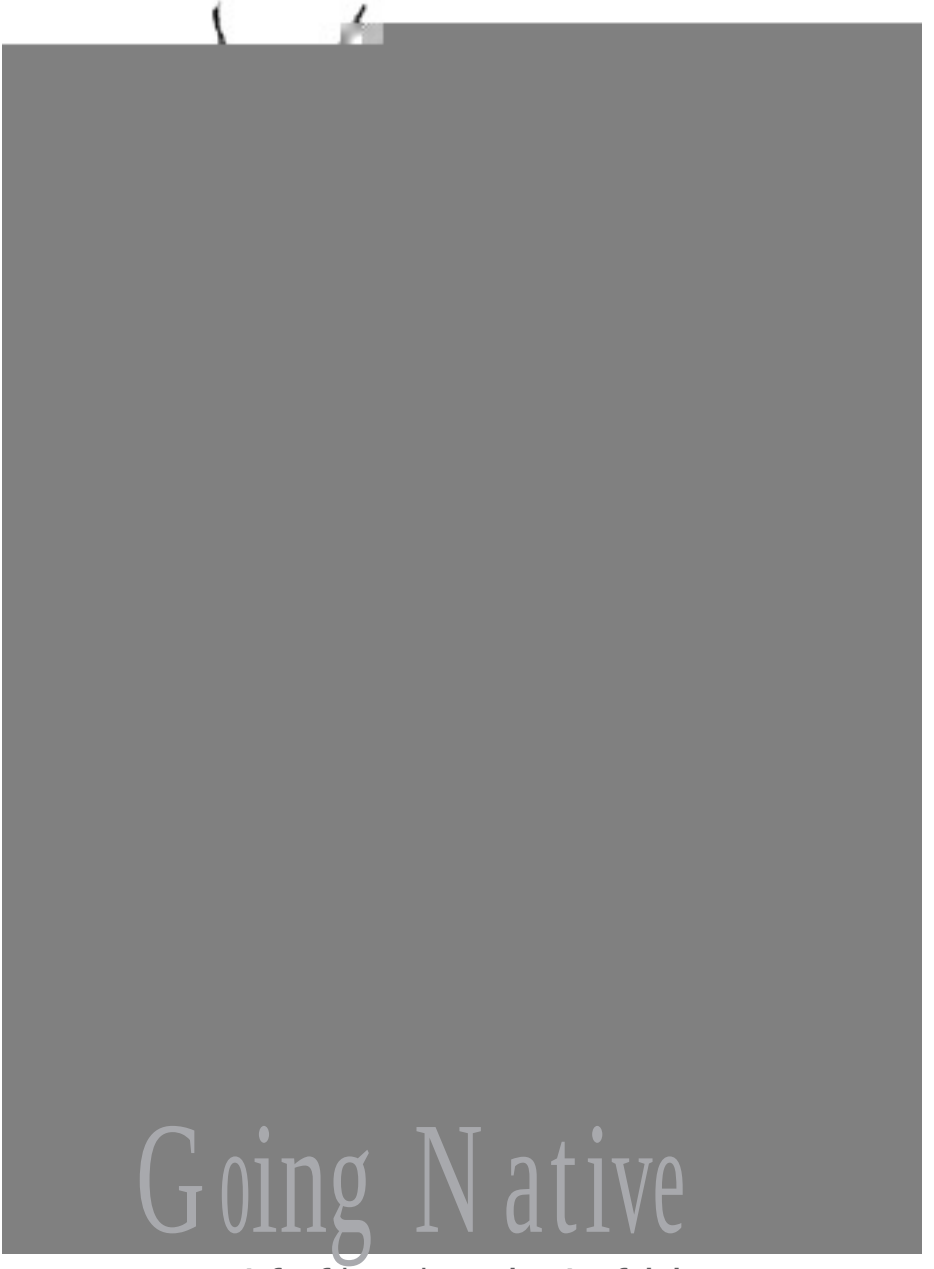

Going Native

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acknowledgements

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about this publication

This booklet is intended as a guide for Minnesota landowners interested in doing their own small (up to 20 acres) planting of a native prairie community where none remains. Once you have made the decision to establish a prairie plant community, it is important to develop a plan of action. This publication provides the specific steps you will need to consider and follow.

There is an important distinction between the meaning of "restoration" and "reconstruction," although you may hear the words used interchangeably. Prairie reconstruction or planting refers to reestablishing native plants such as prairie grasses and flowers on a site that probably grew there before being eliminated by lawns, crops, or other development.

A prairie restoration, on the other hand, refers to an existing native prairie remnant, a small piece of prairie that has never been completely eradicated, that is being managed to improve the native prairie plant community. Removing problem species, reintroducing fire, and possibly adding seed or seedlings are the management tools used to supplement existing species diversity.

Before you start digging, do take the time to do a plant survey. It could be that you already have native plants on your site which are uniquely adapted to your particular soil and microclimate. Often, a damaged remnant can be returned to a condition close to its original state by nurturing surviving plants and animals. We are promoting the use of native prairie plants and prairie reconstruction, but we want to point out that the best way to preserve native prairie (and other native communities) is to protect and enhance the remaining pieces of native habitat.

If you have a degraded prairie remnant, it may be a better choice to create an environment in which those plants will thrive, rather than to start all over with new seeds and species. This requires a different application of techniques than the ones outlined in this publication, and other resources should be consulted.

table of

Black Energy

Life is seething in this soil
which has been millions of years
in the making.
It has been forever
in the making.

