



Lake States Forest Health Watch



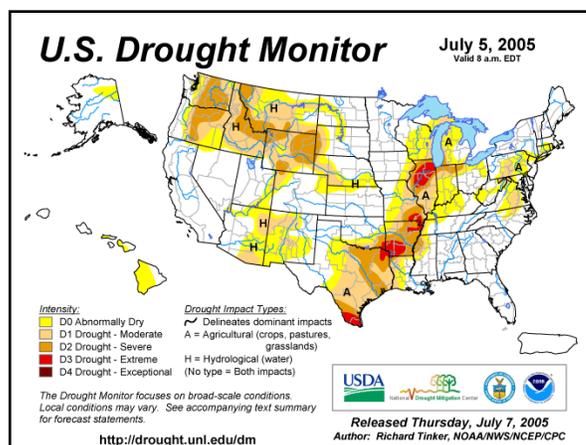
December 05, 2005

About this newsletter...

The Forest Health Protection unit of the Forest Service located in St. Paul, Minnesota produces this newsletter. Our intent is to keep Federal land managers in the Upper Great Lakes region abreast of forest health related issues such as insect and pathogen outbreaks. Please contact us with your observations.

What happened in 2005...

Weather can drive insect and disease outbreaks. Drought especially stresses trees. This past year was not extreme on either the wet or dry end though we did have moderate drought conditions persist across Lower Michigan, the eastern end of the U.P. and eastern Wisconsin. October was unusually warm, and we may observe some unusual tree responses next spring. But overall, the growing season included nothing extreme. On the insect side, we had some extensive jack pine budworm defoliation and spruce budworm was active in many locations. With the exception of some locally intense gypsy moth defoliation in central Lower Michigan, hardwood defoliation was not widely observed. A couple of more uncommon insects that were reported were the hickory bark beetle, and beech blight aphid in Michigan. On the disease side we have had an upswing in Dutch elm disease in many areas, oak wilt activity is increasing in central Lower Michigan and Annosum root disease is beginning to appear more frequently in southern and central Wisconsin red pine stands.



Some aspen stands in northern Minnesota did have “decline” type symptoms in 2005. Our aerial survey folks mapped areas of what looked like light defoliation from the air, but ground surveys found only small leaves and thin crowns. This may have been a response to a late spring frost event or a response by trees stressed by forest tent caterpillar (FTC) defoliation and drought that impacted the stands over the last 3-5 years. There was little evidence of FTC populations anywhere in the region in 2005.

Exotic pests continue to be an overriding threat to our regional forest resource. Beech bark disease has a very firm foothold in Michigan, gypsy moth appears to have established along Minnesota’s North Shore, including portions of the Superior National Forest. Gypsy moth populations have also gotten established on some of the Apostle Islands and adjacent areas in Bayfield and Ashland counties of Wisconsin. Emerald ash borer (EAB) looms over the regions ash resource. EAB populations continue to be found scattered across Lower Michigan and one population was found in Michigan’s Brimley State Park which is adjacent to National Forest land on the Hiawatha.

Some of the decline situations we have discussed over the past 2-3 years still persist. Black ash decline appears to have stabilized, some tree recovery is occurring. White spruce plantation decline in northern Wisconsin is still being reported. Spruce budworm defoliation in many of the remaining spruce plantations on the Chequamegon-Nicolet Forest has added further stress.

Jack pine budworm – 2005 was an active year for jack pine budworm. Michigan reported 126,490 acres of defoliation, Minnesota 75,621 acres, and Wisconsin 17,519 acres. In Michigan and Wisconsin much of the activity is on or close to National Forest land. The Huron-Manistee, Hiawatha, Ottawa, and Chequamegon-Nicolet all have extensive areas of jack pine defoliated by budworm. In Minnesota, most of the activity is just to the west of the Chippewa. We had a number of reports from Minnesota of red pine being fed upon. This does occur on occasion, budworm feeding can be damaging to red pine with top-kill being the most likely problem. This outbreak has been underway in most locations for 2-3 years so we would expect a population collapse soon. For more on jack pine budworm see:

http://www.na.fs.fed.us/spfo/pubs/howtos/ht_jack/ht_jack.htm



Jack pine budworm caterpillar in mid-June

Spruce budworm – Spruce budworm is a traditional forest pest in the region, feeding on balsam fir and white spruce. Almost every year we have defoliation reported somewhere in the three Lake States, especially in northeast Minnesota. The last regional outbreak was in the 1970's and early 1980's when millions of older balsam fir and white spruce were killed. Because of that outbreak and the persistent activity in northern Minnesota, extensive older balsam fir stands do not exist in the region. Until the balsam fir resource ages, a regional spruce budworm outbreak is unlikely. Nevertheless, 2005 was an active year for spruce budworm. Michigan reported 9,500 acres, Minnesota 92,500 acres, and Wisconsin almost 21,000 acres of defoliation with much of this activity concentrated in white spruce plantations. Spruce budworm populations tend to persist at high levels for many years. Therefore, their presence in these stands could be very problematic.

