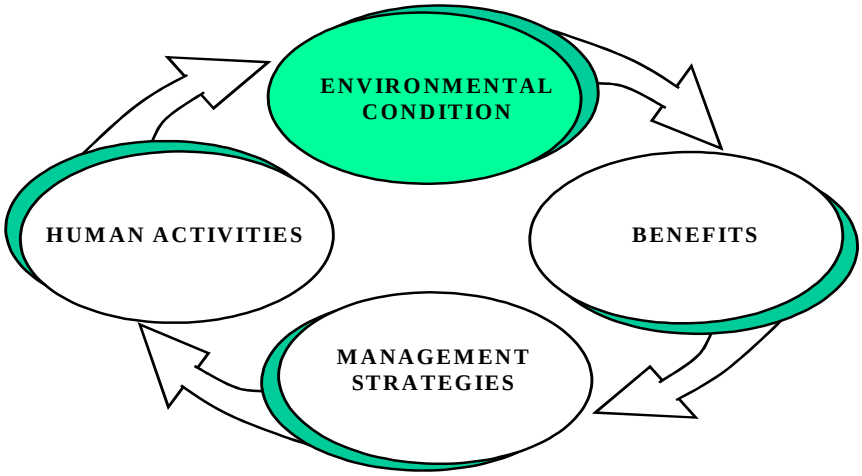
Environmental Indicators Initiative

DEVELOPING ENVIRONMENTAL INDICATORS FOR MINNESOTA

INDICATOR **F** *ACTSHEET* SUSTAINING MINNESOTA'S FORESTS

Forest Area and Forest Types



What does the indicator tell us?

This indicator charts the amount of land in Minnesota with forest cover. Since there are many different types of forest in our state (pine forest, birch-aspen, maple basswood, oak/ hardwood, etc.), and since each forest type provides unique benefits in terms of timber products, wildlife habitat, and recreational potential, it is helpful to track the expansion or decline of different forest types.

Three great ecoregions meet in Minnesota: northern coniferous forest, eastern deciduous forest, and prairie. From the pineries of our northeast through the hardwood stands of the state's center to the oak woodlands at the prairie edge, Minnesota is blessed with a surprising richness of forest resources. Since settlement, logging and conversion to farms and cities have reduced Minnesota's forested area by about half, to 16.7 million acres. The mix of forest types in Minnesota has also changed significantly since settlement. White pine was intensively logged at the end of the last century and is still less abundant than it was. Red and jack pine, white spruce, tamarack, and balsam fir are less common than they were before settlement. Farming and timber harvest created habitat for white-tailed deer which subsequently browsed species such as northern white cedar more heavily. On the prairie border, fire suppression let oak savannahs thicken into oak woodland, and now allows green ash and box elder to replace the oak stands. On the other hand, aspen has spread widely. Aspen is a short-lived tree that sprouts quickly after fire or logging and was once considered a weed tree. New technologies make aspen a valuable source of pulp and fiber. The transformation of other forest types to aspen, however, has both economic and ecological implications.

The area in various forest types is vital data for long-term forest management.

FORESTS

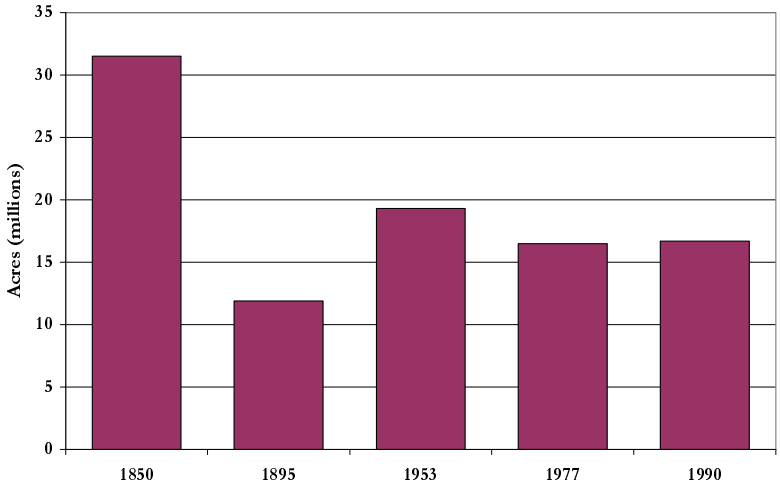
Forest Types in Minnesota

How many types of forest does Minnesota have? Many—but just how many depends on which characteristics you choose to focus on. Forest resource managers classify forest according to cover type defined by the timber species that forms the majority of wood volume in a stand. In this scheme, Minnesota's forests are typically grouped into nine or more major cover types. In other classification systems, other characteristics are more important. Ecologists recognize some 30 different forest types in Minnesota, based on factors like soil type, average moisture level, and upland or lowland location, as well as predominant tree species.

