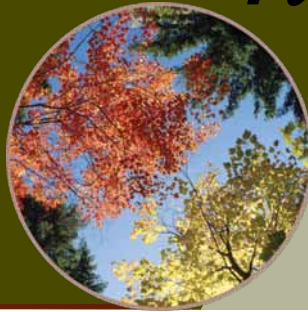
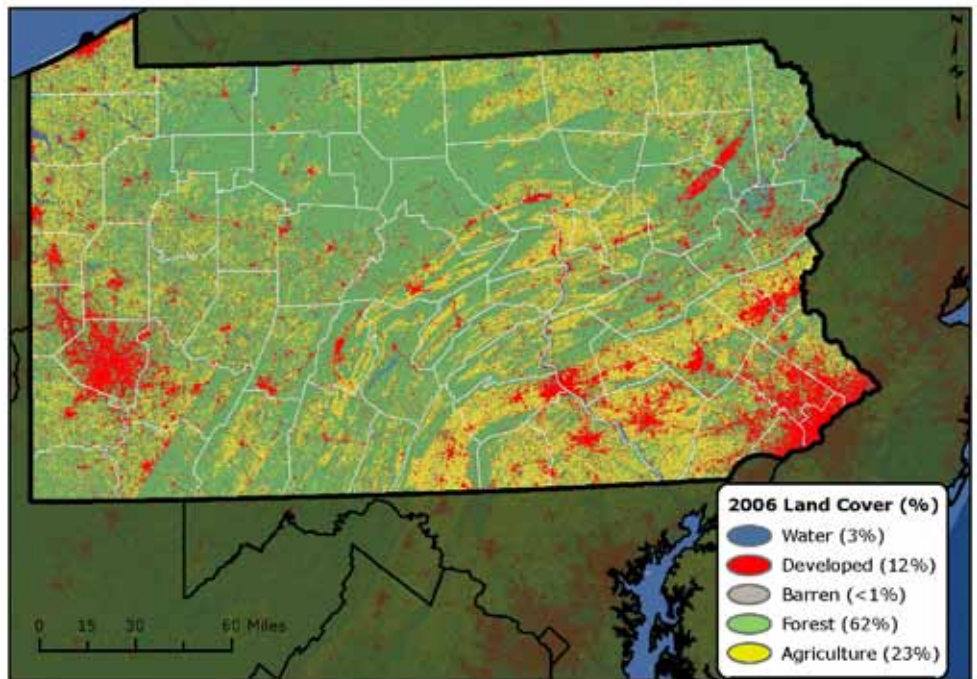


2012 Forest Health PENNSYLVANIA *highlights*



The Resource

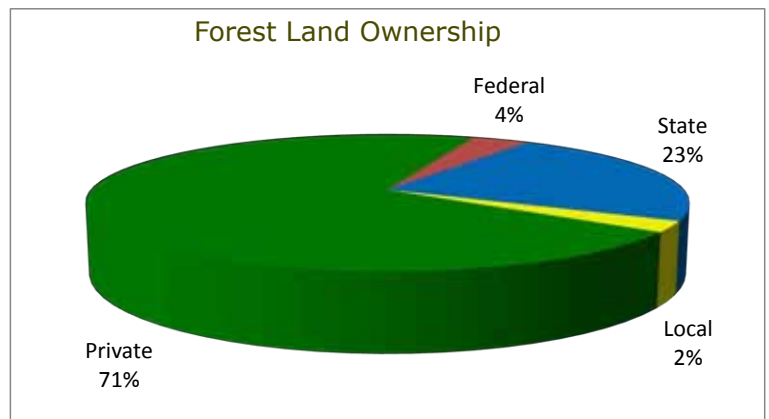
Pennsylvania covers a land area of 25,333 square miles and is 59 percent forested. Seventy-five percent of the forest land in the State is privately owned by 513,900 landowners. Yet with a population of 12 million people, forest landowners account for only 4 percent of the total population. Forests provide timber, watershed protection, wildlife habitat, and recreational benefits for all Pennsylvanians.



