



# Training notes from the woods & the classroom

September 2008

## Timber Stand Improvement

This full-day, classroom and field workshop will present key principles of successful Minnesota TSI operations in a practical, straightforward format. Participants will learn to quickly evaluate a new stand's potential for a TSI treatment, including silvicultural, operational, and economic considerations.

### Learning objectives

At the end of the workshop, you will:

1. Be familiar with timber stand improvement (TSI) terminology and concepts
2. Have experience designing TSI treatments in two different stands
3. Have discussed tradeoffs inherent in TSI planning and implementation
4. Have considered and discussed possible roles for TSI in your business operations.
5. Feel more confident communicating with landowners, foresters, and loggers about TSI.



### Frequently Asked Questions (FAQs)

#### ***Q. What is TSI?***

- A. TSI stands for Timber Stand Improvement. TSI refers to treatments designed primarily to improve the future value, vigor, and growth of existing stands. TSI can be done to improve timber productivity, but it can also be done for other reasons. TSI is commonly done to eradicate invasive, nonnative species or to speed a stand's conversion from one species (e.g. aspen) to another (e.g. balsam fir and spruce).

In textbooks, TSI generally refers only to precommercial treatments. However, for this workshop, we'll consider TSI more broadly, to include precommercial as well as some commercial treatments.

#### ***Q. What's the difference between TSI and thinning?***

- A. A textbook would say that the difference is whether or not the harvested materials can be sold. Under this reasoning, TSI costs the landowner money, and is justified only because of an expectation of increased future value in the stand. Thinnings, on the other hand, generate enough revenue from sale of the harvested products to cover the harvesting costs and make money for the landowner.

However, for this workshop we're going to consider TSI more broadly, to include precommercial as well as some commercial

treatments. Why? 1) Many of the same principles apply to TSI and thinnings; 2) emerging biomass markets may make treatments that were precommercial a few years ago commercial now; 3) loggers are in the best position to know what is and is not profitable for them.

#### ***Q. What are the different kinds of TSI operations? Which are common in Minnesota?***

- A. In this workshop, we'll cover four different classes of TSI operations. We may or may not see each of them in the field depending on available sites, but we'll discuss these four:

1. **Crop tree release:** Identify the most desirable trees in the stand and remove nearby trees in order to increase the growing space available to crop trees. This is a conceptually simple approach. It emphasizes leaving the best growing stock in the woods to increase in value, while removing lower value products.
2. **Row thinning:** Row thinning can occur in either planted or natural (aspen) stands. In Minnesota, it's done far more often in plantations. There are many variations on this theme, for example every second, third, or fourth row can be removed, or two rows of every five, or other options.
3. **Cull tree removal:** This approach has much in common with both CTM and species thinning. It involves removing only the worst

trees from a stand, to focus growing space on more valuable species. Normally with a cull tree removal situation, the killed trees would be left on site. For more on this approach, see *Controlling Undesirable Trees, Shrubs, and Vines in Your Woodland* (<http://ohioline.osu.edu/for-fact/0045.html>).

4. **Species thinning:** In a species thinning, most or all trees of undesirable species are removed, focusing growing space on trees of one or more desirable species. Species thinning can greatly increase the speed of normal stand development (e.g. speeding the conversion from aspen and birch to tolerant conifers). It can also be used to increase mast production for wildlife or for eradication of invasive species like buckthorn.

***Q. Does TSI happen primarily on public lands? How often on private / NIPF lands?***

- A. TSI happens on both public and private lands. Although no reliable data exist on the frequency of TSI operations on public vs. private (or private industrial vs. nonindustrial) land, most foresters believe that TSI is most common on public and industrial lands. It's impossible to say exactly how common TSI is on private nonindustrial lands.

***Q. What kind of equipment is best suited to each general kind of TSI?***

- A. In general, the equipment is less important than the sale layout and the operator's skill and care in operating it. Most equipment can be used in a wide variety of TSI operations with minimal

residual stand damage if the sale is laid out well and the operator is careful and skilled. However, all equipment is naturally better suited to some situations than others.

Care for the residual stand is absolutely critical in TSI. Rutting, excessive soil compaction, and scuffed up trees will all directly reduce future stand productivity, vigor, and value. This is exactly the opposite of what TSI is designed to do.

In general, TSI requires equipment that is maneuverable through tight spaces and that does minimal damage to soil and roots. This means that in most cases, tree-length harvesting equipment may not be suitable (some row thinning may be an exception-[image1](#), [image2](#)).

***Q. How often are TSI operations implemented in Minnesota? Is this just some textbook concept, or does it actually make sense?***

- A. TSI is done quite commonly on public lands. It's done most often where invasive species are particularly problematic or where specific stand conditions are desired. Early thinnings (commercial or precommercial) can have great impacts on stand productivity and quality over the full rotation.

Although most private woodland owners are not strongly motivated by timber production, many county, state, and commercial (e.g. TIMO or REIT) owners are. For owners like this, the benefits of well-planned TSI greatly outweigh the costs.

**Workshop Materials**

Copies of the workshop materials including agenda, exercises and handouts can be accessed on our website at: <http://www.mlep.org/trainingmaterials.htm>

**Instructors**

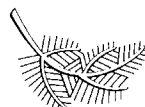
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