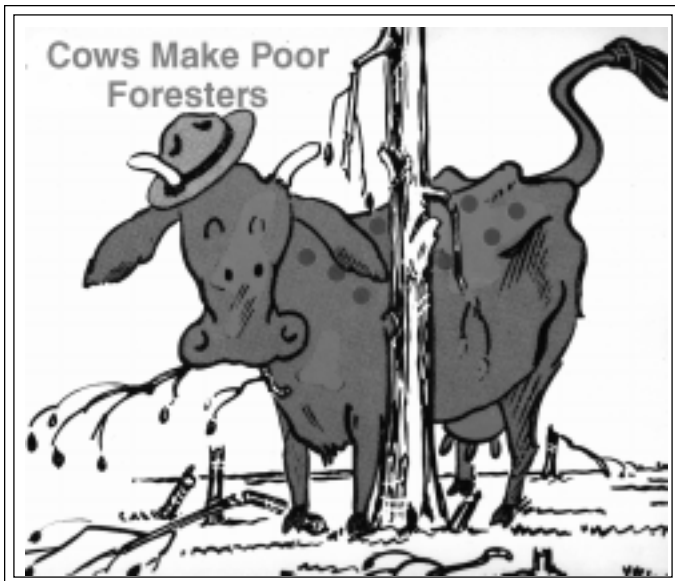




FORESTRY EXTENSION NOTES

GRAZING IOWA'S WOODLANDS

Livestock grazing of woodlands has been a longstanding practice in Iowa. Grazing has occurred ever since the first European settlers came to Iowa in the 1800's. Since that time there has never been less than 50% of Iowa's woodlands being used for pasture. Today, more than 75% of Iowa's woodlands are grazed.



The practice of grazing has been questioned by many researchers. A great deal of research has been done concerning the effects of grazing on timber land. The results provide clear evidence that woodlands should not be grazed.

Despite concerns of professionals, landowners continue to graze their woodlands. Many

landowners cannot interpret the damage grazing has on the woodland. The trees appear healthy and woodlots appear parklike because grazing keeps the "brush" down. An examination of woodland grazing from the viewpoint of the farmer reveals many reasons for this practice which are really misconceptions. These include: 1) To derive the greatest monetary gain from the farm by using all the non-cropable land for grazing the maximum number of cattle; 2) To protect cattle by shading them on hot, sunny days and shielding them from wind and precipitation on stormy days; 3) To utilize low value timber that has few good trees to attract buyers; and, 4) To seek short-term profits since there is no return on the timber management investments of planting, fencing, and weed control for many years, plus there is risk of fire and storm damage until harvest. Lack of knowledge on how to manage Iowa's woodlands also deters landowners from attempting to manage their woodlands.

The landowners' reasons for grazing their woodlands have been debated over the years. Many experiments have shown woodlot grazing to be damaging to the forest soil, trees, and livestock.

Forest Soils

The effect of grazing on the forest floor and the associated soils are detrimental to the woodland itself. Grazing causes: 1) reduced amounts of soil organic matter, 2) increased

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soil compaction, 3) increased soil erosion, 4) reduced soil fertility.

Investigations into the physical effects of grazing on soils supporting farm woodlands have shown that grazing reduces soil organic matter levels by as much as 25%. As the woodlot is grazed, understory plants are eliminated, crown density is reduced and tree vigor declines, resulting in less deposition of leaves and litter compared to the ungrazed woodlots. With the crown opened, the forest floor becomes warmer, causing the organic matter and litter to decay faster. The increase in the amount of sod in the grazed woodlot contributes organic matter due to dying grass roots, but this addition is not enough to offset the decline of tree and understory vegetation litter.

The compaction of soil by grazing leads to greater resistance of the soil to passage of air and water. This impermeability is the result of the destruction of the soil structure due to trampling or direct rainfall impact. When soils become compacted, they typically are characterized by lower initial moisture content in the spring and a greater tendency to dry out in the summer or fall. Grazed woodlots typically have lower soil moisture levels despite less moisture loss due to transpiration and less moisture interception by the dense crown cover of the ungrazed woodlot.