Weather Conditions

The weather conditions affecting Pennsylvania forests in 2012 were somewhat unusual because an exceptional period of warm weather in March resulted in some very unusual phenological advances in some tree species. Across the northern tier of Pennsylvania, unseasonably warm air temperatures stimulated early flower bud break and flower development in sugar maple and red maple. Flowers

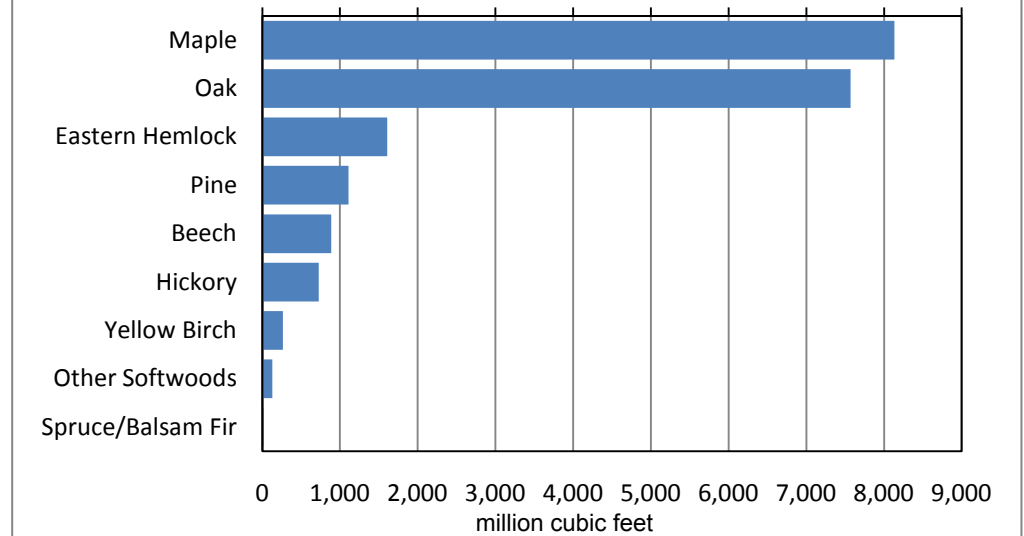
(continued on page 3)



Forest Health Programs

State forestry agencies work in partnership with the U.S. Forest Service to monitor forest conditions and trends in their State and respond to pest outbreaks to protect the forest resource.

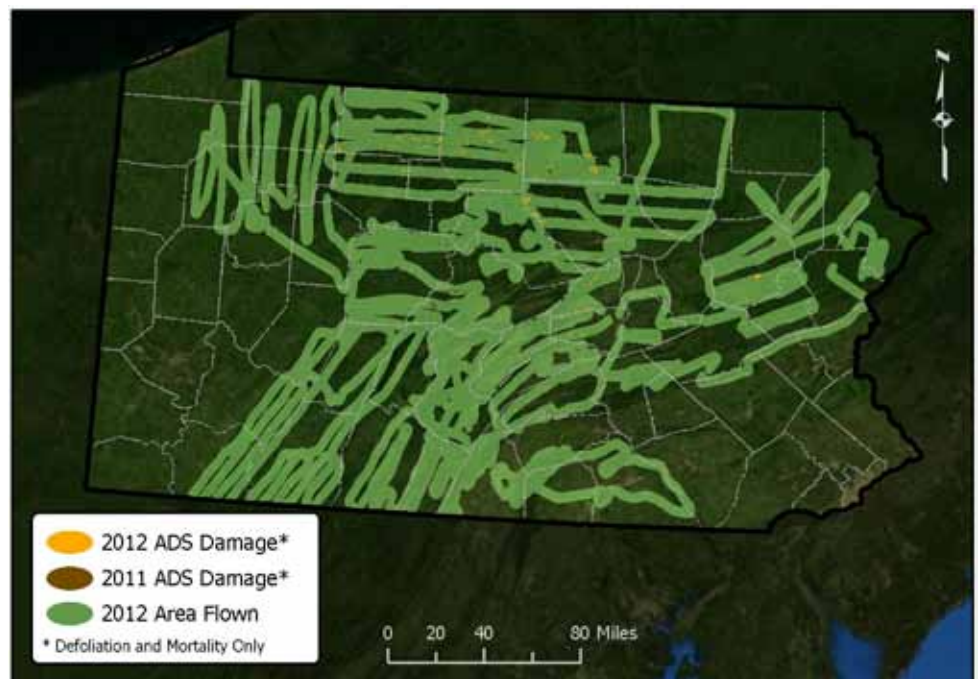
Forest Species Type



Aerial Surveys

A total of 10,721,280 acres were flown in 2012. In addition, personnel ground truthed aerial survey damage polygons and conducted ground surveys throughout the Commonwealth for major insect and disease pests.