Hickory bark beetle – We have had reports of increased hickory mortality in Wisconsin and southern Minnesota over the past few years. Most of the problem is associated with bitternut hickory, *Carya cordiformis*. The range of bitternut is generally south of National Forest land in Michigan and Minnesota, and only the southern portions of the Chequamegon-Nicolet have hickory in their forests. The south end of the Nicolet is one location where hickory mortality was reported this past summer. Hickories are attacked by a native bark beetle, appropriately called the hickory bark beetle, *Scolytus quadrispinosus*. The distinctive galleries found just under the bark can be seen in the photo. This beetle does have a documented history of undergoing localized outbreaks that can kill large numbers of older hickory trees. Hickory bark beetles are active in the areas where mortality is being reported. But, not every tree that has died has evidence of extensive bark beetle infestations. Many bark beetles carry blue-staining fungi with them, these fungi help the beetles quickly kill trees by plugging a tree's vascular system. It is the fungi that may be playing a key role in this newest round of hickory mortality. Hickory bark beetles may be transmitting at least two different fungi, one that may be more lethal. We would like to receive reports on dead and declining hickory.



Hickory bark beetle galleries

Beech blight aphid – This aphid is covered with long white, waxy filaments that make it very showy and obvious on infested beech trees as well as several other hardwood trees. For some reason, outbreak populations developed across Michigan this past summer. We did not have any reports of beech blight aphid outbreaks in Michigan prior to this, though it very likely occurred in the state just at low levels. There are reports of large outbreaks further east in the U.S. and in southern Canada. Most of the historical records indicate that outbreaks tend to dissipate very rapidly, rarely lasting more than one year. This insect does raise concerns because the white waxy coating can mimic beech scale which is also covered with a white waxy material. Beech scale is associated with beech bark disease. The scale does not have long flowing waxy filaments, it is cottony but compact.

Annosum root disease – We have not discussed Annosum root disease in past newsletters. With the exception of the Huron-Manistee Forest in Lower Michigan, this pathogen has been generally viewed as a more southern and western concern. It was not known to occur in Wisconsin or Minnesota. However, over the past few years it has been found in a number of southern and central Wisconsin red pine stands and it appears to be expanding its range. The fungus *Heterobasidion annosum* causes a root and butt rot that often kills infected conifers. In red pine plantations the disease creates pockets or groups of dead and dying trees. These pockets can expand over time killing more and more trees. The fungus usually enters a healthy stand by infecting fresh stumps, which makes Annosum a problem primarily in thinned red pine plantations. The Wisconsin DNR has developed some management suggestions, these can be found at:

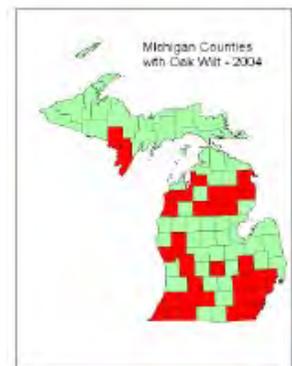
<http://www.dnr.state.wi.us/org/land/Forestry/fh/fhissues/annosum.htm>



Dead and declining red pine found along the edge of an expanding Annosum pocket.

Oak wilt in Lower Michigan – Regionally, oak wilt is one of our more significant disease problems, especially in parts of Wisconsin and southeast and east central Minnesota. Central parts of Lower Michigan including the Huron-Manistee Forest have not been considered a hot spot for oak wilt, but that seems to be changing. More and more oak wilt pockets are reported in that area every year. Aerial surveys in 2005 mapped a number of new and expanding pockets on the Huron-Manistee and on private lands adjacent to the Forest. The fungus responsible for oak wilt can be moved long distances on firewood. Further, oak wilt is favored by any activity that wounds oak trees in the spring and early summer. Housing construction in oak dominated areas acts like a magnet for new oak wilt infection centers. For more on oak wilt see:

http://www.na.fs.fed.us/spfo/pubs/howtos/ht_oakwilt/toc.htm



Black ash decline – We have been mentioning black ash decline for the past several years. This decline that appears to have peaked around 2004, has occurred across much of the region. Black ash trees appear to be very resilient, many of them are showing some signs of slow recovery.