Our diverse forests provide valuable commercial products, from white pine lumber and oak veneer to balsam fir for holiday decorations. But the commercial value of the forests is just the beginning.

More than 180 kinds of birds and animals and 300 plant species depend on forests. Some are generalists, and are widespread in many forest types. Others inhabit only in certain types of forest. Oak savannahs harbor rare prairie butterflies, and oak forests produce morel mushrooms. Birds like the yellow-crowned night heron and Louisiana waterthrush depend on riparian forest. The woodland caribou vanished from Minnesota as old-growth pine forest was eliminated, but today's second-growth pine forests still support pine marten and red-shouldered hawks.

Minnesota Forest Lands Since 1850



Forests also add aesthetic and recreational appeal to Minnesota's landscape. The flaming red of autumn sugar maples, the deep green of mature pine, the brilliance of white paper birch and the grandeur of bur oak are all part of the outdoor experience cherished by Minnesota's hunters, anglers, and other outdoors enthusiasts.

How is forest of various types measured?

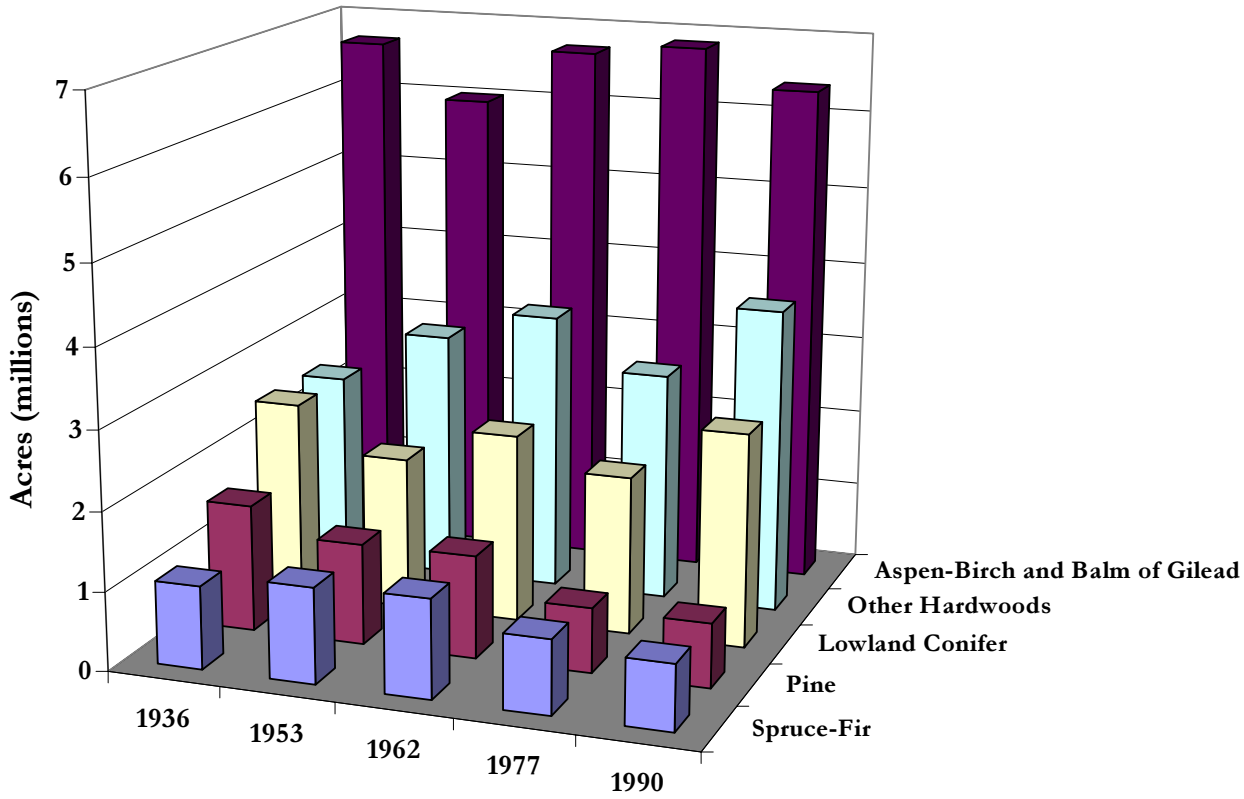
Several state, federal, and cooperative programs survey Minnesota's forest. The USDA Forest Service conducts the oldest survey program, the Forestry Inventory and Analysis (FIA). The FIA program surveys 12,500 permanent forest plots approximately once every 20 years. Surveys in Minnesota were conducted in 1936, 1952, 1977, and 1990.