Pennsylvania forests were generally healthy in 2012, with some minor damage found in the central and northern part of the State. Major causal agents include oak anthracnose (15,960 acres), maple anthracnose (1,503 acres), and frost damage (6,976 acres). A total of 26,467 acres of forests were discolored or defoliated this year, a slight decrease from last year. Tree mortality was observed in 14,068 acres of forests, the result of forest tent caterpillar defoliation in 2010 and the gypsy moth outbreak in 2008. On the other hand, emerald ash borer continues its expansion to the east and northeast, with six new counties found infested in 2012.



This map delineates aerial detection survey (ADS) results for Pennsylvania in 2012 and 2011.

Weather Conditions *(continued from page 1)*

normally emerge in early May, but in 2012, sugar maple flowers had fully emerged by the end of March and the first week of April. Monitoring plots in Potter County where flower emergence has been followed since 1986 showed extensive distribution of flower emergence and development of 60 to 80 percent of a tree's canopy. Although the study area is confined to Potter County, the entire northern tier exhibited significant early flower emergence. Personnel made subsequent observations in late August to document seed crop development; most tree crowns exhibited little or no seed development. The lack of seed was likely due to cold temperature injury in April or poor fertilization conditions.

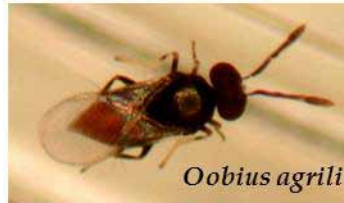
Soil moisture conditions in the spring of 2012 were exceptionally good in part due to excessive rainfall throughout 2011 in all regions of the Commonwealth. Drought periods were observed in most regions of the Commonwealth from early through late July of 2012. Nationally, July was the hottest, driest month on record. Generally the fungal pathogens associated with anthracnose are less damaging during hot, dry conditions. However, cool, moist conditions in April and May were conducive to the development of anthracnose diseases of foliage that affect chestnut oak, red oak, red maple, sugar maple, and sycamore. Although these foliage diseases were abundantly distributed, the resultant damage was quite variable; ridge top and upper elevation positions exhibited light to moderate foliar damage. However, aerial surveys in June/July did not appear to detect significant anthracnose damage.

Emerald Ash Borer (EAB)

Integrated Pest Management Project at North Park in Allegheny County

This is the final year of the 2-year emerald ash borer (*Agilus planipennis* Fairmaire) project. Personnel evaluated chemical treatment efficacy and parasitoid establishment. Results showed that ash crown dieback progressed at a slower pace in treated trees compared to that of untreated

control trees. One larval parasitoid, *Spathius agrili*, was recovered from the release site. In addition, a supplemental release of 243 *Tetrastichus planipennisi* and 420 *Oobius agrili* was carried out in the park in June.



These three biocontrol agents have been released in Pennsylvania to control EAB.



Chemical treatment for EAB.

Biological Control

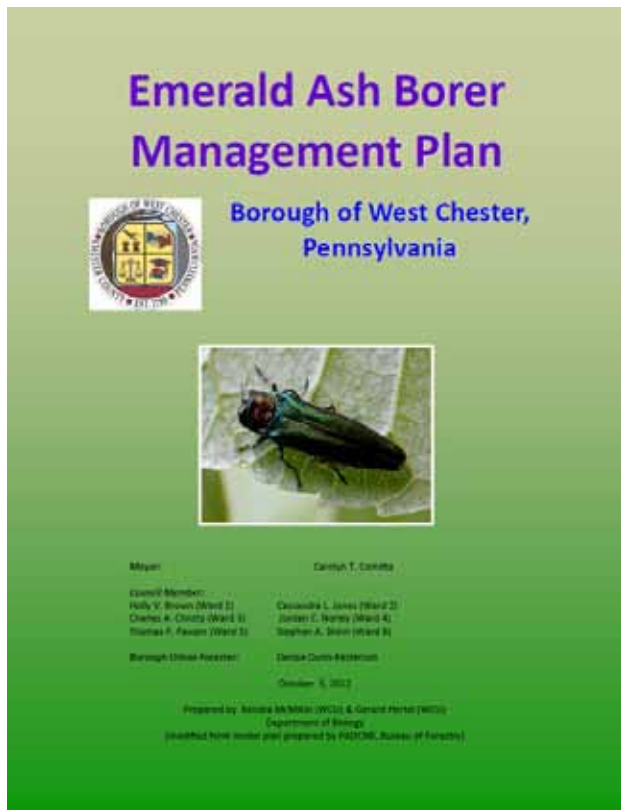
Biological control was extended to two new sites in 2012 with 5,159 and 5,139 parasitoids (all three species) released at Greenwood Furnace State Park in Huntingdon County and Shawnee State Park in Bedford County, respectively. In addition, a total of 154 *T. planipennisi* were released at Deer Lakes Park in Allegheny County as a supplement.

