

A PRIMER FOR TIMBER HARVEST PLANNING AND EXECUTION AND INVASIVE SPECIES MANAGEMENT

The spread of invasive plant species into the interior of productive woodlands is a serious and rapidly evolving problem that has the potential to significantly impact the financial productivity and ecological diversity of the native Appalachian hardwood forest.

The problems created by some invasive species such as autumn olive, multiflora rose and kudzu are long known and their impact on land management and biological productivity in general is now well documented.

As a result of their incredible ability to germinate and spread, Japanese stiltgrass and garlic mustard have combined to become the most significant threat to natural hardwood regeneration woodland owners and forester managers have been faced with since the invention of deer.

There are dozens of invasive plant species that are poised to impact our forests and the arrival and spread of emerald ash borer is going to create millions of light gaps in the forest for some of the worst of the invasive plants to become established.

Currently there are no set protocol for obtaining natural regeneration while managing hardwood timber that also includes containment and control of invasive plant species.

Dealing with the cost of invasive species of plants in our woodlands is a management expense that will never go away but controlling the arrival or spread of two of the worst species of woodland invasives found in West Virginia, Japanese stiltgrass and garlic mustard, should be a part of the timber harvest management process.

What follows is a suggested set of steps to the timber harvest planning process that can significantly impact the spread of invasive plant species during timber harvesting.

INVENTORY

During the cruise and planning process, notice and documentation for the location or presence of existing populations of Japanese stiltgrass or garlic mustard in areas that are being planned or under consideration for harvesting. At this time in some interior locations of West Virginia, Japanese stiltgrass is only found along road sides and ditch lines but for much of the state a general invasion of forested land is underway and the location of spreading populations

(hot spots) deep within woodland boundaries should be noted. Foresters and Forest Technicians should learn how to identify Japanese stiltgrass in all seasons of the year.

Garlic mustard has only recently arrived in much of the state but the spread of the weed has been extremely rapid in all areas of the state where increased oil and gas exploitation is currently underway. Learning how to identify garlic mustard is extremely important for foresters involved with timber inventories and management planning.

Foresters conducting inventories, developing forest management plans and planning timber harvests with the intention of perpetuating the Appalachian hardwood forests should do so with at least two aspects of consideration relative to invasive species management:

- Knowledge that: garlic mustard is a biennial plant that is often found spreading into undisturbed woods along public roadways, logging trails or gas and oil well service roads...that garlic mustard also stays green over the winter, flowers and goes to seed very early in the growing season while producing prodigious amounts of seed that persist in the soil as a viable seed bank for at least ten years. With its' allelopathic properties now proven, identification and treatment of an infestation of garlic mustard before it becomes a general invasion is critical to maintaining natural regeneration as a long term forest management option.
- Knowledge that: Japanese stiltgrass rapidly builds up a thatch of previous years' growth that is extremely slow to decompose, produces a heavy shade on the forest floor that drastically changes the soil moisture regime on the forest floor, stifles tree seedling germination and possesses an almost explosive flammability. Japanese stiltgrass, when it burns, burns with an extremely hot fire that will kill most trees less than 6" in diameter. A fire in a Japanese stiltgrass infested woods will kill 100% of advance regeneration on a burned site and leave most of the burned area incapable of reproducing trees naturally, from seed without significant intervention or expense. In addition to being extremely flammable, Japanese stiltgrass produces extremely large amounts of seed that will persist in the soil as a viable seed bank for at least four years.

HARVEST PLANNING

Whenever possible and when time allows, harvest planning should take place over the course of at least a year or complete growing season to allow the time to fully identify potential invasive threats to the planned harvest area by garlic mustard or Japanese stiltgrass.

If either species are present a contingency plan for treatment could include:

- Pretreatment of potential landing locations with appropriate herbicides (where permitted or authorized) during the growing season in advance of seed production.
- If a landing location is to be used regularly or repeatedly, mechanical maintenance (weed whacker or brush hog) of the landing on an annual basis timed to be most destructive to targeted invasive plant seed production...stiltgrass in

late August.

- If established logging roads or skid trails that are going to be utilized in a harvest pass through areas with stiltgrass or garlic mustard present, pretreatment of the trails and ditches in advance of use to at least prevent seed production in the current growing season is also recommended.
- Without advance treatment of infestations of that will be crossed or passed through during skidding or extraction activities related to logging, immediate invasion of the entire harvest site by Japanese stiltgrass and/or garlic mustard is a nearly certain outcome.
- When getting ready for a harvest, bulldozer work done between mid August and September 7 will kill the current years' growth of Japanese stiltgrass and prevent seed set.
- Because Japanese stiltgrass responds so favorably to any type of release or increase in sunlight, when possible, defer entry into areas heavily covered with stiltgrass until a regeneration or maintenance plan has been developed.
- The thatch of stiltgrass remains flammable in all seasons of the year and depending upon soil conditions at the time of the burn, can respond to a fire by germinating at a rate approaching one billion of seedlings per acre, overwhelming the ability of the forest to recover.
- Garlic mustard is so persistent in the soil that herbicide treatment may be necessary to slow its spread into the forest.

EQUIPMENT HYGIENE

Both Japanese stiltgrass and garlic mustard are easily spread by all equipment used in forest management and includes everything from logging boots to ATVs or bulldozers, loaders and skidders. Both plants produce small seeds that can number close to 500,000 per pound and the persistence of viable seeds in the soil contributes significantly to the seed bank that will rapidly respond to changes in sunlight and soil conditions created by timber harvesting.

