,000 ac mapped in 2007. However, it appears that defoliator and damage signature development were delayed in many areas this year due to a combination of high residual snowfall and below average summer temperatures. Ground surveys indicated a much greater degree of defoliation for some agents than was observed during aerial surveys. The majority of defoliation this year was attributable to Western spruce budworm, larch casebearer, and balsam woolly adelgid. Low levels of defoliation were also attributed to satin moth, hemlock sawfly, black pineleaf scale, spruce aphid, and Douglas-fir tussock moth. Preliminary results for trap captures of Douglas-fir tussock moth were highly variable, but suggest an overall statewide decline, while a total of 12 gypsy moths were captured in Oregon in this year.

Major agents in 2008:

Western Spruce Budworm, *Choristoneura occidentalis*

Western spruce budworm defoliation was detected on 10,000 ac in 2008, a significant decline from the 96,000 ac observed in 2007. However, this was likely related to delayed signature development as follow-up ground surveys indicated light to moderate defoliation in many of the areas affected the previous year. The damage appears to be primarily limited to areas of the Ochoco and Malheur NFs in northeast Oregon.

Balsam Woolly Adelgid, *Adelges piceae*

Damage by balsam woolly adelgid (BWA) was detected on over 123,000 ac in 2008, similar to the 132,000 ac detected in 2007. Tree decline and mortality continues to be most apparent in stands of subalpine fir. Scattered damage is occurring in the Cascades from Mt. Hood NF south to Rogue River NF, while intense and widespread damage has been seen on the Wallowa-Whitman, Umatilla, and Malheur NFs as well as in Hells Canyon NRA. An “evaluation monitoring” project is ongoing to evaluate stand decline, tree mortality and regeneration in some infested areas.

Larch Casebearer, *Coleophora laricella*

Larch casebearer damage has been observed in northeast Oregon since 1999. In 2008, over 55,000 ac of light defoliation was detected, down from 82,000 acres in 2007. Similar to budworm, declines this year appear to be more attributable to late signature development than reduced occurrence. Damage was most apparent on the Mt. Hood and Umatilla NFs this year, as well as adjacent private lands. Ground surveys indicate that damage from casebearer activity and associated foliar diseases continues to occur in many areas of the Wallowa-Whitman NF as well.

Minor agents in 2008:

Satin Moth, *Leucoma salicis*

The satin moth is a non-native defoliator of poplars that has periodic, localized outbreaks in Oregon. Defoliation was estimated at over 3,000 ac in 2008, a significant increase from the 250 ac detected in 2007. Damage is commonly observed in isolated aspen stands on BLM and private lands in southcentral Oregon, but was also detected this year in areas of the Umatilla and Wallowa-Whitman NFs in northeast OR. Ground surveys confirmed the presence of satin moth in some areas, which appear to be the primary damaging agent.

Black pine leaf scale, *Nuculaspis californica*

Defoliation due to black pine leaf scale was detected on over 1,400 ac in 2008, up from 1,200 ac in 2007. Damage is often associated with activities that disrupt natural enemies, particularly scale parasitoids. Private lands in the Hood River Valley that are subject to periodic spray drift from surrounding orchards have been seeing mortality in both ponderosa pine and Douglas-fir, a secondary host. New detections in wildland-urban interface areas of Central Oregon were also seen this year and appear to be associated with fogging applications for mosquito control.

Hemlock Sawfly, *Neodiprion tsugae*

Approximately 170 ac of defoliation due to hemlock sawfly was observed in 2008, the first detection since 1998. Damage was restricted to mature western hemlock East of Springfield on BLM land. While localized defoliation was severe, the outbreak appears to have collapsed with little to no tree mortality. The black-headed budworm (*Acleris gloverana*), which is often found in association with hemlock sawfly, was not observed in these areas.

Spruce Aphid, *Elatobium abietium*

In 2008, spruce aphid accounted for 170 ac of damage to Sitka spruce along the Oregon coast. Scattered damage was observed in Tillamook, Coos & Curry Counties. Damage was similar to that detected in 2006 and 2007, and significantly less than outbreak levels in 2005.

Douglas-Fir Tussock Moth, *Orygia pseudotsugata*

Defoliation by Douglas-fir tussock moth was observed (and confirmed by ground surveys) on over 100 ac in 2008, representing the first aerial detection of damage since 2003, when the last outbreak collapsed. Damage was observed in two areas of the Wallowa-Whitman NF, one of which is in close proximity to areas with high trap captures and egg mass detections in 2007.