A mingling of everything
which ever whistled here, leaped
or waved in the wind.
Plants and animals,
grasses of this prairie.
Buffalo and antelope grazing down
into roots and back again
into the sun.
Birds and insects, their wings still hum
in this soil.

And this swarm drinks
sunlight and rain,
and rises again and again
into corn and beans
and flesh and bone.

The quick bodies of animals and men
risen
from this black energy.

Joe Paddock
from Earth Tongues

introd

Held up against the past, the native grassland preserves on the Coteau des Prairies are so small as to be nonexistent, inconsequential as veins of northern Minnesota gold. But we do not live in the past. … So we begin the only way we are able. We begin not with what was, but with what is. And like the wind in the grasses, sometimes the next pass we make is one that mends.

Laurie Allmann, from
Far From Tame

introduction

Less than one percent now remains of the 200 million acres of grassland that blanketed the North American continent from Illinois to Manitoba to Texas. Though we can't recreate that prairie, we can restore a sense of its grandeur by fostering plants and animals native to the region.

On a large scale, fragments of native prairie are being protected from degradation and destruction by established programs and organizations like the Minnesota Department of Natural Resources' (DNR) Scientific and Natural Areas Program and The Nature Conservancy (TNC). You can support these organizations and other local or national efforts to sustain and enhance the prairie by volunteering or contributing financially.

A new approach to sustaining existing prairie links smaller isolated parcels with continuous prairie grass corridors (see figure 1). This can greatly increase the long-term sustainability and diversity of scattered remnants and plantings by providing avenues that allow plants and animals to move between sites.

On a smaller scale, landowners like you can create a prairie on a field, building site, or backyard. This is much more than a beautiful, dynamic, and low-maintenance landscaping option. This is also an opportunity to gain insights into the complex relationship between native plants and animals and the larger environment.

By planting a prairie, you are protecting the environment. An established prairie absorbs more rainfall than many other vegetative covers, and can reduce erosion and runoff, improving water quality. A mature prairie doesn't need herbicides or pesticides, and thrives without the use of fertilizers.

You are creating a place in our modern landscape for the native plants that early settlement pushed out to make way for

figure 1: A grass corridor linking two prairie remnants or plantings can help to increase plant, insect, and other animal diversity in those areas if the corridor is large enough to harbor plant species and encourage insect and other animal movement between the sites.

roads, towns, and farms. You may even be creating a small haven for some native animals and insects, especially if your prairie is near other prairie remnants, other native plantings, or grassy areas.

You are promoting ecological diversity. A study from the University of Minnesota has shown that areas with diverse plant communities supporting dozens of species are more stable during the extreme variations in weather so common in the Midwest. A lawn or farm field contains around five species, making them more susceptible to drought, pests, and disease.

Planting a prairie is an exciting and dynamic process, but it can be slow and will require a commitment of time and resources. Some native plants take three to five years to establish. When growing a prairie, patience really is a virtue.

When your prairie plants do begin to take root and blossom, you will have the pleasure and satisfaction of watching their subtle and beautiful changes through the seasons and over the years.

chapter

Examine each question in terms of what is ethically and esthetically right, as well as what is economically expedient. A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.

Aldo Leopold, from
A Sand County Almanac

one

site evaluation & project plan

groundwork

Before you pick up a shovel or buy a seed, you'll want to give some attention to your goals and budget. There may also be legal restrictions such as city codes and local ordinances at your location. Once you know what you want and what your budget allows, but before you begin planting, you will need to know the particulars of your site. Your site may have physical limitations due to past use and soil characteristics. Doing the groundwork will help to avoid frustrating and time-consuming problems later.

clarify your goals

Why are you planting a prairie? Is prairie, rather than forest, savanna, or wetland, the most appropriate community for your land? What do you want it to look like in five, 20 or 50 years? Each location is different, from a 1,000-square-foot backyard prairie, to a community landscaping project, to a 20-acre planting on an old field. It's much easier to make decisions along the way if you know where you're headed to begin with. Here are some things to consider.

aesthetics

Will you want trails, benches, prairie flower borders? Plan trails to meander through the restoration, but don't include so many that the prairie is cut up into tiny pieces. A mowed trail can also act as a firebreak, while other trail materials, like woodchips, will burn and can encourage weeds.

including wildlife

You shouldn't expect a huge migration of native birds and butterflies to a small prairie planting, but there are things that you can do to attract wildlife to your site. Specifics can be found on pages 8 and 9.

neighbors

There are a few things you can do to help your neighbors enjoy your prairie as much as you do. Although landscaping with prairie plants is widely accepted, most communities do have ordinances that regulate how tall a lawn can grow. If you live in a more urban area, or have a very visible site, consider mowing the edges of your prairie or plant a prairie flower border. This will give a visual cue that your planting is a landscaping choice, not a neglected lawn.

You may want to post signs indicating that you have planted a prairie. Some native plant nurseries sell signs, or you can make your own. Plant a border with clearly separated plants. Label the plants, and encourage people to look for them in the larger planting. Provide a bench or place to stop and enjoy the prairie.

Share your enthusiasm. You might want to offer to give a presentation at your school, church, or club. Not only will people appreciate your prairie more, they might decide to plant their own.

estimate your budget

What money and other resources do you have available to you? This will determine the size and scope of your project. Compared to a lawn, a prairie takes less money and time to maintain in the long run, but there is a substantial initial

expand it as you can afford to. You could use seed from this first section to plant other areas later. Keep in mind that a bigger prairie will harbor more diversity and be less susceptible to weed invasions, but don't let that keep you from planting a smaller one.

start with fewer species

Plant a few of the common or more easily grown grasses over the entire site at first, and add more species as time and money allow.

do some or all of your own work

If you have the time and tools, this is a great way to save money and it can also be a lot of fun.

check local ordinances

Are there any legal restrictions for plant or lawn height that would prevent a prairie planting at your site? You can get this information by calling your county or city clerk. Changes to existing restrictions or introducing new ordinances to allow native plantings may be needed in your community.