Parasitoid Recovery

In addition to the recovery of *S. agrili* in North Park, the parasitoid *O. agrili* was recovered from EAB eggs collected from Deer Lakes Park.

Community Management Plan

A management plan was developed in early 2012 to help local communities preparing for EAB. Greenwood Furnace State Park and the Borough of West Chester in Chester County completed their plans with help from the Pennsylvania Department of Conservation and Natural Resources Forest Pest Management division.



EAB management plans, such as this one for West Chester, PA, were developed in 2012.

Biological Control Site Selection

Selection of potential biological control sites continued through visual surveys and trapping efforts with purple panel traps. A total of 23 traps were deployed at 22 sites in 7 northern and northeastern counties. EAB adults were found in six traps, with one of them leading to the identification of a new infested county (Clinton).

Hemlock Woolly Adelgid (HWA)

Suppression

Suppression of hemlock woolly adelgid (*Adelges tsugae* Annand) continued in three State parks and three State forests in five counties (Centre, Huntingdon, Perry, Pike, and Sullivan). A total of 1,160 trees (16,734 inches d.b.h.) on 234 acres were treated with imidacloprid (Xytect 75WSP and CoreTect) or dinotefuran (safari 20SG).



HWA suppression efforts continued in five Pennsylvania counties in 2012.



An insecticide is injected into the soil around a hemlock tree.