Pandora Moth, *Coloradia pandora*

Defoliation from Pandora moth, which occurs during periodic outbreaks, is detectable every other year due to their two-year lifecycle and synchronized lifestages. The most recent outbreak in central Oregon, which peaked in 2004 at over 80,000 ac, appear to have collapsed as no defoliation was observed this year.

Pheromone Trapping:**Douglas-Fir Tussock Moth, *Orygia pseudotsugata***

Preliminary assessments suggest a statewide decline in Douglas-fir tussock moth trap captures for 2008. While slight increases were observed on the Mount Hood and Umatilla NFs, declines were seen on the Deschutes, Ochoco, Malheur, and Fremont-Winema NFs. Evaluations for the Wallowa-Whitman NF, which have had some of the highest average captures for Oregon in recent years, as well as detectable egg masses, are ongoing.

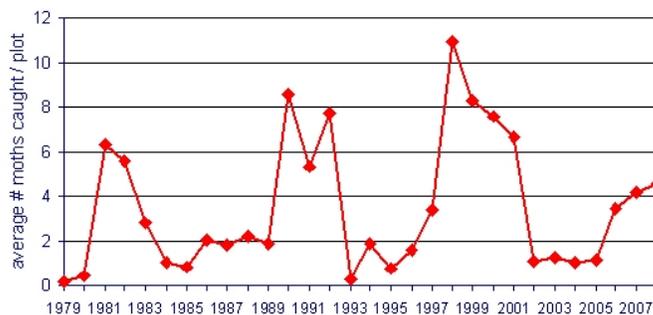
Gypsy Moth, *Lymantria dispar*

Approximately 18,000 traps were placed in 2008, which captured a total of 12 gypsy moths at one old and four new sites. All were determined to be the North American strain. Seven moths were captured in the city of Eugene, while 2 additional moths were captured three miles southwest of that site. Previous captures near this site in 2007 indicate a breeding population may be present. Three additional moths were detected at sites in NE and NW Portland. Delimitation trapping will be conducted in 2009 around positive sites. No additional moths have been found at the three most recent eradication sites in Bend, St. Helens, and Shady Cove.

Douglas-fir Tussock Moth

Status of DFTM in R6:

The Early warning system in R6 consists of about 300 plots throughout eastern Washington and Oregon. Preliminary results indicate that DFTM is increasing in WA and OR. Long term (almost 30 years of) trapping trends show the cyclic nature of DFTM. In some areas, even though the population may not break threshold and go to outbreak, the traps still indicate the cyclic nature of the population.



Maintenance of the Goose Lake Colony:

The Goose Lake-1 DFTM colony is the colony used for the production of the NPV virus for TM-BioControl-1. Since the Virus Production Facility was closed in 1995, the colony has been maintained at the Canadian Forest Service, Pacific Forestry Center in Victoria, B.C. by Dr. Imre Otvos. Once Imre retires the CFS would not maintain the colony. The colony is needed for TM-Biocontrol efficacy comparison tests, and would be needed to produce more virus if necessary. Beginning in October 2007, Imre began transferring the DFTM colony to the Northern Research Station Lab in Hamden CT. to be maintained by Dr. John Podgwaite. The colony was transferred as four separate batches of eggmasses, approximately 3 months apart. This would insure that, if something happened to any one batch, that there would still be viable population. All batches have been received by the NRS.

Douglas-fir tussock Moth Mating Disruption Elution Study:

A pheromone flake loaded with DFTM pheromone, DFTM Disrupt, produce by Hercon Environmental is currently registered with EPA for use in mating disruption for DFTM. The current registered product is a small plastic laminated flake. Hercon has been working to develop a biodegradable flake for mating disruption. In a small study partly funded by SERG-I, a field elution trial was conducted to determine the elution of the pheromone from the flakes over time. The study was set up in the field in Arizona, near Flagstaff and near Bend, OR. Sites similar to field conditions where DFTM would occur were selected and a series of steel bolting cloth cards with the treatments adhered to them were put out in the field. There were three treatments – the Hercon biodegradeable flake, a new matrix formulation called “SPLAT” and the Hercon plastic laminated flake as a standard, were put in the field. Three replications of each treatment were collected each week in each location over a period of two months (60 days). GLC (Gas Liquid Chromatograph) is currently being done on the cards to determine the elution rates.

A second part of the study was to evaluate a helicopter/bucket applicator assembly for applying the flakes. The bucket was up in Canada last fall, when we were going to test it, so this part of the study still needs to be done.

