

2009 Nebraska Forest Health Highlights

The Forest Resource

Excerpts taken from FIA report: Meneguzzo, D.M., Butler, B.J., Crocker, S.J., Haugen, D.E., Moser, W.K., Perry, C.H., Wilson, B.T., Woodall, C.W. 2008. *Nebraska's Forests 2005, Resource Bulletin NRS 27. USDA Forest Service, Northern Research Station.*

Nebraska hosts a unique and diverse array of important forest types. (Fig.1) Our riparian forests along rivers throughout the State are home to forests of cottonwood, American elm, and green ash. Stately stands of ponderosa pine grace northwestern

Nebraska's Pine Ridge. In the Niobrara Valley, central hardwood (oak and walnut), ponderosa pine/eastern redcedar,

and remnants of the northern boreal (aspen and birch) forests form an ecologically unique confluence.

Windbreaks, shelterbelts, and narrow wooded riparian strips account for an additional 400,000 acres of tree-covered land. Community forests add hundreds of thousands of acres to our total forest resources.

Nebraska's many thousands of miles of rivers are home to extensive riparian forests. Riparian forests are important to wildlife, especially songbirds and bald eagles. Cottonwood provides millions of board feet of lumber annually and is the primary commercial species (in volume) in Nebraska.

The overall condition of live tree crowns can provide an indication of the current health of a forest stand. Uncompacted live crown ratio, crown dieback, and crown transparency are measured to evaluate tree crowns. Uncompacted live crown ratio estimates the portion of the tree height that supports live foliage. Crown dieback is the percentage of branch tips in the crown that are dead. Crown transparency measures the amount of sunlight that passes through the tree crown. A high percentage of crown dieback, low crown ratios, and/or high transparency can be signs of poor site conditions or insects and diseases that affect tree foliage.

There is relatively little crown dieback in Nebraska. Ninety percent of the sampled trees had no dieback, 4 percent had light dieback, another 4 percent had moderate dieback, and 2 percent had severe dieback. Six species had moderate dieback: American elm, bur oak, cottonwood, green ash, silver

maple, and slippery elm. Severe dieback was found on American elm and green ash. The three species with the highest percentages of moderate to severe dieback were cottonwood (26 percent), green ash (21), and American elm (16).

Comparisons were done of the different tree or forest types in Nebraska (Fig.2). Living trees and trees categorized as "Rough" or "Rotten" indicate general "health" of these trees. Rough and Rotten trees usually have significant damages caused by various insects, diseases, or abiotic damage agents. Hardwoods, spruce, and junipers showed the most signs of decay and decline. Spruce trees do not naturally occur in Nebraska, so these trees were probably located in urban or conservation plantings.



Nebraska State Tree, Plains Cottonwood
Populus deltoides var. *occidentalis*

Figure 1.

