Clearcutting as a Silvicultural Practice

A Position of the Society of American Foresters

Originally adopted by the SAF in 1997 and revised and renewed in April 2019. This position statement will expire in 2024, unless, after subsequent review, it is further extended by the SAF Board of Directors.

Purpose: Address societal concerns about clearcutting as a forest management practice and solidify the scientific foundation for clearcutting as a legitimate and sustainable regeneration and restoration tool.

Scope: Clearcutting practices are most applicable to landowners practicing even-aged silviculture with commercial species but should be available appropriately to all landowner groups across all forest types.

Position

The Society of American Foresters supports the use of clearcutting as a proven regeneration method to meet multiple forest management objectives associated with efficient utilization of commercial timber resources and prompt reforestation. Clearcutting is a particularly effective tool to regenerate shade-intolerant tree species, control spread of forest insects and pathogens, improve the timber productivity of managed even-aged forests, and provide early-seral forest wildlife habitat. Oversight by professional foresters and other natural resource specialists and adherence to contemporary forest management standards (laws and Best Management Practices) ensure that clearcutting is applied in a manner that addresses ecological, economic, and social dynamics of sustainability.

Clearcutting is not appropriate in all forest types, nor will it accomplish the desired forest management objectives for all forest owners. The Society of American Foresters does not endorse exclusive use of any specific silvicultural system; however, where suitable to forest types, site conditions, and forest owner objectives, and where applied carefully by skilled professionals, clearcutting is an effective silvicultural practice that can achieve a variety of forest management objectives.

Issue

There has been considerable public confusion and angst about clearcutting and its effects on the environment (Kimmins 1997) for decades. The visual impact of a clearcut commonly leads to negative perceptions that manifest an array of misconceptions about impacts to soils, watersheds, wildlife, and recreation, as well as concerns about long-term sustainability. While the annual cycle of harvesting and replanting agricultural fields is widely accepted, as is forest clearing for other land uses (e.g. pastures and housing), the appearance of a recent clearcut in a forested area often contributes to perceptions that the forest may never recover (Bliss 2000). However, clearcutting as a silvicultural tool should not be confused with land clearing ("deforestation") for the purpose of converting working forests to non-forest uses. It is an intense, site-specific disturbance but one from which the forest recovers and often quickly.

Social challenges to clearcutting have traditionally centered on negative visual attributes (Bliss 2000); perceived conflicts between timber harvesting, clearcuts and wildlife habitat conservation (Ribe 2006); landslides, surface erosion, and flooding (Klein et al. 2012); and most recently, harvesting and associated operation's contributions to non-point-source water pollution (Cristan et al. 2016). However, these concerns are often based on outdated perceptions of the effects of clearcutting as it was practiced in the early- to mid-20th Century. In recent decades, clearcutting practices have been refined to minimize negative site impacts. For example, the retention of mature trees, snags and coarse wood in clearcut units has become increasingly common in order to provide important biological legacies historically found in many of these systems (Gustafsson et al. 2012).

Federal forest agencies and many states now regulate clearcutting (and other forest practices) substantially. Forest owners who use clearcutting today are often encouraged or required to employ best management practices (BMPs) to limit any adverse environmental effects of clearcutting. Additionally, many forest owners voluntarily manage the size and shape of clearcuts to minimize visual impacts (SFI, 2018). In some states, these BMPs are implemented in an educational, non-regulatory manner, while other states have incorporated BMPs into their forest management regulations (Brandow and Cafferata 2014). Cristan (2016) published a systematic, regional review showing the consistent effectiveness of these BMPs.

Creating large openings via clearcutting for the establishment and early growth of shade-intolerant species is the most common regeneration method for even-aged silvicultural systems (Tappeiner et al. 2015). It allows for the most efficient harvesting, site preparation, and regeneration (typically planting) of a new cohort of trees, which then develops as a single structural layer and uniform crop. This creates management and planning efficiency as well as economic efficiency, and follows a basic agricultural model. Without the ability to use clearcutting as a silvicultural practice, it will be more costly to harvest and regenerate shade-intolerant forests in many regions of the country, as well as more difficult to maintain and improve forest health and desirable tree species composition and early-seral structural stages in the landscape.