An STDP proposal was submitted to do actual field evaluations of the effectiveness of the biodegradeable flakes for DFTM mating disruption in north central Washington in the summer of 2009. Iral has been working with Glenn Kohler with the Washington Department of Natural Resources (WDNR) and Connie Mehmel, FHP Wenatchee Field Office to locate potential sites for the field evaluation.

Survey for FHP and State Forest Health Specialists with Regard to Aerial Application Projects:

In early FY2007 a survey was conducted to determine the level aerial application expertise among western entomologists and to determine the amount of interest in obtaining training. The survey was sent to FHP Regions and some states.

Responses from 36 people representing 4 western state and 4 Regions.

The questions covered a number of areas of experience ranging from NEPA, contracting, aerial application characterization, to entomology and biological sampling. Folk were also asked about their level of interest in obtaining the training. The numbers represent the responses and are likely similar to those regions of states that did not respond. Since the survey a number of folks with the most expertise have retired.

Some of the questions were:

1. What level of expertise and how familiar are you with setting up and planning an aerial insecticide application project?

Level of Expertise:

38% with no expertise

14% with a little expertise

14% with moderate expertise

25% with high expertise (of those 66% were close to or already retired)

Number of Projects that you have been involved in and when? (number of projects or years of experience).

Level of involvement with:

- NEPA - 33% had project-related NEPA experience
- Project Planning (contracting, writing project work plans, safety plans, etc)
 - 50% had some to lots of experience in project planning (some had contracting experience in contracting related to other projects.
 - 15% with some experience
 - of those, 44% were close to retirement
- Project Entomology (planning, insect development, plot establishment)
55% (or 20 people) had experience with entomological sampling related to projects and project entomology of any level.
33% had experience since 2000; 16% had not worked on a project in the last 20 years; and 20% would soon retire.
- Project Implementation (aircraft calibration, type, application parameters, etc.)
38% had experience with working with aircraft and calibration – of those 64% were close to retirement.
- Project Monitoring
Same as Entomology

2. When was the last project you worked on (type and how long ago)?

Ranged from 0 (33%); to 33% who have not worked on a project in 10 to 20+ years; and 33% who had worked on a project in the last 10 years.

3. If an aerial application training session were held, would you attend/ and be willing to maintain expertise?

75% responded that they would attend training, or would, if allowed to
2 offered to help provide training.

Status of Western Forest Insects Book

The Western Forest Insects book website is:

<http://www.fs.fed.us/r6/nr/fid/wfi/index.shtml>

This is a revision of the Western Forest Insects book, not a complete; although in some cases there is a lot more information about some insects and more writing is necessary. Others will change very little. The revision is progressing. A number of folks have offered to help, but Iral will still take all of the help she can. Iral handed out examples of what some of the revisions look like. Doug has provided a small amount of funding and she has issued a few small purchase orders to retirees to help with the revision. Bill Ciesla is working on the Diprionidae and Zadiprionidae, Lasiocampidae, Choristoneura, and all of the Lymantriinae except, DFTM and GM. He is also working on some of the Dendroctonus. Skeeter Warner is working on some of the insects more specific to Alaska. Contact Iral if you wish to help, or visit the website.

Western North American Defoliator Working Group
December 9-10, 2008
REGION 2-Colorado/Wyoming/South Dakota/Kansas/Nebraska

Colorado

Douglas-fir Tussock Moth:

- Bear Creek (SW of Denver)
Aerial surveyors mapped the 1,800 acres defoliated in this area, a large increase from the 600 acres recorded in 2007. Moths are affecting Douglas-fir trees in a popular mountain biking area.
- Pike National Forest, Rampart Range (NW of Colorado Springs)
Early Warning Pheromone System: 9 trap sets caught only 15 moths. This is a large decrease from 324 moths that were caught last year.

Western Spruce Budworm:

- Rampart Range (NW of Colorado Springs)
Budworm populations mixed in with DFTM populations.
- Northern Colorado
Low populations throughout high-country on spruce.
- Rio Grand, Uncompahgre, San Juan, and San Isabel National Forests and Culebra-Sangre de Cristo Range, including the Telluride Area (Southern CO)
Wide-spread budworm outbreaks in white fir, Douglas-fir, and Engelmann spruce across southern Colorado. Fairly long-term, chronic infestations in many areas. Outbreak extends into New Mexico. Some landowners sprayed about 1,000 acres with *Bt* this year at a ranch around Laveta in the Sangre De Cristo Mtns, there's no information on results. Landowners want to spray a greater area with *Bt* but, there are no spray contractors willing to do this type of work in CO (they earn more in Ag).