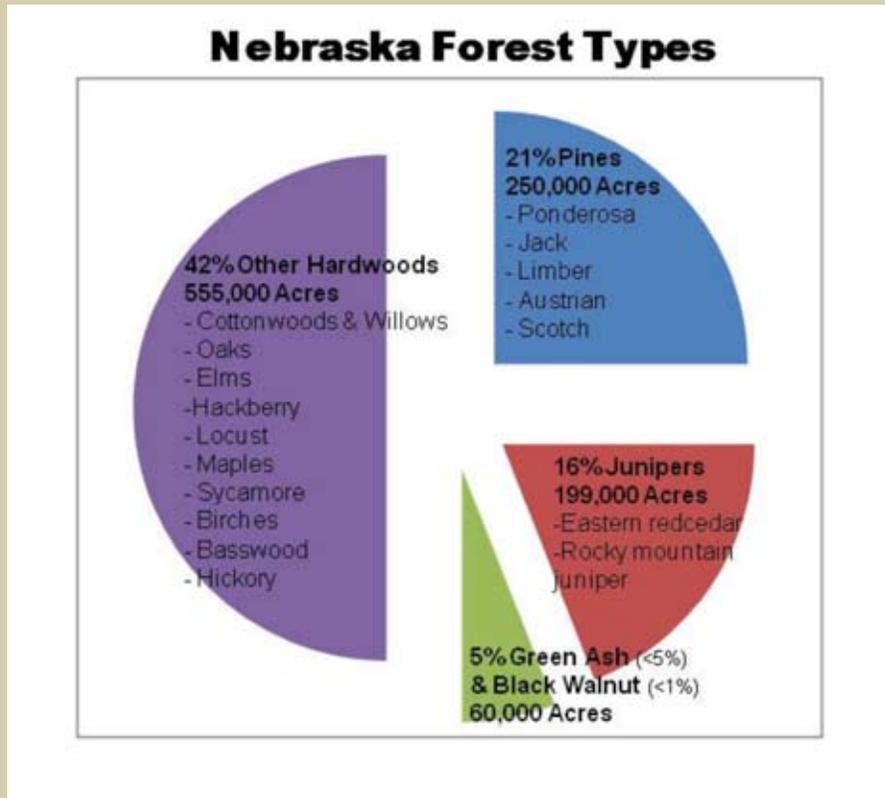
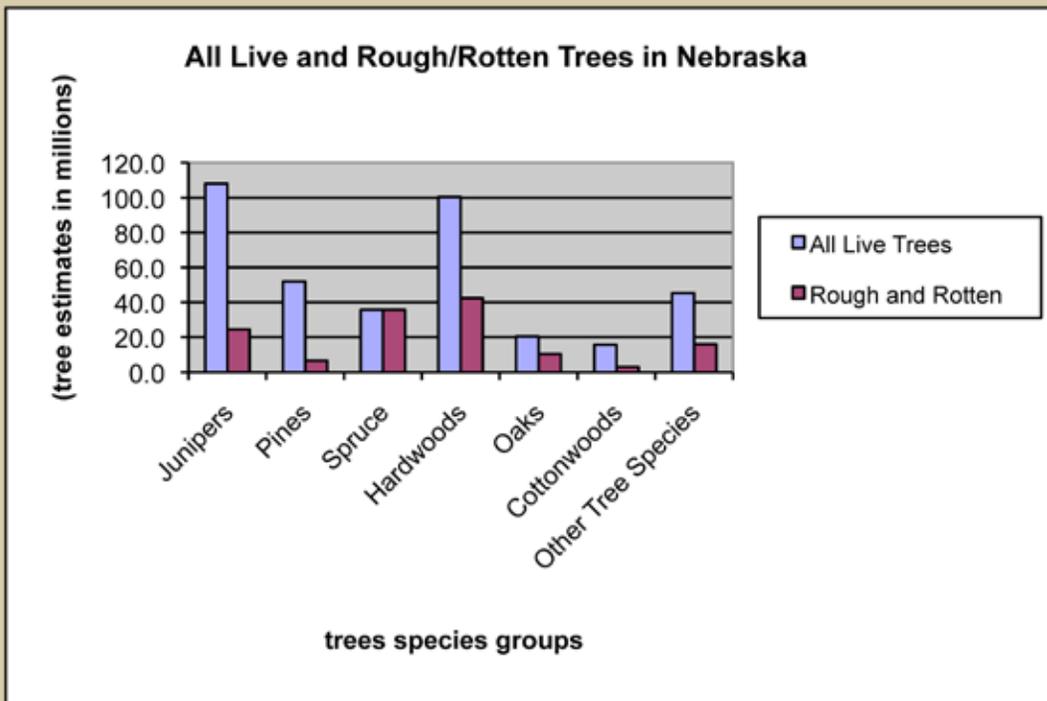


Figure 2.



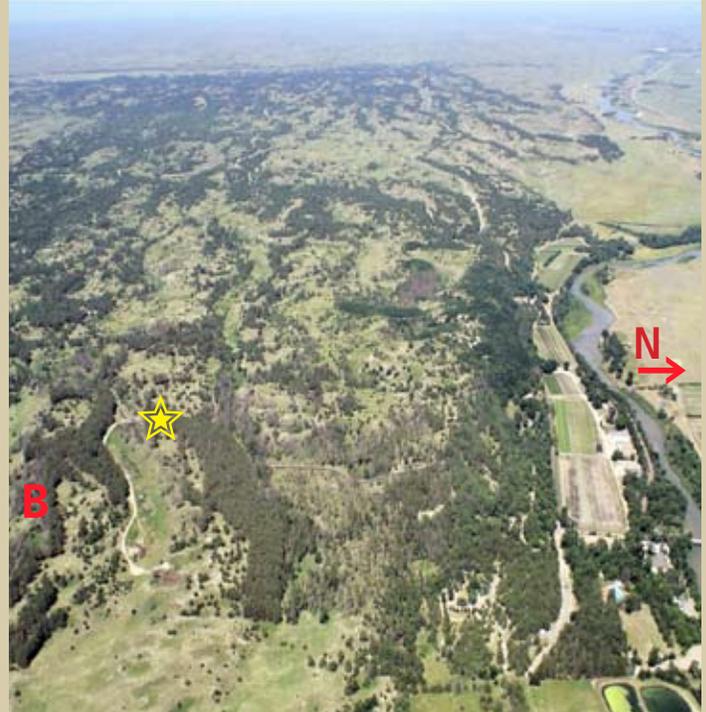
Components of Change and Forest Health Issues:

Figure 3a.