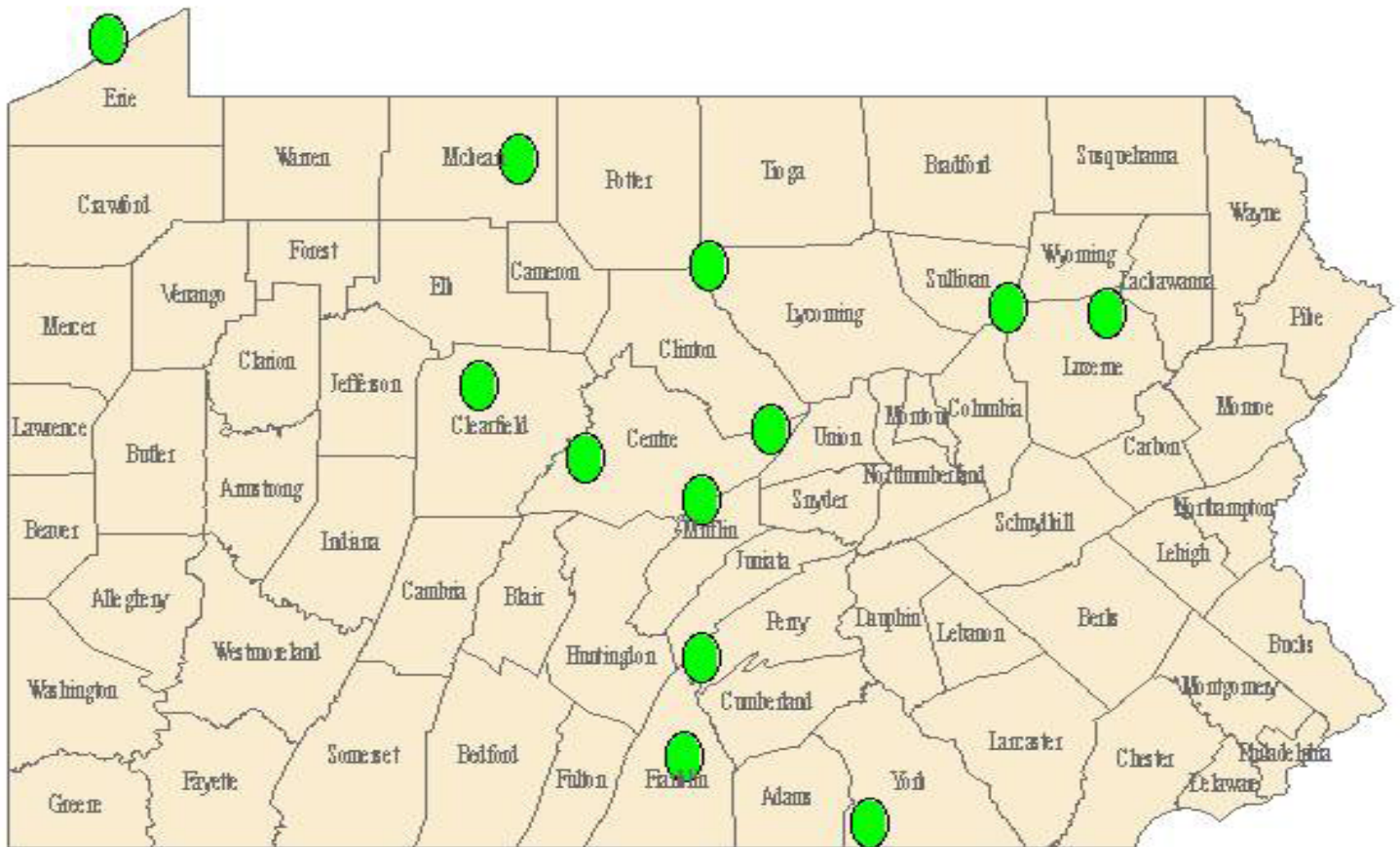
Leading Edge Survey

The HWA leading edge survey continued in 16 counties surveyed in 2011 with a new addition of Beaver County in 2012; final results are pending.

Exotic Bark Beetles

Early Detection Rapid Response

This survey continued for the third year at 12 sites. A total of 2,552 specimens were collected over a 12-week period. Preliminary results showed that *Xylosandrus germanus*, *Gnathotrichus materiarius*, *Euwallacea validus*, and *Anisandrus sayi* are the species encountered the most.



The Early Detection Rapid Response survey for exotic bark beetles continued for the third year at 12 sites in Pennsylvania.

Gypsy Moth

Egg Mass Survey

Still ongoing. Early results showed that a small suppression program for gypsy moth (*Lymantria dispar* L.) is possible in 2013. Expected participants of the suppression program include four counties; seven State forests; five State parks; and a few other Federal, State, and local agencies.

Asian Longhorned Beetle

Trapping

A pilot trapping project was carried out in 2012 to detect this pest (*Anoplophora glabripennis* Motschulsky) early using protocols developed by Penn State. A total of 13 traps were deployed in 10 State parks. Traps were serviced biweekly from June to September. No adults were found.



ALB trap.

Disease Conditions

Anthracnose

Anthracnose diseases of foliage affect chestnut oak, red oak, red maple, sugar maple, and sycamore. Generally the fungal pathogens associated with anthracnose are less damaging during hot, dry conditions. Although these foliage diseases were abundantly distributed in 2012, the resultant damage was quite variable; ridge top and upper elevation positions exhibited light to moderate foliar damage. However, aerial surveys in June/July did not appear to detect significant anthracnose damage. A total of 19,492 acres were observed to be discolored.

Sudden Oak Death

Terrestrial surveys for *Phytophthora ramorum*, the causal agent of sudden oak death, were initiated in 2003 based on trace-forward shipments of nursery stock from West Coast quarantine zones. Since 2006, 23 Pennsylvania streams representing 17 counties have been surveyed for *P. ramorum*; there have been no positive recoveries of *P. ramorum* in surveyed streams from 2006 through 2012. In 2012, stream baiting was conducted in Butler, Lancaster, Montgomery, and Somerset Counties with no recovery of *P. ramorum*.