Wyoming

Western Spruce Budworm:

- Medicine Bow NF (South-Central WY)
Chronic budworm populations on the east and west margins of the Snowy Mountains, with some stand mortality along the South Platte River in the west.
- Absaroka Mountains, Wind River Indian Reservation (Northern WY)
Defoliation was again visible with acreage increasing to about 1,300 acres.
- Bighorn NF (North-Central WY)
Light defoliation noted on 930 acres.

Other Defoliators:

Colorado

- San Isabel NF (near Cuchara)
Heavy defoliation by western tent caterpillar in the Sangre de Cristo/Culebra Range has subsided; populations appeared to have moved southward from the area.
- Telluride Area

- Populations of western tent caterpillar were high within the town the last two-three years. Dimilin was sprayed from the air early summer 2007, results appear to be successful. In 2008 only a few spots were detected with large numbers of caterpillars, these were sprayed from the ground with Dimilin.
- Front Range from Colorado Springs to Fort Collins
Ponderosa pine needleminer (probably *Coleotechnites ponderosae*) affecting ponderosa pine trees at the plains/forest ecotone. 4,700 acres were visible during aerial survey.
 - Mesa Verde National Park (SW Colorado)
A pine sawfly, *Zadiprion rowheri*, caused defoliation of pinyon pine for the past 3 years. This insect has rarely been seen in SW Colorado. This year the populations crashed, many larvae were found drooping from branches. Minimum defoliation.
 - Black Forest
A sawfly, *Neodiprion sp.* was reported again this year. Defoliation in these areas is chronic, usually not causing heavy defoliation.
 - Town of Aspen
Willow scale (*Diaspidiotus gigas*), non-native, has been present in ornamental aspens and narrowleaf cottonwoods for 5 years. It became a problem to the point that the town tried many control methods, but had no success. This year and last they tried soil injections with Safari, it seems to be successful.
 - Arkansas Valley (Central CO)
Pinyon needle scale, *Matsucoccus acalyptus*, continues to cause damage in pinyon pines around the facilities of the Collegiate Peaks look out area.
 - Poudre Canyon (N of Fort Collins)
Fall webworm, *Hyphantria cunea*, continues to cause heavy defoliation in lower elevation of riparian areas. Defoliation visible from the air. Also, western tent caterpillar active in mountain mahogany.
 - Cañon City Area
Defoliation of piñon pine by a june bug was reported in mid-August. It was identified by Whitney Cranshaw as *Phyllophaga falsa*. This insect was reported more than 30 years ago in Colorado.

South Dakota

- Crow Creek Sioux Reservation
Tent caterpillar populations collapsed to low levels on Choke Cherry. This, together with favorable spring weather and some rain, resulted in a good fruit crop. The fruits are used as a food source for humans and wildlife and have cultural significance.

Nebraska

- Southeastern NE
A 4-year old epidemic of bagworm (*Thyridopterix ephemeraeformis*) on eastern red cedar and other *Juniperus* spp. continued to intensify across the southeastern portion of NE and has expanded in area both north and east of Lincoln. Bagworm defoliation has actually caused considerable tree mortality.

Other:

- Aspen dieback in Colorado continues to receive a lot of media attention.
- To date, no gypsy moths have been caught. A grid of 16 traps were put in Aspen Glen Campground in Rocky Mountain National Park where 1 NA moth was caught last year, no moths were caught this year.

Defoliators 2008, Region 5 (California)

Compiled by Sheri Smith, presented by Beverly Bulaon.

Douglas-fir tussock moth (DFTM), *Orgyia pseudotsugata*

The outbreak in the vicinity of Bear Mountain, east of McCloud Flats, Shasta County, collapsed by the end of 2007 and no defoliation occurred this year. In 2007, 7,444 acres of defoliation were mapped. The outbreak, which ran from 2005-2007, resulted in one area (30 acres) of elevated tree mortality on the ridge extending to the SW from Bear Mountain.

Lodgepole needleminer, *Coleotechnites milleri*

Data not yet summarized for 2008.

Jeffrey pine needleminer, *Coleotechnites sp. near milleri*

A Jeffrey pine needleminer infestation was detected during 2007 on the south end of Lake Tahoe on private land between Olying Drive and Pioneer Trail, Eldorado County and continued in 2008. Approximately 5 acres were affected.