As we will discuss later in the chapter on maintenance, fire is an important tool for sustaining a prairie. Find out from your local fire department if you will be able to periodically burn your prairie, and what restrictions or permit requirements there may be.

investigate the history of your site

recent history

If you are planting into a formerly cultivated field, there may be residues of herbicides that will kill prairie wildflowers or grasses. Lawns may have been recently treated with chemicals that could harm prairie plants. If your site has been treated with chemicals, you may need to delay planting until they break down or leave the soil. Your University Extension Service can provide more specific guidelines on the effects of selected herbicides.

Identify any areas that may need special attention, such as an old road that might be very compacted, or areas with tree stumps, old fences, or large rocks that could damage farm equipment.

biological history

If your site is vegetated, determine if it is an old field or pasture, previously cultivated or never plowed. Find out what was growing in your area before European settlement.

There are many kinds of native prairie, differing according to topography, soil and region of the state. Lists of plants commonly found in particular types of prairie have been compiled. Some of these sources are listed in appendix a. Appendix b in this publication is a province map, which shows the basic ecological zones in Minnesota.

Visit a prairie preserve to see what a native prairie looks like. *A Guide to Minnesota's Scientific and Natural Areas* is available from the Minnesota DNR. The Nature Conservancy also prints a guide to their preserves. Contact your local DNR office to find out which state parks or wildlife management areas contain native prairies. Appendix a lists these and other organizations that can identify protected native prairies in your area.

get to know your soil

Dry, mesic (having moderate moisture levels), and wet prairies each sustain different plant communities. By getting to know your soil's type, drainage, and pH you will be able to make better seed selection and planting decisions. The slope and aspect of the land will also be significant.

It's a good idea to test your soil for composition and nutrients. Keep in mind that you may have different types of soil on one site. Your University Extension Service offers inexpensive soil testing kits along with good advice about how to use them. Local labs and farm cooperatives can also process soil samples.

soil types

There are many different soil types, but they can be generalized into three basic categories: sand, silt, and clay. You will

generally find a combination of these categories, with about five percent organic matter from decomposing plants and, if you have healthy soil, lots of living organisms mixed in.

Sandy soil feels gritty and doesn't stick to your hands when it's wet. Silt feels like flour. Wet silty soil tends to stick to your hands. Clay has a smooth texture, and sticks to itself and your hands when it's wet. Loam refers to a mixture of these categories.

Note the presence or absence of rock or gravel in your soil. Certain native plants are adapted to those conditions.

drainage

Sandy soils tend to be drier, because they don't hold water.

Extension Service.) This will tell you if you have acidic or alkaline (limey) soil. The pH is measured on a scale from 1 to 14, with 1 being acid and 14 alkaline. Most plants do best with soil that has a neutral pH, between 6 and 7.5, because that is when the nutrients are most readily available to the plant.

Typically, it's not necessary to change the pH of your soil. If your soil doesn't have a neutral pH, that may be its normal condition. You can select plants that are adapted to acidic soils or soils high in lime.

If you want or need to amend your soil to change the pH, ask your University Extension Service about the long-term effects on the soil, plant establishment and survival, time commitment, and costs.

slope and sun

Prairies need six to 10 hours of sun a day. If you have shady areas, plan to plant them with native savanna or woodland species to complement your prairie.

Slope and aspect will affect both available sunlight and drainage. Hilltops and steep slopes will tend to be drier than depressions and valleys, no matter what soil type. South and west facing slopes will be hotter and drier, east facing slopes will generally have more moderate conditions, and slopes facing north will be cooler and wetter.

the plan

Once you have figured out why you want a prairie, what your goals are, and your site's particular characteristics, you can plan the layout, appropriate methods of site preparation, seed selection, and long-term maintenance. Here are some tips as you develop your plan.

write it down

While you might remember when you should call the contractor, when you were supposed to cultivate your site, which seeds you ordered, where and when you planted them, which section of prairie you burned last year, and where that pesky patch of sweet clover showed up, chances are you won't.

Planting a prairie, even a small one, is an involved undertaking. Developing a written plan, and then keeping a written record of your or your contractor's activities can become a very useful tool. It can be as simple as writing notes on your calendar or in a small notebook.

Write out a schedule to make sure that everything is in place as you need it. For an example, refer to appendices d and e.

While writing down important dates, activities, and seeding rates is important, many people find that keeping a prairie journal is a fun and interesting way to keep track of changes as the site matures. You can include photographs, notes about wildlife, dates that plants bloom, even pressed flowers.

map your site

Draw a map of your proposed site, like the one in appendix c. For larger sites, topographical maps and aerial photographs of your site would work well—ask your University Extension Service if they are available for your area.

If your map is to scale you will have a much easier time

seed and how much you'll need, and what method of maintenance—burning or mowing—you will use. The following paragraphs discuss some additional issues you will need to resolve to complete your plan.

hiring a contractor

If you plan to plant a tract larger than five to 10 acres, it is advisable to consult professional contractors with experience planting native prairies. Their access to large and specialized equipment make them better able to manage a large site. Even on smaller sites, contractors are a good choice if you don't have the time, equipment, or inclination to do the work yourself.