Thousand Cankers Disease

This disease was detected in 2011 and confirmed on black walnut branch samples from Bucks County north of Doylestown. An internal quarantine has been established by the Pennsylvania Department of Agriculture to restrict movement of any black walnut wood, bark, and byproduct from Bucks County. Detection surveys have been carried out in adjacent counties by regulatory and natural resource professionals to monitor and report on the distribution of this disease, which is caused by the fungus *Geosmithia morbida* and the walnut twig beetle (*Pityophthorus juglandis*) that is a principal agent in its occurrence.

The initial location of thousand cankers disease in Bucks County was intensively surveyed to determine the extent of the infestation, followed by the eradication of 50 black walnut trees in February 2012.

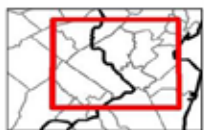
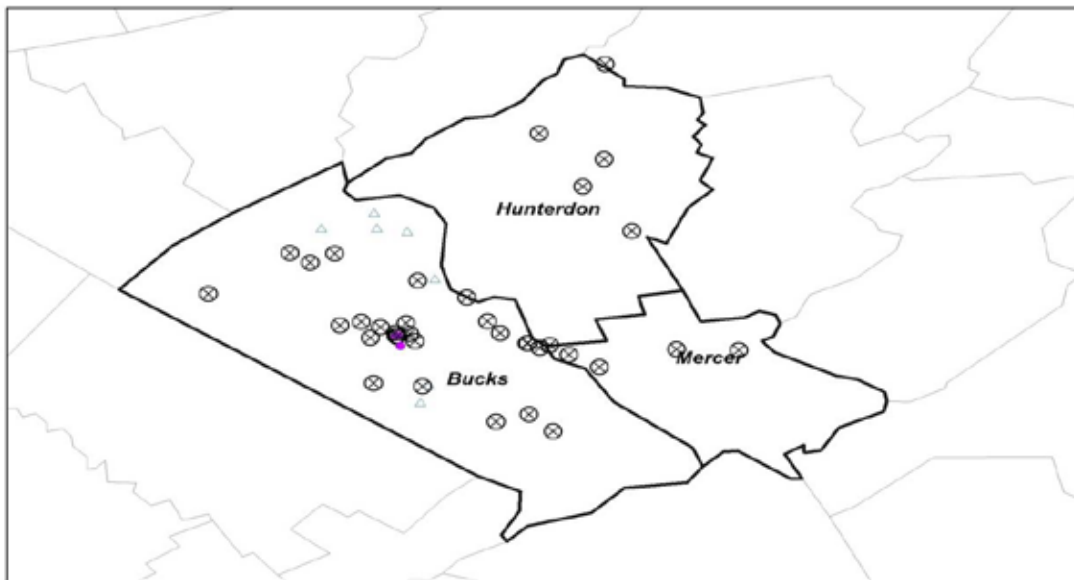
Ongoing collaboration among a number of partners—the Pennsylvania Department of Agriculture, Bureau of Plant Industry and the Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry, Division of Forest Pest Management; U.S. Forest Service, Northeastern Area State and Private Forestry, Forest Health Protection; and the USDA Animal and Plant Health Inspection Service—resulted in a statewide survey of 50 Pennsylvania counties from early April through October 5, 2012. Personnel conducted trap and visual inspection surveys with no positive finds of *P. juglandis* outside of Bucks County in southeastern Pennsylvania. Within Bucks County, personnel monitored a total of 43 trap locations with positive finds of *P. juglandis* at the initial infestation site and three nearby locations. *Geosmithia morbida* has not been found in the area since the eradication event in February 2012.

2006 – 2012 SOD Stream Bait Sites



2006 – 2012 Sudden oak death (SOD) stream bait sites.

Draft Map of TCD Monitoring Trap Locations In PA & NJ



- ⊗ Funnel Trap- WTB not found
- Funnel Trap- WTB found
- △ Visual Survey

Draft map of thousand cankers disease (TCD) monitoring trap locations in Pennsylvania and New Jersey.



A Lindgren funnel trap was used to survey Pityophthorus juglandis in Pennsylvania in 2012.

References

Land Cover Map:

U.S. Geological Survey. 2011. 2006 National land cover dataset. Sioux Falls, SD.

Forest Land Ownership, Forest Species Type:

U.S. Department of Agriculture, Forest Service. 2009. Forest resources of the United States, 2007. Gen. Tech. Rep. WO-78. Washington, DC. 336 p.



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