The Minnesota DNR also surveys five million acres of DNR-administered forest in a project known as the Cooperative Stand Assessment (CSA). Begun in 1985, the CSA uses aerial photos to survey representative plots. If a plot appears to have changed substantially since its last photo, it is surveyed on the ground.

Can we use this indicator now?

Yes. A number of statewide surveys classify Minnesota lands according to forest type. FIA data are available at the USDA Forest Service North Central Forest Experiment Station, located at the University of Minnesota in St. Paul. The Minnesota DNR Division of Forestry also

Minnesota Forest Composition Since 1936



maintains a large database of aerial photos, satellite maps, and on-site survey reports. Forest managers and forest products professionals use these resources to design timber sales and forest management plans.

What are the limitations of this indicator?

Measurements of the type and amount of forest are subject to the limitations of our survey techniques. Aerial photos and satellite images are excellent tools for measuring the area of forest cover, but time-consuming ground surveys provide the details of species mix that allow classification of the type and quality of forest habitat. Thus, depending on survey design and technique, differing conclusions may be drawn about the same resource. For example, the GIS-based FIA calculates less white pine acreage in Minnesota than DNR's CSA surveys, which rely more heavily on ground-based sampling.

Many surveys classify forest according to cover type. But this ignores important differences between sites, including factors like soil type, slope, and moisture availability. Cover type surveys should be combined with an Ecological Classification System to better reflect the variation in forest characteristics observed in Minnesota.

In addition, wildlife and recreation values of a forest may differ if the forest is in one large tract (contiguous) or in many smaller patches (fragmented). Measuring total forest acreage does not reveal the extent of fragmentation.

Information Sources

Aaseng, Norman E., and John C. Almendinger, Robert P. Dana, Barbara C. Delaney, Hannah L. Dunevitz, Kurt A. Rusterholz, Nancy P. Sather, and Daniel S. Wovcha. 1993. Minnesota's Native Vegetation: a Key to Natural Communities. Minnesota Department of Natural Resources, Natural Heritage Program, Biological Report 20, version 1.5.

Coffin, B. and L. A. Pfanmuller. 1988. Minnesota's Endangered Flora and Fauna. University of Minnesota Press, Minneapolis.

Hoff, M. 1997. Sustaining Minnesota's Forest Resources—A Citizen's Guide. Division of Forestry, Minnesota Department of Natural Resources, St. Paul.

Leatherberry et al., 1995. An analysis of Minnesota's fifth Forest Resources Inventory, 1990. USDA Forest Service, North Central Forest Experiment Station, St. Paul. Resource Bulletin NC-165.

Minnesota Forest Resources Council. 1997. Minnesota's forest resources: a biennial report to the governor and the legislature on the implementation of Minnesota's Sustainable Forest Resources Act. Minnesota FRC, St. Paul.

Pearson, C. 1998. Planning for the birds. Section of Wildlife, Minnesota Department of Natural Resources, St. Paul.

Tester, J. 1995. Minnesota's Natural Heritage. University of Minnesota Press, Minneapolis.

White Pine Regeneration Strategies Work Group. 1996. Minnesota's White Pine: Now and for the Future. Division of Forestry, Minnesota Department of Natural Resources, St. Paul.

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