Agricultural Land Development Practices

FGV-00241

INTRODUCTION

The State of Alaska is implementing an agricultural rights land disposal program through which agricultural land is transferred to private ownership. Proper development of this land is critical to realize its full agricultural potential. Many of the new landowners are unfamiliar with land clearing technology. Improperly applied clearing techniques can impair the productivity of the soil.

Conservation and wise use of our natural resources begins with education. This publication is offered as an educational guide in developing our agricultural land.

PHYSICAL CHARACTERISTICS

Alaskan agricultural land is rated as Class II and Class III soils by the Soil Conservation Service, United States Department of Agriculture. This land is level to gently rolling in topography and may be perennially frozen. Vegetation may consist of mixed hardwoods (birch, aspen, willow) and spruce (black and white), with an understory of brush (alder, blueberry, labrador tea) and mosses (feather, sphagnum, club).

LAND DEVELOPMENT OBJECTIVES

The primary objective in developing agricultural land is to remove the overburden from the soil in an efficient and environmentally safe manner. This includes utilizing as much of the timber as is economically feasible by converting it into products such as logs, firewood, posts, rails or chips.

EQUIPMENT

Only the most common land clearing implements will be discussed because a complete description of all equipment modifications is beyond the scope of this publication.

DOZERS

Crawler type tractors (D-8/D-9 size or equivalent) are the most effective for the majority of clearing work.

BLADES

Standard industrial blades that are mounted on dozers in either normal (perpendicular to direction of travel) or angled (20 - 45 degrees) configuration are most popular. Some blades have been modified by placing extended teeth along the bottom to improve root removal from the soil. Other shearing blades have had horizontal cutting surfaces attached to the blade bottom to shear the vegetation from the soil.

CHAINS

Large anchor chains that weigh up to 30 pounds per link and in lengths exceeding 600 feet have been used. The chain is used to pull down trees and uproot stumps when drawn by two dozers, which usually are operated 100 - 200 feet apart.

ROOT-RAKES

Large, rotating-drum root-rakes driven by hydraulic motors successfully remove stumps and roots that remain firmly attached in the soil following land clearing operations. Smaller, wheel type, friction-driven rakes windrow the loose sticks and debris that remain on the soil surface.

BREAKING DISKS

Large, heavy-duty implements with disk diameters usually exceeding 30 inches are used to conduct the primary tillage on newly cleared land. Any remaining roots and sticks are chopped up and loosened to facilitate their natural decomposition or removal by hand. This operation may improve root-raking efforts in areas where dense stands of hardwoods previously existed.

TECHNIQUES

SURVEYING

A dozer with angled blade can be efficiently used in conjunction with a surveyor to establish the boundaries of a land parcel. The surveyor directs the actions of the dozer through radio communication with the operator. The dozer shears off the overburden and creates a clear trail.

This procedure is normally used to lay out the entire farm including boundaries, windbreaks, homesteads, fields, and traction trails for chaining and subsequent placement of berm rows.

CHAINING

Pulling a large chain between two dozers is often a primary clearing technique. Trees that grow on permafrost soils have very shallow roots. Chaining will pull down the larger trees and dislodge the roots from the soil, thereby facilitating the clearing operation. This method is very effective on trees with diameters of 4 - 5 inches or larger, but smaller trees tend to bend over and spring back without dislodging. Chaining can be performed when the soil is frozen sufficiently to physically support the dozer. On nonpermafrost sites, chaining should be conducted while the soil is thawed. Trees are more deeply rooted in nonpermafrost soils, so chaining in the absence of frost permits the deeply anchored roots to pull free rather than break off.

PILING

Dozers equipped with either straight or angled blades are then used to push the debris into piles or berm rows (see box). It is important that all moss, which is an insulator, be removed from the soil. This activity should take place only on frozen soil to reduce the possibility of accidentally scraping topsoil into the berm rows. Most areas of Alaska have a spring work season during which snow has melted, but mineral soil remains frozen.

All berms should be placed in straight rows on previously cleared areas (i.e., traction trails) rather than simply be pushed into standing trees and abandoned. This practice greatly improves the burning quality of the berms and cleanup. It also allows farming to proceed between the berms until they can be eliminated. Large berms should be piled as far apart (150 feet or more) as is practical. They are usually burned successfully during the winter.

Angled blades may also be used to simply shear the vegetation from the soil and roll it into small berm rows or windrows 10 to 12 feet apart to be burned at a later time. A large ratio of snow to combustible material usually precludes effective burning of small berms in winter months. Although this piling method is cost-effective, it necessitates summer burning of berm rows, and restrictions that entail extra costs may be imposed on summer burning activities (see box).

BERM REMOVAL

All berms should be permitted to dry at least one full summer prior to burning. Following the initial burn, the unburned material is consolidated into either round piles or long berm rows and reburned as necessary. After sufficient reduction in volume, the unburned material is either buried (after which the carefully saved topsoil is replaced) or removed from the field.

Before debris is piled, it is advisable to contact the State Division of Forestry and local government entities in your area for information about burning berm rows. Guidelines, safety precautions, regulations, and/or permit requirements for burning debris vary widely from locality to locality and from season to season. Knowing in advance what restrictions may apply to burning will help you determine whether to pile debris in large or small berm rows and when to burn them.

BREAKING

Large breaking disks are used to loosen the soil and any remaining roots. Breaking aids the primary tillage of new soil by incorporating organic matter and destroying existing root systems.

ROOT-RAKING

Hydraulically driven, drum root-rakes are utilized to remove large, attached roots and trash from the soil. The rake places the residue in windrows, which are then consolidated and burned. On nonpermafrost sites with deeply rooted vegetation, root-raking is generally found to be most advantageous, but may be less than cost effective where anchored debris is minimal.

Sites on which a significant amount of loose trash is present may be efficiently cleaned with a friction-driven wheel rake. The windrowed material is again consolidated and burned.

ALTERNATIVE CLEARING TECHNIQUES

BURNING IN PLACE

Timber can be chained and/or sheared with a shearing blade and then burned. This method reduces the amount of debris that has to be pushed into berm rows. In addition, broadcast burning permits an even distribution of ashes which, in turn, tends to raise the soil pH and add nutrients. This method requires extreme caution and should be undertaken only with the assistance and cooperation of the local fire protection office.

College of Rural Alaska

Cooperative Extension Service

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157/6/83/DQ/500 Reprinted July 2002