- Boots. Mud on boots can easily track seed from one property to another and muddy landings set out in bottoms with lots of stiltgrass can spread from one property to the next. At this time Japanese stiltgrass is much more widespread in WV but garlic mustard is moving in very quickly. The dried mud that becomes dirt and dust on the floor of a foresters' pickup can spread seeds to nearly every place a forester walks. An extreme example and possibility could be the arrival and spread of Sudden Oak Death SOD on the shoes of hikers or tires of mountain bikes.
- Pickups and SUVs. A weekly vacuuming of woodland detritus from the floor of pickups used in infected areas is recommended. It is also a good practice to empty the dusty crap that accumulates on floor mats...anywhere but on the ground.
- ATVs. Increasingly, foresters are using ATVs during timber sale administration and inventory work. In addition to the obvious potential for spreading weeds with muddy wheels, the skid plates on many models of ATV can trap and hold large quantities of trail debris, including weed seeds. When multiple properties are visited by a forester without cleaning mud off an ATV, both garlic mustard

and stiltgrass are likely to be injected in every site visited by the forester using the ATV.

- Trailers. Every type of trailer, whether it is a small trailer used to haul ATVs, or flatbed trailers that bulldozers and skidders are often moved on can be a significant source of invasive plant infection. Regularly planned high pressure cleaning of trailers used moving equipment to and from infected properties can be an effective way to stifle the spread of some of the worst invasive plants.
- Bulldozers. When a dirty bulldozer with tracks filled with mud is dropped in the entry to a parcel of invasive plant free woodland at the beginning of a harvest, it may be appropriate for the sale manager or property owner to request, prior to the bulldozer being unloaded and embarking on several months of unprotected sex with the soil on the land being logged, that the machine be cleaned of mud from the previous work site. Such a recommendation is extremely valid when the overseeing forester or sale manager is aware of the presence of garlic mustard or stiltgrass at previous work locations. For a property owner, clean logging equipment entering their woodland is presently the only peace of mind available.
- Bulldozer tracks are extremely effective at injecting invasive weed seeds into every place they travel or work. If Japanese stiltgrass or garlic mustard is already present, excess scarification and unnecessary “punch roads” can result in their extremely rapid establishment and spread into harvested areas.
- Skidders. Skidder chains can carry and move large quantities of soil and ground skidding can smear mud and very easily transport invasive plant weed seeds along all travel routes. Moving a clean skidder to a logging site is as important as having a clean bulldozer.
- Chain chokers, wire cables and anything else that passes through the dirt can also help disperse seeds, especially if any land to be disturbed in the vicinity of the landing area contains established populations of invasive herbaceous species like Japanese stiltgrass or garlic mustard.

MULCH HAY

Mulching of disturbed land to reduce erosion has become both a commonplace and legally required part of timber harvesting in West Virginia. As priorities have evolved and environmental laws have changed, the necessity of mulching portions of land disturbed by logging has drastically increased the quantity of mulching material being spread in the woods.

For years mulching material used for erosion control and reclamation on logging jobs was low quality or moldy garbage hay farmers neighboring the logging site had laying around. In the past, mulch hay could be hay that was harvested late in the growing season and got rained on a couple of times or it may have been the cheapest moldy, unpalatable to livestock or extremely coarse plant material available close to the harvest location where it was needed.

With some logging jobs now requiring several hundred bales of hay to accomplish State DOF approved soil stabilization, sources of mulch material can be more than a hundred miles from a logging site and mulch hay can be an extremely effective vector for spreading several destructive invasive species.

Garlic mustard is not normally found in open fields but is often growing along field edges and the fringes of poorly maintained meadows. Because garlic mustard flowers and goes to seed early in the growing season garlic mustard seed can be present in first cut hay. Most farmers cannot identify garlic mustard. If the acquisition and use of mulch hay that is likely to be garlic mustard seed-free is a management concern, use of “first cut” hay for mulch is not recommended at this time.

Japanese stiltgrass has spread very rapidly throughout West Virginia and it is found in nearly every bottomland field or streamside meadow in the central part of the state. Any hay that is used for mulch material that was processed after Labor Day or mid September at the latest is likely to have large quantities of viable stiltgrass seed present.

Spending the time and effort to determine and assure that the source of mulch hay and mulch material is from properties that are stiltgrass or garlic mustard free may be initially more expensive but the losses in post harvest productivity, enhanced regeneration difficulties and increased management expense of invasive plant infested woodland will linger far longer than the one time cost of purchasing the cheapest mulching material available.

Because so many farmers have switched to production of round bales from the standard square bales, straw is increasingly being imported from other parts of the country to be used as mulch. Straw is generally higher in cost than local hay and there is usually no guarantee that straw bales do **not** contain unwanted or unexpected constituents.

POST HARVEST TREATMENT

For at least three years after the harvest has been completed some effort to contain the spread of invasive species brought to the site during the logging is recommended. Treatment options include:

- Leave skid roads and logging trails open and passable to facilitate ATV or tractor access for mowing or herbicide dispersal on “hot spots”.
- Visit harvest site during season of the year most conducive to identification of invasives of concern...mid spring for garlic mustard when the plants are flowering
- Japanese stiltgrass is easiest to identify in late fall or winter (when the ground is not snow covered). Dead stiltgrass has a golden yellow color and a stringy appearance unlike any other plant found in the woods. During the early part of the growing season stiltgrass can become confused with several native grasses and later in summer stiltgrass can get so tall that it is difficult to walk through, especially if there is logging debris buried beneath the thatch.
- Prevention of seed set for growing populations of most invasive plant species is the easiest and most certain method of containment and control.