



Restoration Practices of The Nature Conservancy in Minnesota

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Introduction

The Nature Conservancy (TNC) is an international, non-profit conservation organization that was established in Washington, D.C. in 1951. The Minnesota chapter was founded in 1958. The Nature Conservancy's mission statement is "to preserve plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive" (*The Nature Conservancy of Minnesota*, 1997). They pursue this mission through a variety of methods, including acquiring land to protect remnant ecosystems and restoring degraded land in strategically located areas.

Because their mission statement is so broad and the need is so large, they have to establish priorities for conservation. Their primary goal is to protect "the most critical natural habitats for plants and animals" [Emphasis theirs] ("Landscape Conservation" 1991). To determine which habitats are at greatest risk, they routinely rank species and ecosystems based on their relative rarity and the threats to their survival. Conservation strategies are developed based on these rankings. The majority of their efforts in Minnesota are focused within the three most critical ecosystems: the prairie-forest border, the northern tallgrass prairie, and the Lake Superior highlands.

Restoration in Minnesota

There is a distinction to be made in the types of restoration work that The Conservancy does in Minnesota. The more intensive restoration efforts (essentially starting over from scratch) are typically referred to within TNC as reconstructions (Fuller, 1998). In addition, they do ongoing maintenance to improve existing remnant sites. These maintenance practices do not usually involve replanting. To be consistent with the rest of the papers within this volume, I will refer to the reconstructions as restorations and will discuss the maintenance practices separately.

The Minnesota chapter of TNC has been doing maintenance on remnant sites, including some light hand-seeding, burning and exotic species removal, since around 1960. Fuller estimated that each year they burn over 3000 acres, remove exotic species from around 20 preserves, and do ongoing seeding at several preserves. They have been doing intensive restoration for a shorter period. They began restoring prairies in 1991 and planting trees in 1993 (Fuller, 1998).

The lands that are targeted for intensive restoration are typically adjacent to existing remnant plant communities. The restored areas expand and buffer the higher quality remnants. Other lands are restored in order to connect two or more high quality sites.

Most of the sites that have been restored in Minnesota are prairies. They also restore deciduous forests and savannas. They rarely do wetland restoration, but expect to begin to do more in the future. There are about 45 sites that have been restored or are slated to be restored within the next few years. Restoration sites range in size from about three acres up to 200 acres, with a combined total of around 1800 acres in Minnesota (Fuller, 1998).

TNC also does restoration work on land that they do not own. For example, there are about 100 acres that have been or will be reforested in the Maple-Basswood woodlands near Faribault, Minnesota. Although some of the reforestation is within the Trout Lily Preserve, which is owned by TNC, a lot of the restoration is occurring on public lands. Nerstrand Big Woods State Park has expanded its boundaries substantially within the past decade, and The Nature Conservancy has helped to restore a portion of that area.

How do they determine which specific lands to restore?

The Conservancy prioritizes all preserves for any action, including restoration. They have a "top ten" list of the preserves that are the highest quality and largest sites. Nine of the top ten preserves in Minnesota are prairies. These are the sites that receive the most attention. Within each preserve (the top ten and all others) they evaluate the threats (e.g. erosion, fragmentation, exotic species) and address the greatest threats first. These evaluations are very site-specific. For example, if a prairie has a serious weed problem they will deal with that first. Another priority is to create buffer zones around and corridors between high quality sites. In deciduous woodlands, the primary goals of reforestation are to minimize fragmentation, close openings and to increase the core area of existing forests (Fuller, 1998).

TNC does not typically restore wetlands. In part, this is because wetlands have not been considered high priorities. TNC does not consider them avenue for exotic species invasion, with the notable exception of reed canary grass. Fuller expects to do more wetland restoration in the future. Although they do not restore many wetlands, there have been many wetlands restored by other conservation groups in the western half of the state (Fuller, 1998).

In order to keep everything organized, TNC has an internal comprehensive plan that outlines the restoration needs of all their preserves. These needs are prioritized. The plan helps them to budget and plan for several years at once. The current plan outlines priorities through the year 2003. This plan is updated every year as well as whenever new properties are acquired (Fuller, 1998).

The kinds of practices that are encouraged

The most obvious and important principle that they adhere to in all restorations is to plant only native species. In addition, to preserve the local genotype, all seed must be collected from within thirty miles of a restoration site. "We're lucky," says Fuller, because usually there is a high-quality remnant site adjacent to each restoration site (Fuller, 1998). With few exceptions, The Conservancy collects all seed.

While most restoration sites are seeded, seedlings are planted in some of the smaller high-profile sites. Volunteers are occasionally recruited to grow prairie seedlings from locally collected seed in their own homes. These seedlings are then planted in the spring, often by the volunteers who grew them. Volunteers have also collected acorns and other tree seeds to be used in restoration sites. In 1991 and 1992 red oak, butternut and hickory seeds were collected from Nerstrand Big Woods State Park. "These seeds (were) sent to the DNR nursery for two or three years of care before being used to restore areas within the park's new boundaries" ("Volunteer Activities" 1992). The seeds collected in 1991 and 1992 were planted in 1994. Volunteers planted 9000 red oaks and 500 butternuts during the 1994 Big Woods Tree Planting Project (Falky, 1994).

TNC does not transplant seedlings or plants from existing remnant sites, yet. But Fuller expects to try this in wetland restoration projects beginning in 1999. This technique may prove to be especially helpful in agricultural lands where there are remnant wetland plant populations in open ditches (Fuller, 1998).