Forest Service Research has initiated a project to investigate the cause or causes of this most recent decline episode. Brian Palik, Mike Ostry, Rob Venette and Kathy Ward are involved in the effort. They are attempting to use statistical tools to look for associations between the incidence of decline and factors such as soil texture, slope, drought intensity, and the presence or absence of roads. The group needs to locate more “healthy” black ash stands that they can compare with the many “unhealthy” stands in the region. If you have location data for healthy black ash stands please contact Kathy Ward at kward01@fs.fed.us



A declining black ash stand near Cloquet, MN.

Updates on exotic pests...

Exotic insects, pathogens and weeds are causing great concern in the Great Lakes region. This problem is nothing new, we have had exotic insect and pathogen introductions in the past that have greatly altered our forests. Tamarack forests were decimated in the early 1900's following the introduction of two needle feeding insects, larch casebearer and larch sawfly. White pine blister rust and Dutch elm disease have killed many white pine and American elm, respectively. More recently we have virtually lost our butternut resource from a disease called butternut canker and our basswood trees face regular bouts of defoliation from a small insect called introduced basswood thrips. Despite past experiences, we continue to see new damaging introductions. Several very significant threats are active in the region and others are relatively close. The species most at risk in the next 5-10 years include all of our native ash (*Fraxinus* spp.), and American beech.

Beech bark disease (BBD) -- was detected in Michigan in the spring of 2000 and is established in the western Lower Peninsula and in the eastern Upper Peninsula. The interaction of an exotic scale insect (*Cryptococcus fagisuga*) and a native and exotic canker-causing fungus (*Nectria* sp.) cause beech bark disease. Once infected by the fungus, trees usually decline and trunks may break at canker sites.

Beech bark disease is viewed as a major threat to American beech. For more see:

<http://www.na.fs.fed.us/spfo/pubs/fidls/beechnbark/fidl-beech.htm>



Beech trees that have beech bark disease often fail, a condition referred to as beech snap.

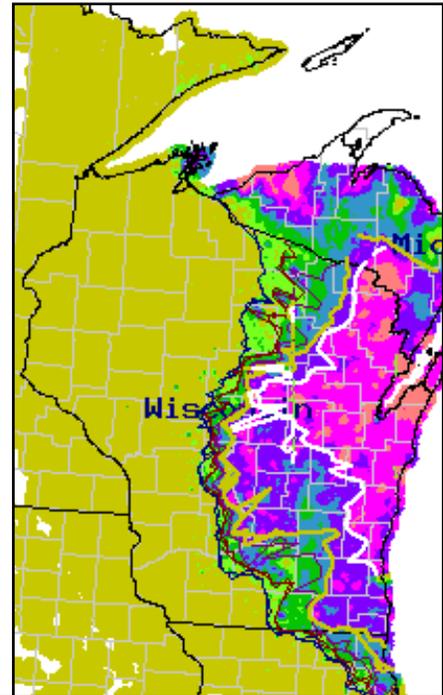
Gypsy Moth – Look closely at the adjacent map and you will notice some green areas along Minnesota's North Shore of Lake Superior. Those green blobs indicate a number of male moth traps that came up positive in 2005. Gypsy moth males have been collected in this area for the past several years in increasing numbers. Last year an isolated population was found on the Superior National Forest in the Ely area. That population was treated and early trapping results indicate that it was "cleaned up". But, further scattered low-level populations appear to be surviving and slowly building in the area. A much larger treatment program, probably relying on pheromone flake applications, is being considered for 2006.

Elsewhere, Wisconsin populations have actually receded to the east the past two years, though some scattered high populations are persisting in the Bayfield Peninsula. Cool wet spring weather in 2004 and 2005 has encouraged disease outbreaks in gypsy moth caterpillars and slowed the westward expansion.

Michigan's Lower Peninsula has seen some local gypsy moth outbreaks, especially in the central regions near Grayling and Roscommon.