A pair of aerial photographs taken 40 years apart, show about the same location at the Bessey Ranger District and Bessey Tree Nursery on the Nebraska National Forest. Stars indicate corresponding map locations. The 1967 photo (Fig. 3a) was taken while flying north; it shows the impact of the 1965 Plum fire (F) and the subsequent pine mortality caused by *Ips* spp. bark beetles (B).

Figure 3b.



The second photo was taken in 2007 (Fig.3b) by aerial surveyor A. Dymerski while flying West. This picture shows recent mortality in Jack pines. It is suspected that this tree mortality is a result of repeated defoliation by Jack pine budworm, significant hail storm damage, and then infection by the disease *Diplodia* Blight. Throughout all of these disturbances, a few of these weakened Jack pines were then attacked and killed by *Ips* spp. bark beetles (B).

Aerial Overview Detection Surveys – This type of Detection Monitoring called Aerial Survey was performed each September over pine forests in Nebraska between 2004 – 2009 by A. Dymerski and W. Schaupp (USDA Forest Service, Rocky Mountain Region). The standard goal of such surveys is to detect and describe, not to quantify or exactly locate, all visible impacts from forest insects, tree diseases, or abiotic factors.

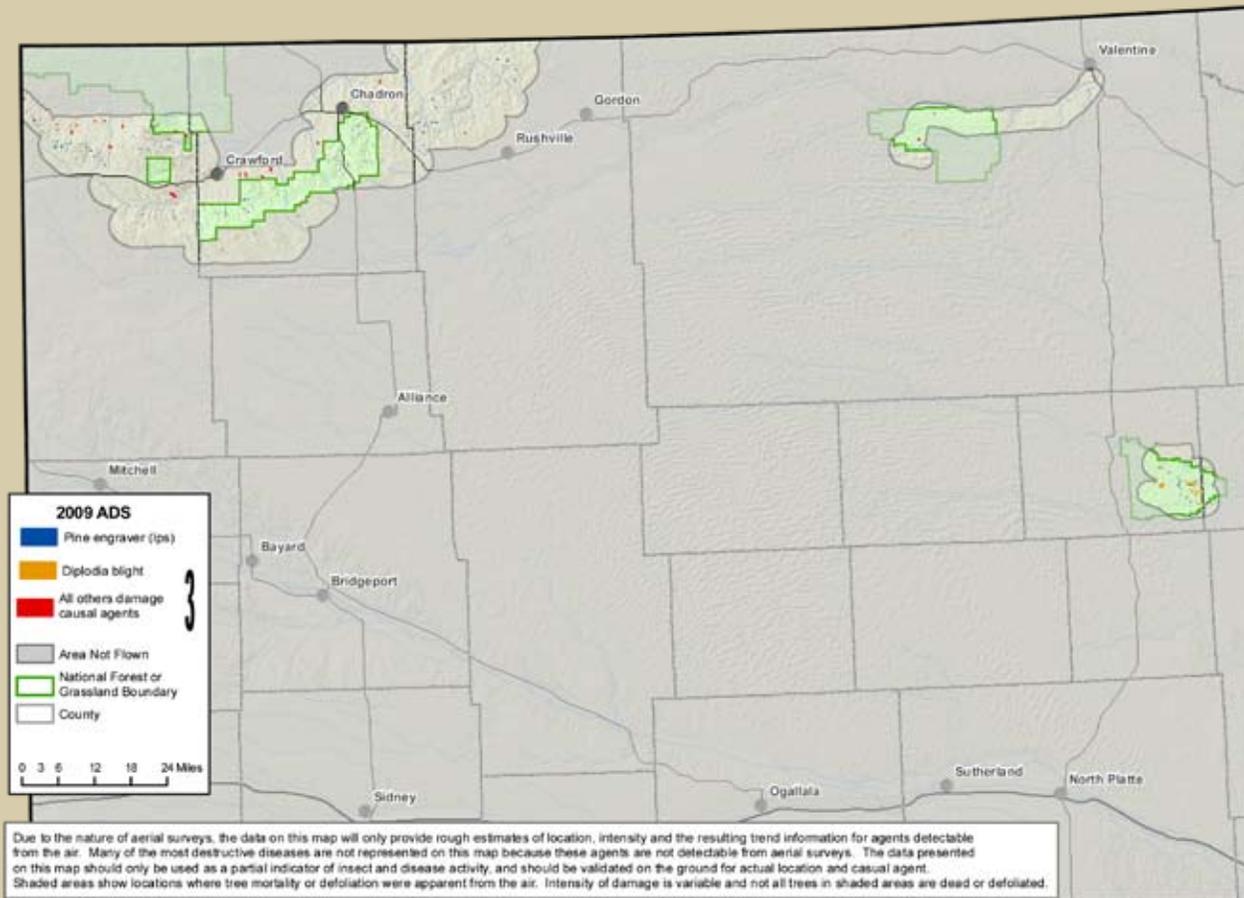
The 2009 aerial survey covered forested lands in the valley – side slope topographic region of northwestern Nebraska, as well as the forested portions of the Samuel P. McKelvie National Forest and the Bessey Ranger District of the Nebraska National Forest in central Nebraska. The total surveyed area encompassed about 1.2 million acres.