They try to minimize chemical applications, but they do use Roundup to control certain invasive exotic species. At times it is necessary to use more aggressive herbicides. For example, they treat leafy spurge (*Euphorbia esula*) with Tordon and use Transline or other specific herbicides on Canada thistle (*Cirsium arvense*). They have found Garlon to be more effective than Roundup on buckthorn (*Rhamnus spp.*), an especially troublesome invasive. One advantage of Garlon is that it can be used when the temperatures are below freezing (Fuller, 1998). Other methods for exotic and invasive species control include burning, mowing, girdling (e.g. aspen and buckthorn), hand weeding (this is often done by volunteers) and cutting and burning (e.g. juniper).

Most restoration seeding projects are a "one-shot" deal. Some preserves have active volunteers who will go back in after an initial seeding and plant additional species (sometimes seedlings that they have grown themselves). There are occasions where they do targeted re-planting on small sites. Usually these are the more publicly visible preserves. They have also re-seeded a couple of prairie sites that were obvious failures. All restoration sites receive on-going maintenance, such as prescribed burning.

Volunteers assist the staff with planting, seed collection and other tasks. They contract out much of the large-scale work. TNC often hires local farmers or co-ops to do site preparation. And they regularly hire Prairie Restorations, Inc. to do seeding, planting and one year of mowing. The Conservancy staff does the ongoing maintenance.

Limiting factors

While funding is "most definitely a limiting factor," the availability of local seed is an even more important limitation (Fuller, 1998). They will only collect seed from within 30 miles of a restoration site; if the adjacent remnant prairie has relatively low diversity then that limits the ultimate diversity of the restored prairie. Also, the availability of enough seed may restrict a restoration project. Sometimes they have to divide a project into several sections and seed them one at a time over several years as enough seed is harvested. The amount of available staff also limits the amount of work that can be done in a single year.

Target communities to which sites are restored

Again, because they are limited to using seed from within 30 miles, the local remnants also serve as models, in a sense. However, there are also instances when a more abstract target community serves as a model. For instance, they are currently restoring a savanna in an area where no remnant savannas remain, even of poor quality. So they are combining local prairie species with acorns from local oaks to recreate a savanna community. The final species mix will be based in part on information about pre-European settlement savanna communities from Land Survey notes.

How is success evaluated?

It takes a long time to judge the ultimate success of a restoration project. Most of TNC's prairie sites are so new that it has been difficult to determine their successfulness yet. They have been doing tree planting for only five years, so they haven't been able to determine the successfulness of these yet either. However, they are currently working on methods to evaluate restorations.

At the moment, they have rough guidelines for monitoring restoration sites. Mostly they estimate percent cover, calculate the proportion of native vs. non-native species, and do some diversity calculations. Transects and test plots have been set up in about 10 restored sites. They are monitored by TNC staff, seasonal employees, and contract botanists. So far, they have collected baseline information and in some instances data from a single field season. No evaluation has been performed on the data. TNC staff would like to do more monitoring and evaluation (Fuller 1998).

Other types of research are being performed in restored sites owned by The Conservancy. At Ordway Prairie and at Helen Allison Savanna tests have been performed by Brian Winter, Director of Preserve Stewardship. Winter "is studying the effects of fire versus girdling to see which method best controls the spread of aspen onto prairie" ("Volunteers at Work" 1992).

Ongoing studies to monitor the effects of restoration practices include one at Hole in the Mountain Prairie. Sarah Cronlund, a graduate student at the University of Minnesota, re-sampled plots during the summer of 1997 to determine effects of prescribed burns. The plots were established between 1979 and 1982 and since then the prairie has been burned on a regular basis. Her initial data showed an increase in warm season native grasses (Winter, 1997).

There have also been efforts to monitor the effects of restoration and management practices on arthropods. All of this research will be useful in evaluating the current restoration methods and will assist the Conservancy staff in making recommendations for the future. However, more rigorous and regular monitoring and evaluation does need to be done.

Analysis of program effectiveness

Because the Conservancy's restoration program is so young it is difficult to ascertain its effectiveness. The absence of monitoring and analysis of restoration sites is particularly limiting. Their maintenance programs are more easily evaluated, since they have been doing things like prescribed burns since the 1960s. However, because that was not the focus of this paper, I did not investigate these practices in enough depth to evaluate them.

One of the most important aspects of the program that is to be lauded is that they only plant native seed from sources within 30 miles of a restoration site. But there are some obvious limitations to the program's effectiveness. First of all, the fact that most restorations are one-shot deals may limit their ultimate success. It is vital to the ongoing success of a restoration to monitor and make adjustments as needed, to improve the diversity of a planting, for instance.

It is also unfortunate that The Conservancy does not do more wetland restoration. Wetland restoration has become such a hot practice in Minnesota and so many people are attempting them that it would be helpful if The Nature Conservancy were on the cutting edge instead of lagging behind. If they were to do them with scientific rigor and document and publish their successes and failures, a lot of people would benefit.

Which brings me to my final point. Without exception, the only information I was able to gather from published documents about TNC's restoration efforts in Minnesota came from their own newsletter and The Nature Conservancy's web site. Garth Fuller, Minnesota's Eastern Preserve Management Assistant, was an excellent and very helpful source for information, without whom this paper would have been far less informed. However, I believe it is important for organizations like The Nature Conservancy to document, evaluate and publish their successes and failures more widely.

References

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