Background

Emulating natural disturbances

Forest management practices are not identical to natural disturbance, but forestry professionals are able to emulate natural disturbances in many ways through use of silvicultural practices, including clearcutting (D'Amato et al. 2017). Clearcutting, which involves removal of nearly all standing trees within a limited area for the specific purpose of regenerating a new forest (Helms 1998), is commonly used to successfully regenerate shade- intolerant forest tree species precisely because it so closely emulates site conditions supporting tree growth following some forms of large-scale natural disturbances. This emulation of natural disturbance lends itself to the creation of early-successional habitat, which replicates critical foraging and cover values for a variety of wildlife (Bolen et al. 1995). The lack of disturbance or clearcutting that emulates disturbance on federal lands over the past 20 years has resulted in a net loss of early seral forests and habitat for wildlife that use these forests (Kennedy and Spies, 2005; Betts et al. 2010, Swanson et al. 2011).

Advances in forest ecology research in recent decades have highlighted the importance of natural disturbances in rejuvenating many forest types that are adapted to periodic cycles of disturbance resulting, for example, from wildfires and windstorms. These disturbances clear areas of tree cover and, in the case of wildfire, help control disease and insect pests, and expose mineral soil seedbeds. Tree species that do not reproduce or grow well in shade (Burns and Honkala 1990, Tappeiner et al. 2015) thrive for a time in these open conditions, only to be later replaced by species that will reproduce and prosper as understory species in shade. Eventually, the shade intolerant species return in another cycle of disturbance and succession.

Economic efficiency

Clearcutting is typically the most effective, and economical way to harvest and regenerate commercially-important native tree species (Benzie 1977, Alexander 1986, Hicks 1998), enabling full utilization of the timber produced on each harvested area. Non-native plantation forests also can serve an important role in meeting society's needs for wood products, and clearcutting is traditionally used for such intensive plantation management. Worker productivity and safety is part of this efficiency during the harvest, site preparation and planting phases of forest operations. And beyond commercial species, clearcutting can be used to promote other species (e.g. fruiting shrubs) that provide broad ecosystem services.

Regeneration following clearcutting is often accomplished by planting tree seedlings within one or two years following timber harvest. Recent advances in genetic stock for seedlings, nursery practices, site preparation, pest control and fertilization have significantly improved survival and growth of early stands (Tappeiner et al. 2017). Intensive forest management practices such as clearcutting can assure landowners of a good return on their investment. This gives landowners the financial justification for "keeping forests as forests" rather than conversion to other uses such as housing development or agriculture. (Mortimer et al. 2003).

Landscape pattern and restoration

In addition to the regeneration of individual stands of shade-intolerant species (Hicks 1998), the creation of open areas within a broader landscape through clearcutting is also desirable when conditions imperil surrounding forests. For instance, the spread of insect and disease outbreaks can often be slowed, and sometimes contained, through the removal of infected trees (Tainter et al. 1996, Clatterbuck 2006, Sheppard 2006). To be effective, this usually requires the removal of nearly all standing trees within the containment area. The strategic use of clearcutting is likely to become critical not only in controlling native forest insects and diseases (e.g. mountain pine beetle), but in limiting the spread of the increasing number of harmful invasive insects that threaten the health of US forests, such as the Asian longhorned beetle (Smith et al. 2009).

Clearcutting also can be a useful tool for ensuring local safety and protecting public and private property following large-scale natural disturbances. When these disturbances create dangerous conditions (e.g. tree hazards or increased future risk of fire), an effective mitigation measure is to remove nearly all standing trees prior to regenerating a new forest. Similarly, when land changes ownership, a new owner may have differing management objectives, and clearcutting is often the most efficient tool to move the forest onto a different developmental trajectory.

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