Alaska Natural Resource Management Series

FWM-00111

EFFICIENT LAND CLEARING TECHNIQUES

Land clearing, even under the best of conditions, is costly. If it is not done properly, costs can increase markedly. Thorough planning and the implementation of proven clearing techniques will help insure that productive land is put into operation in the manner most cost effective.

PLANNING

A well thought out plan needs to be developed before land clearing operations begin. Priorities should be set for where, when, and how much land will be cleared in a given period. There are several interrelated components to consider before proceeding with clearing operations.

1. Utilization Potential

Determine whether or not there are economically salvageable wood products on the parcel before it is cleared. Harvesting timber for personal use is an alternative worth considering. Selling wood off the parcel may generate a positive cash flow and allow utilization of a resource that would otherwise be wasted. This also will result in less material to be cleared and piled.

Products such as fuelwood, sawlogs and houselogs usually are in demand in Alaska, and the potential exists for chip and hardwood/softwood export markets. Consider time restraints, legal aspects, the amount and type of wood available, and market conditions when evaluating the feasibility of selling timber prior to clearing.

2. Deadlines and Timing

The timing of clearing operations is critical to successfully meeting clearing deadlines. For example, land should be cleared when the soil is frozen with minimal snow cover or during a dry summer period. Establishing reasonable time frames to meet specific operations provides the flexibility to clear and pile when conditions are optimal.

3. Physical Development Factors

Several interrelated factors influence how and when to clear and pile berms. Those factors include field layout; timber species, size and density; soil types and conditions; slope and contour; wind, and solar exposure.

A. Field layout—Establishing development priorities by the order and manner in which fields will be cleared, and locating windbreaks are important to get the best land into production first.

B. Timber species, size, and density—These factors determine what size of equipment is needed for clearing operations. Stands of sparse or small diameter timber may be efficiently knocked down by pushing with a bulldozer. Sparse stands often can be pushed into round piles from the start. Dense timber stands or large diameter timber is likely to require chaining.

C. Soil types and conditions—Soil types and conditions impact clearing ability. Lowlands generally offer a shorter summer clearing season as they take longer to drain and return to a dry, workable condition. Lowlands generally react to seasonal rainfall quickly, and can become too wet to work efficiently. Higher ground or well drained soils tend to dry out sooner following spring thaw or periods of rainfall than lowland sites. Frozen soil can provide optimal clearing conditions.

D. Slope and contour—Changes in slope across the parcel may require different clearing schedules due to the effect on soil moisture conditions. Varying degrees of slope may require different equipment or clearing techniques to maximize effectiveness, minimize potential soil erosion, and operate safely. Berm piles should generally follow contours.

E. Wind—If berm piles are to be burned, it is advantageous to align the piles parallel to the prevailing winds of the burn season. The burning of piles that are oriented perpendicular to prevailing winds greatly increases the chance of fire control problems in the form of embers igniting adjacent piles.

F. Solar exposure—Solar exposure should be taken into consideration when planning the layout of piles to be burned. A north-south alignment provides maximum solar exposure which enhances drying and curing piles. Piles running east-west often retain snow or moisture on the north side longer than on the south side, resulting in piles that are not uniformly cured and thus burn less efficiently.

4. Available Resources

Evaluating what can be done with available equipment, finances, and personnel greatly helps determine when and how, and how fast land can be cleared. In small diameter timber (5" or less), or if time restrictions are not a problem, much can be accomplished with a medium-sized bulldozer (D-6 or equivalent). As a general rule, when chaining or rough piling large timber, bigger is better in terms of the amount of work that can be completed for the dollars spent. Depending on the task, one may want to consider using different size bulldozers to maximize efficiency. Large bulldozers (D-9 or equivalent) can be used for chaining and rough piling, and smaller bulldozers can do the lighter clean up work. Overextension of personnel or equipment can result in breakdowns, lost time, and unrealized expectations. Be certain that deadlines can be met with the available resources.

LAND CLEARING AND PILING

Experience has shown that there is no one best method to clear land. The variables and constraints for individual projects are different and require different approaches and techniques for clearing. Ultimately, individual land-clearers must weigh their own available resources and the local environmental factors against whatever contractual or other constraints they are working under.

Clearing methods can be broken down into the different techniques that are applied during the winter and/or summer for a particular situation; however, some principles remain constant regardless of the season in which clearing and piling is done.

1. Creating the Optimal Berm Pile

The creation of berm piles should generally follow the same guidelines whether or not they will be burned. The berm pile should be as high, narrow, compact, and as free of dirt and snow as possible. This leaves the topsoil in the field, allows for maximum field utilization, and creates the best pile to burn efficiently and safely.

Trees should always be chained or pushed down parallel to each other. This facilitates piling operations and creates compact berms. Clearing strips, bulldozed swaths clear of stumps and debris, should be created prior to chaining. The berm piles then can be located on these clearing strips to facilitate piling and make final clean up easier. Piling, or pushing, of downed timber to create berms should be done with a brush or toothed blade to avoid piling unwanted organic debris, snow, or topsoil in the pile. Berm piles should be parallel to each other and depending on size of bulldozers doing the piling and the size of the timber, 100 to 200 feet apart. Every 200 to 600 feet along the length of the piles should be a break of at least 30 feet. These breaks facilitate equipment movement through the fields and also act as firebreaks. Avoid creating dead end piles in a field that would inhibit equipment movement. To insure adequate firebreaks, piling operations should begin around the field perimeter. Do not have any pile closer than 100 feet from adjacent woodland.