Here are a few tips to encourage wildlife on your prairie:

- Plant and maintain high quality food plants. Attempt to plant so that some species are blooming throughout the growing season to provide nectar, pollen, and seeds.
- Provide a small pond or low, shallow bird bath for birds, mammals, and amphibians. Birdbaths should be cleaned every three days to minimize the spread of disease. Butterflies can't drink from open water, and need a moist, sandy spot to drink from.
- Don't burn the entire planting in a single year. Mow or burn your prairie in sections, and vary the timing from early to late, spring to fall. This promotes diversity, leaves winter cover, provides refuge for wildlife, and allows seed development for food and plant propagation.
- If you have a choice, locate your prairie near other prairie sites and/or adjacent to grassy areas. Your planting will entice birds or butterflies living nearby with additional food and nesting areas.
- Minimize or eliminate herbicide and pesticide use on the rest of your property, because they can enter the food chain and harm wild animals and insects.

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chapter

There might be as many as thirty million species of insects…rapidly disappearing. The current extinction rate is four hundred times that of the recent geologic past and climbing. It is an odd irony that the places we call empty should retain some memory of the diversity of life, while the places we have filled up grow emptier and emptier.

Paul Gruchow from
The Necessity of Empty Places

planting considerations

timing

Decide whether you will plant in the spring or the fall. There are advantages and disadvantages to both. The best time to plant prairie seed in Minnesota is late May to mid-July. If you plant too early in the spring, especially in northern Minnesota, you risk freezing newly germinated seed. Planting in late spring or early summer increases the chance of sufficient rainfall and reduces competition with fast-growing cool-season weeds. (You will have cultivated, applied herbicide, or mowed them down, depending on your site preparation method.) Prairie seeds, which germinate best in warmer temperatures, will do well planted later. Unless there is a feasible way to water your site, don't plant after July 15 or you risk not getting enough rainfall for good germination.

good choice for interseeding forbs into a grass stand and augmenting a prairie remnant. Seed broadcast on frozen ground, or any broadcast seed that is exposed on the soil surface, is more susceptible to being eaten by birds and rodents.

mosaic planting

If your site has varied conditions, such as a sunny hill and a wet bottomland, you should consider a mosaic planting. With this method, you plant each area with species that fit those specific conditions. While it takes a little more time and planning to customize your seed mix this way, your plants will do better and you'll have a more diverse prairie.

planting methods

There are two methods for planting: drill and broadcast. Both have advantages and disadvantages. Equipment for both methods must be carefully calibrated to achieve the desired planting rates. Check regularly while planting to make sure that seeding rates are appropriate.

The two most important factors in successful seed germination are seed to soil contact and sufficient water. Good seed to soil contact is achieved by starting with a smooth, firm seedbed (described on page 23), and by packing the soil after seeding, which is discussed below. We'll talk about water later in this chapter.

native-seed drill

Many brands of native-seed drill are available, including Truax, Nesbit, Tye, and Great Plains. The native-seed drill is adapted to accommodate different shapes and sizes of seeds that have different seeding requirements. It has a series of small plows or disks that open a furrow for the seed and meter out specific amounts of seed. The seed is then covered by soil and packed down by rubber rollers, ensuring good soil to seed contact. Several different sizes are available for pulling behind tractors and ATVs.

The native-seed drill is a good choice for no-till seeding,

spring planting, and planting on a windy day. The drill is also the best choice for large plantings when you have a limited amount of seed and require very even coverage.

Drills can be rented or borrowed, but you may have problems scheduling for optimum planting, since everyone else wants the equipment at the same time.

Native-seed drills require very clean seed. Even small amounts of straw will clog the machine, and you will have to stop frequently to clean it out.

The drill plants in parallel rows, and the visual effect can remain apparent for some time. This is an aesthetic consideration, not a functional one.

how to drill

The drill requires a firm seedbed. Seeding should be done immediately following roller packing or cultipacking. A special no-till drill is used to plant into dead sod or stubble, and doesn't require seedbed preparation.

Seed should be planted no deeper than one-half inch in clay, silt, or loam soils, and three-quarters of an inch in sandy soils. Calibrate the drill so that the desired planting rate is achieved.

broadcasting

Broadcasting, as the name suggests, is simply spreading the seed by hand or mechanically on the soil surface. This is followed by lightly incorporating the seed and packing the seedbed to achieve good contact between seed and soil. Be careful of the two most common mistakes while broadcasting: spreading seed too thickly and not making good soil to seed contact.

Broadcasting has the advantages of requiring no special equipment and creating a less structured look than seeds planted in rows by a drill. Truck and tractor-pulled agricultural broadcasters are commonly available. Small ATV-mounted broadcast seeders are also on the market. Some native-seed broadcasters, such as the Vicon, are adapted to spread mixes of different sized seeds more evenly and work well with bulk or mixed prairie seed.

Another advantage of broadcasting is that the seed doesn't need to be clean. In fact, uncleaned bulk seed or seed mixed with some sand or other organic inert carrier is preferable because it minimizes clogging in the equipment and spreads seed more evenly.

Broadcasting can also be used for seeding into mowed or burned cover crops.

