A SUSTAINABLE PHILOSOPHY BASED ON VEGETATIVE HABITAT TYPING

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ABSTRACT.—The opportunities to practice sustainable forestry are decreasing as forest acres increasingly fall into improper management and development. The forestry profession has contributed to part of the problem. Sustainable philosophies, quantitative objectives, and accurate assessments of site capability need to be part of resource management. All silvicultural manipulations must be based on improving the growth and quality of the timber stand. Quantifiable objectives allow us to judge success or failure in management. Subjective perceptions do not. Accurate assessments of site productivity are needed to determine appropriate long-term silvicultural objectives.

Productive forests require at least three things: a management philosophy based on sustainability, quantifiable objectives, and knowledge of the productive capacity of the land.

A SUSTAINABLE PHILOSOPHY

Each day more forest acreage is allocated to residential development, forest management practices are restricted on more land, and more high grading masquerading as silviculture consumes quality timber faster than the forest can grow it. In light of this, the need to enhance timber productivity and quality on the remaining acreage becomes paramount. While urban sprawl and public land management are usually political decisions beyond the influence of the community of practicing forestry professionals, silvicultural manipulations clearly fall under our responsibility to produce commodities from the forest in ecologically sound ways. We should be able to ensure that those treatments applied by practicing foresters will enhance the future productivity of the forest. If the profession does not meet this charge, we will lose the authority to manage forest lands and non-foresters will rightly redirect silvicultural treatments in attempts to correct our failings.

The long-term commitment to sustaining forest resources requires that all silvicultural manipulations have the objectives of enhancing the quality and vigor of the residual stand and/or providing suitable conditions for successful regeneration. The residual timber stand should have better grade and vigor than the stand before treatment. In uneven-aged and mature even-aged stands, if our practices do not produce well-stocked, vigorous regeneration of species appropriate to the site, then we again have failed to meet the mandate of improving the quality of the stand. Any treatment that fails to satisfy one or both of these objectives should not be called forestry and cannot be considered sustainable.

These objectives are often compromised in two very different ways, but with the same net effect. Treatments with a short-term outlook preferentially remove all the largest and highest quality stems, leaving poorer quality, lower vigor trees in their place. These high-grading treatments are really log procurement, not forestry. High grading violates the principles upon which sustainable forestry is based; professional foresters should not be involved in any way with such activity, regardless of landowner objectives. Private landowners who truly seek to maximize short-term revenue at the expense of the integrity of their forests certainly have that right (although in my experience and that of many others there are far fewer of these landowners than high-grading practitioners claim; it is primarily a matter of misinformation). However, simply extracting logs does not require the silvicultural skills of a forester and the profession is only tainted by their involvement.

The other extreme applies treatments designed primarily to minimize unfavorable public perceptions while leaving the stand in no better condition than before treatment. Managers seek to manipulate public response by altering silvicultural prescriptions, often in silviculturally inappropriate ways. Thinnings are forgone or done ineffectually. Stands are thinned when they really need to be regenerated. Even-aged methods are avoided when they are silviculturally required. If the growth of quality stems is not improved due to the treatment, we are not practicing sustainable forestry.

QUANTIFIABLE OBJECTIVES

Before initiating long-term management on a landholding, the manager needs to know the management objective for
the property. This requires clear and quantifiable objectives for all resources and concerns. We need targets in order to assess our success or failure in managing to meet the objectives over the long term. The only way we can determine whether corrective action is needed or whether we are on track is to compare the current forest condition to our objectives. We must make choices and we need clear objectives to help us make the choices.

This implies that we must choose objectives that are relatively simple. Fuzzy objectives based on perceptions will mire us in conflict and indecision similar to the condition much of the forestry profession finds itself in today. Whether we like it or not, we need to quantify each objective, basing our quantification on the best knowledge currently available, and work to meet it. As our knowledge increases over time, we may need to modify the objective. Change is acceptable. Waiting until we have all the answers is not acceptable or feasible.

There will often be multiple objectives for a landholding. The different objectives cannot be diametrically opposed, and there must be an acceptance of short-term gains and losses because it is unlikely that we can maximize all objectives at the same time. Over the long term, all the objectives should be optimized. Quantification is again necessary to determine whether lesser gains, or even losses, in some objectives outweigh gains made toward other objectives.

Forest management is usually not a zero-sum situation. We can often significantly enhance productivity while still making progress toward meeting other objectives. Actions such as green retention, altered riparian zone management, and distribution of treatments spatially and temporally can often be done with minimal impact on productivity.

Professional forestry is the science of producing commodities in ecologically sound and silviculturally appropriate ways. The manager must first assess the silvicultural needs of the stand. Then the gains or losses in each of the objectives can be determined, and accommodations can be made for those objectives that are not being met. Confusing prescriptions for other resources with silvicultural prescriptions will quickly lead to a loss of direction and potentially degrade the quality and vigor of the stand. If commodity production is undesirable, then management authority should pass to those disciplines that can focus on other values.