You can get more information on this insect at:

<http://www.fs.fed.us/na/morgantown/fhp/hwa/hwasite.html>



Gypsy moth status in 2005. The yellow color indicates no male moth catches, green indicates low male moth catches, and red indicates high male moth catches.

Emerald ash borer (EAB) is well entrenched in southeast Michigan and neighboring northwest Ohio and Windsor, Ontario. Scattered populations have been found across Lower Michigan, and in locations in Ohio and Indiana. A population was located in the eastern end of the Upper peninsula in 2005 in Brimley State Park. Firewood movement is the likely culprit for many of the outlying populations in Michigan.

For emerald ash borer status in Indiana

<http://www.entm.purdue.edu/EAB/>

For emerald ash borer status in Ohio

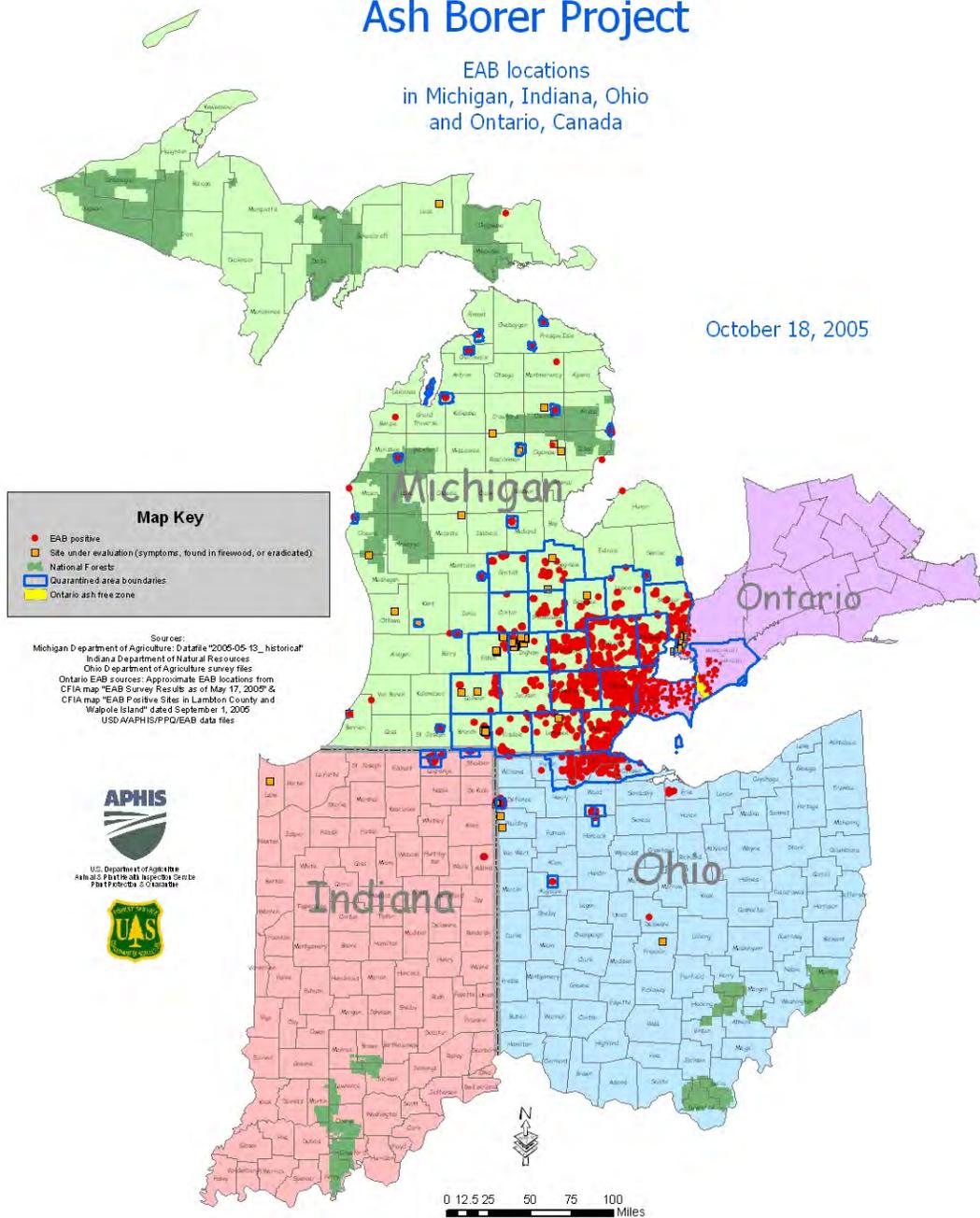
<http://ashalert.osu.edu/>

For emerald ash borer status in Michigan

<http://www.emeraldashborer.info/index.cfm>

Cooperative Emerald Ash Borer Project

EAB locations
in Michigan, Indiana, Ohio
and Ontario, Canada



Sudden Oak Death -- The fungus-like plant pathogen *Phytophthora ramorum* is the cause of several diseases of woody plants, including sudden oak death (SOD). The pathogen causes bleeding cankers and tree mortality on oak species and tanoak in California, and also causes a variety of leaf, twig, branch and trunk symptoms on a variety of plants in several different families. To date, the pathogen has been found in forested landscapes in the U.S. only in California and Oregon, despite the fact that in the spring of 2004, millions of nursery plants from infected nurseries in California were shipped to hundreds of locations across the country.

The 2005 sudden oak death survey has been completed in all 7 North Central states. The highest priority areas to sample were trace forward nurseries and retail outlets. 118 nursery perimeter plots were installed and 184 samples were collected. General forest plots with oaks and other potential herbaceous hosts are the highest priority forests to survey. 67 plots were installed and 97 samples collected. All samples were negative for SOD. Individual state results are in the table. Surveys will be conducted at least 1 more year barring any unforeseen movement of the organism.

| State | # of Nursery Perimeter Locations Sampled | # of Nursery Perimeter Samples Submitted | # of Nursery Perimeter Samples PCR (-) for Pr | # of Nursery Perimeter Samples PCR (+) for Pr | # of General Forest Locations Sampled | # General Forest Samples Submitted | # of General Forest Samples PCR (-) for Pr | # of General Forest Samples PCR (+)for Pr |
|-------|--|--|---|---|---------------------------------------|------------------------------------|--|---|