The impermeability of grazed woodlot soils leads to increased surface water runoff. For example, runoff from grazed forest floors (even with sod established under the remaining trees) averaged 344 cubic feet per year per acre over 7 years compared to less than 30 cubic feet per year per acre from comparable ungrazed woodlots. Severe erosion and soil loss can occur where woodlot grazing has been permitted and compaction has occurred.

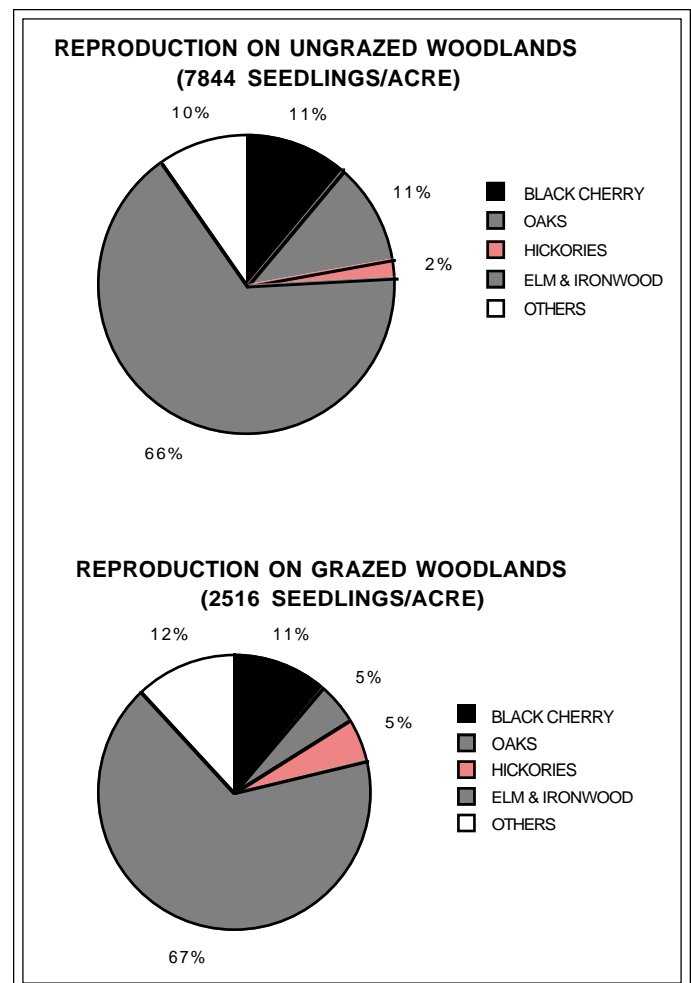
In addition to physical effects, woodlot grazing effects the fertility of soil supporting farm woodlands. Litter removed from adjacent stands of grazed and ungrazed woodlots showed re-

duced fertility due to grazing, particularly in organic matter and available nutrients. This reduction in fertility is primarily due to less understory vegetation and tree litter, and the leaching and removal of nutrients by surface water runoff. Fertility reduction is critical because it occurs in the surface soil layers which serve as seedbeds for natural regeneration.

Trees

During woodlot pasturing the trees and associated vegetation are also affected. The diversity of plants decreases, tree reproduction decreases or is eliminated, and the trees become stressed and diseased.

The effects of reduced soil fertility on tree reproduction could be measured if the area was not browsed, trampled, and ridden down by livestock. Within a few weeks, cattle will



Stand	Trees per Acre		Basal Area (ft ² /acre)		Stocking (Percent)	
	Ungrazed	Grazed	Ungrazed	Grazed	Ungrazed	Grazed
Sapling	599	291	11	11	20	17
Poletimber	120	137	36	35	35	35
Sawtimber	67	39	75	43	59	34
Total	786	467	122	89	114	86

Number of Trees/acre, basal area, and stocking in grazed and ungrazed woodlands

begin to browse shrubs and foliage of young trees. In 5 to 10 years all reproduction will have been destroyed, and the lower limbs of the larger trees will be brosed back creating the "grazing line" common to all heavily-grazed woodlots.