Oak Leaf Miner

(unknown species)

Activity of this leaf mining insect increased dramatically in black oak (*Quercus kelloggii*) in 2008 near Blue Canyon, Tahoe National Forest, Placer County. The insect causing the defoliation was presumed to be a species of micromoth (Order: *Lepidoptera*). While the intensity of defoliation increased, the area affected has remained the same. No trees or individual branches have died as a result of the 4 years of partial defoliation caused by this insect.

White Fir Sawfly, *Neodiprion abietis*

The white fir sawfly partially defoliated approximately 1000 acres of white fir on the Eagle Lake Ranger District, Lassen National Forest, Lassen County, near Antelope and Fox Mountains. Injury ranged from light to moderate defoliation of older needles, mostly affecting understory trees and lower crowns of mid and overstory trees. (photo)

California Tortoise Shell, *Nymphalis californica*

The California tortoise shell defoliated several thousand acres of *Ceanothus spp.* throughout northeastern California in 2008. In Lassen County, approximately 600 acres of snow brush (*Ceanothus velutinus*) on Antelope Mountain, Eagle Lake Ranger District, Lassen National Forest (M261D) was almost completely defoliated. However, nearly all

shrubs had put on new foliage by the end of summer. Successful development of larvae in these areas resulted in a spectacular adult flight by late July and reports of mass butterfly migrations from motorists on state highways were widespread.

California tortoise shell defoliated snow brush on the Mt. Shasta and McCloud Ranger Districts, Shasta-Trinity National Forest (Shasta County) and the Goosenest District, Klamath National Forest, especially along the Everitt Memorial Highway and in rural subdivisions about 5 miles northeast of McCloud, Siskiyou County.

Non-native defoliators

Gypsy moth, *Lymantria dispar*

Eleven gypsy moths were trapped in CA during 2008.

Number of gypsy moths trapped during 2008, by county.

County	# of gypsy moths trapped
Ventura	7
Orange	1
Los Angeles	1
Alameda	1
Placer	1
Total	11

In 2008, seven gypsy moth adults were trapped in the area of Ojai, Ventura Co. In 2007 there were 4 moths caught in traps in the same ½ mile square location; egg mass surveys are ongoing by CDFG. Suspect egg masses were found on oak trees on two separate private properties (photos below). One of the properties had an airstream trailer parked under the oak trees that were infested. The trailer was from Grand Marais, Michigan. Another egg mass was found under a fence rail. Partial samples of egg masses were collected and shipped to the Plant Pest Diagnostics Lab. Efforts will be made in 2009 to eradicate the population by spraying *Bacillus thuringiensis*.

Light Brown Apple Moth (LBAM), *Epiphyas postvittana*

LBAM was first reported in early Feb. 2007 near Berkeley, CA. It is originally from Australia and is considered established in New Zealand, New Caledonia, Hawaii, and the British Isles. It's discovery in CA was a new North American record. During 2007 it was confirmed in 12 counties. Hosts include at least 200 plants in 20 genera and 50 families.

The population of the light brown apple moth continued to increase in 2008 throughout the coastal area of central California primarily from Monterey to Sonoma Counties with outlying populations in Napa and Santa Barbara Counties. Eradication efforts using aerial spraying of pheromones for mating disruption were halted due to public concerns and court orders. Ground treatments using twist ties impregnated with pheromones

continued. Mating disruption will be reinstated using sterile moth release in 2009. The first detection of feeding injury was noted in 2008 in the areas with the highest populations of the moths, Soquel in Santa Cruz County and Golden Gate Park in San Francisco. Minor defoliation and leaf injury was noted on Australian Tea Tree in Golden Gate Park and on various hosts in the Soquel area. More information can be found at http://www.cdfa.ca.gov/phpps/PDEP/lbam/lbam_main.html.

WNADWG Meeting – December 9010, 2008 – Bozeman, MT

Summary of Various Presentations by Kathy Sheehan, USFS R6

FIDLs

Forest Insect and Disease Leaflets (FIDLs) are now being coordinated nationally by Kathy Sheehan, with assistance from Regional FIDL Contacts. See handout (sheehan-fidls-handout) for a list of the FIDL Contacts, an overview of “who does what” regarding FIDLs, and a list of planned new and revised FIDLs. Two FIDLs dealing with western defoliators are currently being revised: #86 (Douglas-fir Tussock Moth) by Lee Pederson, and #139 (Large Aspen Tortrix) by Cielsa and Cruse).

For additional information about FIDLs, visit the website: www.fs.fed.us/r6/nr/fid/wo-fidls/. You can view FIDLs by number, title, scientific name, general category (defoliators, bark beetles, etc.). This website also provides the latest list of planned FIDLs, guidelines for FIDL authors, FIDL “facts”, and contacts for more information.