| IA | 21 | 37 | 37 | 0 | 9 | 16 | 16 | 0 |
| IL | 7 | 21 | 16 | 0 | 3 | 4 | 4 | 0 |
| IN | 12 | 8 | 8 | 0 | 10 | 8 | 8 | 0 |
| MI | 8 | 20 | 20 | 0 | 22 | 38 | 38 | 0 |
| MN | 26 | 22 | 22 | 0 | 7 | 7 | 7 | 0 |
| MO | 22 | 22 | 22 | 0 | 8 | 4 | 4 | 0 |
| WI | 22 | 54 | 54 | 0 | 8 | 20 | 20 | 0 |

What About Exotic Weeds...

Late fall and early winter can be a great time to locate infestations of **common buckthorn**. This invasive small tree has a distinctive habit of maintaining green leaves well into late November. Further, the fruit persists on branches into the winter months. A simple walk in the woods after most trees have dropped their leaves should be a productive time to locate buckthorn trees and plan your method of removal.



New Weed Publication...

Proceedings: symposium on the biology, ecology, and management of garlic mustard (*Alliaria petiolata*) and European buckthorn (*Rhamnus cathartica*). Luke Skinner (Editor), USDA Forest Service Forest Health technology Enterprise Team, Publication Number FHTET-2005-09. For copies of this publication contact Richard Reardon at rreardon@fs.fed.us

Quiz...



Test your knowledge. The photograph on the left was taken in early October. It is a picture of a northern pin oak acorn that has been cut in half. The acorn has a single round hole in it. The inside of the acorn is largely hollowed out. The C-shaped insect larva emerged from the acorn by cutting out the round hole with its mandibles. What insect is this? The butterfly on the right is relatively common though not as abundant as its yellow relative.

Quiz answers...

The photograph on the left is one of our native acorn weevils. Weevils are a group of smaller beetles that are distinguished by the presence of a long snout on the adult. The larvae have well developed heads (brownish red in the picture) and often curl into a C-shape when at rest. There are two weevil genera that infest acorns in the region, *Curculio* and *Conotrachelus*. The larval stages are very difficult to identify to genera much less down to the individual species. Larvae spend the summer inside of developing acorns. Most emerge from acorns after the acorn drops to the forest floor in the fall. Once a larva is out of the acorn, it tunnels into the soil where it spends the winter. Adults emerge the following spring and fly or climb into nearby oaks where they lay eggs on developing acorns. Newly hatched larvae enter acorns generally through small wounds or cracks. The butterfly is a black swallowtail, *Papilio polyxenes asterius*. It is not as common as its relative the yellow swallowtail. The caterpillar stage of this butterfly is not a tree leaf feeder, rather it feeds on the foliage of plants such as Queen-Anne's-lace, carrot, parsley and dill.

