

An Overview of Rural Forestry Tree Planting in North Dakota

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North Dakota is largely a rural State with an economy that is deeply rooted in agriculture. The State's long history of tree planting efforts dates back to the Timber Culture Act of 1873. Early settlers planted trees to provide wind protection, fuel, and food. The Dust Bowl of the 1930s had far-reaching social, economic, and environmental consequences, which accelerated tree planting programs. The most notable program was the Prairie States Forestry Project, which resulted in the planting of 217 million trees in the Great Plains. Tree planting efforts have continued throughout the State into present times.

North Dakota is often characterized as a prairie State because of the topography, soils, and climate that promote perennial grasses and forbs and limit the natural distribution of forest land. Despite this characterization, some diverse and unique forest resources are found in the State. Upland forests (including deciduous and coniferous forests and wooded shrub lands), riparian forests, and rural tree plantings encompass 1,958,000 acres. In addition, community forests include boulevard trees, city park trees, and trees that occur naturally within city limits and rights-of-way. Nearly 70 percent of forest land in the State is privately owned (figure 1) (Haugen and Kangas 2007).

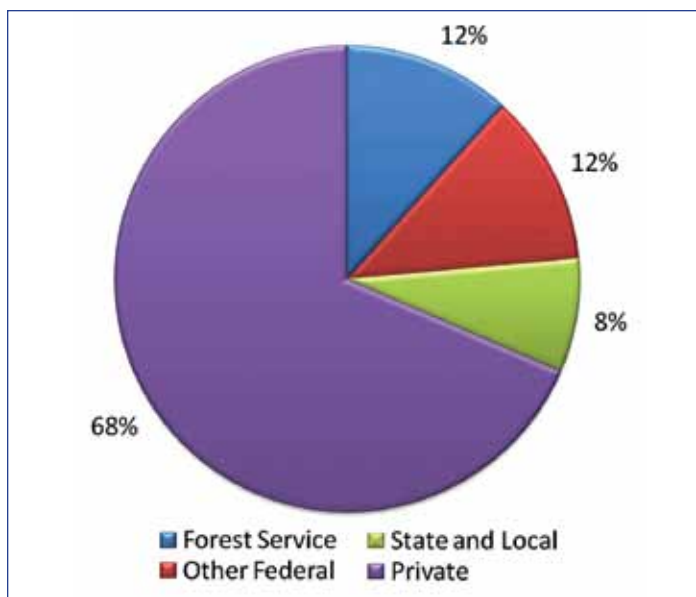


Figure 1. Ownership of forest land in North Dakota.

State Forestry Program

The North Dakota Forest Service is organized under the North Dakota Board of Higher Education. A State forester, who reports to the President of North Dakota State University at Fargo, administers the agency. The land-grant mission is to “care for, protect, and improve forest and natural resources to enhance the quality of life for present and future generations.” The agency maintains nine office locations in the State and is organized around three programs, each of which is led by a team leader. The Forestry and Fire Assistance Team focuses on fire protection, assistance to community forests, forest stewardship for landowners, and forest health to minimize invasive pathogens and other pests. The Nursery and State Forests Team manages the State forestry nursery and the State's five forests (encompassing 13,000 acres). The Administration Team provides information, education, and administrative services.

Upland Forests

Upland forests (figure 2) can be found throughout the State but are more prevalent in the eastern and northern areas (figure 3). The most common deciduous upland forest types in North Dakota include the aspen/birch (*Populus tremuloides* Michx./*Betula papyrifera* Marsh.) and bur oak (*Quercus macrocarpa* Michx.) forest types.

Only 2 percent of the State's forest land is classified as western conifer forests. Isolated stands of ponderosa pine (*Pinus ponderosa* P. & C. Lawson) and limber pine (*Pinus flexilis* James) are located in the southwest counties of the State. In addition, approximately 600,000 acres of Rocky Mountain juniper (*Juniperous scopulorum* Sarg.) shrub lands grow in the Badlands of western North Dakota.



Figure 2. Upland forest in northeastern North Dakota.

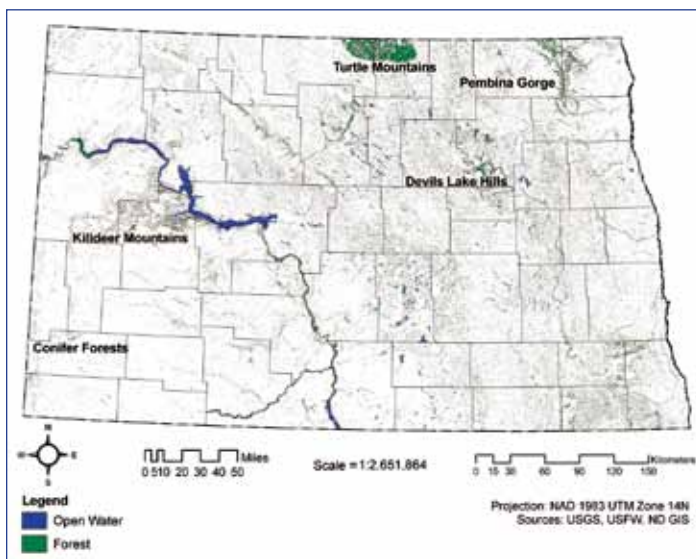


Figure 3. Distribution of upland forests in North Dakota.