Hand broadcasting is the best choice for small sites, but big sites can readily be hand broadcast with a few volunteers. It takes 10 people about three hours to hand broadcast 40 acres. One person can seed an acre in about 45 minutes. Hand broadcasting or small ATV-mounted broadcasters are good choices for more complicated mosaic plantings or plantings in areas that are too wet to support heavy machinery. You can also use hand-held cyclone seeders and small fertilizer spreaders, which are inexpensive and can be found at most hardware stores. Depending on the type of seed you're using, they may clog up. They work best with heavier, smoother seeds.

how to broadcast

Broadcast seed on a prepared, firm, smooth seedbed. Don't broadcast seed on a windy day.

Cleaned seed may need to be mixed with one to four parts of an inert carrier. Very small seeds such as gentians should be handled separately, because they'll settle to the bottom of your bucket or seeder and result in uneven coverage.

Make two passes at right angles to each other to get a more even covering of seed. It's better to spread the seed too lightly and have to make an extra pass than to sow too heavily and run out of seed. Practice hand broadcasting by spreading about a cup of uncleaned seed or seed/carrier mix over a 10-by-10-foot area. A good rule of thumb for broadcasting is 40 seeds per square foot.

If you're doing a mosaic planting, the edges of mosaic pieces should overlap.

Incorporate the seed using a long-handled garden cultivator or a rake on small areas, or lightly harrowing for larger areas. The rule of thumb is to cover the seed with soil twice as deep as the thickness of the seed. Seed shouldn't be buried deeper than one-half inch.

After you've incorporated the seed, firm the planted seedbed to ensure good seed to soil contact. Use a hand-pushed water-filled roller over a small planting. Tires or any other heavy, rollable object will also work, or you can simply walk over the entire area. Firm larger areas with a roller or cultipacker.

nurse crops

A nurse crop is an annual species that germinates quickly, planted with prairie seed to suppress annual weeds and reduce soil erosion from wind and water. A nurse crop can also reduce prairie seed loss, especially in fall plantings. Nurse crops are generally drilled, even over broadcast prairie seed. Oats, wheat, and annual rye make good nurse crops.

For fall seeding in mid to late September, plant 96 to 128 pounds per acre of oats or wheat, 15 to 20 pounds per acre for

annual rye. Spring seeding rates, in mid to late July, are 20 to 64 pounds per acre for oats or wheat. Annual rye spring seeding rate is five pounds per acre, flax should be planted at 10 pounds per acre.

planting seedlings

Although planting seedlings is a quick way to see results, it is expensive and time consuming, so it's not usually used as a method for establishing prairie. You may want to plant nursery-grown seedlings in a border garden or as specimen plants in small plantings. Regardless of your prairie's size, after a few years when your planting is more established you may want to plant seedlings to increase the amount of flowering plants or to incorporate some species that are rare or hard to germinate from seed.

don't use fertilizers

Prairie plants don't need additional nitrogen and weeds love it, so don't fertilize your prairie planting. Talk to your prairie seed supplier about innoculants (microorganisms) that can be added to improve plant growth.

If your soil is particularly high in nitrogen (you should know this from your soil samples), you may want to consider incorporating organic matter, like straw, into the soil while you cultivate to reduce nitrogen available to weed seeds. Make sure the organic matter doesn't contain herbicides or grass and weed seeds. Contact your local University Extension Service for more information.

watering

While most prairie plants are drought resistant, prairie *seedlings* are susceptible to drought. An entire prairie planting could be lost due to insufficient moisture at critical times in the growth cycle. While it doesn't make sense to worry too much about the weather, it does make sense to research your area's average rainfall. Especially for large sites that can't be watered or irrigated, plant when you're most likely to get sufficient rain, generally before July 15 in most parts of Minnesota.

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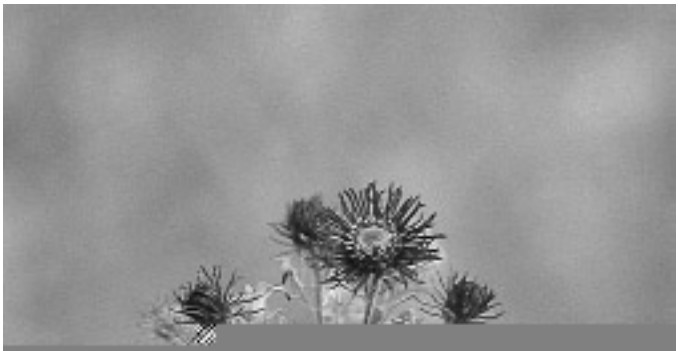
your first-grade teacher



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useful literature and publications

Ecological Restoration published by the Society for Ecological Restoration. Members receive the journal, which is a nationally-recognized academic publication, but also a good read for those interested in restoration. For subscription and membership information, contact SER, University of Wisconsin-Madison Arboretum, 1207 Seminole Highway, Madison, WI 53711, (608) 262-9547, web site ser@macc.wisc.edu or www.ser.org

Grow Plants Native to Minnesota brochure, Minnesota Department of Natural Resources, St. Paul. This leaflet has an excellent bibliography, and is a highly recommended addition to your planting resources. Call the DNR Information Center (numbers follow) for a copy.

A Guide to Minnesota's Scientific and Natural Areas, Minnesota DNR, second edition, illustrated, 1999. Available from the DNR Gift Shop at (651) 228-9165 or the Minnesota Book Store at (651) 297-3000 or (800) 657-3757.

How to Manage Small Prairie Fires, by Wayne R. Pauly, Dane County Park Commission, Madison, WI, 1982. An invaluable guide for carrying out a prescribed burn. To order, call the Minnesota Department of Natural Resources Scientific and Natural Areas Program (numbers follow).