Any idea what's going on here???



This is actually a relatively common site along many roads in the Great Lakes region, especially in areas dominated by sandy outwash soils. The stand in the photo is a mixture of red and Scotch pine. It includes some sheared Christmas trees. Damaged trees are especially evident along the stand edge where grass competition is severe. Some trees appear yellow (faders) while others are already dead. Another interesting tidbit is that some of the trees have tipped. These trees are under attack by a common pine pest in the region, any ideas?

These trees are heavily infested with pine root collar weevil, *Hylobius radicis*. This weevil is one of the most notorious Christmas tree pests in the region. But, it also damages red and Scotch pine trees in windbreak settings and in young plantations that have heavy grass competition and where trees are widely spaced. The larval stages of the weevil feed at the root collar (the stem area at the soil surface). Feeding damage constricts the stem, resin soaks the bark and damages the vascular system. Often times the stem breaks and the trees literally tip over. Damage can be very extensive.

Aerial survey maps...

The Forest Service Forest Health Protection unit along with cooperators in the state forest health groups, conduct annual surveys for forest insect and disease outbreaks. Each Lake State National Forest along with most other Federal properties are flown annually and damage is recorded onto maps. This information has been gathered for many years, in some cases since the 1950's in Michigan, Minnesota and Wisconsin. You can access the annual survey data on our web site at:

<http://www.na.fs.fed.us/spfo/fhp/maps/aerial.shtm>

We encourage you to visit that site and take a look at the information available. If you have questions or suggestions for improvement of the site or about the surveys please contact Quinn Chavez at qchavez@fs.fed.us

State Forest Health Highlights...

Our state cooperators in Michigan, Minnesota and Wisconsin annually put together a report called forest health highlights. At this time, the 2004 highlights are posted. The 2005 reports should be posted early in 2006. These reports are an excellent record of the major insect and disease activity within each state. Much of the information is directly relevant to Federal lands in the Lake States. They are developed in cooperation with the Forest Service, Forest Health Monitoring (FHM) program, and can be accessed at the FHM web site:

<http://www.fhm.fs.fed.us/fhh/fhmusamap.shtm>

Upcoming forest health workshops...

5th Annual Forest and Wildlife Research Review, January 11, 2006. University of Minnesota Duluth. One-day
This one-day workshop covers a wide variety of research topics relevant to forest and wildlife management in northern Minnesota and Wisconsin, the Upper Peninsula of Michigan, and Ontario. Topics this year will include Great Lakes forest change assessment, real estate transactions, red pine management, prescribed fire, public involvement in forest planning, and forested wetlands. For more information contact: Louise Levy at llevy@umn.edu

Publications and resources...oldies but goodies

There have been many excellent Forest Service publications written on forest insects and diseases over the past 30-40 years. We tend to forget about many of these, especially as it becomes hard to find original copies. A number of these are now available on the internet at http://www.na.fs.fed.us/spfo/fth_pub.htm A few of our favorites include:

Pocket guide to red pine diseases and their management (Printed copies are available)

<http://www.na.fs.fed.us/spfo/pubs/misc/red%20pine%20pocket%20guide/covcontent.htm>

How to identify white pine blister rust and remove cankers (printed copies are available)

http://www.na.fs.fed.us/spfo/pubs/howtos/ht_wpblister/toc.htm

How to identify and control sapsucker injury on trees (printed copies not available)

http://www.na.fs.fed.us/spfo/pubs/howtos/ht_sap/sap.htm

How to identify and control the sugar maple borer (printed copies not available)

http://www.na.fs.fed.us/spfo/pubs/howtos/ht_mapleborer/mapleborer.htm

Spruce budworm in the eastern United States

<http://na.fs.fed.us/spfo/pubs/fidls/sbw/budworm.htm>

Almost all of our publications are available via our home page found on the World Wide Web. This can be accessed at:

<http://www.na.fs.fed.us/spfo/>

Copies can be obtained by contacting our office at the address or phone number listed to the right.

For More Information
Forest Health Protection
USDA Forest Service
1992 Folwell Avenue
St. Paul, MN 55108
(651) 649-5262
skatovich@fs.fed.us