



Logging Systems of Southeast Alaska

Factors for choice of System

United States Department of Agriculture



Terrain Some factors to consider include slope, ground profile, streams and wetlands, gullies, and roughness. These factors affect the ability of the equipment to travel over the ground to reach the operating sites. Driving access is required to all parts of the harvest area for ground-based equipment, while cable and helicopter systems allow for remote access. The ground profile is critical to the success of cable systems so the layout must be engineered with adequate deflection and ground clearance to support the intended payload. In general, ground-based systems are less expensive to own and operate than cable systems, which are less expensive than helicopter systems. Sensitive areas must be considered carefully to ensure that soil disturbance or other environmental damage does not occur.

Timber characteristics The following timber characteristics can influence equipment selection: tree size, volume per acre, and timber quality. There are two primary concerns: (1) the physical ability of the equipment to handle the trees without causing unsafe working conditions or causing damage to the equipment, site, or timber; and (2) harvesting economics for both per-tree and per-harvest unit costs. Small trees are less economical to harvest than large trees, and small harvest units are less economical than larger units. Fixed costs such as road construction must be amortized over the volume harvested from the unit, and lower volumes per acre result in smaller unit volumes and higher costs. Harvesting systems with high mobilization costs, such as cable or aerial systems, are especially susceptible to the effects of low volumes per acre. The timber quality affects the timber value, and thus the harvesting economics. Large trees may be too heavy for some equipment to handle, and small trees may be damaged by large equipment.

Soil The soil characteristics to consider during equipment selection include texture, moisture content, and seasonal impact. These factors affect the bearing strength of the soil, and its ability to withstand machine traffic without degradation. Fine-textured soils and moist soils are more sensitive to machine traffic than coarse-textured or dry soils.



Business requirements The timber must be harvested safely and economically for the contractor to ensure worker safety and to remain in business. All costs, including ownership, operating, and maintenance costs may impose conditions on the harvesting operations. These business requirements may include the operating season, timber flow, mill's log specifications, amount of work available, unique operating methods, labor availability, and equipment availability, service, and mobilization. Each company chooses harvesting equipment and methods that it feels best meets its corporate objectives, and different corporate objectives can be reflected in the equipment selection.



Silvicultural system The silvicultural system is significant for equipment selection. Some machines can maneuver better than others between the standing trees and extract logs from a partial cut without damaging the residual stand or affecting future growth potential. Machine size and maneuverability are important issues to consider in relation to silvicultural systems.



Legislation, regulations, and Tongass Land and Resource Management Plan requirements Some of the operating parameters within the harvest units result from legislative and Forest Plan requirements and are required by the Forest Service. For example, utilization standards may include acceptable limits for stump heights and levels of stem breakage. Soil disturbance guidelines can limit the number of roads, trails, and other access structures that are allowed to be constructed on various sites, and thus affect the range of candidate equipment.

Planning horizon for equipment selection

Selecting the equipment for a particular site must be made within the current corporate and regulatory environment. Some typical questions to ask might be: What equipment is available? What is the long- and short-term budgeted production? What are the log quality requirements for the mill? What capital is available? What special environmental factors must be considered? Sometimes, different equipment can be selected upon short notice, but more often the equipment available for any specific site is limited by budgets or by other long-term commitments. The Forest Service does not purchase equipment themselves, but they may influence the choices made by logging contractors by way of their future timber sale opportunities and the conditions placed on specific timber sales.