Valley of Grass: Tallgrass Prairie and Parkland of the Red River Region, by Kim Alan Chapman, Adelheid Fischer, and Mary Kinsella Ziegenhagen, North Star Press of St. Cloud, 1998. This Nature Conservancy publication, which won a Minnesota Book Award, documents the natural legacy of the Red River Valley with sound science accompanied by stories told by the people who live there. To order, call (612) 331-1759.

Wild and Beautiful: A Guide to the Native Wildflowers of Southeastern Minnesota, includes a map and information about finding wildflowers in their native habitat. Call the Institute for the Development of Educational Alternatives, (800) 828-1231.

Wisconsin Manual of Control Recommendations for Ecologically Invasive Plants, edited by Randy Hoffman and Kelly Kearns, Bureau of Endangered Resources, Wisconsin DNR, 1997, PO Box 7921, Madison, WI 53703. Steps to control many problem weeds.

helpful organizations

Great River Greening

A nonprofit, Twin Cities metro-based organization whose purpose is to help communities restore, manage and learn about their natural environment through volunteer involvement. For more information, call (651) 665-9500.

Laq Qui Parle Prairie Preservation Group

A grassroots organization educating landowners in western Minnesota to recognize and manage prairie, and explore ways to make prairie an economically vital component of farming. For more information, contact Lynn Lokken at (320) 269-2105.

Minnesota Department of Natural Resources

Information Center. Toll-free (888) 646-6367, or (651) 296-6157 in the metro area; TTY (800) 657-3929 or (651) 296-5484 in the metro area; website at www.dnr.state.mn.us

Minnesota County Biological Survey. Identifies high quality natural communities and rare plant occurrences. (651) 296-9782.

Natural Heritage and Non-game Wildlife Program. Maintains a database of known locations of rare species and natural communities of Minnesota. (651) 296-8324.

Neighborhood Wilds Program (NWP). NWP promotes stewardship among groups of private homeowners in order to protect and restore the ecological value of communities and nearby natural areas. Metro region only. (651)772-7574.

Oak Savanna Landscape Project, Minnesota DNR. Working to restore or preserve native ecosystems in nine southeastern Minnesota counties. Call to find out if you are in the targeted area. Cynthia Osmundson, (507) 444-2424 or cynthia.osmundson@dnr.state.mn.us

Roadsides for Wildlife Program. Works with private landowners, public parks and highway departments to promote the use of native plants along roads. (507) 359-6036 or 261 Hwy. 15 S, New Ulm, MN 56073-8915.

Scientific and Natural Areas Program (SNA). The SNA program preserves natural features and rare resources of exceptional scientific and educational value, and provides public access to these rare and endangered features in their natural communities. St. Paul: (651) 297-2357. SNA Prairie Biologist, Fergus Falls, MN: (218) 739-7497.

The Nature Conservancy of Minnesota

The Nature Conservancy in an international organization committed to preserving plants, animals, and natural communities that represent the diversity of life on earth by protecting the lands and waters they need to survive. Field trips are available to some preserves, preserve guide available. Minneapolis office: (612) 331-0750 or www.tnc.org.

Minnesota Native Plant Society

Guest speakers, monthly meetings, and quarterly newsletter. They've got a great web site. 220 Biological Sciences Center, 1445 Gortner Ave., St. Paul, MN 55108. www.stolaf.edu/depts/biology/mnps

Minnesota Native Wildflower/Grass Producers Association

Promotes diversity, quality, and availability of native plant species. Member listing and brochure available. Rt. 3, PO Box 163, Winona, MN 55987.

The Minnesota Landscape Arboretum

In Chanhassen, Minnesota, the arboretum includes a 20-acre prairie planting. Membership and educational opportunities. (612) 443-2460.

Northern Tallgrass Prairie National Wildlife Refuge, U.S. Fish and Wildlife Service

This ambitious project plans to permanently protect, enhance, and restore 77,000 acres of tallgrass prairie remnants in western Minnesota and northwest Iowa with participation from private landowners and other organizations. For more information, call the Big Stone National Wildlife Refuge at (320) 273-2191. For information about the Big Stone refuge, call (800) 344-WILD. You can also call your local U.S. Fish and Wildlife office.