ASSESSING SITE CAPABILITY

To determine appropriate long-term silvicultural objectives, we need to accurately assess site productivity over the landholding. We must know what range of site types is available, how they are distributed on the landscape, and what can be grown on them to meet management objectives. Ideally we would want to know where in the successional process the stand is and where we could feasibly modify the development of the stand. We need to be able to assess why the stand looks as it does. Has the stand history been such that stem quality has declined due to high grading, grazing, or fire? Is the site simply incapable of supporting the quality development of certain species? Where examples of mature stands are not present, how do we determine what could be grown at high productivity on the site? While the extremes of site productivity are obvious to anyone with some field experience, there are wide ranges in site productivity and a large middle ground where decisions will not be so obvious.

On the Menominee Forest, we are using vegetative habitat typing as the basis for assessing site potential. As developed by Dr. John Kotar, habitat type is not tied to current overstory condition and provides a common denominator among different sites. Vegetative habitat types are based on the association of understory flora whose herbaceous species recolonize sites much more quickly than tree species. The understory flora have adapted to the conditions of the site and are able to delineate fine-scale changes in moisture and nutrient status, providing a reliable predictor of site potential.

We have habitat typed each of the 884 Continuous Forest Inventory plots on the Menominee Forest. We can examine over 30 years of inventory data by habitat type for trends in growth rates, tree grade, cull rate, regeneration status, and other areas of concern. We have developed what we term featured forest cover types for each of our 11 habitat types. A featured forest cover type is the assemblage of tree species that will produce quality sawtimber on the site and be competitive with other species on that site. While all species will produce better quality timber on the better habitat types, it may not be physically or financially feasible to get them to regenerate there. For example, although white pine will be very productive on the best northern hardwood habitat types, it will be extremely difficult to keep white pine regeneration from being overtaken by hardwood competition on those sites.

Habitat Type as a Planning Tool

Once the habitat types are mapped over the forest, we can overlay the habitat types on the forest cover type map to determine where on the forest the tree species are on appropriate habitat types. This operation allows the manager to examine those areas over the landscape where species are on inappropriate habitat types and where conversion (restoration) is necessary. The diversity of habitat types in the restoration area on Menominee will allow for a diversity of featured cover types, often a given
habitat type will support more than one featured forest cover type. We still need to decide how much of each cover type we want over the entire forest. Again, the objectives for the landscape must be examined to determine the proper mix of cover types on that habitat type.

For each cover type, we can use the acreage where it is already on an appropriate habitat type to determine the minimum acreage of that cover type over the forest. If we then add all the acreage of appropriate habitat types in the restoration area to that acreage, we can obtain an upper limit on the acreage for that cover type (without converting areas where cover types are on appropriate habitat types). We have then delimited the silviculturally and physiologically acceptable acreage range for that featured cover type. At this point, we can turn decisionmaking over to policymakers or landowners to determine exactly what mix of cover types they desire over the entire forest. As long as they maintain the acreage of a given featured forest cover type within the acreage bounds established by the habitat type and the physiological needs of the tree species, the manager has little cause for concern.

**CONCLUSIONS**

The forestry profession has found itself in a difficult position with regard to public trust, both undeservedly and deservedly so. When individual foresters implement practices detrimental to the quality and vigor of forests, we are all tarnished. The profession bears the responsibility when those members who implement such practices are not censured. It is no longer acceptable to hide behind “It’s what the landowner wants.” As professional foresters, we need to re-establish a sound philosophical underpinning to our management that has as its foundation the improvement of tree quality and vigor through proper silvicultural manipulation.

While subjective feeling may be used as input to guide the development of silvicultural prescriptions, it cannot preclude sound silvicultural prescriptions. Concerns that cannot be addressed with quantifiable objectives should not outweigh scientifically based management principles. We must take the lead in demonstrating that when we are managing with all quantifiable objectives in mind, with a willingness to adapt our management to improved information, we are doing sound, state-of-the-art forestry. No need for excuses should then exist.

Vegetative habitat type can be used to determine whether the stand condition we see today is a result of stand history or site. The site potential as determined by habitat type will indicate what silvicultural techniques are necessary and whether the use of a given technique will enhance the stand quality and vigor. We can evaluate the successional opportunities for a stand on a given site and determine where even-aged or uneven-aged management techniques need to be applied for the sustainable production of forest products. We can provide policymakers or landowners with physiological sideboards when determining silvicultural objectives.

Much of the diversity in forest cover types in the Lake States exists due to the combination of even-aged and uneven-aged conditions found over the area. Applying silviculturally appropriate prescriptions to enhance the quality and vigor of these stands will require the use of a variety of manipulations. Castigating any one silvicultural system as inherently bad, even though silvically proper, will only serve to reduce the cover type diversity of our forested lands. Balance in all respects is necessary.

The profession needs to demonstrate that it has a long-term perspective and that it can restore the public’s trust in forestry. Short-term perspectives are no longer appropriate given the public’s fear of forestry and the concomitant reduction in the land base on which to practice forestry. If our management is conducted under a sustainable philosophy and we manage tree species on habitat types that allow them to reach their fullest potential within the constraints of quantifiable objectives, we will improve the productivity of our forests.