Of particular note was the low level of pine mortality attributed to pine bark beetles [*Ips* spp.]. Pine bark beetle mortality associated with recent fires was observed in two sites in western Nebraska.

There has not been a trend of increasing acres affected by pine-killing bark beetles as would be expected from a building MPB epidemic. There is currently no evidence of a building bark-beetle problem in Nebraska.

Figure 4. Surveyed area and sketchmapped observations from the 2009 overview aerial detection survey.

2009 Aerial Detection Survey: Nebraska's National Forests



Affected acres (in thousands) by agent in western and central Nebraska as estimated by the 2009 aerial overview detection survey for forest insect and tree disease impacts*.

Attributed Agent	Location in Nebraska	
	Western	Central
<i>Ips pini</i> and <i>Ips spp.</i> in pines	121	46
Sawfly defoliation of ponderosa pine	4	0
Diplodia tip blight of pines	16	467
Flooding/high water	16	0
Foliage discoloration of pines	163	0
Mortality of hardwoods	113	0
Dieback of hardwoods	227	11

* Due to the nature of aerial surveys, these data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. The data presented should only be used as a partial indicator of insect activity and should be validated on the ground for actual location, intensity, and casual agent.

See www.fs.fed.us/r2/resources/fhm/aerialsurvey

Other Forest Tree Insect and Disease Concerns in Nebraska

Diplodia Blight on Ponderosa, Austrian, and Scotch Pines

Diplodia Blight seemed to increase in importance in the Great Plains and was one of the most important diseases affecting pines in the area.

Since there were few reports of this disease in the 1900s, this shoot blight pathogen is considered a nonnative, invasive, forest pathogen in Nebraska

Stress from drought allowed this disease to cause greater damage in planted areas and native forest.

Dutch Elm Disease on American Elm

The incidence of Dutch Elm Disease did not increase from 2004 – 2009, though elm tree mortality was higher than what was experienced during the 1990's. This disease is still a concern, especially in trees that escaped the first wave of the disease and are about 5-6" diameter, or about 20 years of age. Larger trees were succumbing as well. The disease continues to be a problem in riparian areas and cities in the state.

Gypsy Moth on Hardwood trees

Annual detection trapping for gypsy moth is conducted each year in the state. Traps were placed among potential hosts at popular developed recreation sites.

In Nebraska, gypsy moths were caught in traps at three locations: near Omaha, Papillion, and Gretna in 2006. Site inspections were conducted at the Omaha and Papillion sites, and no egg masses believed to be viable.

Mountain pine beetle (MPB) on pines.

In 2009, the presence of mountain pine beetle was detected in Nebraska; its origin is unknown. A few native and some planted European pines in rural and urban forests of western Nebraska have been attacked. Little tree mortality has resulted, mostly among native ponderosa pines which were also attacked by *Ips* spp. pine engravers. Detection and sanitation efforts are ongoing. Monitoring of these sites continues.