Prairie Enthusiasts of Central Wisconsin

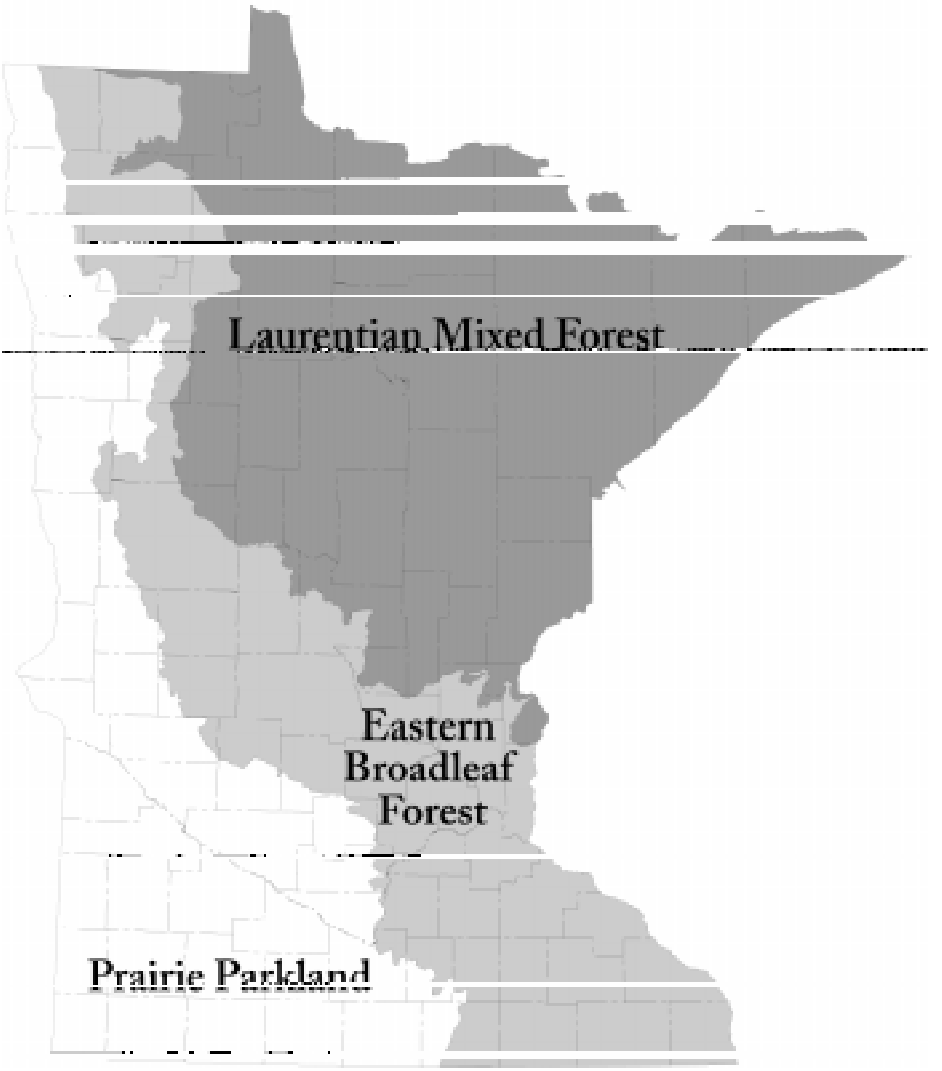
Offers burn workshops and other events. Active volunteer organization with chapters in Wisconsin, Minnesota, and Iowa. Contact Alice Mirk, 10052 CTH C, Woodman, WI 53827, or log on to www.prairie.pressenter.com.

Prairie Smoke

Volunteer organization that promotes prairie restoration and reconstruction on private lands. PO Box 392, Chatfield, MN 55923.

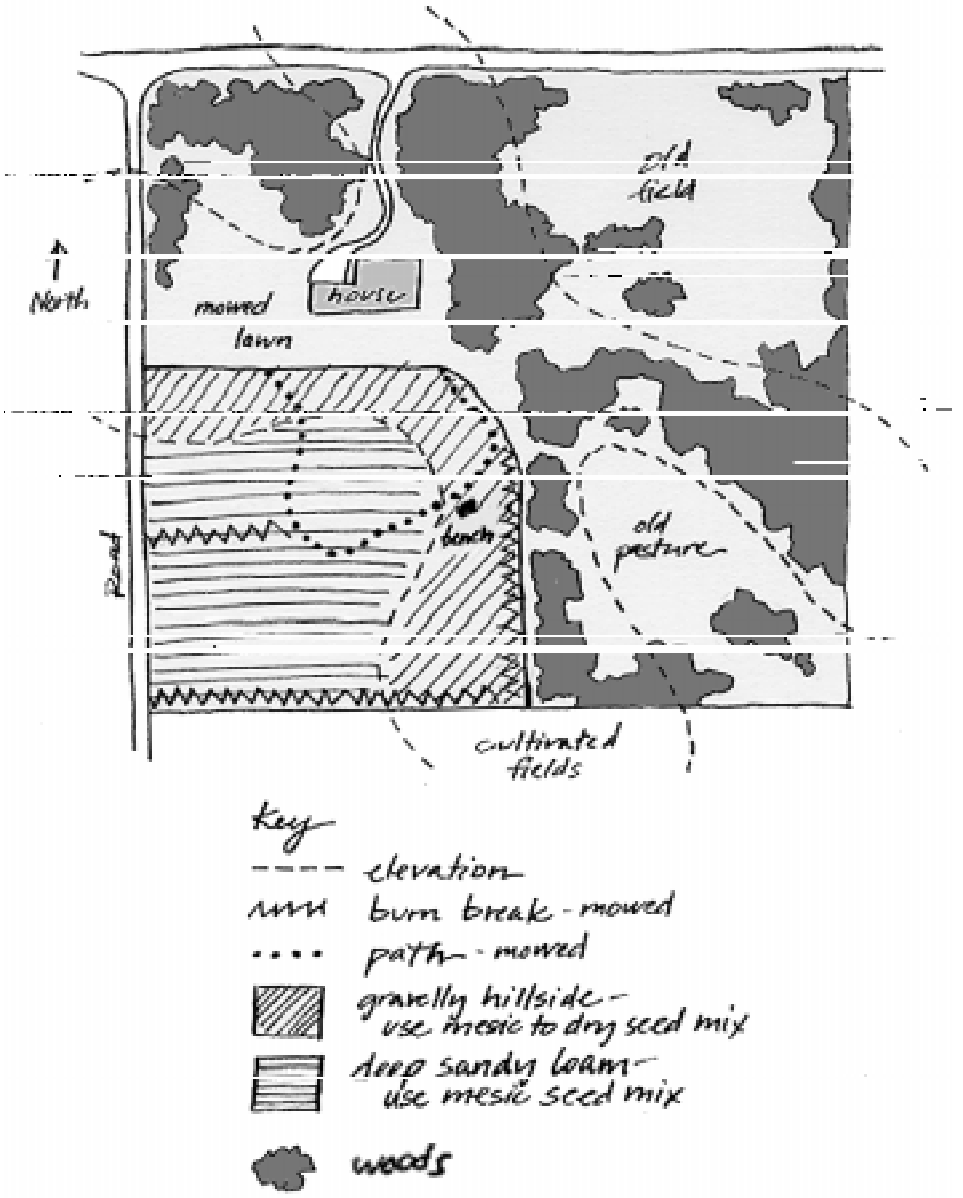
appendix b

province map of Minnesota's ecological classification system



appendix c

sample map of the "New Farm" prairie planting



appendix d

sample prairie planting plan for southwest 12 acres at "New Farm"