A study done in the Skunk River basin in south east Iowa by the US Forest Service in 1986 compared forest characteristics of woodlands with a grazing history and woodlands that were not grazed. Grazed woodlands average 2516 seedlings per acre; 344 of these were high value species (oaks, ash and walnut). Ungrazed woodlands average 7844 seedlings per acre; 1281 were high value species. Without adequate reproduction to restock the woodland and as grazing continues, number of trees per acre, basal area per acre and stocking percent goes down. Stocking is an indication of relative stand density and degree of site utilization; forest areas less than 100% stocked are not producing as much wood crop as possible.

The growth of trees remaining in the woodlot is also reduced due to grazing. As the litter layer is diminished and the soil becomes compacted, shallow root systems become exposed and vulnerable to trampling injuries. These injuries are potential disease entrance points that can further reduce the vigor of trees. Because there is no tree reproduction in a grazed

woodlot, any large tree that is cut or dies results in reduced crown cover and stocking. This reduction in stand density corresponds to a reduction in periodic annual growth of the stand as a unit. Decreased volume growth is due to both adverse site changes associated with grazing and to decreased stand density itself.

The deterioration of the site quality of the grazed woodlot reduces the growth and quality of the timber. With the elimination of reproduction, the stand opens up. The eventual result is the elimination of all trees and the development of open land. Permanent pasture may well be economically desirable from management goal and may be quite suitable to the landscape, but many years of transition (should the gradual elimination of trees by woodlot grazing be allowed) create a situation where the land is not economically useful for grazing or the production of timber.

Livestock

The livestock can also be harmed by grazing woodlands. Research has shown that livestock loose weight when grazed in a woodland area. The other damage to livestock is they can be harmed by poisonous plants in the woodlands.

Actual forage value of woodlands is quite low. A woodland pasture yielded only 276 pounds

of 8 percent protein forage per acre per year as opposed to 5,222 pounds of 15 percent protein per acre per year from a renovated and improved pasture. Cattle may not gain weight when grazed in farm woodlots without grain supplement. Four months of woodlot grazing at levels of 4 acres per animal unit and 6 acres per animal unit found weight losses in steers until they received a supplement of 3 pounds of corn per day. On the average, 30 acres of well stocked Iowa hardwoods are required to support an animal unit during the 6 month summer grazing season.

Poisonous plants can be a problem in graze woodlands. Poisonous annual plants include: pokeweed, cocklebur, hemlock, snake root, bracken fern, jimson weed, night shade, and jack-in-the-pulpit. Poisonous trees include: wild cherry, buckeye, kentucky coffee tree, oaks, and black locust. They may be poisonous only during certain seasons. Also only certain parts of the plant may be poisonous. Forestry Extension Note F-351 entitled, "Poisonous Plants Commonly Found in Woodlands," provides more information on the subject. This publication is available from Forestry Extension, 251 Bessey Hall, Iowa State University, Ames, IA 50011.

Alternatives to Grazing Woodlands

One of the major problems landowners have is that many of their pastures are fringed with

timber. To fence around the border of the timber could be costly. A viable alternative to this is to separate the higher quality trees from the pasture and to convert the lower quality trees to pasture. By converting a small section of the woodland into pasture and using improved pasture management, the landowner will actually increase the amount of forage potential of the lands. By using good management practices on woodlands including the elimination of grazing, Iowa woodlands have the potential for economic return.

While the argument of increased farm revenue appears to be a benefit, closer observation indicates that the cost may actually outweigh the benefit. Woodlot grazing is not considered a viable alternative of woodlot management. Realistically, the landowner has two management alternatives: (1) timber management, (2) conversion to pasture.

For help in improving the quality of your woodland and developing a timber management plan, contact your District Forester. For more information on timber management contact Forestry Extension, Iowa State University.

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