Riparian Forests

The elm/ash/cottonwood forest type is the most abundant of all forest types in North Dakota and occurs along rivers, lakes, and streams. In eastern North Dakota, riparian forests are often associated with sites that have deep, alluvial soils at the base of slopes. These forest sites are often present in coulees that were formed by glaciation and water erosion. Thick layers of organic matter are common in the deep soils of these areas. Species such as green ash (*Fraxinus pennsylvanica* Marsh.), box elder (*Acer negundo* L.), and basswood (*Tilia americana* L.) may dominate along the eastern rivers, although cottonwood (*Populus deltoids* Bartr. ex Marsh.), ash, and box elder may be more common to the west. Other associated tree species include American elm (*Ulmus americana* L.), hackberry (*Celtis occidentalis* L.), bur

oak, and willow (*Salix* spp.). Associated shrub species include chokecherry (*Prunus virginiana* L.), gooseberry (*Ribes* spp.), and snowberry (*Symphoricarpos* spp.).

Forestry and Conservation Nurseries in North Dakota

When the early settlers came to North Dakota during the mid-to late 1800s, trees were so scarce on the prairies that homes were constructed from sod and heated with buffalo chips. The limited forest resources in the State served as motivation for homesteaders to plant trees for fuel, building materials, fencing, and protection from the harsh environment of the Northern Plains. When North Dakota became a State in 1889, the State constitution authorized a State School of Forestry to assess tree and shrub species suitability and identify appropriate planting techniques. The community of Bottineau was selected as the site for the school due to its close proximity to the Turtle Mountains, the largest contiguous tract of forest land in the State.

Following passage of the North Dakota State legislature's Forest Nursery Act in 1913, the first forest tree nursery was opened in Bottineau in 1915. In 1951, the North Dakota Forest Service, which operated the nursery, moved it to its present location in Towner (north-central North Dakota) on a site that the U.S. Department of Agriculture (USDA), Forest Service previously occupied. The Towner State Nursery has been continuously operating ever since. The 160-acre facility is the only conifer seedling nursery in the State and produces 1.2 million trees annually (figure 4). The nursery grows both bare-root and container stocktypes. Trees that are produced to meet the needs of North Dakota citizens are used primarily in shelter belts, living snow fences, and other conservation plantings. Most trees are sold to the North Dakota Soil Conservation District, which is administered by the USDA Natural Resources Conservation Service and which offers a variety of cost-share programs to landowners.

In addition to the conifer stock produced in the nursery in Towner, deciduous conservation stock is produced at the Lincoln-Oakes nurseries. The Lincoln unit had its beginning in the early 1930s as the Mandan Nursery, under the supervision of the Bureau of Plant Industry. It was both a production nursery and a plant-testing facility. In 1935, the nursery was transferred to the Soil Erosion Service, which, 1 month later, became the Soil Conservation Service. At that time, the Mandan Nursery was moved to an area between Bismarck and Mandan and was renamed the Heart River Nursery. The Soil Conservation Service moved it to its present location

on the parade grounds of the Fort Lincoln Military Post just south of Bismarck. In 1953, when the USDA discontinued all Soil Conservation Service nurseries, the North Dakota Association of Soil Conservation Districts agreed to assume the operation of the 355-acre Fort Lincoln unit. The Oakes unit of the Lincoln-Oakes nurseries was started in the late 1930s by the USDA Forest Service, south of Oakes, ND. It was closed from 1942 through 1947, until it was purchased by the North Dakota Association of Soil Conservation Districts. The 180-acre nursery has been in operation since.



Figure 4. The Towner Nursery produces more than 1 million conifer seedlings annually.

Rural Tree Plantings

Rural tree plantings throughout North Dakota generally refer to farmstead plantings, shelter belts, living snow fences, wildlife plantings, riparian buffer strips, and others that are designed to achieve conservation, economic, and societal goals. For example, field windbreaks reduce soil erosion during years of drought, reduce water evaporation from adjacent cropland, and increase crop yields (figure 5). Foresters estimate that 55,000 miles of windbreaks have been planted in the State to date. Some plantings are designed to stabilize riverbanks, filter water runoff from adjacent agricultural lands, provide wildlife habitat, protect stretches of highways prone to severe snow accumulation, provide wind protection

for livestock, or protect farmsteads and rural homes from snow and wind. Although many conservation tree plantings occur in areas where the historical vegetation type was prairie, these resources are critical for the present needs of rural residents who live in the current agricultural landscape. Tree species for rural plantings in most areas of North Dakota need to be drought tolerant and cold hardy.

Harvesting and planting in State forests is limited; timber is not a notable revenue source for the State. These forests are primarily native deciduous trees and are managed primarily for recreation and wildlife habitat. Natural regeneration (e.g., root suckers from aspen) is adequate in most cases. On occasion, over-mature stands are cut back to promote native species composition in the forests. With the absence of fire or other disturbances, stands can reach a pathological rotation age. As the trees die out, brush species such as beaked hazel (*Corylus cornuta* Marsh.) can become dominant. The North Dakota Forest Service plans to study succession of aspen in the Turtle Mountains (where the largest State forest is located) by assessing various successional scenarios, which will ultimately assist with future management decisions.



Figure 5. Windbreaks planted among crop fields to protect against soil erosion and desiccating winds.

REFERENCES

Haugen, D.E.; Kangas, M. 2007. North Dakota's forest resources, 2006. Research Note NRS-5. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 4 p.