general overview and desired results

We'll plant the 12-acre field in native prairie vegetation, with a balance of grass and flowers. The field was last plowed 15 years ago and now has a solid cover of exotic grasses and weeds.

The flat bottom area will be planted with species that do well with moderate moisture levels (mesic). The hillsides will be planted with species that are better suited to drier conditions.

We'll buy our seed from Prairies-Are-Us in Big Bluestem, Minnesota. They will do herbicide spraying and planting.

Harold, the former owner of our land who still farms the fields adjacent to us, is willing to do some of the fieldwork to prepare for planting, and some of the follow-up maintenance mowing.

There are some small trees and stumps, and part of an old fence on the east end of the field to watch out for.

We want an expanse of prairie plants to look at off the back deck of the house, with nice trails and a bench. We hope we'll see a lot of butterflies. In about five years, we want to expand the restoration to the adjacent old pasture, cutting some of the trees but keeping all of the bur oaks.

yearly outline of tasks

Year One (1998)

A. Site Preparation

1.-Remove old fence posts, small trees, and stumps in fall 1997.

2.-Mow the field to six inches in June 1998.

3.-Allow vegetation to regrow to 10 to 12 inches, then treat with glyphosate according to directions.

4.-Implement a controlled burn, with the assistance of

Prairies-Are-Us, using appropriate procedures, equipment, and permits.

B.Seed and Seeding

1.-Buy local seed in August 1998.

Year Two (1999)

A. Site Preparation

1.-Re-spray with glyphosate where regrowth occurs when it reaches 10 to 12 inches.

2.-Allow the herbicide to work for at least seven days before disturbing the vegetation with other procedures.

3.-Disk or cultivate the soil to four inches.

4.-Harrow to create a smooth, firm seedbed. Pack if needed.

B. Seed and Seeding

1.-Plant in May (July 15 at the very latest).

C. Maintenance

1.-When first year growth gets 10 to 12 inches tall, mow to four or five inches.

2.-Keep the vegetation at six to eight inches by mowing one to three more times.

Year Three (2000)

1.-Flag location of path and bench area (see map).

2.-Mow the path and install bench.

3.-Mow second year growth 10 to 12 inches high, above the tops of the native seedlings.

4.-Mow again only if needed.

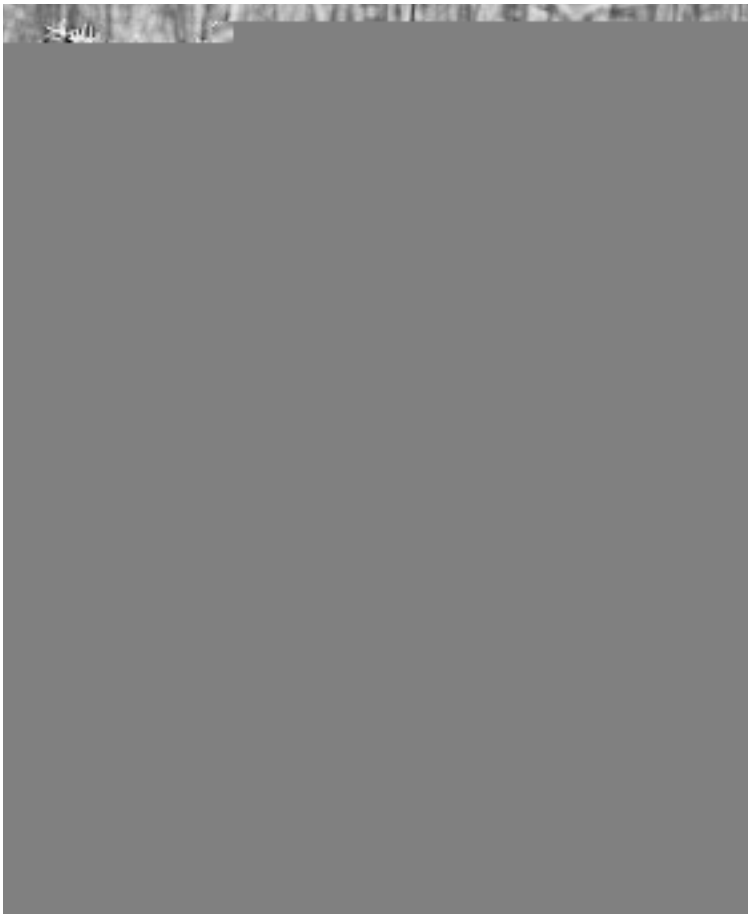
5.-Mow 10- to 15-foot-wide burn breaks (see map).

Year Four (2001)

1.-Burn the three northwest acres between late April and mid-May to set back the cool-season exotic grasses. Don't forget to move the bench! Burn the other sections over the next two years, then repeat the cycle.

appendix e

sample planning chart



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