WNADWG Website

The website is: www.fs.fed.us/r6/nr/fid/pubsweb/westdef.shtml

This website includes information about upcoming meetings, notes from previous meetings, and other documents and files related to western defoliators. Contact Kathy Sheehan (ksheehan@fs.fed.us) to provide material or suggestions regarding this webpage.

Western Spruce Budworm

The website is: www.fs.fed.us/r6/nr/fid/budworm/

We plan to:

- ❖ Review strategies & tactics used previously
- ❖ Summarize current state of knowledge, emphasizing options available to USFS
- ❖ Convene a workshop to review & critique the above summary + identify research needs
- ❖ Develop public information tools

So far, ~100 suppression projects conducted against WSB since 1970 have been summarized and posted on the above website. We're looking for additional information about these or other projects (Canadian projects are very under-represented), as well as information about silvicultural treatments – please contact Kathy Sheehan (ksheehan@fs.fed.us) to contribute reports or publications. The workshop will be held in conjunction with the next WNADWG meeting.

Douglas-fir Tussock Moth

Pheromone trap catch data from the DFTM Early Warning System from 1979 to the present is available for the western US in a Microsoft Access database that can be downloaded from this website: www.fs.fed.us/r6/nr/efd/dftmweb/ (scroll down to “download the EWS database”). An analysis of the first 20 years of the EWS is also posted at this website (click on “description & analysis” near the top).

The database can be used to create graphs showing trap catches over time by Region or subregions/forests, and the data can also be exported into a spreadsheet. Contact Kathy Sheehan (ksheehan@fs.fed.us) if you have questions, want to contribute data, or need a different format other than Access.



Forest Insect and Disease Leaflets (FIDLs)



The Forest Health Protection publications known as “Forest Insect and Disease Leaflets” (FIDLs) are a popular source of information about the biology, effects, and management of forest pests. For decades, FIDLs have served as a valuable information tool within the Forest Service and for many partners including States, other Federal agencies, and the general public. In recent years, however, there have been some concerns and confusion regarding the numbering of FIDLs, potential overlap among new or revised FIDLs, standard formats, and options for publishing FIDLs. Brennan Ferguson’s presentation at the 2007 Western International Disease Work Conference focused attention on the current status of the FIDL series.

FIDLs website: www.fs.fed.us/r6/nr/fig/wo-fidls/

View FIDLs online by number, title, or scientific name

All FIDLs are now available online in pdf format. Our thanks go to Brennan Ferguson (Ferguson Forest Pathology Consulting, Inc., Missoula, MT) for compiling, organizing, and creating high-quality PDFs of the FIDL series. Thanks also to Amy Gannon, Forest Pest Management Specialist with the Forestry Division of the Montana Department of Natural Resources and Conservation, whose support and funding allowed this work to be done.

In July 2009, Rob Mangold (Director, USFS Forest Health Protection) appointed Kathy Sheehan (USFS R6 Entomologist) to serve as national FIDL coordinator, and requested each FS Region/Area/IITF identify someone to serve as primary FIDL contact (see names and contact information below). The responsibilities of authors, contacts, and the national coordinator are:

Authors: write the new or revised FIDL manuscript & prepare publication-ready figures; solicit and respond to peer review comments; review publication proofs; and work with the regional contact to coordinate distribution of paper copies.

Regional/Area/IITF FIDL contacts: Respond to requests for paper copies of FIDLs; secure funding for proposed FIDLs that their region agrees to sponsor; review the final manuscript; and coordinate the distribution of paper copies with the national coordinator.

National FIDL coordinator: Track new and revised FIDLs; develop a standard format; maintain the FIDLs website (www.fs.fed.us/r6/nr/fig/wo-fidls/); identify and coordinate publishing options for FIDLs; work with regional contacts on other FIDLs issues.

