Supplemental Information Report (SIR):

*Microstegium vimineum* (Nepalese browntop) within the

“Harris Branch Restoration of Hardwoods in a Pine Stand Project Area”

and its presence on the Shawnee National Forest

Introduction

This document (SIR) addresses a qualitative and quantitative assessment of the non-native invasive species, *Microstegium vimineum*, commonly known as Nepalese browntop, Japanese stiltgrass, Mary’s grass, basket grass, Microstegium, or stiltgrass. Nepalese browntop is a highly invasive annual grass species first observed by Forest Service employees along a trail in Pope County, on the Shawnee National Forest in the 1991. Nepalese browntop has been observed to grow on almost any site from very wet to very dry and spreads readily by many vectors (Gauge 2010, Rauschert et al. 2010). We first noticed a rapid spread of Nepalese browntop along roadways and trails. We suspect this is a result of the very small seed of the Nepalese browntop being picked up in the mud or dirt by vehicles, hiking boots, horse hoofs, or other similar conveyance (Mehrhoff 2000, Christen and Matlock 2008) from the site where it was growing, and transported for long distances before dropping off and establishing a new site, possibly many miles away. Nepalese browntop seed is also transported by water (flooding) (Gibson et al. 2002, Oswalt and Oswalt 2007), and where the initial population was in an upstream site it has established populations downstream for many miles. A third vector, which has more recently been acknowledged as contributing to the spread of Nepalese browntop, is movement by animals (Gibson et al. 2002, Oswalt and Oswalt 2007). Nepalese browntop has been identified in deer pellets (Williams et al. 2008), and growing in deer scrapes and turkey scratchings (Tom Neal, personal observations). Nepalese browntop seed can be transported by the feet or fur of any animals. Wind can also contribute to moving seed short distances.

Harris Branch

The environmental analysis for the Environmental Assessment for the Harris Branch Restoration of Hardwoods in a Pine Stand project was initiated in 2003. It was recognized that there was a population of Nepalese browntop along the two roads that traversed the project area. At some locations the Nepalese browntop had migrated several hundred feet from the road edge into the adjacent woodlands. At that time, the inventory team did not observe any substantial
populations within the 200-acre project area interior. In August 2005 two quantitative vegetative plots (0.06 acre or 0.025-hectare in size) were established and named Plot 19 and Plot 20. All vegetation within the plot boundaries were identified and recorded. Plot 19 contained approximately 470 stems of Nepalese browntop; Plot 20 did not have any Nepalese browntop. Since the initial inventory observations, we have observed a virtual explosion in the Nepalese browntop populations. It is now possible to observe Nepalese browntop on almost every acre within the project area. The quantitative measurement of the two vegetation plots in May 2012 substantiates our visual observations. Plot 19 now contains more than 18,075 Nepalese browntop stems and plot 20 now contains more than 3050 stems: a 4494% increase in less than seven years for the combined plots. Visual estimations show an approximate 75% infestation of Plot 19 and a 30% infestation of Plot 20. There has not been any known vehicle or other human assisted vectors (other than foot travel) which would have moved the Nepalese browntop to the interior of the project area. It is speculated that the natural processes of water, animals and possibly some wind has distributed the Nepalese browntop throughout the project area. Regardless of vector, Nepalese browntop has naturally infested the project area in as little as 10 years.

Since the project initiation in 2003, there has been extensive research on Nepalese browntop, its effect on the environment and its control. One study documented that logging and using mechanized equipment transported Nepalese browntop seed from one area in the timber sale to other areas not previously having Nepalese browntop (Marshall and Buckley 2008, Shelton 2010). As a result of this documented information, we anticipate the accelerated spread of Nepalese browntop during the Harris Branch logging operations. After an interdisciplinary review, we have determined that logging equipment will likely move Nepalese browntop seed throughout the area being logged. We have further determined that there is no long term effect or difference between the natural spread of Nepalese browntop (through normal processes as described above) and the mechanized spread of Nepalese browntop in an area the size of Harris Branch on a temporal scale. As stated above, Nepalese browntop, through its natural vectors of spread, has already infested the Harris Branch area in less than 10 years. If there had been a logging operation in 2003 Nepalese browntop would have probably occupied the area at a more rapid rate, possibly in three years.

An additional concern addressed, is the potential allelopathic affect (general inhibitory effects on growth of other plants) on germination of tree seed and growth of existing seedlings and saplings (Gage et al. 2010). The most current available science, indicates that: 1) the allelopathic effect of Nepalese browntop may affect the germination of small seeded tree species but not large seed such as oak and hickory seed, and 2) one year old seedlings may show a slight effect when in competition with Nepalese browntop, but that two year old seedlings showed little to no effect (Beasley and McCarthy 2011, Flory and Clay 2010, Marshall
et al. 2009, and Leicht 2005). The existing condition at Harris Branch, when inventoried, indicated that there were on the average, greater than 400 oak and hickory seedlings and saplings present per acre. With the proposed management (thinning to increase sunlight to the forest floor and burning to reduce competition from shade tolerant species thus providing conditions favorable for future oak and hickory regeneration) it is expected that the existing and future seedlings will provide adequate hardwood regeneration, which includes oak and hickories to meet the 2006 Forest Land and Resource Management Plan goals and objectives.

Summary: 1) for the Harris Branch project area, under the temporal scale that we use to analyze effects of management and its effects on an oak/hickory ecosystem (the Forest Plan recognizes 200 years) there is no difference between the colonization of Nepalese browntop when comparing natural dispersal (currently documented to have infested the area in less than 10 years) to mechanical logging (estimated at approximately 3 years). Infestation of Nepalese browntop by either means would result. 2) According to the latest studies, the allelopathic effect of Nepalese browntop should not affect the restoration of hardwoods at the Harris Branch project area. It is concluded that a correction, supplement, or revision is not needed for the current environmental assessment prepared for the Harris Branch Restoration of Hardwoods in a Pine Stand Project Area.

Shawnee National Forest

Similar conditions regarding Nepalese browntop are apparent across the National Forest. We are observing new populations and increased rates of spread on all areas of the National Forest where Nepalese browntop populations occur and in areas that it was not previously noted. It is the exception if we do not find Nepalese browntop in most areas. Rarely, we will encounter areas where no Nepalese browntop is notable. Often these are remote areas within natural areas such as the interior of Cave Hill and Dennison Hollow Research Natural Areas. There are few controls available or in place to stop the human or natural spread by vectors on a landscape scale. Funding for chemical control of Nepalese browntop is extremely limited and biological controls are presently unavailable. Restrictions for human spread of Nepalese browntop is unrealistic as they may require prohibition of human entry on or adjacent to National Forest lands and, hypothetically, if there were such a restriction, the animal/water vectors are uncontrollable and would eventually negate any human restriction. Design criteria for bringing equipment in to operate on National Forest lands are currently in place which requires washing equipment prior to operation for some activities.
Summary: At the present time, considering existing populations, the invasive nature of Nepalese browntop and control options available, landscape scale control of Nepalese browntop is unattainable.

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References