No trees should protrude from piles that are to be burned. Protruding trees can become flaming torches and emit embers high into the air. From a fire safety and pile removal viewpoint, creating clean piles cannot be snow or dirt do not cure properly and they also burn poorly. Dirty piles create excessive smoke, tend to smolder for long periods, and are not consumed completely as are clean piles. Prior to burning, the pile should be fully cured.

2. Winter Operations

Winter operations on a frozen stable surface provide the advantages of minimal soil disturbance and movement. This results in reasonably clean, dirt-free piles. Trees knocked down in the winter are at their lowest moisture content and cure more rapidly. Winter operations may offer a work time advantage compared to the summer when other activities may have priority. Winter clearing does leave the roots in the ground, and usually works best for clearing if the trees are less than 4" in diameter. The remaining small residual roots usually are broken

up adequately by summer disking operations. If the trees are larger the root wads have to be removed in summer operations, when they can be separated from the soil.

Separating trees from frozen soil can be accomplished by shearing at ground level with a straight or angle blade dozer or chaining them with multiple dozers. During winter after deep, hard freezing occurs, straight or angle blade shearing is more efficient at removing the total above-ground tree than chaining, as chained trees often snap off or shatter above ground. Shearing becomes difficult and inefficient if the trees are large or the snow cover is significant. During early winter before deep freezing has occurred, chaining works well with little or no shattering. Chaining also works in snowy conditions and usually proceeds faster than shearing over a given area.

Winter piling should be done only when minimal snow cover exists. Pushing snow into the berms creates wider piles, cuts down the percentage of productive field, and requires more time to push. Large amounts of snow packed into piles may not melt entirely during the course of the summer, leaving wet piles which cure slowly and burn poorly. If piling must be done with snow on the ground, do only the initial rough push and leave the smaller timber residue for summer clean up.

Given these constraints, there are only a few periods during the year when piling can be done on snowless, frozen ground. Generally, these periods occur either after freeze-up and before heavy snowfall in the late fall, or after snowmelt and before the soil thaws in the early spring. In the spring, the ground thaws quickly once exposed to the sun. It is necessary to make a concentrated effort to pile quickly before the ground becomes too soft for equipment.

3. Summer Operations

Summer clearing operations have the advantage of occurring under favorable daylight and weather conditions. Large trees having shallow root systems can be removed from the soil effectively. The time available to work on clearing, however, may be at a premium in the summer. In addition, the sap content of stem and branches is at its peak, causing longer curing time. Careless piling operations can result in excessive dirt in the piles and removal of topsoil from the fields. Summer clearing works well for large trees as the roots can be tipped out of the ground. With either a single straight or angle blade dozer, or by chaining with two dozers. Chaining is the most effective, efficient method to do summer knockdown of standing timber.

Summer clearing is bound by weather constraints in that it needs to be done when the soil is dry. Dry soil facilitates uprooting of trees and tends to leave the soil on the ground and not in the root wad. In Alaska, generally dry soil conditions occur seasonally in June and July. Increasing rainfall in the later part of the summer and fall creates wet soils that tend to rut excessively during piling, increase erosion problems, and create muddy piles.

Rough pushing under wet summer conditions can create deep rutting, and also can bury large amounts of sticks and limbs, complicating the final cleanup operation. Buried wood decays slowly in the ground and frost can keep pushing it to the surface over the years, creating new litter that must be removed. A brush blade with tooth spacing of 12" to 17" is a must for any piling and cleanup as it greatly reduces the amount of dirt pushed into the pile. During cleanup, lifting and rolling root wads and other debris while pushing into the pile further reduces the amount of dirt in the pile.

4. Combining Summer and Winter Techniques

Combining winter and summer techniques often results in the best alternative for clearing operations. For example, large trees can be chained down during late fall after the ground begins to freeze. This provides a stable ground surface to operate on at a time of low sap content in the trees. The initial rough piling then can be done during a period of minimal snow cover as in early winter or before breakup. The final cleanup then can be done during a dry summer season. Chaining large trees during dry summer months and piling them after the ground has frozen and snow cover is minimal is another option. Consideration should be given to allowing the downed timber a year to cure on the ground if possible. The trees will cure better in their chained condition than in piles due to greatly increased sun and wind exposure. If trees are allowed to cure this way, fire breaks need to be established around the perimeter.

In conclusion, always keep in mind that the ultimate objective is to remove timber as efficiently as possible, with minimal disturbance and movement of topsoil. The local Division of Agriculture field office can assist in planning and clearing operation. The Division of Forestry can provide information on timber utilization potential. If burning is an option, the local Division of Forestry Area Office provides site-specific advice to aid in constructing piles that will burn safely and efficiently. Refer to the Division of Forestry publication on “Burning Land Clearing Debris” for more information on burning.

Contractors experienced at clearing or burning also can be good sources of information. Obtaining all the information available on land clearing techniques and applying it to site-specific situations prior to beginning clearing operations will help insure that clearing goals are met.

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151/8-90/TG/1000 Reprinted May 2003