Contacts:

Northern Region (R1): Laura Moffitt (lmoffit@fs.fed.us)

Rocky Mountain Region (R2): Robert Cain (ricain@fs.fed.us)

Southwestern Region (R3): MaryLou Fairweather (mfairweather@fs.fed.us)
Intermountain Region (R4): Laura Moffitt (lmoffit@fs.fed.us)
Pacific Southwest Region (R5): Sheri Smith (ssmith@fs.fed.us)
Pacific Northwest Region (R6): Kathy Sheehan (ksheehan@fs.fed.us)
Southern Region (R8): Paul Mistretta (pmistretta@fs.fed.us)
Alaska Region (R10): Melinda Lamb (mlamb@fs.fed.us)
Northeastern Area (NA): Judy Antipin (jantipin@fs.fed.us)
International Instituted of Tropical Forestry (IITF): Magaly Figueroa (mafigueroa@fs.fed.us)



National FIDLs coordinator: Kathy Sheehan (ksheehan@fs.fed.us; 503-808-2674)

Forest Insect and Disease Leaflets (FIDLs)



Planned New and Revised FIDLs

Planned Revisions

- # 2 Mountain Pine Beetle (*Bentz, Kegley, Gibson*)
- # 11 Jeffrey Pine Beetle (*Smith, Borys, Shea*)
- # 36 White Pine Blister Rust (*Schwandt, Kearns, Ferguson*)
- # 49 Southern Pine Beetle (*Clarke, Nowak*)
- # 52 Heart Rots of Red & White Firs (*Mallams, Angwin, Chadwick*)
- # 55 Red Turpentine Beetle (*Smith, Owen*)
- # 60 Silver Fir Beetle (*Carlson, Ragenovich*)
- # 62 Comandra Rust (*Geils, Jacoby*)
- # 73 Heart Rots of Douglas-fir (*D.Goheen, Ferguson*)
- # 86 Douglas-fir Tussock Moth (*Pederson*)
- # 87 Fir Broom Rust (*Jackson, Guyon*)
- # 90 Heart Rots of Western Hemlock (*Hennon, Trummer, Filip*)
- # 93 Rust-red Stringy Rot (*Filip, D.Goheen, Kimmey*)
- # 116 Arizona 5-spined Ips (*McMillin, DeGomez*)
- # 123 Red Rot of Ponderosa Pine (*Fairweather, Lockman*)
- # 139 Large Aspen Tortrix (*Ciesla, Cruse*)
- # 147 Mistletoes of Hardwoods (*Mallams*)
- # 149 Decay and Discoloration of Aspen (*Burns, Geils, Fairweather, Worrall*)
- # 150 Heart Rots of Engelmann Spruce & Subalpine Fir (*Worrall, Geils, Burns*)

Planned New FIDLs

- Schweinitzii Root & Butt Rot of Western Conifers (*Filip, Hagle*)
- Pinyon Ips (*McMillin, Eager, Smith, Steed*)
- Western Balsam Bark Beetle (*Eager, Munson, McMillin, Kegley*)

Mystery FIDL

The # 177 was assigned, but records of the author(s) and topic have been lost. Please contact Kathy Sheehan (see below) if you can solve this mystery.

FIDLs website: www.fs.fed.us/r6/nr/fid/wo-fids/

For more information, please contact:
Kathy Sheehan (ksheehan@fs.fed.us; 503-808-2674) – National FIDLs Coordinator

WNADWG 2008 – Washington state report

Compiled by Glenn Kohler and Jeff Moore, Washington DNR

Summary of important defoliation events in Washington State:

Two areas with Douglas-fir tussock moth (DFTM) defoliation were detected in northeastern Washington in 2008. DFTM defoliation has not been recorded in Washington since 2002. The defoliated areas in 2008 totaled approximately 300 acres. Early Warning System trap catches indicate that defoliation in northeastern Washington will increase in 2009 (Fig. 1). A major western spruce budworm (WSBW) outbreak remains active on the eastern slopes of the Washington Cascade Mountains (Fig. 2). Pheromone trap catches indicate new areas of defoliation can be expected in northern Okanogan and Ferry Counties in 2009. WSBW defoliated areas in western Yakima County have significantly decreased since a peak in defoliated area in 2006. Where DFTM irruptions occur, it is likely that activity from both defoliating agents may overlap.

Figure 1. Historic Douglas-fir tussock moth trap catches and defoliated acres in Washington state.

Figure 2.

Douglas-fir tussock moth (DFTM): Two areas of new defoliation have been detected in Okanogan County in north-central Washington. One site is on Palmer Mountain, four miles north of Loomis and the other is on Chesaw road, five miles east of Oroville. Total defoliation covers approximately 300 acres on BLM and private land within ten miles of the border with British Columbia. Fresh egg masses and cocoons were recorded over a much wider area during fall 2008 ground surveys; covering approximately 1,800 acres at Palmer Mountain and 1,200 acres at Chesaw Road. Defoliation is expected to expand in summer 2009.