Oak Decline and Oak Wilt disease on Bur, Northern Red, and other Oaks

Oak Decline is a complex decline issue dealing with many biological, environmental, and agricultural factors that combine into situations unfavorable to oaks. Canker diseases have been noted in many decline situations. Weather extremes of flooding and drought are important as well as cattle damage causing soil compaction and erosion issues.

Bur oaks in eastern and north-central Nebraska over the past several years have shown symptoms like oak wilt disease. The symptoms include foliage that dies completely or has large necrotic areas, branch dieback, general tree decline, and occasionally some streaking in the wood. It appears the trees are declining from changes in site conditions from human activities combined with oak wilt along the eastern edge of Nebraska and grazing in the north-central area.

Pine wilt / Pinewood Nematode on Austrian, ponderosa, and Scotch pines

Pine wilt caused by a pinewood nematode is an increasing problem in Great Plains windbreaks. About 1,000 trees, mostly Scotch pine, were killed by pine wilt in Nebraska in 2006. Southeastern Nebraska is the area most heavily affected by the disease, but it continues to spread north and west.

Weather Damages on All Tree Species:

Drought Effects – Drought was still stressing trees and causing many conifers and broadleaf trees to die from secondary and stress-related insect pests and diseases, such as bark beetles, Diplodia blight, and root diseases. Reduced growth and poor color were seen in many tree species, especially conifers. Trees particularly stressed from the drought were those in windbreaks and in riparian areas where water tables around them dropped.

Hail/Ice/Snow damage – Hail and Ice damage often occur in the Great Plains and cause severe damages to many different tree species. An ice storm in late December 2006 caused some limb breakage to trees in central Nebraska.

Zimmerman pine moths on Austrian and Ponderosa Pines

Zimmerman pine moth continued to be a problem in windbreaks and ornamental plantings of Nebraska. Austrian pine is the primary species affected, though ponderosa pine windbreaks in drought-stricken areas were also experiencing significant branch injury. These borers continue to kill branches and entire trees in windbreaks and plantations in much of central and western Nebraska.

Forest Health Monitoring efforts continue in Nebraska's forests to carefully examine green ash and walnut trees in urban and rural settings. Early detection surveys are occurring to find exotic, invasive insects and diseases like Emerald Ash Borer and Thousand Canker Disease on Walnut. Nebraska and other Great Plains states play an important role in preventing the spread of damaging insects and diseases from Eastern and Western forests to other forests across the United States.

Figure 5.



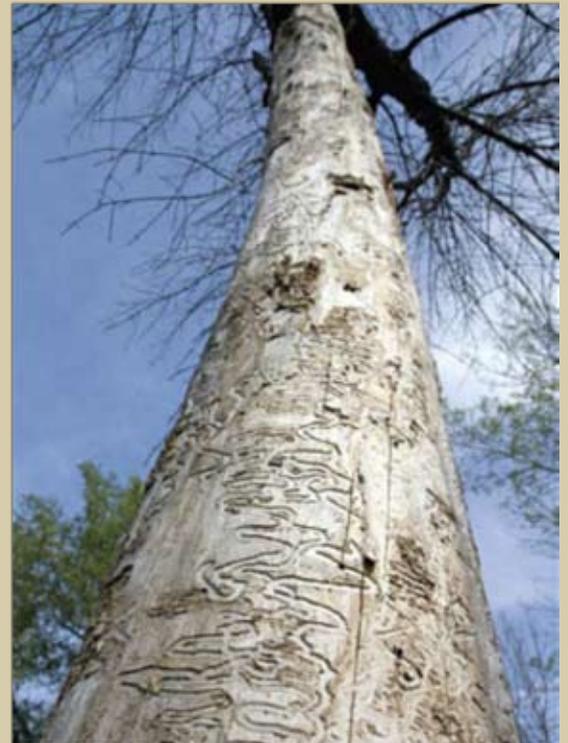
Wilting Walnut tree with 1000 Canker Disease; walnut stem showing multiple cankers
http://www.ext.colostate.edu/pubs/insect/0812_alert.pdf

Figure 6.



Emerald Ash Borer (EAB) beetle on ash leaf; Ash tree killed by EAB, note the beetle galleries

http://na.fs.fed.us/spfo/pubs/pest_al/eab/eab.pdf



For further information on Forest Health in Nebraska, especially during the “missing years” of Forest Health Highlight reports please refer to the websites listed below.



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