DFTM defoliation of sentinel trees, mostly ornamental spruce, has been reported at 8 locations throughout northeastern Washington. DFTM early warning system trap counts had increased during 2007 and rose again in 2008 in north-central Washington. Eight Washington DNR trap locations in Okanogan County had average counts over 40 moths. During October through December 2008, in cooperation with Forest Service Region 6 FHP, areas near high trap counts were surveyed for fresh DFTM egg masses and cocoons. All egg masses found were in Okanogan County, with the highest concentration of locations in the Methow Valley (Fig. 3). No defoliation was detected in these areas in 2008.

Figure 3.

Western spruce budworm (WSBW): The east slopes of the Washington Cascade Mountains continue to experience large areas of WSBW defoliation (Fig. 2). Aerial survey has detected over 300,000 acres of defoliation annually since 2005 (Fig. 4). Areas with WSBW defoliation recorded in the 2008 aerial survey have increased to 450,643 acres, up from 355,362 acres in 2007, but remains below a peak of 555,748 acres recorded in 2006. WSBW pheromone trap counts in central and eastern Okanogan

County and northern Ferry County were elevated during 2007 and 2008. Correspondingly, the acres of WSBW defoliation recorded in eastern Okanogan County have increased in 2008. In addition, trap counts also remain high in Kittitas County where defoliation is likely to continue. Both trap counts and defoliated acres have decreased during 2007 and 2008 in western Yakima County (Fig. 5). This area experienced heavy defoliation in 2005 and 2006.

Figure 4.

Figure 5.

Larch casebearer: Areas of moderate to high larch casebearer activity were recorded throughout much of eastern Washington (Fig. 2). It is unknown how much of this is attributable to casebearer or to foliar diseases and both are likely active. In 2008, 70,558 acres with larch casebearer/foliar disease signature were recorded in Washington. Most of the affected areas were in northeastern Washington in Ferry, Stevens, and Pend Oreille Counties. Northern Idaho aerial survey reported cold weather injury to high elevation western larch over a widespread area and reported seeing similar damage in northeastern Washington. However, Washington's aerial observers could not confirm cold weather injury to western larch in Washington due to a second flush of new needles before the affected areas were flown.

Balsam woolly adelgid (BWA): In 2008, the aerial survey recorded 44,719 acres with BWA damage in Washington. This is a decrease from approximately 59,000 acres in 2007 and more than the approximately 36,000 acres affected by BWA in 2006. BWA damage was recorded at high elevations on both the west and east slopes of the Cascade Mountains in Washington. High elevations of the Blue Mountains and Olympic Peninsula were also affected (Figs. 2 and 6).

Figure 6.

Loopers (Lepidoptera: Geometridae): Looper defoliation detected from the air can be damage caused by one or more looper species, including western hemlock looper and phantom hemlock looper. The primary host in Washington is western hemlock. From the air, looper defoliated hemlocks and associated species appear yellow to red. The aerial signature is most obvious late in the summer. Approximately 500 acres with hemlock looper defoliation was detected in the 2008 aerial survey on the north slope of Mt. Baker. Hemlock looper defoliation was also recorded in this area in 2006 and 2007.

Black pineleaf scale: The 2008 aerial survey recorded approximately 90 acres with black pineleaf scale defoliation in areas between Wenatchee and Leavenworth.

Needleminer in ponderosa pine: A report from a DNR forester led to recording defoliation caused by a needleminer, *Coleotechnites ponderosae* (Lepidoptera: Gelechiidae), in ponderosa pine. The areas affected were low elevation drainages where

ponderosa pine meets brush on state lands in Kittitas and Chelan Counties between Wenatchee and Ellensburg. Approximately 400 to 600 acres were affected. No mortality has been attributed to the needleminer. A pitchworm or shoot borer, *Dioryctria okanoganella* (Lepidoptera: Pyralidae), was also feeding in new buds of some affected ponderosa pines.

Light brown apple moth (LBAM): In 2008, the Washington State Department of Agriculture (WSDA) placed 132 pheromone traps around nurseries that may have received stock from California. Most of these traps were located in eastern Washington. No LBAM were detected in Washington in 2008.

Gypsy moth: In 2008, the WSDA placed 24,299 gypsy moth pheromone traps in Washington. Twenty-one gypsy moths were collected from 17 catch areas, all in western Washington. All 21 gypsy moths collected were the North American variety from the established European population in the eastern United States. Eleven catch areas were new detections. A total catch of 21 moths is not unusually high when more than twenty thousand traps are used. In the past ten years, the highest number of moths collected was 92 in 1992. No eradication projects were conducted in 2008 and none are planned for 2009.